Belgacom Regulatory Cost Model 2013

General Description

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1 General description

REG (Group Regulatory Affairs) department ensures the preparation of separated accounts and sets up the Cost model inherent to the reporting of separated accounts, and used in other regulatory files. In accordance with European Commission recommendations, the entire costs of statutory accounts are taken into account in the cost model and reporting of separated accounts, to the exception of statutory accounts 65 to 68, as well as some other accounts excluded from the cost model perimeter. As said, the cost basis of the cost model is directly issued from the general accounting of Belgacom SA, as recorded in SAP accounting tool. Statutory accounts of Belgacom SA have been audited in 2014 by Deloitte, external auditors. Deloitte auditors issued an unqualified opinion on statutory accounts.

Separated accounts result from allocation flows of Network/IT and SRW (Support, Retail and Wholesale) costs, as included in the general accounting of Belgacom SA, as well as the cost of capital of these two modules.

The following chart illustrates the accounting system of costs, as well as main allocation flows. The whole costs included in the allocation process are loaded in a tool (INCA Software) that runs accuracy tests and prevents double costs counting or multiple allocations.

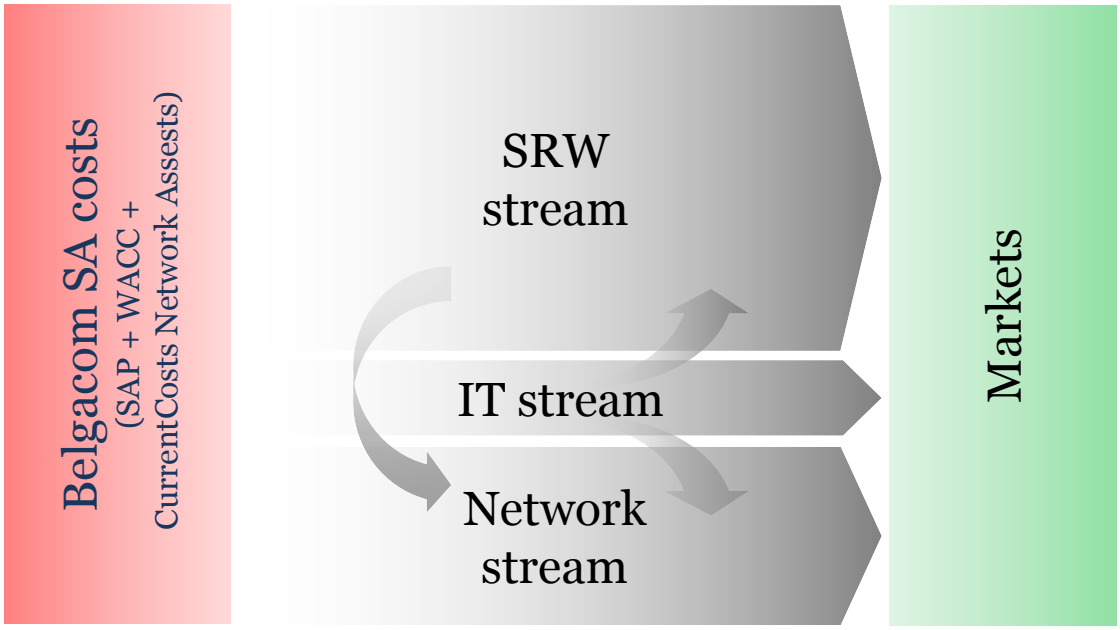


Figure 1

SRW allocation flows include retail costs, and other direct and indirect costs that are not included in the Network nor IT allocation flows.

Network and IT flows include all the costs related to the Network and Information & Communication technology.

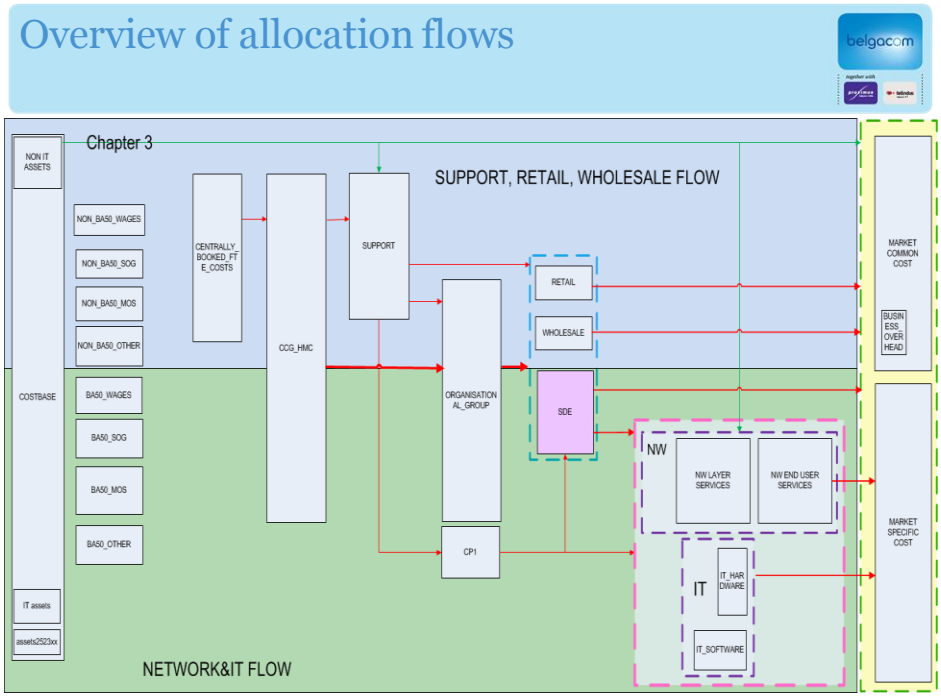
Costs allocated in allocations flows SRW, Network and IT have the same cost basis origin, this latter being SAP statutory accounts of Belgacom SA. IT tool INCA of the cost model makes validity checks to prevent any double counting and trace allocated costs from their unique SAP cost basis origin to their final destination.

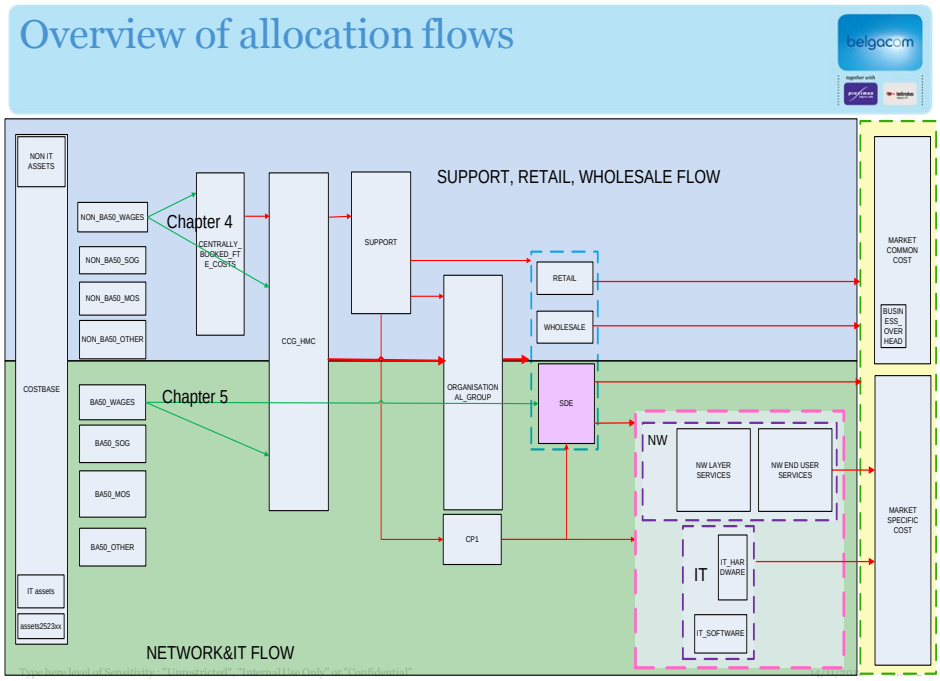
The Cost model per Market is a top-down model.

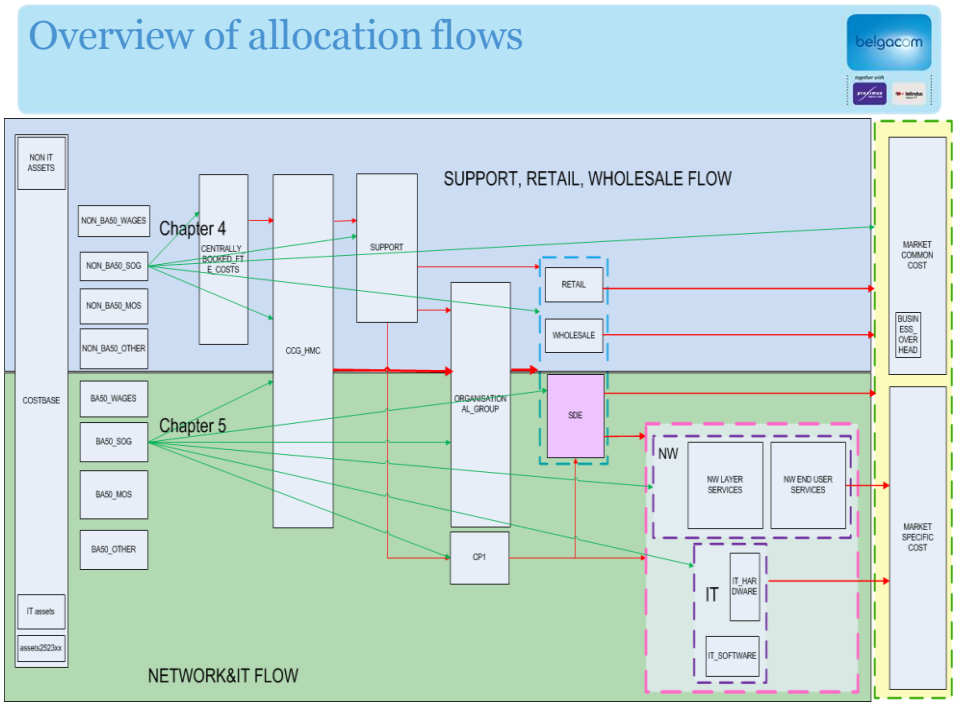
2 Model Allocation Structure

This section provides with a global view on the allocation structure of the model by walking through the major allocation flows and introducing the major building blocks and concepts in the model.

The following Figures will be the supporting tools for such discovery walk, where the major modules constituting the model as well as the global allocation flows among them are shown. The differentiation between SRW , IT and Network flows is also illustrated in the exhibit.




Overview of allocation flows
belgacom
NON IT ASSETS
NON_BA50_WAGES
NON_BA50_SOG
NON_BA50_MOS
NON_BA50_OTHER
Chapter 4
CENTRALLY BOOKED_FTE_COSTS
CCG_HMC
SUPPORT
SUPPORT, RETAIL, WHOLESALE FLOW
RETAIL
WHOLESALE
SDE
ORGANISATIONAL_GROUP
CP1
COSTBASE
BA50_WAGES
BA50_SOG
BA50_MOS
BA50_OTHER
Chapter 5
IT assets
assets2523xx
NETWORK&IT FLOW
NW
NW LAYER SERVICES
NW END USER SERVICES
IT
IT_HARDWARE
IT_SOFTWARE
MARKET COMMON COST
BUSINESS_OVERHEAD
MARKET SPECIFIC COST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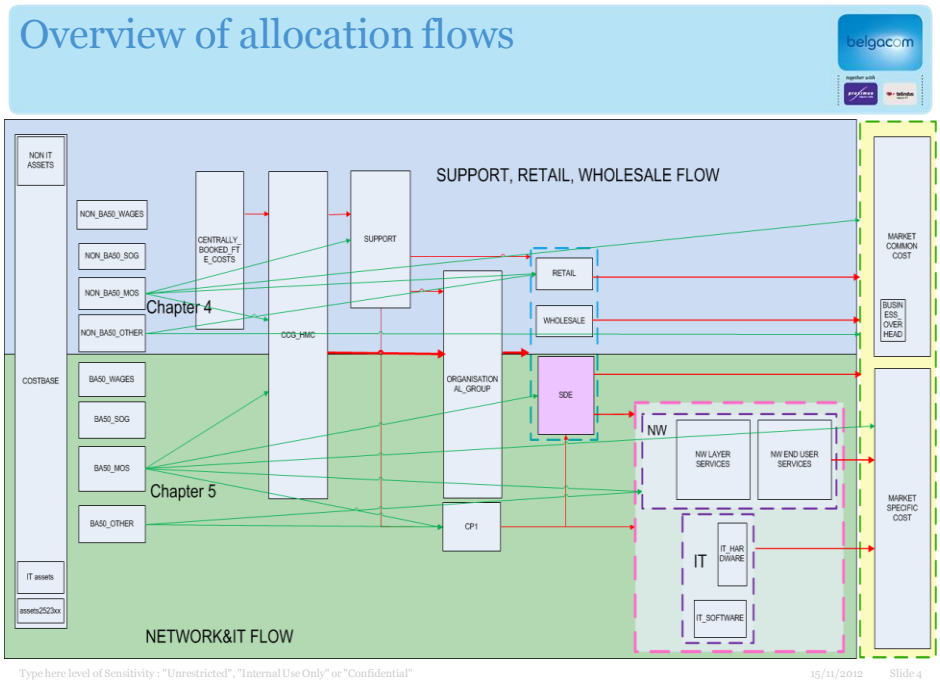
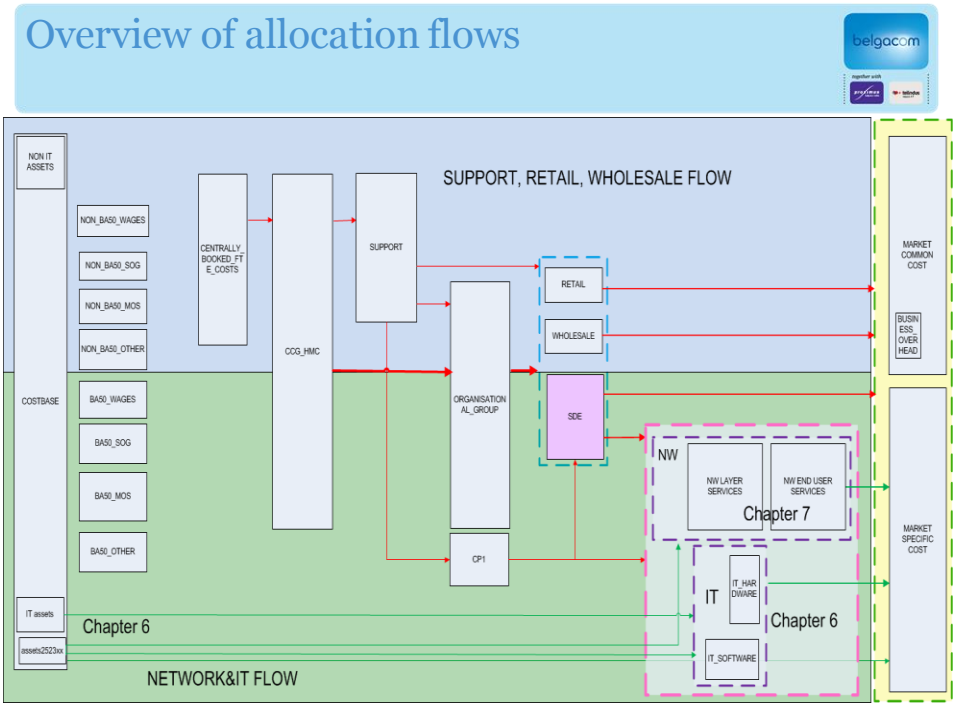
BUSINESS_OVERHEAD
MARKET SPECIFIC COST





The overall objective of the model is allocating all the attributable costs present in the cost base to the markets as defined in the regulatory framework.

Therefore, the cost base constitutes the foundation of the model.

Further, the model allocation process can be subdivided into three main streams, SRW, IT and Network.

The SRW stream has as objective to allocate all costs that are not part of the Network or IT model towards the markets.

The IT and Network streams, although having completely separated CAPEX basis, both share a common OPEX source.

Once this has been discussed (chapter 5), the IT stream (chapter 6) and Network stream (chapter 7) can be dealt with independently.

3 Cost Base

3.1 Cost model perimeter

3.1.1 Determination of the Cost model perimeter

Costs included in the Cost model are operating charges, i.e. general ledger (GL) accounts 60 to 64 of statutory accounting, as well as part of GL 69.

GL 60 "cost of goods sold" includes mainly telecom equipment purchases (ADSL modem, handsets, cables, mobile SIM cards, etc.), small equipment (cpe, …) and stocks movements.

GL 61 « services and other goods » includes primarily costs linked to traffic (a.o. interconnection fees) and operating expenses such as maintenance, utilities, renting, marketing, representation allowances, consultancy, travel fees, etc.

GL 62 corresponds to all personnel costs (wages and other salary benefits).

GL 63 includes depreciation and amortization, stocks and trade receivable accruals for write-off and movements of provisions for liabilities.

GL 64 gathers other operating expenses, including a.o. write-off on trade receivables, immovable withholding tax and local taxes, taxes on pylons, etc.

GL 69 relates to company result appropriation corresponding to the part of personnel in the profit (collective bonus).

At last, GL 72 – « Produced Fixed assets » reduces the cost basis to cancel costs linked to produced fixed assets and to avoid a double counting of these costs with the corresponding depreciation charge.

To the costs perimeter from the general accounting is added the weighted average cost of capital (WACC) of 9,61% for Belgacom Fix products and 10,05% for Belgacom Mobile products.

In 2013, materiality of costs included in the model (excluding WACC that does not come from general accounting) is as follows:

Table 1. Materiality of costs included in the Cost model perimeter (in EUR and in % of total costs).

[CONFIDENTIAL]

However in the Cost Base we have almost 9.000 lines with "zeros" or with "almost zeros" within a same CCG_CP combination (coming from transfers between GL accounts). The total amount of these lines is 4 EUR. For practical reasons these lines will not be loaded up in the model tool INCA.

Consequently the total cost included in the model is **[CONFIDENTIAL]** EUR.

To the Cost model perimeter from general accounting, a weighted average cost of capital (WACC) of 9,61% on Fixed products and of 10,05% on Mobile products is added, or [confidential] MEUR.

Hence, the total cost basis handled as the source costs of the Cost model 2013 amounts to [confidential] MEUR in 2013, at historical costs ([confidential]).

Following last adjustments to switch from historical costs to current costs done for the Network costs (+[confidential] MEUR), we reach a total Cost basis, being the Cost model source costs (cost accounting and separated accounts), of around [confidential] MEUR in current costs.

3.1.2 Costs excluded from the Cost model perimeter

Other costs than those mentioned above are excluded from the Cost model. It relates to GL 65 to 69 of general accounting, to the exception mentioned above, for part of GL 69 (share of personnel in profit).

Some costs are excluded since considered as having no causal link to the products and activities. This matters for extraordinary costs (GL 66) and tax costs (GL 67 and 68).

Other costs are excluded since already included in the WACC. This relates to financial costs (GL65) and dividends appropriation (GL 69).

Costs excluded mentioned here above are costs excluded from the Cost model upstream (i.e., when defining Cost model perimeter with costs included in general accounting). On top of these ones, other costs will be excluded downstream in the Cost model, i.e. costs excluded via the allocation flow. E.g.: Support costs involving affiliates.

For the year 2013, materiality of the costs excluded is the following:

Table 2. Materiality of costs excluded from the Cost model perimeter (in EUR and in % of total costs)

[CONFIDENTIAL]

3.2 Cost regrouping

Belgacom books the costs on one hand, on a general ledger account defined in general accounting, and on another hand, on a cost center defined in reporting and analytics accounting. This way to handle costs has for objective to gather data, in order to simplify data processing.

Two types of aggregation are done:

- Aggregation of 690 GL of general accounting in 200 Cost pools (CP)
- Aggregation of 546 cost centers in 271 Cost Centers Groups (CCG).

A **Cost pool** is a group of costs with similar characteristics and issued from the same family of cost natures.

Regarding material resources, gathering of costs is based on the similar function that these costs have. E.g., cost pool "Training expenses" sums up costs of trainings organized inside Belgacom, external trainings, training books and documentation costs.

Regarding human resources (referred as FTE, or Full Time Equivalent), cost pools gather workers with the same profile. E.g., cost pool "Level S" includes wages and salaries of employees with level S (Sales force), as well as premiums and other wages benefits paid to these employees.

Costs included in the same cost pool have an identical causal link to the products and activities to which they related. They have the same "resource driver".

A **Cost Center Group (CCG)** sums up cost centers with similar characteristics and realizing similar activities. E.g., cost center representing a particular point of sales (e.g. point of sales of Region of Wavre) will be added with all the other particular (to another geographical region) points of sales. They all realize the same activity and as a consequence, can be aggregated into the same cost center group.

Each Cost Center Group uses various cost pools. In our example of point of sales, the point of sale of Wavre employs employees with level S (Sales force). Hence, the Cost Center Group "Points of sales" will gather the level S employees "consumption" of all points of sales of Belgacom.

Combinations cost pool/cost center group constitute the **Resource Groups**. The Resource Groups are the Cost basis of the Cost model.

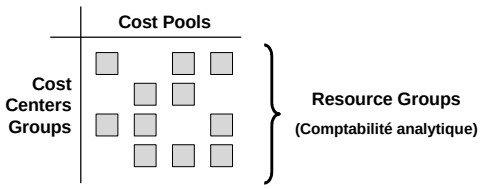


Figure 2 : Resource Groups

3.3 Organisation

In 2013 the main changes were within S&S (Staff & Support), where a new department Group Communications (GCO) was created with activities like Internal and Corporate communications, Corporate Identity, Branding, Reputation (IBR) and Corporate Social Responsibilities (CSR).

The department Regulatory went from Group Public Affairs (GPA) to Legal (LEG).

Within GIS (in BA_78) new departments were created: Operational Center of Excellence (OCE) (including also the service Translations and Business Services which were formerly part of division 79) and Energy management (ENY).

Within CBU there was a regrouping of the CCA activities whereby no more different cost centers were used for the different locations of the Contact Centers and the Front and Back-end activities.

EBU has undergone a change of organisational structure as described in Retail chapter 4.2.3.5. This organisational change did not change in substance the cost center structure of EBU. We have two name changes: SME Market (SME) becomes BUS Market (BUS) and Product and Solutions Mgmt (PRS) becomes Solution Mgmt (SOL).

The organisational structure is laying upon 4 pillars:

- Consumer Business Unit (CBU) has the responsibility over the residential customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Service Delivery Engine (SDE) centralises wholesale, network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

For information, find below the organization as on December 31, 2013:

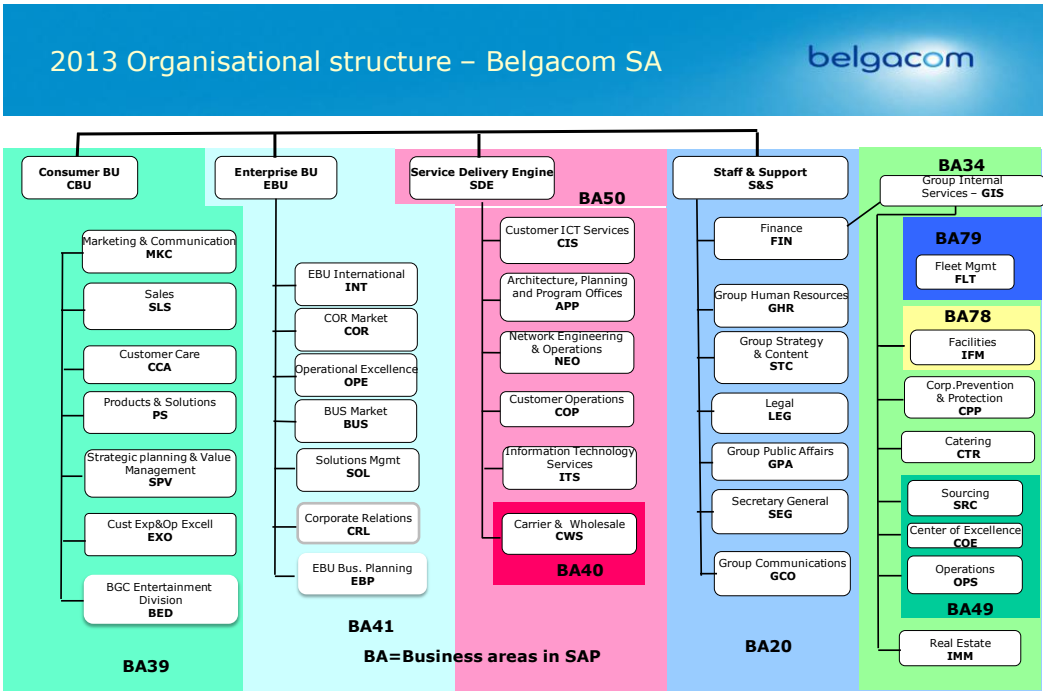


Figure 2

- This organisation has a clear split between the residential and professional customers by creating the divisions Consumer and Enterprise Business Units.
- The Service Delivery Engine brings together Network and IT services, Customer Operations (COP) and Carrier Wholesale (CWS).
- Within Staff & Support, the content (FIN, GHR, STC, LEG, GPA….) remains the same. Group Internal Services grouping internal services like Fleet, Facilities, Prevention&Protection, Sourcing….falls under the responsibility of FIN, the Financial department.

3.4 Split of the Cost perimeter SRW and Network/IT flow

Cost perimeter is split by the REG department between allocation flows of Network/IT and SRW, after completeness and accuracy checks (no double counting) on costs data from SAP. As mentioned in general description, allocation flow Network/IT allocates all costs and assets (capital expenditure) in IT and Network, while the allocation flow SRW allocates costs and assets other than IT and Network related.

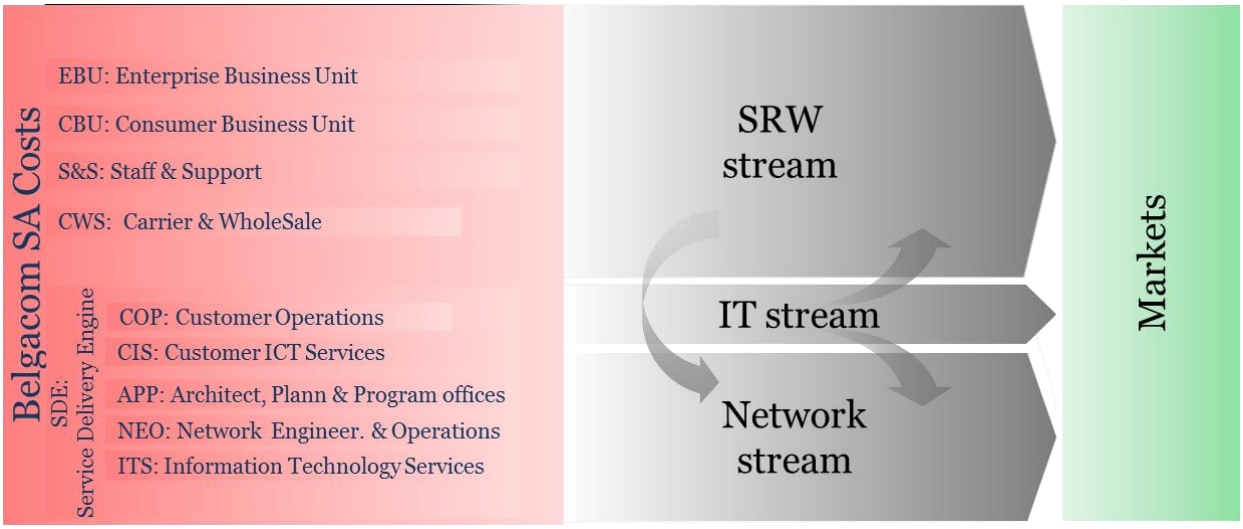


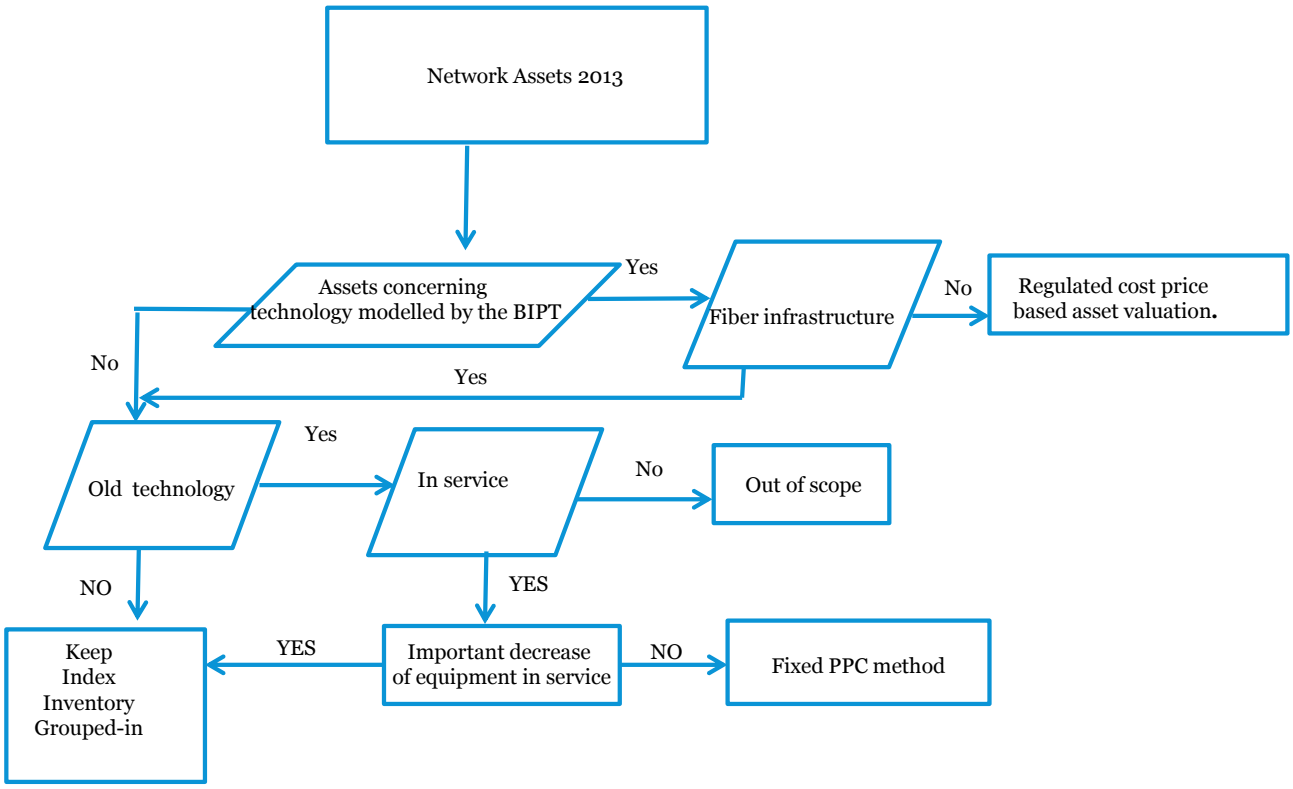
Figure 3

Split of cost perimeter between allocation flows Network/IT and SRW is processed as follows:

- All departments within SDE are treated within the Network / IT flow.
- Provisions for taxes on telecom equipment that are booked at the level of SDE management are downstream shared via allocation flows between assets classes to which they relate.
- All other costs, not mentioned above are treated within the SRW flow namely the divisions CBU (Consumer Business Unit) and EBU (Enterprise Business Unit), CWS (Carrier Wholesale) and Staff & Support. The Staff & Support division comprises different departments. Firstly, STB (Services to Business) which includes Headquarters, Legal, Group Public Affairs and Secretary General. Then we have departments like Finance, Group Human Resources, Group Strategy & Content and GIS (Group Internal Services) for departments like Real Estate, Business Services, Facilities, Prevention & Protection, CSM (Corporate Sourcing & Supply Change) and Catering.
- Regarding Assets (depreciation and WACC), repartition into flow SRW and Network/IT is done based on an analysis of assets classes: assets IT and Network of SDE Business area are handled in the allocation flow Network/IT, while all other assets (building, utilities equipment, CPE, etc.) are allocated in the flow SRW.

3.5 Assets revaluation

3.5.1 Decision tree



3.5.2 Methods used to revaluate the network assets

The regulatory framework clearly states that the cost accounting systems of operators being declared as dominant on relevant markets must be set based on Current cost accounting for the network costs.

The network & IT flows within the top down model calculate the current costs for the network related assets. Current costs have been computed as explained hereafter.

There are five methods to evaluate the current value of the network: reassessment of the current inventory, price indexation, by default “keep everything as it is”, index based on a fixed PPC and regulated cost price based. For old assets concerning technology still in service we use a method based on a fixed PPC2007. Each of these methods requires its own set of inputs. It is mainly the availability (or lack) of input which dictates the choice of the method. Nevertheless each method has its advantages and disadvantages with respect to the others.

The inventory and price indexation methods assume that network departments replace the equipment of its assets by equivalent equipment. The notion of equivalent is quite fuzzy. An engineer would tell you that over time there are always more functions integrated in new equipment and that they are always more cost-effective. It makes the comparison between different

generations of equipment difficult. The notion of equivalent has therefore been addressed through the term Modern Equivalent Asset (MEA). The assets must be replaced by their MEA. The MEA is the replacement cost of the technology expected to be in place within the planning horizon. Note that this notion takes into account the introduction speed of a new technology in the network. If network departments plan to have replaced 50% of an old technology by a new one within the planning horizon, it makes no sense to simulate the costs with higher percentages because the planning takes into account the availability of the resources to carry out the work.

Find hereafter the rules that have been used:

- Technology still in procurement: use current price, e.g. SDH equipment, DWDM equipment
- Technology to be replaced within the planning horizon: use current price of the modern equivalent asset, e.g. some PDH line system equipments are replaced by SDH equivalents.
- Obsolete technology: use current price of the modern equivalent asset, e.g. the HDSL technology for high speed services on copper replaces the less cost-effective HDB3 technology.
- Technology grouped in : those assets will be revaluated by another asset concerning the same technology
- Old technology not anymore in service : those assets are set out of scope and will not be revaluated
- Old technology still in service (in maintenance mode); those assets are revaluated by an index method based on a fixed PPC instead of index, keep or inventory method. Old assets revaluated by keep will keep the CAV value as GRC
- BIPT regulated technology : use the BIPT regulated cost price to calculate the annual capital cost

3.5.2.1 *Price Indexation*

This is the most straightforward approach, provided historical costs are available. The investments for each year (from 1981 on) are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The method is refined by defining price indexes depending on the nature of the cost. This is particularly true when costs of a different nature experienced a different price evolution. Three different types of price indices have been defined: the labour index, the indices for services delivered by external companies and the material index. Note that indices for services supplied by external companies vary according to the asset involved. For example, services supplied by external companies related to cable assets, are in fact outsourced labour costs for trenching and cable installation. In such case, a labour index has been applied. Other external services less labour intensive are resulting in other price indices, such as a fibre cable index.

3.5.2.2 *Inventory*

This is the best method to reflect accurately the price of assets currently in service in the network. The revaluation is merely performed by multiplying the volume of each specific type of equipment currently deployed in the network by its average current unit cost. The current unit costs are based on the prices defined in the current frame agreements we have with our suppliers.

In terms of inputs it is the most demanding method. It requires an extensive inventory of equipment.

The inventory method has been used for data, switching, transmission and access equipment. Switching data is based on the inventory reports delivered by the engineering service. Transmission and access data are obtained from the technical database ITR. Data inventories are obtained from field operational tracking sheets.

3.5.2.3 *Keep as it is.*

The "keep as it is" method is merely what its name says. We keep the price we have in the historical accounting books. This method is only valid for costs with a very short depreciation period or for software intensive products. For the latter we assume that on the one hand software development is labour intensive but on the other hand the rapidly evolving programming environment improves the productivity compensating for the higher labour cost. This results in a stable software price. Another practical reason to select the "Keep as it is" method is the amount booked on the asset. If this amount is small, the method has also been applied. In this particular case, the effort to collect all the information about the cost evolution outweighs the impact on the service costs.

3.5.2.4 *Index Based on a fixed PPC*

Old technology still in service (in maintenance mode) ; those assets are revaluated by an index method based on a fixed PPC.

If Belgacom has done some investments for keeping those technologies in service, we take those investments also into account.

If Belgacom has done some great retirements, the revaluation method is revised.

- Formula :

$$GRCyearN = \left[\left(GRCyearN - 1\right) * \left(1 + fixedPPC\ 2007\right)\right] + investmentsYearN$$

3.5.2.5 *Price Indexation for mobile assets*

The investments for each year are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The historical series of indexes for each asset has been derived from the yearly percentage price change determined in the **BIPT model 2008.**

This method is used for assets which are not impacted by the BIPT regulated cost price base valuation.

Formula :

Index year = (1+ (ppc year))* (1+(ppc year -1))* (1+(ppc year -2))*……..

3.5.2.6 *Asset valuation based on the Belgacom Reference Offer tariffs and BIPT bottom-up mobile cost model*

3.5.2.6.1 Method background and rationale

The market for fixed telecommunication services, the related technologies and the competition have evolved through the years leading to the current situation where the vast majority of the telecom services provided by the Belgacom's access and area backbone networks are regulated. This regulation has been enforced, amongst other initiatives, by clearly specifying the services and applying regulated tariffs, as reflected in the Belgacom Reference Offers (BRUO, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA).

Since the regulated tariffs are cost oriented and determined by bottom-up costing models, it is reasonable to use the direct CAPEX component of these prices to calculate the annuity of the assets addressed by the Belgacom Reference Offers.

Mobile telephony regulation mainly focuses on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a mobile call (MTR). In order to calculate this termination rate, BIPT has developed a bottom up mobile cost model, including all voice and data services 2G and 3G. The latest available version of this model was published by BIPT in November 2013, and has been used to value mobile assets.

3.5.2.6.2 Method description

All the fixed network assets, except optical fiber infrastructure, concerned by the technologies covered by the Belgacom Reference Offer models (BRxx), namely BRUO, Block&Tie cables, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA, are valued by applying the direct CAPEX component of the relevant BRxx tariff to the appropriate volumes extracted from the Belgacom inventories.

For mobile assets valuation, Belgacom mobile volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting CAPEX economic cost has been extracted in order to value the assets.

3.5.2.6.3 Scope

The technologies to be valued by this method, since they are covered by the Belgacom Reference Offers and BIPT mobile cost model, are:

- Copper infrastructure: including trenching, ducting and copper cable.
- (D)WDM
- PDH/SDH
- xDSL: including ADSL, ADSL2+ and SDSL
- VDSL
- Ethernet
- Mobile network assets 2G and 3G

However, some parts of the networks deployed with the above mentioned technologies are not covered by the BIPT tariffs for they provide non regulated services. Consequently they cannot be valued by means of the regulated tariffs.

These services are:

- Any service provided by the Belgacom express network layer, also called intercity network.
- Multicast services, namely broadcast TV.
- Access lines for the Explore customers.

The chosen alternative for valuing the network sections providing the non regulated services has been the development of specific models in order to determine applicable direct CAPEX unit prices.

3.5.2.6.4 Method implementation

- *Inputs Fixed Network*
  - *Broken down tariffs*
    - *Broken down tariff based on the BIPT BRxx models*

      By analyzing each of the current BRxx models, the direct CAPEX component of each product of each tariff has been isolated. Further, this constituent has been broken down into all its applicable technological contributors, so that a unit price per technology, per product and per tariff is extracted (Figure 4: Conceptual description of the BRxx tariff breakdown.).

      Although the above described process is applicable to the majority of the BRxx models, there is an exception to the rule, the BIPT BROBA transport model. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, is given in paragraph 3.5.2.6.9.

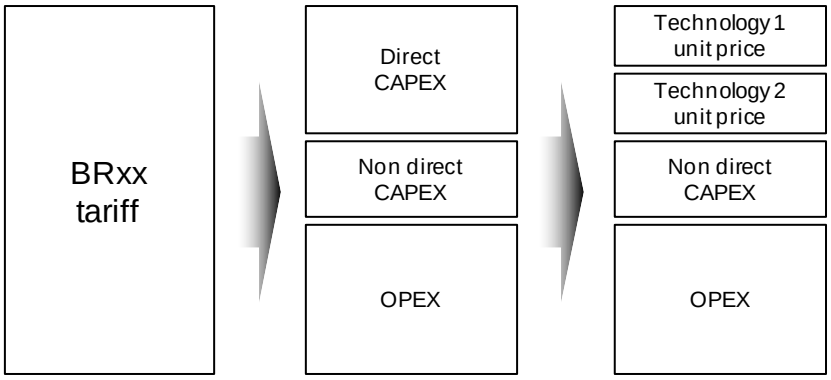


Figure 4: Conceptual description of the BRxx tariff breakdown.

Note: There is no relation between the size of the components and any broken down BRxx tariff.

- *Broken down tariff for network areas not under the BIPT BRxx models scope*

  For those areas of the network not within the scope of the BIPT models, specific models have been developed in order to derive applicable broken down tariffs. These models have been built up on similar principles to those applied in the models developed by the BIPT. Whenever possible the actual BIPT tariff components have been re-used and existing BIPT models have been adjusted so that the obtained results are as comparable to those of the BIPT models as possible.

- *Volumes*

  The volumes (demands) of all the telecommunication services utilizing the technologies subject to this valuation methodology are extracted from or determined based on Belgacom inventory systems.

- *Valuation (Fixed network)*
  - In a first step, each pair, line, VP, link or VLAN present in the volumes is valued by applying each and all of the technology unit prices of the relevant BRxx tariff. In this way, each telecom service's individual contribution to the assets valuation is calculated.
  - Finally, all the individual contributions are summarized per network asset, obtaining the final asset annuity.
- *Inputs mobile network*

  The latest version of the BIPT mobile cost model has been used in order to value mobile assets related to :

  - Radio Access network (RAN)
  - Ground Antenna
  - Mobile Voice Switching
  - Mobile Data Switching
  - Mobile Location Register

  Belgacom mobile voice and data volumes, as determined based on Belgacom inventory systems, have been used as the demand for the cost model. Based on this demand, the model dimensions the required network assets.

Only capex economic depreciation has been taken into account, all opex values in the model have been set to 0.

The WACC is based on BIPT's last decision issued on May 4, 2010 (10,05%).

- *Valuation mobile network assets*

Capital expenditures are annualized according to BIPT's economic depreciation. This is a different methodology compared to the TAM used for fixed network related assets.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2013, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output in the form of a net present value.

3.5.2.6.5 Exceptions to the generic implementation

Although the above described process is applicable to the majority of the tariffs and related technologies, there are two exceptions to the rule.

The breakdown of the BIPT BROBA transport tariff is made differently. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, and how it is applied is given in paragraph 3.5.2.6.9.

The valuation of the transport SDH/PDH assets implementing the regulated part of the Belgacom's SDH network, although based on the BIPT's BROTSoLL model, do not follow the above described generic process. The used methodology is described under the paragraph "Updated BROTSoLL model to the 2013 demand".

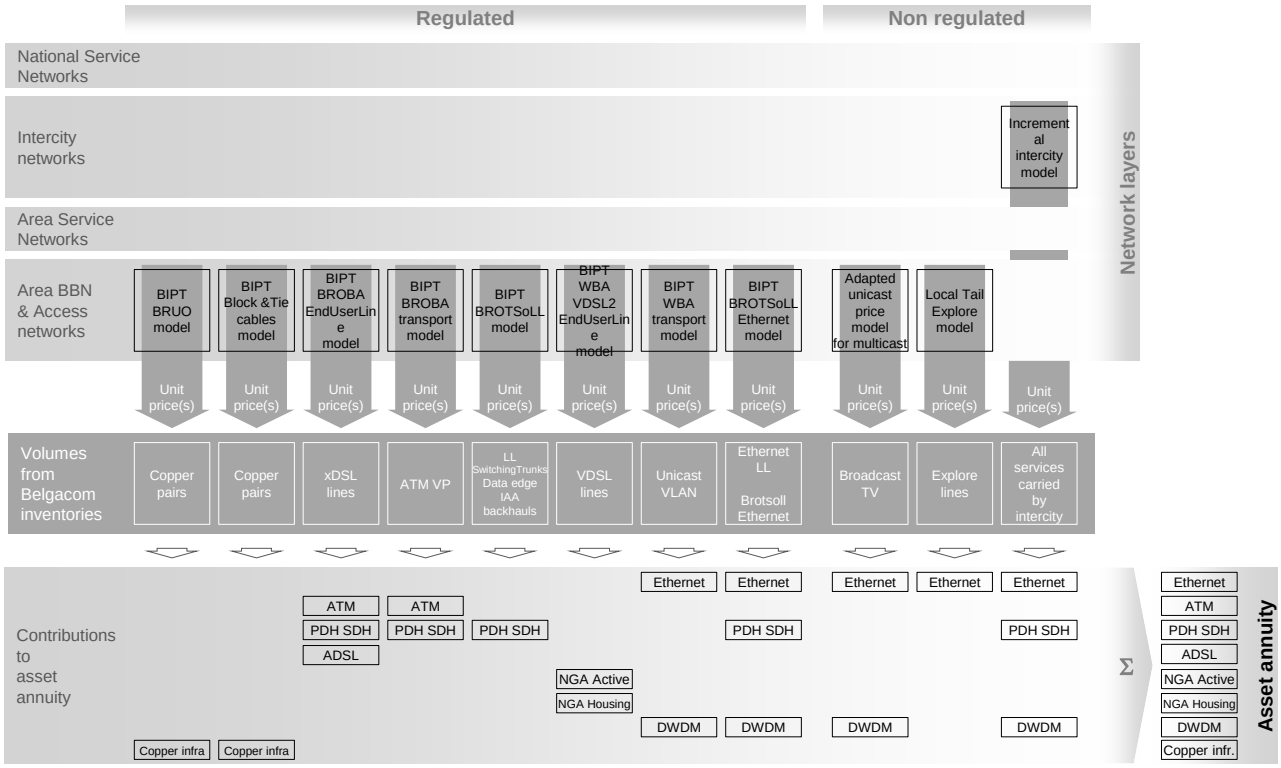


Figure 5: BRxx based valuation method. Scope and implementation.

3.5.2.6.6 BIPT BRxx tariffs as base for asset valuation

3.5.2.6.6.1 BRUO

The BIPT BRUO model (decision of 9/11/2011) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. These assets have been valued based on the unit direct CAPEX cost in the BRUO model and the number of pairs used. It mainly includes the cost of copper cables, trenching and street cabinets and covers the copper distribution and copper feeding networks.

The yearly direct CAPEX cost of the following assets has been calculated based on BRUO tariffs:

- Raw Copper for PSTN/ISDN accesses, central site based broadband without voice accesses, local tails for leased lines type of connectivity, BRUO raw copper.
- Copper subloop, for ROP based VDSL connections without voice accesses.
- Copper subloop testing cost, to ensure remote line testing of ROP based VDSL connections without voice accesses. This cost is valued based on the unit direct CAPEX cost of the feeding network that can be derived from the BRUO tariffs (local loop, subloop).

In the frame of a possible fixed/variable analysis of the results of the model, copper distribution and feeding network costs are categorized as fixed. It should be noted that this has no impact on the results of the model itself.

Our analysis is based on the approach used by BIPT and its consultant, Analysys Mason, for the development of an NGN/NGA model. The dimensioning of the copper distribution and feeding network is dependant on the evolution of the number of households, reflecting the universal service obligation of Belgacom. The evolution of the number of copper pairs actually used by customers subscriptions or internal usage, has no impact on the total copper access investment cost calculated by the BIPT NGN/NGA model. Copper access (distribution and feeding) is a fixed cost, with no causality of the volume of copper pairs actually used.

Its allocation method could be based on the market value of the different products using the network. However, in order to be conform with the approach used by BIPT in the BRUO/BROBA reference offers, we have attributed the copper access network cost towards the different end-user services and markets based on the number of consumed copper pairs.

The cost of the copper splitters, to split narrowband and broadband signals for shared pairs has been valued based on the shared pairs inventory.

3.5.2.6.6.2 Blocks and tie cables

The BIPT Blocks and Tie cable model (decision 2/7/2008) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. This bottom-up model defines direct CAPEX prices for Main Distribution Frame blocks and for tie cables to other access network equipments.

The current value of following assets has been calculated based on Blocks and Tie cable tariffs:

- Copper local loop testing: internal cabling for copper connectivity to perform remote testing of broadband customer connections without voice accesses based at the central site.
- Copper subloop testing: internal cabling for copper connectivity of ROP based VDSL customer connections without voice accesses.
- Continue raw copper and shared feeding pairs: internal cabling for copper connectivity from the Main Distribution Frame or broadband splitter equipment to other access equipments or collocated access equipments.

3.5.2.6.6.3 BROBA rental per end-user line

The BROBA rental fee per end-user line is split by BIPT between the active part and the transport rental ATM or Ethernet part. This model is sometimes referred to as BROBA Bitstream.

3.5.2.6.6.3.1 Active part

The BROBA model (decision of 6/8/2010) has been used to valuate assets included in AC2_20102 ADSL equipment. It is related to DSLAM and Main Distribution Frame space yearly direct CAPEX costs.

The asset has been calculated based on the direct CAPEX part of the BROBA Bitstream tariff applied to ADSL, ADSL2+ and SDSL subscription volumes.

3.5.2.6.6.3.2 Transport rental ATM

- ATM is outphased and is no longer valuated in the 2013 model.

3.5.2.6.6.4 BROBA ATM transport

- ATM is outphased and is no longer valuated in the 2013 model.

3.5.2.6.6.5 BROTSoLL (access line only)

The Belgacom Reference Offer for Terminating Segments of Leased Lines (BROTSoLL) regulates the complete PDH/SDH transmission network of Belgacom, with the exception of the highest hierarchy rings, the so called Intercity network or express layer. The current BIPT decision on this tariff dates from 10/3/2008.

*Note that for this model the below explanation is only applicable to the valuation of the access lines to BROTSoLL services. The valuation of the transport costs has been done as described in the paragraph "*Transport PDH/SDH valuation". The technologies covered by this reference offer and consequently to be valued through this tariff are:

- PDH/SDH : covering the costs of the access line equipment of this technology.

Further, this service can in fact make use of the copper infrastructure on the access side in case of small bandwidth lines. However, these costs are embedded in the BRUO based valuation.

The SDH access line valuation has been done by applying the above technologies direct CAPEX unit cost to all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR, the Belgacom transmission inventory system.

3.5.2.6.6.6 WBA VDSL2 end user line

3.5.2.6.6.6.1 Passive part

The BIPT WBA model (decision 10/11/2010) has been used to valuate the assets AC2_20108 NGA Housing as well as part of the asset AC2_20106 fibre infrastructure related to external fiber connectivity to the cabinet (ROP ; Remote Optical Platform).

For the valuation of AC2_20108 NGA Housing, the BIPT unit direct CAPEX cost has been applied to the number of VDSL2 subscriptions. The main elements included are the cost of the ROP, the copper connectivity between the ROP and the street cabinet and power equipments.

3.5.2.6.6.6.2 Active part

The asset AC2_20107 NGA Active equipment has been valued based on the related BIPT direct CAPEX cost.

It is mainly related to the IP DSLAM installed in the ROP or in the local site, the equipment to aggregate the fibre cables connecting the ROP to the local exchange ("aggregators"), as well as the internal cabling and block positions on the optical main distribution frame (OMDF).

3.5.2.6.6.7 WBA transport

WBA transport regulates the transport of Ethernet based data (unicast VLANs), covering the complete Belgacom Ethernet/MPLS network, with the exception of the highest hierarchy level, the Intercity network or express layer. The current BIPT decision on this pricing dates from 6/8/2010.

The Ethernet data, grouped in VLANs, is directly carried on densely multiplexed optical wavelengths over optical fiber. Thus, the technologies to be valued via this model are:

- Ethernet (AC2_20105 ethernet equipment): values the ethernet routers and switches allowing the transport of Ethernet data within an ethernet area.
- DWDM (AC2_20101 (D)WDM equipment): covers the cost of the Dense Wavelength Division Multiplex network that, together with the fibre infrastructure, brings the physical connectivity amongst the Ethernet equipments.

In order to obtain the value of each of the above technological components, the direct CAPEX unit costs for the different technologies have been applied to the unicast VLANs implemented on the MPLS network. For each VLAN, the peak bandwidth is determined. This peak bandwidth :

- equals the ordered bandwidth (for Broba and Eline for OLO) or
- is determined on basis of number (and type of consumption) of subscribers and sizing rules (for FI, VoIP, VoD) or
- is estimated on basis of the ordered bandwidth and measurements on the ethernet equipments (relative to the service like IPVPN, Eline)

The peak bandwidth is then distributed over the different (relevant) priority bits.

3.5.2.6.6.8 BROTSoLL Ethernet

Being a special case of BROTSoLL, the services within the BROTSoLL Ethernet scope are the dedicated transparent Ethernet connections. The current BIPT decision on this tariff dates from 10/3/2008.

In principle these lines are implemented as Ethernet over SDH. However, due to the rather large bandwidth typical to this type of services -10 Mbps, 100 Mbps or 1Gbps- this implementation is neither always possible nor efficient. Therefore we distinguish two main technical executions:

- Ethernet over SDH: for the 10 or 100 Mbps lines, also named Ethernet and Fast Ethernet respectively
- Ethernet over DWDM: for the 1 Gbps or Gigabit Ethernet lines, where the DWDM wavelength is dedicated to the line. Note that no SDH equipment is used in this case.

The Ethernet over SDH services require SDH and optical fiber for their implementation. Therefore, and following the 2013 model logic, the SDH costs incurred by the implementation of such services will be valued by the “Updated BROTSoLL model to the 2013 demand”. The optical fiber costs are not valued by the BRxx method anymore.

Regarding the Ethernet over DWDM services, due to the lack of a BIPT model backing up the regulated tariff, Belgacom has developed a simple model in order to arrive to a valid cost oriented tariff for asset valuation purposes (see the below sub-paragraph for further details on the development of this model). This tariff contributes to the valuation of the DWDM and optical fiber

asset. Nevertheless, the DWDM tariff component will be the only one used by the BRxx valuation method since the fiber is not valued by this method in the 2013 model.

Finally, the only cost component valued by this method within BROTSoLL Ethernet is the DWDM. The valuation has been done by applying the DWDM direct CAPEX unit cost to all the links implemented over DWDM under the BROTSoLL Ethernet scope which are documented in ITR, the Belgacom transmission inventory system.

3.5.2.6.6.8.1 BROTSoLL Ethernet model for 1 Gbps lines

Transport tariff component

Given the fact that the lines subject to be valued by this model are dedicated DWDM wavelengths to the BROTSoLL Ethernet line, the average tariff is constituted by:

- the actual cost of a kilometer of DWDM wavelength according to the Belgacom Regulatory Cost Model.
- the cost of a Km optical fiber infrastructure, according to BROTSoLL.

Finally, this average cost per kilometer of wavelength has been annualized and de-averaged to obtain a tariff per distance ranges as that of the regulated tariff.

Access tariff component

The access tariffs are the same as in BROTSoLL.

3.5.2.6.7 Transport PDH/SDH valuation

The present BROTSoLL model is based on the Belgacom SDH services inventory belonging to 2005. From 2005 until now the utilization of the SDH services has changed and new services consuming large bandwidth, typically Brotsoll Ethernet and the like products, have been implemented over SDH. These new services would alter the distribution of services per bandwidth, putting an extra weight on the higher bandwidths, imposing changes in the network dimensioned by the BROTSoLL calculation sheets which in turn will incur in (non linear) costs changes.

Therefore, in order to incorporate a more realistic SDH cost in the model, it was decided to re-play the current BROTSoLL model with the 2013 SDH services demand.

In order to do so, the relevant files of the cumbersome BROTSoLL model have been consolidated into two streamlined files that easily allow the dimensioning and costing of the required SDH network for any given demand.

Then the set of all the SDH based services running on the Belgacom network at the end of the year 2013 (all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR) was entered into the new consolidated transport BROTSoLL engine and the resulting SDH costs represent the value of the PDH/SDH asset in the 2013 model.

3.5.2.6.8 Non regulated tariffs as base for asset valuation

3.5.2.6.8.1 Adapted unicast price model for multicast

The only multicast service currently carried by the Belgacom's network is BroadcastTV. Since the VLAN used by this service is shared by all the Belgacom TV customers, the VoD shared VLAN tariff could initially be contemplated as tariff.

However, the maximum bandwidth this VLAN can reach is reserved for multicast services, while the bandwidth of the unicast VLANs –within the WBA transport scope- cannot be reserved. Hence, the unicast VLAN tariff is not applicable anymore.

This bandwidth reservation characteristic needs to be valued, for it represents a disadvantage, a reduction of the overall available bandwidth, for the unicast VLANs coexisting in the same physical medium. Since the reserved bandwidth for multicast is one fifth of the physical medium bandwidth (maximum 2 Gbps multicast traffic over the 10 Gbps bandwidth of the DWDM bandwidth), the multicast tariff used for valuation purposes is five times that of the unicast.

As this model is an adaptation of the WBA transport model, it contributes to the same assets as the WBA transport:

- Ethernet
- DWDM

The valuation of the assets consumed by this service is calculated by applying the direct CAPEX tariff components to all the configured multicast VLANs in the network.

3.5.2.6.8.2 Local Tail Explore

Local Tail Explore refers to the access line, this is to say the set of equipments and infrastructure entailed to provide the connectivity between the customer and the Belgacom network, the Explore customers require. Given that Explore is not a regulated product and has specific technical requirements that are not contemplated by any of the existing BIPT models, a new model needed to be developed to cost this segment.

In fact the model is very straightforward since it just consists of isolating the few different components in the offered technical solutions and applying their respective annualized costs. Since the infrastructure components present in this model have already been valued by existing BIPT models, the regulated direct CAPEX unit costs have been applied to them.

The only asset in which this model participates is Ethernet.

In principle, this model should also contribute to the Copper infrastructure, since there is a technical solution on copper, however this asset valuation component is fully taken into consideration by the valuation based on the BRUO model.

The valuation has been done by applying the fitting direct CAPEX technology to all access lines to Explore services documented in ITR, the Belgacom transmission inventory system.

3.5.2.6.8.3 Incremental intercity model

This model is an incremental inventory based model that covers the cost of the equipment and infrastructure deploying the express layer of the network.

It is incremental since only the extra costs incurred in the implementation of such intercity network are taken into account.

Further, for it is an inventory based model, inventories of all the technologies present at the intercity level, namely DWDM, SDH and Ethernet, were gathered. Then the corresponding gross replacement costs have been applied and annualized arriving to the total gross replacement costs per technology of the intercity network.

3.5.2.6.9 ATM equipment asset valuation

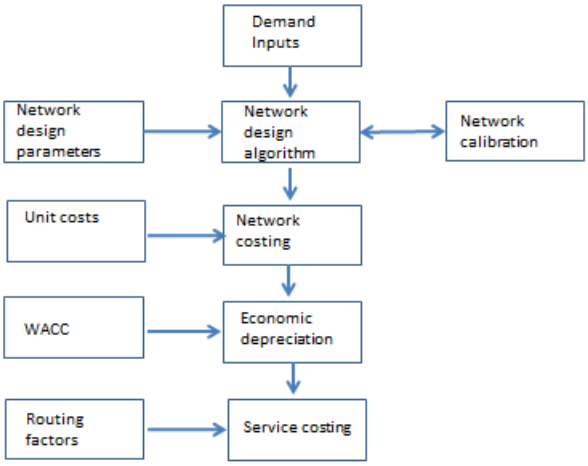
- ATM is outphased and is no longer valuated in the 2013 model.

3.5.2.6.10 Mobile cost model for network assets valuation

The BIPT bottom-up mobile cost model has been used to value assets :

- AC2_20110 RAN
- AC2_20111 Ground Antenna
- AC2_20112 Mobile Data Switching
- AC2_20113 Mobile Location Register
- AC2_20114 Mobile Voice switching

The flow diagram of BIPT mobile cost model can be summarized as follows :



Mobile cost model – flow diagram (source : Analysys Mason)

Belgacom volumes (subscribers and mobile voice and data traffic) have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2013, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output (volume generated by the network element) in the form of a net present value.

The calculation can be summarized as follows :

Calculation of net present value expenditures

NPV (Invest) = $\sum_{Years} Investment * discount\ rate\ multiplier$

Calculation of net present value output (recovery)

NPV (volume* ppc) = $\sum_{Years} PPC\ year * Vol\ year *\ discount\ rate\ multiplier$

ppc being the cost trend for the related network element

the discount rate multiplier is calculated based on a 10,05% WACC (BIPT's last decision issued on May 4, 2010)

The capex cost per unit output can be defined as :

$$p0_{1993}=\frac{NPV\ (Invest)}{NPV\ (Vol*ppc)}$$

and

$$pn_{2013}=P0*ppc_{2013}$$

The total annualized economic cost for the year 2013 is equal to :

$$p_{2013}*V_{2013}$$

3.5.3 TAM: Tilted Annuity Method

3.5.3.1 *Theory*

The purpose of this section is to describe how the Tilted Annuity Method (TAM) is finally implemented in the Current Cost Accounting (CCA) based network cost model 2013.

As from the 2003 model, Belgacom implemented the formula that BIPT suggested.

$$ACC\mu Y = F1, \mu Y \times F2, \mu Y$$

where

$$F1, \mu Y = (GRC\mu Y, begin + GRC\ \mu Y, end)/2$$

$$F2, \mu Y = \sqrt{}(1 + WACCY) \times [\ 1 - (1 + APC\mu)/(1 + WACCY)\ ] / [1 - [(1 + APC\mu)/(1 + WACCY)]\ \hat{}\ L\mu]$$

and where

- ACCμY: Annual CAPEX Cost of asset μ and year Y. It includes the annual depreciation and the cost of capital.
- WACCY: WACC of year Y.
- GRCμY, begin: Gross Replacement Cost of asset μ at the beginning of year Y.
- GRC μY, end: Gross Replacement Cost of asset μ at the end of year Y.
- APCμ : Annual Price Change of asset μ .
- Lμ : Lifetime of asset μ.

Remarks:

The formula assumes that:

- In the beginning of year Y was invested in an asset and that at the middle of each year of the lifetime of the asset revenues will be generated.
- The annual price change is constant over the lifetime of the asset.
- The asset price does not evolve during the year, i.e. price changes only appear at January 1st.

The factor F1, μY represents the value of asset μ in the middle of year Y.

- The purpose of the arithmetic average of GRCμY, begin and GRC μY, end is to take into account investments or disinvestments of asset μ during the year Y.
- The arithmetic average of GRCμY, begin and GRC μY, end does not filter out the price evolution of the asset μ during the year Y.

The difference between the formula of BIPT and the formula of Exhibit 5, p. B3. of the white paper of Analysys is the factor $1 / \sqrt{(1 + APC\mu)}$, which filters out the price evolution of the asset μ during the year Y.

The gross replacement cost (GRC) of assets at any particular point in time is calculated as the sum over all assets owned by the business at that point in time, of the investment that would be necessary to purchase and install new replacements for those assets at that point in time (using modern equivalent assets if the existing assets are no longer available or efficient). The replacement value of assets, used for costing purposes should always include the gross value of every asset in use by the business (the current cost of replacing it with a new, possibly modern equivalent asset), irrespective of the history of depreciation of that asset in any financial accounts to date.

Lμ : Lifetime of asset μ, i.e. the expected useful lifetime of the new asset μ.

The depreciation period and the expected useful lifetime of a new asset are defined differently. The depreciation period refers to accounting. The expected useful lifetime of a new asset does not refer to accounting. It refers to the period that is expected that a new asset will be used. The main factor to determine the expected useful lifetime of a new asset is the evolution of the associated operational costs, i.e. the asset will be replaced when operating it becomes too expensive. Another factor is the appearance of new technology: if in the future new technology will come-up it could be that the asset will be replaced (even if it is not too expensive to operate).

4 SRW stream

4.1 Allocation of the support costs

In the 2013 cost model there are no changes in the way how support costs are allocated:

- All support costs are treated within one SUPPORT module.
- No cascade principle is used meaning that support costs, once in the SUPPORT module, could only be allocated to a non support destination and to a non support division.

A summary of the support activities and their drivers for the 2013 cost model is provided in the following table:

Support activity	Driver FROM support activity
CBU_billing	ALL CBU RETAIL PRODUCTS
CBU_billing_fix products	ALL CBU FIX RETAIL PRODUCTS
CWS_Billing	ALL CWS PRODUCTS
EBU_billing	ALL EBU RETAIL PRODUCTS
EBU_billing_fix products	ALL EBU FIX RETAIL PRODUCTS
MOB_billing	ALL MOBILE LINE RETAIL PRODUCTS
Support_Internal mail services	Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_IT	ITBuilding
Support_Manage cables	total MOS value
Support_Manage goods, warehouse & equivalents	% Occupation/Picking Lines
Support_Manage internal distribution	Transported Volumes(%Cubages)
Support_Manage moves	Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Manage waste and scrap	Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Manage, maintain and repair buildings (excluding moves) (office space)	Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Manage, maintain and repair buildings (excluding moves) (shop space)	ALL CBU RETAIL PRODUCTS
Support_Manage, maintain and repair fleet vehicles (management vehicles)	#management cars per orgUnit
Support_Manage, maintain and repair fleet vehicles (sales vehicles)	#sales cars per orgUnit
Support_Manage, maintain and repair fleet vehicles (utility vehicles)	#utility cars per orgUnit
SUPPORT_MOB	ALL MOBILE RETAIL PRODUCTS
Support_Power Chain for telecom_SDE	CP_Technical_Building
Support_Provide catering services	Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Provide copy services	Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Provide printing services (excluding outgoing invoices)	ALL CBU RETAIL PRODUCTS
Support_PROX_Pylons	NE_GroundAntenna
Support_Purchasing, quality and ordering	Amount_of_PO_SDE_nonSDE
Support_Reverse logistics	Nbr_entryLines_RSC
Support_Telecom space_SDE	CP_Technical_Building
Support_13001 Data Managed Services & Applications	
Support_14001 TV and VoD	
Support_15001 CPE GSM	
Support_22243 Nat. IC - infra. Co-location /Co-mingling	
Support_30000 Subsidiaries & externals	
Support_50000 Out of scope	

4.2 Allocation of the retail costs

4.2.1 Determination of the retail costs perimeter

As stated previously the Belgacom organisational structure distinguishes between 4 distinct organisational pillars called Business units, we recapitulate :

- Consumer Business Unit (CBU) has the responsibility over the residential customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Service Delivery Engine (SDE) centralises network, Carrier Wholesale and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

All commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential customers and at the level of Business unit EBU (enterprise business unit) for the professional customers.

The Belgacom financial and accounting structure clearly registers (directly attributable) retail costs on costcenters 39xxxx (retail for residential customers) or costcenter 41xxxx (retail for professional customers).

Starting from the Belgacom organisational structure, we can identify 4 blocks in the Retail cost perimeter:

1. Retail FTE related costs
2. Retail Support costs
3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Retail FTE related costs

Includes all direct FTE related costs of Business units 39 and 41 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Retail Business units in the accounting books but do relate to Retail FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Belgacom personnel/FTE's (and thus also towards these residing under CBU and EBU). E.g.: costs re. Fleet, office building, traincards, bonus, training, gsm's in the context of the employee phone program, …

2. Retail Support costs

Retail Support costs are non FTE related costs which are centrally booked and managed but relate to Retail activities. E.g.: Billing, Shop space, …

3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Retail departments, costs for legal claims, mandatory professional contributions, market surveys, etc.

4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.:Cost of sales such as commissions paid on sales of identifiable products, cost of goods sold on equipment, dedicated outsourcing costs, etc.

4.2.2 Retail costs allocation principles

4.2.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitue a unique combination for each Retail CP-CCG.

These attribute-qualifications are applied on all the Retail CP-CCG combinations, but at different levels of INCA modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Retail allocation process as described below.

4.2.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies Retail costs based on their variability towards product[1] volumes.

We distinguish between 4 var_types :

a. Marginal (mar) : retail costs which can be considered variable with each additional unit of output of a single product. Typically it concerns costs of goods sold (e.g. handsets, customer premises equipment,…) and costs of sales (commissions, interconnection costs,…).
b. Variable (var) : retail costs which can be considered sensitive to (important) volume changes of a single product or a range of products, whereby this (range of) product(s) is considered to be the last increment in the product portfolio. Examples of costs which are considered variable

[1] Products at the level of the customer (fix voice access, fast internet, idTV, mobile voice access, traffic types, …). These do not correspond with the (aggregated) notion of ABC_products as defined in the INCA cost model.

based on these criteria : the sales departments (FTE's), call center activities, …

c. Fix (fix) : retail costs are considered as fixed when they are likely to be inert to important volume variances. E.g.: Marketing spendings. If the marketing campaigns can be directed to specific products, the amount of costs for these campaigns is not linked to volumes of the considered product.
d. Common (common) : retail costs are considered common when they do relate to the ordinary course of business but have no relation with products. E.g.: Costs of litigations, branding & sponsoring expenses not directed to specific products, but well to Belgacom image and Proximus trademark, …

4.2.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies retail costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We distinguish between 2 PS types:

a. PRODUCT_SPECIFIC (PS): these costs can be allocated directly to the products and thus are generated specifically for that related product. E.g. the costs of sale of a product.
b. NON_PRODUCT_SPECIFIC (NPS): Retail costs which do not have a clear (causal) relation with specific products.

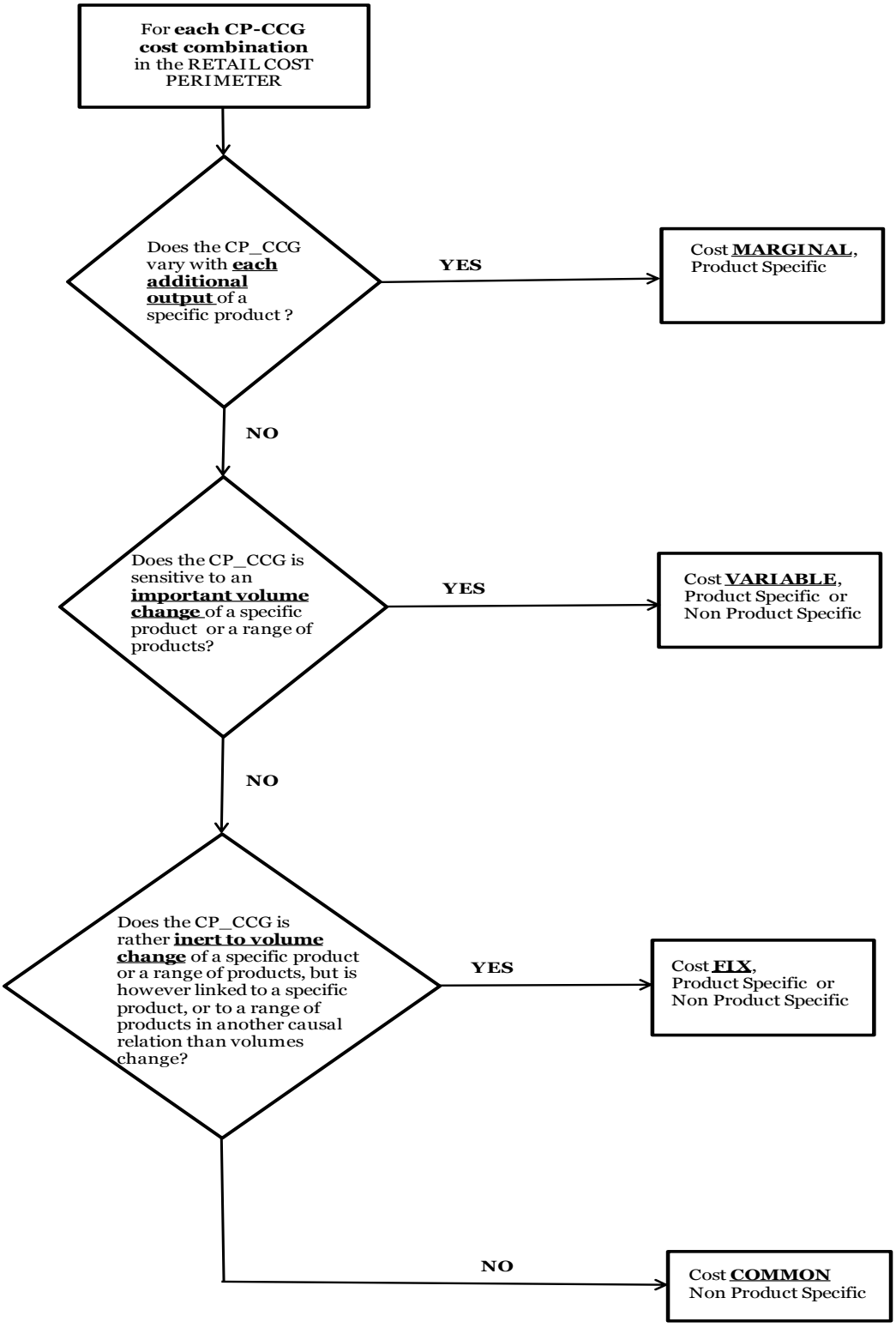
In addition to the attribute PS_TYPE, all retail costs are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

COST GROUP specifies the product, when the cost is product_specific.
COST GROUP also gives the information on whether the costs are related to both Retail Business Units (CBU and EBU), or are only linked to one of them.

Used Cost Groups for the Retail costs are:

PRODUCT SPECIFIC
13001 Data Managed Services & Applications
11302 Directory Assistance Services and listing
iDTV
All retail mobile only products
NON PRODUCT SPECIFIC
All retail products
All Fixed line retail products
All retail Fix and Convergent products
All CBU retail products
All EBU retail products
All CBU Fix retail products
All EBU Fix retail products

The qualification of the 2 attributes VAR_TYPE and PS_TYPE to all retail costs is illustrated in the following decision tree:



4.2.2.4 *Criteria for allocation of retail costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to). This means that these costs will be either allocated to Market 0 – Residual Market OR Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards Markets based on volumes drivers. The drivers for allocation of variable costs are documented further, per block of Retail costs (1->4). In practice, this means that these costs will be either:

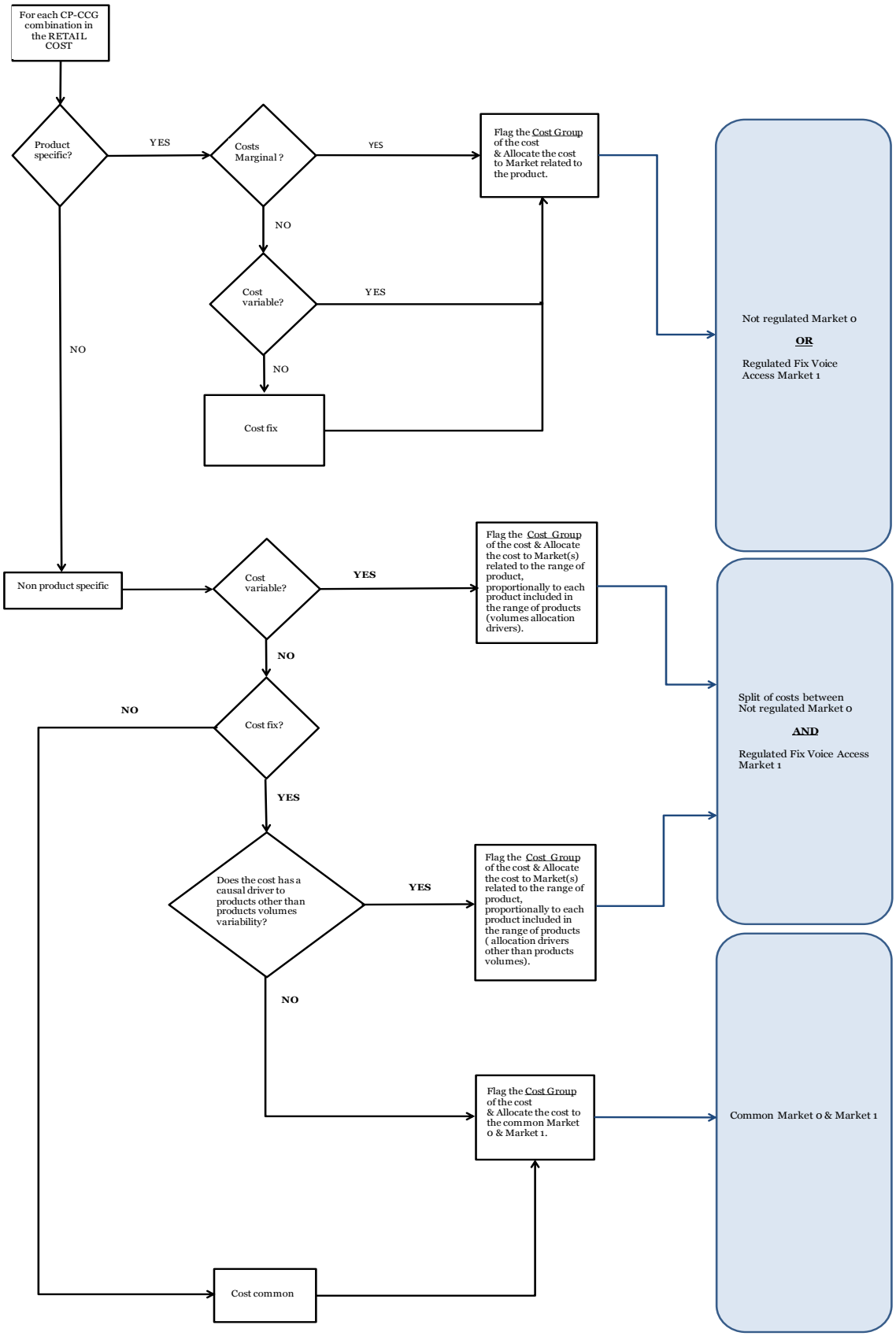
- allocated to Market 0 OR Market 1, if they relate to a panel of products related to the same market,
- allocated to Market 0 AND Market 1, with respect to volumes driver allocation key, if they relate to a panel of products related to both markets.

c. Non product specific Fix costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market', when they cannot be allocated to Market 0 and/or to Market 1, with a causal driver other than volumes of products.

E.g.: Marketing expenses are per nature costs that are not linked to volumes of products and that cover a panel of products. According to definitions, marketing expenses are therefore Fix, non product specific costs. However, based on the detail of marketing campaigns, we can allocate Marketing costs to products they aim (and hence to markets), with another causal driver than volumes of products.

d. Non product specific Common costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

4.2.2.5 *Graphical view on principles for retail costs allocation to Markets*



4.2.3 Retail costs allocation flow

4.2.3.1 *General principles*

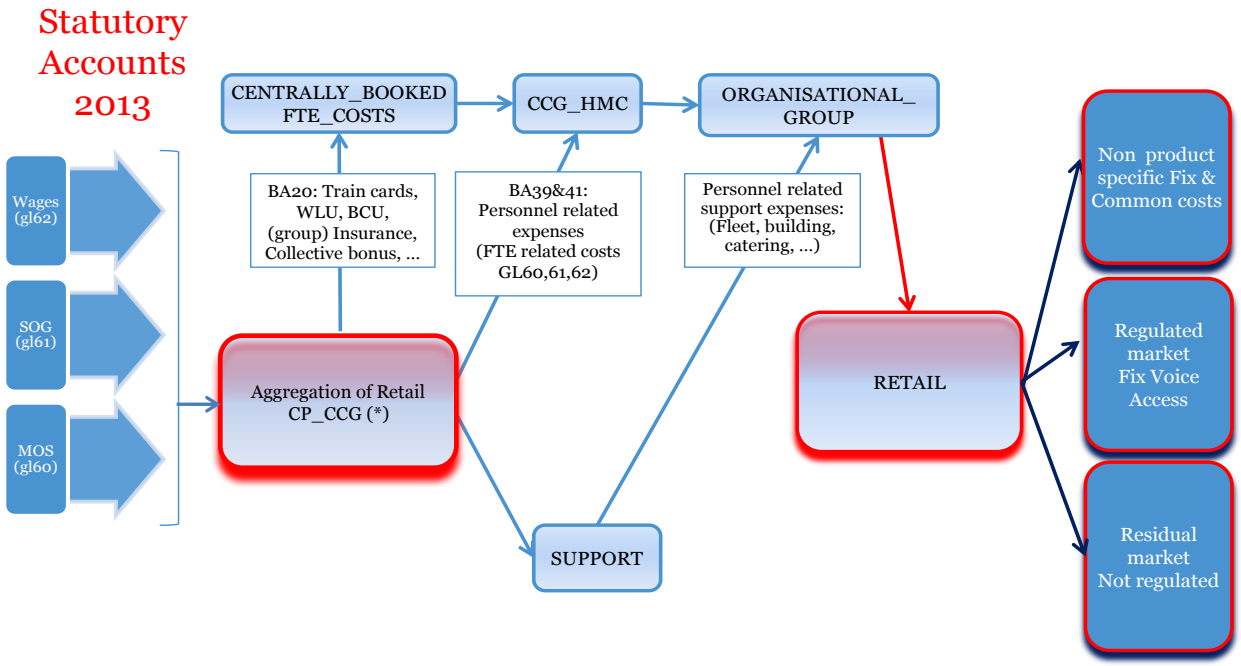
As described above, the 4 blocks of costs included in the Retail cost perimeter are all specified with 2 cost type attributes (VAR_TYPE; PS_TYPE) prior to be allocated to Markets.

However, the 4 blocks of costs:

- Do not follow all the same path of allocation; some are directly allocated to Markets from the Cost basis,
- Are not all specified with VAR_TYPE and PS_TYPE within the module Retail.

The allocation flow followed by a Retail CCG_CP will depend on its block of costs (1->4).

4.2.3.2 ***Retail FTE related costs* (block 1)**



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

All Retail FTE related costs (GL 62 of BU 39xxx and 41xxx, as well as some GL60 and GL61 categorized or considered as FTE related costs – see definitions above) are identified into the Cost basis.

Retail FTE related costs are at first gathered into INCA module CCG_HMC. CCG_HMC module is simultaneously feeded with INCA module Centrally Booked FTE costs (Train cards, WorkLifeUnit costs, etc.) for what matters costs related to BU 39xxx and 41xxx.

In module CCG_HMC, costs are organized in the same way they are in the Cost basis, per CCG_CP.

Retail FTE related costs gathered in CCG_HMC are afterwards loaded into INCA module ORGANISATIONAL_GROUP. In ORGANISATIONAL_GROUP module, FTE related costs are

summed up with SUPPORT costs managed centrally (Fleet, building, catering, etc.) but that have to be allocated towards Belgacom FTE costs.

In module ORGANISATIONAL_GROUP, costs are organized in the same way they are in the Cost basis, per CCG_CP.

This is also at this stage of allocation flow that attributes VAR_TYPE and PS_TYPE are flagged on CCG_CP and where CCG_CP are renamed as "Organisational groups" (terminology specific to FTE costs).

Organisational groups costs are at last directed to INCA module Retail, prior to be allocated to Markets, in accordance to criteria for allocation of Retail costs to Markets, as described in chapter 4.2.2.

VAR TYPE

With regard to the definitions of attribute dimension VAR, Retail FTE related costs can only be either Fix (FIX), either Variable (VAR) costs.

Variability is defined as the sensibility to important change in volume of a single product or of a range of products, whereby this (range of) product(s) is considered to be the last increment in the product portfolio. E.g. PSTN : what if we stop PSTN, which costs do we avoid?

For what matters FTE costs, this variability sensibility has been defined taking the following assumption:

Are Fix FTE costs, all the FTE costs that are needed to ensure the Belgacom going concern independently of products volumes, id est, costs needed to maintain the Belgacom minimum organizational structure.

Two types of FTE costs were identified as needed to maintain the Belgacom minimum organizational structure:

- Staff costs such as IT officers supporting DB and IT tools used, reporting and analysts teams, research staff such as Products&Solutions engineers, Marketing staff costs, as the size of such departments does not vary with the volumes of products sold but well with other causal factors such as market size and market position of Belgacom, products technicity, etc.
- All the Belgacom hierarchy structure (team responsibles).

PS TYPE

Organizational groups dedicated to a specific product are categorized as product_specific (PS). E.g.: all the organizational groups in charge of Directory Information Services (DIS) or Belgacom Entertainment Division (BED) by CBU, or all organizational groups in charge of Information & Communication Technology (ICT) by EBU.

Organisational groups covering a span of products are categorized as non_product_specific (NPS).

4.2.3.2.1 CBU Organisational groups: VAR_TYPE; PS_TYPE; COST_GROUP

As a general rule, CBU Organisational groups are easy to classify as Fix or Var in function of their activities. For some organisational groups, Fix FTE costs are however adjacent to VAR costs. In such organisational groups, we took allocation keys to split the FTE costs between Fix and Var. These "mixed" organisational groups are flagged in the present table as "*Mix Fix/Var*".

Organisational group functional activities	FIX/VAR (*)	PS/NPS	Cost Group
CBU Top management	FIX	NPS	ALL CBU RETAIL PRODUCTS
CBU Sales - Top management	FIX	NPS	ALL CBU RETAIL PRODUCTS
CBU Direct sales	VAR (*)	NPS	ALL CBU RETAIL PRODUCTS
In charge Relations for CBU indirect sales channels	FIX	NPS	ALL CBU RETAIL PRODUCTS
National and Int. Information services	Mix FIX/VAR	PS	11302 Directory Assistance Services and listing
Support staff for Sales department (all channels)	FIX	NPS	ALL CBU RETAIL PRODUCTS
CBU Marketing	FIX	NPS	ALL CBU RETAIL PRODUCTS
Call Center Activities	Mix FIX/VAR	NPS	*See developments further*
CBU Reporting and IT internal tools services	FIX	NPS	ALL CBU RETAIL PRODUCTS
In charge for CBU e-sales	FIX	NPS	ALL CBU RETAIL PRODUCTS
CBU Scarlet Top management	FIX	NPS	ALL CBU RETAIL PRODUCTS
CBU Belgacom Entertainment Division	FIX	PS	idTV
CBU Products & Solutions specialists	FIX	NPS	ALL CBU RETAIL PRODUCTS
CBU strategic planning	FIX	NPS	ALL CBU RETAIL PRODUCTS

(*) excluding Team responsible flagged as Fix costs.

Organisational group National and international information services includes as well Fix support staff like people responsible for IT tools and process of the activity, Marketers promoting the Belgacom Information Services, as well as Var FTE in contact with the external clients. To separate Fix FTE costs from variable ones, we used as allocation key the functional organisation of this division.
Fix and Var FTE costs of National and international information services are directly attributable to products (no volumes drivers needed for variable part of these costs) as they are Product Specific costs.

Organisational group Call center Activities also gathers Fix and Var FTE costs. Similarly, we referred at first to the functional organisation of CCA to separate Fix from Var FTE costs.

4.2.3.2.2 CBU Call center activities (CBU CCA): VAR_TYPE; PS_TYPE; COST_GROUP

CBU CCA includes *4 main sub-departments*:

1. Front Office
2. After Sales
3. Sales, Care & Transformation
4. Billing & Credit Risk management

Front Office is the department with FTE who are in contact with external clients. Activities of the Front office are primarily sales and sales orders intake, supported by the After Sales department.

After Sales department is the CCA Back office. Its tasks are primarily input in systems of sales orders, handling of clients billing complaints and requests (e.g.: change of invoicing address).

Sales, Care & Transformation is a support staff in charge of the set up of CCA strategy, budget and planning activities, as well as training of CCA agents, work force management ([2]), and information communication regarding Belgacom products ([3]).

Billing & Credit Risk management is the department responsible for the billing of CBU and EBU ([4]), for the follow up of bad debt and credit collection, and for fraud detection and prevention.

In the Cost model 2013, we take the assumption that the costs of these two CCA sub-departments are VAR costs:

- *Front office*

  Front office activity is primarily the sales. Hence, the size of this department will grow with the volumes of products (to be) sold, in a variable causal relationship as defined in chapter 4.2.2.

- *After Sales*

  After Sales activity is primarily to support the Front office activity, for the sales orders intakes, for clients complaints handling. It also happens that some after sales agents support the Front office in their sales activity during intense business periods. In substance, After Sales department can be considered as an extension of the Front office department, whose costs vary in the same volumes causal relationship to products.

We take the assumption that the costs of these two CCA sub-departments are FIX costs:

- *Sales, Care & Transformation*

  Sales, Care & Transformation is a support staff for all CCA activities, whose costs are not linked to volumes of products.

- *Billing and Credit risk management*

  Billing costs and activities linked (mainly, credit risk management and fraud detection) are not variable to the volumes of products, but well to other causal factors such as the number of customers, the macro-economic context, the regulatory environment ([5]). Besides, main majority of the customers have a portfolio of different products. As a consequence, the absence of one specific product in the customer portfolio will not impact the need for invoicing of that customer. According to our definition, Billing costs are categorized as fix, non product specific costs.

  For small part of these non product specific costs, a causal link to specific products, other than volumes driver, can however be raised. Billing costs are not sensitive to volumes of products but well to number of clients. As such, clients 1Play (id est, client with one product only) identify the billing costs that can be linked to specific products. Would Belgacom decide to stop to sell this product (e.g.: no more selling of Proximus mobile subscriptions only), or should these clients stop their contract with Belgacom, would the invoicing and

[2] Work Force Management is the optimization of calls handling and outsourcers management.

[3] Web site development, intranet update, information flashes for all sales channels

[4] Except e-billing which is done separately by CBU for CBU clients, and by EBU for EBU clients.

[5] e.g.: the new telecom law that suppressed minimum fix terms contract.

follow-up of the invoice costs stop too. Billing costs related to clients 1 Play were allocated to the product of the client. Clients 1 Play who reside in the same invoicing address (e.g. all the members of a family who are all 1 play clients for the same product) were counted only once.

PS_TYPE attribute must be separately handled whether Front office and After Sales.

Since years, CCA activities of Front office and After Sales were organized based on 3 big pillars:

- Proximus Mobile only products,
- Belgacom Fix products only,
- Belgacom One Fix and Mobile products (convergent products).

In 2013, with the convergent move of Telco products, the need to educate all CCA teams to handle all types of products, whether Fix, Mobile or Convergent arose, and led to the change in the functioning of CCA teams. Trainings were organized to all people of the Front office all along the year, so that at the end of the year, all the Front office officers were able to handle and handled actually all types of products. The After Sales activities remained for their part, specialized per pillar.

This new 2013 organization of Front office activity led us to identify a new key for attributing Front office organisational costs to products. The key used is the number of calls per origin, according to CCA IVR Tool (Interactive Virtual Response). CCA IVR tool identifies calls from Proximus only clients, from Belgacom only clients, and from Belgacom One (convergent) clients. To better match costs to products, the numbers of calls were weighted by the average handling time depending on product. Indeed, sales efforts are not equivalent to all products.

PS_TYPE attribution to After Sales activity remained, like preceding years, based on Belgacom functional organisation.

CBU organisational groups with attribute VAR can be summarized in the following table:

Organisational group functional activities	VAR (*)	PS/NPS	Cost Group	Cost Group Allocation key
CBU Direct sales	VAR	NPS	ALL CBU RETAIL PRODUCTS	Direct
National and Int. Information services	VAR	PS	11302 Directory Assistance Services and listing	Direct
Call Center Activities				
Front office	VAR	PS	ALL RETAIL MOBILE ONLY PRODUCTS	CCA IVR Call type
Front office	VAR	NPS	ALL RETAIL FIX AND CONVERGENT PRODUCTS	CCA IVR Call type
After Sales	VAR	PS	ALL RETAIL MOBILE ONLY PRODUCTS	Team name FTE File
After Sales	VAR	NPS	ALL RETAIL FIX AND CONVERGENT PRODUCTS	Team name FTE File
After Sales	VAR	NPS	ALL EBU RETAIL PRODUCTS	Team name FTE File

(*) excluding Team responsible flagged as Fix costs.

4.2.3.2.3 EBU Organisational groups: VAR_TYPE; PS_TYPE; COST_GROUP

Organizational framework

Within EBU a major organizational change occurred. Before 2013, EBU was organized on two pillars, representing markets of Belgacom clients: COR, for Corporate enterprise and SME, for Small and Medium enterprises, where COR enterprises were defined as companies with minimum annual turnover at Belgacom of more than 200.000 EUR.

The organisational change transferred the Medium enterprise market part of SME to COR, id est the enterprise clients with annual turnover at Belgacom between 12.000 EUR and 200.000 EUR. Meanwhile, SME was renamed BUS, for designating BUSINESS enterprises, or independent and small enterprises with consumption behaviour and needs near of the Residential clients. As a result, size of the teams in charge of ex-SME was considerably reduced, to reinforce COR teams.

Simultaneously, Solutions teams were created. Before 2013, EBU was organized per functional department, while after 2013, EBU gathered all specialists per products and solutions. E.g.: In 2012, solutions sales and presales, products managers (department PRS), were in the same functional department, independently of the products and solutions they handle. As from 2013, Solutions sales and presales, as well as Products manager's teams were split into teams specialized per products and solutions, such as BeCloud, BeMobile, BeConnected, etc.

As a general rule, EBU Organisational groups are easy to classify as Fix or Var in function of their activities. For some organisational groups, Fix FTE costs are however adjacent to VAR costs. In such organisational groups, we took allocation keys to split the FTE costs between Fix and Var.

These "mixed" organisational groups are flagged in the present table as "*Mix Fix/Var*".

Organisational group functional activities	FIX/VAR (*)	PS/NPS	Cost Group
EBU top management	FIX	NPS	ALL EBU RETAIL PRODUCTS
In charge Relations for COR (1) Public clients	FIX	NPS	ALL EBU RETAIL PRODUCTS
In charge Relations for EBU International affiliates	FIX	NPS	ALL EBU RETAIL PRODUCTS
COR top management	FIX	NPS	ALL EBU RETAIL PRODUCTS
COR Direct sales	VAR (*)	NPS	ALL EBU RETAIL PRODUCTS
COR ICT Project architects & Outsourcing mgmt	FIX	PS	13001 Data Managed Services & Applications
COR Marketing	FIX	NPS	ALL EBU RETAIL PRODUCTS
COR Business development and Bid management	FIX	NPS	ALL EBU RETAIL PRODUCTS
BUS(2) top management	FIX	NPS	ALL EBU RETAIL PRODUCTS
BUS all sales channels strategy & BUS Direct sales	Mix FIX/VAR	NPS	ALL EBU RETAIL PRODUCTS
BUS Marketing	FIX	NPS	ALL EBU RETAIL PRODUCTS
In charge Relations for BUS indirect sales channels	FIX	NPS	ALL EBU RETAIL PRODUCTS
EBU Solutions top management	FIX	NPS	ALL EBU RETAIL PRODUCTS
EBU Services & Solutions Integration (3)	FIX	NPS	ALL EBU RETAIL PRODUCTS
EBU Solutions Specialists and Solutions sales Telco	Mix FIX/VAR	NPS	ALL EBU RETAIL PRODUCTS
EBU Solutions Specialists and Solutions sales IT	Mix FIX/VAR	PS	13001 Data Managed Services & Applications
EBU Solutions Specialists Business Development	FIX	NPS	ALL EBU RETAIL PRODUCTS
OPE (4) top management	FIX	NPS	ALL EBU RETAIL PRODUCTS
EBU OPE Revenues financial reporting & IT Tools mgmt	FIX	NPS	ALL EBU RETAIL PRODUCTS
EBU OPE Strategy and Products profitability analyses	FIX	NPS	ALL EBU RETAIL PRODUCTS
EBU OPE Customer Project Management	FIX	NPS	ALL EBU RETAIL PRODUCTS
EBU OPE After Sale Back-office	Mix FIX/VAR	NPS	*See developments further*
EBU stategic planning	FIX	NPS	ALL EBU RETAIL PRODUCTS

(*) excluding Team responsible flagged as Fix costs.

(1) COR, for CORPORATE, is the subdivision of EBU including big size enterprises.

(2) BUS, for BUSINESS, is the subdivision of EBU including small size enterprises.

(3) SSI, is the Support EBU division in charge of Process & Products portfolio management. Are included in this CCG, staff teams for Product portfolio optimization, Products pricing, EBU partnerships, EBU solutions integration.

(4) OPE, for OPERATIONAL EXCELLENCE, is a Support EBU division in charge of internal Process optimization and IT internal tools management. Are included in this CCG, staff teams for financial reporting, IT Tools management, Customer Project management, Direct Margin and cost analysis, After Sale Back-Office.

Organisational group BUS all sales channels strategy & Bus Direct sales includes as well FIX support staff in charge of defining strategy to adopt with all BUS sales channels, as well as BUS Direct sales FTE costs, that are variable staffs costs with respect to the VAR attribute definition.
To separate Fix from Var costs of this Organisational group, we took as allocation key the FTE profile as indicated in the Belgacom SA FTE file. All FTE who had a *Sales profile* were flagged as VAR Direct sales FTE costs, to be allocated on basis of volumes drivers.

Organisational groups EBU Solutions Specialists and Solutions sales Telco/IT gather all the EBU Solutions departments. Solutions departments are organized by (categories of) product(s) they handle. These organisational groups include as well FIX support staff such as products managers & products specialists in charge to optimize products configuration, facilitate go-to-market activities and product financials follow-up (forecasting and budgeting per product), as well as Solutions Sales and Pre-Sales FTE who have to be considered as Direct Sales FTE. To separate Fix from VAR costs of these Organisational groups, we took as allocation key the FTE profile as indicated in the official Belgacom SA FTE file. All FTE who had a *Sales profile* were flagged as VAR Direct sales FTE costs, to be allocated on basis of volumes drivers.

Organisational group EBU OPE-BSC-After sales back office is mainly a VAR cost, since OPE-BSC is an After Sales Back office department for all EBU Mass Market products. However, a small part of these costs are FIX support staff in charge to optimize process and functioning of OPE-BSC department. The scission between Fix and VAR costs of OPE-BSC is done based on the functional organization of this team.

EBU organisational groups with attribute VAR can be summarized in the following table:

Organisational group functional activities	VAR (*)	PS/NPS	Cost Group	Cost Group Allocation key
COR Direct sales	VAR	NPS	ALL EBU RETAIL PRODUCTS	Direct
BUS all sales channels strategy & BUS Direct sales	VAR	NPS	ALL EBU RETAIL PRODUCTS	Direct
EBU Solutions Specialists and Solutions sales Telco	VAR	NPS	ALL EBU RETAIL PRODUCTS	Direct (**)
EBU Solutions Specialists and Solutions sales IT	VAR	PS	13001 Data Managed Services & Applications	Direct (**)
EBU OPE After Sale Back-office				
EBU OPE After Sale Back-office a)	VAR	PS	ALL RETAIL MOBILE ONLY PRODUCTS	FTE file - Team name
EBU OPE After Sale Back-office b)	VAR	NPS	ALL RETAIL FIX AND CONVERGENT PRODUCTS	FTE file - Team name
EBU OPE After Sale Back-office c)	VAR	PS	13001 Data Managed Services & Applications	FTE file - Team name

(*) excluding Team responsible flagged as Fix costs.
(**) Direct, in accordance with solution(s) handled by the organisational group.

4.2.3.2.4 Allocation of Retail FTE related costs - costs block 1 – to Markets

Product specific organizational group's costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to).

Non product specific Fix (parts of) organizational group's costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

Non product specific Variable (parts of) organizational group's costs are allocated towards Market 0 and/or Market 1, based on volumes drivers.

CBU organisational groups with attribute VAR are allocated to Markets with the following drivers:

Organisational group functional activities	Regulated market Fix Voice Access	Residual market Non regulated	Cost Group	Market Allocation key
CBU Direct sales	x	x	ALL CBU RETAIL PRODUCTS	Safin provisioning volumes
National and Int. Information services	-	x	11302 Directory Assistance Services and listing	Direct
Call Center Activities				
Front office	-	x	ALL RETAIL MOBILE ONLY PRODUCTS	Direct
Front office	x	x	ALL RETAIL FIX AND CONVERGENT PRODUCTS	OMS ordering system volumes
After Sales	-	x	ALL RETAIL MOBILE ONLY PRODUCTS	Direct
After Sales	x	x	ALL RETAIL FIX AND CONVERGENT PRODUCTS	OMS ordering system volumes
After Sales	-	x	ALL EBU RETAIL PRODUCTS (**)	Direct

(*) excluding Team responsible flagged as Fix costs.
(**) Team of CCA CBU that is dedicated to EBU professional products. This team was transferred to SDE business unit as of January, 1rst 2014.

CBU Direct sales are allocated to Market 0 and Market 1, according to the provisioning volumes, as reported in Safin DB.

National and International Information services are directly allocated to Market 0, being the market of the specific product it handles.

CBU call center activities :

- that handle Mobile only products or All EBU professional products are directly allocated to Market 0, being the market of the specific product they handle.
- that handle Fix and convergent products are allocated to Market 0 and/or to Market 1, according to provisioning volumes, as reported in an extract of OMS DB.
  OMS (order management system) is the tool used by call center activities for all the orders intake.

EBU organisational groups with attribute VAR are allocated to Markets with the following drivers:

Organisational group functional activities	Regulated market Fix Voice Access	Residual market Non regulated	Cost Group	Driver
COR Direct sales	x	x	ALL EBU RETAIL PRODUCTS	TTVA 2013 COR Direct sales
BUS all sales channels strategy & BUS Direct sales	x	x	ALL EBU RETAIL PRODUCTS	TTVA 2013 BUS Direct sales
EBU Solutions Specialists and Solutions sales Telco	x	x	ALL EBU RETAIL PRODUCTS	TTVA 2013 All EBU sales channels (*)
EBU Solutions Specialists and Solutions sales IT	-	x	13001 Data Managed Services & Applications	Direct
EBU OPE After Sale Back-office				
EBU OPE After Sale Back-office a)	-	x	ALL RETAIL MOBILE ONLY PRODUCTS	Direct
EBU OPE After Sale Back-office b)	x	x	ALL RETAIL FIX AND CONVERGENT PRODUCTS	OMS ordering sytem volumes
EBU OPE After Sale Back-office c)	-	x	13001 Data Managed Services & Applications	Direct

(*) EBU Solutions Sales Telco support all the EBU Business channels.

EBU Sales organisational groups

Like for CBU, at first sight, the more appropriate driver to allocate FTE sales costs seems to be the provisioning volumes. However, when we look at the EBU transformation of recent years from a Telco business unit towards a business unit directed to Solutions IT & Solutions Telco that answers the specific needs of the professional clients, we consider that the provisioning volumes are not an appropriate unit of measure of EBU FTE sales efforts. The point is that the full catalogue of products and solutions of EBU cannot be measured in volumes. E.g.: ICT solutions are proposed to the clients as tailor-made contracts, declined in SLA (Service Level Agreement) and quoted in EUR.

On top of the fact that not all the EBU products can be declined in volumes, EBU sales efforts are quite different depending on the product. EBU Telco mass market products are quickly available to the client, to the contrary of projects ICT that are generally sold for a 2-3 years minimum period time. Such long time period contract needs sales efforts deployed on a certain period of time too.

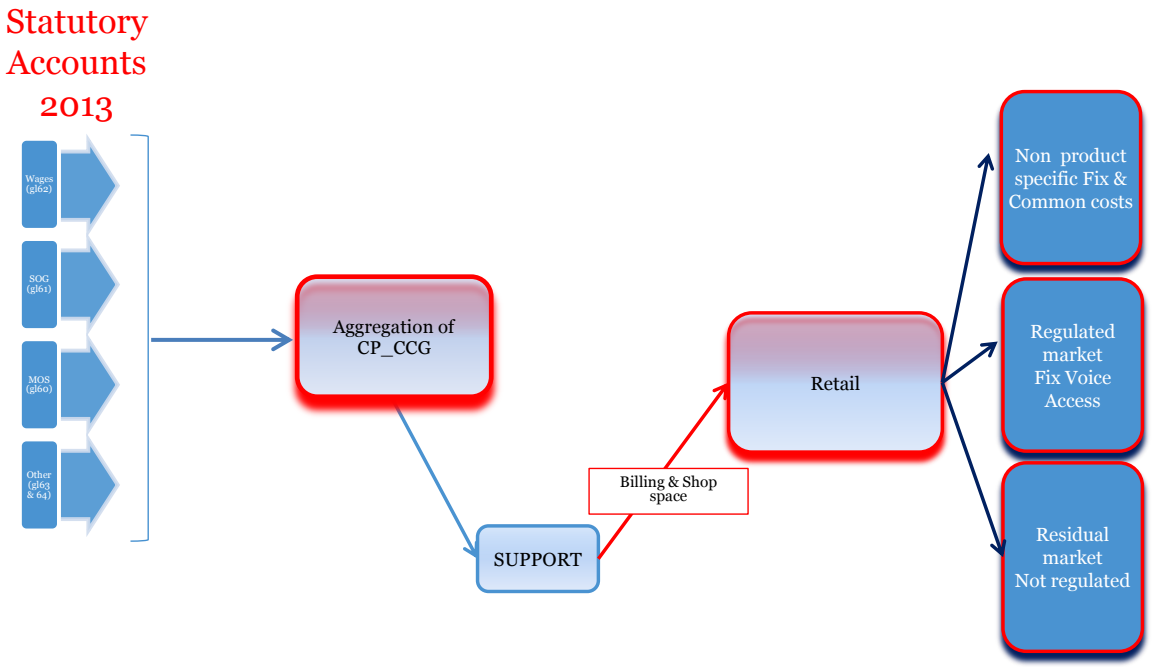
To tackle this key point, we took the total transaction value (TTVA) generated by Sales people for products and (or) solutions in 2013, as the common volume driver for EBU allocation of Sales FTE costs. The TTVA measures the total annual value of a won contract. Taking the TTVA as driver enables us to compare with a simple unit of measure (EUR) products with specificities very different such as Telco mobile subscription, ICT Data center hosting subscription, etc. Besides, inside EBU Business unit, the TTVA generated is the central driver for all what matters remuneration of direct and indirect sales channels, sales bonus calculations, etc.

EBU OPE-BSC organisational group

EBU OPE-BSC has a functional organisation that splits teams in charge of ICT products from teams in charge of Telco Mass market products. As a consequence, the issue to find an appropriate unit of measure of products, common to all EBU products & services catalogue, as explained just above, is not met.

EBU OPE-BSC organisational groups costs in charge of EBU Mass market Telco products were allocated to Market 0 or Market 1 with the same volumes allocation driver than used for CCA CBU, id est, provisioning volumes of products, as reported in OMS ([6]).

4.2.3.3 *Retail Support costs (block 2)*



Module 'Support' identifies and collects the costs of a number of support objects which a.o. are retail related. The retail related support objects primarily concern billing costs (invoice printing, stuffing and postage) and costs for shop space. These costs are primarily gathered in INCA module SUPPORT, prior to be flowed into INCA module RETAIL.

Costs for shop space are considered FIX. The costs of creation and maintain in good state a shop is not linked to the volumes of products the shop offers, but well to other criteria such as geographical localisation, local withholding tax regulation, points of sales optimization, etc. The CBU shops sell all types of products. These costs are therefore assigned as "non product specific", with the cost group "All CBU retail products".

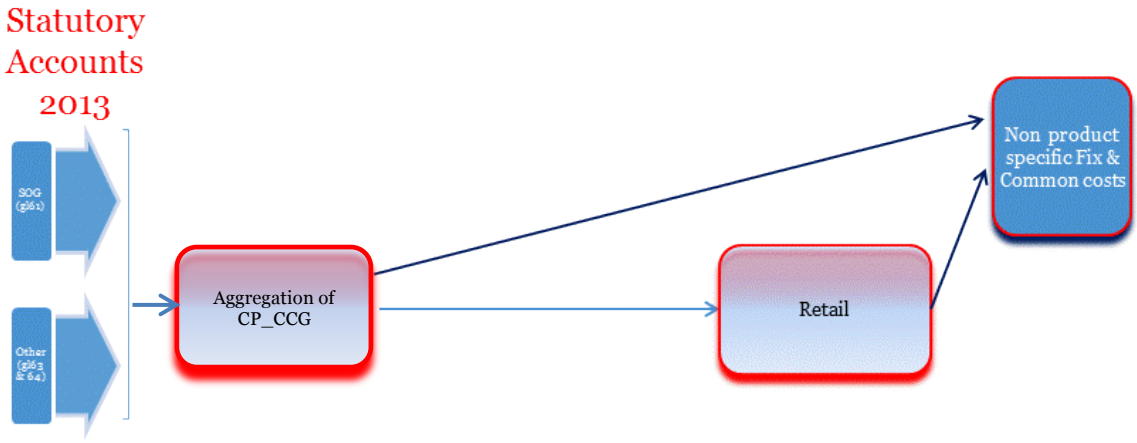
As developed under chapter 4.2.3.2.2, billing costs are fix, non product specific costs. We also highlighted the specific case where the client has only one product to bill. Cost group brings the additional information whether the billing costs relate to CBU, EBU or both.

[6] OMS for Orders Management System. IT Tools used by Belgacom for intake of sales orders for Belgacom Fix and Convergent Telco products.

Retail support costs, as they are materially considered as fix, non product specific costs, are mainly allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

Billing costs identifiable to products (1Play customer) are allocated towards Market 0 or to Market 1, according to the number of clients 1 Play.

4.2.3.4 *Retail costs which do not have a causal relationship with products (block 3)*



Retail costs that do not have a straightforward driver towards products are either grouped in module Retail, if they can be linked to the activity of a Retail organisational group, or they are directly routed to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

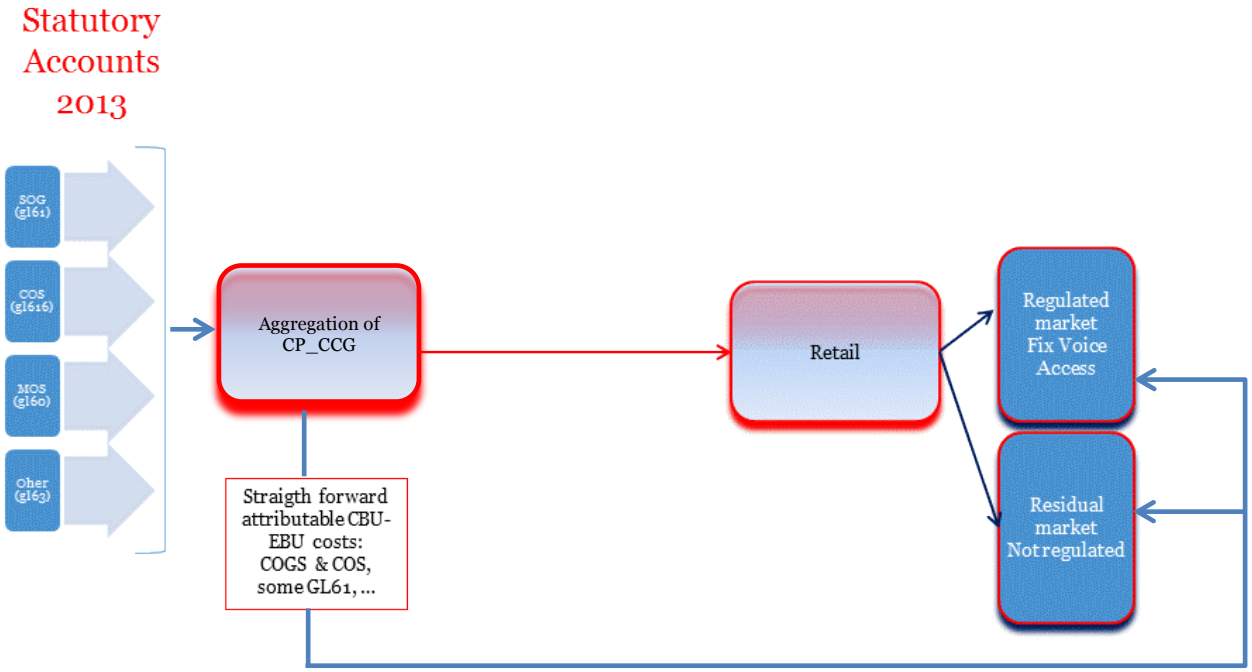
Per definition these costs are either fix (e.g. IT developments non capitalized for the internal needs of Sales departments) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, bad debt, etc.).

Per definition, these costs are non product specific. Cost group brings the additional information whether the costs relate to CBU, EBU or both.

Bad debt is categorized as common costs. Bad debt does not have a link to products but well to the ordinary course of business. Bad debt evolution is linked to criteria such as competitive environment, regulatory framework (new telecom law), quality rating of the portfolio of clients, rather than to the products themselves. Follow up and provision for bad debt is not done per products, but well per invoices and clients.

Fix and common non_product_specific costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

4.2.3.5 *Retail costs which have a causal relationship with products (block 4)*



Are included in this block of Retail costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products. Costs of block 4 are either directly allocated to Market they relate, either they transit by INCA Retail module, when the costs have to be identified as Retail objects at first, prior to be allocated to Market they relate.

Per definition, these costs have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not. Are therefore included in Retail costs - block 4, the following combinations of VAR_TYPE ; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost group specifies the product, when the cost is product_specific. Cost group brings the additional information on the panel of products covered by costs non_specific and identifies whether the costs relate to CBU, EBU or both.

The main costs of this category are Cost of goods sold, costs of sales (e.g: commissions indirect sales channels, interconnection fees), marketing expenses, and consultancy costs such as CCA (Customer Care Activities) outsourcing.

Cost of goods sold and Cost of sales, as MAR product specific costs, have a direct link to volumes of product they relate. Therefore, they can directly be allocated to the Market they relate.

Marketing expenses are Fix non product specific costs. Costs are however allocated to products (Markets) thanks to the recapitulative of all marketing campaigns costs, detailed per products.

- **Outsourcing costs**

Non product specific outsourcing costs that cannot be allocated directly to products were allocated to the INCA module Retail, where attached to the Organisational group they relate.
E.g.: Outsourcing HR recruitment costs for a specific department.

Product specific outsourcing costs (e.g. : outbound calls outsourcing costs for Mobile Retention program) were allocated directly to the Market they relate.

CBU CCA outsourcing costs were allocated to Markets in 2 steps:

- Safin Database report to share outsourcing costs related to Mobile only products from Fix and Convergent products;
- OMS report (OMS provisioning volumes) to allocate CBU CCA outsourcing costs busy with Fix and Convergent products.

EBU OPE-BSC outsourcing costs
EBU call center outsourcing costs were allocated the same way to the EBU OPE-BSC Organisational groups they support, id est, based on

- OPE-BSC functional organization to share costs specific to Telco from ICT, and inside Telco products, to split costs for Mobile only products from the other Telco products (Fix and Convergent);
- OMS provisioning volumes report for costs related to Fix and Convergent products.

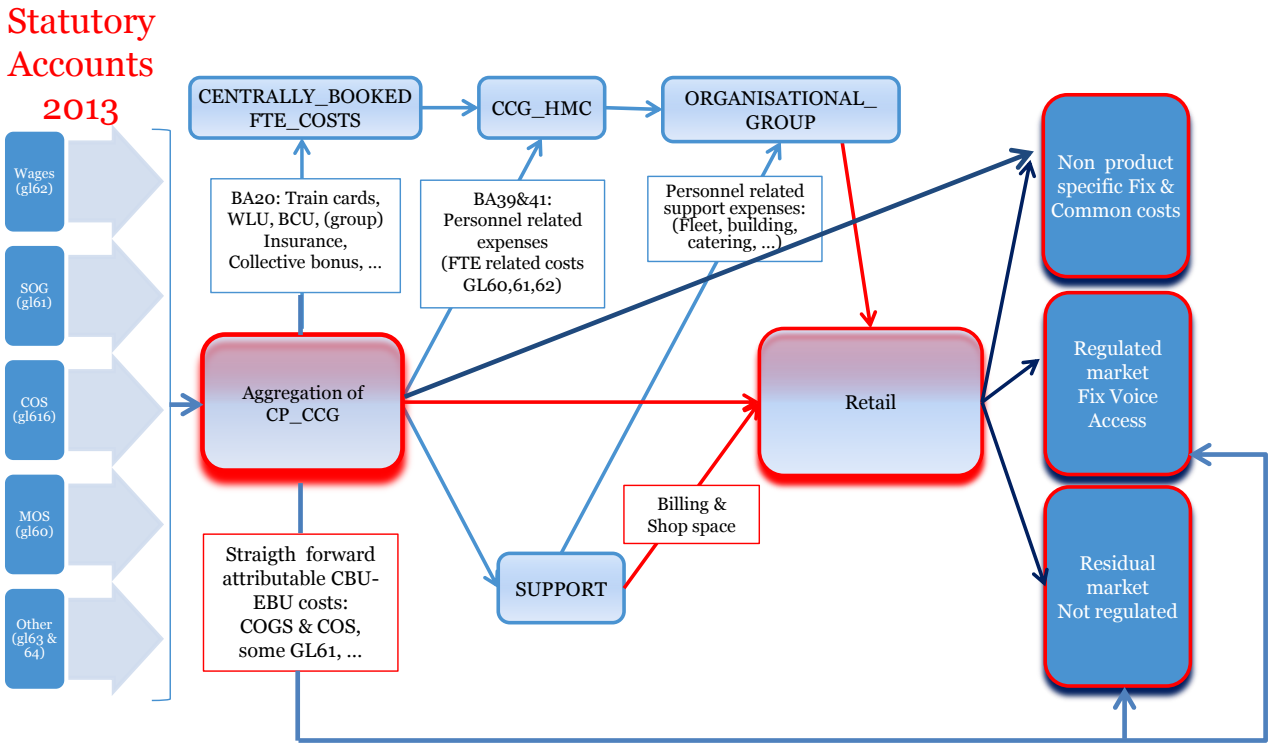
CBU/EBU sales outsourcing costs
Sales outsourcing costs were allocated directly to the Market they relate when product specific (e.g.: sales outbound calls in Mobile) or allocated the same way to the Retail Organisational group they are attached.

Allocation of costs of block 4 to the Markets is summarized as follows:

VAR_TYPE	Regulated market Fix Voice Access	Residual market Non regulated	Cost Group	Driver
Mar				
CBU/EBU Cost of good sold	-	x	EBU/CBU Product specific (see list above)	Direct
CBU/EBU Cost of sales	x	x	EBU/CBU Product specific (see list above)	Direct
Variable				
CBU CCA Outsourcing a)	-	x	ALL RETAIL MOBILE ONLY PRODUCTS	Direct
CBU CCA Outsourcing b)	x	x	ALL RETAIL FIX AND CONVERGENT PRODUCTS	OMS ordering system volumes
CBU Outsourcing e-business sales	x	x	ALL CBU RETAIL PRODUCTS	Safin volumes e-channels
EBU OPE-BSC Outsourcing a)	-	x	ALL RETAIL MOBILE ONLY PRODUCTS	Direct
EBU OPE-BSC Outsourcing b)	x	x	ALL RETAIL FIX AND CONVERGENT PRODUCTS	OMS ordering system volumes
EBU OPE-BSC Outsourcing c)	-	x	13001 Data Managed Services & Applications	Direct
EBU outsourcing Direct sales	x	x	ALL EBU RETAIL PRODUCTS	TTVA 2013 Direct sales
EBU outsourcing Indirect sales	x	x	ALL EBU RETAIL PRODUCTS	TTVA 2013 Indirect sales
Fix				
CBU Marketing expenses	x	x	ALL CBU RETAIL PRODUCTS	Detail of Marketing expenses
EBU Marketing expenses	x	x	ALL EBU RETAIL PRODUCTS	Detail of Marketing expenses

4.2.3.6 *Graphical view on retail allocation flow – all costs block (1->4)*

Retail allocation flow of all types of retail costs is presented as follows:



4.3 Allocation of CWS (Customer Whole Sale Division) related costs

The allocation flow and principles are identical to the retail cost allocation flow.

4.3.1 Determination of the CWS cost perimeter

All Wholesale activities are situated at the level of Business unit CWS (Customer Whole Sale).

The Belgacom financial and accounting structure clearly registers (directly attributable) Wholesale costs on costcenters 40xxxx.

Starting from the Belgacom organisational structure, we can identify 4 blocks in the Wholesale cost perimeter:

1. Wholesale FTE costs
2. Wholesale Support costs
3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Wholesale FTE costs

   Includes all direct FTE related costs of Business unit 40 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

   Includes also a number of costs that are not directly attributed to Wholesale Business unit in the accounting books but do relate to Wholesale FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Belgacom personnel/FTE's (and thus also towards these residing under CWS). E.g.: costs re. Fleet, office building, traincards, bonus, training, gsm's in the context of the employee phone program, …

2. Wholesale Support costs

   Wholesale Support costs are non FTE related costs which are centrally booked and managed but relate to Wholesale activities. E.g.: Billing.

3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

   This block includes costs such as IT developments not capitalized for applications specific to Wholesale departments, costs for legal claims, etc.

4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

   Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales and costs of good sold, interconnection fee, etc;

4.3.2 Wholesale cost allocation principles

4.3.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitue a unique combination for each wholesale CP-CCG.

These attribute-qualifications are applied on all the wholesale CP-CCG combinations, but at different levels of INCA modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Wholesale allocation process as described below.

4.3.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies wholesale costs based on their variability towards product[7] volumes.

We distinguish between 4 var_types:

- Marginal (mar)
- Variable (var)
- Fix (fix)
- Common (common)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 4 var_types as described in chapter 4.2.2.2.

4.3.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies wholesale costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We distinguish between 2 PS_types :

- PRODUCT_SPECIFIC (PS)
- NON_PRODUCT_SPECIFIC (NPS)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 2 ps_types as described in chapter 4.2.2.3.

In addition to the attribute PS_TYPE, all wholesale costs are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

[7] Products at the level of the customer (fast internet, TV, voice access, traffic, …). These do not correspond with the (aggregated) notion of ABC_product as defined in the INCA cost model.

Used Cost Groups for wholesale costs are:

PRODUCT SPECIFIC
20000 Mobile Roaming IN

NON PRODUCT SPECIFIC
All CWS products
All CWS non regulated products
All CWS products excluding Roaming

Since this is stricto sensu the same decision tree to qualify wholesale CP_CCG with attributes VAR and PS, than for the Retail allocation process, we refer to the decision tree presented in chapter 4.2.2.3 of the Retail module to illustrate the wholesale costs qualification with attributes VAR and PS.

4.3.2.4 *Criteria for allocation of wholesale costs to Markets*

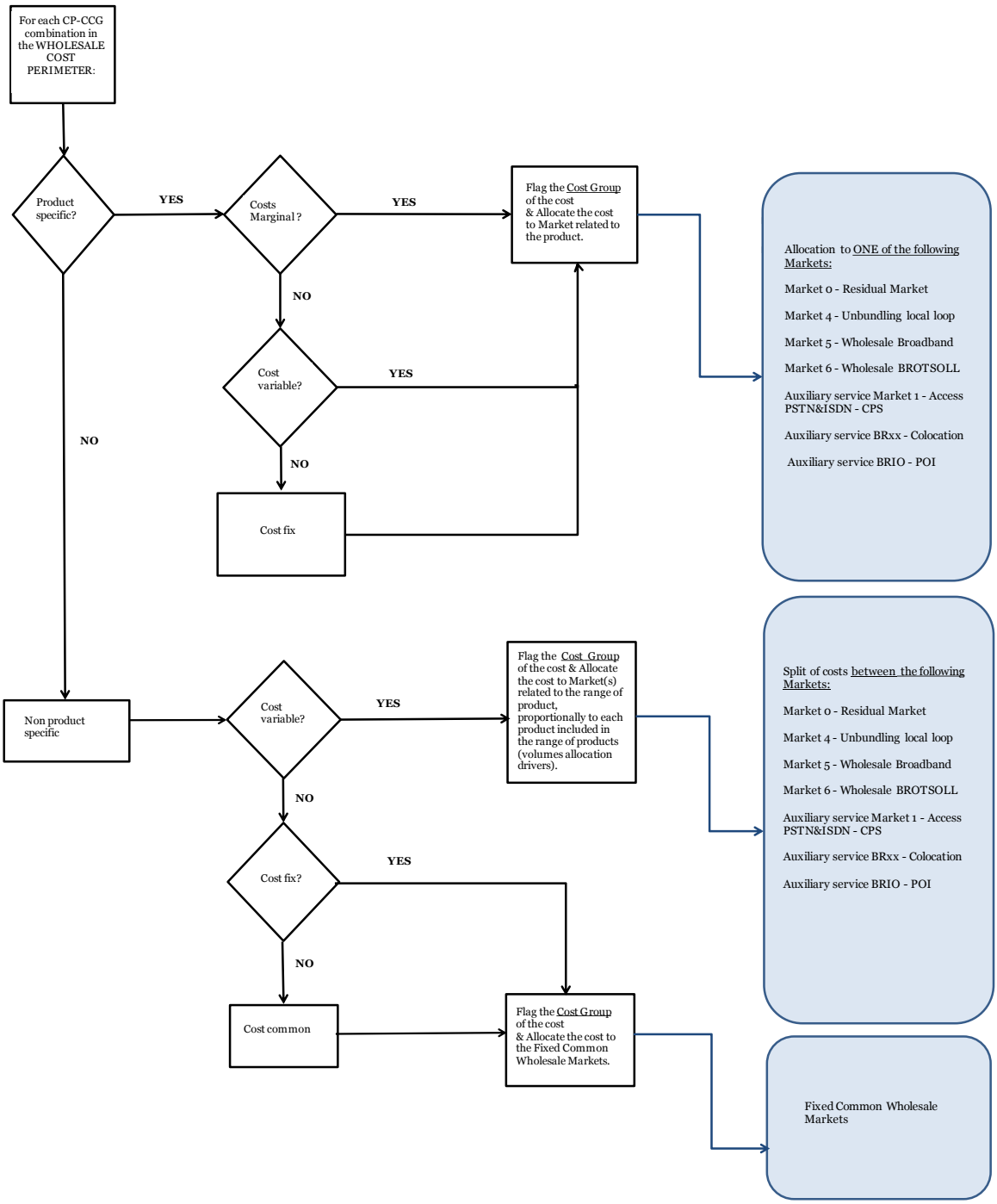
a. Product specific costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to). This means that the costs will be allocated towards one of these wholesale Markets:

   Market 0 - Residual Market
   Market 4 - Unbundling local loop
   Market 5 - Wholesale Broadband
   Market 6 - Wholesale BROTSOLL
   Auxiliary service Market 1 - Access PSTN&ISDN - CPS
   Auxiliary service BRxx - Colocation
   Auxiliary service BRIO - POI

b. Non product specific Variable costs are allocated towards wholesale Markets (see list above) based on volumes drivers. The drivers for allocation of variable costs are documented further, per block of wholesale costs (1->4).

c. Non product specific Fix and Common costs are allocated towards Market 'Fixed Common Wholesale Markets'.

4.3.2.5 *Graphical view on principles for wholesale costs allocation to Markets*



4.3.3 Wholesale allocation flow principles

4.3.3.1 *General principles*

As described above, the 4 blocks of costs included in Wholesale cost perimeter are all specified with 2 cost type attributes (VAR TYPE; PS TYPE) prior to be allocated to Markets. Similarly to the Retail allocation flow, the 4 blocks of costs do not follow all the same path of allocation. The allocation flow followed by a Wholesale CCG_CP will depend on its block of costs (1->4).

4.3.3.2 *Wholesale FTE related costs (block 1)*

The allocation flow of Wholesale FTE related costs is the same than the Retail one. We therefore refer to chapter 4.2.3.2. for presentation of the several INCA modules whereby FTE related costs are centralized/allocated. As a reminder, the list of INCA modules that deal with FTE related costs is as follows:

- Cost basis (GL62, as well as some GL60&61),
- CCG_HMC or SUPPORT ([8]),
- ORGANISATIONAL_GROUP,
- WHOLESALE.

4.3.3.2.1 Criteria for attribute dimension VAR_TYPE

With regard to the definitions of Attribute dimension VAR, Wholesale FTE related costs can only be either Fix (FIX), or Variable (VAR) costs.

Criteria to classify FTE related costs into FIX vs. VAR costs were similarly defined as for the Retail allocation flow, id est: are considered as FIX costs, all the FTE costs needed to maintain the Belgacom minimum organisational structure, independently of products volumes. These ones include staff costs such as IT officers, reporting & analysts teams, research staff (e.g.: products & solutions managers), as well as the Belgacom hierarchy structure (team responsibles).

4.3.3.2.2 Criteria for attribute dimension PS_TYPE

Organizational groups dedicated to a specific product are categorized as product_specific (PS). We identified only one organizational group in the Wholesale organisation structure that is product specific, id est, the team involved exclusively in Roaming agreements.

Organizational groups covering a span of products are categorized as non_product_specific.

4.3.3.2.3 CWS Organisational groups: VAR_TYPE; PS_TYPE; COST_GROUP

Inside CWS, organisational groups are easy to classify as Fix or Var in function of their activities. For some organisational groups, Fix FTE costs are adjacent to VAR costs. In such organisational groups, we took allocation keys to split the FTE costs between Fix and Var.

[8] Only FTE related support costs.

These "mix" organisational groups are flagged in the present table as "*Mix Fix/Var*".

Organisational group functional activities	FIX/VAR (*)	PS/NPS	Cost Group
CWS Top management	FIX	NPS	ALL CWS products
CWS Sales department	VAR (*)	NPS	ALL CWS products
CWS Products & Solutions specialists	FIX	NPS	ALL CWS products excluding roaming
CWS Call center activities	Mix FIX/VAR	NPS	*See developments further*
CWS Roaming agreements Team	FIX	PS	20000 Mobile Roaming IN
CWS Strategic planning and internal process	FIX	NPS	ALL CWS products

(*) excluding Team responsible flagged as Fix costs.

CWS Sales department is an organisational group defined as Var, non product specific. CWS sales FTE are responsible for regulated and non regulated products. The size of the department varies with the volumes of products (to be) sold.

CWS Call center activities include 3 main divisions:

- *Operational team* in contact with external clients. This division gathers the Front office and Back office in charge of the sales orders intake, answers to questions of clients, and support to the CWS Sales department in period of high business activity
- *Billing and credit collection team*
- *Reporting, IT tools management and process optimization team.*

Billing and credit collection teams were qualified as "fix, non product specific" organisational group costs. Billing activity is a cost depending on number of clients, not on number of products. In this sense, billing activity is a fix cost, as not materially changing with volumes of products. Billing costs is also a non_product_specific cost, as vast majority of CWS clients have more than one product by Belgacom. The absence or suppression of one product in the client products portfolio will not alter the need for invoicing the client.

Reporting, IT tools management and process optimization team, as Support staff team, is identified as a "fix, non product specific" organisational group cost.

Front office and Back office costs are categorized as "variable, non product specific", considering the variability of these costs with volumes of products (to be) sold, and taking into account that CWS Call center activities handle all CWS products, regulated as well as non-regulated products.

CWS organisational groups with attribute VAR can be summarized in the following table:

Organisational group functional activities	VAR (*)	PS/NPS	Cost Group	Cost Group Allocation key
CWS Sales department	VAR	NPS	All CWS products	Direct (**)
CWS Call center activities				
CWS Front office and Back office	VAR	NPS	All CWS products	Direct (**)

(*) excluding Team responsible flagged as Fix costs.

(**) Direct, based on functional organisation of CWS.

4.3.3.2.4 Allocation of CWS FTE related costs – costs block 1 – to Markets

Product specific organizational group Fix of the Roaming Team is allocated to non regulated Market 0.

Non product specific organizational groups Fix are routed towards the "Fixed Common Wholesale Markets".

Non product specific Variable (part of) organisational group's costs are allocated towards Markets based on volumes drivers.

CWS organisational groups with attribute VAR are allocated to Markets with the following drivers:

Organisational group functional activities	Regulated markets BRxxx and auxiliary services	Non regulated residual market	Cost Group	Market Allocation key
CWS Sales department	x	x	All CWS products	Provisioning volumes
CWS Call center activities				
CWS Front office and Back office	x	x	All CWS products	BCI Voice Calls & Mails report

CWS sales department costs are allocated to products (markets), according to provisioning volumes.

CWS Call center activities costs are allocated to products (markets) according to minutes of Voice Calls and number of mails handled, detailed per product, as indicated in 2 reports: BCI Voice calls report and BCI Mails report. BCI is the IT tool where CCA agents introduce a track of any question/complaint/ordering of an external client.

4.3.3.3 *Wholesale support costs (block 2)*

The wholesale support costs are identified firstly in INCA Module "Support". Wholesale support costs specifically concern "CWS_Billing" (i.e. costs for invoice printing, stuffing and postage).

We qualify CWS_Billing as a fix non_product_specific cost. Cost Group of CWS_Billing is All CWS products, since the CWS_Billing support costs include all the products of CWS, whether regulated or not.

As mentioned in chapter 4.3.3.2.3 related to the CWS CCA staff team in charge of Billing and credit collection follow-up, to the contrary of the Retail billing costs, the case that billing costs can be linked to some unique product is not met, since the vast majority of the CWS clients have more than one product billable. As a consequence, the absence or suppression of one product will not change the need for invoicing the client.

CWS_Billing costs are therefore allocated towards "Fixed Common Wholesale Markets".

4.3.3.4 *Wholesale costs which do not have a causal relationship with products (block 3)*

Wholesale costs that do not have a straightforward driver towards products are either grouped in module Wholesale, if they can be linked to the activity of a Wholesale organisational group, or they are directly routed to the Market "Fixed Common Wholesale Markets".

Per definition these costs are either fix (e.g. IT developments non capitalized for the internal needs of Sales departments) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, bad debt, etc.).

Per definition, these costs are non_product_specific.

Cost group of costs of block 3 is "All CWS products".

Fix and common non_product_specific costs are allocated towards Market "Fixed Common Wholesale Markets".

4.3.3.5 *Wholesale costs which have a causal relationship with products (block 4)*

Are included in this block of Wholesale costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products. Costs of block 4 are either directly allocated to Market they relate, or they transit by INCA Wholesale module, when the costs have to be identified as Wholesale objects at first, prior to be allocated to Market they relate.

Per definition, these costs have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not. Are therefore included in Wholesale costs - block 4, the following combinations of VAR_TYPE ; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost group specifies the product, when the cost is product_specific. Cost group brings the additional information on the panel of products covered by costs non_specific.

The main costs of this category are Cost of goods sold, cost of sales (e.g: interconnection fees), consultancy and outsourcing costs.

Cost of goods sold and Cost of sales, as MAR product specific costs, have a direct link to volumes of product they relate. Therefore, they can directly be allocated to the Market they relate.

Outsourcing and consultancy costs

Non product specific costs that cannot be allocated directly to products were allocated in a first step to the INCA module Wholesale, where attached to the Organisational group they relate, and in a second step to the Markets, with the same allocation flows than the Organisational group they relate. E.g.: Outsourced CWS CCA Back office activities.

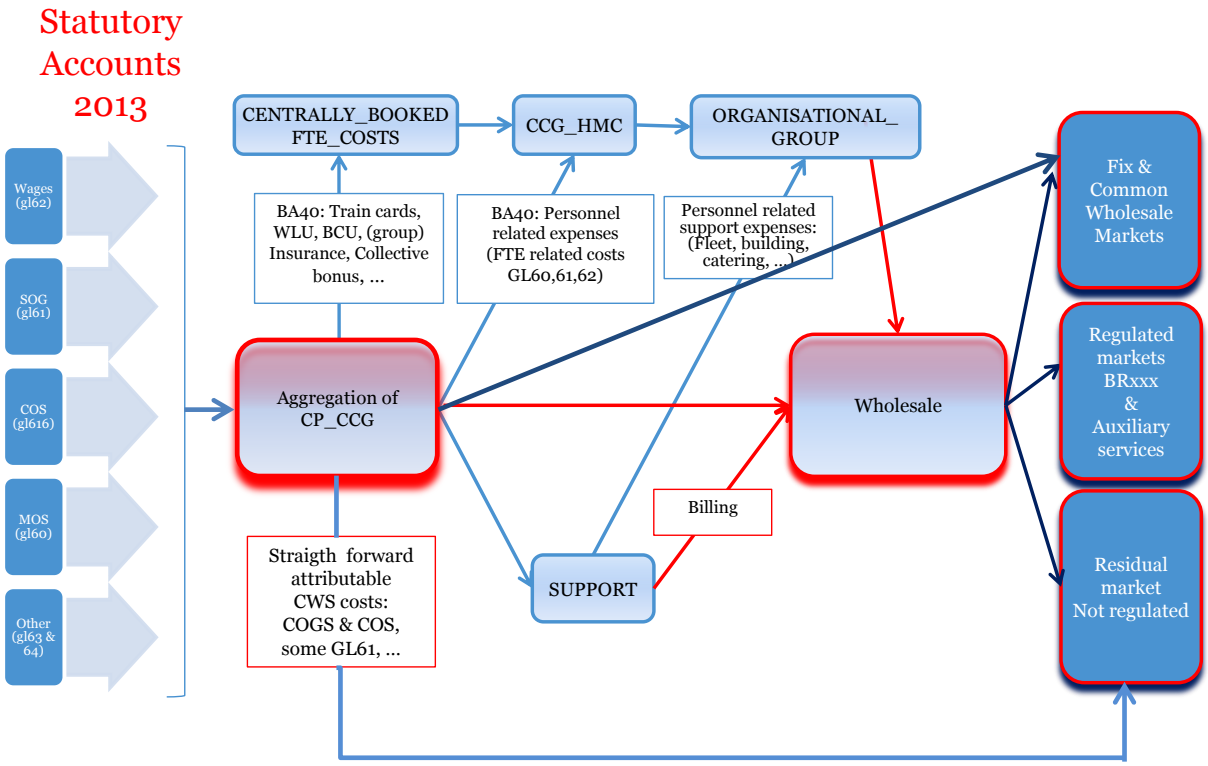
Product specific costs were allocated directly to the Market they relate. E.g.: Fees to Clearing Offices for roaming voice&data flows.

Allocation of costs of block 4 to the Markets is summarized as follows:

VAR_TYPE	BRxxx regulated market	Residual market Non regulated	Driver
Mar			
Cost of good sold	-	x	Direct
Cost of sales	-	x	Direct
Variable			
CWS CCA Outsourcing	x	x	BCI Voice Calls & Mails report
Fix			
Mandatory prof. fees	-	x	Direct

4.3.3.6 *Graphical view on wholesale allocation flow – all costs blocks (1->4)*

Wholesale allocation flow of all types of Wholesale costs is presented as follows:



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
•CCG = cost center grouping = grouping of cost centers with comparable characteristics

5 SDE OPEX (network&IT) stream

5.1 Allocation of SDE OPEX costs going through the "SDE" INCA module

5.1.1 Determination of the SDE cost perimeter

As stated previously the Belgacom organisational structure distinguishes between 4 distinct organisational pillars called Business units, we recapitulate :

- Consumer Business Unit (CBU) has the responsibility over the residential customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Service Delivery Engine (SDE) centralises network, Carrier Wholesale and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

All commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential customers and at the level of Business unit EBU (enterprise business unit) for the professional customers.

All network & IT activities are situated at the level of Business unit SDE (Service Delivery Engine), as well as the wholesale activities (CWS).

The Belgacom financial and accounting structure clearly registers (directly attributable) SDE costs on cost centers 50xxxx, separately from the wholesale costs booked on cost centers 40xxxx.

However, a number of costs are not directly attributed to SDE in the accounting books but do relate to SDE activities.

It concerns :

1. FTE related costs
   Costs which are centrally booked and/or managed but which need to be flagged towards all Belgacom personnel/FTE's (and thus also towards these residing under SDE).

   E.g. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program.
2. Non FTE related costs
   Costs which are centrally booked and managed but relate to SDE activities
   E.g. Telco space & power.

The costs under point 1. above are added up with the directly attributable FTE related costs (essentially all payroll costs and costs categorized with Cost type 'personnel-related' in the cost base, in lesser extent a limited number of costs categorized as 'non personnel-related', i.e. primarily training costs, printing costs and cost for office equipment) and allocated towards the organisational groups (as a general rule, the organisational group corresponds with the cost center group - except for hybrid network & IT CCG's (like CIS ISD NSC), IPP/VHR CCG's and COP field CCG's (like COP CFO Cable & Mass/Professional) - in module "Organisational_ group".

The costs under point 2. (telco & power space) above are identified as specific objects in Module Support and are further allocated towards network or IT elements but not to the SDE module. So their allocation will not be described in this subchapter.

The "SDE" INCA module costs are primarily sourced from the following INCA modules :

1. Organisational_Group
   This concerns the costs of organisational groups 50xxx.

2. CP1
   This mainly concerns the outsourcing costs of the remote and the field activities of COP/Customer Operations (COP CRO & COP CFO Cable & Mass/Professional).

3. BA50 Wages
   This concerns the PFA (Produced Fixed Assets, the capitalized manpower).

4. BA50_SOG
   This primarily concerns costs for consultancy bodyshopping in order to face the lack of manpower during peak times.

5.1.2 SDE cost allocation

5.1.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

For SDE, unlike for retail, these attribute qualifications are not defined at the level of the cost base for all CP-CCG combinations but only for the FTE related costs at the level of the organizational groups (module "organisational_group").

5.1.2.2 *Criteria for Attribute dimension VAR_TYPE*

Dimension VAR_TYPE only qualifies SDE FTE-related costs in the SDE module, unlike in the retail module.

Variability refers to the service volume produced by the company in the long-run. This variability has 2 dimensions : volume within a product or diversity of products. The considered increment is the whole product. E.g. PSTN : what if we stop PSTN, which costs do we avoid? This is very hard to reach, especially in a top-down model.

Therefore, we prefer to opt for a simple approach that is only an approximation of the minimum fixed costs, by only considering as fixed FTE-related costs the minimum organizational structure, represented by the persons attributed with a "team responsibility" or in an MST cost center, as officially reported in the SAP accounting system.

We distinguish between 2 var_types only (unlike Retail, with 4 var types):

1. Fix (fix) : SDE FTE-related costs are considered as fixed when they are related to the minimum organizational structure (represented by the team responsibles and the Management & support teams) should there be a change in the long run.
2. Variable (var) : SDE costs which are not considered as fixed according to the definition hereabove (hence overestimated).

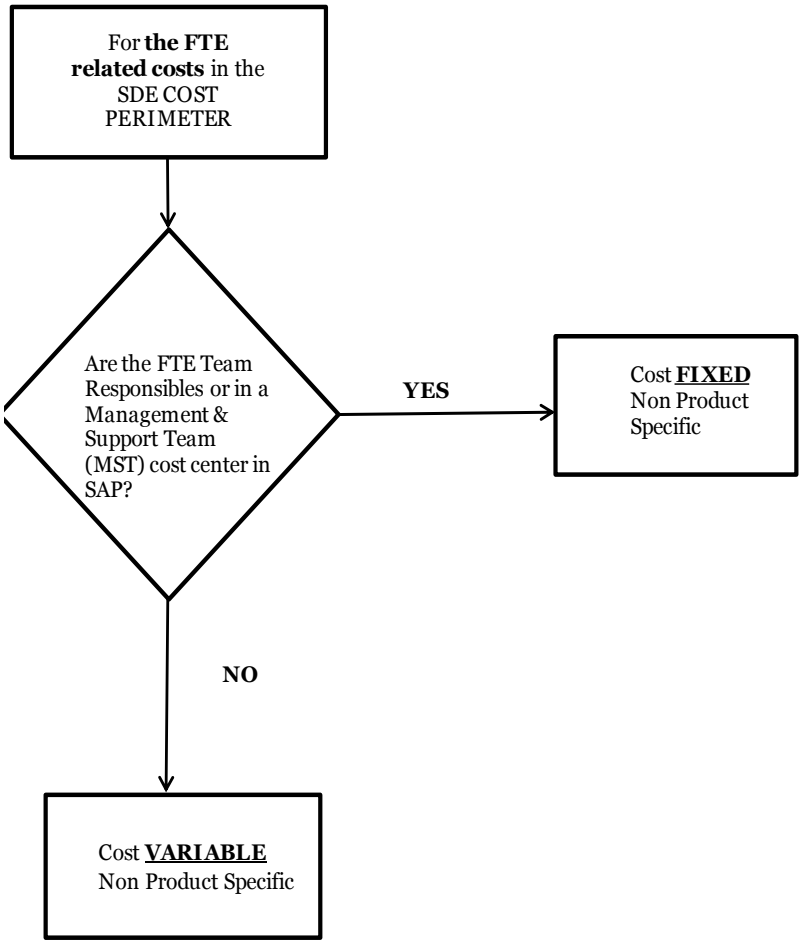
5.1.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies SDE costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We only have one category in the SDE module :

a. NON_PRODUCT_SPECIFIC : SDE costs which do not have a clear (causal) relation with specific products.

SDE MODULE: VAR & PS TYPE



5.1.3 SDE allocation process

5.1.3.1 *Allocation of "Organisational_Group" costs*

For SDE, except for IPP/VHR & COP field as well as hybrid (network & IT) teams, the organisational groups correspond with the cost center groupings as introduced at the level of the cost base.

The criteria as set above (5.1.2.2.) regarding variability are currently translated towards organisational groups based on this decision table :

	Criteria	Justification
fix FTE	Assigned as Team responsible in SAP	Assumption of Belgacom as ongoing concern on the long run, independent of product mix or individual product volumes : maintain the same organisational structure (reflected through team respo's)
	Assigned to an MSTcost center in SAP	MST cost centers are referring to Management & Support teams

Organisational groups dedicated to a specific product are categorized as product_specific.

Organisational groups covering a span of products are categorized as non_product_specific.

In SDE, all organisational groups have been defined as "non_product_specific".

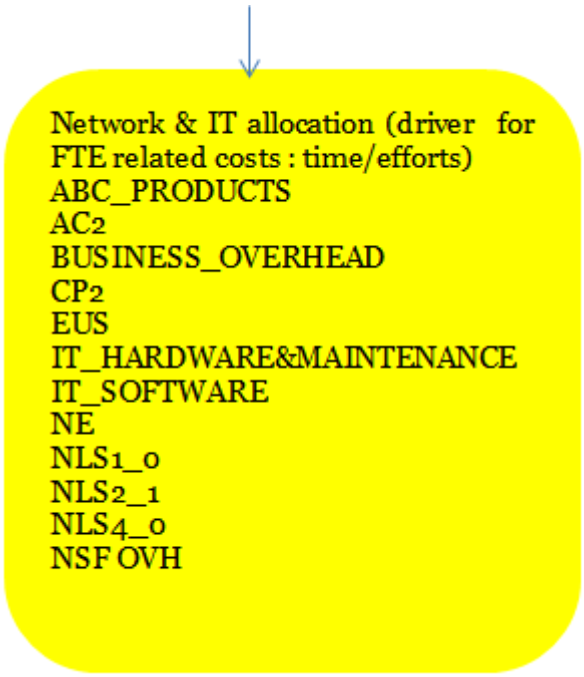
The allocation for fix & var (parts of) SDE organizational groups is the same.

The FTE related costs of organizational groups are allocated towards network or IT elements based on time or efforts spent for these respective network or IT elements, as registered in various reporting systems depending upon the department (CANVAS/PLATO working hours for NEO, TM1 Dispatch Units for COP CFO, CMS working minutes for COP CRO, Rapid for ITS).

5.1.3.1.1 Service Delivery Engine Organisational group allocation

5.1.3.1.1.1 SDE network & IT OPEX organizational group allocation

[Confidential]



In the SDE module, the organisational groups in the above table do not only encompass the costs of GL 62 wages (including the PFA, capex manpower), but also FTE-related costs from GL60 MOS or GL 61 SOG, as well as outsourcing costs (mainly for COP field and remote teams).

In the later case, the driver is the same (based on time/efforts), but does take into account the time/efforts of both the internal & external manpower.

The allocation of the "operational" teams is done directly through the driver whilst the allocation of the "overhead" teams is done through generic keys taking into account the scope of the overhead team (driver is the remuneration cost allocation of all the teams in the scope of the overhead team).

The allocation of the "fix" part of the "operational" teams is done through generic keys (a simple copy of the remuneration cost allocation of the "var" part of the same operational team).

5.1.3.2 *Allocation of SDE support costs*

Module 'Support' identifies and collects the costs of a number of support objects which a.o. are SDE related. The SDE related support objects primarily concern costs for telco power & space. However, telco power & space costs are not treated in the SDE module and are thus not described in this subchapter.

5.1.3.3 *Graphical view on SDE OPEX allocation flow*

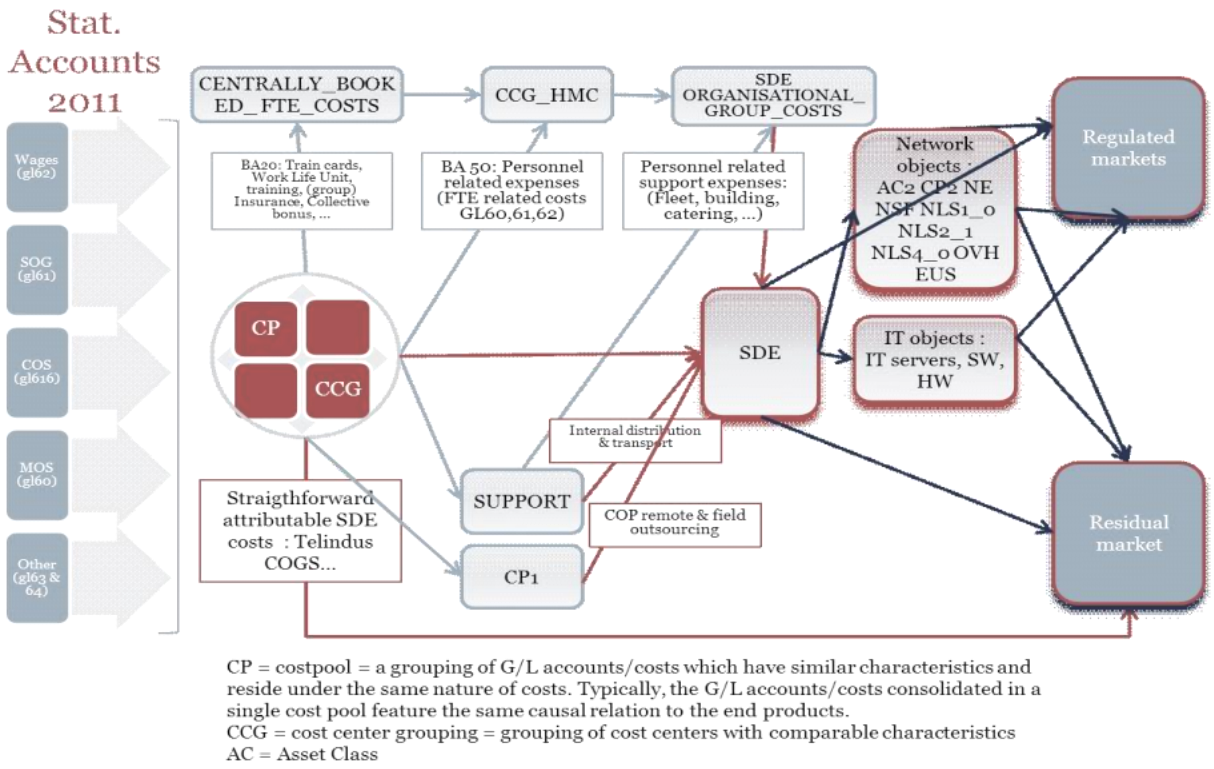


Figure 6: SDE OPEX Flow – General

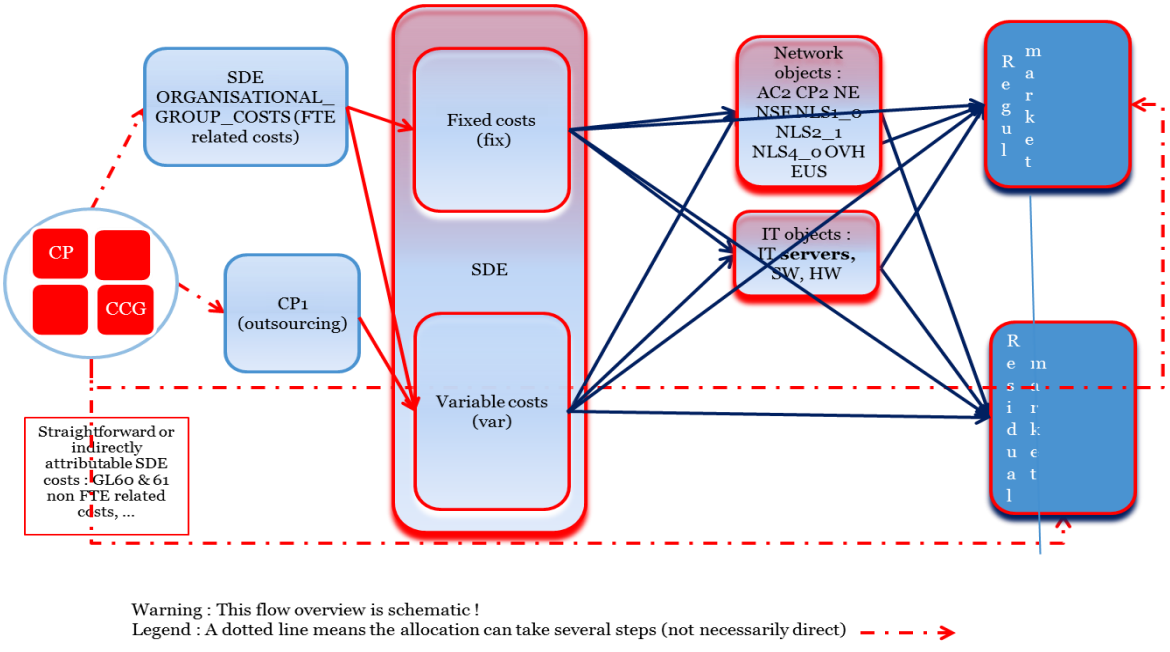


Figure 7: SDE OPEX Flow – Fix / Var

5.2 Allocation of SDE OPEX costs not going through the "SDE" INCA module

5.2.1 GL61 accounts – Services and Other Goods (SOG)

The GL accounts in the 61 range mainly register outsourcing, consultancy, renting & maintenance costs as well as miscellaneous costs driven by staff (GSM, memberships, office material, internal events etc.).

The GL61 accounts are at a sufficient detail level to allow for a direct allocation to one of the cost objects of the allocation flow. The destination cost objects are distributed over different allocation modules:

GL 61 Input Cost Cost Center-GL Account	Manpower related GL	CCG_HMC
	Building related , maintenance, consultancy, Outsourcing - GL's	CP1
	Cable infrastructure GL	CP2
	Office Automation GLs	IT_Hardware&Maintenance
	maintenance Fleet Gl's	ORGANISATIONAL_GROUP
	Consultancy GL	SDE
	technology Specific GL	AC2
		EUS
		NE

5.2.2 GL60 accounts – Material Out of Stock

The GL60 account costs cover the cost of all kinds of material taken out of the stocks of Belgacom and used for the repair and provisioning of network or the cost of small items (office material, GSM,…) consumed by the staff in the context of their daily activities.

Note that movements from stock also occur for the construction of the network; these costs are capitalized. From SAP-MM, it is possible to filter out the movements to be capitalized and the others. The capitalized MOS costs are implicitly treated with the assets.

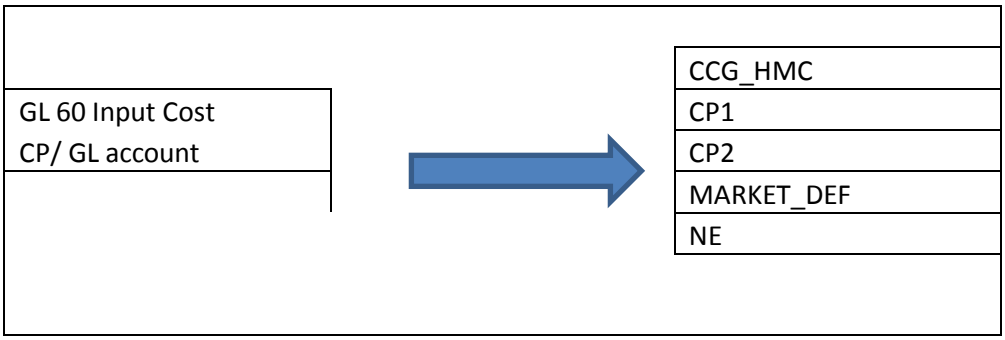
MOS costs are reported at CP/ GL account level per cost center.

This level doesn't always allow an accurate attribution of the costs to the model cost objects and therefore an analysis is performed at the cost base level together with detailed information out of the SAP database .

- The SAP records are reported among other detailed information such as the Material Item Number, where the amounts can be directly attributed to a cost object of the cost model based on the description of the material item.

  The SAP database contains more than 600.000 records.

This analysis results in an allocation towards: network related cost pools (CP2, NE, SDE), manpower related cost pools CCG_HMC & specific market cost .



Once each material item is attributed to a cost object, it is easy to report an allocation from the CC/GL account aggregate to the model cost objects.

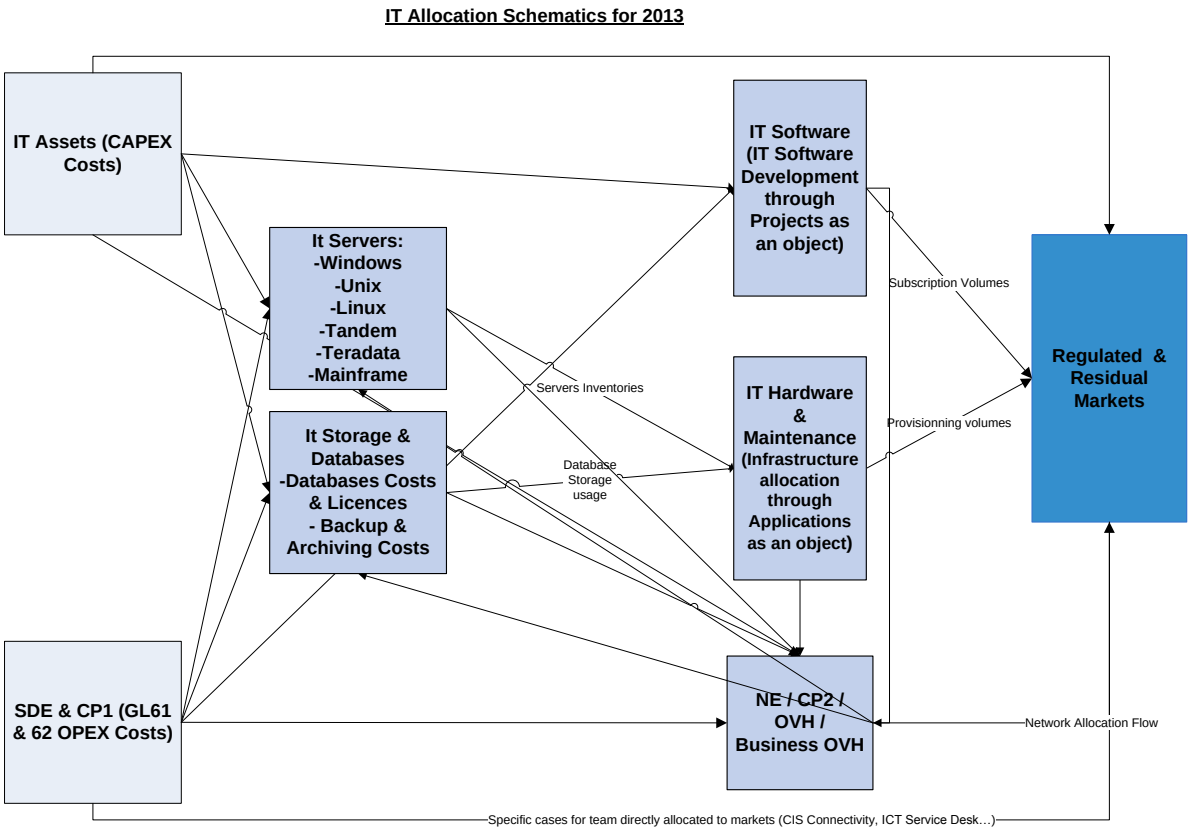
6 IT stream

6.1 IT delivery

6.1.1 IT allocation flow: Introduction

The IT model can be summarized by the following drawing representing the different IT Modules as defined in the IT model, as well as describing objects contained in each of them. The creation of these modules and objects will be detailed in the following paragraphs as well as how they are allocated to each market through an allocation which uses causal and generic keys created with data available in different inventories or reporting systems within the company.

ICT is the use of programs with a specific infrastructure to deliver a requested service or product to the end-user (which can be a Belgacom Client or a Belgacom Employee). In Telecommunications, rarely will we encounter an Application or a project that are exclusively used by one product or market. Most of the time, it will be used by different ones. Therefore, the goal of this model is to regroup all capitalized and operational costs within clusters of applications or projects that have been defined so that the link to markets can be made.



Reporting systems and inventories either report to an application and its component or to a project. For the last years, Regulatory created clusters of applications called Constellations which were dropped off since the 2011 model. All this IT information coming both from REG and internal sources allow the creation of an allocation towards the markets. The same approach was followed

for the allocation of IT software developments through the attribution of projects to the markets. The allocation stream goal is to link the costs of manpower and infrastructure that are used in order to create, run and maintain applications, components and projects to the markets defined in the regulatory model.

These costs can be of two different types: capitalized and therefore depreciated following accounting rules (for IT, depreciation length is mostly 4 or 5 years), or operational and fully charged for the current year. Depending of the cost's nature, the allocation stream will follow a different path and use different inventories and reporting systems in order to create the optimal allocation keys.

Accounting has defined, for capitalized costs, more than 130 IT assets or sub-assets which can be easily identified as distinctive IT objects in the model. Inventories and accounting provided the raw data needed in order to create the allocation keys.

6.1.2 Data sources: IT Inventories and Reporting Systems:

Infrastructure and Hardware Inventory:

The hardware layer of the IT Infrastructure within Belgacom is composed of a server park, a storage facility and an intranet required for interconnection. For Servers allocation, two inventories were used to populate the park and gain depth in their use. WMC[9] and Sun:bc for UNIX are databases maintained by IT Engineering. Regarding Storage, the weight of databases from different technologies is used as the allocation driver.

Internal IT Databases:

The main database used in the model is the "Configuration Management Database" (CMDB) which populates and links together all IT related objects in Belgacom, such as which databases are used by an application, or what is hosted on a server. This is used primarily for incident management.

IT Asset Manager (ITAM) is the inventory for all IT equipments with a reference to its cost and is used by Finance to calculate yearly the costs for IT hardware Assets.

ARIS is a recent initiative to install a business process modeling tool which allows the aggregation of applications and to understand fully their purposes.

Reporting Systems:

Rapid[10] is a tool used for projects, budget and capacity management related processes, with interfaces to other core systems such as SAP HR (human resource & organization units data) , SAP Finance (actuals, purchase order..), IMD (release Management) and timesheets applications (used by SDE to report their day-to-day work). Rapid will be used to calculate allocation keys for most manpower costs for SDE regarding both Capex (allocation of Assets ranging from 2526 to 2573)

[9] Windows Management Console

[10] **R**epository for the **A**dministration of **P**rojects and **I**nitiatives in a **D**ecentralized way

and Opex. 2523 and 2547 assets categories will be allocated using a direct allocation key as their sub-asset provides enough information.

Regarding maintenance and contractors, the data is no longer maintained by the vendor management team. Rapid is therefore used for both these allocations.

TM1 is an interface from excel to SAP allowing the extraction of Data coming from Finance and HR. It completes our asset reconstruction for the non workload costs.

6.1.3 Modules and Objects composing the IT allocation flow

IT Servers

A server is a set of hardware running as a service to serve the needs or requests of others programs or users. The followed approach is to split the servers into families based on their technology as firstly, it matches the operational organization within Belgacom, helping in coherence and giving the opportunity to have for each family an expert available to help, backed up by dedicated inventories for windows, linux and unix. Secondly, families follow a logical flow of cost allocation. Windows machines can be split in two categories (physical and Virtualized) to which we apply a weight based on their occurences within the inventories in order to give more consistency to the data used for the allocation keys created. Linux and unix follow the same rules. Finally Teradata, Tandem and Mainframes machines will be directly allocated to the applications that use these special technologies.

Splitting the server asset between these families was achieved by using the cumulated purchase costs of these families which is provided by Finance. This calculation is made possible by the inventory maintained in ITAM. It should be noted that for the 2013 model, the key used were from 2012.

a) Windows family

Windows is split between two categories: Physical and Virtualized servers. Virtualization machines use a software layer to emulate more (virtual) servers with the possibility of using different operating systems or environments, helping to rationalize resources (by allowing more redundancy, saving space etc.).

b) Linux Family

Historically, Linux mostly supports applications and processes related to the residual market.

c) UNIX Family

The Unix Allocation follows the same method as the Windows family.

d) Teradata and Tandem Families:

Teradata are servers specifically used by the Data Warehouse and will be directly allocated to the corresponding cluster (DWH).

Tandem machines are non-stop servers for the Customer Billing application and will be directly allocated to its corresponding cluster (COB).

e) Mainframes family

Mainframes are used by a small group of specific applications and will be allocated according to an IMA key based on the number of users for each application using directly mainframe resources.

Storage

In order to allocate costs from databases to applications, we used a report from each database family operational team (Oracle, SQL, Teradata and IDMS) to map databases with applications and to create allocation keys based on the total size of the databases used by each application. For 2013, keys from 2012 were used.

IT Hardware & Maintenance:

The Hardware & Maintenance module summarizes all costs related to the hardware infrastructure as well as specific maintenance. All applications that receive any cost from servers and storage are found in this module. There are 3 specific cases which are detailed by the following:

a) Connect IT:

Connect IT is the Intranet used by the IT infrastructure in order to inter-connect the different objects it uses to deliver a service. The allocation will be based on a post-process generic key defined by the CAPEX Software investments for the last 5 years and OPEX from 2013.

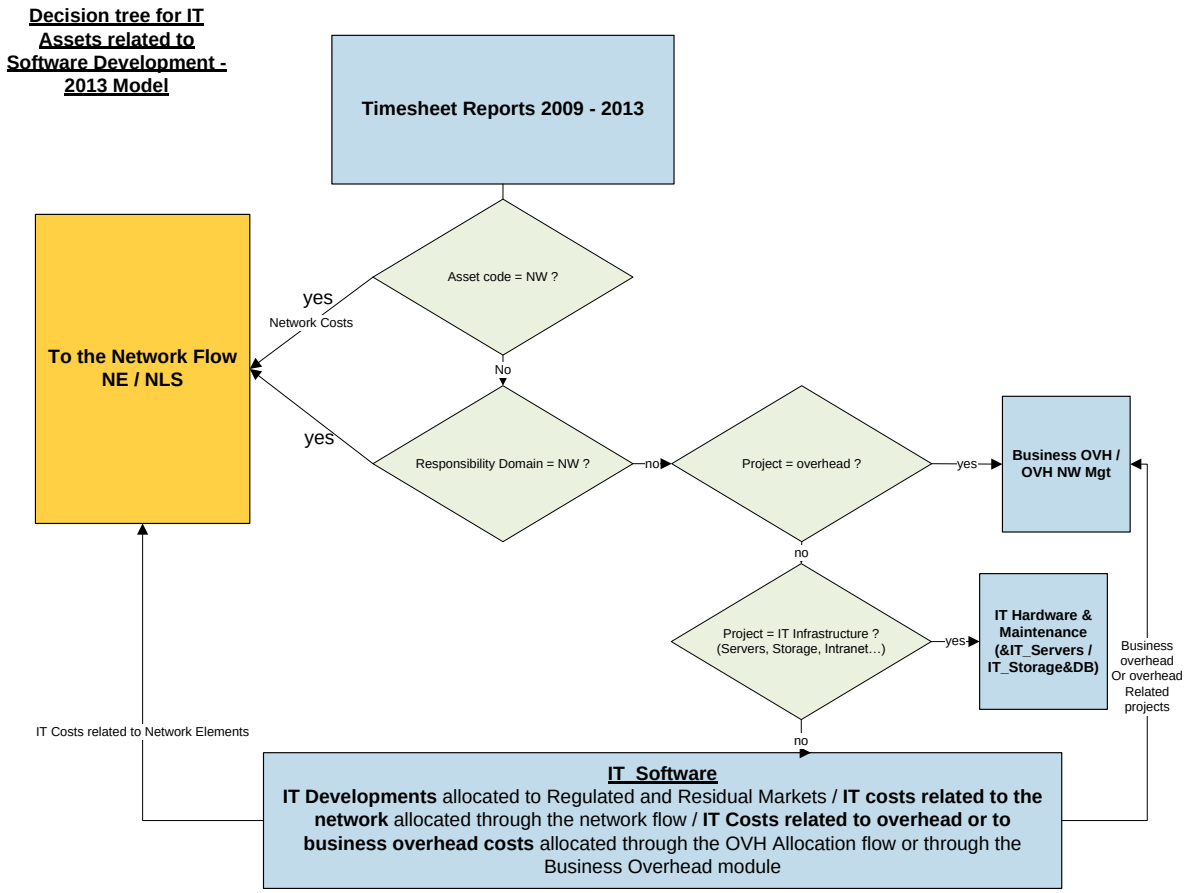
b) Application Interaction Platform:

The Application Interaction Platform object is defined as the software layer required to inter-connect Belgacom's complex IT infrastructure. Websphere and middleware costs compose most of this object. Websphere Application Server (WAS) sets up, operates and integrates electronic business applications across multiple computing platforms allowing real-time application integration, event-driven processing and process automation. A middleware is a software component that provides interoperability in order to support and simplify complex distributed applications. It is an intermediary layer between application software working on different environments or operating systems. This object receives mostly costs from either middleware or websphere licenses, upgrades and the infrastructure costs it uses (mainly storage and servers). The same generic key as Connect IT is used to allocate application interaction platform.

c) IT Overhead

The overhead object is a pool of costs that manages the Belgacom's IT Infrastructure. It is internalized in the IT model by the use of a generic key based on the IT_Software module allocation on OPEX costs from BA 50

IT Software:



The IT Software module summarizes all the IT CAPEX costs from the last 5 years and the OPEX costs from 2013. It pools all software development costs and excludes pure network costs, which will follow the network allocation stream.

In order to give more consistency to the allocation, we regrouped some projects into two different clusters that will follow a particular generic allocation:

a) Non development projects:

Non development projects relate to existing support projects in which employees or contractors book their activities when they are not involved in an IT project development. It represents mainly support projects which exist due to investments projects. It is

allocated by a generic key based on the IT Software module CAPEX costs from the IT Assets only and the OPEX costs from BA 50.

b) SW Application Interaction Platform

This object is the same as the one in IT Hardware & Maintenance but for software development instead of IT infrastructure.

Allocation Process for IT Assets and Operational Costs:

IT Assets allocation:

- **2500 Servers (Inclus. Tandem)**

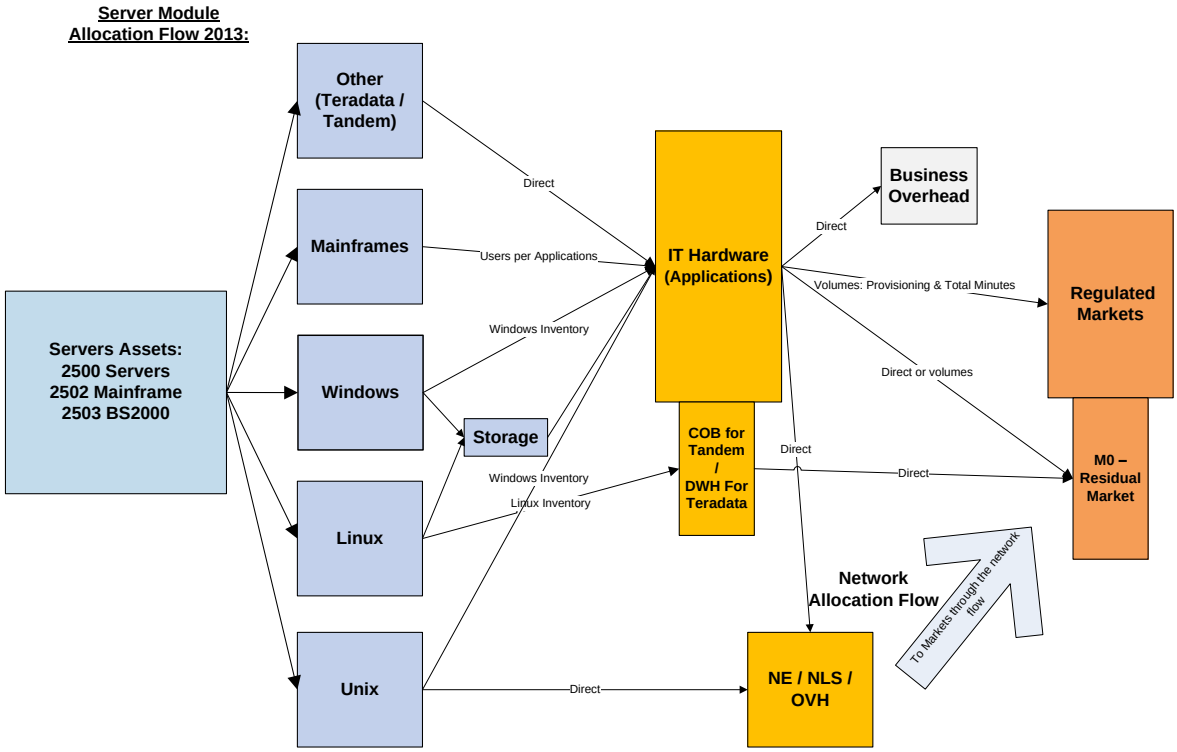
Servers can be used by applications (software sold by a vendor or developed in-house) and databases or for interconnectivity and security. This asset pools most of servers families used within the company such as Windows, Linux, UNIX, Teradata and Tandem technologies. Accounting distinguishes the following families: Wintel (Windows for Telecommunication), UNIX (with Linux pooled in this family), Teradata and Tandem. Keys are created from Finance split in order to allocate costs to each family, which will be treated distinctively, following a specified allocation path depending on the technology.

Linux, Windows and Unix are allocated through a careful analysis of their respective inventories.

Tandem and Teradata are both allocated directly to their corresponding application: Customer Oriented Billing (COB) for Tandem and Data warehouse for Teradata (DWH). By definition, they will directly contribute to the Residual market as well.

Mainframes costs are distributed between the 7 applications that use this technology (ABD-FH, ABD-NFH, ABR, AGS, ASR, ITC and ITR) by a key based on the number of users per application.

Finally, UNIX costs are allocated to other IT objects by using the same approach as the windows allocation.



- **2501 Storage:**

Storage for Belgacom is both a core business as well as a support for employees and customers. It is required in order to run applications and databases, create backup and archives to save an employee's work or a customer's information (regarding billing or call details records for instance).

- **2502 Mainframe BS2000 HW & 2503 BS2000 Software:**

Mainframes are powerful computing platforms used for critical applications. They can be considered as multiple servers within one machine. Sensitive applications and data that require heavy computing power are hosted on them. It requires specific software to run which costs are pooled in the 2503 BS2000 Software asset. The mainframe park has been updated to the Z-Series designed by IBM.

- **2504 IT Internal Network**

IT Internal Network is an asset representing Belgacom's Intranet, required to support the needs of employees as well as the interconnection needed in order for the different IT objects to communicate.

- **2505 Office Automation**

Office Automation pools IT costs and improves productivity such as development environment, printing servers etc.

- **2506 End user IT Device**

Concerns IT material made available to Belgacom's employees such as laptops and desktops. It is an office automation cost.

- **2520 System Software:**

System software is an asset for some specific database and middleware applications costs (websphere for instance) and licenses of some IT applications running on Ethernet MPLS and (D)WDM equipment. Database is an object within the "IT_Storage&DB" module and middleware is a main contributor to the "Application_Interaction_Platform" object. In order to split the costs, the capex costs for the year 2013 were used from SAP records in Asset Accounting for all booked projects related to this asset.

- **2523 Major Software Application:**

This is a specific asset that pools applicative mobile costs. It contains IT sub-assets as well as network ones due to historical reasons. Each element can be identified in terms of type (IT / Network) and costs (distribution per sub-asset) and allows individual and direct allocation. The following table represents this asset allocation:

Mobile Assets Allocation	Sum of COST	Sum of FRACTION
CP2		
CP_Mobile_Backbone		
IT_HARDWARE&MAINTENANCE		
IT_Office_Automation		
IT_SERVERS		
IT_Servers_Linux		
IT_Servers_TANDEM		
IT_Servers_TERADATA		
IT_Servers_Unix		
IT_Servers_Windows		
IT_SOFTWARE		
Mobile_Business_Software_development (AC2523)		
SW_Application_Interaction_Platform		
IT_STORAGE&DB		
IT_Storage&DB		
MARKET_DEF		
Market 0 - Residual Market		
Market 7 - Wholesale Mobile Termination		
NE		
NE_MobileDataSwitching		
NE_MobileIntelligentNetwork		
NE_MobileVoiceSwitching		
NE_RAN		
Grand Total		

*Mobile Business Software Development regroups all mobile sub-assets related to the residual market. As they relate to specific software development, allocating them to the IT_Software module gives more coherence to the model in order to regroup all IT development costs in the same module. This object will later on be allocated to the Residual Market.

- **2525 Application Software Other:**

Application Software Other is an asset for all Capex licenses costs that are not pooled in another IT asset (licenses costs for minor applications for instance). It is heavily related to applications and office automation as it is composed of licenses for antivirus, to a software package sold by an external vendor and used by an in-house core application such as our Order Management System (OMS) or statistical and databases manager for our data warehouse department. In order to allocate this key efficiently, the number of logical machines (physical and virtual) from each server related family was used as a means to ventilate these costs through the server allocation process.

All following assets (with the exception of the 2547 one) are related to specific software development and will follow a specific allocation in order to pool all costs to the IT Software module. The key consists of a 5 year CAPEX study of the cumulative investments per project for each asset. Explicit projects are copied in the IT Software module with their full name while non-explicit projects are pooled within dedicated objects such as: “non development project” and “SW Application Interaction Platform”.

- **2526 Applic SW IMA:**

All costs related to the **I**dentify **Ma**nagement (IMA) application are assigned to this asset. IMA is composed of 6 components (Core, Employee, Dealers, Customer, Module, and Management) that identify all Belgacom users.

- **2529 Appl SW Middleware:**

Although named Middleware, this asset is composed of special applications that play the role of a middleware inside Belgacom’s IT infrastructure. It has to be distinguished from some costs objects in System Software and Application Software Other that also have middleware costs such as Websphere licenses. This asset pools IT domains from:

- A **B**usiness **P**rocess **M**odeler which delivers a process integration platform for enterprise services based on service-oriented architecture.
- A **S**ervice **O**riented **A**rchitecture layer.
- A **S**OA **S**ervices **R**epository to document and describe all SOA services.
- And a **H**ub **C**ontract **S**oftware used as a middleware connectivity tool.

- **2530 Applic. SW PILA:**

Pila Asset is composed of more than 20 applications and components related to the **O**rder handling **M**anagement **S**ystem (OMS) with all its bridges with provisioning systems and a customer relationship management interface with BCI as well. OMS is one of the main contributors to this

asset, as is the **N**etwork **P**rovisioning **S**ystem linking OMS with provisioning systems and the **O**rder **F**low **A**pplication (an interface between BCI and OMS).

- **2531 Applic. SW BCI:**

The Belgacom Channel Integration (BCI) is a customer relationship management tool for all call-centers. This asset is composed of 15 components -enabling a real-time customer information input or output in order to improve the feedback a customer receives when calling Belgacom's helpdesks.

- **2532 RID(Reference Inventory&Design):**

RID is an asset related mostly to inventories and documentation that are used in different processes as it pools 6 different Domains.

- **2533 Applic. SW WFMS**

The **W**ork **F**orce Capacity **M**anagement tools (WFM) asset is composed of 23 applications which automate the dispatching on the field of all Belgacom's technicians including a scheduler and reporting system.

- **2534 Applic. SW UTS**

The **U**nified **T**rouble **T**icketing System (UTS) is a system used in order to register and follow-up trouble tickets pro-actively and reactively.

- **2535 Applic. SW Cust Relationship Management**

This asset is composed of two applications related to the selling process and are directly linked to CRM: **C**ustomer **S**ales **A**ssistant (CSA) and **C**ustomer **V**alue **M**anagement (CVM).

- **2536 Appl SW COB**

This asset pools costs from the **C**ustomer **O**riented **B**illing system (COB), composed of 24 applications that are mapped on 3 different domains: **C**ustomer **D**ata**B**ase (CDB) **I**ntercarrier **B**illing **I**nformation **S**ystem (IBIS) and the **C**all **D**etails **R**ecords **Flow** (CDRFLOW). Billing data is a sensitive matter for both customers and Belgacom and requires real-time redundancy. Therefore, COB applications are hosted on dedicated technology: Tandem servers also called "Non-stop servers". The CDB Application is retail related, IBIS wholesale related and CDRFLOW applies to both.

- **2537 Appl SW SAP**

The SAP Asset pools all costs coming from all modules used by Belgacom.

- **2538 APPL SW-Number Portability**

Number Portability is composed of two main applications called **F**ixed **N**umber **P**ortability (FNP) and **C**arrier **P**re-**S**election (CPS). CPS is an important system as it is an interface with OLO's requirements to deliver their services. As for FPS, it is a domain exclusively used by Belgacom.

- **2539 Applic. SW ECA/ECM/VORTAL**

E-Channel **A**pplications (ECA) and **E-C**ontent **M**anagement (ECM) are tools to manage and web-enable digital content for consumers (B2C) or enterprises (B2E). These are websites to engage customer relationship in order to conduct e-business via the Belgacom websites. 40 applications are stored in this asset and regrouped into 3 IT domains.

- **2540 APPL SW – ROSY**

ROSY is a core component of the IT infrastructure as it is the runtime engine for SDH, XDSL and ITDV provisioning and repair.

- **2541 APPL SW – NETCAM**

NETCAM is a dedicated asset for Rosy's workflow engine for SDH (BPEL).

- **2542 Sales Handling Engine(SHE)**

The **S**ales **H**andling **E**ngine (SHE) is a sales application used as a layer in order to enable convergence between all selling applications so that our vendors and partners will have a global view on all products supplied by Belgacom Group, improving order intake and rationalizing the IT selling infrastructure. Pre-Sales and Sales are activities in the fulfillment process being mostly allocated to the residual market.

- **2544 APPL SW -IT Security**

IT Security asset pools heterogeneous costs that can be related to applications NFM (**N**ew **F**raud **M**anagement) and IMS (Identify and authentify for provisioning engine), buildings (physical security), to even Skynet Costs to protect user's privacy or overhead costs to protect the IT infrastructure from malicious harm (virus, pirate take-over…)

- **2545 SW Usability Lab**

This asset will follow the same allocation pattern as the 2509 HW Usability Lab and all costs will be sent to the business overhead object.

- **2547 Major software applications**

Major software applications are assets regrouping all new IT developments and applications since 2010.

2547 Asset allocation 2013	Sum of COST	Sum of FRACTION
BUSINESS_OVERHEAD		
Business Overhead		
CP2		
CP_Copper_Burried_Cables&Splices		
CP_Ducts&Manholes		
CP_Mobile_Backbone		
IT_HARDWARE&MAINTENANCE		
OMS PILA		
TLSBISCLARIFY		
IT_SOFTWARE		
Market 0 - Residual Market		
SW_Development (AC2547)		
ORGANISATIONAL_GROUP		
50900 NEO - MST - Mgmt Support & Staff		
Grand Total		

*Software Development regroups all new sub-assets related to the market 0. As they relate to specific software development, allocating them to the IT_Software module gives more coherence to the model in order to regroup all IT development costs in the same module. This object will later on be allocated to the Residual Market.

- **2550 APPL SW ABC**

The **A**ccess **B**ackbone **C**onnectivity asset (ABC) is a core element of Belgacom's infrastructure. SRW is an inventory for connectivity and equipment documentation and is used as an interface between 3 IDMS Applications and front-office applications such as OMS, WFM or COB/CDB. Three other core domains are also pooled in this asset: ABR[11] for the local loop connectivity and managing resources and services. ANA[12] (**A**utomated **N**umber **A**ssignment) supports service order provisioning of phone numbers through automation of the attribution of a phone number to a customer. Finally, ITR[13] (**I**nfrastructure **TR**ansmission) is the inventory of Belgacom's backbone and optical network covering leased lines, physical equipment, trails, trunks, cables and the multiplexing hierarchy between all these elements. It should be noted that applications grouped in this asset use a special hardware in order to run properly as they are all linked to huge databases that require daily processing of data per batches. For the last years, BS2000 mainframes from Fujitsu were used but they were recently replaced by Z-Series from IBM[14].

[14] One IBM z10 Mainframe is supposedly 1500 times more powerful than regular x86 servers while consuming 85% less power (source IBM).

- **2551 Operational Inventories**

Operational Inventories are applications used to maintain ATM, DSLAM, Ethernet and IP inventories and statistics.

- **2552 GraphDoc**

The Graphdoc asset pools all graphical documentation components which are tools used to create or modify the local loop network documentation. It allows an integration of the Autocad package which is a drawing software.

- **2561 APPL SW – NETCOOL**

Netcool is a software package sold by IBM and developed internally to suit Belgacom's needs. It is a set of alarms and probes used for monitoring to ensure both a pro-active and reactive service assurance process. It is divided in two main domains: **N**et**c**ool **T**ransmission (NCT) and **N**et**c**ool **D**ata (NCD).

- **2562 APPL SW - e-Health**

E-health is a reporting tool for bilan and is composed of 3 domains: e-health (A-EHT), Provisioning (A-PRO) which is an interface between e-health and umbrella/CMS and oblicore service layer (A-SLR). These domains are allocated to the service assurance of Explore products.

- **2563 APPL SW-Customer Remote Support**

Applications used by the helpdesks or customers through the Belgacom portal.

- **2566 APPL SW-DIAMON&CORRELATOR**

The diamond (DIA) and Correlator (CRL) asset regroups those two IT domains that enable the monitoring of network alarms. It also creates tickets to respond efficiently to problems.

- **2567 APPL SW – DARE**

DARE stands for **D**iagnose **A**nalyze **R**epair **E**ngine and is the main tool to analyze alarms and probes reports. It diagnoses problems through a root analysis, classifies incident by priority and forwards them to responsible persons for problem resolution.

- **2568 APPL SW-Learning & Mngt Syst.**

The learning management system asset is essentially a component of SAP HR (or SAP LMS for **L**earning **M**anagement **S**ystem).

- **2569 APPL SW-ECRM**

The E-CRM asset contains one application named **G**roup **C**ontent **M**anagement (GCM) which is a platform for contract, records and business process management.

- **2570 APPL SW Business Intelligence Tool**

All costs from the Microstrategy software are sent to the Business Intelligence Tool asset as the main software used by our business intelligence department (which is the Data Warehouse: DWH). It is heavily related to data warehouse and will be grouped with it so that the tools they use are represented in the total cost of the data warehouse. Business Intelligence costs are mainly allocated to the residual market.

- **2571 APPL SW ONE-Catalog**

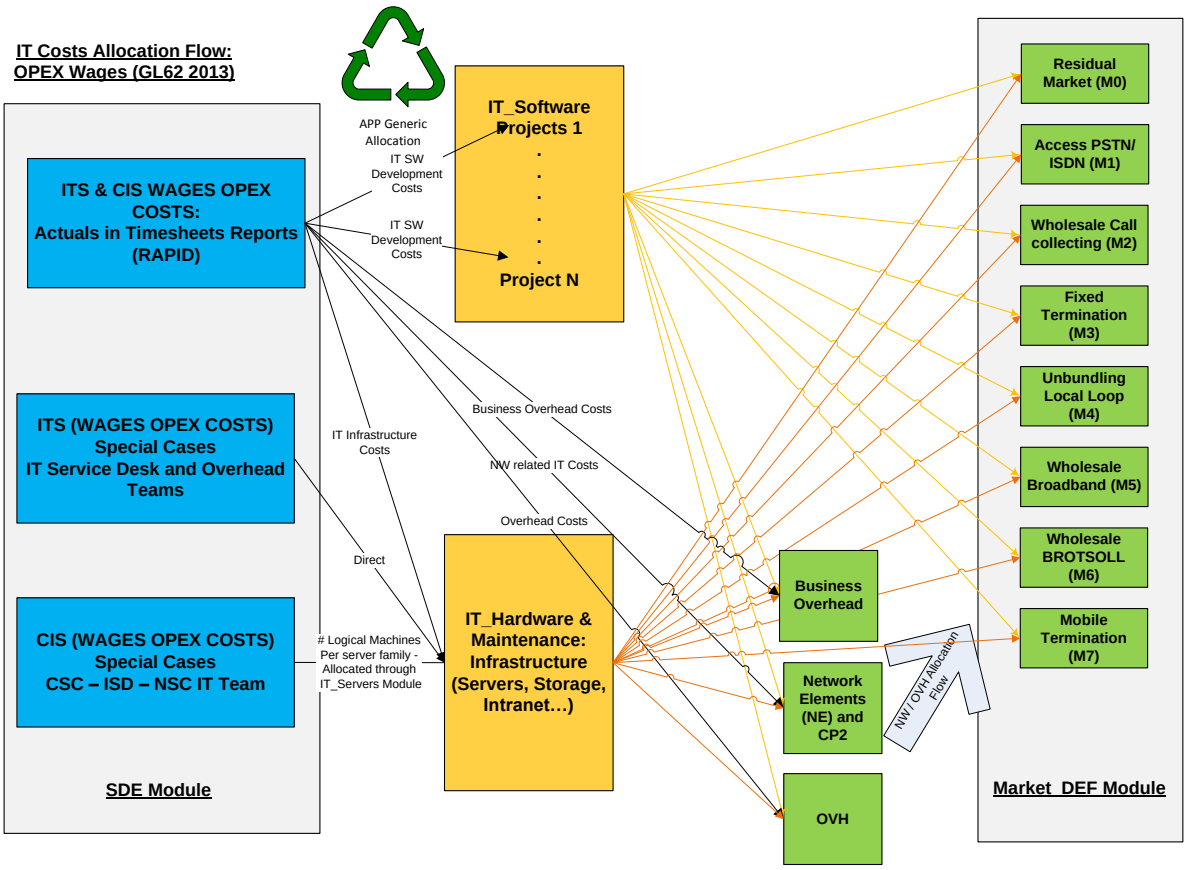
Asset pooling costs from the **B**elgacom **P**roduct **C**atalog (BPC) which is an application that stores advice and information about all products and services.

- **2573 Appl SW DWH**

The data warehouse department has heavy requirements in terms of hardware and software as it calculates statistics and indicators for Belgacom's products and network. Data warehouse uses a special hardware from the Teradata technology that helps with the treatment of large data volumes with the possibility for many users to analyze them.

All Assets from 2526 to 2599 are Software assets and will be allocated through a project analysis from a scope of costs going over the last 5 years. All costs distributed between these projects were linked to a specific object from the modules following IT Software in the model allocation flow.

Operational Costs:



There are 4 sources of IT opex costs:

A) Maintenance related:

Maintenance costs are regrouped into 2 different cost pools (61120 and 61130). RAPID was used to create allocation keys, distributing these costs towards servers, applications within the Hardware&Maintenance module, storage, servers CP2 and NEs.

B) OPEX Wages internal

Internal wages for IT OPEX costs were allocated by the use of the RAPID database. A report by cost centers giving a detailed output of OPEX projects was linked to the cost centers groups from the cost base allowing an allocation from all IT teams to the projects objects from the IT Software module in 2013.

C) OPEX Contractors Fixed Priced:

RAPID makes the distinction between employees and contractors and also between the different contractors types (fixed price, body shopping etc.). This precision allows us to create specific keys for contractors in the same way as it was done for internal employees, by allocating their costs to the different projects they contributed in 2013 via the RAPID tool.

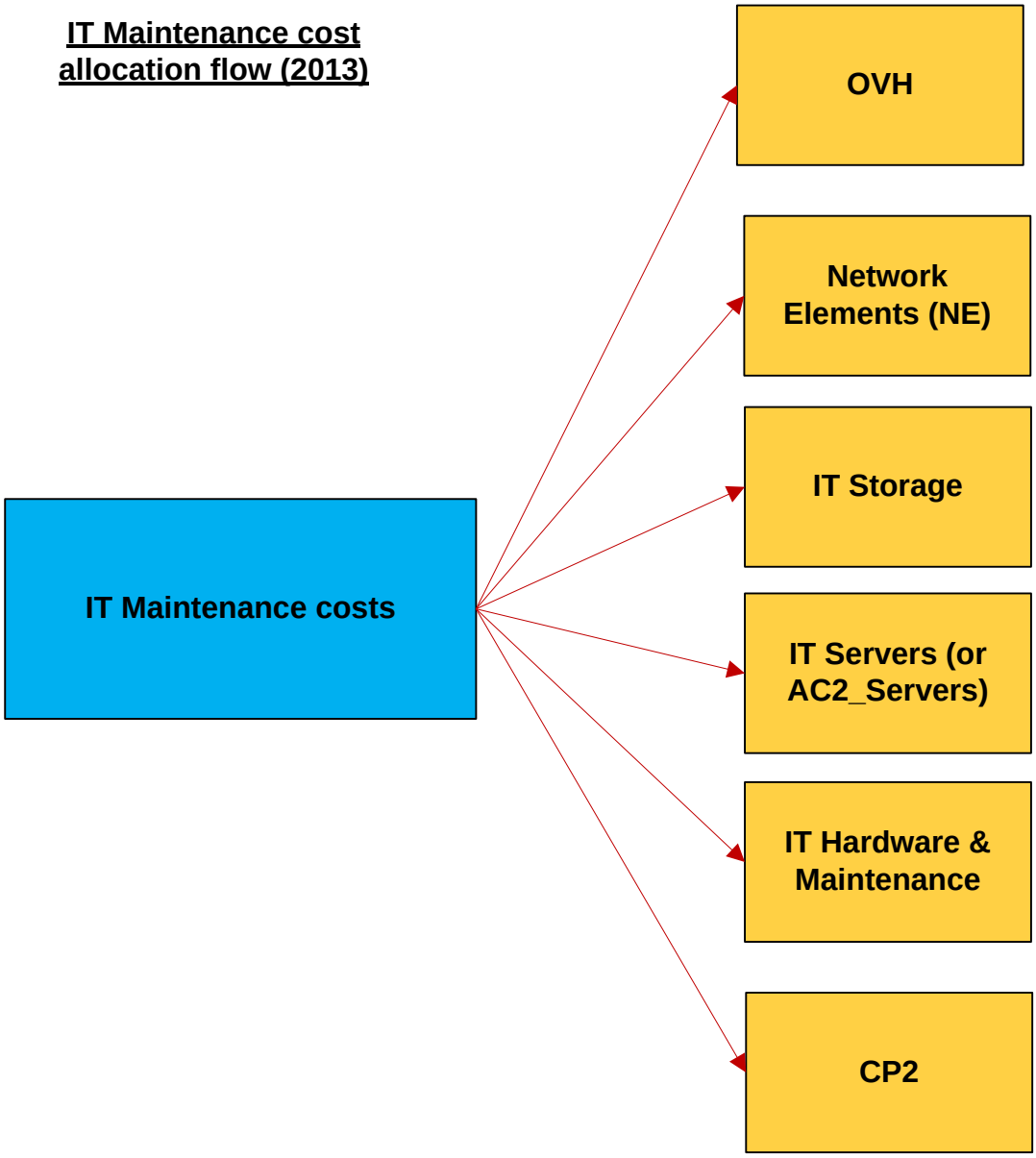
D) OPEX Contractors Bodyshopping

The same principle was applied for bodyshopping costs allocation as for the fixed price ones. In 2013, bodyshoppers and fixed prices contractors were regrouped into one object to eliminate the redundancy of this allocation.

The following drawing recaps the IT cost allocation for OPEX wages:

In 2013, this cost object was pooled with the contractors Fixed price within the same object to facilitate the allocation and limit the number of redundant allocation keys.

Wages OPEX Costs are allocated using RAPID as a tool for the creation of allocation keys for each cost center within ITS and CIS. Reports are designed in order to regroup OPEX costs on the 2013 projects in the IT_Software module. Regarding the CIS IT teams, a special allocation was made as some of these teams are focused on supporting IT development, therefore reporting most of their resources on support projects that are by definition hard to allocate to specific markets. Maintenance Costs is the other main source of IT operational costs and can be related to server's or storage maintenance or to IT Development in case of applications bought off the shelf. The maintenance cost allocation can be represented by the following diagram:



6.1.4 Applications to Markets

a) IT Applications

The IT applicative layer is composed of applications or software being used by either an end-user (such as an employee or a customer) or by a service (such as an inventory or a billing system). There are more than 1000 applications that have been bought off a vendor and adapted to suit the company's needs or developed internally by Belgacom's IT developers. Over the years, these applications have been updated, replaced, renamed or out phased.

b) **Markets**

Through a careful analysis of each application and project, a mapping table was defined in order to create a link between applications and the impacted markets. Most of them relate to the Residual Market, others were directly developed in order to support a specific market resulting in a direct allocation towards this market. But in cases where an application was developed for a group of markets, an allocation key is needed to distribute the costs of these applications. Being an application underlying hardware costs, the driver used is a proxy of the transactions processed by these applications, namely the provisioning volumes.

6.1.5 Projects to Markets

In the same way as for the applications, the whole project we took into our scope of analysis was linked to markets as well. Based on the projects name, we are able to categorize them between development and non-development projects. For non-development projects, a special object in the model was created to regroup them: the non-development project object which will follow a generic allocation based on the IT Assets and BA50 Wages allocations.

For development projects, a careful study of each of them allowed the creation of a mapping table between all projects defined and the markets. The non-regulated products (of the residual market) receive a high amount of the majority of the development project costs. However a non-negligible amount of development projects introduce features and enhancements from which regulated products also benefit. For instance, a project investing in an xDSL capacity upgrade enhances retail products as well as regulated products. For such projects, an allocation key is needed to distribute the costs. Being software development costs, the driver used is the subscription volumes (except for software contributing to traffic products where usage minutes are used).

6.1.6 Allocation to Markets of IT costs that are common to several Markets

In order to allocate all IT costs regrouped in the Hardware&Maintenance and in the Software module, three different drivers were taken into account: the provisioning volumes for hardware allocation, the subscription ones for software and the total number of minutes consumed for projects and applications related to the voice markets.

Calculating these volumes is quite straightforward for the regulated markets. For the residual market only the volumes of corresponding services are taken into account. With access regulated markets, access retail products of the residual market are considered. With fix traffic regulated markets, only fix retail traffic volumes are considered.

7 Network stream

The network allocation stream is organized around the network investment structure (leading to network functional blocks in the allocation stream). The focus is on Capital Expenditure costs which are directly associated with the network equipment deployed ; these costs originate from the assets accounting system of Belgacom and they are gradually cascaded by means of a variety of cost deaggregation keys and a variety of cost drivers up to the telecommunication services. By contrast, the SRW stream focuses on the operating expenditures of the business activities, which are directly allocated to end- markets by means of business drivers.

For the operating costs of the network itself however, an intermediate allocation approach is used : the remuneration costs and the personnel related OPEX costs are associated to typical network activities (as described in Chapter 5) which are finally attributed to network functional blocks . This part is discussed in section 7.3 hereafter .

7.1 A layered allocation model

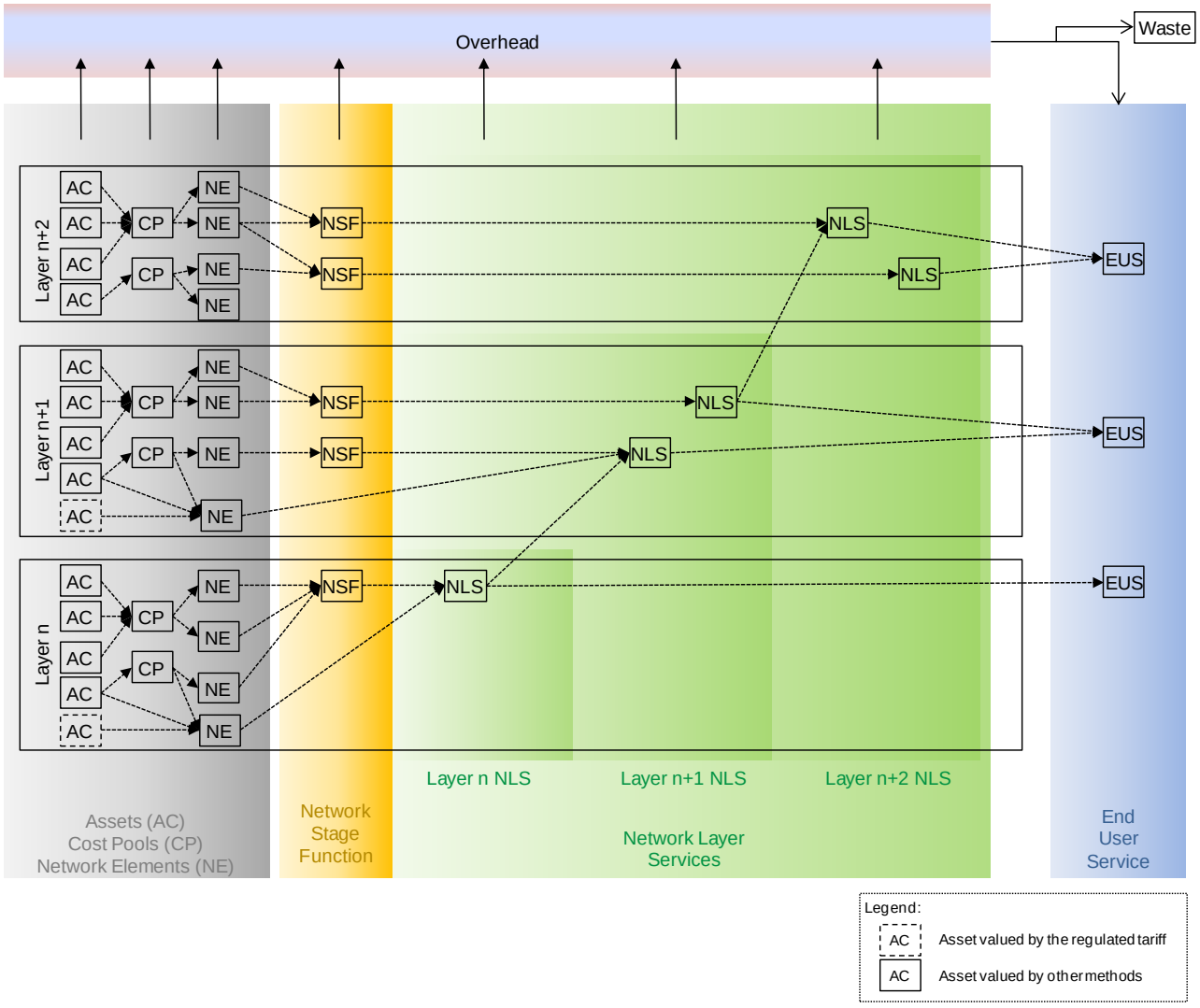


Figure 8: Layered allocation model

It is common practice in the telecommunication industry to separate investments in different logical levels , lower levels corresponding to basic (simple and general purpose) services, higher levels corresponding to complex higher valued and purpose oriented services. The pursued effect of such separation is to promote the reuse of basic lower level services by higher level services thereby bringing in the short term the volumes at each layer to levels that benefit from economies of scale. In the long term, the pursued effect is to benefit also from economies of scope.

The network cost allocation model is designed to reflect the layered functional structure of Belgacom's telecommunication infrastructure , each layer offering services to the upper layers. In practice , 5 layer levels are represented in the cost allocation model in order to allow each invested technology to be situated at the right level of its contribution in implementing the layer services.

In practice , a network equipment may participate to several different layers especially in the interfacing boards towards other network equipment because it acts as a terminating point of lower level layer services.

To avoid any ambiguity , a network equipment will be considered as belonging to the highest layer implemented in it and operated by it . For the example of the IP router , this simple criterium locates an IP router on the third layer (IP layer) above SDH.

Using this criterium all investments still in service of Belgacom's infrastructure are distributed in one of the following layers:

Layer NLS1.0 : Passive infrastructure gathering investments in access copper, in ducts and fibre cables (access and backbone).

Layer NLS2.0 : Active transmission infrastructure based on Time Division Multiplexing technology gathering investments in PDH, SDH.

Layer NLS2.1 : Active data infrastructure based on Packet Based technology gathering investments in Ethernet/MPLS.

Layer NLS3 : Active data infrastructure based on IP technology gathering IP routers , IPVPN routers.

Layer NLS4.0 : Active application infrastructure based on a variety of technologies gathering applicative equipment like telephony digital switches, VoIP platforms, Intelligent Network platforms, Broadcast TV platforms, Video on Demand platforms.

In the model layers are represented by a number of "standard" services (referred to in the sequel as Network Layer Services – NLS) offered to upper layers or directly used as retail/wholesale products (End User Services – EUS) . In turn the services offered by a layer are the result of the combination of layer specific functions (referred to as Network Stage functions – NSF)* and services offered by lower level layers allowing the layer specific functions to interact with each other.

*Note: Except the following Network Elements that receive assets cost valuated by the regulated tariff. Those Network Elements include network stage functionality and directly offer services of the same level as their's or upper layer services. The driver used is "yearly direct CAPEX cost". The driver "yearly direct CAPEX cost" is in fact a by-product of the valuation exercise done for the assets valued by the regulated BIPT tariff.

For the asset valuation exercise a full integration of all the asset valuation components of the relevant technology was necessary (see paragraph 3.5.2.6.4), but in the case of the calculation of this driver the required aggregation degree is determined by the allocation key to be calculated.

The inventories used as input for the asset valuation contain many details allowing the grouping of the costs components based on any combination of such aspects.

Therefore, the driver "yearly direct CAPEX cost" refers to the sum of all the relevant technology valuation components from the appropriate models that meet the allocation requirements (for example, usage of the link or bandwidth or bandwidth and service span or concerned network layer…).

Due to the method used for the valuation of the SDH, the "yearly direct CAPEX cost" allocation driver for the NE_PDH SDH equipment can't be calculated as referred above. Instead it is calculated as the incremental SDH cost of the service for which the allocation is being computed.

Incremental costs of one service are those costs that are avoided by not providing that service. See Figure 9 for an example specific to this context, where:

- the cost incurred by all the SDH services equals the SDH asset value, resulting from running the "consolidated transport BROTSoLL engine" (see paragraph 3.5.2.6.7Transport PDH/SDH valuation) with the full set of services carried over SDH
- the cost incurred by an SDH network carrying all the SDH services except service X is the outcome of the dimensioning and costing done by the "consolidated transport BROTSoLL engine" when having as input all the SDH services but service X.
- the SDH incremental cost for service X is calculated as the difference between the two above costs

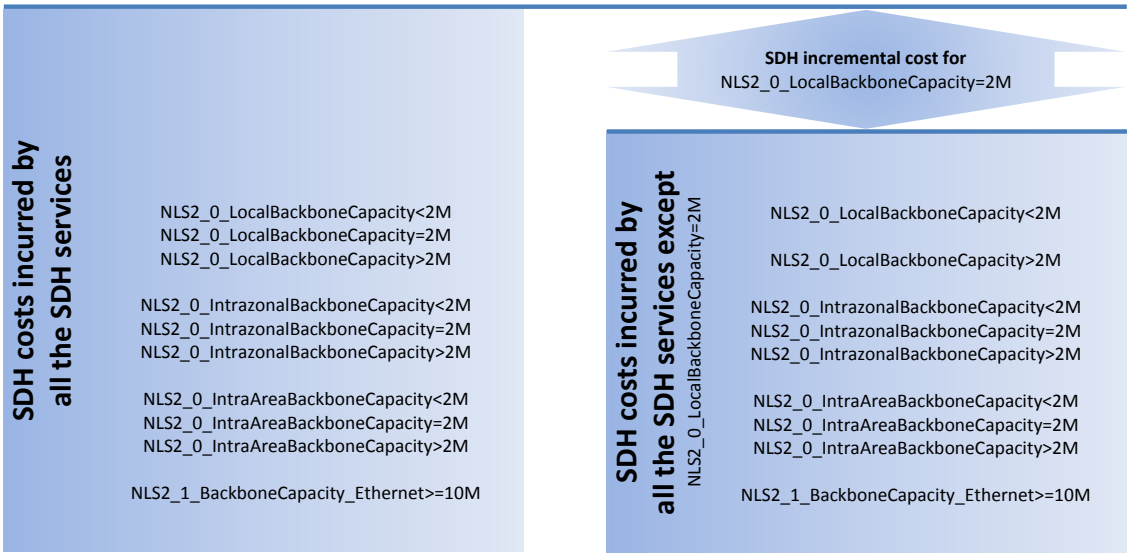


Figure 9: Incremental SDH costs calculation method, an example

NE receiving assets by the regulated tariff	offered services
NE_(D)WDM equipment	NLS2_1_LocalTailCapacity_Ethernet>=10M
	NLS2_1_BackboneCapacity_Ethernet>=10M
	NLS2_1_Backbone_MulticastVPLS_IntraRegion
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion
NE_ADSL equipment	NLS2_1_ADSL_SDSL_Bitstream
NE_ethernet equipment	NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd
	NLS2_1_LocalTail_Eline_LowEnd
	NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd
	NLS2_1_LocalTail_Eline_HighEnd
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion
NE_NGA Active equipment	NLS2_1_VDSL_Bitstream
NE_NGA Housing	NLS2_1_VDSL_Bitstream
NE_PDH SDH equipment	NLS2_1_LocalTailCapacity_Ethernet>=10M
	NLS2_1_BackboneCapacity_Ethernet>=10M
	NLS2_0_IntraAreaBackboneCapacity<2M
	NLS2_0_IntraAreaBackboneCapacity=2M
	NLS2_0_IntraAreaBackboneCapacity>2M
	NLS2_0_IntrazonalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity=2M
	NLS2_0_LocalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity>2M
	NLS2_0_LocalBackboneCapacity>2M
	NLS2_0_LocalBackboneCapacity=2M
	NLS2_0_LocalTail=2M
	NLS2_0_LocalTail<2M
	NLS2_0_LocalTail>2M
NE_Copper_Cables_Distribution	NLS1_0_Copper_Subloop
	NLS1_0_Raw_Copper
NE_Copper_Cables_Feeding	NLS1_0_Copper_Subloop_testing
	NLS1_0_Raw_Copper
NE_Copper_Blocks_and_Tie_Cables	NLS1_0_Continue_Raw_Copper
	NLS1_0_Copper_Localloop_testing
	NLS1_0_Copper_Subloop_testing
NE_Copper_Splitter	NLS1_0_Copper_Splitter

The use of BIPT mobile cost model enables to define network element cost attribution to the underlying network stage function per category of service : voice, data or SMS.

NE receiving assets by the mobile cost model	attribution
NE_RAN	NSF_Mobile RAN_Voice
	NSF_Mobile RAN_Data
	NSF_Mobile RAN_SMS
NE_GroundAntenna	NSF_Mobile RAN_Voice
	NSF_Mobile RAN_Data

	NSF_Mobile RAN_SMS
NE_MobileVoiceSwitching	NSF_Mobile_BackBone_Voice
	NSF_Mobile_BackBone_Data
	NSF_Mobile_BackBone_SMS
NE_MobileDataSwitching	NSF_Mobile_BackBone_Data
	NSF_Mobile_BackBone_SMS
NE_MobileLocationRegister	NSF_Mobile_BackBone_Voice
	NSF_Mobile_BackBone_SMS

Layer n--layer n+1 cost allocation mechanism:

Each layer represented in the model produces the defined NLS services with a certain amount of volume (the service amount); this amount is "consumed" by the upper layer services and it is used as a driver to allocate the costs to the consumer services in the upper layers.

Layer cost allocation cascade:

The 5 defined layers are put one after another according to their level generating a cascade of cost allocation mechanism.

Each layer is discussed in a specific chapter of this documentation.

Establishing costs of the Network Stage Functions

The "network stage functions" (NSF) are the direct constituents of a layer, they are intermediate network building blocks providing well defined logical network functions specific to that layer (also called network functional units) . A Network Stage Function can be limited to a node or it can be a cluster (distributed function) corresponding to "network stages". A network stage function is characterized by the amount of function it produces (volume).

Network Stage Functions are implemented in equipment , but the corresponding investment values are not always directly identifiable in the asset structure of Belgacom : for example some assets aggregate investments per technology (not per function in the network) , some other do not cover the totality of a given technology due to the history of the accounting asset structure in SAP (reorganization of assets, transfers between assets, closing of asset classes and opening of new ones) .

Different methods are used and combined to constitute the investment costs of Network Stage Functions :

1. Aggregation of assets in a larger asset or a cost pool in order to gather investments of same technology and align them with operational inventories.
2. Deaggregation of cost pools in network elements : this step decomposes cost pools into network elements; a network element corresponds to an entire physical equipment as deployed in the Belgacom infrastructure. Operational inventories of pieces of equipment and component prices are used.
3. Direct allocation of assets or cost pools to network elements when the assets or cost pools are directly identifiable with a network element of the model.

4. Composition of the network elements to form a network stage function covering one of the stages.

The stepwise combination of these methods are discussed in the next section.

7.2 From Assets to Network Stage Functions.

Next table gives the list of the NSF present in the network allocation flow.

Layer_name	NSF_name	NSF description
L1_PASSIVE	NSF_Backbone_FibreConnectivity_express	backbone fibre connectivity of express ring
	NSF_Backbone_FibreConnectivity_Regional&Core	backbone fibre connectivity of regional&Core rings
	NSF_FTTC_FibreConnectivity	fibre connectivity between the central office (LEX) and ROP
	NSF_FTTO_FibreConnectivity	fibre connectivity between the central office (LEX) and customer office
L3_IP	NSF_BroadBand_Public_IP_Collect	Access authentication , data traffic accounting, attribution of public IP address to broadband customers and collection of customer traffic towards public internet service providers
	NSF_BroadBand_VoD_IP_Collect	Access authentication , data traffic accounting, attribution of IP TV address to IP TV customers and collection of IP video customer traffic towards Video On Demand platforms
	NSF_BroadBand_VoIP_IP_Collect	Access authentication , data traffic accounting, attribution of Voice over IP address to VoIP customers and collection of Voice over IP customer traffic towards VoIP platforms
	NSF_Dedicated_Access_to_PrivateIP	connectivity between customer and Belgacom IP-VPN network
	NSF_Homegateway	Broadband CPE like b-box
	NSF_IP_security	
	NSF_PrivateIPSwitching	IP-VPN switching
	NSF_PublicInternetSwitching	Public Internet Routing
	NSF_Mobile RAN_Data	Mobile Radio Access function destinated to all Mobile data products
	NSF_Mobile_BackBone-Data	Mobile backbone function destinated to all Mobile data products
	NSF_Mobile_PrepaidData_Services	Intelligent platform services related to prepaid mobile data
L4_IDTV	NSF_BroadcastTV	Broadcast digital television functionalities
	NSF_VoD	Video On Demand (VOD) functionalities and user quality of experience functionalities.
L4_M2M	NSF_Machine_to_Machine	Related to M2M applications, enabling customers to remotely manage their M2M devices in the cloud or gather business data from the devices and to integrate and link it with business softwares.

L4_VOICE	NSF_Automated_call_distribution	intelligent distribution of calls towards call center
	NSF_CallerIdentity_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_InteractiveVoiceResponse_CallHandling	Voice Value Added network function
	NSF_InternetDialUp_CallHandling	
	NSF_ISDN_NetworkTermination	Functionalities related to the ISDN network termination equipment
	NSF_ISDN_Primary_Access	Access for PRA
	NSF_ISDN_Voice_concentrator	Aggregation of ISDN voice calls towards backbone circuit switching
	NSF_MessageWaitingIndicator_Inserting	Voice Value Added network function destinated to residential customers
	NSF_Mobile RAN_Voice	Mobile Radio Access function destinated to all Mobile voice products
	NSF_Mobile_BackBone-Voice	Mobile backbone function destinated to all Mobile voice products
	NSF_Private_Communication_Call_Handling	Intelligent platform service related to mobile closed user groups and virtual private networks
	NSF_Mobile_PrepaidTraffic_Services	Intelligent platform services related to mobile voice prepaid traffic
	NSF_Mobile_Access_Backaul_ABIS	Mobile access 2G network backhauling
	NSF_Mobile_Access_Backhaul_IUB	Mobile access 3G network backhauling
	NSF_NumberPortability_CallHandling	telephony ported number realtime translation
	NSF_OtherAdvanced_CallHandling	Voice Value Added network function
	NSF_PairGainSystem	Analog line multiplexing functions, used to concentrate narrow band analog signals on customer pairs to a 2Mb/s digital signal on a few feeding copper pairs. This is however an old technology not compatible with broadband.
	NSF_Payphones	Functionalities needed for the service “public payphones”
	NSF_PSTN_Voice_concentrator	Aggregation of PSTN voice calls towards backbone circuit switching
	NSF_Public_NumberPortability_Database	telephony ported number repository
	NSF_Service_Announcements_Playing	Functionalities in order to announce to callers any requested value added services.
	NSF_Televoting_CallHandling	Voice Value Added network function destinated to Business customers
	NSF_VirtualPrivateNetwork_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_Voice_call_CAE_charging	generation of call detail records for interoperator voice traffic accounting
	NSF_Voice_call_CAE_Processing	handling of voice calls at transit level
	NSF_Voice_call_CAE_Trunks	multiplexing/demultiplexing voice circuits at transit level
	NSF_Voice_call_Local_charging	generation of call detail records for customer voice usage charging
	NSF_Voice_call_Local_Processing	handling of voice calls at originating or terminating level
	NSF_Voice_call_Local_Trunks	multiplexing/demultiplexing voice circuits generated/terminated

	NSF_VoiceFeatures_SelfManaging	Voice Value Added network function destinated to residential customers
	NSF_Voicemail&Messaging	Voice Value Added network function destinated to residential customers
	NSF_WakeUp_CallHandling	Voice Value Added network function destinated to residential customers
L4_Messaging	NSF_Mobile RAN_SMS	Mobile Radio Access function destinated to all Mobile SMS products
	NSF_Mobile_BackBone-SMS	Mobile backbone function destinated to all Mobile SMS products
	NSF_SMS_Services	Intelligent platform service related to mobile SMS

Investment costs of Belgacom SA assets are mapped to these NSF , except investments related with network administration, and some other that cannot be related to any current product or service. The exceptions are not filed into the network allocation cascade , but are allocated like an overhead cost (i.e. with no direct causality) to a range of End User Services (depending on the kind of overhead cost) proportionally to the cascaded costs on these EUS.

Mapping asset cost sources to Asset objects of the model AC2

Network assets are 1-to-1 allocated to a homonymic AC2 object except for the 7 voice switching assets which are aggregated in AC2_TDM_Voice_Switching_Equipment.

Mapping AC2 objects to cost pools or Network elements

AC2 Aggregation.

At this stage AC2 asset objects are aggregated into cost pools, network elements , overhead objects and eventually end user services (costs marginal end user services , or direct waste).

The aggregations into cost pools serve to form technology pools for which operational inventories can be queried for various statistics that are further used to decompose into network elements. The technology pools typically are (D)WDM equipment, Copper Cables, Broadband (ADSL/SDSL) equipment, SDH equipment , PDH equipment, Ethernet equipment etc. Those cost pools include also the OPEX of SDE.

The aggregation into network elements concerns assets that are already a network element , and it serves also to gather assets that are individually more detailed than the definition of network elements and that can be easily associated to a network element . Typical examples are IP-VPN assets , broadcast TV assets, Analog Multiplexers, Metallic line testing assets etc.

AC2 Deaggregation.

By contrast, a set of AC2 assets are decomposed (deaggregated) into cost pools, Network elements, waste pool and marginal end user services.

Among these, some assets collect investments on network administration (Hardware and software supervision platforms) and on value added services platforms (IN, messaging, voice mail etc.) ; they need to be decomposed into the network technologies they supervise and into the value added service categories.

⇨ The driver used is the "cumulatedInvestedAmount" per technology obtained after deep analysis of historical investment data (TM1 financial reporting tool).

The asset 1680 "TPT-BBN-infra.elect/mécan in transmis rooms" collects internal cabling within technical buildings and is decomposed essentially into the following cost pools CP_Backbone_Coax_cabling, CP_Backbone_Optical_cabling, CP_(D)WDM_equipment.

⇨ The driver used is the "Current annualized cost" of the cost pools , calculated from a diversity of constituent volumes and corresponding prices (coax/fibre cables, connectors, copper pair cables , cable ways,etc) . The main volumes are extracted from the infrastructure inventory database (ITR), other volumes are derived under assumptions.

The AC2_TDM_VoiceSwitching_Equipment asset is decomposed in the three main switching units forming the switched network topology : the Remote Units (acting principally as voice concentrators), the Base units (providing call processing and local switching), and the Transit Units (providing transit switching).

⇨ The driver used is the "Nbr of equivalent lines" , a unit that is at the basis of the purchase contracts with the switches vendors where purchased switching Unit (Remote, Base, Transit) value is proportional to the equivalent lines installed per switching unit. The driver value is obtained from installed base reporting of the switched voice network.

Deaggregation of cost pools into network elements

In performing the previous steps cost pools are introduced in the model. They are now deaggregated into different Network Elements by means of following drivers:

cost pool	driver name	Deaggregated Network elements
CP_(D)WDM_equipment	Yearly Direct CAPEX Cost	regional&core DWDM network elements and express DWDM network elements
CP_Backbone_Optical_cabling	Nbr_Connections	pre-allocated to all inside network elements using fibre cabling
CP_Backbone_Coax_cabling	Nbr_Connections	pre-allocated to all inside network elements using coax cabling
CP_Copper_Burried_Cables&Splices	yearly direct CAPEX cost	distribution cables, feeding cables network
CP_DSLAM	yearly direct CAPEX cost	xDSL ATM based network elements and VDSL Ethernet based network elements
CP_Ducts&Manholes	Trenches cumulated length (km)	Ducts& manholes for Next Generation Access, Ducts & manholes for corporate /complex nodes in access
CP_EthernetMPLS_equipment	Yearly Direct CAPEX Cost	Ethernet Ports, Ethernet/MPLS switches
CP_IntelligentNetwork_Hardware	EstimatedValue_of_IN_HW_components	Service Control Point hardware, service management point Hardware, CPU, RAM memory, Disk
CP_Optical_Fibre_Cables	kmxfibre	Fibre cables for Next Generation Access, Fibre cables for corporate/complex nodes in access
CP_OSS_VoiceTraffic	fair split	Collecting, terminating and transit of voice network elements
CP_SDH	Yearly Incremental Cost	
CP_TDM_VoiceDigital_BaseUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice concentration elements, Originating/Terminating voice call handling elements
CP_TDM_VoiceDigital_RemoteUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice concentration elements, Originating/Terminating voice call handling elements
CP_TDM_VoiceDigital_TransitUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice transit elements
CP_Mobile_RAN	Yearly capitalized manpower cost	Mobile Radio Access network, Ground antenna
CP_Mobile_Backbone	fair split	Mobile Voice and Data switching elements

From Network elements to Network Stage Functions

The previous steps populate the cost model with Network Elements. In the next step , they are allocated to the Network Stage Functions.

Among these, some network elements are directly embedded within Network Stage Function (either identical to a NSF or constituent of a NSF).

NE technology	#NE	NSF technology	#NSF
IDTV	4	IDTV	2
IP	4	IP	3
		WEB	1
MOBILE	7	MOBILE	3
VOICE	8	BVAS	1
		MVAS	3
		VOICE	4
ALL	1	ALL	1
ATM&ETHERNET	1	UNSPECIFIED	1
ETHERNET	1	IP	1
REALTIME DATA	1	REALTIME DATA	1

The other network elements need to be further decomposed either because they still aggregate a same function deployed in different network stages or because they still aggregate different functions delivering different volumes.

NE technology	#NE	NSF technology	#NSF
IP	1	IP	3
VOICE	5	BVAS	2
		MVAS	3
		VOICE	9
		VAS	1
ATM	1	ATM	2
FIBREPLANT	4	FIBRE	4
VAS	8	MOBILE	1
		MVAS	8
		VAS	1
VOIP	1	VOICE	2

The decomposition of network elements into network stage functions is driven by a variety of cost drivers listed below per technology :

NE_technology	Driver Name
FIBREPLANT	Estimated incremental trench length (km)
	kmxfibre
	Number of Optical Accesses (ROP/Offices)
IP	Total_tributary_capacity(Gbps)
VAS	fair split
	Invested_Amount
	perc_occupation_of_IN_hardware_by_services
VOICE	Invested_Amount
	Nbr_of_equivalueInstalledLines
	RoutedMin
	VendorCertifiedValue_of_Originating_Terminating_CallHandling_subcomponents
	VendorCertifiedValue_of_Transit_CallHandling_subcomponents
VOIP	VoIP_call_handling_distribution_local_Area

7.3 End User Services

The network allocation model terminates when all network stage functions (or NEs) have been allocated to network layer services and when network layer services have been combined into a user level telecommunication service, the End User Service.

The End User must be understood as the telecommunication service party that will pay for the service. In case of a retail service the user is identical to the service consumer (residential service) or to the service provider (business service) , in case of wholesale service , the user is in principle another licensed operator , or a network service provider.

Being composed of network layer services, End User Services may emanate from different levels of network layers since interconnection between network operators is being unbundled . For retail services , the end user telecommunication services may arise from different layers : the more a service is oriented for a specific usage the higher the level of network layers involved. For example IP services are less usage oriented than voice telephony, the latter being a layer 4 service, the former a layer 3 service.

The End User Services represented in the model are listed hereunder.

End User Service Layer	Market	End User Service Name
L1_PASSIVE	INTERCONNECT	EUS_Raw copper subscription
		EUS_Shared pair subscription
	RETAIL&WHOLESALE	EUS_Broadband Drop
L2_PACKETBASED	INTERCONNECT	EUS_BROBA_accessLine
		EUS_BROBA_EndUserLine subscription
		EUS_OLOAccessLine
		EUS_wholesale transport BROBA subscription
		EUS_wholesale transport WBA subscription
	RETAIL	EUS_X25
	WHOLESALE	EUS_Ethernet_Backhaul
L2_TDM	INTERCONNECT	EUS_BROTSOLL_segment<2M
		EUS_BROTSOLL_segment>2M
		EUS_BROTSOLL_segment2M
	RETAIL&WHOLESALE	EUS_LL <2M subscription - International
		EUS_LL <2M subscription - National
		EUS_LL >2M subcription- National
		EUS_LL >2M subscription - International
		EUS_LL 2M subscription - International
		EUS_LL 2M subscription - National
		EUS_LL_Analog National Subscription - National
	WHOLESALE	EUS_Nat IC-Infra Wholesale subscription
L2_TDM&L1_ACTIVEANALOG	RETAIL&WHOLESALE	EUS_Trans LAN subscription
L3_IP	RETAIL	EUS_DataManagedServices
		EUS_Homegateway
		EUS_Mobile_Data national
		EUS_Public_IP_Extension_on_Symmetric
	RETAIL&WHOLESALE	EUS_FastInternet subscription
		EUS_Private_IP&Ethernet_on_asymmetric subscription - National
		EUS_Private_IP&Ethernet_on_backup
		EUS_Private_IP&Ethernet_on_international Subscription
		EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
		EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National
	WHOLESALE	EUS_ADSL_Carrier_wholesale subscription
		EUS_Mobile_Roaming IN_Data
		EUS_VDSL_Carrier_wholesale subscription
L4_IDTV	RETAIL	EUS_IDTV_subscription
L4_M2M	RETAIL	EUS_Machine_to_Machine
L4_MESSAGING	INTERCONNECT	EUS_BGC Mobile_Incoming SMS international
		EUS_BGC Mobile_Incoming SMS national
	RETAIL	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
	WHOLESALE	EUS_Mobile_Roaming IN_Originating_SMS
		EUS_Mobile_Roaming IN_Terminating_SMS

L4_VOICE	INTERCONNECT	EUS_BGC Fixed international traffic incoming
		EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
		EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed Outgoing International Freephone traffic
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_Carrier PreSelection IAA interconnection
		EUS_Carrier PreSelection local interconnection
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_IAA interconnection - BGC Fixed to FOLO
		EUS_IAA interconnection - FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_Incoming International Transit (M)OLO Traffic
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Interconnection FOLO to BGC Mobile
		EUS_Interconnection MOLO to BGC Mobile
		EUS_International Transit border to border
		EUS_international_switchingTrunk
		EUS_internet traffic - FOLO to BGC 0909/3 IAA
		EUS_Local interconnection - FOLO to BGC Fixed
		EUS_Number Portability access per line subscription
		EUS_Outgoing International Transit (M)OLO Traffic
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
		EUS_Traff. Internet- BGC fixed
		EUS_Voice_traffic_IAA_PointOfInterconnect subscription
		EUS_Voice_traffic_Local_PointOfInterconnect subscription
	RETAIL	EUS_Astrid
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_BGC Mobile_Roaming Out Origination
		EUS_BGC Mobile_Roaming Out Termination
		EUS_BVAS Call & Conference - BGC fixed
		EUS_Consultel 090x Traffic - (M)FOLO to BGC Fixed
		EUS_Freephone Traffic - (M)FOLO to BGC
		EUS_ISDN CATT traffic - BGC Fixed
		EUS_MVAS - BGC Fixed
		EUS_OPS International Information Traffic - BGC
		EUS_OPS National Information Traffic - BGC
		EUS_Other_Traffic - BGC Fixed
		EUS_Payph operations - BGC Fixed
		EUS_Split Charging Traffic - (M)FOLO to BGC Fixed
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
		EUS_Virtual Private Network Traffic- BGC fixed
	RETAIL&WHOLESALE	EUS_BGC Fixed DCIA traffic
		EUS_BGC Fixed international traffic outgoing
		EUS_BGC Fixed interzonal traffic
		EUS_BGC Fixed local traffic
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Fixed zonal non local traffic
		EUS_Calling Card Postpaid Traffic - BGC Fixed
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_IAA interconnection - BGC Fixed to MOLO
		EUS_Incoming International Freephone Traffic (OLO+BGC mobile) to BGC
		EUS_ISDN-BA Access - subscription
		EUS_ISDN-PRA Access - subscription
		EUS_PSTN Access - subscription
		EUS_Split Charging Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
	WHOLESALE	EUS_Mobile_Roaming IN Termination
		EUS_Universal Access Number Traffic - FOLO to BGC Fixed
		EUS_Mobile_Roaming IN Origination
L4_WEB	RETAIL	EUS_Eservices

Broadband drop

The network element Broadband Drop groups costs related to fieldwork performed in the copper access network in order to realise broadband connections for end-users. These activities are mainly situated at the MDF, SC and the introduction up to the Network Termination Point (included).

7.4 Network services of the passive infrastructure layer : NLS1.0

7.4.1 Definition

This layer deals with the physical end-to-end connectivity between customers and the central sites (access), the physical connectivity inside the central site between access equipment and the physical connectivity between central sites (backbone).

Access Physical connectivity services (see Figure 10***):***

- NLS1_0_Continue_Raw_Copper : internal cabling for copper connectivity from Main Distribution Frame or broadband splitter equipment to other access active equipment like voice switches, leased lines access equipment, collocated access equipment (of other licensed operators).
- NLS1_0_Copper_Localloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper loop.
- NLS1_0_Copper_Splitter : resources to split the narrowband and broadband copper physical signal.
- NLS1_0_Copper_Subloop : end-to-end copper connectivity from the network termination point at the customer premises to a delivery point in the street (street cabinet).
- NLS1_0_Copper_Subloop_testing : outside and inside copper connectivity and equipment required to perform remote testing of the copper subloop.
- NLS1_0_Raw_Copper : end-to-end copper connectivity from the network termination point at the customer premises to the Central site.
- NLS1_0_CentralOffice2Office_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and corporate customers office buildings .
- NLS1_0_CentralOffice2Office_Fibre : end-to-end fibre connectivity between the central sites and corporate customers office buildings or between central sites and Belgacom mobile sites.
- NLS1_0_CentralOffice2RemoteOpticalNode_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and the Belgacom subtended optical nodes and Belgacom optical nodes at street cabinet level.
- NLS1_0_CentralOffice2RemoteOpticalNode_Fibre : end-to-end fibre connectivity between the central sites and the Belgacom subtended optical nodes and Belgacom optical nodes at street cabinet level.

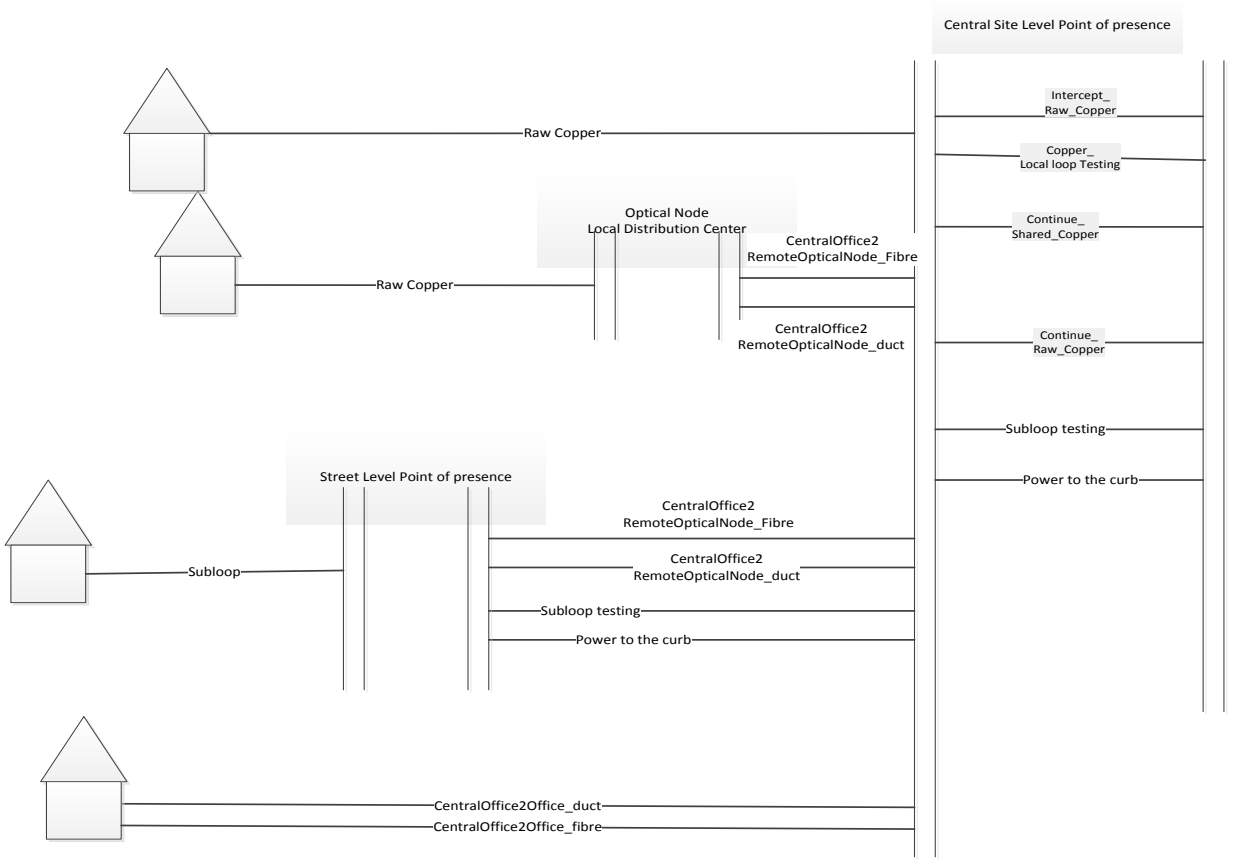


Figure 10: Access Physical connectivity services

Backbone Physical connectivity services

- NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core: end-to end fibre connectivity (fibre cables and duct and trenches) for SDH transmission networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Express : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the express (national level) network. These nodes correspond to the largest cities in the country.

7.4.2 Usage of the passive infrastructure

The physical connectivity services of this layer are used by upper layers in order to interconnect their specific equipment. The costs are distributed to the service users according to “consumption drivers” as listed in the table below.

Network layer Service	Driver	Service consumers
NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, BRUO Shared Pairs
NLS1_0_Copper_Localloop_testing	nbr of lex based broadband connections without voice	Broadband bitstream layer 2.1 services
NLS1_0_Copper_Splitter	Direct	BRUO Shared pairs
NLS1_0_Copper_Subloop	Direct	VDSL bistream layer 2.1 service
NLS1_0_Copper_Subloop_testing	Direct	VDSL bistream layer 2.1 service
NLS1_0_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, Broadband Bitstream layer 2.1 service
NLS1_0_CentralOffice2RemoteOptical Node_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2RemoteOptical Node_Fibre	Nb_access_fibres_used	
NLS1_0_CentralOffice2Office_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2Office_Fibre	Nb_access_fibres_used	
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)	Backbone services (leased lines/backhaul and Broadcast) delivered by the SDH equipment at regional and core level.
NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)	Regional&Core backbone services of layer 2.1 (Ethernet transport, unicast and multicast)
NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)	Express backbone services of layer 2.0 (leased lines) and layer 2.1 (Ethernet)

7.4.3 Contributors to the passive infrastructure layer

7.4.3.1 *Access*

The objective of the access network is the delivery of a connection between our customers and our telecommunication network where all services are implemented.

Copper infrastructure:

The access network services of the copper passive infrastructure layer are based on several network elements valued using the BIPT regulated cost price, as listed below. For these network elements, there is no change in the valuation methodology compared to previous model. As in the 2012 model, the former network element NE_Copper infrastructure has been split in several subparts, in order to enable the fix/variable analysis of the model results .

- ✓ NE_Copper_Cables_Distribution

copper distribution pairs and access to distribution pairs in street (to be attributed to copper subloop for VDSL connections without voice and to the raw copper for all other copper connections, based on the corresponding regulated cost);

- ✓ NE_Copper_Cables_Feeding

  copper feeding pairs and access to feeding pairs in street and central site (to be attributed to the copper subloop testing for VDSL connections without voice and to the raw copper for all other connections);

- ✓ NE_Copper_Blocks_and_Tie_cables

  copper local loop testing for broadband customer connections without voice at the central site,

  copper subloop testing for ROP based VDSL customer connections without voice,

  continue copper feeding pairs based on the number of shared pairs in service,

  continue raw copper for all other copper pairs in use.

- ✓ NE_Copper Splitter

  For the BRUO shared pairs in service.

NSF_PSTN_Voice_concentrator:

Attributed to :

- copper local loop testing based on the number of broadband without voice customers connections at the central site,
- copper subloop testing for VDSL without voice customer connections at the street cabinet,
- PSTN Access based on the number of subscriptions

Customer connections without voice are connected to the switching equipment in order to perform remote testing of the line.

Access Fibre Infrastructure:

The costs of the fibre deployed in the access network have been separated in the civil works related costs producing duct routes, and in the cable related works producing fibre connectivity inside the duct routes. Civil work related costs and cable related costs are subject to different assets within Belgacom's asset accounting and can easily be identified. These assets do not distinguish the investments realized for connection of customer sites, mobile sites or remote optical nodes (at subtending level and street cabinet level). Therefore two drivers are used :

1. Kmxfibre : to separate the fibre cable costs between customer/mobile sites and remote optical sites
2. Amount km routes to physical sites : to separate the civil works costs between customer/mobile sites and remote optical sites .

Yielding following objects :

NSF_CentralOffice2RemoteOpticalNode_FibreCables

NSF_CentralOffice2Office_FibreCables

NSF_CentralOffice2RemoteOpticalNode_Track

NSF_CentralOffice2Office_Track

7.4.3.2 *Backbone*

The backbone fibre connectivity services are realized by the following Network Stage Functions embodying the resources in the fibre outside plant (ducts&manholes, and fibre cables):

- NSF_Backbone_FibreConnectivity_Regional&Core
- NSF_Backbone_FibreConnectivity_express

NSF	Driver	NLS1_0
NSF_Backbone_FibreConnectivity_express	**direct**	NLS1_0_Fibre_connect_Backbone_DWDM_Express
NSF_Backbone_FibreConnectivity_Regional&Core	**fair split of fixed cost**	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core

7.5 Network services of the transmission infrastructure (NLS2_0)

7.5.1 Definition

This layer deals with the transmission services between customer sites and the Belgacom Offices (access) also called local tail for leased lines , and it deals also with the transport segments services (also called backbone leased lines segments and backhaul capacity) between Belgacom Offices (backbone).

The national wide transmission infrastructure collects transmission traffic in three aggregation stages: local level aggregation (circ 600 locations) , zonal level aggregation (circ 36 locations) , area level aggregation (20 locations) (see Figure 11: Transport Segments). Traffic at each stage can be cross-connected allowing to create transport segments from any location to any location.

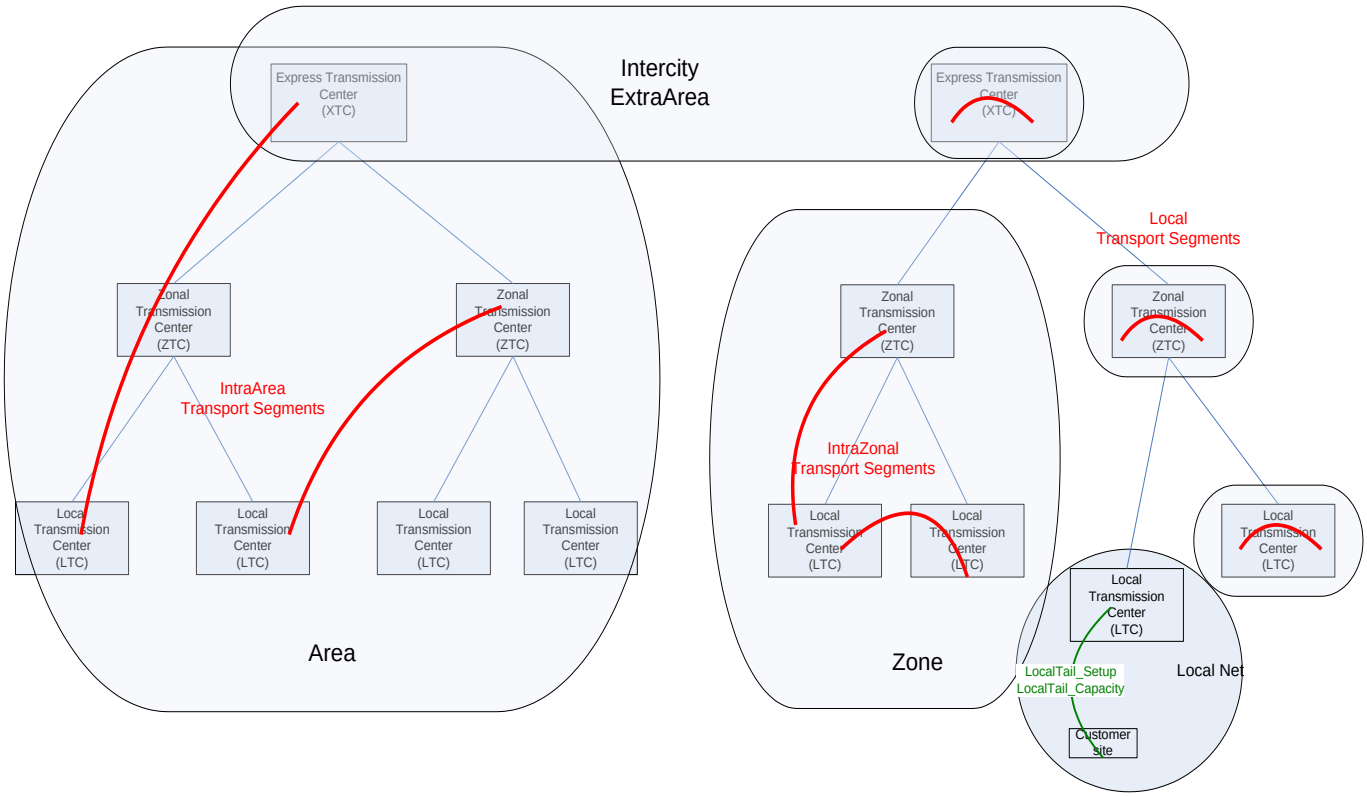


Figure 11: Transport Segments

Access services

The access services deliver the transmission between the customer site and the Belgacom Office (access).

They capture costs related to the physical_dedicated link between the customer site and the central office and the equipment needed to activate the link in a capacity category.

Backbone services:

The backbone transport segments are classified in capacity (or bandwidth) categories -<2Mb/s, 2Mb/s, >2Mb/s- combined with distance categories -intraarea > intrazonal > local- depending on the end point situation in the aggregation hierarchy (see Figure 11).

The following NLS2.0 services are present in the model:

Network Layer 2.0 service
NLS2_0_LocalBackboneCapacity<2M
NLS2_0_LocalBackboneCapacity=2M
NLS2_0_LocalBackboneCapacity>2M
NLS2_0_IntrazonalBackboneCapacity<2M
NLS2_0_IntrazonalBackboneCapacity=2M
NLS2_0_IntrazonalBackboneCapacity>2M

NLS2_0_IntraAreaBackboneCapacity<2M
NLS2_0_IntraAreaBackboneCapacity=2M
NLS2_0_IntraAreaBackboneCapacity>2M
NLS2_0_InterCityBackboneCapacity<2M
NLS2_0_InterCityBackboneCapacity=2M
NLS2_0_InterCityBackboneCapacity>2M
NLS2_0_LocalTail<2M
NLS2_0_LocalTail=2M
NLS2_0_LocalTail>2M

7.5.2 Usage of the transmission infrastructure

The NLS2_0 Local tail services are used to bring transmission capacity to the customer sites and they are thus directly involved in leased line services between two customer sites, leased lines to data services, backhaul services to other licensed operators and monitoring of the access network.

The costs of these access services are distributed according to the number of customer sites per bandwidth category (driver name: "Nbr_of_Customer_sites"), whereas the backbone services costs are further allocated according to their bandwidth (driver name: "Bandwidth consumed (Mbit/s)").

The model elements receiving costs from this network layer are exhaustively presented in the following table.

	Upper layer consumer or end user service
Backbone Virtual Paths (VP)	NLS2_1_Backbone_VirtualPath_InterArea
	NLS2_1_Backbone_VirtualPath_IntraArea
Belgacom mobile	NLS2_2_Mobile_Access_Backhaul_Abis
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS2_2_Mobile_Backbone_Backhaul
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS2_2_Mobile_Access_Backhaul_IuB
	NLS4_0_MobileTerminatingLinks
Belgacom testing environments	OVH_Lab
Broadband access to public IP switching	NLS3_ADSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
Data services backbone (IP-VPN)	NLS3_Private_IP&Ethernet_Routing
Internal Belgacom network	OVH_InternalCommunicationNetwork
	OVH_InternalIPNetwork
International access to data services (IP-VPN)	EUS_Private_IP&Ethernet_on_international Subscription
Leased line access to public IP switching	NLS3_Public_IP_Extension_on_symmetric
Leased line accesses to data services (IP-VPN)	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
Other	Business Overhead
	EUS_DataManagedServices
	EUS_Subsidiaries

	NLS4_0_VAS_signaling
	NLS4_1 BVAS - BGC Fixed
Public IP switching	NLS3_Public_IP_switching
Regulated broadband services	EUS_BROBA_accessLine
	NLS2_1_ADSL_SDSL_Bitstream
Regulated wholesale segments	EUS_BROTSOLL_segment<2M
	EUS_BROTSOLL_segment>2M
	EUS_BROTSOLL_segment2M
Retail&Wholesale leased lines	EUS_international_switchingTrunk
	EUS_LL <2M subscription - International
	EUS_LL <2M subscription - National
	EUS_LL >2M subcription- National
	EUS_LL >2M subscription - International
	EUS_LL 2M subscription - International
	EUS_LL 2M subscription - National
	EUS_LL_Analog National Subscription - National
	EUS_X25
Telephony access	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV services	NLS4_0_BroadcastTV
	NLS4_0_iDTV
Voice services in backbone	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
Wholesale transport capacity	EUS_Bandwidth_Wholesale subscription
	EUS_Nat IC-Infra Wholesale subscription

7.5.3 Contributors to the transmission infrastructure

7.5.3.1 *Local Tail*

A local tail transmission service is made of equipment installed at the customer premises extracting the digital signal from the physical line, of a physical link between the customer site and the central office and of grooming equipment in the central office (or subtended optical nodes).

Depending on the bandwidth of the local tail different equipment technologies are installed: PDH on copper , PDH on fibre or SDH on fibre. For the high bandwidth cases (>2Mb/s) a fibre based technology is required whereas for lower bandwidths the choice between fibre and copper

technologies exists. However, since fibre local links are much more expensive than copper links, the preferred option for low bandwidth local tails is the copper based solution.

	Contributor to NLS2_0	Driver name
Equipment	NE_PDH SDH equipment	Yearly Incremental Cost
Physical inks	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

7.5.3.2 *Transport Segments*

Transport segments are realised by configuring the SDH clusters in different network stages. The transmission aggregation levels introduced hereabove (section 7.5.1 and Figure 11) are realised by different SDH clusters (regional, core and express SDH rings) interconnected by digital-crossconnects. The SDH rings are made of add-drop multiplexers deployed in LTC for the regional ones, in ZTC for the core ones and in the XTC for the express ones. The equipments within a ring are linked by fibre or by an optical wavelength.

To summarize, the building blocks for the transport segments are:

Contributor to NLS2_0	Driver name
NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)
NE_Express_DWDM_equipment	Bandwidth (Mbps)
NE_PDH SDH equipment	Yearly Incremental Cost
NE_Express_SDH_equipment	Bandwidth (Mbps)

7.6 Network services of the packet based infrastructure (NLS2_1)

7.6.1 Definition

This layer deals with the data collection services (broadband or dedicated) between the customer and the central office (access) and the transport of data central office (backbone) . Two technologies coexist as well in the access part as in the backbone part : ATM technology and Ethernet/MPLS technology. Next picture summarizes the end point locations of packet based services. Remark : ATM is outphased and is no longer valuated in the 2013 model.

This layer also integrates point to point dedicated Ethernet transparent connections delivered over the DWDM national backbone.

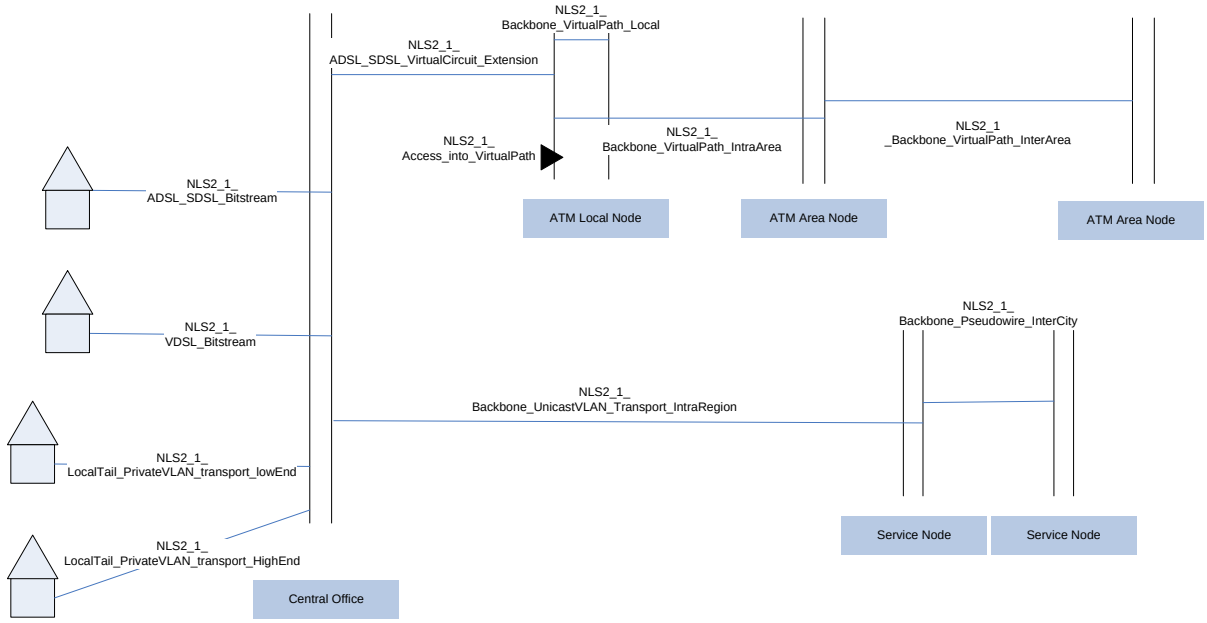


Figure 12: Network services of the packet based infrastructure 2.1

Access part

Layer 2.1 access service	Comment
NLS2_1_ADSL_SDSL_Bitstream	Broadband (ADSL-SDSL) end to end data streams between customer site and aggregation point in central office
NLS2_1_VDSL_Bitstream	Broadband VDSL end to end data streams between customer site and aggregation point in central office
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Ethernet symmetric dedicated link with central office over copper
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	Ethernet symmetric dedicated link with central office over fibre
NLS2_1_LocalTailCapacity_Ethernet>=10M	High bandwidth transparent Ethernet frame transport between customer and central office (BLES local tail)
NLS2_1_LocalTail_Eline_HighEnd	Ethernet symmetric dedicated link with central office

Backbone part

For data transport between central offices, the end point locations of the layer 2.1 services depend on the technology, the underlying networks having different topologies.

For the Ethernet/MPLS technology , the following services are defined:

Layer 2.1 Ethernet transport service	Comment
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	MPLS Transport of Ethernet VLANs between a central office and the service node of the region. These VLANs are unicast
NLS2_1_Backbone_Pseudowire_InterCity	MPLS Transport of Ethernet VLANs between service nodes of different regions. These VLANs are unicast

NLS2_1_Backbone_MulticastVPLS_IntraRegion	

Eventually , the dedicated Ethernet transparent connections also introduce backbone connectivity services :

Layer 2.1 Ethernet transparent transport	Comment
NLS2_1_BackboneCapacity_Ethernet>=10M and NLS2_1_BackboneCapacity_Ethernet>=1G	Any combination of end points different that of the two of them being express transmission centers, respectively 10/100Mbps and 1/10Gbps.
NLS2_1_InterCityBackboneCapacity_Ethernet>=10M and NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	End points are between two express transmission centers, respectively 10/100Mbps and 1/10Gbps.

7.6.2 Usage of the data packet infrastructure

The access services of the data packet infrastructure are combined with the data packet backbone services to deliver end-to-end connectivity between IP appliances at customer site (IP router in ADSL/VDSL modems, private LAN IP routers) and IP service nodes , primarily the broadband access servers and the IPVPN routers offering layer3 services like ADSL/SDSL IP collection, VoD IP collection, Private VLAN extensions up to IPVPN nodes.

Next table summarizes the drivers used expressing how NLS2.1 contribute in layer 3 services or directly to End user services.

NLS2.1 service	Driver Name	Upper layer services "consuming" NLS2.1 services
NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines	BROBA end user line, all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines	all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)	Symmetric accesses to IPVPN and BROBA access line
NLS2_1_Backbone_MulticastVPLS_IntraRegion	direct	For television
NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps) The PeakBandwidth is a realistic estimation (based on measurements in the network) of the traffic (Mbps) during peak hour. This estimation is used for validation (dimensioning) and allocation purposes	Broadband public IP NLS3 service, VoIP , Broadcast TV, and private IPVPN routing.
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)	Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing, Ethernet backhaul and WBA transport.
NLS2_1_Backbone_VirtualPath_Int	VP bandwidth Gbps	BROBA transport, Broadband public IP NLS3 service, VoIP , VoD and

erArea		access to private IPVPN routing
NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or- committed bandwidth)	
NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or- committed bandwidth)	
NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)	BLES EUS services, High capacity accesses to IPVPN, IP-VPN routers interconnection, internal networks routers interconncetion
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	Number of Lambdas	
NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)	
NLS2_1_BackboneCapacity_Ethernet>=1G	Number of Lambdas	
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)	
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	direct	Access to IPVPN layer 3 services
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	direct	Access to IPVPN layer 3 services

7.6.3 Contributors to the data packet infrastructure services

NLS2_1_ADSL_SDSL_Bitstream is the result of the central office (the Belgacom technical building closest to the end customer) based nework element NE_ADSL equipment. That function interacts with the broadband CPE equipment (at the customer site) by means of copper connectivity and potentially fiber connectitivy to optical subtended nodes.

The Ethernet based layer 2.1 services are implemented by the configuration of the Ethernet/MPLS network elements (NE_ethernet equipment) interacting with each other using lower layer connectivity services (see picture Figure 13).

NLS2_1_VDSL_Bitstream is the result of the function present in the deployed VDSL equipment (network elements NE_NGA Active equipment and NE_NGA Housing).

That function interacts with the broadband CPE equipment (at the customer site) by means of copper and fibre connectivity.

NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion is the result of the Ethernet/MPLS unicast function present in the deployed Ethernet equipment (NE_ethernet equipment). The function is activated in different locations to form aggregation clusters, whose links are mainly deployed on DWDM (NE_(D)WDM equipment) and in a limited number by direct fibre connectivity. The NLS2_1_Backbone_Pseudowire_InterCity and the NLS2_1_Backbone_MulticastVPLS_IntraRegion are implemented in the exact same way.

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd_or LowEnd and NLS2_1_LocalTail_Eline_HighEnd are the result of customer sited equipment (NE_ethernet equipment) and the connectivity to the Belgacom network. Such connectivity consists of a fibre based link for the high end cases and of a copper based link in the low end situation.

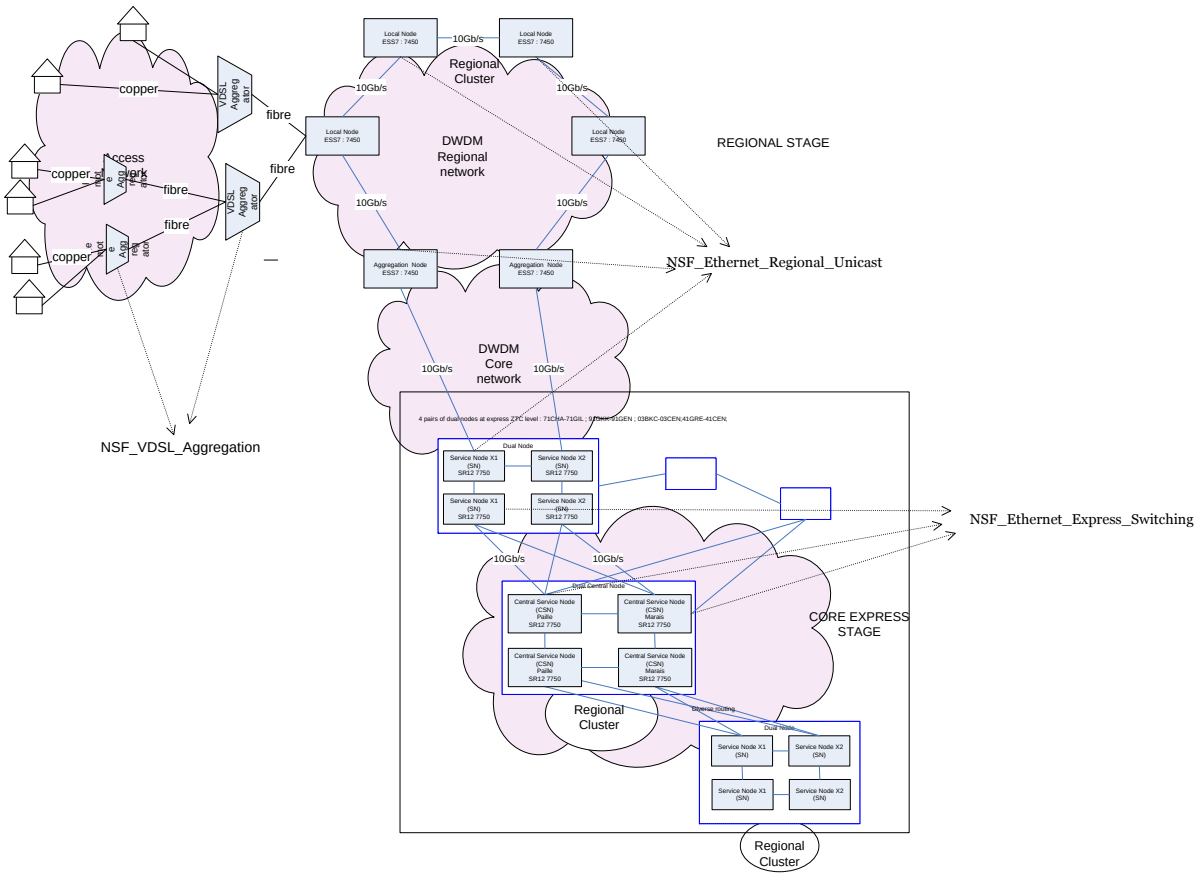


Figure 13: Ethernet layer 2.1

Finally the dedicated Ethernet transparent connection services NLS2_1_LocalTailCapacity_Ethernet>=10M, NLS2_1_XXX_BackboneCapacity_Ethernet>=10M are realized either on SDH equipment (up to 100 Mbps), reusing the SDH clusters deployed and already discussed in 7.5.3 (SDH over fibre) or for very high capacity connections (above 100 Mbps)

they are directly realized on a wavelength (deployed as Fibre_connect_to_the_office for the local tail and as (D)WDM for the other cases).

The table hereunder summarizes the drivers used to distribute the cost contributors to the NLS2.1 services.

NLS2_1 service category	Building block of layer 2_1 service	Driver name
Ethernet transport	NE_(D)WDM equipment	Yearly Direct CAPEX Cost
	NE_ethernet equipment	Yearly Direct CAPEX Cost
	NE_Express_DWDM_equipment	Bandwidth (Mbps)
	NE_Express_Ethernet_equipment	direct
	NE_Express_SDH_equipment	Bandwidth (Mbps)
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
Backbone_MulticastVPLS_IntraRegion	NE_(D)WDM equipment	Yearly Direct CAPEX Cost
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)
Broadband aggregation	NE_ADSL equipment	direct
	NE_NGA Active equipment	direct
	NE_NGA Housing	direct
	NLS1_0_Copper_Localloop_testing	nbr of broadband lex based without voice
	NLS1_0_Copper_Subloop	direct
	NLS1_0_Copper_Subloop_testing	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NSF_FTTC_FibreConnectivity	direct
Ethernet local tail	NE_ethernet equipment	Yearly Direct CAPEX Cost
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
Transparent Ethernet connection services	NE_(D)WDM equipment	Yearly Direct CAPEX Cost
	NE_Express_DWDM_equipment	Bandwidth (Mbps)
	NE_Express_SDH_equipment	Bandwidth (Mbps)
	NE_PDH SDH equipment	Yearly Direct CAPEX Cost
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)
	NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from NE_PDH SDH equipment)
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

7.7 Network services of the mobile backhauling infrastructure (NLS 2.2)

7.7.1 Leased Lines infrastructure for mobile access backhauling

- NLS2_2_Mobile_Access_Backhaul_Abis is related to backhauling of the 2G network, providing connectivity by means of leased lines between the Base Station Transceiver (BTS) and the Base Station controller (BSC).
- NLS2_2_Mobile_Access_Backhaul_IuB is related to backhauling of the 3G network, providing connectivity by means of leased lines between the Node B antenna and the Radio Network Controller (RNC) in the Radio Access Network.

7.8 Network services of the IP infrastructure layer (NLS3-IP)

7.8.1 Scope

This layer provides the following basic IP services in the model.

Fixed IP service type	IP service
Collection of IP traffic for public internet or internal internet	NLS3_ADSL_Public_IP_collection
	NLS3_SDSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
	NLS3_VoD_IP_collection
	NLS3_VoIP_IP_collection
	NLS3_Public_IP_Extension_on_symmetric
Public Internet routing	NLS3_Public_IP_switching
Connection of IP sites to IP-VPN	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
	NLS3_Private_IP&Ethernet_Routing
	NLS3_Private_IP&Ethernet_Extension_on_asymmetric
	NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter
IP security	NLS3_IP_security

In addition, NLS3 also includes collection of mobile data traffic in the mobile access and backbone network.

The actual NLS3's are described further. A comprehensive listing of which NLS or EUS they contribute to together with a description of the driver utilized in each case is also presented. Finally, a table will exhibit the cost allocation of these layer services, including driver and driver volume.

7.8.1.1 *Public services*

7.8.1.1.1 IP_collection

Gathers all the data traffic, except that of the private networks, generated by the customers at their locations -homes and offices placed all over the country- at the highest network level where it can be further delivered to the Internet.

This gathering is achieved thanks to the broad and narrow band servers together with the connectivity capabilities of the MPLS backbone network.

This generic service is in fact divided in several actual NLS3, depending on the traffic type and/or underlying technology, as follows:

- Data traffic:
  - NLS3_ADSL_Public_IP_Collection
  - NLS3_SDSL_Public_IP_Collection
  - NLS3_VDSL_Public_IP_Collection
  - NLS3_Public_IP_Extension_on_symmetric: where the customer-IP router connectivity is provided by means of Leased Lines, as opposed to the other services which are based on broadband access technologies.
- Video on Demand traffic:
  - NLS3_VoD_IP_Collection
- Voice over IP traffic:
  - NLS3_VoIP_IP_Collection

Further, these NLS3's contribute to the following higher network layer services and end user services (EUS) as specified hereunder:

NLS3	Driver name	Target element
NLS3_ADSL_Public_IP_collection NLS3_ADSL_Public_IP_collection	Nbr_of_retail_wholesale_ADSL_lines	EUS_ADSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_ADSL_lines	EUS_FastInternet subscription
NLS3_SDSL_Public_IP_collection	Nbr_of_retail_wholesale_SDSL_lines	EUS_FastInternet subscription
NLS3_VDSL_Public_IP_collection NLS3_VDSL_Public_IP_collection	Nbr_of_retail_wholesale_VDSL_lines	EUS_VDSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_VDSL_lines	EUS_FastInternet subscription
NLS3_Public_IP_Extension_on_symmetric	direct	EUS_Public_IP_Extension_on_Symmetric
NLS3_VoD_IP_collection	direct	NLS4_0_VoD
NLS3_VoIP_IP_collection	direct	NLS4_0_PSTN_access

7.8.1.1.2 Public_IP_switching

This service brings the intelligence to route the gathered traffic by the "IP_collection" generic NLS3 into the appropriate external network within the "public Internet".

This service, NLS3_Public_IP_switching, is fully and exclusively realized by the Belgacom Internet Routers and is totally dedicated to the end user service EUS_FastInternet subscription.

7.8.1.2 *Private services*

7.8.1.2.1 Private_IP&Ethernet_Extension

This NLS transparently extends the customer's private local area networks, situated at any location within Belgium, to the edge of the Belgacom's network, thanks to the routers installed at the

customer premises (CPE) and the connectivity capabilities of the MPLS aggregation and core-clouds.

This generic service consists in fact of several actual services, specific to the access technology type, as follows:

- NLS3_Private_IP&Ethernet_Extension_on_symmetric_Datacenter
- NLS3_Private_IP&Ethernet_Extension_on_asymmetric
- NLS3_Private_IP&Ethernet_Extension_on_symmetric_lowEnd
- NLS3_Private_IP&Ethernet_Extension_on_symmetric _highEnd

The higher level NLS/EUS to which the above NLS3's deliver their services and their costs allocations are:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_asymmetric subscription – National
NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter	direct	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription – National
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription – National

7.8.1.2.2 NLS3_Private_IP&Ethernet_Routing

This NLS delivers the capability of routing the private networks traffic to the requested end point, within the Belgacom private IPVPN network.

This service, NLS3_Private_IP&Ethernet_Routing, is completed by the Belgacom IPVPN Routers and the core MPLS cloud and, in turn, supports all the following EUS:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_asymmetric subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_international Subscription
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National

Figure 14: Layer 3 topology and contributors exhibits the layer's basic topology and all the contributors to the Layer 3 services.

NLS3 - IP

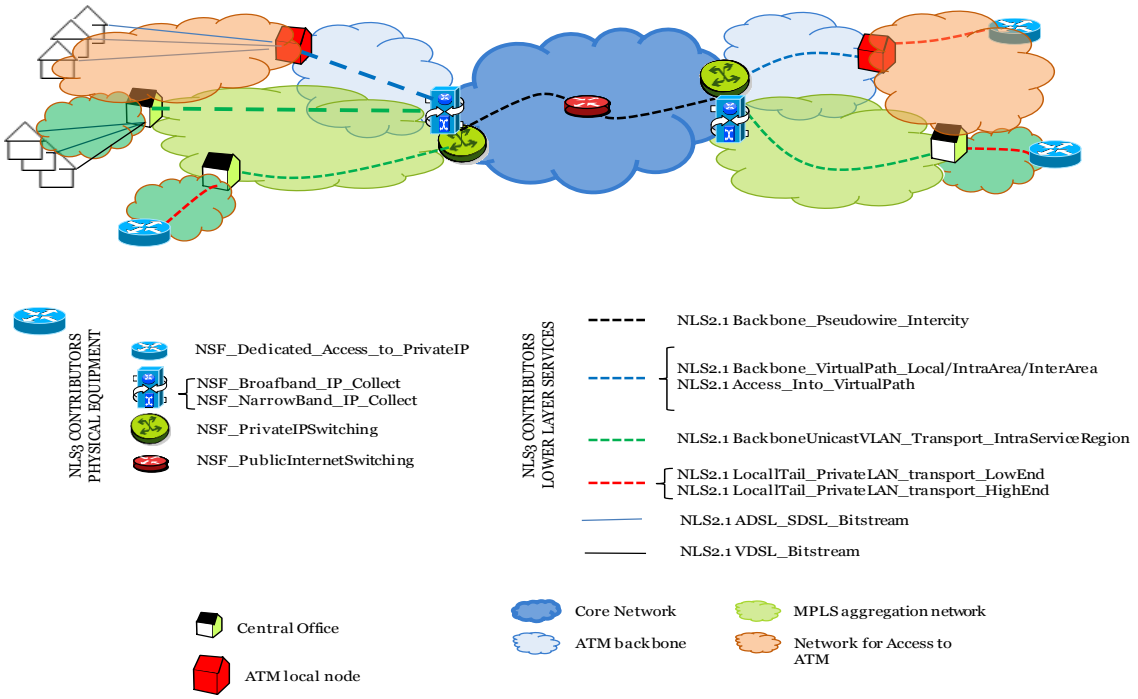


Figure 14: Layer 3 topology and contributors

7.8.1.3 *Mobile Data traffic*

The network layer 3 elements included at this level are :

- NLS3_0_BGC_Mobile_Access Data
- NLS3_0_BGC_Mobile_Backbone_Data

7.8.2 Contributors to the Network Layer 3 services

The table hereunder summarizes the contributors and the drivers used to distribute the costs to the NLS3 services.

NLS3 service category	Building block of layer 3 service	Driver name
Asymmetric Private_IP&Ethernet_Extension	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or- committed bandwidth)

	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_Dedicated_Access_to_PrivateIP	Number of Access
Symmetric Private_IP&Ethernet_Extension	NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalTail<2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail>2M	Nbr_of_Customer_sites
	NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Direct
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_Dedicated_Access_to_PrivateIP	Nbr_of_Sites

Symmetric Public_IP_Extension	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
Public_IP_collection	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_Public_IP_Collect	PeakHour_PublicInternetTraffic(Gbps)
VoD_IP_collection	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_VoD_IP_Collect	PeakHour_VoDTraffic(Gbps)
VoIP_IP_collection	NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps)
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NSF_BroadBand_VoIP_IP_Collect	Direct
Public_IP_switching	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)

	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PublicInternetSwitching	TotalPeakHour_PublicInternetTraffic(Gbps)
Private_IP&Ethernet_Routing	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_Backbone_Pseudowire_InterCity	Bandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PrivateIPSwitching	Direct
IP_security	NSF_IP_security	Direct
Mobile Data Handling	NSF_Mobile_RAN_Data NSF_Mobile_Backbone_Data	Routed volumes Routed volumes

7.9 Network Services of the application layer

7.9.1 Definition

This layer deals with the telecommunication application services to end users. The application layer services are :

NLS4_0_BroadcastTV, NLS4_0_VoD, NLS4_0_iDTV and voice telephony related services classified as follows:

CLASS	DEF_NLS_DESCR
Access to VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate

	NLS4_0_Voice_traffic_Local_PointOfInterconnect
NP	NLS4_0_FixedPortableNumberLocation
	NLS4_0_Public_NumberPortability
Telephony Access	NLS4_0_ISDN_access
	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling
	NLS4_0_CallerIdentity_CallHandling
	NLS4_0_CallingCard_CallHandling
	NLS4_0_InteractiveVoiceResponse_CallHandling
	NLS4_0_MessageWaitingIndicator_Inserting
	NLS4_0_OtherAdvanced_CallHandling
	NLS4_0_PrepaidCallingCard_CallHandling
	NLS4_0_Service_Announcements_Playing
	NLS4_0_Televoting_CallHandling
	NLS4_0_VirtualPrivateNetwork_CallHandling
	NLS4_0_VoiceFeatures_SelfManaging
	NLS4_0_Voicemail&Messaging
	NLS4_0_WakeUp_CallHandling
Voice transport	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_MSC
VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Collect
	NLS4_0_Voice_traffic_AreaLevel_Complete
	NLS4_0_Voice_traffic_AreaLevel_Terminate
	NLS4_0_Voice_traffic_AreaLevel_Transit
	NLS4_0_Voice_traffic_Local_Collect
	NLS4_0_Voice_traffic_Local_Complete
	NLS4_0_Voice_traffic_Local_Terminate
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS4_0_BGC Mobile_Access_Collect_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice
	NLS4_0_BGC_Mobile_Access_Distribute_SMS
	NLS4_0_BGC Mobile_BackBone_Voice
	NLS4_0_BGC_Mobile_Backbone_SMS
Mobile IN Platform	NLS4_0_SMS_Services
	NLS4_0_Private_Communication_Call_Handling
	NLS4_0_Mobile_PrepaidTraffic_Services
	NLS4_0_Mobile_PrepaidData_Services
Special	NLS4_0_Automated_call_distribution
	NLS4_0_PublicPayphones
Other special	NLS4_0_InternetDialUp_CallHandling

For the access, the voice application services are end-to-end voice connections between the customer site and the central office (technical building closest to the user) . For the backbone, voice applications are either pure call handling related and do not span over distant nodes, or they are voice transport applications between distant nodes . Next picture puts into perspective the services of the Voice application layer.

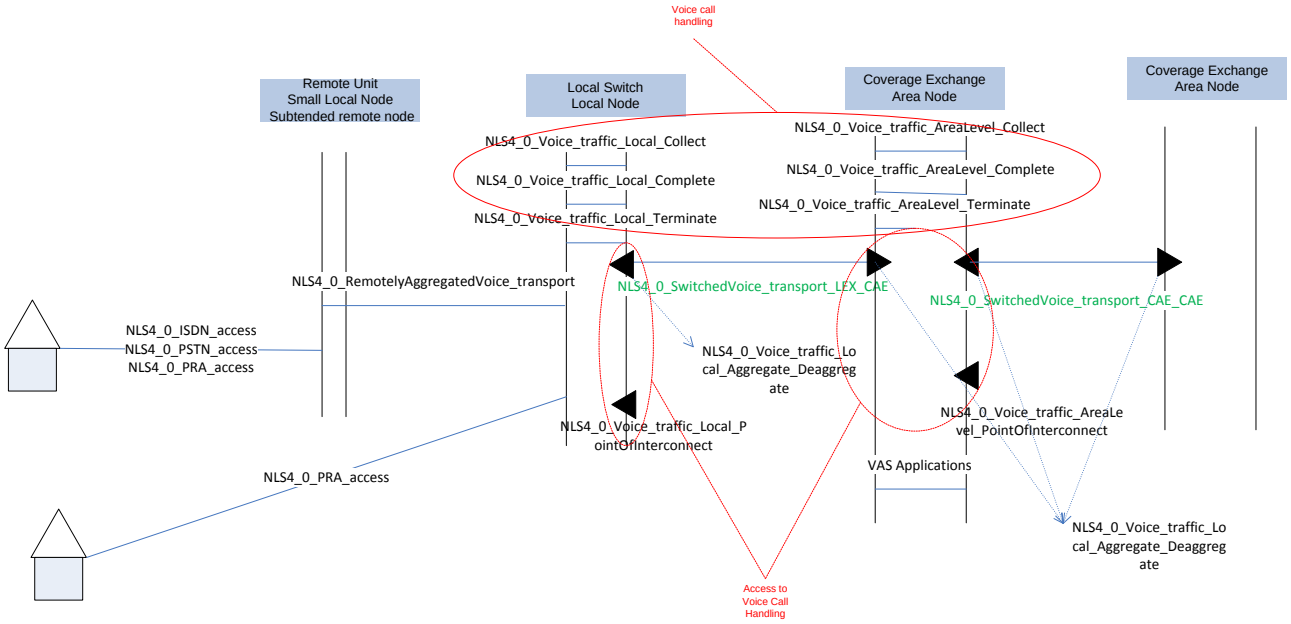


Figure 15: the services of the Voice application layer 4.0

7.9.2 Usage of the application layer

The TV related applications are completely used for iDTV end-user services, no specific consumption driver needs to be defined.

The voice application services are distributed to a variety of traffic types , each with a specific driver. The following table summarizes the used drivers per voice application service.

Class of application service	Voice application service	Driver to distribute the NLS4.0 application service to EUS or NLS4.1
Access to VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	TimeSlotEquivalent_capacity_used
	NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	routed minutes
	NLS4_0_Voice_traffic_Local_PointOfInterconnect	TimeSlotEquivalent_capacity_used
NP	NLS4_0_FixedPortableNumberLocation	Nbr_calls
	NLS4_0_Public_NumberPortability	Nbr_of_ported_numbers
Telephony Access	NLS4_0_ISDN_access	Nbr_lines_inUse
	NLS4_0_ISDN-PRA_access	Nbr_lines_inUse
	NLS4_0_PSTN_access	Nbr_lines_inUse
VAS application	NLS4_0_CallerIdentity_CallHandling	direct
	NLS4_0_CallingCard_CallHandling	direct
	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
	NLS4_0_MessageWaitingIndicator_Inserting	direct
	NLS4_0_OtherAdvanced_CallHandling	Direct
	NLS4_0_PrepaidCallingCard_CallHandling	Direct
	NLS4_0_Service_Announcements_Playing	Nbr_calls
	NLS4_0_Televoting_CallHandling	Nbr_calls_explosive_traffic

	NLS4_0_VirtualPrivateNetwork_CallHandling	direct
	NLS4_0_VoiceFeatures_SelfManaging	direct
	NLS4_0_Voicemail&Messaging	direct
	NLS4_0_WakeUp_CallHandling	direct
Voice transport	NLS4_0_RemotelyAggregatedVoice_transport	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_CAE	routed minutes
	NLS4_0_FixedSwitchedVoice_transport_National_offnet	TimeSlotEquivalent_capacity_used
	NLS4_0_SwitchedVoice_transport_LEX_CAE	routed minutes
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_MSC	routed minutes
	NLS4_0_SwitchedVoice_transport_LEX_MSC	routed minutes
VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Collect	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Complete	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Terminate	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Transit	routed minutes
	NLS4_0_Voice_traffic_Local_Collect	routed minutes
	NLS4_0_Voice_traffic_Local_Complete	routed minutes
	NLS4_0_Voice_traffic_Local_Terminate	routed minutes
Mobile Voice&MessagingHandling	NLS4_0_BGC Mobile_Access_Collect_Voice	routed minutes
	NLS4_0_BGC_Mobile_Access_Collect_SMS	routed volumes
	NLS4_0_BGC Mobile_Access_Distribute_Voice	routed minutes
	NLS4_0_BGC Mobile_Access_Distribute_SMS	routed volumes
	NLS4_0_BGC Mobile_BackBone_Voice	routed minutes
	NLS4_0_BGC_Mobile_Backbone_SMS	routed volumes
Mobile IN platform	NLS4_0_SMS_Services	Cumulated invested value
	NLS4_0_Private_Communication_Call_Handling	Cumulated invested value
	NLS4_0_Mobile_PrepaidTraffic_Services	Cumulated invested value
	NLS4_0_Mobile_PrepaidData_Services	Cumulated invested value

The driver “routed minutes” (or “routed volumes” in the case of mobile SMS) consists in determining the average nbr of times (=routing factor) a traffic type is using the voice application service across all possible call scenarios compatible with the traffic type. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) of that traffic type.

The traffic types (“consumers”) of these voice applications are:

Class of voice application	Traffic type
Access to VoiceCallHandling	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Carrier PreSelection IAA interconnection
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed

	EUS_Mobile_Roaming IN Origination
	EUS_MVAS - BGC Fixed
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
	EUS_Voice_traffic_Local_PointOfInterconnect subscription
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
Mobile Voice&MessagingHandling	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile international traffic incoming
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile to BGC Mobile
	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Interconnection FOLO to BGC Mobile
	EUS_Interconnection MOLO to BGC Mobile
	EUS_Mobile_On net SMS
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_Mobile_Roaming IN_Terminating_SMS
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
NP	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_IAA interconnection - BGC Fixed to FOLO
	EUS_Incoming International Transit (M)OLO Traffic
	EUS_Other_Traffic - BGC Fixed
	EUS_Number Portability access per line subscription
Special	EUS_AUTOMATEDCALLDISTRIBUTION
	EUS_Payph operations - BGC Fixed
Telephony Access	EUS_ISDN-BA Access - subscription

	EUS_Private_IP&Ethernet_on_backup
	EUS_ISDN-PRA Access - subscription
	EUS_PSTN Access - subscription
VAS application	EUS_BGC Fixed DCIA traffic
	EUS_BGC Fixed international traffic incoming
	EUS_BGC Fixed interzonal traffic
	EUS_BGC Fixed local traffic
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed zonal non local traffic
	EUS_BVAS Call & Conference - BGC fixed
	EUS_Calling Card Postpaid Traffic - BGC Fixed
	EUS_Carrier PreSelection IAA interconnection
	EUS_Carrier PreSelection local interconnection
	EUS_Consultel 090x Traffic - (M)FOLO to BGC Fixed
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
	EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	EUS_MVAS - BGC Fixed
	EUS_notAllocated
	EUS_OPS International Information Traffic - BGC
	EUS_OPS National Information Traffic - BGC
	EUS_Other_Traffic - BGC Fixed
	EUS_Payph operations - BGC Fixed
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
Voice transport	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile international traffic incoming
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_BGC Mobile_Roaming Out Origination
	EUS_BGC Mobile_Roaming Out Termination
	EUS_Carrier PreSelection local interconnection
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Interconnection FOLO to BGC Mobile

	EUS_Interconnection MOLO to BGC Mobile
	EUS_Local interconnection - FOLO to BGC Fixed
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_MVAS - BGC Fixed
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Local BGC Fixed_On net Voice
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
VoiceCallHandling	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Carrier PreSelection IAA interconnection
	EUS_Carrier PreSelection local interconnection
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	EUS_Mobile_Roaming IN Origination
	EUS_MVAS - BGC Fixed
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Local BGC Fixed_On net Voice
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
	NLS4_1_Transit International (M)OLO Traffic IAA

Other special	EUS_internet traffic - FOLO to BGC 0909/3 IAA
	EUS_Other_Traffic - BGC Fixed

Below table gives a view on fixed or mobile related traffic types ("consumers") of those voice applications:

traffic category	Voice application service	EUS or NLS4_1
mobile traffic related	NLS4_0_BGC Mobile_Access_Collect_Voice	EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Mobile_Roaming IN Origination
		NLS4_1 BVAS - BGC Fixed
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	NLS4_0_BGC Mobile_Access_Collect_SMS	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
		EUS_Mobile_Roaming IN_Originating_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile to BGC Mobile
		EUS_Interconnection FOLO to BGC Mobile
		EUS_Interconnection MOLO to BGC Mobile
		EUS_Mobile_Roaming IN Origination
		EUS_Mobile_Roaming IN Termination
	NLS4_0_BGC Mobile_Access_Distribute_SMS	EUS_BGC Mobile_Incoming SMS international
		EUS_BGC Mobile_Incoming SMS national
		EUS_Mobile_On net SMS
		EUS_Mobile_Roaming IN_Originating_SMS
		EUS_Mobile_Roaming IN_Terminating_SMS
	NLS4_0_BGC Mobile_Backbone_Voice	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile

	EUS_BGC Mobile_Roaming Out Termination
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Interconnection FOLO to BGC Mobile
	EUS_Interconnection MOLO to BGC Mobile
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
NLS4_0_BGC Mobile_Backbone_SMS	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_Mobile_On net SMS
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_Mobile_Roaming IN_Terminating_SMS
NLS4_0_MobileSwitchedVoice_transport_National_offnet	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile_Roaming Out Termination
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN_Originating_SMS
NLS4_0_RemotelyAggregatedVoice_transport	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_SwitchedVoice_transport_CAE_MSC	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_Mobile_Roaming IN Origination
	NLS4_1 BVAS - BGC Fixed
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
NLS4_0_SwitchedVoice_transport_LEX_CAE	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed

	NLS4_0_SwitchedVoice_transport_LEX_MSC	EUS_BGC Mobile to BGC Fixed
		EUS_Mobile_Roaming IN Origination
	NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Mobile_Roaming IN Origination
		NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_0_Voice_traffic_AreaLevel_Collect	EUS_BGC Fixed to BGC Mobile
		NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Mobile_Roaming IN Origination
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_1 BVAS - BGC Fixed
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_0_Voice_traffic_AreaLevel_Terminate	EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Mobile_Roaming IN Origination
		NLS4_1 BVAS - BGC Fixed
	NLS4_0_Voice_traffic_AreaLevel_Transit	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
		EUS_BGC Mobile National outg. FOLO
		EUS_Mobile_Roaming IN Origination
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Mobile_Roaming IN Origination
		NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_0_Voice_traffic_Local_Collect	EUS_BGC Fixed to BGC Mobile
		NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_0_Voice_traffic_Local_Terminate	EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Mobile_Roaming IN Origination
Mobile IN	NLS4_0_SMS_Services	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international

		EUS_Mobile_Outgoing SMS_national
		EUS_BGC Mobile_Roaming Out Origination
	NLS4_0_Private_Communication_Call_Handling	EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_0_Mobile_PrepaidTraffic_Services	EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_0_Mobile_PrepaidData_Services	EUS_Mobile_Data national
		EUS_BGC Mobile_Roaming Out Data
pure fixed traffic related	NLS4_0_FixedSwitchedVoice_transport_National_offnet	EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_1_IAA interconnection - BGC Fixed to FOLO
		EUS_IAA interconnection - BGC Fixed to MOLO
	NLS4_0_RemotelyAggregatedVoice_transport	EUS_Carrier PreSelection local interconnection
		EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_IAA interconnection - BGC Fixed to MOLO
		EUS_Local interconnection - FOLO to BGC Fixed
		EUS_MVAS - BGC Fixed
		NLS4_1 BVAS - BGC Fixed

	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Local BGC Fixed_On net Voice
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_SwitchedVoice_transport_CAE_CAE	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_Transit International (M)OLO Traffic EAA
NLS4_0_SwitchedVoice_transport_LEX_CAE	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
NLS4_0_Voice_traffic_AreaLevel_Collect	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO

	EUS_MVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Complete	NLS4_1 BVAS - BGC Fixed
	NLS4_1_IAA BGC Fixed_On net Voice
NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
NLS4_0_Voice_traffic_AreaLevel_Terminate	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Transit	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
	NLS4_1_Transit International (M)OLO Traffic IAA
NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_Local_Collect	EUS_Carrier PreSelection IAA interconnection
	EUS_Carrier PreSelection local interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed

	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_Local_Complete	NLS4_1_Local BGC Fixed_On net Voice
NLS4_0_Voice_traffic_Local_PointOfInterconnect	EUS_Voice_traffic_Local_PointOfInterconnect subscription
NLS4_0_Voice_traffic_Local_Terminate	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed

7.9.3 Contributors to the application services

TV services

The broadcast TV application service is the result of the video streaming network stage function and the nation wide broadcast using the SDH clusters and simultaneously the multicast features of the Ethernet/MPLS regional clusters combined with the express pseudowires in order to reach all regional clusters.

Contributor to NLS4_0_BroadcastTV	**Driver**
NSF_BroadcastTV	Nbr_TV_users
NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_LocalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_1_Backbone_MulticastVPLS_IntraRegion	Direct
NLS2_1_Backbone_Pseudowire_InterCity	TotalPeakBandwidth_used(Gbps)
NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)

NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)

Similarly, the Video On Demand service is the result of Video Movie servers delivering the content and the transport services towards the closest local node to the customer . The transport is realized on the Ethernet/MPLS network.

Contributor to NLS4_0_VoD	Driver
NLS3_VoD_IP_collection	direct
NSF_VoD	Nbr_TV_users

Voice application services in the access

PSTN and ISDN access services are the result of the voice concentrator function in the closest technical building (local switch or remote unit) and the physical copper connectivity between the customer site and the technical building. In addition, the data connectivity required to transport Voice over IP signaling and traffic to the Voice over IP switching units is also included as a contributor to voice access.

PRA access services do not need a concentrator function (that function is typically realized within the customer site by private switches) but merely a voice transport link to the local switch. This one is obtained directly from layer 2.0 transport segments and local tails.

Hereunder a summary of the contributors to voice access together with the drivers used to determine their level of involvement in the service

Voice access service	Contributor	Driver Name
NLS4_0_ISDN_access	**NLS1_0_Continue_Raw_Copper**	Nbr_of_used_pairs
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NSF_ISDN_NetworkTermination	Nbr_of_accesses
	NSF_ISDN_Voice_concentrator	Nbr_lines_inUse
NLS4_0_PSTN_access	**NLS1_0_Continue_Raw_Copper**	Nbr_of_used_pairs
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS3_VoIP_IP_collection	Direct
	NSF_PairGainSystem	Direct
	NSF_PSTN_Voice_concentrator	Nbr_lines_inUse
NLS4_0_ISDN-PRA_access	**NLS2_0_InterCityBackboneCapacity=2M**	Bandwidth consumed (Mbit/s)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_LocalTailCapacity	Bandwidth consumed (Mbit/s)
	NSF_ISDN_Primary_Access	Nbr_lines_inUse

Voice application services in the backbone (see picture Figure 15: the services of the Voice application layer 4.0)

The services in the group "Access to VoiceCallHandling" allow to access the switching matrix and call handling , they are realized by ports to the switch (a switch port concentrates the voice circuits from/to the switching matrix). The switching ports (trunks) can be those of a local switch or of a transit switch.

For the case of interconnection with other operators (NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect, NLS4_0_Voice_traffic_Local_PointOfInterconnect) , the charging function of the switch is also exercised in order to allow for interoperator billing.

In summary the contributors are distributed using following drivers:

Network functions used to realize Access to VoiceCallHandling services	Driver used to attribute network functions to access to VoiceCallHandling services
NSF_Voice_call_CAE_charging	Routed minutes
NSF_Voice_call_CAE_Trunks	TimeSlot_capacity_used
NSF_Voice_call_Local_charging	Routed minutes
NSF_Voice_call_Local_Trunks	TimeSlot_capacity_used

The services in the group "VoiceCallHandling" result from three network stage functions:
NSF_Voice_call_CAE_Processing
NSF_Voice_call_Local_Processing
NSF_Voice_call_Local_charging

The driver used is "routed minutes" and it consists in determining the average nbr of times (=routing factor) a voice call handling type is using the network functions . The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) exercising that voice call handling type.

Network function		Driver Name
NSF_Voice_call_CAE_Processing	NLS4_0_Voice_traffic_AreaLevel_Collect	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Complete	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Terminate	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Transit	Routed minutes
NSF_Voice_call_Local_charging	NLS4_0_Voice_traffic_Local_Collect	Routed minutes
	NLS4_0_Voice_traffic_Local_Complete	Routed minutes
	NLS4_0_Voice_traffic_Local_PointOfInterconnect	Routed minutes
NSF_Voice_call_Local_Processing	NLS4_0_Voice_traffic_Local_Collect	Routed minutes
	NLS4_0_Voice_traffic_Local_Complete	Routed minutes

NLS4_0_Voice_traffic_Local_Terminate		Routed minutes

The services in the group "Voice transport" are emanating from layer 2.0 Backbone transport capacity (<=2M) which are distributed according to the consumed bandwidth.

Contributor to NLS4_x	Driver	NLS4_x element
NLS2_0_LocalBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_ISDN-PRA_access
NLS2_0_LocalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access

		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalTail<2M	Nbr_of_Customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
NLS2_0_LocalTail=2M	Nbr_of_Customer_sites	NLS4_0_ISDN-PRA_access

The services in the group "VAS application" are in fact directly identified with a network function:

NSF_CallerIdentity_CallHandling	NLS4_0_CallerIdentity_CallHandling	direct
NSF_CallingCard_CallHandling	NLS4_0_CallingCard_CallHandling	direct
NSF_InteractiveVoiceResponse_CallHandling	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
NSF_MessageWaitingIndicator_Inserting	NLS4_0_MessageWaitingIndicator_Inserting	direct
NSF_OtherAdvanced_CallHandling	NLS4_0_OtherAdvanced_CallHandling	direct
NSF_PrepaidCallingCard_CallHandling	NLS4_0_PrepaidCallingCard_CallHandling	direct
NSF_Service_Announcements_Playing	NLS4_0_Service_Announcements_Playing	direct
NSF_Televoting_CallHandling	NLS4_0_Televoting_CallHandling	direct
NSF_VirtualPrivateNetwork_CallHandling	NLS4_0_VirtualPrivateNetwork_CallHandling	direct
NSF_VoiceFeatures_SelfManaging	NLS4_0_VoiceFeatures_SelfManaging	direct
NSF_Voicemail&Messaging	NLS4_0_Voicemail&Messaging	direct
NSF_WakeUp_CallHandling	NLS4_0_WakeUp_CallHandling	direct

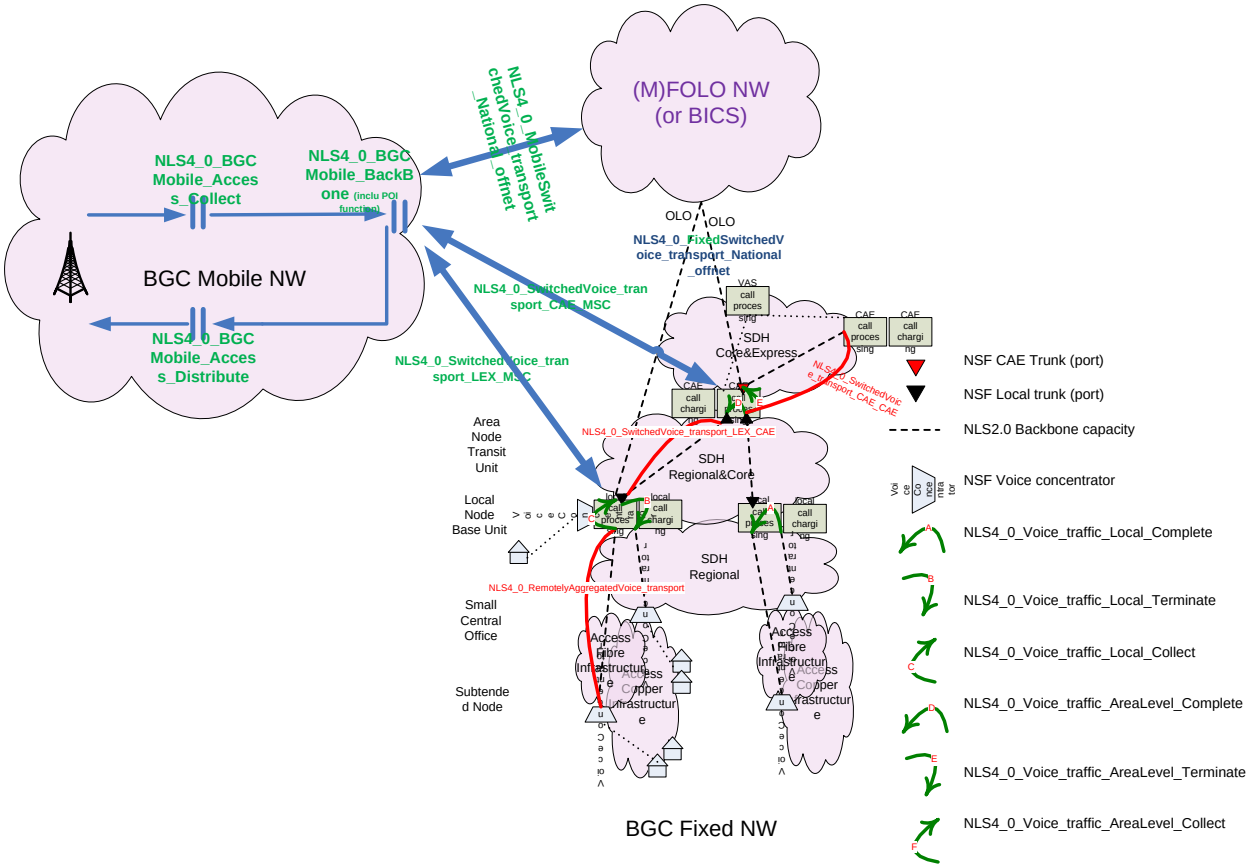


Figure 16: Switching Network

8 Annex I: SRW Flow Acronyms

SRW	Support, Retail, Wholesale
BIPT	Belgian Institute for Postal services and Telecommunications
BTN	Business TransformatioN
CBU	Consumer Business Unit
CC	Costs Center
CCG	Costs Center Group
CP	Costs Pool
CWS	Carrier & WholeSale
EBU	Enterprise Business Unit
FAC	Fully Allocated Costs
HCA	Historical Cost Accounting
HMC	Human Manpower Cost
MOS	Material Out of Stock
NRA	National Regulatory Authority
REG	(Belgacom) Group Regulatory Affairs
SMP	Significant Market Power
SOG	Services & Other Goods
S&S	Staff & Support

9 Annex II: Network and IT Flows Acronyms

AC	Asset Class
ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
BA	Basic Access
BAS	Broadband Access Server
BES	Belgacom European Solutions
BGC	Belgacom
BILAN	Belgacom Interconnection of LANs
BLES	Belgacom LAN Extension Service
BROBA	Belgacom Reference Offer for Bitstream Access
BROTSOLL	Belgacom Reference Offer for Terminating Segment of Leased Line
BVAS	Business Value Added Services
CAE	Coverage Exchange Area
CAPEX	CApital Expenditures
CP	Cost Pool
CPE	Customer Premises Equipment
CPU	Central Processing Unit
CWDM	Coarse Wavelength Division Multiplexing
DACS	Digital Analog Cross-connect System
DCN	Data Communication Network
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DU	Dispatching Unit
DWDM	Dense Wavelength Division Multiplexing
EAA	Extra Access Area
EAL	Ethernet Access Line
EFM	Ethernet First Mile
ESS	Ethernet Service Switch
Ethane	ETHernet Aggregation NETwork
EUS	End User Service
FAC	Fully Allocated Costs
FIFA	Fast Internet Future Architecture

FTTC	Fiber To The Cabinet
FTTO	Fiber To The Office
Gb	Giga bit
Gbps	Giga bits per second
HW	HardWare
IAA	Intra Access Area
iDTV	interactive Digital TeleVision
IN	Intelligent Network
INCA	Integrated Cost Application
IO	In/Out
IP	Internet Protocol
IPVPN	Internet Protocol Virtual Private Network
ISAM	IP Subscriber Line Access Multiplexer
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LDC	Local Distribution Center
LEX	Local Exchange
LL	Leased Line
LTE	Line Terminating Equipment
Mbit	Mega bit
MOLO	Mobile Other Licensed Operator
MPLS	MultiProtocol Label Switching
MSR	Multi Server Router
MUX	Multiplexer
MVAS	Mass Value Added Services
MWE	MicroWave Equipment
NE	Network Element
NGA	New Generation Access
NGN	New Generation Network
NLS	Network Layer Service
NTE	Network Terminating Equipment
NTP	Network Termination Point
NSF	Network Stage Function
OLO	Other Licensed Operator

OLTE	Optical Line Terminating Equipment
OPEX	OPerational Expenditure
OVH	Overhead
PDH	Plesiochronous Digital Hierarchy
PRA	Primary Access
PSTN	Public Switched Telephony Network
QoS	Quality of Service
RAM	Random Access Memory
ROP	Remote Optical Platform
SDH	Synchronous Digital Hierarchy
SDSL	Symmetric Digital Subscriber Line
STM	Synchronous Transport Module
TDM	Time Division Multiplexing
TV	TeleVision
VAS	Value Added Services
VDSL	Very high speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VP	Virtual Path
VPLS	Virtual Private Local area network Service
VPN	Virtual Private Network
WDM	Wavelength Division Multiplexing
SDE	Service Delivery Engine
NEO	Network Engineering & Operations
COP	Customer Operations
CFO	Customer Field Operations
CIS	Customer ICT Services
ITS	Information Technology Services
APP	Architecture, Planning & Program Office

Proximus Regulatory Cost Model 2014

General Description

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1 General description

REG (Group Regulatory Affairs) department ensures the preparation of separated accounts and sets up the Cost model inherent to the reporting of separated accounts, and used in other regulatory files. In accordance with European Commission recommendations, the entire costs of statutory accounts are taken into account in the cost model and reporting of separated accounts, to the exception of statutory accounts 65 to 68, as well as some other accounts excluded from the cost model perimeter. As said, the cost basis of the cost model is directly issued from the general accounting of Proximus SA, as recorded in SAP accounting tool. Statutory accounts of Proximus SA have been audited in 2014 by Deloitte, external auditors. Deloitte auditors issued an unqualified opinion on statutory accounts.

Separated accounts result from allocation flows of Network/IT and SRW (Support, Retail and Wholesale) costs, as included in the general accounting of Proximus SA, as well as the cost of capital of these two modules.

The following chart illustrates the accounting system of costs, as well as main allocation flows. The whole costs included in the allocation process are loaded in a tool (INCA Software) that runs accuracy tests and prevents double costs counting or multiple allocations.

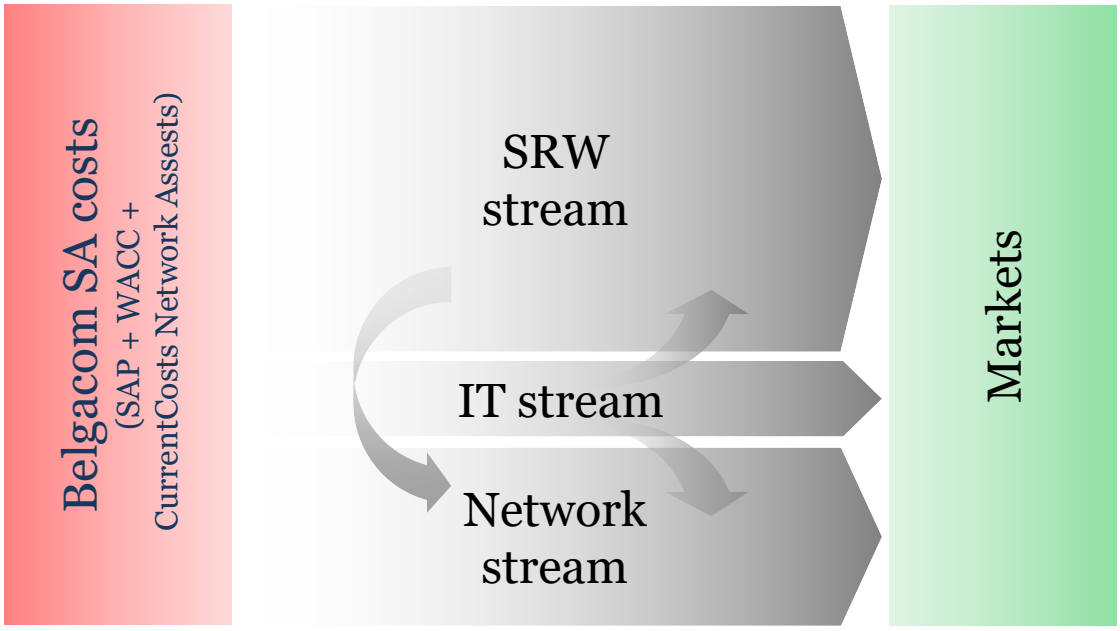

Figure 1

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SRW allocation flows include retail costs, and other direct and indirect costs that are not included in the Network nor IT allocation flows.

Network and IT flows include all the costs related to the Network and Information & Communication technology.

Costs allocated in allocations flows SRW, Network and IT have the same cost basis origin, this latter being SAP statutory accounts of Proximus SA. IT tool INCA of the cost model makes validity checks to prevent any double counting and trace allocated costs from their unique SAP cost basis origin to their final destination.

The Cost model per Market is a top-down model.

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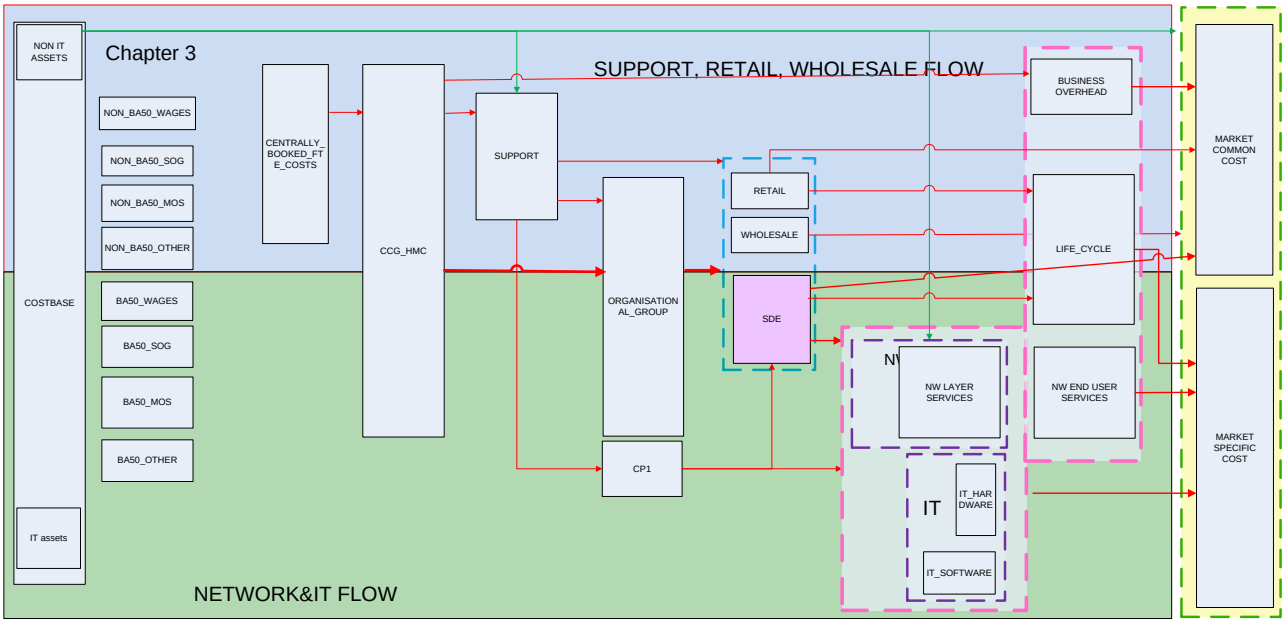
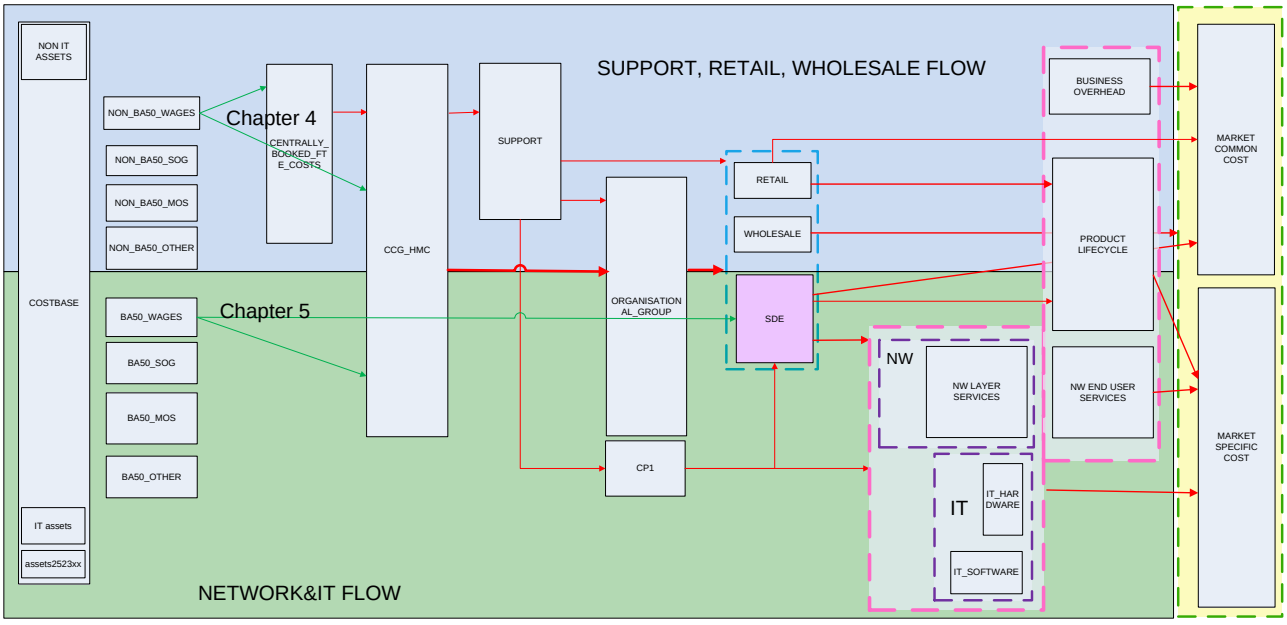
2 Model Allocation Structure

This section provides with a global view on the allocation structure of the model by walking through the major allocation flows and introducing the major building blocks and concepts in the model.

The following Figures will be the supporting tools for such discovery walk, where the major modules constituting the model as well as the global allocation flows among them are shown. The differentiation between SRW , IT and Network flows is also illustrated in the exhibit.





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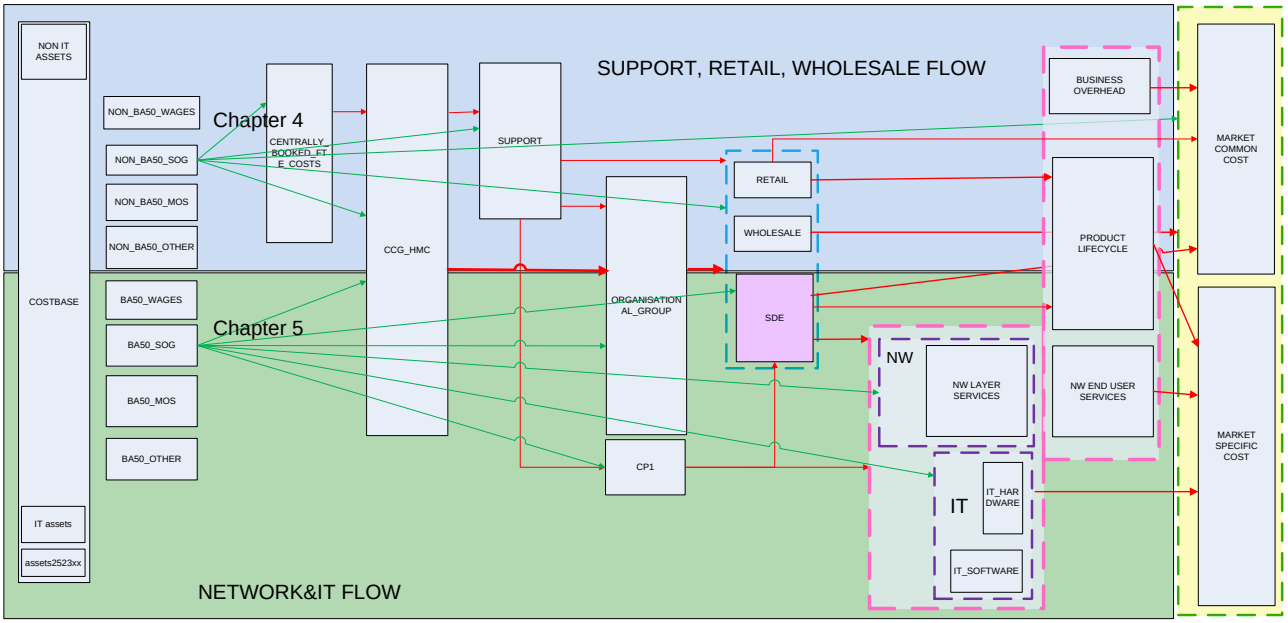

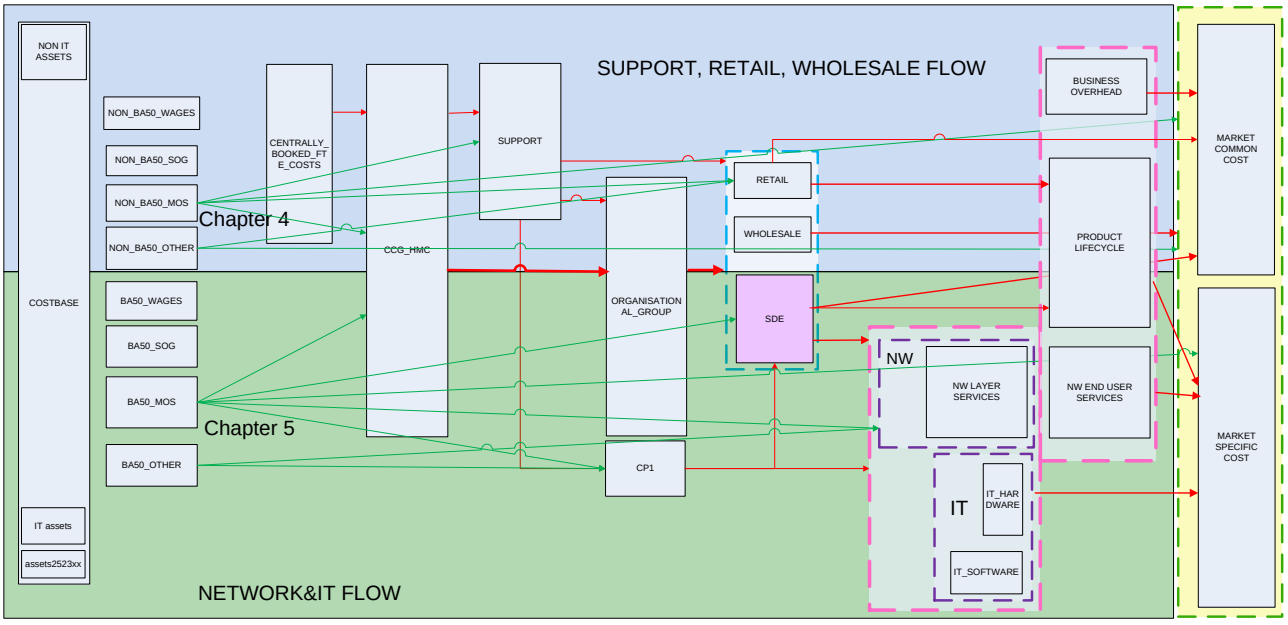

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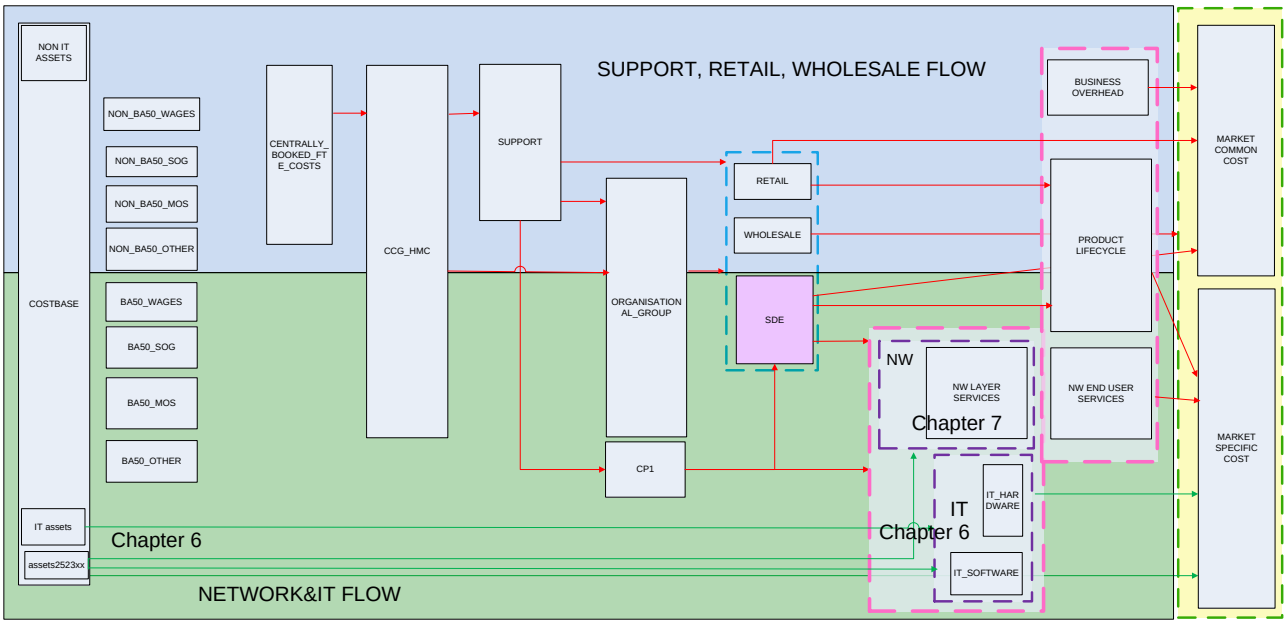

The overall objective of the model is allocating all the attributable costs present in the cost base to the markets as defined in the regulatory framework.

Therefore, the cost base constitutes the foundation of the model.

Further, the model allocation process can be subdivided into three main streams, SRW, IT and Network.

The SRW stream has as objective to allocate all costs that are not part of the Network or IT model towards the markets.

The IT and Network streams, although having completely separated CAPEX basis, both share a common OPEX source.

Once this has been discussed (chapter 5), the IT stream (chapter 6) and Network stream (chapter 7) can be dealt with independently.

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3 Cost Base

3.1 Cost model perimeter

3.1.1 Determination of the Cost model perimeter

Costs included in the Cost model are operating charges, i.e. general ledger (GL) accounts 60 to 64 of statutory accounting, as well as part of GL 69.

GL 60 “cost of goods sold” includes mainly telecom equipment purchases (ADSL modem, handsets, cables, mobile SIM cards, etc.), small equipment (cpe, …) and stocks movements.

GL 61 « services and other goods » includes primarily costs linked to traffic (a.o. interconnection fees) and operating expenses such as maintenance, utilities, renting, marketing, representation allowances, consultancy, travel fees, etc.

GL 62 corresponds to all personnel costs (wages and other salary benefits).

GL 63 includes depreciation and amortization, stocks and trade receivable accruals for write-off and movements of provisions for liabilities.

GL 64 gathers other operating expenses, including a.o. write-off on trade receivables, immovable withholding tax and local taxes, taxes on pylons, etc.

GL 69 relates to company result appropriation corresponding to the part of personnel in the profit (collective bonus).

At last, GL 72 – « Produced Fixed assets » reduces the cost basis to cancel costs linked to produced fixed assets and to avoid a double counting of these costs with the corresponding depreciation charge.

To the costs perimeter from the general accounting is added the weighted average cost of capital (WACC) of 9,61% for Proximus Fix products and 10,05% for Proximus Mobile products.

In 2014, materiality of costs included in the model (excluding WACC that does not come from general accounting) is as follows:

Table 1. Materiality of costs included in the Cost model perimeter (in EUR and in % of total costs).

60 Materials out of stock
61 Services & other goods
62 Remunerations, social security and pensions
63 Depreciations, write offs and accruals
64 Other operating charges
69 Appropriation
72 PFA
Total costs

To the Cost model perimeter from general accounting, a weighted average cost of capital (WACC) of 9,61% on Fixed products and of 10,05% on Mobile products is added.

Hence, the total cost basis handled as the source costs of the Cost model 2014 amounts to (Confidential) MEUR in 2014, at historical costs (Confidential).

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Following last adjustments to switch from historical costs to current costs done for the Network costs (Confidential), we reach a total Cost basis, being the Cost model source costs (cost accounting and separated accounts), of around (Confidential) MEUR in current costs.

3.1.2 Costs excluded from the Cost model perimeter

Other costs than those mentioned above are excluded from the Cost model. It relates to GL 65 to 69 of general accounting, to the exception mentioned above, for part of GL 69 (share of personnel in profit).

Some costs are excluded since considered as having no causal link to the products and activities. This matters for extraordinary costs (GL 66) and tax costs (GL 67 and 68).

Other costs are excluded since already included in the WACC. This relates to financial costs (GL65) and dividends appropriation (GL 69).

Costs excluded mentioned here above are costs excluded from the Cost model upstream (i.e., when defining Cost model perimeter with costs included in general accounting). On top of these ones, other costs will be excluded downstream in the Cost model, i.e. costs excluded via the allocation flow. E.g.: Support costs involving affiliates.

For the year 2014, materiality of the costs excluded is the following:

Table 2. Materiality of costs excluded from the Cost model perimeter (in EUR and in % of total costs)

65 financial Charges
66 Extraordinary charges
67 Income taxes
68 Transfer to deferred taxes and untaxed reserves
69 Appropriation
Total costs excluded

3.2 Cost regrouping

Proximus books the costs on one hand, on a general ledger account defined in general accounting, and on another hand, on a cost center defined in reporting and analytics accounting. This way to handle costs has for objective to gather data, in order to simplify data processing.

Two types of aggregation are done:

- Aggregation of 690 GL of general accounting in 184 Cost pools (CP)
- Aggregation of 660 cost centers in 277 Cost Centers Groups (CCG).

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A **Cost pool** is a group of costs with similar characteristics and issued from the same family of cost natures.

Regarding material resources, gathering of costs is based on the similar function that these costs have. E.g., cost pool "Training expenses" sums up costs of trainings organized inside Proximus, external trainings, training books and documentation costs.

Regarding human resources (referred as FTE, or Full Time Equivalent), cost pools gather workers with the same profile. E.g., cost pool "Level S" includes wages and salaries of employees with level S (Sales force), as well as premiums and other wages benefits paid to these employees.

Costs included in the same cost pool have an identical causal link to the products and activities to which they related. They have the same "resource driver".

A **Cost Center Group (CCG)** sums up cost centers with similar characteristics and realizing similar activities and as a consequence, can be aggregated into the same cost center group.

Each Cost Center Group uses various cost pools.

Combinations cost pool/cost center group constitute the **Resource Groups**. The Resource Groups are the Cost basis of the Cost model.

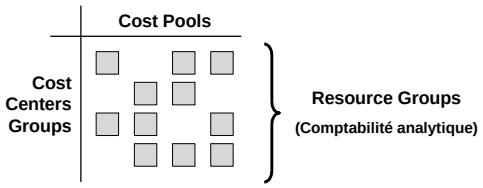

Figure 2 : Resource Groups

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3.3 Organisation

The organization as on December 31, 2014 as used in the costbase :

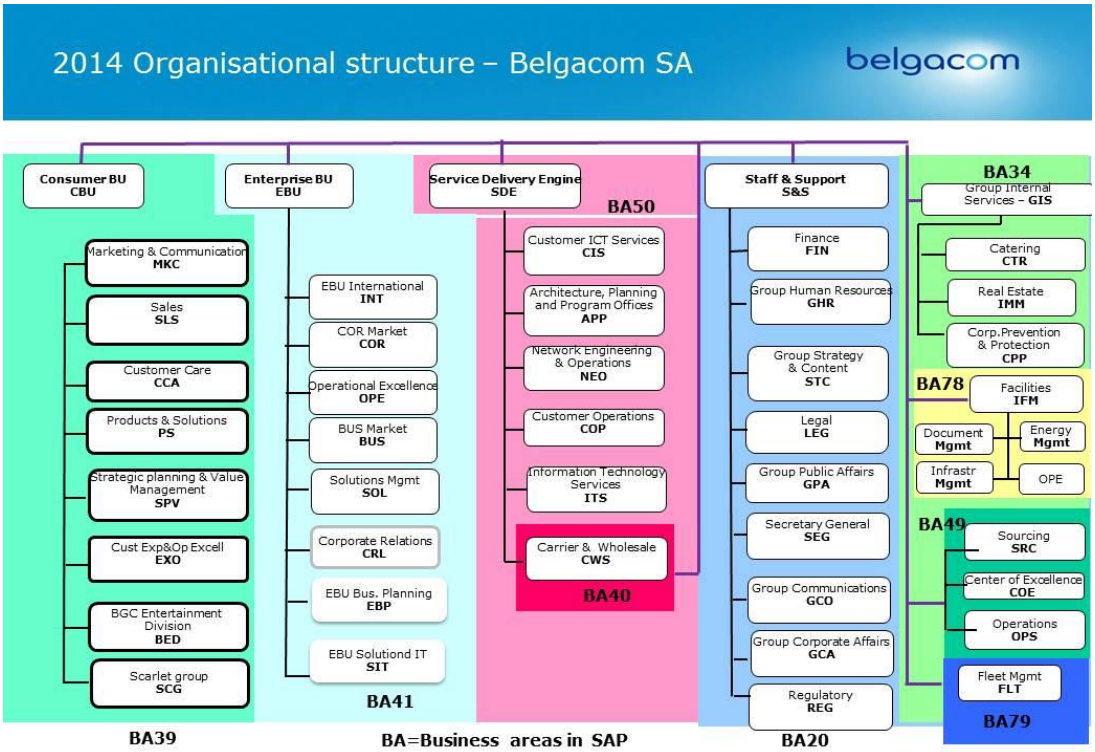

Figure 2

- This organisation has a clear split between the residential and professional customers by the divisions Consumer and Enterprise Business Units.
- The Service Delivery Engine brings together Network and IT services, Customer Operations (COP) and Carrier Wholesale (CWS).
- Within Staff & Support, the content (FIN, GHR, STC, LEG, GPA….) remains the same. Group Internal Services grouping internal services like Fleet, Facilities, Prevention&Protection, Sourcing….falls under the responsibility of FIN, the Financial department.

3.4 Split of the Cost perimeter SRW and Network/IT flow

Cost perimeter is split by the REG department between allocation flows of Network/IT and SRW, after completeness and accuracy checks (no double counting) on costs data from SAP. As mentioned in general description, allocation flow Network/IT allocates all costs and assets (capital expenditure) in IT and Network, while the allocation flow SRW allocates costs and assets other than IT and Network related.

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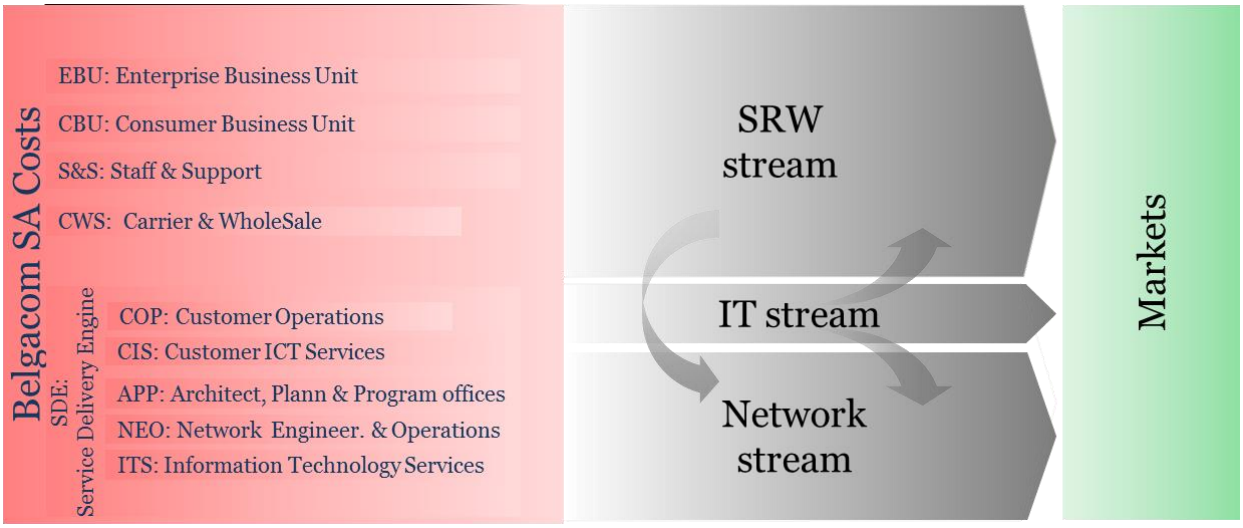

Figure 3

Split of cost perimeter between allocation flows Network/IT and SRW is processed as follows:

- All departments within SDE are treated within the Network / IT flow.
- Provisions for taxes on telecom equipment that are booked at the level of SDE management are downstream shared via allocation flows between assets classes to which they relate.
- All other costs, not mentioned above are treated within the SRW flow namely the divisions CBU (Consumer Business Unit) and EBU (Enterprise Business Unit), CWS (Carrier Wholesale) and Staff & Support. The Staff & Support division comprises different departments. Firstly, STB (Services to Business) which includes Headquarters, Legal, Group Public Affairs and Secretary General. Then we have departments like Finance, Group Human Resources, Group Strategy & Content and GIS (Group Internal Services) for departments like Real Estate, Business Services, Facilities, Prevention & Protection, CSM (Corporate Sourcing & Supply Change) and Catering.
- Regarding Assets (depreciation and WACC), repartition into flow SRW and Network/IT is done based on an analysis of assets classes: assets IT and Network of SDE Business area are handled in the allocation flow Network/IT, while all other assets (building, utilities equipment, CPE, etc.) are allocated in the flow SRW.

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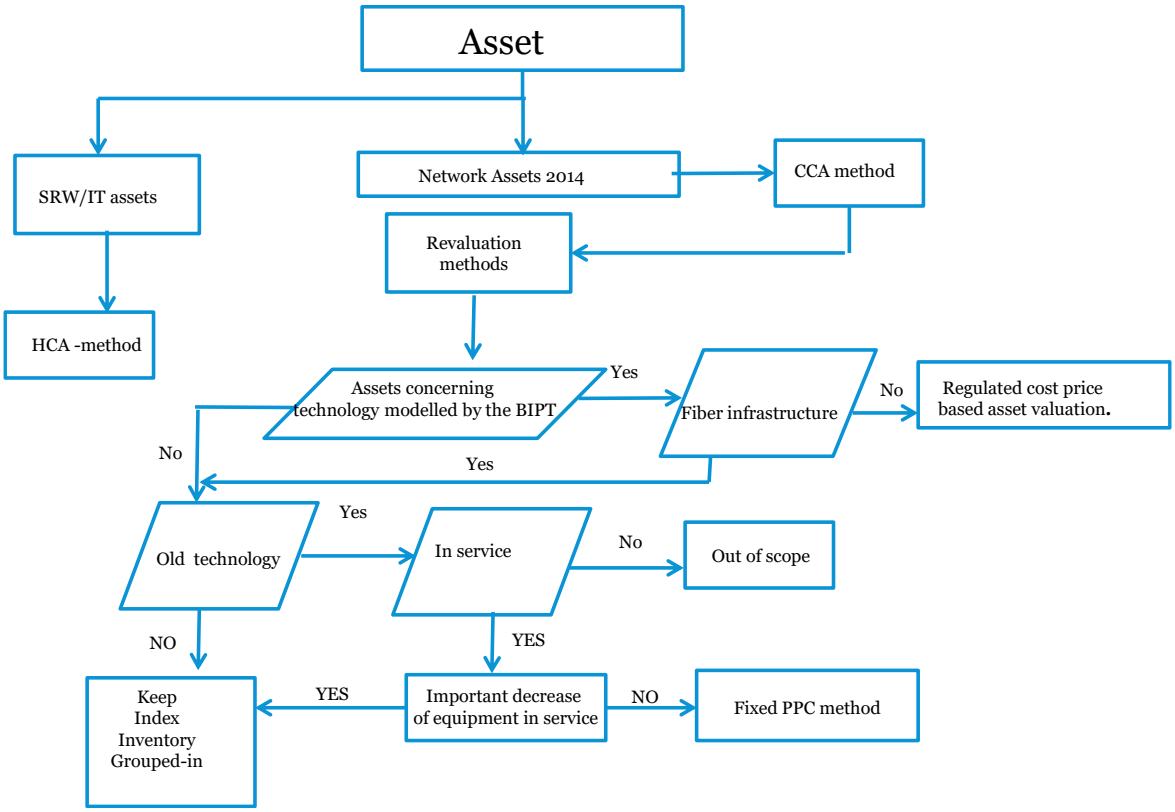
3.5 Assets revaluation

3.5.1 Decision tree



3.5.1.1 *Split network - SWR and IT assets*

The assets base was splitting up in Network – SRW and IT assets. The cost of the network assets must be based, for operators being declared as dominant, on the Current Cost Accounting. For the SRW assets (EBU-CBU–SUPPORT-Facilities-Sourcing-Fleet) and IT related assets the cost accounting systems is based on the Historical Cost Accounting method.

3.5.2 Methods used to revaluate the network assets

The regulatory framework clearly states that the cost accounting systems of operators being declared as dominant on relevant markets must be set based on Current cost accounting for the network costs.

The network & IT flows within the top down model calculate the current costs for the network related assets. Current costs have been computed as explained hereafter.

There are five methods to evaluate the current value of the network: reassessment of the current inventory, price indexation, by default “keep everything as it is”, index based on a fixed PPC and regulated cost price based. For old assets concerning technology still in service we use a method

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based on a fixed PPC2007. Each of these methods requires its own set of inputs. It is mainly the availability (or lack) of input which dictates the choice of the method. Nevertheless each method has its advantages and disadvantages with respect to the others.

The inventory and price indexation methods assume that network departments replace the equipment of its assets by equivalent equipment. The notion of equivalent is quite fuzzy. An engineer would tell you that over time there are always more functions integrated in new equipment and that they are always more cost-effective. It makes the comparison between different generations of equipment difficult. The notion of equivalent has therefore been addressed through the term Modern Equivalent Asset (MEA). The assets must be replaced by their MEA. The MEA is the replacement cost of the technology expected to be in place within the planning horizon. Note that this notion takes into account the introduction speed of a new technology in the network. If network departments plan to have replaced 50% of an old technology by a new one within the planning horizon, it makes no sense to simulate the costs with higher percentages because the planning takes into account the availability of the resources to carry out the work.

Find hereafter the rules that have been used:

- Technology still in procurement: use current price, e.g. SDH equipment, DWDM equipment
- Technology to be replaced within the planning horizon: use current price of the modern equivalent asset, e.g. some PDH line system equipments are replaced by SDH equivalents.
- Obsolete technology: use current price of the modern equivalent asset, e.g. the HDSL technology for high speed services on copper replaces the less cost-effective HDB3 technology.
- Technology grouped in : those assets will be revaluated by another asset concerning the same technology
- Old technology not anymore in service : those assets are set out of scope and will not be revaluated
- Old technology still in service (in maintenance mode); those assets are revaluated by an index method based on a fixed PPC instead of index, keep or inventory method. Old assets revaluated by keep will keep the CAV value as GRC
- BIPT regulated technology : use the BIPT regulated cost price to calculate the annual capital cost

3.5.2.1 *Price Indexation*

This is the most straightforward approach, provided historical costs are available. The investments for each year (from 1981 on) are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The method is refined by defining price indexes depending on the nature of the cost. This is particularly true when costs of a different nature experienced a different price evolution. Three different types of price indices have been defined: the labour index, the indices for services delivered by external companies and the material index. Note that indices for services supplied by external companies vary according to the asset involved. For example, services supplied by external companies related to cable assets, are in fact outsourced labour costs for trenching and cable

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installation. In such case, a labour index has been applied. Other external services less labour intensive are resulting in other price indices, such as a fibre cable index.

3.5.2.2 *Inventory*

This is the best method to reflect accurately the price of assets currently in service in the network. The revaluation is merely performed by multiplying the volume of each specific type of equipment currently deployed in the network by its average current unit cost. The current unit costs are based on the prices defined in the current frame agreements we have with our suppliers.

In terms of inputs it is the most demanding method. It requires an extensive inventory of equipment.

The inventory method has been used for data, switching, transmission and access equipment. Switching data is based on the inventory reports delivered by the engineering service. Transmission and access data are obtained from the technical database ITR. Data inventories are obtained from field operational tracking sheets.

3.5.2.3 *Keep as it is.*

The "keep as it is" method is merely what its name says. We keep the price we have in the historical accounting books. This method is only valid for costs with a very short depreciation period or for software intensive products. For the latter we assume that on the one hand software development is labour intensive but on the other hand the rapidly evolving programming environment improves the productivity compensating for the higher labour cost. This results in a stable software price. Another practical reason to select the "Keep as it is" method is the amount booked on the asset. If this amount is small, the method has also been applied. In this particular case, the effort to collect all the information about the cost evolution outweighs the impact on the service costs.

3.5.2.4 *Index Based on a fixed PPC*

Old technology still in service (in maintenance mode) ; those assets are revaluated by an index method based on a fixed PPC.

If Proximus has done some investments for keeping those technologies in service, we take those investments also into account.

If Proximus has done some great retirements, the revaluation method is revised.

- Formula :

$$GRCyearN = \left[\left(GRCyearN - 1\right) * \left(1 + fixedPPC2007\right)\right] + investmentsYearN$$

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3.5.2.5 *Price Indexation for mobile assets*

The investments for each year are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The historical series of indexes for each asset has been derived from the yearly percentage price change determined in the **BIPT model 2008.**

This method is used for assets which are not impacted by the BIPT regulated cost price base valuation.

Formula :

Index year = (1+ (ppc year))* (1+(ppc year -1))* (1+(ppc year -2))*……..

3.5.2.6 *Asset valuation based on the Proximus Reference Offer tariffs and BIPT bottom-up mobile cost model*

3.5.2.6.1 Method background and rationale

The market for fixed telecommunication services, the related technologies and the competition have evolved through the years leading to the current situation where the vast majority of the telecom services provided by the Proximus's access and area backbone networks are regulated. This regulation has been enforced, amongst other initiatives, by clearly specifying the services and applying regulated tariffs, as reflected in the Proximus Reference Offers (BRUO, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA).

Since the regulated tariffs are cost oriented and determined by bottom-up costing models, it is reasonable to use the direct CAPEX component of these prices to calculate the annuity of the assets addressed by the Proximus Reference Offers.

Mobile telephony regulation mainly focuses on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a mobile call (MTR). In order to calculate this termination rate, BIPT has developed a bottom up mobile cost model, including all voice and data services 2G and 3G. The latest available version of this model was published by BIPT in November 2013, and has been used to value mobile assets.

3.5.2.6.2 Method description

All the fixed network assets, except optical fiber infrastructure, concerned by the technologies covered by the Proximus Reference Offer models (BRxx), namely BRUO, Block&Tie cables, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA, are valued by applying the direct CAPEX component of the relevant BRxx tariff to the appropriate volumes extracted from the Proximus inventories.

For mobile assets valuation, Proximus mobile volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting CAPEX economic cost has been extracted in order to value the assets.

3.5.2.6.3 Scope

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The technologies to be valued by this method, since they are covered by the Proximus Reference Offers and BIPT mobile cost model, are:

- Copper infrastructure: including trenching, ducting and copper cable.
- (D)WDM
- PDH/SDH
- xDSL: including ADSL, ADSL2+ and SDSL
- VDSL
- Ethernet
- Mobile network assets 2G, 3G and 4G.

However, some parts of the networks deployed with the above mentioned technologies are not covered by the BIPT tariffs for they provide non regulated services. Consequently they cannot be valued by means of the regulated tariffs.

These services are:

- Any service provided by the Proximus express network layer, also called intercity network.
- Multicast services, namely broadcast TV.
- Access lines for the Explore customers.

The chosen alternative for valuing the network sections providing the non regulated services has been the development of specific models in order to determine applicable direct CAPEX unit prices.

3.5.2.6.4 Method implementation

- *Inputs Fixed Network*
  - *Broken down tariffs*
    - *Broken down tariff based on the BIPT BRxx models*

      By analyzing each of the current BRxx models, the direct CAPEX component of each product of each tariff has been isolated. Further, this constituent has been broken down into all its applicable technological contributors, so that a unit price per technology, per product and per tariff is extracted (Figure 4: Conceptual description of the BRxx tariff breakdown.).

      Although the above described process is applicable to the majority of the BRxx models, there is an exception to the rule, the BIPT BROBA transport model. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, is given in paragraph 3.5.2.6.9.

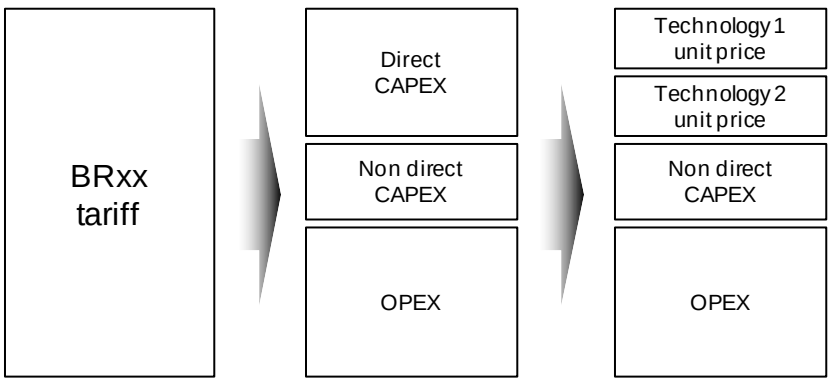

Figure 4: Conceptual description of the BRxx tariff breakdown.

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Note: There is no relation between the size of the components and any broken down BRxx tariff.

- *Broken down tariff for network areas not under the BIPT BRxx models scope*

  For those areas of the network not within the scope of the BIPT models, specific models have been developed in order to derive applicable broken down tariffs. These models have been built up on similar principles to those applied in the models developed by the BIPT. Whenever possible the actual BIPT tariff components have been re-used and existing BIPT models have been adjusted so that the obtained results are as comparable to those of the BIPT models as possible.

- *Volumes*

  The volumes (demands) of all the telecommunication services utilizing the technologies subject to this valuation methodology are extracted from or determined based on Proximus inventory systems.

- *Valuation (Fixed network)*
  - In a first step, each pair, line, VP, link or VLAN present in the volumes is valued by applying each and all of the technology unit prices of the relevant BRxx tariff. In this way, each telecom service's individual contribution to the assets valuation is calculated.
  - Finally, all the individual contributions are summarized per network asset, obtaining the final asset annuity.

- *Inputs mobile network*

  The latest version of the BIPT mobile cost model has been used in order to value mobile assets related to :

  - Radio Access network (RAN)
  - Ground Antenna
  - Mobile Voice Switching
  - Mobile Data Switching
  - Mobile Location Register

  Proximus mobile voice and data volumes, as determined based on Proximus inventory systems, have been used as the demand for the cost model. Based on this demand, the model dimensions the required network assets.

  Only capex economic depreciation has been taken into account, all opex values in the model have been set to 0.

  The WACC is based on BIPT's decision issued on May 4, 2010 (10,05%).

- *Valuation mobile network assets*

Capital expenditures are annualized according to BIPT's economic depreciation. This is a different methodology compared to the TAM used for fixed network related assets.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2014, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output in the form of a net present value.

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3.5.2.6.5 Exceptions to the generic implementation

Although the above described process is applicable to the majority of the tariffs and related technologies, there are two exceptions to the rule.

The breakdown of the BIPT BROBA transport tariff is made differently. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, and how it is applied is given in paragraph3.5.2.6.9.

The valuation of the transport SDH/PDH assets implementing the regulated part of the Proximus's SDH network, although based on the BIPT's BROTSoLL model, do not follow the above described generic process. The used methodology is described under the paragraph "Updated BROTSoLL model to the 2013 demand".

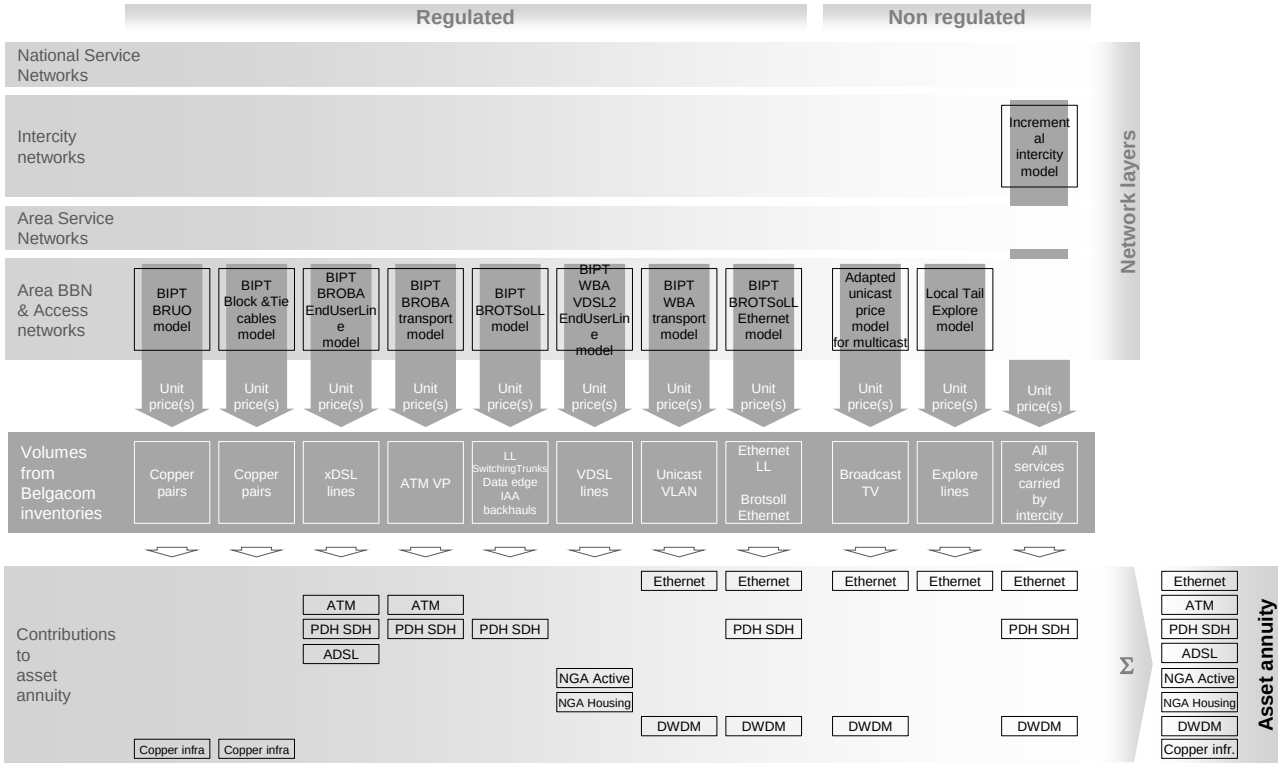

Figure 5: BRxx based valuation method. Scope and implementation.

3.5.2.6.6 BIPT BRxx tariffs as base for asset valuation

3.5.2.6.6.1 BRUO

The BIPT BRUO model (decision of 9/11/2011) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. These assets have been valued based on the unit direct CAPEX

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cost in the BRUO model and the number of pairs used. It mainly includes the cost of copper cables, trenching and street cabinets and covers the copper distribution and copper feeding networks.

The yearly direct CAPEX cost of the following assets has been calculated based on BRUO tariffs:

- Raw Copper for PSTN/ISDN accesses, central site based broadband without voice accesses, local tails for leased lines type of connectivity, BRUO raw copper.
- Copper subloop, for ROP based VDSL connections without voice accesses.
- Copper subloop testing cost, to ensure remote line testing of ROP based VDSL connections without voice accesses. This cost is valued based on the unit direct CAPEX cost of the feeding network that can be derived from the BRUO tariffs (local loop, subloop).

In the frame of a possible fixed/variable analysis of the results of the model, copper distribution and feeding network costs are categorized as fixed. It should be noted that this has no impact on the results of the model itself.

Our analysis is based on the approach used by BIPT and its consultant, Analysys Mason, for the development of an NGN/NGA model. The dimensioning of the copper distribution and feeding network is dependant on the evolution of the number of households, reflecting the universal service obligation of Proximus. The evolution of the number of copper pairs actually used by customers subscriptions or internal usage, has no impact on the total copper access investment cost calculated by the BIPT NGN/NGA model. Copper access (distribution and feeding) is a fixed cost, with no causality of the volume of copper pairs actually used.

Its allocation method could be based on the market value of the different products using the network. However, in order to be conform with the approach used by BIPT in the BRUO/BROBA reference offers, we have attributed the copper access network cost towards the different end-user services and markets based on the number of consumed copper pairs.

The cost of the copper splitters, to split narrowband and broadband signals for shared pairs has been valued based on the shared pairs inventory.

3.5.2.6.6.2 Blocks and tie cables

The BIPT Blocks and Tie cable model (decision 2/7/2008) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. This bottom-up model defines direct CAPEX prices for Main Distribution Frame blocks and for tie cables to other access network equipments.

The current value of following assets has been calculated based on Blocks and Tie cable tariffs:

- Copper local loop testing: internal cabling for copper connectivity to perform remote testing of broadband customer connections without voice accesses based at the central site.
- Copper subloop testing: internal cabling for copper connectivity of ROP based VDSL customer connections without voice accesses.
- Continue raw copper and shared feeding pairs: internal cabling for copper connectivity from the Main Distribution Frame or broadband splitter equipment to other access equipments or collocated access equipments.

Sensitivity: Unrestricted

3.5.2.6.6.3 BROBA rental per end-user line

The BROBA rental fee per end-user line is split by BIPT between the active part and the transport rental ATM or Ethernet part. This model is sometimes referred to as BROBA Bitstream.

3.5.2.6.6.3.1 Active part

The BROBA model (decision of 6/8/2010) has been used to valuate assets included in AC2_20102 ADSL equipment. It is related to DSLAM and Main Distribution Frame space yearly direct CAPEX costs.

The asset has been calculated based on the direct CAPEX part of the BROBA Bitstream tariff applied to ADSL, ADSL2+ and SDSL subscription volumes.

3.5.2.6.6.3.2 Transport rental ATM

- ATM is outphased and is no longer valuated in the 2014 model.

3.5.2.6.6.4 BROBA ATM transport

- ATM is outphased and is no longer valuated in the 2014 model.

3.5.2.6.6.5 BROTSoLL (access line only)

The Proximus Reference Offer for Terminating Segments of Leased Lines (BROTSoLL) regulates the complete PDH/SDH transmission network of Proximus, with the exception of the highest hierarchy rings, the so called Intercity network or express layer. The current BIPT decision on this tariff dates from 10/3/2008.

*Note that for this model the below explanation is only applicable to the valuation of the access lines to BROTSoLL services. The valuation of the transport costs has been done as described in the paragraph "*Transport PDH/SDH valuation". The technologies covered by this reference offer and consequently to be valued through this tariff are:

- PDH/SDH : covering the costs of the access line equipment of this technology.

Further, this service can in fact make use of the copper infrastructure on the access side in case of small bandwidth lines. However, these costs are embedded in the BRUO based valuation.

The SDH access line valuation has been done by applying the above technologies direct CAPEX unit cost to all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR, the Proximus transmission inventory system.

3.5.2.6.6.6 WBA VDSL2 end user line

3.5.2.6.6.6.1 Passive part

The BIPT WBA model (decision 10/11/2010) has been used to valuate the assets AC2_20108 NGA Housing as well as part of the asset AC2_20106 fibre infrastructure related to external fiber connectivity to the cabinet (ROP ; Remote Optical Platform).

For the valuation of AC2_20108 NGA Housing, the BIPT unit direct CAPEX cost has been applied to the number of VDSL2 subscriptions. The main elements included are the cost of the ROP, the copper connectivity between the ROP and the street cabinet and power equipments.

Sensitivity: Unrestricted

3.5.2.6.6.6.2 Active part

The asset AC2_20107 NGA Active equipment has been valued based on the related BIPT direct CAPEX cost.

It is mainly related to the IP DSLAM installed in the ROP or in the local site, the equipment to aggregate the fibre cables connecting the ROP to the local exchange ("aggregators"), as well as the internal cabling and block positions on the optical main distribution frame (OMDF).

3.5.2.6.6.7 WBA transport

WBA transport regulates the transport of Ethernet based data (unicast VLANs), covering the complete Proximus Ethernet/MPLS network, with the exception of the highest hierarchy level, the Intercity network or express layer. The current BIPT decision on this pricing dates from 6/8/2010.

The Ethernet data, grouped in VLANs, is directly carried on densely multiplexed optical wavelengths over optical fiber. Thus, the technologies to be valued via this model are:

- Ethernet (AC2_20105 ethernet equipment): values the ethernet routers and switches allowing the transport of Ethernet data within an ethernet area.
- DWDM (AC2_20101 (D)WDM equipment): covers the cost of the Dense Wavelength Division Multiplex network that, together with the fibre infrastructure, brings the physical connectivity amongst the Ethernet equipments.

In order to obtain the value of each of the above technological components, the direct CAPEX unit costs for the different technologies have been applied to the unicast VLANs implemented on the MPLS network. For each VLAN, the peak bandwidth is determined. This peak bandwidth :

- equals the ordered bandwidth (for Broba and Eline for OLO) or
- is determined on basis of number (and type of consumption) of subscribers and sizing rules (for FI, VoIP, VoD) or
- is estimated on basis of the ordered bandwidth and measurements on the ethernet equipments (relative to the service like IPVPN, Eline)

The peak bandwidth is then distributed over the different (relevant) priority bits.

3.5.2.6.6.8 BROTSoLL Ethernet

Being a special case of BROTSoLL, the services within the BROTSoLL Ethernet scope are the dedicated transparent Ethernet connections. The current BIPT decision on this tariff dates from 10/3/2008.

In principle these lines are implemented as Ethernet over SDH. However, due to the rather large bandwidth typical to this type of services -10 Mbps, 100 Mbps or 1Gbps- this implementation is neither always possible nor efficient. Therefore we distinguish two main technical executions:

- Ethernet over SDH: for the 10 or 100 Mbps lines, also named Ethernet and Fast Ethernet respectively
- Ethernet over DWDM: for the 1 Gbps or Gigabit Ethernet lines, where the DWDM wavelength is dedicated to the line. Note that no SDH equipment is used in this case.

Sensitivity: Unrestricted

The Ethernet over SDH services require SDH and optical fiber for their implementation. Therefore, and following the 2013 model logic, the SDH costs incurred by the implementation of such services will be valued by the "Updated BROTSoLL model to the 2013 demand". The optical fiber costs are not valued by the BRxx method anymore.

Regarding the Ethernet over DWDM services, due to the lack of a BIPT model backing up the regulated tariff, Proximus has developed a simple model in order to arrive to a valid cost oriented tariff for asset valuation purposes (see the below sub-paragraph for further details on the development of this model). This tariff contributes to the valuation of the DWDM and optical fiber asset. Nevertheless, the DWDM tariff component will be the only one used by the BRxx valuation method since the fiber is not valued by this method in the 2013 model.

Finally, the only cost component valued by this method within BROTSoLL Ethernet is the DWDM. The valuation has been done by applying the DWDM direct CAPEX unit cost to all the links implemented over DWDM under the BROTSoLL Ethernet scope which are documented in ITR, the Proximus transmission inventory system.

3.5.2.6.6.8.1 BROTSoLL Ethernet model for 1 Gbps lines

Transport tariff component

Given the fact that the lines subject to be valued by this model are dedicated DWDM wavelengths to the BROTSoLL Ethernet line, the average tariff is constituted by:

- the actual cost of a kilometer of DWDM wavelength according to the Proximus Regulatory Cost Model.
- the cost of a Km optical fiber infrastructure, according to BROTSoLL.

Finally, this average cost per kilometer of wavelength has been annualized and de-averaged to obtain a tariff per distance ranges as that of the regulated tariff.

Access tariff component

The access tariffs are the same as in BROTSoLL.

3.5.2.6.7 Transport PDH/SDH valuation

The present BROTSoLL model is based on the Proximus SDH services inventory belonging to 2005. From 2005 until now the utilization of the SDH services has changed and new services consuming large bandwidth, typically Brotsoll Ethernet and the like products, have been implemented over SDH. These new services would alter the distribution of services per bandwidth, putting an extra weight on the higher bandwidths, imposing changes in the network dimensioned by the BROTSoLL calculation sheets which in turn will incur in (non linear) costs changes.

Therefore, in order to incorporate a more realistic SDH cost in the model, it was decided to re-play the current BROTSoLL model with the 2013 SDH services demand.

In order to do so, the relevant files of the cumbersome BROTSoLL model have been consolidated into two streamlined files that easily allow the dimensioning and costing of the required SDH network for any given demand.

Then the set of all the SDH based services running on the Proximus network at the end of the year 2013 (all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR) was entered into the new consolidated transport BROTSoLL engine and the resulting SDH costs represent the value of the PDH/SDH asset in the 2013 model.

Sensitivity: Unrestricted

3.5.2.6.8 Non regulated tariffs as base for asset valuation

3.5.2.6.8.1 Adapted unicast price model for multicast

The only multicast service currently carried by the Proximus's network is BroadcastTV. Since the VLAN used by this service is shared by all the Proximus TV customers, the VoD shared VLAN tariff could initially be contemplated as tariff.

However, the maximum bandwidth this VLAN can reach is reserved for multicast services, while the bandwidth of the unicast VLANs –within the WBA transport scope- cannot be reserved. Hence, the unicast VLAN tariff is not applicable anymore.

This bandwidth reservation characteristic needs to be valued, for it represents a disadvantage, a reduction of the overall available bandwidth, for the unicast VLANs coexisting in the same physical medium. Since the reserved bandwidth for multicast is one fifth of the physical medium bandwidth (maximum 2 Gbps multicast traffic over the 10 Gbps bandwidth of the DWDM bandwidth), the multicast tariff used for valuation purposes is five times that of the unicast.

As this model is an adaptation of the WBA transport model, it contributes to the same assets as the WBA transport:

- Ethernet
- DWDM

The valuation of the assets consumed by this service is calculated by applying the direct CAPEX tariff components to all the configured multicast VLANs in the network.

3.5.2.6.8.2 Local Tail Explore

Local Tail Explore refers to the access line, this is to say the set of equipments and infrastructure entailed to provide the connectivity between the customer and the Proximus network, the Explore customers require. Given that Explore is not a regulated product and has specific technical requirements that are not contemplated by any of the existing BIPT models, a new model needed to be developed to cost this segment.

In fact the model is very straightforward since it just consists of isolating the few different components in the offered technical solutions and applying their respective annualized costs. Since the infrastructure components present in this model have already been valued by existing BIPT models, the regulated direct CAPEX unit costs have been applied to them.

The only asset in which this model participates is Ethernet.

In principle, this model should also contribute to the Copper infrastructure, since there is a technical solution on copper, however this asset valuation component is fully taken into consideration by the valuation based on the BRUO model.

The valuation has been done by applying the fitting direct CAPEX technology to all access lines to Explore services documented in ITR, the Proximus transmission inventory system.

3.5.2.6.8.3 Incremental intercity model

This model is an incremental inventory based model that covers the cost of the equipment and infrastructure deploying the express layer of the network.

It is incremental since only the extra costs incurred in the implementation of such intercity network are taken into account.

Sensitivity: Unrestricted

Further, for it is an inventory based model, inventories of all the technologies present at the intercity level, namely DWDM, SDH and Ethernet, were gathered. Then the corresponding gross replacement costs have been applied and annualized arriving to the total gross replacement costs per technology of the intercity network.

3.5.2.6.9 ATM equipment asset valuation

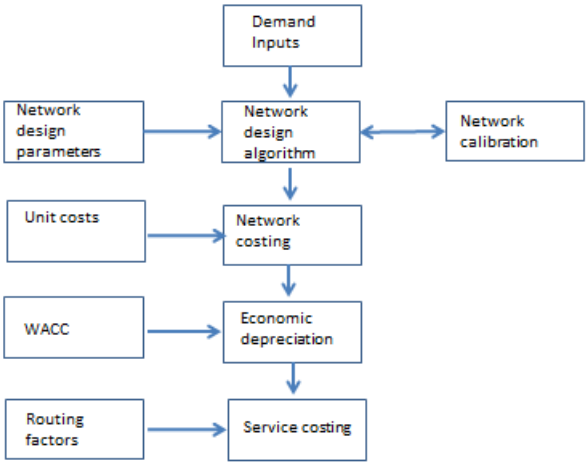
- ATM is outphased and is no longer valuated in the 2014 model.

3.5.2.6.10 Mobile cost model for network assets valuation

The BIPT bottom-up mobile cost model has been used to value assets :

- AC2_20110 RAN
- AC2_20111 Ground Antenna
- AC2_20112 Mobile Data Switching
- AC2_20113 Mobile Location Register
- AC2_20114 Mobile Voice switching

The flow diagram of BIPT mobile cost model can be summarized as follows :



Mobile cost model – flow diagram (source : Analysys Mason)

Proximus volumes (subscribers and mobile voice and data traffic) have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2014, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output (volume generated by the network element) in the form of a net present value.

The calculation can be summarized as follows :

<u>Calculation of net present value expenditures</u>

Sensitivity: Unrestricted

NPV (Invest) = $\sum_{Years} Investment * discount\ rate\ multiplier$

Calculation of net present value output (recovery)

NPV (volume* ppc) = $\sum_{Years} PPC\ year * Vol\ year *\ discount\ rate\ multiplier$

ppc being the cost trend for the related network element

the discount rate multiplier is calculated based on a 10,05% WACC (BIPT's decision issued on May 4, 2010)

The capex cost per unit output can be defined as :

$p0_{1993}=\frac{NPV\ (Invest)}{NPV\ (Vol*ppc)}$

and

$pn_{2014}=P0*ppc_{2014}$

The total annualized economic cost for the year 2014 is equal to :

$$p_{2014*V_{2014}}$$

3.5.3 TAM: Tilted Annuity Method

3.5.3.1 *Theory*

The purpose of this section is to describe how the Tilted Annuity Method (TAM) is finally implemented in the Current Cost Accounting (CCA) based network cost model 2013.

As from the 2003 model, Proximus implemented the formula that BIPT suggested.

$$ACC\mu Y = F1, \mu Y \times F2, \mu Y$$

where

$F1, \mu Y = (GRC\mu Y, begin + GRC\ \mu Y, end)/2$

$F2, \mu Y = \sqrt{}(1 + WACCY) \times [\ 1 - (1 + APC\mu)/(1 + WACCY)\ ] / [1 - [(1 + APC\mu)/(1 + WACCY)]\ ^\ L\mu]$

and where

- ACCμY: Annual CAPEX Cost of asset μ and year Y. It includes the annual depreciation and the cost of capital.
- WACCY: WACC of year Y.
- GRCμY, begin: Gross Replacement Cost of asset μ at the beginning of year Y.

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- GRC μY, end: Gross Replacement Cost of asset μ at the end of year Y.
- APCμ : Annual Price Change of asset μ .
- Lμ : Lifetime of asset μ.

Remarks:

The formula assumes that:

- In the beginning of year Y was invested in an asset and that at the middle of each year of the lifetime of the asset revenues will be generated.
- The annual price change is constant over the lifetime of the asset.
- The asset price does not evolve during the year, i.e. price changes only appear at January 1st.

The factor F1, μY represents the value of asset μ in the middle of year Y.

- The purpose of the arithmetic average of GRCμY, begin and GRC μY, end is to take into account investments or disinvestments of asset μ during the year Y.
- The arithmetic average of GRCμY, begin and GRC μY, end does not filter out the price evolution of the asset μ during the year Y.

The difference between the formula of BIPT and the formula of Exhibit 5, p. B3. of the white paper of Analysys is the factor $1 / \sqrt{(1 + APC\mu)}$, which filters out the price evolution of the asset μ during the year Y.

The gross replacement cost (GRC) of assets at any particular point in time is calculated as the sum over all assets owned by the business at that point in time, of the investment that would be necessary to purchase and install new replacements for those assets at that point in time (using modern equivalent assets if the existing assets are no longer available or efficient). The replacement value of assets, used for costing purposes should always include the gross value of every asset in use by the business (the current cost of replacing it with a new, possibly modern equivalent asset), irrespective of the history of depreciation of that asset in any financial accounts to date.

Lμ : Lifetime of asset μ, i.e. the expected useful lifetime of the new asset μ.

The depreciation period and the expected useful lifetime of a new asset are defined differently. The depreciation period refers to accounting. The expected useful lifetime of a new asset does not refer to accounting. It refers to the period that is expected that a new asset will be used. The main factor to determine the expected useful lifetime of a new asset is the evolution of the associated operational costs, i.e. the asset will be replaced when operating it becomes too expensive. Another factor is the appearance of new technology: if in the future new technology will come-up it could be that the asset will be replaced (even if it is not too expensive to operate).

Sensitivity: Unrestricted

4 SRW stream

4.1 Allocation of the support costs

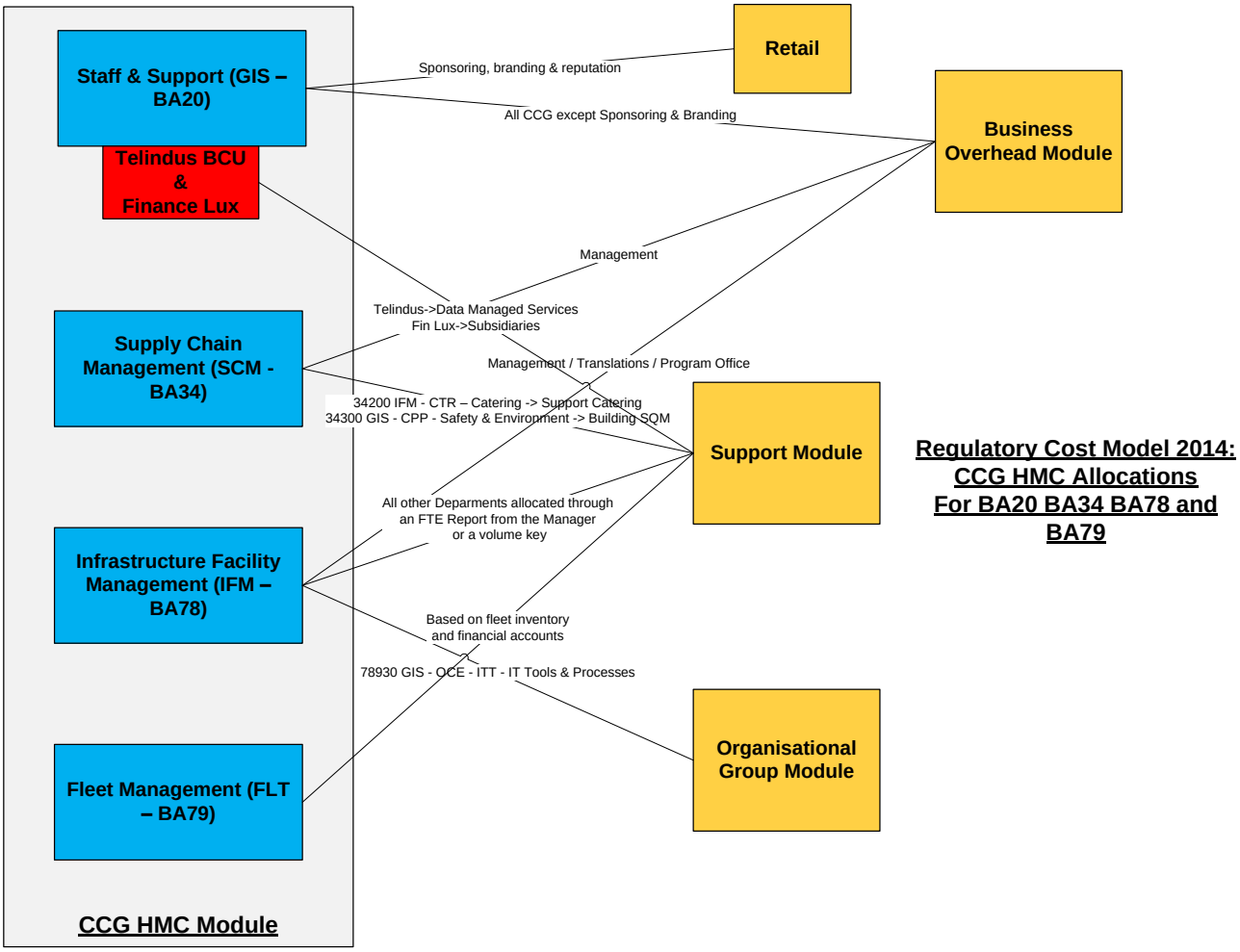
4.1.1 Support Scope

Since 2013, all support costs are treated within one SUPPORT module and as such, no cascade principle is used meaning that support costs, once in the SUPPORT module, can only be allocated to a non-support destination and to a non-support division. The divisions that are considered as support costs are:

- Group Internal Services (GIS – BA34) for departments like Real Estate, Business Services, Security, Safety & Environment, and Catering.
- Supply Chain Management (SCM – BA49) responsible for Procurement, warehousing and distribution.
- Infrastructure Facility Management (IFM – BA78) encompasses a wide variety of support activities like building & technical services, print shops and copy shops, energy and operational centre of excellence.
- Fleet Management (FLT – BA79) for the support of all Proximus management, utility and sales vehicles.

They fall under the responsibility of FIN, the financial department from the Staff and Support division (S&S – BA20) where are located the GHR, Legal, Strategy, Public Affairs and Communications departments. The Staff & Support costs should avoid passing by the Support allocation flow as they are business overhead related costs. There can be some exceptions to this rule when a specific support cost is booked in the BA20 such as illustrated bellow:

Sensitivity: Unrestricted



4.1.2 Support Cost Objects

For the 2014 Cost Model, the following support objects were created in order to pool all support costs within one module, before allocating them either directly to the cost's specific object located further on in the cost model, either to multiple objects using inventory-based allocation keys. This work is achieved by using reports from dedicated teams supporting an inventory from which specific volumes can be derived, such as the ones from fleet management regarding Proximus vehicle's park or Connect Immo regarding the building's occupation. A last group of support objects are allocated by the use of FTE keys in order to split these costs among all departments that benefit from them. In 2014, the overall support allocation can be summarized as follows:

Driver Type / Support Object to destination with 2014 Costs
% Occupation/Picking Lines
Support_Manage goods, warehouse & equivalents
COP Repair - CFO MASS PROF
Market 0 - Residual Market
NE_Logistics
Amount_of_PO_SDE_nonSDE
Support_Purchasing, quality and ordering
61361 consultancy-Bodyshopping/OSS fix price

Sensitivity: Unrestricted

Business Overhead
CP_Purchasing_Assets
CP_Purchasing_OPEX

Avg # FTE ALL LEVELS with office excl. support/centrally booked

Support_Internal mail services
Support_Manage moves
Support_Manage waste and scrap
Support_Manage, maintain and repair buildings (excluding moves) (office space)
Support_Provide catering services
Support_Provide copy services

direct

CBU_billing_fix products
CBU_Billing_fix_products
CWS_Billing
All CWS products
EBU_billing
EBU_Billing
EBU_billing_fix products
EBU_Billing_fix_products
MOB_billing
CBU_EBU_MOB_billing
Support_13001 Data Managed Services & Applications
Market 0 - Residual Market
Support_14001 TV and VoD
Market 0 - Residual Market
Support_22243 Nat. IC - infra. Co-location /Co-mingling
Auxiliary service BRxx - Colocation
Support_30000 Subsidiaries & externals
ExcludedCosts
Support_50000 Out of scope
ExcludedCosts
Support_IT
AC2_ITBuilding
Support_Manage, maintain and repair buildings (excluding moves) (shop space)
CBU_Shops_Building
Support_Power Chain for ROP
NE_NGA Active equipment / 36
Support_Power Chain for telecom_SDE
CP_Technical_Building
Support_Provide printing services (excluding outgoing invoices)
CBU_Printing_Services
Support_PROX_Pylons
NE_GroundAntenna / 16
Support_Telecom space_SDE
CP_Technical_Building

total MOS value 2011

Support_Manage cables

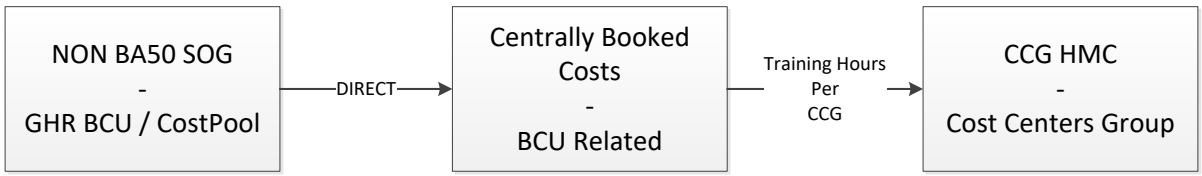
Sensitivity: Unrestricted

CP_Copper_Burried_Cables&Splices / 5
CP_Ducts&Manholes / 7

Vehicule count per type weighted by FTE per Org Grp
Support_Manage, maintain and repair fleet vehicles (management vehicles)
Support_Manage, maintain and repair fleet vehicles (sales vehicles)
Support_Manage, maintain and repair fleet vehicles (utility vehicles)
Grand Total

The driver named "Avg # FTE All Levels with office excl. support/centrally booked" is a specific driver calculated internally by the cost modelling team by excluding all support divisions (BA34, BA78 and BA79) and teams that should not occupy a desk in Proximus Buildings, so that the allocation keys match the scope of the costs. In order to give coherence to this trade-off, the decision factor for the COP division was swapped from the level of the employee within the company to the cost variability of the organisational group in question as fixed costs organisational groups are management related while variable ones are field related. Therefore, only fixed organisational groups were considered in the scope of this driver as the field teams are by definition not in Proximus offices and should not benefit from the support costs.

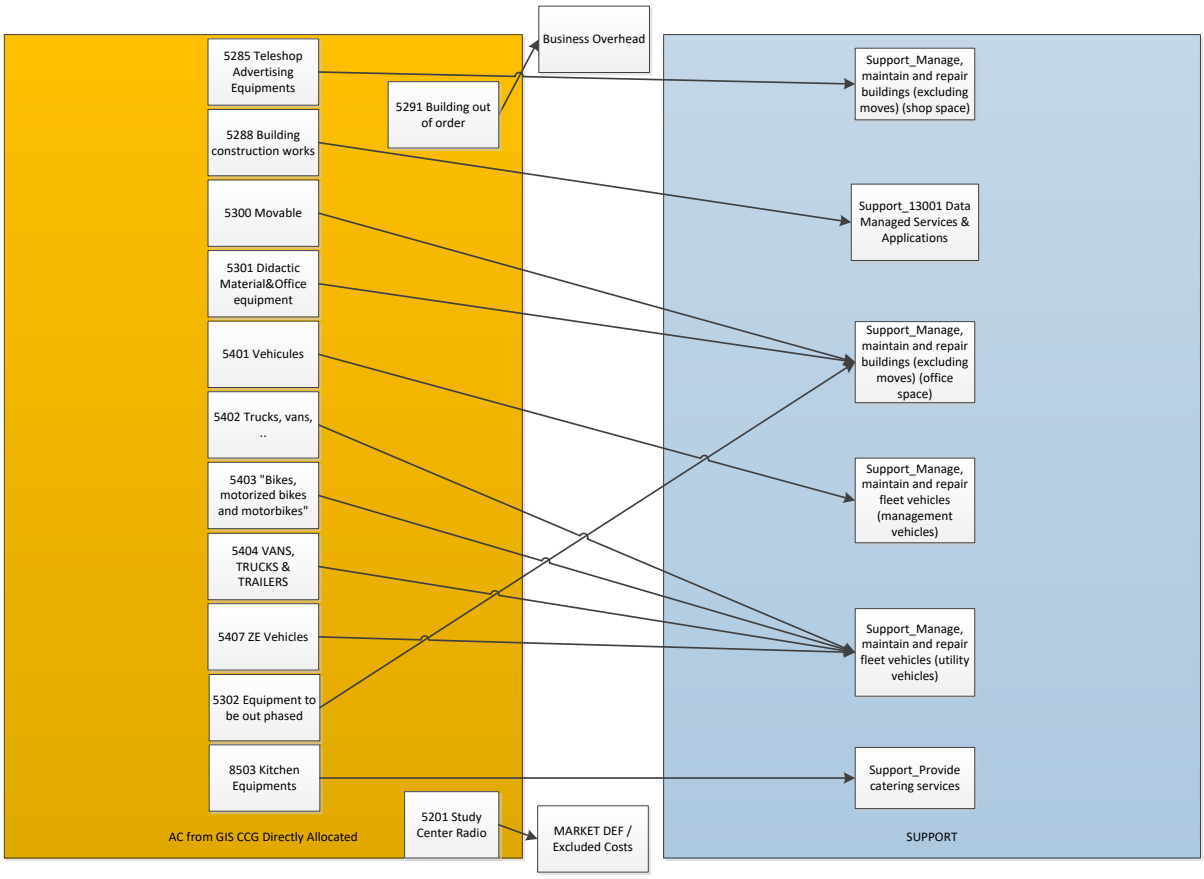
It should be noted that training costs related to Proximus's Corporate University (BCU) have to avoid passing through the SUPPORT module but have to be pooled with their respective team's/CCGs. The grouping of these costs is done as illustred below:



4.1.3 Asset Support Allocation

Two types of assets allocations can be distinguished: The ones that can be directly linked to a support object from the previous list and allocated as shown by the following diagram:

Sensitivity: Unrestricted

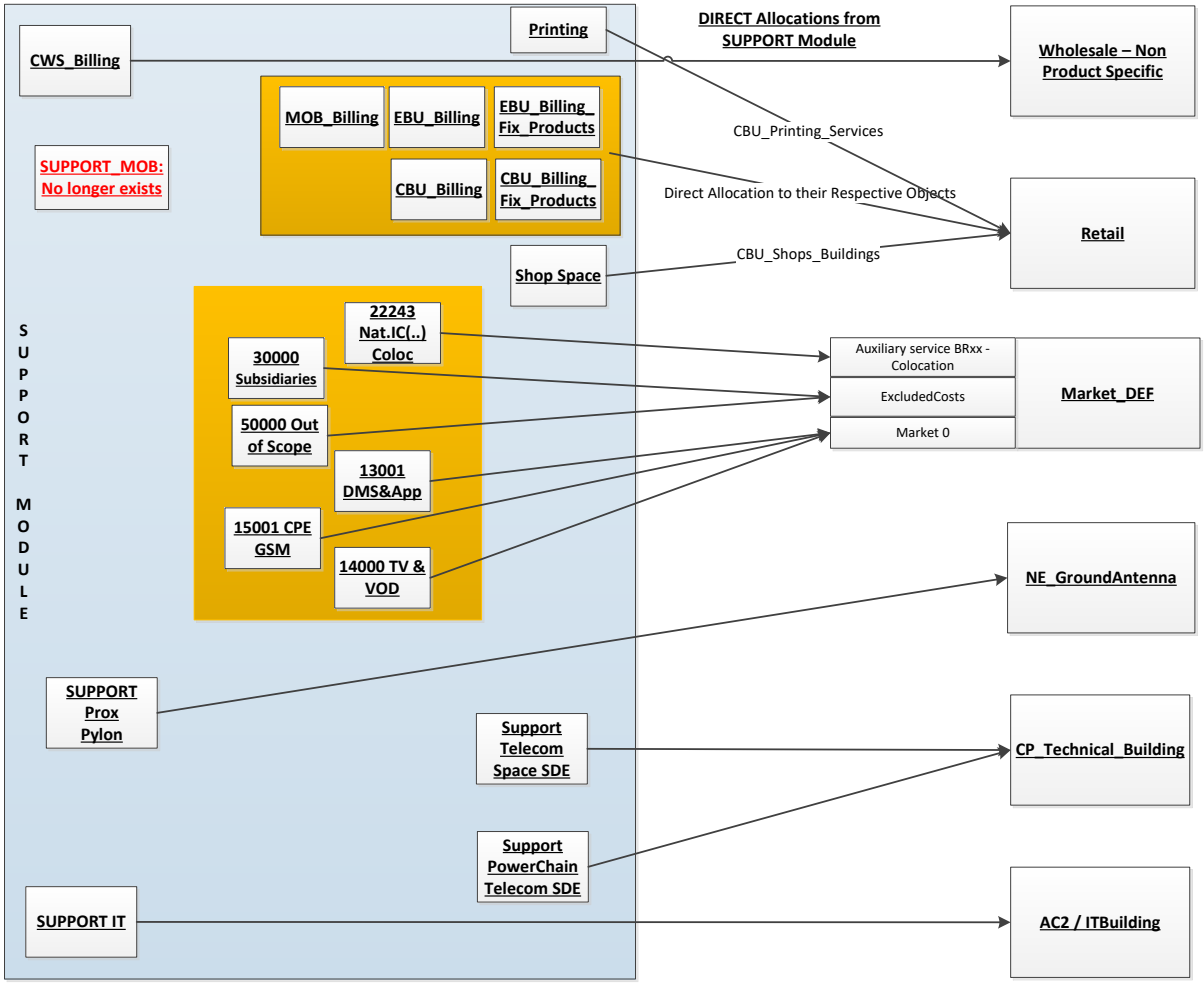


Other assets affect multiple support activities where the use of a specific cost driver is required. Typically, buildings, fleet and energy are support activities that need to be ventilated on many support objects with the use of their corresponding driver: vehicles per category for fleet, square meters occupied per building type for buildings and electricity consumption per equipment or building for energy.

4.1.4 Allocation From the support module

The same principle as before is applied: if a support object can be directly linked to an object located further on in the cost model, it will be directly allocated to it. Such cases are illustrated in the following figure:

Sensitivity: Unrestricted



4.1.5 Fleet case

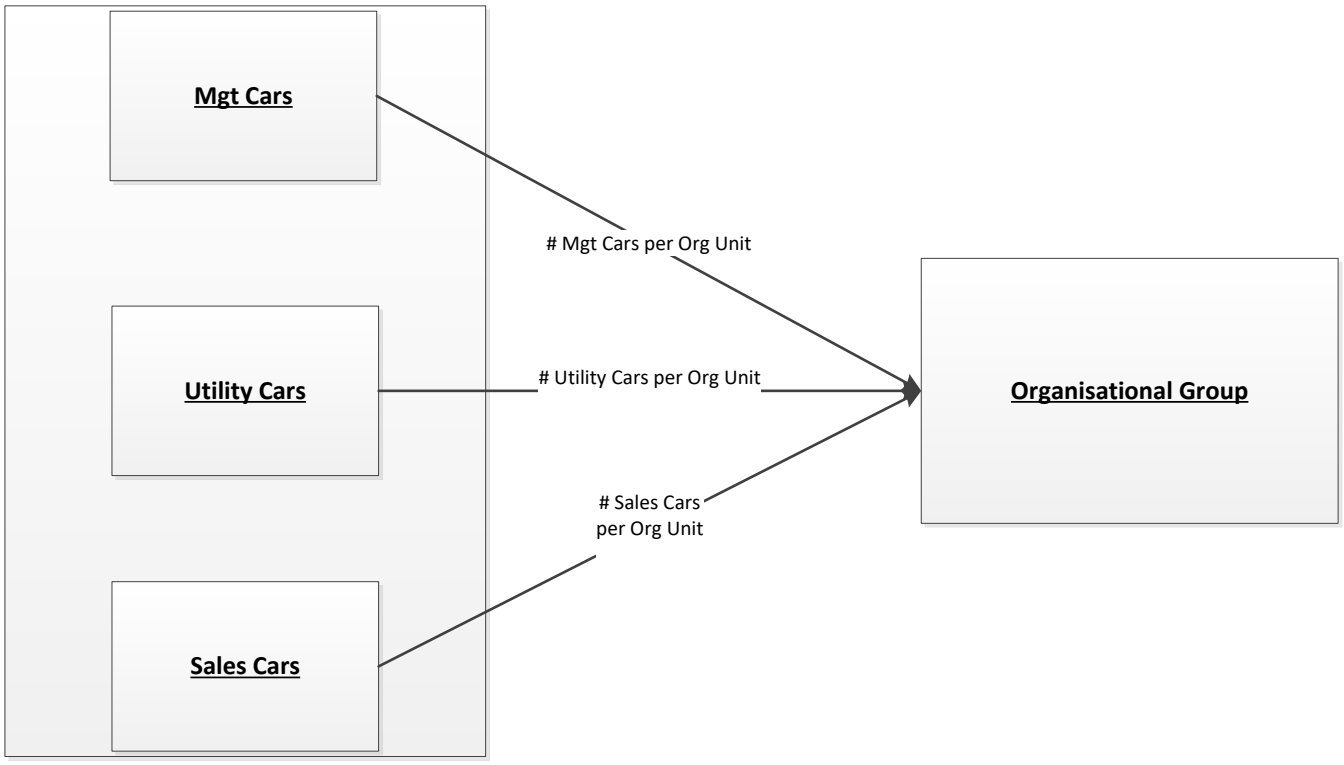
All fleet related costs are pooled in the Support module within the three following objects:

- The support, maintenance and repair of management vehicles.
- The support, maintenance and repair of sales vehicles
- The support, maintenance and repair of management vehicles.

For 2014, the cost distribution for Proximus whole fleet is:

With the use of an inventory maintained internally by Proximus, the total number of vehicles per category and organisational group are used as an allocation key for the fleet costs.

Sensitivity: Unrestricted



Car Type Determination:

Category KPI and CP

Sales or Mgt ? -> check CP (Level S for Sales)

MGT or utility ? -> Check category KPI (company car = Mgt, others = utility)

Sensitivity: Unrestricted

4.2 Allocation of the retail costs

4.2.1 Determination of the retail costs perimeter

As stated previously the Proximus organisational structure distinguishes between 4 distinct organisational pillars called Business units, we recapitulate:

- Consumer Business Unit (CBU) has the responsibility over the residential customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Service Delivery Engine (SDE) centralises network, Carrier Wholesale and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

All commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential customers and at the level of Business unit EBU (enterprise business unit) for the professional customers.

The Proximus financial and accounting structure clearly registers (directly attributable) retail costs on costcenters 39xxx (retail for residential customers) or costcenter 41xxx (retail for professional customers).

Starting from the Proximus organisational structure, we can identify 4 blocks in the Retail cost perimeter:

1. Retail FTE related costs
2. Retail Support costs
3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Retail FTE related costs

Includes all direct FTE related costs of Business units 39 and 41 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Retail Business units in the accounting books but do relate to Retail FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus personnel/FTE's. E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

2. Retail Support costs

Retail Support costs are non FTE related costs which are centrally booked and managed but relate to Retail activities. E.g.. Billing, Shop space, …

Sensitivity: Unrestricted

3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Retail departments, costs for legal claims, mandatory professional contributions, market surveys, etc.

4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales such as commissions paid on sales of identifiable products, cost of goods sold on equipment, dedicated outsourcing costs, etc.

4.2.2 Retail costs allocation principles

4.2.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each Retail CP-CCG.

These attribute-qualifications are applied on all the Retail CP-CCG combinations, but at different levels of INCA modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Retail allocation process as described below.

4.2.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies Retail costs based on their variability towards product volumes.

We distinguish between 4 var_types :

a. Marginal (mar) : retail costs which can be considered variable with each additional unit of a single product. Typically it concerns costs of goods sold (e.g. handsets, customer premises equipments,…) and costs of sales (commissions, interconnection costs,…).
b. Variable (var) : retail costs which can be considered sensitive to (important) volume changes of a single product or a range of products, whereby this (range of) product(s) is considered to be the last increment in the product portfolio. Examples of costs which are considered variable based on these criteria : the sales departments, call center activities, …
c. Fix (fix): retail costs are considered as fixed when they are likely to be inert to important volume variances. E.g.: Marketing spending. If the marketing campaigns can be directed to specific products, the amount of costs for these campaigns is not linked to volumes of the considered product.
d. Common (common): retail costs are considered common when they do relate to the ordinary course of business but have no relation with

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products. E.g.: Costs of litigations, branding & sponsoring expenses not directed to specific products, but well to Proximus image and trademark,…

4.2.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies retail costs based on whether they can be attributed directly, or through a specific non generic key and/or non general driver, towards products.

We distinguish between 2 PS types:

a. PRODUCT_SPECIFIC (PS): these costs can be allocated directly to the products and thus are generated specifically for that related product. E.g. the costs of sale of a product.
b. NON_PRODUCT_SPECIFIC (NPS): Retail costs which do not have a clear causal relation with specific product.

In addition to the attribute PS_TYPE, all retail costs of INCA RETAIL module are flagged with an additional dimension "COST_GROUP" enabling to identify the (span of) product(s) it covers.

COST GROUP specifies the product, when the cost is product_specific.
COST GROUP also gives the information on whether the costs are related to both Retail Business Units (CBU and EBU), or are only linked to one of them.

Used Cost Groups for the Retail costs are:

PRODUCT SPECIFIC
11302 Directory Assistance Services and listing
13001 Data Managed Services & Applications
idTV Mass market product
All CBU&EBU Mass market mobile products, excluding in packs
All EBU professional mobile products, excluding in packs
All Mobile EBU professional & Mass market products

NON PRODUCT SPECIFIC
All CBU Mass market products
All EBU professional products
All EBU Mass market products
All Fix data EBU professional & Mass market products
All EBU professional fix line products
All EBU professional & Mass market products
All CBU&EBU Mass market fix line products
All CBU&EBU Mass market mobile products
All CBU&EBU Mass market products
All CBU&EBU products

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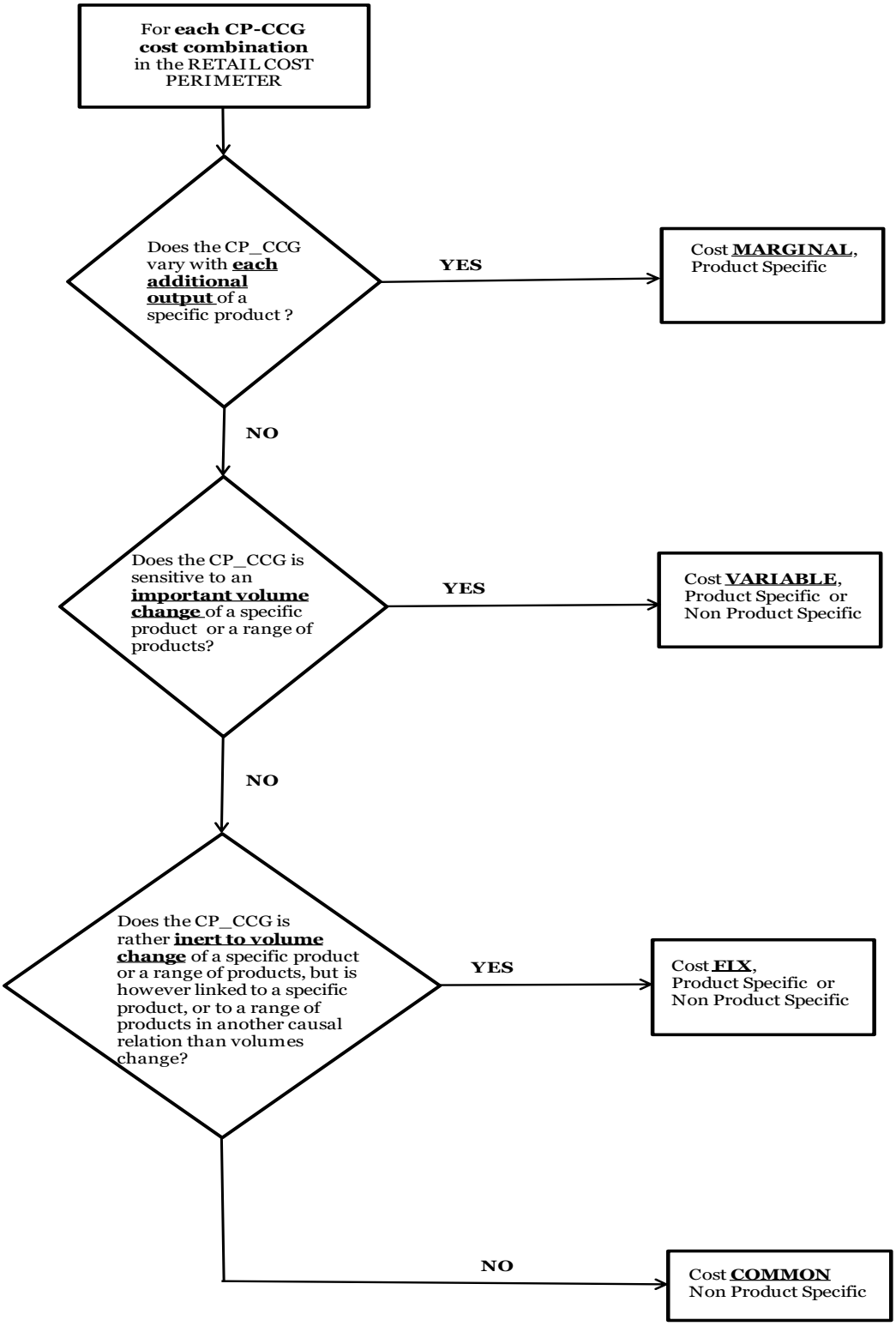
The qualification of the 2 attributes VAR_TYPE and PS_TYPE to all retail costs is illustrated in the following decision tree:



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4.2.2.4 *Criteria for allocation of retail costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which correspond to their costgroup (which is the product they relate to). This means that these costs will be either allocated to Market 0 – Residual Market or to Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards Markets based on volumes drivers. In practice, this means that these costs will be either:

- allocated to Market 0 or to Market 1, if they relate to a panel of products related to the same market,
- allocated to Market 0 and to Market 1, with respect to volumes driven allocation key, if they relate to a panel of products related to both markets.

c. Non product specific Fix costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market', when they cannot be allocated to Market 0 and/or to Market 1, with a causal driver other than volumes of products.

d. Non product specific Common costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

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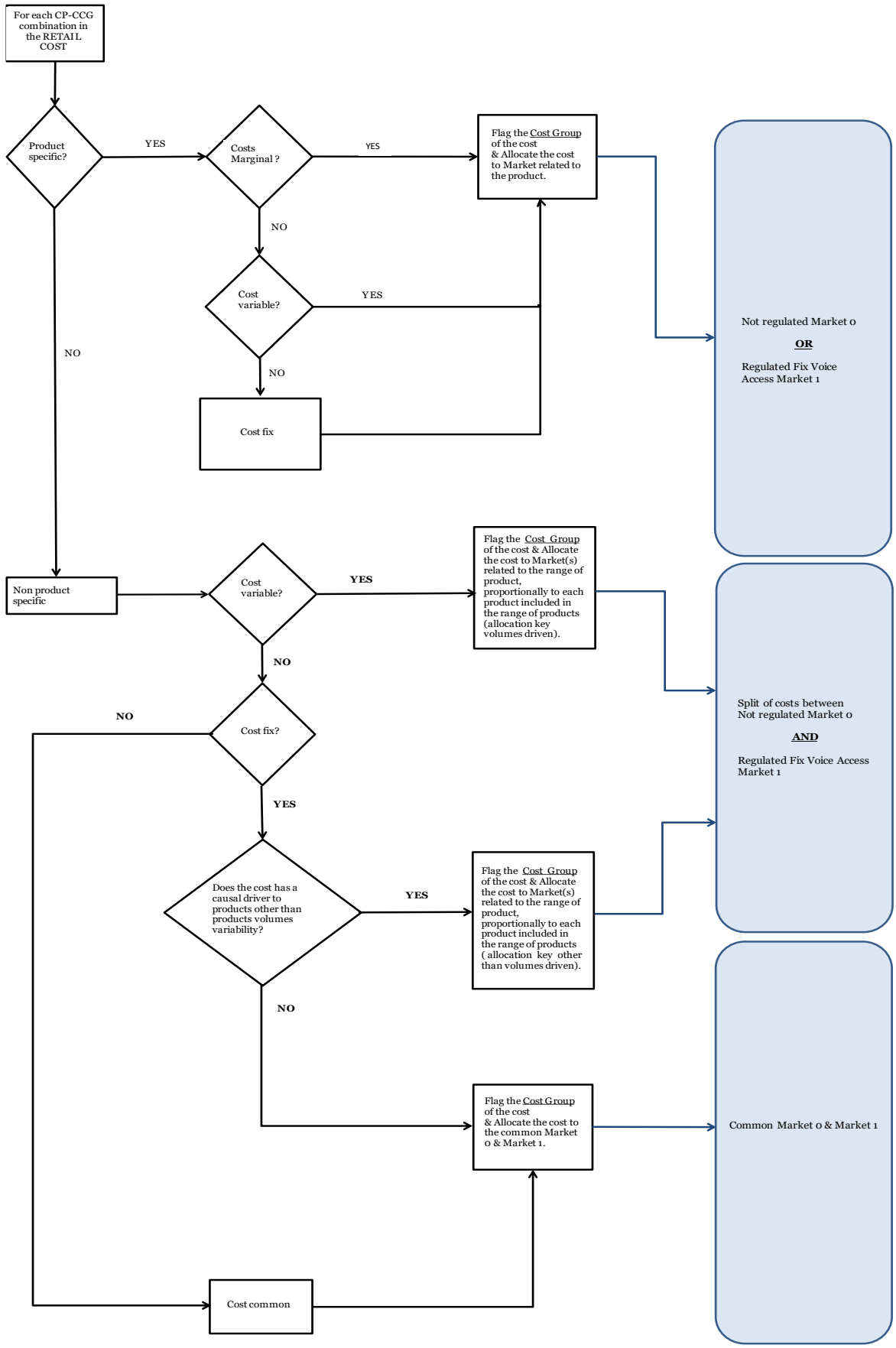
4.2.2.5 *Graphical view on principles for retail costs allocation to Markets*



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4.2.3 Retail costs allocation flows

4.2.3.1 ***General principles***

As described above, the 4 blocks of costs included in the Retail cost perimeter are all specified with 2 cost type attributes (VAR_TYPE; PS_TYPE) prior to be allocated to Markets.

However, the 4 blocks of costs:

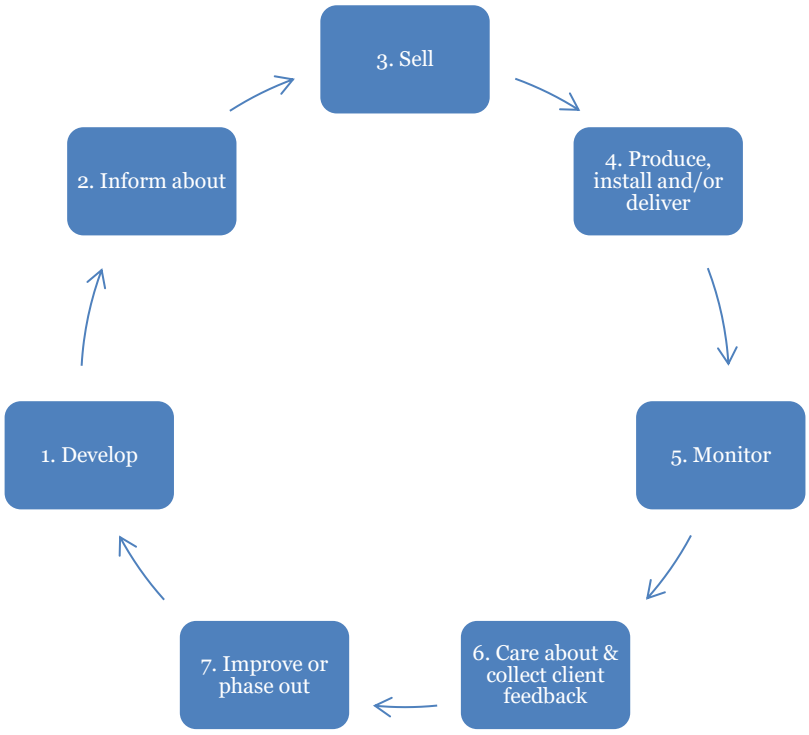
- Do not follow all the same path of allocation; some are directly allocated to Markets from the Cost basis,
- Are not all specified with VAR_TYPE and PS_TYPE within the module Retail.

The allocation flow followed by a Retail CCG_CP will depend on its block of costs (1->4).

Life cycle of products

In the Cost model 2014, a new module, the LIFE_CYCLE module, was created, to catch part of the Retail costs that we find during the life cycle of a product.

Inside the 4 categories of Retail costs, as described in chapter 4.2.1., all the costs needed to launch, develop, monitor a product until its improvement/phase out, were identified and gathered in this new module, prior to be allocated to Markets.



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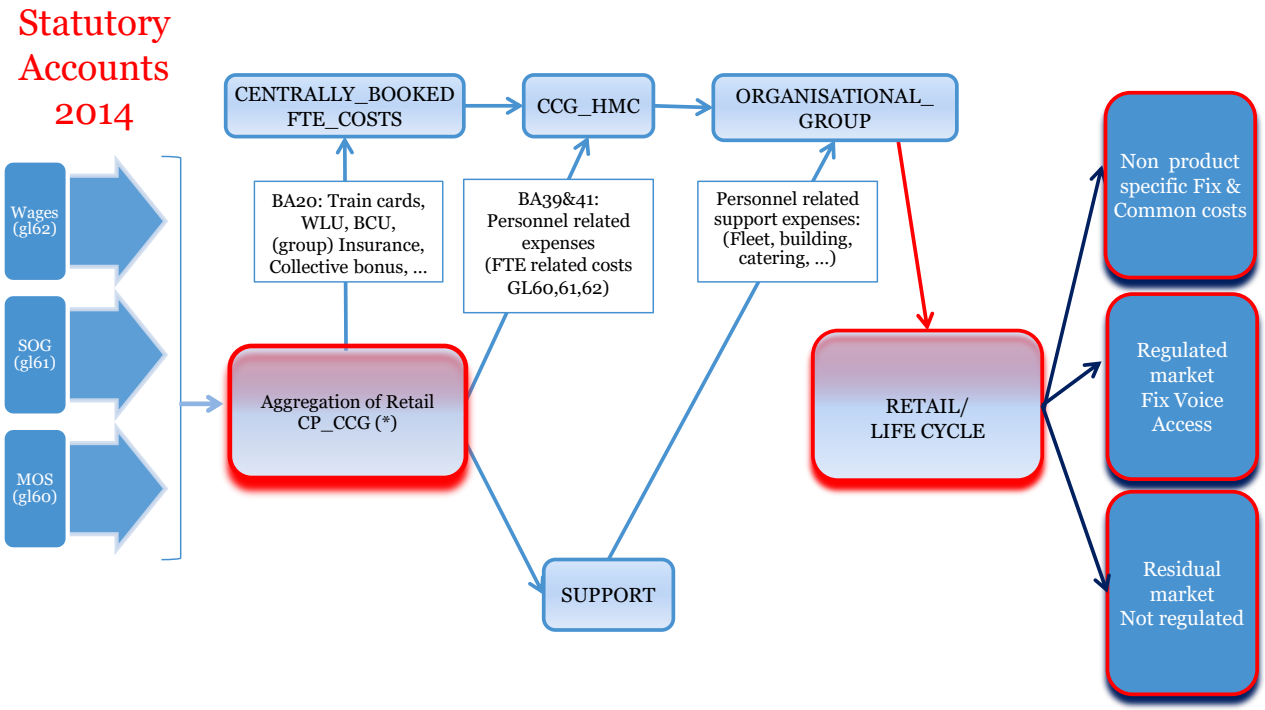
4.2.3.2 ***Retail FTE related costs (block 1)***



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

Starting from the Cost basis, Retail FTE related costs are at first gathered into INCA module CCG_HMC. CCG_HMC module is simultaneously feeded with INCA module Centrally_Booked_FTE_costs (Train cards, WorkLifeUnit costs, etc.).

Retail FTE related costs gathered in CCG_HMC are afterwards loaded into INCA module ORGANISATIONAL_GROUP. In ORGANISATIONAL_GROUP module, FTE related costs are summed up with SUPPORT costs managed centrally (Fleet, building, catering, etc.) but that have to be allocated towards Proximus FTE costs.

This is also at this stage of allocation flow that attributes VAR_TYPE and PS_TYPE are flagged on CCG_CP and where CCG_CP are renamed as "Organisational groups" (terminology specific to FTE costs).

Organisational groups costs are at last directed to INCA module Retail, prior to be allocated to Markets (via LIFE_CYCLE module, for part of it), in accordance to criteria for allocation of Retail costs to Markets, as described in chapter 4.2.2.

With regard to the definitions of attribute dimension VAR, Retail FTE related costs can only be either Fix (FIX), either Variable (VAR) costs.

For what matters FTE costs, this variability sensibility has been defined taking the following assumption:

Are Fix FTE costs, all the FTE costs that are needed to ensure the Proximus going concern independently of products volumes, id est, costs needed to maintain the Proximus minimum organizational structure.

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Two types of FTE costs were identified as needed to maintain the Proximus minimum organizational structure:

- Staff costs such as IT officers supporting DB and IT tools used, reporting and analysts teams, research staff such as Products&Solutions engineers, Marketing staff costs, as the size of such departments does not vary with the volumes of products sold but well with other causal factors such as market size and market position of Proximus, products technicity, etc.
- All the Proximus hierarchy structure (team responsibles).

The classification of FTE costs for CBU and EBU between FIX and VAR costs is as follows:

CBU Organisational group	FIX/VAR (*)	PS/NPS	Cost Group
CBU Top management	FIX	NPS	All CBU Mass market products
CBU Sales - Top management	FIX	NPS	All CBU&EBU Mass market products
CBU Direct sales	VAR (*)	NPS	All CBU&EBU Mass market products
In charge Relations for CBU indirect sales channels	FIX	NPS	All CBU&EBU Mass market products
National and International Information services	Mix FIX/VAR	PS	11302 Directory Assistance Services and listing
Support staff for Sales department (all channels)	FIX	NPS	All CBU&EBU Mass market products
CBU Marketing	FIX	NPS	All CBU&EBU Mass market products
Call Center Activities	Mix FIX/VAR	NPS	*See developments further*
CBU Reporting and IT internal tools services	FIX	NPS	All CBU&EBU Mass market products
In charge for CBU e-sales	FIX	NPS	All CBU&EBU Mass market products
CBU Scarlet Top management	FIX	NPS	All CBU&EBU Mass market products
CBU idTV Content management	FIX	PS	idTV
CBU Products & Solutions specialists	FIX	NPS	All CBU&EBU Mass market products
CBU strategic planning	FIX	NPS	All CBU&EBU Mass market products

(*) excluding Team responsible flagged as Fix costs.

EBU Organisational group	FIX/VAR (*)	PS/NPS	Cost Group
EBU top management	FIX	NPS	All EBU professional & Mass market products
In charge Relations for COR (1) Public clients	FIX	NPS	All EBU professional products
In charge Relations for EBU International affiliates	FIX	NPS	All EBU professional & Mass market products
COR top management	FIX	NPS	All EBU professional products
COR Direct sales	VAR (*)	NPS	All EBU professional products
COR ICT Project architects & Outsourcing mgmt	FIX	PS	13001 Data Managed Services & Applications
COR Marketing	FIX	NPS	All EBU professional products
COR Business development and Bid management	FIX	NPS	All EBU professional products
BUS(2) top management	FIX	NPS	All EBU Mass market products
BUS all sales channels strategy & BUS Direct sales	Mix FIX/VAR	NPS	All EBU professional & Mass market products
BUS Marketing	FIX	NPS	All EBU Mass market products
In charge Relations for BUS indirect sales channels	Mix FIX/VAR	NPS	All EBU professional & Mass market products
EBU Telco Solutions top management	FIX	NPS	All EBU professional & Mass market products
EBU Telco Solutions Specialists and Solutions sales	Mix FIX/VAR	NPS	All EBU professional & Mass market products
EBU IT Solutions top management	FIX	PS	13001 Data Managed Services & Applications
EBU IT Solutions Specialists and Solutions sales	Mix FIX/VAR	PS	13001 Data Managed Services & Applications
OPE (3) top management	FIX	NPS	All EBU professional products
EBU OPE Revenues financial reporting & IT Tools mgmt	FIX	NPS	All EBU professional & Mass market products
EBU OPE Transformation, Process & operations	FIX	NPS	All EBU professional & Mass market products
EBU OPE Customer Project Management	FIX	NPS	All EBU professional & Mass market products
EBU OPE After Sale Back-office	Mix FIX/VAR	NPS	*See developments further*
EBU stategic planning	FIX	NPS	All EBU professional & Mass market products
In charge Relations for ICT sales channels	FIX	NPS	All EBU professional & Mass market products

(*) excluding Team responsible flagged as Fix costs.

(1) COR, for CORPORATE, is the subdivision of EBU including big size enterprises.

(2) BUS, for BUSINESS, is the subdivision of EBU including small size enterprises.

(3) OPE, for OPERATIONAL EXCELLENCE, is a Support EBU division in charge of internal Process optimization and IT internal tools management. Are included in this EBU department, staff teams for financial reporting, IT Tools management, Customer Project management, Direct Margin and cost analysis, After Sale Back-Office.

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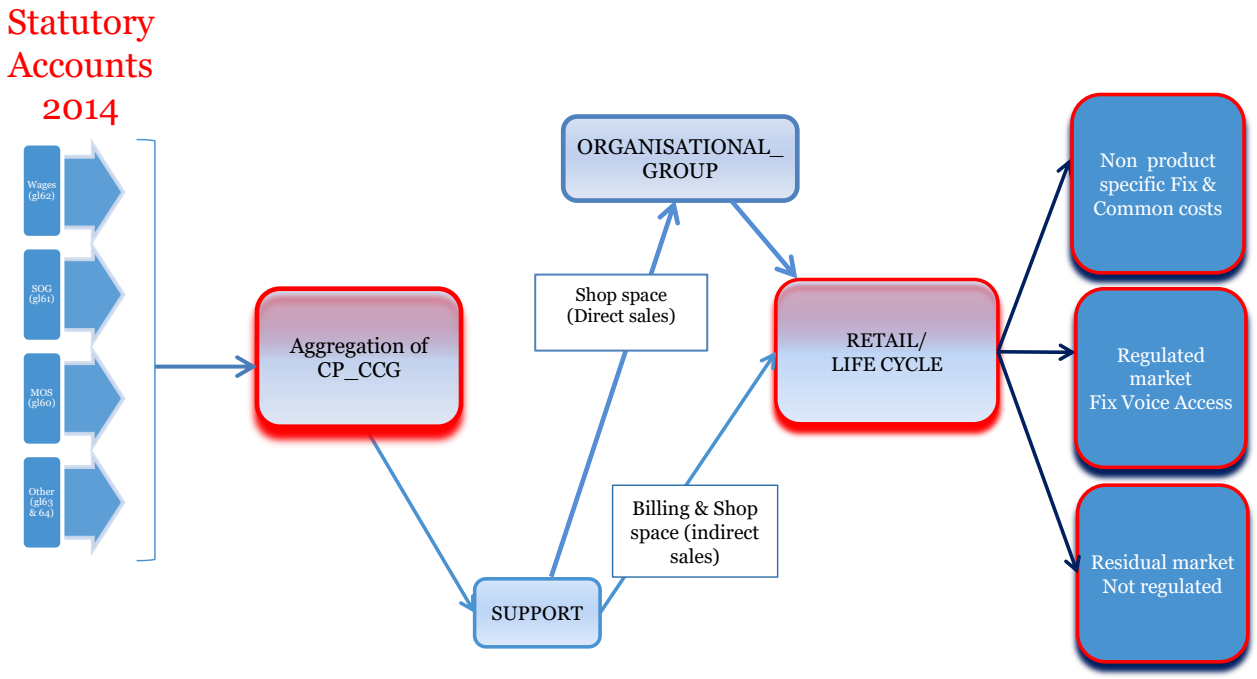
4.2.3.3 ***Retail Support costs (block 2)***



Module SUPPORT identifies and collects the costs of a number of support objects which a.o. are retail related.

The retail related support objects primarily concern billing costs (invoice printing, stuffing and postage, as well as teams in charge of billing&collecting) and costs for shop space. These costs are primarily gathered in INCA module SUPPORT.

Costs for shop space are considered fix. The costs of creation and maintain a shop is not linked to the volumes of products the shop offers, but well to other criteria such as geographical localisation, local withholding tax regulation, points of sales optimization, etc. The CBU shops sell all types of products. These costs are therefore assigned as non product specific.

Proximus shops are occupied mainly by Proximus Direct Sales teams and, in a lower extent, by part of the Indirect Sales who do not have their own shops. Costs for shop space were allocated towards those teams, via module ORGANISATIONAL_GROUP (Proximus Direct Sales) and RETAIL (Indirect Sales).

Billing costs are fix, non product specific costs. In the specific cases of clients who have only one product to bill (1Play customer), or clients who have a panel of products belonging all to the same market, billing costs were allocated towards the concerned Market, with number of clients as allocation key. Billing costs of clients multiplay were allocated to Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

Cost group brings the additional information whether the billing costs relate to CBU, EBU or both.

Retail support costs, as they are materially considered as fix, non product specific costs, are mainly allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

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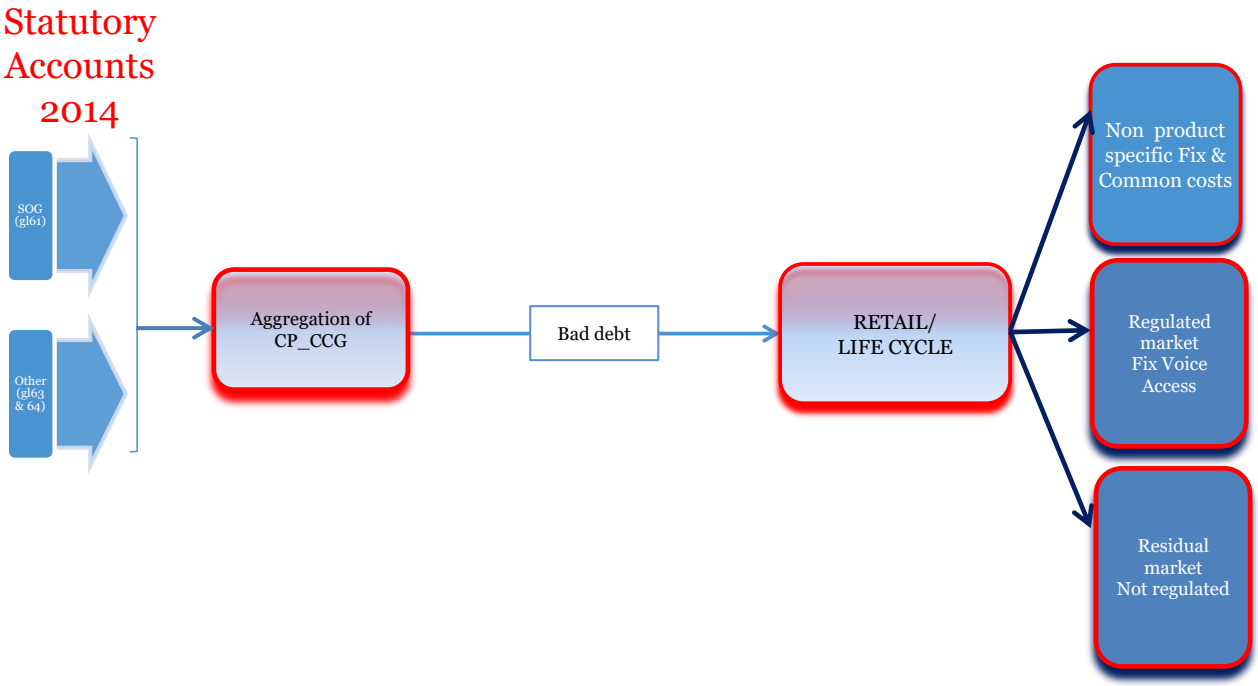
4.2.3.4 ***Retail costs which do not have a causal relationship with products (block 3)***



Per definition these costs are either fix (e.g. IT developments non capitalized for the internal needs of a Retail department, bad debt, etc.) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, etc.).

Per definition, these costs are non product specific.

Most of costs of block 3 are sent to module Retail, where linked to the activity of a Retail organisational group, prior to be routed to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

Bad debt is categorized as fix costs. Bad debt does not have a link to products but well to criteria such as competitive environment, regulatory framework (new telecom law), quality rating of the portfolio of clients, rather than to volumes of products.

Follow up and provision for bad debt is not done per products, but well per invoices and clients.

Bad debt tends to increase with turnover growth. Accordingly, we use the turnover per division as allocation key for bad debt to Market 0 or Market 1.

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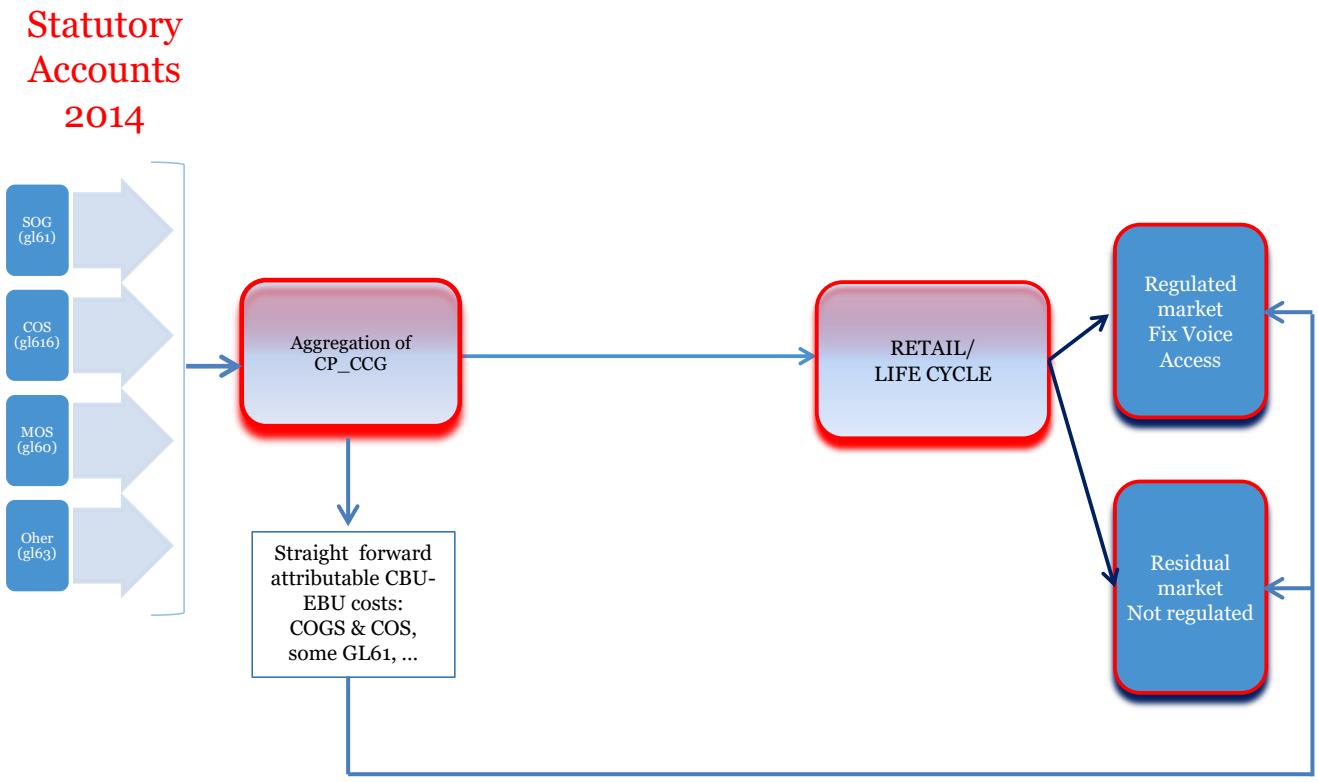
4.2.3.5 ***Retail costs which have a causal relationship with products (block 4)***



Are included in this block of Retail costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products.

The main costs of this category are Cost of goods sold, costs of sales (e.g: commissions indirect sales channels, interconnection fees), marketing expenses, and consultancy costs such as CCA (Customer Care Activities) outsourcing.

Most of the costs of block 4 are gathered by similar categories into INCA Retail and/or LIFE CYCLE modules, prior to be allocated to the Market they relate, some of them being however directly sent to the Market they relate.

Per definition, Retail costs of Block 4 have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are therefore included the following combinations of VAR_TYPE; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost of goods sold and Cost of sales have a direct link to product they relate. Therefore, they can be allocated directly.

Marketing expenses are Fix non product specific costs. Costs are however allocated to products (Markets) based on the recapitulative of all marketing campaigns costs, detailed per products.

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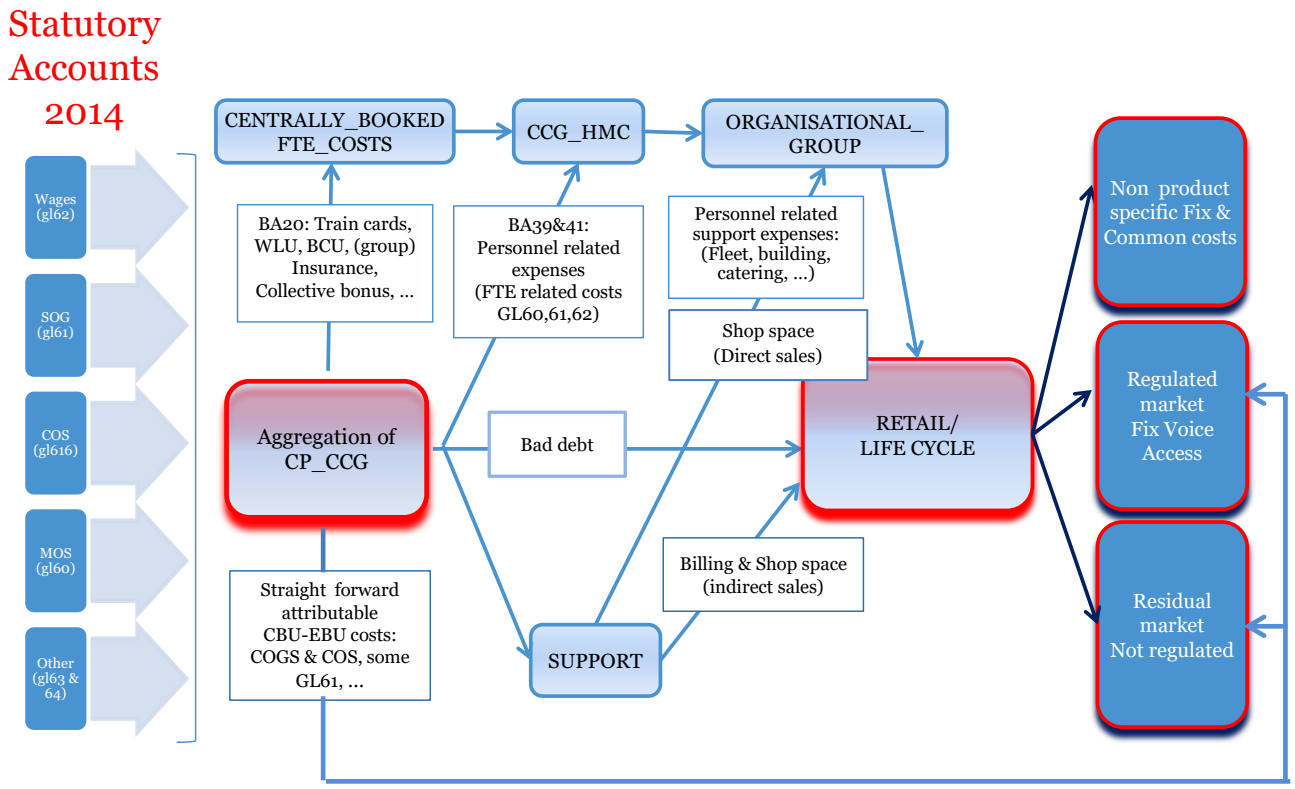
4.2.3.6 ***Graphical view on retail allocation flow – all costs blocks (1->4)***



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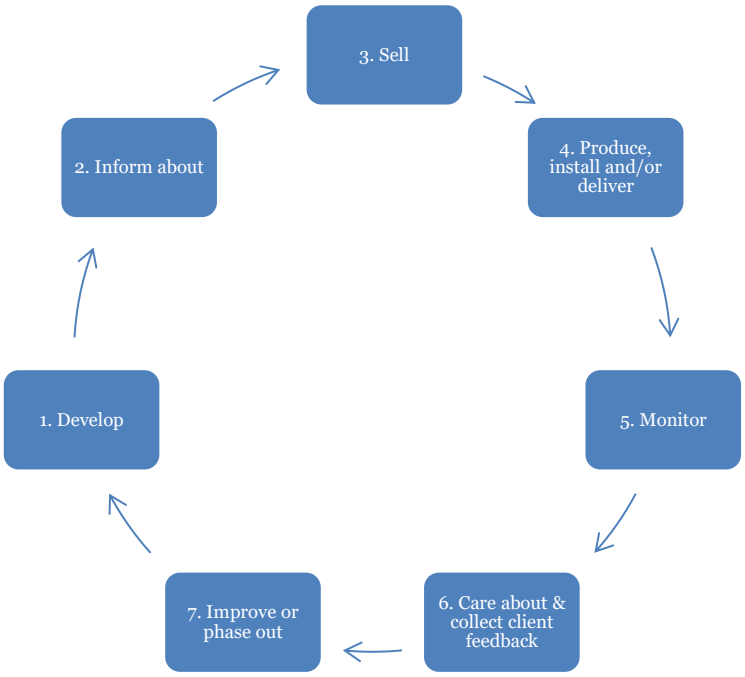
4.2.4 Retail costs allocation drivers

4.2.4.1 *Retail costs and life cycle of products*

In the Cost model 2014, a new classification of Retail costs is added, on top of the usual classification of costs between MAR, VAR, FIX and Common.

Cost model 2014 identified all the costs included in the life cycle of a product. Those costs were filtered in the LIFE CYCLE module, prior to be sent to Markets, while all the other costs were sent directly from RETAIL module to Markets.

The life cycle of a product includes the following stages:



At each stage of the life cycle of a product, we identified the following Retail costs:

DEVELOP

- Develop product configuration
- Target market & analyze financial impacts
- Develop aspects for sales channels: training, shops equipment, processes

GL62 wages:
Product & solutions managers
Business & financial analysts
Project managers

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INFORM	➢ Organize marketing campaigns	GL61 SOG: Marketing campaigns expenses GL62 wages: Marketers
SELL	➢ Acquire gross gains of products: new client and existing client, via All sales channels: o Call center agents o Direct sales o Indirect sales o Web sales	GL60 COGS-MOS: CPE equipment GL61 COGS: Commissions indirect sales Call center agents outsourced GL62 wages: Call center agents insourced Direct sales
PRODUCE, INSTALL & DELIVER	➢ Deliver gross gains of products acquired. More an activity of technical departments, to the exception of some products, delivered in shops (e.g.: mobile products)	GL61 COGS: Interconnection costs (Telco/ICT) to various platforms, idTV content fees GL62 wages: Direct sales
MONITOR: Changes on products sold	➢ Adapt product configuration, in accordance with requirements of the client: swap, downgrade/upgrade of a pricing plan, additional option, churn, configure multiple products in a pack (pack configuration)	GL61 SOG: Call center agents outsourced GL62 wages: Direct sales, Call center agents insourced
MONITOR: Billing & Collecting Revenues	➢ Produce and send bills ➢ Manage bad debt: follow ageing balance, send reminders & bailiffs costs	GL61 SOG: Printing & postage costs Bailiffs costs GL62 w ages: Call center agents insourced (dedicated team Billing&Credit risk) GL 63&64 Other: Bad debt provision & write-off
CARE: Handling clients complaints	➢ Handle billing complaints ➢ Process request for changes of personal data (clients moves, etc.) NB: technical complaints are handled by SDE teams, not Retail costs.	GL61 SOG: Call center agents outsourced GL62 wages: Call center agents insourced, Direct sales
CARE: Retention & Loyalties programs	➢ Inform about loyalties actions & facilities, ➢ Implement retention actions ➢ Maintain clients installed base	GL60 MOS-MAT: Sales gifts and loyalties advantages GL61 SOG: Call center agents outsourced Marketing campaigns expenses GL62 w ages: Call center agents insourced Marketers

Sensitivity: Unrestricted

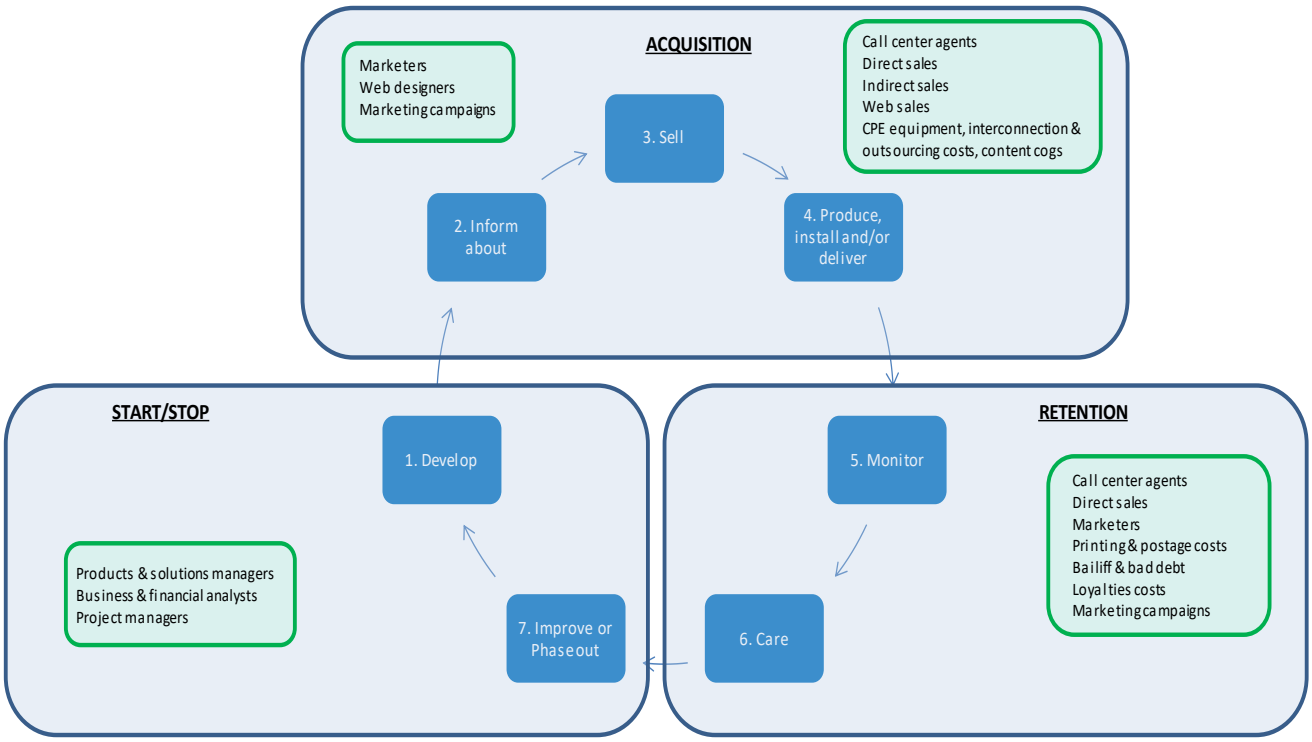
IMPROVE or PHASE OUT

- Design product new configuration/phase out
- Target market & analyze financial impacts
- Develop aspects for sales channels: training, shops equipment, processes

GL62 wages:
Product & solutions managers
Business & financial analysts
Project managers

The list of Retail costs that intervene in the life cycle of a product shows that:

- 2 big categories of costs can be highlighted:
  ACQUISITION costs, of new clients and/or products,
  RETENTION costs (or PARK costs), on existing clients and/or products.
- some costs are found in several stages of the life cycle (e.g.: call center agents wages costs), while other are specific to one stage of the life cycle (e.g.: project managers)



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The LIFE_CYCLE Module aims to determine the Retail unit costs. For this, Cost model 2014 collects operational drivers, with respect to each category of costs.

Below, we give specifications about some CBU/EBU costs, costs where different drivers need to be applied, with respect to the functional organization of Proximus

- **CBU call centers agents (VAR costs):**

  - *Front Office* is the department with FTE who are in contact with external clients. Activities of the Front office are primarily sales and sales orders intake, supported by the After Sales department.
  - *After Sales* department is the CCA Back office. Its tasks are primarily input in systems of sales orders, handling of clients billing complaints and requests (e.g.: change of invoicing address).

CBU Call center agents use different *IT tools*,

- whether they deals with complaints, or with orderings,
- for orderings, whether they handle fix line products (fix voice, internet & idTV) or mobile products. This, due to historical reason (a decade ago, mobile products were sold by a separate legal entity) and due to the non full integration of retail ordering IT tools.

The IT managing system for tracking calls handling of the *Front office* is the **IVR** (Interactive Virtual Response), where calls passed and minutes of calls are recorded, for fix line products and mobile products.

The IT managing system for tracking activities of the *After Sales* is **BCI** (orderings, complaints handlings, requests), for fix line products and mobile products.

The IT managing system for orderings is **OMS** for fix line products, **PNI** for mobile products.
OMS and PNI track records of orderings per product and per type of orderings: acquisition (gross gains) vs. retention (additional option, swap of pricing plan, churns, change, pack configuration, etc.)

- **CBU call centers agents (FIX costs):**

  - *Sales, Care & Transformation* is the support staff in charge of the set up of CCA strategy, budget and planning activities, as well as training of CCA agents, work force management ([1]), and information communication regarding Proximus products ([2]).
  - *Billing & Credit Risk management* is the department responsible for the billing of CBU and EBU ([3]), for the follow up of bad debt and credit collection, and for fraud detection and prevention.

- **EBU call centers agents (FIX and VAR costs):**

[1] Work Force Management is the optimization of calls handling and outsourcers management.

[2] Web site development, intranet update, information flashes for all sales channels

[3] Except e-billing which is done separately by CBU for CBU clients, and by EBU for EBU clients.

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EBU OPE-BSC is an *After Sales* department for all EBU professional products.

A small part of these costs are FIX support staff in charge to optimize process and functioning of OPE-BSC department. The scission between Fix and VAR costs of OPE-BSC is done based on the functional organization of this team.
Inside VAR costs, the scission between teams in charge of Fix line products, mobile products or ICT products, is based on the functional organization as those teams are all specialized per products (no generic profiles for EBU business).

The IT managing system for tracking activities (orderings, complaints handlings, requests) of the *EBU OPE-BSC After Sales* is **BCI**, for Telco fix line products and mobile products,

The IT managing system for orderings is **OMS** for Telco fix line products, **PNI** for Telco mobile products.
OMS and PNI track records of orderings per product and per type of orderings: acquisition (gross gains) vs. retention (additional option, swap of pricing plan, churns, change, pack configuration, etc.).

The IT managing system for orderings ICT products is **EPS**.

- **EBU solutions teams**

EBU solutions teams are teams that gather FIX and VAR FTE working on the same EBU product&solutions. EBU solutions teams includes as well as *Sales and Presales*, with sales objectives and variable remuneration, as well as *Product&Solutions managers* supporting the Sales and Presales for what matters product architecture.

The scission between FIX and VAR costs is based on the functional organization and in accordance with Retail principles for determining if a cost is FIX or VAR: Sales and Presales were defined as VAR costs while product managers were defined as FIX costs.

4.2.4.2 *Modern equivalent opex (MEO)*

The Cost model 2014 introduces the concept of modern equivalent opex: a company will perform an activity with its own personnel, if the use of its own personnel is equivalent in costs than another business model such as partnership, outsourcing, interim workers, commissioning, etc.

The MEO introduces a new way to determine VAR costs. Objective of the MEO is to only keep as VAR costs the incremental, effective costs needed to perform an activity, by comparing unit cost of FTE Proximus with unit cost of Outsourcing.

MEO concept application requires some basics:

- comparison basis is reliable: activities insourced and outsourced must be of the same nature,
- availability of drivers to compare both costs.

CBU Proximus outsources part of its VAR Retail activities: direct sales, front office and after sales. These activities are also performed with FTE Proximus, as described above.

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CBU Direct sales and After Sales team cannot appropriately be compared to their outsourced equivalent teams: performance remuneration differs, tasks differ quite also.
E.g.: After sales outsourcers are used for specific tasks, often easier than the ones assigned to FTE Proximus, more trained and skilled about products and Proximus IT Tools use.

The only sales channel where we can apply the MEO valuably is the Front office.

Front officers:
- use the same Proximus IT tools (**IVR**-see above), where volumes and minutes of calls are registered.
- perform the same tasks: receive phone calls of clients and promote Proximus products & services.

Unit cost/call of the Front office Outsourced is applied to volumes of calls of the Front office Insourced, to determine the MEO Front office VAR costs, other part of cost is considered as a Fix cost.

4.2.4.3 *Retail costs allocation drivers*

- **CBU/EBU sales channels**

Sources of drivers are not the same for Fixed lines products and Mobile line products, for IT tools reasons, as mentioned in chapter 4.2.4.1.

Drivers themselves also differ depending on Sale channel, following specificities of their activities and/or products they handle.

By example, EBU sales activity of ICT cannot be declined in volumes. ICT solutions are offered to the clients as tailor-made contracts, declined in SLA (Sales level agreement) and quoted in EUR.
Besides, ICT contracts include most of the time One-time items. The need to split costs of EBU Direct sales between products led us to take another allocation key than volume driven.

On top of the fact that not all the EBU products can be declined in volumes, EBU sales efforts are quite different depending on the product. EBU Telco mass market products are quickly available to the client, to the contrary of projects ICT that are generally sold for a 2-3 years minimum period time. Such long time period contract needs sales efforts deployed on some period of time too.

To tackle this key point, we took both drivers to allocate EBU Sales costs:

- Total transaction value (TTVA) to measure acquisition sales costs,
- Yearly turnover to measure retention sales costs.

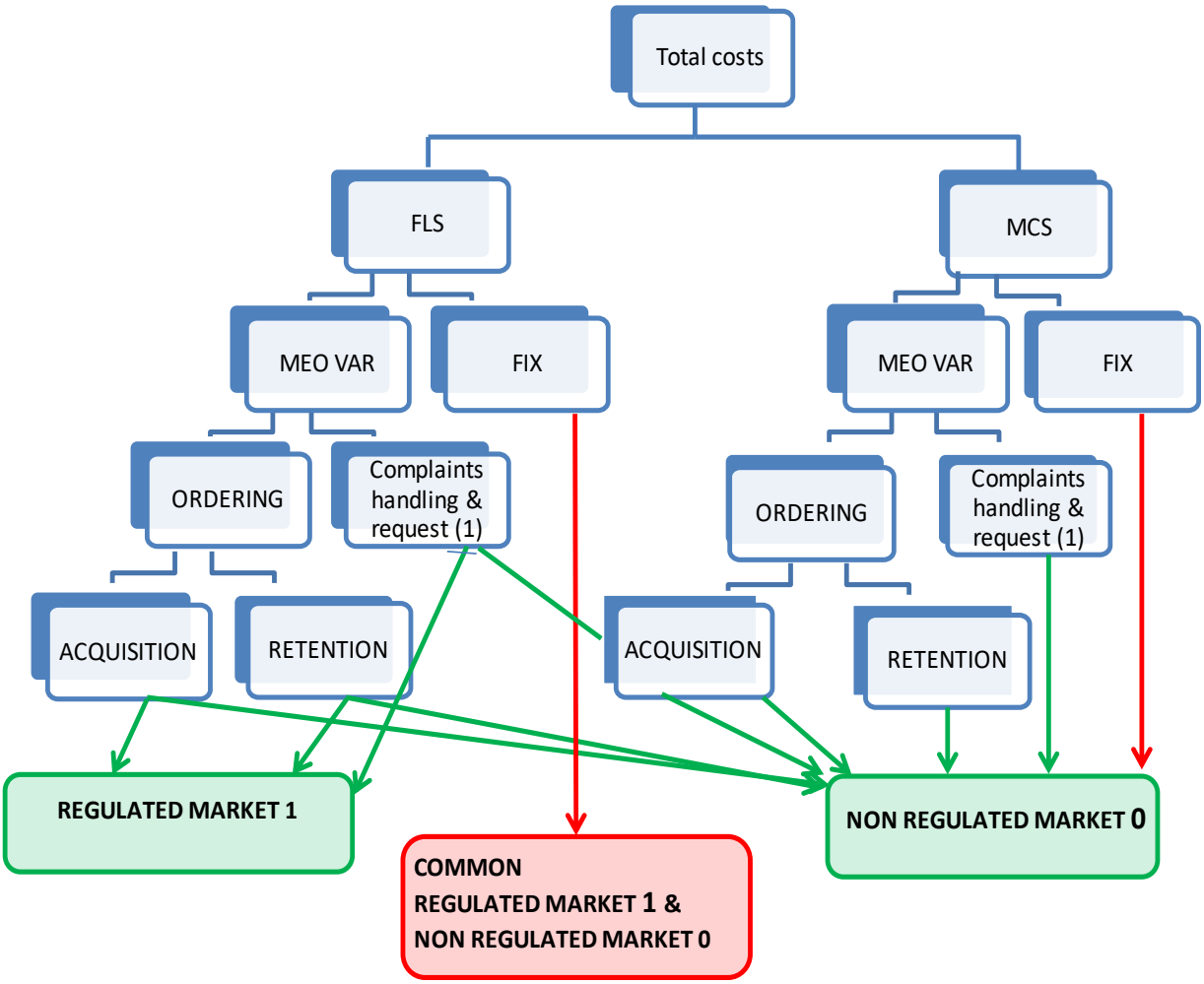
TTVA measures the total annual value of a won contract. Taking the TTVA as driver enables us to compare with a simple unit of measure (EUR) products with specificities very different such as Telco mobile subscription, ICT Data center hosting subscription, etc. Besides, inside EBU Business unit, the TTVA generated is the central driver for all what matters remuneration of direct and indirect sales channels, sales bonus calculations, etc.
Retail costs are cascading allocated.

For illustration purposes, we develop below allocation of the **Front office** extensively.

Sensitivity: Unrestricted

Allocation step	Driver source: Driver
1. Split total costs between Fix lines products (FLS) Mobile products (MCS)	 **IVR**: # calls x average handling time (AHT)
2. Compute MEO costs FLS (MCS)	**Generic key**: # calls FLS (MCS) x outsourcing FLS (MCS) unit cost
3. Isolate ordering from complaints & requests handling activity FLS (MCS)	 **n.a.**: front office considered as full ordering activity
4. Split ordering per products and per activity (acquisition/retention) FLS (MCS) -> unit weighted cost of ordering	 **OMS (FLS)**: # weighted orders (*) per product&activity **PNI (MCS)**: # weighted orders per product& activity
5. Send acquisition/retention costs: FLS to Market 0 and Market 1 MCS to Market 0 -> Retail unit costs	 **OMS (FLS) - PNI (MCS)**: # orders per product - acquisition **OMS (FLS) - PNI (MCS)**: # products (park) - retention

(*) Based on a study performed on sales channels, we weighted the ordering unit costs, depending on product (analog line, digital line, mobile line, additional service, etc.) and depending on type of ordering: acquisition vs. retention.



- N.a. for the front office: for completeness purposes.

Other CBU sales channels than CCA Front are allocated as follows:

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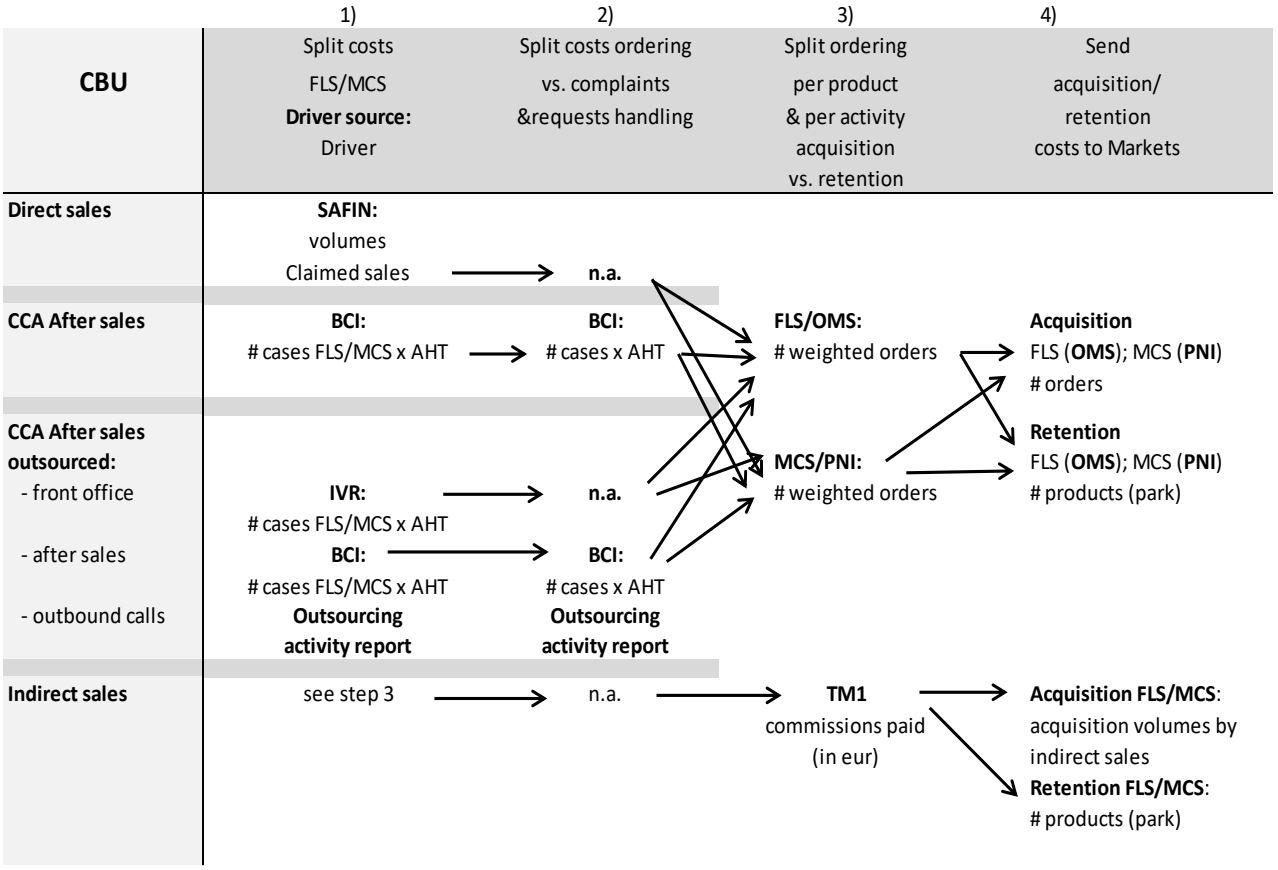
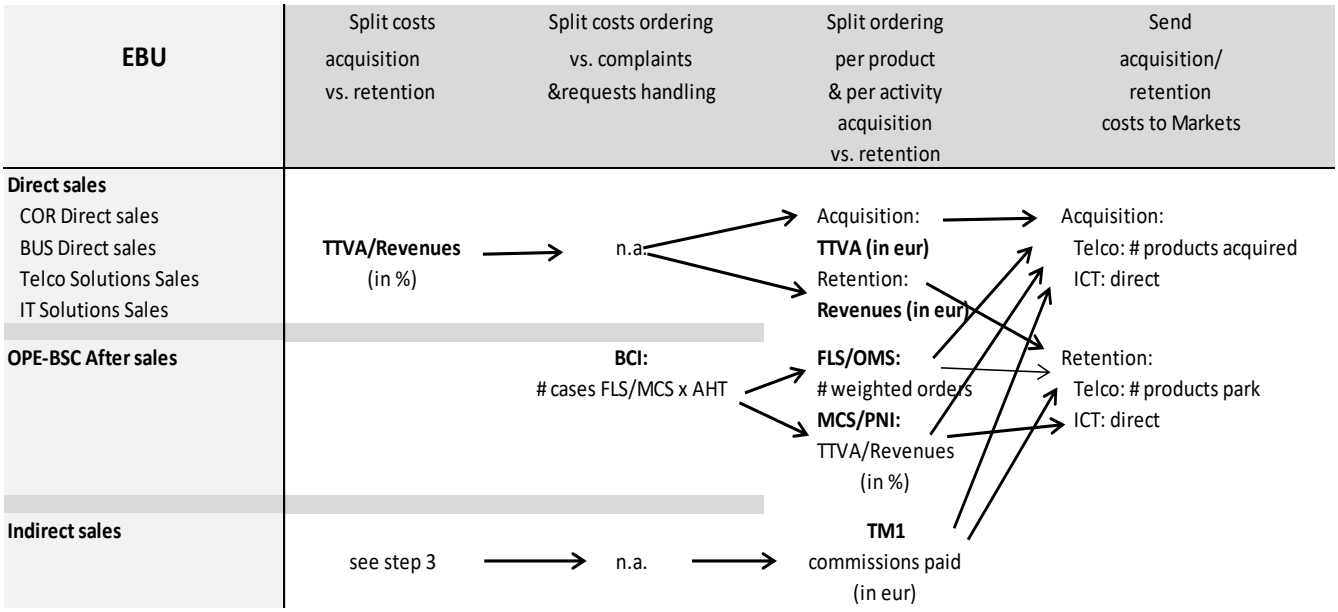


EBU Sales channels are allocated as follows:



4.3 Allocation of CWS (Customer Whole Sale Division) related costs

The allocation flow and principles are identical to the retail cost allocation flow.

Sensitivity: Unrestricted

4.3.1 Determination of the CWS cost perimeter

All Wholesale activities are situated at the level of Business unit CWS (Customer Whole Sale).

The Proximus financial and accounting structure clearly registers (directly attributable) Wholesale costs on costcenters 40xxxx.

Starting from the Proximus organisational structure, we can identify 4 blocks in the Wholesale cost perimeter:

1. Wholesale FTE costs
2. Wholesale Support costs
3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Wholesale FTE costs

Includes all direct FTE related costs of Business unit 40 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Wholesale Business unit in the accounting books but do relate to Wholesale FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus personnel/FTE's (and thus also towards these residing under CWS). E.g.: costs re. Fleet, office building, traincards, bonus, training, gsm's in the context of the employee phone program, …

2. Wholesale Support costs

Wholesale Support costs are non FTE related costs which are centrally booked and managed but relate to Wholesale activities. E.g.: Billing.

3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Wholesale departments, costs for legal claims, etc.

4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales and costs of good sold, interconnection fee, etc;

4.3.2 Wholesale cost allocation principles

4.3.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

Sensitivity: Unrestricted

These attributes are “VAR_TYPE” and “PS_TYPE” and they constitue a unique combination for each wholesale CP-CCG.

These attribute-qualifications are applied on all the wholesale CP-CCG combinations, but at different levels of INCA modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Wholesale allocation process as described below.

4.3.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies wholesale costs based on their variability towards product volumes.

We distinguish between 4 var_types:

- Marginal (mar)
- Variable (var)
- Fix (fix)
- Common (common)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 4 var_types as described in chapter 4.2.2.2.

4.3.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies wholesale costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We distinguish between 2 PS_types :

- PRODUCT_SPECIFIC (PS)
- NON_PRODUCT_SPECIFIC (NPS)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 2 ps_types as described in chapter 4.2.2.3.

In addition to the attribute PS_TYPE, all wholesale costs are flagged with an additional dimension “COST GROUP” enabling to identify the (span of) product(s) it covers.

Sensitivity: Unrestricted

Used Cost Groups for wholesale costs are:

PRODUCT SPECIFIC
20000 Mobile Roaming IN

NON PRODUCT SPECIFIC
All CWS products
All CWS non regulated products
All CWS products excluding Roaming

Since this is stricto sensu the same decision tree to qualify wholesale CP_CCG with attributes VAR and PS, than for the Retail allocation process, we refer to the decision tree presented in chapter 4.2.2.3 of the Retail module to illustrate the wholesale costs qualification with attributes VAR and PS.

4.3.2.4 *Criteria for allocation of wholesale costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to). This means that the costs will be allocated towards one of these wholesale Markets:

   Market 0 - Residual Market
   Market 4 - Unbundling local loop
   Market 5 - Wholesale Broadband
   Market 6 - Wholesale BROTSOLL
   Auxiliary service Market 1 - Access PSTN&ISDN - CPS
   Auxiliary service BRxx - Colocation
   Auxiliary service BRIO - POI

b. Non product specific Variable costs are allocated towards wholesale Markets (see list above) based on volumes drivers. The drivers for allocation of variable costs are documented further, per block of wholesale costs (1->4).

c. Non product specific Fix and Common costs are allocated towards Market 'Fixed Common Wholesale Markets'.

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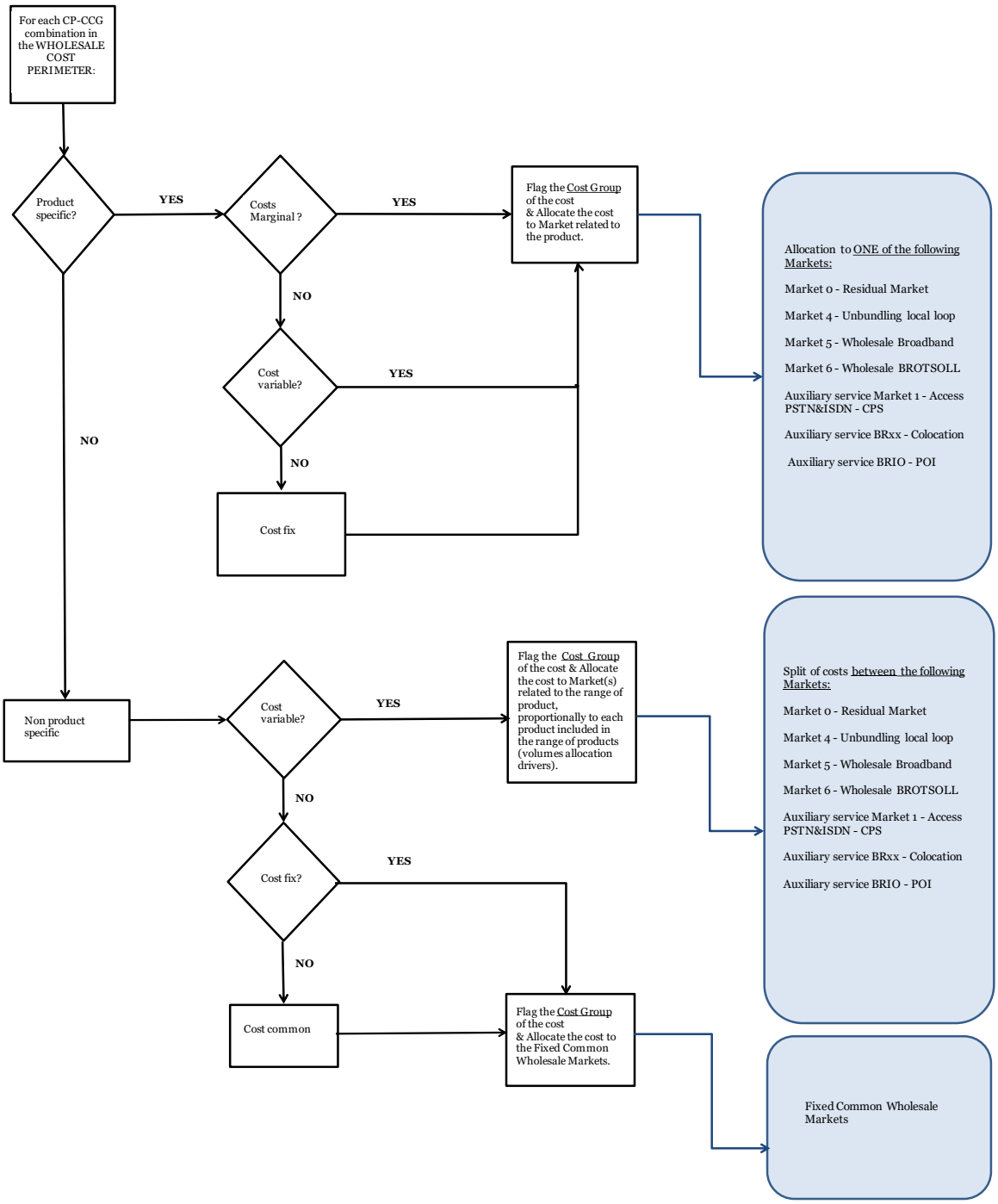
4.3.2.5 *Graphical view on principles for wholesale costs allocation to Markets*



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4.3.3 Wholesale allocation flow principles

4.3.3.1 *General principles*

As described above, the 4 blocks of costs included in Wholesale cost perimeter are all specified with 2 cost type attributes (VAR TYPE; PS TYPE) prior to be allocated to Markets. Similarly to the Retail allocation flow, the 4 blocks of costs do not follow all the same path of allocation. The allocation flow followed by a Wholesale CCG_CP will depend on its block of costs (1->4).

4.3.3.2 *Wholesale FTE related costs (block 1)*

The allocation flow of Wholesale FTE related costs is the same than the Retail one. We therefore refer to chapter 4.2.3.2. for presentation of the several INCA modules whereby FTE related costs are centralized/allocated. As a reminder, the list of INCA modules that deal with FTE related costs is as follows:

- Cost basis (GL62, as well as some GL60&61),
- CCG_HMC or SUPPORT ([4]),
- ORGANISATIONAL_GROUP,
- WHOLESALE.

4.3.3.2.1 Criteria for attribute dimension VAR_TYPE

With regard to the definitions of Attribute dimension VAR, Wholesale FTE related costs can only be either Fix (FIX), or Variable (VAR) costs.

Criteria to classify FTE related costs into FIX vs. VAR costs were similarly defined as for the Retail allocation flow, id est: are considered as FIX costs, all the FTE costs needed to maintain the Proximus minimum organisational structure, independently of products volumes. These ones include staff costs such as IT officers, reporting & analysts teams, research staff (e.g.: products & solutions managers), as well as the Proximus hierarchy structure (team responsibles).

4.3.3.2.2 Criteria for attribute dimension PS_TYPE

Organizational groups dedicated to a specific product are categorized as product_specific (PS). We identified only one organizational group in the Wholesale organisation structure that is product specific, id est, the team involved exclusively in Roaming agreements.

Organizational groups covering a span of products are categorized as non_product_specific.

4.3.3.2.3 CWS Organisational groups: VAR_TYPE; PS_TYPE; COST_GROUP

Inside CWS, organisational groups are easy to classify as Fix or Var in function of their activities. For some organisational groups, Fix FTE costs are adjacent to VAR costs. In such organisational groups, we took allocation keys to split the FTE costs between Fix and Var.

[4] Only FTE related support costs.

Sensitivity: Unrestricted

These "mix" organisational groups are flagged in the present table as "*Mix Fix/Var*".

Organisational group functional activities	FIX/VAR (*)	PS/NPS	Cost Group
CWS Top management	FIX	NPS	ALL CWS products
CWS Sales department	VAR (*)	NPS	ALL CWS products
CWS Products & Solutions specialists	FIX	NPS	ALL CWS products excluding roaming
CWS Call center activities	Mix FIX/VAR	NPS	*See developments further*
CWS Roaming agreements Team	FIX	PS	20000 Mobile Roaming IN
CWS Strategic planning and internal process	FIX	NPS	ALL CWS products

(*) excluding Team responsible flagged as Fix costs.

CWS Sales department is an organisational group defined as Var, non product specific. CWS sales FTE are responsible for regulated and non regulated products. The size of the department varies with the volumes of products (to be) sold.

CWS Call center activities include 3 main divisions:

- *Operational team* in contact with external clients. This division gathers the Front office and Back office in charge of the sales orders intake, answers to questions of clients, and support to the CWS Sales department in period of high business activity
- *Billing and credit collection team*
- *Reporting, IT tools management and process optimization team.*

Billing and credit collection teams were qualified as "fix, non product specific" organisational group costs. Billing activity is a cost depending on number of clients, not on number of products. In this sense, billing activity is a fix cost, as not materially changing with volumes of products. Billing costs is also a non_product_specific cost, as vast majority of CWS clients have more than one product by Proximus. The absence or suppression of one product in the client products portfolio will not alter the need for invoicing the client.

Reporting, IT tools management and process optimization team, as Support staff team, is identified as a "fix, non product specific" organisational group cost.

Front office and Back office costs are categorized as "variable, non product specific", considering the variability of these costs with volumes of products (to be) sold, and taking into account that CWS Call center activities handle all CWS products, regulated as well as non-regulated products.

CWS organisational groups with attribute VAR can be summarized in the following table:

Organisational group functional activities	VAR (*)	PS/NPS	Cost Group	Cost Group Allocation key
CWS Sales department	VAR	NPS	All CWS products	Direct (**)
CWS Call center activities				
CWS Front office and Back office	VAR	NPS	All CWS products	Direct (**)

(*) excluding Team responsible flagged as Fix costs.
(**) Direct, based on functional organisation of CWS.

4.3.3.2.4 Allocation of CWS FTE related costs – costs block 1 – to Markets

Product specific organizational group Fix of the Roaming Team is allocated to non regulated Market 0.

Non product specific organizational groups Fix are routed towards the "Fixed Common Wholesale Markets".

Non product specific Variable (part of) organisational group's costs are allocated towards Markets based on volumes drivers.

Sensitivity: Unrestricted

CWS organisational groups with attribute VAR are allocated to Markets with the following drivers:

Organisational group functional activities	Regulated markets BRxxx and auxiliary services	Non regulated residual market	Cost Group	Market Allocation key
CWS Sales department	x	x	All CWS products	Provisioning volumes
CWS Call center activities				
CWS Front office and Back office	x	x	All CWS products	BCI Voice Calls & Mails report

CWS sales department costs are allocated to products (markets), according to provisioning volumes.

CWS Call center activities costs are allocated to products (markets) according to minutes of Voice Calls and number of mails handled, detailed per product, as indicated in 2 reports: BCI Voice calls report and BCI Mails report. BCI is the IT tool where CCA agents introduce a track of any question/complaint/ordering of an external client.

4.3.3.3 *Wholesale support costs (block 2)*

The wholesale support costs are identified firstly in INCA Module "Support". Wholesale support costs specifically concern "CWS_Billing" (i.e. costs for invoice printing, stuffing and postage).

We qualify CWS_Billing as a fix non_product_specific cost. Cost Group of CWS_Billing is All CWS products, since the CWS_Billing support costs include all the products of CWS, whether regulated or not.

As mentioned in chapter 4.3.3.2.3 related to the CWS CCA staff team in charge of Billing and credit collection follow-up, to the contrary of the Retail billing costs, the case that billing costs can be linked to some unique product is not met, since the vast majority of the CWS clients have more than one products billable. As a consequence, the absence or suppression of one product will not change the need for invoicing the client.

CWS_Billing costs are therefore allocated towards "Fixed Common Wholesale Markets".

4.3.3.4 *Wholesale costs which do not have a causal relationship with products (block 3)*

Wholesale costs that do not have a straightforward driver towards products are either grouped in module Wholesale, if they can be linked to the activity of a Wholesale organisational group, or they are directly routed to the Market "Fixed Common Wholesale Markets".

Per definition these costs are either fix (e.g. IT developments non capitalized for the internal needs of Sales departments) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, bad debt, etc.).

Per definition, these costs are non_product_specific.

Cost group of costs of block 3 is "All CWS products".

Fix and common non_product_specific costs are allocated towards Market "Fixed Common Wholesale Markets".

Sensitivity: Unrestricted

4.3.3.5 *Wholesale costs which have a causal relationship with products (block 4)*

Are included in this block of Wholesale costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products. Costs of block 4 are either directly allocated to Market they relate, or they transit by INCA Wholesale module, when the costs have to be identified as Wholesale objects at first, prior to be allocated to Market they relate.

Per definition, these costs have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not. Are therefore included in Wholesale costs - block 4, the following combinations of VAR_TYPE ; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost group specifies the product, when the cost is product_specific. Cost group brings the additional information on the panel of products covered by costs non_specific.

The main costs of this category are Cost of goods sold, cost of sales (e.g: interconnection fees), consultancy and outsourcing costs.

Cost of goods sold and Cost of sales, as MAR product specific costs, have a direct link to volumes of product they relate. Therefore, they can directly be allocated to the Market they relate.

Outsourcing and consultancy costs

Non product specific costs that cannot be allocated directly to products were allocated in a first step to the INCA module Wholesale, where attached to the Organisational group they relate, and in a second step to the Markets, with the same allocation flows than the Organisational group they relate. E.g.: Outsourced CWS CCA Back office activities.

Product specific costs were allocated directly to the Market they relate. E.g.: Fees to Clearing Offices for roaming voice&data flows.

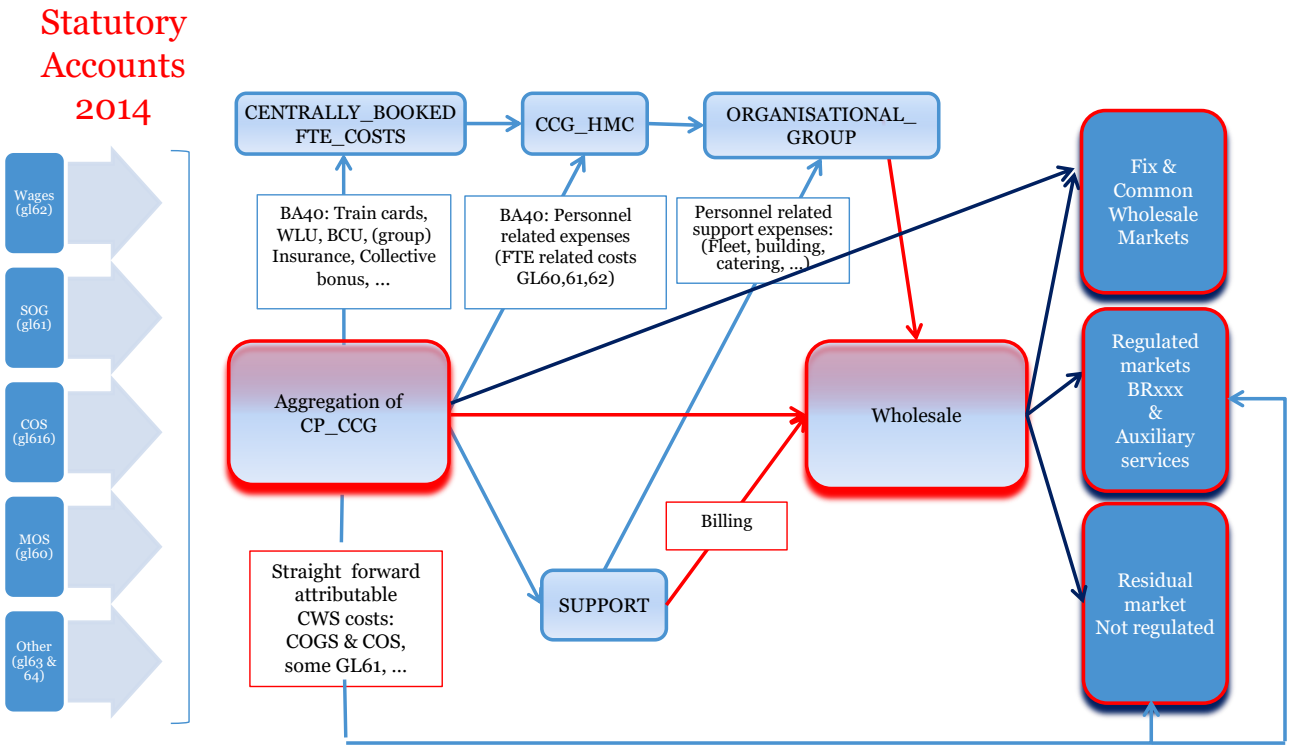
Allocation of costs of block 4 to the Markets is summarized as follows:

VAR_TYPE	BRxxx regulated market	Residual market Non regulated	Driver
Mar			
Cost of good sold	-	x	Direct
Cost of sales	-	x	Direct
Variable			
CWS CCA Outsourcing	x	x	BCI Voice Calls & Mails report
Fix			
Mandatory prof. fees	-	x	Direct

Sensitivity: Unrestricted

4.3.3.6 *Graphical view on wholesale allocation flow – all costs blocks (1->4)*

Wholesale allocation flow of all types of Wholesale costs is presented as follows:



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
•CCG = cost center grouping = grouping of cost centers with comparable characteristics

Sensitivity: Unrestricted

5 SDE OPEX (network&IT) stream

5.1 Allocation of SDE OPEX costs going through the "SDE" INCA module

5.1.1 Determination of the SDE cost perimeter

As stated previously the Belgacom organisational structure distinguishes between 4 distinct organisational pillars called Business units :

- Consumer Business Unit (CBU) has the responsibility over the residential customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Service Delivery Engine (SDE) centralises network, Carrier Wholesale and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential customers and at the level of Business unit EBU (enterprise business unit) for the professional customers.

Network & IT activities are situated at the level of Business unit SDE (Service Delivery Engine), as well as the carrier & wholesale activities (CWS).

The Belgacom financial and accounting structure clearly registers (directly attributable) SDE costs on cost centers 50xxxx, separately from the wholesale costs booked on cost centers 40xxxx.

However, a number of costs are not directly attributed to SDE in the accounting books but do relate to SDE activities.

It concerns :

1. FTE related costs
   Costs which are centrally booked and/or managed but which need to be flagged towards all Belgacom personnel/FTE's (and thus also towards these residing under SDE).

   E.g. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program.
2. Non FTE related costs
   Costs which are centrally booked and managed but relate to SDE activities
   E.g. Telco space & power.

The costs under point 1. above are added up with the directly attributable FTE related costs (essentially all payroll costs and costs categorized with Cost type 'personnel-related' in the cost base, in lesser extent a limited number of costs categorized as 'non personnel-related', i.e. primarily training costs, printing costs and cost for office equipment) and allocated towards the organisational groups (as a general rule, the organisational group corresponds with the cost center group - except for teams like hybrid network & IT CCG's (CIS ISD NSC), IPP/VHR CCG's and COP field CCG's (like COP CFO Cable & Mass/Professional) - in module "Organisational_ group".

Sensitivity: Unrestricted

The costs under point 2. (telco & power space) above are identified as specific objects in Module Support and are further allocated towards network or IT elements but not to the SDE module. So their allocation will not be described in this subchapter.

The "SDE" INCA module costs are primarily sourced from the following INCA modules :

1. Organisational_Group
   This concerns the costs of organisational groups 50xxx.

2. CP1
   This mainly concerns the outsourcing costs of the remote and the field activities of COP/Customer Operations (COP CRO & COP CFO Cable & Mass/Professional).

3. BA50_SOG
   This primarily concerns costs for consultancy bodyshopping in order to face the lack of manpower during peak times.

5.1.2 SDE cost allocation

5.1.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

For SDE, unlike for retail, these attribute qualifications are not defined at the level of the cost base for all CP-CCG combinations but only for the FTE related costs at the level of the organizational groups (module "organisational_group").

5.1.2.2 *Criteria for Attribute dimension VAR_TYPE*

Dimension VAR_TYPE only qualifies SDE FTE-related costs in the SDE module, unlike in the retail module.

Variability refers to the service volume produced by the company in the long-run. This variability has 2 dimensions : volume within a product or diversity of products. The considered increment is the whole product. E.g. PSTN : what if we stop PSTN, which costs do we avoid? This is very hard to reach, especially in a top-down model.

Therefore, we prefer to opt for a simple approach that is only an approximation of the minimum fixed costs, by only considering as fixed FTE-related costs the minimum organizational structure, represented by the persons attributed with a "team responsibility" or in an MST cost center, as officially reported in the SAP accounting system.

We distinguish between 2 var_types only (unlike Retail, with 4 var types):

1. Fix (fix) : SDE FTE-related costs are considered as fixed when they are related to the minimum organizational structure (represented by the team responsibles and the Management & support teams) should there be a change in the long run.

Sensitivity: Unrestricted

2. Variable (var) : SDE costs which are not considered as fixed according to the definition hereabove (hence overestimated).

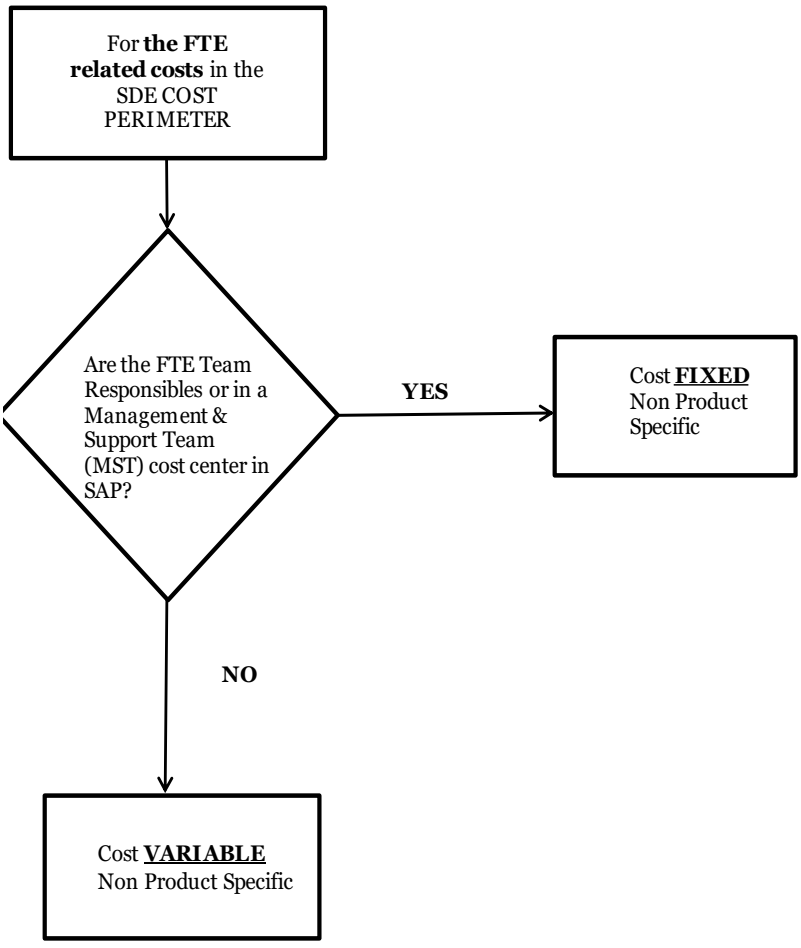
5.1.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies SDE costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We only have one category in the SDE module :

a. NON_PRODUCT_SPECIFIC : SDE costs which do not have a clear (causal) relation with specific products.

SDE MODULE: VAR & PS TYPE



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5.1.3 SDE allocation process

5.1.3.1 *Allocation of "Organisational_Group" costs*

For SDE, except for teams like IPP/VHR, COP field & COP remote, the organisational groups correspond with the cost center groupings as introduced at the level of the cost base.

The criteria as set above (5.1.2.2.) regarding variability are currently translated towards organisational groups based on this decision table :

	Criteria	Justification
fix FTE	Assigned as Team responsible in SAP	Assumption of Belgacom as ongoing concern on the long run, independent of product mix or individual product volumes : maintain the same organisational structure (reflected through team respo's)
	Assigned to an MSTcost center in SAP	MST cost centers are referring to Management & Support teams

Organisational groups dedicated to a specific product are categorized as product_specific.

Organisational groups covering a span of products are categorized as non_product_specific.

In SDE, all organisational groups have been defined as "non_product_specific".

The allocation for fix & var SDE organizational groups is the same (fix is a copy of var through a generic key implemented in INCA) except for a few teams where fix costs are allocated towards the relevant common markets.

The FTE related costs of organizational groups are allocated towards activities in the life cycle, markets, network or IT elements based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (CANVAS working hours for NEO, TM1 Dispatch Units for COP CFO, CMS working minutes for COP CRO, Rapid for ITS…).

5.1.3.1.1 Service Delivery Engine Organisational group allocation

5.1.3.1.1.1 SDE network & IT OPEX organizational group allocation

The network & IT teams of SDE are thus split into fix and var on the basis of objective criteria found in SAP but allocated the same way (var being a copy of fix) to the following elements :

- AC2
- BUSINESS_OVERHEAD
- CP2
- EUS
- IT_HARDWARE&MAINTENANCE
- IT_SOFTWARE
- IT_SERVERS
- IT_STORAGE&DB
- NE
- NLS2_0
- NLS2_2
- NLS4_0
- NSF

Sensitivity: Unrestricted

- OVH
- LIFE_CYCLE
- MARKET_DEF

An exception is made for a few teams whose fix costs are directly allocated towards the relevant common markets.

In the SDE module, the organisational groups do not only encompass the costs of GL 62 wages (including the PFA, capex manpower), but also FTE-related costs from GL60 MOS or GL 61 SOG, as well as outsourcing costs (mainly for COP field and remote teams).

In the later case, the driver is the same (based on time/efforts), but does take into account the time/efforts of both the internal & external manpower.

The allocation of the "operational" teams is done directly through the driver whilst the allocation of the "overhead" teams is done through generic keys taking into account the scope of the overhead team (driver is the remuneration cost allocation of all the teams in the scope of the overhead team).

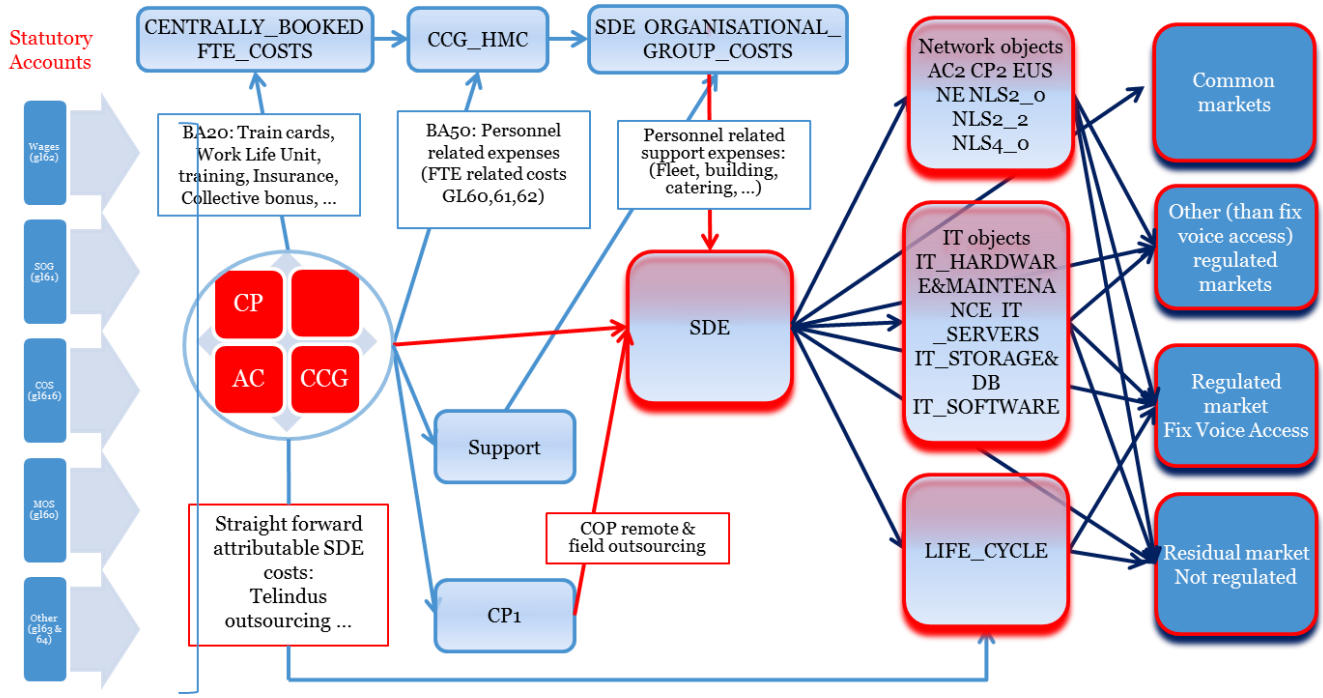
The allocation of the "fix" part of the "operational" teams is done through generic keys (a simple copy of the remuneration cost allocation of the "var" part of the same operational team).

5.1.3.2 *Allocation of SDE support costs*

Module 'Support' identifies and collects the costs of a number of support objects which a.o. are SDE related. The SDE related support objects primarily concern costs for telco power & space. However, telco power & space costs are not treated in the SDE module and are thus not described in this subchapter.

Sensitivity: Unrestricted

5.1.3.3 *Graphical view on SDE OPEX allocation flow*



CP = Cost Pool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs. Typically, the G/L accounts/costs consolidated in a single cost pool feature the same causal relation.
CCG = Cost Center Grouping = grouping of cost centers with comparable characteristics
AC = Asset Class

Figure 6: SDE OPEX Flow – General

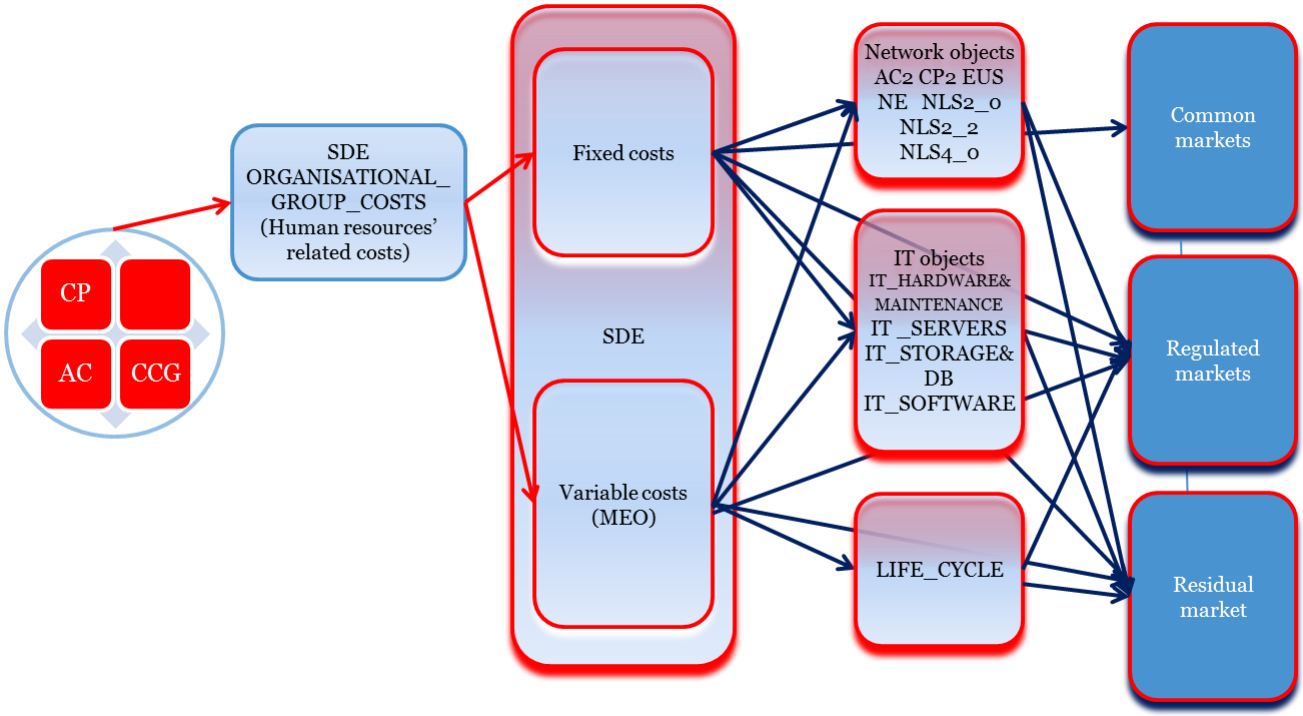


Figure 7: SDE OPEX Flow – Fix / Var

Sensitivity: Unrestricted

5.1.4 Allocation of SDE retail costs through the Life Cycle

5.1.4.1 *SDE retail costs and life cycle of products*

In the 2014 cost model, a new classification of SDE costs has been added. This model identified all the costs included in the life cycle of a product/service.

The SDE retail costs have been filtered in the Life Cycle module, just before being sent to the Market module. The other (not retail) SDE costs have been allocated like in the previous years.

All costs in the Life Cycle module have been categorized into 2 high level phases :

- Sales
- Post Sales

All the SDE retail costs in the life cycle belong to the second phase, Post Sales.

In the Life Cycle module, we identified the following SDE retail costs :

DELIVER :
Remote activation

- All products (mass or professional, fixed or mobile) must be remotely activated in the network.
- The remote activation may be sufficient to deliver the product in specific cases but in many cases, a field travel is necessary to complete the product delivery.
- Ideally, the remote activations would all be automatically executed further to an order from the customer in the IT systems but in reality, this process still requires manual interventions.
- The complexity of professional remote activations naturally requires a specific and important team (CNN). The activation activity in the life cycle refers to CNN.
- The PCD (Provisioning Coordination Desk) mass remote activation activity is consolidated with the dispatching activity in the CDC included in the field installation life cycle activity.

GL61 SOG:
PCD (Provisioning Coordination Desk) in the CDC (Coordination & Dispatch Center) (COP/CFO/DCO), CNN (Professional Connectivity)

GL62 wages:
PCD (Provisioning Coordination Desk) in the CDC (Coordination & Dispatch Center) (COP/CFO/DCO), CNN (Professional Connectivity)

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DELIVER :
Field installation

- A remote activation of the product in the network may not be sufficient, especially in the case of fixed products.
- In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions :
  - in the network up to the NTP (Network Termination Point in the customer house) (even DIY installations by the customer may require a field action in the network) and/or
  - outside of the network e.g. the modem and/or TV decoder (FULL installation).
- The field installation activity in the life cycle relates to the work done by the technicians outside of the network.
- It also includes the remote activation (for mass products) as well as the dispatching activities from the CDC and the supervision activity located in COP CFO MP.

GL60 MOS-MAT:
Equipments like modems and/or TV decoders, located in "Terminals" life cycle various categories

GL61 SOG:
Copper
CDC (Coordination & Dispatch Center), COP CFO MP (Customer Operations Customer Field Operations Mass Professional) fulfilment & supervisors
Fiber
NEO IPP VHR (Network Engineering Operations, Inside Production Plant, Very High Rate) fulfilment

GL62 wages :
Copper
CDC (Coordination & Dispatch Center), COP CFO MP (Customer Operations Customer Field Operations Mass Professional) fulfilment & supervisors
Fiber
NEO IPP VHR (Network Engineering Operations, Inside Production Plant, Very High Rate) fulfilment

CARE:
Remote repair

- When a customer has a technical issue with a product/service, he/she can contact the appropriate call center (mass or professional). Whilst the customer is waiting on the line, the DARE IT system already processes the customer data in order to test potential issue drivers.
- The first line call center agent may be able to fix the issue of the customer … or not.
  - In the later case, the call center agent will call upon the second line agents who themselves will call upon a third line outside of CHC or ISD if they can 't fix the issue.
- The remote repair activity in the lifecycle relates to the COP CRO CHC (Customer Operations, Customer Remote Operations, Customer Help Center, for mass products) and the CIS ICT ISD (Customer ICT Services, Information & Communication Technology, ICT Service Desk, for professional products)

GL61 SOG:
COP CRO CHC (Customer Operations, Customer Remote Operations, Customer Help Center, dealing with mass products) and CIS ICT ISD (Customer ICT Services, Information & Communication Technology, ICT Service Desk)

GL62 w ages:
COP CRO CHC (Customer Operations, Customer Remote Operations, Customer Help Center, dealing with mass products) and CIS ICT ISD (Customer ICT Services, Information & Communication Technology, ICT Service Desk)

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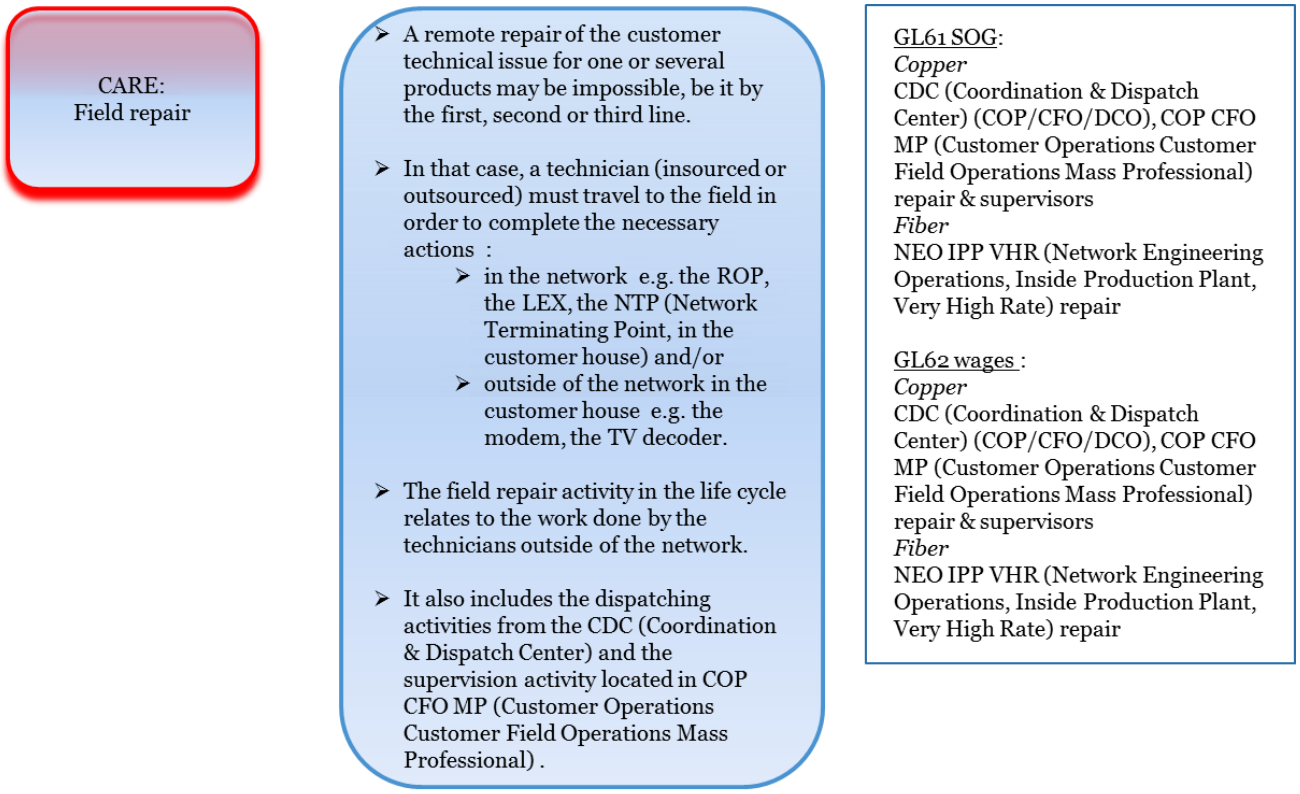

The LIFE_CYCLE Module aims to determine the Retail unit costs.
To that end, the 2014 model uses the activities' volumes to allocate them to the Markets.

5.1.4.2 *Modern Equivalent Opex (MEO)*

The MEO introduces a new way to determine VAR costs. Objective of the MEO is to only keep as VAR costs the incremental, effective costs needed to perform an activity, by comparing unit cost of Proximus insourced FTE with unit cost of Proximus outsourced FTE.

MEO concept application requires some basics, comparison basis must be reliable:

- activities (insourced and outsourced) must be of the same nature,
- same drivers must be available to compare both costs.

COP outsources part of its VAR Retail activities: remote repair (by the CHC technical call center), field installation and field repair. These activities are also performed with Proximus insourced FTE, as described above.

The COP CHC technical center second line may not come into consideration for MEO : tasks differ from the first line ones and can not be measured the same way. However, tasks of outsourcees for both field installation and repair do not differ and can be measured the same way, as well as tasks of outsourcees for the COP CHC technical center first line.

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MEO is thus valuably applied to the CHC technical call center first line, the field installation & the field repair.

Front officers (the first line of the CHC technical call center for remote repair) :
- use the same Proximus IT tools & volumes and minutes of calls are registered the same way.
- perform the same tasks: receive phone calls of clients and try to remotely repair the products.

Technicians (for both field installation and repair) :
- use the same Proximus IT tools & volumes and DU are registered the same way.
- perform the same tasks: install and repair products/services of customers on the field.

Unit cost/minute of the Outsourced Front office is applied to volumes of minutes of the Insourced Front office, to determine the MEO technical Front office VAR costs, other part of cost is considered as a Fix cost.

Unit cost/DU (measure of time) of the Outsourced Technicians is applied to volumes of DU of the Insourced Technicians, to determine the MEO Technicians VAR costs, other part of cost is considered as a Fix cost.

5.2 Allocation of SDE OPEX costs not going through the "SDE" INCA module

5.2.1 GL61 accounts – Services and Other Goods (SOG)

The GL accounts in the 61 range mainly register outsourcing, consultancy, renting & maintenance costs as well as miscellaneous costs driven by staff (GSM, memberships, office material, internal events etc.).

The GL61 accounts are at a sufficient detail level to allow for a direct allocation to one of the cost objects of the allocation flow. The destination cost objects are distributed over different allocation modules:

GL 61 Input Cost Cost Center-GL Account	Manpower related GL	CCG_HMC
	Building related , maintenance, consultancy, Outsourcing - GL's	CP1
	Cable infrastructure GL	CP2
	Office Automation GLs	IT_Hardware&Maintenance
	maintenance Fleet Gl's	ORGANISATIONAL_GROUP
	Consultancy GL	SDE
	technology Specific GL	AC2
		EUS
		NE

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5.2.2 GL60 accounts – Material Out of Stock

The GL60 account costs cover the cost of all kinds of material taken out of the stocks of Proximus and used for the repair and provisioning of network or the cost of small items (office material, GSM,…) consumed by the staff in the context of their daily activities.

Note that movements from stock also occur for the construction of the network; these costs are capitalized. From SAP-MM, it is possible to filter out the movements to be capitalized and the others. The capitalized MOS costs are implicitly treated with the assets.

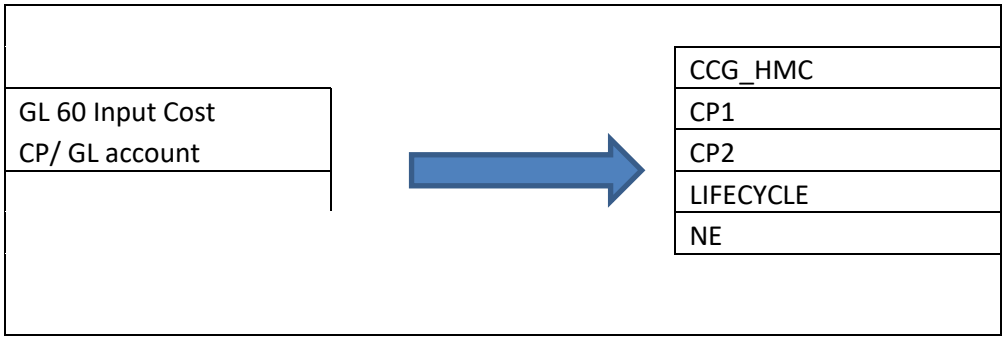
MOS costs are reported at CP/ GL account level per cost center.

This level doesn't always allow an accurate attribution of the costs to the model cost objects and therefore an analysis is performed at the cost base level together with detailed information out of the SAP database .

- The SAP records are reported among other detailed information such as the Material Item Number, where the amounts can be directly attributed to a cost object of the cost model based on the description of the material item.

  The SAP database contains more than 600.000 records.

This analysis results in an allocation towards: network related cost pools (CP2, NE, SDE), manpower related cost pools CCG_HMC and Lifecycle cost .



Once each material item is attributed to a cost object, it is easy to report an allocation from the CC/GL account aggregate to the model cost objects.

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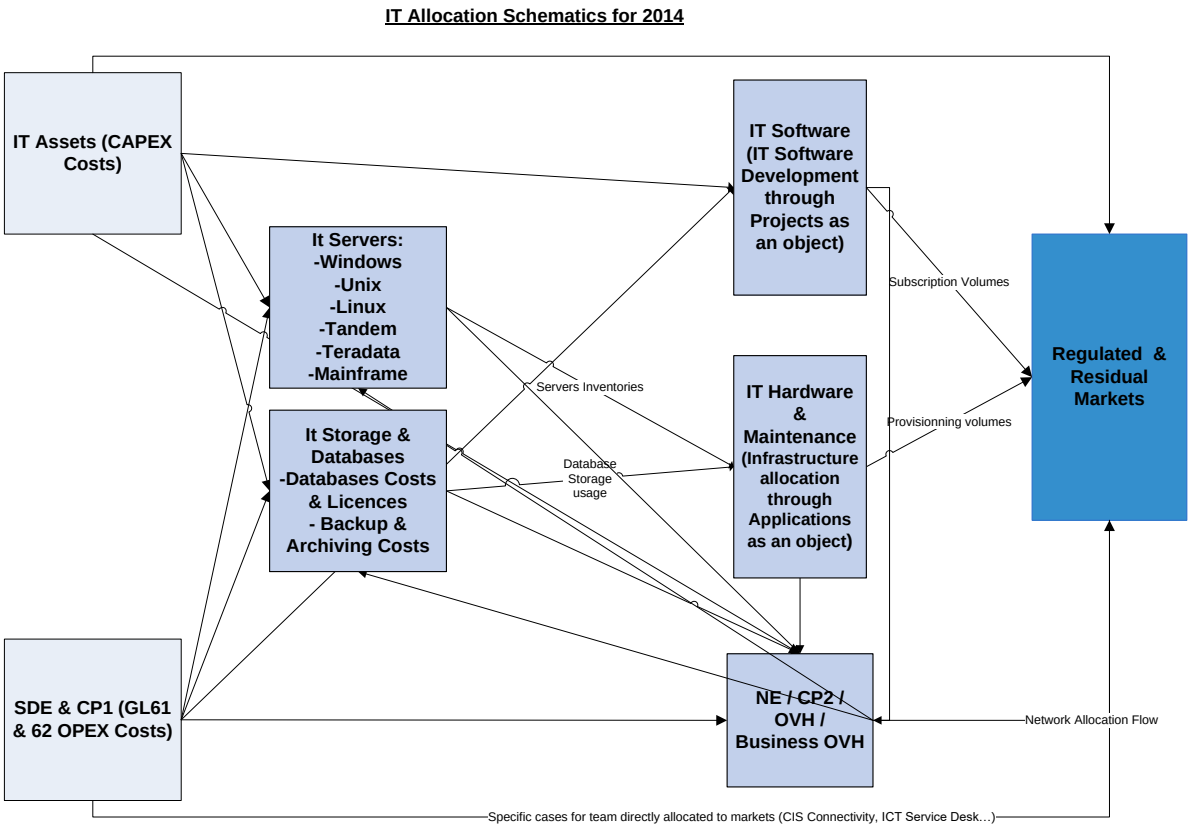
6 IT stream

6.1 IT Allocation flow

6.1.1 IT allocation flow: Introduction

The IT model can be summarized by the following drawing representing the different IT Modules as defined in the IT model, as well as describing objects contained in each of them. The creation of these modules and objects will be detailed in the following paragraphs as well as how they are allocated to each market through an allocation which uses causal and generic keys created with data available in different inventories or reporting systems within the company.

ICT is the use of programs with a specific infrastructure to deliver a requested service or product to the end-user (which can be a Proximus Client or a Proximus Employee/Contractors). In Telecommunications, an incumbent ISP will rarely develop an Application or invest in a project exclusively for one regulated product or market. Most of the time, its specifications will cover multiple usages. Therefore, the goal of this model is to regroup all capitalized and operational costs within clusters of applications or projects that have been defined so that a link can easily be made to the network allocation flow or the regulated/residual markets



Reporting systems and inventories either report to an application and its component or to a project. All this IT information coming both from REG and internal sources allow the creation of an allocation towards the markets. The same approach was followed for the allocation of IT software

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developments through the attribution of projects to the markets. The allocation stream goal is to link the costs of manpower and infrastructure that are used in order to create, run and maintain applications, components and projects to the markets defined in the regulatory model.

These costs can be of two different types: capitalized and therefore depreciated following accounting rules (for IT, depreciation length is mostly 4 or 5 years), or operational and fully charged for the current year. Depending of the cost's nature, the allocation stream will follow different paths (IT, IT&NW and overhead) and use specific inventories and reporting systems in order to create the optimal allocation keys.

6.1.2 Data sources: IT Inventories and Reporting Systems:

Infrastructure and Hardware Inventory:

The hardware layer of the IT Infrastructure within Proximus is composed of a server park, a storage facility and an intranet required for interconnection. For Servers allocation, two inventories were used to populate the park and gain depth in their use. WMC[5] and Sun:bc for UNIX are databases maintained by IT Engineering. Regarding Storage, the weight of databases from different technologies is used as the allocation driver.

Internal IT Databases:

The main database used in the model is the "Configuration Management Database" (CMDB) which populates and links together all IT related objects in Proximus, such as which databases are used by an application, or what is hosted on a server. This is used primarily for incident management.

IT Asset Manager (ITAM) is the inventory for all IT equipments with a reference to its cost and is used by Finance to calculate yearly the costs for IT hardware Assets.

ARIS is a recent initiative to install a business process modeling tool which allows the aggregation of applications and to understand fully their purposes.

Reporting Systems:

Rapid[6] is a tool used for projects, budget and capacity management related processes, with interfaces to other core systems such as SAP HR (human resource & organization units data) , SAP Finance (actuals, purchase order..), IMD (release Management) and timesheets applications (used by SDE to report their day-to-day work). Rapid will be used to calculate allocation keys for most manpower costs for SDE regarding both Capex (allocation of Assets ranging from 2526 to 2573) and Opex. 2523, which are proximus historical assets, will be allocated using a direct allocation key as their sub-asset provides enough information. The 2547 Assets, which represent the investments for new IT platforms will now use an allocation key based on the 5 year CAPEX cumulated costs in the same way as other software related assets.

[5] Windows Management Console

[6] **R**epository for the **A**dministration of **P**rojects and **I**nitiatives in a **D**ecentralized way

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Regarding maintenance and contractors, the data is no longer maintained by the vendor management team. Rapid is therefore used for both these allocations.

TM1 is an interface from excel to SAP allowing the extraction of Data coming from Finance and HR. It completes our asset reconstruction for the non-workload costs.

6.1.3 Modules and Objects composing the IT allocation flow

IT Servers

A server is a set of hardware running as a service to serve the needs or requests of others programs or users. The followed approach is to split the servers into families based on their technology as firstly, it matches the operational organization within Proximus, helping in coherence and giving the opportunity to have for each family an expert available to help, backed up by dedicated inventories for windows, linux and unix. Secondly, families follow a logical flow of cost allocation. Windows machines can be split in two categories (physical and Virtualized) to which we apply a weight based on their occurences within the inventories in order to give more consistency to the data used for the allocation keys created. Linux and unix follow the same rules. Finally Teradata, Tandem and Mainframes machines will be directly allocated to the applications that use these special technologies.

Splitting the server asset between these families was achieved by using the cumulated purchase costs of these families which is provided by Finance. This calculation is made possible by the inventory maintained in ITAM.

a) Windows family

Windows is split between two categories: Physical and Virtualized servers. Virtualization machines use a software layer to emulate more (virtual) servers with the possibility of using different operating systems or environments, helping to rationalize resources (by allowing more redundancy, saving space etc.).

b) Linux Family

Historically, Linux mostly supports applications and processes related to the residual market.

c) UNIX Family

The Unix Allocation follows the same method as the Windows family.

d) Teradata and Tandem Families:

Teradata are servers specifically used by the Data Warehouse and will be directly allocated to the corresponding object (DWH).

Tandem machines are non-stop servers for the Customer Billing application and will be directly allocated to its corresponding cluster (COB).

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e) Mainframes family

Mainframes are used by a small group of specific applications and will be allocated according to an IMA key based on the number of users for each application using directly mainframe resources.

Storage

In order to allocate costs from databases to applications, we used a report from each database family operational team (Oracle, SQL, Teradata and IDMS) to map databases with applications and to create allocation keys based on the total size of the databases used by each application.

IT Hardware & Maintenance:

The Hardware & Maintenance module summarizes all costs related to the hardware infrastructure as well as specific maintenance. All applications that receive any cost from servers and storage are found in this module. There are 3 specific cases which are detailed by the following:

a) Connect IT:

Connect IT is the Intranet used by the IT infrastructure in order to inter-connect the different objects it uses to deliver a service. The allocation will be based on a post-process generic key defined by the CAPEX Software investments for the last 5 years and OPEX from 2014.

b) Application Interaction Platform:

The Application Interaction Platform object is defined as the software layer required to inter-connect Proximus's complex IT infrastructure. Websphere and middleware costs compose most of this object. Websphere Application Server (WAS) sets up, operates and integrates electronic business applications across multiple computing platforms allowing real-time application integration, event-driven processing and process automation. A middleware is a software component that provides interoperability in order to support and simplify complex distributed applications. It is an intermediary layer between application software working on different environments or operating systems. This object receives mostly costs from either middleware or websphere licenses, upgrades and the infrastructure costs it uses (mainly storage and servers). The same generic key as Connect IT is used to allocate application interaction platform.

c) IT Overhead

The overhead object is a pool of costs that manages the Proximus's IT Infrastructure. It is internalized in the IT model by the use of a generic key based on the IT_Software module allocation on OPEX costs from BA 50

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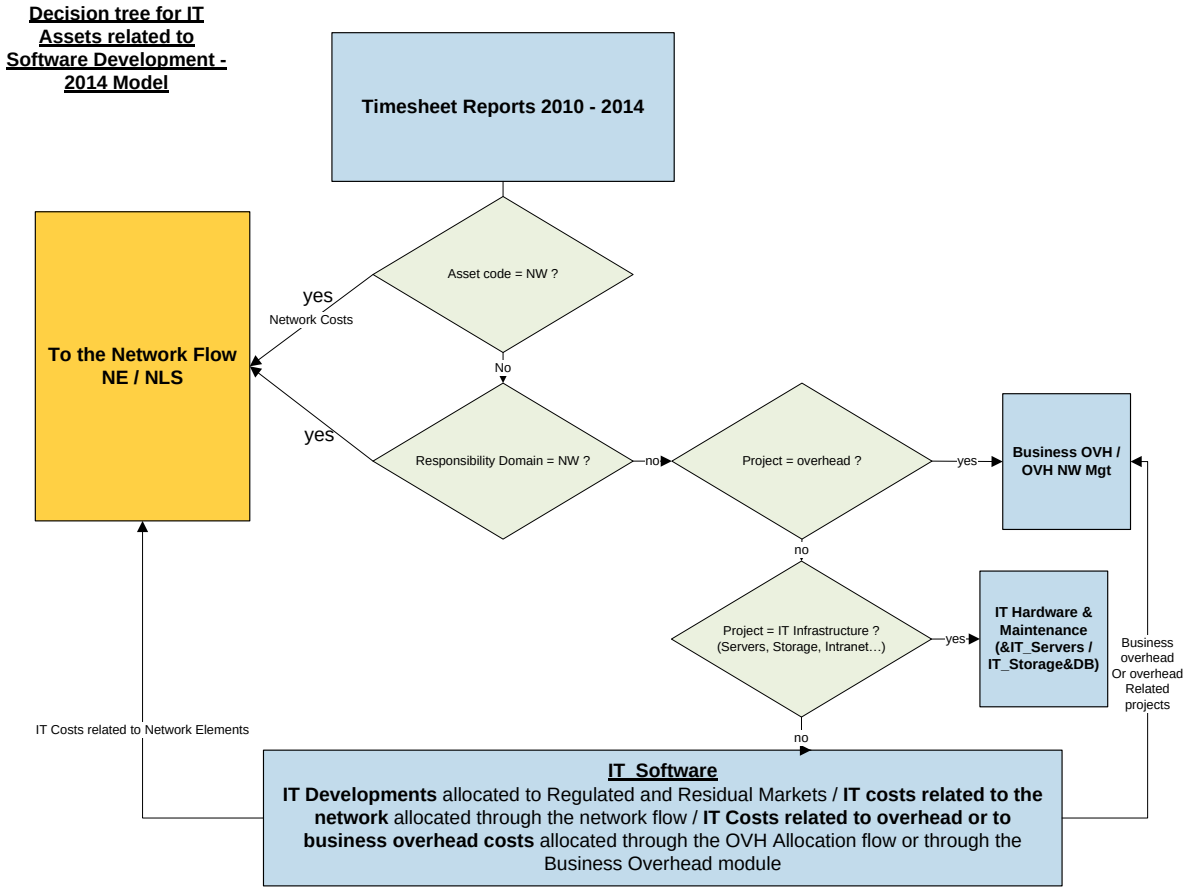
IT Software:



The IT Software module summarizes all the IT CAPEX costs from the last 5 years and the OPEX costs from 2014. It pools all software development costs and excludes pure network costs, which will follow the network allocation stream.

In order to give more consistency to the allocation, we regrouped some projects into two different clusters that will follow a particular generic allocation:

a) Non development projects:

Non development projects relate to existing support projects in which employees or contractors book their activities when they are not involved in an IT project development. It represents mainly support projects which exist due to investments projects. It is allocated by a generic key based on the IT Software module CAPEX costs from the IT Assets only and the OPEX costs from BA 50.

b) SW Application Interaction Platform

This object is the same as the one in IT Hardware & Maintenance but for software development instead of IT infrastructure.

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Allocation Process for IT Assets and Operational Costs:

IT Assets allocation:

- **2500 Servers (Inclus. Tandem)**

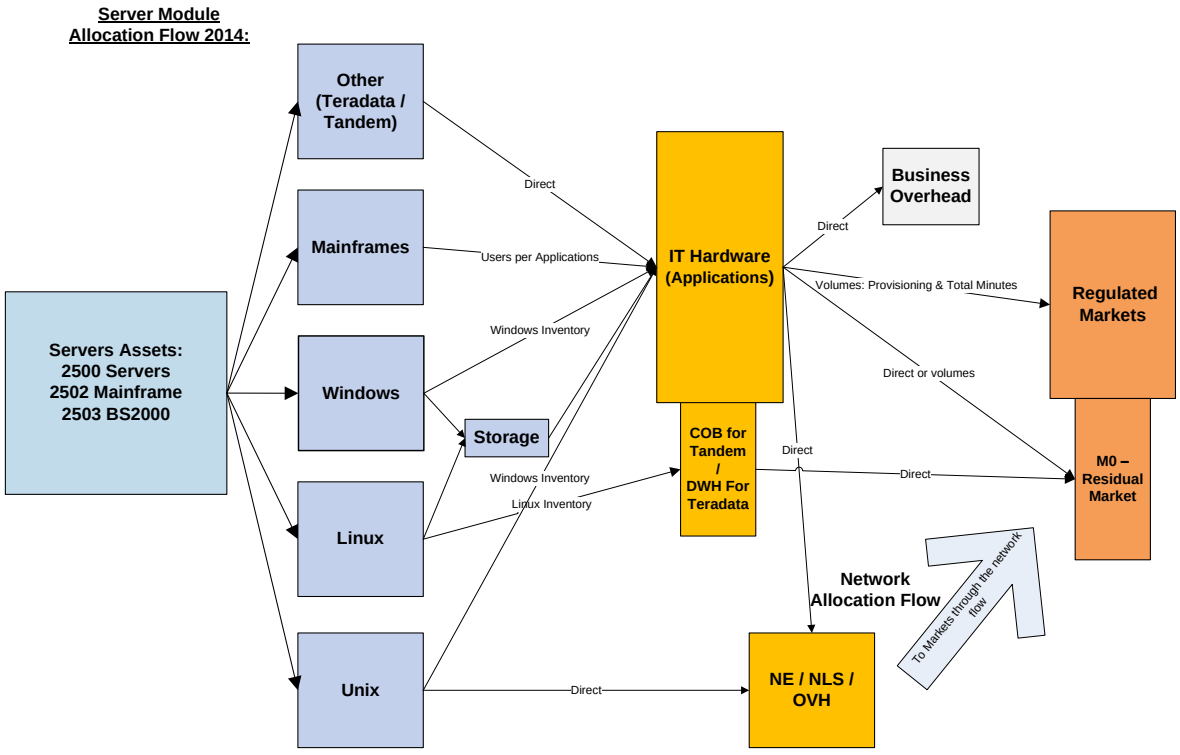
Servers can be used by applications (software sold by a vendor or developed in-house) and databases or for interconnectivity and security. This asset pools most of servers families used within the company such as Windows, Linux, UNIX, Teradata and Tandem technologies. Accounting distinguishes the following families: Wintel (Windows for Telecommunication), UNIX (with Linux pooled in this family), Teradata and Tandem. Keys are created from Finance split in order to allocate costs to each family, which will be treated distinctively, following a specified allocation path depending on the technology.

Linux, Windows and UNIX are allocated through a careful analysis of their respective inventories.

Tandem and Teradata are both allocated directly to their corresponding application: Customer Oriented Billing (COB) for Tandem and Data warehouse for Teradata (DWH). By definition, they will directly contribute to the Residual market as well.

Mainframes costs are distributed between the 7 applications that use this technology (ABD-FH, ABD-NFH, ABR, AGS, ASR, ITC and ITR) by a key based on the number of users per application.

Finally, UNIX costs are allocated to other IT objects by using the same approach as the windows allocation.



- **2501 Storage:**

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Storage is used both as a core business as well as a support for employees and customers. It is required in order to run applications and databases, create backup and archives to save an employee's work or a customer's information (regarding billing or call details records for instance).

- **2502 Mainframe BS2000 HW & 2503 BS2000 Software:**

Mainframes are powerful computing platforms used for critical applications. They can be considered as multiple servers within one machine. Sensitive applications and data that require heavy computing power are hosted on them. It requires specific software to run which costs are pooled in the 2503 BS2000 Software asset. The mainframe park has been updated to the Z-Series designed by IBM.

- **2504 IT Internal Network**

IT Internal Network is an asset representing Proximus Intranet, required to support the needs of employees as well as the interconnection needed in order for the different IT objects to communicate.

- **2505 Office Automation**

Office Automation pools IT costs and improves productivity such as development environment, printing servers etc.

- **2506 End user IT Device**

Concerns IT material made available to Proximus employees such as laptops and desktops. It is an office automation cost.

- **2520 System Software:**

System Software are specific costs that can neither be linked to a specific development project, neither to infrastructure components. These costs are pooled within generic named objects that relate to database, operating systems or middleware upgrades. In order to create allocation keys, an extract from SAP: Asset accounting is used.

- **2523 Major Software Application:**

This is a specific asset that pools applicative mobile costs. It contains IT sub-assets as well as some network-related ones due to historical reasons. Each element can be identified in terms of type (IT / Network) and costs (distribution per sub-asset). This gives enough information to link these sub-assets directly to an object in the cost model. The following table represents this asset allocation:

Module destination	Object Destination
CP2	CP_Mobile_Backbone
IT_HARDWARE&MAINTENANCE	IT_Office_Automation
IT_SERVERS	IT_Servers_Linux
	IT_Servers_TANDEM

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	IT_Servers_TERADATA
	IT_Servers_Unix
	IT_Servers_Windows
IT_SOFTWARE	Mobile_Business_Software_development (AC2523)
	SW_Application_Interaction_Platform
IT_STORAGE&DB	IT_Storage&DB
MARKET_DEF	Market 0 - Residual Market
	Market 7 - Wholesale Mobile Termination
NE	NE_MobileDataSwitching
	NE_MobileIntelligentNetwork
	NE_MobileVoiceSwitching
	NE_RAN

*Mobile Business Software Development regroups mobile sub-assets linked with the residual market. As they relate to specific software development, allocating them to the IT_Software module gives more coherence to the model in order to regroup all IT development costs in the same module. This object will later on be allocated to the Residual Market.

- **2525 Application Software Other:**

"Application Software Other" is an asset for all Capex licenses costs that are not pooled in another IT asset (licenses costs for minor applications for instance). It is heavily related to applications and office automation as it is composed of licenses for antivirus, to a software package sold by an external vendor and used by an in-house core application such as our Order Management System (OMS) or statistical and databases manager for our data warehouse department. In order to allocate this key efficiently, the number of logical machines (physical and virtual) from each server related family was used as a means to ventilate these costs through the server allocation flow.

All following assets are related to specific software development and will follow a specific allocation in order to pool all costs to the IT Software module. The key consists of a 5 year CAPEX study of the cumulative investments per project for each asset. Explicit projects are copied in the IT Software module with their full name while non-explicit projects are pooled within dedicated objects such as: "non-development project" and "SW Application Interaction Platform".

In order to bring more consistency to the IT Software module constitution and allocation, a visual basic script was written to automate a part of the process consisting in pre-regrouping similar IT Software development and non-development costs instead of duplicating them due to the project's name nature. It betters the model in terms of accuracy and lessens possible human errors as well.

- **2526 Applic SW IMA:**

All costs related to the **I**dentify **Ma**nagement (IMA) application are assigned to this asset. IMA is composed of 6 components (Core, Employee, Dealers, Customer, Module, and Management) that identify all Proximus users.

- **2529 Appl SW Middleware:**

Sensitivity: Unrestricted

Although named Middleware, this asset is composed of developed applications playing the role of a middleware inside Proximus IT infrastructure. It has to be distinguished from some costs objects in System Software and Application Software Other that also have middleware costs such as Websphere licenses. This asset pools IT domains from:

- A **B**usiness **P**rocess **M**odeler which delivers a process integration platform for enterprise services based on service-oriented architecture.
- A **S**ervice **O**riented **A**rchitecture layer.
- A **S**OA **S**ervices **R**epository to document and describe all SOA services.
- And a **H**ub **C**ontract **S**oftware used as a middleware connectivity tool.

- **2530 Applic. SW PILA:**

Pila Asset is a cluster of applications and components related to the **O**rder handling **M**anagement **S**ystem (OMS) with all its bridges with provisioning systems and a customer relationship management interface with BCI as well. OMS is one of the main contributors to this asset, as is the **N**etwork **P**rovisioning **S**ystem linking OMS with provisioning systems and the **O**rder **F**low **A**pplication (an interface between BCI and OMS).

- **2531 Applic. SW BCI:**

The Proximus Channel Integration (BCI) is a customer relationship management tool for all call-centers-enabling a real-time customer information input or output in order to improve the feedback a customer receives when calling Proximus helpdesks.

- **2532 RID(Reference Inventory&Design):**

RID is an asset related to inventories and documentation.

- **2533 Applic. SW WFMS**

The **W**ork **F**orce Capacity **M**anagement tools (WFM) asset pools all costs related to the automation of the dispatching on the field of all Proximus technicians including a scheduler and reporting system.

- **2534 Applic. SW UTS**

The **U**nified **T**rouble **T**icketing System (UTS) is a system used in order to register and follow-up trouble tickets pro-actively and reactively.

- **2535 Applic. SW Cust Relationship Management**

This asset is composed of two applications related to the selling process and are directly linked to CRM: **C**ustomer **S**ales **A**ssistant (CSA) and **C**ustomer **V**alue **M**anagement (CVM).

- **2536 Appl SW COB**

Sensitivity: Unrestricted

This asset pools costs from the **C**ustomer **O**riented **B**illing system (COB) is a cluster formed from three IT platforms: **C**ustomer **D**ata**B**ase (CDB) **I**ntercarrier **B**illing **I**nformation **S**ystem (IBIS) and the **C**all **D**etails **R**ecords **Flow** (CDRFLOW). Billing data is a sensitive matter for both customers and Proximus and requires real-time redundancy. Therefore, COB applications are hosted on dedicated technology: Tandem servers also called "Non-stop servers". The CDB Application is retail related, IBIS wholesale related and CDRFLOW applies to both.

- **2537 Appl SW SAP**

The SAP Asset pools all costs coming from all modules used by Proximus. It is a typical business overhead costs.

- **2538 APPL SW-Number Portability**

Number Portability is composed of two main applications called **F**ixed **N**umber **P**ortability (FNP) and **C**arrier **P**re-**S**election (CPS). CPS is an important system as it is an interface with OLO's requirements to deliver their services.

- **2539 Applic. SW ECA/ECM/VORTAL**

E-**C**hannel **A**pplications (ECA) and **E**-**C**ontent **M**anagement (ECM) are tools to manage and web-enable digital content for consumers (B2C) or enterprises (B2E). These are websites to engage customer relationship in order to conduct e-business via the Proximus websites.

- **2540 APPL SW – ROSY**

ROSY is a core component of the IT infrastructure as it is the runtime engine for SDH, XDSL and IDTV provisioning and repair.

- **2541 APPL SW – NETCAM**

NETCAM is a dedicated asset for Rosy's workflow engine for SDH (BPEL).

- **2542 Sales Handling Engine(SHE)**

The **S**ales **H**andling **E**ngine (SHE) is a sales application used as a layer in order to enable convergence between all selling applications so that our vendors and partners will have a global view on all products supplied by Proximus, improving order intake and rationalizing the IT selling infrastructure. Pre-Sales and Sales are activities in the fulfillment process being mostly allocated to the residual market.

2544 APPL SW -IT Security

IT Security asset pools heterogeneous costs that can be related to applications NFM (**N**ew **F**raud **M**anagement) and IMS (Identify and authentify for provisioning engine), buildings (physical security), to even Skynet Costs to protect user's privacy or overhead costs to protect the IT infrastructure from malicious harm (virus, pirate take-over…)

- **2545 SW Usability Lab**

Sensitivity: Unrestricted

This asset will follow the same allocation pattern as the 2509 HW Usability Lab and all costs will be sent to the business overhead object.

- **2547 Major software applications**

Major software applications are assets regrouping all new IT developments and applications since 2010. In 2014, the allocation method was changed to a 5 year CAPEX cumulated costs key as are other IT software assets.

In 2014, the "2547 Major Software Applications" regrouping all new IT platforms investments is now allocated by a 5 year CAPEX cumulated costs based on the data maintained in TM1. This changes the allocation from previous years where this asset was allocated by an analysis of each of its sub-asset involving the use of a direct allocate key, much like the 2523 allocation, instead of this causal approach used in the 2014 model.

- **2550 APPL SW ABC**

The **A**ccess **B**ackbone **C**onnectivity asset (ABC) is a core element of Proximus's infrastructure. SRW is an inventory for connectivity and equipment documentation and is used as an interface between IDMS and front-office applications such as OMS, WFM or COB/CDB. Three other core domains are also pooled in this asset: ABR[7] for the local loop connectivity and managing resources and services. ANA[8] (**A**utomated **N**umber **A**ssignment) supports service order provisioning of phone numbers through automation of the attribution of a phone number to a customer. Finally, ITR[9] (**I**nfrastructure **TR**ansmission) is the inventory of Proximus's backbone and optical network covering leased lines, physical equipment, trails, trunks, cables and the multiplexing hierarchy between all these elements. It should be noted that applications grouped in this asset use a special hardware in order to run properly as they are all linked to huge databases that require daily processing of data per batches. For the last years, BS2000 mainframes from Fujitsu were used but they were recently replaced by Z-Series from IBM[10].

- **2551 Operational Inventories**

Operational Inventories are applications used to maintain ATM, DSLAM, Ethernet and IP inventories and statistics.

- **2552 GraphDoc**

The Graphdoc asset pools all graphical documentation components which are tools used to create or modify the local loop network documentation. It allows an integration of the Autocad package which is a drawing software.

- **2561 APPL SW – NETCOOL**

[10] One IBM z10 Mainframe is supposedly 1500 times more powerful than regular x86 servers while consuming 85% less power (source IBM).

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Netcool is a software package sold by IBM and developed internally to suit Proximus needs. It is a set of alarms and probes used for monitoring to ensure both a pro-active and reactive service assurance process. It is divided in two main domains: **N**et**c**ool **T**ransmission (NCT) and **N**et**c**ool **D**ata (NCD).

- **2562 APPL SW - e-Health**

E-health is a reporting tool for bilan and is composed of e-health (A-EHT), Provisioning (A-PRO) which is an interface between e-health and umbrella/CMS and oblicore service layer (A-SLR).

- **2563 APPL SW-Customer Remote Support**

Applications used by the helpdesks or customers through the Proximus portal.

- **2566 APPL SW-DIAMON&CORRELATOR**

The diamond (DIA) and Correlator (CRL) asset regroups those two IT domains that enable the monitoring of network alarms. It also creates tickets to respond efficiently to problems.

- **2567 APPL SW – DARE**

DARE stands for **D**iagnose **A**nalyze **R**epair **E**ngine and is the main tool to analyze alarms and probes reports. It diagnoses problems through a root analysis, classifies incident by priority and forwards them to responsible persons for problem resolution.

- **2568 APPL SW-Learning & Mngt Syst.**

The learning management system asset is essentially a component of SAP HR (or SAP LMS for **L**earning **M**anagement **S**ystem).

- **2569 APPL SW-ECRM**

The E-CRM asset contains one application named **G**roup **C**ontent **M**anagement (GCM) which is a platform for contract, records and business process management.

- **2570 APPL SW Business Intelligence Tool**

All costs from the Microstrategy software are sent to the Business Intelligence Tool asset as the main software used by our business intelligence department (which is the Data Warehouse: DWH). It is heavily related to data warehouse and will be grouped with it so that the tools they use are represented in the total cost of the data warehouse. Business Intelligence costs are mainly allocated to the residual market.

- **2571 APPL SW ONE-Catalog**

The **Proximus P**roduct **C**atalog (BPC) is an application that stores advice and information about all products and services. It is heavily used by Proximus Sales divisions and as a service assurance tool for customer care.

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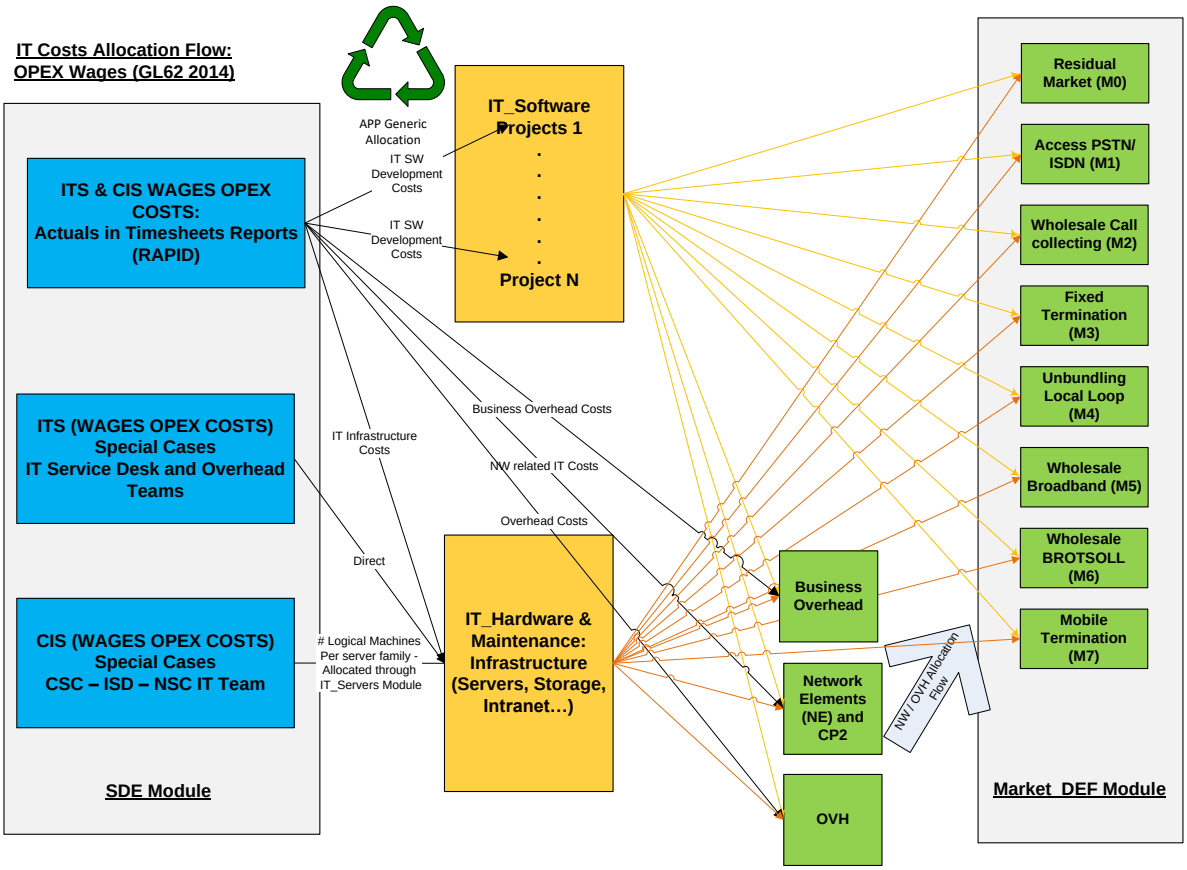
- **2573 Appl SW DWH**

The data warehouse department has heavy requirements in terms of hardware and software as it calculates statistics and indicators for Proximus products and network. Data warehouse uses a special hardware from the Teradata technology that helps with the treatment of large data volumes with the possibility for many users to analyze them.

All Assets from 2526 to 2599 are Software assets and will be allocated through a project analysis from a scope of costs going over the last 5 years. All costs distributed between these projects were linked to a specific object from the modules following IT Software in the model allocation flow.

Operational Costs:



There are 4 sources of IT opex costs:

A) Maintenance related:

Maintenance costs are regrouped into 2 different cost pools (61120 and 61130) to which we apply allocations keys to distribute these costs towards servers, applications within the Hardware&Maintenance module, storage, servers CP2 and NEs.

B) OPEX Wages internal

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Internal wages for IT OPEX costs were allocated by the use of the RAPID database. A report by cost centers giving a detailed output of OPEX projects was linked to the cost centers groups from the cost base allowing an allocation from all IT teams to the objects from the IT Software module.

C) OPEX Contractors Fixed Priced:

RAPID makes the distinction between employees and contractors and also between the different contractors types (fixed price, body shopping etc.). This precision allows us to create specific keys for contractors the same way as it was done for internal employees, by allocating their costs to the different projects they contributed in 2014 via the RAPID tool.

D) OPEX Contractors Bodyshopping

The same principle was applied for bodyshopping costs allocation as for the fixed price ones. In 2014, bodyshoppers and fixed prices contractors were regrouped into one object to eliminate the redundancy of this allocation.

The following drawing recaps the IT cost allocation for OPEX wages:

In 2014, this cost object was pooled with the contractors fixed price within the same object to facilitate the allocation and avoid duplicating allocation keys for the same cost types.

Wages OPEX Costs are allocated using RAPID as a tool for the creation of allocation keys for each cost center within ITS and CIS. Reports are designed in order to regroup OPEX costs on the 2014 projects in the IT_Software module. Regarding the CIS IT teams, a special allocation was made as some of these teams are focused on supporting IT development, therefore reporting most of their resources on support projects that are by definition hard to allocate to specific markets. Maintenance Costs is the other main source of IT operational costs and can be related to server's or storage maintenance or to IT Development in case of applications bought off the shelf. The maintenance cost allocation can be represented by the following diagram:

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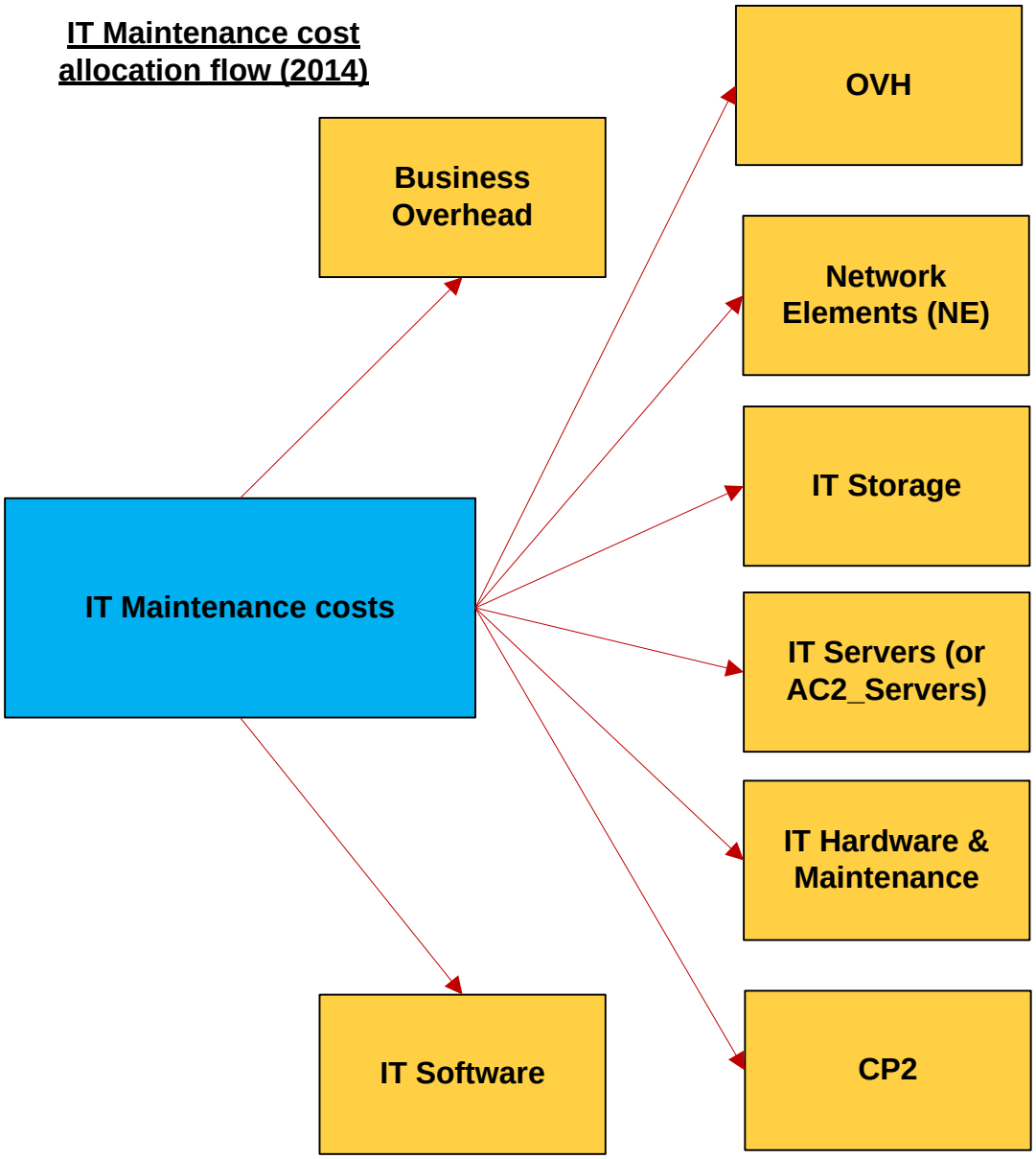

6.1.4 Applications to Markets

a) IT Applications

The IT applicative layer is composed of applications or software being used by either an end-user (such as an employee or a customer) or by a service (such as an inventory or a billing system). There are more than 1000 applications that have been bought off a vendor and adapted to suit the company's needs or developed internally by Proximus IT developers. Over the years, these applications have been updated, replaced, renamed or out phased.

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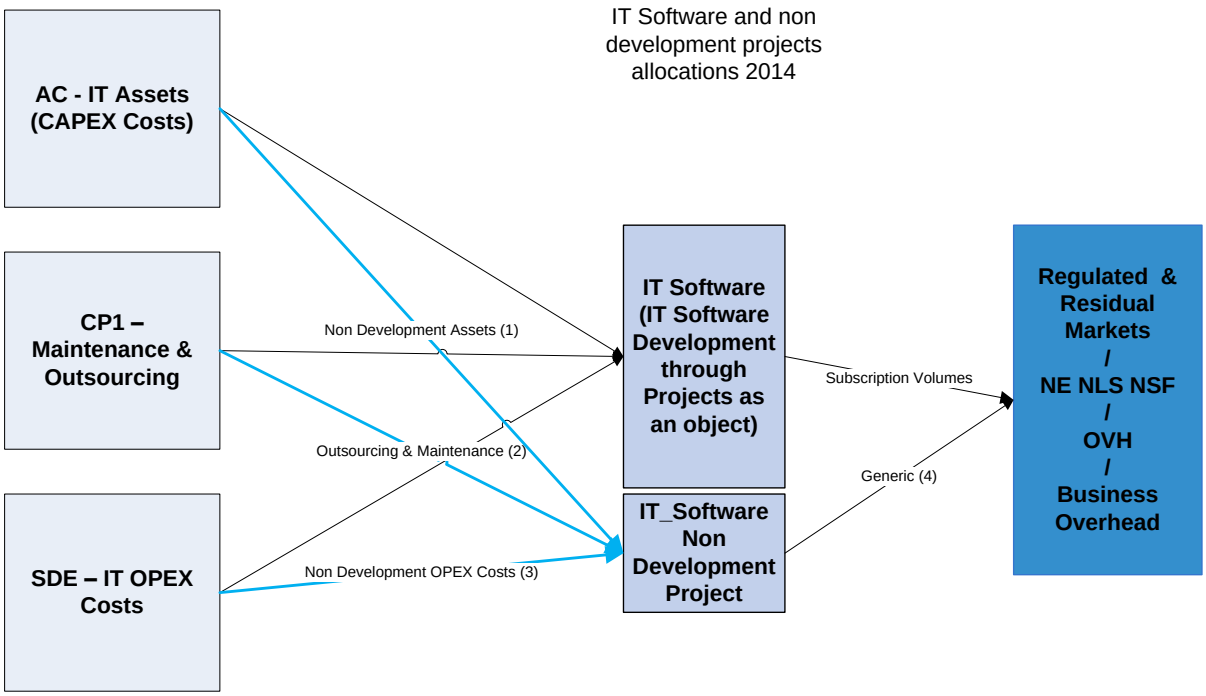
b) **Markets**

Through a careful analysis of each application and project, a mapping table was defined in order to create a link between applications and the impacted markets. Most of them relate to the Residual Market, others were directly developed in order to support a specific market resulting in a direct allocation towards this market. But in cases where an application was developed for a group of markets, an allocation key is needed to distribute the costs of these applications. Being an application underlying hardware costs, the driver used is a proxy of the transactions processed by these applications, namely the provisioning volumes.

6.1.5 Projects to Markets

In the same way as for the applications, the whole project we took into our scope of analysis was linked to markets as well. Based on the projects name, we are able to categorize them between development and non-development projects. For non-development projects, a special object was created projects, to regroup them: the non-development project object which will follow a generic allocation based on the IT Assets and BA50 Wages allocations.



The non development Project Object is the daily IT operational activities and maintenance that are pooled together in order to be allocated through the analysis of today's and past's IT investments and evaluated by the IT assets depreciation from the last 5 years and the opex costs from 2014

The calculation is programmed in INCA and done by the coding engine

For development projects, a careful study of each of them allowed the creation of a mapping table between all projects defined and the markets. The non-regulated products (of the residual market)

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receive a high amount of the majority of the development project costs. However a non-negligible amount of development projects introduce features and enhancements from which regulated products also benefit. For instance, a project investing in an xDSL capacity upgrade enhances retail products as well as regulated products. For such projects, an allocation key is needed to distribute the costs. Being software development costs, the driver used is the subscription volumes (except for software contributing to traffic products where usage minutes are used). Allocation to Markets of IT costs that are common to several Markets

In order to allocate all IT costs regrouped in the Hardware&Maintenance and in the Software modules, three different drivers were taken into account: the provisioning volumes for hardware allocation, the subscription ones for software and the total number of minutes consumed for projects and applications related to the voice markets.

Calculating these volumes is quite straightforward for the regulated markets. For the residual market only the volumes of corresponding services are taken into account. With access regulated markets, access retail products of the residual market are considered. With fix traffic regulated markets, only fix retail traffic volumes are considered.

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7 Network stream

The network allocation stream is organized around the network investment structure (leading to network functional blocks in the allocation stream). The focus is on Capital Expenditure costs which are directly associated with the network equipment deployed ; these costs originate from the assets accounting system of Proximus and they are gradually cascaded by means of a variety of cost deaggregation keys and a variety of cost drivers up to the telecommunication services. By contrast, the SRW stream focuses on the operating expenditures of the business activities, which are directly allocated to end- markets by means of business drivers.

For the operating costs of the network itself however, an intermediate allocation approach is used : the remuneration costs and the personnel related OPEX costs are associated to typical network activities (as described in Chapter 5) which are finally attributed to network functional blocks . This part is discussed in section 7.3 hereafter .

7.1 A layered allocation model

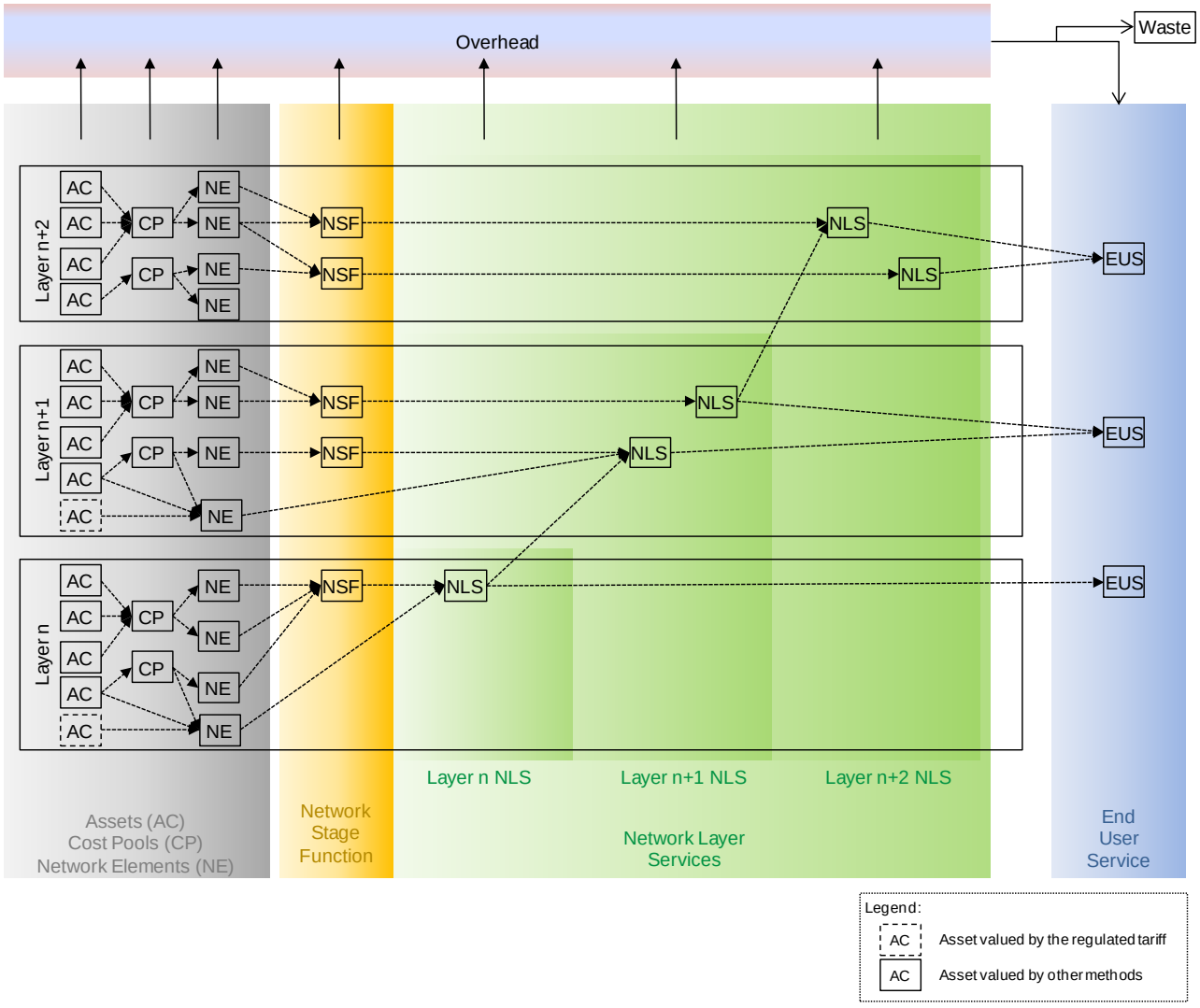

Figure 8: Layered allocation model

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It is common practice in the telecommunication industry to separate investments in different logical levels , lower levels corresponding to basic (simple and general purpose) services, higher levels corresponding to complex higher valued and purpose oriented services. The pursued effect of such separation is to promote the reuse of basic lower level services by higher level services thereby bringing in the short term the volumes at each layer to levels that benefit from economies of scale. In the long term, the pursued effect is to benefit also from economies of scope.

The network cost allocation model is designed to reflect the layered functional structure of Proximus's telecommunication infrastructure , each layer offering services to the upper layers. In practice , 5 layer levels are represented in the cost allocation model in order to allow each invested technology to be situated at the right level of its contribution in implementing the layer services.

In practice , a network equipment may participate to several different layers especially in the interfacing boards towards other network equipment because it acts as a terminating point of lower level layer services.

To avoid any ambiguity , a network equipment will be considered as belonging to the highest layer implemented in it and operated by it . For the example of the IP router , this simple criterium locates an IP router on the third layer (IP layer) above SDH.

Using this criterium all investments still in service of Proximus's infrastructure are distributed in one of the following layers:

Layer NLS1.0 : Passive infrastructure gathering investments in access copper, in ducts and fibre cables (access and backbone).

Layer NLS2.0 : Active transmission infrastructure based on Time Division Multiplexing technology gathering investments in PDH, SDH.

Layer NLS2.1 : Active data infrastructure based on Packet Based technology gathering investments in Ethernet/MPLS.

Layer NLS2.2 : Mobile backhauling infrastructure

Layer NLS3 : Active data infrastructure based on IP technology gathering IP routers , IPVPN routers.

Layer NLS4.0 : Active application infrastructure based on a variety of technologies gathering applicative equipment like telephony digital switches, VoIP platforms, Intelligent Network platforms, Broadcast TV platforms, Video on Demand platforms.

In the model layers are represented by a number of "standard" services (referred to in the sequel as Network Layer Services – NLS) offered to upper layers or directly used as retail/wholesale products (End User Services – EUS) . In turn the services offered by a layer are the result of the combination of layer specific functions (referred to as Network Stage functions – NSF)* and services offered by lower level layers allowing the layer specific functions to interact with each other.

*Note: Except the following Network Elements that receive assets cost valuated by the regulated tariff. Those Network Elements include network stage functionality and directly offer services of the same level as their's or upper layer services. The driver used is "yearly direct CAPEX cost". The driver "yearly direct CAPEX cost" is in fact a by-product of the valuation exercise done for the assets valued by the regulated BIPT tariff.

For the asset valuation exercise a full integration of all the asset valuation components of the relevant technology was necessary (see paragraph 3.5.2.6.4), but in the case of the calculation of this driver the required aggregation degree is determined by the allocation key to be calculated.

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The inventories used as input for the asset valuation contain many details allowing the grouping of the costs components based on any combination of such aspects.

Therefore, the driver "yearly direct CAPEX cost" refers to the sum of all the relevant technology valuation components from the appropriate models that meet the allocation requirements (for example, usage of the link or bandwidth or bandwidth and service span or concerned network layer…).

Due to the method used for the valuation of the SDH, the "yearly direct CAPEX cost" allocation driver for the NE_PDH SDH equipment can't be calculated as referred above. Instead it is calculated as the incremental SDH cost of the service for which the allocation is being computed.

Incremental costs of one service are those costs that are avoided by not providing that service. See Figure 9 for an example specific to this context, where:

- the cost incurred by all the SDH services equals the SDH asset value, resulting from running the "consolidated transport BROTSoLL engine" (see paragraph 3.5.2.6.7Transport PDH/SDH valuation) with the full set of services carried over SDH
- the cost incurred by an SDH network carrying all the SDH services except service X is the outcome of the dimensioning and costing done by the "consolidated transport BROTSoLL engine" when having as input all the SDH services but service X.
- the SDH incremental cost for service X is calculated as the difference between the two above costs

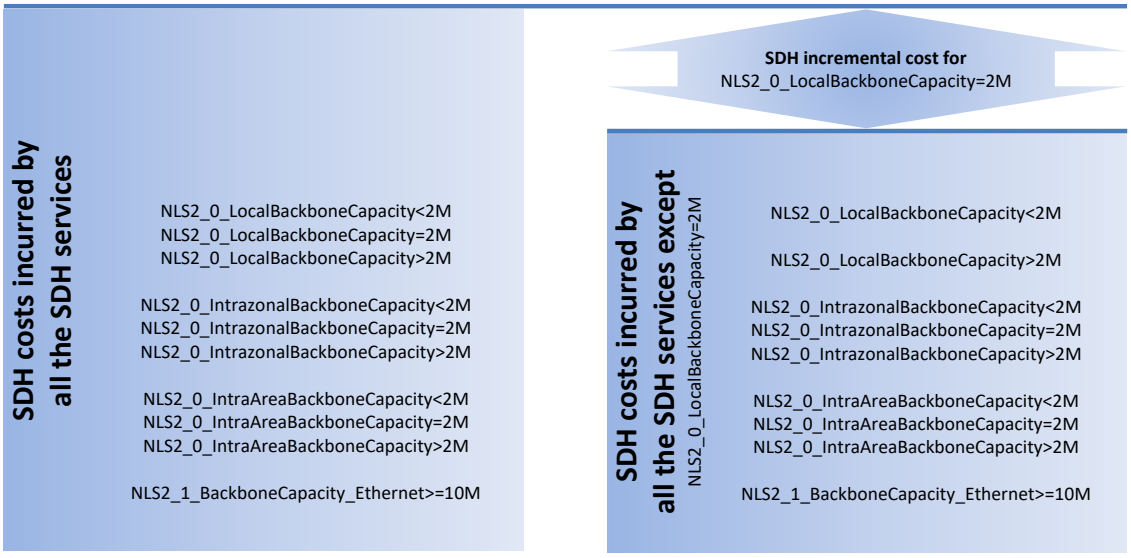

Figure 9: Incremental SDH costs calculation method, an example

NE receiving assets by the regulated tariff offered services

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NE_ADSL equipment	NLS2_1_ADSL_SDSL_Bitstream
NE_NGA Active equipment	NLS2_1_VDSL_Bitstream
NE_NGA Housing	NLS2_1_VDSL_Bitstream
NE_PDH SDH equipment	NLS2_1_LocalTailCapacity_Ethernet>=10M
	NLS2_1_BackboneCapacity_Ethernet>=10M
	NLS2_0_IntraAreaBackboneCapacity<2M
	NLS2_0_IntraAreaBackboneCapacity=2M
	NLS2_0_IntraAreaBackboneCapacity>2M
	NLS2_0_IntrazonalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity=2M
	NLS2_0_LocalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity>2M
	NLS2_0_LocalBackboneCapacity>2M
	NLS2_0_LocalBackboneCapacity=2M
	NLS2_0_LocalTail=2M
	NLS2_0_LocalTail<2M
	NLS2_0_LocalTail>2M
NE_Copper_Cables_Distribution	NLS1_0_Copper_Subloop
	NLS1_0_Raw_Copper
NE_Copper_Cables_Feeding	NLS1_0_Copper_Subloop_testing
	NLS1_0_Raw_Copper
NE_Copper_Blocks_and_Tie_Cables	NLS1_0_Continue_Raw_Copper
	NLS1_0_Copper_Localloop_testing
	NLS1_0_Copper_Subloop_testing
NE_Copper_Splitter	NLS1_0_Copper_Splitter

The use of BIPT mobile cost model enables to define network element cost attribution to the underlying network stage function per category of service : voice, data or SMS.

NE receiving assets by the mobile cost model	attribution
NE_RAN	NSF_Mobile RAN_Voice
	NSF_Mobile RAN_Data
	NSF_Mobile RAN_SMS
NE_GroundAntenna	NSF_Mobile RAN_Voice
	NSF_Mobile RAN_Data
	NSF_Mobile RAN_SMS
NE_MobileVoiceSwitching	NSF_Mobile_BackBone_Voice
	NSF_Mobile_BackBone_Data
	NSF_Mobile_BackBone_SMS
NE_MobileDataSwitching	NSF_Mobile_BackBone_Data
	NSF_Mobile_BackBone_SMS
NE_MobileLocationRegister	NSF_Mobile_BackBone_Voice
	NSF_Mobile_BackBone_SMS

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Layer n--layer n+1 cost allocation mechanism:

Each layer represented in the model produces the defined NLS services with a certain amount of volume (the service amount); this amount is "consumed" by the upper layer services and it is used as a driver to allocate the costs to the consumer services in the upper layers.

Layer cost allocation cascade:

The 5 defined layers are put one after another according to their level generating a cascade of cost allocation mechanism.

Each layer is discussed in a specific chapter of this documentation.

Establishing costs of the Network Stage Functions

The "network stage functions" (NSF) are the direct constituents of a layer, they are intermediate network building blocks providing well defined logical network functions specific to that layer (also called network functional units) . A Network Stage Function can be limited to a node or it can be a cluster (distributed function) corresponding to "network stages". A network stage function is characterized by the amount of function it produces (volume).

Network Stage Functions are implemented in equipment , but the corresponding investment values are not always directly identifiable in the asset structure of Proximus : for example some assets aggregate investments per technology (not per function in the network) , some other do not cover the totality of a given technology due to the history of the accounting asset structure in SAP (reorganization of assets, transfers between assets, closing of asset classes and opening of new ones) .

Different methods are used and combined to constitute the investment costs of Network Stage Functions :

1. Aggregation of assets in a larger asset or a cost pool in order to gather investments of same technology and align them with operational inventories.
2. Deaggregation of cost pools in network elements : this step decomposes cost pools into network elements; a network element corresponds to an entire physical equipment as deployed in the Proximus infrastructure. Operational inventories of pieces of equipment and component prices are used.
3. Direct allocation of assets or cost pools to network elements when the assets or cost pools are directly identifiable with a network element of the model.
4. Composition of the network elements to form a network stage function covering one of the stages.

The stepwise combination of these methods are discussed in the next section.

7.2 From Assets to Network Stage Functions.

Next table gives the list of the NSF present in the network allocation flow.

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Layer_name	NSF_name	NSF description
L1_PASSIVE	NSF_Backbone_FibreConnectivity_express	backbone fibre connectivity of express ring
	NSF_Backbone_FibreConnectivity_Regional&Core	backbone fibre connectivity of regional&Core rings
	NSF_FTTC_FibreConnectivity	fibre connectivity between the central office (LEX) and ROP
	NSF_FTTO_FibreConnectivity	fibre connectivity between the central office (LEX) and customer office
L3_IP	NSF_BroadBand_Public_IP_Collect	Access authentication , data traffic accounting, attribution of public IP address to broadband customers and collection of customer traffic towards public internet service providers
	NSF_BroadBand_VoD_IP_Collect	Access authentication , data traffic accounting, attribution of IP TV address to IP TV customers and collection of IP video customer traffic towards Video On Demand platforms
	NSF_BroadBand_VoIP_IP_Collect	Access authentication , data traffic accounting, attribution of Voice over IP address to VoIP customers and collection of Voice over IP customer traffic towards VoIP platforms
	NSF_Dedicated_Access_to_PrivateIP	connectivity between customer and Proximus IP-VPN network
	NSF_Homegateway	Broadband CPE like b-box
	NSF_IP_security	
	NSF_PrivateIPSwitching	IP-VPN switching
	NSF_PublicInternetSwitching	Public Internet Routing
	NSF_Mobile RAN_Data	Mobile Radio Access function destinated to all Mobile data products
	NSF_Mobile_BackBone-Data	Mobile backbone function destinated to all Mobile data products
	NSF_Mobile_PrepaidData_Services	Intelligent platform services related to prepaid mobile data
L4_IDTV	NSF_BroadcastTV	Broadcast digital television functionalities
	NSF_VoD	Video On Demand (VOD) functionalities and user quality of experience functionalities.
L4_M2M	NSF_Machine_to_Machine	Related to M2M applications, enabling customers to remotely manage their M2M devices in the cloud or gather business data from the devices and to integrate and link it with business softwares.
L4_VOICE	NSF_Automated_call_distribution	intelligent distribution of calls towards call center
	NSF_Advanced_Number_Translation_CallHandling	Voice Value Added network function
	NSF_CallerIdentity_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_InteractiveVoiceResponse_CallHandling	Voice Value Added network function
	NSF_InternetDialUp_CallHandling	
	NSF_ISDN_NetworkTermination	Functionalities related to the ISDN network termination equipment
	NSF_ISDN_Primary_Access	Access for PRA

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	NSF_ISDN_Voice_concentrator	Aggregation of ISDN voice calls towards backbone circuit switching
	NSF_MessageWaitingIndicator_Inserting	Voice Value Added network function destinated to residential customers
	NSF_Mobile RAN_Voice	Mobile Radio Access function destinated to all Mobile voice products
	NSF_Mobile_BackBone-Voice	Mobile backbone function destinated to all Mobile voice products
	NSF_Private_Communication_Call_Handling	Intelligent platform service related to mobile closed user groups and virtual private networks
	NSF_Mobile_PrepaidTraffic_Services	Intelligent platform services related to mobile voice prepaid traffic
	NSF_Mobile_Access_Backaul_ABIS	Mobile access 2G network backhauling
	NSF_Mobile_Access_Backhaul_IUB	Mobile access 3G network backhauling
	NSF_NumberPortability_CallHandling	telephony ported number realtime translation
	NSF_OtherAdvanced_CallHandling	Voice Value Added network function
	NSF_PairGainSystem	Analog line multiplexing functions, used to concentrate narrow band analog signals on customer pairs to a 2Mb/s digital signal on a few feeding copper pairs. This is however an old technology not compatible with broadband.
	NSF_Payphones	Functionalities needed for the service “public payphones”
	NSF_PSTN_Voice_concentrator	Aggregation of PSTN voice calls towards backbone circuit switching
	NSF_Public_NumberPortability_Database	telephony ported number repository
	NSF_Service_Announcements_Playing	Functionalities in order to announce to callers any requested value added services.
	NSF_Televoting_CallHandling	Voice Value Added network function destinated to Business customers
	NSF_VirtualPrivateNetwork_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_Voice_call_CAE_charging	generation of call detail records for interoperator voice traffic accounting
	NSF_Voice_call_CAE_Processing	handling of voice calls at transit level
	NSF_Voice_call_CAE_Trunks	multiplexing/demultiplexing voice circuits at transit level
	NSF_Voice_call_Local_charging	generation of call detail records for customer voice usage charging
	NSF_Voice_call_Local_Processing	handling of voice calls at originating or terminating level
	NSF_Voice_call_Local_Trunks	multiplexing/demultiplexing voice circuits generated/terminated
	NSF_VoiceFeatures_SelfManaging	Voice Value Added network function destinated to residential customers
	NSF_Voicemail&Messaging	Voice Value Added network function destinated to residential customers
	NSF_WakeUp_CallHandling	Voice Value Added network function destinated to residential customers
L4_Messaging	NSF_Mobile RAN_SMS	Mobile Radio Access function destinated to all Mobile SMS products

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	NSF_Mobile_BackBone-SMS	Mobile backbone function destinated to all Mobile SMS products
	NSF_SMS_Services	Intelligent platform service related to mobile SMS
L4_WEB	NSF_EServices	NSF gathering SDE workload related to the E-services.

Investment costs of Proximus SA assets are mapped to these NSF , except investments related with network administration, and some other that cannot be related to any current product or service. The exceptions are not filed into the network allocation cascade , but are allocated like an overhead cost (i.e. with no direct causality) to a range of End User Services (depending on the kind of overhead cost) proportionally to the cascaded costs on these EUS.

Mapping asset cost sources to Asset objects of the model AC2

Network assets are 1-to-1 allocated to a homonymic AC2 object except for the 7 voice switching assets which are aggregated in AC2_TDM_Voice_Switching_Equipment.

Mapping AC2 objects to cost pools or Network elements

AC2 Aggregation.

At this stage AC2 asset objects are aggregated into cost pools, network elements , overhead objects and eventually end user services (costs marginal end user services , or direct waste).

The aggregations into cost pools serve to form technology pools for which operational inventories can be queried for various statistics that are further used to decompose into network elements. The technology pools typically are (D)WDM equipment, Copper Cables, Broadband (ADSL/SDSL) equipment, SDH equipment , PDH equipment, Ethernet equipment etc. Those cost pools include also the OPEX of SDE.

The aggregation into network elements concerns assets that are already a network element , and it serves also to gather assets that are individually more detailed than the definition of network elements and that can be easily associated to a network element . Typical examples are IP-VPN assets , broadcast TV assets, Analog Multiplexers, Metallic line testing assets etc.

AC2 Deaggregation.

By contrast, a set of AC2 assets are decomposed (deaggregated) into cost pools, Network elements, waste pool and marginal end user services.

Among these, some assets collect investments on network administration (Hardware and software supervision platforms) and on value added services platforms (IN, messaging, voice mail etc.) ; they need to be decomposed into the network technologies they supervise and into the value added service categories.

⇨ The driver used is the “cumulatedInvestedAmount” per technology obtained after deep analysis of historical investment data (TM1 financial reporting tool).

The asset 1680 “TPT-BBN-infra.elect/mécan in transmis rooms” collects internal cabling within technical buildings and is decomposed essentially into the following cost pools CP_Backbone_Coax_cabling, CP_Backbone_Optical_cabling, CP_(D)WDM_equipment.

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- ⇨ The driver used is the “Current annualized cost” of the cost pools , calculated from a diversity of constituent volumes and corresponding prices (coax/fibre cables, connectors, copper pair cables , cable ways,etc) . The main volumes are extracted from the infrastructure inventory database (ITR), other volumes are derived under assumptions.

The AC2_TDM_VoiceSwitching_Equipment asset is decomposed in the three main switching units forming the switched network topology : the Remote Units (acting principally as voice concentrators), the Base units (providing call processing and local switching), and the Transit Units (providing transit switching).

- ⇨ The driver used is the “Nbr of equivalent lines” , a unit that is at the basis of the purchase contracts with the switches vendors where purchased switching Unit (Remote, Base, Transit) value is proportional to the equivalent lines installed per switching unit. The driver value is obtained from installed base reporting of the switched voice network.

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Deaggregation of cost pools into network elements

In performing the previous steps cost pools are introduced in the model. They are now deaggregated into different Network Elements by means of following drivers:

cost pool	driver name	Deaggregated Network elements
CP_(D)WDM_equipment	Yearly Direct CAPEX Cost	regional&core DWDM network elements and express DWDM network elements
CP_Backbone_Optical_cabling	Nbr_Connections	pre-allocated to all inside network elements using fibre cabling
CP_Backbone_Coax_cabling	Nbr_Connections	pre-allocated to all inside network elements using coax cabling
CP_Copper_Burried_Cables&Splices	yearly direct CAPEX cost	distribution cables, feeding cables network
CP_DSLAM	yearly direct CAPEX cost	xDSL ATM based network elements and VDSL Ethernet based network elements
CP_Ducts&Manholes	Trenches cumulated length (km)	Ducts& manholes for Next Generation Access, Ducts & manholes for corporate /complex nodes in access
CP_EthernetMPLS_equipment	Yearly Direct CAPEX Cost	Ethernet Ports, Ethernet/MPLS switches
CP_IntelligentNetwork_Hardware	EstimatedValue_of_IN_HW_components	Service Control Point hardware, service management point Hardware, CPU, RAM memory, Disk
CP_Optical_Fibre_Cables	kmxfibre	Fibre cables for Next Generation Access, Fibre cables for corporate/complex nodes in access
CP_OSS_VoiceTraffic	fair split	Collecting, terminating and transit of voice network elements
CP_SDH	Yearly Incremental Cost	
CP_TDM_VoiceDigital_BaseUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice concentration elements, Originating/Terminating voice call handling elements
CP_TDM_VoiceDigital_RemoteUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice concentration elements, Originating/Terminating voice call handling elements
CP_TDM_VoiceDigital_TransitUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice transit elements
CP_Mobile_RAN	Yearly capitalized manpower cost	Mobile Radio Access network, Ground antenna
CP_Mobile_Backbone	fair split	Mobile Voice and Data switching elements

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From Network elements to Network Stage Functions

The previous steps populate the cost model with Network Elements. In the next step , they are allocated to the Network Stage Functions.

The decomposition of network elements into network stage functions is driven by a variety of cost drivers listed below per technology :

NE technology	Driver name
(D)WDM	Direct
ETHERNET	Direct
FIBREPLANT	Amount km routes to physical sites
	Estimated incremental trench length (km)
	kmxfibre
IDTV	Direct
IP	Direct
	Total_tributary_capacity(Gbps)
MOBILE	Attributed investment from bottom up model
	Cumulated Invested Value
VOICE	Direct
	Invested_Amount
	Nbr_of_equivalent InstalledLines
	Nbr_of_equivalueInstalledLines
	routed minutes
	VendorCertifiedValue_of_Originating_Terminating_CallHandling_subcomponents
	VendorCertifiedValue_of_Transit_CallHandling_subcomponents
VOIP	VoIP_call_handling_distribution_local_Area

7.3 End User Services

The network allocation model terminates when all network stage functions (or NEs) have been allocated to network layer services and when network layer services have been combined into a user level telecommunication service , the End User Service.

The End User must be understood as the telecommunication service party that will pay for the service. In case of a retail service the user is identical to the service consumer (residential service) or to the service provider (business service) , in case of wholesale service , the user is in principle another licensed operator , or a network service provider.

Being composed of network layer services, End User Services may emanate from different levels of network layers since interconnection between network operators is being unbundled . For retail services , the end user telecommunication services may arise from different layers : the more a service is oriented for a specific usage the higher the level of network layers involved. For example IP services are less usage oriented than voice telephony, the latter being a layer 4 service, the former a layer 3 service.

Sensitivity: Unrestricted

The End User Services represented in the model are listed hereunder.

End User Service Layer	Market	End User Service Name
L1_PASSIVE	INTERCONNECT	EUS_Raw copper subscription
		EUS_Shared pair subscription
	RETAIL&WHOLESALE	EUS_Broadband Drop
L2_PACKETBASED	INTERCONNECT	EUS_BROBA_accessLine
		EUS_BROBA_EndUserLine subscription
		EUS_OLOAccessLine
		EUS_wholesale transport BROBA subscription
		EUS_wholesale transport WBA subscription
	RETAIL	EUS_X25
	WHOLESALE	EUS_Ethernet_Backhaul
L2_TDM	INTERCONNECT	EUS_BROTSOLL_segment<2M
		EUS_BROTSOLL_segment>2M
		EUS_BROTSOLL_segment2M
	RETAIL&WHOLESALE	EUS_LL <2M subscription - International
		EUS_LL <2M subscription - National
		EUS_LL >2M subcription- National
		EUS_LL >2M subscription - International
		EUS_LL 2M subscription - International
		EUS_LL 2M subscription - National
		EUS_LL_Analog National Subscription - National
	WHOLESALE	EUS_Nat IC-Infra Wholesale subscription
L2_TDM&L1_ACTIVEANALOG	RETAIL&WHOLESALE	EUS_Trans LAN subscription
L3_IP	RETAIL	EUS_DataManagedServices
		EUS_Homegateway
		EUS_Mobile_Data national
		EUS_Public_IP_Extension_on_Symmetric
	RETAIL&WHOLESALE	EUS_FastInternet subscription
		EUS_Private_IP&Ethernet_on_asymmetric subscription - National
		EUS_Private_IP&Ethernet_on_backup
		EUS_Private_IP&Ethernet_on_international Subscription
		EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
		EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National
	WHOLESALE	EUS_ADSL_Carrier_wholesale subscription
		EUS_Mobile_Roaming IN_Data
		EUS_VDSL_Carrier_wholesale subscription
L4_IDTV	RETAIL	EUS_IDTV_subscription
L4_M2M	RETAIL	EUS_Machine_to_Machine
L4_MESSAGING	INTERCONNECT	EUS_BGC Mobile_Incoming SMS international
		EUS_BGC Mobile_Incoming SMS national
	RETAIL	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
	WHOLESALE	EUS_Mobile_Roaming IN_Originating_SMS
		EUS_Mobile_Roaming IN_Terminating_SMS
L4_VOICE	INTERCONNECT	EUS_BGC Fixed international traffic incoming
		EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
		EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed Outgoing International Freephone traffic
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_Carrier PreSelection IAA interconnection
		EUS_Carrier PreSelection local interconnection
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_IAA interconnection - BGC Fixed to FOLO
		EUS_IAA interconnection - FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_Incoming International Transit (M)OLO Traffic
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Interconnection FOLO to BGC Mobile
		EUS_Interconnection MOLO to BGC Mobile
		EUS_International Transit border to border
		EUS_international_switchingTrunk
		EUS_internet traffic - FOLO to BGC 0909/3 IAA
		EUS_Local interconnection - FOLO to BGC Fixed
		EUS_Number Portability access per line subscription
		EUS_Outgoing International Transit (M)OLO Traffic
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO

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		EUS_Traff. Internet- BGC fixed
		EUS_Voice_traffic_IAA_PointOfInterconnect subscription
		EUS_Voice_traffic_Local_PointOfInterconnect subscription
	RETAIL	EUS_Astrid
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_BGC Mobile_Roaming Out Origination
		EUS_BGC Mobile_Roaming Out Termination
		EUS_BVAS Call & Conference - BGC fixed
		EUS_Consultel 090x Traffic - (M)FOLO to BGC Fixed
		EUS_Freephone Traffic - (M)FOLO to BGC
		EUS_ISDN CATT traffic - BGC Fixed
		EUS_MVAS - BGC Fixed
		EUS_OPS International Information Traffic - BGC
		EUS_OPS National Information Traffic - BGC
		EUS_Other_Traffic - BGC Fixed
		EUS_Payph operations - BGC Fixed
		EUS_Split Charging Traffic - (M)FOLO to BGC Fixed
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
		EUS_Virtual Private Network Traffic- BGC fixed
	RETAIL&WHOLESALE	EUS_BGC Fixed DCIA traffic
		EUS_BGC Fixed international traffic outgoing
		EUS_BGC Fixed interzonal traffic
		EUS_BGC Fixed local traffic
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Fixed zonal non local traffic
		EUS_Calling Card Postpaid Traffic - BGC Fixed
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_IAA interconnection - BGC Fixed to MOLO
		EUS_Incoming International Freephone Traffic (OLO+BGC mobile) to BGC
		EUS_ISDN-BA Access - subscription
		EUS_ISDN-PRA Access - subscription
		EUS_PSTN Access - subscription
		EUS_Split Charging Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
	WHOLESALE	EUS_Mobile_Roaming IN Termination
		EUS_Universal Access Number Traffic - FOLO to BGC Fixed
		EUS_Mobile_Roaming IN Origination
L4_WEB	RETAIL	EUS_Eservices

Broadband drop

The network element Broadband Drop groups costs related to fieldwork performed in the copper access network in order to realise broadband connections for end-users. These activities are mainly situated at the MDF, SC and the introduction up to the Network Termination Point (included).

7.4 Network services of the passive infrastructure layer : NLS1.0

7.4.1 Definition

This layer deals with the physical end-to-end connectivity between customers and the central sites (access), the physical connectivity inside the central site between access equipment and the physical connectivity between central sites (backbone).

Access Physical connectivity services (see Figure 10***):***

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- NLS1_0_Continue_Raw_Copper : internal cabling for copper connectivity from Main Distribution Frame or broadband splitter equipment to other access active equipment like voice switches, leased lines access equipment, collocated access equipment (of other licensed operators).
- NLS1_0_Copper_Localloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper loop.
- NLS1_0_Copper_Splitter : resources to split the narrowband and broadband copper physical signal.
- NLS1_0_Copper_Subloop : end-to-end copper connectivity from the network termination point at the customer premises to a delivery point in the street (street cabinet).
- NLS1_0_Copper_Subloop_testing : outside and inside copper connectivity and equipment required to perform remote testing of the copper subloop.
- NLS1_0_Raw_Copper : end-to-end copper connectivity from the network termination point at the customer premises to the Central site.
- NLS1_0_CentralOffice2Office_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and corporate customers office buildings .
- NLS1_0_CentralOffice2Office_Fibre : end-to-end fibre connectivity between the central sites and corporate customers office buildings or between central sites and Proximus mobile sites.
- NLS1_0_CentralOffice2RemoteOpticalNode_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.
- NLS1_0_CentralOffice2RemoteOpticalNode_Fibre : end-to-end fibre connectivity between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.

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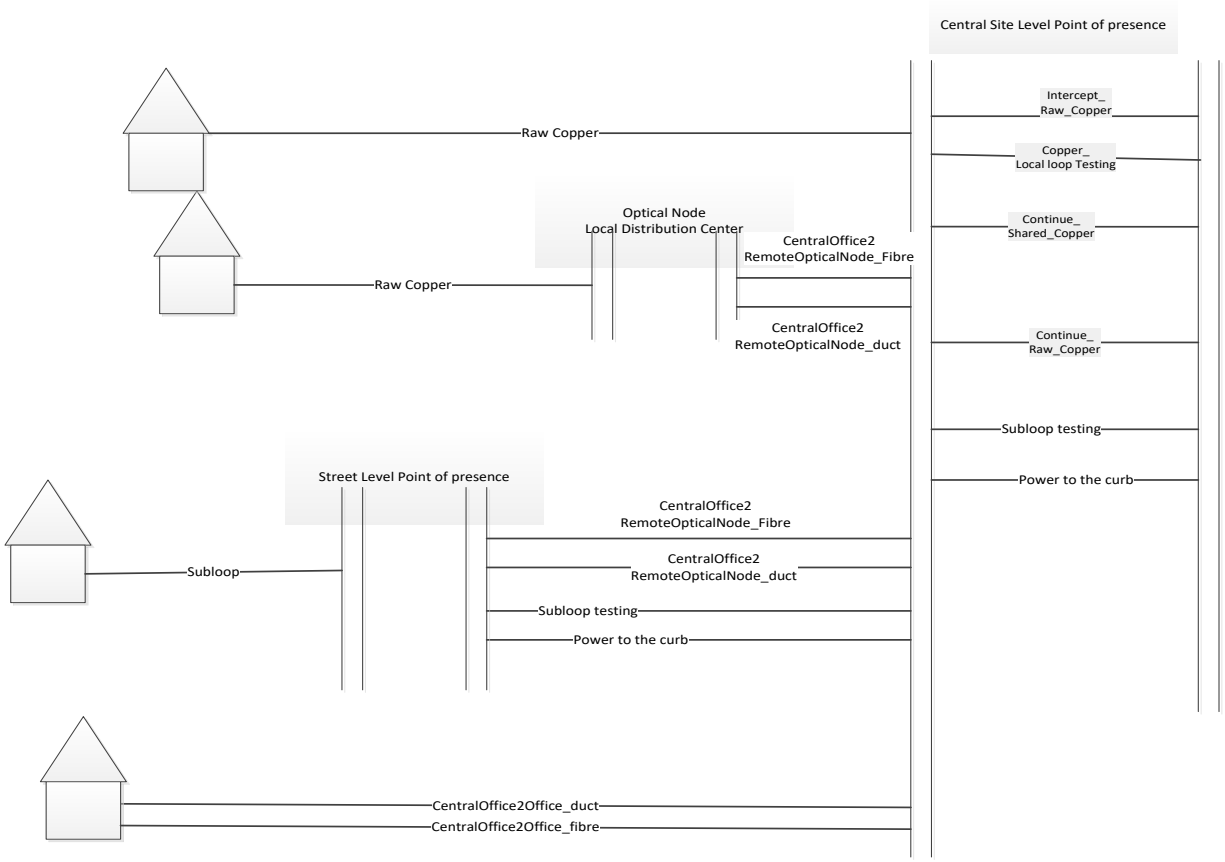

Figure 10: Access Physical connectivity services

Backbone Physical connectivity services

- NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core: end-to end fibre connectivity (fibre cables and duct and trenches) for SDH transmission networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Express : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the express (national level) network. These nodes correspond to the largest cities in the country.

7.4.2 Usage of the passive infrastructure

The physical connectivity services of this layer are used by upper layers in order to interconnect their specific equipment. The costs are distributed to the service users according to “consumption drivers” as listed in the table below.

Sensitivity: Unrestricted

Network layer Service	Driver	Service consumers
NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, BRUO Shared Pairs
NLS1_0_Copper_Localloop_testing	nbr of lex based broadband connections without voice	Broadband bitstream layer 2.1 services
NLS1_0_Copper_Splitter	Direct	BRUO Shared pairs
NLS1_0_Copper_Subloop	Direct	VDSL bistream layer 2.1 service
NLS1_0_Copper_Subloop_testing	Direct	VDSL bistream layer 2.1 service
NLS1_0_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, Broadband Bitstream layer 2.1 service
NLS1_0_CentralOffice2RemoteOptical Node_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2RemoteOptical Node_Fibre	Nb_access_fibres_used	
NLS1_0_CentralOffice2Office_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2Office_Fibre	Nb_access_fibres_used	
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)	Backbone services (leased lines/backhaul and Broadcast) delivered by the SDH equipment at regional and core level.
NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)	Regional&Core backbone services of layer 2.1 (Ethernet transport, unicast and multicast)
NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)	Express backbone services of layer 2.0 (leased lines) and layer 2.1 (Ethernet)

7.4.3 Contributors to the passive infrastructure layer

7.4.3.1 *Access*

The objective of the access network is the delivery of a connection between our customers and our telecommunication network where all services are implemented.

Copper infrastructure:

The access network services of the copper passive infrastructure layer are based on several network elements valued using the BIPT regulated cost price, as listed below. For these network elements, there is no change in the valuation methodology compared to previous model. As in the 2012 model, the former network element NE_Copper infrastructure has been split in several subparts, in order to enable the fix/variable analysis of the model results .

- ✓ NE_Copper_Cables_Distribution

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copper distribution pairs and access to distribution pairs in street (to be attributed to copper subloop for VDSL connections without voice and to the raw copper for all other copper connections, based on the corresponding regulated cost);

- ✓ NE_Copper_Cables_Feeding

  copper feeding pairs and access to feeding pairs in street and central site (to be attributed to the copper subloop testing for VDSL connections without voice and to the raw copper for all other connections);

- ✓ NE_Copper_Blocks_and_Tie_cables

  copper local loop testing for broadband customer connections without voice at the central site,

  copper subloop testing for ROP based VDSL customer connections without voice,

  continue copper feeding pairs based on the number of shared pairs in service,

  continue raw copper for all other copper pairs in use.

- ✓ NE_Copper Splitter

  For the BRUO shared pairs in service.

NSF_PSTN_Voice_concentrator:

Attributed to :

- copper local loop testing based on the number of broadband without voice customers connections at the central site,
- copper subloop testing for VDSL without voice customer connections at the street cabinet,
- PSTN Access based on the number of subscriptions

Customer connections without voice are connected to the switching equipment in order to perform remote testing of the line.

Access Fibre Infrastructure:

The costs of the fibre deployed in the access network have been separated in the civil works related costs producing duct routes, and in the cable related works producing fibre connectivity inside the duct routes. Civil work related costs and cable related costs are subject to different assets within Proximus's asset accounting and can easily be identified. These assets do not distinguish the investments realized for connection of customer sites, mobile sites or remote optical nodes (at subtending level and street cabinet level). Therefore two drivers are used :

1. Kmxfibre : to separate the fibre cable costs between customer/mobile sites and remote optical sites
2. Amount km routes to physical sites : to separate the civil works costs between customer/mobile sites and remote optical sites .

Yielding following objects :

NSF_CentralOffice2RemoteOpticalNode_FibreCables

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NSF_CentralOffice2Office_FibreCables

NSF_CentralOffice2RemoteOpticalNode_Track

NSF_CentralOffice2Office_Track

7.4.3.2 *Backbone*

The backbone fibre connectivity services are realized by the following Network Stage Functions embodying the resources in the fibre outside plant (ducts&manholes, and fibre cables):

- NSF_Backbone_FibreConnectivity_Regional&Core
- NSF_Backbone_FibreConnectivity_express

NSF	Driver	NLS1_0
NSF_Backbone_FibreConnectivity_express	**direct**	NLS1_0_Fibre_connect_Backbone_DWDM_Express
NSF_Backbone_FibreConnectivity_Regional&Core	**fair split of fixed cost**	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core

7.5 Network services of the transmission infrastructure (NLS2_0)

7.5.1 Definition

This layer deals with the transmission services between customer sites and the Proximus Offices (access) also called local tail for leased lines , and it deals also with the transport segments services (also called backbone leased lines segments and backhaul capacity) between Proximus Offices (backbone).

The national wide transmission infrastructure collects transmission traffic in three aggregation stages: local level aggregation (circ 600 locations) , zonal level aggregation (circ 36 locations) , area level aggregation (20 locations) (see Figure 11: Transport Segments). Traffic at each stage can be cross-connected allowing to create transport segments from any location to any location.

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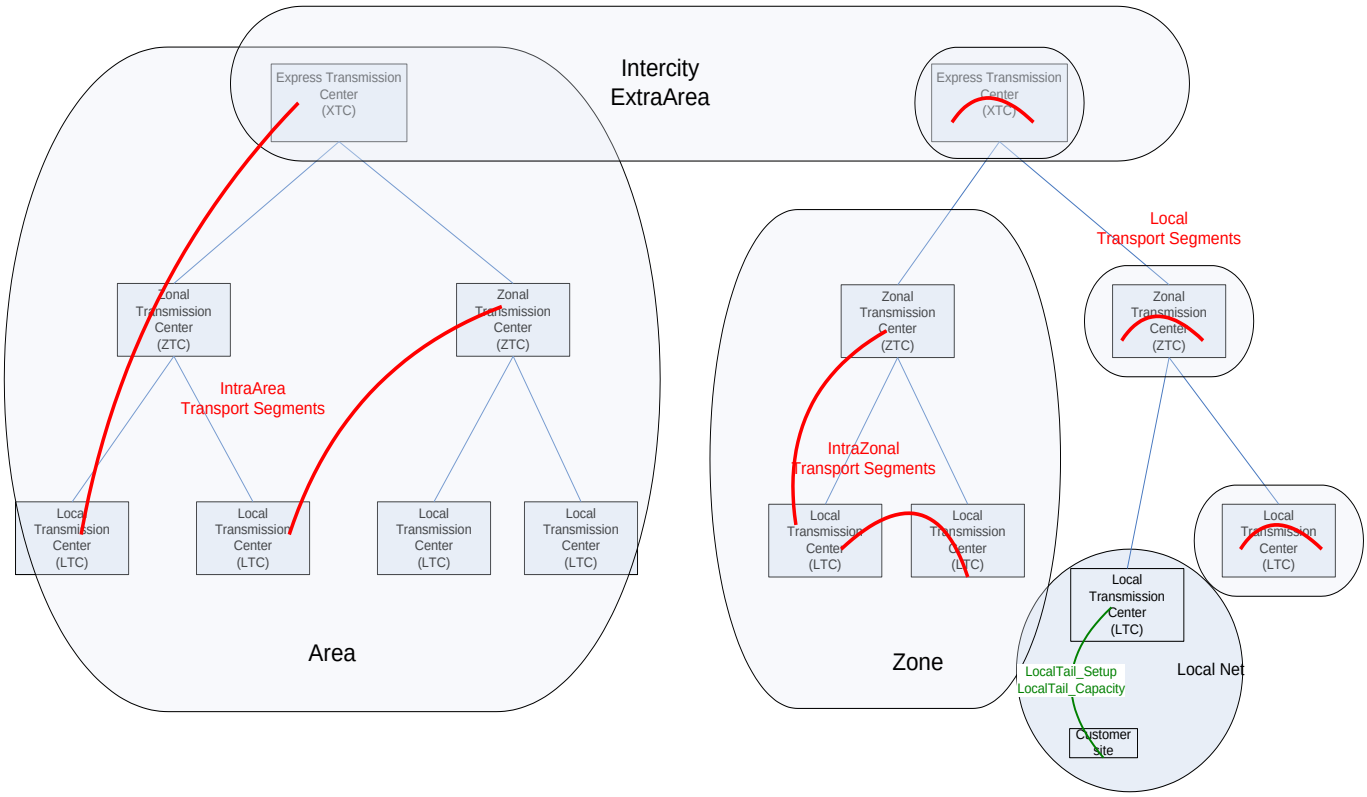

Figure 11: Transport Segments

Access services

The access services deliver the transmission between the customer site and the Proximus Office (access).

They capture costs related to the physical dedicated link between the customer site and the central office and the equipment needed to activate the link in a capacity category.

Backbone services:

The backbone transport segments are classified in capacity (or bandwidth) categories -<2Mb/s, 2Mb/s, >2Mb/s- combined with distance categories -intraarea > intrazonal > local- depending on the end point situation in the aggregation hierarchy (see Figure 11).

The following NLS2.0 services are present in the model:

Network Layer 2.0 service
NLS2_0_LocalBackboneCapacity<2M
NLS2_0_LocalBackboneCapacity=2M
NLS2_0_LocalBackboneCapacity>2M
NLS2_0_IntrazonalBackboneCapacity<2M
NLS2_0_IntrazonalBackboneCapacity=2M
NLS2_0_IntrazonalBackboneCapacity>2M

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NLS2_0_IntraAreaBackboneCapacity<2M
NLS2_0_IntraAreaBackboneCapacity=2M
NLS2_0_IntraAreaBackboneCapacity>2M
NLS2_0_InterCityBackboneCapacity<2M
NLS2_0_InterCityBackboneCapacity=2M
NLS2_0_InterCityBackboneCapacity>2M
NLS2_0_LocalTail<2M
NLS2_0_LocalTail=2M
NLS2_0_LocalTail>2M

7.5.2 Usage of the transmission infrastructure

The NLS2_0 Local tail services are used to bring transmission capacity to the customer sites and they are thus directly involved in leased line services between two customer sites, leased lines to data services, backhaul services to other licensed operators and monitoring of the access network.

The costs of these access services are distributed according to the number of customer sites per bandwidth category (driver name: "Nbr_of_Customer_sites"), whereas the backbone services costs are further allocated according to their bandwidth (driver name: "Bandwidth consumed (Mbit/s)").

The model elements receiving costs from this network layer are exhaustively presented in the following table.

	Upper layer consumer or end user service
Backbone Virtual Paths (VP)	NLS2_1_Backbone_VirtualPath_InterArea
	NLS2_1_Backbone_VirtualPath_IntraArea
Proximus mobile	NLS2_2_Mobile_Access_Backhaul_Abis
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS2_2_Mobile_Backbone_Backhaul
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS2_2_Mobile_Access_Backhaul_IuB
	NLS4_0_MobileTerminatingLinks
Proximus testing environments	OVH_Lab
Broadband access to public IP switching	NLS3_ADSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
Data services backbone (IP-VPN)	NLS3_Private_IP&Ethernet_Routing
Internal Proximus network	OVH_InternalCommunicationNetwork
	OVH_InternalIPNetwork
International access to data services (IP-VPN)	EUS_Private_IP&Ethernet_on_international Subscription
Leased line access to public IP switching	NLS3_Public_IP_Extension_on_symmetric
Leased line accesses to data services (IP-VPN)	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
Other	Business Overhead
	EUS_DataManagedServices
	EUS_Subsidiaries

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	NLS4_0_VAS_signaling
	NLS4_1 BVAS - BGC Fixed
Public IP switching	NLS3_Public_IP_switching
Regulated broadband services	EUS_BROBA_accessLine
	NLS2_1_ADSL_SDSL_Bitstream
Regulated wholesale segments	EUS_BROTSOLL_segment<2M
	EUS_BROTSOLL_segment>2M
	EUS_BROTSOLL_segment2M
Retail&Wholesale leased lines	EUS_international_switchingTrunk
	EUS_LL <2M subscription - International
	EUS_LL <2M subscription - National
	EUS_LL >2M subcription- National
	EUS_LL >2M subscription - International
	EUS_LL 2M subscription - International
	EUS_LL 2M subscription - National
	EUS_LL_Analog National Subscription - National
	EUS_X25
Telephony access	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV services	NLS4_0_BroadcastTV
	NLS4_0_iDTV
Voice services in backbone	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
Wholesale transport capacity	EUS_Bandwidth_Wholesale subscription
	EUS_Nat IC-Infra Wholesale subscription

7.5.3 Contributors to the transmission infrastructure

7.5.3.1 *Local Tail*

A local tail transmission service is made of equipment installed at the customer premises extracting the digital signal from the physical line, of a physical link between the customer site and the central office and of grooming equipment in the central office (or subtended optical nodes).

Depending on the bandwidth of the local tail different equipment technologies are installed: PDH on copper , PDH on fibre or SDH on fibre. For the high bandwidth cases (>2Mb/s) a fibre based technology is required whereas for lower bandwidths the choice between fibre and copper

Sensitivity: Unrestricted

technologies exists. However, since fibre local links are much more expensive than copper links, the preferred option for low bandwidth local tails is the copper based solution.

	Contributor to NLS2_0	Driver name
Equipment	NE_PDH SDH equipment	Yearly Incremental Cost
Physical inks	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

7.5.3.2 *Transport Segments*

Transport segments are realised by configuring the SDH clusters in different network stages. The transmission aggregation levels introduced hereabove (section 7.5.1 and Figure 11) are realised by different SDH clusters (regional, core and express SDH rings) interconnected by digital-crossconnects. The SDH rings are made of add-drop multiplexers deployed in LTC for the regional ones, in ZTC for the core ones and in the XTC for the express ones. The equipments within a ring are linked by fibre or by an optical wavelength.

To summarize, the building blocks for the transport segments are:

Contributor to NLS2_0	Driver name
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)
NE_PDH SDH equipment	Yearly Incremental Cost
NE_Express_SDH_equipment	Bandwidth (Mbps)

7.6 Network services of the packet based infrastructure (NLS2_1)

7.6.1 Definition

This layer deals with the data collection services (broadband or dedicated) between the customer and the central office (access) and the transport of data central office (backbone) . Two technologies coexist as well in the access part as in the backbone part : ATM technology and Ethernet/MPLS technology. Next picture summarizes the end point locations of packet based services. Remark : ATM is outphased and is no longer valuated in the 2013 model.

This layer also integrates point to point dedicated Ethernet transparent connections delivered over the DWDM national backbone.

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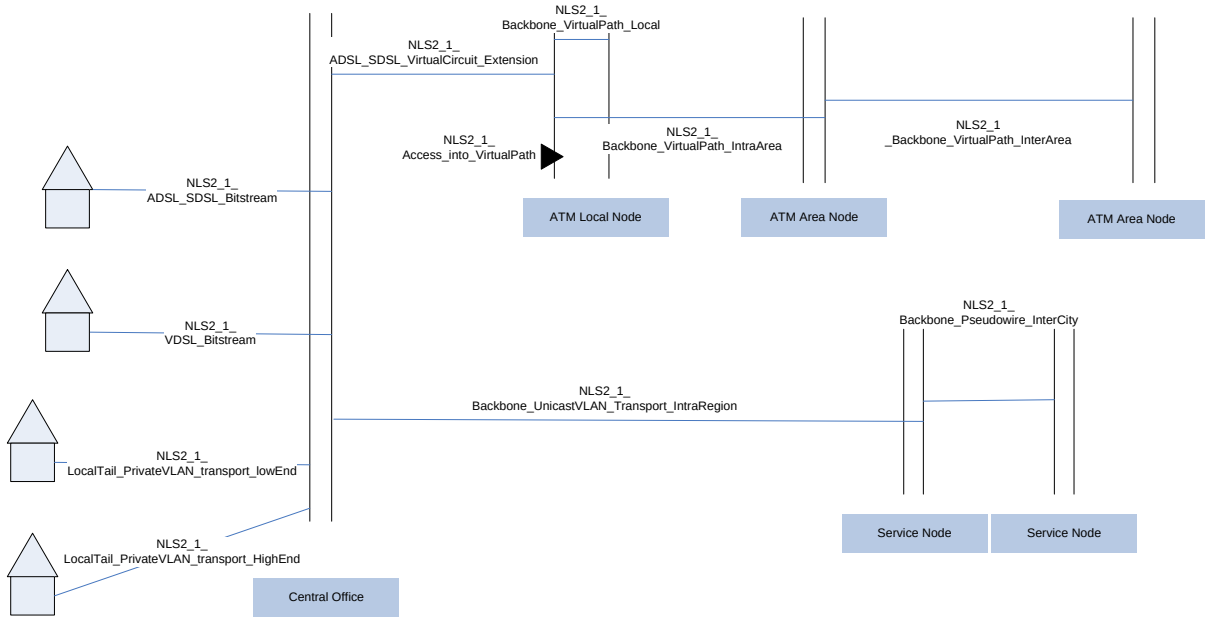

Figure 12: Network services of the packet based infrastructure 2.1

Access part

Layer 2.1 access service	Comment
NLS2_1_ADSL_SDSL_Bitstream	Broadband (ADSL-SDSL) end to end data streams between customer site and aggregation point in central office
NLS2_1_VDSL_Bitstream	Broadband VDSL end to end data streams between customer site and aggregation point in central office
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Ethernet symmetric dedicated link with central office over copper
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	Ethernet symmetric dedicated link with central office over fibre
NLS2_1_LocalTailCapacity_Ethernet>=10M	High bandwidth transparent Ethernet frame transport between customer and central office (BLES local tail)
NLS2_1_LocalTail_Eline_HighEnd	Ethernet symmetric dedicated link with central office

Backbone part

For data transport between central offices, the end point locations of the layer 2.1 services depend on the technology, the underlying networks having different topologies.

For the Ethernet/MPLS technology , the following services are defined:

Layer 2.1 Ethernet transport service	Comment
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	MPLS Transport of Ethernet VLANs between a central office and the service node of the region. These VLANs are unicast
NLS2_1_Backbone_Pseudowire_InterCity	MPLS Transport of Ethernet VLANs between service nodes of different regions. These VLANs are unicast

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NLS2_1_Backbone_MulticastVPLS_IntraRegion	

Eventually , the dedicated Ethernet transparent connections also introduce backbone connectivity services :

Layer 2.1 Ethernet transparent transport	Comment
NLS2_1_Intra/InterZonalBackboneCapacity_Ethernet>=1G	Any combination of end points different that of the two of them being express transmission centers, bandwidth of 1/10Gbps.
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	End points are between two express transmission centers, bandwidth of 1/10Gbps.

7.6.2 Usage of the data packet infrastructure

The access services of the data packet infrastructure are combined with the data packet backbone services to deliver end-to-end connectivity between IP appliances at customer site (IP router in ADSL/VDSL modems, private LAN IP routers) and IP service nodes , primarily the broadband access servers and the IPVPN routers offering layer3 services like ADSL/SDSL IP collection, VoD IP collection, Private VLAN extensions up to IPVPN nodes.

Next table summarizes the drivers used expressing how NLS2.1 contribute in layer 3 services or directly to End user services.

NLS2.1 service	Driver Name	Upper layer services "consuming" NLS2.1 services
NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines	BROBA end user line, all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines	all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)	Symmetric accesses to IPVPN and BROBA access line
NLS2_1_Backbone_MulticastVPLS_IntraRegion	direct	For television
NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps) The PeakBandwidth is a realistic estimation (based on measurements in the network) of the traffic (Mbps) during peak hour.	Broadband public IP NLS3 service, VoIP , Broadcast TV, and private IPVPN routing.
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)	Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing, Ethernet backhaul and WBA transport.
NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps	BROBA transport, Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing
NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS	

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	aspects are translated in bandwidth +or- committed bandwidth)	
NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or- committed bandwidth)	
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	BLES EUS services, High capacity accesses to IPVPN, IP-VPN routers interconnection, internal networks routers interconncetion
NLS2_1_IntraZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_InterZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)	
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	direct	Access to IPVPN layer 3 services
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	direct	Access to IPVPN layer 3 services

7.6.3 Contributors to the data packet infrastructure services

NLS2_1_ADSL_SDSL_Bitstream is the result of the central office (the Proximus technical building closest to the end customer) based nework element NE_ADSL equipment. That function interacts with the broadband CPE equipment (at the customer site) by means of copper connectivity and potentially fiber connectitivy to optical subtended nodes.

The Ethernet based layer 2.1 services (NLS2_1_Backbone_Uni/MulticastVPLS_IntraRegion and NLS2_1_Backbone_Pseudowire_InterCity) are implemented by the configuration of the Ethernet/MPLS network elements interacting with each other using lower layer connectivity services (see picture Figure 13).

NLS2_1_VDSL_Bitstream is the result of the function present in the deployed VDSL equipment (network elements NE_NGA Active equipment and NE_NGA Housing).

That function interacts with the broadband CPE equipment (at the customer site) by means of copper and fibre connectivity.

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NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion is the result of the Ethernet/MPLS unicast function present in the deployed Ethernet equipment. The function is activated in different locations to form aggregation clusters, whose links are mainly deployed on DWDM and in a limited number by direct fibre connectivity. The NLS2_1_Backbone_PseudowireInterCity and the NLS2_1_Backbone_MulticastVPLS_IntraRegion are implemented in the exact same way.

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd_or LowEnd and NLS2_1_LocalTail_Eline_HighEnd are the result of customer sited Ethernet equipment and the connectivity to the Proximus network. Such connectivity consists of a fibre based link for the high end cases and of a copper based link in the low end situation.

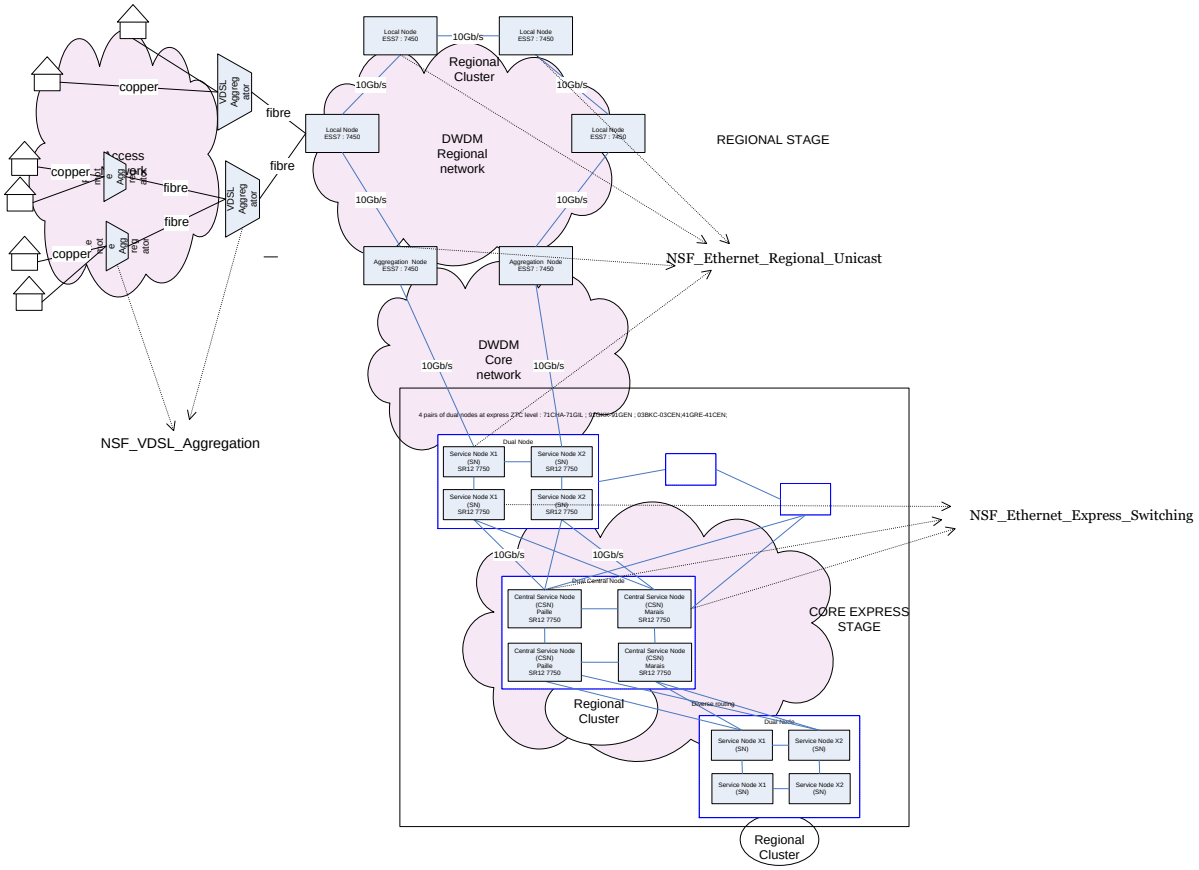

Figure 13: Ethernet layer 2.1

The dedicated Ethernet transparent backbone connection services (NLS2_1_xxxBackboneCapacity_Ethernet>=1G) are realized over the DWDM network with its Add Drop Multiplexers (ADM) or , when the capacity of the ADMs and rings is not sufficient, over point to point DWDM links.

The dedicated Ethernet transparent local tail connection services NLS2_1_LocalTailCapacity_Ethernet>=10M, is realized either on SDH equipment (up to 100 Mbps), reusing the SDH clusters deployed and already discussed in 7.5.3 (SDH over fibre) or for very

Sensitivity: Unrestricted

high capacity connections (above 100 Mbps) they are directly realized on a wavelength (deployed as Fibre_connect_to_the_office for the local tail and as (D)WDM for the other cases).

The table hereunder summarizes the drivers used to distribute the cost contributors to the NLS2.1 services.

NLS2_1 service category	Building block of layer 2_1 service	Driver name
Ethernet transport	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Transponder	Number of Transponder
	NE_EthernetSwitch_Chassis	Usage of Switch in Percentage
	NE_EthernetSwitch_Port10GE	Number of Port
	NE_EthernetSwitch_Port1GE	Number of Port
	NE_EthernetSwitch_Port1GE_Adapter	Number of Adapter
	NSF_Express_EthernetSwitch_Chassis	Traffic in Mbps
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express DWDM equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
Broadband aggregation	NE_ADSL equipment	direct
	NE_NGA Active equipment	direct
	NE_NGA Housing	direct
	NLS1_0_Copper_Localloop_testing	nbr of broadband lex based without voice
	NLS1_0_Copper_Subloop	direct
	NLS1_0_Copper_Subloop_testing	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NSF_FTTC_FibreConnectivity	direct
Ethernet local tail	NE_ethernet equipment	Yearly Direct CAPEX Cost
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
Transparent Ethernet backbone connection services	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Point_to_Point_InterZonal	Direct
	NE_DWDM_Point_to_Point_IntraZonal	Direct
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Point_to_Point	Direct
	NSF_Express_DWDM_Transponder	Number of Transponder
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express_DWDM_equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

The cost relative to the building blocks and the driver values, for Ethernet transport and Transparent Ethernet backbone connection services, are determined in a top-down model, which was derived from the BIPT NGN-NGA model. (by Analysis Mason)

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7.7 Network services of the mobile backhauling infrastructure (NLS 2.2)

7.7.1 Leased Lines infrastructure for mobile access backhauling

- NLS2_2_Mobile_Access_Backhaul_Abis is related to backhauling of the 2G network, providing connectivity by means of leased lines between the Base Station Transceiver (BTS) and the Base Station controller (BSC).
- NLS2_2_Mobile_Access_Backhaul_IuB is related to backhauling of the 3G network, providing connectivity by means of leased lines between the Node B antenna and the Radio Network Controller (RNC) in the Radio Access Network.

7.8 Network services of the IP infrastructure layer (NLS3-IP)

7.8.1 Scope

This layer provides the following basic IP services in the model.

Fixed IP service type	IP service
Collection of IP traffic for public internet or internal internet	NLS3_ADSL_Public_IP_collection
	NLS3_SDSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
	NLS3_VoD_IP_collection
	NLS3_VoIP_IP_collection
	NLS3_Public_IP_Extension_on_symmetric
Public Internet routing	NLS3_Public_IP_switching
Connection of IP sites to IP-VPN	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
	NLS3_Private_IP&Ethernet_Routing
	NLS3_Private_IP&Ethernet_Extension_on_asymmetric
	NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter
IP security	NLS3_IP_security

In addition, NLS3 also includes collection of mobile data traffic in the mobile access and backbone network.

The actual NLS3's are described further. A comprehensive listing of which NLS or EUS they contribute to together with a description of the driver utilized in each case is also presented. Finally, a table will exhibit the cost allocation of these layer services, including driver and driver volume.

7.8.1.1 *Public services*

7.8.1.1.1 IP_collection

Sensitivity: Unrestricted

Gathers all the data traffic, except that of the private networks, generated by the customers at their locations -homes and offices placed all over the country- at the highest network level where it can be further delivered to the Internet.

This gathering is achieved thanks to the broad and narrow band servers together with the connectivity capabilities of the MPLS backbone network.

This generic service is in fact divided in several actual NLS3, depending on the traffic type and/or underlying technology, as follows:

- Data traffic:
  - NLS3_ADSL_Public_IP_Collection
  - NLS3_SDSL_Public_IP_Collection
  - NLS3_VDSL_Public_IP_Collection
  - NLS3_Public_IP_Extension_on_symmetric: where the customer-IP router connectivity is provided by means of Leased Lines, as opposed to the other services which are based on broadband access technologies.
- Video on Demand traffic:
  - NLS3_VoD_IP_Collection
- Voice over IP traffic:
  - NLS3_VoIP_IP_Collection

Further, these NLS3's contribute to the following higher network layer services and end user services (EUS) as specified hereunder:

NLS3	Driver name	Target element
NLS3_ADSL_Public_IP_collection NLS3_ADSL_Public_IP_collection	Nbr_of_retail_wholesale_ADSL_lines	EUS_ADSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_ADSL_lines	EUS_FastInternet subscription
NLS3_SDSL_Public_IP_collection	Nbr_of_retail_wholesale_SDSL_lines	EUS_FastInternet subscription
NLS3_VDSL_Public_IP_collection NLS3_VDSL_Public_IP_collection	Nbr_of_retail_wholesale_VDSL_lines	EUS_VDSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_VDSL_lines	EUS_FastInternet subscription
NLS3_Public_IP_Extension_on_symmetric	direct	EUS_Public_IP_Extension_on_Symmetric
NLS3_VoD_IP_collection	direct	NLS4_0_VoD
NLS3_VoIP_IP_collection	direct	NLS4_0_PSTN_access

7.8.1.1.2 Public_IP_switching

This service brings the intelligence to route the gathered traffic by the "IP_collection" generic NLS3 into the appropriate external network within the "public Internet".

This service, NLS3_Public_IP_switching, is fully and exclusively realized by the Proximus Internet Routers and is totally dedicated to the end user service EUS_FastInternet subscription.

7.8.1.2 *Private services*

7.8.1.2.1 Private_IP&Ethernet_Extension

Sensitivity: Unrestricted

This NLS transparently extends the customer's private local area networks, situated at any location within Belgium, to the edge of the Proximus's network, thanks to the routers installed at the customer premises (CPE) and the connectivity capabilities of the MPLS aggregation and core- clouds.

This generic service consists in fact of several actual services, specific to the access technology type, as follows:

- NLS3_Private_IP&Ethernet_Extension_on_symmetric_Datacenter
- NLS3_Private_IP&Ethernet_Extension_on_asymmetric
- NLS3_Private_IP&Ethernet_Extension_on_symmetric_lowEnd
- NLS3_Private_IP&Ethernet_Extension_on_symmetric _highEnd

The higher level NLS/EUS to which the above NLS3's deliver their services and their costs allocations are:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_asymmetric subscription – National
NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter	direct	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription – National
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription – National

7.8.1.2.2 NLS3_Private_IP&Ethernet_Routing

This NLS delivers the capability of routing the private networks traffic to the requested end point, within the Proximus private IPVPN network.

This service, NLS3_Private_IP&Ethernet_Routing, is completed by the Proximus IPVPN Routers and the core MPLS cloud and, in turn, supports all the following EUS:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_asymmetric subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_international Subscription
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National

Figure 14: Layer 3 topology and contributors exhibits the layer's basic topology and all the contributors to the Layer 3 services.

Sensitivity: Unrestricted

NLS3 - IP

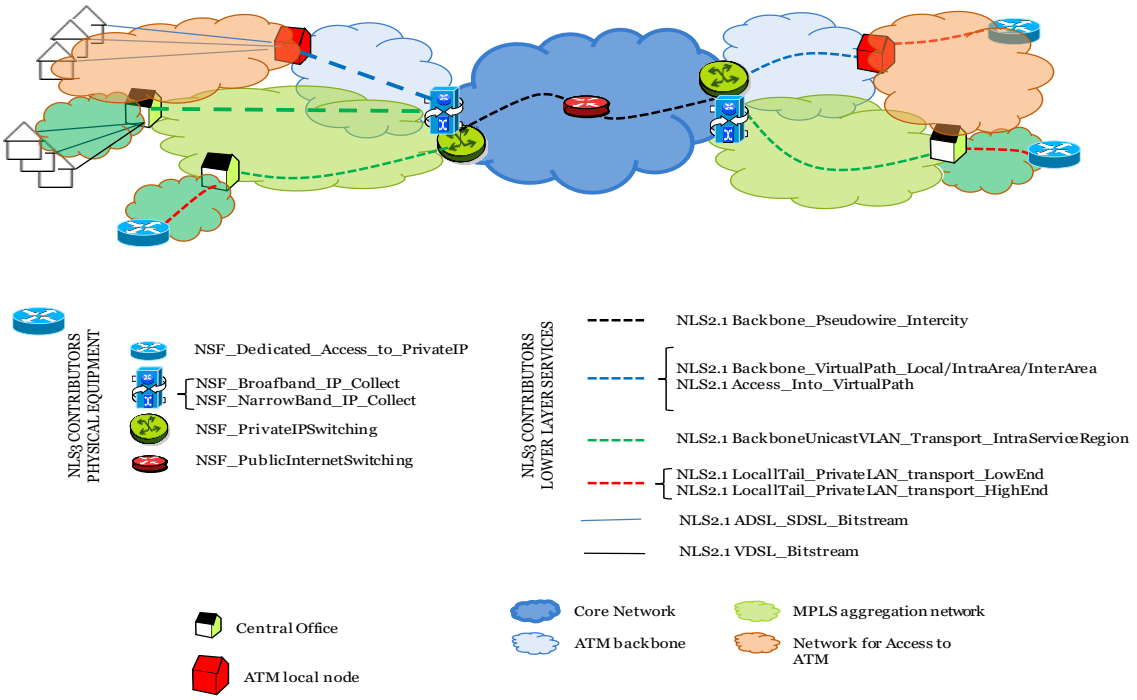

Figure 14: Layer 3 topology and contributors

7.8.1.3 *Mobile Data traffic*

The network layer 3 elements included at this level are :

- NLS3_0_BGC_Mobile_Access Data
- NLS3_0_BGC_Mobile_Backbone_Data

7.8.2 Contributors to the Network Layer 3 services

The table hereunder summarizes the contributors and the drivers used to distribute the costs to the NLS3 services.

NLS3 service category	Building block of layer 3 service	Driver name
Asymmetric Private_IP&Ethernet_Extension	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects

Sensitivity: Unrestricted

		are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_Dedicated_Access_to_PrivateIP	Number of Access
Symmetric Private_IP&Ethernet_Extension	NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalTail<2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail>2M	Nbr_of_Customer_sites
	NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Direct

Sensitivity: Unrestricted

	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_Dedicated_Access_to_PrivateIP	Nbr_of_Sites
Symmetric Public_IP_Extension	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
Public_IP_collection	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_Public_IP_Collect	PeakHour_PublicInternetTraffic(Gbps)
VoD_IP_collection	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_VoD_IP_Collect	PeakHour_VoDTraffic(Gbps)
VoIP_IP_collection	NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps)
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NSF_BroadBand_VoIP_IP_Collect	Direct
Public_IP_switching	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)

Sensitivity: Unrestricted

	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PublicInternetSwitching	TotalPeakHour_PublicInternetTraffic(Gbps)
Private_IP&Ethernet_Routing	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_Backbone_Pseudowire_InterCity	Bandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PrivateIPSwitching	Direct
IP_security	NSF_IP_security	Direct
Mobile Data Handling	NSF_Mobile_RAN_Data NSF_Mobile_Backbone_Data	Routed volumes Routed volumes

7.9 Network Services of the application layer

7.9.1 Definition

This layer deals with the telecommunication application services to end users. The application layer services are :

NLS4_0_BroadcastTV, NLS4_0_VoD, NLS4_0_iDTV and voice telephony related services classified as follows:

CLASS	DEF_NLS_DESCR

Sensitivity: Unrestricted

Access to VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate
	NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect
	NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate
	NLS4_0_Voice_traffic_Local_PointOfInterconnect
NP	NLS4_0_FixedPortableNumberLocation
	NLS4_0_Public_NumberPortability
Telephony Access	NLS4_0_ISDN_access
	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling
	NLS4_0_CallerIdentity_CallHandling
	NLS4_0_CallingCard_CallHandling
	NLS4_0_InteractiveVoiceResponse_CallHandling
	NLS4_0_MessageWaitingIndicator_Inserting
	NLS4_0_OtherAdvanced_CallHandling
	NLS4_0_PrepaidCallingCard_CallHandling
	NLS4_0_Service_Announcements_Playing
	NLS4_0_Televoting_CallHandling
	NLS4_0_VirtualPrivateNetwork_CallHandling
	NLS4_0_VoiceFeatures_SelfManaging
	NLS4_0_Voicemail&Messaging
	NLS4_0_WakeUp_CallHandling
Voice transport	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_MSC
VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Collect
	NLS4_0_Voice_traffic_AreaLevel_Complete
	NLS4_0_Voice_traffic_AreaLevel_Terminate
	NLS4_0_Voice_traffic_AreaLevel_Transit
	NLS4_0_Voice_traffic_Local_Collect
	NLS4_0_Voice_traffic_Local_Complete
	NLS4_0_Voice_traffic_Local_Terminate
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS4_0_BGC Mobile_Access_Collect_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice
	NLS4_0_BGC_Mobile_Access_Distribute_SMS
	NLS4_0_BGC Mobile_BackBone_Voice
	NLS4_0_BGC_Mobile_Backbone_SMS
Mobile IN Platform	NLS4_0_SMS_Services
	NLS4_0_Private_Communication_Call_Handling
	NLS4_0_Mobile_PrepaidTraffic_Services
	NLS4_0_Mobile_PrepaidData_Services
Special	NLS4_0_Automated_call_distribution
	NLS4_0_PublicPayphones
Other special	NLS4_0_InternetDialUp_CallHandling

For the access, the voice application services are end-to-end voice connections between the customer site and the central office (technical building closest to the user) . For the backbone, voice

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applications are either pure call handling related and do not span over distant nodes, or they are voice transport applications between distant nodes . Next picture puts into perspective the services of the Voice application layer.

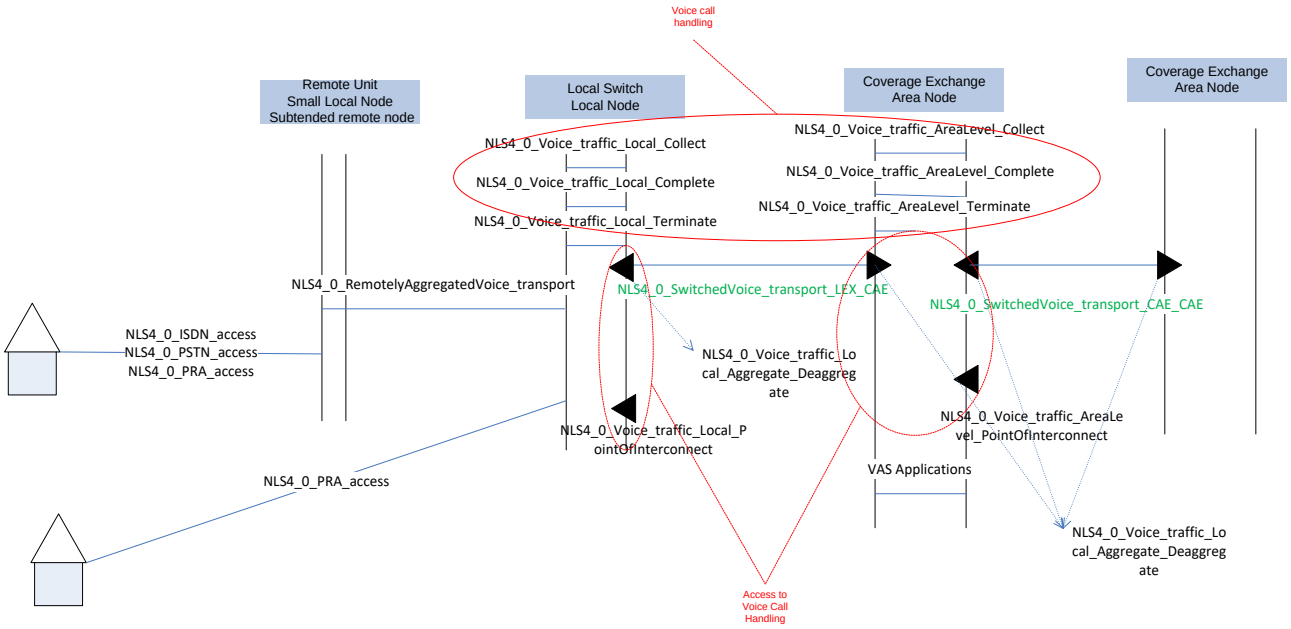

Figure 15: the services of the Voice application layer 4.0

7.9.2 Usage of the application layer

The TV related applications are completely used for iDTV end-user services, no specific consumption driver needs to be defined.

The voice application services are distributed to a variety of traffic types , each with a specific driver. The following table summarizes the used drivers per voice application service.

Class of application service	Voice application service	Driver to distribute the NLS4.0 application service to EUS or NLS4.1
Access to VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	TimeSlotEquivalent_capacity_used
	NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	routed minutes
	NLS4_0_Voice_traffic_Local_PointOfInterconnect	TimeSlotEquivalent_capacity_used
NP	NLS4_0_FixedPortableNumberLocation	Nbr_calls
	NLS4_0_Public_NumberPortability	Nbr_of_ported_numbers
Telephony Access	NLS4_0_ISDN_access	Nbr_lines_inUse
	NLS4_0_ISDN-PRA_access	Nbr_lines_inUse
	NLS4_0_PSTN_access	Nbr_lines_inUse
VAS application	NLS4_0_CallerIdentity_CallHandling	direct
	NLS4_0_CallingCard_CallHandling	direct
	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
	NLS4_0_MessageWaitingIndicator_Inserting	direct
	NLS4_0_OtherAdvanced_CallHandling	Direct

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	NLS4_0_PrepaidCallingCard_CallHandling	Direct
	NLS4_0_Service_Announcements_Playing	Nbr_calls
	NLS4_0_Televoting_CallHandling	Nbr_calls_explosive_traffic
	NLS4_0_VirtualPrivateNetwork_CallHandling	direct
	NLS4_0_VoiceFeatures_SelfManaging	direct
	NLS4_0_Voicemail&Messaging	direct
	NLS4_0_WakeUp_CallHandling	direct
Voice transport	NLS4_0_RemotelyAggregatedVoice_transport	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_CAE	routed minutes
	NLS4_0_FixedSwitchedVoice_transport_National_offnet	TimeSlotEquivalent_capacity_used
	NLS4_0_SwitchedVoice_transport_LEX_CAE	routed minutes
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_MSC	routed minutes
	NLS4_0_SwitchedVoice_transport_LEX_MSC	routed minutes
VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Collect	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Complete	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Terminate	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Transit	routed minutes
	NLS4_0_Voice_traffic_Local_Collect	routed minutes
	NLS4_0_Voice_traffic_Local_Complete	routed minutes
	NLS4_0_Voice_traffic_Local_Terminate	routed minutes
Mobile Voice&MessagingHandling	NLS4_0_BGC Mobile_Access_Collect_Voice	routed minutes
	NLS4_0_BGC_Mobile_Access_Collect_SMS	routed volumes
	NLS4_0_BGC Mobile_Access_Distribute_Voice	routed minutes
	NLS4_0_BGC Mobile_Access_Distribute_SMS	routed volumes
	NLS4_0_BGC Mobile_BackBone_Voice	routed minutes
	NLS4_0_BGC_Mobile_Backbone_SMS	routed volumes
Mobile IN platform	NLS4_0_SMS_Services	Cumulated invested value
	NLS4_0_Private_Communication_Call_Handling	Cumulated invested value
	NLS4_0_Mobile_PrepaidTraffic_Services	Cumulated invested value
	NLS4_0_Mobile_PrepaidData_Services	Cumulated invested value

The driver "routed minutes" (or "routed volumes" in the case of mobile SMS) consists in determining the average number of times (=routing factor) a traffic type is using the voice application service across all possible call scenarios compatible with the traffic type. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) of that traffic type.

The traffic types ("consumers") of these voice applications are:

Class of voice application	Traffic type
Access to VoiceCallHandling	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Carrier PreSelection IAA interconnection
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO

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	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Mobile_Roaming IN Origination
	EUS_MVAS - BGC Fixed
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
	EUS_Voice_traffic_Local_PointOfInterconnect subscription
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
Mobile Voice&MessagingHandling	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile international traffic incoming
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile to BGC Mobile
	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Interconnection FOLO to BGC Mobile
	EUS_Interconnection MOLO to BGC Mobile
	EUS_Mobile_On net SMS
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_Mobile_Roaming IN_Terminating_SMS
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
NP	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_IAA interconnection - BGC Fixed to FOLO
	EUS_Incoming International Transit (M)OLO Traffic
	EUS_Other_Traffic - BGC Fixed
	EUS_Number Portability access per line subscription
Special	EUS_AUTOMATEDCALLDISTRIBUTION

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	EUS_Payph operations - BGC Fixed
Telephony Access	EUS_ISDN-BA Access - subscription
	EUS_Private_IP&Ethernet_on_backup
	EUS_ISDN-PRA Access - subscription
	EUS_PSTN Access - subscription
VAS application	EUS_BGC Fixed DCIA traffic
	EUS_BGC Fixed international traffic incoming
	EUS_BGC Fixed interzonal traffic
	EUS_BGC Fixed local traffic
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed zonal non local traffic
	EUS_BVAS Call & Conference - BGC fixed
	EUS_Calling Card Postpaid Traffic - BGC Fixed
	EUS_Carrier PreSelection IAA interconnection
	EUS_Carrier PreSelection local interconnection
	EUS_Consultel 090x Traffic - (M)FOLO to BGC Fixed
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
	EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	EUS_MVAS - BGC Fixed
	EUS_notAllocated
	EUS_OPS International Information Traffic - BGC
	EUS_OPS National Information Traffic - BGC
	EUS_Other_Traffic - BGC Fixed
	EUS_Payph operations - BGC Fixed
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
Voice transport	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile international traffic incoming
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_BGC Mobile_Roaming Out Origination
	EUS_BGC Mobile_Roaming Out Termination
	EUS_Carrier PreSelection local interconnection
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed

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	EUS_Interconnection BGC Mobile to MOLO
	EUS_Interconnection FOLO to BGC Mobile
	EUS_Interconnection MOLO to BGC Mobile
	EUS_Local interconnection - FOLO to BGC Fixed
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_MVAS - BGC Fixed
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Local BGC Fixed_On net Voice
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
VoiceCallHandling	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Carrier PreSelection IAA interconnection
	EUS_Carrier PreSelection local interconnection
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	EUS_Mobile_Roaming IN Origination
	EUS_MVAS - BGC Fixed
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Local BGC Fixed_On net Voice
	NLS4_1_Outgoing International Traffic - BGC Fixed

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	NLS4_1_Transit International (M)OLO Traffic EAA
	NLS4_1_Transit International (M)OLO Traffic IAA
Other special	EUS_internet traffic - FOLO to BGC 0909/3 IAA
	EUS_Other_Traffic - BGC Fixed

Below table gives a view on fixed or mobile related traffic types ("consumers") of those voice applications:

traffic category	Voice application service	EUS or NLS4_1
mobile traffic related	NLS4_0_BGC Mobile_Access_Collect_Voice	EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Mobile_Roaming IN Origination
		NLS4_1 BVAS - BGC Fixed
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	NLS4_0_BGC Mobile_Access_Collect_SMS	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
		EUS_Mobile_Roaming IN_Originating_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile to BGC Mobile
		EUS_Interconnection FOLO to BGC Mobile
		EUS_Interconnection MOLO to BGC Mobile
		EUS_Mobile_Roaming IN Origination
		EUS_Mobile_Roaming IN Termination
	NLS4_0_BGC Mobile_Access_Distribute_SMS	EUS_BGC Mobile_Incoming SMS international
		EUS_BGC Mobile_Incoming SMS national
		EUS_Mobile_On net SMS
		EUS_Mobile_Roaming IN_Originating_SMS
		EUS_Mobile_Roaming IN_Terminating_SMS
	NLS4_0_BGC Mobile_Backbone_Voice	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic

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	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile to BGC Mobile
	EUS_BGC Mobile_Roaming Out Termination
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Interconnection FOLO to BGC Mobile
	EUS_Interconnection MOLO to BGC Mobile
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
NLS4_0_BGC Mobile_Backbone_SMS	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_Mobile_On net SMS
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_Mobile_Roaming IN_Terminating_SMS
NLS4_0_MobileSwitchedVoice_transport_National_offnet	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile_Roaming Out Termination
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN_Originating_SMS
NLS4_0_RemotelyAggregatedVoice_transport	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_SwitchedVoice_transport_CAE_MSC	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_Mobile_Roaming IN Origination
	NLS4_1 BVAS - BGC Fixed
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
NLS4_0_SwitchedVoice_transport_LEX_CAE	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination

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	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_SwitchedVoice_transport_LEX_MSC	EUS_BGC Mobile to BGC Fixed
	EUS_Mobile_Roaming IN Origination
NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Collect	EUS_BGC Fixed to BGC Mobile
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
NLS4_0_Voice_traffic_AreaLevel_Terminate	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1 BVAS - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Transit	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Mobile National outg. FOLO
	EUS_Mobile_Roaming IN Origination
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_Local_Collect	EUS_BGC Fixed to BGC Mobile
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_Local_Terminate	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination

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Mobile IN	NLS4_0_SMS_Services	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
	NLS4_0_Private_Communication_Call_Handling	EUS_BGC Mobile_Roaming Out Origination
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_0_Mobile_PrepaidTraffic_Services	EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_0_Mobile_PrepaidData_Services	EUS_Mobile_Data national
		EUS_BGC Mobile_Roaming Out Data
pure fixed traffic related	NLS4_0_FixedSwitchedVoice_transport_National_offnet	EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_1_IAA interconnection - BGC Fixed to FOLO
		EUS_IAA interconnection - BGC Fixed to MOLO
	NLS4_0_RemotelyAggregatedVoice_transport	EUS_Carrier PreSelection local interconnection
		EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_IAA interconnection - BGC Fixed to MOLO
		EUS_Local interconnection - FOLO to BGC Fixed

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	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Local BGC Fixed_On net Voice
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_SwitchedVoice_transport_CAE_CAE	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_Transit International (M)OLO Traffic EAA
NLS4_0_SwitchedVoice_transport_LEX_CAE	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
NLS4_0_Voice_traffic_AreaLevel_Collect	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO

Sensitivity: Unrestricted

	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Complete	NLS4_1 BVAS - BGC Fixed
	NLS4_1_IAA BGC Fixed_On net Voice
NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
NLS4_0_Voice_traffic_AreaLevel_Terminate	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Transit	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
	NLS4_1_Transit International (M)OLO Traffic IAA
NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_Local_Collect	EUS_Carrier PreSelection IAA interconnection
	EUS_Carrier PreSelection local interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO

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	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
NLS4_0_Voice_traffic_Local_Complete	NLS4_1_Local BGC Fixed_On net Voice
NLS4_0_Voice_traffic_Local_PointOfInterconnect	EUS_Voice_traffic_Local_PointOfInterconnect subscription
NLS4_0_Voice_traffic_Local_Terminate	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed

7.9.3 Contributors to the application services

TV services

The broadcast TV application service is the result of the video streaming network stage function and the nation wide broadcast using the SDH clusters and simultaneously the multicast features of the Ethernet/MPLS regional clusters combined with the express pseudowires in order to reach all regional clusters.

Contributor to NLS4_0_BroadcastTV	**Driver**
NSF_BroadcastTV	Nbr_TV_users
NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_LocalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_1_Backbone_MulticastVPLS_IntraRegion	Direct

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NLS2_1_Backbone_Pseudowire_InterCity	TotalPeakBandwidth_used(Gbps)
NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)

Similarly, the Video On Demand service is the result of Video Movie servers delivering the content and the transport services towards the closest local node to the customer . The transport is realized on the Ethernet/MPLS network.

Contributor to NLS4_0_VoD	Driver
NLS3_VoD_IP_collection	direct
NSF_VoD	Nbr_TV_users

Voice application services in the access

PSTN and ISDN access services are the result of the voice concentrator function in the closest technical building (local switch or remote unit) and the physical copper connectivity between the customer site and the technical building. In addition, the data connectivity required to transport Voice over IP signaling and traffic to the Voice over IP switching units is also included as a contributor to voice access.

PRA access services do not need a concentrator function (that function is typically realized within the customer site by private switches) but merely a voice transport link to the local switch. This one is obtained directly from layer 2.0 transport segments and local tails.

Hereunder a summary of the contributors to voice access together with the drivers used to determine their level of involvement in the service

Voice access service	Contributor	Driver Name
NLS4_0_ISDN_access	**NLS1_0_Continue_Raw_Copper**	Nbr_of_used_pairs
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NSF_ISDN_NetworkTermination	Nbr_of_accesses
	NSF_ISDN_Voice_concentrator	Nbr_lines_inUse
NLS4_0_PSTN_access	**NLS1_0_Continue_Raw_Copper**	Nbr_of_used_pairs
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS3_VoIP_IP_collection	Direct
	NSF_PairGainSystem	Direct
	NSF_PSTN_Voice_concentrator	Nbr_lines_inUse
NLS4_0_ISDN-PRA_access	**NLS2_0_InterCityBackboneCapacity=2M**	Bandwidth consumed (Mbit/s)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_LocalTailCapacity	Bandwidth consumed (Mbit/s)

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	NSF_ISDN_Primary_Access	Nbr_lines_inUse

Voice application services in the backbone (see picture Figure 15: the services of the Voice application layer 4.0)

The services in the group "Access to VoiceCallHandling" allow to access the switching matrix and call handling , they are realized by ports to the switch (a switch port concentrates the voice circuits from/to the switching matrix). The switching ports (trunks) can be those of a local switch or of a transit switch.

For the case of interconnection with other operators (NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect, NLS4_0_Voice_traffic_Local_PointOfInterconnect) , the charging function of the switch is also exercised in order to allow for interoperator billing.

In summary the contributors are distributed using following drivers:

Network functions used to realize Access to VoiceCallHandling services	Driver used to attribute network functions to access to VoiceCallHandling services
NSF_Voice_call_CAE_charging	Routed minutes
NSF_Voice_call_CAE_Trunks	TimeSlot_capacity_used
NSF_Voice_call_Local_charging	Routed minutes
NSF_Voice_call_Local_Trunks	TimeSlot_capacity_used

The services in the group "VoiceCallHandling" result from three network stage functions:
NSF_Voice_call_CAE_Processing
NSF_Voice_call_Local_Processing
NSF_Voice_call_Local_charging

The driver used is "routed minutes" and it consists in determining the average nbr of times (=routing factor) a voice call handling type is using the network functions . The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) exercising that voice call handling type.

Network function		**Driver Name**
NSF_Voice_call_CAE_Processing	NLS4_0_Voice_traffic_AreaLevel_Collect	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Complete	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Terminate	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Transit	Routed minutes
NSF_Voice_call_Local_charging	NLS4_0_Voice_traffic_Local_Collect	Routed minutes
	NLS4_0_Voice_traffic_Local_Complete	Routed minutes
	NLS4_0_Voice_traffic_Local_PointOfInterconnect	Routed minutes

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NSF_Voice_call_Local_Processing	NLS4_0_Voice_traffic_Local_Collect	Routed minutes
	NLS4_0_Voice_traffic_Local_Complete	Routed minutes
	NLS4_0_Voice_traffic_Local_Terminate	Routed minutes

The services in the group "Voice transport" are emanating from layer 2.0 Backbone transport capacity (<=2M) which are distributed according to the consumed bandwidth.

Contributor to NLS4_x	Driver	NLS4_x element
NLS2_0_LocalBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_ISDN-PRA_access
NLS2_0_LocalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC

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		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalTail<2M	Nbr_of_Customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
NLS2_0_LocalTail=2M	Nbr_of_Customer_sites	NLS4_0_ISDN-PRA_access

The services in the group "VAS application" are in fact directly identified with a network function:

NSF_CallerIdentity_CallHandling	NLS4_0_CallerIdentity_CallHandling	direct
NSF_CallingCard_CallHandling	NLS4_0_CallingCard_CallHandling	direct
NSF_InteractiveVoiceResponse_CallHandling	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
NSF_MessageWaitingIndicator_Inserting	NLS4_0_MessageWaitingIndicator_Inserting	direct
NSF_OtherAdvanced_CallHandling	NLS4_0_OtherAdvanced_CallHandling	direct
NSF_PrepaidCallingCard_CallHandling	NLS4_0_PrepaidCallingCard_CallHandling	direct
NSF_Service_Announcements_Playing	NLS4_0_Service_Announcements_Playing	direct
NSF_Televoting_CallHandling	NLS4_0_Televoting_CallHandling	direct
NSF_VirtualPrivateNetwork_CallHandling	NLS4_0_VirtualPrivateNetwork_CallHandling	direct
NSF_VoiceFeatures_SelfManaging	NLS4_0_VoiceFeatures_SelfManaging	direct
NSF_Voicemail&Messaging	NLS4_0_Voicemail&Messaging	direct
NSF_WakeUp_CallHandling	NLS4_0_WakeUp_CallHandling	direct

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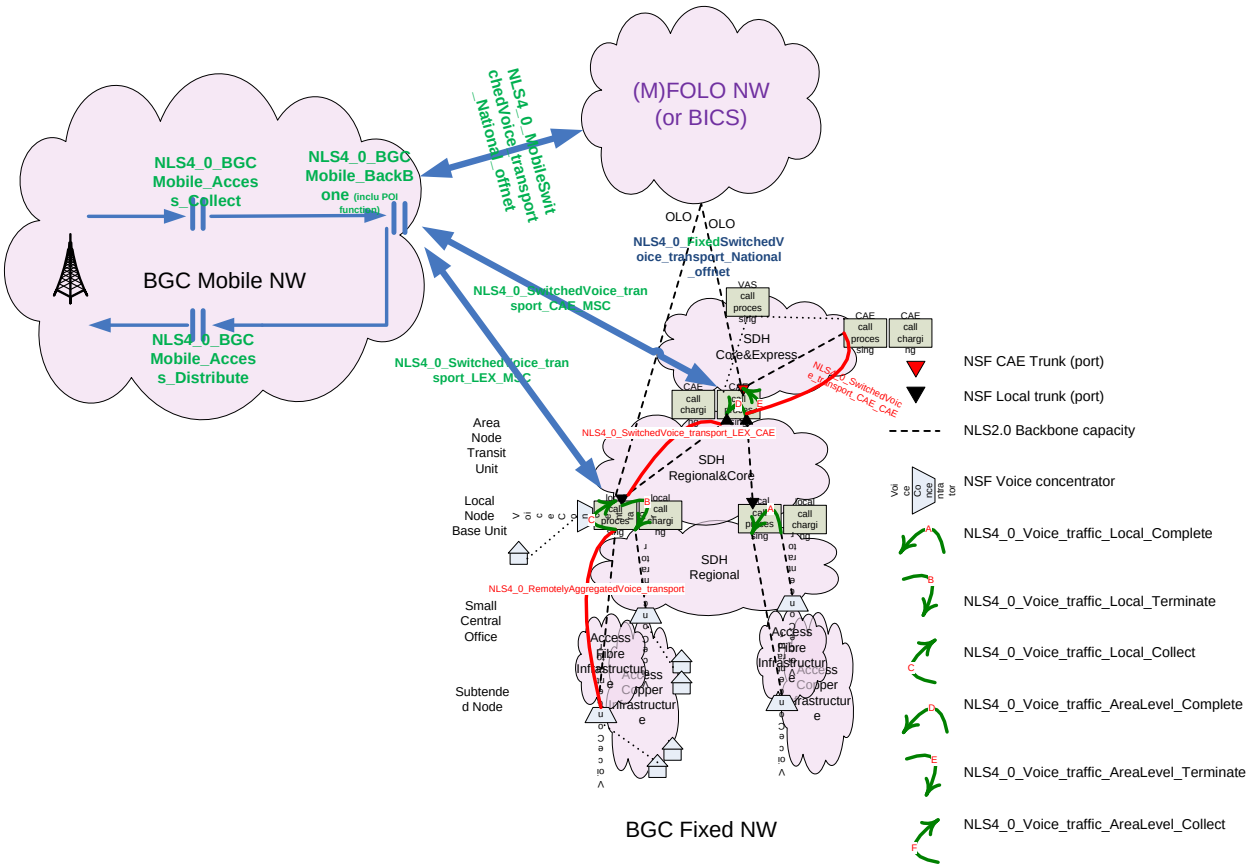

Figure 16: Switching Network

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8 Annex I: SRW Flow Acronyms

SRW	Support, Retail, Wholesale
BIPT	Belgian Institute for Postal services and Telecommunications
BTN	Business TransformatioN
CBU	Consumer Business Unit
CC	Costs Center
CCG	Costs Center Group
CP	Costs Pool
CWS	Carrier & WholeSale
EBU	Enterprise Business Unit
FAC	Fully Allocated Costs
HCA	Historical Cost Accounting
HMC	Human Manpower Cost
MOS	Material Out of Stock
NRA	National Regulatory Authority
REG	(Proximus) Group Regulatory Affairs
SMP	Significant Market Power
SOG	Services & Other Goods
S&S	Staff & Support

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9 Annex II: Network and IT Flows Acronyms

AC	Asset Class
ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
BA	Basic Access
BAS	Broadband Access Server
BES	Proximus European Solutions
BGC	Proximus
BILAN	Proximus Interconnection of LANs
BLES	Proximus LAN Extension Service
BROBA	Proximus Reference Offer for Bitstream Access
BROTSOLL	Proximus Reference Offer for Terminating Segment of Leased Line
BVAS	Business Value Added Services
CAE	Coverage Exchange Area
CAPEX	CApital Expenditures
CP	Cost Pool
CPE	Customer Premises Equipment
CPU	Central Processing Unit
CWDM	Coarse Wavelength Division Multiplexing
DACS	Digital Analog Cross-connect System
DCN	Data Communication Network
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DU	Dispatch Unit
DWDM	Dense Wavelength Division Multiplexing
EAA	Extra Access Area
EAL	Ethernet Access Line
EFM	Ethernet First Mile
ESS	Ethernet Service Switch
Ethane	ETHernet Aggregation NETwork
EUS	End User Service
FAC	Fully Allocated Costs
FIFA	Fast Internet Future Architecture

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FTTC	Fiber To The Cabinet
FTTO	Fiber To The Office
Gb	Giga bit
Gbps	Giga bits per second
HW	HardWare
IAA	Intra Access Area
iDTV	interactive Digital TeleVision
IN	Intelligent Network
INCA	Integrated Cost Application
IO	In/Out
IP	Internet Protocol
IPVPN	Internet Protocol Virtual Private Network
ISAM	IP Subscriber Line Access Multiplexer
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LDC	Local Distribution Center
LEX	Local Exchange
LL	Leased Line
LTE	Line Terminating Equipment
Mbit	Mega bit
MEO	Modern Equivalent Opex
MOLO	Mobile Other Licensed Operator
MPLS	MultiProtocol Label Switching
MSR	Multi Server Router
MUX	Multiplexer
MVAS	Mass Value Added Services
MWE	MicroWave Equipment
NE	Network Element
NGA	New Generation Access
NGN	New Generation Network
NLS	Network Layer Service
NTE	Network Terminating Equipment
NTP	Network Termination Point
NSF	Network Stage Function

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OLO	Other Licensed Operator
OLTE	Optical Line Terminating Equipment
OPEX	OPerational Expenditure
OVH	Overhead
PDH	Plesiochronous Digital Hierarchy
PRA	Primary Access
PSTN	Public Switched Telephony Network
QoS	Quality of Service
RAM	Random Access Memory
ROP	Remote Optical Platform
SDH	Synchronous Digital Hierarchy
SDSL	Symmetric Digital Subscriber Line
STM	Synchronous Transport Module
TDM	Time Division Multiplexing
TV	TeleVision
VAS	Value Added Services
VDSL	Very high speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VP	Virtual Path
VPLS	Virtual Private Local area network Service
VPN	Virtual Private Network
WDM	Wavelength Division Multiplexing
SDE	Service Delivery Engine
NEO	Network Engineering & Operations
COP	Customer Operations
CFO	Customer Field Operations
CIS	Customer ICT Services
ITS	Information Technology Services
APP	Architecture, Planning & Program Office

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Proximus Regulatory Cost Model 2015

General Description

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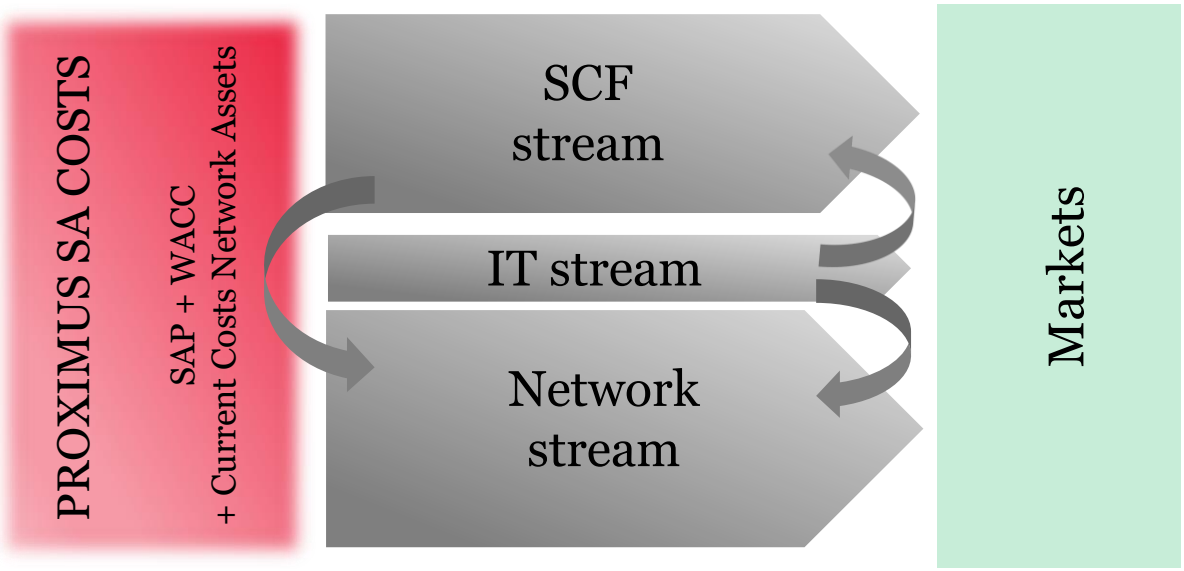
1 General description

REG (Group Regulatory Affairs) department ensures the preparation of separated accounts and sets up the Cost model inherent to the reporting of separated accounts, and used in other regulatory files. In accordance with European Commission recommendations, the entire costs of statutory accounts are taken into account in the cost model and reporting of separated accounts, to the exception of statutory accounts 65 to 68, as well as some other accounts excluded from the cost model perimeter. As said, the cost basis of the cost model is directly issued from the general accounting of Proximus SA, as recorded in SAP accounting tool. Statutory accounts of Proximus SA have been audited in 2015 by Deloitte, external auditors. Deloitte auditors issued an unqualified opinion on statutory accounts.

Separated accounts result from allocation flows of Network/IT and SCF (Support and Customer flow) costs, as included in the general accounting of Proximus SA, as well as the cost of capital of these two modules.

The following chart illustrates the accounting system of costs, as well as main allocation flows. The whole costs included in the allocation process are loaded in a tool (Telecom Costs Expert Software, referred as TCE) that runs accuracy tests and prevents double costs counting or multiple allocations.



SCF allocation flows include costs that are of service to the customer and other direct and indirect costs that are not included in the Network nor IT allocation flows.

Network and IT flows include all the costs related to the Network and Information & Communication technology.

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Costs allocated in allocations flows SCF, Network and IT have the same cost basis origin, this latter being SAP statutory accounts of Proximus SA. IT tool TCE, in past models named INCA, makes validity checks to prevent any double counting and trace allocated costs from their unique SAP cost basis origin to their final destination.

The Cost model per Market is a top-down model.

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2 Model Allocation Structure

This section provides with a global view on the allocation structure of the model by walking through the major allocation flows and introducing the major building blocks and concepts in the model.

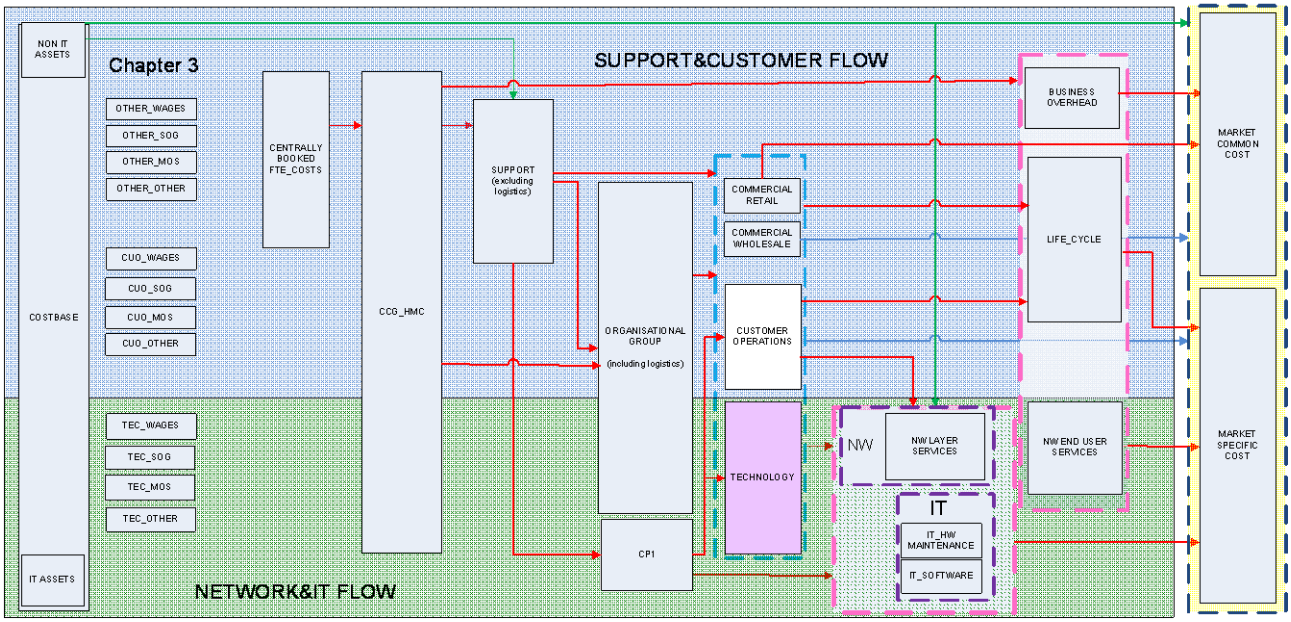
The following Figures will be the supporting tools for such discovery walk, where the major modules constituting the model as well as the global allocation flows among them are shown. The differentiation between SCF, Network and IT flows is also illustrated in the exhibit.

The overall objective of the model is allocating all the attributable costs present in the cost base to the markets as defined in the regulatory framework.

Therefore, the cost base constitutes the foundation of the model.

Further, the model allocation process is subdivided into three main streams, SCF, Network and IT.

The Cost base settings and the Non IT assets are presented in chapter 3.



The SCF stream has as objective to allocate all costs that are not part of the Network or IT model towards the markets.

SCF stream (chapter 4) encompasses Support, Commercial Retail, Commercial Wholesale and Customer operations costs.

The IT and Network streams, although having completely separated CAPEX basis, both share a common OPEX source.

OPEX of IT and Network streams are handled via allocation of costs of Technology business unit (chapter 5).

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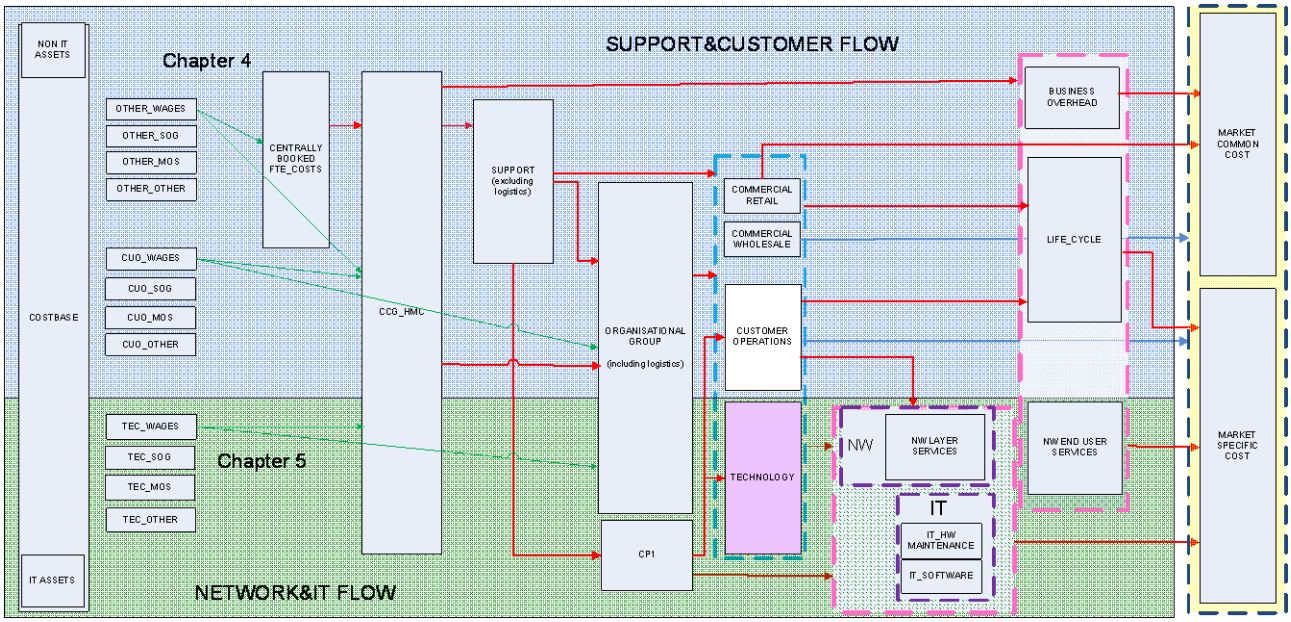
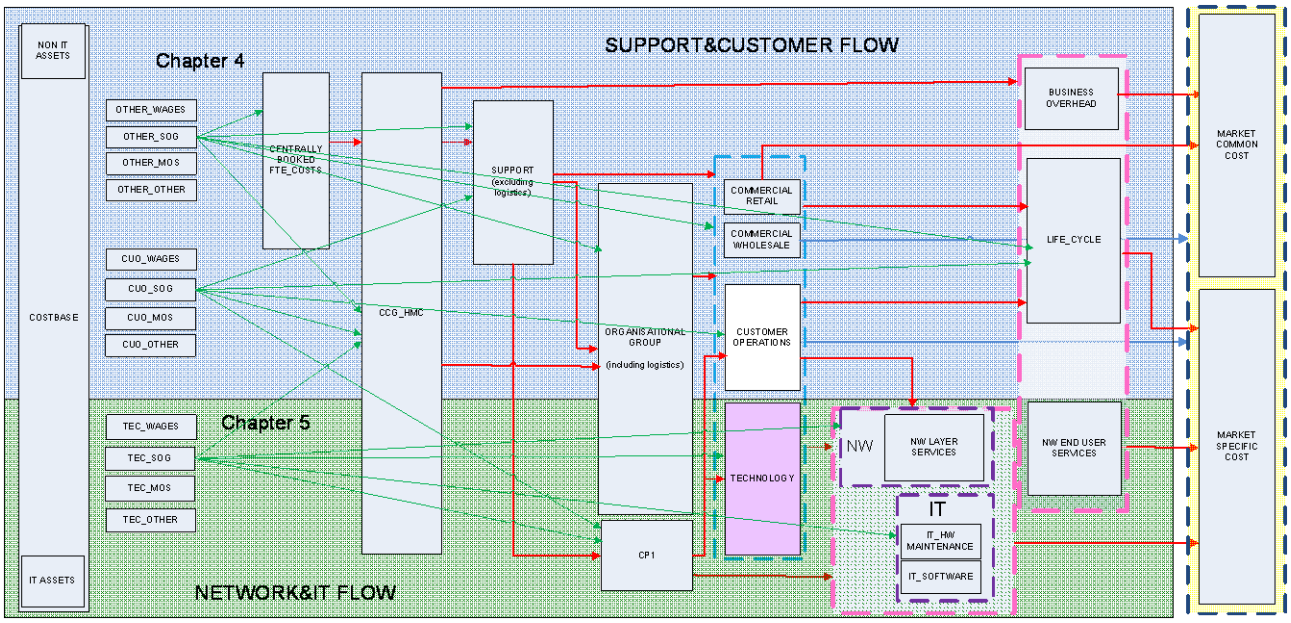
WAGES OPEX allocation flows are as follows:



Services and Other Goods OPEX allocation flows are as follows:



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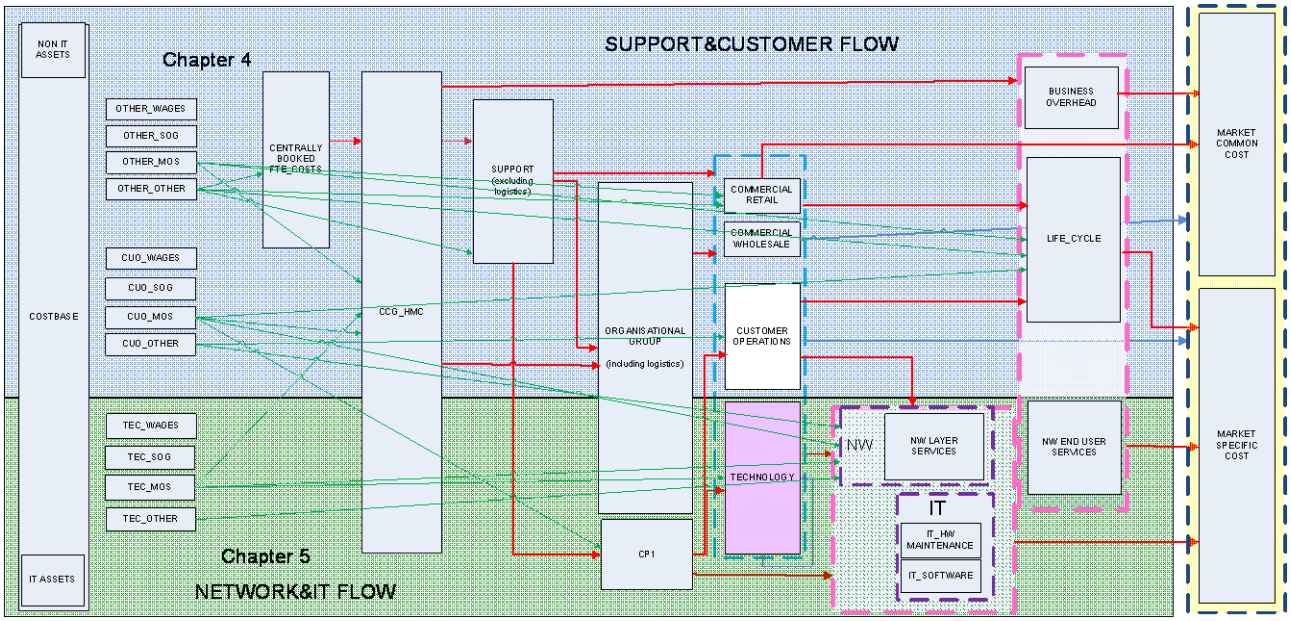
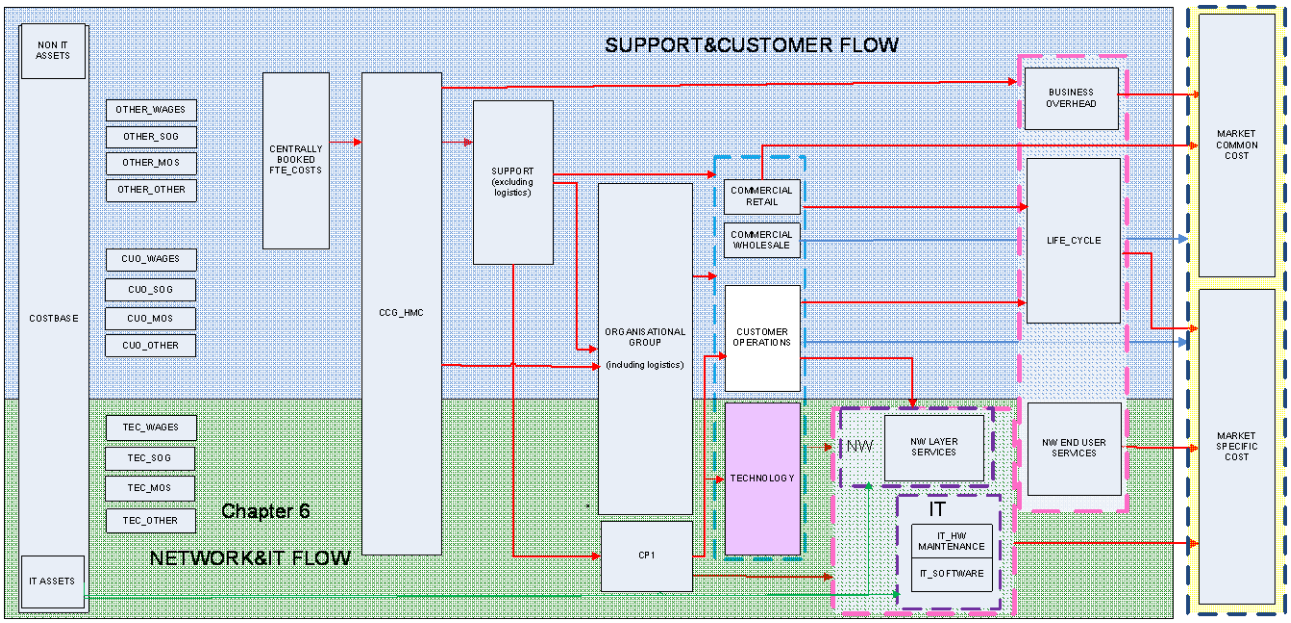
Materials out of stock and Other OPEX allocation flows are as follows:



IT Assets allocation flows are as follows:



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3 Cost Base

3.1 Cost model perimeter

3.1.1 Determination of the Cost model perimeter

Costs included in the Cost model are operating charges, i.e. general ledger (GL) accounts 60 to 64 of statutory accounting, as well as part of GL 69.

GL 60 "cost of goods sold" includes mainly telecom equipment purchases (ADSL modem, handsets, cables, mobile SIM cards, etc.), small equipment (cpe, …) and stocks movements.

GL 61 « services and other goods » includes primarily costs linked to traffic (a.o. interconnection fees) and operating expenses such as maintenance, utilities, renting, marketing, representation allowances, consultancy, travel fees, etc.

GL 62 corresponds to all personnel costs (wages and other salary benefits).

GL 63 includes depreciation and amortization, stocks and trade receivable accruals for write-off and movements of provisions for liabilities.

GL 64 gathers other operating expenses, including a.o. write-off on trade receivables, immovable withholding tax and local taxes, taxes on pylons, etc.

GL 69 relates to company result appropriation corresponding to the part of personnel in the profit (collective bonus).

At last, GL 72 – « Produced Fixed assets » reduces the cost basis to cancel costs linked to produced fixed assets and to avoid a double counting of these costs with the corresponding depreciation charge.

To the costs perimeter from the general accounting is added the weighted average cost of capital (WACC) of 8,13% for Proximus Fix products and for Proximus Mobile products.

In 2015, materiality of costs included in the model (excluding WACC that does not come from general accounting) is as follows:

Table 1. Materiality of costs included in the Cost model perimeter (in EUR and in % of total costs).

	Amount	Percentage
60 Materials out of stock		
61 Services & other goods		
62 Remunerations, social secur		
63 Depreciations, write offs and		
64 Other operating charges		
69 Appropriation		
72 PFA		

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3.1.2 Costs excluded from the Cost model perimeter

Other costs than those mentioned above are excluded from the Cost model. It relates to GL 65 to 69 of general accounting, to the exception mentioned above, for part of GL 69 (share of personnel in profit).

Some costs are excluded since considered as having no causal link to the products and activities. This matters for extraordinary costs (GL 66) and tax costs (GL 67 and 68).

Other costs are excluded since already included in the WACC. This relates to financial costs (GL65) and dividends appropriation (GL 69).

Costs excluded mentioned here above are costs excluded from the Cost model upstream (i.e., when defining Cost model perimeter with costs included in general accounting). On top of these ones, other costs will be excluded downstream in the Cost model, i.e. costs excluded via the allocation flow. E.g.: Support costs involving affiliates.

For the year 2015, materiality of the costs excluded is the following:

Table 2. Materiality of costs excluded from the Cost model perimeter (in EUR and in % of total costs)

	Amount	Percentage
66 Extraordinary charges		
69 Appropriation		
65 financial Charges		
67 Income taxes		
68 Transfer to deferred taxes a		

3.2 Cost regrouping

Proximus books the costs on one hand, on a general ledger account defined in general accounting, and on another hand, on a cost center defined in reporting and analytics accounting. This way to handle costs has for objective to gather data, in order to simplify data processing.

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Two types of aggregation are done:

- Aggregation of 690 GL of general accounting in 185 Cost pools (CP)
- Aggregation of 660 cost centers in 263 Cost Centers Groups (CCG).

A **Cost pool** is a group of costs with similar characteristics and issued from the same family of cost natures.

Regarding material resources, gathering of costs is based on the similar function that these costs have. E.g., cost pool "Training expenses" sums up costs of trainings organized inside Proximus, external trainings, training books and documentation costs.

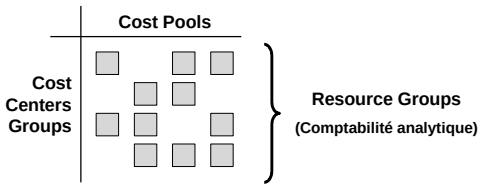
Regarding human resources (referred as FTE, or Full Time Equivalent), cost pools gather workers with the same profile. E.g., cost pool "Level S" includes wages and salaries of employees with level S (Sales force), as well as premiums and other wages benefits paid to these employees.

Costs included in the same cost pool have an identical causal link to the products and activities to which they related. They have the same "resource driver".

A **Cost Center Group (CCG)** sums up cost centers with similar characteristics and realizing similar activities and as a consequence, can be aggregated into the same cost center group.

Each Cost Center Group uses various cost pools.

Combinations cost pool/cost center group constitute the **Resource Groups**. The Resource Groups are the Cost basis of the Cost model.



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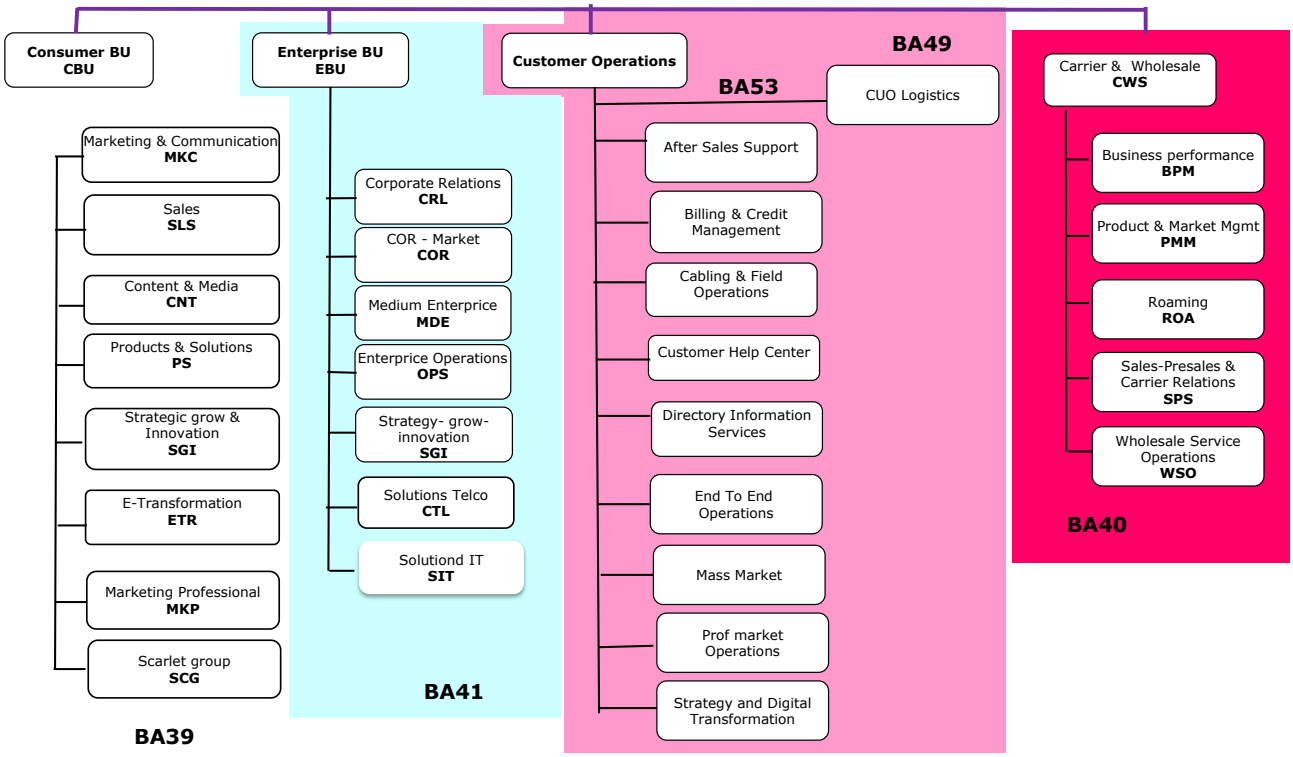
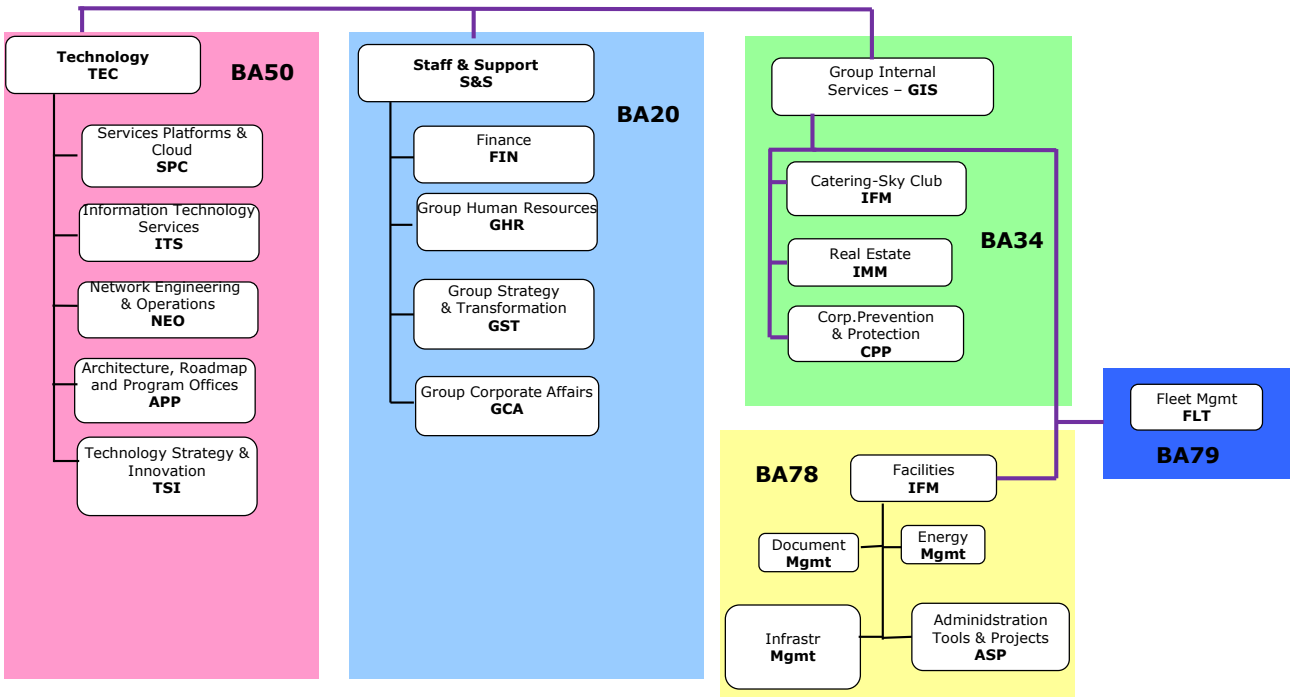
3.3 Organization

The organizational structure of Proximus SA, as on December 31, 2015 as used in the Cost base, is as follows:

Part Customers



Part Technology, Staff&Support and GIS



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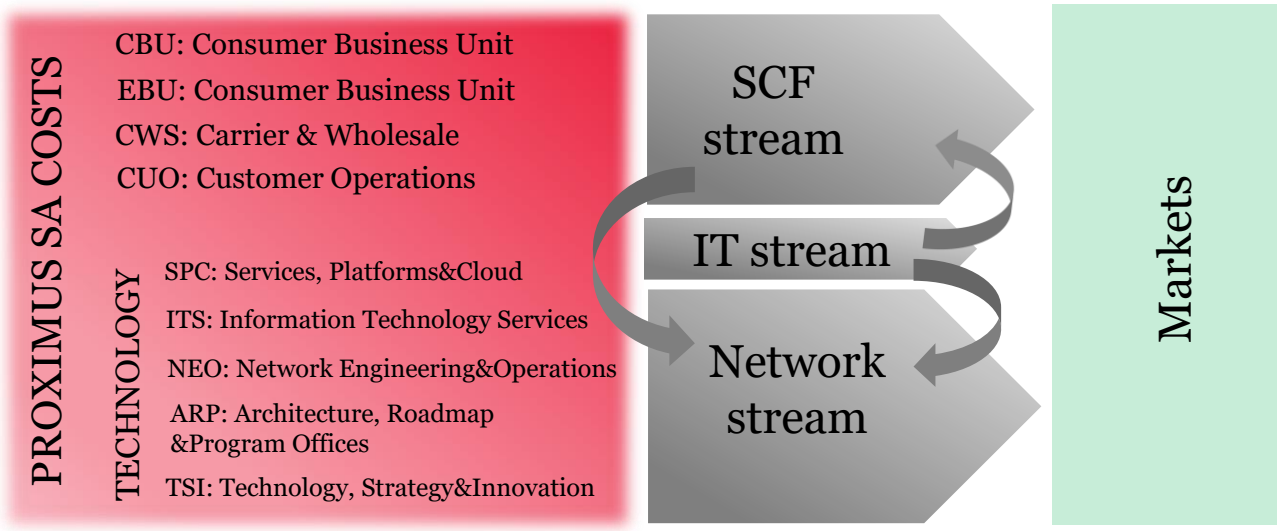
- This organisation has a clear split between the residential and professional customers by the divisions Consumer and Enterprises Business units, as well as the wholesale customers with Carrier & Wholesale Business unit. ,
- The Technology Business unit (TEC) brings together Network and IT services,
- The Customer Operations Business unit gathers all services in direct link with the customer, whether private consumer or enterprise,
- Within Staff & Support, the content (FIN, GHR, GST, GCA) remains the same.
- Group Internal Services groups internal services like Fleet, Facilities, Prevention &Protection, etc.

Cost perimeter is split by the REG department between allocation flows of Network/IT and Support and Customer flow, after completeness and accuracy checks (no double counting) on costs data from SAP. As mentioned in general description, allocation flow Network/IT allocates all costs and assets (capital expenditure) in IT and Network, while the allocation flow Support and Customer flow allocates costs and assets other than IT and Network related.



Split of cost perimeter between allocation flows Network/IT and SCF is processed as follows:

- All departments within TEC are treated within the Network / IT flow.
- Provisions for taxes on telecom equipment that are booked at the level of TEC management are downstream shared via allocation flows between assets classes to which they relate.
- All other costs, not mentioned above are treated within the SCF flow namely the divisions CBU (Consumer Business Unit), EBU (Enterprise Business Unit), CWS (Carrier Wholesale), CUO (Customer operations) and Staff & Support. The Staff & Support division comprises different departments, including Headquarters, GCA (Group Corporate Affairs) which includes Legal, Group Public Affairs, Regulatory, Internal audit, Group communications and Secretary General. Then we have departments like Finance, Group Human Resources, Group Strategy & Transformation and GIS (Group Internal Services) for departments like Real Estate, Business Services, Facilities, Prevention & Protection, Fleet and Catering.

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- Regarding Assets (depreciation and WACC), repartition is done based on an analysis of assets classes: assets IT and Network are handled in the allocation flow Network/IT, while all other assets (buildings, utilities equipment, CPE, etc.) are allocated in the flow SCF.

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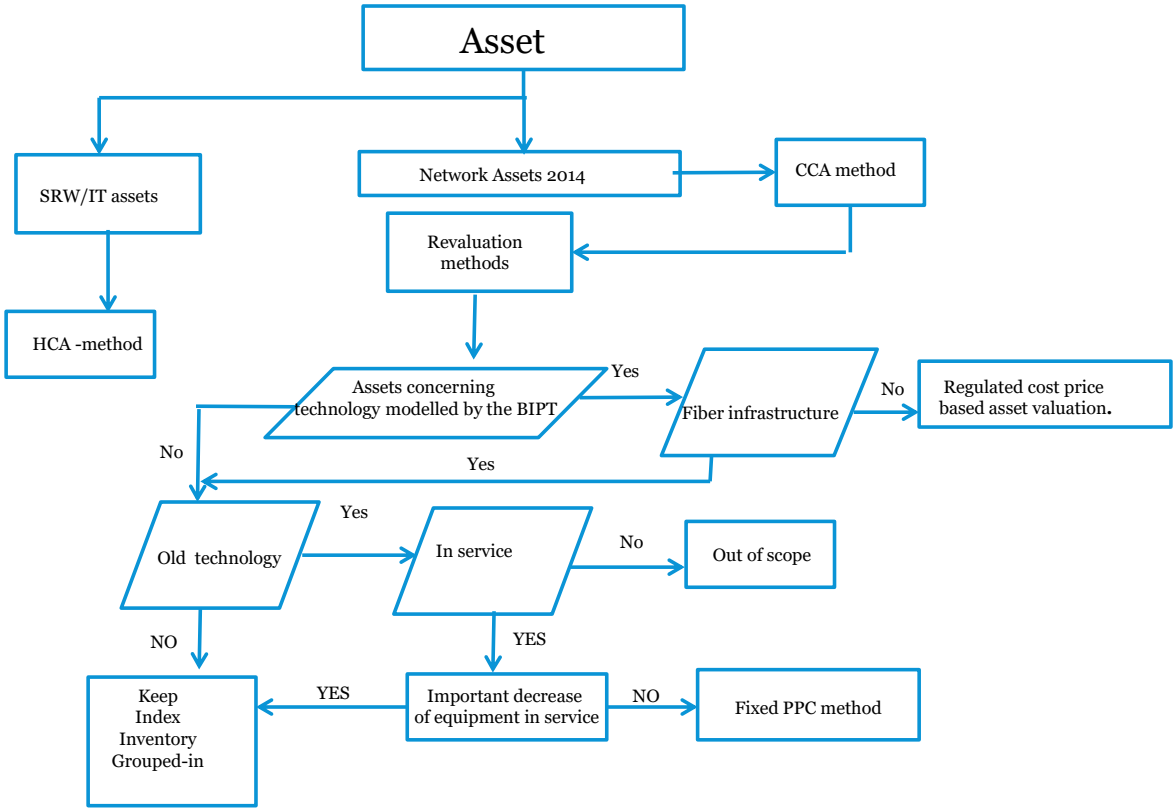
3.4 Assets revaluation

3.4.1 Decision tree



3.4.1.1 *Split network - SCF and IT assets*

The assets base was split up in Network – SCF and IT assets. The cost of the network assets must be based, for operators being declared as dominant, on the Current Cost Accounting. For the SCF assets (EBU-CBU– CUSTOMER OPERATIONS- SUPPORT-Facilities-Sourcing-Fleet) and IT related assets the cost accounting systems is based on the Historical Cost Accounting method.

3.4.2 Methods used to reevaluate the network assets

The regulatory framework clearly states that the cost accounting systems of operators being declared as dominant on relevant markets must be set based on Current cost accounting for the network costs.

The network & IT flows within the top down model calculate the current costs for the network related assets. Current costs have been computed as explained hereafter.

There are five methods to evaluate the current value of the network: reassessment of the current inventory, price indexation, by default “keep everything as it is”, index based on a fixed PPC and regulated cost price based. For old assets concerning technology still in service we use a method

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based on a fixed PPC2007. Each of these methods requires its own set of inputs. It is mainly the availability (or lack) of input which dictates the choice of the method. Nevertheless each method has its advantages and disadvantages with respect to the others.

The inventory and price indexation methods assume that network departments replace the equipment of its assets by equivalent equipment. The notion of equivalent is quite fuzzy. An engineer would tell you that over time there are always more functions integrated in new equipment and that they are always more cost-effective. It makes the comparison between different generations of equipment difficult. The notion of equivalent has therefore been addressed through the term Modern Equivalent Asset (MEA). The assets must be replaced by their MEA. The MEA is the replacement cost of the technology expected to be in place within the planning horizon. Note that this notion takes into account the introduction speed of a new technology in the network. If network departments plan to have replaced 50% of an old technology by a new one within the planning horizon, it makes no sense to simulate the costs with higher percentages because the planning takes into account the availability of the resources to carry out the work.

Find hereafter the rules that have been used:

- Technology still in procurement: use current price, e.g. SDH equipment, DWDM equipment
- Technology to be replaced within the planning horizon: use current price of the modern equivalent asset, e.g. some PDH line system equipments are replaced by SDH equivalents.
- Obsolete technology: use current price of the modern equivalent asset, e.g. the HDSL technology for high speed services on copper replaces the less cost-effective HDB3 technology.
- Technology grouped in : those assets will be revaluated by another asset concerning the same technology
- Old technology not anymore in service : those assets are set out of scope and will not be revaluated
- Old technology still in service (in maintenance mode); those assets are revaluated by an index method based on a fixed PPC instead of index, keep or inventory method. Old assets revaluated by keep will keep the CAV value as GRC
- BIPT regulated technology : use the BIPT regulated cost price to calculate the annual capital cost

3.4.2.1 *Price Indexation*

This is the most straightforward approach, provided historical costs are available. The investments for each year (from 1981 on) are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The method is refined by defining price indexes depending on the nature of the cost. This is particularly true when costs of a different nature experienced a different price evolution. Three different types of price indices have been defined: the labour index, the indices for services delivered by external companies and the material index. Note that indices for services supplied by external companies vary according to the asset involved. For example, services supplied by external companies related to cable assets, are in fact outsourced labour costs for trenching and cable

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installation. In such case, a labour index has been applied. Other external services less labour intensive are resulting in other price indices, such as a fibre cable index.

3.4.2.2 *Inventory*

This is the best method to reflect accurately the price of assets currently in service in the network. The revaluation is merely performed by multiplying the volume of each specific type of equipment currently deployed in the network by its average current unit cost. The current unit costs are based on the prices defined in the current frame agreements we have with our suppliers.

In terms of inputs it is the most demanding method. It requires an extensive inventory of equipment.

3.4.2.3 *Keep as it is.*

The "keep as it is" method is merely what its name says. We keep the price we have in the historical accounting books. This method is only valid for costs with a very short depreciation period or for software intensive products. For the latter we assume that on the one hand software development is labour intensive but on the other hand the rapidly evolving programming environment improves the productivity compensating for the higher labour cost. This results in a stable software price. Another practical reason to select the "Keep as it is" method is the amount booked on the asset. If this amount is small, the method has also been applied. In this particular case, the effort to collect all the information about the cost evolution outweighs the impact on the service costs.

3.4.2.4 *Index Based on a fixed PPC*

Old technology still in service (in maintenance mode) ; those assets are revaluated by an index method based on a fixed PPC.

If Proximus has done some investments for keeping those technologies in service, we take those investments also into account.

If Proximus has done some great retirements, the revaluation method is revised.

- Formula :

$$GRCyearN = [(GRCyearN-1)*(1+ fixedPPC2007)] + investmentsYearN$$

Formula :

Index year = (1+ (ppc year))* (1+(ppc year -1))* (1+(ppc year -2))*.....

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3.4.2.5 *Asset valuation based on the Proximus Reference Offer tariffs and BIPT bottom-up cost models*

3.4.2.5.1 Method background and rationale

The market for fixed telecommunication services, the related technologies and the competition have evolved through the years leading to the current situation where the vast majority of the telecom services provided by the Proximus's access and area backbone networks are regulated. This regulation has been enforced, amongst other initiatives, by clearly specifying the services and applying regulated tariffs, as reflected in the Proximus Reference Offers (BRUO, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA).

Since the regulated tariffs are cost oriented and determined by bottom-up costing models, it is reasonable to use the direct CAPEX component of these prices to calculate the annuity of the assets addressed by the Proximus Reference Offers or to reuse directly the underlying bottom-up cost models. For fixed access network assets, the regulated prices are directly used; for backbone regulated fixed assets, the bottom-up models of the BIPT have been reused.

For mobile assets, we turn towards the mobile telephony regulation where the focus is on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a mobile call (MTR). In order to calculate this termination rate, BIPT has developed a bottom up mobile cost model, including all voice and data services 2G and 3G. The latest available version of this model was published by BIPT in November 2013, and has been used to value mobile assets.

3.4.2.5.2 Method description

All the fixed network assets, except optical fiber infrastructure, concerned by the technologies covered by the Proximus Reference Offer models (BRxx), namely BRUO, Block&Tie cables, BROBA are valued by applying the direct CAPEX component of the relevant BRxx tariff to the appropriate volumes extracted from the Proximus inventories.

For the backbone regulated fix assets, Proximus capacity volumes are used as demand for the adequate bottom-up model resulting in CAPEX economic depreciation costs that are used in the top down model.

For mobile assets valuation, Proximus mobile volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting CAPEX economic cost has been extracted in order to value the assets.

3.4.2.5.3 Scope

The technologies to be valued by this method, since they are covered by the Proximus Reference Offers and BIPT mobile cost model, are:

- Copper infrastructure: including trenching and copper cable.
- (D)WDM
- PDH/SDH
- xDSL: including ADSL, ADSL2+ and SDSL
- VDSL
- Ethernet
- Mobile network assets 2G, 3G.

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However, some parts of the networks deployed with the above mentioned technologies are not covered by the BIPT tariffs for they provide non-regulated services. Consequently they cannot be valued by means of the regulated tariffs.

These services are:

- Any service provided by the Proximus express network layer, also called intercity network.
- Multicast services, namely broadcast TV.
- High speed Access lines for the Explore customers.
- Mobile network assets 4G.

The chosen alternative for valuing the network sections providing the non-regulated services has been the development of specific models in order to determine applicable direct CAPEX unit prices, at the exception of the mobile network assets related to 4G technology that have been integrated in the bottom-up mobile cost model.

3.4.2.5.4 Method implementation

- *Inputs Fixed Network*
  - *Broken down tariffs*
    - *Broken down tariff based on the BIPT BRxx models*

      By analyzing each of the current BRxx models, the direct CAPEX component of each product of each tariff has been isolated. Further, this constituent has been broken down into all its applicable technological contributors, so that a unit price per technology, per product and per tariff is extracted (Figure 1: Conceptual description of the BRxx tariff breakdown.).

      Although the above described process is applicable to the majority of the BRxx models, there is an exception to the rule, the BIPT BROBA transport model. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, is given in paragraph 3.4.2.5.10.

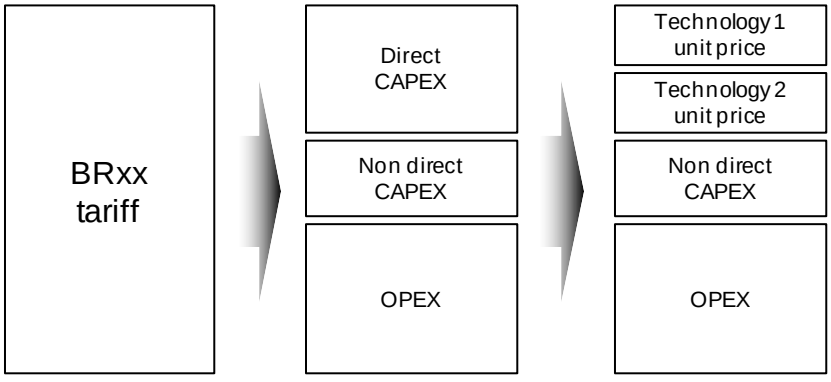

Figure 1: Conceptual description of the BRxx tariff breakdown.

Note: There is no relation between the size of the components and any broken down BRxx tariff.

    - *Broken down tariff for network areas not under the BIPT BRxx models scope*

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For those areas of the network not within the scope of the BIPT models, specific models have been developed in order to derive applicable broken down tariffs. These models have been built up on similar principles to those applied in the models developed by the BIPT. Whenever possible the actual BIPT tariff components have been re-used and existing BIPT models have been adjusted so that the obtained results are as comparable to those of the BIPT models as possible.

- *Volumes*

  The volumes (demands) of all the telecommunication services utilizing the technologies subject to this valuation methodology are extracted from or determined based on Proximus inventory systems.

- *Valuation (Fixed network)*
  - In a first step, each pair, xDSL line present in the volumes is valued by applying each and all of the technology unit prices of the relevant BRxx tariff. In this way, each telecom service's individual contribution to the assets valuation is calculated.
  - Finally, all the individual contributions are summarized per network asset, obtaining the final asset annuity.
- *Inputs mobile network*

  The latest version of the BIPT mobile cost model has been used in order to value mobile assets related to :

  - Radio Access network (RAN)
  - Ground Antenna
  - Mobile Voice Switching
  - Mobile Data Switching
  - Mobile Location Register

  Proximus mobile voice and data volumes, as determined based on Proximus inventory systems, have been used as the demand for the cost model. Based on this demand, the model dimensions the required network assets.

  Only capex economic depreciation has been taken into account, all opex values in the model have been set to 0.

  The WACC is based on BIPT's decision issued on February 26, 2015 (8,13%).

- *Valuation mobile network assets*

Capital expenditures are annualized according to BIPT's economic depreciation. This is a different methodology compared to the TAM used for fixed network related assets.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2015, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The mobile assets expenditures as calculated in the model are separated in a common fix part (traffic volume insensitive) and a variable part (traffic volume sensitive).

The level of economic cost for the traffic insensitive part is determined as a constant annuity over time such that its present value offsets the present value of the fix part expenditures.

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The level of economic cost for the traffic sensitive part is determined by the net present value of total traffic sensitive expenditure divided by the accumulated produced volumes weighted with the discount factor used in the present value calculation (a sort of "actualised" total produced volume).

3.4.2.5.5 Exceptions to the generic implementation

Although the above described process is applicable to the majority of the tariffs and related technologies, there are two exceptions to the rule.

The breakdown of the BIPT BROBA transport tariff is made differently. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, and how it is applied is given in paragraph 3.4.2.5.10.

The valuation of the transport SDH/PDH assets implementing the regulated part of the Proximus's SDH network, although based on the BIPT's BROTSoLL model, do not follow the above described generic process. The used methodology is described under the paragraph "Updated BROTSoLL model to the 2013 demand".

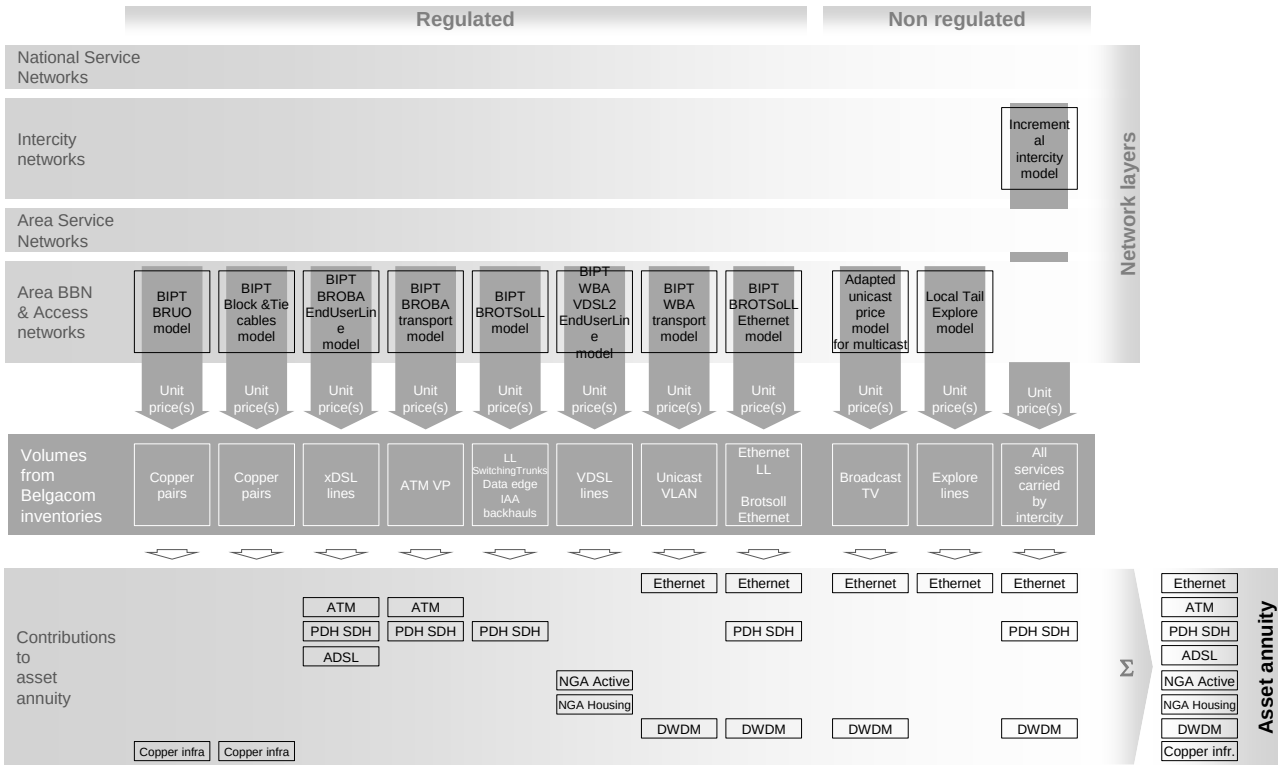

Figure 2: BRxx based valuation method. Scope and implementation.

3.4.2.5.6 BIPT BRxx tariffs as base for asset valuation

3.4.2.5.6.1 BRUO

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The BIPT BRUO model (decision of 9/11/2011) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. These assets have been valued based on the unit direct CAPEX cost in the BRUO model and the number of pairs used. It mainly includes the cost of copper cables, trenching and street cabinets and covers the copper distribution and copper feeding networks.

The yearly direct CAPEX cost of the following assets has been calculated based on BRUO tariffs:

- Raw Copper for PSTN/ISDN accesses, central site based broadband without voice accesses, local tails for leased lines type of connectivity, BRUO raw copper.
- Copper subloop, for ROP based VDSL connections without voice accesses.
- Copper subloop testing cost, to ensure remote line testing of ROP based VDSL connections without voice accesses. This cost is valued based on the unit direct CAPEX cost of the feeding network that can be derived from the BRUO tariffs (local loop, subloop).

In the frame of a possible fixed/variable analysis of the results of the model, copper distribution and feeding network costs are categorized as fixed. It should be noted that this has no impact on the results of the model itself.

Our analysis is based on the approach used by BIPT and its consultant, Analysys Mason, for the development of an NGN/NGA model. The dimensioning of the copper distribution and feeding network is dependent on the evolution of the number of households, reflecting the universal service obligation of Proximus. The evolution of the number of copper pairs actually used by customers subscriptions or internal usage, has no impact on the total copper access investment cost calculated by the BIPT NGN/NGA model. Copper access (distribution and feeding) is a fixed cost, with no causality of the volume of copper pairs actually used.

Its allocation method could be based on the market value of the different products using the network. However, in order to be conform to the approach used by BIPT in the BRUO/BROBA reference offers, we have attributed the copper access network cost towards the different end-user services and markets based on the number of consumed copper pairs.

The cost of the copper splitters, to split narrowband and broadband signals for shared pairs has been valued based on the shared pairs inventory.

3.4.2.5.6.2 Blocks and tie cables

The BIPT Blocks and Tie cable model (decision 2/7/2008) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. This bottom-up model defines direct CAPEX prices for Main Distribution Frame blocks and for tie cables to other access network equipments.

The current value of following assets has been calculated based on Blocks and Tie cable tariffs:

- Copper local loop testing: internal cabling for copper connectivity to perform remote testing of broadband customer connections without voice accesses based at the central site.
- Copper subloop testing: internal cabling for copper connectivity of ROP based VDSL customer connections without voice accesses.
- Continue raw copper and shared feeding pairs: internal cabling for copper connectivity from the Main Distribution Frame or broadband splitter equipment to other access equipments or collocated access equipments.

Sensitivity: Unrestricted

3.4.2.5.6.3 BROBA rental per end-user line

The BROBA rental fee per end-user line is split by BIPT between the active part and the transport rental ATM or Ethernet part. This model is sometimes referred to as BROBA Bitstream.

3.4.2.5.6.3.1 Active part

The BROBA model (decision of 6/8/2010) has been used to valuate assets included in AC2_20102 ADSL equipment. It is related to DSLAM and Main Distribution Frame space yearly direct CAPEX costs.

The asset has been calculated based on the direct CAPEX part of the BROBA Bitstream tariff applied to ADSL, ADSL2+ and SDSL subscription volumes.

3.4.2.5.6.3.2 Transport rental ATM

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.4 BROBA ATM transport

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.5 BROTSoLL (access line only)

The Proximus Reference Offer for Terminating Segments of Leased Lines (BROTSoLL) regulates the complete PDH/SDH transmission network of Proximus, with the exception of the highest hierarchy rings, the so called Intercity network or express layer. The current BIPT decision on this tariff dates from 10/3/2008.

*Note that for this model the below explanation is only applicable to the valuation of the access lines to BROTSoLL services. The valuation of the transport costs has been done as described in the paragraph "*Transport PDH/SDH valuation". The technologies covered by this reference offer and consequently to be valued through this tariff are:

- PDH/SDH : covering the costs of the access line equipment of this technology.

Further, this service can in fact make use of the copper infrastructure on the access side in case of small bandwidth lines. However, these costs are embedded in the BRUO based valuation.

The SDH access line valuation has been done by applying the above technologies direct CAPEX unit cost to all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR, the Proximus transmission inventory system.

3.4.2.5.6.6 WBA VDSL2 end user line

3.4.2.5.6.6.1 Passive part

The BIPT WBA model (decision 10/11/2010) has been used to value the assets AC2_20108 NGA Housing as well as part of the asset AC2_20106 fiber infrastructure related to external fiber connectivity to the cabinet (ROP ; Remote Optical Platform).

Sensitivity: Unrestricted

For the valuation of AC2_20108 NGA Housing, the BIPT unit direct CAPEX cost has been applied to the number of VDSL2 subscriptions. The main elements included are the cost of the ROP, the copper connectivity between the ROP and the street cabinet and power equipment.

3.4.2.5.6.6.2 Active part

The asset AC2_20107 NGA Active equipment has been valued based on the related BIPT direct CAPEX cost.

It is mainly related to the IP DSLAM installed in the ROP or in the local site, the equipment to aggregate the fiber cables connecting the ROP to the local exchange ("aggregators"), as well as the internal cabling and block positions on the optical main distribution frame (OMDF).

3.4.2.5.6.7 BROTSoLL Ethernet (access line only)

Being a special case of BROTSoLL, the services within the BROTSoLL Ethernet scope are the dedicated transparent Ethernet connections. The current BIPT decision on this tariff dates from 10/3/2008.

In principle these lines are implemented as Ethernet over SDH. However, due to the rather large bandwidth typical to this type of services -10 Mbps, 100 Mbps or 1Gbps- this implementation is neither always possible nor efficient. Therefore we distinguish two main technical executions:

- Ethernet over SDH: for the 10 or 100 Mbps lines, also named Ethernet and Fast Ethernet respectively
- Ethernet over DWDM: for the 1 Gbps or Gigabit Ethernet lines, where the DWDM wavelength is dedicated to the line. Note that no SDH equipment is used in this case.

The Ethernet over SDH services require SDH and optical fiber for their implementation. Therefore, and following the 2013 model logic, the SDH costs incurred by the implementation of such services will be valued by the "Updated BROTSoLL model to the 2013 demand". The optical fiber costs are not valued by the BRxx method anymore.

Regarding the Ethernet over DWDM services, the access tariffs are the same as in BROTSoLL and the transport cost is calculated as described in chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.7 Transport PDH/SDH valuation

The present BROTSoLL model is based on the Proximus SDH services inventory belonging to 2005. From 2005 until now the utilization of the SDH services has changed and new services consuming large bandwidth, typically Brotsoll Ethernet and the like products, have been implemented over SDH. These new services would alter the distribution of services per bandwidth, putting an extra weight on the higher bandwidths, imposing changes in the network dimensioned by the BROTSoLL calculation sheets which in turn will incur in (non linear) costs changes.

Therefore, in order to incorporate a more realistic SDH cost in the model, it was decided to re-play the current BROTSoLL model with the 2015 SDH services demand.

In order to do so, the relevant files of the cumbersome BROTSoLL model have been consolidated into two streamlined files that easily allow the dimensioning and costing of the required SDH network for any given demand.

Then the set of all the SDH based services running on the Proximus network at the end of the year 2013 (all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH

Sensitivity: Unrestricted

scope which are documented in ITR) was entered into the new consolidated transport BROTSoLL engine and the resulting SDH costs represent the value of the PDH/SDH asset in the 2013 model.

3.4.2.5.8 Transport Ethernet and DWDM valuation

The model used is based on the national network design module for NGN/NGA fixed LRIC model, by Analysis Mason for BIPT. A number of modifications to this module were done in order to support non-NGN (ADSL or SDSL via Ethernet switch) traffic and customer lambda services in a more realistic way. The adapted module is used to forecast investment costs for Ethernet and DWDM equipment to meet input level of demand.

The demand covers Voice over IP (VoIP), Fast Internet access (FIA, retail and wholesale), Bitstream (shared and dedicated), Video on Demand (VoD), Belgacom TV (multicast), Business Data (Explore IPVPN and Eline) and lambda services (transparent ethernet 1Gbps and 10Gbps lines via DWDM for customers).

This bottom-up model takes into account the actual demand and calculates the needed backbone (regional and national-intercity) Ethernet and DWDM elements and their valuation.

3.4.2.5.9 Non regulated tariffs as base for asset valuation

3.4.2.5.9.1 Local Tail Explore

Local Tail Explore refers to the access line, this is to say the set of equipments and infrastructure entailed to provide the connectivity between the customer and the Proximus network, the Explore customers require. Given that Explore is not a regulated product and has specific technical requirements that are not contemplated by any of the existing BIPT models, a new model needed to be developed to cost this segment.

In fact the model is very straightforward since it just consists of isolating the few different components in the offered technical solutions and applying their respective annualized costs. Since the infrastructure components present in this model have already been valued by existing BIPT models, the regulated direct CAPEX unit costs have been applied to them.

The only asset in which this model participates is Ethernet.

In principle, this model should also contribute to the Copper infrastructure, since there is a technical solution on copper, however this asset valuation component is fully taken into consideration by the valuation based on the BRUO model.

The valuation has been done by applying the fitting direct CAPEX technology to all access lines to Explore services documented in ITR, the Proximus transmission inventory system.

3.4.2.5.9.2 Incremental intercity model

We refer to the chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.10 ATM equipment asset valuation

- ATM is outphased and is no longer valuated in the model.

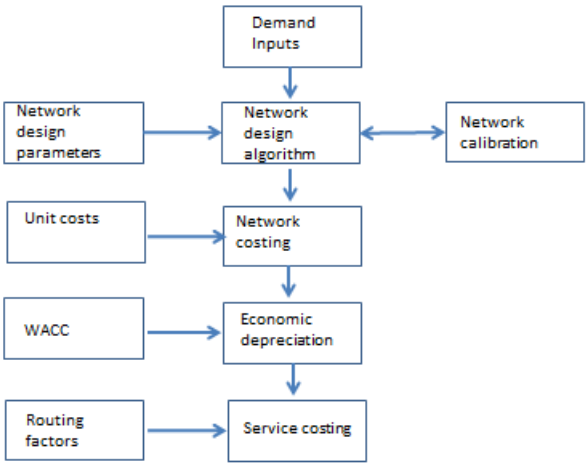
3.4.2.5.11 Mobile cost model for network assets valuation

Sensitivity: Unrestricted

The BIPT bottom-up mobile cost model has been used to value assets :

- AC2_20110 RAN
- AC2_20111 Ground Antenna
- AC2_20112 Mobile Data Switching
- AC2_20113 Mobile Location Register
- AC2_20114 Mobile Voice switching

The flow diagram of BIPT mobile cost model can be summarized as follows :



Mobile cost model – flow diagram (source : Analysys Mason)

Proximus volumes (subscribers and mobile voice and data traffic) have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2015, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The mobile assets expenditures as calculated in the model are separated in a common fix part (traffic volume insensitive) and a variable part (traffic volume sensitive).

The level of economic cost for the traffic insensitive part is determined as a constant annuity over time such that its present value offsets the present value of the fix part expenditures.

The calculations can be summarized as follows :

Calculation of net present value traffic insensitive expenditures

NPV (Invest) = $\sum_{Years} Investment * discount\ rate\ multiplier$

Calculation of net present value of constant annuity over time (recovery)

NPV (1* ppc) = $\sum_{Years} PPC\ year * Vol\ year * \ discount\ rate\ multiplier$

ppc being the cost trend for the related network element

Sensitivity: Unrestricted

the discount rate multiplier is calculated based on a 8,13% WACC (BIPT's decision issued on February 26, 2015)

The constant annuity is obtained as :

$$\text{Annuity}0_{1993}=\frac{NPV\ (Invest)}{NPV\ (1*ppc)}$$

and

$$\text{annuity}n=annuity(n-1)*ppc_{n-1}$$

The level of economic cost for the traffic sensitive part is determined by the net present value of total traffic sensitive expenditure divided by the accumulated produced volumes weighted with the discount factor used in the present value calculation (a sort of "actualised" total produced volume).

The calculations can be summarized as follows :

Calculation of net present value traffic sensitive expenditures

NPV (Invest) = $\sum_{Years} Investment * discount\ rate\ multiplier$

Calculation of net present value output (recovery)

NPV (volume* ppc) = $\sum_{Years} PPC\ year * Vol\ year *\ discount\ rate\ multiplier$

ppc being the cost trend for the related network element

the discount rate multiplier is calculated based on a 8,13% WACC (BIPT's decision issued on February 26, 2015)

The capex cost per unit output can be defined as :

$$\text{p}0_{1993}=\frac{NPV\ (Invest)}{NPV\ (Vol*ppc)}$$

and

$$\text{p}n_{2015}=P0*ppc_{2015}$$

The total annualized economic cost for the year 2015 is equal to :

$$annuity(2015) +\ p_{2015*V_{2015}}$$

Sensitivity: Unrestricted

3.4.3 TAM: Tilted Annuity Method

3.4.3.1 *Theory*

The purpose of this section is to describe how the Tilted Annuity Method (TAM) is finally implemented in the Current Cost Accounting (CCA) based network cost model 2013.

As from the 2003 model, Proximus implemented the formula that BIPT suggested.

$$ACC\mu Y = F1, \mu Y \times F2, \mu Y$$

where

$F1, \mu Y = (GRC\mu Y, begin + GRC\ \mu Y, end)/2$

$F2, \mu Y = \sqrt{}(1 + WACCY) \times [\ 1 - (1 + APC\mu)/(1 + WACCY)\ ] / [1 - [(1 + APC\mu)/(1 + WACCY)]\ ^\wedge\ L\mu]$

and where

- ACCμY: Annual CAPEX Cost of asset μ and year Y. It includes the annual depreciation and the cost of capital.
- WACCY: WACC of year Y.
- GRCμY, begin: Gross Replacement Cost of asset μ at the beginning of year Y.
- GRC μY, end: Gross Replacement Cost of asset μ at the end of year Y.
- APCμ : Annual Price Change of asset μ .
- Lμ : Lifetime of asset μ.

Remarks:

The formula assumes that:

- In the beginning of year Y was invested in an asset and that at the middle of each year of the lifetime of the asset revenues will be generated.
- The annual price change is constant over the lifetime of the asset.
- The asset price does not evolve during the year, i.e. price changes only appear at January 1st.

The factor F1, μY represents the value of asset μ in the middle of year Y.

- The purpose of the arithmetic average of GRCμY, begin and GRC μY, end is to take into account investments or disinvestments of asset μ during the year Y.
- The arithmetic average of GRCμY, begin and GRC μY, end does not filter out the price evolution of the asset μ during the year Y.

The difference between the formula of BIPT and the formula of Exhibit 5, p. B3. of the white paper of Analysys is the factor $1 / \sqrt{}(1 + APC\mu)$, which filters out the price evolution of the asset μ during the year Y.

Sensitivity: Unrestricted

The gross replacement cost (GRC) of assets at any particular point in time is calculated as the sum over all assets owned by the business at that point in time, of the investment that would be necessary to purchase and install new replacements for those assets at that point in time (using modern equivalent assets if the existing assets are no longer available or efficient). The replacement value of assets, used for costing purposes should always include the gross value of every asset in use by the business (the current cost of replacing it with a new, possibly modern equivalent asset), irrespective of the history of depreciation of that asset in any financial accounts to date.

L_μ : Lifetime of asset μ, i.e. the expected useful lifetime of the new asset μ.

The depreciation period and the expected useful lifetime of a new asset are defined differently. The depreciation period refers to accounting. The expected useful lifetime of a new asset does not refer to accounting. It refers to the period that is expected that a new asset will be used. The main factor to determine the expected useful lifetime of a new asset is the evolution of the associated operational costs, i.e. the asset will be replaced when operating it becomes too expensive. Another factor is the appearance of new technology: if in the future new technology will come-up it could be that the asset will be replaced (even if it is not too expensive to operate).

Sensitivity: Unrestricted

4 SCF (Support and Customer Flow) stream

4.1 Allocation of the support costs

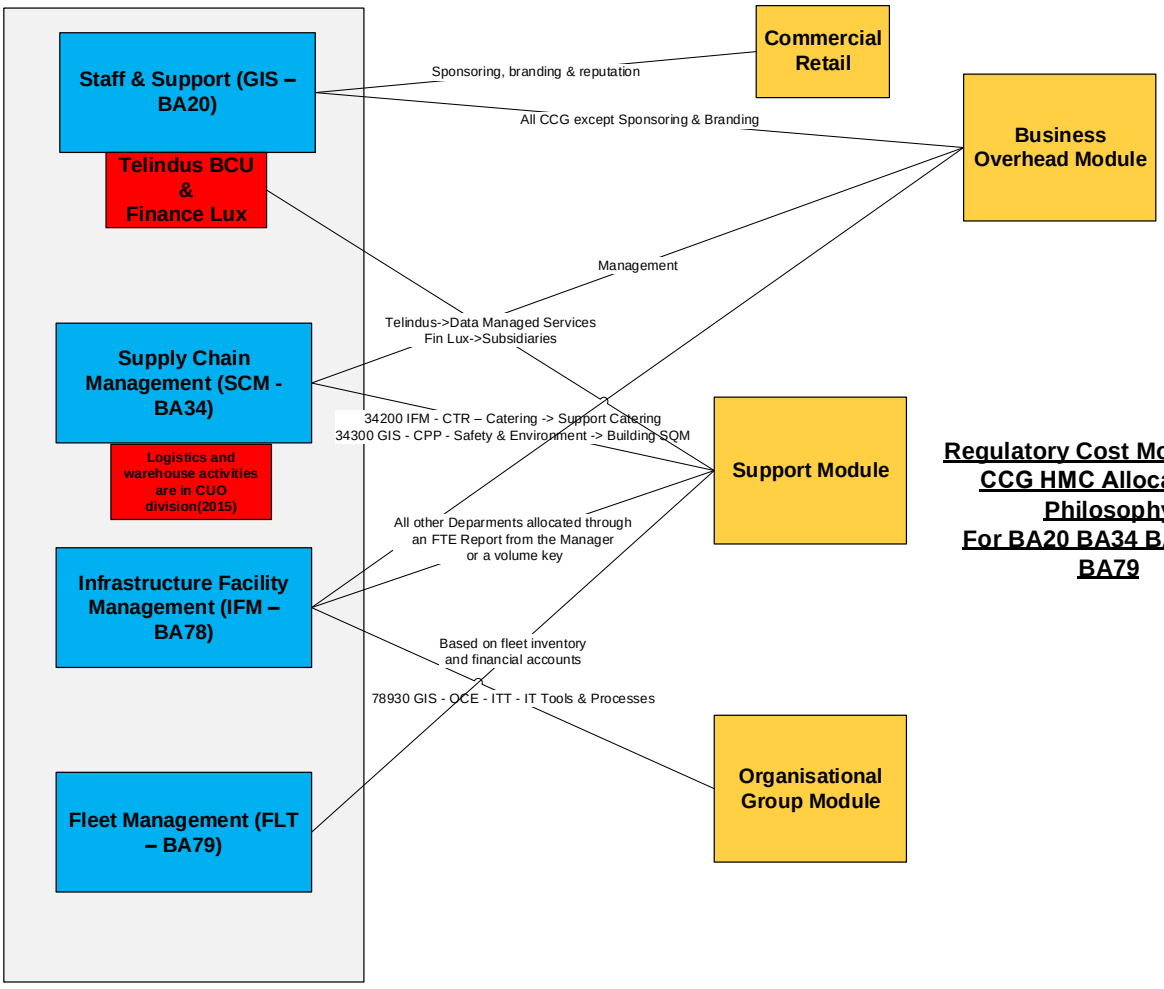
4.1.1 Support Scope

Since 2013, all support costs are treated within one SUPPORT module and as such, no cascade principle is used meaning that support costs, once in the SUPPORT module, can only be allocated to a non-support destination and to a non-support division. The divisions that are considered as support costs are:

- Group Internal Services (GIS – BA34) for departments like Real Estate, Business Services, Security, Safety & Environment, and Catering.
- Supply Chain Management responsible for warehousing, logistics and distribution is now part of the CUO division.
- Infrastructure Facility Management (IFM – BA78) encompasses a wide variety of support activities like building & technical services, print shops and copy shops, energy and operational centre of excellence.
- Fleet Management (FLT – BA79) for the support of all Proximus management, utility and sales vehicles.

They fall under the responsibility of FIN, the financial department from the Staff and Support division (S&S – BA20) where are located the GHR, Legal, Strategy, Public Affairs and Communications departments. The Staff & Support costs should avoid passing by the Support allocation flow as they are business overhead related costs. There can be some exceptions to this rule when a specific support cost is booked in the BA20 such as illustrated bellow:

Sensitivity: Unrestricted



4.1.2 Support Cost Objects

For the 2015 Cost Model, the following support objects were created in order to pool support costs within one module, before allocating them either directly to the cost's specific object located further on in the cost model, either to multiple objects using inventory-based allocation keys. This work is achieved by using reports from dedicated teams supporting an inventory from which specific volumes can be derived, such as the ones from fleet management regarding Proximus vehicle's park or Connect Immo regarding the building's occupation. A last group of support objects are allocated by the use of FTE keys in order to split these costs among all departments that benefit from them. In 2015, the overall support allocation can be summarized as follows:

Summary of Driver type relation to Support Object allocation
% Occupation/Picking Lines
Support_Manage goods, warehouse & equivalents
Fixed Common Market 1 - Access PSTN&ISDN & Market0 - Residual Market
NE_Logistics
CUO Field MP Repair - MASS PROF
Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Manage moves
Support_Manage waste and scrap
Support_Manage, maintain and repair buildings (excluding moves) (office space)

Sensitivity: Unrestricted

Support_Provide catering services

Support_Provide copy services

Shop's buildings costs (in %)

Support_Manage, maintain and repair buildings (excluding moves) (shop space)

direct

CBU_billing_fix products

CBU_Billing_fix_products

CWS_Billing

CWS_billing

EBU_billing_fix products

EBU_Billing_fix_products

MOB_billing

CBU_EBU_MOB_billing

Support_13001 Data Managed Services & Applications

EUS_DataManagedServices

Support_14001 TV and VoD

NE_BroadcastTVEquipment

Support_15001 CPE GSM

Market 0 - Residual Market

Support_22243 Nat. IC - infra. Co-location /Co-mingling

Auxiliary service BRxx - Colocation

Support_30000 Subsidiaries & externals

ExcludedCosts

Support_IT

AC2_ITBuilding

Support_Power Chain for ROP

NE_NGA Active equipment

Support_Power Chain for telecom_SDE

CP_Technical_Building

Support_Provide printing services (excluding outgoing invoices)

CBU_Printing_Services

Support_PROX_Pylons

NE_GroundAntenna

Support_Telecom space_SDE

CP_Technical_Building

Estimated Nbr Management Cars

Nbr_entryLines_RSC

Support_Reverse logistics

Market 0 - Residual Market

NE_Logistics

total MOS value 2011

Support_Manage cables

CP_Copper_Burried_Cables&Splices

CP_Ducts&Manholes

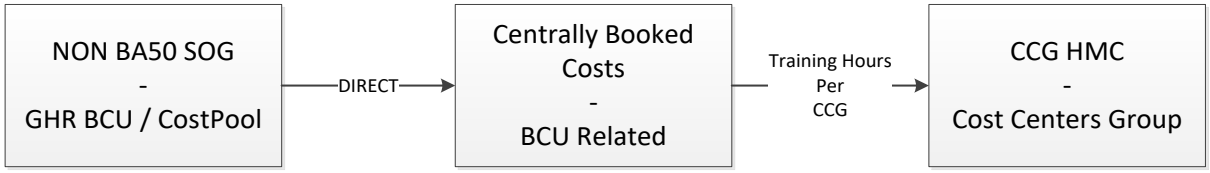
Value of material transported from stock (in eur)

Support_Manage internal distribution

Sensitivity: Unrestricted

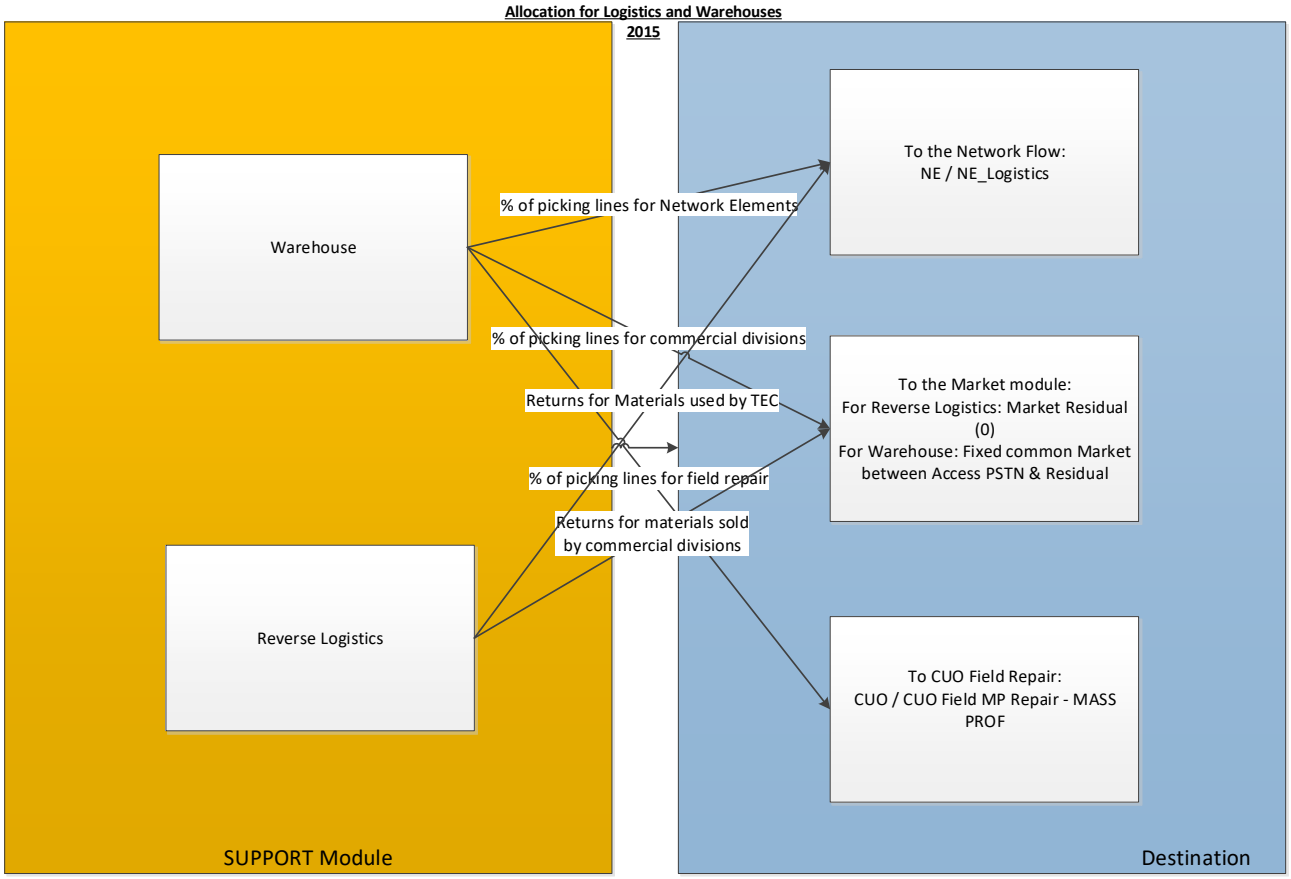
The driver named “Avg # FTE All Levels with office excl. support/centrally booked” is a specific driver calculated internally in the cost modelling team by excluding all support divisions (BA34, BA78 and BA79) and teams that should not occupy a desk in Proximus Buildings, so that the allocation keys match the scope of the costs. In order to give coherence to this trade-off, the decision factor for the COP division was changed from the level of the employee within the company to the cost variability of the organisational group in question. The underlying reason being that fixed costs organisational groups are management related while variable ones are field related. Therefore, only fixed organisational groups were considered in the scope of this driver as the field teams are by definition not in Proximus offices and should not benefit from the specific support costs this key is applied to.

It should be noted that training costs related to Proximus’s Corporate University (PCU) have to avoid passing through the SUPPORT module but have to be pooled with their respective team’s/CCGs. The grouping of these costs is done as illustred below:



In 2015, Logistics and warehouse activities were reorganized within the CUO division in order to improve the quality of service by giving more consistency to the customer service chain as well as improving the systems of logistics controls in order to better the material flow in the Proximus group. The warehouse is where most equipment used by Proximus or by its clients are stored. Allocation keys are based on the inventories from their corresponding team registering which type of equipment in what type of quantities were stored and delivered.

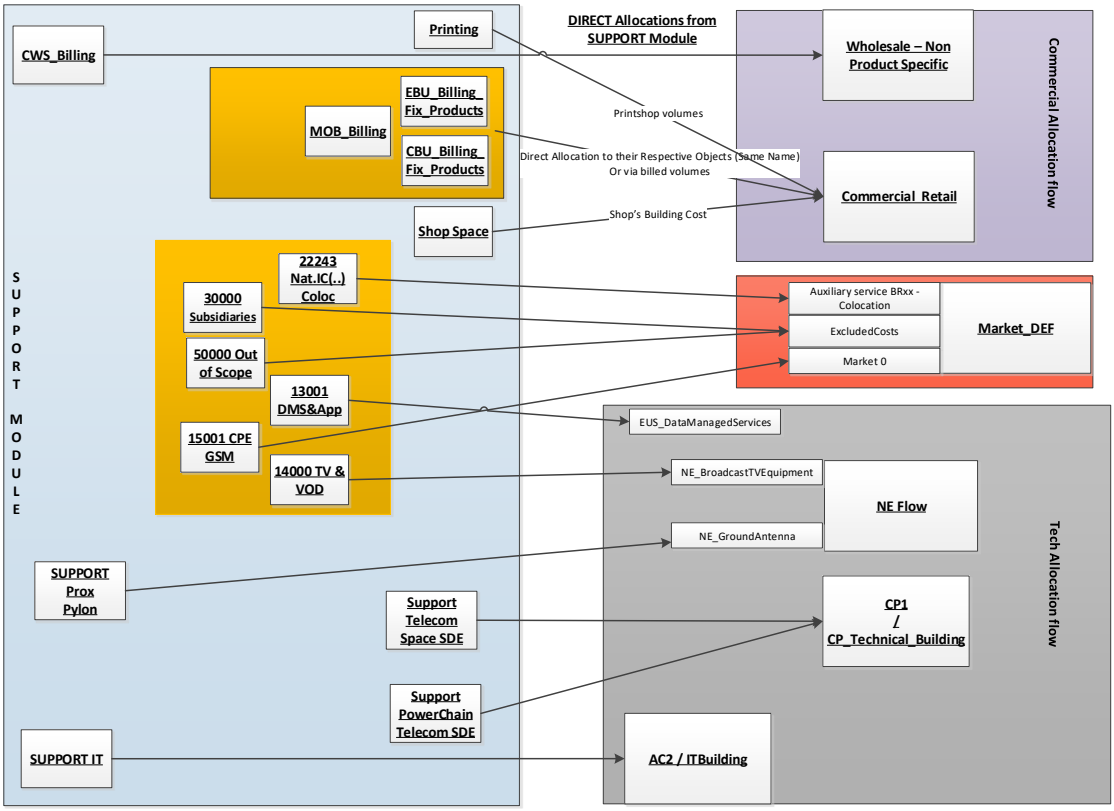
Sensitivity: Unrestricted



4.1.3 Asset Support Allocation

Two types of assets allocations can be distinguished: The ones that can be directly linked to a support object from the previous list and allocated as shown by the following diagram:

Sensitivity: Unrestricted



Other assets affect multiple support activities where the use of a specific cost driver is required. Typically, buildings, fleet and energy are support activities that need to be ventilated on many support objects with the use of their corresponding driver: vehicles per category for fleet, square meters occupied per building type for buildings and electricity consumption per equipment or building for energy.

4.1.4 Allocation From the support module

The same principle as before is applied: if a support object can be directly linked to an object located further on in the cost model, it will be directly allocated to it. Such cases are illustrated in the following drawing:

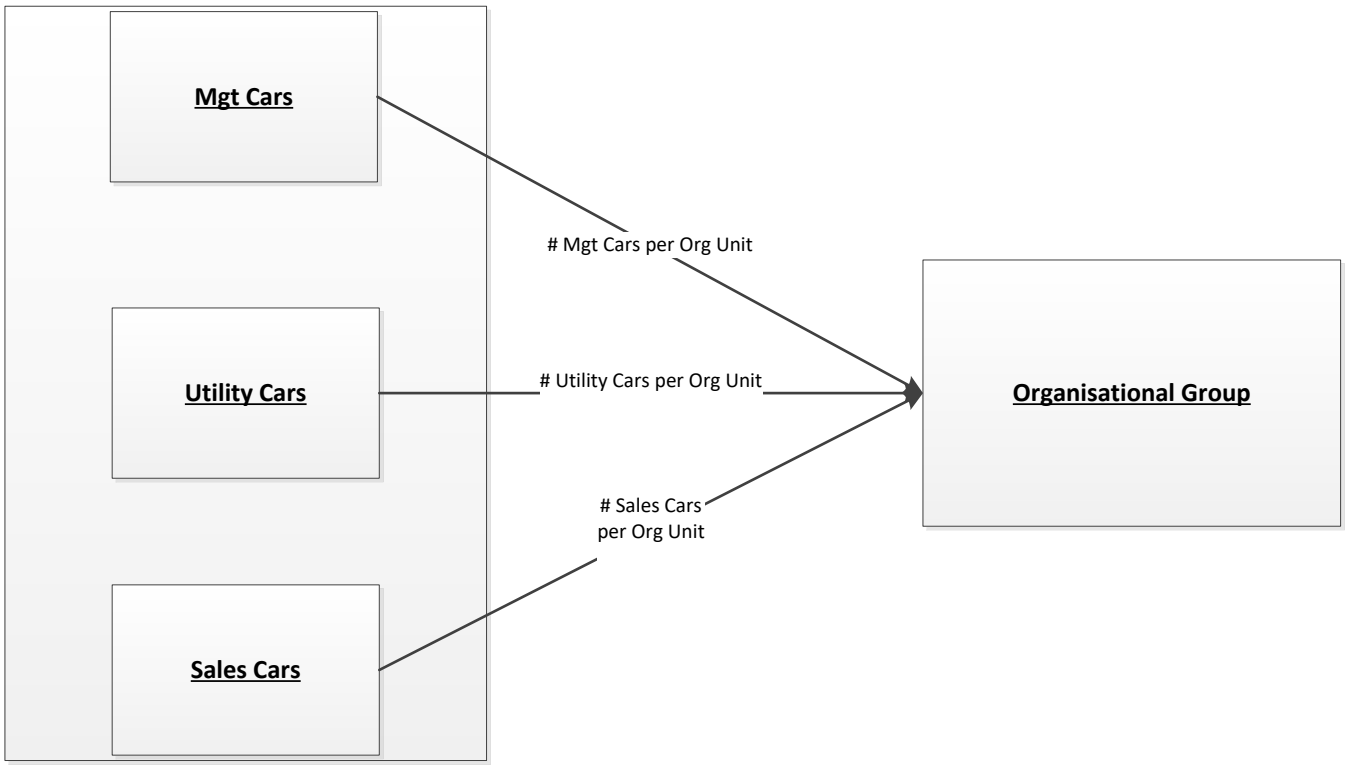
4.1.5 Fleet case

All fleet related costs are pooled in the Support module within the three following objects:

- The support, maintenance and repair of management vehicles.
- The support, maintenance and repair of sales vehicles
- The support, maintenance and repair of management vehicles.

Sensitivity: Unrestricted

With the use of an inventory maintained internally by Proximus, the number of vehicles per type and organisational group is used as an allocation key for the fleet costs.



Car Type Determination:

Category KPI and CP

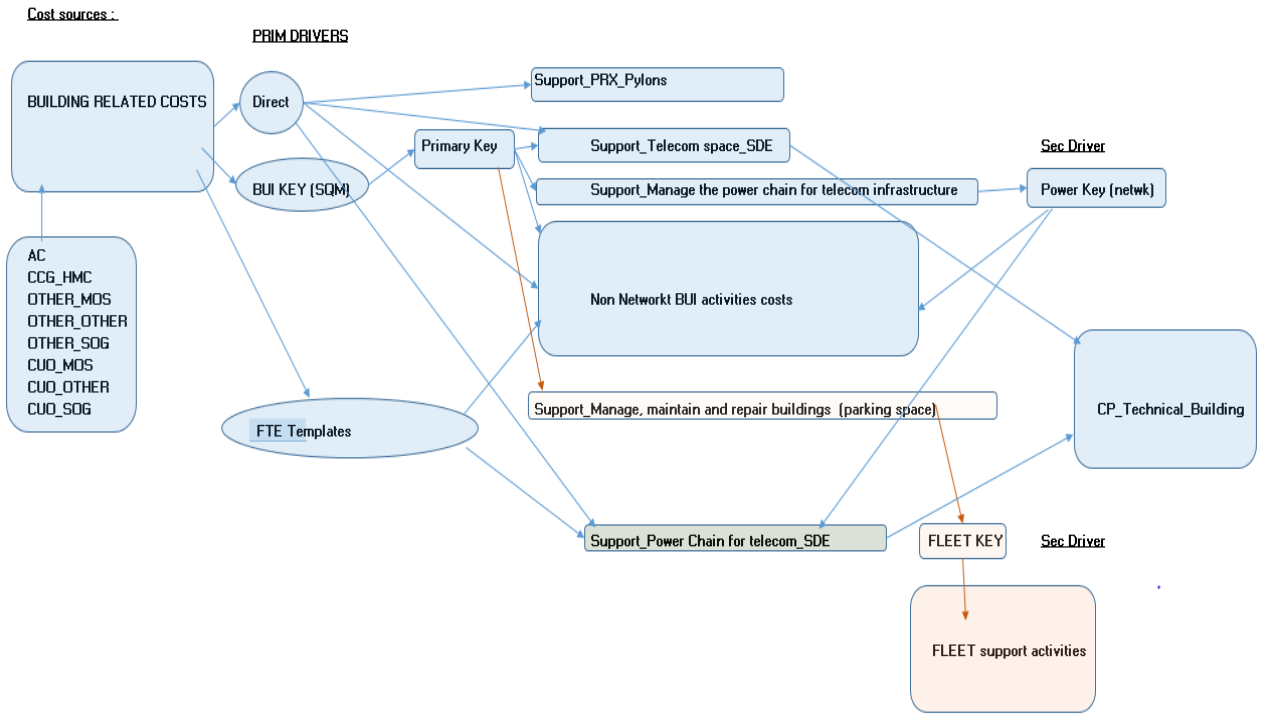
Sales or Mgt ? -> check CP (Level S for Sales)

MGT or utility ? -> Check category KPI (company car = Mgt, others = utility)

Sensitivity: Unrestricted

4.1.6 Buildings Support costs :

4.1.6.1 *Global picture of the allocation:*



4.1.6.2 *Source of the buildings costs :*

The BUI support costs are mainly located as below:

COST_NATURE	SOURCE of COSTS
AC	5282 Work in rented building
AC	5240 Exploitation buildings
AC	5220 Exploitation land
SOG_NCOGS	GIS - IMM - Real Estate 34100 building 61010
SOG_NCOGS	MOB - GIS - IFM - PROX - PYLONS / 78501 / building / 61010
SOG_NCOGS	GIS - IMM - Real Estate / 34100 / Third party local taxes / 61850
SOG_NCOGS	GIS - IMM - Real Estate / 34100 / Clmmo & third party building & equipm. taxes / 61160
SOG_NCOGS	GIS - IMM - Real Estate / 34100 / Belgacom Inter Company Services / 61350
SOG_NCOGS	GIS - IFM - BTS-Building & Technical Services / 78401 / building / 61010
SOG_NCOGS	GIS - ENY - Utilities & Support / 78610 / Pylons / 61195
SOG_NCOGS	GIS - CPP - Security / 34310 / building / 61010
WAGES	78401 GIS - IFM - BTS-Building & Technical Services
WAGES	34300 GIS - CPP - Safety & Environment
OTHER	GIS - IMM - Real Estate / 34100 / tax-building / 6401

Building costs are mainly located in Building costs centers (SOG_NCOGS) and in building AC.

Sensitivity: Unrestricted

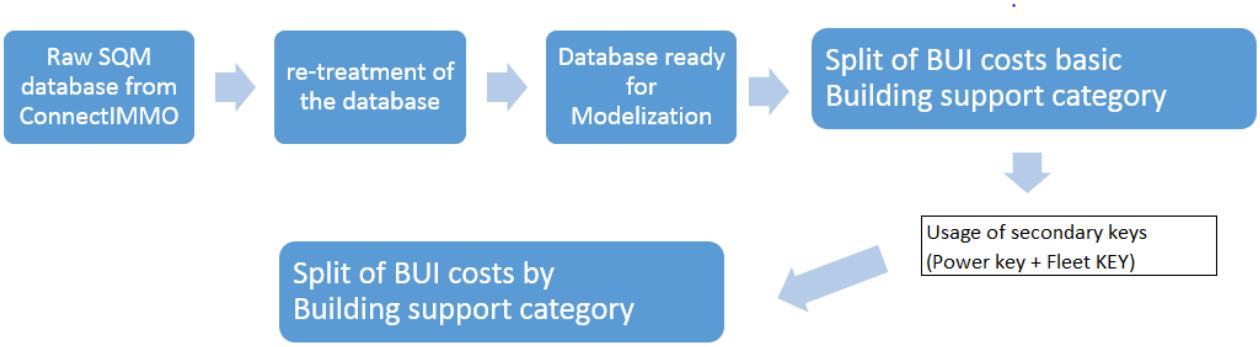
4.1.6.3 *Drivers used for the allocation*

4.1.6.3.1 The SQM (Tower included or excluded).

This key is based on a database provided by ConnectImmo, the Proximus separate entity that manages the PXS Building/SQM portfolios

SQM Allocation

sources and process



4.1.6.3.2 Direct:

Pylon related costs, Exploitation land (AC) to Support_Manage, maintain and repair buildings (excluding moves) (office space)

4.1.6.3.3 FTE Template completion

4.1.6.4 *The Destinatiation of the BUI related costs :*

After usage of primary and/or secondary keys, the BUI related costs are allocated to following activities:

Sensitivity: Unrestricted

Activity	
Support_Telecom space_SDE	Network related
Support_Power Chain for telecom_SDE	Network related
Support_PROX_Pylons	Network related
Support_Manage cables	Network related
Support_Manage, maintain and repair buildings (excluding moves) (shop space)	Retail related
Support_Manage, maintain and repair fleet vehicles (utility vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (management vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (sales vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair buildings (excluding moves) (office space)	FTE related
Support_Provide catering services	FTE related
Support_IT	IT related
Support_Manage goods, warehouse & equivalents	Logistics related
Support_14001 TV and VoD	product related
Support_13001 Data Managed Services & Applications	product related
Support_30000 Subsidiaries & externals	product related

4.1.7 The power Key:

This key split the power related costs coming directly from power costs and from the buildings to different costs objects. It is based on the analytical split provided by the field:

The total KWH consumption is known (about 400 Mio kwh/y) is split in 4 categories:

1. Mobile access (directly allocated to Support_PROX_Pylons)
2. Fixed access network (indirect allocation) to:
   Support_14001 TV and VoD
   Support_22243 Nat. IC - infra. Co-location /Co-mingling
   Support_30000 Subsidiaries & externals (for memory)
   Data centers, (split between SUPPORT_IT an Support_13001 Data Managed Services & Applications, based on real consumption)
   Support_Power Chain for telecom_SDE
   Support_Power Chain for ROP
3. Shops
4. Other (directly allocated to shops, or allocated to various element via generic key : offices, …)

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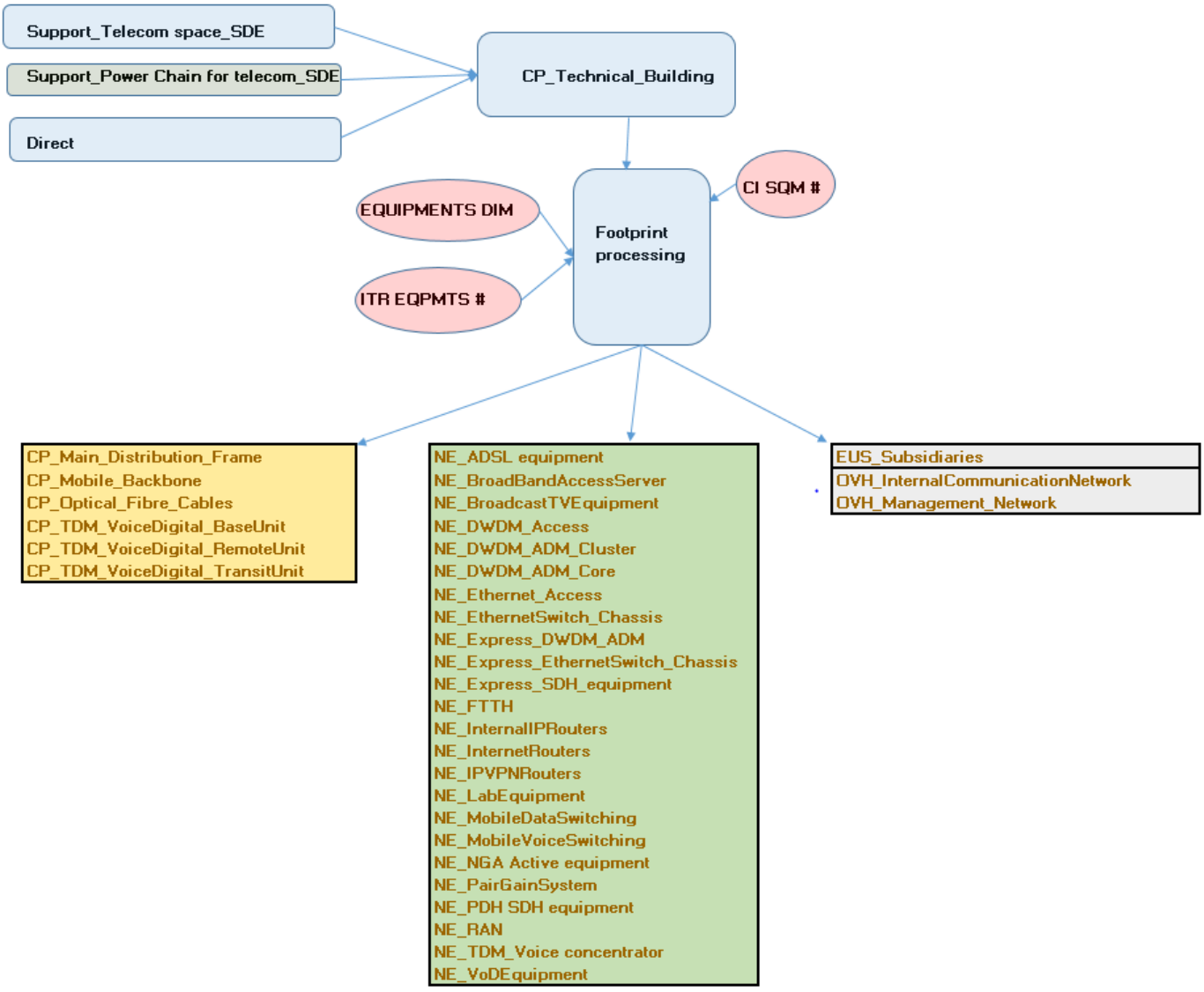
4.1.8 Allocation of the Network building related costs: CP_Technical_Buildings

Based on the ConnectIMMO database (SQM), ITR (equipment), and some measurement and constants (footprint of equipments), the CP_Technical_Building is allocated via the running a access macro.

4.1.8.1 *Allocation Flow :*



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4.2 Allocation of the retail costs

4.2.1 Retail costs perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units, we recapitulate:

- Consumer Business Unit (CBU) has the responsibility over the residential customers and small enterprises (less than 10 employees)
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Retail costs relate to all commercial retail activities at the level of Business units CBU and EBU. The Proximus financial and accounting structure clearly registers (directly attributable) retail costs on costcenters 39xxx (CBU) or costcenter 41xxx (EBU).

Starting from the Proximus organisational structure, we can identify 4 blocks in the Retail cost perimeter:

1. Retail FTE related costs
2. Retail Support costs
3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Retail FTE related costs

Includes all direct FTE related costs of Business units 39 and 41 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Retail Business units in the accounting books but do relate to Retail FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's. E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

2. Retail Support costs

Retail Support costs are non FTE related costs which are centrally booked and managed but relate to Retail activities. E.g. Billing, Shop space,…

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3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Retail departments, costs for legal claims, mandatory professional contributions, market surveys, etc.

4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales such as commissions paid on sales of identifiable products, cost of goods sold on equipment, dedicated outsourcing costs, etc.

4.2.2 Retail costs allocation principles

4.2.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each Retail CP-CCG.

These attribute-qualifications are applied on all the Retail CP-CCG combinations, but at different levels of modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Retail allocation process as described below.

4.2.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies Retail costs based on their variability towards product volumes.

We distinguish between 4 var_types :

a. Marginal (mar) : retail costs which can be considered variable with each additional unit of a single product. Typically it concerns costs of goods sold (e.g. handsets, customer premises equipment,) and costs of sales (commissions, interconnection costs,…).
b. Variable (var) : retail costs which can be considered sensitive to (important) volume changes of a single product or a range of products, whereby this (range of) product(s) is considered to be the last increment in the product portfolio. Examples of costs which are considered variable based on these criteria: the sales departments, call center activities, …
c. Fix (fix): retail costs are considered as fixed when they are likely to be inert to important volume variances. E.g.: Marketing spending. If the marketing campaigns can be directed to specific products, the amount of costs for these campaigns is not linked to volumes of the considered product.
d. Common (common): retail costs are considered common when they do relate to the ordinary course of business but have no relation with

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products. E.g.: Costs of litigations, branding & sponsoring expenses not directed to specific products, but well to Proximus image and trademark,…

4.2.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies retail costs based on whether they can be attributed directly, or through a specific non generic key and/or driver, towards products.

We distinguish between 2 PS types:

a. PRODUCT_SPECIFIC (PS): these costs can be allocated directly to the products and thus are generated specifically for that related product. E.g. the costs of sale of a product.
b. NON_PRODUCT_SPECIFIC (NPS): Retail costs which do not have a clear causal relation with specific product.

In addition to the attribute PS_TYPE, all retail costs of RETAIL module are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

COST GROUP specifies the product, when the cost is product_specific.
COST GROUP also gives the information on whether the costs are related to both Retail Business Units (CBU and EBU), or are only linked to one of them.

Used Cost Groups for the Retail costs are:

Non product specific	**Product specific**
All CBU&EBU products	All CBU Mobile products
ALL CBU&EBU mobile products	All EBU Mobile products
All CBU products	All EBU Advanced Telco Services products (*)
All EBU products	All EBU Fix data products
All CBU Fix products	All EBU Fix voice products
All CBU Mass market products	All EBU ICT products
All EBU Fix products	idTV
All EBU professional & Mass market products	(*) m2m&IOT, Big data, Mobile Payment&Ticketing
All EBU Telco products	
All EBU, CWS, SE products	

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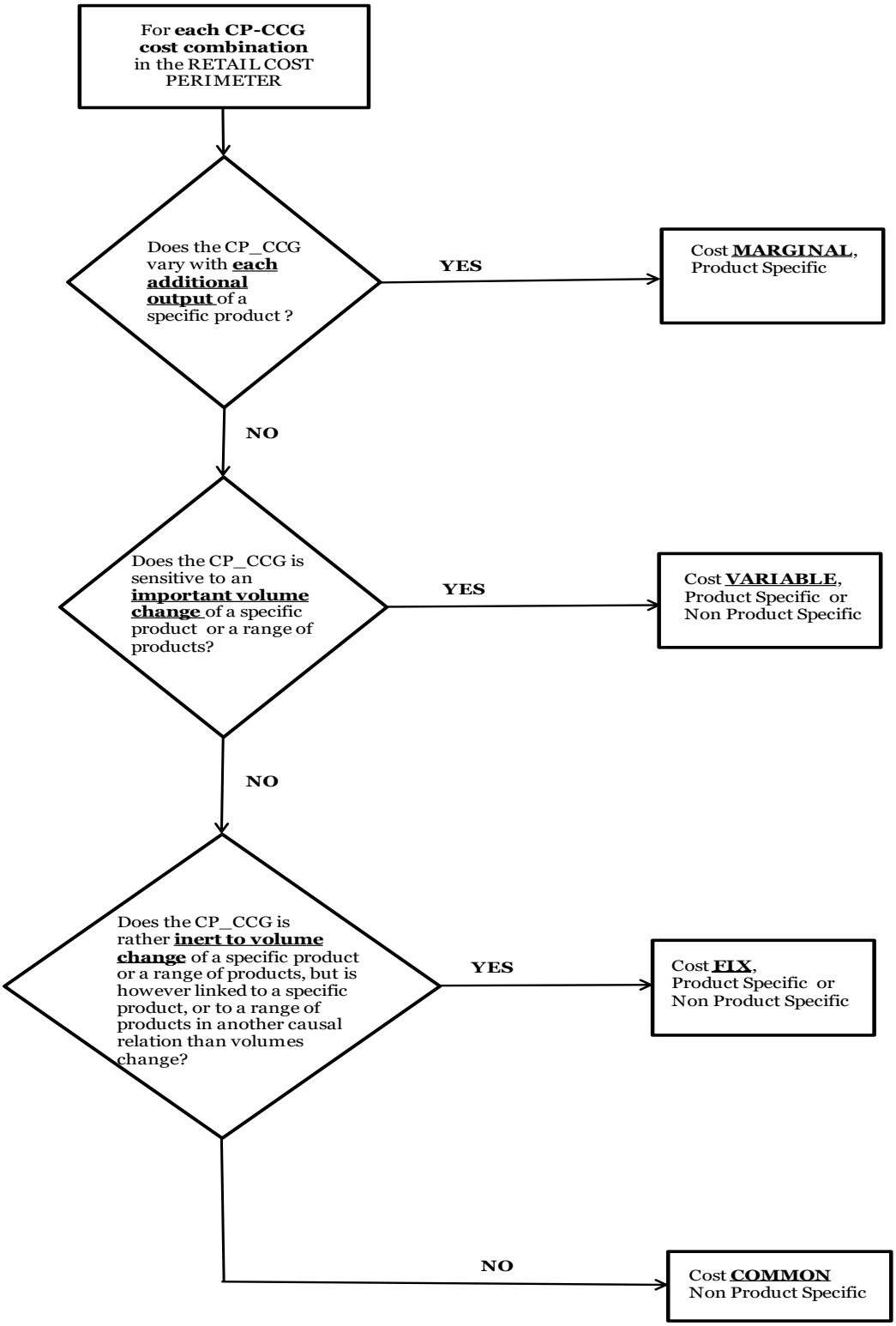
The qualification of the 2 attributes VAR_TYPE and PS_TYPE to all retail costs is illustrated in the following decision tree:



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4.2.2.4 *Criteria for allocation of retail costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which correspond to their costgroup (which is the product they relate to). This means that these costs will be either allocated to Market 0 – Residual Market or to Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards Markets based on volumes drivers. In practice, this means that these costs will be either:

- allocated to Market 0 or to Market 1, if they relate to a panel of products related to the same market,
- allocated to Market 0 and to Market 1, with respect to volumes driven allocation key, if they relate to a panel of products related to both markets.

c. Non product specific Fix costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market', when they cannot be allocated to Market 0 and/or to Market 1, with a causal driver other than volumes of products.

d. Non product specific Common costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

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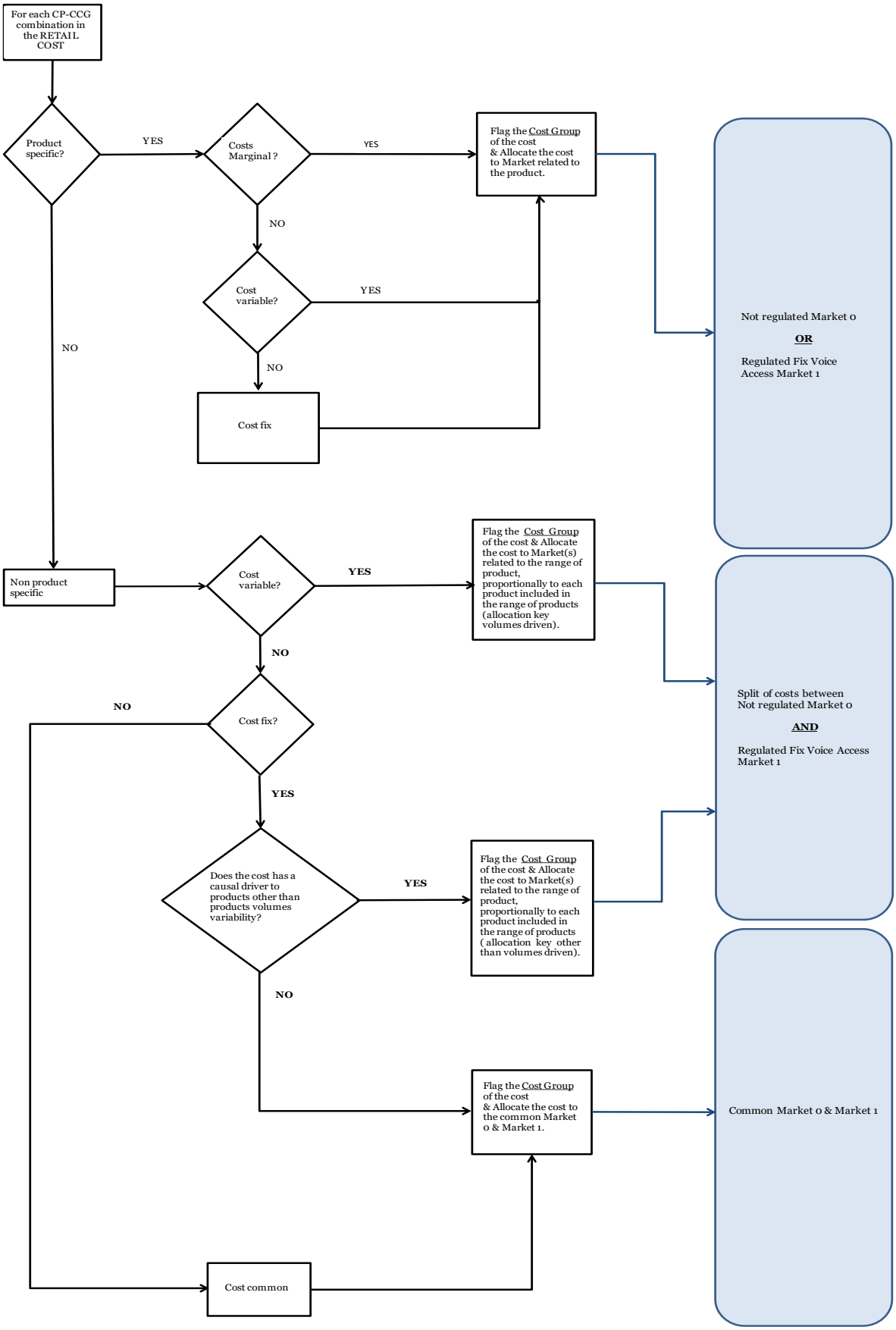
Principles for retail costs allocation to Markets can be illustrated as follows:



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4.2.3 Retail costs allocation flows

4.2.3.1 ***General principles***

As described above, the 4 blocks of costs included in the Retail cost perimeter are all specified with 2 cost type attributes (VAR_TYPE; PS_TYPE) prior to be allocated to Markets.

However, the 4 blocks of costs:

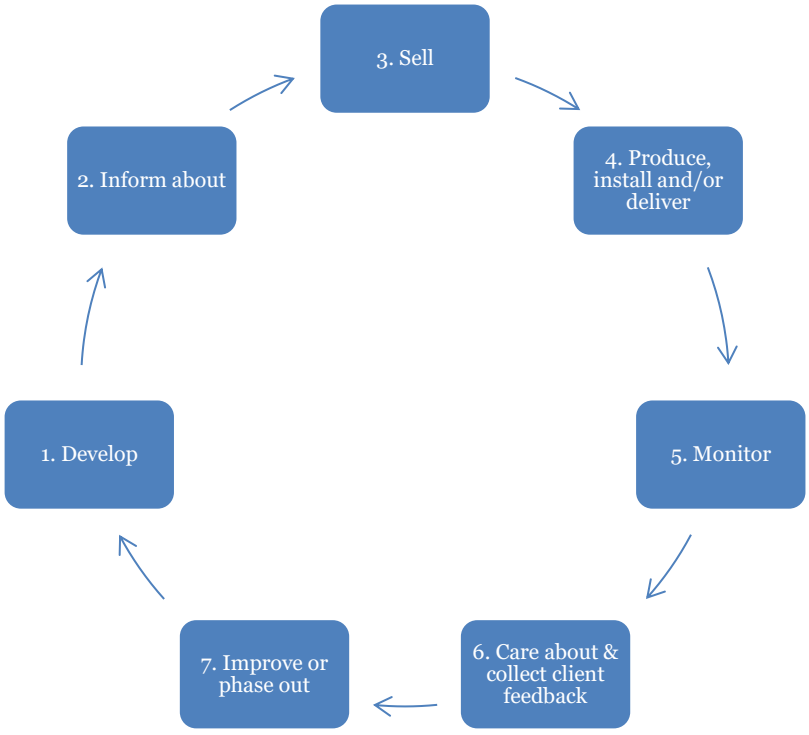
- Do not follow all the same path of allocation; some are directly allocated to Markets from the Cost basis,
- Are not all specified with VAR_TYPE and PS_TYPE within the module Retail.

The allocation flow followed by a Retail CCG_CP will depend on its block of costs (1->4).

Life cycle of products

Since the Cost model 2014, a new module, the LIFE_CYCLE module, was created, to catch part of the Retail costs that we find during the life cycle of a product.

Inside the 4 categories of Retail costs, as described in chapter 4.2.1., all the costs needed to launch, develop, monitor a product until its improvement/phase out, were identified and gathered in this new module, prior to be allocated to Markets.



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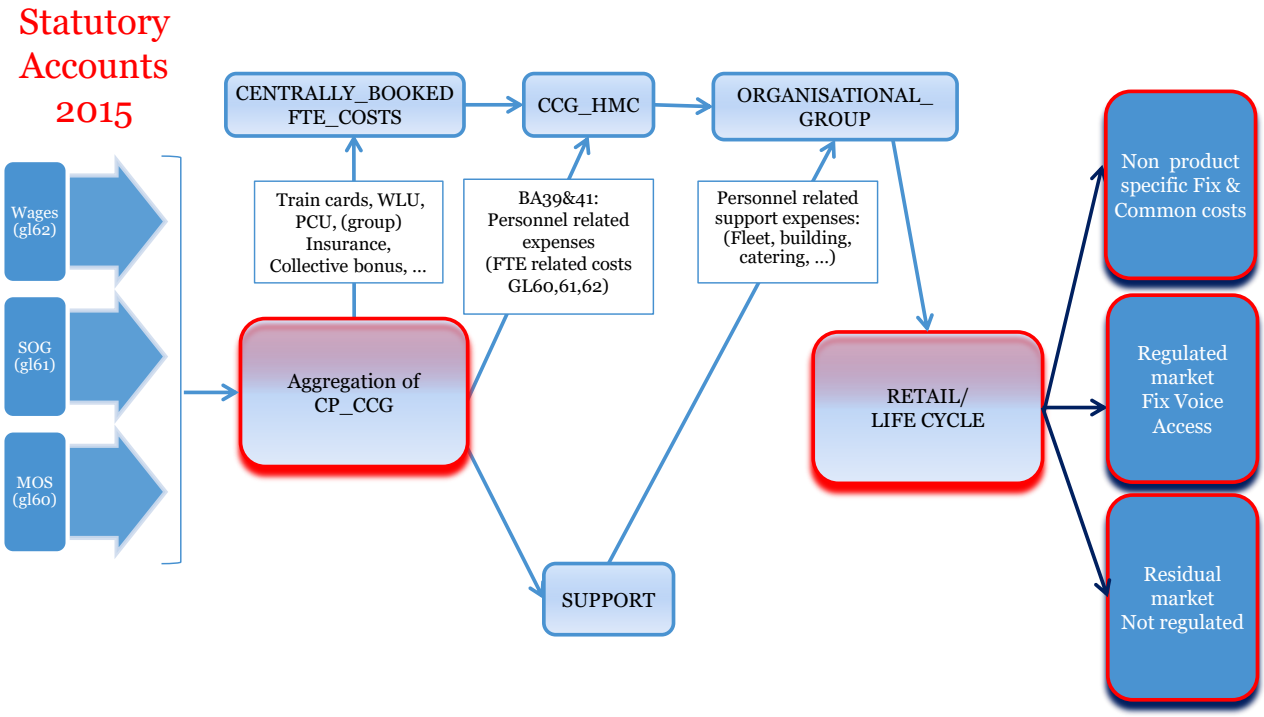
4.2.3.2 ***Retail FTE related costs (block 1)***



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

Starting from the Cost basis, Retail FTE related costs are at first gathered into module CCG_HMC. CCG_HMC module is simultaneously feeded with module Centrally_Booked_FTE_costs (Train cards, WorkLifeUnit costs, etc.).

Retail FTE related costs gathered in CCG_HMC are afterwards loaded into module ORGANISATIONAL_GROUP. In ORGANISATIONAL_GROUP module, FTE related costs are summed up with SUPPORT costs managed centrally (Fleet, building, catering, etc.) but that have to be allocated towards Proximus FTE costs.

This is also at this stage of allocation flow that attributes VAR_TYPE and PS_TYPE are flagged on CCG_CP and where CCG_CP are renamed as "Organisational groups" (terminology specific to FTE costs).

Organisational groups costs are at last directed to module Retail, prior to be allocated to Markets (via LIFE_CYCLE module, for part of it), in accordance to criteria for allocation of Retail costs to Markets, as described in chapter 4.2.2.

With regard to the definitions of attribute dimension VAR, Retail FTE related costs can only be either Fix (FIX), either Variable (VAR) costs.

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For what matters FTE costs, this variability sensibility has been defined taking the following assumption:

Are Fix FTE costs, all the FTE costs that are needed to ensure the Proximus going concern independently of products volumes, id est, costs needed to maintain the Proximus minimum organizational structure.

Two types of FTE costs were identified as needed to maintain the Proximus minimum organizational structure:

- Staff costs such as IT officers supporting DB and IT tools used, reporting and analysts teams, research staff such as Products&Solutions engineers, Marketing staff costs, as the size of such departments does not vary with the volumes of products sold but well with other causal factors such as market size and market position of Proximus, products technicity, etc.
- All the Proximus hierarchy structure (team responsibles).

The classification of FTE costs for CBU and EBU between FIX and VAR costs, and whether product_specific or not, is as follows:

CBU Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	ALL CBU PRODUCTS
Sales - Top management	Fix	NPS	ALL CBU PRODUCTS
Direct sales	Var (*)	NPS	ALL CBU PRODUCTS
In charge Relations for indirect sales channels	Fix	NPS	ALL CBU PRODUCTS
Support staff for Sales department (all channels)	Fix	NPS	ALL CBU PRODUCTS
Marketing	Fix	NPS	ALL CBU PRODUCTS
Call Center Activities	Var	NPS	ALL CBU PRODUCTS
In charge for e-sales	Fix	NPS	ALL CBU PRODUCTS
idTV Content management	Fix	PS	idTV
Products & Solutions specialists	Fix	NPS	ALL CBU PRODUCTS
Strategic planning	Fix	NPS	ALL CBU PRODUCTS

(*) excluding Team responsible flagged as Fix costs.

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EBU Organisational group	FIX/VAR	PS/NPS	Cost Group
EBU Top management	Fix	NPS	All EBU products
Strategic planning	Fix	NPS	All EBU products
Marketing	Fix	NPS	All EBU products
COR Top management	Fix	NPS	All EBU products
COR Direct sales	Var (*)	NPS	All EBU products
In charge Relations for COR (1) clients	Fix	NPS	All EBU products
COR ICT Project architects & Outsourcing mgmt	Fix	PS	All EBU ICT products
ME (2) top management	Fix	NPS	All EBU products
ME Direct sales	Var (*)	NPS	All EBU products
Support staff for ME Sales (all channels)	Fix	NPS	All EBU products
In charge Relations for ME ICT sales channels	Mix Fix/Var	PS	All EBU ICT products
In charge Relations for ME indirect sales channels	Mix Fix/Var	NPS	All EBU products
Telco Solutions Top management	Fix	NPS	All EBU Telco products
Telco Solutions Specialists and Solutions sales	Mix Fix/Var	NPS	All EBU Telco products
IT Solutions Top management	Fix	PS	All EBU ICT products
IT Solutions Specialists and Solutions sales	Mix Fix/Var	PS	All EBU ICT products
OPS (3) top management	Fix	NPS	All EBU products
Financial reporting & IT Tools management	Fix	NPS	All EBU products
After Sales Back-office	Var (*)	NPS	All EBU products
Customer Project Management	Fix	NPS	All EBU products
Transformation, Process & Operations	Fix	NPS	All EBU products
ICT Outsourcing & industrialised services	Var (*)	PS	All EBU ICT products
ICT Customer service desk	Var (*)	NPS	All EBU, CWS, SE products

(*) excluding Team responsible flagged as Fix costs.

(1) COR, for CORPORATE, is the subdivision of EBU including big size enterprises.

(2) ME, for Medium Enterprises, is the subdivision of EBU including smaller size enterprises (from 10 to 50 employees).

(3) OPS, for OPERATIONS, is a Support division specific to EBU in charge of internal Process & IT optimization, financial reporting, customer projet management, as well as customer service: commercial and technical repair helpdesk.

Some EBU organisational groups have a mix of Fix/Var costs per type of activity. The scission of these teams into FIX and VAR costs is based on #FTE, in accordance with Proximus functional organization and Retail principles for determining if a cost is FIX or VAR.

E.g.:

Teams in charge for relations with indirect sales channels are made of Direct sales (VAR costs) and of people in charge of Sales channels optimization, strategy and budgeting (FIX costs).

Teams of Solutions Specialists and Solutions Sales are made of Direct sales (VAR costs) and Products&Solutions managers in charge of product catalogue and architecture (FIX costs).

- Retail FTE Fix costs non product specific are directly allocated to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

- Retail FTE Fix costs product specific are directly allocated to the Market of the product they relate.

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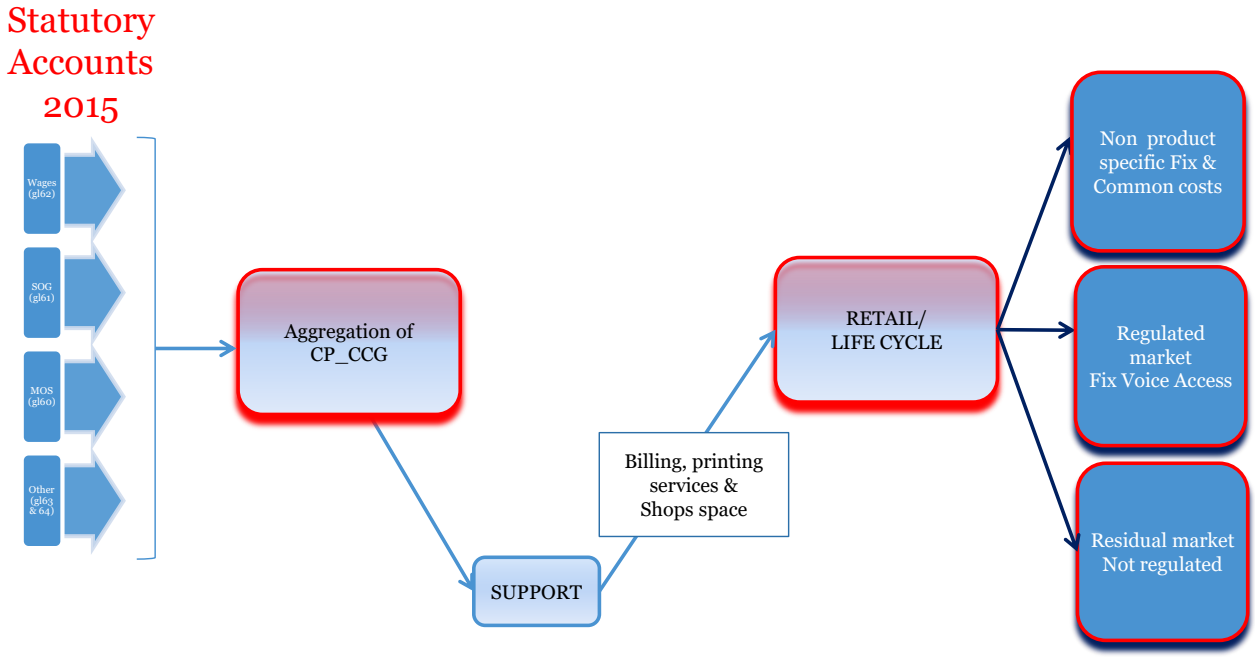
- Retail FTE Var costs non product specific are split with volumes allocation keys between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market .

- Retail FTE Var costs product specific are allocated to the Market of the product they relate, with volumes, for information purpose only.

Retail FTE Var costs are allocated towards activities in the LIFE_CYCLE module, prior to be sent to Market(s).We refer to chapter 4.5 Allocation of Costs included in the Life cycle of products, for further developments on allocations keys for Retail FTE VAR costs.

4.2.3.3 ***Retail Support costs (block 2)***



Module SUPPORT identifies and collects the costs of a number of support objects which a.o. are retail related.

The retail related support objects primarily concern billing costs (invoice printing, stuffing and postage, as well as teams in charge of billing&collecting) and costs for shop space. These costs are primarily gathered in module SUPPORT.

Costs for shop space are considered fix. The costs of creation and maintain a shop is not linked to the volumes of products the shop offers, but well to other criteria such as geographical localisation, local withholding tax regulation, points of sales optimization, etc. The CBU shops sell all types of products. These costs are therefore assigned as non_product_specific.

Proximus shops are occupied mainly by Proximus Direct Sales teams and, in a lower extent, by part of the Indirect Sales who do not have their own shops. Costs for shop space were allocated towards those teams, via module RETAIL.

Billing costs are fix, non_product_specific costs. In the specific cases of clients who have only one product to bill (1Play customer), or clients who have a panel of products belonging all to the same market, billing costs were allocated towards the concerned Market, with number of clients billed as

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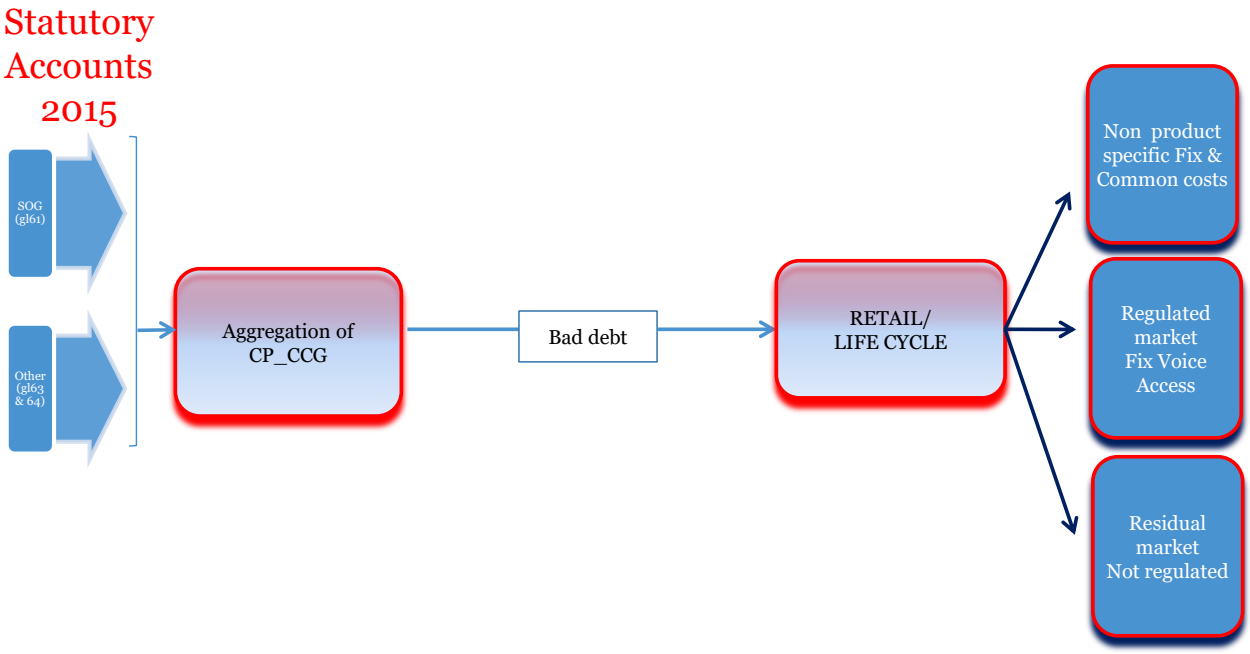
allocation key. Billing costs of clients multiplay were split between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market, according to billed items per client invoiced, for invoice printing and postage costs, and according to turnover for teams in charge of billing&collecting'.

Retail support costs, as they are materially considered as fix, non product specific costs, are mainly allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

4.2.3.4 ***Retail costs which do not have a causal relationship with products (block 3)***



Per definition these costs are either fix (e.g. IT developments non capitalized for the internal needs of a Retail department, bad debt, etc.) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, etc.).

Per definition, these costs are non product specific.

Most of costs of block 3 are sent to module Retail, where linked to the activity of a Retail organisational group, prior to be routed to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

Bad debt is categorized as fix costs. Bad debt does not have a link to products but well to criteria such as competitive environment, regulatory framework (new telecom law), quality rating of the portfolio of clients, rather than to volumes of products.

Follow up and provision for bad debt is not done per products, but well per invoices and clients.

Bad debt tends to increase with turnover growth. Accordingly, we use the turnover per division as allocation key for bad debt to Market 0 or Market 1.

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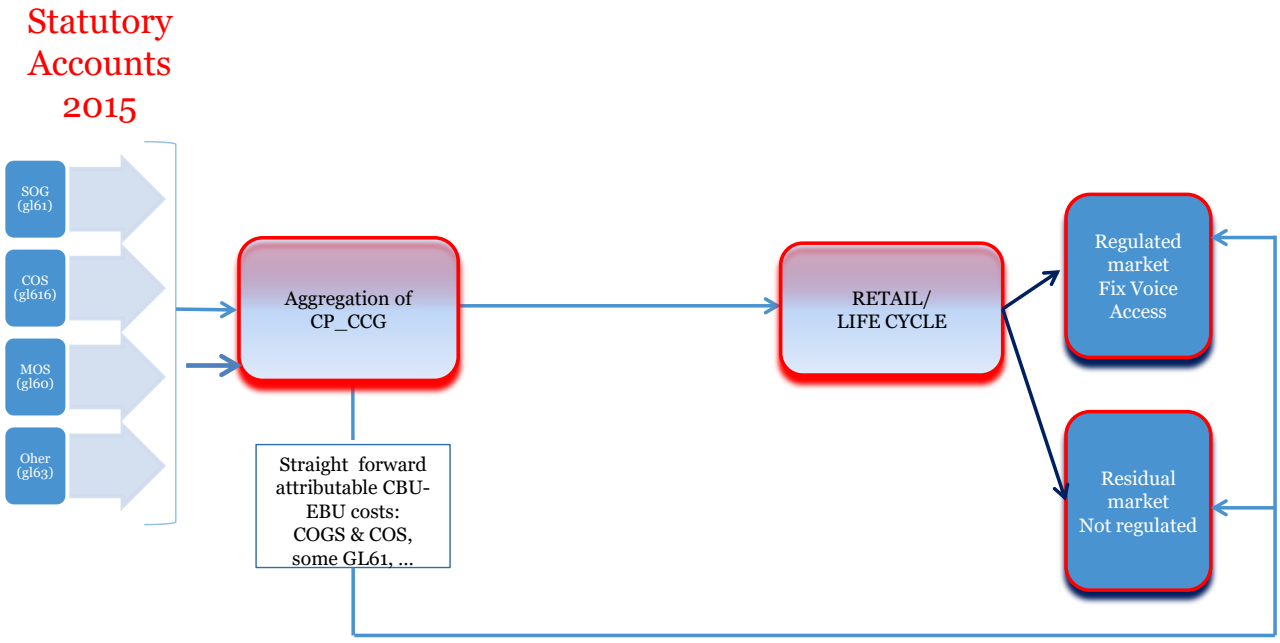
4.2.3.5 ***Retail costs which have a causal relationship with products (block 4)***



Are included in this block of Retail costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products.

Examples of costs of this category are Cost of goods sold, costs of sales (e.g: commissions indirect sales channels, interconnection fees), campaigns marketing directed on a product, and sales actions oriented on a dedicated products such as Outbound call sales actions..

Most of the costs of block 4 are gathered by similar categories into _Retail and/or LIFE CYCLE modules, prior to be allocated to the Market they relate, some of them being however directly sent to the Market they relate.

Per definition, Retail costs of Block 4 have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are therefore included the following combinations of VAR_TYPE; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost of goods sold and Cost of sales have a direct link to product they relate. Therefore, they can be allocated directly.

Marketing expenses are per definition fix non_product_specific costs. Part of Marketing expenses can however be allocated to (specific) product(s) (Markets), in case of dedicated campaigns.

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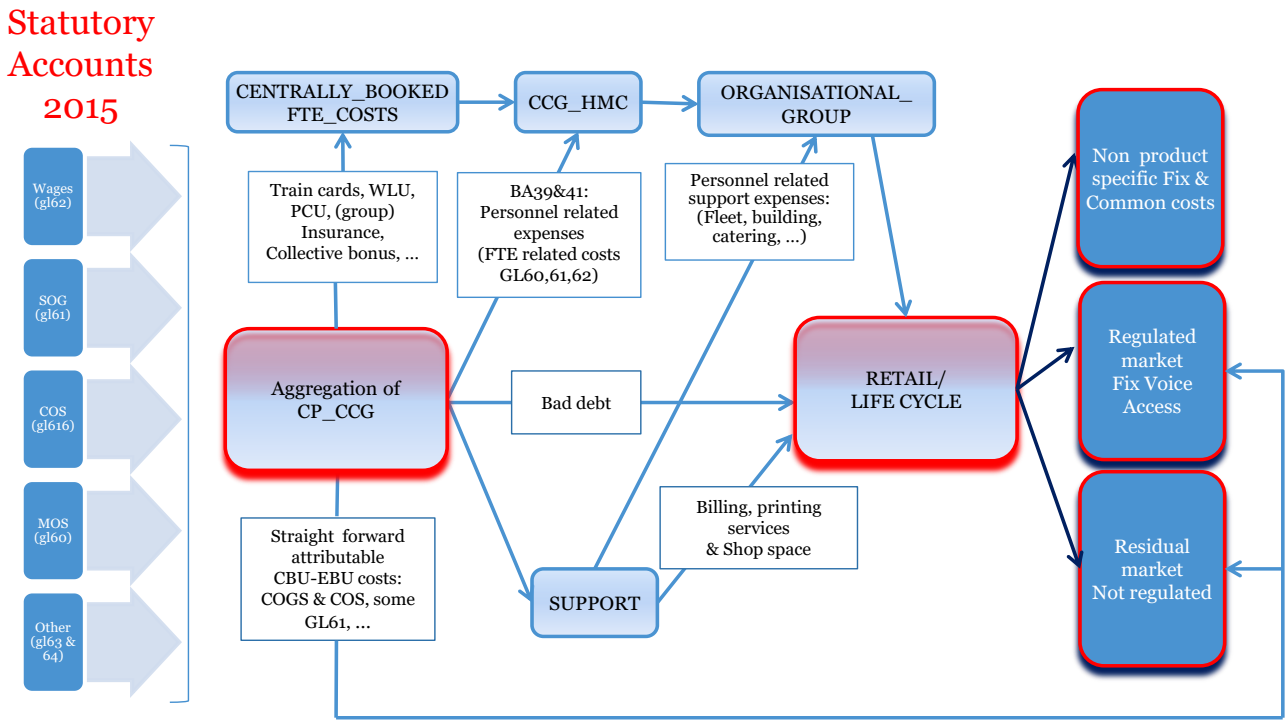
Retail allocation flows – all costs blocks (1->4), can be illustrated as follows:



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4.3 Allocation of the CWS (Customer Wholesale division) costs

The allocation flow and principles are identical to the retail cost allocation flow.

4.3.1 Wholesale costs perimeter

All Wholesale activities are situated at the level of Business unit CWS (Customer Whole Sale).

The Proximus financial and accounting structure clearly registers (directly attributable) Wholesale costs on costcenters 40xxxx.

Starting from the Proximus organisational structure, we can identify 4 blocks in the Wholesale cost perimeter:

1. Wholesale FTE costs
2. Wholesale Support costs
3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Wholesale FTE costs

Includes all direct FTE related costs of Business unit 40 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Wholesale Business unit in the accounting books but do relate to Wholesale FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus personnel/FTE's (and thus also towards these residing under CWS). E.g.: costs re. Fleet, office building, traincards, bonus, training, gsm's in the context of the employee phone program,…

2. Wholesale Support costs

Wholesale Support costs are non FTE related costs which are centrally booked and managed but relate to Wholesale activities. E.g.: Billing.

3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Wholesale departments, costs for legal claims, etc.

4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales and costs of goods sold, interconnection fee, etc;

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4.3.2 Wholesale costs allocation principles

4.3.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each wholesale CP-CCG.

These attribute-qualifications are applied on all the wholesale CP-CCG combinations, but at different levels of modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Wholesale allocation process as described below.

4.3.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies wholesale costs based on their variability towards product volumes.

We distinguish between 4 var_types:

- Marginal (mar)
- Variable (var)
- Fix (fix)
- Common (common)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 4 var_types as described in chapter 4.2.2.2.

4.3.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies wholesale costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We distinguish between 2 PS_types :

- PRODUCT_SPECIFIC (PS)
- NON_PRODUCT_SPECIFIC (NPS)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 2 ps_types as described in chapter 4.2.2.3.

In addition to the attribute PS_TYPE, all wholesale costs are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

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Used Cost Groups for wholesale costs are:

Non product specific	Product specific
All CWS products	Mobile Roaming
All CWS products excluding Mobile Roaming	Fastinternet,Profinternet
	LeasedLines,Explore
	ICT
	Mobile
	FixVoiceTraffic

Since this is stricto sensu the same decision tree to qualify wholesale CP_CCG with attributes VAR and PS, than for the Retail allocation process, we refer to the decision tree presented in chapter 4.2.2.3 of the Retail module to illustrate the wholesale costs qualification with attributes VAR and PS.

4.3.2.4 *Criteria for allocation of wholesale costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to). This means that the costs will be allocated towards one of these wholesale Markets:

   Market 0 - Residual Market
   Market 4 - Unbundling local loop
   Market 5 - Wholesale Broadband
   Market 6 - Wholesale BROTSOLL
   Auxiliary service Market 1 - Access PSTN&ISDN - CPS
   Auxiliary service BRxx - Colocation
   Auxiliary service BRIO - POI

b. Non product specific Variable costs are allocated towards wholesale Markets (see list above) based on volumes drivers. The drivers for allocation of variable costs are documented further, per block of wholesale costs (1->4).

c. Non product specific Fix and Common costs are allocated towards Market 'Fixed Common Wholesale Markets'.

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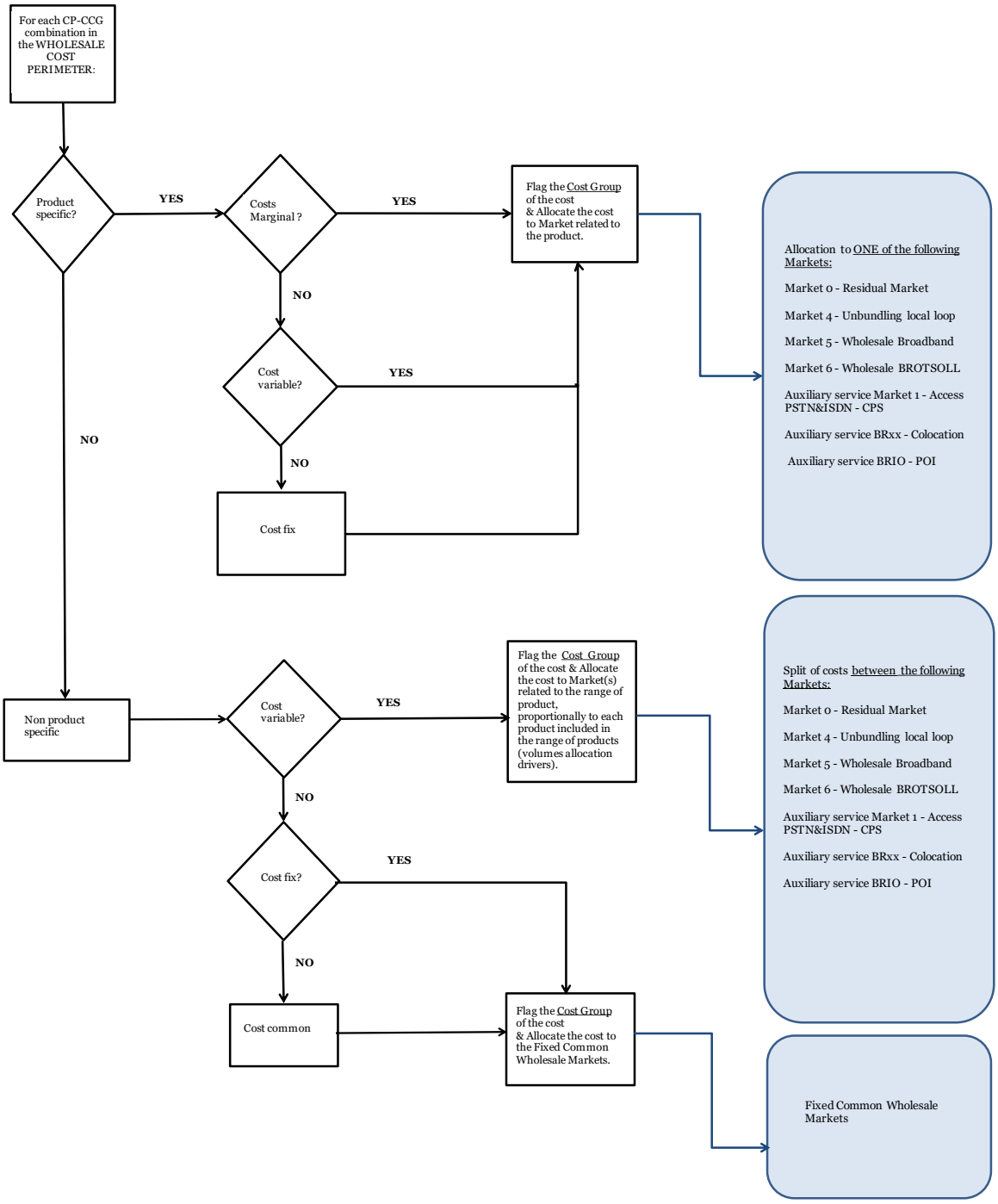
Principles for wholesale costs allocation to Markets can be illustrated as follows:



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4.3.3 Wholesale costs allocation flows

4.3.3.1 *General principles*

As described above, the 4 blocks of costs included in Wholesale cost perimeter are all specified with 2 cost type attributes (VAR TYPE; PS TYPE) prior to be allocated to Markets. Similarly to the Retail allocation flow, the 4 blocks of costs do not follow all the same path of allocation. The allocation flow followed by a Wholesale CCG_CP will depend on its block of costs (1->4).

4.3.3.2 *Wholesale FTE related costs (block 1)*

The allocation flow of Wholesale FTE related costs is the same than the Retail one. We therefore refer to chapter 4.2.3.2. for presentation of the several modules whereby FTE related costs are centralized/allocated. As a reminder, the list of modules that deal with FTE related costs is as follows:

- Cost basis (GL62, as well as some GL60&61),
- CCG_HMC or SUPPORT ([1]),
- ORGANISATIONAL_GROUP,
- WHOLESALE.

With regard to the definitions of Attribute dimension VAR, Wholesale FTE related costs can only be either Fix (FIX), or Variable (VAR) costs.

Criteria to classify FTE related costs into FIX vs. VAR costs were similarly defined as for the Retail allocation flow, id est: are considered as FIX costs, all the FTE costs needed to maintain the Proximus minimum organisational structure, independently of products volumes. These ones include staff costs such as IT officers, reporting & analysts teams, research staff (e.g.: products & solutions managers), as well as the Proximus hierarchy structure (team responsibles).

Organizational groups dedicated to a specific product are categorized as product_specific (PS). We identified only one organizational group in the Wholesale organisation structure that is product specific, id est, the team involved exclusively in Roaming agreements.

Organizational groups covering a span of products are categorized as non_product_specific.

The classification of FTE costs for CWS between FIX and VAR costs, and whether product_specific or not, is as follows:

CWS Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All CWS products
Direct Sales	Var (*)	NPS	All CWS products
Call center activities	Mix Fix/Var	NPS	All CWS products
Roaming agreements	Fix	PS	Mobile Roaming
Products & solutions management	Fix	NPS	All CWS products excluding Mobile Roaming
Strategic planning and internal process	Fix	NPS	All CWS products

(*) excluding Team responsible flagged as Fix costs.

[1] Only FTE related support costs.

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CWS Sales department is an organisational group defined as Var, non product specific. CWS sales FTE are responsible for regulated and non regulated products. The size of the department varies with the volumes of products (to be) sold.

CWS Call center activities include 3 main divisions:

- *Operational team* in contact with external clients. This division gathers the Front office and Back office in charge of the sales orders intake, answers to questions of clients, and support to the CWS Sales department in period of high business activity
- *Billing and credit collection team*
- *Reporting, IT tools management and process optimization team*.

Billing and credit collection team is qualified as "fix, non product specific"cost. Billing activity is a cost depending on volumes of clients, not on volumes of products.Billing costs is also a non_product_specific cost, as vast majority of CWS clients have more than one product by Proximus.

Reporting, IT tools management and process optimization team, as Support staff team, is identified as a "fix, non product specific" organisational group cost.

Front office and Back office costs are categorized as "variable, non product specific", considering the variability of these costs with volumes of products sold, and taking into account that CWS Call center activities handle all CWS products, regulated as well as non-regulated products.

Product specific organizational group Fix of the Roaming Team is allocated directly to non regulated Market 0.

Non product specific organizational groups Fix are routed directly towards the "Fixed Common Wholesale Markets".

Non product specific Variable organisational group's costs are split into CWS Markets based on the following volumes drivers:

1. CWS sales department costs are allocated to products (markets), according to provisioning volumes.

2. CWS Call center activities costs are allocated to products (markets) according to minutes of Voice Calls and number of BCI cases (*) handled, detailed per product
(*) BCI: Belgacom Channel Infrastructure: tool where call center registers a case (ordering, claim, complaint handling) to ensure appropriate follow up and treatment of the client request.

4.3.3.3 *Wholesale support costs (block 2)*

The wholesale support costs are identified firstly in Module "Support". Wholesale support costs specifically concern "CWS_Billing" (invoice printing, stuffing and postage).

We qualify CWS_Billing as a fix non_product_specific cost. Cost Group of CWS_Billing is All CWS products, since the CWS_Billing support costs include all the products of CWS, whether regulated or not.

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As mentioned in chapter 4.3.3.2.3 related to the CWS CCA staff team in charge of Billing and credit collection follow-up, to the contrary of the Retail billing costs, the case that billing costs can be linked to some unique product is not met, since the vast majority of the CWS clients have more than one products billable. The absence or suppression of one product will not change the need for invoicing the client.

CWS_Billing costs are split between CWS Markets according to the park of CWS products.

4.3.3.4 *Wholesale costs which do not have a causal relationship with products (block 3)*

Wholesale costs that do not have a straightforward driver towards products are either grouped in module Wholesale, if they can be linked to the activity of a Wholesale organisational group, or they are directly routed to the Market "Fixed Common Wholesale Markets".

Per definition these costs are either fix (e.g. IT developments non capitalized for the internal needs of Sales departments) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, bad debt, etc.).

Per definition, these costs are non_product_specific.

Fix and common non_product_specific costs are allocated directly towards Market "Fixed Common Wholesale Markets".

4.3.3.5 *Wholesale costs which have a causal relationship with products (block 4)*

Are included in this block of Wholesale costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products. Costs of block 4 are either directly allocated to Market they relate, or they transit by Wholesale module, when the costs have to be gathered in the same Wholesale object at first, prior to be allocated to Market they relate.

Per definition, these costs have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are included in Wholesale costs - block 4, the following combinations of VAR_TYPE ; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

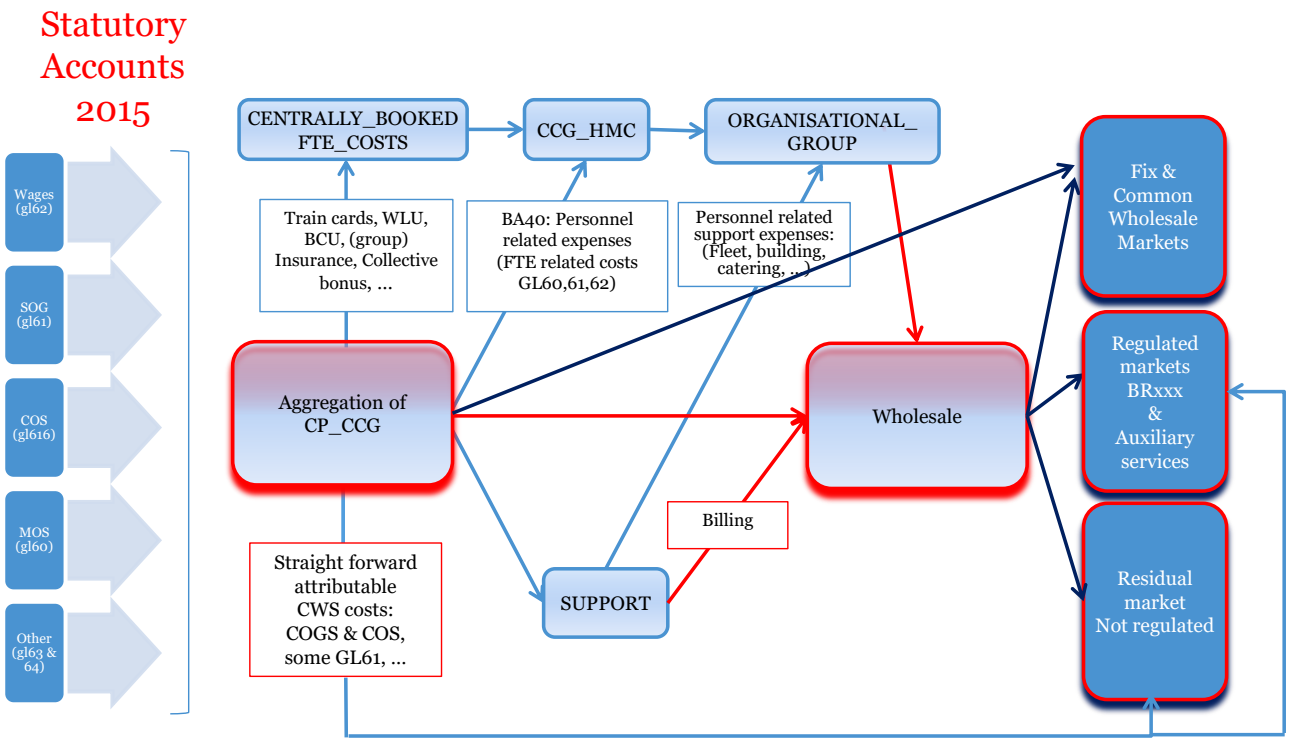
The main costs of this category are Cost of goods sold, cost of sales (e.g: interconnection fees), consultancy and outsourcing costs dedicated to specific products.

Cost of goods sold and Cost of sales, as MAR product specific costs, have a direct link to volumes of product they relate. Therefore, they can directly be allocated to the Market they relate.

Consultancy and outsourcing costs areallocated directly to the Market they relate. E.g.: Fees to Clearing Offices for roaming.

Sensitivity: Unrestricted

Wholesale allocation flows of all types of Wholesale costs is presented as follows:



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

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4.4 Allocation of the Customer operations costs

4.4.1 Customer operations costs perimeter

Customer operations is a new Business unit created in 2014. The division gathers activities previously done inside Business Units Consumer Business Unit (CBU), Service Delivery Engine (SDE) and Staff and Support (S&S).

Objective of the creation of the Business unit Customer operations (CUO) was to join in the same Business Unit all the Proximus activities to the service of the customer.

In the Cost model 2015, we ensured consistence with allocations of previous year by allocating costs of CUO in the same way as done previous year inside the separate Business Units CBU, SDE and S&S, for the CCG concerned.

The Proximus financial and accounting structure clearly registers (directly attributable) CUO costs on cost centers 49xxxx and 50xxxx.

However, a number of costs are not directly attributed to CUO in the accounting books but do relate to CUO activities.

It concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's.

E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

These costs are added up with the directly attributable FTE related costs and allocated to CUO CCG towards the organisational groups.

We refer to chapter 4.2.3.2 Retail FTE related costs, where the allocation flow is described for FTE related costs, as it is applicable to CUO FTE related costs.

The CUO module is primarily sourced from the following modules:

1. **Organisational_Group**
   This concerns the CUO FTE related costs.

2. **CP1**
   This mainly concerns the outsourcing costs for the field and remote technical activities (provisioning and repair).

3. **CUO_SOG**
   This primarily concerns costs for the outsourcing of commercial call centers (front office and after sales).

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4.4.2 Customer operations costs allocation principles

4.4.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are “VAR_TYPE” and “PS_TYPE” and they constitute a unique combination for each Customer operations CP-CCG.

4.4.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies customer operations costs based on their variability towards product volumes.

We distinguish between 2 var_types:

- Variable (var)
- Fix (fix)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 2 var_types as described in chapter 4.2.3.2. Retail FTE related costs.

4.4.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies CUO costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards specific products.

Considering the activities of CUO Business unit (activities of services to the customer), most of the costs are non product specific.

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4.4.3 Customer operations costs allocation flows

4.4.3.1 *Allocation of Organisational Group costs*

The classification of FTE costs for CUO between FIX and VAR costs, and whether product specific or not, is as follows:

CUO Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All Proximus products
Support services to the business unit			
Strategic planning	Var (*)	NPS	All Proximus products
E2E operations: IT tools, reporting & process	Var (*)	NPS	All Proximus products
Technical services to the customer			
After sales technical - provisioning (1)	Var (*)	NPS	All Proximus products
After sales technical - repair (1)	Var (*)	NPS	All Proximus products
Field Cable	Var (*)	NPS	All Proximus products
Commercial services to the customer			
After sales commercial (2)	Var (*)	NPS	All CBU and CWS products
Directory Information Services	Var (*)	PS	Directory Assistance Services and listing
Billing & Collecting invoices	Fix	NPS	All CBU and EBU products

(1) Remote and field

(2) Back office of Telesales agents for provisioning and complaints handling

(*) excluding Team responsible flagged as Fix costs

Technical services to the customer

The allocation for fix & var organizational groups is the same (fix is a copy of var through a generic key implemented in TCE tool). There are exceptions to this principle, in which case the fix allocation directly goes to common markets. The latter applies when variable costs of a team are sent to the life cycle.

The FTE related costs of organizational groups are mostly allocated to the LIFE_CYCLE, modules of Network elements or MARKETS based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Dispatch units for Field operations, Minutes of interactions with the customer for the remote repair of mass products, etc.).

Commercial services to the customer

- After Sales commercial costs are split between Market 1 – Access PSTN&ISDN & Market 0 – Residual Market for teams handling CBU products, and between Wholesale Markets for teams handling CWS products. The allocation is based on volumes of time or efforts spent for the respective products, as collected in ordering and complaints handling operational databases.
- Directory Information Services are allocated directly to Market 0.

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- Billing and Collecting invoices activities are split between Market 1 – Access PSTN&ISDN and Market 0, according to turnover of the two divisions CBU and EBU, the two beneficiaries of this CUO service.

Costs of Organisational groups of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. to more developments on allocation keys of CUO Organisational groups.

4.4.3.2 *Allocation of Outsourcing costs*

Outsourcing costs include :

- costs gathered in module CP1 for technical teams as well as
- the commercial call centers outsourced (front office and after sales).

When activity is similar, outsourcing costs were allocated with the same drivers (based on time/efforts) than used for the Organisational groups.When activity is specific, dedicated allocation keys were applied.

Outsourcing costs of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. for more developments on allocation keys of CUO Outsourcing costs.

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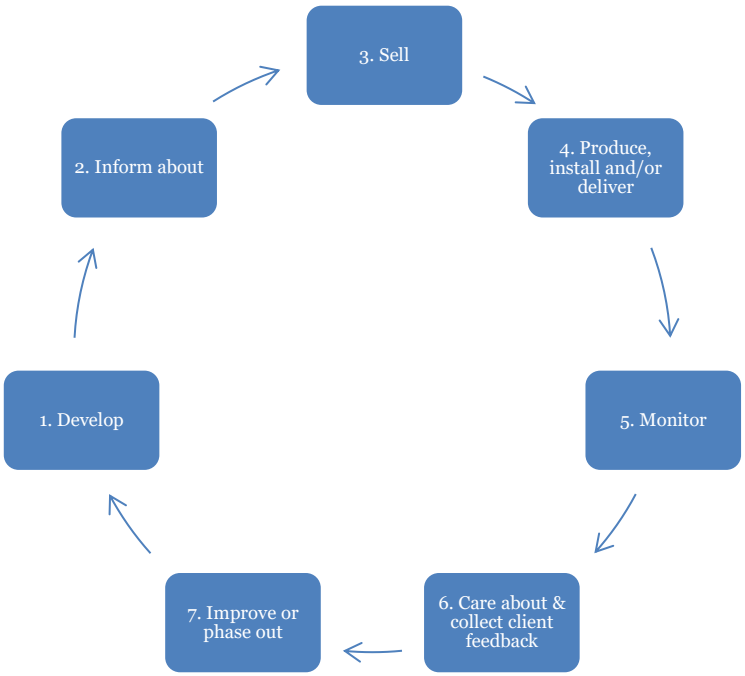
4.5 Allocation of Costs included in the Life cycle of products

4.5.1 Cost perimeter

Since the Cost model 2014, all the costs included in the life cycle of a product/service were specifically gathered in a module, the LIFE_CYCLE MODULE, prior to be allocated to Markets.
The costs were sourced primarily from modules OTHER_MOS, OTHER_SOG, COMMERCIAL_RETAIL, AC and CUSTOMER_OPERATIONS.

The life cycle of a product includes the following stages:



Sensitivity: Unrestricted

Following costs were identified in the life cycle o product/service:

DEVELOP	➢ Develop product configuration ➢ Target market & analyze financial impacts ➢ Develop aspects for sales channels: training, shops equipment, processes	GL62 wages: Product & solutions managers Business & financial analysts Project managers
INFORM	➢ Organize marketing campaigns	GL61 SOG: Marketing campaigns expenses GL62 wages: Marketers
SELL	➢ Acquire gross gains of products: new client and existing client, via All sales channels: ○ Call center agents ○ Direct sales ○ Indirect sales ○ Web sales	GL60 COGS-MOS: CPE equipment GL61 COGS & SOG: Commissions indirect sales (Cogs) Call center agents outsourced (SOG) GL62 wages: Call center agents insourced Direct sales
PRODUCE, INSTALL & DELIVER	➢ Deliver gross gains of products acquired. More an activity of technical departments, to the exception of some products, delivered in shops (e.g.: mobile products)	GL61 COGS: Interconnection costs (Telco/ICT) to various platforms, idTV content fees GL62 wages: Direct sales

Sensitivity: Unrestricted

DELIVER :
Remote activation

- All products (mass or professional, fixed or mobile) must be remotely activated in the network.
- The remote activation may be sufficient to deliver the product in specific cases but in many cases, a field travel is necessary to complete the product delivery.
- Ideally, the remote activations would all be automatically executed further to an order from the customer in the IT systems but in reality, this process still requires manual interventions.
- The complexity of professional remote activations naturally requires a specific and important team (CNN). The activation activity in the life cycle refers to CNN.
- The PCD (Provisioning Coordination Desk) mass remote activation activity is consolidated with the dispatching activity in the DCO included in the field installation life cycle activity.

GL61 SOG:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

GL62 wages:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

Sensitivity: Unrestricted

DELIVER :
Field installation

- A remote activation of the product in the network may not be sufficient, especially in the case of fixed products.
- In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions :
  - in the network up to the NTP (Network Termination Point in the customer house) (even DIY installations by the customer may require a field action in the network) and/or
  - outside of the network e.g. the modem and/or TV decoder (FULL installation).
- The field installation activity in the life cycle relates to the work done by the technicians outside of the network.
- It also includes the remote activation (for mass products) as well as the dispatching activities from the DCO.

GL60 MOS-MAT:
Equipments like modems and/or TV decoders, located in "Terminals" life cycle various categories

GL61 SOG:
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

GL62 wages :
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

MONITOR:
Billing & Collecting Revenues

- Produce and send bills
- Manage bad debt:
  follow ageing balance, send reminders & bailiffs costs

GL61 SOG:
Printing & postage costs
Bailiffs costs

GL62 w ages:
Call center agents insourced (dedicated team Billing&Credit risk)

GL 63&64 Other:
Bad debt provision & write-off

MONITOR:
Changes on products sold

- Adapt product configuration, in accordance with requirements of the client:
  swap, downgrade/upgrade of a pricing plan, additional option, churn, configure multiple products in a pack (pack configuration)

GL61 SOG:
Call center agents outsourced

GL62 wages:
Direct sales, Call center agents insourced

CARE:
Handling clients complaints

- Handle billing complaints
- Process request for changes of personal data (clients moves, etc.)

GL61 SOG:
Call center agents outsourced

GL62 wages:
Call center agents insourced, Direct sales

Sensitivity: Unrestricted

CARE:
Remote repair

- When a customer has a technical issue with a product/service, he/she can contact the appropriate call center (mass or professional). Whilst the customer is waiting on the line, the DARE IT system already processes the customer data in order to test potential issue drivers.
- The first line call center agent may be able to fix the issue of the customer … or not.
  - In the later case, the call center agent will call upon the second line agents who themselves will call upon a third line outside of CHC or ISD if they can 't fix the issue.
- The remote repair activity in the life cycle relates to the CUO CHC (Customer Operations, Customer Help Center, for mass products) and the EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology - for professional products)

GL61 SOG:
CUO CHC (Customer Operations, Customer Help Center) for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products

GL62 w ages:

CUO CHC (Customer Operations, Customer Help Center for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products

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CARE: Field repair	➢ A remote repair of the customer technical issue for one or several products may be impossible, be it by the first, second or third line. ➢ In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions : ➢ in the network e.g. the ROP, the LEX, the NTP (Network Terminating Point, in the customer house) and/or ➢ outside of the network in the customer house e.g. the modem, the TV decoder. ➢ The field repair activity in the life cycle relates to the work done by the technicians outside of the network. ➢ It also includes the dispatching activities from the DCO (Dispatch & Cordination Center).	GL61 SOG: *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair GL62 wages : *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair
CARE: Retention & Loyalties programs	➢ Inform about loyalties actions & facilities, ➢ Implement retention actions	GL60 MOS-MAT: Sales gifts and loyalties advantages GL61 SOG: Call center agents outsourced GL62 w ages: Call center agents insourced
IMPROVE or PHASE OUT	➢ Design product new configuration/phase out ➢ Target market & analyze financial impacts ➢ Develop aspects for sales channels: training, shops equipment, processes	GL62 wages: Product & solutions managers Business & financial analysts Project managers

Sensitivity: Unrestricted

4.5.2 Allocation drivers

Allocation drivers for costs to the Life_cycle module are the following ones:

	Sourced from Module(s)	Driver for allocation to Life_Cycle split per product and customer segment
Organisational groups costs		
Commercial services to the customer		
Marketing	Commercial_Retail	Detail of marketing expenses
Sales and after sales, insourced&outsourced, mass market products	Commercial_Retail/ Customer_operations(1)	Time&efforts spent per product according to operational volumes for ordering&complaints handling
Sales and after sales, insourced&outsourced, professional market products	Commercial_Retail	Time&efforts spent per product according to TTVA/revenues
Indirect sales, mass market and prof. market products	Commercial_Retail	Commissions paid
ICT dedicated ressources: governance&sourcing	Commercial_Retail	Direct
Billing&Collecting invoices: FTE costs	Customer_Operations	Turnover per business area
Technical services to the customer		
Customer activation	Customer_Operations	SAP HR teams names, Complaints volumes (complaints handling) and Configured nodes (connectivity activity)
Customer field installation&repair on copper	Customer_Operations	DU (Dispatch Units) translating time spent on activity
Customer field installation, repair&maintenance on fibre	Technology	#FTE
Customer remote repair, mass market products	Customer_operations(2)	#FTE and minutes
Customer remote repair, prof. market products	Commercial_Retail(2)	#FTE and Repair tickets
Assets and Cost of good sold/cost of sales		
CPE rented	AC	Direct
idTV content fees	AC;Other(*)_SOG	Direct
CPE sold	Other(*)_MOS	Direct
Interconnection	Other(*)_SOG	Direct
Outsourced ressources/IT platforms&applications	Other(*)_SOG	Direct
Sales gifts	Other(*)_MOS	Direct
Other		
Bad debt	Commercial_Retail	Direct
Internal distribution costs	Support	Value of material moved out of stock (3)
Billing & Collecting invoices: Printing & stamps costs	Commercial_Retail	#billed clients, weighted when multiplay clients

(*) Commercial Retail costs.

(1) Commercial Retail:

Direct sales

Call centers insourced: Front office Telesales (Inbound calls)

Call centers outsourced: Front office Telesales (Outbound calls)

(1) Customer operations:

Call centers insourced: Back office Inbound calls

Call centers outsourced: Front office Telesales (Inbound calls) and Back office Inbound calls

(2) Commercial Retail:

EBU OPS ISO (Operations - ICT Services operations)

Customer_operations:

CUO CHC (Technical call center)

(3) Opex and Capex.

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Commercial services to the customer:

Below, we give some specifications about drivers of sales and after sales costs.

1) Sales and after sales, insourced and outsourced, mass market products

This Life_cycle object includes all Sales and After sales channels handling "simple" products, i.e. mainly Telco products (fix voice, fix internet, idTV). This category includes also products for small size enterprises. In short, it includes all CBU consumer business unit sales channels (even is, as from 2015, some of these channels are in the new CUO business unit).

Call centers agents:

- *Front Office* is the department with FTE who are in contact with external clients. Activities of the Front office are primarily sales and sales orders intake, supported by the After Sales department.
- *After Sales* department is the CCA Back office. Its tasks are primarily input in systems of sales orders, handling of clients billing complaints and requests (e.g.: change of invoicing address).

The IT managing system for tracking calls handling of the *Front office* is the **IVR** (Interactive Virtual Response), where calls passed and minutes of calls are recorded, for fix line products and mobile products.

The IT managing system for tracking activities of the *After Sales* is **BCI** (Belgacom Channels Infrastructure) where cases detailing activity of the agents (ordering, complaints handlings, requests), for fix line products and mobile products, are registered.

Usually, ordering is passed by Front office agent, simultaneously with the sales, but when the ordering takes longer time (because need for installation on field, or due to any longer issue), task is delegated to an After Sale agent who will create a case in BCI.

The IT managing system for ordering of the Front office and the Back office is **OMS** for fix line products, **PNI** for mobile products.

OMS and PNI track records of orderings per product and per type of ordering: acquisition (gross gains) vs. retention (additional option, swap of pricing plan, churns, change, pack configuration, etc.)

Cost model uses OMS and PNI operational volumes as allocation drivers for ordering.

For After Sales agents, activity is at first split between ordering and complaints handlings, with BCI reports.

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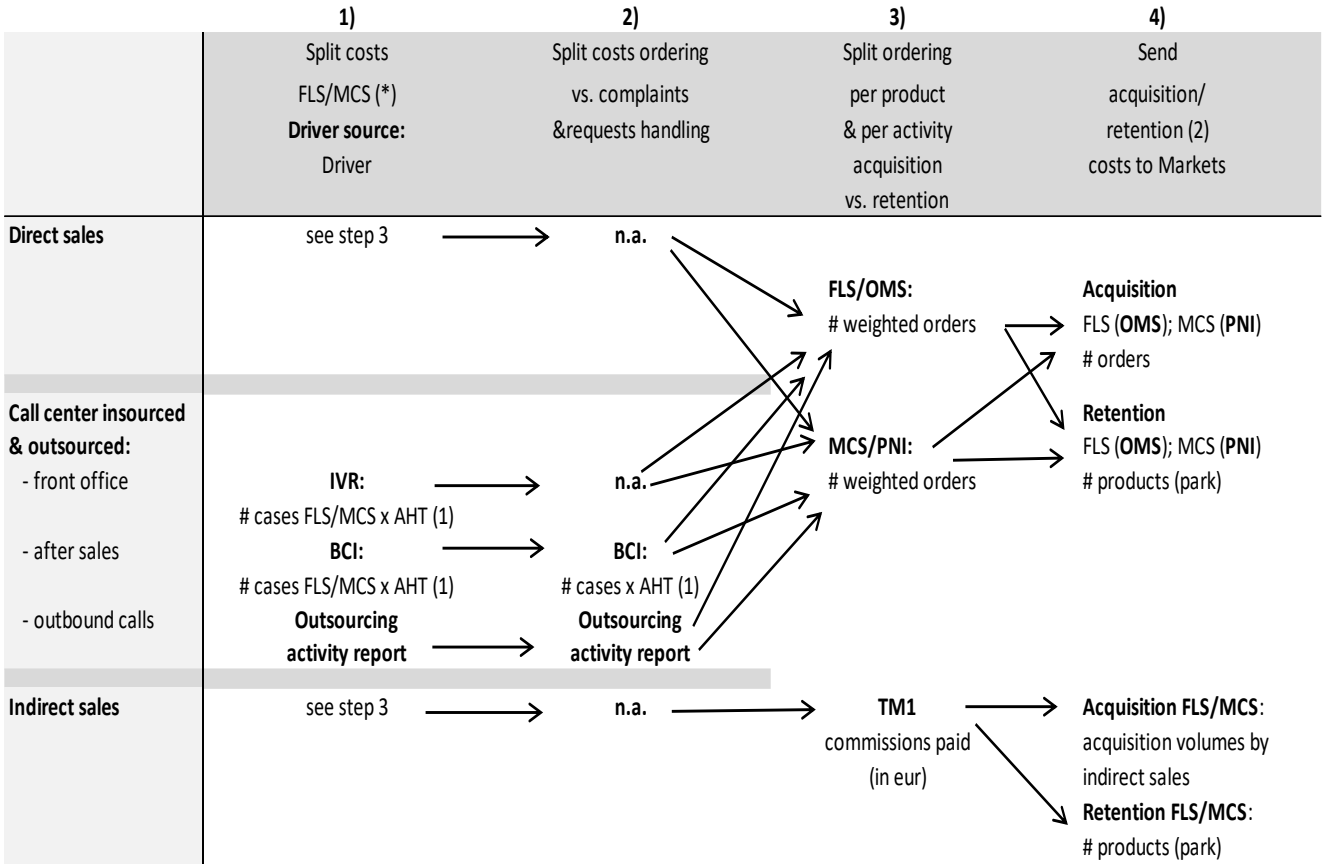
Allocation drivers of Sales and After Sales, mass market products, can be presented as follows:



(*) FLS: Fix Line services products. MCS: Mobile communication products.

(1) AHT: Average handling time. Effort spent per product are weighted, based on a study of time for handling products.

(2) Complaints handling are handled as ordering retention activities: allocation to market with # products - park.

Sales and after sales, insourced and outsourced, professional market products

This life_cycle object includes all EBU business unit sales and after sales channels.

EBU owns its dedicated after sales department: Operations-Business Support Centre (OPS-BSC).

OPS-BSC deals as the back office of the EBU Direct sales for complex ordering, as well as front office towards EBU clients for all what concerns commercial issues on products, Telco, fix&mobile, and ICT. We referred to team's names to split OPS-BSC into Telco Fix, mobile and ICT costs, since OPS-BSC is organized in teams dedicated per product.

Like CBU, EBU sales and after sales can be split into 2 big categories: acquisition costs, and retention costs. We include in retention costs the complaints handling activity of OPS-BSC.

EBU sales activity of ICT cannot be declined in volumes. ICT solutions are offered to the clients as tailor-made contracts, declined in SLA (Sales level agreement) and quoted in EUR.

Besides, ICT contracts include most of the time One-time items. The need to split costs of EBU Sales between products led us to take another allocation key than volume driven.

On top of the fact that not all the EBU products can be declined in volumes, EBU sales efforts are quite different depending on the product. EBU Telco mass market products are quickly available to

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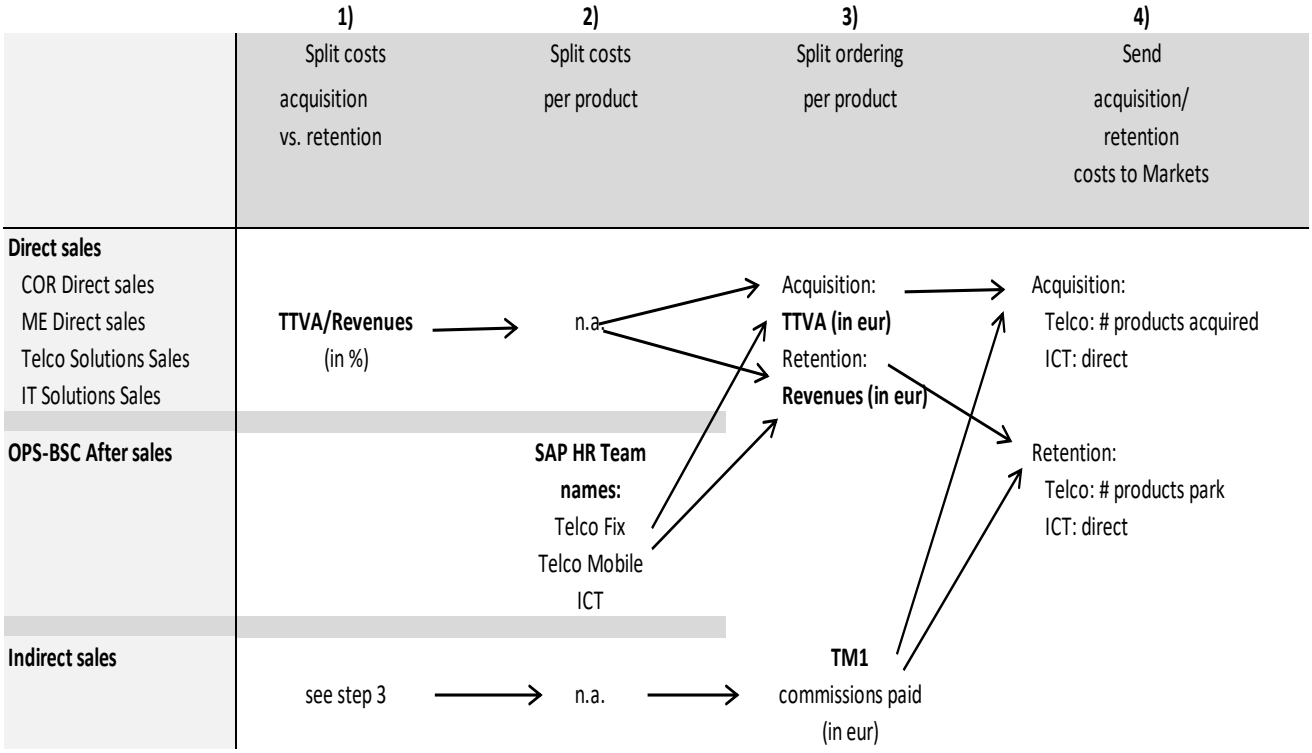
the client, to the contrary of projects ICT that are generally sold for a 2-3 years minimum period time. Such a long time period contract needs sales efforts deployed on longer period of time too.

To tackle this key point, we took 2 drivers to allocate EBU Sales costs:

- Total transaction value (TTVA) to measure acquisition sales costs,
- Yearly turnover to measure retention sales costs.

TTVA measures the total annual value of a won contract. Taking the TTVA as driver enables to compare with a simple unit of measure (EUR) products with specificities very different such as Telco mobile subscription, ICT Data center hosting subscription, etc. Besides, inside EBU Business unit, the TTVA generated is the central driver for all what matters remuneration of direct and indirect sales channels, sales bonus calculations, etc.

Allocation drivers of Sales and After Sales, professional products, can be presented as follows:



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4.5.3 Modern equivalent opex (MEO)

The Cost model 2014 introduced the concept of modern equivalent opex: a company will perform an activity with its own personnel, if the use of its own personnel is equivalent in costs than another business model such as partnership, outsourcing, interim workers, commissioning, etc.

The MEO introduces a new way to determine VAR costs. Objective of the MEO is to only keep as VAR costs the incremental, effective costs needed to perform an activity, by comparing unit cost of FTE Proximus with unit cost of Outsourcing.

MEO concept application requires some basics:

- comparison basis is reliable: activities insourced and outsourced must be of the same nature,
- same drivers must be available to compare both costs.

MEO application to Commercial activities:

Proximus outsources part of its commercial activities: direct sales, front office and after sales. These activities are also performed with FTE Proximus, as described above.

Direct sales and After Sales team cannot appropriately be compared to their outsourced equivalent teams: performance remuneration differs, tasks differ quite also.
E.g.: After sales outsourcers are used for specific tasks, often easier than the ones assigned to FTE Proximus, more trained and skilled about Proximus products and IT Tools.

The only sales channel where we can apply the MEO valuably is the Front office.

Front officers:

- use the same Proximus IT tools (**IVR**-see above), where volumes and minutes of calls are registered.
- perform the same tasks: receive phone calls of clients and promote Proximus products & services.

Unit cost/minute of call of the Front office Outsourced is applied to volumes of minutes of calls of the Front office Insourced, to determine the MEO Front office VAR costs, other part of cost is considered as a Fix cost.

MEO application to Technical activities:

CUO outsources part of its VAR Retail activities: remote repair (by the CHC technical call center), field installation and field repair. These activities are also performed with Proximus insourced FTE, as described above.

The CUO CHC technical center second line may not come into consideration for MEO: tasks differ from the first line ones and cannot be measured the same way. However, tasks of outsourcers for both field installation and repair do not differ and can be measured the same way, as well as tasks of outsourcers for the CUO CHC technical center first line.

MEO is thus valuably applied to the CHC technical call center first line, the field installation & the field repair.

Front officers (the first line of the CHC technical call center for remote repair):

- use the same Proximus IT tools & volumes and minutes of calls are registered the same way.

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- perform the same tasks: receive phone calls of clients and try to remotely repair the products.

Technicians (for both field installation and repair) :

- use the same Proximus IT tools & volumes and DU are registered the same way.
- perform the same tasks: install and repair products/services of customers on the field.

Unit cost/minute of the Outsourced Front office is applied to volumes of minutes of the Insourced Front office, to determine the MEO technical Front office VAR costs, other part of cost is considered as a Fix cost.

Unit cost/DU (measure of time) of the Outsourced Technicians is applied to volumes of DU of the Insourced Technicians, to determine the MEO Technicians VAR costs, other part of cost is considered as a Fix cost.

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5 TEC OPEX (network&IT) stream

5.1 Allocation of TEC OPEX costs going through the "TECHNOLOGY" INCA module

5.1.1 Determination of the TEC cost perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units :

- Consumer Business Unit (CBU) has the responsibility over the residential customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential customers and at the level of Business unit EBU (enterprise business unit) for the professional customers.

Network & IT activities as well as technical retail activities (except the professional remote repair transferred to EBU – Enterprise Business Unit - during the reorganisation) are situated at the level of Business unit TEC, as well as the carrier & wholesale activities (CWS).

The Proximus financial and accounting structure clearly registers (directly attributable) TEC costs on cost centers 50xxxx, separately from the wholesale costs booked on cost centers 40xxxx.

However, a number of costs are not directly attributed to TEC in the accounting books but do relate to TEC activities.

It concerns :

1. FTE related costs
   Support and centrally booked costs which need to be ventilated towards all Proximus personnel/FTE's (and thus also towards these residing under TEC).

   E.g. Proximus University, Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program.

2. Non FTE related costs
   Costs which are centrally booked and managed but relate to TEC activities such as space and power consumption.

The costs under point 1. above are added up with the directly attributable FTE related costs (essentially all payroll costs and costs categorized with Cost type 'personnel-related' in the cost base, in lesser extent a limited number of costs categorized as 'non personnel-related', i.e. primarily training costs, printing costs and cost for office equipment) and allocated towards the organisational

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groups (as a general rule, the organisational group corresponds with the cost center group - except for teams like IPP/VHR or hybrid network & IT CCG's (SPC NSC).

The TECHNOLOGY module costs are primarily sourced from the following modules :

1. Organisational_Group
   This concerns the costs of organisational groups 50xxx.

2. CP1
   This mainly concerns maintenance infrastructure costs.

3. TEC_SOG
   This primarily concerns costs for consultancy bodyshopping and fix price capacity.

5.1.2 TEC cost allocation

5.1.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

For TEC, these attribute qualifications are not defined at the level of the cost base for all CP-CCG combinations but only for the FTE related costs at the level of the organisational groups (module "organisational_group").

5.1.2.2 *Criteria for Attribute dimension VAR_TYPE*

Dimension VAR_TYPE only qualifies TEC FTE-related costs in the TEC module, unlike in the retail module.

Variability refers to the service volume produced by the company in the long-run. This variability has 2 dimensions : volume within a product or diversity of products. The considered increment is the whole product. E.g. PSTN : what if we stop PSTN, which costs do we avoid? This is very hard to reach, especially in a top-down model.

Therefore, we prefer to opt for a simple approach that is only an approximation of the minimum fixed costs, by only considering as fixed FTE-related costs the minimum organizational structure, represented by the persons attributed with a "team responsibility" or in an MST cost center, as officially reported in the SAP accounting system.

We distinguish between 2 var_types only (unlike Retail, with 4 var types):

1. Fix (fix) : TEC FTE-related costs are considered as fixed when they are related to the minimum organizational structure (represented by the team responsibles and the Management & support teams) should there be a change in the long run.
2. Variable (var) : TEC costs which are not considered as fixed according to the definition hereabove (hence overestimated).

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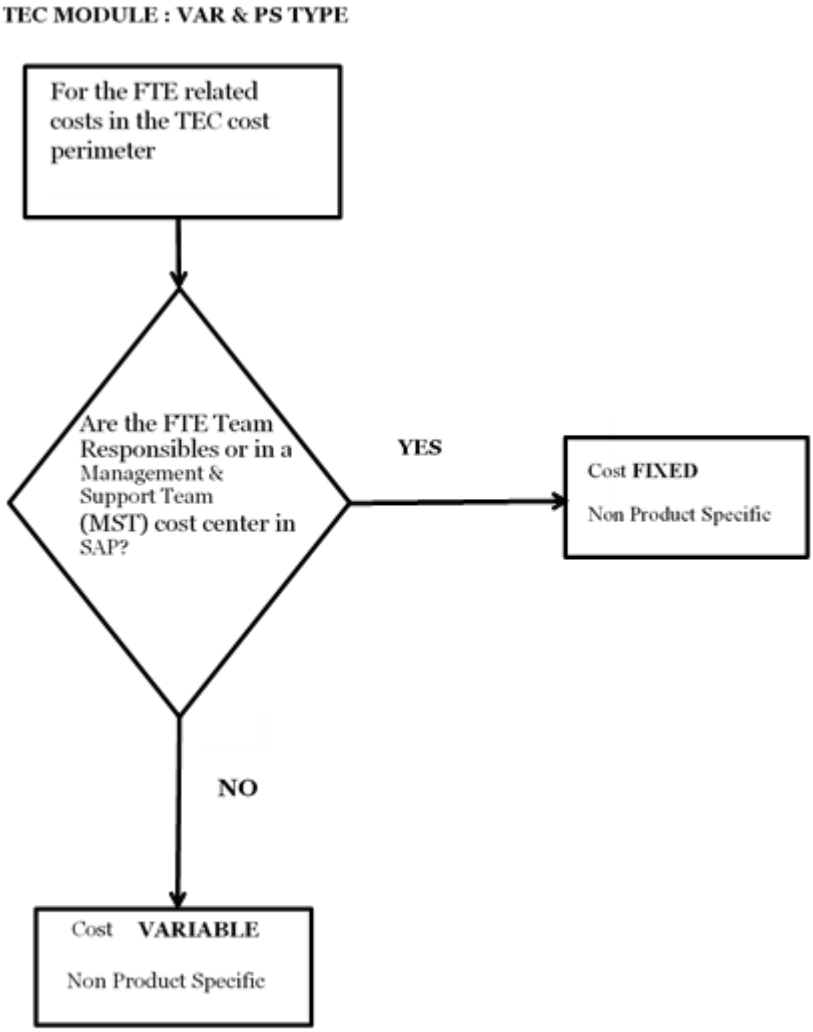
5.1.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies TEC costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We only have one category in the TEC module :

a. NON_PRODUCT_SPECIFIC : TEC costs which do not have a clear (causal) relation with specific products.



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5.1.3 TEC allocation process

5.1.3.1 *Allocation of "Organisational_Group" costs*

For TEC, except for teams like IPP/VHR, the organisational groups correspond with the cost center groupings as introduced at the level of the cost base.

The criteria regarding variability are currently translated towards organisational groups based on this decision table :

	Criteria	Justification
fix FTE	**Assigned as Team responsible in SAP**	Assumption of Proximus as an ongoing concern on the long run, independent of product mix or individual product volumes
	Assigned to an MSTcost center in SAP	MST cost centers are referring to Management & Support teams

Organisational groups dedicated to a specific product are categorized as product_specific.

Organisational groups covering a span of products are categorized as non_product_specific.

In TEC, all organisational groups have been defined as "non_product_specific".

The allocation for fix & var TEC organizational groups is the same (fix is a copy of var through a generic key implemented in INCA). There are exceptions to this principle, in which case the fix allocation directly goes to common markets. The latter applies when variable costs of a team are sent to the life cycle.

The FTE related costs of organizational groups are mostly allocated towards activities in the life cycle, markets, network or IT elements based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Rapid for ITS & SPC, SAP and UTS for NEO…).

5.1.3.1.1 Technology (TEC) Organisational group allocation

5.1.3.1.1.1 TEC network & IT OPEX organizational group allocation

The network & IT teams of TEC are thus split into fix and var on the basis of objective criteria found in SAP but allocated the same way (var being a copy of fix) to the following elements :

- AC2
- BUSINESS_OVERHEAD
- CP2
- EUS
- IT_HW_MAINTENANCE
- IT_SOFTWARE
- IT_SERVERS
- IT_STORAGE_DB
- NE
- NLS2_0
- NLS2_2

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- NSF
- OVH
- LIFE_CYCLE
- MARKET

An exception is made when the variable costs of a team are sent to the LIFE CYCLE. In that case, fix costs are directly allocated towards the relevant common markets.

In the TEC module, the organisational groups do not only encompass the costs of GL 62 wages (including the PFA, capex manpower), but also FTE-related costs from GL60 MOS or GL 61 SOG.

The allocation of the "operational" teams is done directly through the driver whilst the allocation of the "overhead" teams is done through generic keys taking into account the scope of the overhead team (driver is the remuneration cost allocation of all the teams in the scope of the overhead team).

The allocation of the "fix" part of the "operational" teams is generally done through generic keys (a simple copy of the remuneration cost allocation of the "var" part of the same operational team).

5.1.3.2 *Allocation of TEC support costs*

Module 'Support' identifies and collects the costs of a number of support objects which a.o. are TEC related. The TEC related support objects primarily concern costs for telco power & space. However, telco power & space costs are not treated in the TEC module and are thus not described in this subchapter.

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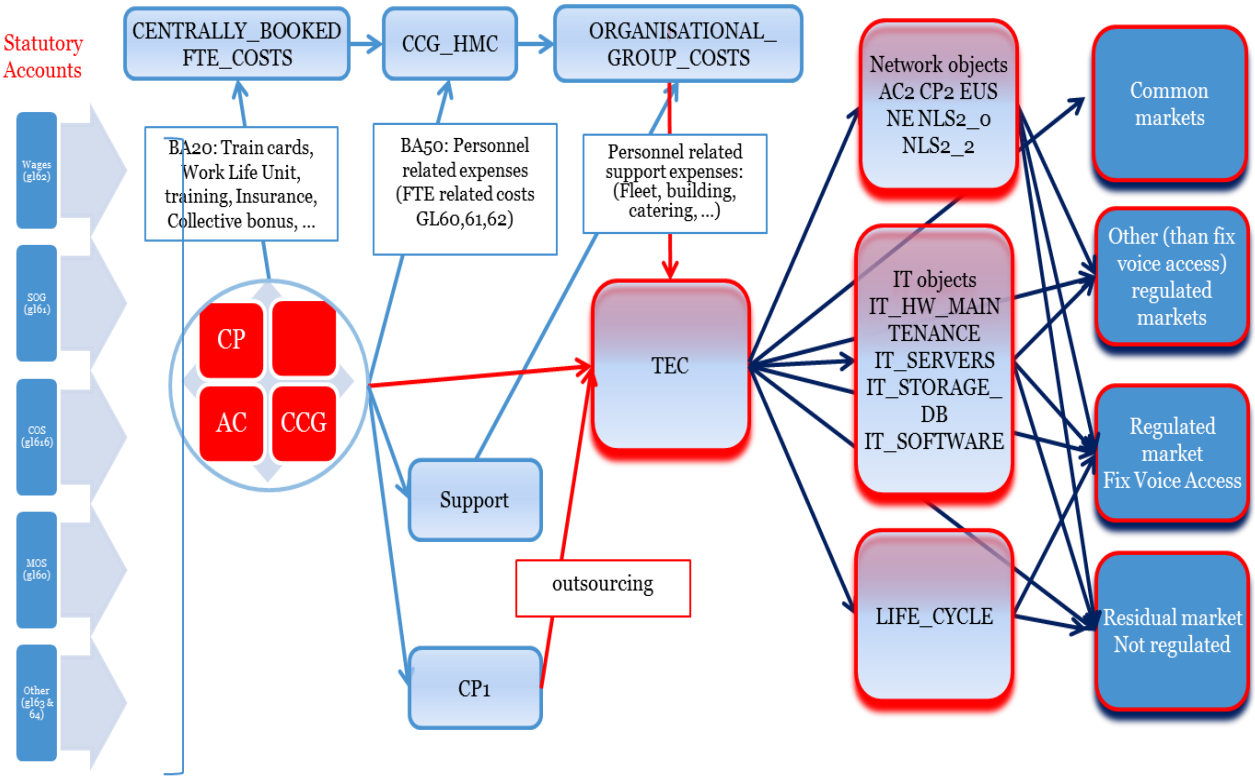
5.1.3.3 *Graphical view on TEC OPEX allocation flow*



CP = Cost Pool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs. Typically, the G/L accounts/costs consolidated in a single cost pool feature the same causal relation.
CCG = Cost Center Grouping = grouping of cost centers with comparable characteristics
AC = Asset Class

Figure 3: TEC OPEX Flow – General

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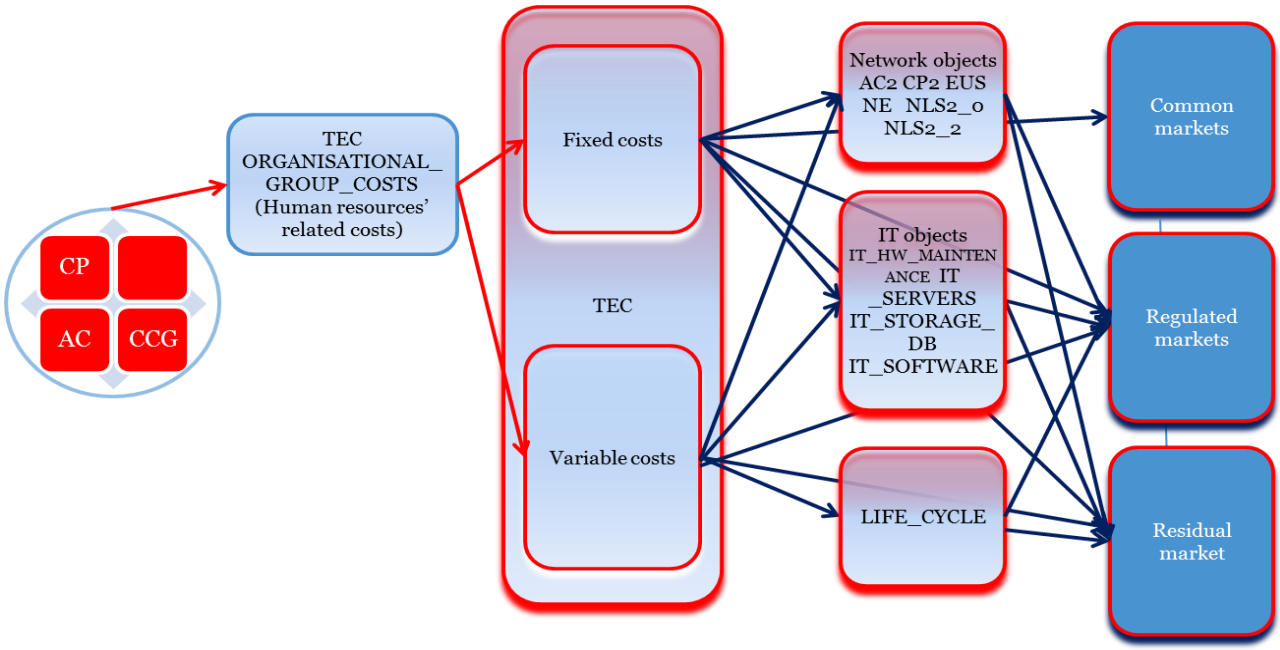

Figure 4: TEC OPEX Flow – Fix / Var

5.1.4 Allocation of TEC retail costs through the Life Cycle

5.1.4.1 *TEC retail costs and life cycle of products*

In the 2014 cost model, a new classification of TEC costs has been added. This model identified all the costs included in the life cycle of a product/service.

The TEC retail costs have been filtered in the Life Cycle module, just before being sent to the Market module. The other (not retail) TEC costs have been allocated like in the previous years.

All costs in the Life Cycle module have been categorized into 2 high level phases :

- Sales
- Post Sales

All the TEC retail costs in the life cycle belong to the second phase, Post Sales.

In the Life Cycle module, we identified the following TEC retail costs :

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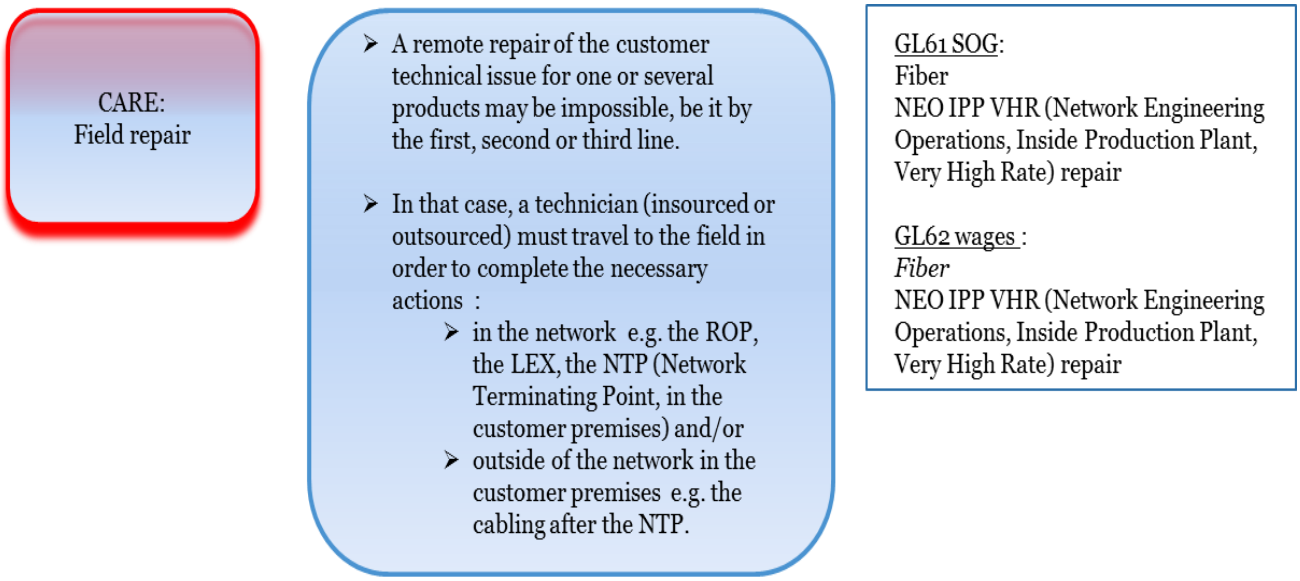

The LIFE_CYCLE Module aims to determine the Retail unit costs.
To that end, the model uses the activities' volumes to allocate them to the Markets.

5.2 Allocation of TEC OPEX costs not going through the "TEC" TCE module

5.2.1 GL61 accounts – Services and Other Goods (SOG)

The GL accounts in the 61 range mainly register outsourcing, consultancy, renting & maintenance costs as well as miscellaneous costs driven by staff (GSM, memberships, office material, internal events etc.).

The GL61 accounts are at a sufficient detail level to allow for a direct allocation to one of the cost objects of the allocation flow. The destination cost objects are distributed over different allocation modules : CCG_HMC ,CP1,CP2,EUS,IT_HW_Maintenance,Market,NE

5.2.2 GL60 accounts – Material Out of Stock

The GL60 account costs cover the cost of all kinds of material taken out of the stocks of Proximus and used for the repair and provisioning of network or the cost of small items (office material, GSM,…) consumed by the staff in the context of their daily activities.

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Note that movements from stock also occur for the construction of the network; these costs are capitalized. From SAP-MM, it is possible to filter out the movements to be capitalized and the others. The capitalized MOS costs are implicitly treated with the assets.

MOS costs are reported at CP/ GL account level per cost center.

This level doesn't always allow an accurate attribution of the costs to the model cost objects and therefore an analysis is performed at the cost base level together with detailed information out of the SAP database .

- The SAP records are reported among other detailed information such as the Material Item Number, where the amounts can be directly attributed to a cost object of the cost model based on the description of the material item.

  The SAP database contains more than 600.000 records.

This analysis results in an allocation towards: network related cost pools (CP1, CP2, NE, CCG_HMC and Lifecycle cost) .

Once each material item is attributed to a cost object, it is easy to report an allocation from the CC/GL account aggregate to the model cost objects.

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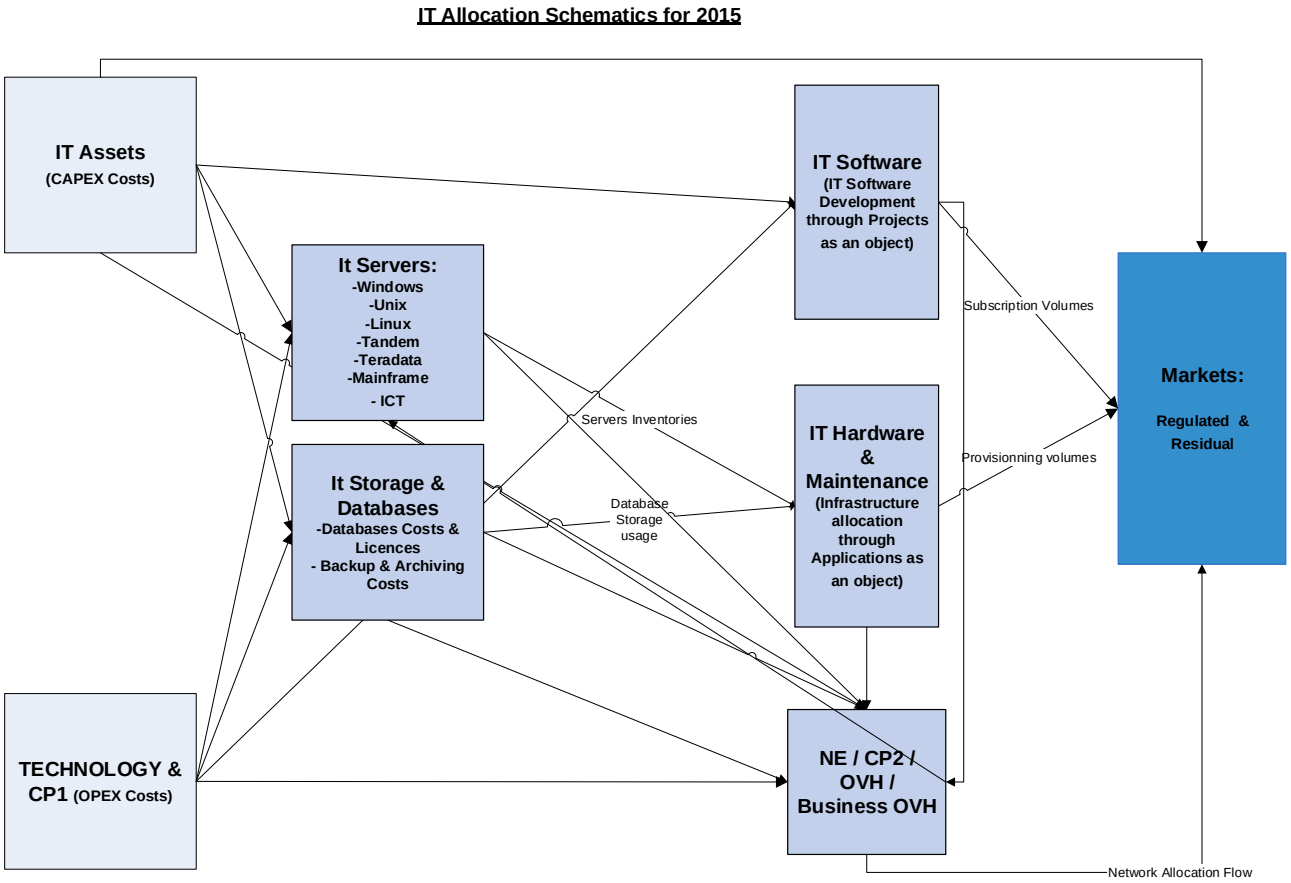
6 IT stream

6.1 IT Allocation flow

6.1.1 IT allocation flow: Introduction

The IT model can be summarized by the following drawing representing the different IT Modules as defined in the IT model, as well as describing objects contained in each of them. The creation of these modules and objects will be detailed in the following paragraphs as well as how they are allocated to each market through an allocation which uses causal and generic keys created with data available in different inventories or reporting systems within the company.

ICT is the use of programs with a specific infrastructure to deliver a requested service or product to the end-user (which can be a Proximus Client or a Proximus Employee/Contractors). In Telecommunications, an incumbent ISP will rarely develop an Application or invest in a project exclusively for one regulated product or market. Most of the time, its specifications will cover multiple usages. Therefore, the goal of this model is to regroup all capitalized and operational costs within clusters of applications or projects that have been defined so that a link can easily be made to the network allocation flow or the regulated/residual markets



Reporting systems and inventories either report to an application and its component or to a project. All this IT information coming both from REG and internal sources allow the creation of an

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allocation towards the markets. The same approach was followed for the allocation of IT software developments through the attribution of projects to the markets. The allocation stream goal is to link the costs of manpower and infrastructure that are used in order to create, run and maintain applications, components and projects to the markets defined in the regulatory model.

These costs can be of two different types: capitalized and therefore depreciated following accounting rules (for IT, depreciation length is mostly 4 or 5 years), or operational and fully charged for the current year. Depending of the cost's nature, the allocation stream will follow different paths (IT, IT&NW and overhead) and use specific inventories and reporting systems in order to create the optimal allocation keys.

6.1.2 Data sources: IT Inventories and Reporting Systems:

Infrastructure and Hardware Inventory:

The hardware layer of the IT Infrastructure within Proximus is composed of a server park, a storage facility and an intranet required for interconnection. For Servers allocation, three inventories were used to populate the park and gain depth in their use. WMC[2], LMC[3] and Sun:bc for UNIX are databases maintained by IT Engineering. Regarding Storage, the weight of databases from different technologies is used as the allocation driver.

Internal IT Databases:

The main database used in the model is the "Configuration Management Database" (CMDB) which populates and links together all IT related objects in Proximus, such as which databases are used by an application, or what is hosted on a server. This is used primarily for incident management.

IT Asset Manager (ITAM) is the inventory for all IT equipment with a reference to its cost and is used by Finance to calculate yearly the costs for IT hardware Assets.

ARIS is a recent initiative to install a business process modeling tool which allows the aggregation of applications and to understand fully their purposes.

Reporting Systems:

Rapid[4] is a tool used for projects, budget and capacity management related processes, with interfaces to other core systems such as SAP HR (human resource & organization units data) , SAP Finance (actuals, purchase order..), IMD (release Management) and timesheets applications (used by TEC to report their day-to-day work). Rapid will be used to calculate allocation keys for most manpower costs for TEC regarding both Capex (allocation of Assets ranging from 2526 to 2573) and Opex. Asset 2523, which pools mobile's historical assets, will be allocated using timesheets reporting as well. The 2547 Assets, which represent the investments for new IT platforms will now use an allocation key

[2] **W**indows **M**anagement **C**onsole

[3] **L**inux **M**anagement **C**onsole

[4] **R**epository for the **A**dministration of **P**rojects and **I**nitiatives in a **D**ecentralized way

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based on the 5 year CAPEX cumulated costs in the same way as other software related assets but through TM1 reporting instead of timesheets.

Regarding maintenance and contractors, the data is no longer maintained by the vendor management team. Timesheets are therefore also used for both these allocations.

TM1 is an interface from excel to SAP allowing the extraction of Data coming from Finance and HR. It completes our asset reconstruction for the non-workload costs.

6.1.3 Modules and Objects composing the IT allocation flow

IT Servers

A server is a set of hardware running as a service to serve the needs or requests of others programs or users. The followed approach is to split the servers into families based on their technology as firstly, it matches the operational organization within Proximus, helping in coherence and giving the opportunity to have for each family an expert available to help, backed up by dedicated inventories for windows, Linux and Unix. Secondly, families follow a logical flow of cost allocation. Windows machines can be split in two categories (physical and Virtualized) to which we apply a weight based on their occurrences within the inventories in order to give more consistency to the data used for the allocation keys created. Linux and Unix follow the same rules. Finally Teradata, Tandem and Mainframes machines will be directly allocated to the applications that use these special technologies.

Splitting the server asset between these families was achieved by using the cumulated purchase costs of these families which is provided by Finance. This calculation is made possible by the inventory maintained in ITAM.

a) Windows family

Windows is split between two categories: Physical and Virtualized servers. Virtualization machines use a software layer to emulate more (virtual) servers with the possibility of using different operating systems or environments, helping to rationalize resources (by allowing more redundancy, saving space etc.).

b) Linux Family

Historically, Linux mostly supports applications and processes related to the residual market or to overhead costs.

c) UNIX Family

The Unix Allocation follows the same method as the Windows family. Most Critical platforms are hosted on this technology.

d) Teradata and Tandem Families:

Teradata are servers specifically used by the Data Warehouse and will be directly allocated to the corresponding object (DWH).

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Tandem machines are non-stop servers for the Customer Billing application and will be directly allocated to its corresponding cluster (COB).

e) Mainframes family

Mainframes are used by a small group of specific applications and will be allocated according to an IMA key based on the number of users for each application using directly mainframe resources.

f) ICT Servers

In 2015, new server assets were created specifically for EBU internal projects with an asset number beginning by "62**". Their costs are pooled in the IT_Servers module within the IT_Servers_ICT object in order to be allocated to the NE_ICT related object.

Storage

In order to allocate costs from databases to applications, we used a report from each database family operational team (Oracle, SQL, Teradata and IDMS) to map databases with applications and to create allocation keys based on the total size of the databases used by each application.

IT Hardware & Maintenance:

The Hardware & Maintenance module summarizes all costs related to the hardware infrastructure as well as specific maintenance. All applications that receive any cost from servers and storage are found in this module. There are 3 specific cases which are detailed by the following:

a) Connect IT:

Connect IT is the Intranet used by the IT infrastructure in order to inter-connect the different objects it uses to deliver a service. The allocation will be based on a post-process generic key defined by the CAPEX Software investments for the last 5 years and OPEX from 2014.

b) Application Interaction Platform:

The Application Interaction Platform object is defined as the software layer required to inter-connect Proximus's complex IT infrastructure. Websphere and middleware costs compose most of this object. Websphere Application Server (WAS) sets up, operates and integrates electronic business applications across multiple computing platforms allowing real-time application integration, event-driven processing and process automation. A middleware is a software component that provides interoperability in order to support and simplify complex distributed applications. It is an intermediary layer between application software working on different environments or operating systems. This object receives mostly costs from either middleware or websphere licenses, upgrades and the infrastructure costs it uses (mainly storage and servers). The same generic key as Connect IT is used to allocate application interaction platform.

c) IT Overhead

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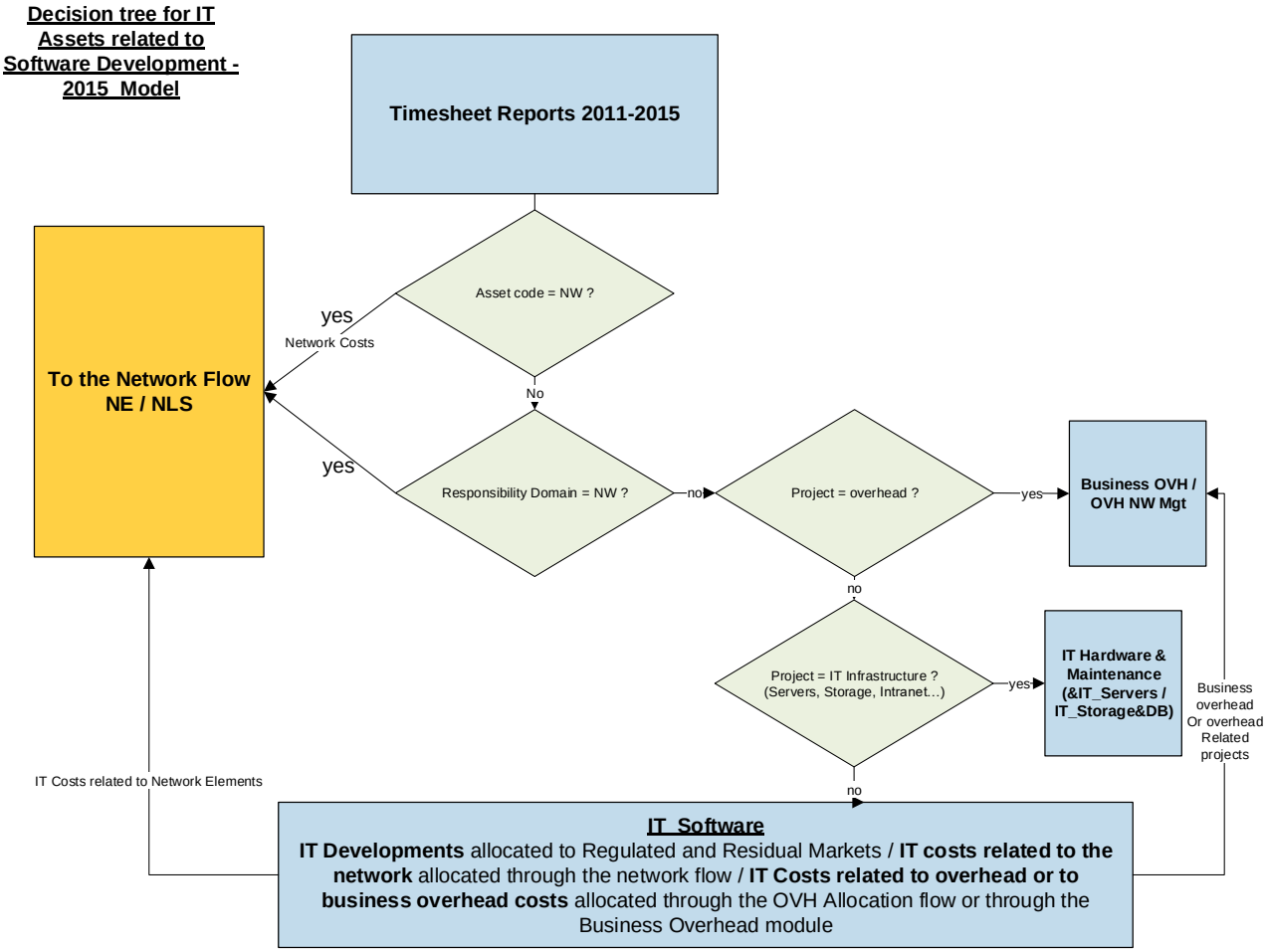
The overhead object is a pool of costs that manages the Proximus's IT Infrastructure. It is internalized in the IT model by the use of a generic key based on the IT_Software module allocation on OPEX costs from BA 50

IT Software:



The IT Software module summarizes all the IT CAPEX costs from the last 5 years and the OPEX costs from 2015. It pools all software development costs and reroutes pure network costs towards the network allocation stream.

In order to give more consistency to the allocation, we regrouped some projects into two different clusters that will follow a particular generic allocation:

a) **Non development projects:**
   Non development projects relate to existing support projects in which employees or contractors book their activities when they are not involved in an IT development project. It

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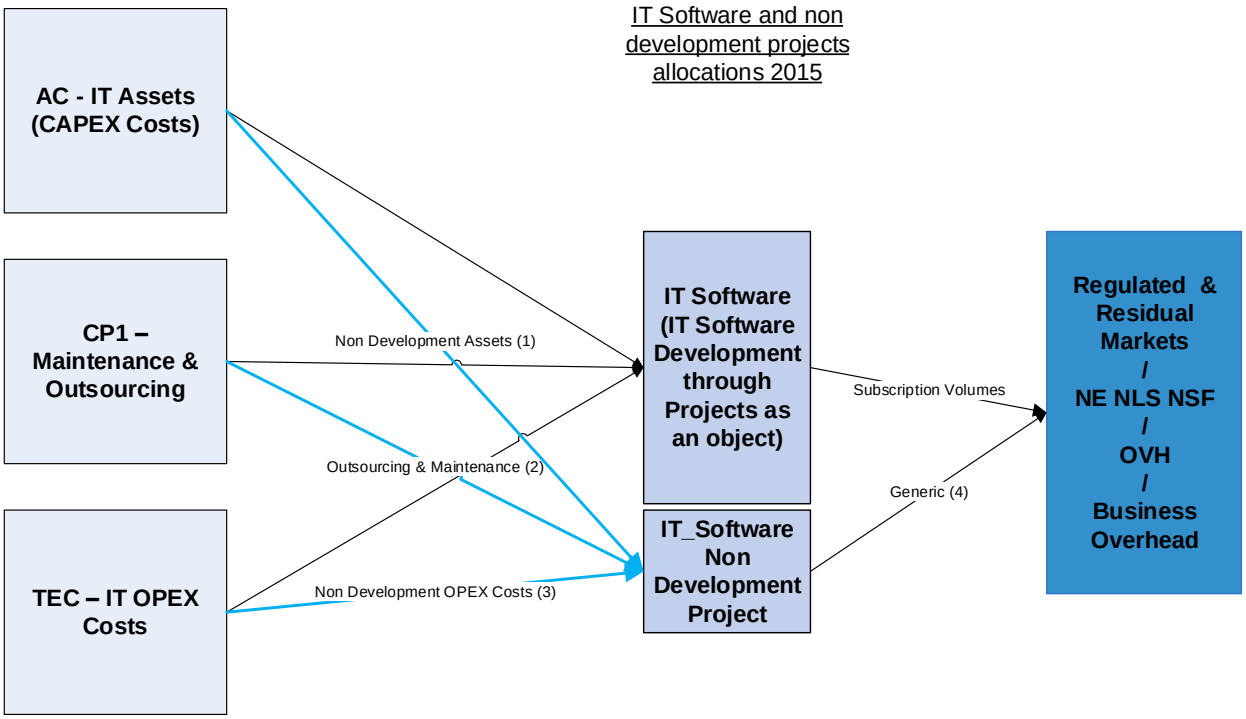
represents support projects which exist due to investments projects. It is allocated by a generic key based on the IT Software module CAPEX costs from the IT Assets only and the OPEX costs from BA 50.



The non development Project Object is the daily IT operational activities and maintenance that are pooled together in order to be allocated through the analysis of today's and past's IT investments and evaluated by the IT assets depreciation from the last 5 years and the opex costs from 2015

The calculation is programmed in INCA and done by the coding engine

b) <u>SW Application Interaction Platform</u>

This object is the same as the one in IT Hardware & Maintenance but for software development instead of IT infrastructure.

<u>Allocation Process for IT Assets and Operational Costs:</u>

IT Assets allocation:

- **<u>2500 Servers (Inclus. Tandem)</u>**

Servers can be used by applications (software sold by a vendor or developed in-house) and databases or for interconnectivity and security. This asset pools most of servers families used within the company such as Windows, Linux, UNIX, Teradata and Tandem technologies. Accounting distinguishes the following families: Wintel (Windows for Telecommunication), UNIX (with Linux pooled in this family), Teradata and Tandem. Keys are created from Finance inventory analysis in order to allocate costs to each family, which will be treated distinctively, following a specified allocation path depending on the technology.

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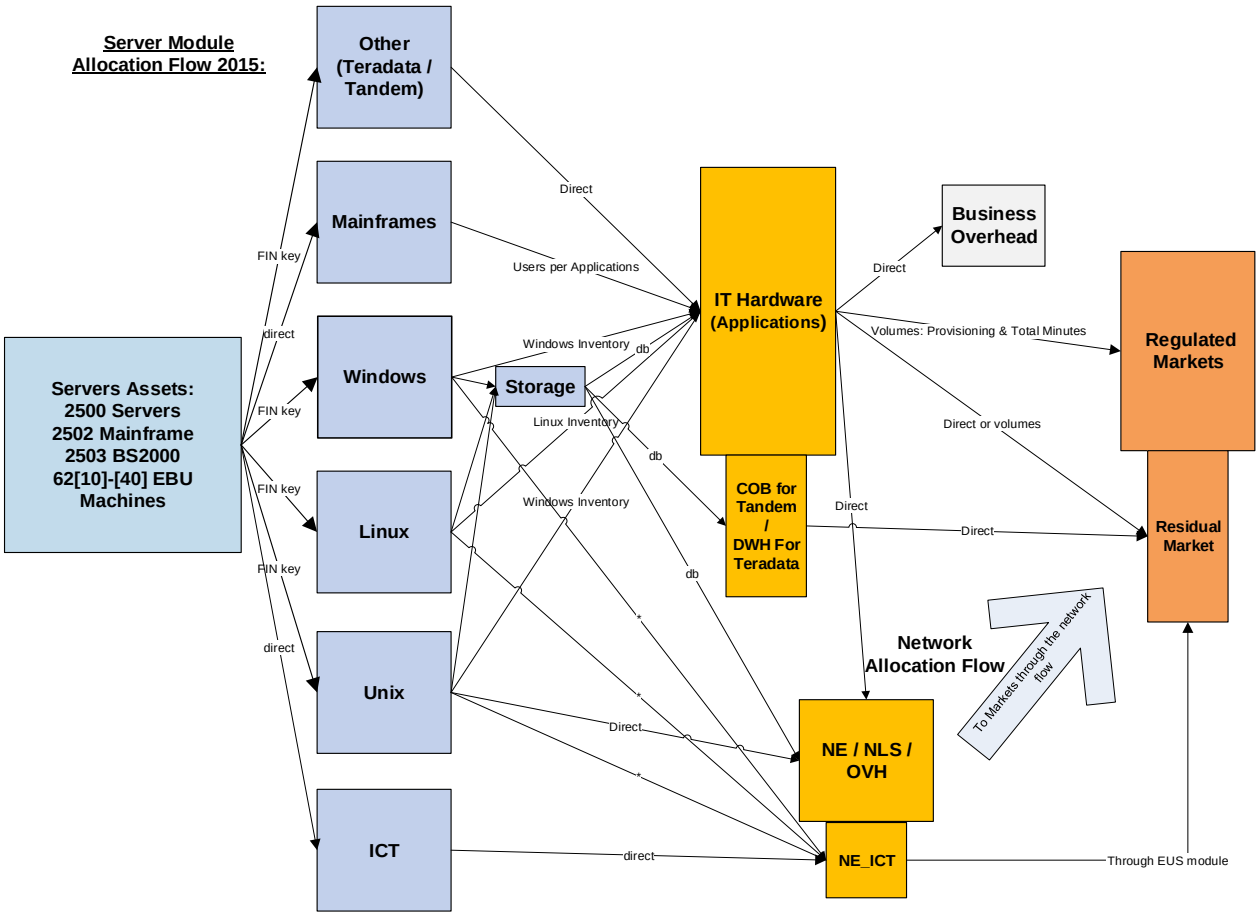
Linux, Windows and UNIX are allocated through a careful analysis of their respective inventories.

Tandem and Teradata are both allocated directly to their corresponding application: Customer Oriented Billing (COB) for Tandem and Data warehouse for Teradata (DWH). By definition, they will directly contribute to the Residual market as well.

Mainframes costs are distributed between the 7 applications that use this technology (ABD-FH, ABD-NFH, ABR, AGS, ASR, ITC and ITR) by a key based on the number of users per application.

Finally, UNIX costs are allocated to other IT objects by using the same approach as the windows allocation.



- **2501 Storage:**

Storage is used both as a core business as well as a support for employees and customers. It is required in order to run applications and databases, create backup and archives to save an employee's work or a customer's information (regarding billing or call details records for instance).

- **2502 Mainframe BS2000 HW & 2503 BS2000 Software:**

Mainframes are powerful computing platforms used for critical applications. They can be considered as multiple servers within one machine. Sensitive applications and data that require heavy computing power are hosted on them. It requires specific software to run which costs are pooled in

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the 2503 BS2000 Software asset. The mainframe park has been updated to the Z-Series manufactured by IBM.

- **2504 IT Internal Network**

IT Internal Network is an asset representing Proximus Intranet, required to support the needs of employees as well as the interconnection needed in order for the different IT objects to communicate.

- **2505 Office Automation**

Office Automation pools IT costs and improves productivity such as development environment, printing servers and Digital Workspace.

- **2506 End user IT Device**

Concerns IT material made available to Proximus employees such as laptops and desktops. It is an office automation cost.

- **2520 System Software:**

System Software are specific costs that can neither be linked to a specific development project, nor to an infrastructure components. These costs are pooled within generic named objects that relate to database, operating systems or middleware upgrades. In order to create allocation keys, an extract from SAP: Asset accounting is used.

- **2523 Major Software Application:**

This is a specific asset that pools applicative mobile costs. It contains IT sub-assets as well as some network-related ones due to historical reasons. Timesheets reports from RAPID are used to allocate this asset.

- **2525 Application Software Other:**

"Application Software Other" is an asset for all Capex licenses costs that are not pooled in another IT asset (licenses costs for minor applications for instance). It is heavily related to applications and office automation as it is composed of licenses for antivirus, to a software package sold by an external vendor and used by an in-house core application such as our Order Management System (OMS) or statistical and databases manager for our data warehouse department. In order to allocate these costs, the number of logical machines (physical and virtual) from each server related family was used as a means to ventilate these costs through the server allocation flow.

All following assets are related to specific software development and will follow a specific allocation in order to pool all costs to the IT Software module. The key consists of a 5 year CAPEX study of the cumulative investments per project for each asset. Explicit projects are copied in the IT Software

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module with their full name while non-explicit projects are pooled within dedicated objects such as: "non-development project" and "SW Application Interaction Platform".

In order to bring more consistency to the IT Software module constitution and allocation, a visual basic script was written to automate a part of the process consisting in pre-regrouping similar IT Software development and non-development costs instead of duplicating them due to the project's name nature. It betters the model in terms of accuracy and lessens possible human errors as well. It also automates the distinction between IT costs from the ones that are linked to the Network, either management related or pure IT code for Network related equipment.

- **2526 Applic SW IMA:**

All costs related to the **I**dentify **Ma**nagement (IMA) application are assigned to this asset. IMA is composed of 6 components (Core, Employee, Dealers, Customer, Module, and Management) that identify all Proximus users.

- **2529 Appl SW Middleware:**

Although named Middleware, this asset is composed of developed applications playing the role of a middleware inside Proximus IT infrastructure. It has to be distinguished from some costs objects in System Software and Application Software Other that also have middleware costs such as Websphere licenses. This asset pools IT domains from:

- A **B**usiness **P**rocess **M**odeler which delivers a process integration platform for enterprise services based on service-oriented architecture.
- A **S**ervice **O**riented **A**rchitecture layer.
- A **S**OA **S**ervices **R**epository to document and describe all SOA services.
- And a **H**ub **C**ontract **S**oftware used as a middleware connectivity tool.

- **2530 Applic. SW PILA:**

Pila Asset is a cluster of applications and components related to the **O**rder handling **M**anagement **S**ystem (OMS) with all its bridges with provisioning systems and a customer relationship management interface with BCI as well. OMS is one of the main contributors to this asset, as is the **N**etwork **P**rovisioning **S**ystem linking OMS with provisioning systems and the **O**rder **F**low **A**pplication (an interface between BCI and OMS). In the process of being phased out and replaced by the MCOM system. (which is accounted in its related sub-asset from the 2547 asset)

- **2531 Applic. SW BCI:**

The Proximus Channel Integration (BCI) is a customer relationship management tool for all call-centers-enabling a real-time customer information input or output in order to improve the feedback a customer receives when calling Proximus helpdesks.

- **2532 RID(Reference Inventory&Design):**

RID is an asset related to inventories and documentation.

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- **2533 Applic. SW_WFMS**

The **W**ork **F**orce Capacity **M**anagement tools (WFM) asset pools all costs related to the automation of the dispatching on the field of all Proximus technicians including a scheduler and reporting system.

- **2534 Applic. SW_UTS**

The **U**nified **T**rouble **T**icketing System (UTS) is a system used in order to register and follow-up trouble tickets pro-actively and reactively.

- **2535 Applic. SW_Cust Relationship Management**

This asset is composed of two applications related to the selling process and are directly linked to CRM: **C**ustomer **S**ales **A**ssistant (CSA) and **C**ustomer **V**alue **M**anagement (CVM).

- **2536 Appl SW COB**

This asset pools costs from the **C**ustomer **O**riented **B**illing system (COB) is a cluster formed from three IT platforms: **C**ustomer **D**ata**B**ase (CDB) **I**ntercarrier **B**illing **I**nformation **S**ystem (IBIS) and the **C**all **D**etails **R**ecords **Flow** (CDRFLOW). Billing data is a sensitive matter for both customers and Proximus and requires real-time redundancy. Therefore, COB applications are hosted on dedicated technology: Tandem servers also called "Non-stop servers". The CDB Application is retail related, IBIS wholesale related and CDRFLOW applies to both.

- **2537 Appl SW SAP**

The SAP Asset pools all costs coming from all modules used by Proximus. It is a typical business overhead costs.

- **2538 APPL SW-Number Portability**

Number Portability is composed of two main applications called **F**ixed **N**umber **P**ortability (FNP) and **C**arrier **P**re-**S**election (CPS). CPS is an important system as it is an interface with OLO's requirements to deliver their services.

- **2539 Applic. SW ECA/ECM/VORTAL**

E-Channel **A**pplications (ECA) and **E-C**ontent **M**anagement (ECM) are tools to manage and web-enable digital content for consumers (B2C) or enterprises (B2E). These are websites to engage customer relationship in order to conduct e-business via the Proximus websites.

- **2540 APPL SW – ROSY**

ROSY is a core component of the IT infrastructure as it is the runtime engine for SDH, XDSL and IDTV provisioning and repair.

- **2541 APPL SW – NETCAM**

NETCAM is a dedicated asset for Rosy's workflow engine for SDH (BPEL).

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- **2542 Sales Handling Engine(SHE)**

The **S**ales **H**andling **E**ngine (SHE) is a sales application used as a layer in order to enable convergence between all selling applications so that our vendors and partners will have a global view on all products supplied by Proximus, improving order intake and rationalizing the IT selling infrastructure. Pre-Sales and Sales are activities in the fulfillment process being mostly allocated to the residual market.

2544 APPL SW -IT Security

IT Security asset pools heterogeneous costs that can be related to applications NFM (**N**ew **F**raud **M**anagement), Proximus IT security in general, IMS (Identify and authentify for provisioning engine), to even Skynet Costs to protect user's privacy or overhead costs to protect the IT infrastructure from malicious harm (virus, hackers take-over…)

- **2547 Major software applications**

Major software applications are assets regrouping all new IT developments and applications since 2010. In 2014, the allocation method was changed to a 5 year CAPEX cumulated costs key as are other IT software assets.

Since 2014, the "2547 Major Software Applications" regrouping all new IT platforms investments is now allocated by a 5 year CAPEX cumulated costs based on the data maintained in TM1. This changes the allocation from previous years where this asset was allocated by an analysis of each of its sub-asset involving the use of a direct allocate key, much like the 2523 allocation, instead of this causal approach used in the 2014 model. The main difference is that TM1 is used instead of RAPID's timesheet as the data contained in RAPID is incomplete for this specific Asset.

- **2550 APPL SW ABC**

The **A**ccess **B**ackbone **C**onnectivity asset (ABC) is a core element of Proximus's infrastructure. SRW is an inventory for connectivity and equipment documentation and is used as an interface between IDMS and front-office applications such as OMS, WFM or COB/CDB. Three other core domains are also pooled in this asset: ABR[5] for the local loop connectivity and managing resources and services. ANA[6] (**A**utomated **N**umber **A**ssignment) supports service order provisioning of phone numbers through automation of the attribution of a phone number to a customer. Finally, ITR[7] (**I**nfrastructure **TR**ansmission) is the inventory of Proximus's backbone and optical network covering leased lines, physical equipment, trails, trunks, cables and the multiplexing hierarchy between all these elements. It should be noted that applications grouped in this asset use a special hardware in order to run properly as they are all linked to huge databases that require daily processing of data per batches.

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For the last years, BS2000 mainframes from Fujitsu were used but they were recently replaced by Z-Series from IBM[8].

- **2551 Operational Inventories**

Operational Inventories are applications used to maintain ATM, DSLAM, Ethernet and IP inventories and statistics.

- **2552 GraphDoc**

The Graphdoc asset pools all graphical documentation components which are tools used to create or modify the local loop network documentation. It allows an integration of the Autocad package which is a drawing software.

- **2561 APPL SW – NETCOOL**

Netcool is a software package sold by IBM and developed internally to suit Proximus needs. It is a set of alarms and probes used for monitoring to ensure both a pro-active and reactive service assurance process. It is divided in two main domains: **N**et**c**ool **T**ransmission (NCT) and **N**et**c**ool **D**ata (NCD).

- **2562 APPL SW - e-Health**

E-health is a reporting tool for bilan and is composed of e-health (A-EHT), Provisioning (A-PRO) which is an interface between e-health and umbrella/CMS and oblicore service layer (A-SLR).

- **2563 APPL SW-Customer Remote Support**

Applications used by the helpdesks or customers through the Proximus portal.

- **2566 APPL SW-DIAMON&CORRELATOR**

The diamond (DIA) and Correlator (CRL) asset regroups those two IT domains that enable the monitoring of network alarms. It also creates tickets to respond efficiently to problems.

- **2567 APPL SW – DARE**

DARE stands for **D**iagnose **A**nalyze **R**epair **E**ngine and is the main tool to analyze alarms and probes reports. It diagnoses problems through a root analysis, classifies incident by priority and forwards them to responsible persons for problem resolution.

- **2568 APPL SW-Learning & Mngt Syst.**

The learning management system asset is essentially a component of SAP HR (or SAP LMS for **L**earning **M**anagement **S**ystem).

[8] One IBM z10 Mainframe is supposedly 1500 times more powerful than regular x86 servers while consuming 85% less power (source IBM).

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- **2569 APPL SW-ECRM**

The E-CRM asset contains one application named **G**roup **C**ontent **M**anagement (GCM) which is a platform for contract, records and business process management.

- **2570 APPL SW Business Intelligence Tool**

All costs from the Microstrategy software are sent to the Business Intelligence Tool asset as the main software used by our business intelligence department (which is the Data Warehouse: DWH). It is heavily related to data warehouse and will be grouped with it so that the tools they use are represented in the total cost of the data warehouse. Business Intelligence costs are mainly allocated to the residual market.

- **2571 APPL SW ONE-Catalog**

The **Proximus P**roduct **C**atalog is an application that stores advice and information about all products and services. It is heavily used by Proximus Sales divisions and as a service assurance tool for customer care.

- **2573 Appl SW DWH**

The data warehouse department has heavy requirements in terms of hardware and software as it calculates statistics and indicators for Proximus products and network. Data warehouse uses a special hardware from the Teradata technology that helps with the treatment of large data volumes with the possibility for many users to analyze them.

All Assets from 2526 to 2599 are Software assets and will be allocated through a project analysis from a scope of costs going over the last 5 years. All costs distributed between these projects were linked to a specific object from the modules following IT Software in the model allocation flow.

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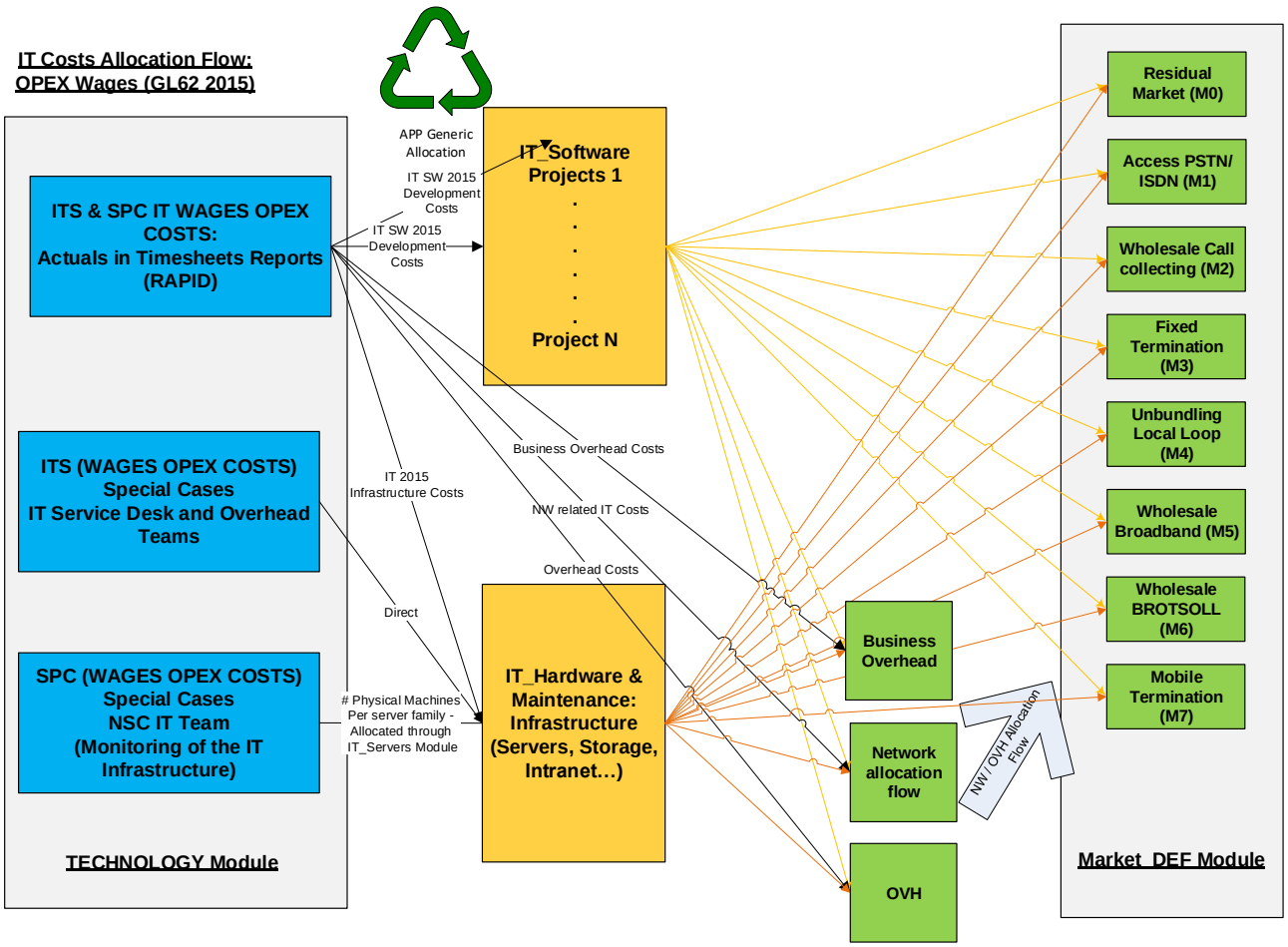
Operational Costs:



There are 4 sources of IT opex costs:

A) Maintenance related:

Maintenance costs are regrouped into 2 different cost pools (61120 and 61130) to which we apply allocations keys to distribute these costs towards servers, applications within the Hardware&Maintenance module, storage, servers CP2 and NEs.

B) OPEX Wages internal

Internal wages for IT OPEX costs were allocated by the use of the RAPID database. A report by cost centers giving a detailed output of OPEX projects was linked to the cost centers groups from the cost base allowing an allocation from all IT teams to the objects from the IT Software module.

C) OPEX Contractors Fixed Priced:

RAPID makes the distinction between employees and contractors and also between the different contractors types (fixed price, body shopping etc.). This precision allows us to create specific keys for contractors the same way as it was done for internal employees, by allocating their costs to the different projects they contributed in 2014 via the RAPID tool.

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D) OPEX Contractors Bodyshopping

The same principle was applied for bodyshopping costs allocation as for the fixed price ones. Since 2014, bodyshoppers and fixed prices contractors were regrouped into one object to eliminate the redundancy of this allocation.

Wages OPEX Costs are allocated using timesheets report from RAPID for the calculation of allocation keys for each cost center within ITS and SPC. Reports are designed in order to regroup OPEX costs on the 2014 projects in the IT Software module. Regarding the SPC IT teams, a special allocation was made as some of these teams are focused on supporting IT development, therefore reporting most of their resources on support projects that are by definition hard to allocate to specific markets. Maintenance Costs is the other main source of IT operational costs and can be related to server's or storage maintenance or to IT Development in case of applications bought off the shelf. The maintenance cost allocation can be represented by the following diagram:

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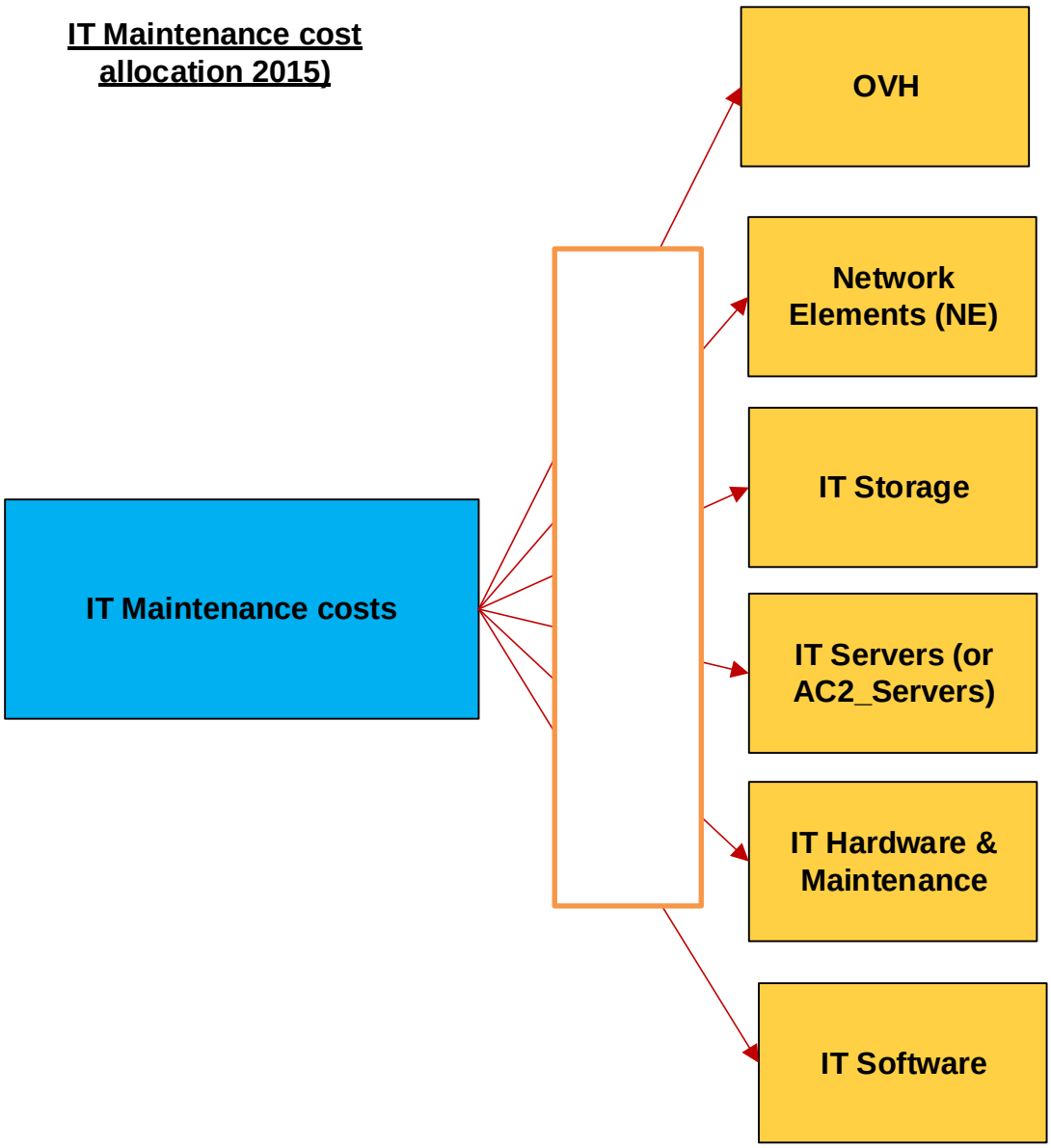

6.1.4 Applications to Markets

a) IT Applications

The IT applicative layer is composed of applications or software being used by either an end-user (such as an employee or a customer) or by a service (such as an inventory or a billing system). There are more than 1000 applications that have been bought off a vendor and adapted to suit the company's needs or developed internally by Proximus IT developers. Over the years, these applications have been updated, replaced, renamed or out phased.

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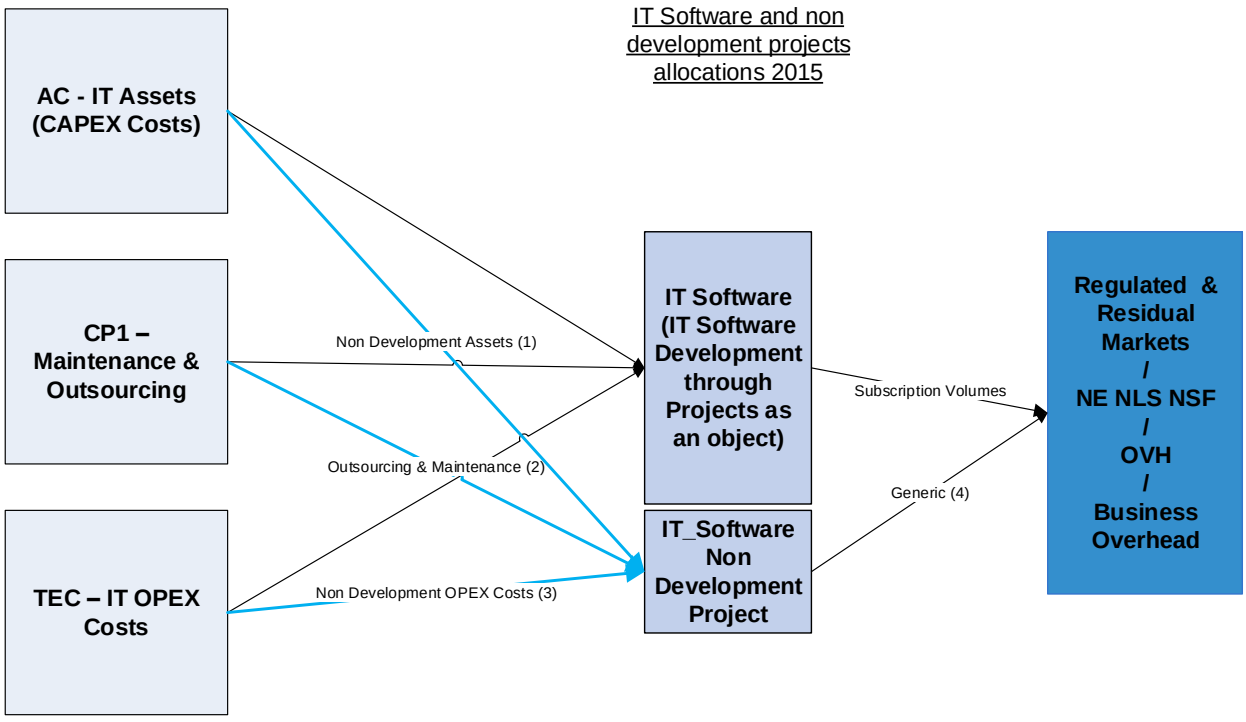
b) **Markets**

Through a careful analysis of each application and project, a mapping table was defined in order to create a link between applications and their corresponding impacted markets. Most of them relate to the Residual Market, others were directly developed in order to support a specific market resulting in a direct allocation towards this market. But in cases where an application was developed for a group of markets, an allocation key is needed to distribute the costs of these applications. Being an application underlying hardware costs, the driver used is a proxy of the transactions processed by these applications, namely the provisioning volumes.

6.1.5 Projects to Markets

In the same fashion as for the applications allocations, the projects list has to be linked to markets or to an object in the Network or Overhead flow. Based on the projects name, we are able to categorize them between development and non-development projects. For non-development projects, a special object was created projects, to regroup them: the non-development project object which will follow a generic allocation based on the IT Assets and BA50 Wages allocations.



The non development Project Object is the daily IT operational activities and maintenance that are pooled together in order to be allocated through the analysis of today's and past's IT investments and evaluated by the IT assets depreciation from the last 5 years and the opex costs from 2015

The calculation is programmed in INCA and done by the coding engine

For development projects, a careful study of each of them allowed the creation of a mapping table between all projects defined and the markets. The non-regulated products (of the residual market)

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receive the majority of project development costs. However a non-negligible amount of development projects introduce features and enhancements from which regulated products also benefit. For instance, a project investing in an xDSL capacity upgrade enhances retail products as well as regulated products. For such projects, an allocation key is needed to distribute the costs. Being software development costs, the driver used is the subscription volumes (except for software contributing to traffic products where usage minutes are used). Allocation to Markets of IT costs that are common to several Markets

In order to allocate all IT costs regrouped in the Hardware&Maintenance and in the Software modules, three different drivers were taken into account: the provisioning volumes for hardware allocation, the subscription ones for software and the total number of minutes consumed for projects and applications related to the voice markets.

Calculating these volumes is quite straightforward for the regulated markets. For the residual market only the volumes of corresponding services are taken into account. With access regulated markets, access retail products of the residual market are considered. With fix traffic regulated markets, only fix retail traffic volumes are considered.

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7 Network stream

The network allocation stream is organized around the network investment structure (leading to network functional blocks in the allocation stream). The focus is on Capital Expenditure costs which are directly associated with the network equipment deployed ; these costs originate from the assets accounting system of Proximus and they are gradually cascaded by means of a variety of cost deaggregation keys and a variety of cost drivers up to the telecommunication services. By contrast, the SRW stream focuses on the operating expenditures of the business activities, which are directly allocated to end- markets by means of business drivers.

For the operating costs of the network itself however, an intermediate allocation approach is used : the remuneration costs and the personnel related OPEX costs are associated to typical network activities (as described in Chapter 5) which are finally attributed to network functional blocks . This part is discussed in section 7.3 hereafter.

7.1 A layered allocation model

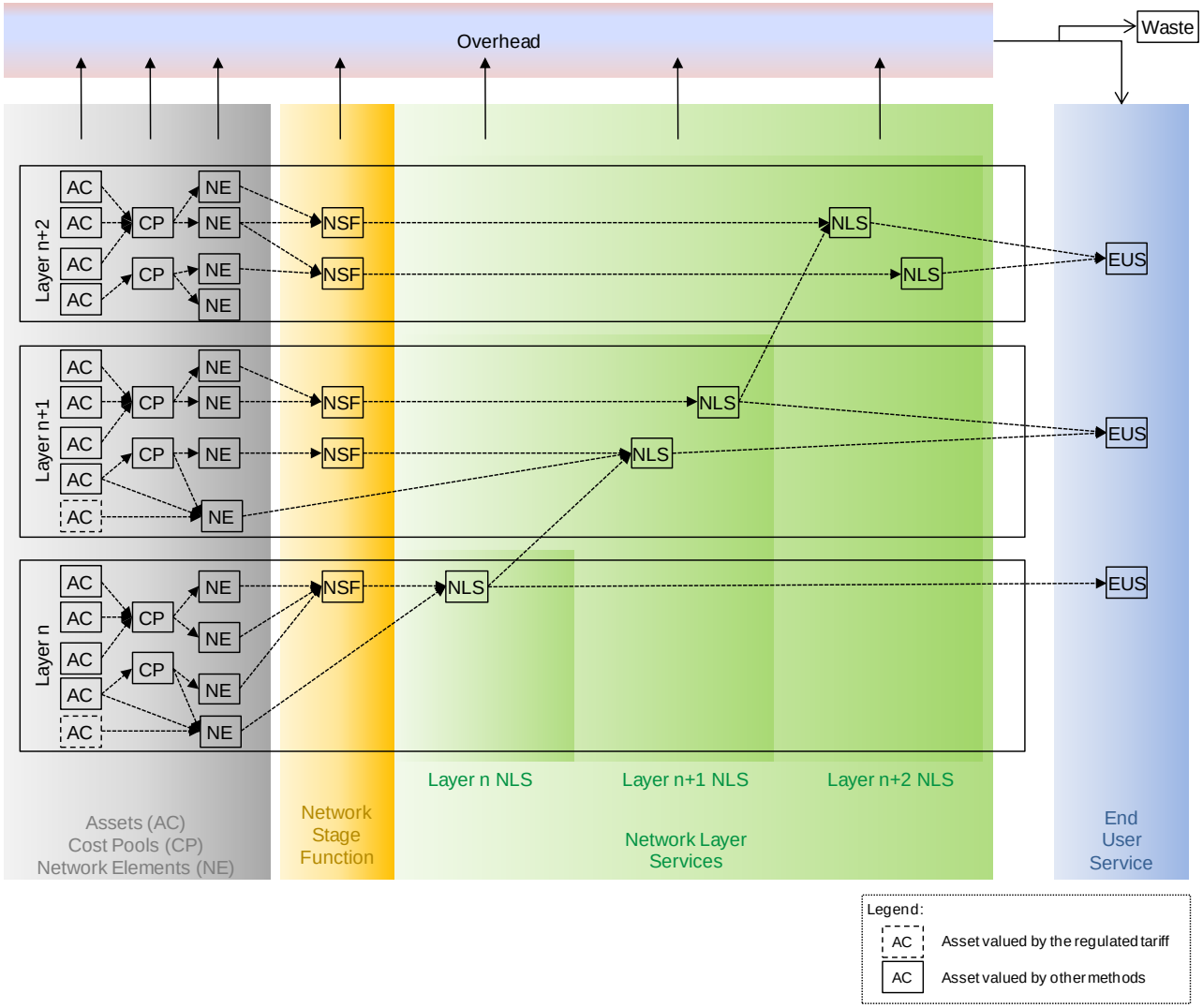

Figure 5: Layered allocation model

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It is common practice in the telecommunication industry to separate investments in different logical levels; lower levels corresponding to basic (simple and general purpose) services, higher levels corresponding to complex higher valued and purpose oriented services. The pursued effect of such separation is to promote the reuse of basic lower level services by higher level services thereby bringing in the short term the volumes at each layer to levels that benefit from economies of scale. In the long term, the pursued effect is to benefit also from economies of scope.

The network cost allocation model is designed to reflect the layered functional structure of Proximus's telecommunication infrastructure , each layer offering services to the upper layers. In practice 5 layer levels are represented in the cost allocation model in order to allow each invested technology to be situated at the right level of its contribution in implementing the layer services.

In practice a network equipment may participate to several different layers especially in the interfacing boards towards other network equipment because it acts as a terminating point of lower level layer services.

To avoid any ambiguity, a network equipment will be considered as belonging to the highest layer implemented in it and operated by it. For the example of the IP router, this simple criterium locates an IP router on the third layer (IP layer) above SDH.

Using this criterium all investments still in service of Proximus's infrastructure are distributed in one of the following layers:

Layer NLS1.0 : Passive infrastructure gathering investments in access copper, in ducts and fibre cables (access and backbone).

Layer NLS2.0 : Active transmission infrastructure based on Time Division Multiplexing technology gathering investments in PDH, SDH.

Layer NLS2.1 : Active data infrastructure based on Packet Based technology gathering investments in Ethernet/MPLS.

Layer NLS2.2 : Mobile backhauling infrastructure

Layer NLS3 : Active data infrastructure based on IP technology gathering IP routers , IPVPN routers.

Layer NLS4.0 : Active application infrastructure based on a variety of technologies gathering applicative equipment like telephony digital switches, VoIP platforms, Intelligent Network platforms, Broadcast TV platforms, Video on Demand platforms.

In the model layers are represented by a number of "standard" services (referred to in the sequel as Network Layer Services – NLS) offered to upper layers or directly used as retail/wholesale products (End User Services – EUS). In turn the services offered by a layer are the result of the combination of layer specific functions (referred to as Network Stage functions – NSF)* and services offered by lower level layers allowing the layer specific functions to interact with each other.

*Note: Except the following Network Elements that receive assets cost valuated by the regulated tariff. Those Network Elements include network stage functionality and directly offer services of the same level as their upper layer services. The driver used is "yearly direct CAPEX cost". The driver "yearly direct CAPEX cost" is in fact a by-product of the valuation exercise done for the assets valued by the regulated BIPT tariff.

For the asset valuation exercise a full integration of all the asset valuation components of the relevant technology was necessary (see paragraph 3.4.2.5.4), but in the case of the calculation of this driver the required aggregation degree is determined by the allocation key to be calculated.

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The inventories used as input for the asset valuation contain many details allowing the grouping of the costs components based on any combination of such aspects.

Therefore, the driver "yearly direct CAPEX cost" refers to the sum of all the relevant technology valuation components from the appropriate models that meet the allocation requirements (for example, usage of the link or bandwidth or bandwidth and service span or concerned network layer…).

Due to the method used for the valuation of the SDH, the "yearly direct CAPEX cost" allocation driver for the NE_PDH SDH equipment can't be calculated as referred above. Instead it is calculated as the incremental SDH cost of the service for which the allocation is being computed.

Incremental costs of one service are those costs that are avoided by not providing that service. See Figure 6 for an example specific to this context, where:

- the cost incurred by all the SDH services equals the SDH asset value, resulting from running the "consolidated transport BROTSoLL engine" (see paragraph 3.4.2.5.7Transport PDH/SDH valuation) with the full set of services carried over SDH
- the cost incurred by an SDH network carrying all the SDH services except service X is the outcome of the dimensioning and costing done by the "consolidated transport BROTSoLL engine" when having as input all the SDH services but service X.
- the SDH incremental cost for service X is calculated as the difference between the two above costs

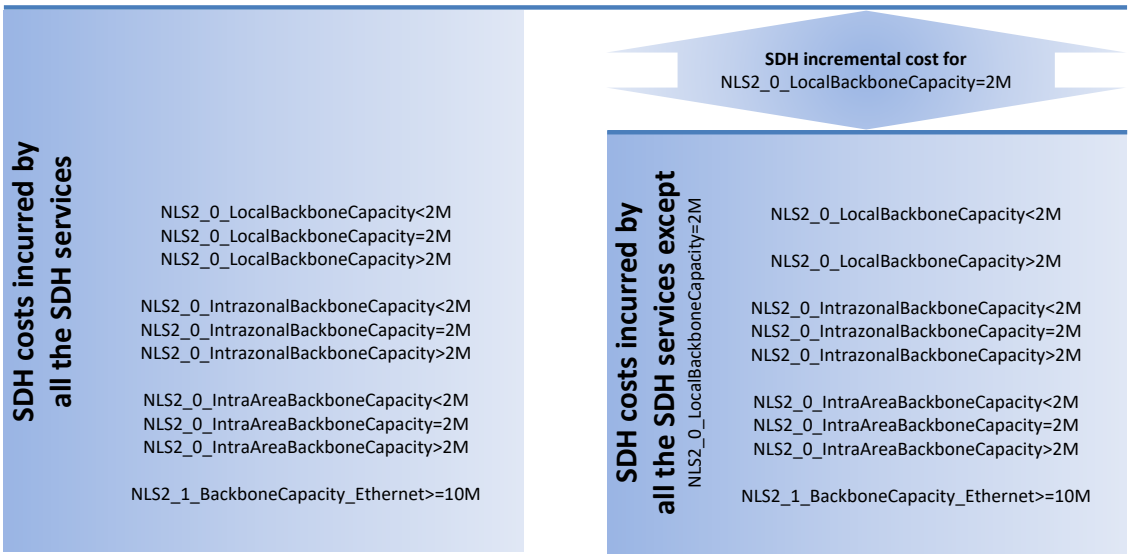

Figure 6: Incremental SDH costs calculation method, an example

NE receiving assets by the regulated tariff offered services

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NE_ADSL equipment	NLS2_1_ADSL_SDSL_Bitstream
NE_NGA Active equipment	NLS2_1_VDSL_Bitstream
NE_NGA Housing	NLS2_1_VDSL_Bitstream NSF_PSTN_Voice_concentrator
NE_PDH SDH equipment	NLS2_1_LocalTailCapacity_Ethernet>=10M
	NLS2_1_BackboneCapacity_Ethernet>=10M NLS2_0_IntraAreaBackboneCapacity<2M NLS2_0_IntraAreaBackboneCapacity=2M NLS2_0_IntraAreaBackboneCapacity>2M NLS2_0_IntrazonalBackboneCapacity<2M NLS2_0_IntrazonalBackboneCapacity=2M NLS2_0_LocalBackboneCapacity<2M NLS2_0_IntrazonalBackboneCapacity>2M NLS2_0_LocalBackboneCapacity>2M NLS2_0_LocalBackboneCapacity=2M NLS2_0_LocalTail=2M NLS2_0_LocalTail<2M NLS2_0_LocalTail>2M
NE_Copper_Cables_Distribution	NLS1_0_Copper_Subloop NLS1_0_Raw_Copper
NE_Copper_Cables_Feeding	NLS1_0_Copper_Subloop_testing NLS1_0_Raw_Copper
NE_Copper_Blocks_and_Tie_Cables	NLS1_0_Continue_Raw_Copper NLS1_0_Copper_Localloop_testing NLS1_0_Copper_Subloop_testing
NE_Copper_Splitter	NLS1_0_Copper_Splitter

The use of BIPT mobile cost model enables to define network element cost attribution to the underlying network stage function per category of service : voice, data or SMS.

NE receiving assets by the mobile cost model	attribution
NE_RAN	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_GroundAntenna	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_MobileVoiceSwitching	NSF_Mobile_BackBone_Voice NSF_Mobile_BackBone_Data NSF_Mobile_BackBone_SMS
NE_MobileDataSwitching	NSF_Mobile_BackBone_Data NSF_Mobile_BackBone_SMS
NE_MobileLocationRegister	NSF_Mobile_BackBone_Voice NSF_Mobile_BackBone_SMS

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Layer n--layer n+1 cost allocation mechanism:

Each layer represented in the model produces the defined NLS services with a certain amount of volume (the service amount); this amount is "consumed" by the upper layer services and it is used as a driver to allocate the costs to the consumer services in the upper layers.

Layer cost allocation cascade:

The 5 defined layers are put one after another according to their level generating a cascade of cost allocation mechanism.

Each layer is discussed in a specific chapter of this documentation.

Establishing costs of the Network Stage Functions

The "network stage functions" (NSF) are the direct constituents of a layer, they are intermediate network building blocks providing well defined logical network functions specific to that layer (also called network functional units) . A Network Stage Function can be limited to a node or it can be a cluster (distributed function) corresponding to "network stages". A network stage function is characterized by the amount of function it produces (volume).

Network Stage Functions are implemented in equipment, but the corresponding investment values are not always directly identifiable in the asset structure of Proximus : for example some assets aggregate investments per technology (not per function in the network) , some other do not cover the totality of a given technology due to the history of the accounting asset structure in SAP (reorganization of assets, transfers between assets, closing of asset classes and opening of new ones) .

Different methods are used and combined to constitute the investment costs of Network Stage Functions :

1. Aggregation of assets in a larger asset or a cost pool in order to gather investments of same technology and align them with operational inventories.
2. Deaggregation of cost pools in network elements : this step decomposes cost pools into network elements; a network element corresponds to an entire physical equipment as deployed in the Proximus infrastructure. Operational inventories of pieces of equipment and component prices are used.
3. Direct allocation of assets or cost pools to network elements when the assets or cost pools are directly identifiable with a network element of the model.
4. Composition of the network elements to form a network stage function covering one of the stages.

The stepwise combination of these methods are discussed in the next section.

7.2 From Assets to Network Stage Functions.

Next table gives the list of the NSF present in the network allocation flow.

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Layer_name	NSF_name	NSF description
L1_PASSIVE	NSF_Backbone_FibreConnectivity_express	backbone fibre connectivity of express ring
	NSF_Backbone_FibreConnectivity_Regional&Core	backbone fibre connectivity of regional&Core rings
	NSF_FTTC_FibreConnectivity	fibre connectivity between the central office (LEX) and ROP
	NSF_FTTO_FibreConnectivity	fibre connectivity between the central office (LEX) and customer office
L3_IP	NSF_BroadBand_Public_IP_Collect	Access authentication , data traffic accounting, attribution of public IP address to broadband customers and collection of customer traffic towards public internet service providers
	NSF_BroadBand_VoD_IP_Collect	Access authentication , data traffic accounting, attribution of IP TV address to IP TV customers and collection of IP video customer traffic towards Video On Demand platforms
	NSF_BroadBand_VoIP_IP_Collect	Access authentication , data traffic accounting, attribution of Voice over IP address to VoIP customers and collection of Voice over IP customer traffic towards VoIP platforms
	NSF_Dedicated_Access_to_PrivateIP	connectivity between customer and Proximus IP-VPN network
	NSF_Homegateway	Broadband CPE like b-box
	NSF_IP_security	
	NSF_PrivateIPSwitching	IP-VPN switching
	NSF_PublicInternetSwitching	Public Internet Routing
	NSF_Mobile RAN_Data	Mobile Radio Access function destinated to all Mobile data products
	NSF_Mobile_BackBone-Data	Mobile backbone function destinated to all Mobile data products
	NSF_Mobile_PrepaidData_Services	Intelligent platform services related to prepaid mobile data
L4_IDTV	NSF_BroadcastTV	Broadcast digital television functionalities
	NSF_VoD	Video On Demand (VOD) functionalities and user quality of experience functionalities.
L4_M2M	NSF_Machine_to_Machine	Related to M2M applications, enabling customers to remotely manage their M2M devices in the cloud or gather business data from the devices and to integrate and link it with business softwares.
L4_VOICE	NSF_Automated_call_distribution	intelligent distribution of calls towards call center
	NSF_Advanced_Number_Translation_CallHandling	Voice Value Added network function
	NSF_CallerIdentity_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_InteractiveVoiceResponse_CallHandling	Voice Value Added network function
	NSF_InternetDialUp_CallHandling	
	NSF_ISDN_NetworkTermination	Functionalities related to the ISDN network termination equipment
	NSF_ISDN_Primary_Access	Access for PRA

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	NSF_ISDN_Voice_concentrator	Aggregation of ISDN voice calls towards backbone circuit switching
	NSF_MessageWaitingIndicator_Inserting	Voice Value Added network function destinated to residential customers
	NSF_Mobile RAN_Voice	Mobile Radio Access function destinated to all Mobile voice products
	NSF_Mobile_BackBone-Voice	Mobile backbone function destinated to all Mobile voice products
	NSF_Private_Communication_Call_Handling	Intelligent platform service related to mobile closed user groups and virtual private networks
	NSF_Mobile_PrepaidTraffic_Services	Intelligent platform services related to mobile voice prepaid traffic
	NSF_Mobile_Access_Backaul_ABIS	Mobile access 2G network backhauling
	NSF_Mobile_Access_Backhaul_IUB	Mobile access 3G network backhauling
	NSF_NumberPortability_CallHandling	telephony ported number realtime translation
	NSF_OtherAdvanced_CallHandling	Voice Value Added network function
	NSF_PairGainSystem	Analog line multiplexing functions, used to concentrate narrow band analog signals on customer pairs to a 2Mb/s digital signal on a few feeding copper pairs. This is however an old technology not compatible with broadband.
	NSF_Payphones	Functionalities needed for the service “public payphones”
	NSF_PSTN_Voice_concentrator	Aggregation of PSTN voice calls towards backbone circuit switching
	NSF_Public_NumberPortability_Database	telephony ported number repository
	NSF_Service_Announcements_Playing	Functionalities in order to announce to callers any requested value added services.
	NSF_Televoting_CallHandling	Voice Value Added network function destinated to Business customers
	NSF_VirtualPrivateNetwork_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_Voice_call_CAE_charging	generation of call detail records for interoperator voice traffic accounting
	NSF_Voice_call_CAE_Processing	handling of voice calls at transit level
	NSF_Voice_call_CAE_Trunks	multiplexing/demultiplexing voice circuits at transit level
	NSF_Voice_call_Local_charging	generation of call detail records for customer voice usage charging
	NSF_Voice_call_Local_Processing	handling of voice calls at originating or terminating level
	NSF_Voice_call_Local_Trunks	multiplexing/demultiplexing voice circuits generated/terminated
	NSF_VoiceFeatures_SelfManaging	Voice Value Added network function destinated to residential customers
	NSF_Voicemail&Messaging	Voice Value Added network function destinated to residential customers
	NSF_WakeUp_CallHandling	Voice Value Added network function destinated to residential customers
L4_Messaging	NSF_Mobile RAN_SMS	Mobile Radio Access function destinated to all Mobile SMS products

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	NSF_Mobile_BackBone-SMS	Mobile backbone function destinated to all Mobile SMS products
	NSF_SMS_Services	Intelligent platform service related to mobile SMS
L4_WEB	NSF_EServices	NSF gathering SDE workload related to the E-services.

Investment costs of Proximus SA assets are mapped to these NSF , except investments related with network administration, and some other that cannot be related to any current product or service. The exceptions are not filed into the network allocation cascade , but are allocated like an overhead cost (i.e. with no direct causality) to a range of End User Services (depending on the kind of overhead cost) proportionally to the cascaded costs on these EUS.

Mapping asset cost sources to Asset objects of the model AC2

Network assets are 1-to-1 allocated to a homonymic AC2 object except for the voice switching assets which are aggregated in AC2_TDM_Voice_Switching_Equipment.

Mapping AC2 objects to cost pools or Network elements

AC2 Aggregation.

At this stage, AC2 asset objects are aggregated into cost pools, network elements, overhead objects and eventually end user services (costs marginal end user services , or direct waste).

The aggregations into cost pools serve to form technology pools for which operational inventories can be queried for various statistics that are further used to decompose into network elements. The technology pools typically are (D)WDM equipment, Copper Cables, Broadband (xDSL) equipment, SDH equipment , PDH equipment, Ethernet equipment etc. Those cost pools include also the OPEX of SDE.

The aggregation into network elements concerns assets that are already a network element , and it serves also to gather assets that are individually more detailed than the definition of network elements and that can be easily associated to a network element. Typical examples are IP-VPN assets , broadcast TV assets, Analog Multiplexers, Metallic line testing assets etc.

AC2 Deaggregation.

By contrast, a set of AC2 assets are decomposed (deaggregated) into cost pools, Network elements, waste pool and marginal end user services.

Among these, some assets collect investments on network administration (Hardware and software supervision platforms) and on value added services platforms (IN, messaging, voice mail etc.) ; they need to be decomposed into the network technologies they supervise and into the value added service categories.

- ⇨ The driver used is the “cumulatedInvestedAmount” or “Cumulated Invested Value” per technology obtained after deep analysis of historical investment data (TM1 financial reporting tool).

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The asset 1680 “TPT-BBN-infra.elect/mécan in transmis rooms” collects internal cabling within technical buildings and is decomposed essentially into the following cost pools CP_Backbone_Coax_cabling, CP_Backbone_Optical_cabling, CP_(D)WDM_equipment. EUS_notAllocated

- ⇨ The driver used is the “Current annualized cost” of the cost pools , calculated from a diversity of constituent volumes and corresponding prices (coax/fibre cables, connectors, copper pair cables , cable ways,etc) . The main volumes are extracted from the infrastructure inventory database (ITR), other volumes are derived under assumptions.

The AC2_TDM_VoiceSwitching_Equipment asset is decomposed in the three main switching units forming the switched network topology : the Remote Units (acting principally as voice concentrators), the Base units (providing call processing and local switching), and the Transit Units (providing transit switching).

- ⇨ The driver used is the “Nbr of equivalent lines” , a unit that is at the basis of the purchase contracts with the switches vendors where purchased switching Unit (Remote, Base, Transit) value is proportional to the equivalent lines installed per switching unit. The driver value is obtained from installed base reporting of the switched voice network. A 2012 based correction factor is applied to the number of lines in service, to balance the effect of the switching outphasing related migration to Access Gateways.

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Deaggregation of cost pools into network elements

In performing the previous steps cost pools are introduced in the model. They are now deaggregated into different Network Elements by means of following drivers:

cost pool	driver name	Deaggregated Network elements
CP_(D)WDM_equipment	Yearly Direct CAPEX Cost	regional&core DWDM network elements and express DWDM network elements
CP_Backbone_Optical_cabling	Nbr_Connections	pre-allocated to all inside network elements using fibre cabling
CP_Backbone_Coax_cabling	Nbr_Connections	pre-allocated to all inside network elements using coax cabling
CP_Copper_Burried_Cables&Splices	yearly direct CAPEX cost	distribution cables, feeding cables network
CP_DSLAM	yearly direct CAPEX cost	xDSL ATM based network elements and VDSL Ethernet based network elements
CP_Ducts&Manholes	Trenches cumulated length (km)	Ducts& manholes for Next Generation Access, Ducts & manholes for corporate /complex nodes in access
CP_EthernetMPLS_equipment	Yearly Direct CAPEX Cost	Ethernet Ports, Ethernet/MPLS switches
CP_IntelligentNetwork_Hardware	EstimatedValue_of_IN_HW_components	Service Control Point hardware, service management point Hardware, CPU, RAM memory, Disk
CP_Optical_Fibre_Cables	kmxfibre	Fibre cables for Next Generation Access, Fibre cables for corporate/complex nodes in access
CP_OSS_VoiceTraffic	fair split	Collecting, terminating and transit of voice network elements
CP_SDH	Yearly Incremental Cost	
CP_TDM_VoiceDigital_BaseUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice concentration elements, Originating/Terminating voice call handling elements
CP_TDM_VoiceDigital_RemoteUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice concentration elements, Originating/Terminating voice call handling elements
CP_TDM_VoiceDigital_TransitUnit	%VendorCertifiedValue_of_RemoteUnit_subcomponents	Voice transit elements
CP_Mobile_RAN	Yearly capitalized manpower cost	Mobile Radio Access network, Ground antenna
CP_Mobile_Backbone	fair split	Mobile Voice and Data switching elements

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From Network elements to Network Stage Functions

The previous steps populate the cost model with Network Elements. In the next step , they are allocated to the Network Stage Functions.

The decomposition of network elements into network stage functions is driven by a variety of cost drivers listed below per technology :

NE technology	Driver name
(D)WDM	Direct
ETHERNET	Direct
FIBREPLANT	Amount km routes to physical sites
	Estimated incremental trench length (km)
	kmxfibre
IDTV	Direct
IP	Direct
	Total_tributary_capacity(Gbps)
MOBILE	Attributed investment from bottom up model
	Cumulated Invested Value
VOICE	Direct
	Invested_Amount
	Nbr_of_equivalent InstalledLines
	Nbr_of_equivalueInstalledLines
	routed minutes
	VendorCertifiedValue_of_Originating_Terminating_CallHandling_subcomponents
	VendorCertifiedValue_of_Transit_CallHandling_subcomponents
VOIP	VoIP_call_handling_distribution_local_Area

7.3 End User Services

The network allocation model terminates when all network stage functions (or NEs) have been allocated to network layer services and when network layer services have been combined into a user level telecommunication service , the End User Service.

The End User must be understood as the telecommunication service party that will pay for the service. In case of a retail service the user is identical to the service consumer (residential service) or to the service provider (business service) , in case of wholesale service , the user is in principle another licensed operator , or a network service provider.

Being composed of network layer services, End User Services may emanate from different levels of network layers since interconnection between network operators is being unbundled . For retail services , the end user telecommunication services may arise from different layers : the more a service is oriented for a specific usage the higher the level of network layers involved. For example

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IP services are less usage oriented than voice telephony, the latter being a layer 4 service, the former a layer 3 service.

The End User Services represented in the model are listed hereunder.

End User Service Layer	Market	End User Service Name
L1_PASSIVE	INTERCONNECT	EUS_Raw copper subscription
		EUS_Shared pair subscription
	RETAIL&WHOLESALE	EUS_Broadband Drop
L2_PACKETBASED	INTERCONNECT	EUS_BROBA_accessLine
		EUS_BROBA_EndUserLine subscription
		EUS_OLOAccessLine
		EUS_wholesale transport BROBA subscription
		EUS_wholesale transport WBA subscription
	RETAIL	EUS_X25
	WHOLESALE	EUS_Ethernet_Backhaul
L2_TDM	INTERCONNECT	EUS_BROTSOLL_segment<2M
		EUS_BROTSOLL_segment>2M
		EUS_BROTSOLL_segment2M
	RETAIL&WHOLESALE	EUS_LL <2M subscription - International
		EUS_LL <2M subscription - National
		EUS_LL >2M subcription- National
		EUS_LL >2M subscription - International
		EUS_LL 2M subscription - International
		EUS_LL 2M subscription - National
		EUS_LL_Analog National Subscription - National
	WHOLESALE	EUS_Nat IC-Infra Wholesale subscription
L2_TDM&L1_ACTIVEANALOG	RETAIL&WHOLESALE	EUS_Trans LAN subscription
L3_IP	RETAIL	EUS_DataManagedServices
		EUS_Homegateway
		EUS_Mobile_Data national
		EUS_Public_IP_Extension_on_Symmetric
	RETAIL&WHOLESALE	EUS_FastInternet subscription
		EUS_Private_IP&Ethernet_on_asymmetric subscription - National
		EUS_Private_IP&Ethernet_on_backup
		EUS_Private_IP&Ethernet_on_international Subscription
		EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
		EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National
	WHOLESALE	EUS_ADSL_Carrier_wholesale subscription
		EUS_Mobile_Roaming IN_Data
		EUS_VDSL_Carrier_wholesale subscription
L4_IDTV	RETAIL	EUS_IDTV_subscription
L4_M2M	RETAIL	EUS_Machine_to_Machine
L4_MESSAGING	INTERCONNECT	EUS_BGC Mobile_Incoming SMS international
		EUS_BGC Mobile_Incoming SMS national
	RETAIL	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
	WHOLESALE	EUS_Mobile_Roaming IN_Originating_SMS
		EUS_Mobile_Roaming IN_Terminating_SMS
L4_VOICE	INTERCONNECT	EUS_BGC Fixed international traffic incoming
		EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
		EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
		EUS_BGC Fixed Outgoing International Freephone traffic
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_Carrier PreSelection IAA interconnection
		EUS_Carrier PreSelection local interconnection
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_IAA interconnection - BGC Fixed to FOLO
		EUS_IAA interconnection - FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_Incoming International Transit (M)OLO Traffic
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Interconnection FOLO to BGC Mobile
		EUS_Interconnection MOLO to BGC Mobile
		EUS_International Transit border to border
		EUS_international_switchingTrunk
		EUS_internet traffic - FOLO to BGC 0909/3 IAA

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		EUS_Local interconnection - FOLO to BGC Fixed
		EUS_Number Portability access per line subscription
		EUS_Outgoing International Transit (M)OLO Traffic
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
		EUS_Traff. Internet- BGC fixed
		EUS_Voice_traffic_IAA_PointOfInterconnect subscription
		EUS_Voice_traffic_Local_PointOfInterconnect subscription
	RETAIL	EUS_Astrid
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_BGC Mobile_Roaming Out Origination
		EUS_BGC Mobile_Roaming Out Termination
		EUS_BVAS Call & Conference - BGC fixed
		EUS_Consultel 090x Traffic - (M)FOLO to BGC Fixed
		EUS_Freephone Traffic - (M)FOLO to BGC
		EUS_ISDN CATT traffic - BGC Fixed
		EUS_MVAS - BGC Fixed
		EUS_OPS International Information Traffic - BGC
		EUS_OPS National Information Traffic - BGC
		EUS_Other_Traffic - BGC Fixed
		EUS_Payph operations - BGC Fixed
		EUS_Split Charging Traffic - (M)FOLO to BGC Fixed
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
		EUS_Virtual Private Network Traffic- BGC fixed
	RETAIL&WHOLESALE	EUS_BGC Fixed DCIA traffic
		EUS_BGC Fixed international traffic outgoing
		EUS_BGC Fixed interzonal traffic
		EUS_BGC Fixed local traffic
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Fixed zonal non local traffic
		EUS_Calling Card Postpaid Traffic - BGC Fixed
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_IAA interconnection - BGC Fixed to MOLO
		EUS_Incoming International Freephone Traffic (OLO+BGC mobile) to BGC
		EUS_ISDN-BA Access - subscription
		EUS_ISDN-PRA Access - subscription
		EUS_PSTN Access - subscription
		EUS_Split Charging Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
	WHOLESALE	EUS_Mobile_Roaming IN Termination
		EUS_Universal Access Number Traffic - FOLO to BGC Fixed
		EUS_Mobile_Roaming IN Origination
L4_WEB	RETAIL	EUS_Eservices

Copper Termination

The network element Copper Termination groups costs related to fieldwork performed in the copper access network in order to realise broadband connections for end-users. These activities are mainly situated at the MDF, SC and the introduction up to the Network Termination Point (included).

7.4 Network services of the passive infrastructure layer : NLS1.0

7.4.1 Definition

This layer deals with the physical end-to-end connectivity between customers and the central sites (access), the physical connectivity inside the central site between access equipment and the physical connectivity between central sites (backbone).

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Access Physical connectivity services (see Figure 7***):***

- NLS1_0_Continue_Raw_Copper : internal cabling for copper connectivity from Main Distribution Frame or broadband splitter equipment to other access active equipment like voice switches, leased lines access equipment, collocated access equipment (of other licensed operators).
- NLS1_0_Copper_Localloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper loop.
- NLS1_0_Copper_Splitter : resources to split the narrowband and broadband copper physical signal.
- NLS1_0_Copper_Subloop : end-to-end copper connectivity from the network termination point at the customer premises to a delivery point in the street (street cabinet).
- NLS1_0_Copper_Subloop_testing : outside and inside copper connectivity and equipment required to perform remote testing of the copper subloop.
- NLS1_0_Raw_Copper : end-to-end copper connectivity from the network termination point at the customer premises to the Central site.
- NLS1_0_CentralOffice2Office_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and corporate customers office buildings .
- NLS1_0_CentralOffice2Office_Fibre : end-to-end fibre connectivity between the central sites and corporate customers office buildings or between central sites and Proximus mobile sites.
- NLS1_0_CentralOffice2RemoteOpticalNode_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.
- NLS1_0_CentralOffice2RemoteOpticalNode_Fibre : end-to-end fibre connectivity between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.

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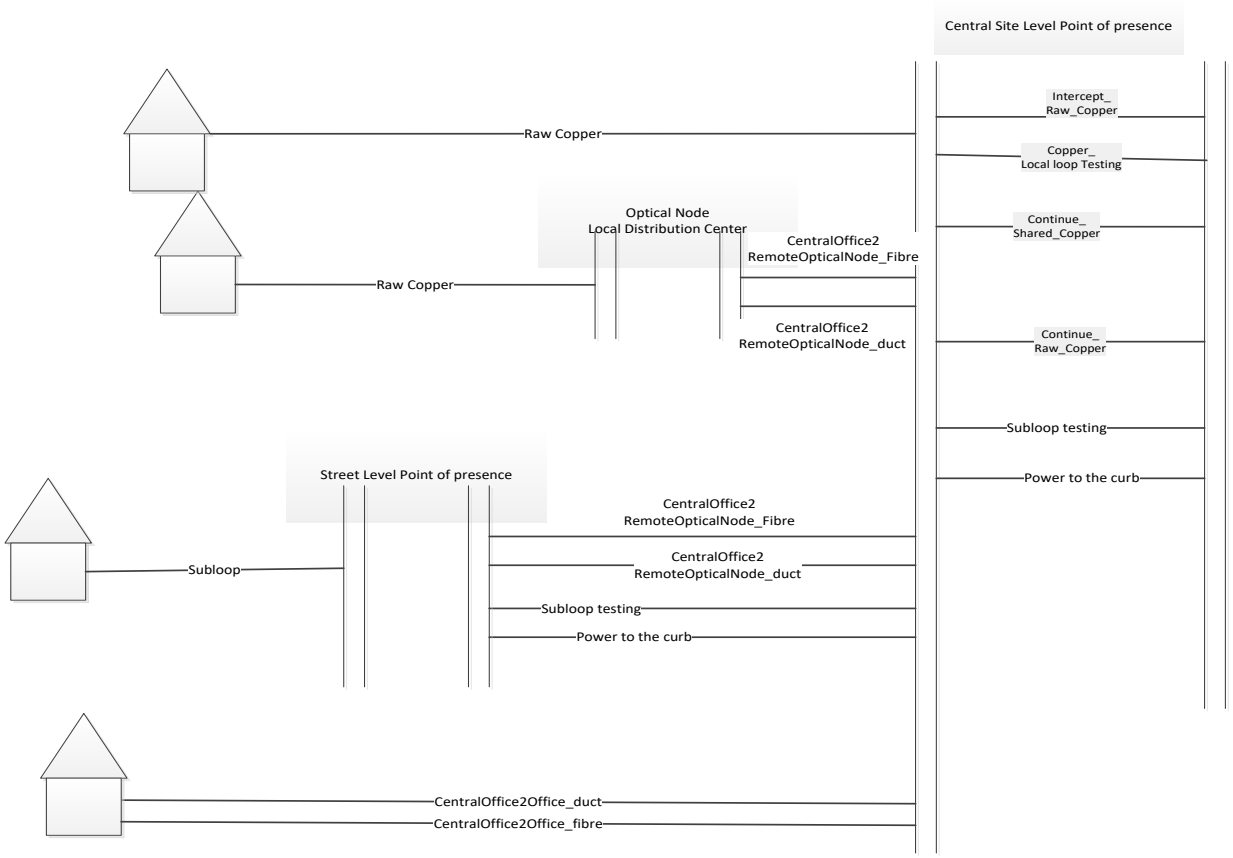

Figure 7: Access Physical connectivity services

Backbone Physical connectivity services

- NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core: end-to end fibre connectivity (fibre cables and duct and trenches) for SDH transmission networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Express : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the express (national level) network. These nodes correspond to the largest cities in the country.

7.4.2 Usage of the passive infrastructure

The physical connectivity services of this layer are used by upper layers in order to interconnect their specific equipment. The costs are distributed to the service users according to “consumption drivers” as listed in the table below.

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Network layer Service	Driver	Service consumers
NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, BRUO Shared Pairs
NLS1_0_Copper_Localloop_testing	nbr of lex based broadband connections without voice	Broadband bitstream layer 2.1 services
NLS1_0_Copper_Splitter	Nbr of used shared pairs	BRUO Shared pairs
NLS1_0_Copper_Subloop	Direct	VDSL bistream layer 2.1 service
NLS1_0_Copper_Subloop_testing	Nbr of used pairs	VDSL bistream layer 2.1 service
NLS1_0_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, Broadband Bitstream layer 2.1 service
NLS1_0_CentralOffice2RemoteOptical Node_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2RemoteOptical Node_Fibre	Nb_access_fibres_used	
NLS1_0_CentralOffice2Office_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2Office_Fibre	Nb_access_fibres_used	
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)	Backbone services (leased lines/backhaul and Broadcast) delivered by the SDH equipment at regional and core level.
NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)	Regional&Core backbone services of layer 2.1 (Ethernet transport, unicast and multicast)
NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)	Express backbone services of layer 2.0 (leased lines) and layer 2.1 (Ethernet)

7.4.3 Contributors to the passive infrastructure layer

7.4.3.1 *Access*

The objective of the access network is the delivery of a connection between our customers and our telecommunication network where all services are implemented.

Copper infrastructure:

The access network services of the copper passive infrastructure layer are based on several network elements valued using the BIPT regulated cost price, as listed below. For these network elements, there is no change in the valuation methodology compared to previous model. As in the previous models, the former network element NE_Copper infrastructure has been split in several subparts, in order to enable the fix/variable analysis of the model results .

- ✓ NE_Copper_Cables_Distribution

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copper distribution pairs and access to distribution pairs in street (to be attributed to copper subloop for VDSL connections without voice and to the raw copper for all other copper connections, based on the corresponding regulated cost);

- ✓ NE_Copper_Cables_Feeding

  copper feeding pairs and access to feeding pairs in street and central site (to be attributed to the copper subloop testing for VDSL connections without voice and to the raw copper for all other connections);

- ✓ NE_Copper_Blocks_and_Tie_cables

  copper local loop testing for broadband customer connections without voice at the central site,

  copper subloop testing for ROP based VDSL customer connections without voice,

  continue copper feeding pairs based on the number of shared pairs in service,

  continue raw copper for all other copper pairs in use.

- ✓ NE_Copper Splitter

  For the BRUO shared pairs in service.

NSF_PSTN_Voice_concentrator:

Attributed to :

- copper local loop testing based on the number of broadband without voice customers connections at the central site,
- copper subloop testing for VDSL without voice customer connections at the street cabinet,
- PSTN Access based on the number of subscriptions

Customer connections without voice are connected to the switching equipment in order to perform remote testing of the line.

Access Fibre Infrastructure:

The costs of the fibre deployed in the access network have been separated in the civil works related costs producing duct routes, and in the cable related works producing fibre connectivity inside the duct routes. Civil work related costs and cable related costs are subject to different assets within Proximus's asset accounting and can easily be identified. These assets do not distinguish the investments realized for connection of customer sites, mobile sites or remote optical nodes (at subtending level and street cabinet level). Therefore two drivers are used :

1. Kmxfibre : to separate the fibre cable costs between customer/mobile sites and remote optical sites
2. Amount km routes to physical sites : to separate the civil works costs between customer/mobile sites and remote optical sites .

Yielding following objects :

NSF_CentralOffice2RemoteOpticalNode_FibreCables

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NSF_CentralOffice2Office_FibreCables

NSF_CentralOffice2RemoteOpticalNode_Track

NSF_CentralOffice2Office_Track

7.4.3.2 *Backbone*

The backbone fibre connectivity services are realized by the following Network Stage Functions embodying the resources in the fibre outside plant (ducts&manholes, and fibre cables):

- NSF_Backbone_FibreConnectivity_Regional&Core
- NSF_Backbone_FibreConnectivity_express

NSF	Driver	NLS1_0
NSF_Backbone_FibreConnectivity_express	**direct**	NLS1_0_Fibre_connect_Backbone_DWDM_Express
NSF_Backbone_FibreConnectivity_Regional&Core	**fair split of fixed cost**	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core

7.5 Network services of the transmission infrastructure (NLS2_0)

7.5.1 Definition

This layer deals with the transmission services between customer sites and the Proximus Offices (access) also called local tail for leased lines , and it deals also with the transport segments services (also called backbone leased lines segments and backhaul capacity) between Proximus Offices (backbone).

The national wide transmission infrastructure collects transmission traffic in three aggregation stages: local level aggregation (circ 600 locations) , zonal level aggregation (circ 36 locations) , area level aggregation (20 locations) (see Figure 8: Transport Segments). Traffic at each stage can be cross-connected allowing to create transport segments from any location to any location.

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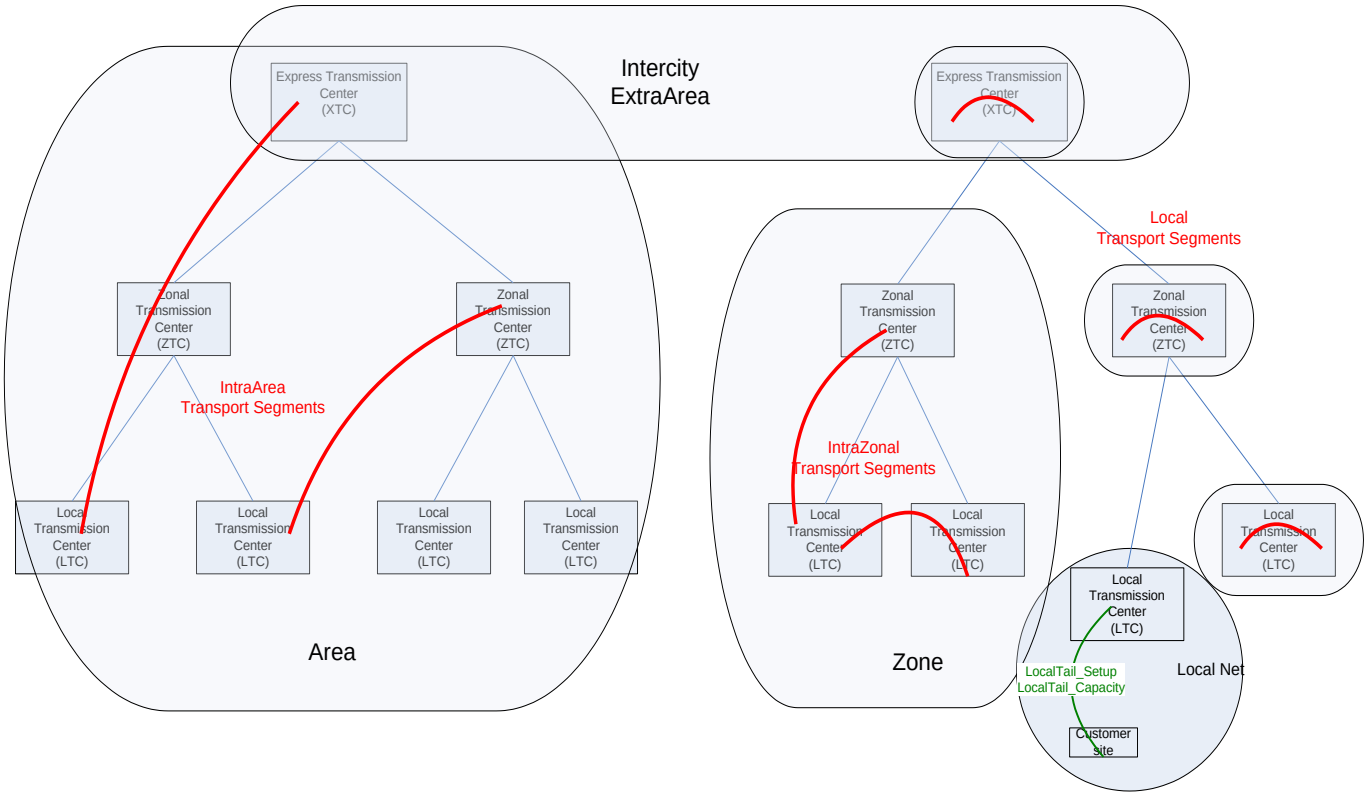

Figure 8: Transport Segments

Access services

The access services deliver the transmission between the customer site and the Proximus Office (access).

They capture costs related to the physical_dedicated link between the customer site and the central office and the equipment needed to activate the link in a capacity category.

Backbone services:

The backbone transport segments are classified in capacity (or bandwidth) categories -<2Mb/s, 2Mb/s, >2Mb/s- combined with distance categories -intraarea > intrazonal > local- depending on the end point situation in the aggregation hierarchy (see Figure 8).

The following NLS2.0 services are present in the model:

Network Layer 2.0 service
NLS2_0_LocalBackboneCapacity<2M
NLS2_0_LocalBackboneCapacity=2M
NLS2_0_LocalBackboneCapacity>2M
NLS2_0_IntrazonalBackboneCapacity<2M
NLS2_0_IntrazonalBackboneCapacity=2M

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NLS2_0_IntrazonalBackboneCapacity>2M
NLS2_0_IntraAreaBackboneCapacity<2M
NLS2_0_IntraAreaBackboneCapacity=2M
NLS2_0_IntraAreaBackboneCapacity>2M
NLS2_0_InterCityBackboneCapacity<2M
NLS2_0_InterCityBackboneCapacity=2M
NLS2_0_InterCityBackboneCapacity>2M
NLS2_0_LocalTail<2M
NLS2_0_LocalTail=2M
NLS2_0_LocalTail>2M

7.5.2 Usage of the transmission infrastructure

The NLS2_0 Local tail services are used to bring transmission capacity to the customer sites and they are thus directly involved in leased line services between two customer sites, leased lines to data services, backhaul services to other licensed operators and monitoring of the access network.

The costs of these access services are distributed according to the number of customer sites per bandwidth category (driver name: "Nbr_of_Customer_sites"), whereas the backbone services costs are further allocated according to their bandwidth (driver name: "Bandwidth consumed (Mbit/s)").

The model elements receiving costs from this network layer are exhaustively presented in the following table.

	Upper layer consumer or end user service
Backbone Virtual Paths (VP)	NLS2_1_Backbone_VirtualPath_InterArea
	NLS2_1_Backbone_VirtualPath_IntraArea
Proximus mobile	NLS2_2_Mobile_Access_Backhaul_Abis
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS2_2_Mobile_Backbone_Backhaul
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS2_2_Mobile_Access_Backhaul_IuB
	NLS4_0_MobileTerminatingLinks
Proximus testing environments	OVH_Lab
Broadband access to public IP switching	NLS3_ADSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
Data services backbone (IP-VPN)	NLS3_Private_IP&Ethernet_Routing
Internal Proximus network	OVH_InternalCommunicationNetwork
	OVH_InternalIPNetwork
International access to data services (IP-VPN)	EUS_Private_IP&Ethernet_on_international Subscription
Leased line access to public IP switching	NLS3_Public_IP_Extension_on_symmetric
Leased line accesses to data services (IP-VPN)	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
Other	Business Overhead
	EUS_DataManagedServices

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	EUS_Subsidiaries
	NLS4_0_VAS_signaling
	NLS4_1 BVAS - BGC Fixed
Public IP switching	NLS3_Public_IP_switching
Regulated broadband services	EUS_BROBA_accessLine
	NLS2_1_ADSL_SDSL_Bitstream
Regulated wholesale segments	EUS_BROTSOLL_segment<2M
	EUS_BROTSOLL_segment>2M
	EUS_BROTSOLL_segment2M
Retail&Wholesale leased lines	EUS_international_switchingTrunk
	EUS_LL <2M subscription - International
	EUS_LL <2M subscription - National
	EUS_LL >2M subcription- National
	EUS_LL >2M subscription - International
	EUS_LL 2M subscription - International
	EUS_LL 2M subscription - National
	EUS_LL_Analog National Subscription - National
	EUS_X25
Telephony access	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV services	NLS4_0_BroadcastTV
	NLS4_0_iDTV
Voice services in backbone	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
Wholesale transport capacity	EUS_Bandwidth_Wholesale subscription
	EUS_Nat IC-Infra Wholesale subscription

7.5.3 Contributors to the transmission infrastructure

7.5.3.1 *Local Tail*

A local tail transmission service is made of equipment installed at the customer premises extracting the digital signal from the physical line, of a physical link between the customer site and the central office and of grooming equipment in the central office (or subtended optical nodes).

Depending on the bandwidth of the local tail different equipment technologies are installed: PDH on copper , PDH on fibre or SDH on fibre. For the high bandwidth cases (>2Mb/s) a fibre based

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technology is required whereas for lower bandwidths the choice between fibre and copper technologies exists. However, since fibre local links are much more expensive than copper links, the preferred option for low bandwidth local tails is the copper based solution.

	Contributor to NLS2_0	Driver name
Equipment	NE_PDH SDH equipment	Yearly Incremental Cost
Physical inks	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

7.5.3.2 *Transport Segments*

Transport segments are realised by configuring the SDH clusters in different network stages. The transmission aggregation levels introduced hereabove (section 7.5.1 and Figure 8) are realised by different SDH clusters (regional, core and express SDH rings) interconnected by digital-crossconnects. The SDH rings are made of add-drop multiplexers deployed in LTC for the regional ones, in ZTC for the core ones and in the XTC for the express ones. The equipments within a ring are linked by fibre or by an optical wavelength.

To summarize, the building blocks for the transport segments are:

Contributor to NLS2_0	Driver name
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)
NE_PDH SDH equipment	Yearly Incremental Cost
NE_Express_SDH_equipment	Bandwidth (Mbps)

7.6 Network services of the packet based infrastructure (NLS2_1)

7.6.1 Definition

This layer deals with the data collection services (broadband or dedicated) between the customer and the central office (access) and the transport of data central office (backbone) . Two technologies coexist as well in the access part as in the backbone part : ATM technology and Ethernet/MPLS technology. Next picture summarizes the end point locations of packet based services. Remark : ATM is outphased and is no longer valuated in the 2013 model.

This layer also integrates point to point dedicated Ethernet transparent connections delivered over the DWDM national backbone.

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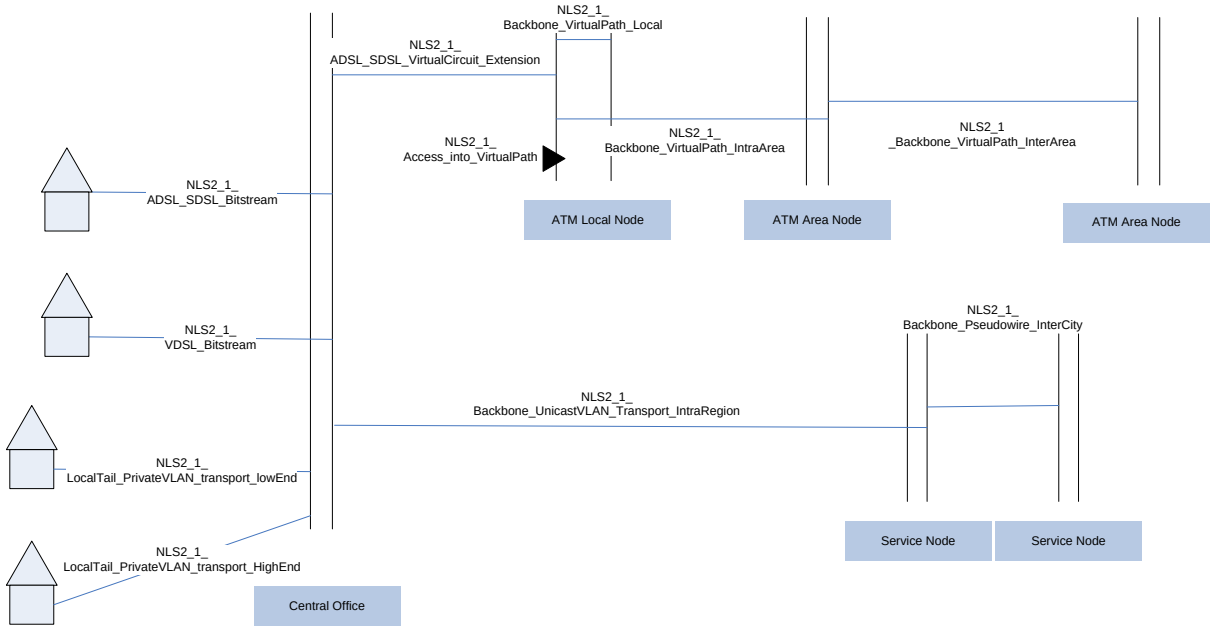

Figure 9: Network services of the packet based infrastructure 2.1

Access part

Layer 2.1 access service	Comment
NLS2_1_ADSL_SDSL_Bitstream	Broadband (ADSL-SDSL) end to end data streams between customer site and aggregation point in central office
NLS2_1_VDSL_Bitstream	Broadband VDSL end to end data streams between customer site and aggregation point in central office
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Ethernet symmetric dedicated link with central office over copper
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	Ethernet symmetric dedicated link with central office over fibre
NLS2_1_LocalTailCapacity_Ethernet>=10M	High bandwidth transparent Ethernet frame transport between customer and central office (BLES local tail)
NLS2_1_LocalTail_Eline_HighEnd	Ethernet symmetric dedicated link with central office

Backbone part

For data transport between central offices, the end point locations of the layer 2.1 services depend on the technology, the underlying networks having different topologies.

For the Ethernet/MPLS technology , the following services are defined:

Layer 2.1 Ethernet transport service	Comment
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	MPLS Transport of Ethernet VLANs between a central office and the service node of the region. These VLANs are unicast
NLS2_1_Backbone_Pseudowire_InterCity	MPLS Transport of Ethernet VLANs between service nodes of different regions. These VLANs are unicast

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NLS2_1_Backbone_MulticastVPLS_IntraRegion	

Eventually , the dedicated Ethernet transparent connections also introduce backbone connectivity services :

Layer 2.1 Ethernet transparent transport	Comment
NLS2_1_Intra/InterZonalBackboneCapacity_Ethernet>=1G	Any combination of end points different that of the two of them being express transmission centers, bandwidth of 1/10Gbps.
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	End points are between two express transmission centers, bandwidth of 1/10Gbps.

7.6.2 Usage of the data packet infrastructure

The access services of the data packet infrastructure are combined with the data packet backbone services to deliver end-to-end connectivity between IP appliances at customer site (IP router in ADSL/VDSL modems, private LAN IP routers) and IP service nodes , primarily the broadband access servers and the IPVPN routers offering layer3 services like ADSL/SDSL IP collection, VoD IP collection, Private VLAN extensions up to IPVPN nodes.

Next table summarizes the drivers used expressing how NLS2.1 contribute in layer 3 services or directly to End user services.

NLS2.1 service	Driver Name	Upper layer services "consuming" NLS2.1 services
NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines	BROBA end user line, all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines	all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)	Symmetric accesses to IPVPN and BROBA access line
NLS2_1_Backbone_MulticastVPLS_IntraRegion	direct	For television
NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps) The PeakBandwidth is a realistic estimation (based on measurements in the network) of the traffic (Mbps) during peak hour.	Broadband public IP NLS3 service, VoIP , Broadcast TV, and private IPVPN routing.
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)	Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing, Ethernet backhaul and WBA transport.
NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps	BROBA transport, Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing
NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS	

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	aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	BLES EUS services, High capacity accesses to IPVPN, IP-VPN routers interconnection, internal networks routers interconncetion
NLS2_1_IntraZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_InterZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)	
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	direct	Access to IPVPN layer 3 services
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	direct	Access to IPVPN layer 3 services

7.6.3 Contributors to the data packet infrastructure services

NLS2_1_ADSL_SDSL_Bitstream is the result of the central office (the Proximus technical building closest to the end customer) based network element NE_ADSL equipment. That function interacts with the broadband CPE equipment (at the customer site) by means of copper connectivity and potentially fiber connectivity to optical subtended nodes.

The Ethernet based layer 2.1 services (NLS2_1_Backbone_Uni/MulticastVPLS_IntraRegion and NLS2_1_Backbone_Pseudowire_InterCity) are implemented by the configuration of the Ethernet/MPLS network elements interacting with each other using lower layer connectivity services (see picture Figure 10).

NLS2_1_VDSL_Bitstream is the result of the function present in the deployed VDSL equipment (network elements NE_NGA Active equipment and NE_NGA Housing).

That function interacts with the broadband CPE equipment (at the customer site) by means of copper and fibre connectivity.

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NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion is the result of the Ethernet/MPLS unicast function present in the deployed Ethernet equipment. The function is activated in different locations to form aggregation clusters, whose links are mainly deployed on DWDM and in a limited number by direct fibre connectivity. The NLS2_1_Backbone_PseudowireInterCity and the NLS2_1_Backbone_MulticastVPLS_IntraRegion are implemented in the exact same way.

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd_or_LowEnd and NLS2_1_LocalTail_Eline_HighEnd are the result of customer sited Ethernet equipment and the connectivity to the Proximus network. Such connectivity consists of a fibre based link for the high end cases and of a copper based link in the low end situation.

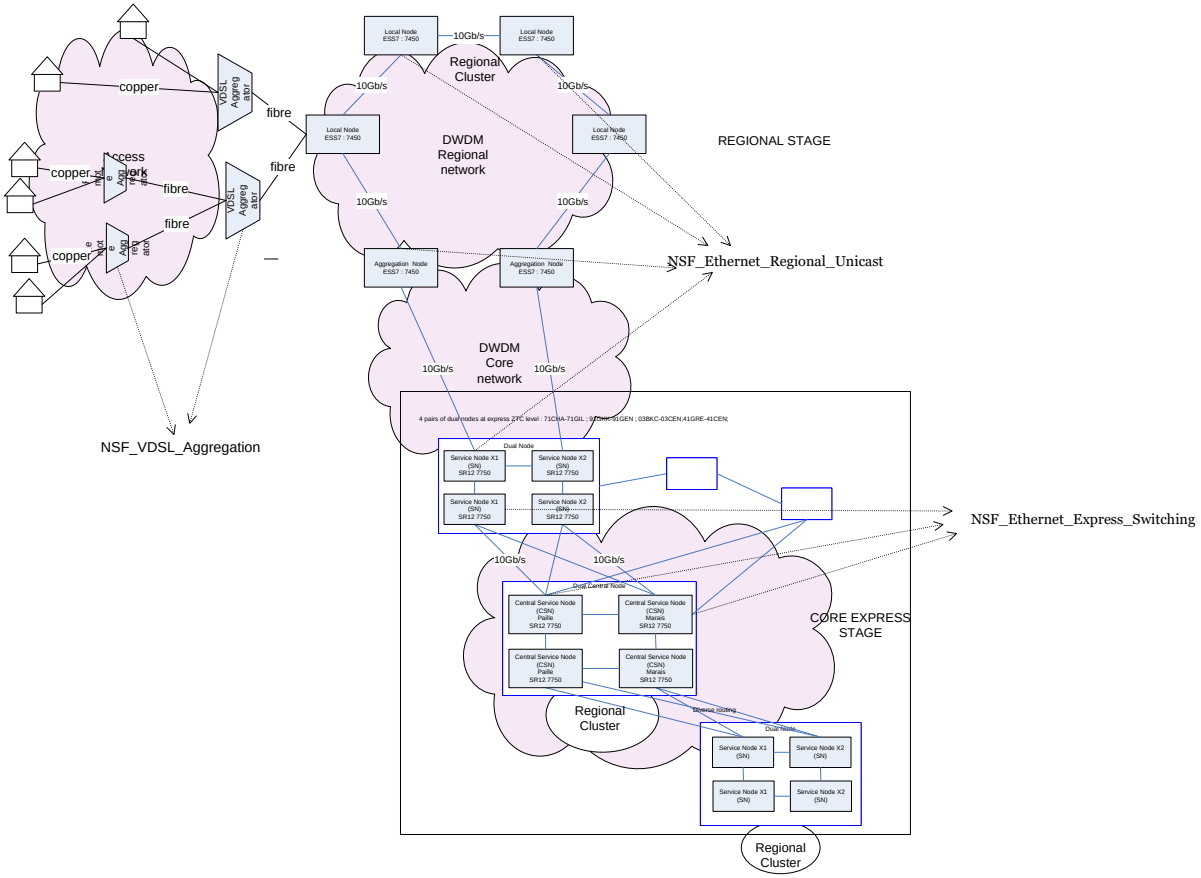

Figure 10: Ethernet layer 2.1

The dedicated Ethernet transparent backbone connection services (NLS2_1_xxxBackboneCapacity_Ethernet>=1G) are realized over the DWDM network with its Add Drop Multiplexers (ADM) or , when the capacity of the ADMs and rings is not sufficient, over point to point DWDM links.

The dedicated Ethernet transparent local tail connection services NLS2_1_LocalTailCapacity_Ethernet>=10M, is realized either on SDH equipment (up to 100 Mbps), reusing the SDH clusters deployed and already discussed in 7.5.3 (SDH over fibre) or for very

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high capacity connections (above 100 Mbps) they are directly realized on a wavelength (deployed as Fibre_connect_to_the_office for the local tail and as (D)WDM for the other cases).

The table hereunder summarizes the drivers used to distribute the cost contributors to the NLS2.1 services.

NLS2_1 service category	Building block of layer 2_1 service	Driver name
Ethernet transport	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Transponder	Number of Transponder
	NE_EthernetSwitch_Chassis	Usage of Switch in Percentage
	NE_EthernetSwitch_Port10GE	Number of Port
	NE_EthernetSwitch_Port1GE	Number of Port
	NE_EthernetSwitch_Port1GE_Adapter	Number of Adapter
	NSF_Express_EthernetSwitch_Chassis	Traffic in Mbps
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express DWDM equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
Broadband aggregation	NE_ADSL equipment	direct
	NE_NGA Active equipment	direct
	NE_NGA Housing	direct
	NLS1_0_Copper_Localloop_testing	nbr of broadband lex based without voice
	NLS1_0_Copper_Subloop	direct
	NLS1_0_Copper_Subloop_testing	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NSF_FTTC_FibreConnectivity	direct
Ethernet local tail	NE_ethernet equipment	Yearly Direct CAPEX Cost
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
Transparent Ethernet backbone connection services	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Point_to_Point_InterZonal	Direct
	NE_DWDM_Point_to_Point_IntraZonal	Direct
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Point_to_Point	Direct
	NSF_Express_DWDM_Transponder	Number of Transponder
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express_DWDM_equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

The cost relative to the building blocks and the driver values, for Ethernet transport and Transparent Ethernet backbone connection services, are determined in a top-down model, which was derived from the BIPT NGN-NGA model. (by Analysis Mason)

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7.7 Network services of the mobile backhauling infrastructure (NLS 2.2)

7.7.1 Leased Lines infrastructure for mobile access backhauling

- NLS2_2_Mobile_Access_Backhaul_Abis is related to backhauling of the 2G network, providing connectivity by means of leased lines between the Base Station Transceiver (BTS) and the Base Station controller (BSC).
- NLS2_2_Mobile_Access_Backhaul_IuB is related to backhauling of the 3G network, providing connectivity by means of leased lines between the Node B antenna and the Radio Network Controller (RNC) in the Radio Access Network.

7.7.2 Leased Lines infrastructure for mobile backbone backhauling

- NLS2_2_Mobile_Backbone_Backhaul

7.8 Network services of the IP infrastructure layer (NLS3-IP)

7.8.1 Scope

This layer provides the following basic IP services in the model.

Fixed IP service type	IP service
Collection of IP traffic for public internet or internal internet	NLS3_ADSL_Public_IP_collection
	NLS3_SDSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
	NLS3_VoD_IP_collection
	NLS3_VoIP_IP_collection
	NLS3_Public_IP_Extension_on_symmetric
Public Internet routing	NLS3_Public_IP_switching
Connection of IP sites to IP-VPN	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
	NLS3_Private_IP&Ethernet_Routing
	NLS3_Private_IP&Ethernet_Extension_on_asymmetric
	NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter
IP security	NLS3_IP_security

In addition, NLS3 also includes collection of mobile data traffic in the mobile access and backbone network.

The actual NLS3's are described further. A comprehensive listing of which NLS or EUS they contribute to together with a description of the driver utilized in each case is also presented.

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7.8.1.1 *Public services*

7.8.1.1.1 IP_collection

Gathers all the data traffic, except that of the private networks, generated by the customers at their locations -homes and offices placed all over the country- at the highest network level where it can be further delivered to the Internet.

This gathering is achieved thanks to the broad and narrow band servers together with the connectivity capabilities of the MPLS backbone network.

This generic service is in fact divided in several actual NLS3, depending on the traffic type and/or underlying technology, as follows:

- Data traffic:
  - NLS3_ADSL_Public_IP_Collection
  - NLS3_SDSL_Public_IP_Collection
  - NLS3_VDSL_Public_IP_Collection
  - NLS3_Public_IP_Extension_on_symmetric: where the customer-IP router connectivity is provided by means of Leased Lines, as opposed to the other services which are based on broadband access technologies.
- Video on Demand traffic:
  - NLS3_VoD_IP_Collection
- Voice over IP traffic:
  - NLS3_VoIP_IP_Collection

Further, these NLS3's contribute to the following higher network layer services and end user services (EUS) as specified hereunder:

NLS3	Driver name	Target element
NLS3_ADSL_Public_IP_collection NLS3_ADSL_Public_IP_collection	Nbr_of_retail_wholesale_ADSL_lines	EUS_ADSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_ADSL_lines	EUS_FastInternet subscription
NLS3_SDSL_Public_IP_collection	Nbr_of_retail_wholesale_SDSL_lines	EUS_FastInternet subscription
NLS3_VDSL_Public_IP_collection NLS3_VDSL_Public_IP_collection	Nbr_of_retail_wholesale_VDSL_lines	EUS_VDSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_VDSL_lines	EUS_FastInternet subscription
NLS3_Public_IP_Extension_on_symmetric	direct	EUS_Public_IP_Extension_on_Symmetric
NLS3_VoD_IP_collection	direct	NLS4_0_VoD
NLS3_VoIP_IP_collection	direct	NLS4_0_PSTN_access

7.8.1.1.2 Public_IP_switching

This service brings the intelligence to route the gathered traffic by the "IP_collection" generic NLS3 into the appropriate external network within the "public Internet".

This service, NLS3_Public_IP_switching, is fully and exclusively realized by the Proximus Internet Routers and is totally dedicated to the end user service EUS_FastInternet subscription.

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7.8.1.2 *Private services*

7.8.1.2.1 Private_IP&Ethernet_Extension

This NLS transparently extends the customer's private local area networks, situated at any location within Belgium, to the edge of the Proximus's network, thanks to the routers installed at the customer premises (CPE) and the connectivity capabilities of the MPLS aggregation and core- clouds.

This generic service consists in fact of several actual services, specific to the access technology type, as follows:

- NLS3_Private_IP&Ethernet_Extension_on_symmetric_Datacenter
- NLS3_Private_IP&Ethernet_Extension_on_asymmetric
- NLS3_Private_IP&Ethernet_Extension_on_symmetric_lowEnd
- NLS3_Private_IP&Ethernet_Extension_on_symmetric _highEnd

The higher level NLS/EUS to which the above NLS3's deliver their services and their costs allocations are:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_asymmetric subscription – National
NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter	direct	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription – National
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription – National

7.8.1.2.2 NLS3_Private_IP&Ethernet_Routing

This NLS delivers the capability of routing the private networks traffic to the requested end point, within the Proximus private IPVPN network.

This service, NLS3_Private_IP&Ethernet_Routing, is completed by the Proximus IPVPN Routers and the core MPLS cloud and, in turn, supports all the following EUS:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_asymmetric subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_international Subscription
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National

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Figure 11: Layer 3 topology and contributors exhibits the layer's basic topology and all the contributors to the Layer 3 services.

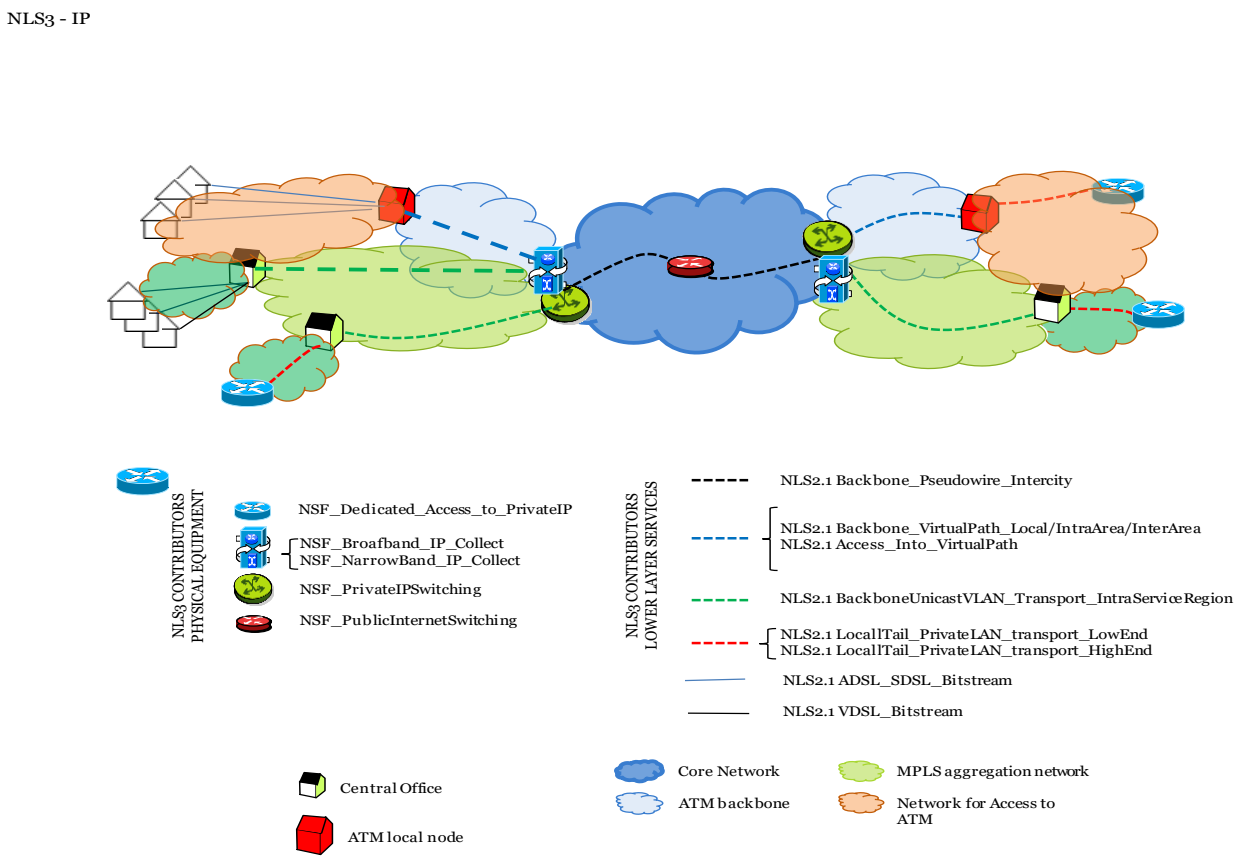

Figure 11: Layer 3 topology and contributors

7.8.1.3 *Mobile Data traffic*

The network layer 3 elements included at this level are :

- NLS3_0_BGC_Mobile_Access Data
- NLS3_0_BGC_Mobile_Backbone_Data

7.8.2 Contributors to the Network Layer 3 services

The table hereunder summarizes the contributors and the drivers used to distribute the costs to the NLS3 services.

NLS3 service category	Building block of layer 3 service	Driver name
Asymmetric Private_IP&Ethernet_Extension	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps

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	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_Dedicated_Access_to_PrivateIP	Number of Access
Symmetric Private_IP&Ethernet_Extension	NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalTail<2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail>2M	Nbr_of_Customer_sites
	NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)

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	NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Direct
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_Dedicated_Access_to_PrivateIP	Nbr_of_Sites
Symmetric Public_IP_Extension	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
Public_IP_collection	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_Public_IP_Collect	PeakHour_PublicInternetTraffic(Gbps)
VoD_IP_collection	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_VoD_IP_Collect	PeakHour_VoDTraffic(Gbps)
VoIP_IP_collection	NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps)
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NSF_BroadBand_VoIP_IP_Collect	Direct
Public_IP_switching	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)

Sensitivity: Unrestricted

	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PublicInternetSwitching	TotalPeakHour_PublicInternetTraffic(Gbps)
Private_IP&Ethernet_Routing	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_Backbone_Pseudowire_InterCity	Bandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PrivateIPSwitching	Direct
IP_security	NSF_IP_security	Direct
Mobile Data Handling	NSF_Mobile_RAN_Data NSF_Mobile_Backbone_Data	Routed volumes Routed volumes

7.9 Network Services of the application layer

7.9.1 Definition

This layer deals with the telecommunication application services to end users. The application layer services are :

NLS4_0_BroadcastTV, NLS4_0_VoD, NLS4_0_iDTV and voice telephony related services classified as follows:

Sensitivity: Unrestricted

CLASS	DEF_NLS_DESCR
Access to VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate
	NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect
	NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate
	NLS4_0_Voice_traffic_Local_PointOfInterconnect
NP	NLS4_0_FixedPortableNumberLocation
Telephony Access	NLS4_0_ISDN_access
	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling
	NLS4_0_CallerIdentity_CallHandling
	NLS4_0_InteractiveVoiceResponse_CallHandling
	NLS4_0_OtherAdvanced_CallHandling
	NLS4_0_Service_Announcements_Playing
	NLS4_0_Televoting_CallHandling
	NLS4_0_VoiceFeatures_SelfManaging
	NLS4_0_Voicemail&Messaging
	NLS4_0_WakeUp_CallHandling
Voice transport	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_MSC
VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Collect
	NLS4_0_Voice_traffic_AreaLevel_Complete
	NLS4_0_Voice_traffic_AreaLevel_Terminate
	NLS4_0_Voice_traffic_AreaLevel_Transit
	NLS4_0_Voice_traffic_Local_Collect
	NLS4_0_Voice_traffic_Local_Complete
	NLS4_0_Voice_traffic_Local_Terminate
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS4_0_BGC Mobile_Access_Collect_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice
	NLS4_0_BGC_Mobile_Access_Distribute_SMS
	NLS4_0_BGC Mobile_BackBone_Voice
	NLS4_0_BGC_Mobile_Backbone_SMS
Mobile IN Platform	NLS4_0_SMS_Services
	NLS4_0_Private_Communication_Call_Handling
	NLS4_0_Mobile_PrepaidTraffic_Services
	NLS4_0_Mobile_PrepaidData_Services
Special	NLS4_0_Automated_call_distribution
	NLS4_0_PublicPayphones

For the access, the voice application services are end-to-end voice connections between the customer site and the central office (technical building closest to the user) . For the backbone, voice applications are either pure call handling related and do not span over distant nodes, or they are voice transport applications between distant nodes . Next picture puts into perspective the services of the Voice application layer.

Sensitivity: Unrestricted

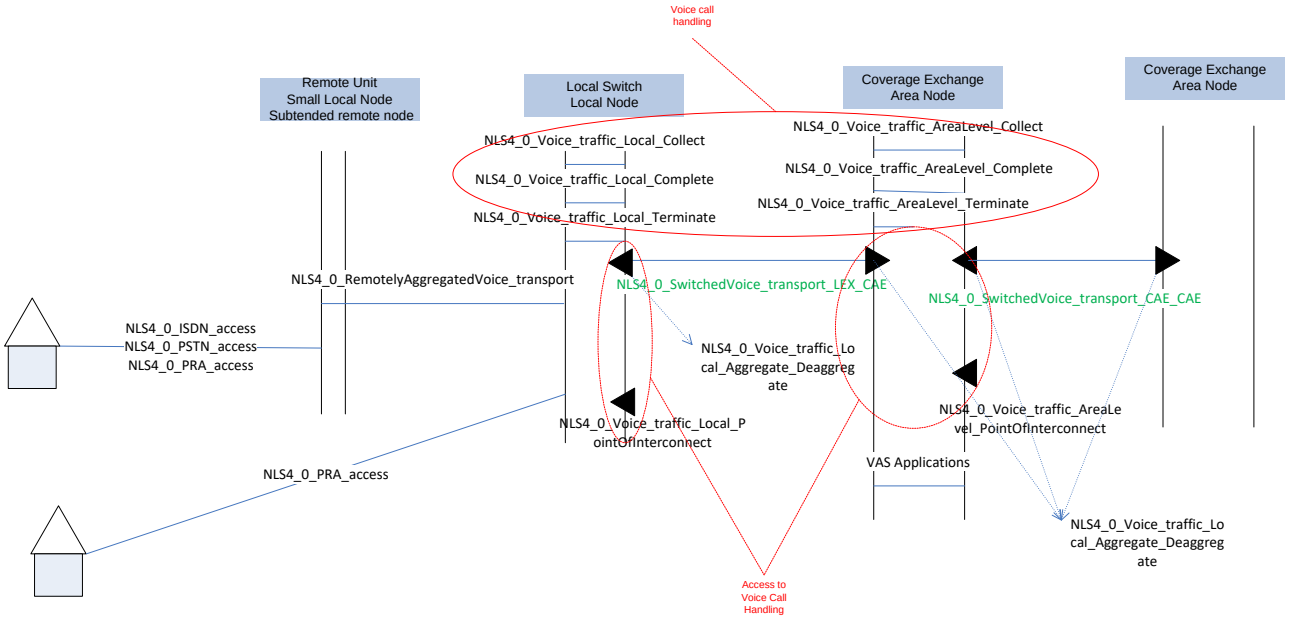

Figure 12: the services of the Voice application layer 4.0

7.9.2 Usage of the application layer

The TV related applications are completely used for iDTV end-user services, no specific consumption driver needs to be defined.

The voice application services are distributed to a variety of traffic types , each with a specific driver. The following table summarizes the used drivers per voice application service.

Class of application service	Voice application service	Driver to distribute the NLS4.0 application service to EUS or NLS4.1
Access to VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	TimeSlotEquivalent_capacity_used
	NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	routed minutes
	NLS4_0_Voice_traffic_Local_PointOfInterconnect	TimeSlotEquivalent_capacity_used
NP	NLS4_0_FixedPortableNumberLocation	Nbr_calls
Telephony Access	NLS4_0_ISDN_access	Nbr_lines_inUse
	NLS4_0_ISDN-PRA_access	Nbr_lines_inUse
	NLS4_0_PSTN_access	Nbr_lines_inUse
VAS application	NLS4_0_CallerIdentity_CallHandling	direct
	NLS4_0_CallingCard_CallHandling	direct
	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
	NLS4_0_OtherAdvanced_CallHandling	Direct
	NLS4_0_Service_Announcements_Playing	Nbr_calls
	NLS4_0_Televoting_CallHandling	Nbr_calls_explosive_traffic
	NLS4_0_VoiceFeatures_SelfManaging	direct
	NLS4_0_Voicemail&Messaging	direct
	NLS4_0_WakeUp_CallHandling	direct
Voice transport	NLS4_0_RemotelyAggregatedVoice_transport	routed minutes

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	NLS4_0_SwitchedVoice_transport_CAE_CAE	routed minutes
	NLS4_0_FixedSwitchedVoice_transport_National_offnet	TimeSlotEquivalent_capacity_used
	NLS4_0_SwitchedVoice_transport_LEX_CAE	routed minutes
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_MSC	routed minutes
	NLS4_0_SwitchedVoice_transport_LEX_MSC	routed minutes
VoiceCallHandling	NLS4_0_Voice_traffic_AreaLevel_Collect	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Complete	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Terminate	routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Transit	routed minutes
	NLS4_0_Voice_traffic_Local_Collect	routed minutes
	NLS4_0_Voice_traffic_Local_Complete	routed minutes
	NLS4_0_Voice_traffic_Local_Terminate	routed minutes
Mobile Voice&MessagingHandling	NLS4_0_BGC Mobile_Access_Collect_Voice	routed minutes
	NLS4_0_BGC_Mobile_Access_Collect_SMS	routed volumes
	NLS4_0_BGC Mobile_Access_Distribute_Voice	routed minutes
	NLS4_0_BGC Mobile_Access_Distribute_SMS	routed volumes
	NLS4_0_BGC Mobile_BackBone_Voice	routed minutes
	NLS4_0_BGC_Mobile_Backbone_SMS	routed volumes
Mobile IN platform	NLS4_0_SMS_Services	Cumulated invested value
	NLS4_0_Private_Communication_Call_Handling	Cumulated invested value
	NLS4_0_Mobile_PrepaidTraffic_Services	Cumulated invested value
	NLS4_0_Mobile_PrepaidData_Services	Cumulated invested value

The driver "routed minutes" (or "routed volumes" in the case of mobile SMS) consists in determining the average number of times (=routing factor) a traffic type is using the voice application service across all possible call scenarios compatible with the traffic type. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) of that traffic type.

Below table gives a view on fixed or mobile related traffic types ("consumers") of those voice applications:

traffic category	Voice application service	EUS or NLS4_1
mobile traffic related	NLS4_0_BGC Mobile_Access_Collect_Voice	EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Mobile_Roaming IN Origination
		NLS4_1 BVAS - BGC Fixed
		EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	NLS4_0_BGC Mobile_Access_Collect_SMS	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
		EUS_Mobile_Roaming IN_Originating_SMS

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NLS4_0_BGC Mobile_Access_Distribute_Voice	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile international traffic incoming
	EUS_BGC Mobile to BGC Mobile
	EUS_Interconnection FOLO to BGC Mobile
	EUS_Interconnection MOLO to BGC Mobile
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
NLS4_0_BGC Mobile_Access_Distribute_SMS	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_Mobile_On net SMS
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_Mobile_Roaming IN_Terminating_SMS
NLS4_0_BGC Mobile_Backbone_Voice	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile international traffic incoming
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile to BGC Mobile
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Interconnection FOLO to BGC Mobile
	EUS_Interconnection MOLO to BGC Mobile
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN Termination
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	NLS4_1 BVAS - BGC Fixed
NLS4_0_BGC Mobile_Backbone_SMS	EUS_BGC Mobile_Incoming SMS international
	EUS_BGC Mobile_Incoming SMS national
	EUS_Mobile_On net SMS
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN_Originating_SMS
	EUS_Mobile_Roaming IN_Terminating_SMS
NLS4_0_MobileSwitchedVoice_transport_National_offnet	EUS_BGC Mobile Outgoing to International Traffic
	EUS_BGC Mobile_Roaming Out Termination
	EUS_Interconnection BGC Mobile to MOLO
	EUS_Mobile_Outgoing SMS_international
	EUS_Mobile_Outgoing SMS_national
	EUS_Mobile_Roaming IN Origination
	EUS_Mobile_Roaming IN_Originating_SMS
NLS4_0_RemotelyAggregatedVoice_transport	EUS_BGC Fixed to BGC Mobile

Sensitivity: Unrestricted

	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Local BGC Fixed_On net Voice
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	EUS_Carrier PreSelection local interconnection
NLS4_0_SwitchedVoice_transport_CAE_MSC	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_Mobile_Roaming IN Origination
	NLS4_1 BVAS - BGC Fixed
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
NLS4_0_SwitchedVoice_transport_LEX_CAE	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed

Sensitivity: Unrestricted

NLS4_0_SwitchedVoice_transport_LEX_MSC	EUS_BGC Mobile to BGC Fixed
	EUS_Mobile_Roaming IN Origination
NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
	EUS_Carrier PreSelection IAA interconnection
NLS4_0_Voice_traffic_AreaLevel_Collect	EUS_BGC Fixed to BGC Mobile
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	EUS_Carrier PreSelection IAA interconnection
NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription

Sensitivity: Unrestricted

NLS4_0_Voice_traffic_AreaLevel_Terminate	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1 BVAS - BGC Fixed
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Transit	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Mobile National outg. FOLO
	EUS_Mobile_Roaming IN Origination
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
	NLS4_1_Transit International (M)OLO Traffic IAA
NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	EUS_Carrier PreSelection IAA interconnection
NLS4_0_Voice_traffic_Local_Collect	EUS_BGC Fixed to BGC Mobile
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed

Sensitivity: Unrestricted

		NLS4_1_EAA BGC Fixed_On net Voice
		NLS4_1_IAA BGC Fixed_On net Voice
		NLS4_1_IAA interconnection - BGC Fixed to FOLO
		EUS_Carrier PreSelection IAA interconnection
		EUS_Carrier PreSelection local interconnection
	NLS4_0_Voice_traffic_Local_Terminate	EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Mobile_Roaming IN Origination
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_Local interconnection - FOLO to BGC Fixed
		NLS4_1 BVAS - BGC Fixed
		NLS4_1_EAA BGC Fixed_On net Voice
		NLS4_1_IAA BGC Fixed_On net Voice
		NLS4_1_IAA interconnection - FOLO to BGC Fixed
		NLS4_1_Incoming International Traffic - BGC Fixed
Mobile IN	NLS4_0_SMS_Services	EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
		EUS_BGC Mobile_Roaming Out Origination
	NLS4_0_Private_Communication_Call_Handling	EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Mobile_On net SMS
		EUS_Mobile_Outgoing SMS_international
		EUS_Mobile_Outgoing SMS_national
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile_Incoming SMS international
		EUS_BGC Mobile_Incoming SMS national
	NLS4_0_Mobile_PrepaidTraffic_Services	EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile international traffic incoming
		EUS_BGC Mobile National outg. FOLO
		EUS_BGC Mobile Outgoing to International Traffic
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile to BGC Mobile
		EUS_BGC Mobile_Roaming Out Origination
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to BGC
		EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO

Sensitivity: Unrestricted

		EUS_Freephone Traffic - BGC Fixed&Mobile to BGC
		EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
		EUS_Interconnection BGC Mobile to MOLO
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to BGC
		EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	NLS4_0_Mobile_PrepaidData_Services	EUS_Mobile_Data national
		EUS_BGC Mobile_Roaming Out Data
pure fixed traffic related	NLS4_0_FixedSwitchedVoice_transport_National_offnet	EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_1_IAA interconnection - BGC Fixed to FOLO
		EUS_IAA interconnection - BGC Fixed to MOLO
	NLS4_0_RemotelyAggregatedVoice_transport	EUS_Carrier PreSelection local interconnection
		EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_IAA interconnection - BGC Fixed to MOLO
		EUS_Local interconnection - FOLO to BGC Fixed
		EUS_MVAS - BGC Fixed
		NLS4_1 BVAS - BGC Fixed
		NLS4_1_EAA BGC Fixed_On net Voice
		NLS4_1_IAA BGC Fixed_On net Voice
		NLS4_1_IAA interconnection - BGC Fixed to FOLO
		NLS4_1_IAA interconnection - FOLO to BGC Fixed
		NLS4_1_Incoming International Traffic - BGC Fixed
		NLS4_1_Local BGC Fixed_On net Voice
		NLS4_1_Outgoing International Traffic - BGC Fixed
		EUS_BGC Fixed to BGC Mobile
		EUS_BGC Mobile to BGC Fixed
		EUS_BGC Mobile_Roaming Out Origination
		NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_0_SwitchedVoice_transport_CAE_CAE	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
		EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		NLS4_1_EAA BGC Fixed_On net Voice
		NLS4_1_Transit International (M)OLO Traffic EAA
	NLS4_0_SwitchedVoice_transport_LEX_CAE	EUS_EAA interconnection - BGC Fixed to FOLO
		EUS_EAA interconnection - BGC Fixed to MOLO
		EUS_EAA interconnection - (M)FOLO to BGC Fixed
		EUS_IAA interconnection - MOLO to BGC Fixed
		EUS_IAA interconnection - BGC Fixed to MOLO
		EUS_MVAS - BGC Fixed
		NLS4_1 BVAS - BGC Fixed
		NLS4_1_EAA BGC Fixed_On net Voice

Sensitivity: Unrestricted

	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	NLS4_1_Incoming International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Aggregate_Deaggregate	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	NLS4_1_Incoming International Traffic - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Collect	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_BGC Fixed to BGC Mobile
NLS4_0_Voice_traffic_AreaLevel_Complete	NLS4_1 BVAS - BGC Fixed
	NLS4_1_IAA BGC Fixed_On net Voice
NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile National outg. FOLO

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	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1 BVAS - BGC Fixed
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
NLS4_0_Voice_traffic_AreaLevel_Terminate	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination
	NLS4_1 BVAS - BGC Fixed
NLS4_0_Voice_traffic_AreaLevel_Transit	EUS_BGC Fixed National Transit (M)OLO traffic EAA interconnection
	EUS_BGC Fixed National Transit (M)OLO traffic IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	NLS4_1_Transit International (M)OLO Traffic EAA
	NLS4_1_Transit International (M)OLO Traffic IAA
	EUS_BGC Mobile National outg. FOLO
	EUS_Mobile_Roaming IN Origination
	EUS_Split Charging Traffic - BGC Fixed&Mobile to FOLO
	EUS_Consultel 090x Traffic - BGC Fixed&Mobile to FOLO
	EUS_Universal Access Number Traffic - BGC Fixed&Mobile to FOLO
	EUS_Freephone Traffic - BGC fixed and Mobile to FOLO
NLS4_0_Voice_traffic_Local_Aggregate_Deaggregate	EUS_Carrier PreSelection IAA interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_BGC Fixed to BGC Mobile
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination

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	EUS_Mobile_Roaming IN Origination
NLS4_0_Voice_traffic_Local_Collect	EUS_Carrier PreSelection IAA interconnection
	EUS_Carrier PreSelection local interconnection
	EUS_EAA interconnection - BGC Fixed to FOLO
	EUS_EAA interconnection - BGC Fixed to MOLO
	EUS_IAA interconnection - BGC Fixed to MOLO
	EUS_MVAS - BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - BGC Fixed to FOLO
	NLS4_1_Outgoing International Traffic - BGC Fixed
	EUS_BGC Fixed to BGC Mobile
NLS4_0_Voice_traffic_Local_Complete	NLS4_1_Local BGC Fixed_On net Voice
NLS4_0_Voice_traffic_Local_PointOfInterconnect	EUS_Voice_traffic_Local_PointOfInterconnect subscription
NLS4_0_Voice_traffic_Local_Terminate	EUS_EAA interconnection - (M)FOLO to BGC Fixed
	EUS_IAA interconnection - MOLO to BGC Fixed
	EUS_Local interconnection - FOLO to BGC Fixed
	NLS4_1 BVAS - BGC Fixed
	NLS4_1_EAA BGC Fixed_On net Voice
	NLS4_1_IAA BGC Fixed_On net Voice
	NLS4_1_IAA interconnection - FOLO to BGC Fixed
	NLS4_1_Incoming International Traffic - BGC Fixed
	EUS_BGC Mobile to BGC Fixed
	EUS_BGC Mobile_Roaming Out Origination
	EUS_Mobile_Roaming IN Origination

7.9.3 Contributors to the application services

TV services

The broadcast TV application service is the result of the video streaming network stage function and the nation wide broadcast using the SDH clusters and simultaneously the multicast features of the Ethernet/MPLS regional clusters combined with the express pseudowires in order to reach all regional clusters.

Contributor to NLS4_0_BroadcastTV	**Driver**
NSF_BroadcastTV	Nbr_TV_users
NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)

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NLS2_0_InterCityBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_LocalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_1_Backbone_MulticastVPLS_IntraRegion	Direct
NLS2_1_Backbone_Pseudowire_InterCity	TotalPeakBandwidth_used(Gbps)
NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)

Similarly, the Video On Demand service is the result of Video Movie servers delivering the content and the transport services towards the closest local node to the customer . The transport is realized on the Ethernet/MPLS network.

Contributor to NLS4_0_VoD	Driver
NLS3_VoD_IP_collection	direct
NSF_VoD	Nbr_TV_users

Voice application services in the access

PSTN and ISDN access services are the result of the voice concentrator function in the closest technical building (local switch or remote unit) and the physical copper connectivity between the customer site and the technical building. In addition, the data connectivity required to transport Voice over IP signaling and traffic to the Voice over IP switching units is also included as a contributor to voice access.

PRA access services do not need a concentrator function (that function is typically realized within the customer site by private switches) but merely a voice transport link to the local switch. This one is obtained directly from layer 2.0 transport segments and local tails.

Hereunder a summary of the contributors to voice access together with the drivers used to determine their level of involvement in the service

Voice access service	Contributor	Driver Name
NLS4_0_ISDN_access	**NLS1_0_Continue_Raw_Copper**	Nbr_of_used_pairs
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NSF_ISDN_NetworkTermination	Nbr_of_accesses
	NSF_ISDN_Voice_concentrator	Nbr_lines_inUse
NLS4_0_PSTN_access	**NLS1_0_Continue_Raw_Copper**	Nbr_of_used_pairs

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	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS3_VoIP_IP_collection	Direct
	NSF_PairGainSystem	Direct
	NSF_PSTN_Voice_concentrator	Nbr_lines_inUse
NLS4_0_ISDN-PRA_access	**NLS2_0_InterCityBackboneCapacity=2M**	Bandwidth consumed (Mbit/s)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
	NLS2_0_LocalTailCapacity	Bandwidth consumed (Mbit/s)
	NSF_ISDN_Primary_Access	Nbr_lines_inUse

Voice application services in the backbone (see picture Figure 12: the services of the Voice application layer 4.0)

The services in the group "Access to VoiceCallHandling" allow to access the switching matrix and call handling , they are realized by ports to the switch (a switch port concentrates the voice circuits from/to the switching matrix). The switching ports (trunks) can be those of a local switch or of a transit switch.

For the case of interconnection with other operators (NLS4_0_Voice_traffic_AreaLevel_PointOfInterconnect, NLS4_0_Voice_traffic_Local_PointOfInterconnect) , the charging function of the switch is also exercised in order to allow for interoperator billing.

In summary the contributors are distributed using following drivers:

Network functions used to realize Access to VoiceCallHandling services	Driver used to attribute network functions to access to VoiceCallHandling services
NSF_Voice_call_CAE_charging	Routed minutes
NSF_Voice_call_CAE_Trunks	TimeSlot_capacity_used
NSF_Voice_call_Local_charging	Routed minutes
NSF_Voice_call_Local_Trunks	TimeSlot_capacity_used

The services in the group "VoiceCallHandling" result from three network stage functions:
NSF_Voice_call_CAE_Processing
NSF_Voice_call_Local_Processing
NSF_Voice_call_Local_charging

The driver used is "routed minutes" and it consists in determining the average nbr of times (=routing factor) a voice call handling type is using the network functions . The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) exercising that voice call handling type.

Network function		**Driver Name**
NSF_Voice_call_CAE_Processing	NLS4_0_Voice_traffic_AreaLevel_Collect	Routed minutes

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	NLS4_0_Voice_traffic_AreaLevel_Complete	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Terminate	Routed minutes
	NLS4_0_Voice_traffic_AreaLevel_Transit	Routed minutes
NSF_Voice_call_Local_charging	NLS4_0_Voice_traffic_Local_Collect	Routed minutes
	NLS4_0_Voice_traffic_Local_Complete	Routed minutes
	NLS4_0_Voice_traffic_Local_PointOfInterconnect	Routed minutes
NSF_Voice_call_Local_Processing	NLS4_0_Voice_traffic_Local_Collect	Routed minutes
	NLS4_0_Voice_traffic_Local_Complete	Routed minutes
	NLS4_0_Voice_traffic_Local_Terminate	Routed minutes

The services in the group "Voice transport" are emanating from layer 2.0 Backbone transport capacity (<=2M) which are distributed according to the consumed bandwidth.

Contributor to NLS4_x	Driver	NLS4_x element
NLS2_0_LocalBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_ISDN-PRA_access
NLS2_0_LocalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC

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		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_RemotelyAggregatedVoice_transport
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_1_Outgoing International Traffic - BGC Fixed
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)	NLS4_0_ISDN-PRA_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalTail<2M	Nbr_of_Customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
NLS2_0_LocalTail=2M	Nbr_of_Customer_sites	NLS4_0_ISDN-PRA_access

The services in the group “VAS application” are in fact directly identified with a network function:

NSF_CallerIdentity_CallHandling	NLS4_0_CallerIdentity_CallHandling	direct
NSF_InteractiveVoiceResponse_CallHandling	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
NSF_MessageWaitingIndicator_Inserting	NLS4_0_MessageWaitingIndicator_Inserting	direct
NSF_OtherAdvanced_CallHandling	NLS4_0_OtherAdvanced_CallHandling	direct
NSF_Service_Announcements_Playing	NLS4_0_Service_Announcements_Playing	direct
NSF_Televoting_CallHandling	NLS4_0_Televoting_CallHandling	direct
NSF_VoiceFeatures_SelfManaging	NLS4_0_VoiceFeatures_SelfManaging	direct
NSF_Voicemail&Messaging	NLS4_0_Voicemail&Messaging	direct
NSF_WakeUp_CallHandling	NLS4_0_WakeUp_CallHandling	direct

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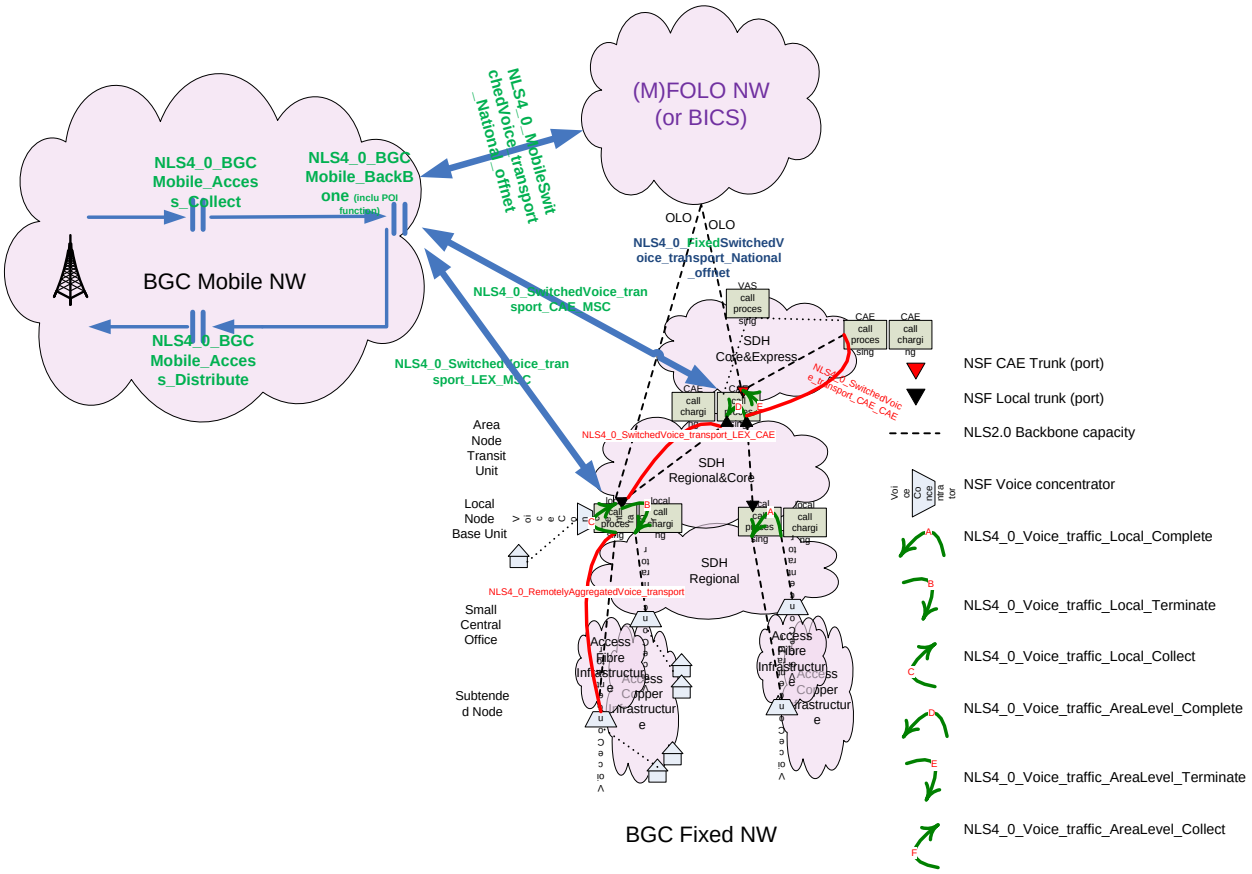

Figure 13: Switching Network

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8 Annex I: SCF Flow Acronyms

SCF	Support and Customer Flow
BIPT	Belgian Institute for Postal services and Telecommunications
BTN	Business Transformation
CBU	Consumer Business Unit
CC	Costs Center
CCG	Costs Center Group
CP	Costs Pool
CWS	Carrier & WholeSale
CUO	Customer Operations
EBU	Enterprise Business Unit
FAC	Fully Allocated Costs
HCA	Historical Cost Accounting
HMC	Human Manpower Cost
MOS	Material Out of Stock
NRA	National Regulatory Authority
REG	(Proximus) Group Regulatory Affairs
SMP	Significant Market Power
SOG	Services & Other Goods
S&S	Staff & Support

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9 Annex II: Network and IT Flows Acronyms

AC	Asset Class
ADSL	Asymmetric Digital Subscriber Line
ARP	Architecture, Roadmap & Program Management
ATM	Asynchronous Transfer Mode
BA	Basic Access
BAS	Broadband Access Server
BES	Proximus European Solutions
BGC	Proximus
BILAN	Proximus Interconnection of LANs
BLES	Proximus LAN Extension Service
BROBA	Proximus Reference Offer for Bitstream Access
BROTSOLL	Proximus Reference Offer for Terminating Segment of Leased Line
BVAS	Business Value Added Services
CAE	Coverage Exchange Area
CAPEX	CApital Expenditures
CIS	Customer ICT Services
CP	Cost Pool
CPE	Customer Premises Equipment
CPU	Central Processing Unit
CWDM	Coarse Wavelength Division Multiplexing
DACS	Digital Analog Cross-connect System
DCN	Data Communication Network
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DU	Dispatch Unit
DWDM	Dense Wavelength Division Multiplexing
EAA	Extra Access Area
EAL	Ethernet Access Line
EFM	Ethernet First Mile
ESS	Ethernet Service Switch
Ethane	ETHernet Aggregation NETwork
EUS	End User Service

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FAC	Fully Allocated Costs
FIFA	Fast Internet Future Architecture
FTTC	Fiber To The Cabinet
FTTO	Fiber To The Office
Gb	Giga bit
Gbps	Giga bits per second
HW	HardWare
IAA	Intra Access Area
iDTV	interactive Digital TeleVision
IN	Intelligent Network
TCE	Telecom CostExpert
IO	In/Out
IP	Internet Protocol
IPVPN	Internet Protocol Virtual Private Network
ISAM	IP Subscriber Line Access Multiplexer
ISDN	Integrated Services Digital Network
ITS	Information Technology Services
LAN	Local Area Network
LDC	Local Distribution Center
LEX	Local Exchange
LL	Leased Line
LTE	Line Terminating Equipment
Mbit	Mega bit
MEO	Modern Equivalent Opex
MOLO	Mobile Other Licensed Operator
MPLS	MultiProtocol Label Switching
MSR	Multi Server Router
MUX	Multiplexer
MVAS	Mass Value Added Services
MWE	MicroWave Equipment
NE	Network Element
NEO	Network Engineering & Operations
NGA	New Generation Access

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NGN	New Generation Network
NLS	Network Layer Service
NTE	Network Terminating Equipment
NTP	Network Termination Point
NSF	Network Stage Function
OLO	Other Licensed Operator
OLTE	Optical Line Terminating Equipment
OPEX	OPerational Expenditure
OVH	Overhead
PDH	Plesiochronous Digital Hierarchy
PRA	Primary Access
PSTN	Public Switched Telephony Network
QoS	Quality of Service
RAM	Random Access Memory
ROP	Remote Optical Platform
SDE	Service Delivery Engine
SDH	Synchronous Digital Hierarchy
SDSL	Symmetric Digital Subscriber Line
SPC	Services Platform & Cloud
STM	Synchronous Transport Module
TEC	Technology (Business Unit)
TDM	Time Division Multiplexing
TSI	Technology Strategy Innovation
TV	TeleVision
VAS	Value Added Services
VDSL	Very high speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VP	Virtual Path
VPLS	Virtual Private Local area network Service
VPN	Virtual Private Network
WDM	Wavelength Division Multiplexing

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Proximus Regulatory Cost Model 2016

General Description

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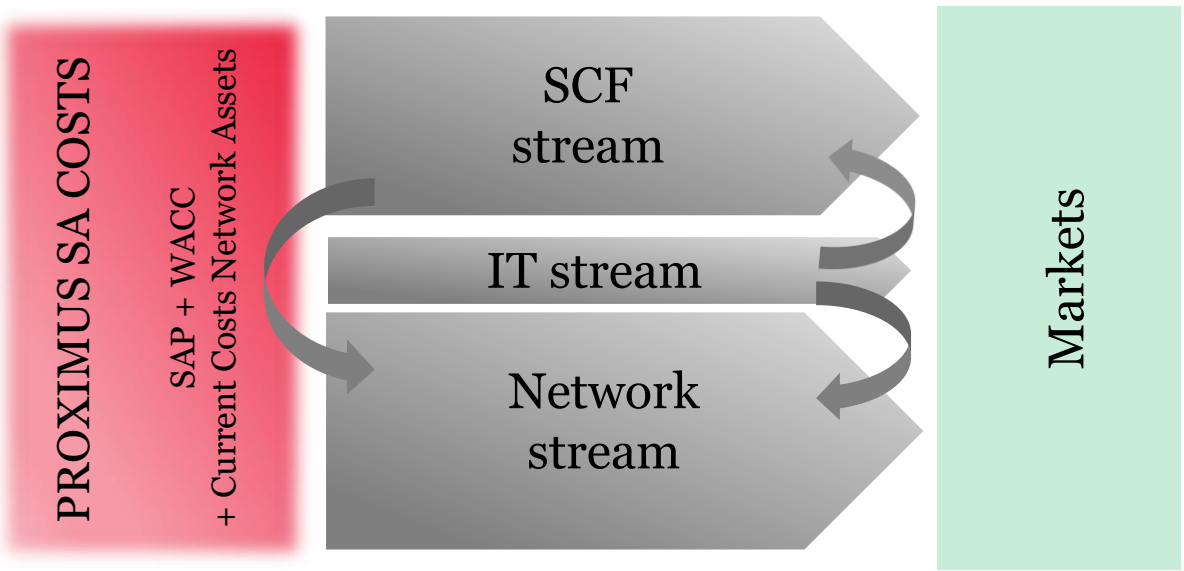
1 General description

REG (Group Regulatory Affairs) department ensures the preparation of separated accounts and sets up the Cost model inherent to the reporting of separated accounts, and used in other regulatory files. In accordance with European Commission recommendations, the entire costs of statutory accounts are taken into account in the cost model and reporting of separated accounts, to the exception of statutory accounts 65 to 68, as well as some other accounts excluded from the cost model perimeter. As said, the cost basis of the cost model is directly issued from the general accounting of Proximus SA, as recorded in SAP accounting tool. Statutory accounts of Proximus SA have been audited in 2016 by Deloitte, external auditors. Deloitte auditors issued an unqualified opinion on statutory accounts.

Separated accounts result from allocation flows of Network/IT and SCF (Support and Customer flow) costs, as included in the general accounting of Proximus SA, as well as the cost of capital of these two modules.

The following chart illustrates the accounting system of costs, as well as main allocation flows. The whole costs included in the allocation process are loaded in a tool (Telecom Costs Expert Software, referred as TCE) that runs accuracy tests and prevents double costs counting or multiple allocations.



SCF allocation flows include costs that are of service to the customer and other direct and indirect costs that are not included in the Network nor IT allocation flows.

Network and IT flows include all the costs related to the Network and Information & Communication technology.

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Costs allocated in allocations flows SCF, Network and IT have the same cost basis origin, this later being SAP statutory accounts of Proximus SA. IT tool TCE, in past models named INCA, makes validity checks to prevent any double counting and trace allocated costs from their unique SAP cost basis origin to their final destination.

The Cost model per Market is a top-down model.

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2 Model Allocation Structure

This section provides with a global view on the allocation structure of the model by walking through the major allocation flows and introducing the major building blocks and concepts in the model.

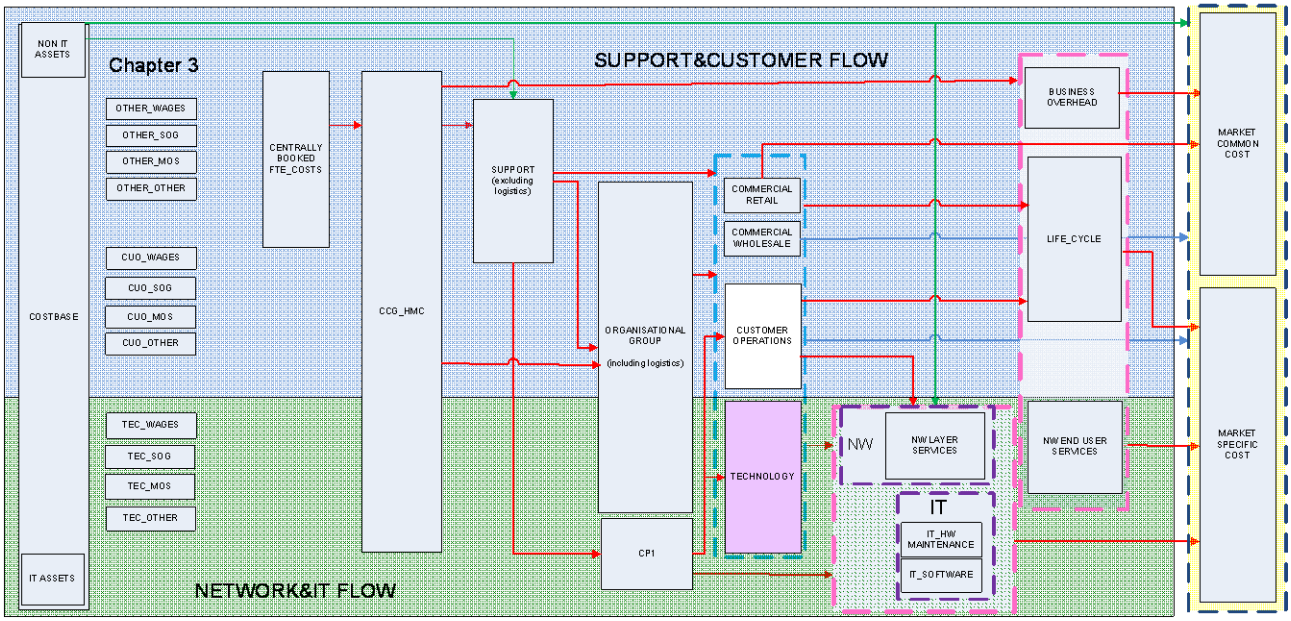
The following Figures will be the supporting tools for such discovery walk, where the major modules constituting the model as well as the global allocation flows among them are shown. The differentiation between SCF, Network and IT flows is also illustrated in the exhibit.

The overall objective of the model is allocating all the attributable costs present in the cost base to the markets as defined in the regulatory framework.

Therefore, the cost base constitutes the foundation of the model.

Further, the model allocation process is subdivided into three main streams, SCF, Network and IT.

The Cost base settings and the Non IT assets are presented in chapter 3.



The SCF stream has as objective to allocate all costs that are not part of the Network or IT model towards the markets.

SCF stream (chapter 4) encompasses Support, Commercial Retail, Commercial Wholesale and Customer operations costs.

The IT and Network streams, although having completely separated CAPEX basis, both share a common OPEX source.

OPEX of IT and Network streams are handled via allocation of costs of Technology business unit (chapter 5).

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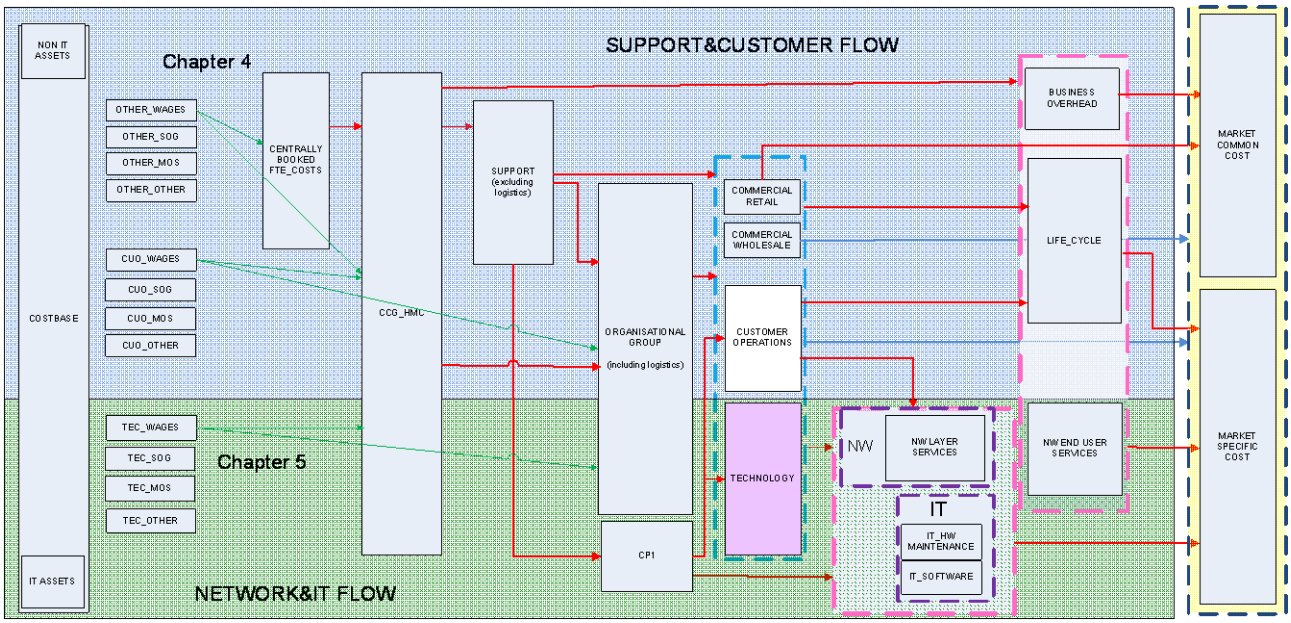
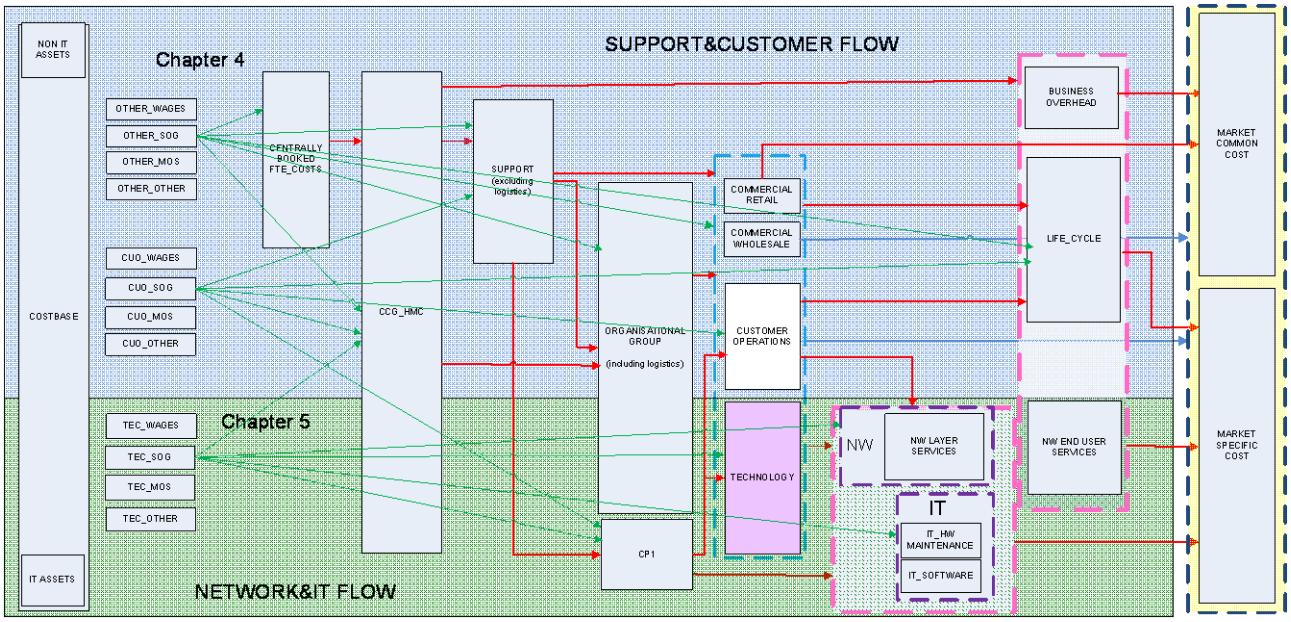
WAGES OPEX allocation flows are as follows:



Services and Other Goods OPEX allocation flows are as follows:



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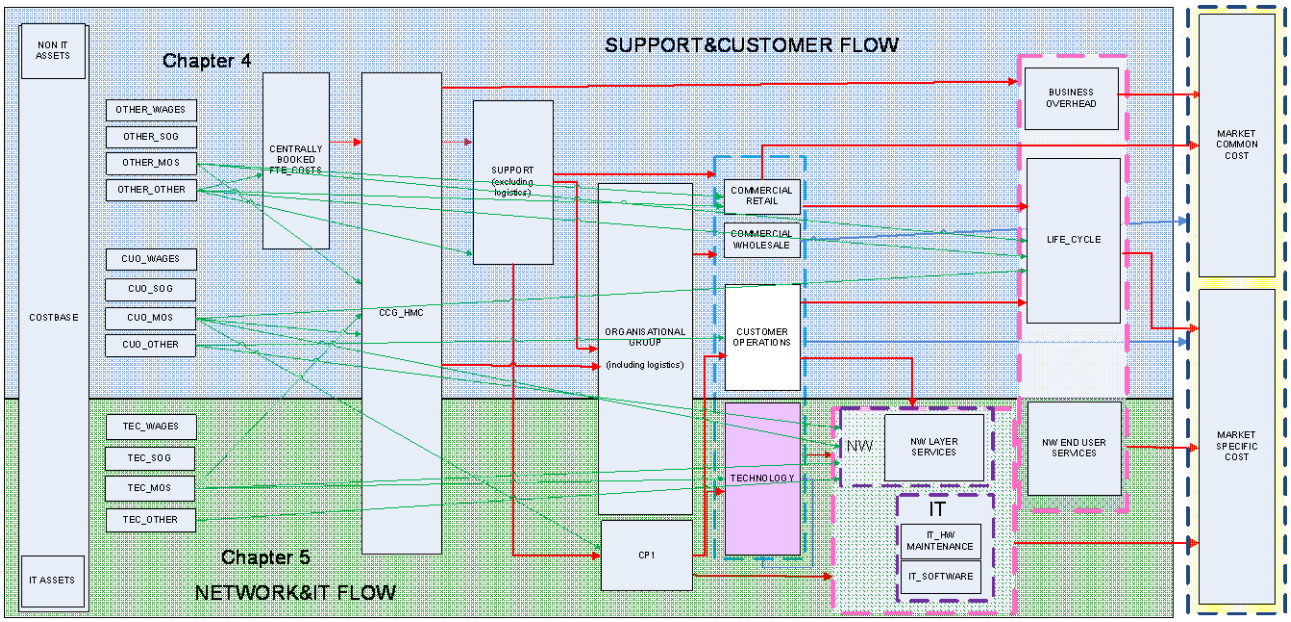
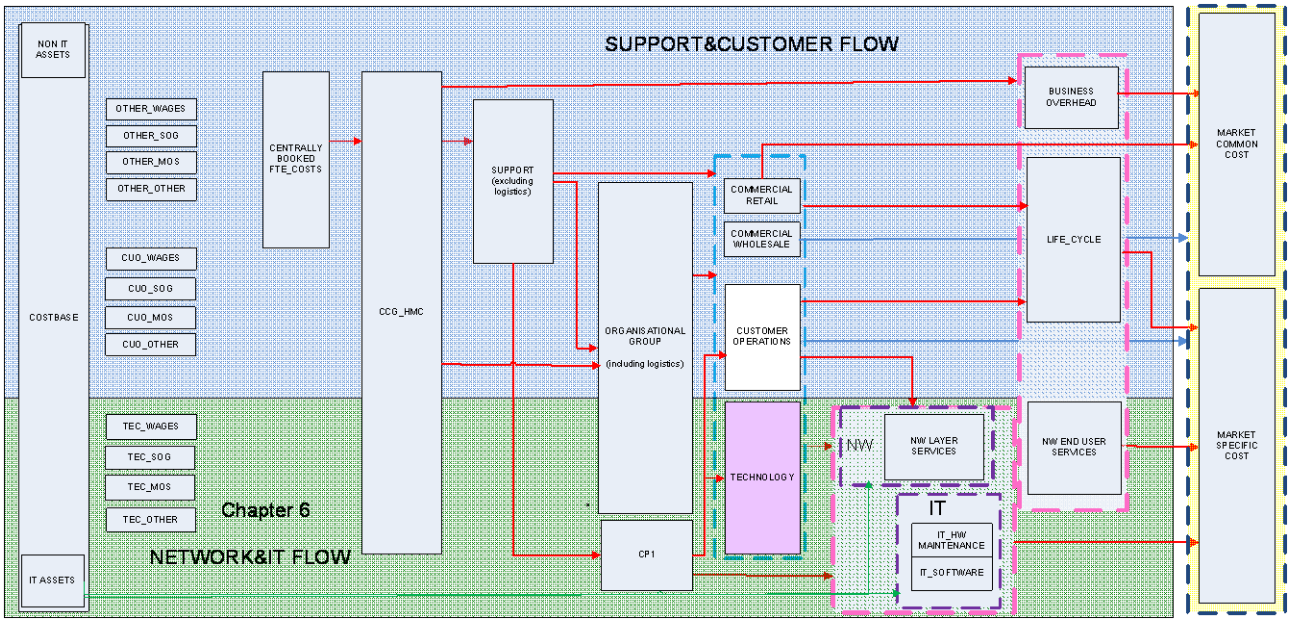
Materials out of stock and Other OPEX allocation flows are as follows:



IT Assets allocation flows are as follows:



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3 Cost Base

3.1 Cost model perimeter

3.1.1 Determination of the Cost model perimeter

Costs included in the Cost model are operating charges, i.e. general ledger (GL) accounts 60 to 64 of statutory accounting, as well as part of GL 69.

GL 60 “cost of goods sold” includes mainly telecom equipment purchases (ADSL modem, handsets, cables, mobile SIM cards, etc.), small equipment (cpe, …) and stocks movements.

GL 61 « services and other goods » includes primarily costs linked to traffic (a.o. interconnection fees) and operating expenses such as maintenance, utilities, renting, marketing, representation allowances, consultancy, travel fees, etc.

GL 62 corresponds to all personnel costs (wages and other salary benefits).

GL 63 includes depreciation and amortization, stocks and trade receivable accruals for write-off and movements of provisions for liabilities.

GL 64 gathers other operating expenses, including a.o. write-off on trade receivables, immovable withholding tax and local taxes, taxes on pylons, etc.

GL 69 relates to company result appropriation corresponding to the part of personnel in the profit (collective bonus).

At last, GL 72 – « Produced Fixed assets » reduces the cost basis to cancel costs linked to produced fixed assets and to avoid a double counting of these costs with the corresponding depreciation charge.

To the costs perimeter from the general accounting is added the weighted average cost of capital (WACC) of 8,13% for Proximus Fix products and for Proximus Mobile products.

3.1.2 Costs excluded from the Cost model perimeter

Other costs than those mentioned above are excluded from the Cost model. It relates to GL 65 to 69 of general accounting, to the exception mentioned above, for part of GL 69 (share of personnel in profit).

Some costs are excluded since considered as having no causal link to the products and activities. This matters for extraordinary costs (GL 66) and tax costs (GL 67 and 68).

Other costs are excluded since already included in the WACC. This relates to financial costs (GL65) and dividends appropriation (GL 69).

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Costs excluded mentioned here above are costs excluded from the Cost model upstream (i.e., when defining Cost model perimeter with costs included in general accounting). On top of these ones, other costs will be excluded downstream in the Cost model, i.e. costs excluded via the allocation flow. E.g.: Support costs involving affiliates.

3.2 Cost regrouping

Proximus books the costs on one hand, on a general ledger account defined in general accounting, and on another hand, on a cost center defined in reporting and analytics accounting. This way to handle costs has for objective to gather data, in order to simplify data processing.

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Two types of aggregation are done:

- Aggregation of 705 GL of general accounting in 178 Cost pools (CP)
- Aggregation of 535 cost centers in 210 Cost Centers Groups (CCG).

A **Cost pool** is a group of costs with similar characteristics and issued from the same family of cost natures.

Regarding material resources, gathering of costs is based on the similar function that these costs have. E.g., cost pool "Training expenses" sums up costs of trainings organized inside Proximus, external trainings, training books and documentation costs.

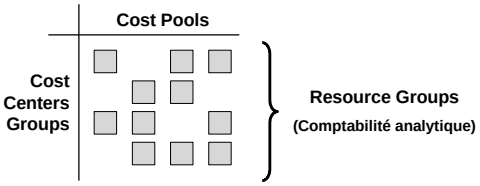
Regarding human resources (referred as FTE, or Full Time Equivalent), cost pools gather workers with the same profile. E.g., cost pool "Level S" includes wages and salaries of employees with level S (Sales force), as well as premiums and other wages benefits paid to these employees.

Costs included in the same cost pool have an identical causal link to the products and activities to which they related. They have the same "resource driver".

A **Cost Center Group (CCG)** sums up cost centers with similar characteristics and realizing similar activities and as a consequence, can be aggregated into the same cost center group.

Each Cost Center Group uses various cost pools.

Combinations cost pool/cost center group constitute the **Resource Groups**. The Resource Groups are the Cost basis of the Cost model.



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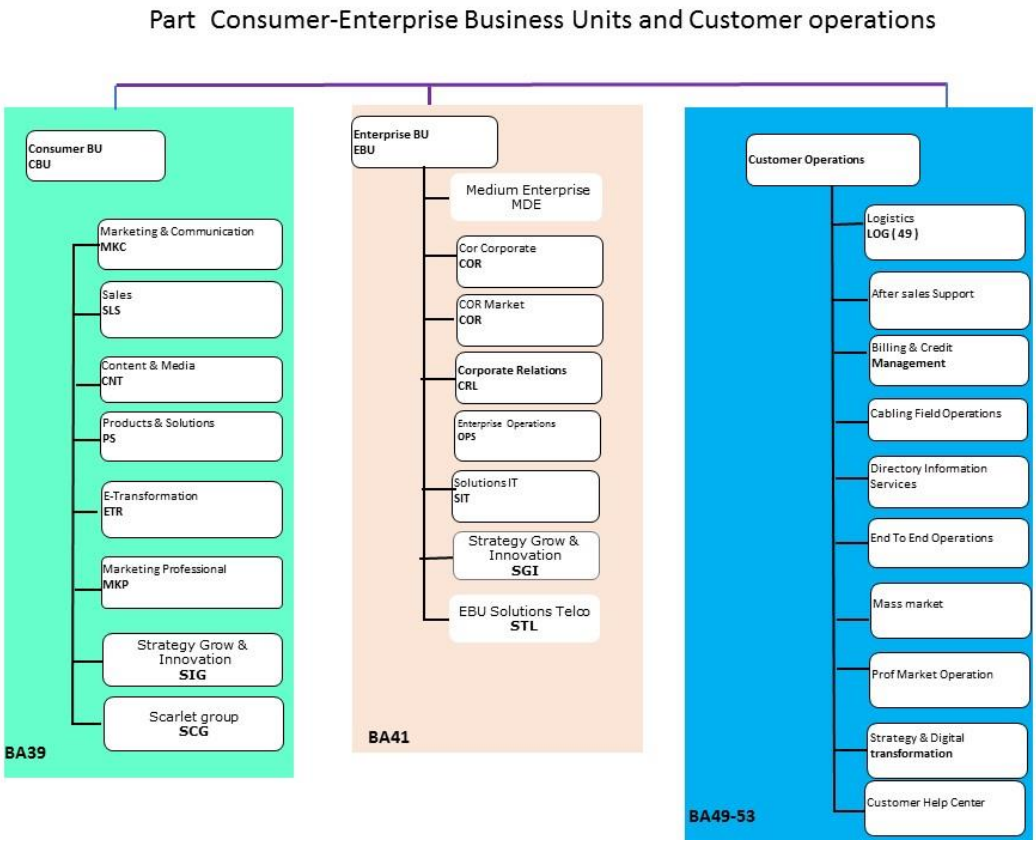
3.3 Organization

The organizational structure of Proximus SA, as on December 31, 2016 as used in the Cost base, is as follows:



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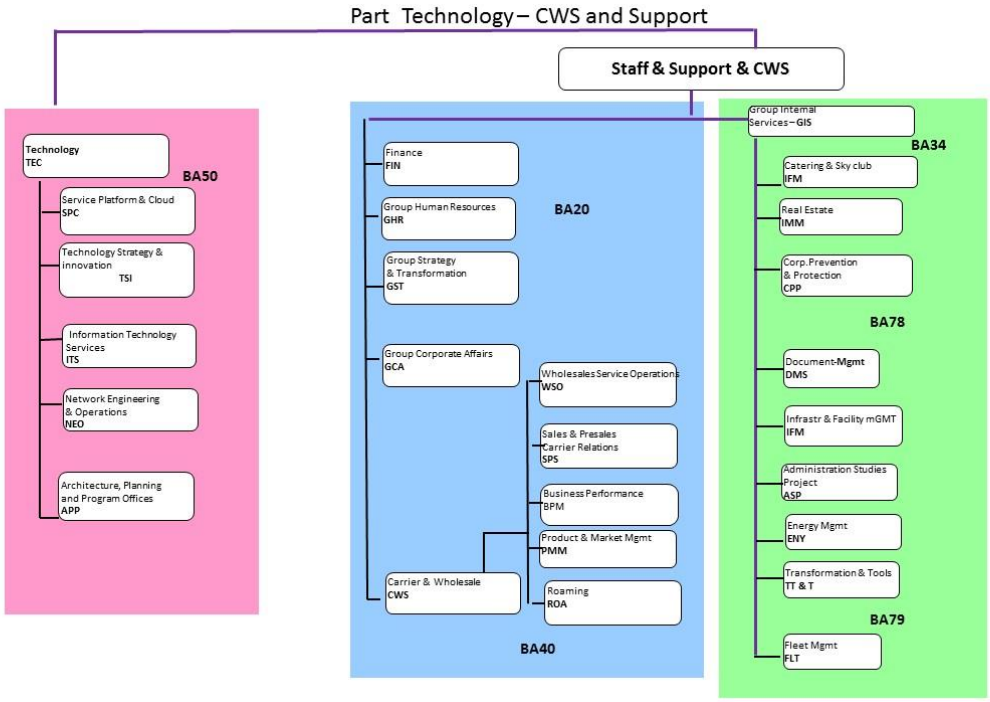

- This organisation has a clear split between the residential and professional customers by the divisions Consumer and Enterprises Business units, as well as the wholesale customers with Carrier & Wholesale Business unit,
- The Technology Business unit (TEC) brings together Network and IT services,
- The Customer Operations Business unit gathers all services in direct link with the customer, whether private consumer or enterprise,
- Within Staff & Support, the content (FIN, GHR, GST, GCA) remains the same.
- Group Internal Services groups internal services like Fleet, Facilities, Prevention &Protection, etc.

Cost perimeter is split by the REG department between allocation flows of Network/IT and Support and Customer flow, after completeness and accuracy checks (no double counting) on costs data from SAP. As mentioned in general description, allocation flow Network/IT allocates all costs and assets (capital expenditure) in IT and Network, while the allocation flow Support and Customer flow allocates costs and assets other than IT and Network related.

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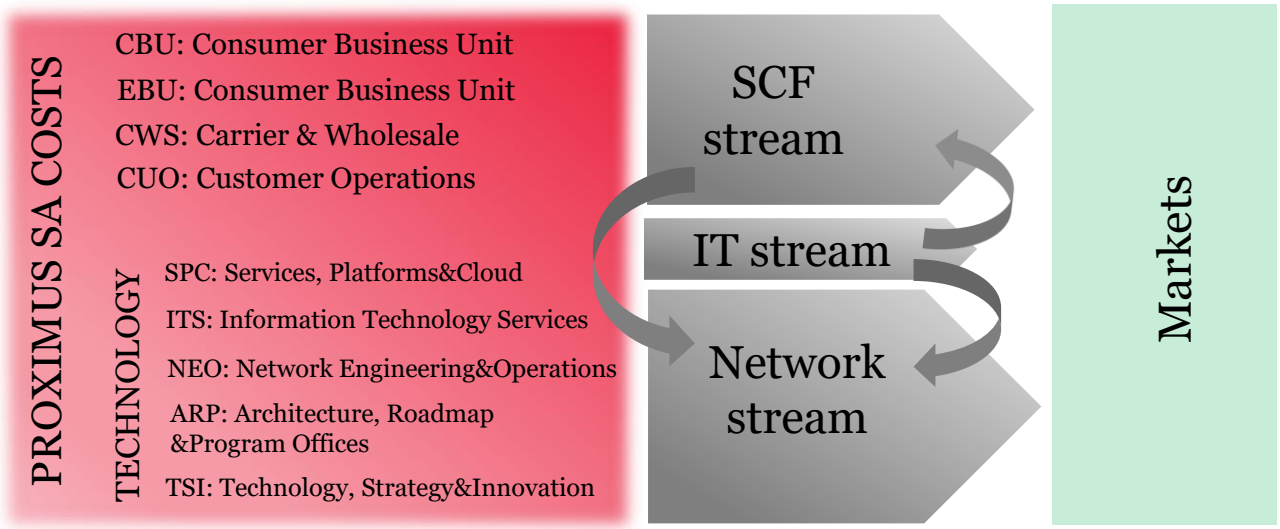

Split of cost perimeter between allocation flows Network/IT and SCF is processed as follows:

- All departments within TEC are treated within the Network / IT flow.
- Provisions for taxes on telecom equipment that are booked at the level of TEC management are downstream shared via allocation flows between assets classes to which they relate.
- All other costs, not mentioned above are treated within the SCF flow namely the divisions CBU (Consumer Business Unit), EBU (Enterprise Business Unit), CWS (Carrier Wholesale), CUO (Customer operations) and Staff & Support. The Staff & Support division comprises different departments, including Headquarters, GCA (Group Corporate Affairs) which includes Legal, Group Public Affairs, Regulatory, Internal audit, Group communications and Secretary General. Then we have departments like Finance, Group Human Resources, Group Strategy & Transformation and GIS (Group Internal Services) for departments like Real Estate, Business Services, Facilities, Prevention & Protection, Fleet and Catering.
- Regarding Assets (depreciation and WACC), repartition is done based on an analysis of assets classes: assets IT and Network are handled in the allocation flow Network/IT, while all other assets (buildings, utilities equipment, CPE, etc.) are allocated in the flow SCF.

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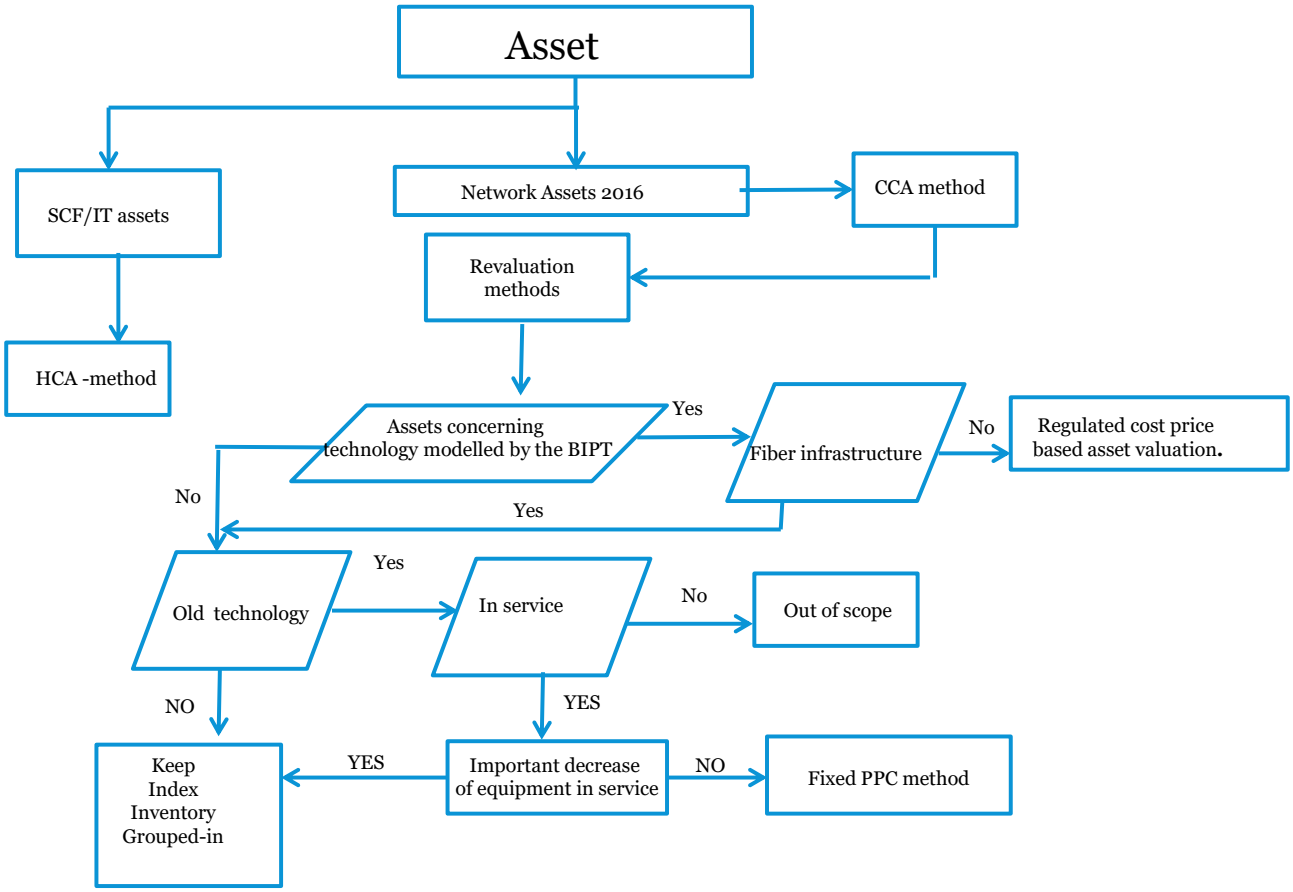
3.4 Assets revaluation

3.4.1 Decision tree



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3.4.1.1 *Split network - SCF and IT assets*

The assets base was split up in Network – SCF and IT assets. The cost of the network assets must be based, for operators being declared as dominant, on the Current Cost Accounting. For the SCF assets (EBU-CBU– CUSTOMER OPERATIONS- SUPPORT-Facilities-Sourcing-Fleet) and IT related assets the cost accounting systems is based on the Historical Cost Accounting method.

3.4.2 Methods used to reevaluate the network assets

The regulatory framework clearly states that the cost accounting systems of operators being declared as dominant on relevant markets must be set based on Current cost accounting for the network costs.

The network & IT flows within the top down model calculate the current costs for the network related assets. Current costs have been computed as explained hereafter.

There are five methods to evaluate the current value of the network: reassessment of the current inventory, price indexation, by default "keep everything as it is", index based on a fixed PPC and regulated cost price based. For old assets concerning technology still in service we use a method based on a fixed PPC2007. Each of these methods requires its own set of inputs. It is mainly the availability (or lack) of input which dictates the choice of the method. Nevertheless each method has its advantages and disadvantages with respect to the others.

The inventory and price indexation methods assume that network departments replace the equipment of its assets by equivalent equipment. The notion of equivalent is quite fuzzy. An engineer would tell you that over time there are always more functions integrated in new equipment and that they are always more cost-effective. It makes the comparison between different generations of equipment difficult. The notion of equivalent has therefore been addressed through the term Modern Equivalent Asset (MEA). The assets must be replaced by their MEA. The MEA is the replacement cost of the technology expected to be in place within the planning horizon. Note that this notion takes into account the introduction speed of a new technology in the network. If network departments plan to have replaced 50% of an old technology by a new one within the planning horizon, it makes no sense to simulate the costs with higher percentages because the planning takes into account the availability of the resources to carry out the work.

Find hereafter the rules that have been used:

- Technology still in procurement: use current price, e.g. IP equipment

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- Technology to be replaced within the planning horizon: use current price of the modern equivalent asset, e.g. TDM based voice equipment are replaced by IP based voice equipment.
- Technology grouped in : those assets will be revaluated by another asset concerning the same technology
- Old technology not anymore in service : those assets are set out of scope and will not be revaluated
- Old technology still in service (in maintenance mode); those assets are revaluated by an index method based on a fixed PPC instead of index, keep or inventory method. Old assets revaluated by keep will keep the CAV value as GRC
- BIPT regulated technology : use the BIPT models to extract relevant unit costs or use BIPT bottom-up models to directly calculate CAPEX costs with 2016 demand volumes

3.4.2.1 *Price Indexation*

This is the most straightforward approach, provided historical costs are available. The investments for each year (from 1981 on) are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The method is refined by defining price indexes depending on the nature of the cost. This is particularly true when costs of a different nature experienced a different price evolution. Three different types of price indices have been defined: the labour index, the indices for services delivered by external companies and the material index. Note that indices for services supplied by external companies vary according to the asset involved. For example, services supplied by external companies related to cable assets, are in fact outsourced labour costs for trenching and cable installation. In such case, a labour index has been applied. Other external services less labour intensive are resulting in other price indices, such as a fibre cable index.

3.4.2.2 *Inventory*

This is the best method to reflect accurately the price of assets currently in service in the network. The revaluation is merely performed by multiplying the volume of each specific type of equipment currently deployed in the network by its average current unit cost. The current unit costs are based on the prices defined in the current frame agreements we have with our suppliers.

In terms of inputs it is the most demanding method. It requires an extensive inventory of equipment.

For some assets that are currently being deployed, we have used a regression method to calculate the investment value of the fully deployed assets.

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3.4.2.3 *Keep as it is.*

The "keep as it is" method is merely what its name says. We keep the price we have in the historical accounting books. This method is only valid for costs with a very short depreciation period or for software intensive products. For the latter we assume that on the one hand software development is labour intensive but on the other hand the rapidly evolving programming environment improves the productivity compensating for the higher labour cost. This results in a stable software price. Another practical reason to select the "Keep as it is" method is the amount booked on the asset. If this amount is small, the method has also been applied. In this particular case, the effort to collect all the information about the cost evolution outweighs the impact on the service costs.

3.4.2.4 *Index Based on a fixed PPC*

Old technology still in service (in maintenance mode) ; those assets are revaluated by an index method based on a fixed PPC.

If Proximus has done some investments for keeping those technologies in service, we take those investments also into account.

If Proximus has done some great retirements, the revaluation method is revised.

- Formula :

$$GRCyearN = [(GRCyearN-1)*(1+ fixedPPC2007)] + investmentsYearN$$

Formula :

Index year = (1+ (ppc year))* (1+(ppc year -1))* (1+(ppc year -2))*……..

3.4.2.5 *Asset valuation based on the Proximus Reference Offer tariffs and BIPT bottom-up cost models*

3.4.2.5.1 Method background and rationale

The market for fixed telecommunication services, the related technologies and the competition have evolved through the years leading to the current situation where the vast majority of the telecom services provided by the Proximus's access and area backbone networks are regulated. This regulation has been enforced, amongst other initiatives, by clearly specifying the services and applying regulated tariffs, as reflected in the Proximus Reference Offers (BRUO, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA).

Since the regulated tariffs are cost oriented and determined by bottom-up costing models, it is reasonable to use the direct CAPEX component of these prices to calculate the annuity of the assets addressed by the Proximus Reference Offers.

For Fixed Voice telephony regulation focusing on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a voice call

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on the fixed network (FTR), BIPT has developed a bottom up NGN cost model, calculating this termination rate. The latest available version of this model has been used to value NGN assets of the Voice NGN Platform.

Mobile telephony regulation mainly focuses on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a mobile call (MTR). In order to calculate this termination rate, BIPT has developed a bottom up mobile cost model, including all voice and data services 2G and 3G. The latest available version of this model was published by BIPT in November 2013, and has been used to value mobile assets.

3.4.2.5.2 Method description

All the fixed network assets, except optical fiber infrastructure, concerned by the technologies covered by the Proximus Reference Offer models (BRxx), namely BRUO, Block&Tie cables, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA, are valued by applying the direct CAPEX component of the relevant BRxx tariff to the appropriate volumes extracted from the Proximus inventories.

For fixed voice NGN assets valuation, Proximus fixed voice volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting economic cost has been extracted in order to value the assets.

For mobile assets valuation, Proximus mobile volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting CAPEX economic cost has been extracted in order to value the assets.

3.4.2.5.3 Scope

The technologies to be valued by this method, since they are covered by the Proximus Reference Offers and BIPT fixed voice NGN and mobile cost models, are:

- Copper infrastructure: including trenching, ducting and copper cable.
- (D)WDM
- PDH/SDH
- xDSL: including ADSL, ADSL2+ and SDSL
- VDSL
- Ethernet
- Fixed Voice NGN Platform assets.
- Mobile network assets 2G, 3G.

However, some parts of the networks deployed with the above mentioned technologies are not covered by the BIPT tariffs for they provide non-regulated services. Consequently they cannot be valued by means of the regulated tariffs.

These services are:

- Any service provided by the Proximus express network layer, also called intercity network.
- Multicast services, namely broadcast TV.
- Access lines for the Explore customers.
- Mobile network assets 4G.

The chosen alternative for valuing the network sections providing the non-regulated services has been the development of specific models in order to determine applicable direct CAPEX unit prices,

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at the exception of the mobile network assets related to 4G technology that have been integrated in the bottom-up mobile cost model.

3.4.2.5.4 Method implementation

- *Inputs Fixed Network*
  - *Broken down tariffs*
    - *Broken down tariff based on the BIPT BRxx models*

      By analyzing each of the current BRxx models, the direct CAPEX component of each product of each tariff has been isolated. Further, this constituent has been broken down into all its applicable technological contributors, so that a unit price per technology, per product and per tariff is extracted (Figure 1: Conceptual description of the BRxx tariff breakdown.).

      Although the above described process is applicable to the majority of the BRxx models, there is an exception to the rule, the BIPT BROBA transport model. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, is given in paragraph 3.4.2.5.10.

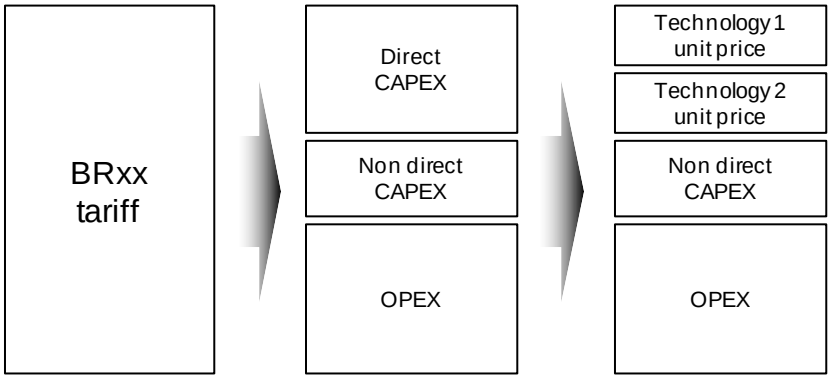

Figure 1: Conceptual description of the BRxx tariff breakdown.

Note: There is no relation between the size of the components and any broken down BRxx tariff.

    - *Broken down tariff for network areas not under the BIPT BRxx models scope*

      For those areas of the network not within the scope of the BIPT models, specific models have been developed in order to derive applicable broken down tariffs. These models have been built up on similar principles to those applied in the models developed by the BIPT. Whenever possible the actual BIPT tariff components have been re-used and existing BIPT models have been adjusted so that the obtained results are as comparable to those of the BIPT models as possible.

  - *Volumes*

    The volumes (demands) of all the telecommunication services utilizing the technologies subject to this valuation methodology are extracted from or determined based on Proximus inventory systems.

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- *Valuation (Fixed network)*
  - In a first step, each pair, line, VP, link or VLAN present in the volumes is valued by applying each and all of the technology unit prices of the relevant BRxx tariff. In this way, each telecom service's individual contribution to the assets valuation is calculated.
  - Finally, all the individual contributions are summarized per network asset, obtaining the final asset annuity.

- *Inputs mobile network*

  The latest version of the BIPT mobile cost model has been used in order to value mobile assets related to :

  - Radio Access network (RAN)
  - Ground Antenna
  - Mobile Voice Switching
  - Mobile Data Switching
  - Mobile Location Register

  Proximus mobile voice and data volumes, as determined based on Proximus inventory systems, have been used as the demand for the cost model. Based on this demand, the model dimensions the required network assets.

  Only capex economic depreciation has been taken into account, all opex values in the model have been set to 0.

  The WACC is based on BIPT's decision issued on February 26, 2015 (8,13%).

- *Valuation mobile network assets*

Capital expenditures are annualized according to BIPT's economic depreciation. This is a different methodology compared to the TAM used for fixed network related assets.

The economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2016, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output in the form of a net present value.

- *Inputs Fixed Voice NGN platform network*

  The latest version of the BIPT mobile cost model has been used in order to value fixed voice NGN platform assets related to :

  - Own Network Call Handling
  - Interconnecting Call Handling
  - Voice over Broadband Session Border Controllers (SBC)
  - Voice IP Router
  - Voice TDM Trunks
- *Valuation fixed voice NGN network*

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The economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2016, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business.

3.4.2.5.5 Exceptions to the generic implementation

Although the above described process is applicable to the majority of the tariffs and related technologies, there are two exceptions to the rule.

The breakdown of the BIPT BROBA transport tariff is made differently. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, and how it is applied is given in paragraph 3.4.2.5.10.

The valuation of the transport SDH/PDH assets implementing the regulated part of the Proximus's SDH network, although based on the BIPT's BROTSoLL model, do not follow the above described generic process. The used methodology is described under the paragraph "Updated BROTSoLL model to the 2013 demand".

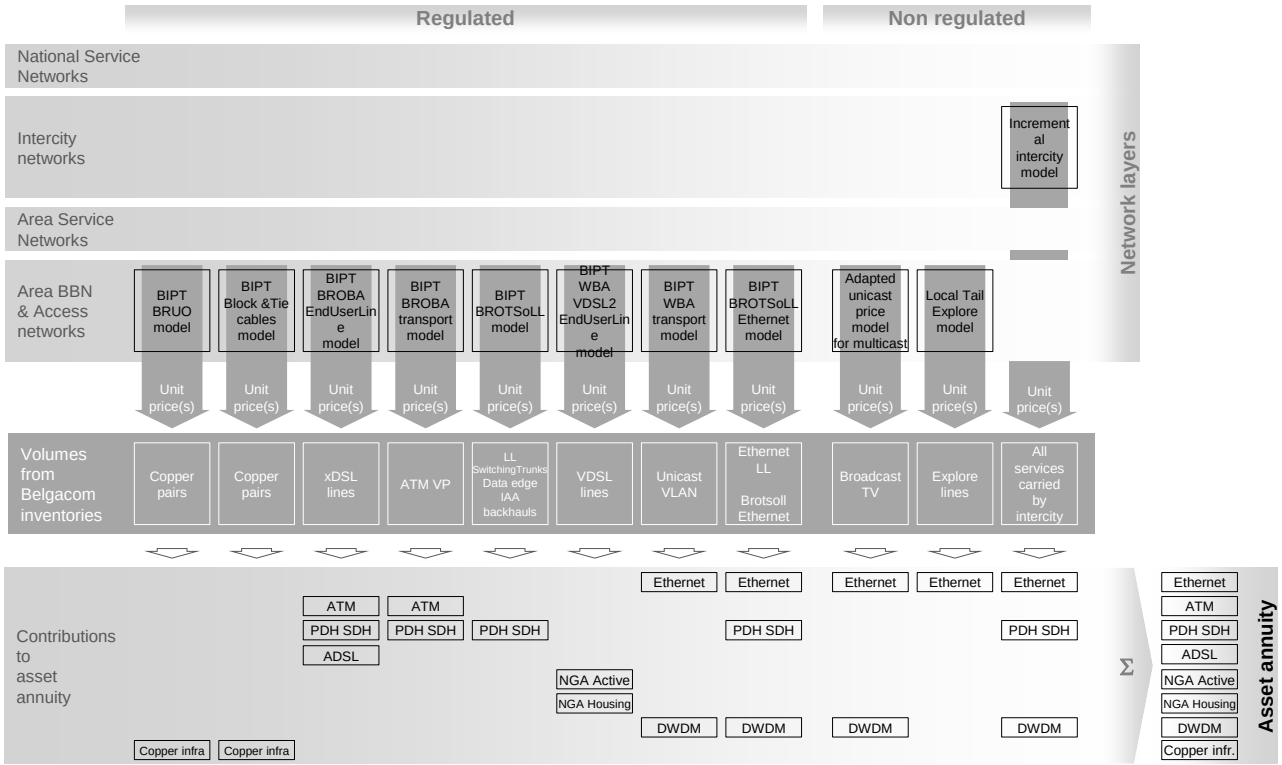

Figure 2: BRxx based valuation method. Scope and implementation.

Sensitivity: Unrestricted

3.4.2.5.6 BIPT BRxx tariffs as base for asset valuation

3.4.2.5.6.1 BRUO

The BIPT BRUO model (decision of 9/11/2011) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. These assets have been valued based on the unit direct CAPEX cost in the BRUO model and the number of pairs used. It mainly includes the cost of copper cables, trenching and street cabinets and covers the copper distribution and copper feeding networks.

The yearly direct CAPEX cost of the following assets has been calculated based on BRUO tariffs:

- Raw Copper for PSTN/ISDN accesses, central site based broadband without voice accesses, local tails for leased lines type of connectivity, BRUO raw copper.
- Copper subloop, for ROP based VDSL connections without voice accesses.
- Copper subloop testing cost, to ensure remote line testing of ROP based VDSL connections without voice accesses. This cost is valued based on the unit direct CAPEX cost of the feeding network that can be derived from the BRUO tariffs (local loop, subloop).

In the frame of a possible fixed/variable analysis of the results of the model, copper distribution and feeding network costs are categorized as fixed. It should be noted that this has no impact on the results of the model itself.

Our analysis is based on the approach used by BIPT and its consultant, Analysys Mason, for the development of an NGN/NGA model. The dimensioning of the copper distribution and feeding network is dependent on the evolution of the number of households, reflecting the universal service obligation of Proximus. The evolution of the number of copper pairs actually used by customers subscriptions or internal usage, has no impact on the total copper access investment cost calculated by the BIPT NGN/NGA model. Copper access (distribution and feeding) is a fixed cost, with no causality of the volume of copper pairs actually used.

Its allocation method could be based on the market value of the different products using the network. However, in order to be conform to the approach used by BIPT in the BRUO/BROBA reference offers, we have attributed the copper access network cost towards the different end-user services and markets based on the number of consumed copper pairs.

The cost of the copper splitters, to split narrowband and broadband signals for shared pairs has been valued based on the shared pairs inventory.

3.4.2.5.6.2 Blocks and tie cables

The BIPT Blocks and Tie cable model (decision 2/7/2008) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. This bottom-up model defines direct CAPEX prices for Main Distribution Frame blocks and for tie cables to other access network equipments.

The current value of following assets has been calculated based on Blocks and Tie cable tariffs:

Sensitivity: Unrestricted

- Copper local loop testing: internal cabling for copper connectivity to perform remote testing of broadband customer connections without voice accesses based at the central site.
- Copper subloop testing: internal cabling for copper connectivity of ROP based VDSL customer connections without voice accesses.
- Continue raw copper and shared feeding pairs: internal cabling for copper connectivity from the Main Distribution Frame or broadband splitter equipment to other access equipments or collocated access equipments.

3.4.2.5.6.3 BROBA rental per end-user line

The BROBA rental fee per end-user line is split by BIPT between the active part and the transport rental ATM or Ethernet part. This model is sometimes referred to as BROBA Bitstream.

3.4.2.5.6.3.1 Active part

The BROBA model (decision of 6/8/2010) has been used to valuate assets included in AC2_20102 ADSL equipment. It is related to DSLAM and Main Distribution Frame space yearly direct CAPEX costs.

The asset has been calculated based on the direct CAPEX part of the BROBA Bitstream tariff applied to ADSL, ADSL2+ and SDSL subscription volumes.

3.4.2.5.6.3.2 Transport rental ATM

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.4 BROBA ATM transport

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.5 BROTSoLL (access line only)

The Proximus Reference Offer for Terminating Segments of Leased Lines (BROTSoLL) regulates the complete PDH/SDH transmission network of Proximus, with the exception of the highest hierarchy rings, the so called Intercity network or express layer. The current BIPT decision on this tariff dates from 10/3/2008.

*Note that for this model the below explanation is only applicable to the valuation of the access lines to BROTSoLL services. The valuation of the transport costs has been done as described in the paragraph "*Transport PDH/SDH valuation". The technologies covered by this reference offer and consequently to be valued through this tariff are:

- PDH/SDH : covering the costs of the access line equipment of this technology.

Further, this service can in fact make use of the copper infrastructure on the access side in case of small bandwidth lines. However, these costs are embedded in the BRUO based valuation.

The SDH access line valuation has been done by applying the above technologies direct CAPEX unit cost to all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR, the Proximus transmission inventory system.

Sensitivity: Unrestricted

3.4.2.5.6.6 WBA VDSL2 end user line

3.4.2.5.6.6.1 Passive part

The BIPT WBA model (decision 10/11/2010) has been used to value the assets AC2_20108 NGA Housing as well as part of the asset AC2_20106 fiber infrastructure related to external fiber connectivity to the cabinet (ROP ; Remote Optical Platform).

For the valuation of AC2_20108 NGA Housing, the BIPT unit direct CAPEX cost has been applied to the number of VDSL2 subscriptions. The main elements included are the cost of the ROP, the copper connectivity between the ROP and the street cabinet and power equipment.

3.4.2.5.6.6.2 Active part

The asset AC2_20107 NGA Active equipment has been valued based on the related BIPT direct CAPEX cost.

It is mainly related to the IP DSLAM installed in the ROP or in the local site, the equipment to aggregate the fiber cables connecting the ROP to the local exchange ("aggregators"), as well as the internal cabling and block positions on the optical main distribution frame (OMDF).

3.4.2.5.6.7 BROTSoLL Ethernet (access line only)

Being a special case of BROTSoLL, the services within the BROTSoLL Ethernet scope are the dedicated transparent Ethernet connections. The current BIPT decision on this tariff dates from 10/3/2008.

In principle these lines are implemented as Ethernet over SDH. However, due to the rather large bandwidth typical to this type of services -10 Mbps, 100 Mbps or 1Gbps- this implementation is neither always possible nor efficient. Therefore we distinguish two main technical executions:

- Ethernet over SDH: for the 10 or 100 Mbps lines, also named Ethernet and Fast Ethernet respectively
- Ethernet over DWDM: for the 1 Gbps or Gigabit Ethernet lines, where the DWDM wavelength is dedicated to the line. Note that no SDH equipment is used in this case.

The Ethernet over SDH services require SDH and optical fiber for their implementation. Therefore, and following the 2013 model logic, the SDH costs incurred by the implementation of such services will be valued by the "Updated BROTSoLL model to the 2013 demand". The optical fiber costs are not valued by the BRxx method anymore.

Regarding the Ethernet over DWDM services, the access tariffs are the same as in BROTSoLL and the transport cost is calculated as described in chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.7 Transport PDH/SDH valuation

The present BROTSoLL model is based on the Proximus SDH services inventory belonging to 2005. From 2005 until now the utilization of the SDH services has changed and new services consuming large bandwidth, typically Brotsoll Ethernet and the like products, have been implemented over SDH. These new services would alter the distribution of services per bandwidth, putting an extra weight on the higher bandwidths, imposing changes in the network dimensioned by the BROTSoLL calculation sheets which in turn will incur in (non linear) costs changes.

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Therefore, in order to incorporate a more realistic SDH cost in the model, it was decided to re-play the current BROTSoLL model with the 2015 SDH services demand.

In order to do so, the relevant files of the cumbersome BROTSoLL model have been consolidated into two streamlined files that easily allow the dimensioning and costing of the required SDH network for any given demand.

Then the set of all the SDH based services running on the Proximus network at the end of the year 2013 (all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR) was entered into the new consolidated transport BROTSoLL engine and the resulting SDH costs represent the value of the PDH/SDH asset in the 2013 model.

3.4.2.5.8 Transport Ethernet and DWDM valuation

The model used is based on the national network design module for NGN/NGA fixed LRIC model, by Analysis Mason for BIPT. A number of modifications to this module were done in order to support non-NGN (ADSL or SDSL via Ethernet switch) traffic and customer lambda services in a more realistic way. The adapted module is used to forecast investment costs for Ethernet and DWDM equipment to meet input level of demand.

The demand covers Voice over IP (VoIP), Fast Internet access (FIA, retail and wholesale), Bitstream (shared and dedicated), Video on Demand (VoD), Proximus TV (multicast), Business Data (Explore IPVPN and Eline) and lambda services (transparent ethernet 1Gbps and 10Gbps lines via DWDM for customers).

This bottom-up model takes into account the actual demand and calculates the needed backbone (regional and national-intercity) Ethernet and DWDM elements and their valuation.

3.4.2.5.9 Non regulated tariffs as base for asset valuation

3.4.2.5.9.1 Local Tail Explore

Local Tail Explore refers to the access line, this is to say the set of equipments and infrastructure entailed to provide the connectivity between the customer and the Proximus network, the Explore customers require. Given that Explore is not a regulated product and has specific technical requirements that are not contemplated by any of the existing BIPT models, a new model needed to be developed to cost this segment.

In fact the model is very straightforward since it just consists of isolating the few different components in the offered technical solutions and applying their respective annualized costs. Since the infrastructure components present in this model have already been valued by existing BIPT models, the regulated direct CAPEX unit costs have been applied to them.

The only asset in which this model participates is Ethernet.

In principle, this model should also contribute to the Copper infrastructure, since there is a technical solution on copper, however this asset valuation component is fully taken into consideration by the valuation based on the BRUO model.

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The valuation has been done by applying the fitting direct CAPEX technology to all access lines to Explore services documented in ITR, the Proximus transmission inventory system.

3.4.2.5.9.2 Incremental intercity model

We refer to the chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.10 ATM equipment asset valuation

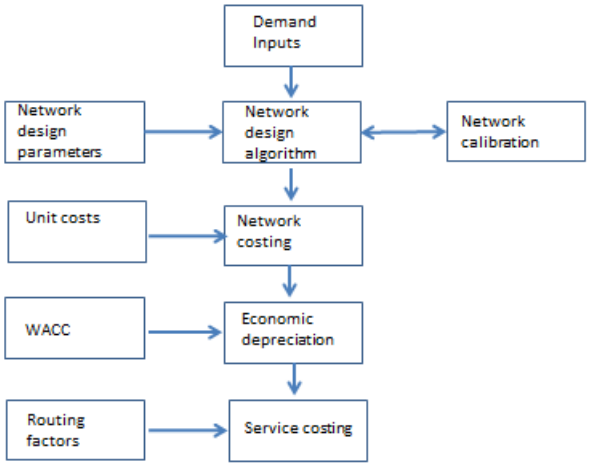
- ATM is outphased and is no longer valuated in the model.

3.4.2.5.11 Mobile cost model for network assets valuation

The BIPT bottom-up mobile cost model has been used to value assets :

- AC2_20110 RAN
- AC2_20111 Ground Antenna
- AC2_20112 Mobile Data Switching
- AC2_20113 Mobile Location Register
- AC2_20114 Mobile Voice switching

The flow diagram of BIPT mobile cost model can be summarized as follows :



Mobile cost model – flow diagram (source : Analysys Mason)

Proximus volumes (subscribers and mobile voice and data traffic) have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2016, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output (volume generated by the network element) in the form of a net present value.

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The calculation can be summarized as follows :

Calculation of net present value expenditures

NPV (Invest) = $\sum_{Years} Investment * discount\ rate\ multiplier$

Calculation of net present value output (recovery)

NPV (volume* ppc) = $\sum_{Years} PPC\ year * Vol\ year *\ discount\ rate\ multiplier$

ppc being the cost trend for the related network element

the discount rate multiplier is calculated based on a 8,13% WACC (BIPT's decision issued on February 26, 2015)

The capex cost per unit output can be defined as :

$p0_{1993}=\frac{NPV\ (Invest)}{NPV\ (Vol*ppc)}$

and

$pn_{2016}=P0*ppc_{2016}$

The total annualized economic cost for the year 2016 is equal to :

$$p_{2016*V_{2016}}$$

3.4.2.5.12 Fixed Voice NGN platform cost model for network assets valuation

The BIPT bottom-up Fixed Voice NGN platform cost model has been used to value asset:

- AC2_20115 FixedVoice_NGN_Platform

Proximus fixed voice traffic volumes have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2016, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business.

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3.4.3 TAM: Tilted Annuity Method

3.4.3.1 *Theory*

The purpose of this section is to describe how the Tilted Annuity Method (TAM) is finally implemented in the Current Cost Accounting (CCA) based network cost model 2013.

As from the 2003 model, Proximus implemented the formula that BIPT suggested.

$$ACC\mu Y = F1, \mu Y \times F2, \mu Y$$

where

$F1, \mu Y = (GRC\mu Y, begin + GRC\ \mu Y, end)/2$

$F2, \mu Y = \sqrt{}(1 + WACCY) \times [\ 1 - (1 + APC\mu)/(1 + WACCY)\ ] / [1 - [(1 + APC\mu)/(1 + WACCY)]\ ^\ L\mu]$

and where

- ACCμY: Annual CAPEX Cost of asset μ and year Y. It includes the annual depreciation and the cost of capital.
- WACCY: WACC of year Y.
- GRCμY, begin: Gross Replacement Cost of asset μ at the beginning of year Y.
- GRC μY, end: Gross Replacement Cost of asset μ at the end of year Y.
- APCμ : Annual Price Change of asset μ .
- Lμ : Lifetime of asset μ.

Remarks:

The formula assumes that:

- In the beginning of year Y was invested in an asset and that at the middle of each year of the lifetime of the asset revenues will be generated.
- The annual price change is constant over the lifetime of the asset.
- The asset price does not evolve during the year, i.e. price changes only appear at January 1st.

The factor F1, μY represents the value of asset μ in the middle of year Y.

- The purpose of the arithmetic average of GRCμY, begin and GRC μY, end is to take into account investments or disinvestments of asset μ during the year Y.
- The arithmetic average of GRCμY, begin and GRC μY, end does not filter out the price evolution of the asset μ during the year Y.

The difference between the formula of BIPT and the formula of Exhibit 5, p. B3. of the white paper of Analysys is the factor $1 / \sqrt{}(1 + APC\mu)$, which filters out the price evolution of the asset μ during the year Y.

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The gross replacement cost (GRC) of assets at any particular point in time is calculated as the sum over all assets owned by the business at that point in time, of the investment that would be necessary to purchase and install new replacements for those assets at that point in time (using modern equivalent assets if the existing assets are no longer available or efficient). The replacement value of assets, used for costing purposes should always include the gross value of every asset in use by the business (the current cost of replacing it with a new, possibly modern equivalent asset), irrespective of the history of depreciation of that asset in any financial accounts to date.

$L\mu$: Lifetime of asset μ, i.e. the expected useful lifetime of the new asset μ.

The depreciation period and the expected useful lifetime of a new asset are defined differently. The depreciation period refers to accounting. The expected useful lifetime of a new asset does not refer to accounting. It refers to the period that is expected that a new asset will be used. The main factor to determine the expected useful lifetime of a new asset is the evolution of the associated operational costs, i.e. the asset will be replaced when operating it becomes too expensive. Another factor is the appearance of new technology: if in the future new technology will come-up it could be that the asset will be replaced (even if it is not too expensive to operate).

Sensitivity: Unrestricted

4 SCF (Support and Customer Flow) stream

4.1 Allocation of the support costs

4.1.1 Support Scope

Since 2013, all support costs are treated within one SUPPORT module and as such, no cascade principle is used meaning that support costs, once in the SUPPORT module, can only be allocated to a non-support destination and to a non-support division. The divisions that are considered as support costs are:

- Group Internal Services (GIS – BA34) for departments like Real Estate, Business Services, Security, Safety & Environment, and Catering.
- Supply Chain Management responsible for warehousing, logistics and distribution is now part of the CUO division.
- Infrastructure Facility Management (IFM – BA78) encompasses a wide variety of support activities like building & technical services, print shops and copy shops, energy and operational centre of excellence.
- Fleet Management (FLT – BA79) for the support of all Proximus management, utility and sales vehicles.

They fall under the responsibility of FIN, the financial department from the Staff and Support division (S&S – BA20) where are located the GHR, Legal, Strategy, Public Affairs and Communications departments. The Staff & Support costs should avoid passing by the Support allocation flow as they are business overhead related costs. There can be some exceptions to this rule when a specific support cost is booked in the BA20 such as illustrated bellow:

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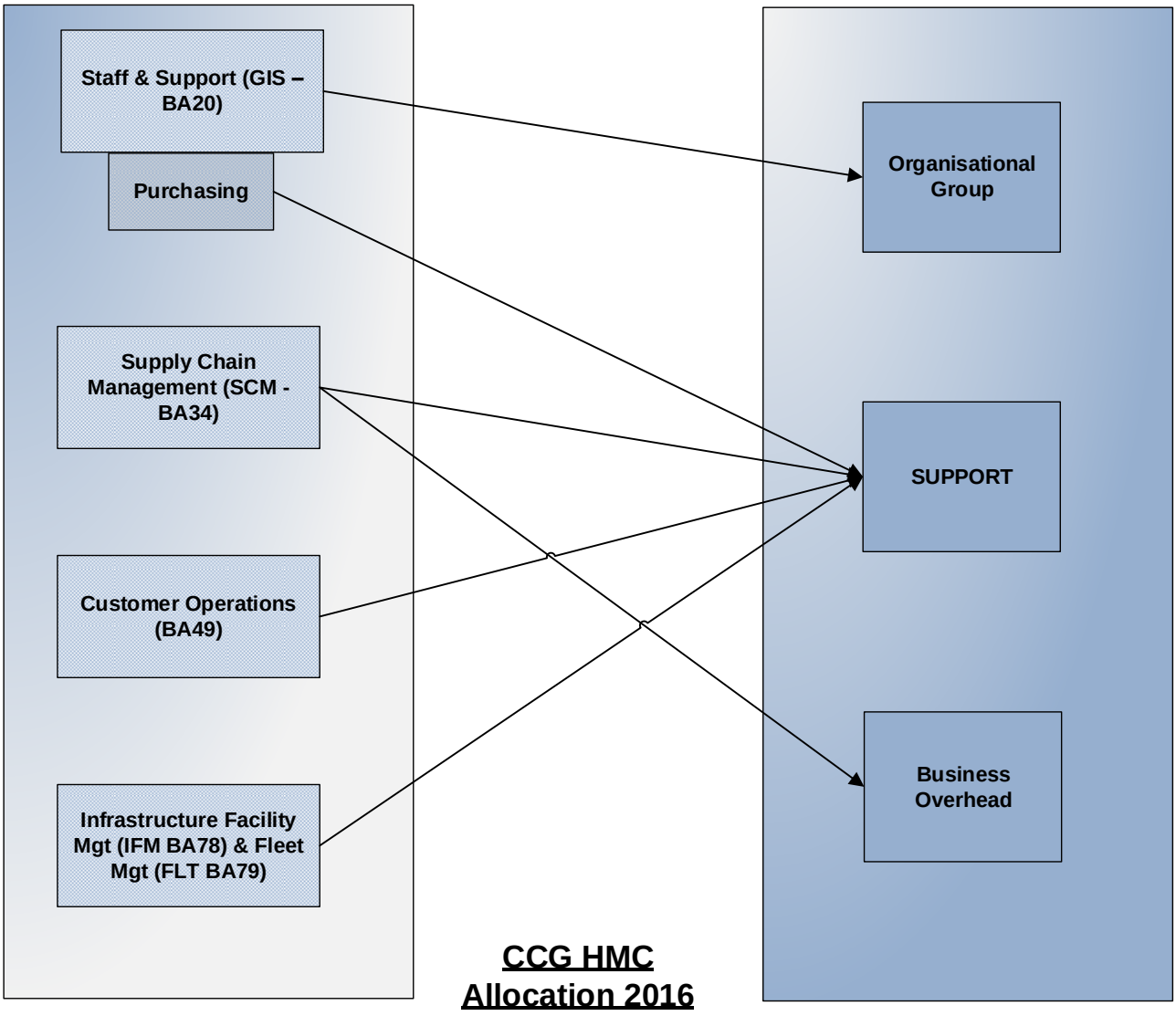

4.1.2 Support Cost Objects

The following support objects were created in order to pool support-related costs within one module, before allocating them either directly to the cost's specific object located further on in the cost model, either to multiple objects using inventory-based allocation keys. This work is achieved by using reports from dedicated teams supporting an inventory from which specific volumes can be derived, such as the ones from fleet management regarding Proximus vehicle's park or Connect Immo regarding the building's occupation. A last group of support objects are allocated by the use of FTE keys in order to split these costs among all departments that benefit from them. The overall support allocation can be summarized as follows:

Summary of Driver type relation to Support Object allocation
Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Manage moves
Support_Manage waste and scrap
Support_Manage, maintain and repair buildings (excluding moves) (office space)

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Support_Provide catering services
Support_Provide copy services

costs of shops buildings (in %)

Support_Manage, maintain and repair buildings (excluding moves) (shop space)

Direct

CBU_billing_fix products
CWS_Billing
EBU_billing_fix products
MOB_billing
Support_13001 Data Managed Services & Applications
Support_14001 TV and VoD
Support_22243 Nat. IC - infra. Co-location /Co-mingling
Support_30000 Subsidiaries & externals
Support_IT
Support_Power Chain for ROP
Support_Power Chain for telecom_SDE
Support_PROX_Pylons
Support_Telecom space_SDE

Estimated Nbr Management Cars

Support_Manage, maintain and repair fleet vehicles (management vehicles)

Estimated Nbr of Sales Cars

Support_Manage, maintain and repair fleet vehicles (sales vehicles)

Estimated Nbr of Utility Cars

Support_Manage, maintain and repair fleet vehicles (utility vehicles)

Stock Material return

SUPPORT_Reverse_Logistics

Stock Quantities

Support_Manage goods, warehouse & equivalents

Sum of Purchase Orders

Support_Purchasing, quality and ordering

total MOS value 2011

Support_Manage cables

Value of material transported from stock (in eur)

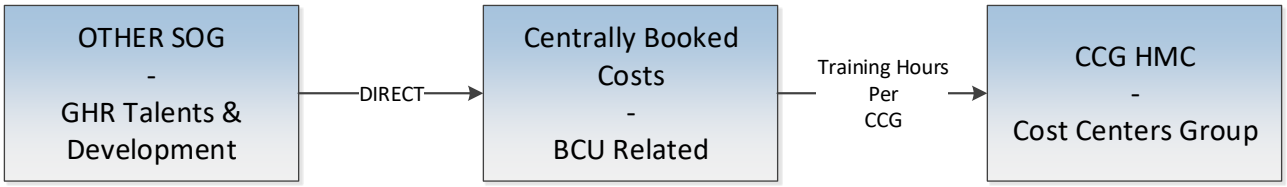
Support_Manage internal distribution

The driver named “Avg # FTE All Levels with office excl. support/centrally booked” is a specific driver calculated internally by the cost modelling team. It excludes from its scope all support divisions and teams that do not benefit from these costs such as employees not occupying a desk in Proximus Buildings. This is done in order to match the scope of these costs. In order to give coherence to such trade-off, the decision factor for the Customer Operation division was changed from the level of the employee within the company to the cost variability of the organisational group in question. The underlying reason being that fixed costs organisational groups are management

Sensitivity: Unrestricted

related while variable ones are field related. Therefore, only fixed organisational groups were considered in the scope of this driver as the field teams are by definition not in Proximus offices and should not benefit from the specific support costs this key is applied to.

It should be noted that training costs related to Proximus's Corporate University (PCU) have to avoid passing through the SUPPORT module but have to be pooled with their respective team's/CCGs. The grouping of these costs is done as illustred below:



In 2015, Logistics and warehouse activities were reorganized within the CUO division in order to improve the quality of service by giving more consistency to the customer service chain as well as improving the systems of logistics controls in order to better the material flow in the Proximus group. The warehouse is where most equipment used by Proximus or by its clients are stored. Allocation keys are based on the inventories from their corresponding team registering which type of equipment in what type of quantities were stored and delivered.

4.1.3 Asset Support Allocation

Two types of assets allocations can be distinguished: The ones that can be directly linked to a support object from the previous list and allocated as shown by the following diagram:

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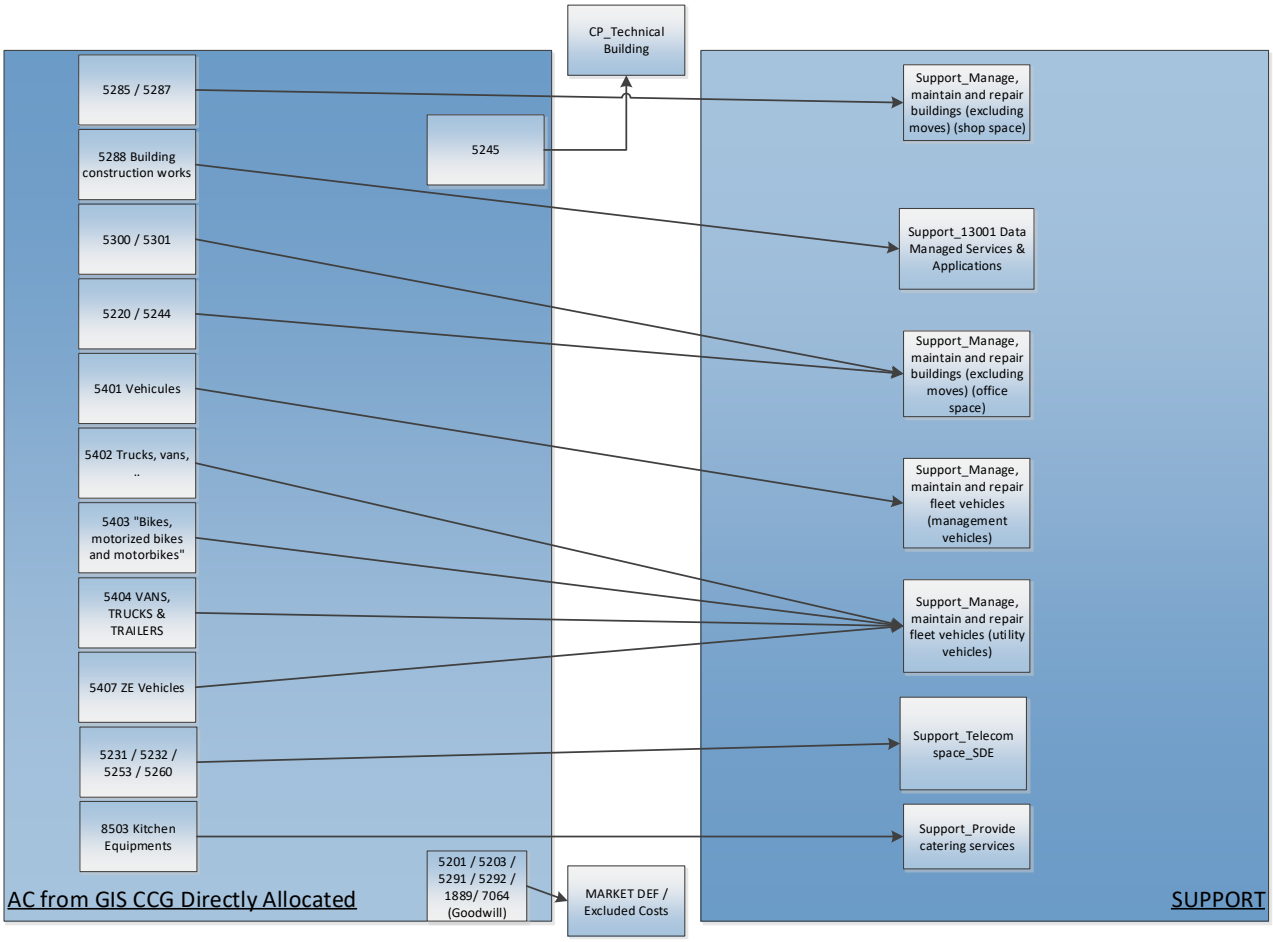

Other assets affect multiple support activities where the use of a specific cost driver is required. Typically, buildings, fleet and energy are support activities that need to be ventilated on many support objects with the use of their corresponding driver: vehicles per category for fleet, square meters occupied per building type for buildings and electricity consumption per equipment or building for energy. The following diagram represents the logic behind asset allocation towards the support flow by presenting its main allocation drivers:

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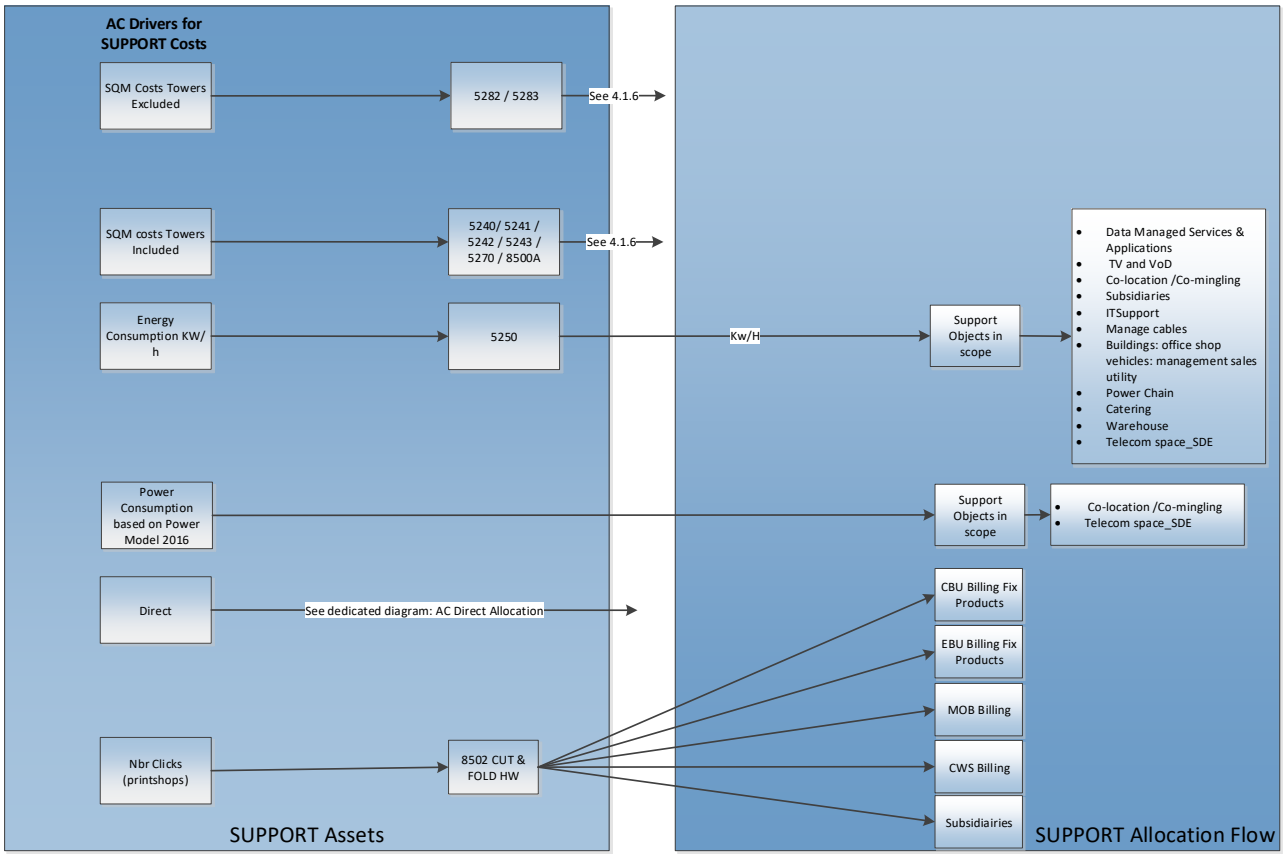
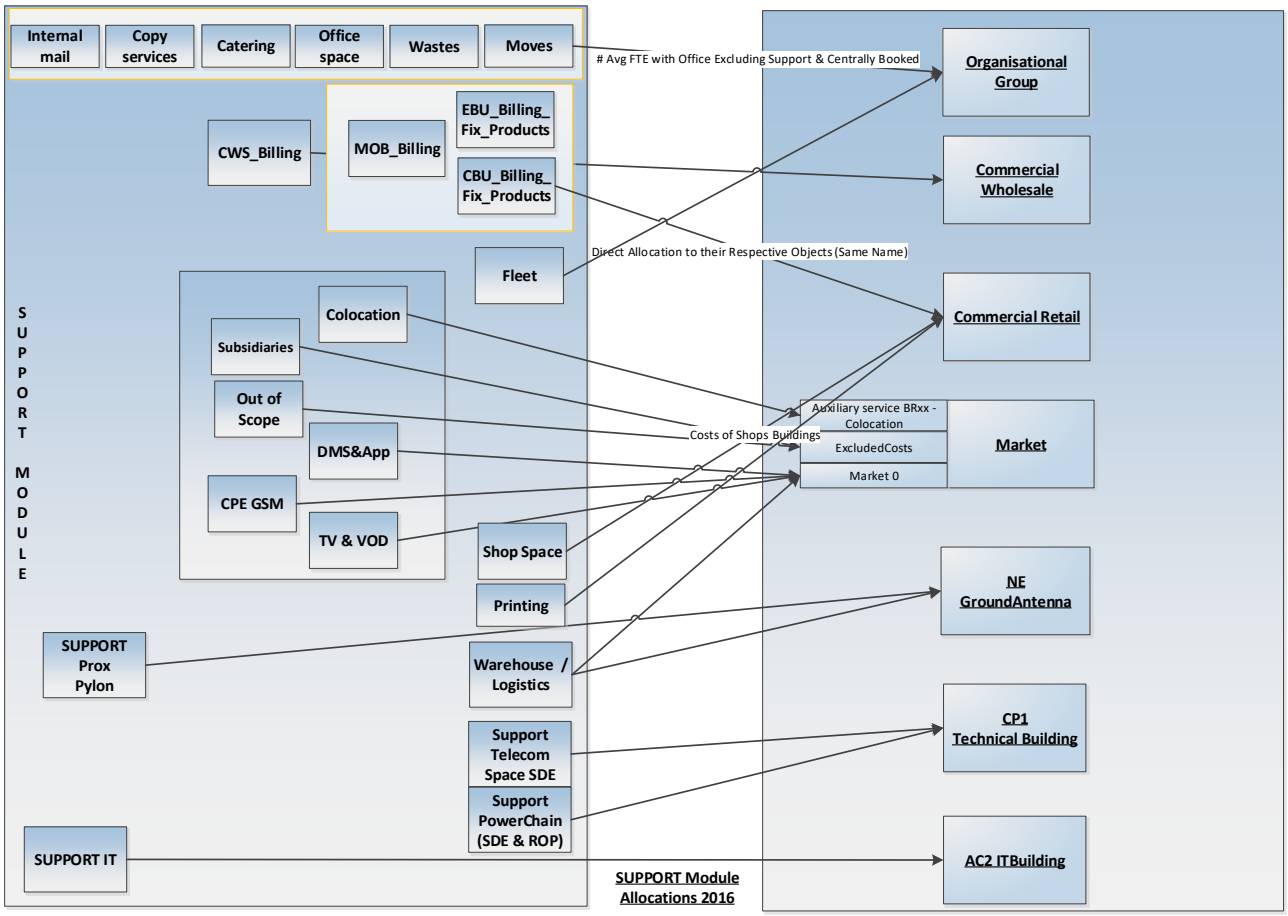


4.1.4 Allocation From the support module

The same principle as before is applied: if a support object can be directly linked to an object located further on in the cost model, it will be directly allocated to it. Such cases are illustrated in the following drawing:

Sensitivity: Unrestricted



4.1.5 Fleet case

All fleet related costs are pooled in the Support module within the three following objects:

- The support, maintenance and repair of management vehicles.
- The support, maintenance and repair of sales vehicles
- The support, maintenance and repair of Utility vehicles.

With the use of an inventory maintained internally by Proximus, the number of vehicles per type and organisational group is used as an allocation key for the fleet costs.

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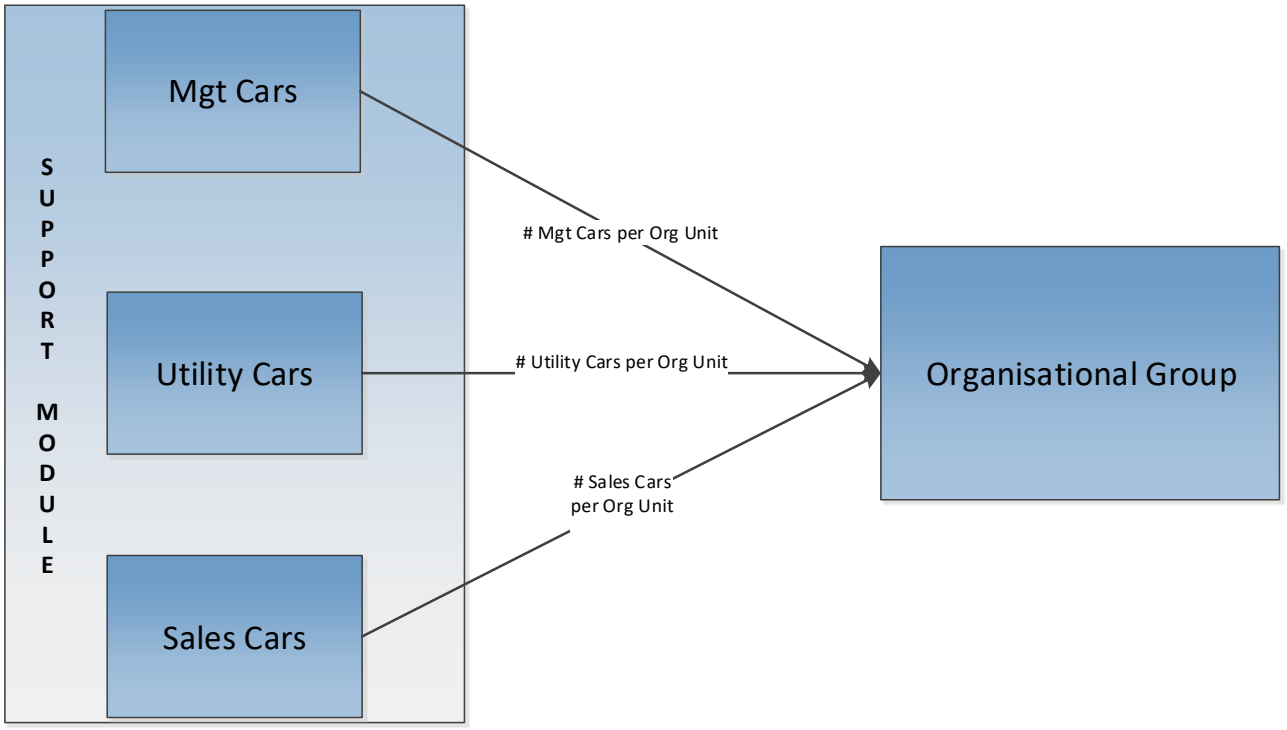

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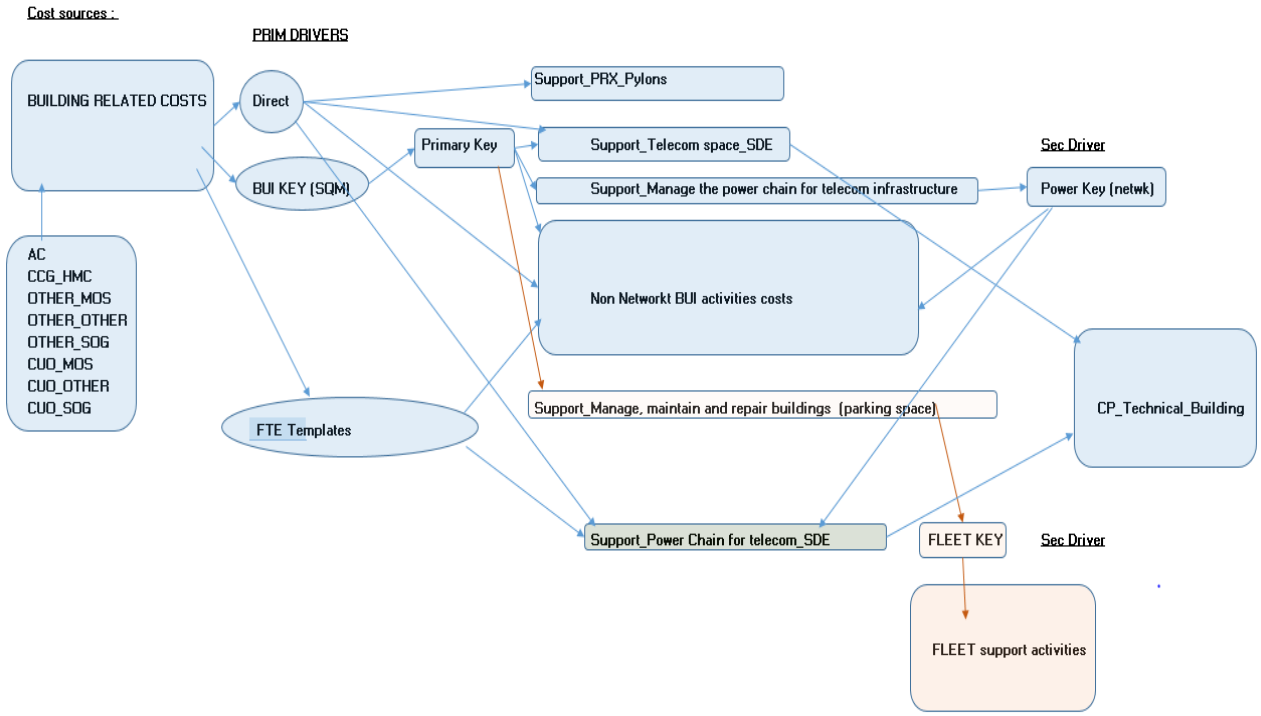
4.1.6 Buildings Support costs :

4.1.6.1 *Global picture of the allocation:*



4.1.6.2 *Source of the buildings costs :*

The BUI support costs are mainly coming from :

Sensitivity: Unrestricted

COST NATURE	Source of costs
ASSET	5255 Heating,Ventilation & Air-Conditioning
	5220 Exploitation land
	5240 Exploitation buildings
	5282 Work in rented building
WAGES	78401 GIS - IFM - BTS-Building & Technical Services
	34300 GIS - CPP - Securit - Safety & Environment
	78003 GIS - ASP - PRO - Projects
OTHER_OTHER	GIS - IMM - Real Estate / 34100 / tax-building / 6401
	GIS - IMM - Real Estate / 34100 / local taxes / 6407
OTHER_SOG	GIS - IMM - Real Estate / 34100 / building / 61010
	GIS - ENY - Utilities & Support / 78610 / Pylons / 61195
	GIS - CPP - Securit - Safety & Environment / 34300 / building / 61010
	GIS - IFM - BTS-Building & Technical Services / 78401 / building / 61010
	GIS - ENY - Utilities & Support / 78610 / energy / 61060
	GIS - IMM - Real Estate / 34100 / CImmo & third party building & equipm. taxes / 61160
	GIS - MOB - IFM - OTH - PYLONS / 78501 / building / 61010
	GIS - MOB - IFM - OTH - PYLONS / 78501 / energy / 61060

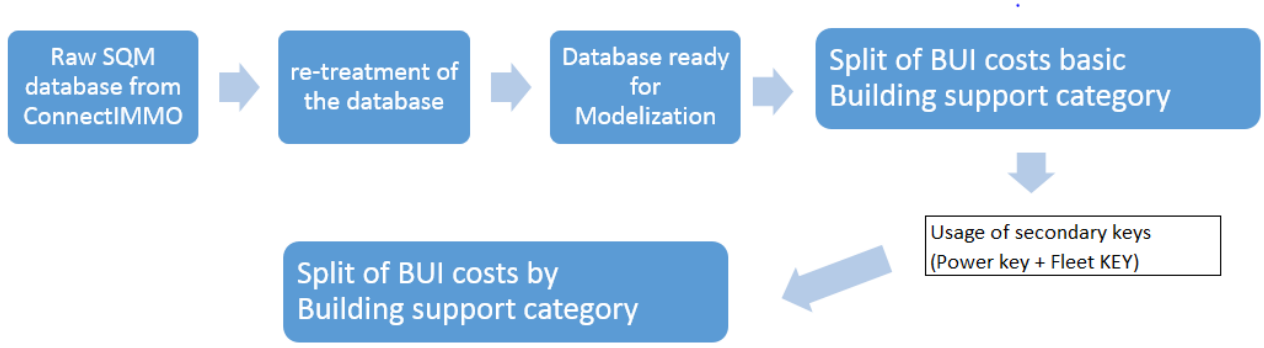
4.1.6.3 *Drivers used for the allocation*

4.1.6.3.1 The SQM (Tower included or excluded).

This key is based on a database provided by ConnectImmo, the Proximus separate entity that manages the PXS Building/SQM portfolios. Volumes (sqm) are valued by category (office, telecom, parking, catering,…) and the resulting keys are used to allocate the costs.

SQM Allocation

sources and process



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4.1.6.3.2 Direct:

Pylon related costs, Exploitation land (AC) to Support_Manage, maintain and repair buildings (excluding moves) (office space)

4.1.6.3.3 FTE Template completion

The following teams are allocated with the input of team leaders (split of FTE's by Building activities).

These teams are in charge of the management of the Proximus Buildings.

78001 GIS - ASP - PRO - Coordination
78003 GIS - ASP - PRO - Projects
78400 GIS - IFM - Infrastr. & Fac. Mgt & Support Staff
78401 GIS - IFM - BTS-Building & Technical Services

4.1.6.4 *The Destination of the BUI related costs :*

After usage of primary and/or secondary keys, the BUI related costs are allocated to following activities:

Activity	
Support_Telecom space_SDE	Network related
Support_Power Chain for telecom_SDE	Network related
Support_PROX_Pylons	Network related
Support_Manage cables	Network related
Support_Manage, maintain and repair buildings (excluding moves) (shop space)	Retail related
Support_Manage, maintain and repair fleet vehicles (utility vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (management vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (sales vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair buildings (excluding moves) (office space)	FTE related
Support_Provide catering services	FTE related
Support_IT	IT related
Support_Manage goods, warehouse & equivalents	Logistics related
Support_14001 TV and VoD	product related
Support_13001 Data Managed Services & Applications	product related
Support_30000 Subsidiaries & externals	product related

4.1.7 The power Key:

This key split the power related costs coming directly from power costs and from the buildings to different costs objects. It is based on the analytical split provided by the field:

The total KWH consumption is known is split in 4 categories:

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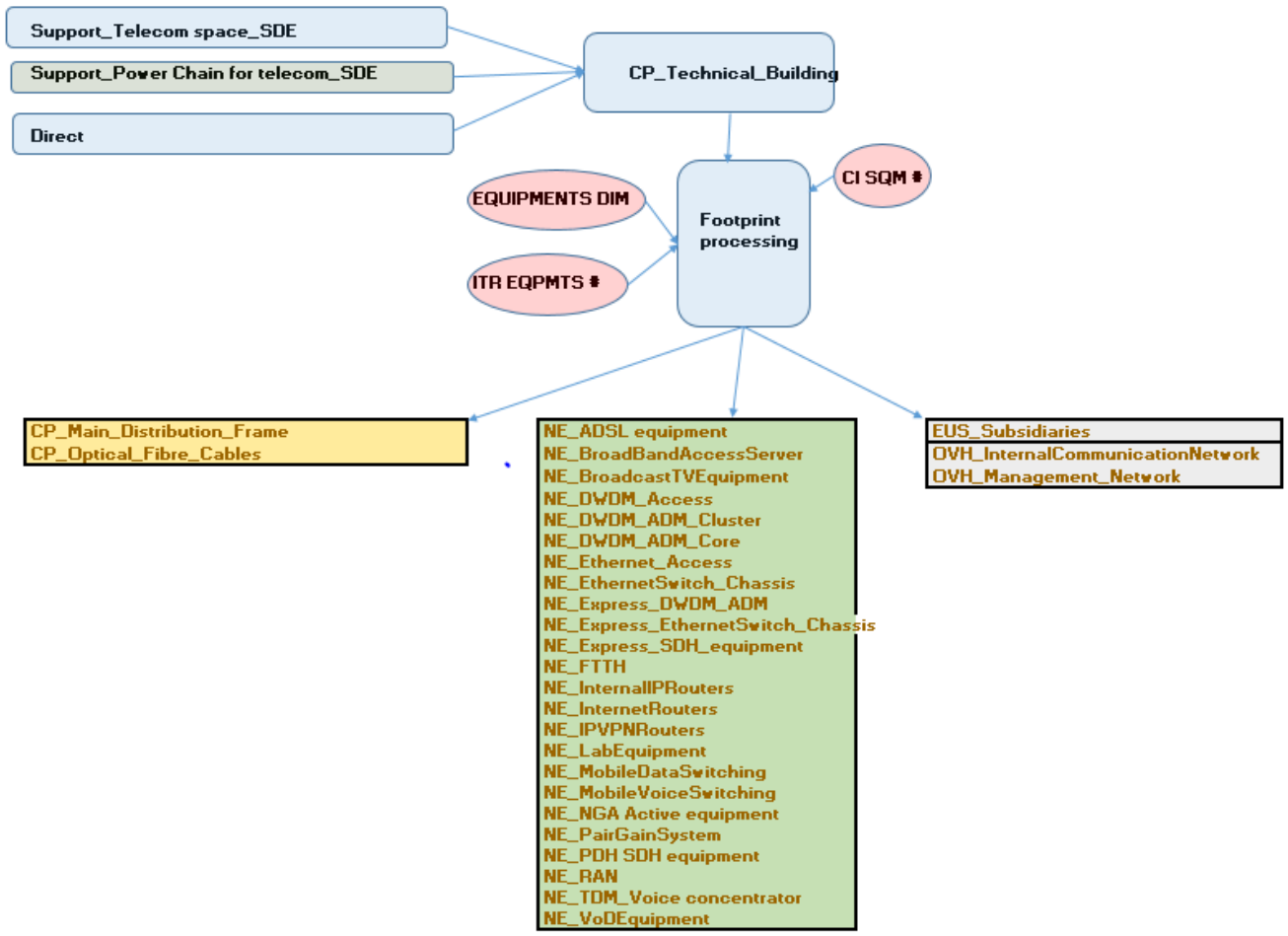
1. Mobile access (directly allocated to Support_PROX_Pylons)
2. Fixed access network (indirect allocation) to:
   Support_14001 TV and VoD
   Support_22243 Nat. IC - infra. Co-location /Co-mingling
   Support_30000 Subsidiaries & externals (for memory)
   Data centers, (split between SUPPORT_IT an Support_13001 Data Managed Services & Applications, based on real consumption)
   Support_Power Chain for telecom_SDE
   Support_Power Chain for ROP
3. Shops
4. Other (directly allocated to shops, or allocated to various element via generic key : offices, …)

Sensitivity: Unrestricted

4.1.8 Allocation of the Network building related costs : CP_Technical_Buildings

Based on the ConnectIMMO database (SQM), ITR (equipment), and some measurement and constants (footprint of equipments), the CP_Technical_Building is allocated via the running a access macro.

4.1.8.1 *Allocation Flow :*



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4.2 Allocation of the retail costs

4.2.1 Retail costs perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units, we recapitulate:

- Consumer Business Unit (CBU) has the responsibility over the residential customers and small enterprises (less than 10 employees)
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Retail costs relate to all commercial retail activities at the level of Business units CBU and EBU. The Proximus financial and accounting structure clearly registers (directly attributable) retail costs on cost centers 39xxx (CBU) or cost center 41xxx (EBU).

Starting from the Proximus organisational structure, we can identify 4 blocks in the Retail cost perimeter:

1. Retail FTE related costs
2. Retail Support costs
3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Retail FTE related costs

Includes all direct FTE related costs of Business units 39 and 41 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Retail Business units in the accounting books but do relate to Retail FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's. E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

2. Retail Support costs

Retail Support costs are non FTE related costs which are centrally booked and managed but relate to Retail activities. E.g. Billing, Shop space…

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3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Retail departments, costs for legal claims, mandatory professional contributions, market surveys, etc.

4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales such as commissions paid on sales of identifiable products, cost of goods sold on equipment, dedicated outsourcing costs, etc.

4.2.2 Retail costs allocation principles

4.2.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

4.2.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies Retail costs based on their variability towards product volumes.

We distinguish between 4 var_types:

a. Marginal (mar): retail costs which can be considered variable with each additional unit of a single product. Typically it concerns costs of goods sold (e.g. handsets, customer premises equipment,…) and costs of sales (commissions, interconnection costs,…).
b. Variable (var) : retail costs which can be considered sensitive to (important) volume changes of a single product or a range of products, whereby this (range of) product(s) is considered to be the last increment in the product portfolio. Examples of costs which are considered variable based on these criteria: the sales departments, call center activities,….
c. Fix (fix): retail costs are considered as fixed when they are likely to be inert to important volume variances. E.g.: Marketing spending. If the marketing campaigns can be directed to specific products, the amount of costs for these campaigns is not linked to volumes of the considered product.
d. Common (common): retail costs are considered common when they do relate to the ordinary course of business but have no relation with products. E.g.: Costs of litigations, branding & sponsoring expenses not directed to specific products, but well to Proximus image and trademark,…

Sensitivity: Unrestricted

4.2.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies retail costs based on whether they can be attributed directly, or through a specific non generic key and/or driver, towards products.

We distinguish between 2 PS types:

a. PRODUCT_SPECIFIC (PS): these costs can be allocated directly to the products and thus are generated specifically for that related product. E.g. the costs of sale of a product.
b. NON_PRODUCT_SPECIFIC (NPS): Retail costs which do not have a clear causal relation with specific product.

In addition to the attribute PS_TYPE, all retail costs of RETAIL module are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

COST GROUP specifies the product, when the cost is product_specific.
COST GROUP also gives the information on whether the costs are related to both Retail Business Units (CBU and EBU), or are only linked to one of them.

Used Cost Groups for the Retail costs are:

Non product specific	**Product specific**
All CBU&EBU products	All CBU Mobile products
ALL CBU&EBU mobile products	All EBU Mobile products
All CBU products	All EBU Advanced Telco Services products (*)
All EBU products	All EBU Fix data products
All CBU Fix products	All EBU Fix voice products
All CBU Mass market products	All EBU ICT products
All EBU Fix products	idTV
All EBU professional & Mass market products	(*) m2m&IOT, Big data, Mobile Payment&Ticketing
All EBU Telco products	
All EBU, CWS, SE products	

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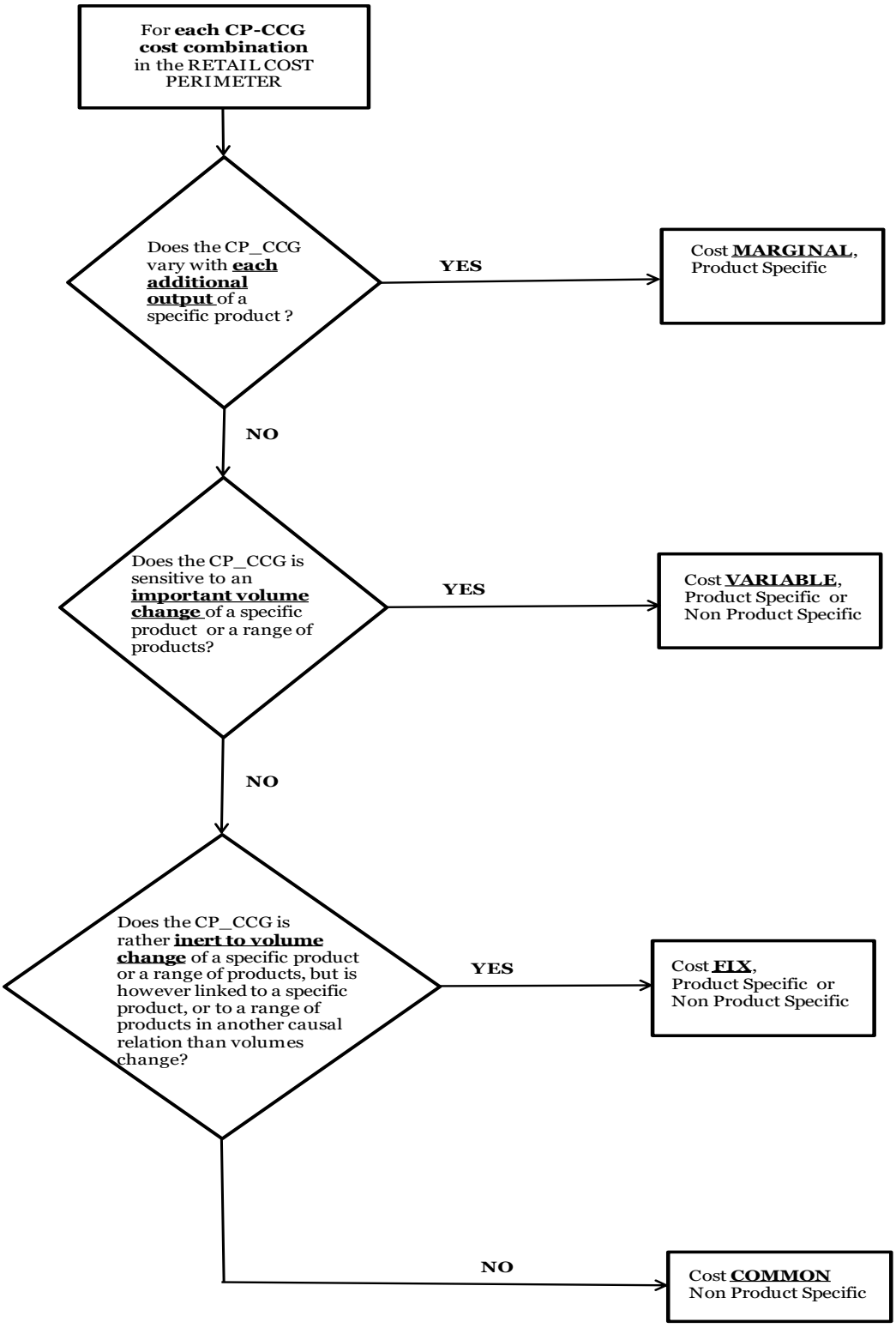
The qualification of the 2 attributes VAR_TYPE and PS_TYPE to all retail costs is illustrated in the following decision tree:



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4.2.2.4 *Criteria for allocation of retail costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which correspond to their costgroup (which is the product they relate to). This means that these costs will be either allocated to Market 0 – Residual Market or to Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards Markets based on volumes drivers. In practice, this means that these costs will be either:

- allocated to Market 0 or to Market 1, if they relate to a panel of products related to the same market,
- allocated to Market 0 and to Market 1, with respect to volumes driven allocation key, if they relate to a panel of products related to both markets.

c. Non product specific Fix costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market', when they cannot be allocated to Market 0 and/or to Market 1, with a causal driver other than volumes of products.

d. Non product specific Common costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

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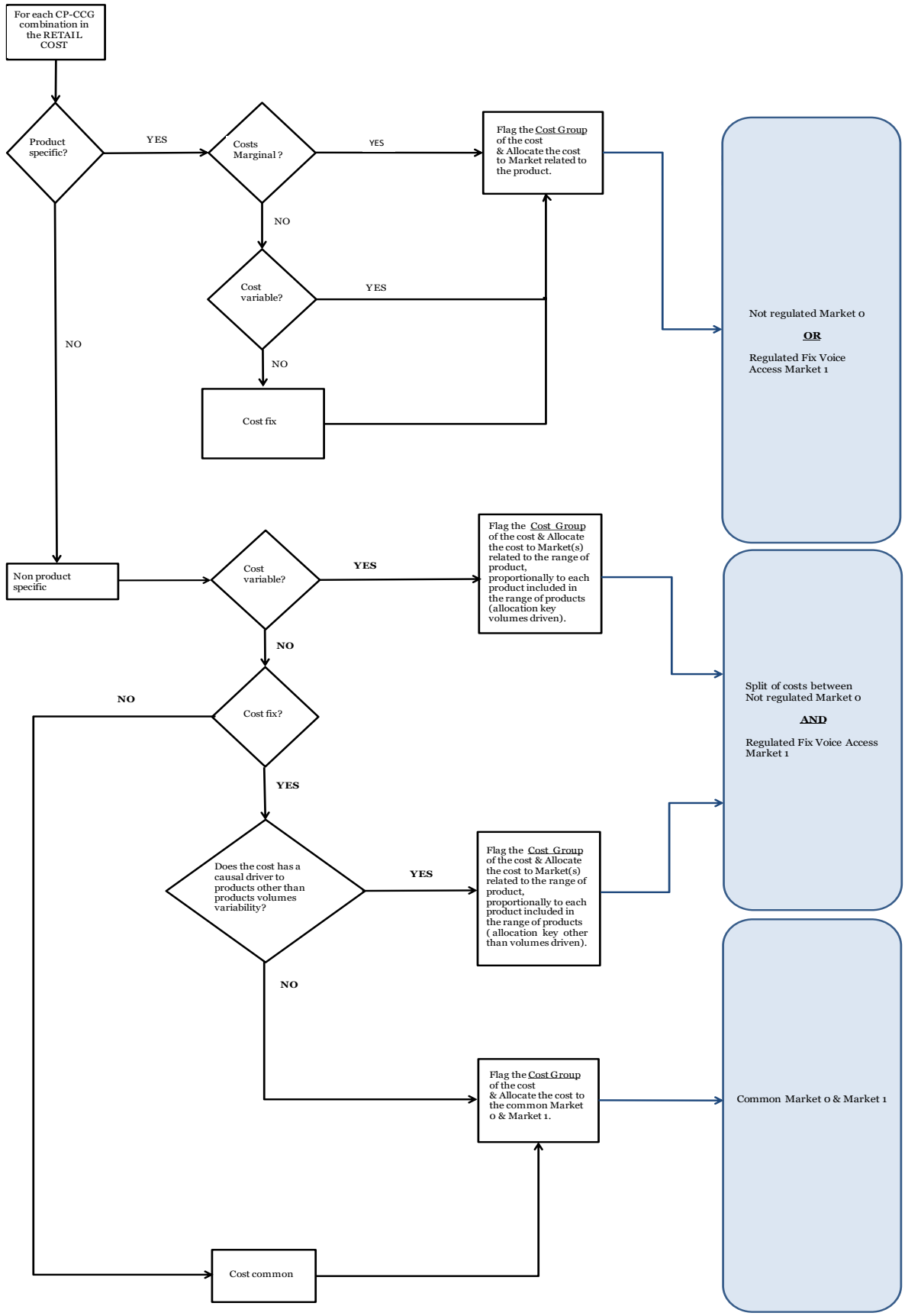
Principles for retail costs allocation to Markets can be illustrated as follows:



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4.2.3 Retail costs allocation flows

4.2.3.1 ***General principles***

As described above, the 4 blocks of costs included in the Retail cost perimeter are all specified with 2 cost type attributes (VAR_TYPE; PS_TYPE) prior to be allocated to Markets.

However, the 4 blocks of costs:

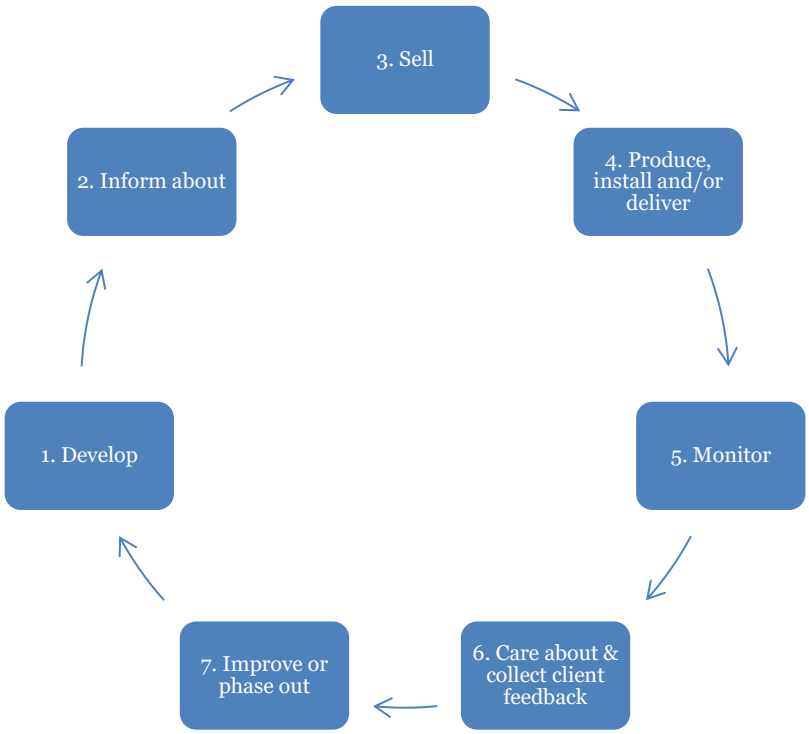
- Do not follow all the same path of allocation; some are directly allocated to Markets from the Cost basis,
- Are not all specified with VAR_TYPE and PS_TYPE within the module Retail.

The allocation flow followed by a Retail CCG_CP will depend on its block of costs (1->4).

Life cycle of products

Since the Cost model 2014, a new module, the LIFE_CYCLE module, was created, to catch part of the Retail costs that we find during the life cycle of a product.

Inside the 4 categories of Retail costs, as described in chapter 4.2.1., all the costs needed to launch, develop, monitor a product until its improvement/phase out, were identified and gathered in this new module, prior to be allocated to Markets.



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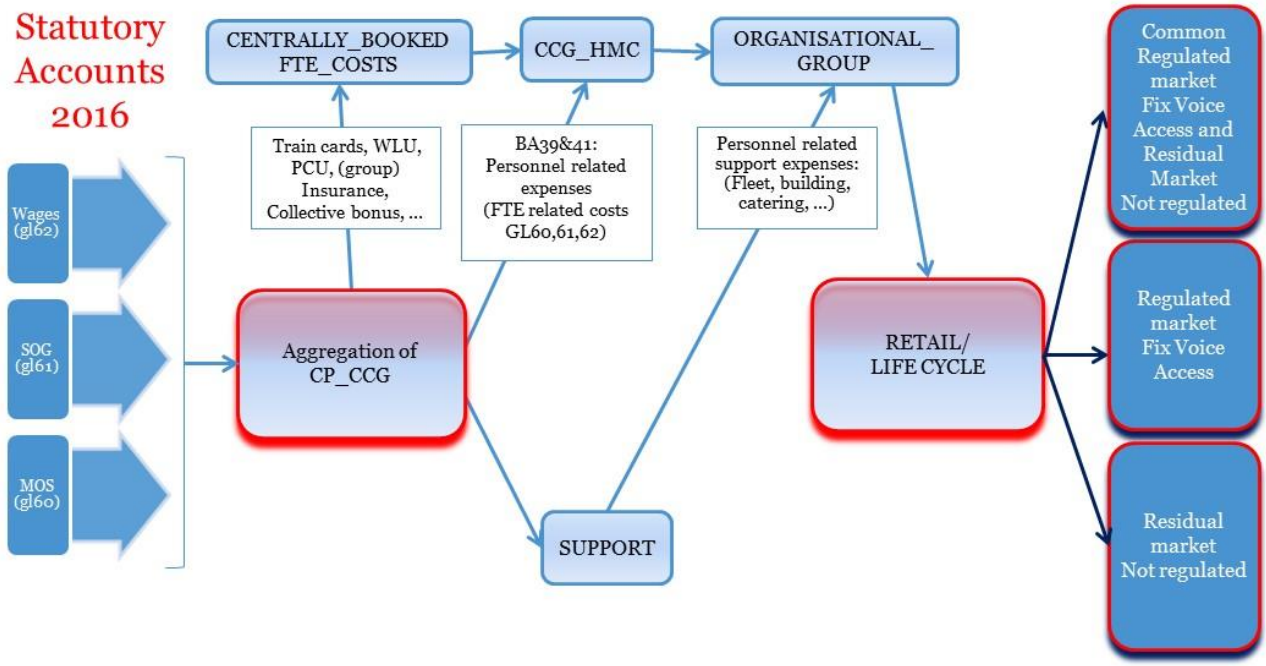
4.2.3.2 ***Retail FTE related costs (block 1)***



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

Starting from the Cost basis, Retail FTE related costs are at first gathered into module CCG_HMC. CCG_HMC module is simultaneously feeded with module Centrally_Booked_FTE_costs (Train cards, WorkLifeUnit costs, etc.).

Retail FTE related costs gathered in CCG_HMC are afterwards loaded into module ORGANISATIONAL_GROUP. In ORGANISATIONAL_GROUP module, FTE related costs are summed up with SUPPORT costs managed centrally (Fleet, building, catering, etc.) but that have to be allocated towards Proximus FTE costs.

This is also at this stage of allocation flow that attributes VAR_TYPE and where CCG_CP are renamed as "Organisational groups" (terminology specific to FTE costs).

Organisational groups costs are at last directed to module Retail, prior to be allocated to Markets (via LIFE_CYCLE module, for part of it), in accordance to criteria for allocation of Retail costs to Markets, as described in chapter 4.2.2.

With regard to the definitions of attribute dimension VAR, Retail FTE related costs can only be either Fix (FIX), either Variable (VAR) costs.

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For what matters FTE costs, this variability sensibility has been defined taking the following assumption:

Are Fix FTE costs, all the FTE costs that are needed to ensure the Proximus going concern independently of products volumes, id est, costs needed to maintain the Proximus minimum organizational structure.

Two types of FTE costs were identified as needed to maintain the Proximus minimum organizational structure:

- Staff costs such as IT officers supporting DB and IT tools used, reporting and analysts teams, research staff such as Products&Solutions engineers, Marketing staff costs;
- All the Proximus hierarchy structure (team responsibles).

The classification of FTE costs for CBU and EBU between FIX and VAR costs, and whether product_specific or not, is as follows:

CBU Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	ALL CBU PRODUCTS
Sales - Top management	Fix	NPS	ALL CBU PRODUCTS
Direct sales	Var (*)	NPS	ALL CBU PRODUCTS
In charge Relations for indirect sales channels	Fix	NPS	ALL CBU PRODUCTS
Support staff for Sales department (all channels)	Fix	NPS	ALL CBU PRODUCTS
Marketing	Fix	NPS	ALL CBU PRODUCTS
Call Center Activities	Var	NPS	ALL CBU PRODUCTS
In charge for e-sales	Fix	NPS	ALL CBU PRODUCTS
idTV Content management	Fix	PS	idTV
Products & Solutions specialists	Fix	NPS	ALL CBU PRODUCTS
Strategic planning	Fix	NPS	ALL CBU PRODUCTS

(*) excluding Team responsible flagged as Fix costs.

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EBU Organisational group	FIX/VAR	PS/NPS	Cost Group
EBU Top management	Fix	NPS	All EBU products
Strategic planning	Fix	NPS	All EBU products
Marketing	Fix	NPS	All EBU products
COR Top management	Fix	NPS	All EBU products
COR Direct sales	Var (*)	NPS	All EBU products
In charge Relations for COR (1) clients	Fix	NPS	All EBU products
COR ICT Project architects & Outsourcing mgmt	Fix	PS	All EBU ICT products
ME (2) top management	Fix	NPS	All EBU products
ME Direct sales	Var (*)	NPS	All EBU products
Support staff for ME Sales (all channels)	Fix	NPS	All EBU products
In charge Relations for ME indirect sales channels	Mix Fix/Var	NPS	All EBU products
Telco Solutions Top management	Fix	NPS	All EBU Telco products
Telco Solutions Specialists and Solutions sales	Mix Fix/Var	NPS	All EBU Telco products
IT Solutions Top management	Fix	PS	All EBU ICT products
IT Solutions Specialists and Solutions sales	Mix Fix/Var	PS	All EBU ICT products
OPS (3) top management	Fix	NPS	All EBU products
Financial reporting & IT Tools management	Fix	NPS	All EBU products
After Sales Back-office	Var (*)	NPS	All EBU products
Customer Project Management	Fix	NPS	All EBU products
Transformation, Process & Operations	Fix	NPS	All EBU products
ICT Outsourcing & industrialised services	Var (*)	PS	All EBU ICT products
ICT Customer service desk	Var (*)	NPS	All EBU, CWS, SE products

(*) excluding Team responsible flagged as Fix costs.

(1) COR, for CORPORATE, is the subdivision of EBU including big size enterprises.

(2) ME, for Medium Enterprises, is the subdivision of EBU including smaller size enterprises (from 10 to 50 employees).

(3) OPS, for OPERATIONS, is a Support division specific to EBU in charge of internal Process & IT optimization, financial reporting, customer projet management, as well as customer service: commercial and technical repair helpdesk.

Some EBU organisational groups have a mix of Fix/Var costs per type of activity. The scission of these teams into FIX and VAR costs is based on #FTE, in accordance with Proximus functional organization and Retail principles for determining if a cost is FIX or VAR.

E.g.:

Teams in charge for relations with indirect sales channels are made of Direct sales (VAR costs) and of people in charge of Sales channels optimization, strategy and budgeting (FIX costs).

Teams of Solutions Specialists and Solutions Sales are made of Direct sales (VAR costs) and Products&Solutions managers in charge of product catalogue and architecture (FIX costs).

- Retail FTE Fix costs non product specific are directly allocated to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

- Retail FTE Fix costs product specific are directly allocated to the Market of the product they relate.

- Retail FTE Var costs non product specific are split with volumes allocation keys between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market.

- Retail FTE Var costs product specific are allocated to the Market of the product they relate, with volumes, for information purpose only.

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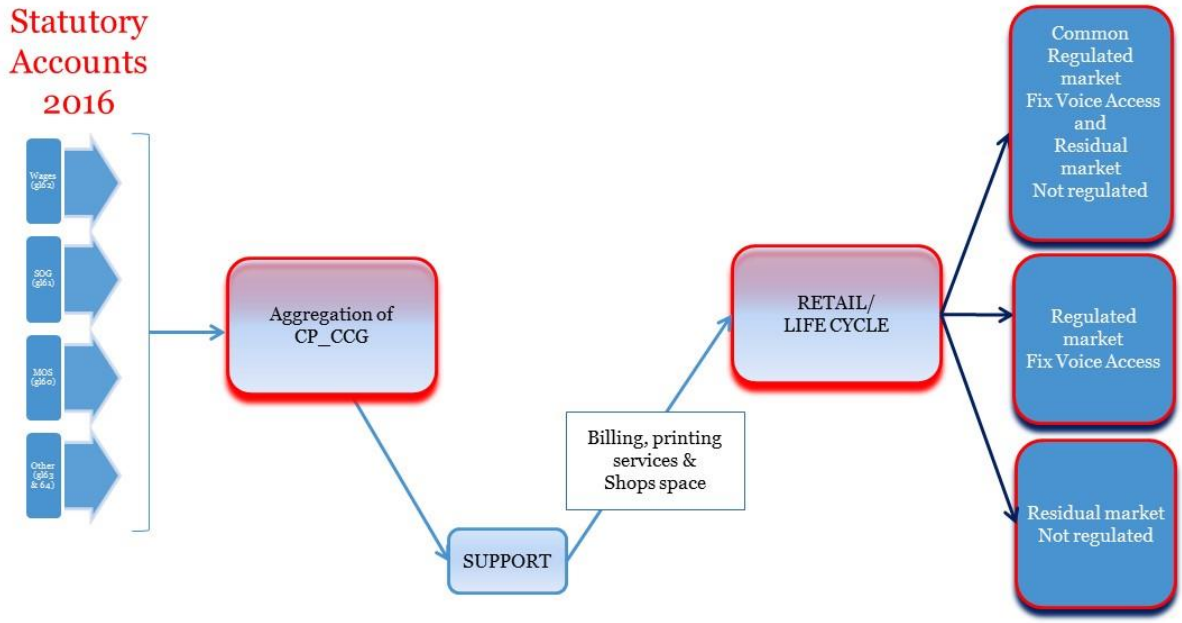
Retail FTE Var costs are allocated towards activities in the LIFE_CYCLE module, prior to be sent to Market(s). We refer to chapter 4.5 Allocation of Costs included in the Life cycle of products, for further developments on allocations keys for Retail FTE VAR costs.

4.2.3.3 ***Retail Support costs (block 2)***



Module SUPPORT identifies and collects the costs of a number of support objects which a.o. are retail related.

The retail related support objects primarily concern billing costs (invoice printing, stuffing and postage, as well as teams in charge of billing&collecting) and costs for shop space. These costs are primarily gathered in module SUPPORT.

Costs for shop space are considered fix. The costs of creation and maintain a shop is not linked to the volumes of products the shop offers, but well to other criteria such as geographical localisation, local withholding tax regulation, points of sales optimization, etc. The CBU shops sell all types of products. These costs are therefore assigned as non_product_specific.

Proximus shops are occupied mainly by Proximus Direct Sales teams and, in a lower extent, by part of the Indirect Sales who do not have their own shops. Costs for shop space were allocated towards those teams, via module RETAIL.

Billing costs are fix, non_product_specific costs. In the specific cases of clients who have only one product to bill (1Play customer), or clients who have a panel of products belonging all to the same market, billing costs were allocated towards the concerned Market, with number of clients billed as allocation key. Billing costs of clients multiplay were split between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market, according to billed items per client invoiced, for invoice printing and postage costs, and according to turnover for teams in charge of billing&collecting'.

Retail support costs, as they are materially considered as fix, non product specific costs, are mainly allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

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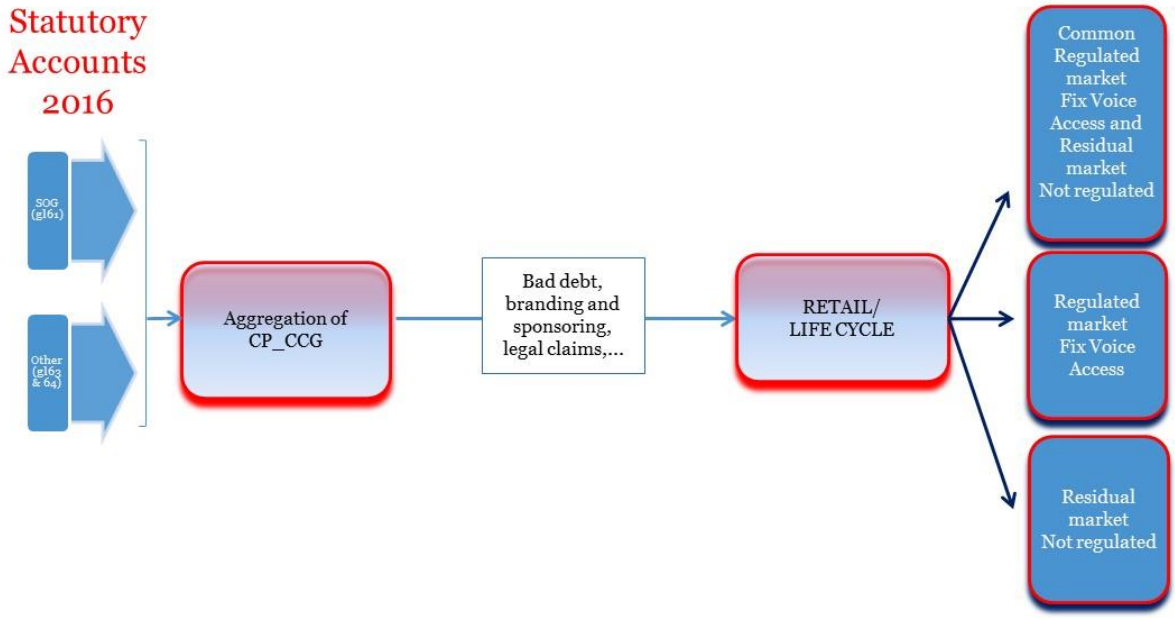
4.2.3.4 ***Retail costs which do not have a causal relationship with products (block 3)***



Per definition these costs are either fix (e.g. IT developments not capitalized for the internal needs of a Retail department, bad debt, etc.) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, etc.).

Per definition, these costs are non product specific.

Most of costs of block 3 are sent to module Retail, where linked to the activity of a Retail organisational group, prior to be routed to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

Bad debt is categorized as fix costs. Bad debt does not have a link to products but well to criteria such as competitive environment, regulatory framework (telecom laws), quality rating of the portfolio of clients, rather than to volumes of products.

Follow up and provision for bad debt is not done per products, but well per invoices and clients.

Bad debt tends to increase with turnover growth. Accordingly, we use the turnover as allocation key for bad debt to Market 0 or Market 1.

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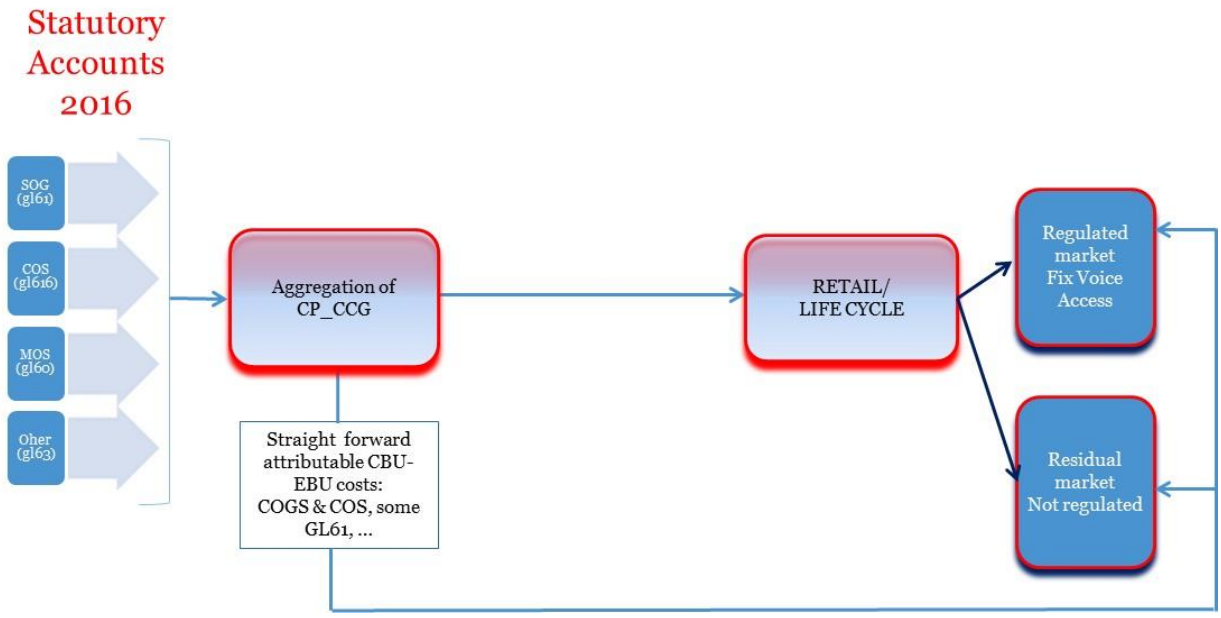
4.2.3.5 ***Retail costs which have a causal relationship with products (block 4)***



Are included in this block of Retail costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products.

Examples of costs of this category are Cost of goods sold, costs of sales (e.g: commissions indirect sales channels, interconnection fees), campaigns marketing directed on a product, and sales actions oriented on a dedicated products such as Outbound call sales actions..

Most of the costs of block 4 are gathered by similar categories into Retail and/or LIFE CYCLE modules, prior to be allocated to the Market they relate, some of them being however directly sent to the Market they relate.

Per definition, Retail costs of Block 4 have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are therefore included the following combinations of VAR_TYPE; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost of goods sold and Cost of sales have a direct link to product they relate. Therefore, they can be allocated directly.

Marketing expenses are per definition fix non_product_specific costs. Part of Marketing expenses can however be allocated to (specific) product(s) (Markets), in case of dedicated campaigns.

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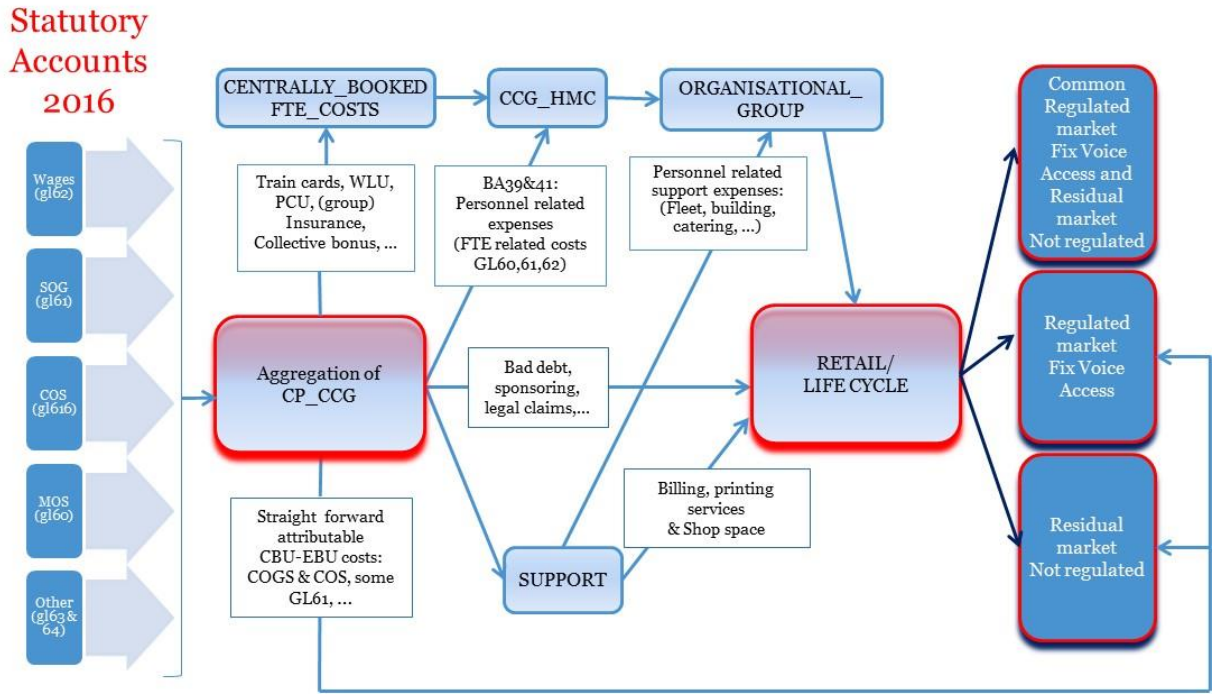
Retail allocation flows – all costs blocks (1->4), can be illustrated as follows:



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4.3 Allocation of the CWS (Customer Wholesale division) costs

The allocation flow and principles are identical to the retail costs allocation flow.

4.3.1 Wholesale costs perimeter

All Wholesale activities are situated at the level of Business unit CWS (Customer Whole Sale).

The Proximus financial and accounting structure clearly registers (directly attributable) Wholesale costs on costcenters 40xxxx.

Starting from the Proximus organisational structure, we can identify 4 blocks in the Wholesale cost perimeter:

1. Wholesale FTE costs
2. Wholesale Support costs
3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Wholesale FTE costs

   Includes all direct FTE related costs of Business unit 40 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

   Includes also a number of costs that are not directly attributed to Wholesale Business unit in the accounting books but do relate to Wholesale FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus personnel/FTE's (and thus also towards these residing under CWS). E.g.: costs re. Fleet, office building, traincards, bonus, training, gsm's in the context of the employee phone program…

2. Wholesale Support costs

   Wholesale Support costs are non FTE related costs which are centrally booked and managed but relate to Wholesale activities. E.g.: Billing.

3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

   This block includes costs such as IT developments not capitalized for applications specific to Wholesale departments, costs for legal claims, etc.

4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

   Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales and costs of goods sold, interconnection fee, etc;

Sensitivity: Unrestricted

4.3.2 Wholesale costs allocation principles

4.3.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each wholesale CP-CCG.

These attribute-qualifications are applied on all the wholesale CP-CCG combinations, but at different levels of modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Wholesale allocation process as described below.

4.3.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies wholesale costs based on their variability towards product volumes.

We distinguish between 4 var_types:

- Marginal (mar)
- Variable (var)
- Fix (fix)
- Common (common)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 4 var_types as described in chapter 4.2.2.2.

4.3.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies wholesale costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We distinguish between 2 PS_types :

- PRODUCT_SPECIFIC (PS)
- NON_PRODUCT_SPECIFIC (NPS)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 2 ps_types as described in chapter 4.2.2.3.

In addition to the attribute PS_TYPE, all wholesale costs are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

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Used Cost Groups for wholesale costs are:

Non product specific	Product specific
All CWS products	Mobile Roaming
All CWS products excluding Mobile Roaming	Fastinternet,Profinternet
	LeasedLines,Explore
	ICT
	Mobile
	FixVoiceTraffic

Since this is stricto sensu the same decision tree to qualify wholesale CP_CCG with attributes VAR and PS, than for the Retail allocation process, we refer to the decision tree presented in chapter 4.2.2.3 of the Retail module to illustrate the wholesale costs qualification with attributes VAR and PS.

4.3.2.4 *Criteria for allocation of wholesale costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to). This means that the costs will be allocated towards one of these wholesale Markets:

   Market 0 - Residual Market
   Market 4 - Unbundling local loop
   Market 5 - Wholesale Broadband
   Market 6 - Wholesale BROTSOLL
   Auxiliary service Market 1 - Access PSTN&ISDN - CPS
   Auxiliary service BRxx - Colocation
   Auxiliary service BRIO - POI

For simplification purpose in the definition of the markets in the Cost model, Auxiliary service Market 1 – Access PSTN&ISDN for Carrier Pre Selection (CPS) was included into Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards wholesale Markets (see list above) based on volumes drivers. The drivers for allocation of variable costs are documented further, per block of wholesale costs (1->4).

c. Non product specific Fix and Common costs are allocated towards Market 'Fixed Common Wholesale Markets'.

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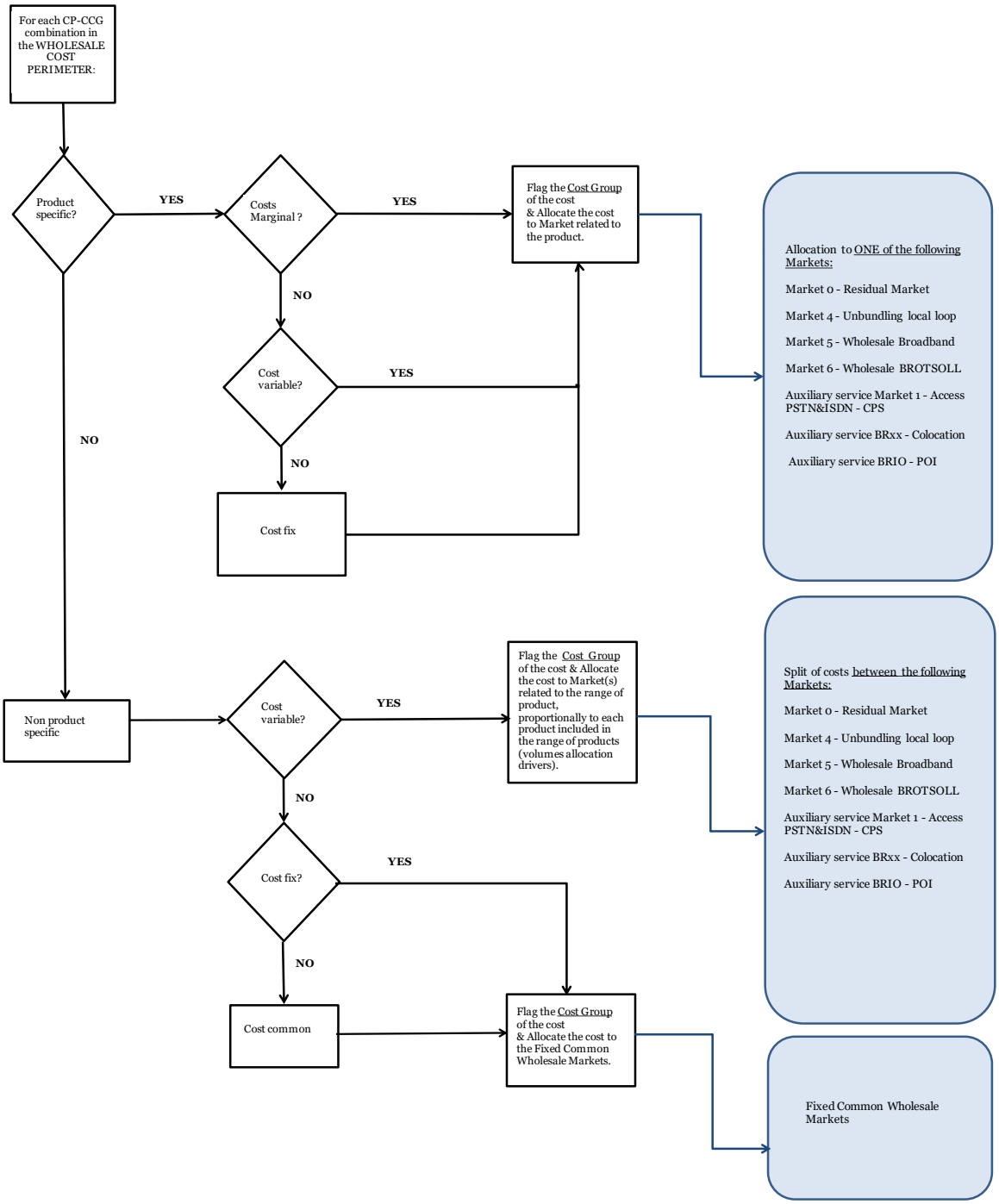
Principles for wholesale costs allocation to Markets can be illustrated as follows:



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4.3.3 Wholesale costs allocation flows

4.3.3.1 *General principles*

As described above, the 4 blocks of costs included in Wholesale cost perimeter are all specified with 2 cost type attributes (VAR TYPE; PS TYPE) prior to be allocated to Markets. Similarly to the Retail allocation flow, the 4 blocks of costs do not follow all the same path of allocation. The allocation flow followed by a Wholesale CCG_CP will depend on its block of costs (1->4).

4.3.3.2 *Wholesale FTE related costs (block 1)*

The allocation flow of Wholesale FTE related costs is the same than the Retail one. We therefore refer to chapter 4.2.3.2. for presentation of the several modules whereby FTE related costs are centralized/allocated. As a reminder, the list of modules that deal with FTE related costs is as follows:

- Cost basis (GL62, as well as some GL60&61),
- CCG_HMC or SUPPORT ([1]),
- ORGANISATIONAL_GROUP,
- WHOLESALE.

With regard to the definitions of Attribute dimension VAR, Wholesale FTE related costs can only be either Fix (FIX), or Variable (VAR) costs.

Criteria to classify FTE related costs into FIX vs. VAR costs were similarly defined as for the Retail allocation flow, id est: are considered as FIX costs, all the FTE costs needed to maintain the Proximus minimum organisational structure, independently of products volumes. These ones include staff costs such as IT officers, reporting & analysts teams, research staff (e.g.: products & solutions managers), as well as the Proximus hierarchy structure (team responsibles).

Organizational groups dedicated to a specific product are categorized as product_specific (PS). We identified only one organizational group in the Wholesale organisation structure that is product specific, id est, the team involved exclusively in Roaming agreements.

Organizational groups covering a span of products are categorized as non_product_specific.

The classification of FTE costs for CWS between FIX and VAR costs, and whether product_specific or not, is as follows:

CWS Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All CWS products
Direct Sales	Var (*)	NPS	All CWS products
Call center activities	Mix Fix/Var	NPS	All CWS products
Roaming agreements	Fix	PS	Mobile Roaming
Products & solutions management	Fix	NPS	All CWS products excluding Mobile Roaming
Strategic planning, reporting and internal process	Fix	NPS	All CWS products

(*) excluding Team responsible flagged as Fix costs.

[1] Only FTE related support costs.

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CWS Sales department is an organisational group defined as Var, non product specific. CWS sales FTE are responsible for regulated and non regulated products. The size of the department varies with the volumes of products (to be) sold.

CWS Call center activities include 3 main divisions:

- *Operational team* in contact with external clients. This division gathers the Front office and Back office in charge of the sales orders intake, answers to questions of clients, and support to the CWS Sales department in period of high business activity
- *Billing and credit collection team*
- *Reporting, IT tools management and process optimization team*.

Billing and credit collection team is qualified as "fix, non product specific"cost. Billing activity is a cost depending on volumes of clients, not on volumes of products.Billing costs is also a non_product_specific cost, as vast majority of CWS clients have more than one product by Proximus.

Reporting, IT tools management and process optimization team, as Support staff team, is identified as a "fix, non product specific" organisational group cost.

Front office and Back office costs are categorized as "variable, non product specific", considering the variability of these costs with volumes of products sold, and taking into account that CWS Call center activities handle all CWS products, regulated as well as non-regulated products.

Product specific organizational group Fix of the Roaming Team is allocated directly to non regulated Market 0.

Non product specific organizational groups Fix are routed directly towards the "Fixed Common Wholesale Markets".

Non product specific Variable organisational group's costs are split into CWS Markets based on the following volumes drivers:

1. CWS sales department costs are allocated to products (markets), according to provisioning volumes.

2. CWS Call center activities costs are allocated to products (markets) according to minutes of Voice Calls and number of BCI cases (*) handled, detailed per product
(*) BCI: Belgacom Channel Infrastructure: tool where call center registers a case (ordering, claim, complaint handling) to ensure appropriate follow up and treatment of the client request.

4.3.3.3 *Wholesale support costs (block 2)*

The wholesale support costs are identified firstly in Module "Support". Wholesale support costs specifically concern "CWS_Billing" (invoice printing, stuffing and postage).

Sensitivity: Unrestricted

We qualify CWS_Billing as a fix non_product_specific cost. Cost Group of CWS_Billing is All CWS products, since the CWS_Billing support costs include all the products of CWS, whether regulated or not.

As mentioned in chapter 4.3.3.2.3 related to the CWS CCA staff team in charge of Billing and credit collection follow-up, to the contrary of the Retail billing costs, the case that billing costs can be linked to some unique product is not met, since the vast majority of the CWS clients have more than one products billable. The absence or suppression of one product will not change the need for invoicing the client.

CWS_Billing costs are split between CWS Markets according to the park of CWS products.

4.3.3.4 *Wholesale costs which do not have a causal relationship with products (block 3)*

Wholesale costs that do not have a straightforward driver towards products are either grouped in module Wholesale, if they can be linked to the activity of a Wholesale organisational group, or they are directly routed to the Market "Fixed Common Wholesale Markets".

Per definition these costs are either fix (e.g. IT developments not capitalized for the internal needs of Sales departments) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, bad debt, etc.).

Per definition, these costs are non_product_specific.

Fix and common non_product_specific costs are allocated directly towards Market "Fixed Common Wholesale Markets".

4.3.3.5 *Wholesale costs which have a causal relationship with products (block 4)*

Are included in this block of Wholesale costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products. Costs of block 4 are either directly allocated to Market they relate, or they transit by Wholesale module, when the costs have to be gathered in the same Wholesale object at first, prior to be allocated to Market they relate.

Per definition, these costs have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are included in Wholesale costs - block 4, the following combinations of VAR_TYPE ; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_specific
Marginal	x	-
Variable	x	x
Fix	x	x

The main costs of this category are Cost of goods sold, cost of sales (e.g: interconnection fees), consultancy and outsourcing costs dedicated to specific products.

Cost of goods sold and Cost of sales, as MAR product specific costs, have a direct link to volumes of product they relate. Therefore, they can directly be allocated to the Market they relate.

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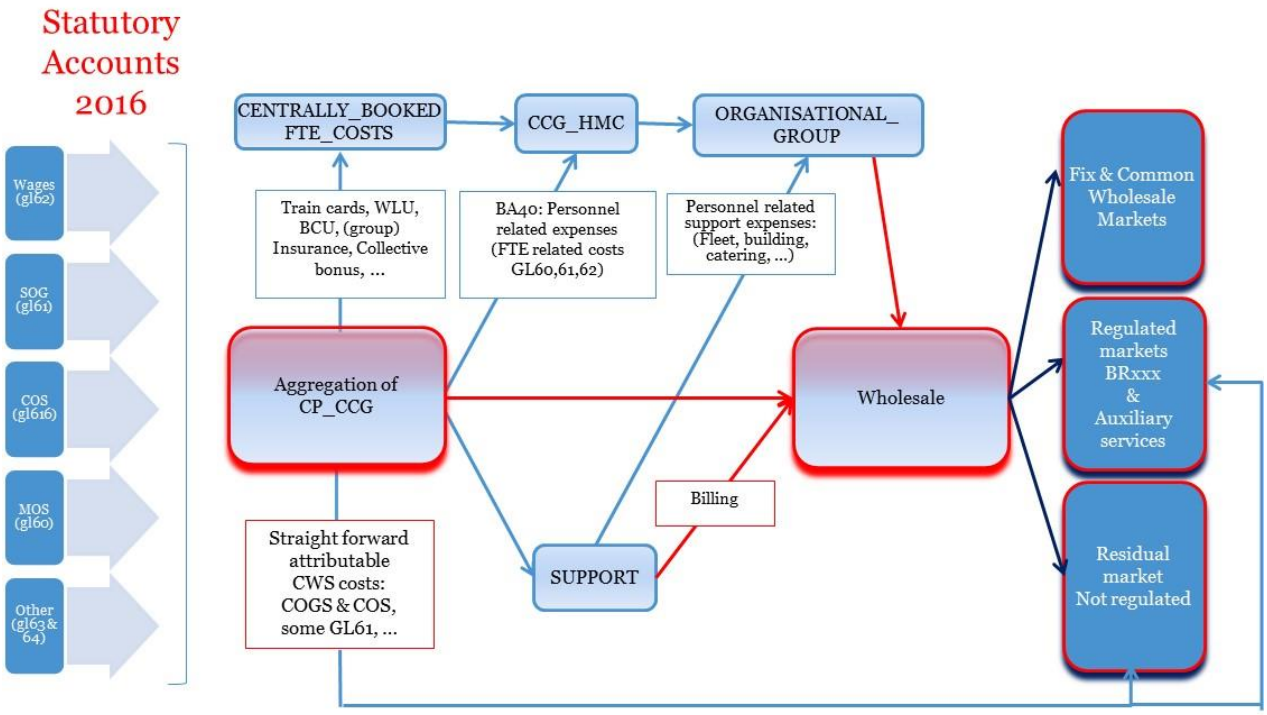
Consultancy and outsourcing costs, when related to a specific product, are allocated directly to the Market they relate. E.g.: Fees to Clearing Offices for roaming.

Wholesale allocation flows of all types of Wholesale costs is presented as follows:



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

Sensitivity: Unrestricted

4.4 Allocation of the CUO (Customer operations) costs

4.4.1 Customer operations costs perimeter

Customer operations is a new Business unit created in 2014. The division gathers activities previously done inside these Business Units: Consumer Business Unit (CBU), Service Delivery Engine (SDE) and Staff and Support (S&S).

Objective of the creation of the Business unit Customer operations (CUO) was to join in the same Business Unit all the Proximus activities to the service of the customer.

CUO concerns both commercial retail (e.g. commercial call centers) and technical retail activities (e.g. technical call centers).

In the 2015 and 2016 Cost model, we ensured consistency with allocations of previous year by allocating costs of CUO in the same way as done previously inside the separate Business Units CBU, SDE and S&S, for the CCG concerned.

The Proximus financial and accounting structure clearly registers (directly attributable) CUO costs on cost centers 49xxxx and 50xxxx.

However, a number of costs are not directly attributed to CUO in the accounting books but do relate to CUO activities.

It concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's.

E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

These costs are added up with the directly attributable FTE related costs and allocated to CUO CCG towards the organisational groups.

We refer to chapter 4.2.3.2 Retail FTE related costs, where the allocation flow is described for FTE related costs, as it is applicable to CUO FTE related costs.

For what matters human power costs, the CUO module is primarily sourced from the following modules:

1. **Organisational_Group**
   This concerns the CUO FTE related costs.

2. **CP1**
   This mainly concerns the outsourcing costs for the field and remote technical activities (provisioning and repair).

3. **CUO_SOG**
   This primarily concerns costs for the outsourcing of commercial call centers (front office and after sales).

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4.4.2 Customer operations costs allocation principles

4.4.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each Customer operations CP-CCG.

4.4.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies customer operations costs based on their variability towards product volumes.

We distinguish between 2 var_types:

- Variable (var)
- Fix (fix)

As they have the same definitions than for Retail allocation, we refer to the definitions of these 2 var_types as described in chapter 4.2.3.2. Retail FTE related costs.

4.4.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies CUO costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards specific products.

Considering the activities of CUO Business unit (activities of services to the customer), most of the costs are non product specific.

Sensitivity: Unrestricted

4.4.3 Customer operations costs allocation flows

4.4.3.1 *Allocation of Organisational Group costs*

The classification of FTE costs for CUO between FIX and VAR costs, and whether product specific or not, is as follows:

CUO Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All Proximus products
Support services to the business unit			
Strategic planning	Var (*)	NPS	All Proximus products
E2E operations: IT tools, reporting & process	Var (*)	NPS	All Proximus products
Technical services to the customer			
After sales technical - provisioning (1)	Var (*)	NPS	All Proximus products
After sales technical - repair (1)	Var (*)	NPS	All Proximus products
Field Cable	Var (*)	NPS	All Proximus products
Commercial services to the customer			
After sales commercial (2)	Var (*)	NPS	All CBU and CWS products
Directory Information Services	Var (*)	PS	Directory Assistance Services and listing
Billing & Collecting invoices	Fix	NPS	All CBU and EBU products

(1) Remote and field

(2) Back office of Telesales agents for provisioning and complaints handling

(*) excluding Team responsible flagged as Fix costs

Technical services to the customer

The allocation for fix & var organizational groups is the same (fix is a copy of var through a generic key implemented in TCE tool). There are exceptions to this principle, in which case the fix allocation directly goes to common markets. The latter applies when variable costs of a team are sent to the life cycle.

The FTE related costs of organizational groups are mostly allocated to the LIFE_CYCLE, modules of Network elements or MARKETS based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Dispatch units for Field operations, Minutes of interactions with the customer for the remote repair of mass products, etc.).

Commercial services to the customer

- After Sales commercial costs are split between Market 1 – Access PSTN&ISDN & Market 0 – Residual Market for teams handling CBU products, and between Wholesale Markets for teams handling CWS products. The allocation is based on volumes of time or efforts spent for the respective products, as collected in ordering and complaints handling operational databases.
- Directory Information Services are allocated directly to Market 0.
- Billing and Collecting invoices activities are split between Market 1 – Access PSTN&ISDN and Market 0, according to turnover of the two divisions CBU and EBU, the two beneficiaries of this CUO service.

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Costs of Organisational groups of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. to more developments on allocation keys of CUO Organisational groups.

4.4.3.2 *Allocation of Outsourcing costs*

Outsourcing costs include:

- costs gathered in module CP1 for technical teams and
- the commercial call centers outsourced (front office and after sales).

When activity is similar, outsourcing costs are allocated with the same drivers (based on time/efforts) than used for the Organisational groups. When activity is specific, dedicated allocation keys were applied.

Outsourcing costs of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. for more developments on allocation keys of CUO Outsourcing costs.

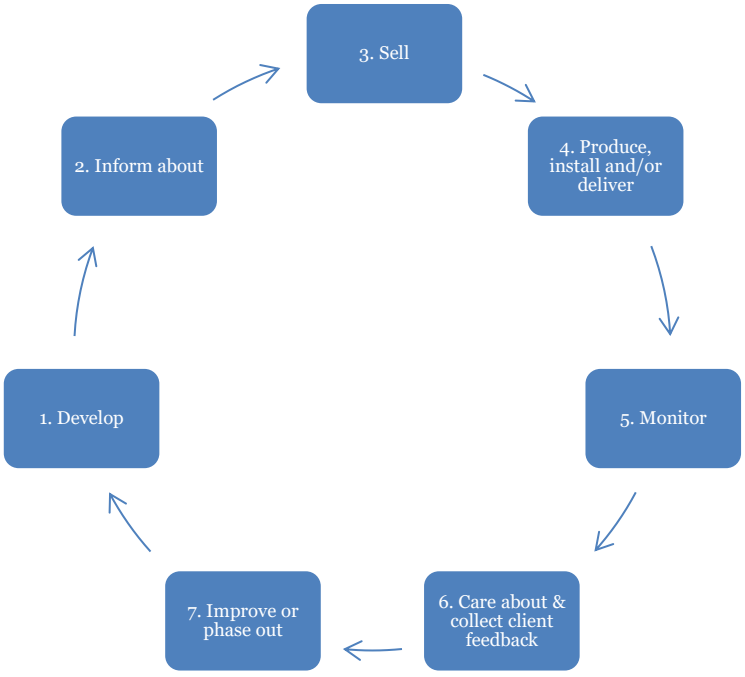
Sensitivity: Unrestricted

4.5 Allocation of Costs included in the Life cycle of products

4.5.1 Cost perimeter

Since the 2014 Cost model, all the costs included in the life cycle of a product/service were specifically gathered in a module, the LIFE_CYCLE MODULE, prior to be allocated to Markets.
The costs were sourced primarily from modules OTHER_MOS, OTHER_SOG, COMMERCIAL_RETAIL, AC and CUSTOMER_OPERATIONS.

The life cycle of a product includes the following stages:



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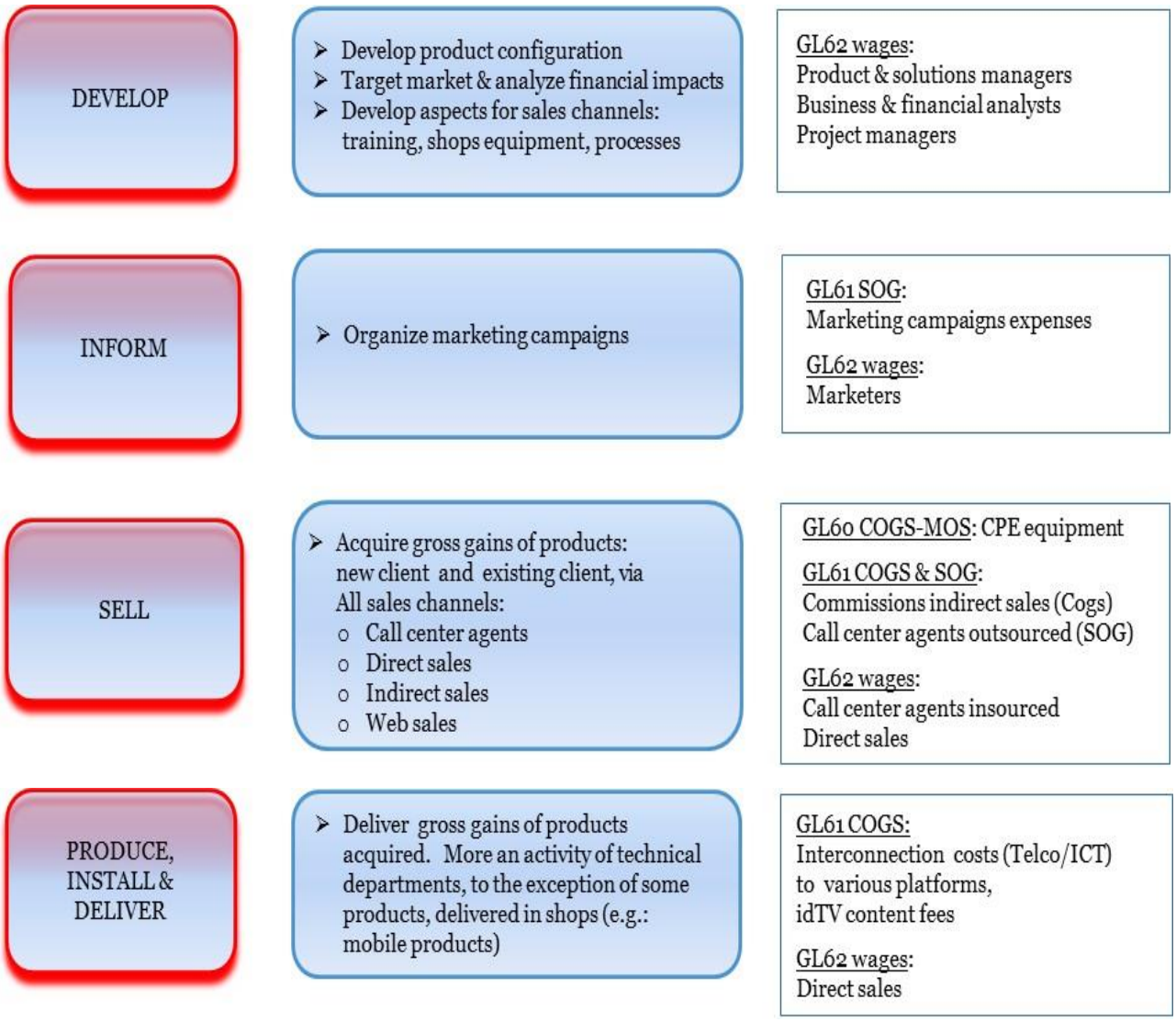
Following costs were identified in the life cycle of a product/service:



Sensitivity: Unrestricted

DELIVER : Remote activation

- All products (mass or professional, fixed or mobile) must be remotely activated in the network.
- The remote activation may be sufficient to deliver the product in specific cases but in many cases, a field travel is necessary to complete the product delivery.
- Ideally, the remote activations would all be automatically executed further to an order from the customer in the IT systems but in reality, this process still requires manual interventions.
- The complexity of professional remote activations naturally requires a specific and important team (CNN). The activation activity in the life cycle refers to CNN.
- The PCD (Provisioning Coordination Desk) mass remote activation activity is consolidated with the dispatching activity in the DCO included in the field installation life cycle activity.

GL61 SOG:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

GL62 wages:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

DELIVER : Field installation

- A remote activation of the product in the network may not be sufficient, especially in the case of fixed products.
- In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions :
  - in the network up to the NTP (Network Termination Point in the customer house) (even DIY installations by the customer may require a field action in the network) and/or
  - outside of the network e.g. for mass products, the modem and/or TV decoder (FULL installation).
- The field installation activity in the life cycle relates to the work done by the technicians outside of the network.
- It also includes the remote activation (for mass products) as well as the dispatching activities from the DCO.

GL60 MOS-MAT:
Equipments like modems and/or TV decoders, located in "Terminals" life cycle various categories

GL61 SOG:
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

GL62 wages :
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

Sensitivity: Unrestricted

MONITOR: Billing & Collecting Revenues	➢ Produce and send bills ➢ Manage bad debt: follow ageing balance, send reminders & bailiffs costs	GL61 SOG: Printing & postage costs Bailiffs costs GL62 w ages: Call center agents insourced (dedicated team Billing&Credit risk) GL 63&64 Other: Bad debt provision & write-off
MONITOR: Changes on products sold	➢ Adapt product configuration, in accordance with requirements of the client: swap, downgrade/upgrade of a pricing plan, additional option, churn, configure multiple products in a pack (pack configuration)	GL61 SOG: Call center agents outsourced GL62 wages: Direct sales, Call center agents insourced
CARE: Handling clients complaints	➢ Handle billing complaints ➢ Process request for changes of personal data (clients moves, etc.)	GL61 SOG: Call center agents outsourced GL62 wages: Call center agents insourced, Direct sales
CARE: Remote repair	➢ When a customer has a technical issue with a product/service, he/she can contact the appropriate call center (mass or professional). Whilst the customer is waiting on e.g. the CHC line, the DARE IT system already processes the customer data in order to test potential issue drivers. ➢ The first line call center agent may be able to fix the issue of the customer … or not. ➢ In the later case, the call center agent will call upon the second line agents who themselves will call upon a third line outside of CHC or ISO if they can 't fix the issue. ➢ The remote repair activity in the life cycle relates to the CUO CHC (Customer Operations, Customer Help Center, for mass products) and the EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology - for professional products)	GL61 SOG: CUO CHC (Customer Operations, Customer Help Center) for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products GL62 w ages: CUO CHC (Customer Operations, Customer Help Center for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products

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CARE: Field repair	➢ A remote repair of the customer technical issue for one or several products may be impossible, be it by the first, second or third line. ➢ In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions : ➢ in the network e.g. the ROP, the LEX, the NTP (Network Terminating Point, in the customer house) and/or ➢ outside of the network in the customer office for professional products or house for mass products (e.g. the modem, the TV decoder). ➢ The field repair activity in the life cycle relates to the work done by the technicians outside of the network. ➢ It also includes the dispatching activities from the DCO (Dispatch & Cordination Center).	GL61 SOG: *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair GL62 wages : *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair
CARE: Retention & Loyalties programs	➢ Inform about loyalties actions & facilities, ➢ Implement retention actions	GL60 MOS-MAT: Sales gifts and loyalties advantages GL61 SOG: Call center agents outsourced GL62 w ages: Call center agents insourced
IMPROVE or PHASE OUT	➢ Design product new configuration/phase out ➢ Target market & analyze financial impacts ➢ Develop aspects for sales channels: training, shops equipment, processes	GL62 wages: Product & solutions managers Business & financial analysts Project managers

Sensitivity: Unrestricted

4.5.2 Allocation drivers

Allocation drivers for VAR costs to the Life_cycle module are the following ones:

	Sourced from Module(s)	Driver for allocation to Life_Cycle split per product and customer segment
Organisational groups costs		
Commercial services to the customer		
Marketing	Commercial_Retail	Detail of marketing expenses
Sales and after sales, insourced&outsourced, mass market products	Commercial_Retail/ Customer_operations(1)	Time&efforts spent per product according to operational volumes for ordering&complaints handling
Sales and after sales, insourced&outsourced, professional market products	Commercial_Retail	Time&efforts spent per product according to TTVA/revenues
Indirect sales, mass market and prof. market products	Commercial_Retail	Commissions paid
ICT dedicated ressources: governance&sourcing	Commercial_Retail	Direct
Billing&Collecting invoices: FTE costs	Customer_Operations	Turnover per business area and per product
Technical services to the customer		
Customer activation	Customer_Operations	SAP HR teams names and configured nodes
Customer field installation&repair on copper	Customer_Operations	DU (Dispatch Units) translating time spent on activity
Customer remote repair, mass market products	Customer_operations(2)	#FTE and minutes
Customer remote repair, prof. market products	Commercial_Retail(2)	#FTE and minutes
Assets and Cost of good sold/cost of sales		
CPE rented	AC	Direct
idTV content fees	AC;Other(*)_SOG	Direct
CPE sold	Other(*)_MOS; Customer_Operations_MOS	Direct
Interconnection	Other(*)_SOG	Direct
Outsourced ressources/IT platforms&applications	Other(*)_SOG	Direct
Sales gifts	Other(*)_MOS	Direct
Other		
Bad debt	Other(*)_DEPR;Other(*)_OTHER	Direct
Internal distribution costs	Support	Value of material moved out of stock (3)
Billing & Collecting invoices: Printing & stamps costs	Commercial_Retail	#billed clients, weighted when multiplay clients

(*) Commercial Retail costs.
(1) Commercial Retail:
Direct sales
Call centers insourced: Front office Telesales (Inbound calls)
Call centers outsourced: Front office Telesales (Outbound calls)
(1) Customer operations:
Call centers insourced: Back office Inbound calls
Call centers outsourced: Front office Telesales (Inbound calls) and Back office Inbound calls
(2) Commercial Retail: Customer_operations:
EBU OPS ISO (Operations - ICT Services operations) CUO CHC (Technical call center)
(3) Opex and Capex.

Commercial services to the customer:

Below, we give some specifications about drivers of sales and after sales costs.

1) Sales and after sales, insourced and outsourced, mass market products

This Life_cycle object includes all Sales and After sales channels handling "simple" products, i.e. mainly Telco products (fix voice, fix internet, idTV, mobile). This category includes also products for small size enterprises. In short, it includes all CBU consumer business unit sales channels (even is, as from 2014, some of these channels are in the new CUO business unit).

Call centers agents:

- *Front Office* is the department with FTE who are in contact with external clients. Activities of the Front office are primarily sales and sales orders intake, supported by the After Sales department.

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- *After Sales* department is the CCA Back office. Its tasks are primarily input in systems of sales orders, handling of clients billing complaints and requests (e.g.: change of invoicing address).

The IT managing system for tracking calls handling of the *Front office* is the **IVR** (Interactive Virtual Response), where calls passed and minutes of calls are recorded, for fix line products and mobile products.

The IT managing system for tracking activities of the *After Sales* is **BCI** (Belgacom Channels Infrastructure) where cases detailing activity of the agents (ordering, complaints handlings, requests), for fix line products and mobile products, are registered.

Usually, ordering is passed by Front office agent, simultaneously with the sales, but when the ordering takes longer time (because need for installation on field, or due to any longer issue), task is delegated to an After Sale agent who will create a case in BCI.

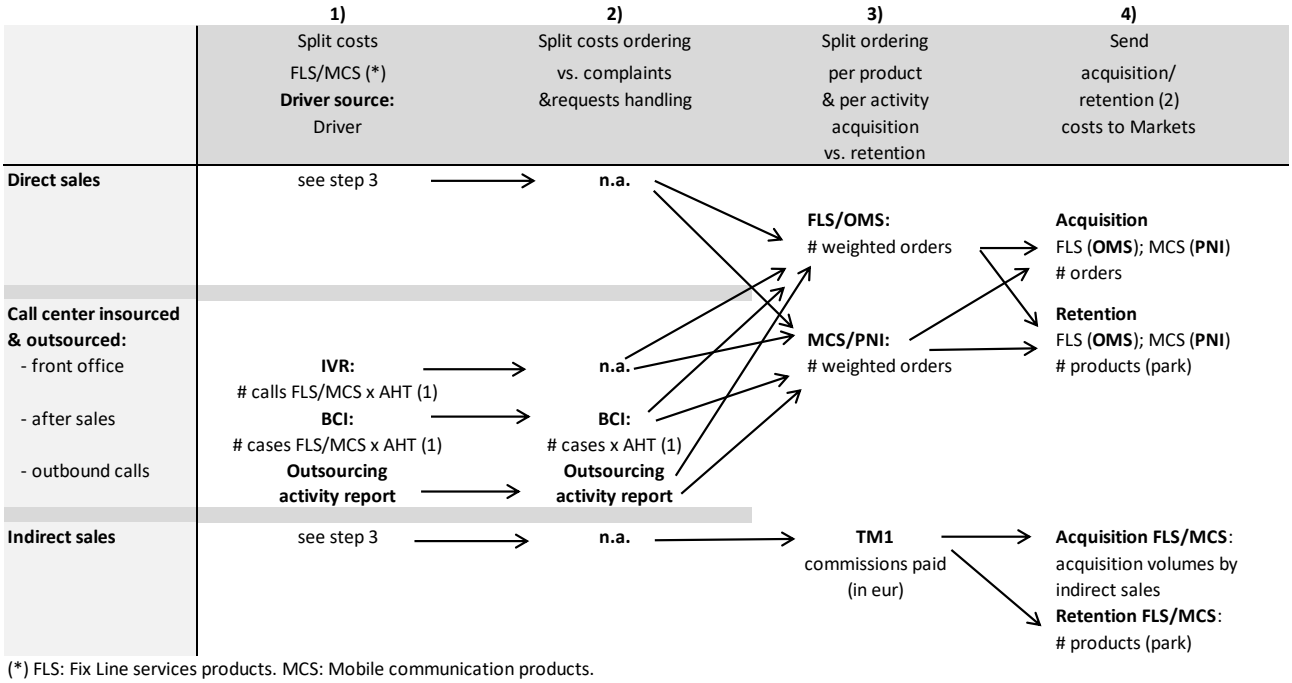
The IT managing system for ordering of the Front office and the Back office is **OMS** for fix line products, **PNI** for mobile products.

OMS and PNI track records of orderings per product and per type of ordering: acquisition (gross gains) vs. retention (additional option, swap of pricing plan, churns, change, pack configuration, etc.)

Cost model use OMS and PNI operational volumes as allocation drivers for ordering.

For After Sales agents, activity is at first split between ordering and complaints handlings, with BCI reports.

Allocation drivers of Sales and After Sales, mass market products, can be presented as follows:



(*) FLS: Fix Line services products. MCS: Mobile communication products.

(1) AHT: Average handling time. Effort spent per product are weighted, based on a study of time for handling products.

(2) Complaints handling are handled as ordering retention activities: allocation to market with # products - park.

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2) Sales and after sales, insourced and outsourced, professional market products

This life_cycle object includes all EBU business unit sales and after sales channels.

EBU owns his dedicated after sales department: Operations-Business Support Centre (OPS-BSC).

OPS-BSC deals as the back office of the EBU Direct sales for complex ordering, as well as front office towards EBU clients for all what concerns commercial issues on products, Telco, fix&mobile, and ICT. We referred to team's names to split OPS-BSC into Telco Fix, mobile and ICT costs, since OPS-BSC is organized in teams dedicated per product.

Like CBU, EBU sales and after sales can be split into 2 big categories: acquisition costs, and retention costs. We include in retention costs the complaints handling activity of OPS-BSC.

EBU sales activity of ICT cannot be declined in volumes. ICT solutions are offered to the clients as tailor-made contracts, declined in SLA (Sales level agreement) and quoted in EUR.

Besides, ICT contracts include most of the time One-time items. The need to split costs of EBU Sales between products led us to take another allocation key than volume driven.

On top of the fact that not all the EBU products can be declined in volumes, EBU sales efforts are quite different depending on the product. EBU Telco mass market products are quickly available to the client, to the contrary of projects ICT that are generally sold for a 2-3 years minimum period time. Such a long time period contract needs sales efforts deployed on longer period of time too.

To tackle this key point, we took 2 drivers to allocate EBU Sales and after sales costs:

- Total transaction value (TTVA) to measure acquisition sales costs,
- Yearly turnover to measure retention sales costs.

TTVA measures the total yearly value of a won contract. Taking the TTVA as driver enables to compare with a simple unit of measure (EUR) products with specificities very different such as Telco mobile subscription, ICT Data center hosting subscription, etc. Besides, inside EBU Business unit, the TTVA generated is the central driver for all what matters remuneration of direct and indirect sales channels, sales bonus calculations, etc.

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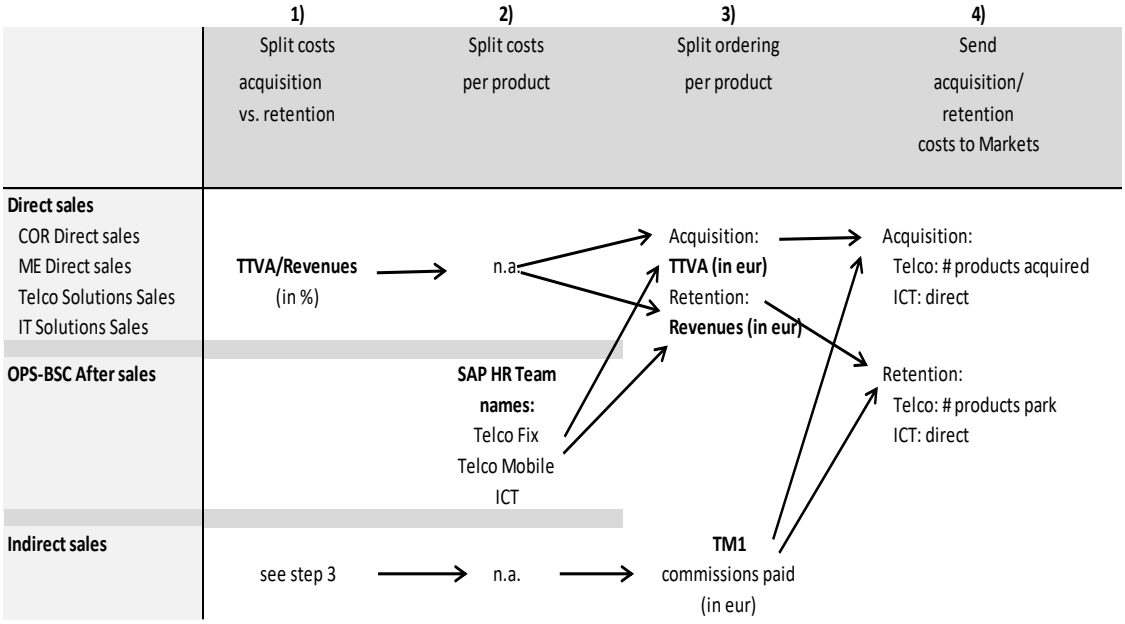
Allocation drivers of Sales and After Sales, professional products, can be presented as follows:



Sensitivity: Unrestricted

4.5.3 Modern equivalent opex (MEO)

The 2014 Cost model introduced the concept of modern equivalent opex: a company will perform an activity with its own personnel, if the use of its own personnel is equivalent in costs to another business model such as partnership, outsourcing, interim workers, commissioning, etc.

The MEO introduces a new way to determine VAR costs. Objective of the MEO is to only keep as VAR costs the incremental, effective costs needed to perform an activity, by comparing unit cost of FTE Proximus with unit cost of Outsourcing.

MEO concept application requires some basics:

- comparison basis is reliable: activities insourced and outsourced must be of the same nature,
- same drivers must be available to compare both costs.

MEO application to Commercial activities:

Proximus outsources part of its commercial activities: direct sales, front office and after sales. These activities are also performed with Proximus FTE, as described above.

Direct sales and After Sales team cannot appropriately be compared to their outsourced equivalent teams: performance remuneration differs, tasks differ quite also.
E.g.: After sales outsourcers are used for specific tasks, often easier than the ones assigned to Proximus FTE, more trained and skilled about Proximus products and IT Tools.

The only sales channel where we can apply the MEO valuably is the Front office.

Front officers:

- use the same Proximus IT tools (**IVR**-see above), where volumes and minutes of calls are registered.
- perform the same tasks: receive phone calls of clients and promote Proximus products & services.

Unit cost/minute of the Front office Outsourced is applied to volumes of minutes of the Front office Insourced, to determine the MEO Front office VAR costs, other part of cost is considered as a Fix cost.

MEO application to Technical activities:

CUO outsources part of its VAR Retail activities: remote repair (by the CHC/Customer Help Center technical call center), field installation and field repair. These activities are also performed with Proximus insourced FTE, as described above.

The CUO CHC technical center second line may not come into consideration for MEO: tasks differ from the first line ones and cannot be measured the same way. However, tasks of outsourcers for both field installation and field repair do not differ and can be measured the same way, as well as tasks of outsourcers for the CUO CHC technical center first line.

MEO is thus valuably applied to the CHC technical call center first line as well as the field installation & the field repair.

Front officers (the first line of the CHC technical call center for remote repair):

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- use the same Proximus IT tools & volumes and minutes of calls are registered the same way.
- perform the same tasks: receive phone calls of clients and try to remotely repair the products.

Technicians (for both field installation and repair) :

- use the same Proximus IT tools & volumes and DU are registered the same way.
- perform the same tasks: install and repair products/services of customers on the field.

Unit cost/minute of the Outsourced Front office is applied to volumes of minutes of the Insourced Front office, to determine the MEO technical Front office VAR costs, other part of cost is considered as a Fix cost.

Unit cost/DU (measure of time) of the Outsourced Technicians is applied to volumes of DU of the Insourced Technicians, to determine the MEO Technicians VAR costs, other part of cost is considered as a Fix cost.

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5 TEC OPEX (network&IT) stream

5.1 Allocation of TEC OPEX costs going through the "TECHNOLOGY" INCA module

5.1.1 Determination of the TEC cost perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units :

- Consumer Business Unit (CBU) has the responsibility over the residential and small enterprise customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver (commercial and technical) services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential and small enterprise customers and at the level of Business unit EBU (enterprise business unit) for the other professional customers (medium and corporate enterprises).

Network & IT activities are situated at the level of Business unit TEC, as well as the carrier & wholesale activities (CWS).

The Proximus financial and accounting structure clearly registers (directly attributable) TEC costs on cost centers 50xxxx, separately from the wholesale costs booked on cost centers 40xxxx.

However, a number of costs are not directly attributed to TEC in the accounting books but do relate to TEC activities.

It concerns :

1. FTE related costs
   Support and centrally booked costs which need to be ventilated towards all Proximus personnel/FTE's (and thus also towards these residing under TEC).

   E.g. Proximus University, Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program.
2. Non FTE related costs
   Costs which are centrally booked and managed but relate to TEC activities such as space and power consumption.

The costs under point 1. above are added up with the directly attributable FTE related costs (essentially all payroll costs and costs categorized with Cost type 'personnel-related' in the cost base, in lesser extent a limited number of costs categorized as 'non personnel-related', i.e. primarily

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training costs, printing costs and cost for office equipment) and allocated towards the organisational groups (as a general rule, the organisational group corresponds with the cost center group - except for teams like hybrid network & IT CCG's (SPC NSC) or NEO IPP or NEO OPP).

The TECHNOLOGY module costs are primarily sourced from the following modules :

1. Organisational_Group
   This concerns the costs of "50xxx" organisational groups not belonging to CUO.

2. TEC_SOG
   This primarily concerns costs for consultancy, rent/buy equipment.

5.1.2 TEC cost allocation

5.1.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

For TEC, these attribute qualifications are not defined at the level of the cost base for all CP-CCG combinations but only for the FTE related costs at the level of the organisational groups (module "organisational_group").

5.1.2.2 *Criteria for Attribute dimension VAR_TYPE*

Dimension VAR_TYPE only qualifies TEC FTE-related costs in the TEC module, unlike in the commercial retail module.

Variability refers to the service volume produced by the company in the long-run. This variability has 2 dimensions : volume within a product or diversity of products. The considered increment is the whole product. E.g. PSTN : what if we stop PSTN, which costs do we avoid? This is very hard to reach, especially in a top-down model.

Therefore, we prefer to opt for a simple approach that is only an approximation of the minimum fixed costs, by only considering as fixed FTE-related costs the so-called overhead teams and the minimum organizational structure, represented by the persons attributed with a "team responsibility" or in an MST cost center, as officially reported in the SAP accounting system.

We distinguish between 2 var_types only (unlike Retail, with 4 var types):

1. Fix (fix) : TEC FTE-related costs are considered as fixed mainly when they are related to the minimum organizational structure (represented by the team responsibles and the Management & support teams) should there be a change in the long run.
2. Variable (var) : TEC costs which are not considered as fixed according to the definition hereabove (hence overestimated).

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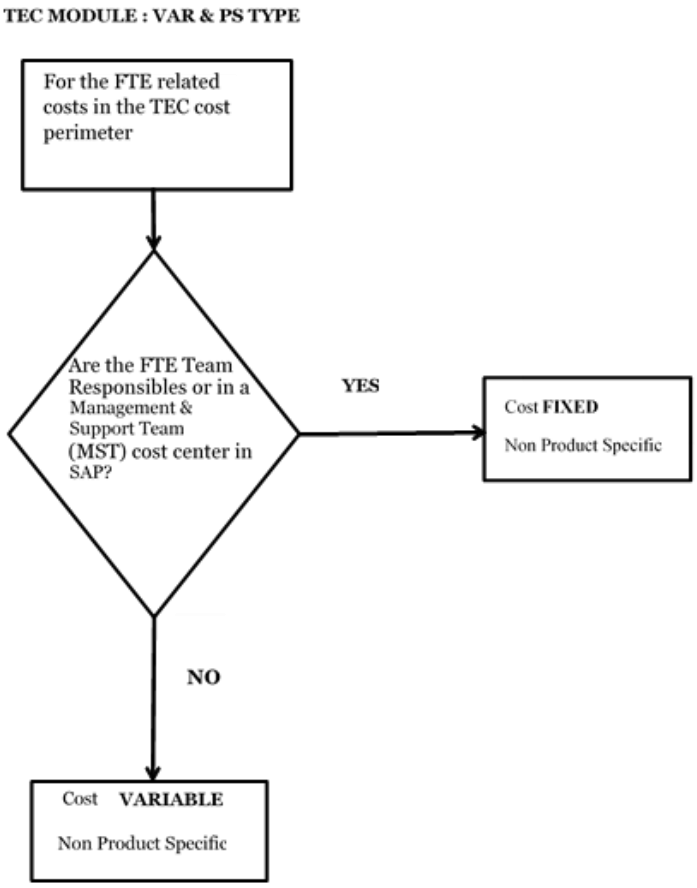
5.1.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies TEC costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We only have one category in the TEC module :

a. NON_PRODUCT_SPECIFIC : TEC costs which do not have a clear (causal) relation with specific products.



5.1.3 TEC allocation process

5.1.3.1 *Allocation of "Organisational_Group" costs*

For TEC, except for teams like NEO IPP or NEO OPP, the organisational groups correspond with the cost center groupings as introduced at the level of the cost base.

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The criteria as set above (5.1.2.2.) regarding variability are currently translated towards organisational groups based on this decision table :

	Criteria	Justification
fix FTE	Assigned as Team responsible in SAP	Assumption of Proximus as ongoing concern on the long run, independent of Product mix : maintain the same organisational structure (reflected through team respo's)
	Assigned to an MSTcost center in SAP	MST cost centers are referring to Management & Support teams

Organisational groups dedicated to a specific product are categorized as product_specific.

Organisational groups covering a span of products are categorized as non_product_specific.

In TEC, all organisational groups have been defined as “non_product_specific”.

The allocation for fix & var TEC organizational groups is the same (fix is a copy of var through a generic key implemented in INCA).

The FTE related costs of organizational groups are allocated towards markets, network or IT elements based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Rapid for ITS and SPC…).

5.1.3.1.1 Technology (TEC) Organisational group allocation

5.1.3.1.1.1 TEC network & IT OPEX organizational group allocation

The network & IT teams of TEC are thus split into fix and var on the basis of objective criteria found in SAP but allocated the same way (var being a copy of fix) to the following elements :

- AC2
- BUSINESS_OVERHEAD
- CP2
- IT_SW_HW
- IT_STORAGE_DB
- NE
- OVH
- MARKET

In the TEC module, the organisational groups do not only encompass the costs of GL 62 wages (including the PFA, capex manpower), but also FTE-related costs from GL60 MOS or GL 61 SOG, as well as outsourcing costs.

In the later case, the driver is mostly the same (based on time/efforts) when it makes sense.

The allocation of the “operational” teams is done directly through the driver whilst the allocation of the “non operational” teams is done through generic keys taking into account the scope of the “non operational” team (driver is the remuneration cost allocation of all the teams in the scope of the “non operational” team).

The allocation of the “fix” part of the “operational” teams is done through generic keys (a simple copy of the remuneration cost allocation of the “var” part of the same operational team).

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5.1.3.2 *Allocation of TEC support costs*

Module 'Support' identifies and collects the costs of a number of support objects which a.o. are TEC related. The TEC related support objects primarily concern costs for telco power & space. However, telco power & space costs are not treated in the TEC module and are thus not described in this subchapter.

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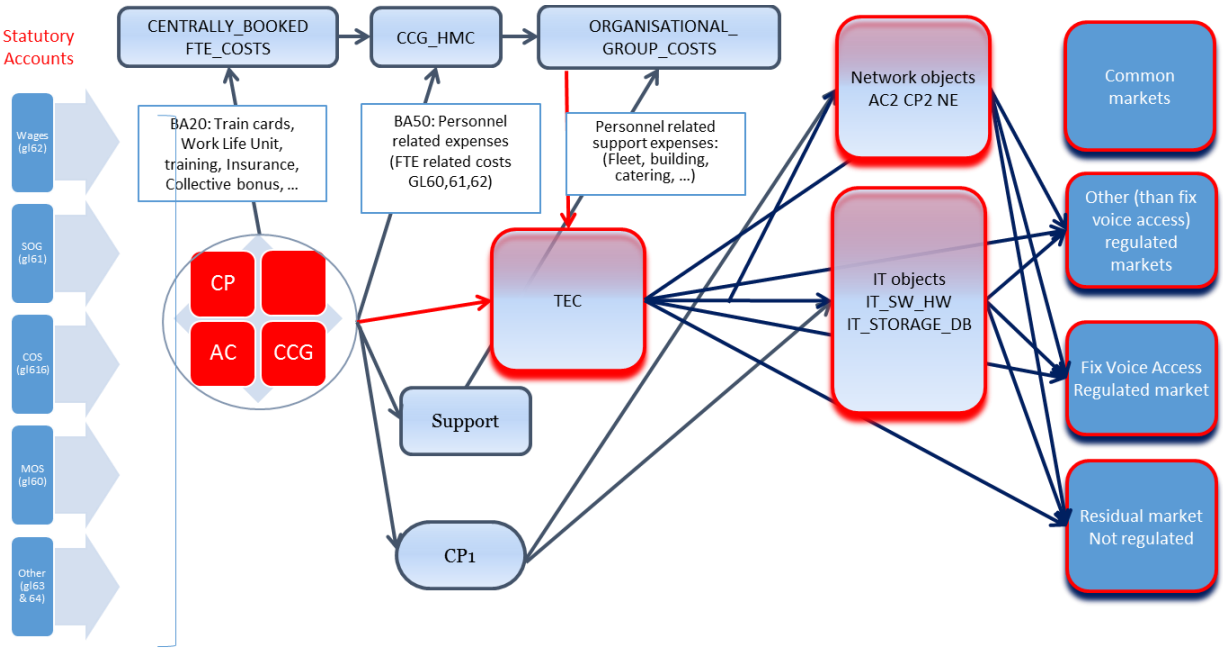
5.1.3.3 *Graphical view on TEC OPEX allocation flow*



CP = Cost Pool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs. Typically, the G/L accounts/costs consolidated in a single cost pool feature the same causal relation.
CCG = Cost Center Grouping = grouping of cost centers with comparable characteristics
AC = Asset Class

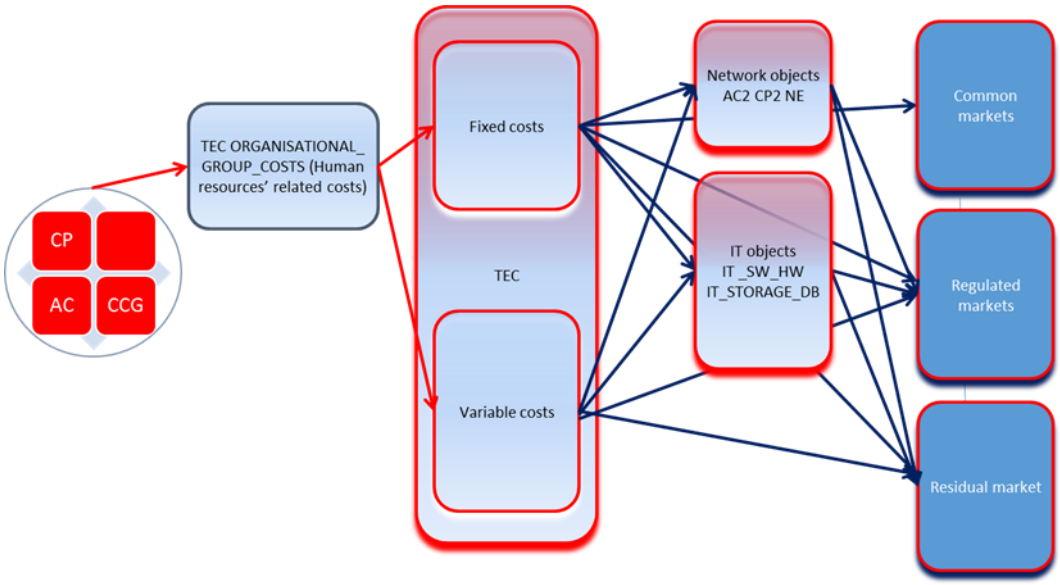


Figure 3: TEC OPEX Flow – General

Figure 4: TEC OPEX Flow – Fix / Var

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5.2 Allocation of TEC OPEX costs not going through the "TEC" TCE module

5.2.1 GL61 accounts – Services and Other Goods (SOG)

The GL accounts in the 61 range mainly register outsourcing, consultancy, renting & maintenance costs as well as miscellaneous costs driven by staff (GSM, memberships, office material, internal events etc.).

The GL61 accounts are at a sufficient detail level to allow for a direct allocation to one of the cost objects of the allocation flow. The destination cost objects are distributed over different allocation modules : CCG_HMC ,CP1,CP2,IT_HW_SW,Market,NE,Life_Cycle,Technology.

5.2.2 GL60 accounts – Material Out of Stock

The GL60 account costs cover the cost of all kinds of material taken out of the stocks of Proximus and used for the repair and provisioning of network or the cost of small items (office material, GSM,…) consumed by the staff in the context of their daily activities.

Note that movements from stock also occur for the construction of the network; these costs are capitalized. From SAP-MM, it is possible to filter out the movements to be capitalized and the others. The capitalized MOS costs are implicitly treated with the assets.

MOS costs are reported at CP/ GL account level per cost center.

This level doesn't always allow an accurate attribution of the costs to the model cost objects and therefore an analysis is performed at the cost base level together with detailed information out of the SAP database .

- The SAP records are reported among other detailed information such as the Material Item Number, where the amounts can be directly attributed to a cost object of the cost model based on the description of the material item.

  The SAP database contains more than 600.000 records.

This analysis results in an allocation towards: network related cost pools (CP1, CP2, NE), CCG_HMC and Lifecycle cost, market and Technology.

Once each material item is attributed to a cost object, it is easy to report an allocation from the CC/GL account aggregate to the model cost objects.

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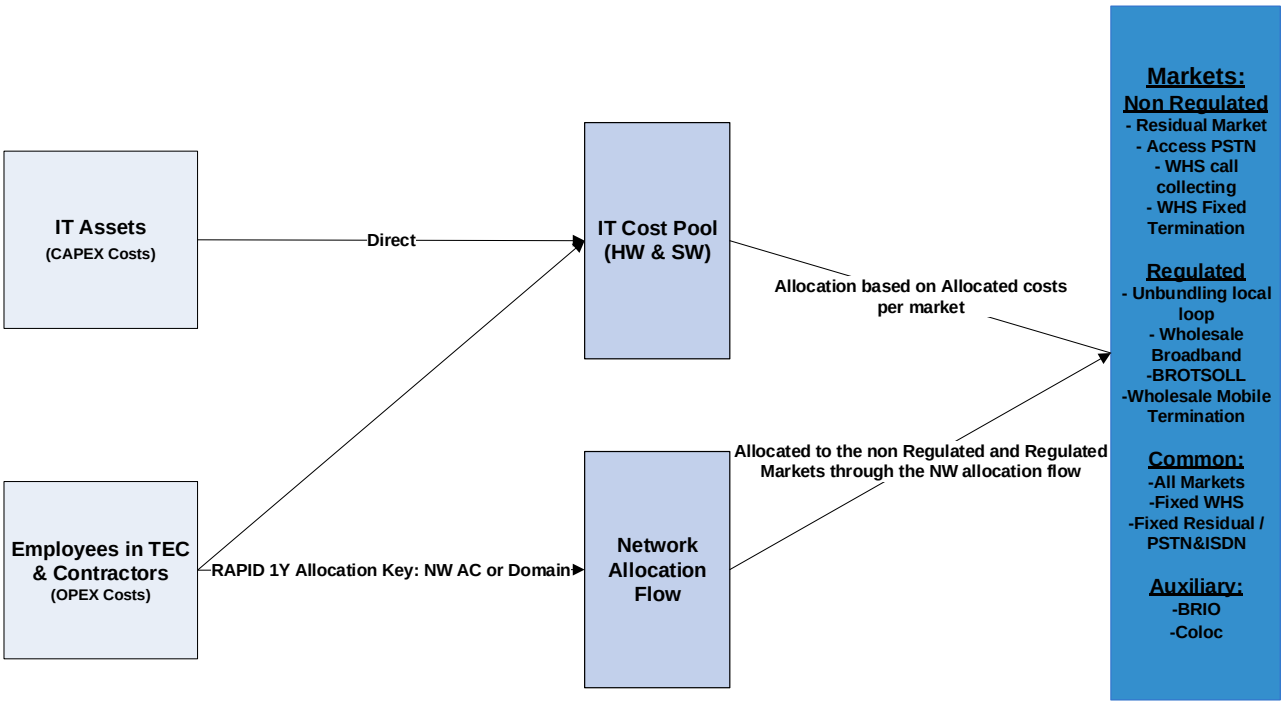
6 IT stream

6.1 IT Allocation flow

6.1.1 IT allocation flow: Introduction

The IT model can be summarized by the following drawing representing the different IT Modules as defined in the IT model, as well as describing objects contained in each of them. The creation of these modules and objects will be detailed in the following paragraphs as well as how they are allocated to each market through an allocation which uses causal and generic keys created with data available in different inventories or reporting systems within the company.

ICT is the use of programs with a specific infrastructure to deliver a requested service or product to the end-user (which can be a Proximus Client or a Proximus Employee/Contractors). In Telecommunications, an incumbent ISP will rarely develop an Application or invest in a project exclusively for one regulated product or market. Most of the time, its specifications will cover multiple usages. Therefore, the goal of this model is to regroup all capitalized and operational costs in order to allocate them to the network allocation flow or the regulated/residual markets



IT Allocation Schematics for 2016

Since 2016, the allocation of IT costs has been rationalized in its scope. This resulted in two main differences compared to last years: the merging of previous modules IT hardware and IT Software into one IT Cost pool and the allocation towards the Market module based on a generic key instead of volumes.

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The allocation stream goal stays the same as it is to link the costs for manpower and infrastructure that are used in order to create, run and maintain applications, components and projects to the markets defined in the regulatory model.

These costs can be of two different types: capitalized and therefore depreciated following accounting rules (for IT, depreciation length is generally 4 or 5 years), or operational and fully charged for the current year. Depending of the cost's nature, the allocation stream will follow different paths (IT, IT&NW and overhead) and use specific inventories and reporting systems in order to create the optimal allocation keys.

6.1.2 Data sources: IT Inventories and Reporting Systems:

Internal IT Databases:

The main database used in the model is the "Configuration Management Database" (CMDB) which populates and links together all IT related objects in Proximus, such as which databases are used by an application, or what is hosted on a server. This is used primarily for incident management. This repository is fed by operational inventories from each category of IT machine.

IT Asset Manager (ITAM) is the inventory for all IT equipment with a reference to its cost and is used by Finance to calculate yearly the costs for IT hardware Assets.

ARIS is a recent initiative to install a business process modeling tool which allows the aggregation of applications and to understand fully their purposes.

Reporting Systems:

Rapid[2] is a tool used for projects, budget and capacity management related processes, with interfaces to other core systems such as SAP HR (human resource & organization units data) , SAP Finance (actuals, purchase order..), IMD (release Management) and timesheets applications (used by TEC to report their day-to-day work). Rapid will be used to calculate allocation keys for most manpower costs for TEC regarding both Capex (allocation of Assets ranging from 2526 to 2573) and Opex. All assets tagged as pure IT are all pooled together in the IT SW HW module.

TM1 is an interface from excel to SAP allowing the extraction of Data coming from Finance and HR. It completes our asset reconstruction for the non-workload costs.

6.1.3 Modules and Objects composing the IT allocation flow

IT Servers

A server is a set of hardware running as a service to serve the needs or requests of others programs or users.

[2] **R**epository for the **A**dministration of **P**rojects and **I**nitiatives in a **D**ecentralized way

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Splitting the server asset between these families was achieved by using the cumulated purchase costs of these families which is provided by Finance. This calculation is made possible by the inventory maintained in ITAM.

IT Assets allocation:

All tagged IT assets that follow are directly allocated to the IT Software and Hardware module.

- **2500 Servers (Inclus. Tandem)**

Servers can be used by applications (software sold by a vendor or developed in-house) and databases or for interconnectivity and security. This asset pools most of servers families used within the company such as Windows, Linux, UNIX, Teradata and Tandem technologies. Accounting distinguishes the following families: Wintel (Windows for Telecommunication), UNIX (with Linux pooled in this family), Teradata and Tandem. Keys are created from Finance inventory analysis in order to allocate costs to each family.

- **2501 Storage:**

Storage is used both as a core business as well as a support for employees and customers. It is required in order to run applications and databases, create backup and archives to save an employee's work or a customer's information (regarding billing or call details records for instance).

- **2502 Mainframe BS2000 HW & 2503 BS2000 Software:**

Mainframes are powerful computing platforms used for critical applications. They can be considered as multiple servers within one machine. Sensitive applications and data that require heavy computing power are hosted on them. It requires specific software to run which costs are pooled in the 2503 BS2000 Software asset. The mainframe park has been updated to the Z-Series manufactured by IBM.

- **2504 IT Internal Network**

IT Internal Network is an asset representing Proximus Intranet, required to support the needs of employees as well as the interconnection needed in order for the different IT objects to communicate.

- **2505 Office Automation**

Office Automation pools IT costs and improves productivity such as development environment, printing servers and Digital Workspace.

- **2506 End user IT Device**

Concerns IT material made available to Proximus employees such as laptops and desktops.

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- **2523 Major Software Application:**

This is a specific asset that pools applicative mobile costs. It contains IT sub-assets as well as some network-related ones due to historical reasons. Timesheets reports from RAPID are used to allocate this asset.

- **2525 Application Software Other:**

"Application Software Other" is an asset for all Capex licenses costs that are not pooled in another IT asset (licenses costs for minor applications for instance). It is heavily related to productivity enhancements and office automation.

- **2526 Applic SW IMA:**

All costs related to the **I**dentify **Ma**nagement (IMA) application are assigned to this asset. IMA identifie all Proximus users.

- **2529 Appl SW Middleware:**

Although named Middleware, this asset is composed of developed applications playing the role of a middleware inside Proximus IT infrastructure. It has to be distinguished from some costs objects in System Software and Application Software Other that also have middleware costs such as Websphere licenses. This asset pools IT domains from:

- A **B**usiness **P**rocess **M**odeler which delivers a process integration platform for enterprise services based on service-oriented architecture.
- A **S**ervice **O**riented **A**rchitecture layer.
- A **S**OA **S**ervices **R**epository to document and describe all SOA services.
- And a **H**ub **C**ontract **S**oftware used as a middleware connectivity tool.

- **2530 Applic. SW PILA:**

Pila Asset is a cluster of applications and components related to the **O**rder handling **M**anagement **S**ystem (OMS) with all its bridges with provisioning systems and a customer relationship management interface with BCI as well. OMS is one of the main contributors to this asset, as is the **N**etwork **P**rovisioning **S**ystem linking OMS with provisioning systems and the **O**rder **F**low **A**pplication (an interface between BCI and OMS). In the process of being phased out and replaced by the MCOM system. (which is accounted in its related sub-asset from the 2547 asset)

- **2531 Applic. SW BCI:**

The Proximus Channel Integration (BCI) is a customer relationship management tool for all call-centers-enabling a real-time customer information input or output in order to improve the feedback a customer receives when calling Proximus helpdesks.

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- **2532 RID(Reference Inventory&Design):**

RID is an asset related to inventories and documentation.

- **2533 Applic. SW WFMS**

The **W**ork **F**orce Capacity **M**anagement tools (WFM) asset pools all costs related to the automation of the dispatching on the field of all Proximus technicians including a scheduler and reporting system.

- **2534 Applic. SW UTS**

The **U**nified **T**rouble **T**icketing System (UTS) is a system used in order to register and follow-up trouble tickets pro-actively and reactively.

- **2535 Applic. SW Cust Relationship Management**

This asset is composed of two applications related to the selling process and are directly linked to CRM: **C**ustomer **S**ales **A**ssistant (CSA) and **C**ustomer **V**alue **M**anagement (CVM).

- **2536 Appl SW COB**

This asset pools costs from the **C**ustomer **O**riented **B**illing system (COB) is a cluster formed from three IT platforms: **C**ustomer **D**ata**B**ase (CDB) **I**ntercarrier **B**illing **I**nformation **S**ystem (IBIS) and the **C**all **D**etails **R**ecords **Flow** (CDRFLOW). Billing data is a sensitive matter for both customers and Proximus and requires real-time redundancy. Therefore, COB applications are hosted on dedicated technology: Tandem servers also called “Non-stop servers”. The CDB Application is retail related, IBIS wholesale related and CDRFLOW applies to both.

- **2537 Appl SW SAP**

The SAP Asset pools all costs coming from all modules used by Proximus. It is a typical business overhead costs.

- **2538 APPL SW-Number Portability**

Number Portability is composed of two main applications called **F**ixed **N**umber **P**ortability (FNP) and **C**arrier **P**re-**S**election (CPS). CPS is an important system as it is an interface with OLO’s requirements to deliver their services.

- **2539 Applic. SW ECA/ECM/VORTAL**

E-**C**hannel **A**pplications (ECA) and **E**-**C**ontent **M**anagement (ECM) are tools to manage and web-enable digital content for consumers (B2C) or enterprises (B2E). These are websites to engage customer relationship in order to conduct e-business via the Proximus websites.

- **2540 APPL SW – ROSY**

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ROSY is a core component of the IT infrastructure as it is the runtime engine for SDH, XDSL and IDTV provisioning and repair.

- **2541 APPL SW – NETCAM**

NETCAM is a dedicated asset for Rosy's workflow engine for SDH (BPEL). This is asset is purely network related and is not allocated to the IT Software and Hardware module. Instead it follows the network allocation stream through the CP2 module.

- **2542 Sales Handling Engine(SHE)**

The **S**ales **H**andling **E**ngine (SHE) is a sales application used as a layer in order to enable convergence between all selling applications so that our vendors and partners will have a global view on all products supplied by Proximus, improving order intake and rationalizing the IT selling infrastructure. Pre-Sales and Sales are activities in the fulfillment process being mostly allocated to the residual market.

2544 APPL SW -IT Security

IT Security asset pools heterogeneous costs that can be related to applications NFM (**N**ew **F**raud **M**anagement), Proximus IT security in general, IMS (Identify and authentify for provisioning engine) to protect user's privacy or overhead costs to protect the IT infrastructure from malicious harm (virus, hackers take-over…)

- **2547 Major software applications**

Major software applications are assets regrouping all new IT developments and applications since 2010.

- **2550 APPL SW ABC**

The **A**ccess **B**ackbone **C**onnectivity asset (ABC) is a core element of Proximus's infrastructure. SRW is an inventory for connectivity and equipment documentation and is used as an interface between IDMS and front-office applications such as OMS, WFM or COB/CDB. Three other core domains are also pooled in this asset: ABR[3] for the local loop connectivity and managing resources and services. ANA[4] (**A**utomated **N**umber **A**ssignment) supports service order provisioning of phone numbers through automation of the attribution of a phone number to a customer. Finally, ITR[5] (**I**nfrastructure **TR**ansmission) is the inventory of Proximus's backbone and optical network covering leased lines, physical equipment, trails, trunks, cables and the multiplexing hierarchy between all these elements. It should be noted that applications grouped in this asset use a special hardware in order to run

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properly as they are all linked to huge databases that require daily processing of data per batches. For the last years, BS2000 mainframes from Fujitsu were used but they were recently replaced by Z-Series from IBM[6].

- **2551 Operational Inventories**

Operational Inventories are applications used to maintain ATM, DSLAM, Ethernet and IP inventories and statistics.

- **2552 GraphDoc**

The Graphdoc asset pools all graphical documentation components which are tools used to create or modify the local loop network documentation. It allows an integration of the Autocad package which is a drawing software.

- **2561 APPL SW – NETCOOL**

Netcool is a software package sold by IBM and developed internally to suit Proximus needs. It is a set of alarms and probes used for monitoring to ensure both a pro-active and reactive service assurance process. It is divided in two main domains: **N**et**c**ool **T**ransmission (NCT) and **N**et**c**ool **D**ata (NCD).

- **2562 APPL SW - e-Health**

E-health is a reporting tool for bilan and is composed of e-health (A-EHT), Provisioning (A-PRO) which is an interface between e-health and umbrella/CMS and oblicore service layer (A-SLR).

- **2563 APPL SW-Customer Remote Support**

Applications used by the helpdesks or customers through the Proximus portal.

- **2566 APPL SW-DIAMON&CORRELATOR**

The diamond (DIA) and Correlator (CRL) asset regroups those two IT domains that enable the monitoring of network alarms. It also creates tickets to respond efficiently to problems.

- **2567 APPL SW – DARE**

DARE stands for **D**iagnose **A**nalyze **R**epair **E**ngine and is the main tool to analyze alarms and probes reports. It diagnoses problems through a root analysis, classifies incident by priority and forwards them to responsible persons for problem resolution.

- **2568 APPL SW-Learning & Mngt Syst.**

[6] One IBM z10 Mainframe is supposedly 1500 times more powerful than regular x86 servers while consuming 85% less power (source IBM).

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The learning management system asset is essentially a component of SAP HR (or SAP LMS for **L**earning **M**anagement **S**ystem).

- **2569 APPL SW-ECRM**

The E-CRM asset contains one application named **G**roup **C**ontent **M**anagement (GCM) which is a platform for contract, records and business process management.

- **2570 APPL SW Business Intelligence Tool**

All costs from the Microstrategy software are sent to the Business Intelligence Tool asset as the main software used by our business intelligence department (which is the Data Warehouse: DWH). It is heavily related to data warehouse and will be grouped with it so that the tools they use are represented in the total cost of the data warehouse.

- **2571 APPL SW ONE-Catalog**

The **Proximus P**roduct **C**atalog is an application that stores advice and information about all products and services. It is heavily used by Proximus Sales divisions and as a service assurance tool for customer care.

- **2573 Appl SW DWH**

The data warehouse department has heavy requirements in terms of hardware and software as it calculates statistics and indicators for Proximus products and network. Data warehouse uses a special hardware from the Teradata technology that helps with the treatment of large data volumes with the possibility for many users to analyze them.

Operational Costs:

There are 4 sources of IT opex costs:

A) Maintenance related:

Maintenance costs are regrouped into 2 different cost pools (G/L 61120 and 61130) on which allocations keys are applied in order to distribute these costs towards servers, IT Software & Hardware module, storage, servers CP2 and NEs.

B) OPEX Wages internal

Internal wages for IT OPEX costs were allocated by the use of the RAPID database. A report by cost centers giving a detailed output of OPEX projects was linked to the cost centers groups from the cost base allowing an allocation from all IT teams to the IT Software & Hardware module.

C) OPEX Contractors Bodyshopping and Fixed price:

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Bodyshoppers and fixed prices contractors are regrouped together and separated from internal employees.

Wages OPEX Costs are allocated using timesheets report from RAPID for the calculation of allocation keys for each cost center within ITS and SPC. Reports are designed in order to regroup OPEX costs based on the allocation it should follow (IT, Network, Overhead).

6.1.4 IT Software and Hardware to Markets

Since 2016, a new methodology is used to allocate IT costs: they are all pooled together based on the principle explained before hand and are allocated to the end objects contained in the Market module based on the total costs per related object.

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7 Network stream

The network allocation stream is organized around the network investment structure (leading to network functional blocks in the allocation stream). The focus is on Capital Expenditure costs which are directly associated with the network equipment deployed ; these costs originate from the assets accounting system of Proximus and they are gradually cascaded by means of a variety of cost deaggregation keys and a variety of cost drivers up to the telecommunication services. By contrast, the SRW stream focuses on the operating expenditures of the business activities, which are directly allocated to end- markets by means of business drivers.

For the operating costs of the network itself however, an intermediate allocation approach is used : the remuneration costs and the personnel related OPEX costs are associated to typical network activities (as described in Chapter 5) which are finally attributed to network functional blocks . This part is discussed in section 7.3 hereafter.

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7.1 A layered allocation model

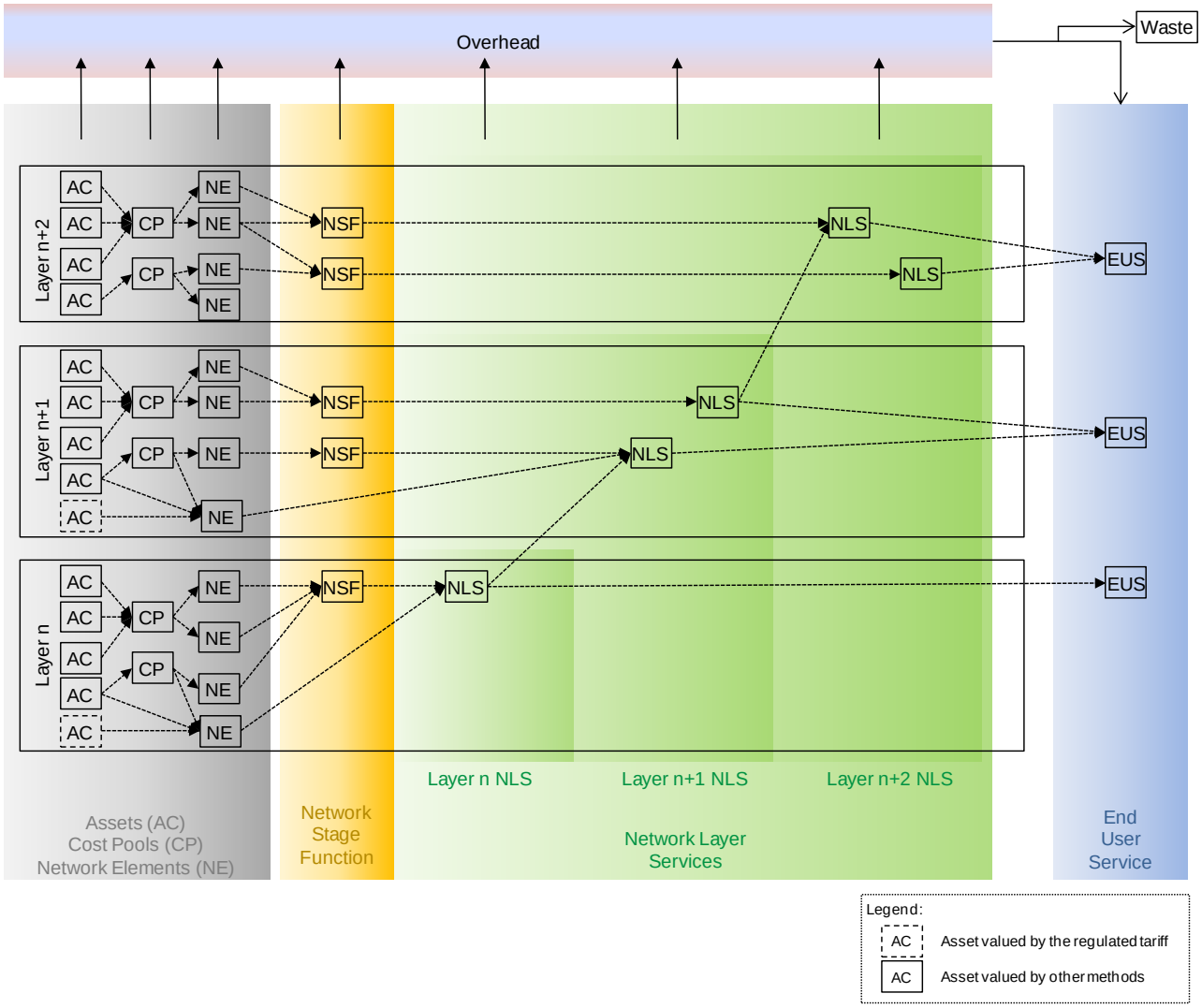

Figure 5: Layered allocation model

It is common practice in the telecommunication industry to separate investments in different logical levels; lower levels corresponding to basic (simple and general purpose) services, higher levels corresponding to complex higher valued and purpose oriented services. The pursued effect of such separation is to promote the reuse of basic lower level services by higher level services thereby bringing in the short term the volumes at each layer to levels that benefit from economies of scale. In the long term, the pursued effect is to benefit also from economies of scope.

The network cost allocation model is designed to reflect the layered functional structure of Proximus's telecommunication infrastructure , each layer offering services to the upper layers. In practice 5 layer levels are represented in the cost allocation model in order to allow each invested technology to be situated at the right level of its contribution in implementing the layer services.

In practice a network equipment may participate to several different layers especially in the interfacing boards towards other network equipment because it acts as a terminating point of lower level layer services.

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To avoid any ambiguity, a network equipment will be considered as belonging to the highest layer implemented in it and operated by it. For the example of the IP router, this simple criterium locates an IP router on the third layer (IP layer) above SDH.

Using this criterium all investments still in service of Proximus's infrastructure are distributed in one of the following layers:

Layer NLS1.0 : Passive infrastructure gathering investments in access copper, in ducts and fibre cables (access and backbone).

Layer NLS2.0 : Active transmission infrastructure based on Time Division Multiplexing technology gathering investments in PDH, SDH.

Layer NLS2.1 : Active data infrastructure based on Packet Based technology gathering investments in Ethernet/MPLS.

Layer NLS2.2 : Mobile backhauling infrastructure

Layer NLS3 : Active data infrastructure based on IP technology gathering IP routers , IPVPN routers.

Layer NLS4.0 : Active application infrastructure based on a variety of technologies gathering applicative equipment like telephony digital switches, VoIP platforms, Intelligent Network platforms, Broadcast TV platforms, Video on Demand platforms.

In the model layers are represented by a number of "standard" services (referred to in the sequel as Network Layer Services – NLS) offered to upper layers or directly used as retail/wholesale products (End User Services – EUS). In turn the services offered by a layer are the result of the combination of layer specific functions (referred to as Network Stage functions – NSF)* and services offered by lower level layers allowing the layer specific functions to interact with each other.

*Note: Except the following Network Elements that receive assets cost valuated by the regulated tariff. Those Network Elements include network stage functionality and directly offer services of the same level as their upper layer services. The driver used is "yearly direct CAPEX cost". The driver "yearly direct CAPEX cost" is in fact a by-product of the valuation exercise done for the assets valued by the regulated BIPT tariff.

For the asset valuation exercise a full integration of all the asset valuation components of the relevant technology was necessary (see paragraph 3.4.2.5.4), but in the case of the calculation of this driver the required aggregation degree is determined by the allocation key to be calculated.

The inventories used as input for the asset valuation contain many details allowing the grouping of the costs components based on any combination of such aspects.

Therefore, the driver "yearly direct CAPEX cost" refers to the sum of all the relevant technology valuation components from the appropriate models that meet the allocation requirements (for example, usage of the link or bandwidth or bandwidth and service span or concerned network layer…).

Due to the method used for the valuation of the SDH, the "yearly direct CAPEX cost" allocation driver for the NE_PDH SDH equipment can't be calculated as referred above. Instead it is calculated as the incremental SDH cost of the service for which the allocation is being computed.

> Incremental costs of one service are those costs that are avoided by not providing that service. See Figure 6 for an example specific to this context, where:

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- the cost incurred by all the SDH services equals the SDH asset value, resulting from running the "consolidated transport BROTSoLL engine" (see paragraph 3.4.2.5.7Transport PDH/SDH valuation) with the full set of services carried over SDH
- the cost incurred by an SDH network carrying all the SDH services except service X is the outcome of the dimensioning and costing done by the "consolidated transport BROTSoLL engine" when having as input all the SDH services but service X.
- the SDH incremental cost for service X is calculated as the difference between the two above costs

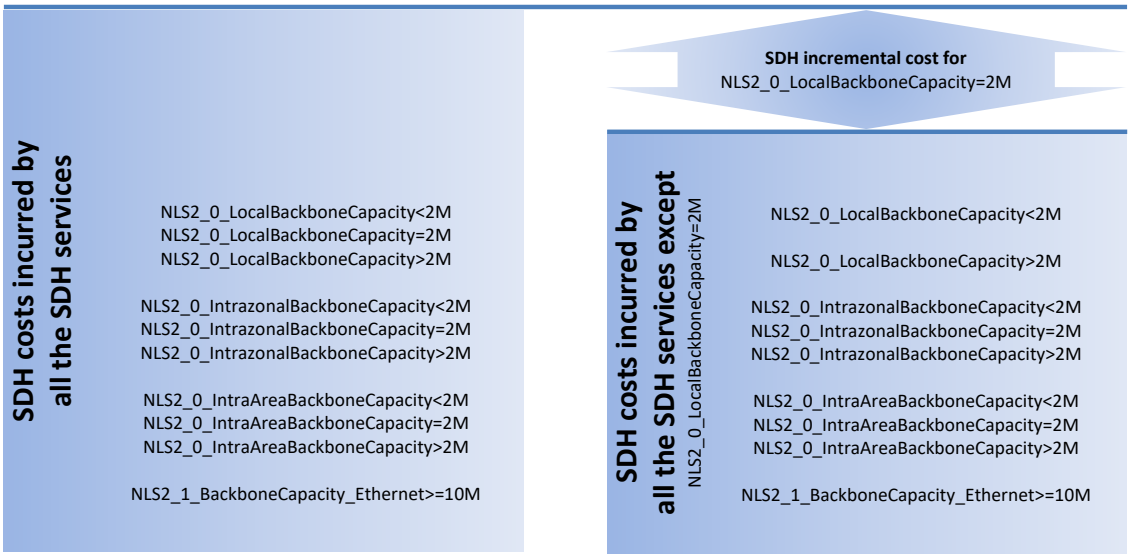

Figure 6: Incremental SDH costs calculation method, an example

NE receiving assets by the regulated tariff	offered services
NE_ADSL equipment	NLS2_1_ADSL_SDSL_Bitstream
NE_NGA Active equipment	NLS2_1_VDSL_Bitstream
NE_NGA Housing	NLS2_1_VDSL_Bitstream
NE_PDH SDH equipment	NLS2_1_LocalTailCapacity_Ethernet>=10M
	NLS2_1_BackboneCapacity_Ethernet>=10M
	NLS2_0_IntraAreaBackboneCapacity<2M
	NLS2_0_IntraAreaBackboneCapacity=2M
	NLS2_0_IntraAreaBackboneCapacity>2M
	NLS2_0_IntrazonalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity=2M
	NLS2_0_LocalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity>2M
	NLS2_0_LocalBackboneCapacity>2M

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	NLS2_0_LocalBackboneCapacity=2M NLS2_0_LocalTail=2M NLS2_0_LocalTail<2M NLS2_0_LocalTail>2M
NE_Copper_Cables_Distribution	NLS1_0_Copper_Subloop NLS1_0_Raw_Copper
NE_Copper_Cables_Feeding	NLS1_0_Copper_Subloop_testing NLS1_0_Raw_Copper
NE_Copper_Blocks_and_Tie_Cables	NLS1_0_Continue_Raw_Copper NLS1_0_Copper_Localloop_testing NLS1_0_Copper_Subloop_testing
NE_Copper_Splitter	NLS1_0_Copper_Splitter

The use of BIPT Fixed voice NGN cost model enables to define the network element cost attribution to the underlying network stage function per asset category

NE receiving assets by the Fixed voice NGN cost model	attribution
NE_OwnNetwork_CallHandling	NSF_OwnNetwork_CallHandling
NE_Interconnecting_CallHandling	NSF_Interconnecting_CallHandling
NE_Voice_o_Broadband_SBC	NSF_Voice_o_Broadband_SBC
NE_VoiceIP_Router	NSF_VoiceIP_Router
NE_VoiceTrunks_TDM	NSF_VoiceTrunks_TDM
NE_VoiceTrunks_IP	NSF_VoiceTrunks_IP
NE_IP_Voice_Concentrator	NSF_PSTN_Voice_concentrator

The use of BIPT mobile cost model enables to define the network element cost attribution to the underlying network stage function per category of service : voice, data or SMS.

NE receiving assets by the mobile cost model	attribution
NE_RAN	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_GroundAntenna	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_MobileVoiceSwitching	NSF_Mobile_BackBone_Voice NSF_Mobile_BackBone_Data

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	NSF_Mobile_BackBone_SMS
NE_MobileDataSwitching	NSF_Mobile_BackBone_Data
	NSF_Mobile_BackBone_SMS
NE_MobileLocationRegister	NSF_Mobile_BackBone_Voice
	NSF_Mobile_BackBone_SMS

Layer n--layer n+1 cost allocation mechanism:

Each layer represented in the model produces the defined NLS services with a certain amount of volume (the service amount); this amount is "consumed" by the upper layer services and it is used as a driver to allocate the costs to the consumer services in the upper layers.

Layer cost allocation cascade:

The 5 defined layers are put one after another according to their level generating a cascade of cost allocation mechanism.

Each layer is discussed in a specific chapter of this documentation.

Establishing costs of the Network Stage Functions

The "network stage functions" (NSF) are the direct constituents of a layer, they are intermediate network building blocks providing well defined logical network functions specific to that layer (also called network functional units) . A Network Stage Function can be limited to a node or it can be a cluster (distributed function) corresponding to "network stages". A network stage function is characterized by the amount of function it produces (volume).

Network Stage Functions are implemented in equipment, but the corresponding investment values are not always directly identifiable in the asset structure of Proximus : for example some assets aggregate investments per technology (not per function in the network) , some other do not cover the totality of a given technology due to the history of the accounting asset structure in SAP (reorganization of assets, transfers between assets, closing of asset classes and opening of new ones) .

Different methods are used and combined to constitute the investment costs of Network Stage Functions :

1. Aggregation of assets in a larger asset or a cost pool in order to gather investments of same technology and align them with operational inventories.
2. Deaggregation of cost pools in network elements : this step decomposes cost pools into network elements; a network element corresponds to an entire physical equipment as deployed in the Proximus infrastructure. Operational inventories of pieces of equipment and component prices are used.
3. Direct allocation of assets or cost pools to network elements when the assets or cost pools are directly identifiable with a network element of the model.
4. Composition of the network elements to form a network stage function covering one of the stages.

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The stepwise combination of these methods are discussed in the next section.

7.2 From Assets to Network Stage Functions.

Next table gives the list of the NSF present in the network allocation flow.

Layer_name	NSF_name	NSF description
L1_PASSIVE	NSF_Backbone_FibreConnectivity_express	backbone fibre connectivity of express ring
	NSF_Backbone_FibreConnectivity_Regional&Core	backbone fibre connectivity of regional&Core rings
	NSF_FTTC_FibreConnectivity	fibre connectivity between the central office (LEX) and ROP
	NSF_FTTO_FibreConnectivity	fibre connectivity between the central office (LEX) and customer office
L3_IP	NSF_BroadBand_Public_IP_Collect	Access authentication , data traffic accounting, attribution of public IP address to broadband customers and collection of customer traffic towards public internet service providers
	NSF_BroadBand_VoD_IP_Collect	Access authentication , data traffic accounting, attribution of IP TV address to IP TV customers and collection of IP video customer traffic towards Video On Demand platforms
	NSF_BroadBand_VoIP_IP_Collect	Access authentication , data traffic accounting, attribution of Voice over IP address to VoIP customers and collection of Voice over IP customer traffic towards VoIP platforms
	NSF_Dedicated_Access_to_PrivateIP	connectivity between customer and Proximus IP-VPN network
	NSF_Homegateway	Broadband CPE like b-box
	NSF_IP_security	
	NSF_PrivateIPSwitching	IP-VPN switching
	NSF_PublicInternetSwitching	Public Internet Routing
	NSF_Mobile RAN_Data	Mobile Radio Access function destinated to all Mobile data products
	NSF_Mobile_BackBone-Data	Mobile backbone function destinated to all Mobile data products
	NSF_Mobile_PrepaidData_Services	Intelligent platform services related to prepaid mobile data
L4_IDTV	NSF_BroadcastTV	Broadcast digital television functionalities
	NSF_VoD	Video On Demand (VOD) functionalities and user quality of experience functionalities.
L4_M2M	NSF_Machine_to_Machine	Related to M2M applications, enabling customers to remotely manage their M2M devices in the cloud or gather business data from the devices and to integrate and link it with business softwares.
L4_VOICE	NSF_Automated_call_distribution	intelligent distribution of calls towards call center

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	NSF_Advanced_Number_Translation_CallHandling	Voice Value Added network function
	NSF_CallerIdentity_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_InteractiveVoiceResponse_CallHandling	Voice Value Added network function
	NSF_ISDN_NetworkTermination	Functionalities related to the ISDN network termination equipment
	NSF_Mobile RAN_Voice	Mobile Radio Access function destinated to all Mobile voice products
	NSF_Mobile_BackBone-Voice	Mobile backbone function destinated to all Mobile voice products
	NSF_Private_Communication_Call_Handling	Intelligent platform service related to mobile closed user groups and virtual private networks
	NSF_Mobile_PrepaidTraffic_Services	Intelligent platform services related to mobile voice prepaid traffic
	NSF_NumberPortability_CallHandling	telephony ported number realtime translation
	NSF_OtherAdvanced_CallHandling	Voice Value Added network function
	NSF_PairGainSystem	Analog line multiplexing functions, used to concentrate narrow band analog signals on customer pairs to a 2Mb/s digital signal on a few feeding copper pairs. This is however an old technology not compatible with broadband.
	NSF_PSTN_Voice_concentrator	Aggregation of PSTN voice calls towards NGN IP Platform
	NSF_Public_NumberPortability_Database	telephony ported number repository
	NSF_Service_Announcements_Playing	Functionalities in order to announce to callers any requested value added services.
	NSF_Televoting_CallHandling	Voice Value Added network function destinated to Business customers
	NSF_VirtualPrivateNetwork_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_Voice_call_CAE_charging	generation of call detail records for interoperator voice traffic accounting
	NSF_Voice_call_CAE_Processing	handling of voice calls at transit level
	NSF_Voice_call_CAE_Trunks	multiplexing/demultiplexing voice circuits at transit level
	NSF_VoiceTrunks_TDM	multiplexing/demultiplexing voice circuits generated/terminated
	NSF_VoiceFeatures_SelfManaging	Voice Value Added network function destinated to residential customers
	NSF_Voicemail&Messaging	Voice Value Added network function destinated to residential customers
	NSF_WakeUp_CallHandling	Voice Value Added network function destinated to residential customers
L4_Messaging	NSF_Mobile RAN_SMS	Mobile Radio Access function destinated to all Mobile SMS products
	NSF_Mobile_BackBone-SMS	Mobile backbone function destinated to all Mobile SMS products
	NSF_SMS_Services	Intelligent platform service related to mobile SMS

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L4_WEB	NSF_EServices	NSF gathering SDE workload related to the E-services.

Investment costs of Proximus SA assets are mapped to these NSF, except investments related with network administration, and some other that cannot be related to any current product or service. The exceptions are not filed into the network allocation cascade, but are allocated like an overhead cost (i.e. with no direct causality) to a range of End User Services (depending on the kind of overhead cost) proportionally to the cascaded costs on these EUS.

Mapping asset cost sources to Asset objects of the model AC2

Network assets are 1-to-1 allocated to a homonymic AC2 object except for the 7 voice switching assets which are aggregated in AC2_TDM_Voice_Switching_Equipment.

Mapping AC2 objects to cost pools or Network elements

AC2 Aggregation.

At this stage, AC2 asset objects are aggregated into cost pools, network elements, overhead objects and eventually end user services (costs marginal end user services, or direct waste).

The aggregations into cost pools serve to form technology pools for which operational inventories can be queried for various statistics that are further used to decompose into network elements. The technology pools typically are (D)WDM equipment, Copper Cables, Broadband (xDSL) equipment, SDH equipment , PDH equipment, Ethernet equipment etc. Those cost pools include also the OPEX of SDE.

The aggregation into network elements concerns assets that are already a network element, and it serves also to gather assets that are individually more detailed than the definition of network elements and that can be easily associated to a network element. Typical examples are IP-VPN assets , broadcast TV assets, Analog Multiplexers, Metallic line testing assets etc.

AC2 Deaggregation.

By contrast, a set of AC2 assets are decomposed (deaggregated) into cost pools, Network elements, waste pool and marginal end user services.

Among these, some assets collect investments on network administration (Hardware and software supervision platforms) and on value added services platforms (IN, messaging, voice mail etc.): they need to be decomposed into the network technologies they supervise and into the value added service categories.

⇨ The driver used is the “cumulatedInvestedAmount” per technology obtained after deep analysis of historical investment data (TM1 financial reporting tool).

The asset 1680 “TPT-BBN-infra.elect/mécan in transmis rooms” collects internal cabling within technical buildings and is decomposed essentially into the following cost pools CP_Backbone_Coax_cabling, CP_Backbone_Optical_cabling, CP_(D)WDM_equipment and EUS_notAllocated (internal cabling of xDSL, switching and AGW equipments in LEX included in assets valued using the Proximus Reference Offer tariffs).

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- ⇨ The driver used is the “Current annualized cost” of the cost pools , calculated from a diversity of constituent volumes and corresponding prices (coax/fibre cables, connectors, copper pair cables , cable ways,etc) . The main volumes are extracted from the infrastructure inventory database (ITR), other volumes are derived under assumptions.

The AC2_TDM_VoiceSwitching_Equipment asset is considered as fully outphased and replaced by MEA AC2_20115 FixedVoice_NGN_Platform. This asset is valued based on BIPT Fixed Voice NGN platform cost model.

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Deaggregation of cost pools into network elements

In performing the previous steps cost pools are introduced in the model. They are now deaggregated into different Network Elements by means of following drivers:

cost pool	driver name	Deaggregated Network elements
CP_(D)WDM_equipment	Yearly Direct CAPEX Cost	regional&core DWDM network elements and express DWDM network elements
CP_Backbone_Optical_cabling	Nbr_Connections	pre-allocated to all inside network elements using fibre cabling
CP_Backbone_Coax_cabling	Nbr_Connections	pre-allocated to all inside network elements using coax cabling
CP_Copper_Burried_Cables&Splices	yearly direct CAPEX cost	distribution cables, feeding cables network
CP_DSLAM	yearly direct CAPEX cost	xDSL ATM based network elements and VDSL Ethernet based network elements
CP_Ducts&Manholes	Trenches cumulated length (km)	Ducts& manholes for Next Generation Access, Ducts & manholes for corporate /complex nodes in access
CP_EthernetMPLS_equipment	Yearly Direct CAPEX Cost	Ethernet Ports, Ethernet/MPLS switches
CP_Optical_Fibre_Cables	kmxfibre	Fibre cables for Next Generation Access, Fibre cables for corporate/complex nodes in access
CP_OSS_VoiceTraffic	fair split	Collecting, terminating and transit of voice network elements
CP_SDH	Yearly Incremental Cost	
CP_TDM_VoiceDigital_TransitUnit	Direct	Voice transit elements
CP_Mobile_RAN	Yearly capitalized manpower cost	Mobile Radio Access network, Ground antenna
CP_Mobile_Backbone	fair split	Mobile Voice and Data switching elements

From Network elements to Network Stage Functions

The previous steps populate the cost model with Network Elements. In the next step, they are allocated to the Network Stage Functions.

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7.3 End User Services

The network allocation model terminates when all network stage functions (or NEs) have been allocated to network layer services and when network layer services have been combined into a user level telecommunication service, the End User Service.

The End User must be understood as the telecommunication service party that will pay for the service. In case of a retail service the user is identical to the service consumer (residential service) or to the service provider (business service) , in case of wholesale service , the user is in principle another licensed operator , or a network service provider.

Being composed of network layer services, End User Services may emanate from different levels of network layers since interconnection between network operators is being unbundled . For retail services , the end user telecommunication services may arise from different layers : the more a service is oriented for a specific usage the higher the level of network layers involved. For example IP services are less usage oriented than voice telephony, the latter being a layer 4 service, the former a layer 3 service.

The End User Services represented in the model are listed hereunder.

End User Service Layer	Market	End User Service Name
L1_passive	**InterConnect**	EUS_Raw copper subscription
		EUS_Shared pair subscription
L2_packetBased	**InterConnect**	EUS_BROBA_EndUserLine subscription
		EUS_wholesale transport WBA subscription
	retail	EUS_X25
	Retail&Wholesale	EUS_Ethernet_Backhaul
L2_TDM	**InterConnect**	EUS_BROTSOLL_segment<2M
		EUS_BROTSOLL_segment>2M
		EUS_BROTSOLL_segment2M
	Retail&Wholesale	EUS_LL <2M subscription - International
		EUS_LL <2M subscription - National
		EUS_LL >2M subcription- National
		EUS_LL >2M subscription - International
		EUS_LL 2M subscription - International
		EUS_LL 2M subscription - National
		EUS_LL_Analog National Subscription - National
	Wholesale	EUS_Nat IC-Infra Wholesale subscription
L2_TDM&L1_ActiveAnalog	**Retail&Wholesale**	EUS_Trans LAN subscription
L3_IP	**retail**	EUS_BGC Mobile_Roaming Out data
		EUS_Homegateway
		EUS_Mobile_Data national
	Retail&Wholesale	EUS_DataManagedServices
		EUS_FastInternet subscription
		EUS_Private_IP&Ethernet_on_asymmetric subscription - National

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		EUS_Private_IP&Ethernet_on_backup
		EUS_Private_IP&Ethernet_on_international Subscription
		EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
		EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National
	Wholesale	EUS_ADSL_Carrier_wholesale subscription
		EUS_Mobile_Roaming IN_Data
		EUS_VDSL_Carrier_wholesale subscription
L4_iDTV	**retail**	EUS_IDTV_subscription
L4_M2M	**retail**	EUS_Machine_to_Machine
L4_messaging	**InterConnect**	EUS_SMS_inbound_intal
		EUS_SMS_inbound_national
	retail	EUS_SMS_on_net_national
		EUS_SMS_outbound_intal
		EUS_SMS_outbound_national
		EUS_SMS_Roaming_OUT_Origination
		EUS_SMS_Roaming_OUT_Termination
	Wholesale	EUS_SMS_Roaming_IN_Origination
		EUS_SMS_Roaming_IN_Termination
L4_voice	**all**	EUS_AUTOMATEDCALLDISTRIBUTION
	InterConnect	EUS_Carrier PreSelection
		EUS_voice_traffic_Fixed_inbound_intal
		EUS_voice_traffic_Fixed_inbound_intal_VAS
		EUS_voice_traffic_Fixed_inbound_national
		EUS_voice_traffic_Fixed_inbound_VAS_national
		EUS_voice_traffic_Mobile_inbound_intal
		EUS_voice_traffic_Mobile_inbound_intal_VAS
		EUS_voice_traffic_Mobile_inbound_national_from FOLO
		EUS_voice_traffic_Mobile_inbound_national_from MOLO
		EUS_voice_traffic_Mobile_inbound_VAS_national
	retail	EUS_Astrid
		EUS_voice_traffic_Fixed_on_net_national
		EUS_voice_traffic_Fixed_on_net_to Mobile_national
		EUS_voice_traffic_Fixed_on_net_VAS_national
		EUS_voice_traffic_Fixed_outbound_intal
		EUS_voice_traffic_Fixed_outbound_intal_VAS
		EUS_voice_traffic_Fixed_outbound_national_to FOLO
		EUS_voice_traffic_Fixed_outbound_national_to MOLO
		EUS_voice_traffic_Fixed_outbound_VAS_national
		EUS_voice_traffic_Fixed_transit_intal
		EUS_voice_traffic_Fixed_transit_national
		EUS_voice_traffic_Mobile_on_net_to Fixed
		EUS_voice_traffic_Mobile_on_net_to Mobile
		EUS_voice_traffic_Mobile_on_net_VAS_national
		EUS_voice_traffic_Mobile_outbound_intal
		EUS_voice_traffic_Mobile_outbound_intal_VAS

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		EUS_voice_traffic_Mobile_outbound_national_to FOLO
		EUS_voice_traffic_Mobile_outbound_to MOLO
		EUS_voice_traffic_Mobile_outbound_VAS_national
		EUS_voice_traffic_OPS
	Retail&Wholesale	EUS_Business voice channels - subscription
		EUS_ISDN-BA Access - subscription
		EUS_PSTN Access - subscription
	Wholesale	EUS_voice_traffic_Mobile_Roaming_IN_Origination
		EUS_voice_traffic_Mobile_Roaming_IN_Termination
		EUS_voice_traffic_Mobile_Roaming_out_Origination
		EUS_voice_traffic_Mobile_Roaming_out_Termination
L4_Web	**retail**	EUS_Eservices

Copper Termination

The network element Copper Termination groups costs related to fieldwork performed in the copper access network in order to realise broadband connections for end-users. These activities are mainly situated at the MDF, SC and the introduction up to the Network Termination Point (included).

7.4 Network services of the passive infrastructure layer : NLS1.0

7.4.1 Definition

This layer deals with the physical end-to-end connectivity between customers and the central sites (access), the physical connectivity inside the central site between access equipment and the physical connectivity between central sites (backbone).

Access Physical connectivity services (see Figure 7***):***

- NLS1_0_Continue_Raw_Copper : internal cabling for copper connectivity from Main Distribution Frame or broadband splitter equipment to other access active equipment like voice switches, leased lines access equipment, collocated access equipment (of other licensed operators).
- NLS1_0_Copper_Localloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper loop.
- NLS1_0_Copper_Splitter : resources to split the narrowband and broadband copper physical signal.
- NLS1_0_Copper_Subloop : end-to-end copper connectivity from the network termination point at the customer premises to a delivery point in the street (street cabinet).
- NLS1_0_Copper_Subloop_testing : outside and inside copper connectivity and equipment required to perform remote testing of the copper subloop.

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- NLS1_0_Raw_Copper : end-to-end copper connectivity from the network termination point at the customer premises to the Central site.
- NLS1_0_CentralOffice2Office_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and corporate customers office buildings .
- NLS1_0_CentralOffice2Office_Fibre : end-to-end fibre connectivity between the central sites and corporate customers office buildings or between central sites and Proximus mobile sites.
- NLS1_0_CentralOffice2RemoteOpticalNode_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.
- NLS1_0_CentralOffice2RemoteOpticalNode_Fibre : end-to-end fibre connectivity between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.

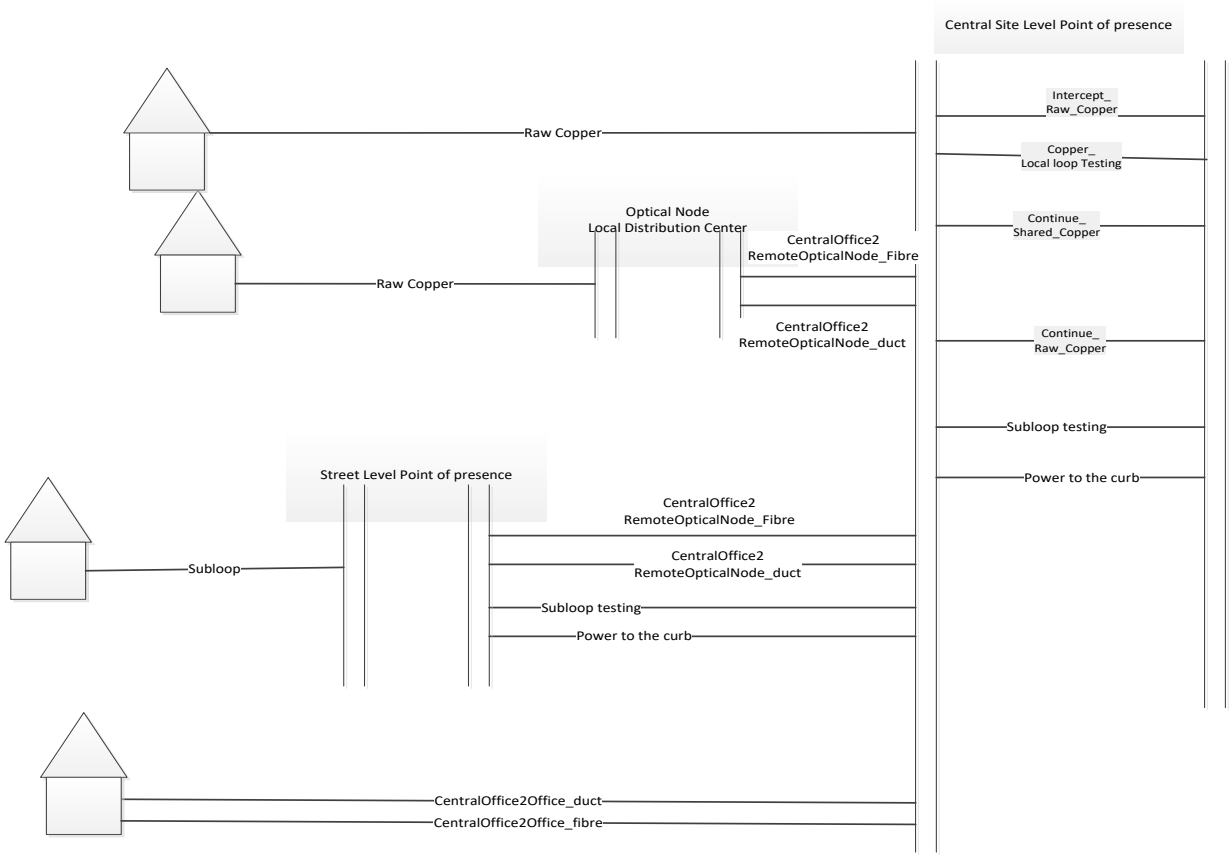

Figure 7: Access Physical connectivity services

Backbone Physical connectivity services

- NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core: end-to end fibre connectivity (fibre cables and duct and trenches) for SDH transmission networking between nodes

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belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.

- NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Express : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the express (national level) network. These nodes correspond to the largest cities in the country.

7.4.2 Usage of the passive infrastructure

The physical connectivity services of this layer are used by upper layers in order to interconnect their specific equipment. The costs are distributed to the service users according to "consumption drivers" as listed in the table below.

Network layer Service	Driver	Service consumers
NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, BRUO Shared Pairs
NLS1_0_Copper_Localloop_testing	nbr of lex based broadband connections without voice	Broadband bitstream layer 2.1 services
NLS1_0_Copper_Splitter	Nbr of used shared pairs	BRUO Shared pairs
NLS1_0_Copper_Subloop	Direct	VDSL bistream layer 2.1 service
NLS1_0_Copper_Subloop_testing	Nbr of used pairs	VDSL bistream layer 2.1 service
NLS1_0_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, Broadband Bitstream layer 2.1 service
NLS1_0_CentralOffice2RemoteOpticalNode_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2RemoteOpticalNode_Fibre	Nb_access_fibres_used	
NLS1_0_CentralOffice2Office_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2Office_Fibre	Nb_access_fibres_used	
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)	Backbone services (leased lines/backhaul and Broadcast) delivered by the SDH equipment at regional and core level.
NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)	Regional&Core backbone services of layer 2.1 (Ethernet transport, unicast and multicast)
NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)	Express backbone services of layer 2.0 (leased lines) and layer 2.1 (Ethernet)

Sensitivity: Unrestricted

7.4.3 Contributors to the passive infrastructure layer

7.4.3.1 *Access*

The objective of the access network is the delivery of a connection between our customers and our telecommunication network where all services are implemented.

Copper infrastructure:

The access network services of the copper passive infrastructure layer are based on several network elements valued using the BIPT regulated cost price, as listed below. For these network elements, there is no change in the valuation methodology compared to previous model. As in the previous models, the former network element NE_Copper infrastructure has been split in several subparts, in order to enable the fix/variable analysis of the model results .

- ✓ NE_Copper_Cables_Distribution

  copper distribution pairs and access to distribution pairs in street (to be attributed to copper subloop for VDSL connections without voice and to the raw copper for all other copper connections, based on the corresponding regulated cost);

- ✓ NE_Copper_Cables_Feeding

  copper feeding pairs and access to feeding pairs in street and central site (to be attributed to the copper subloop testing for VDSL connections without voice and to the raw copper for all other connections);

- ✓ NE_Copper_Blocks_and_Tie_cables

  copper local loop testing for broadband customer connections without voice at the central site,

  copper subloop testing for ROP based VDSL customer connections without voice,

  continue copper feeding pairs based on the number of shared pairs in service,

  continue raw copper for all other copper pairs in use.

- ✓ NE_Copper Splitter

  For the BRUO shared pairs in service.

NSF_PSTN_Voice_concentrator:

Attributed to :

- copper local loop testing based on the number of broadband without voice customers connections at the central site,
- copper subloop testing for VDSL without voice customer connections at the street cabinet,
- PSTN Access based on the number of subscriptions

Sensitivity: Unrestricted

Customer connections without voice are connected to the Access Gateway (AGW) equipments in order to perform remote testing of the line.

Access Fibre Infrastructure:

The costs of the fibre deployed in the access network have been separated in the civil works related costs producing duct routes, and in the cable related works producing fibre connectivity inside the duct routes. Civil work related costs and cable related costs are subject to different assets within Proximus's asset accounting and can easily be identified. These assets do not distinguish the investments realized for connection of customer sites, mobile sites or remote optical nodes (at subtending level and street cabinet level). Therefore two drivers are used :

1. Kmxfibre : to separate the fibre cable costs between customer/mobile sites and remote optical sites
2. Amount km routes to physical sites : to separate the civil works costs between customer/mobile sites and remote optical sites .

Yielding following objects :

NSF_CentralOffice2RemoteOpticalNode_FibreCables

NSF_CentralOffice2Office_FibreCables

NSF_CentralOffice2RemoteOpticalNode_Track

NSF_CentralOffice2Office_Track

7.4.3.2 *Backbone*

The backbone fibre connectivity services are realized by the following Network Stage Functions embodying the resources in the fibre outside plant (ducts&manholes, and fibre cables):

- NSF_Backbone_FibreConnectivity_Regional&Core
- NSF_Backbone_FibreConnectivity_express

NSF	Driver	NLS1_0
NSF_Backbone_FibreConnectivity_express	**direct**	NLS1_0_Fibre_connect_Backbone_DWDM_Express
NSF_Backbone_FibreConnectivity_Regional&Core	**fair split of fixed cost**	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core

Sensitivity: Unrestricted

7.5 Network services of the transmission infrastructure (NLS2_0)

7.5.1 Definition

This layer deals with the transmission services between customer sites and the Proximus Offices (access) also called local tail for leased lines , and it deals also with the transport segments services (also called backbone leased lines segments and backhaul capacity) between Proximus Offices (backbone).

The national wide transmission infrastructure collects transmission traffic in three aggregation stages: local level aggregation (circ 600 locations) , zonal level aggregation (circ 36 locations) , area level aggregation (20 locations) (see Figure 8: Transport Segments). Traffic at each stage can be cross-connected allowing to create transport segments from any location to any location.

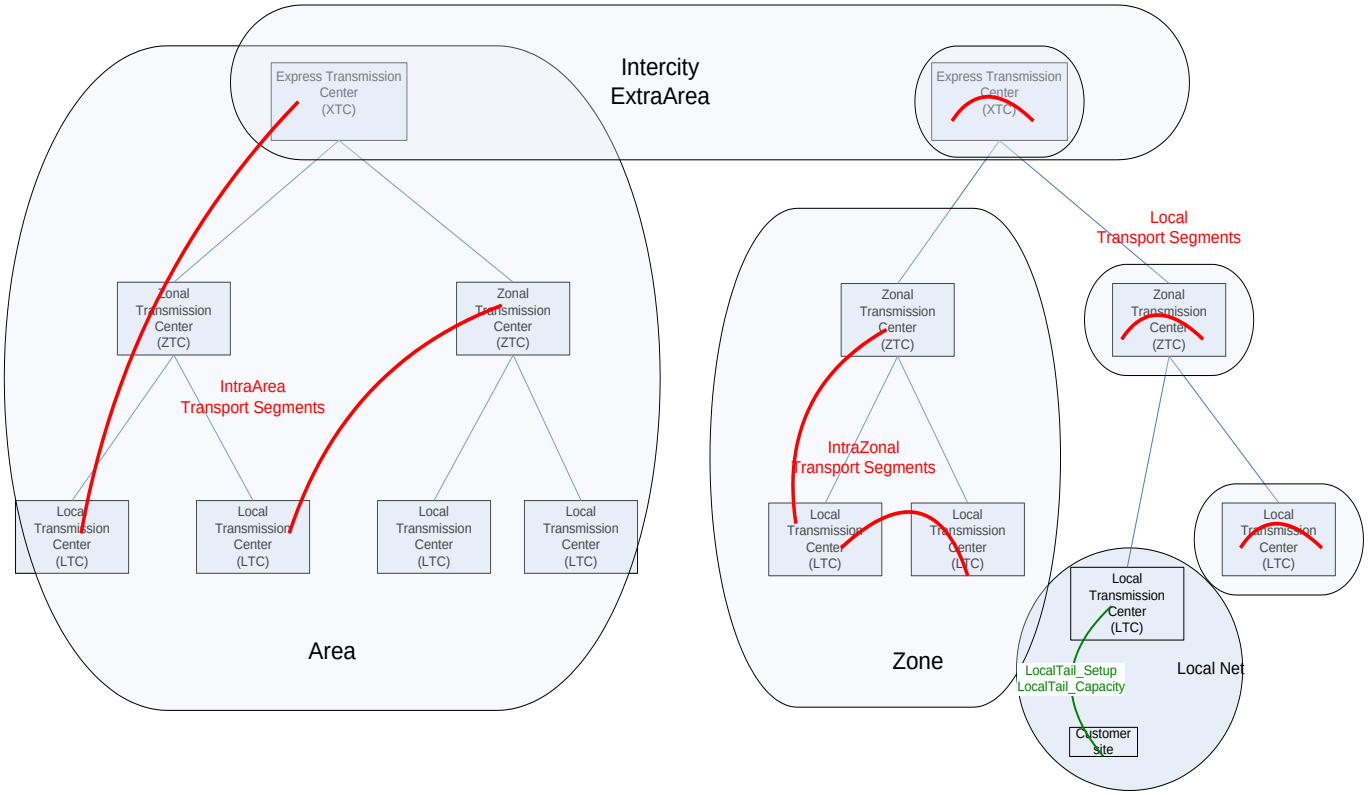

Figure 8: Transport Segments

Access services

The access services deliver the transmission between the customer site and the Proximus Office (access).

They capture costs related to the physical_dedicated link between the customer site and the central office and the equipment needed to activate the link in a capacity category.

Sensitivity: Unrestricted

Backbone services:

The backbone transport segments are classified in capacity (or bandwidth) categories -<2Mb/s, 2Mb/s, >2Mb/s- combined with distance categories -intraarea > intrazonal > local- depending on the end point situation in the aggregation hierarchy (see Figure 8).

The following NLS2.0 services are present in the model:

Network Layer 2.0 service
NLS2_0_LocalBackboneCapacity<2M
NLS2_0_LocalBackboneCapacity=2M
NLS2_0_LocalBackboneCapacity>2M
NLS2_0_IntrazonalBackboneCapacity<2M
NLS2_0_IntrazonalBackboneCapacity=2M
NLS2_0_IntrazonalBackboneCapacity>2M
NLS2_0_IntraAreaBackboneCapacity<2M
NLS2_0_IntraAreaBackboneCapacity=2M
NLS2_0_IntraAreaBackboneCapacity>2M
NLS2_0_InterCityBackboneCapacity<2M
NLS2_0_InterCityBackboneCapacity=2M
NLS2_0_InterCityBackboneCapacity>2M
NLS2_0_LocalTail<2M
NLS2_0_LocalTail=2M
NLS2_0_LocalTail>2M

7.5.2 Usage of the transmission infrastructure

The NLS2_0 Local tail services are used to bring transmission capacity to the customer sites and they are thus directly involved in leased line services between two customer sites, leased lines to data services, backhaul services to other licensed operators and monitoring of the access network.

The costs of these access services are distributed according to the number of customer sites per bandwidth category (driver name: “Nbr_of_Customer_sites”), whereas the backbone services costs are further allocated according to their bandwidth (driver name: “Bandwidth consumed (Mbit/s)”).

The model elements receiving costs from this network layer are exhaustively presented in the following table.

	Upper layer consumer or end user service
Backbone Virtual Paths (VP)	NLS2_1_Backbone_VirtualPath_InterArea
	NLS2_1_Backbone_VirtualPath_IntraArea
Proximus mobile	NLS2_2_Mobile_Access_Backhaul_Abis
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS2_2_Mobile_Backbone_Backhaul
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet

Sensitivity: Unrestricted

	NLS2_2_Mobile_Access_Backhaul_IuB
	NLS4_0_MobileTerminatingLinks
Proximus testing environments	OVH_Lab
Broadband access to public IP switching	NLS3_ADSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
Data services backbone (IP-VPN)	NLS3_Private_IP&Ethernet_Routing
Internal Proximus network	OVH_InternalCommunicationNetwork
	OVH_InternalIPNetwork
International access to data services (IP-VPN)	EUS_Private_IP&Ethernet_on_international Subscription
Leased line access to public IP switching	NLS3_Public_IP_Extension_on_symmetric
Leased line accesses to data services (IP-VPN)	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
Other	Business Overhead
	EUS_DataManagedServices
	EUS_Subsidiaries
	NLS4_0_VAS_signaling
	NLS4_1 BVAS - BGC Fixed
Public IP switching	NLS3_Public_IP_switching
Regulated broadband services	EUS_BROBA_accessLine
	NLS2_1_ADSL_SDSL_Bitstream
Regulated wholesale segments	EUS_BROTSOLL_segment<2M
	EUS_BROTSOLL_segment>2M
	EUS_BROTSOLL_segment2M
Retail&Wholesale leased lines	EUS_international_switchingTrunk
	EUS_LL <2M subscription - International
	EUS_LL <2M subscription - National
	EUS_LL >2M subcription- National
	EUS_LL >2M subscription - International
	EUS_LL 2M subscription - International
	EUS_LL 2M subscription - National
	EUS_LL_Analog National Subscription - National
	EUS_X25
Telephony access	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV services	NLS4_0_BroadcastTV
	NLS4_0_iDTV
Voice services in backbone	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC

Sensitivity: Unrestricted

	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
Wholesale transport capacity	EUS_Bandwidth_Wholesale subscription
	EUS_Nat IC-Infra Wholesale subscription

7.5.3 Contributors to the transmission infrastructure

7.5.3.1 *Local Tail*

A local tail transmission service is made of equipment installed at the customer premises extracting the digital signal from the physical line, of a physical link between the customer site and the central office and of grooming equipment in the central office (or subtended optical nodes).

Depending on the bandwidth of the local tail different equipment technologies are installed: PDH on copper , PDH on fibre or SDH on fibre. For the high bandwidth cases (>2Mb/s) a fibre based technology is required whereas for lower bandwidths the choice between fibre and copper technologies exists. However, since fibre local links are much more expensive than copper links, the preferred option for low bandwidth local tails is the copper based solution.

	Contributor to NLS2_0	**Driver name**
Equipment	NE_PDH SDH equipment	Yearly Incremental Cost
Physical inks	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

7.5.3.2 *Transport Segments*

Transport segments are realised by configuring the SDH clusters in different network stages. The transmission aggregation levels introduced hereabove (section 7.5.1 and Figure 8) are realised by different SDH clusters (regional, core and express SDH rings) interconnected by digital-crossconnects. The SDH rings are made of add-drop multiplexers deployed in LTC for the regional ones, in ZTC for the core ones and in the XTC for the express ones. The equipments within a ring are linked by fibre or by an optical wavelength.

To summarize, the building blocks for the transport segments are:

Contributor to NLS2_0	**Driver name**
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)
NE_PDH SDH equipment	Yearly Incremental Cost
NE_Express_SDH_equipment	Bandwidth (Mbps)

Sensitivity: Unrestricted

7.6 Network services of the packet based infrastructure (NLS2_1)

7.6.1 Definition

This layer deals with the data collection services (broadband or dedicated) between the customer and the central office (access) and the transport of data central office (backbone) . Two technologies coexist as well in the access part as in the backbone part : ATM technology and Ethernet/MPLS technology. Next picture summarizes the end point locations of packet based services. Remark : ATM is outphased and is no longer valuated.

This layer also integrates point to point dedicated Ethernet transparent connections delivered over the DWDM national backbone.

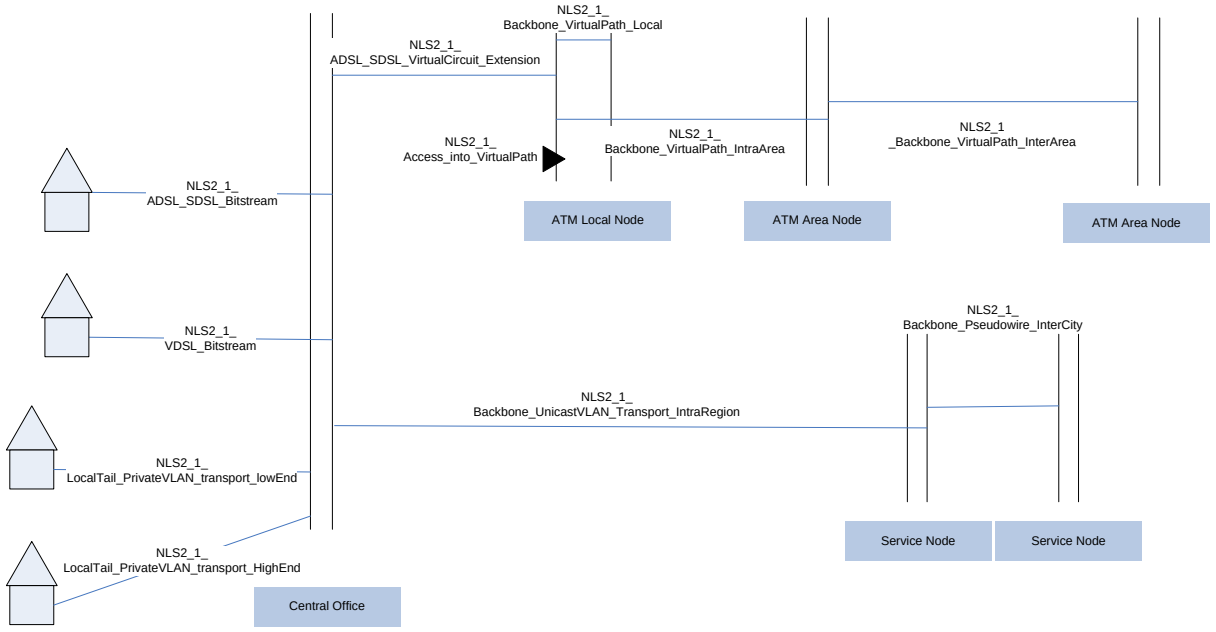

Figure 9: Network services of the packet based infrastructure 2.1

Access part

Layer 2.1 access service	Comment
NLS2_1_ADSL_SDSL_Bitstream	Broadband (ADSL-SDSL) end to end data streams between customer site and aggregation point in central office
NLS2_1_VDSL_Bitstream	Broadband VDSL end to end data streams between customer site and aggregation point in central office
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Ethernet symmetric dedicated link with central office over copper

Sensitivity: Unrestricted

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	Ethernet symmetric dedicated link with central office over fibre
NLS2_1_LocalTailCapacity_Ethernet>=10M	High bandwidth transparent Ethernet frame transport between customer and central office (BLES local tail)
NLS2_1_LocalTail_Eline_HighEnd	Ethernet symmetric dedicated link with central office

Backbone part

For data transport between central offices, the end point locations of the layer 2.1 services depend on the technology, the underlying networks having different topologies.

For the Ethernet/MPLS technology , the following services are defined:

Layer 2.1 Ethernet transport service	Comment
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	MPLS Transport of Ethernet VLANs between a central office and the service node of the region. These VLANs are unicast
NLS2_1_Backbone_Pseudowire_InterCity	MPLS Transport of Ethernet VLANs between service nodes of different regions. These VLANs are unicast
NLS2_1_Backbone_MulticastVPLS_IntraRegion	

Eventually , the dedicated Ethernet transparent connections also introduce backbone connectivity services :

Layer 2.1 Ethernet transparent transport	Comment
NLS2_1_Intra/InterZonalBackboneCapacity_Ethernet>=1G	Any combination of end points different that of the two of them being express transmission centers, bandwidth of 1/10Gbps.
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	End points are between two express transmission centers, bandwidth of 1/10Gbps.

7.6.2 Usage of the data packet infrastructure

The access services of the data packet infrastructure are combined with the data packet backbone services to deliver end-to-end connectivity between IP appliances at customer site (IP router in ADSL/VDSL modems, private LAN IP routers) and IP service nodes , primarily the broadband access servers and the IPVPN routers offering layer3 services like ADSL/SDSL IP collection, VoD IP collection, Private VLAN extensions up to IPVPN nodes.

Next table summarizes the drivers used expressing how NLS2.1 contribute in layer 3 services or directly to End user services.

NLS2.1 service	Driver Name	Upper layer services "consuming" NLS2.1 services

Sensitivity: Unrestricted

NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines	BROBA end user line, all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines	all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)	Symmetric accesses to IPVPN and BROBA access line
NLS2_1_Backbone_MulticastVPLS_IntraRegion	direct	For television
NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps) The PeakBandwidth is a realistic estimation (based on measurements in the network) of the traffic (Mbps) during peak hour.	Broadband public IP NLS3 service, VoIP , Broadcast TV, and private IPVPN routing.
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)	Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing, Ethernet backhaul and WBA transport.
NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps	BROBA transport, Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing
NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	BLES EUS services, High capacity accesses to IPVPN, IP-VPN routers interconnection, internal networks routers interconncetion
NLS2_1_IntraZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_InterZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)	
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	direct	Access to IPVPN layer 3 services
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	direct	Access to IPVPN layer 3 services

Sensitivity: Unrestricted

7.6.3 Contributors to the data packet infrastructure services

NLS2_1_ADSL_SDSL_Bitstream is the result of the central office (the Proximus technical building closest to the end customer) based network element NE_ADSL equipment. That function interacts with the broadband CPE equipment (at the customer site) by means of copper connectivity and potentially fiber connectivity to optical subtended nodes.

The Ethernet based layer 2.1 services (NLS2_1_Backbone_Uni/MulticastVPLS_IntraRegion and NLS2_1_Backbone_Pseudowire_InterCity) are implemented by the configuration of the Ethernet/MPLS network elements interacting with each other using lower layer connectivity services (see picture Figure 10).

NLS2_1_VDSL_Bitstream is the result of the function present in the deployed VDSL equipment (network elements NE_NGA Active equipment and NE_NGA Housing).

That function interacts with the broadband CPE equipment (at the customer site) by means of copper and fibre connectivity.

NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion is the result of the Ethernet/MPLS unicast function present in the deployed Ethernet equipment. The function is activated in different locations to form aggregation clusters, whose links are mainly deployed on DWDM and in a limited number by direct fibre connectivity. The NLS2_1_Backbone_Pseudowire_InterCity and the NLS2_1_Backbone_MulticastVPLS_IntraRegion are implemented in the exact same way.

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd_or LowEnd and
NLS2_1_LocalTail_Eline_HighEnd are the result of customer sited Ethernet equipment and the connectivity to the Proximus network. Such connectivity consists of a fibre based link for the high end cases and of a copper based link in the low end situation.

Sensitivity: Unrestricted

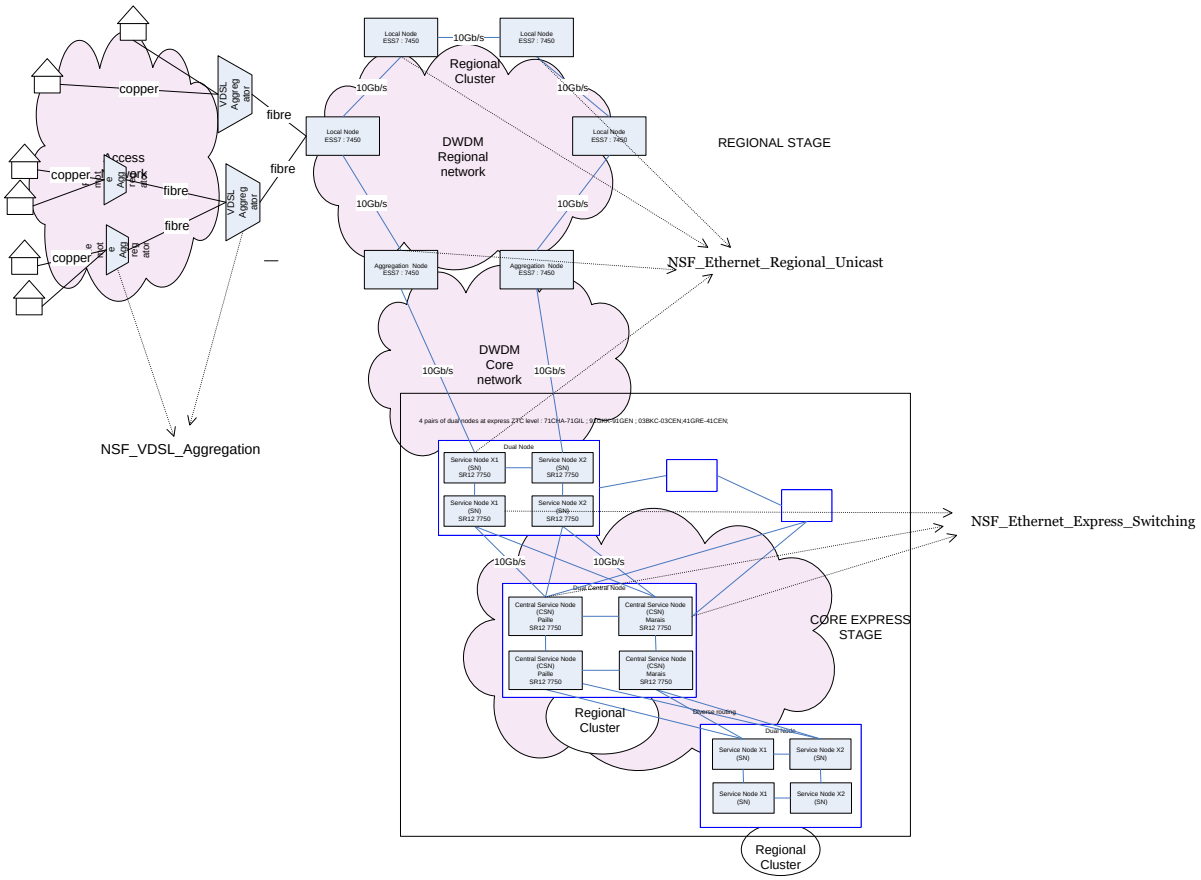

Figure 10: Ethernet layer 2.1

The dedicated Ethernet transparent backbone connection services (NLS2_1_xxxBackboneCapacity_Ethernet>=1G) are realized over the DWDM network with its Add Drop Multiplexers (ADM) or , when the capacity of the ADMs and rings is not sufficient, over point to point DWDM links.

The dedicated Ethernet transparent local tail connection services NLS2_1_LocalTailCapacity_Ethernet>=10M, is realized either on SDH equipment (up to 100 Mbps), reusing the SDH clusters deployed and already discussed in 7.5.3 (SDH over fibre) or for very high capacity connections (above 100 Mbps) they are directly realized on a wavelength (deployed as Fibre_connect_to_the_office for the local tail and as (D)WDM for the other cases).

The table hereunder summarizes the drivers used to distribute the cost contributors to the NLS2.1 services.

NLS2_1 service category	Building block of layer 2_1 service	Driver name
Ethernet transport	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Transponder	Number of Transponder

Sensitivity: Unrestricted

	NE_EthernetSwitch_Chassis	Usage of Switch in Percentage
	NE_EthernetSwitch_Port10GE	Number of Port
	NE_EthernetSwitch_Port1GE	Number of Port
	NE_EthernetSwitch_Port1GE_Adapter	Number of Adapter
	NSF_Express_EthernetSwitch_Chassis	Traffic in Mbps
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express DWDM equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
Broadband aggregation	NE_ADSL equipment	direct
	NE_NGA Active equipment	direct
	NE_NGA Housing	direct
	NLS1_0_Copper_Localloop_testing	nbr of broadband lex based without voice
	NLS1_0_Copper_Subloop	direct
	NLS1_0_Copper_Subloop_testing	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NSF_FTTC_FibreConnectivity	direct
Ethernet local tail	NE_ethernet equipment	Yearly Direct CAPEX Cost
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
Transparent Ethernet backbone connection services	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Point_to_Point_InterZonal	Direct
	NE_DWDM_Point_to_Point_IntraZonal	Direct
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Point_to_Point	Direct
	NSF_Express_DWDM_Transponder	Number of Transponder
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express_DWDM_equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

The cost relative to the building blocks and the driver values, for Ethernet transport and Transparent Ethernet backbone connection services, are determined in a top-down model, which was derived from the BIPT NGN-NGA model. (by Analysis Mason)

7.7 Network services of the mobile backhauling infrastructure (NLS 2.2)

7.7.1 Leased Lines infrastructure for mobile access backhauling

- NLS2_2_Mobile_Access_Backhaul_Abis is related to backhauling of the 2G network, providing connectivity by means of leased lines between the Base Station Transceiver (BTS) and the Base Station controller (BSC).

Sensitivity: Unrestricted

- NLS2_2_Mobile_Access_Backhaul_IuB is related to backhauling of the 3G network, providing connectivity by means of leased lines between the Node B antenna and the Radio Network Controller (RNC) in the Radio Access Network.

7.8 Network services of the IP infrastructure layer (NLS3-IP)

7.8.1 Scope

This layer provides the following basic IP services in the model.

Fixed IP service type	IP service
Collection of IP traffic for public internet or internal internet	NLS3_ADSL_Public_IP_collection
	NLS3_SDSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
	NLS3_VoD_IP_collection
	NLS3_VoIP_IP_collection
	NLS3_Public_IP_Extension_on_symmetric
Public Internet routing	NLS3_Public_IP_switching
Connection of IP sites to IP-VPN	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
	NLS3_Private_IP&Ethernet_Routing
	NLS3_Private_IP&Ethernet_Extension_on_asymmetric
	NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter
IP security	NLS3_IP_security

In addition, NLS3 also includes collection of mobile data traffic in the mobile access and backbone network.

The actual NLS3's are described further. A comprehensive listing of which NLS or EUS they contribute to together with a description of the driver utilized in each case is also presented.

7.8.1.1 *Public services*

7.8.1.1.1 IP_collection

Gathers all the data traffic, except that of the private networks, generated by the customers at their locations -homes and offices placed all over the country- at the highest network level where it can be further delivered to the Internet.

This gathering is achieved thanks to the broad and narrow band servers together with the connectivity capabilities of the MPLS backbone network.

This generic service is in fact divided in several actual NLS3, depending on the traffic type and/or underlying technology, as follows:

Sensitivity: Unrestricted

- Data traffic:
  - NLS3_ADSL_Public_IP_Collection
  - NLS3_SDSL_Public_IP_Collection
  - NLS3_VDSL_Public_IP_Collection
  - NLS3_Public_IP_Extension_on_symmetric: where the customer-IP router connectivity is provided by means of Leased Lines, as opposed to the other services which are based on broadband access technologies.
- Video on Demand traffic:
  - NLS3_VoD_IP_Collection
- Voice over IP traffic:
  - NLS3_VoIP_IP_Collection

Further, these NLS3's contribute to the following higher network layer services and end user services (EUS) as specified hereunder:

NLS3	Driver name	Target element
NLS3_ADSL_Public_IP_collection NLS3_ADSL_Public_IP_collection	Nbr_of_retail_wholesale_ADSL_lines	EUS_ADSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_ADSL_lines	EUS_FastInternet subscription
NLS3_SDSL_Public_IP_collection	Nbr_of_retail_wholesale_SDSL_lines	EUS_FastInternet subscription
NLS3_VDSL_Public_IP_collection NLS3_VDSL_Public_IP_collection	Nbr_of_retail_wholesale_VDSL_lines	EUS_VDSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_VDSL_lines	EUS_FastInternet subscription
NLS3_Public_IP_Extension_on_symmetric	Direct	EUS_Public_IP_Extension_on_Symmetric
NLS3_VoD_IP_collection	Direct	NLS4_0_VoD
NLS3_VoIP_IP_collection	Direct	NLS4_0_PSTN_access

7.8.1.1.2 Public_IP_switching

This service brings the intelligence to route the gathered traffic by the "IP_collection" generic NLS3 into the appropriate external network within the "public Internet".

This service, NLS3_Public_IP_switching, is fully and exclusively realized by the Proximus Internet Routers and is totally dedicated to the end user service EUS_FastInternet subscription.

7.8.1.2 *Private services*

7.8.1.2.1 Private_IP&Ethernet_Extension

This NLS transparently extends the customer's private local area networks, situated at any location within Belgium, to the edge of the Proximus's network, thanks to the routers installed at the customer premises (CPE) and the connectivity capabilities of the MPLS aggregation and core- clouds.

This generic service consists in fact of several actual services, specific to the access technology type, as follows:

- NLS3_Private_IP&Ethernet_Extension_on_symmetric_Datacenter

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- NLS3_Private_IP&Ethernet_Extension_on_asymmetric
- NLS3_Private_IP&Ethernet_Extension_on_symmetric_lowEnd
- NLS3_Private_IP&Ethernet_Extension_on_symmetric _highEnd

The higher level NLS/EUS to which the above NLS3's deliver their services and their costs allocations are:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_asymmetric subscription – National
NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter	direct	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription – National
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription – National

7.8.1.2.2 NLS3_Private_IP&Ethernet_Routing

This NLS delivers the capability of routing the private networks traffic to the requested end point, within the Proximus private IPVPN network.

This service, NLS3_Private_IP&Ethernet_Routing, is completed by the Proximus IPVPN Routers and the core MPLS cloud and, in turn, supports all the following EUS:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_asymmetric subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_international Subscription
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National

Figure 11: Layer 3 topology and contributors exhibits the layer's basic topology and all the contributors to the Layer 3 services.

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NLS3 - IP

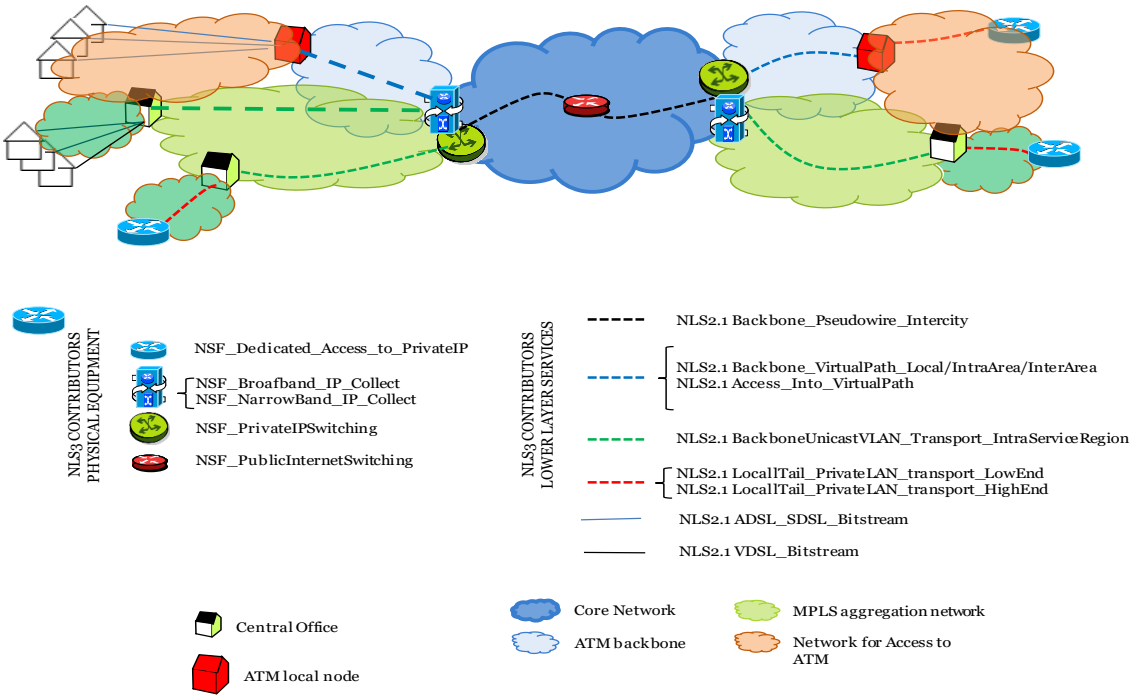

Figure 11: Layer 3 topology and contributors

7.8.1.3 *Mobile Data traffic*

The network layer 3 elements included at this level are :

- NLS3_o_BGC_Mobile_Access Data
- NLS3_o_BGC_Mobile_Backbone_Data

7.8.2 Contributors to the Network Layer 3 services

The table hereunder summarizes the contributors and the drivers used to distribute the costs to the NLS3 services.

NLS3 service category	Building block of layer 3 service	Driver name
Asymmetric Private_IP&Ethernet_Extension	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects

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		are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_Dedicated_Access_to_PrivateIP	Number of Access
Symmetric Private_IP&Ethernet_Extension	NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalTail<2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail>2M	Nbr_of_Customer_sites
	NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)

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	NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Direct
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_Dedicated_Access_to_PrivateIP	Nbr_of_Sites
Symmetric Public_IP_Extension	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
Public_IP_collection	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_Public_IP_Collect	PeakHour_PublicInternetTraffic(Gbps)
VoD_IP_collection	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_VoD_IP_Collect	PeakHour_VoDTraffic(Gbps)
VoIP_IP_collection	NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps)
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NSF_BroadBand_VoIP_IP_Collect	Direct
Public_IP_switching	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)

Sensitivity: Unrestricted

	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PublicInternetSwitching	TotalPeakHour_PublicInternetTraffic(Gbps)
Private_IP&Ethernet_Routing	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_Backbone_Pseudowire_InterCity	Bandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PrivateIPSwitching	Direct
IP_security	NSF_IP_security	Direct
Mobile Data Handling	NSF_Mobile_RAN_Data NSF_Mobile_Backbone_Data	Routed volumes Routed volumes

7.9 Network Services of the application layer

7.9.1 Definition

This layer deals with the telecommunication application services to end users. The application layer services are:

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NLS4_0_BroadcastTV, NLS4_0_VoD, NLS4_0_iDTV and voice telephony related services classified as follows:

Class of Application Service	Application Service
Access to VoiceCallHandling	NLS4_0_Voice_traffic_PointOfInterconnect
Mobile IN Platform	NLS4_0_Mobile_PrepaidData_Services
	NLS4_0_Mobile_PrepaidTraffic_Services
	NLS4_0_Private_Communication_Call_Handling
	NLS4_0_SMS_Services
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_SMS
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS4_0_BGC Mobile_Access_Distribute_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice
	NLS4_0_BGC Mobile_BackBone_SMS
	NLS4_0_BGC Mobile_BackBone_Voice
	NLS4_0_MobileTerminatingLinks
NP	NLS4_0_FixedPortableNumberLocation
Special	NLS4_0_Automated_call_distribution
Telephony Access	NLS4_0_ISDN_access
	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV	NLS4_0_BroadcastTV
	NLS4_0_iDTV
	NLS4_0_VoD
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling
	NLS4_0_CallerIdentity_CallHandling
	NLS4_0_InteractiveVoiceResponse_CallHandling
	NLS4_0_OtherAdvanced_CallHandling
	NLS4_0_Service_Announcements_Playing
	NLS4_0_Televoting_CallHandling
	NLS4_0_VAS_signaling
	NLS4_0_VoiceFeatures_SelfManaging
	NLS4_0_Voicemail&Messaging
	NLS4_0_WakeUp_CallHandling
Voice transport	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
VoiceCallHandling	NLS4_0_Voice_traffic_Collect
	NLS4_0_Voice_traffic_OnNet
	NLS4_0_Voice_traffic_Terminate
	NLS4_0_Voice_traffic_Transit

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For the access, the voice application services are end-to-end voice connections between the customer site and the central office (technical building closest to the user). For the backbone, voice applications are either pure call handling related and do not span over distant nodes, or they are voice transport applications between distant nodes. Next picture puts into perspective the services of the Voice application layer.

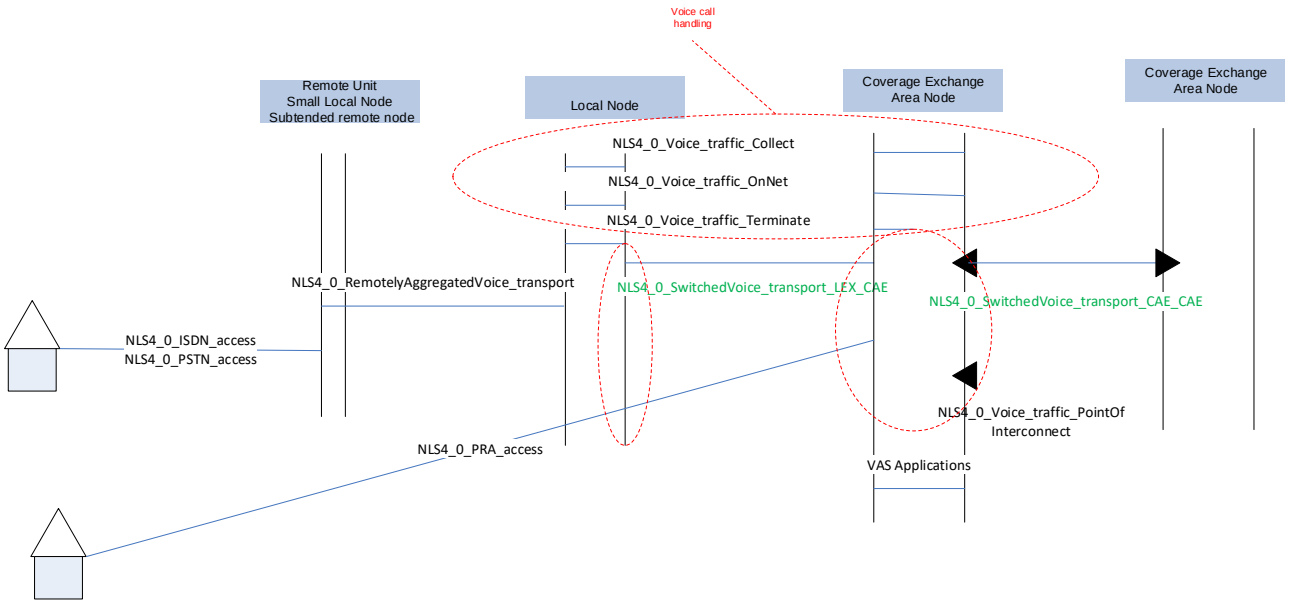

Figure 12: the services of the Voice application layer 4.0

7.9.2 Usage of the application layer

The TV related applications are completely used for iDTV end-user services, no specific consumption driver needs to be defined.

The voice application services are distributed to a variety of traffic types , each with a specific driver. The following table summarizes the used drivers per voice application service.

Class of Application Service	Application Service	Driver to distribute the NLS4.0 application service to EUS or NLS4.1
Access to VoiceCallHandling	NLS4_0_Voice_traffic_PointOfInterconnect	TimeSlot_capacity_used
Mobile IN Platform	NLS4_0_Mobile_PrepaidData_Services	cumulated invested value
	NLS4_0_Mobile_PrepaidTraffic_Services	cumulated invested value
	NLS4_0_Private_Communication_Call_Handling	cumulated invested value
	NLS4_0_SMS_Services	cumulated invested value
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_SMS	routed volumes

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	NLS4_0_BGC Mobile_Access_Collect_Voice	routed minutes
	NLS4_0_BGC Mobile_Access_Distribute_SMS	routed volumes
	NLS4_0_BGC Mobile_Access_Distribute_Voice	routed minutes
	NLS4_0_BGC Mobile_BackBone_SMS	routed volumes
	NLS4_0_BGC Mobile_BackBone_Voice	routed minutes
	NLS4_0_MobileTerminatingLinks	routed minutes
NP	NLS4_0_FixedPortableNumberLocation	Nbr_calls
Special	NLS4_0_Automated_call_distribution	direct
Telephony Access	NLS4_0_ISDN_access	Nbr_lines_inUse
	NLS4_0_ISDN-PRA_access	Nbr_lines_inUse
	NLS4_0_PSTN_access	Nbr_lines_inUse
TV	NLS4_0_BroadcastTV	direct
	NLS4_0_iDTV	direct
	NLS4_0_VoD	direct
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling	NumberTranslationProcessedTime(min)
	NLS4_0_CallerIdentity_CallHandling	direct
	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
	NLS4_0_OtherAdvanced_CallHandling	direct
	NLS4_0_Service_Announcements_Playing	Nbr_calls
	NLS4_0_Televoting_CallHandling	Nbr_calls_explosive_traffic
	NLS4_0_VAS_signaling	direct
	NLS4_0_VoiceFeatures_SelfManaging	direct
	NLS4_0_Voicemail&Messaging	direct
	NLS4_0_WakeUp_CallHandling	direct
Voice transport	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet	routed minutes
	NLS4_0_FixedSwitchedVoice_transport_National_offnet	TimeSlot_capacity_used
	NLS4_0_RemotelyAggregatedVoice_transport	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_CAE	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_MSC	routed minutes
	NLS4_0_SwitchedVoice_transport_LEX_CAE	direct
	NLS4_0_SwitchedVoice_transport_LEX_MSC	direct
VoiceCallHandling	NLS4_0_Voice_traffic_Collect	routed minutes
	NLS4_0_Voice_traffic_OnNet	routed minutes
	NLS4_0_Voice_traffic_Terminate	routed minutes
	NLS4_0_Voice_traffic_Transit	routed minutes

The driver “routed minutes” (or “routed volumes” in the case of mobile SMS) consists in determining the average number of times (=routing factor) a traffic type is using the voice application service across all possible call scenarios compatible with the traffic type. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) of that traffic type.

The traffic types (“consumers”) of these voice applications are:

Sensitivity: Unrestricted

Class of Application Service	End User Service
Access to VoiceCallHandling	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
Mobile IN Platform	EUS_BGC Mobile_Roaming Out data
	EUS_Mobile_Data national
	EUS_SMS_inbound_intal
	EUS_SMS_inbound_national
	EUS_SMS_on_net_national
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_OUT_Origination
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Mobile_inbound_intal
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_to Mobile
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_out_Origination
Mobile Voice&Messaging Handling	EUS_SMS_inbound_intal
	EUS_SMS_inbound_national
	EUS_SMS_on_net_national
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_IN_Origination
	EUS_SMS_Roaming_IN_Termination
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Mobile_inbound_intal
	EUS_voice_traffic_Mobile_inbound_intal_VAS
	EUS_voice_traffic_Mobile_inbound_national_from FOLO

Sensitivity: Unrestricted

	EUS_voice_traffic_Mobile_inbound_national_from MOLO
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_to Mobile
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
	EUS_voice_traffic_Mobile_Roaming_out_Origination
	EUS_voice_traffic_Mobile_Roaming_out_Termination
NP	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
Special	EUS_AUTOMATEDCALLDISTRIBUTION
Telephony Access	EUS_Business voice channels - subscription
	EUS_ISDN-BA Access - subscription
	EUS_Private_IP&Ethernet_on_backup
	EUS_PSTN Access - subscription
TV	EUS_IDTV_subscription
VAS application	EUS_Carrier PreSelection
	EUS_notAllocated
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_intal_VAS
	EUS_voice_traffic_Mobile_inbound_national_from FOLO
	EUS_voice_traffic_Mobile_inbound_VAS_national
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_OPS
	OVH_Management_Network
Voice transport	EUS_Carrier PreSelection

Sensitivity: Unrestricted

	EUS_notAllocated
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_IN_Origination
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_VAS_national
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
	EUS_voice_traffic_Mobile_Roaming_out_Origination
	EUS_voice_traffic_Mobile_Roaming_out_Termination
VoiceCallHandling	EUS_Carrier PreSelection
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_VAS_national

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EUS_voice_traffic_Mobile_on_net_to Fixed
EUS_voice_traffic_Mobile_on_net_VAS_national
EUS_voice_traffic_Mobile_outbound_national_to FOLO
EUS_voice_traffic_Mobile_outbound_VAS_national
EUS_voice_traffic_Mobile_Roaming_IN_Origination
EUS_voice_traffic_Mobile_Roaming_IN_Termination
EUS_voice_traffic_Mobile_Roaming_out_Origination
EUS_voice_traffic_OPS

7.9.3 Contributors to the application services

TV services

The broadcast TV application service is the result of the video streaming network stage function and the nationwide broadcast using the SDH clusters and simultaneously the multicast features of the Ethernet/MPLS regional clusters combined with the express pseudowires in order to reach all regional clusters.

Contributor to NLS4_0_BroadcastTV	**Driver**
NSF_BroadcastTV	Nbr_TV_users
NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_LocalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_1_Backbone_MulticastVPLS_IntraRegion	Direct
NLS2_1_Backbone_Pseudowire_InterCity	TotalPeakBandwidth_used(Gbps)
NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)

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Similarly, the Video On Demand service is the result of Video Movie servers delivering the content and the transport services towards the closest local node to the customer . The transport is realized on the Ethernet/MPLS network.

Contributor to NLS4_0_VoD	Driver
NLS3_VoD_IP_collection	direct

Voice application services in the access

PSTN access services are the result of the voice concentrator function in the Access Gateways and the physical copper connectivity between the customer site and the Access Gateways (in ROP or in local exchange). In addition, the data connectivity required to transport Voice over IP signaling and traffic to the Voice over IP switching units is also included as a contributor to voice access.

PRA access services do not need a concentrator function (that function is typically realized within the customer site by private switches) but merely a voice transport link to the local exchange. This one is obtained directly from layer 2.0 transport segments and local tails.

Hereunder a summary of the contributors to voice access together with the drivers used to determine their level of involvement in the service

Voice Access Services	Contributor	Driver
NLS4_0_ISDN_access	[NLS1_0_Continue_Raw_Copper]	Nbr_of_used_pairs
	[NLS1_0_Raw_Copper]	Nbr_of_used_pairs
	[NSF_ISDN_NetworkTermination]	Nbr_of_accesses
NLS4_0_ISDN-PRA_access	[NLS1_0_CentralOffice2RemoteOpticalNode_Duct]	Number of physical site routes
	[NLS1_0_CentralOffice2RemoteOpticalNode_Fibre]	Number of physical site routes
	[NLS2_0_InterCityBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_InterCityBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_IntraAreaBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_IntrazonalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_IntrazonalBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_LocalBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_LocalTail=2M]	Number_of_customer_sites
NLS4_0_PSTN_access	[NLS1_0_Continue_Raw_Copper]	Nbr_of_used_pairs
	[NLS1_0_Raw_Copper]	Nbr_of_used_pairs
	[NLS2_0_IntrazonalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_LocalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS3_VoIP_IP_collection]	direct
	[NSF_PairGainSystem]	direct
	[NSF_PSTN_Voice_concentrator]	Nbr_lines_inUse

Voice application services in the backbone (see picture Figure 12: the services of the Voice application layer 4.0)

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The services in the group "Access to VoiceCallHandling" allow to access the Fixed Voice NGN Platform.

In summary the contributors are distributed using following drivers:

Network functions used to realize Access to Voice Call Handling services	Driver used to attribute network functions to access to VoiceCallHandling services
[NSF_Interconnecting_CallHandling	Attributed ecodep of capex from bottom up model
[NSF_OwnNetwork_CallHandling]	Attributed ecodep of capex from bottom up model
[NSF_Voice_call_CAE_Processing]	routed minutes
[NSF_Voice_call_CAE_Trunks]	Nbr Time Slots
[NSF_Voice_o_Broadband_SBC]	Attributed ecodep of capex from bottom up model
[NSF_VoiceIP_Router]	Attributed ecodep of capex from bottom up model

The driver "routed minutes" consists in determining the average nbr of times (=routing factor) a voice call handling type is using the network functions. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) exercising that voice call handling type.

The services in the group "Voice transport" are emanating from layer 2.0 Backbone transport capacity (<=2M) which are distributed according to the consumed bandwidth.

Contributor to NLS4_x	Driver	NLS4_x element
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_1 BVAS - BGC Fixed
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_ISDN-PRA_access
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BroadcastTV
		NLS4_0_ISDN-PRA_access
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks

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		NLS4_0_PSTN_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_VAS_signaling
		NLS4_1 BVAS - BGC Fixed
NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_MobileTerminatingLinks
		NLS4_0_PSTN_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_1 BVAS - BGC Fixed
NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_LocalTail<2M	Number_of_customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
NLS2_0_LocalTail=2M	Number_of_customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access

The services in the group “VAS application” are in fact directly identified with a network function:

NSF_CallerIdentity_CallHandling	NLS4_0_CallerIdentity_CallHandling	direct
NSF_CallingCard_CallHandling	NLS4_0_CallingCard_CallHandling	direct
NSF_InteractiveVoiceResponse_CallHandling	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
NSF_MessageWaitingIndicator_Inserting	NLS4_0_MessageWaitingIndicator_Inserting	direct
NSF_OtherAdvanced_CallHandling	NLS4_0_OtherAdvanced_CallHandling	direct
NSF_PrepaidCallingCard_CallHandling	NLS4_0_PrepaidCallingCard_CallHandling	direct
NSF_Service_Announcements_Playing	NLS4_0_Service_Announcements_Playing	direct
NSF_Televoting_CallHandling	NLS4_0_Televoting_CallHandling	direct
NSF_VirtualPrivateNetwork_CallHandling	NLS4_0_VirtualPrivateNetwork_CallHandling	direct
NSF_VoiceFeatures_SelfManaging	NLS4_0_VoiceFeatures_SelfManaging	direct

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NSF_Voicemail&Messaging	NLS4_0_Voicemail&Messaging	direct
NSF_WakeUp_CallHandling	NLS4_0_WakeUp_CallHandling	direct

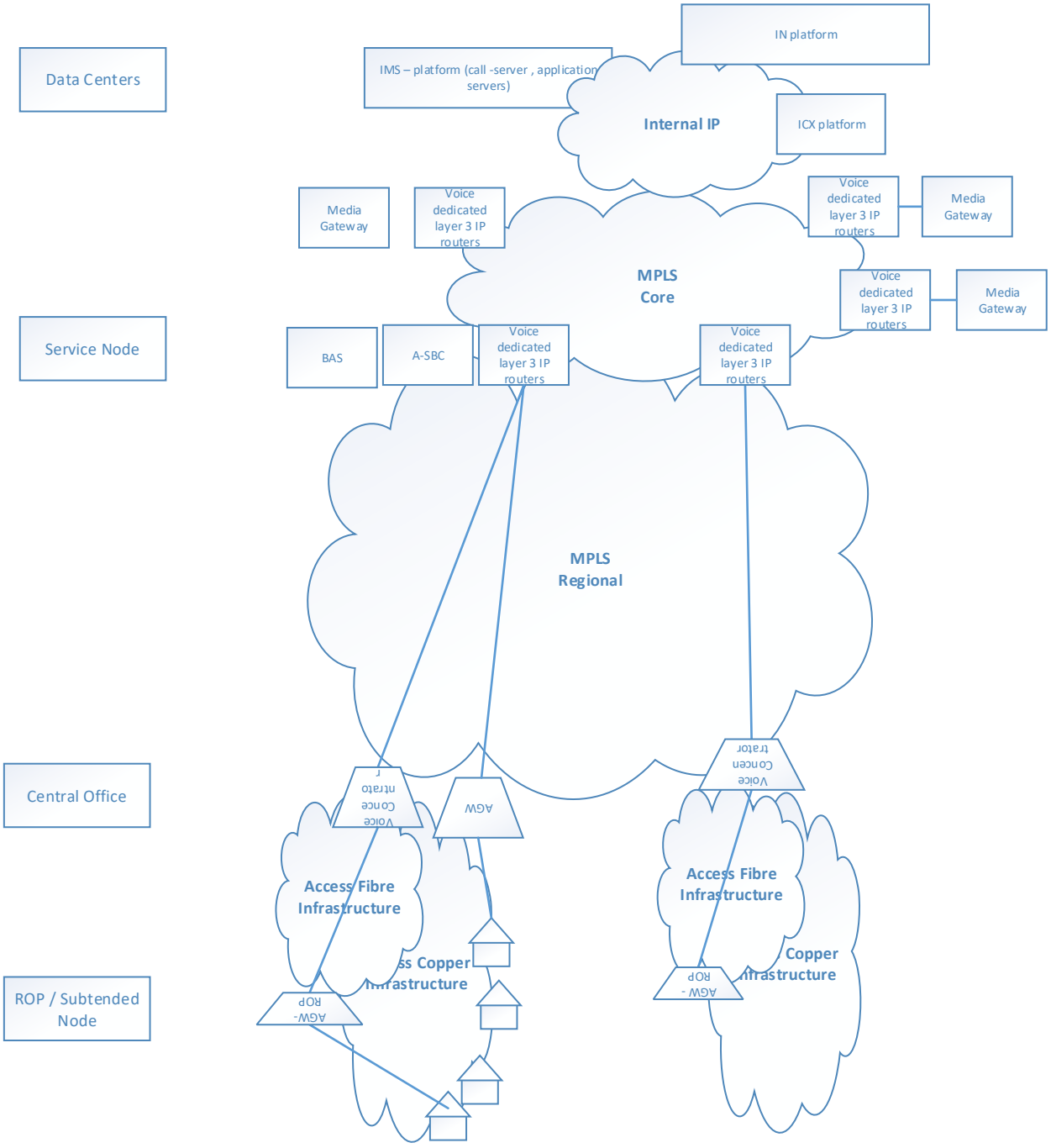

Figure 13: Fixed Voice NGN Network

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8 Annex I: SCF Flow Acronyms

SCF	Support and Customer Flow
BIPT	Belgian Institute for Postal services and Telecommunications
BTN	Business Transformation
CBU	Consumer Business Unit
CC	Costs Center
CCG	Costs Center Group
CP	Costs Pool
CWS	Carrier & WholeSale
CUO	Customer Operations
DIY	Do It Yourself
EBU	Enterprise Business Unit
FAC	Fully Allocated Costs
HCA	Historical Cost Accounting
HMC	Human Manpower Cost
MOS	Material Out of Stock
NRA	National Regulatory Authority
REG	(Proximus) Group Regulatory Affairs
SMP	Significant Market Power
SOG	Services & Other Goods
S&S	Staff & Support

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9 Annex II: Network and IT Flows Acronyms

AC	Asset Class
ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
BA	Basic Access
BAS	Broadband Access Server
BES	Proximus European Solutions
BGC	Proximus
BILAN	Proximus Interconnection of LANs
BLES	Proximus LAN Extension Service
BROBA	Proximus Reference Offer for Bitstream Access
BROTSOLL	Proximus Reference Offer for Terminating Segment of Leased Line
BVAS	Business Value Added Services
CAE	Coverage Exchange Area
CAPEX	CApital Expenditures
CP	Cost Pool
CPE	Customer Premises Equipment
CPU	Central Processing Unit
CWDM	Coarse Wavelength Division Multiplexing
DACS	Digital Analog Cross-connect System
DCN	Data Communication Network
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DU	Dispatch Unit
DWDM	Dense Wavelength Division Multiplexing
EAA	Extra Access Area
EAL	Ethernet Access Line
EFM	Ethernet First Mile
ESS	Ethernet Service Switch
Ethane	ETHernet Aggregation NETwork
EUS	End User Service
FAC	Fully Allocated Costs

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FIFA	Fast Internet Future Architecture
FTTC	Fiber To The Cabinet
FTTO	Fiber To The Office
Gb	Giga bit
Gbps	Giga bits per second
HW	HardWare
IAA	Intra Access Area
iDTV	interactive Digital TeleVision
IN	Intelligent Network
TCE	Telecom CostExpert
IO	In/Out
IP	Internet Protocol
IPVPN	Internet Protocol Virtual Private Network
ISAM	IP Subscriber Line Access Multiplexer
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LDC	Local Distribution Center
LEX	Local Exchange
LL	Leased Line
LTE	Line Terminating Equipment
Mbit	Mega bit
MEO	Modern Equivalent Opex
MOLO	Mobile Other Licensed Operator
MPLS	MultiProtocol Label Switching
MSR	Multi Server Router
MUX	Multiplexer
MVAS	Mass Value Added Services
MWE	MicroWave Equipment
NE	Network Element
NGA	New Generation Access
NGN	New Generation Network
NLS	Network Layer Service
NTE	Network Terminating Equipment

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NTP	Network Termination Point
NSF	Network Stage Function
OLO	Other Licensed Operator
OLTE	Optical Line Terminating Equipment
OPEX	OPerational Expenditure
OVH	Overhead
PDH	Plesiochronous Digital Hierarchy
PRA	Primary Access
PSTN	Public Switched Telephony Network
QoS	Quality of Service
RAM	Random Access Memory
ROP	Remote Optical Platform
SDH	Synchronous Digital Hierarchy
SDSL	Symmetric Digital Subscriber Line
STM	Synchronous Transport Module
TDM	Time Division Multiplexing
TV	TeleVision
VAS	Value Added Services
VDSL	Very high speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VP	Virtual Path
VPLS	Virtual Private Local area network Service
VPN	Virtual Private Network
WDM	Wavelength Division Multiplexing
SDE	Service Delivery Engine
CUO	Customer Operations
CFF	Customer Field Force
TEC	Technology
NEO	Network Engineering & Operations
TSI	Technology, Strategy & Innovation
ITS	Information Technology Services

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ARP	Architecture, Road map & Program Office
SPC	Services, Platforms & Cloud

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Proximus Regulatory Cost Model

2017

General Description

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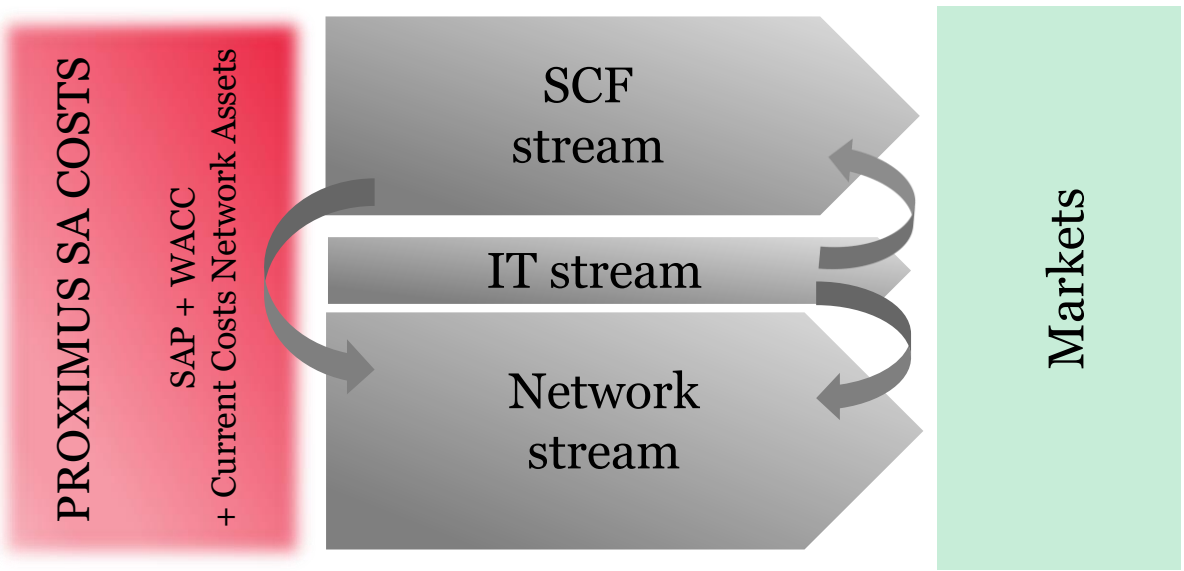
1 General description

REG (Group Regulatory Affairs) department ensures the preparation of separated accounts and sets up the Cost model inherent to the reporting of separated accounts, and used in other regulatory files. In accordance with European Commission recommendations, the entire costs of statutory accounts are taken into account in the cost model and reporting of separated accounts, to the exception of statutory accounts 65 to 68, as well as some other accounts excluded from the cost model perimeter. As said, the cost basis of the cost model is directly issued from the general accounting of Proximus SA, as recorded in SAP accounting tool. Statutory accounts of Proximus SA have been audited in 2017 by Deloitte, external auditors. Deloitte auditors issued an unqualified opinion on statutory accounts.

Separated accounts result from allocation flows of Network/IT and SCF (Support and Customer flow) costs, as included in the general accounting of Proximus SA, as well as the cost of capital of these two modules.

The following chart illustrates the accounting system of costs, as well as main allocation flows. The whole costs included in the allocation process are loaded in a tool (Telecom Costs Expert Software, referred as TCE) that runs accuracy tests and prevents double costs counting or multiple allocations.



SCF allocation flows include costs that are of service to the customer and other direct and indirect costs that are not included in the Network nor IT allocation flows.

Network and IT flows include all the costs related to the Network and Information & Communication technology.

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Costs allocated in allocations flows SCF, Network and IT have the same cost basis origin, this later being SAP statutory accounts of Proximus SA. IT tool TCE, in past models named INCA, makes validity checks to prevent any double counting and trace allocated costs from their unique SAP cost basis origin to their final destination.

The Cost model per Market is a top-down model.

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2 Model Allocation Structure

This section provides with a global view on the allocation structure of the model by walking through the major allocation flows and introducing the major building blocks and concepts in the model.

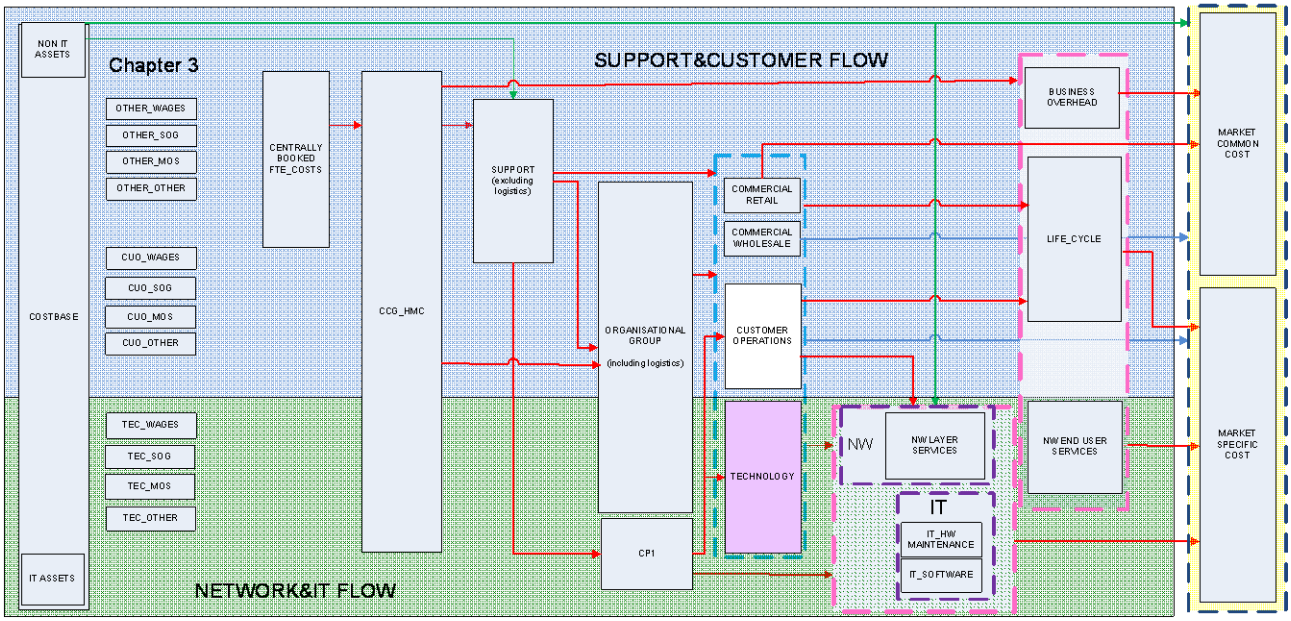
The following Figures will be the supporting tools for such discovery walk, where the major modules constituting the model as well as the global allocation flows among them are shown. The differentiation between SCF, Network and IT flows is also illustrated in the exhibit.

The overall objective of the model is allocating all the attributable costs present in the cost base to the markets as defined in the regulatory framework.

Therefore, the cost base constitutes the foundation of the model.

Further, the model allocation process is subdivided into three main streams, SCF, Network and IT.

The Cost base settings and the Non IT assets are presented in chapter 3.



The SCF stream has as objective to allocate all costs that are not part of the Network or IT model towards the markets.

SCF stream (chapter 4) encompasses Support, Commercial Retail, Commercial Wholesale and Customer operations costs.

The IT and Network streams, although having completely separated CAPEX basis, both share a common OPEX source.

OPEX of IT and Network streams are handled via allocation of costs of Technology business unit (chapter 5).

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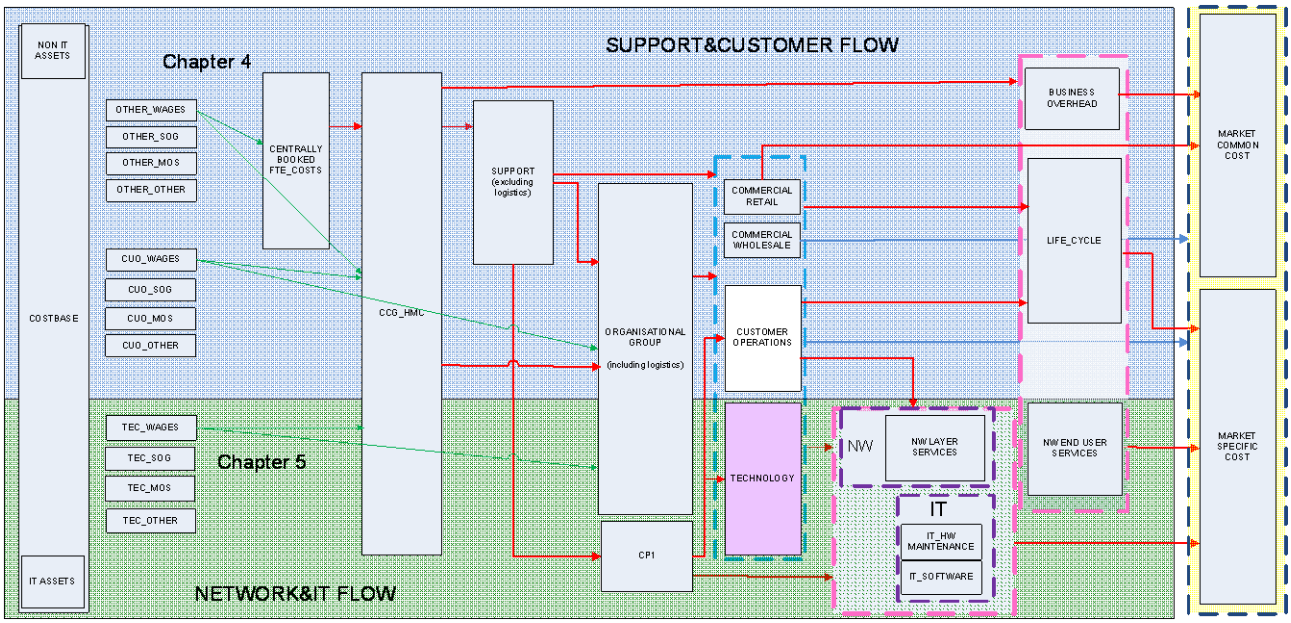
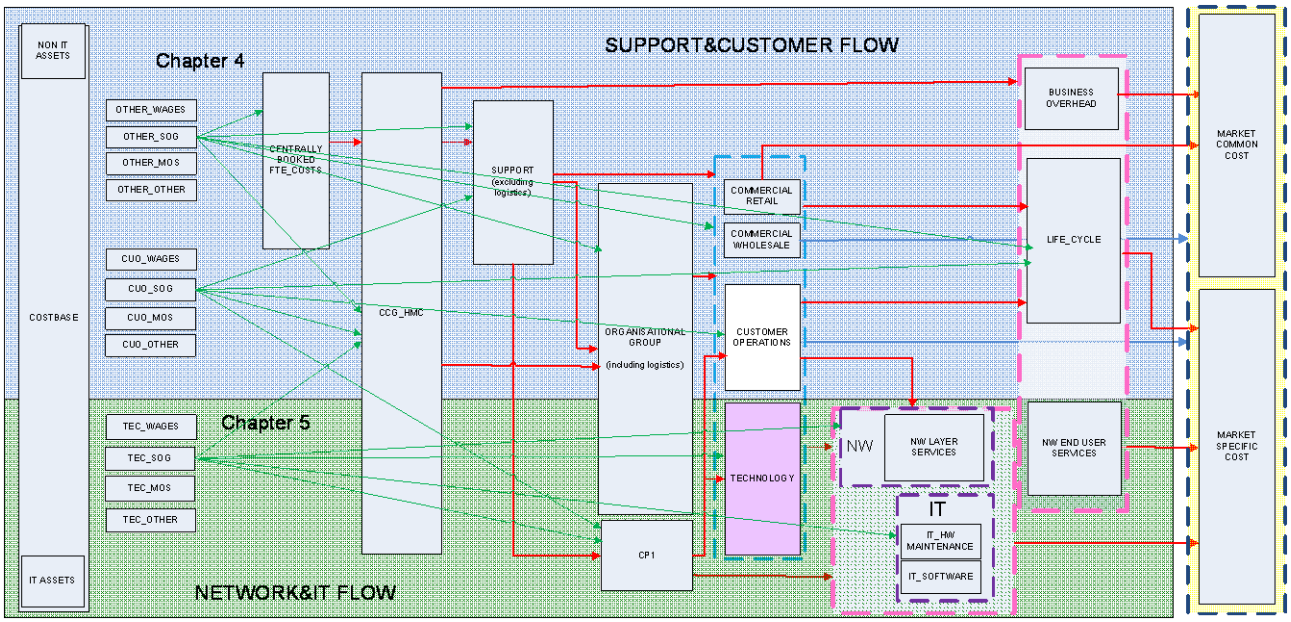
WAGES OPEX allocation flows are as follows:



Services and Other Goods OPEX allocation flows are as follows:



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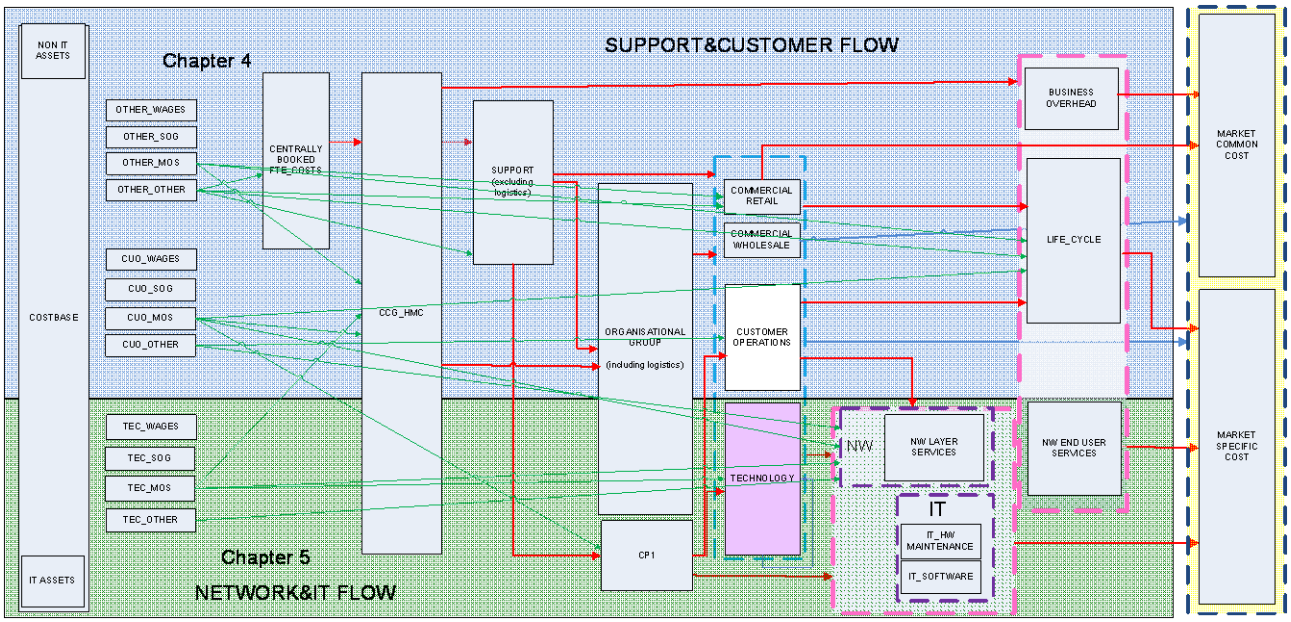
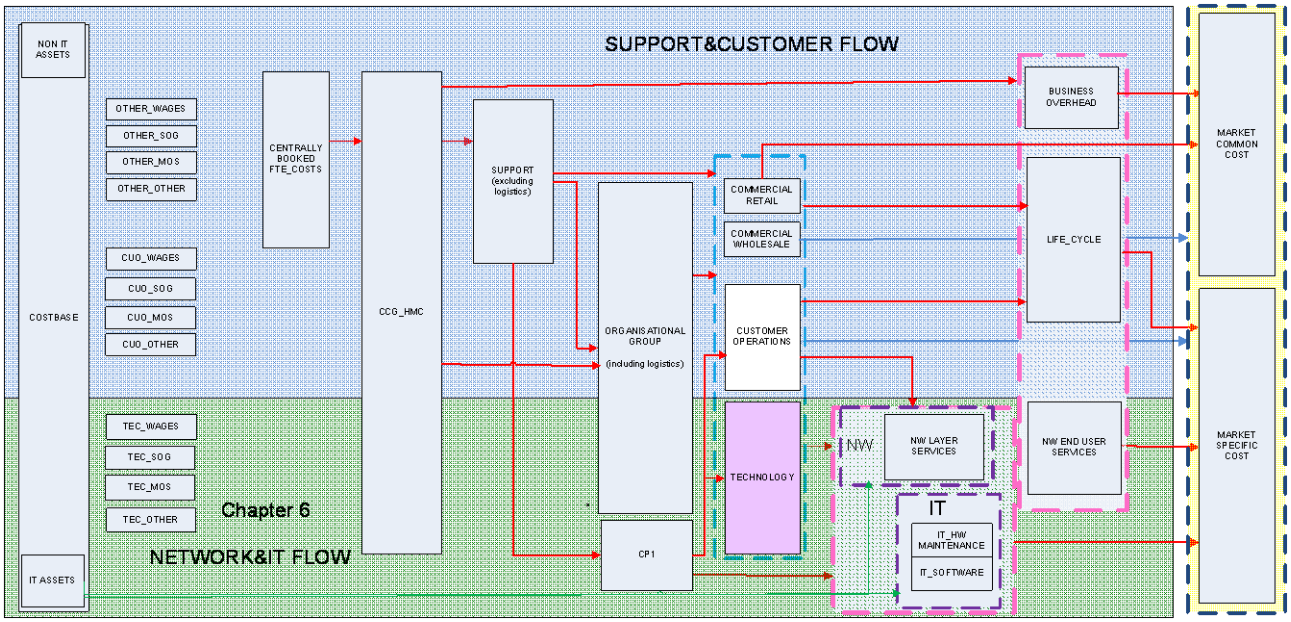
Materials out of stock and Other OPEX allocation flows are as follows:



IT Assets allocation flows are as follows:



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3 Cost Base

3.1 Cost model perimeter

3.1.1 Determination of the Cost model perimeter

Costs included in the Cost model are operating charges, i.e. general ledger (GL) accounts 60 to 64 of statutory accounting, as well as part of GL 69.

GL 60 “cost of goods sold” includes mainly telecom equipment purchases (ADSL modem, handsets, cables, mobile SIM cards, etc.), small equipment (cpe, …) and stocks movements.

GL 61 « services and other goods » includes primarily costs linked to traffic (a.o. interconnection fees) and operating expenses such as maintenance, utilities, renting, marketing, representation allowances, consultancy, travel fees, etc.

GL 62 corresponds to all personnel costs (wages and other salary benefits).

GL 63 includes depreciation and amortization, stocks and trade receivable accruals for write-off and movements of provisions for liabilities.

GL 64 gathers other operating expenses, including a.o. write-off on trade receivables, immovable withholding tax and local taxes, taxes on pylons, etc.

GL 69 relates to company result appropriation corresponding to the part of personnel in the profit (collective bonus).

At last, GL 72 – « Produced Fixed assets » reduces the cost basis to cancel costs linked to produced fixed assets and to avoid a double counting of these costs with the corresponding depreciation charge.

To the costs perimeter from the general accounting is added the weighted average cost of capital (WACC) of 8,13% for Proximus Fix products and for Proximus Mobile products.

3.1.2 Costs excluded from the Cost model perimeter

Other costs than those mentioned above are excluded from the Cost model. It relates to GL 65 to 69 of general accounting, to the exception mentioned above, for part of GL 69 (share of personnel in profit).

Some costs are excluded since considered as having no causal link to the products and activities. This matters for extraordinary costs (GL 66) and tax costs (GL 67 and 68).

Other costs are excluded since already included in the WACC. This relates to financial costs (GL65) and dividends appropriation (GL 69).

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Costs excluded mentioned here above are costs excluded from the Cost model upstream (i.e., when defining Cost model perimeter with costs included in general accounting). On top of these ones, other costs will be excluded downstream in the Cost model, i.e. costs excluded via the allocation flow. E.g.: Support costs involving affiliates.

3.2 Cost regrouping

Proximus books the costs on one hand, on a general ledger account defined in general accounting, and on another hand, on a cost center defined in reporting and analytics accounting. This way to handle costs has for objective to gather data, in order to simplify data processing.

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Two types of aggregation are done:

- Aggregation of 705 GL of general accounting in 178 Cost pools (CP)
- Aggregation of 535 cost centers in 210 Cost Centers Groups (CCG).

A **Cost pool** is a group of costs with similar characteristics and issued from the same family of cost natures.

Regarding material resources, gathering of costs is based on the similar function that these costs have. E.g., cost pool "Training expenses" sums up costs of trainings organized inside Proximus, external trainings, training books and documentation costs.

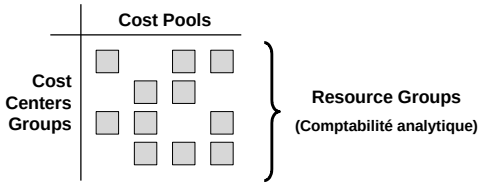
Regarding human resources (referred as FTE, or Full Time Equivalent), cost pools gather workers with the same profile. E.g., cost pool "Level S" includes wages and salaries of employees with level S (Sales force), as well as premiums and other wages benefits paid to these employees.

Costs included in the same cost pool have an identical causal link to the products and activities to which they related. They have the same "resource driver".

A **Cost Center Group (CCG)** sums up cost centers with similar characteristics and realizing similar activities and as a consequence, can be aggregated into the same cost center group.

Each Cost Center Group uses various cost pools.

Combinations cost pool/cost center group constitute the **Resource Groups**. The Resource Groups are the Cost basis of the Cost model.



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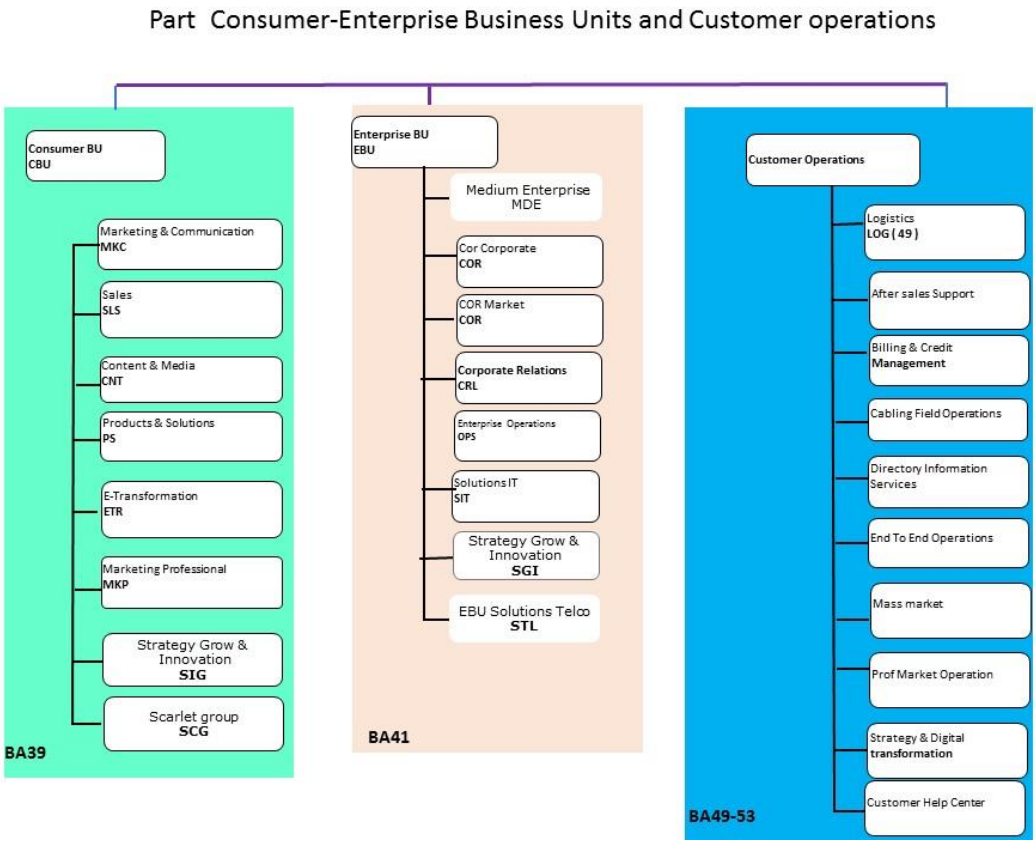
3.3 Organization

The organizational structure of Proximus SA, as on December 31, 2017 as used in the Cost base, is as follows:



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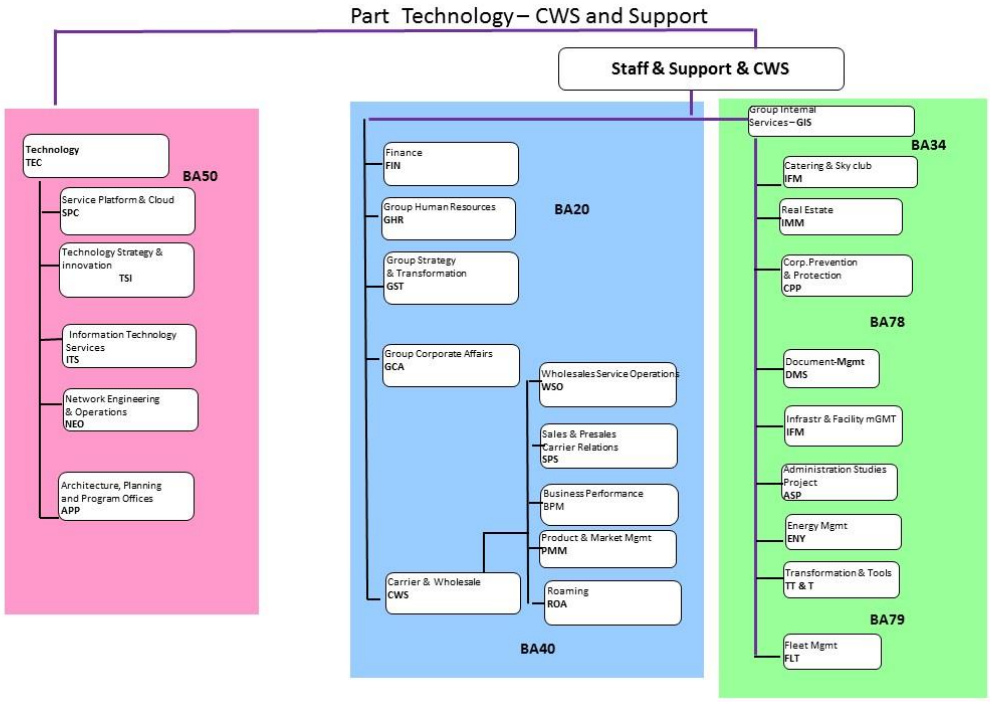

- This organisation has a clear split between the residential and professional customers by the divisions Consumer and Enterprises Business units, as well as the wholesale customers with Carrier & Wholesale Business unit,
- The Technology Business unit (TEC) brings together Network and IT services,
- The Customer Operations Business unit gathers all services in direct link with the customer, whether private consumer or enterprise,
- Within Staff & Support, the content (FIN, GHR, GST, GCA) remains the same.
- Group Internal Services groups internal services like Fleet, Facilities, Prevention &Protection, etc.

Cost perimeter is split by the REG department between allocation flows of Network/IT and Support and Customer flow, after completeness and accuracy checks (no double counting) on costs data from SAP. As mentioned in general description, allocation flow Network/IT allocates all costs and assets (capital expenditure) in IT and Network, while the allocation flow Support and Customer flow allocates costs and assets other than IT and Network related.

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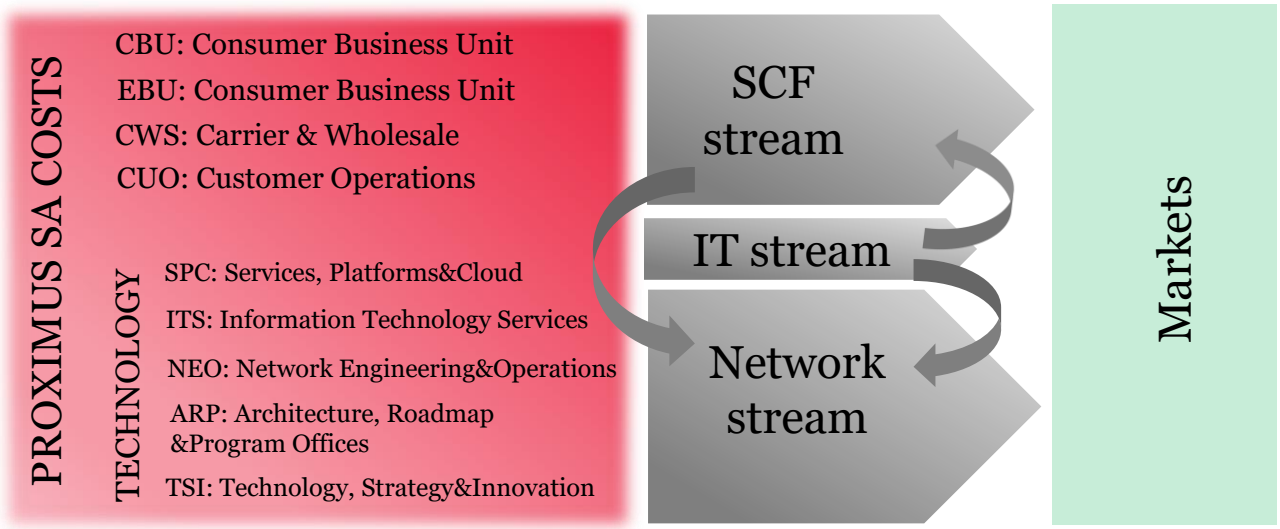

Split of cost perimeter between allocation flows Network/IT and SCF is processed as follows:

- All departments within TEC are treated within the Network / IT flow.
- Provisions for taxes on telecom equipment that are booked at the level of TEC management are downstream shared via allocation flows between assets classes to which they relate.
- All other costs, not mentioned above are treated within the SCF flow namely the divisions CBU (Consumer Business Unit), EBU (Enterprise Business Unit), CWS (Carrier Wholesale), CUO (Customer operations) and Staff & Support. The Staff & Support division comprises different departments, including Headquarters, GCA (Group Corporate Affairs) which includes Legal, Group Public Affairs, Regulatory, Internal audit, Group communications and Secretary General. Then we have departments like Finance, Group Human Resources, Group Strategy & Transformation and GIS (Group Internal Services) for departments like Real Estate, Business Services, Facilities, Prevention & Protection, Fleet and Catering.
- Regarding Assets (depreciation and WACC), repartition is done based on an analysis of assets classes: assets IT and Network are handled in the allocation flow Network/IT, while all other assets (buildings, utilities equipment, CPE, etc.) are allocated in the flow SCF.

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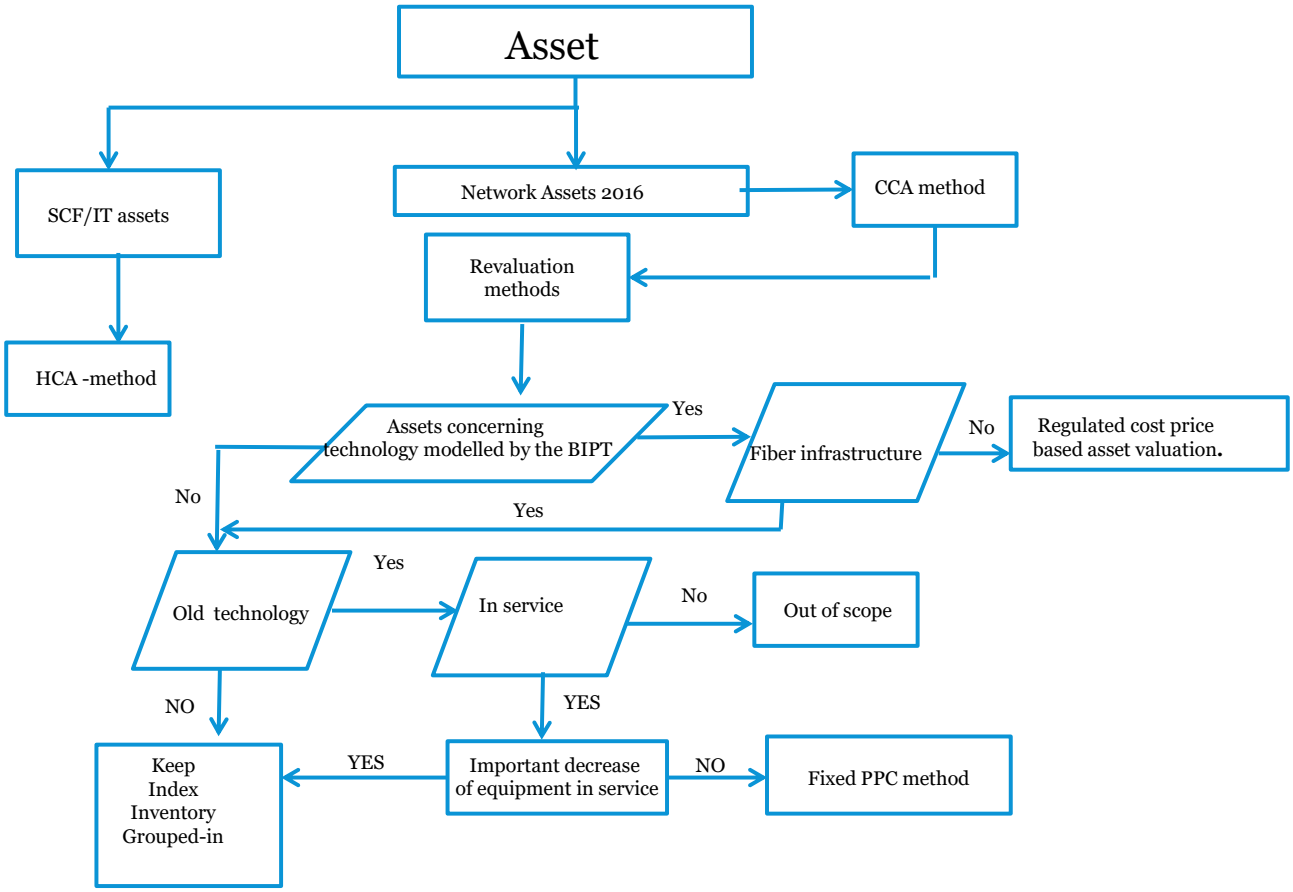
3.4 Assets revaluation

3.4.1 Decision tree



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3.4.1.1 *Split network - SCF and IT assets*

The assets base was split up in Network – SCF and IT assets. The cost of the network assets must be based, for operators being declared as dominant, on the Current Cost Accounting. For the SCF assets (EBU-CBU– CUSTOMER OPERATIONS- SUPPORT-Facilities-Sourcing-Fleet) and IT related assets the cost accounting systems is based on the Historical Cost Accounting method.

3.4.2 Methods used to reevaluate the network assets

The regulatory framework clearly states that the cost accounting systems of operators being declared as dominant on relevant markets must be set based on Current cost accounting for the network costs.

The network & IT flows within the top down model calculate the current costs for the network related assets. Current costs have been computed as explained hereafter.

There are five methods to evaluate the current value of the network: reassessment of the current inventory, price indexation, by default "keep everything as it is", index based on a fixed PPC and regulated cost price based. For old assets concerning technology still in service we use a method based on a fixed PPC2007. Each of these methods requires its own set of inputs. It is mainly the availability (or lack) of input which dictates the choice of the method. Nevertheless, each method has its advantages and disadvantages with respect to the others.

The inventory and price indexation methods assume that network departments replace the equipment of its assets by equivalent equipment. The notion of equivalent is quite fuzzy. An engineer would tell you that over time there are always more functions integrated in new equipment and that they are always more cost-effective. It makes the comparison between different generations of equipment difficult. The notion of equivalent has therefore been addressed through the term Modern Equivalent Asset (MEA). The assets must be replaced by their MEA. The MEA is the replacement cost of the technology expected to be in place within the planning horizon. Note that this notion takes into account the introduction speed of a new technology in the network. If network departments plan to have replaced 50% of an old technology by a new one within the planning horizon, it makes no sense to simulate the costs with higher percentages because the planning takes into account the availability of the resources to carry out the work.

Find hereafter the rules that have been used:

- Technology still in procurement: use current price, e.g. IP equipment

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- Technology to be replaced within the planning horizon: use current price of the modern equivalent asset, e.g. TDM based voice equipment are replaced by IP based voice equipment.
- Technology grouped in : those assets will be revaluated by another asset concerning the same technology
- Old technology not anymore in service : those assets are set out of scope and will not be revaluated
- Old technology still in service (in maintenance mode); those assets are revaluated by an index method based on a fixed PPC instead of index, keep or inventory method. Old assets revaluated by keep will keep the CAV value as GRC
- BIPT regulated technology : use the BIPT models to extract relevant unit costs or use BIPT bottom-up models to directly calculate CAPEX costs with 2017 demand volumes

3.4.2.1 *Price Indexation*

This is the most straightforward approach, provided historical costs are available. The investments for each year (from 1981 on) are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The method is refined by defining price indexes depending on the nature of the cost. This is particularly true when costs of a different nature experienced a different price evolution. Three different types of price indices have been defined: the labour index, the indices for services delivered by external companies and the material index. Note that indices for services supplied by external companies vary according to the asset involved. For example, services supplied by external companies related to cable assets, are in fact outsourced labour costs for trenching and cable installation. In such case, a labour index has been applied. Other external services less labour intensive are resulting in other price indices, such as a fibre cable index.

3.4.2.2 *Inventory*

This is the best method to reflect accurately the price of assets currently in service in the network. The revaluation is merely performed by multiplying the volume of each specific type of equipment currently deployed in the network by its average current unit cost. The current unit costs are based on the prices defined in the current frame agreements we have with our suppliers.

In terms of inputs it is the most demanding method. It requires an extensive inventory of equipment.

For some assets that are currently being deployed, we have used a regression method to calculate the investment value of the fully deployed assets.

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3.4.2.3 *Keep as it is.*

The "keep as it is" method is merely what its name says. We keep the price we have in the historical accounting books. This method is only valid for costs with a very short depreciation period or for software intensive products. For the latter we assume that on the one hand software development is labour intensive but on the other hand the rapidly evolving programming environment improves the productivity compensating for the higher labour cost. This results in a stable software price. Another practical reason to select the "Keep as it is" method is the amount booked on the asset. If this amount is small, the method has also been applied. In this particular case, the effort to collect all the information about the cost evolution outweighs the impact on the service costs.

3.4.2.4 *Index Based on a fixed PPC*

Old technology still in service (in maintenance mode) ; those assets are revaluated by an index method based on a fixed PPC.

If Proximus has done some investments for keeping those technologies in service, we take those investments also into account.

If Proximus has done some great retirements, the revaluation method is revised.

- Formula :

$$GRCyearN = [(GRCyearN-1)*(1+ fixedPPC2007)] + investmentsYearN$$

Formula :

Index year = (1+ (ppc year))* (1+(ppc year -1))* (1+(ppc year -2))*……..

3.4.2.5 *Asset valuation based on the Proximus Reference Offer tariffs and BIPT bottom-up cost models*

3.4.2.5.1 Method background and rationale

The market for fixed telecommunication services, the related technologies and the competition have evolved through the years leading to the current situation where the vast majority of the telecom services provided by the Proximus's access and area backbone networks are regulated. This regulation has been enforced, amongst other initiatives, by clearly specifying the services and applying regulated tariffs, as reflected in the Proximus Reference Offers (BRUO, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA).

Since the regulated tariffs are cost oriented and determined by bottom-up costing models, it is reasonable to use the direct CAPEX component of these prices to calculate the annuity of the assets addressed by the Proximus Reference Offers.

For Fixed Voice telephony regulation focusing on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a voice call

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on the fixed network (FTR), BIPT has developed a bottom up NGN cost model, calculating this termination rate. The latest available version of this model has been used to value NGN assets of the Voice NGN Platform.

Mobile telephony regulation mainly focuses on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a mobile call (MTR). In order to calculate this termination rate, BIPT has developed a bottom up mobile cost model, including all voice and data services 2G and 3G. The latest available version of this model was published by BIPT in November 2013, and has been used to value mobile assets.

3.4.2.5.2 Method description

All the fixed network assets, except optical fiber infrastructure, concerned by the technologies covered by the Proximus Reference Offer models (BRxx), namely BRUO, Block&Tie cables, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA, are valued by applying the direct CAPEX component of the relevant BRxx tariff to the appropriate volumes extracted from the Proximus inventories.

For fixed voice NGN assets valuation, Proximus fixed voice volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting economic cost has been extracted in order to value the assets.

For mobile assets valuation, Proximus mobile volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting CAPEX economic cost has been extracted in order to value the assets.

3.4.2.5.3 Scope

The technologies to be valued by this method, since they are covered by the Proximus Reference Offers and BIPT fixed voice NGN and mobile cost models, are:

- Copper infrastructure: including trenching, ducting and copper cable.
- (D)WDM
- PDH/SDH
- xDSL: including ADSL, ADSL2+ and SDSL
- VDSL
- Ethernet
- Fixed Voice NGN Platform assets.
- Mobile network assets 2G, 3G.

However, some parts of the networks deployed with the above mentioned technologies are not covered by the BIPT tariffs for they provide non-regulated services. Consequently, they cannot be valued by means of the regulated tariffs.

These services are:

- Any service provided by the Proximus express network layer, also called intercity network.
- Multicast services, namely broadcast TV.
- Access lines for the Explore customers.
- Mobile network assets 4G.

The chosen alternative for valuing the network sections providing the non-regulated services has been the development of specific models in order to determine applicable direct CAPEX unit prices,

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at the exception of the mobile network assets related to 4G technology that have been integrated in the bottom-up mobile cost model.

3.4.2.5.4 Method implementation

- *Inputs Fixed Network*
  - *Broken down tariffs*
    - *Broken down tariff based on the BIPT BRxx models*

      By analyzing each of the current BRxx models, the direct CAPEX component of each product of each tariff has been isolated. Further, this constituent has been broken down into all its applicable technological contributors, so that a unit price per technology, per product and per tariff is extracted (Figure 1: Conceptual description of the BRxx tariff breakdown.).

      Although the above described process is applicable to the majority of the BRxx models, there is an exception to the rule, the BIPT BROBA transport model. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, is given in paragraph 3.4.2.5.10.

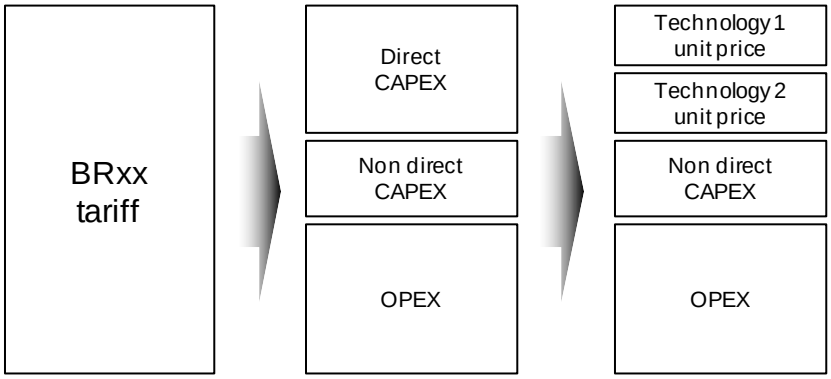

Figure 1: Conceptual description of the BRxx tariff breakdown.

Note: There is no relation between the size of the components and any broken down BRxx tariff.

    - *Broken down tariff for network areas not under the BIPT BRxx models scope*

      For those areas of the network not within the scope of the BIPT models, specific models have been developed in order to derive applicable broken down tariffs. These models have been built up on similar principles to those applied in the models developed by the BIPT. Whenever possible the actual BIPT tariff components have been re-used and existing BIPT models have been adjusted so that the obtained results are as comparable to those of the BIPT models as possible.

  - *Volumes*

    The volumes (demands) of all the telecommunication services utilizing the technologies subject to this valuation methodology are extracted from or determined based on Proximus inventory systems.

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- *Valuation (Fixed network)*
  - In a first step, each pair, line, VP, link or VLAN present in the volumes is valued by applying each and all of the technology unit prices of the relevant BRxx tariff. In this way, each telecom service's individual contribution to the assets valuation is calculated.
  - Finally, all the individual contributions are summarized per network asset, obtaining the final asset annuity.

- *Inputs mobile network*

  The latest version of the BIPT mobile cost model has been used in order to value mobile assets related to :

  - Radio Access network (RAN)
  - Ground Antenna
  - Mobile Voice Switching
  - Mobile Data Switching
  - Mobile Location Register

  Proximus mobile voice and data volumes, as determined based on Proximus inventory systems, have been used as the demand for the cost model. Based on this demand, the model dimensions the required network assets.

  Only capex economic depreciation has been taken into account, all opex values in the model have been set to 0.

  The WACC is based on BIPT's decision issued on February 26, 2015 (8,13%).

- *Valuation mobile network assets*

Capital expenditures are annualized according to BIPT's economic depreciation. This is a different methodology compared to the TAM used for fixed network related assets.

The economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2017, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output in the form of a net present value.

- *Inputs Fixed Voice NGN platform network*

  The latest version of the BIPT mobile cost model has been used in order to value fixed voice NGN platform assets related to :

  - Own Network Call Handling
  - Interconnecting Call Handling
  - Voice over Broadband Session Border Controllers (SBC)
  - Voice IP Router
  - Voice TDM Trunks
- *Valuation fixed voice NGN network*

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The economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2017, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business.

3.4.2.5.5 Exceptions to the generic implementation

Although the above described process is applicable to the majority of the tariffs and related technologies, there are two exceptions to the rule.

The breakdown of the BIPT BROBA transport tariff is made differently. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, and how it is applied is given in paragraph 3.4.2.5.10.

The valuation of the transport SDH/PDH assets implementing the regulated part of the Proximus's SDH network, although based on the BIPT's BROTSoLL model, do not follow the above described generic process. The used methodology is described under the paragraph "Updated BROTSoLL model to the 2013 demand".

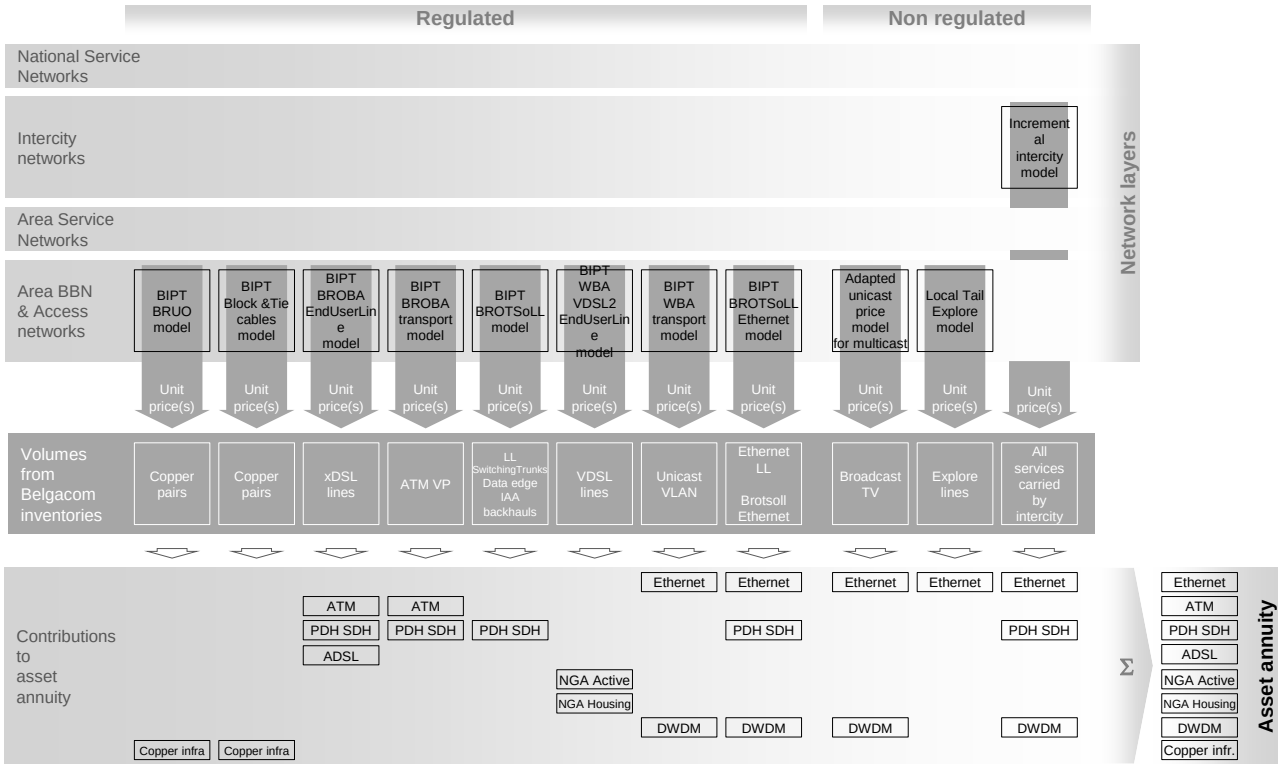

Figure 2: BRxx based valuation method. Scope and implementation.

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3.4.2.5.6 BIPT BRxx tariffs as base for asset valuation

3.4.2.5.6.1 BRUO

The BIPT BRUO model (decision of 9/11/2011) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure until the 2016 model. These assets have been valued based on the unit direct CAPEX cost in the BRUO model and the number of pairs used. It mainly includes the cost of copper cables, trenching and street cabinets and covers the copper distribution and copper feeding networks.

In 2017, the valuation BIPT model has been updated to reflect the current network situation. End 2017, Proximus announced internally that all telephony switches had been out-phased and replaced by AGW (Audio GateWay) technology. Therefor the method used for the valuation of the copper access network needed to be updated.

A separate document, explaining the updates made in the BIPT model and the new method of valuation is available in the folder containing the driver calculation files.

The yearly direct CAPEX cost of the following assets has been calculated based on BRUO tariffs:

- Raw Copper for PSTN/ISDN accesses connected to AGW-LEX, central site based broadband without voice accesses, local tails for leased lines type of connectivity, BRUO raw copper.
- Copper subloop, for VDSL connections without voice accesses and PSTN/ISDN accesses not connected to AGW-LEX.
- Copper subloop testing cost, which was formally used to ensure remote line testing of ROP based VDSL connections without voice accesses, is no longer valuated since this no longer uses separate copper pairs

In the frame of a possible fixed/variable analysis of the results of the model, copper distribution and feeding network costs are categorized as fixed. It should be noted that this has no impact on the results of the model itself.

Our analysis is based on the approach used by BIPT and its consultant, Analysys Mason, for the development of an NGN/NGA model. The dimensioning of the copper distribution and feeding network is dependent on the evolution of the number of households, reflecting the universal service obligation of Proximus. The evolution of the number of copper pairs actually used by customers subscriptions or internal usage, has no impact on the total copper access investment cost calculated by the BIPT NGN/NGA model. Copper access (distribution and feeding) is a fixed cost, with no causality of the volume of copper pairs actually used.

Its allocation method could be based on the market value of the different products using the network. However, in order to be conform to the approach used by BIPT in the BRUO/BROBA reference offers, we have attributed the copper access network cost towards the different end-user services and markets based on the number of consumed copper pairs.

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The cost of the copper splitters, to split narrowband and broadband signals for shared pairs has been valued based on the shared pairs inventory.

3.4.2.5.6.2 Blocks and tie cables

The BIPT Blocks and Tie cable model (decision 2/7/2008) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. This bottom-up model defines direct CAPEX prices for Main Distribution Frame blocks and for tie cables to other access network equipment.

The current value of following assets has been calculated based on Blocks and Tie cable tariffs:

- Copper local loop testing: internal cabling for copper connectivity to perform remote testing of broadband customer connections without voice accesses based at the central site.
- Copper subloop testing: internal cabling for copper connectivity of ROP based VDSL customer connections without voice accesses.
- Continue raw copper and shared feeding pairs: internal cabling for copper connectivity from the Main Distribution Frame or broadband splitter equipment to other access equipment or collocated access equipment.

3.4.2.5.6.3 BROBA rental per end-user line

The BROBA rental fee per end-user line is split by BIPT between the active part and the transport rental ATM or Ethernet part. This model is sometimes referred to as BROBA Bitstream.

3.4.2.5.6.3.1 Active part

The BROBA model (decision of 6/8/2010) has been used to valuate assets included in AC2_20102 ADSL equipment. It is related to DSLAM and Main Distribution Frame space yearly direct CAPEX costs.

The asset has been calculated based on the direct CAPEX part of the BROBA Bitstream tariff applied to ADSL, ADSL2+ and SDSL subscription volumes.

3.4.2.5.6.3.2 Transport rental ATM

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.4 BROBA ATM transport

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.5 BROTSoLL (access line only)

The Proximus Reference Offer for Terminating Segments of Leased Lines (BROTSoLL) regulates the complete PDH/SDH transmission network of Proximus, with the exception of the highest hierarchy rings, the so called Intercity network or express layer. The current BIPT decision on this tariff dates from 10/3/2008.

Note that for this model the below explanation is only applicable to the valuation of the access lines to BROTSoLL services. The valuation of the transport costs has been done as described in the

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*paragraph "*Transport PDH/SDH valuation". The technologies covered by this reference offer and consequently to be valued through this tariff are:

- PDH/SDH : covering the costs of the access line equipment of this technology.

Further, this service can in fact make use of the copper infrastructure on the access side in case of small bandwidth lines. However, these costs are embedded in the BRUO based valuation.

The SDH access line valuation has been done by applying the above technologies direct CAPEX unit cost to all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR, the Proximus transmission inventory system.

3.4.2.5.6.6 WBA VDSL2 end user line

3.4.2.5.6.6.1 Passive part

The BIPT WBA model (decision 10/11/2010) has been used to value the assets AC2_20108 NGA Housing and part of the asset AC2_20106 fiber infrastructure related to external fiber connectivity to the cabinet (ROP ; Remote Optical Platform).

For the valuation of AC2_20108 NGA Housing, the BIPT unit direct CAPEX cost has been applied to the number of VDSL2 subscriptions. The main elements included are the cost of the ROP, the copper connectivity between the ROP and the street cabinet and power equipment.

3.4.2.5.6.6.2 Active part

The asset AC2_20107 NGA Active equipment has been valued based on the related BIPT direct CAPEX cost.

It is mainly related to the IP DSLAM installed in the ROP or in the local site, the equipment to aggregate the fiber cables connecting the ROP to the local exchange ("aggregators"), as well as the internal cabling and block positions on the optical main distribution frame (OMDF).

3.4.2.5.6.7 BROTSoLL Ethernet (access line only)

Being a special case of BROTSoLL, the services within the BROTSoLL Ethernet scope are the dedicated transparent Ethernet connections. The current BIPT decision on this tariff dates from 10/3/2008.

In principle these lines are implemented as Ethernet over SDH. However, due to the rather large bandwidth typical to this type of services -10 Mbps, 100 Mbps or 1Gbps- this implementation is neither always possible nor efficient. Therefore we distinguish two main technical executions:

- Ethernet over SDH: for the 10 or 100 Mbps lines, also named Ethernet and Fast Ethernet respectively
- Ethernet over DWDM: for the 1 Gbps or Gigabit Ethernet lines, where the DWDM wavelength is dedicated to the line. Note that no SDH equipment is used in this case.

The Ethernet over SDH services require SDH and optical fiber for their implementation. Therefore, and following the 2013 model logic, the SDH costs incurred by the implementation of such services

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will be valued by the "Updated BROTSoLL model to the 2013 demand". The optical fiber costs are not valued by the BRxx method anymore.

Regarding the Ethernet over DWDM services, the access tariffs are the same as in BROTSoLL and the transport cost is calculated as described in chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.7 Transport PDH/SDH valuation

The present BROTSoLL model is based on the Proximus SDH services inventory belonging to 2005. From 2005 until now the utilization of the SDH services has changed and new services consuming large bandwidth, typically Brotsoll Ethernet and the like products, have been implemented over SDH. These new services would alter the distribution of services per bandwidth, putting an extra weight on the higher bandwidths, imposing changes in the network dimensioned by the BROTSoLL calculation sheets which in turn will incur in (nonlinear) costs changes.

Therefore, in order to incorporate a more realistic SDH cost in the model, it was decided to re-play the current BROTSoLL model with the 2015 SDH services demand.

In order to do so, the relevant files of the cumbersome BROTSoLL model have been consolidated into two streamlined files that easily allow the dimensioning and costing of the required SDH network for any given demand.

Then the set of all the SDH based services running on the Proximus network at the end of the year 2013 (all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR) was entered into the new consolidated transport BROTSoLL engine and the resulting SDH costs represent the value of the PDH/SDH asset in the 2013 model.

3.4.2.5.8 Transport Ethernet and DWDM valuation

The model used is based on the national network design module for NGN/NGA fixed LRIC model, by Analysis Mason for BIPT. A number of modifications to this module were done in order to support non-NGN (ADSL or SDSL via Ethernet switch) traffic and customer lambda services in a more realistic way. The adapted module is used to forecast investment costs for Ethernet and DWDM equipment to meet input level of demand.

The demand covers Voice over IP (VoIP), Fast Internet access (FIA, retail and wholesale), Bitstream (shared and dedicated), Video on Demand (VoD), Proximus TV (multicast), Business Data (Explore IPVPN and Eline) and lambda services (transparent ethernet 1Gbps and 10Gbps lines via DWDM for customers).

This bottom-up model takes into account the actual demand and calculates the needed backbone (regional and national-intercity) Ethernet and DWDM elements and their valuation.

3.4.2.5.9 Non regulated tariffs as base for asset valuation

3.4.2.5.9.1 Local Tail Explore

Local Tail Explore refers to the access line, this is to say the set of equipments and infrastructure entailed to provide the connectivity between the customer and the Proximus network, the Explore customers require. Given that Explore is not a regulated product and has specific technical

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requirements that are not contemplated by any of the existing BIPT models, a new model needed to be developed to cost this segment.

In fact, the model is very straightforward since it just consists of isolating the few different components in the offered technical solutions and applying their respective annualized costs. Since the infrastructure components present in this model have already been valued by existing BIPT models, the regulated direct CAPEX unit costs have been applied to them.

The only asset in which this model participates is Ethernet.

In principle, this model should also contribute to the Copper infrastructure, since there is a technical solution on copper, however this asset valuation component is fully taken into consideration by the valuation based on the BRUO model.

The valuation has been done by applying the fitting direct CAPEX technology to all access lines to Explore services documented in ITR, the Proximus transmission inventory system.

3.4.2.5.9.2 Incremental intercity model

We refer to the chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.10 ATM equipment asset valuation

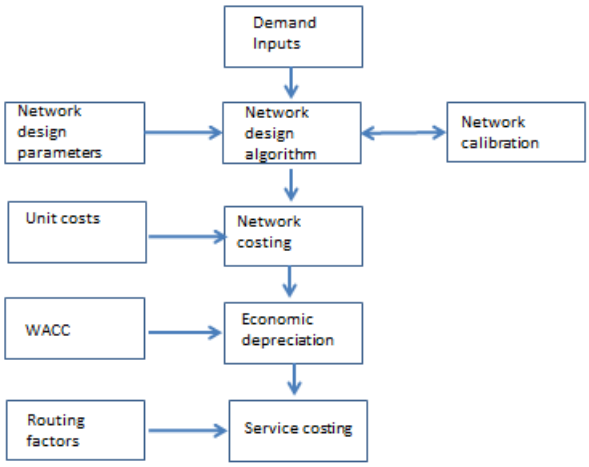
- ATM is outphased and is no longer valuated in the model.

3.4.2.5.11 Mobile cost model for network assets valuation

The BIPT bottom-up mobile cost model has been used to value assets :

- AC2_20110 RAN
- AC2_20111 Ground Antenna
- AC2_20112 Mobile Data Switching
- AC2_20113 Mobile Location Register
- AC2_20114 Mobile Voice switching

The flow diagram of BIPT mobile cost model can be summarized as follows :



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Mobile cost model – flow diagram (source : Analysys Mason)

Proximus volumes (subscribers and mobile voice and data traffic) have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2017, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output (volume generated by the network element) in the form of a net present value.

The calculation can be summarized as follows :

Calculation of net present value expenditures

NPV (Invest) = $\sum_{Years} Investment * discount\ rate\ multiplier$

Calculation of net present value output (recovery)

NPV (volume* ppc) = $\sum_{Years} PPC\ year * Vol\ year * \ discount\ rate\ multiplier$

ppc being the cost trend for the related network element

the discount rate multiplier is calculated based on a 8,13% WACC (BIPT's decision issued on February 26, 2015)

The capex cost per unit output can be defined as :

$p0_{1993}=\frac{NPV\ (Invest)}{NPV\ (Vol*ppc)}$

and

$pn_{year}=P0*ppc_{year}$

The total annualized economic cost for the year "year" is equal to :

$$p_{year}*V_{year}$$

3.4.2.5.12 Fixed Voice NGN platform cost model for network assets valuation

The BIPT bottom-up Fixed Voice NGN platform cost model has been used to value asset:

- AC2_20115 FixedVoice_NGN_Platform

Sensitivity: Unrestricted

Proximus fixed voice traffic volumes have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2017, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business.

3.4.3 TAM: Tilted Annuity Method

3.4.3.1 *Theory*

The purpose of this section is to describe how the Tilted Annuity Method (TAM) is finally implemented in the Current Cost Accounting (CCA) based network cost model 2013.

As from the 2003 model, Proximus implemented the formula that BIPT suggested.

$$ACC\mu Y = F1, \mu Y \times F2, \mu Y$$

where

$F1, \mu Y = (GRC\mu Y, begin + GRC\ \mu Y, end)/2$

$F2, \mu Y = \sqrt{}(1 + WACCY) \times [\ 1 - (1 + APC\mu)/(1 + WACCY)\ ] / [1 - [(1 + APC\mu)/(1 + WACCY)]\ ^\wedge\ L\mu]$

and where

- ACCμY: Annual CAPEX Cost of asset μ and year Y. It includes the annual depreciation and the cost of capital.
- WACCY: WACC of year Y.
- GRCμY, begin: Gross Replacement Cost of asset μ at the beginning of year Y.
- GRC μY, end: Gross Replacement Cost of asset μ at the end of year Y.
- APCμ : Annual Price Change of asset μ .
- Lμ : Lifetime of asset μ.

Remarks:

The formula assumes that:

- In the beginning of year Y was invested in an asset and that at the middle of each year of the lifetime of the asset revenues will be generated.
- The annual price change is constant over the lifetime of the asset.
- The asset price does not evolve during the year, i.e. price changes only appear at January 1st.

The factor F1, μY represents the value of asset μ in the middle of year Y.

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- The purpose of the arithmetic average of GRCμY, begin and GRC μY, end is to take into account investments or disinvestments of asset μ during the year Y.
- The arithmetic average of GRCμY, begin and GRC μY, end does not filter out the price evolution of the asset μ during the year Y.

The difference between the formula of BIPT and the formula of Exhibit 5, p. B3. of the white paper of Analysys is the factor $1 / \sqrt{(1 + APC\mu)}$, which filters out the price evolution of the asset μ during the year Y.

The gross replacement cost (GRC) of assets at any particular point in time is calculated as the sum over all assets owned by the business at that point in time, of the investment that would be necessary to purchase and install new replacements for those assets at that point in time (using modern equivalent assets if the existing assets are no longer available or efficient). The replacement value of assets, used for costing purposes should always include the gross value of every asset in use by the business (the current cost of replacing it with a new, possibly modern equivalent asset), irrespective of the history of depreciation of that asset in any financial accounts to date.

Lμ : Lifetime of asset μ, i.e. the expected useful lifetime of the new asset μ.

The depreciation period and the expected useful lifetime of a new asset are defined differently. The depreciation period refers to accounting. The expected useful lifetime of a new asset does not refer to accounting. It refers to the period that is expected that a new asset will be used. The main factor to determine the expected useful lifetime of a new asset is the evolution of the associated operational costs, i.e. the asset will be replaced when operating it becomes too expensive. Another factor is the appearance of new technology: if in the future new technology will come-up it could be that the asset will be replaced (even if it is not too expensive to operate).

Sensitivity: Unrestricted

4 SCF (Support and Customer Flow) stream

4.1 Allocation of the support costs

4.1.1 Support Scope

Since 2013, all support costs are treated within one SUPPORT module and as such, no cascade principle is used meaning that support costs, once in the SUPPORT module, can only be allocated to a non-support destination and to a non-support division. The divisions that are considered as support costs are:

- Group Internal Services (GIS – BA34) for departments like Real Estate, Business Services, Security, Safety & Environment, and Catering.
- Supply Chain Management responsible for warehousing, logistics and distribution is now part of the CUO division.
- Infrastructure Facility Management (IFM – BA78) encompasses a wide variety of support activities like building & technical services, print shops and copy shops, energy and operational centre of excellence.
- Fleet Management (FLT – BA79) for the support of all Proximus management, utility and sales vehicles.

They fall under the responsibility of FIN, the financial department from the Staff and Support division (S&S – BA20) where are located the GHR, Legal, Strategy, Public Affairs and Communications departments. The Staff & Support costs should avoid passing by the Support allocation flow as they are business overhead related costs. There can be some exceptions to this rule when a specific support cost is booked in the BA20 such as illustrated below:

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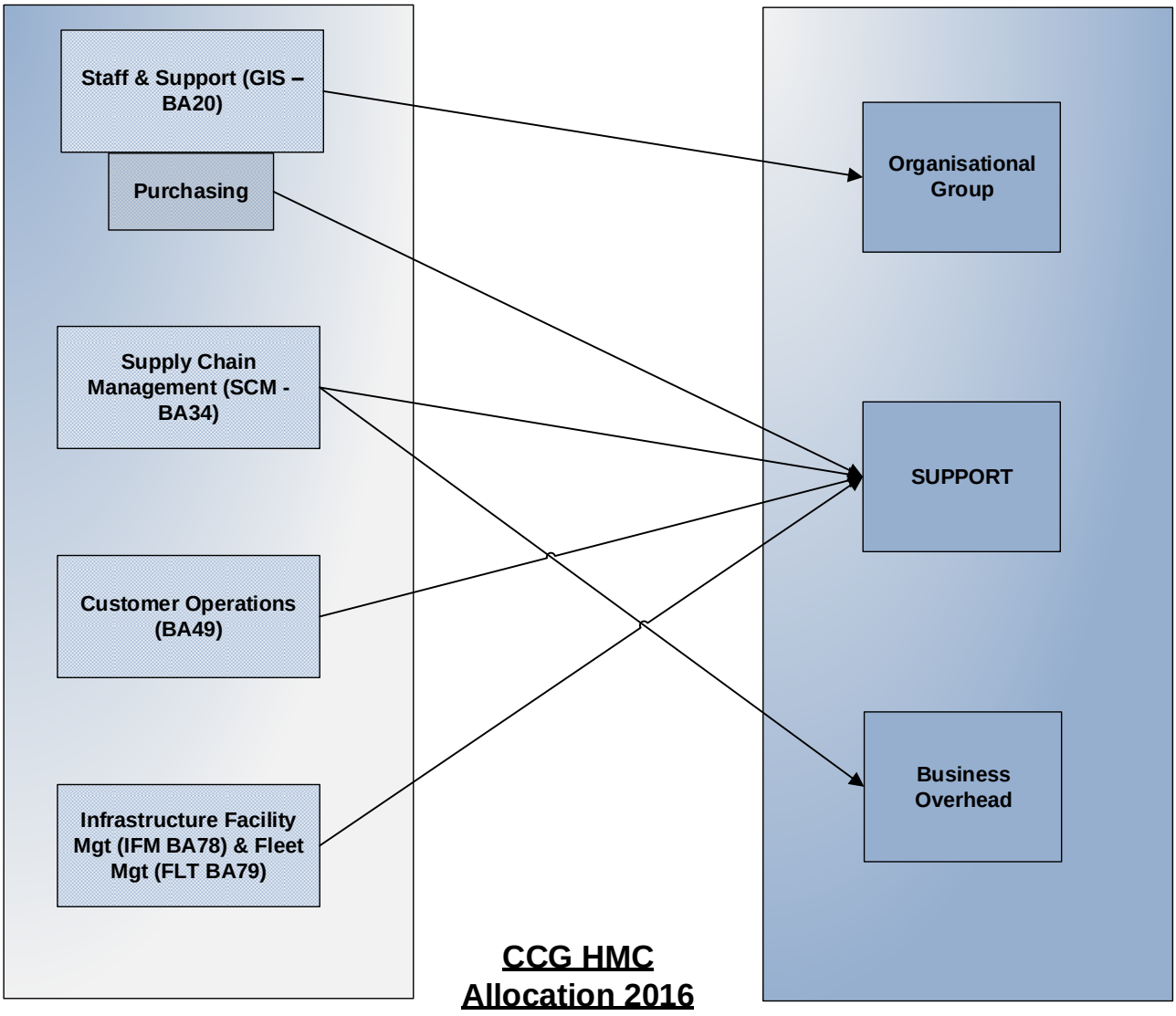

4.1.2 Support Cost Objects

The following support objects were created in order to pool support-related costs within one module, before allocating them either directly to the cost's specific object located further on in the cost model, either to multiple objects using inventory-based allocation keys. This work is achieved by using reports from dedicated teams supporting an inventory from which specific volumes can be derived, such as the ones from fleet management regarding Proximus vehicle's park or Connect Immo regarding the building's occupation. A last group of support objects are allocated by the use of FTE keys in order to split these costs among all departments that benefit from them. The overall support allocation can be summarized as follows:

Summary of Driver type relation to Support Object allocation
Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Manage moves
Support_Manage waste and scrap
Support_Manage, maintain and repair buildings (excluding moves) (office space)

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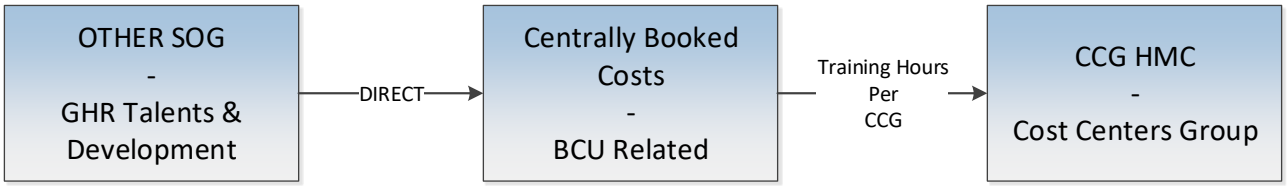
Support_Provide catering services
Support_Provide copy services
costs of shops buildings (in %)
Support_Manage, maintain and repair buildings (excluding moves) (shop space)
Direct
CBU_billing_fix products
CWS_Billing
EBU_billing_fix products
MOB_billing
Support_13001 Data Managed Services & Applications
Support_14001 TV and VoD
Support_22243 Nat. IC - infra. Co-location /Co-mingling
Support_30000 Subsidiaries & externals
Support_IT
Support_Power Chain for ROP
Support_Power Chain for telecom_SDE
Support_PROX_Pylons
Support_Telecom space_SDE
Estimated Nbr Management Cars
Support_Manage, maintain and repair fleet vehicles (management vehicles)
Estimated Nbr of Sales Cars
Support_Manage, maintain and repair fleet vehicles (sales vehicles)
Estimated Nbr of Utility Cars
Support_Manage, maintain and repair fleet vehicles (utility vehicles)
Stock Material return
SUPPORT_Reverse_Logistics
Stock Quantities
Support_Manage goods, warehouse & equivalents
Sum of Purchase Orders
Support_Purchasing, quality and ordering
total MOS value 2011
Support_Manage cables
Value of material transported from stock (in eur)
Support_Manage internal distribution

The driver named “Avg # FTE All Levels with office excl. support/centrally booked” is a specific driver calculated internally by the cost modelling team. It excludes from its scope all support divisions and teams that do not benefit from these costs such as employees not occupying a desk in Proximus Buildings. This is done in order to match the scope of these costs. In order to give coherence to such trade-off, the decision factor for the Customer Operation division was changed from the level of the employee within the company to the cost variability of the organisational group in question. The underlying reason being that fixed costs organisational groups are management

Sensitivity: Unrestricted

related while variable ones are field related. Therefore, only fixed organisational groups were considered in the scope of this driver as the field teams are by definition not in Proximus offices and should not benefit from the specific support costs this key is applied to.

It should be noted that training costs related to Proximus's Corporate University (PCU) have to avoid passing through the SUPPORT module but have to be pooled with their respective team's/CCGs. The grouping of these costs is done as illustred below:

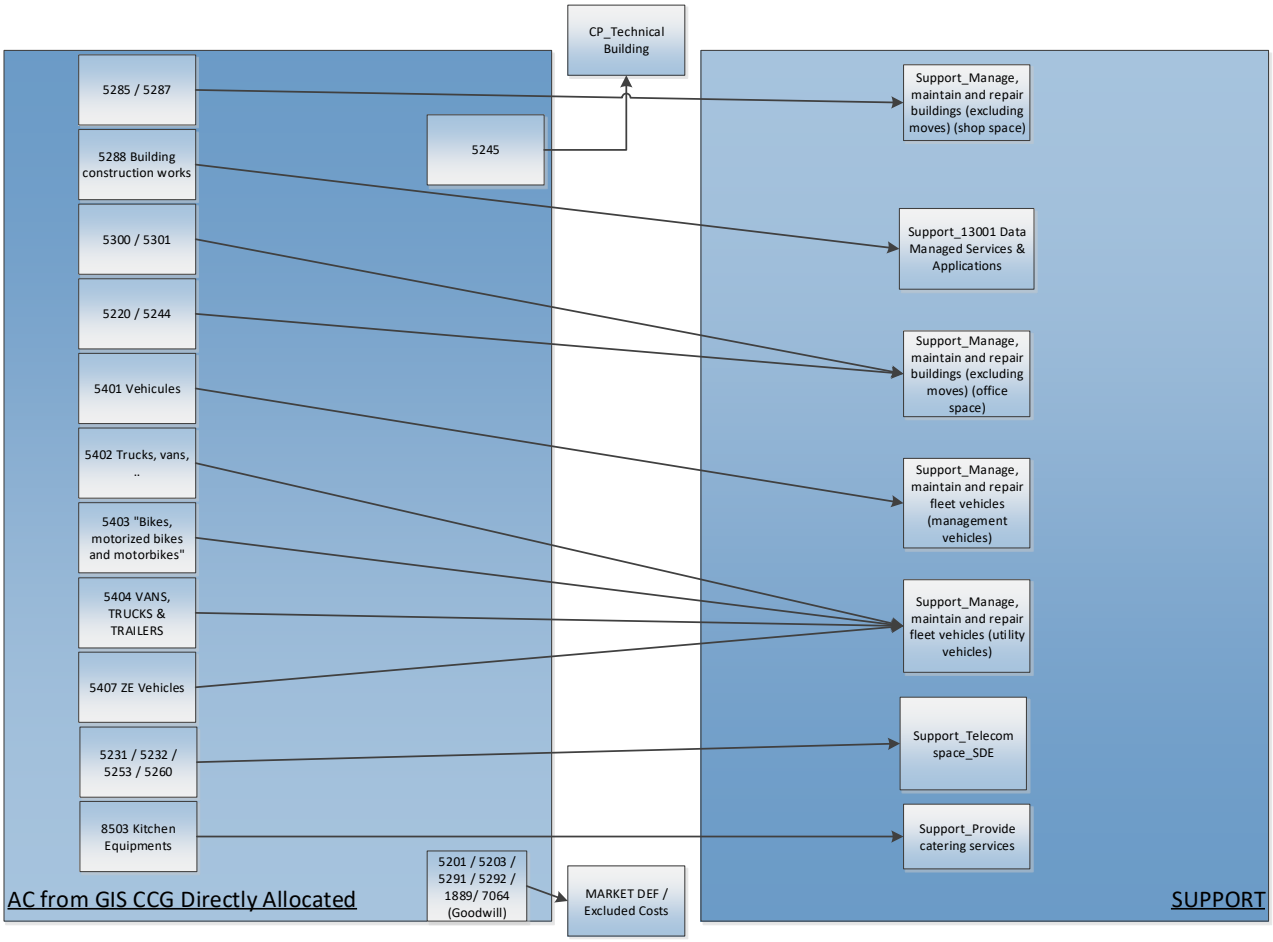


In 2015, Logistics and warehouse activities were reorganized within the CUO division in order to improve the quality of service by giving more consistency to the customer service chain as well as improving the systems of logistics controls in order to better the material flow in the Proximus group. The warehouse is where most equipment used by Proximus or by its clients are stored. Allocation keys are based on the inventories from their corresponding team registering which type of equipment in what type of quantities were stored and delivered.

4.1.3 Asset Support Allocation

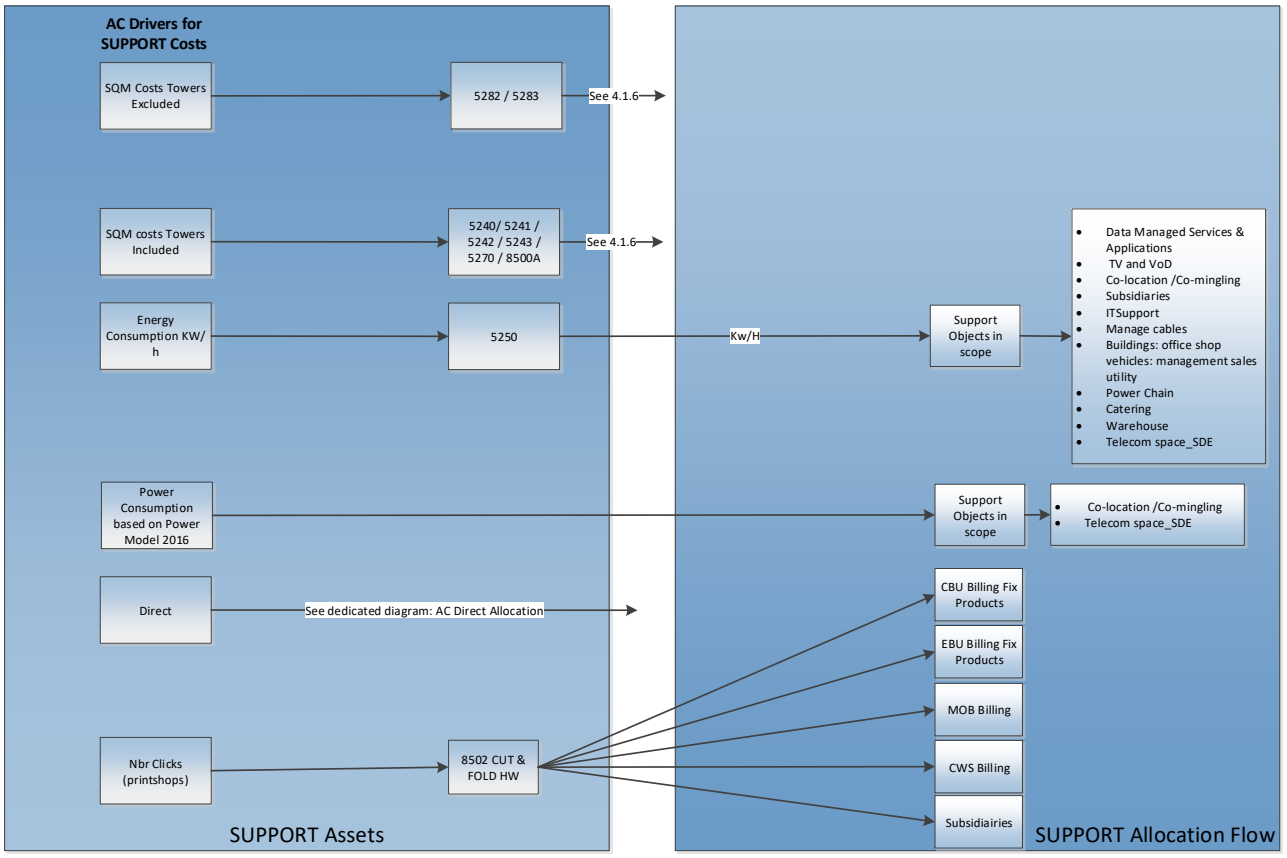
Two types of assets allocations can be distinguished: The ones that can be directly linked to a support object from the previous list and allocated as shown by the following diagram:

Sensitivity: Unrestricted



Other assets affect multiple support activities where the use of a specific cost driver is required. Typically, buildings, fleet and energy are support activities that need to be ventilated on many support objects with the use of their corresponding driver: vehicles per category for fleet, square meters occupied per building type for buildings and electricity consumption per equipment or building for energy. The following diagram represents the logic behind asset allocation towards the support flow by presenting its main allocation drivers:

Sensitivity: Unrestricted



4.1.4 Allocation From the support module

The same principle as before is applied: if a support object can be directly linked to an object located further on in the cost model, it will be directly allocated to it. Such cases are illustrated in the following drawing:

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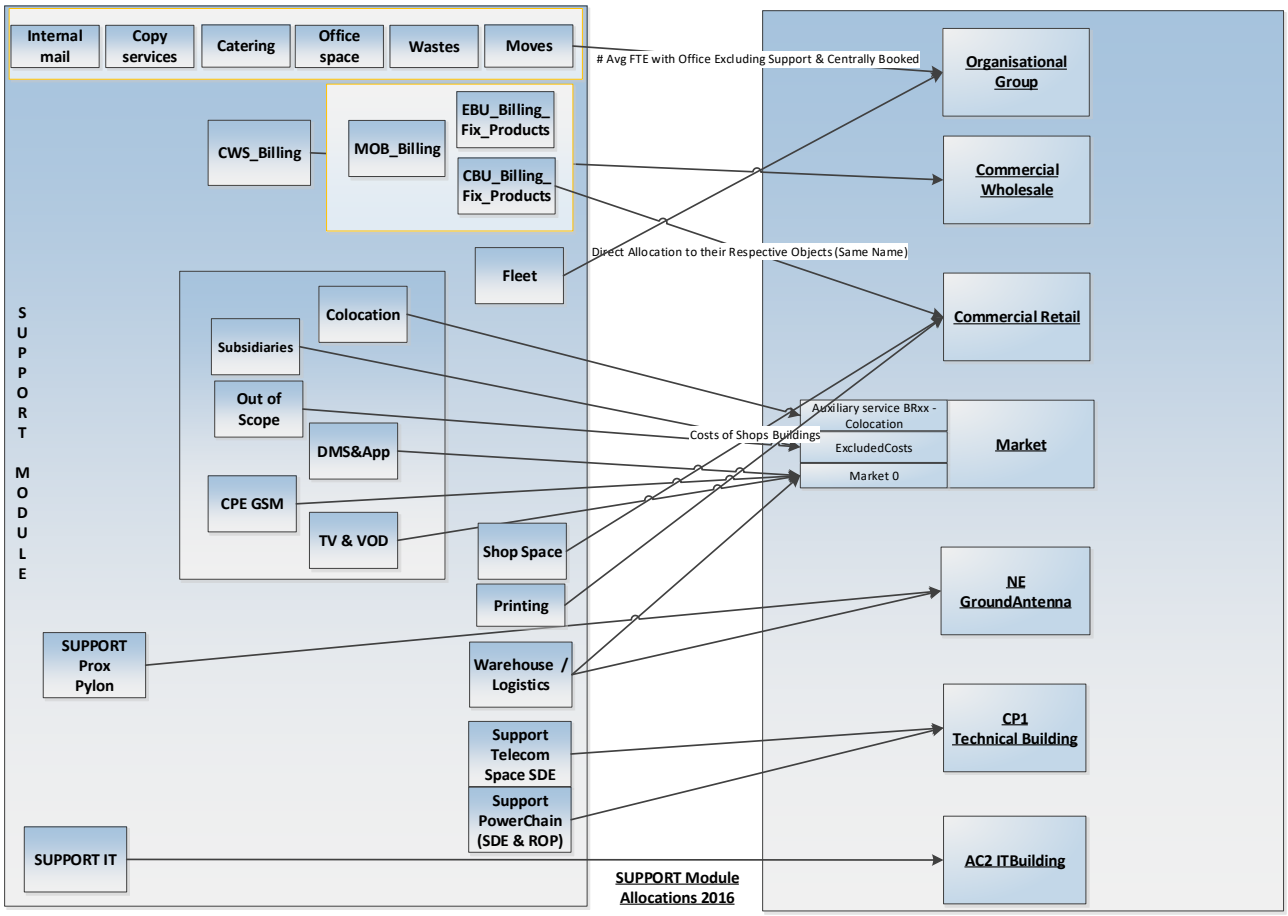


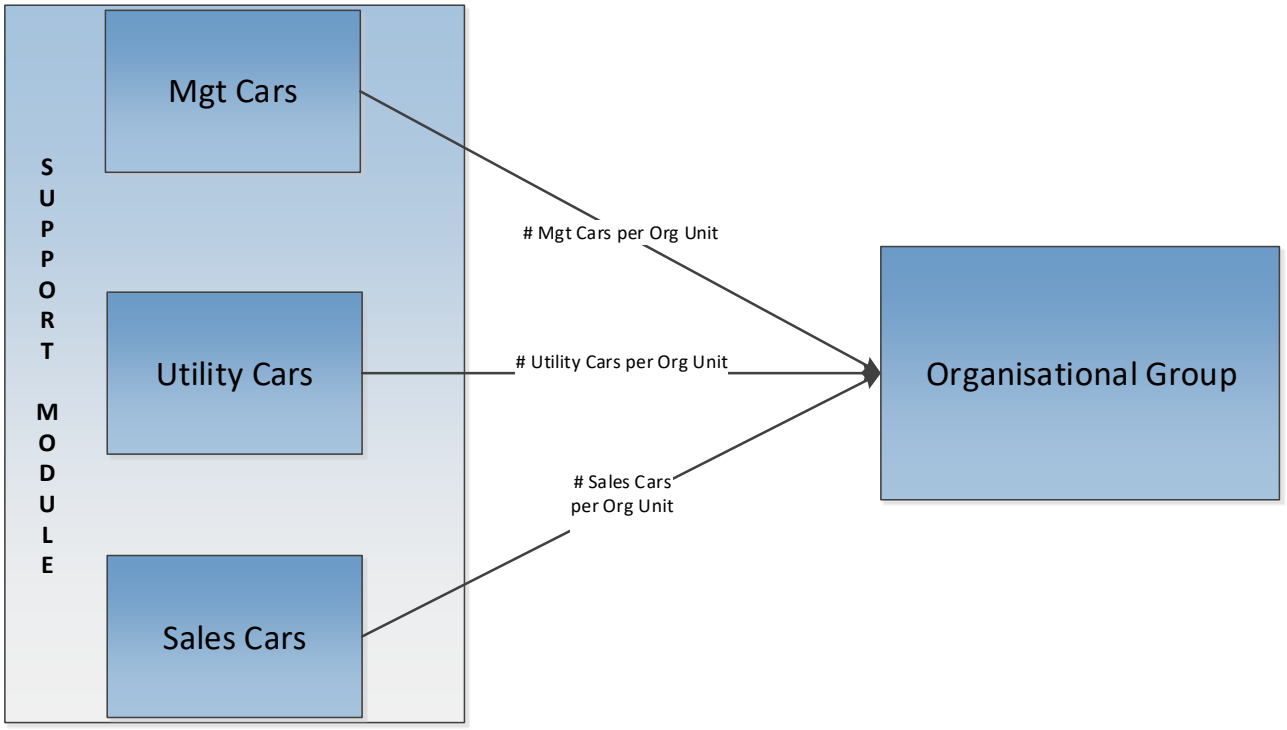
4.1.5 Fleet case

All fleet related costs are pooled in the Support module within the three following objects:

- The support, maintenance and repair of management vehicles.
- The support, maintenance and repair of sales vehicles
- The support, maintenance and repair of Utility vehicles.

With the use of an inventory maintained internally by Proximus, the number of vehicles per type and organisational group is used as an allocation key for the fleet costs.

Sensitivity: Unrestricted



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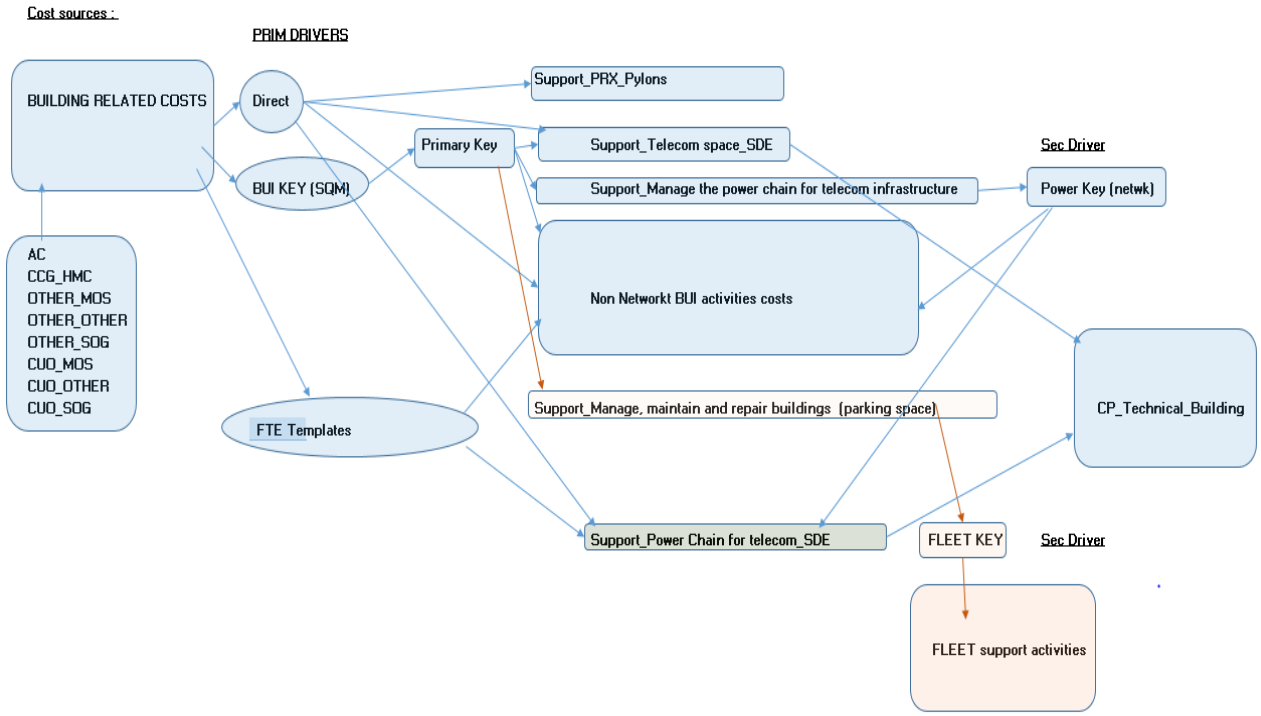
4.1.6 Buildings Support costs :

4.1.6.1 *Global picture of the allocation:*



4.1.6.2 *Source of the buildings costs :*

The BUI support costs are mainly coming from :

Sensitivity: Unrestricted

COST NATURE	Source of costs
ASSET	5255 Heating,Ventilation & Air-Conditioning
	5220 Exploitation land
	5240 Exploitation buildings
	5282 Work in rented building
WAGES	78401 GIS - IFM - BTS-Building & Technical Services
	34300 GIS - CPP - Securit - Safety & Environment
	78003 GIS - ASP - PRO - Projects
OTHER_OTHER	GIS - IMM - Real Estate / 34100 / tax-building / 6401
	GIS - IMM - Real Estate / 34100 / local taxes / 6407
OTHER_SOG	GIS - IMM - Real Estate / 34100 / building / 61010
	GIS - ENY - Utilities & Support / 78610 / Pylons / 61195
	GIS - CPP - Securit - Safety & Environment / 34300 / building / 61010
	GIS - IFM - BTS-Building & Technical Services / 78401 / building / 61010
	GIS - ENY - Utilities & Support / 78610 / energy / 61060
	GIS - IMM - Real Estate / 34100 / CImmo & third party building & equipm. taxes / 61160
	GIS - MOB - IFM - OTH - PYLONS / 78501 / building / 61010
	GIS - MOB - IFM - OTH - PYLONS / 78501 / energy / 61060

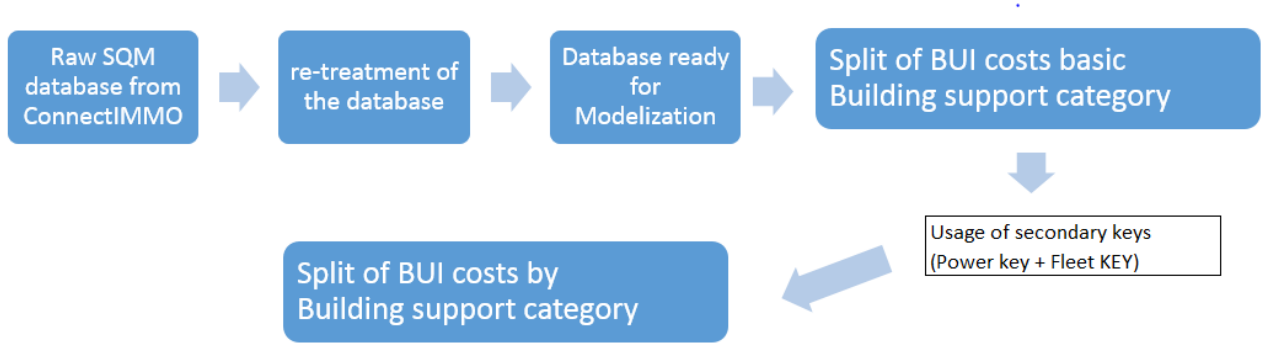
4.1.6.3 *Drivers used for the allocation*

4.1.6.3.1 The SQM (Tower included or excluded).

This key is based on a database provided by ConnectImmo, the Proximus separate entity that manages the PXS Building/SQM portfolios. Volumes (sqm) are valued by category (office, telecom, parking, catering,…) and the resulting keys are used to allocate the costs.

SQM Allocation

sources and process



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4.1.6.3.2 Direct:

Pylon related costs, Exploitation land (AC) to Support_Manage, maintain and repair buildings (excluding moves) (office space)

4.1.6.3.3 FTE Template completion

The following teams are allocated with the input of team leaders (split of FTE's by Building activities).

These teams are in charge of the management of the Proximus Buildings.

78001 GIS - ASP - PRO - Coordination
78003 GIS - ASP - PRO - Projects
78400 GIS - IFM - Infrastr. & Fac. Mgt & Support Staff
78401 GIS - IFM - BTS-Building & Technical Services

4.1.6.4 *The Destination of the BUI related costs :*

After usage of primary and/or secondary keys, the BUI related costs are allocated to following activities:

Activity	
Support_Telecom space_SDE	Network related
Support_Power Chain for telecom_SDE	Network related
Support_PROX_Pylons	Network related
Support_Manage cables	Network related
Support_Manage, maintain and repair buildings (excluding moves) (shop space)	Retail related
Support_Manage, maintain and repair fleet vehicles (utility vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (management vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (sales vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair buildings (excluding moves) (office space)	FTE related
Support_Provide catering services	FTE related
Support_IT	IT related
Support_Manage goods, warehouse & equivalents	Logistics related
Support_14001 TV and VoD	product related
Support_13001 Data Managed Services & Applications	product related
Support_30000 Subsidiaries & externals	product related

4.1.7 The power Key:

This key split the power related costs coming directly from power costs and from the buildings to different costs objects. It is based on the analytical split provided by the field:

The total KWH consumption is known is split in 4 categories:

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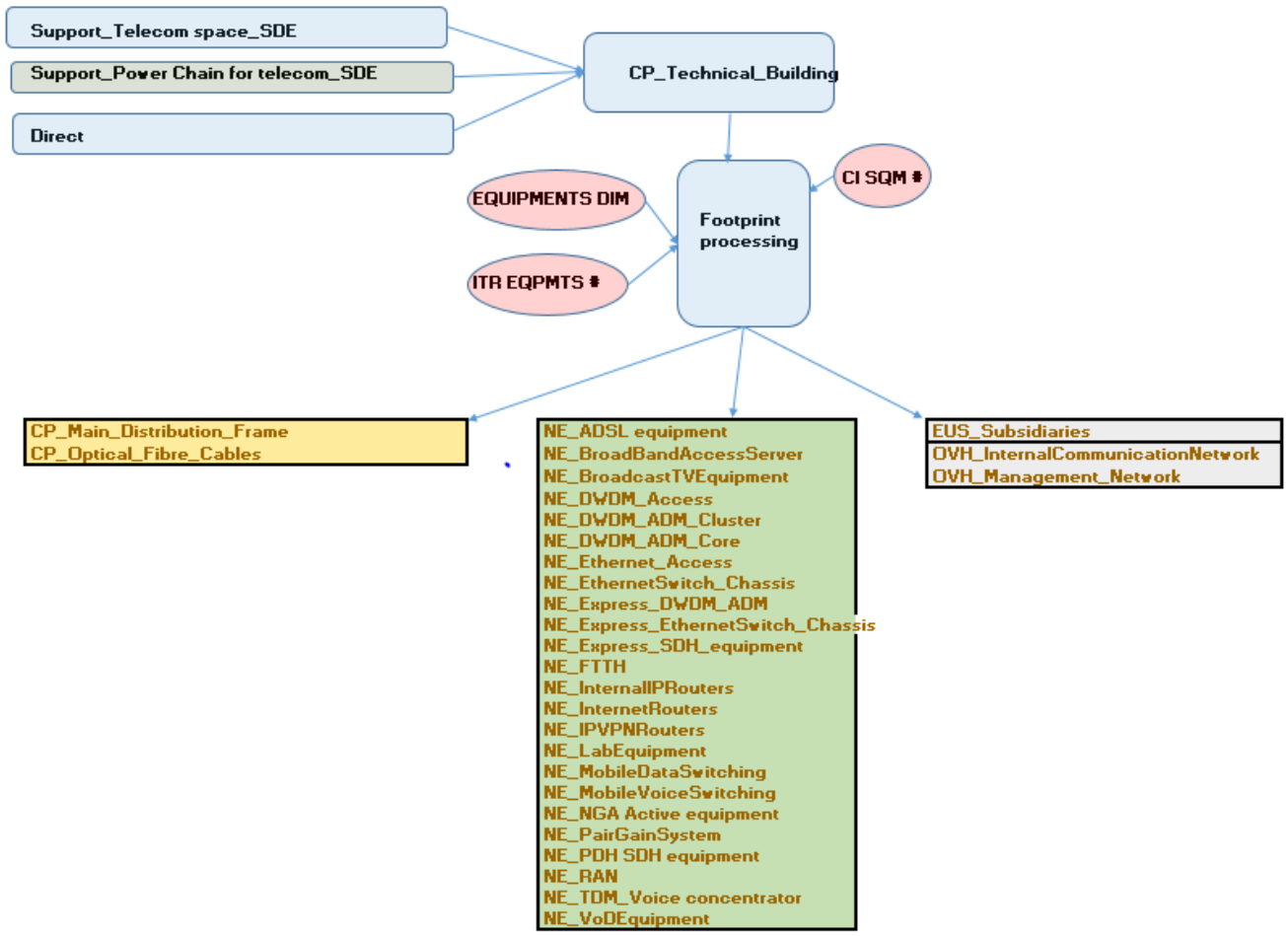
1. Mobile access (directly allocated to Support_PROX_Pylons)
2. Fixed access network (indirect allocation) to:
   Support_14001 TV and VoD
   Support_22243 Nat. IC - infra. Co-location /Co-mingling
   Support_30000 Subsidiaries & externals (for memory)
   Data centers, (split between SUPPORT_IT an Support_13001 Data Managed Services & Applications, based on real consumption)
   Support_Power Chain for telecom_SDE
   Support_Power Chain for ROP
3. Shops
4. Other (directly allocated to shops, or allocated to various element via generic key : offices, …)

Sensitivity: Unrestricted

4.1.8 Allocation of the Network building related costs : CP_Technical_Buildings

Based on the ConnectIMMO database (SQM), ITR (equipment), and some measurement and constants (footprint of equipments), the CP_Technical_Building is allocated via the running a access macro.

4.1.8.1 *Allocation Flow :*



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4.2 Allocation of the retail costs

4.2.1 Retail costs perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units, we recapitulate:

- Consumer Business Unit (CBU) has the responsibility over the residential customers and small enterprises (less than 10 employees)
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Retail costs relate to all commercial retail activities at the level of Business units CBU and EBU. The Proximus financial and accounting structure clearly registers (directly attributable) retail costs on cost centers 39xxx (CBU) or cost center 41xxx (EBU).

Starting from the Proximus organisational structure, we can identify 4 blocks in the Retail cost perimeter:

1. Retail FTE related costs
2. Retail Support costs
3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Retail FTE related costs

Includes all direct FTE related costs of Business units 39 and 41 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Retail Business units in the accounting books but do relate to Retail FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's. E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

2. Retail Support costs

Retail Support costs are non FTE related costs which are centrally booked and managed but relate to Retail activities. E.g. Billing, Shop space…

Sensitivity: Unrestricted

3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Retail departments, costs for legal claims, mandatory professional contributions, market surveys, etc.

4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales such as commissions paid on sales of identifiable products, cost of goods sold on equipment, dedicated outsourcing costs, etc.

4.2.2 Retail costs allocation principles

4.2.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

4.2.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies Retail costs based on their variability towards product volumes.

We distinguish between 4 var_types:

a. Marginal (mar): retail costs which can be considered variable with each additional unit of a single product. Typically it concerns costs of goods sold (e.g. handsets, customer premises equipment…) and costs of sales (commissions, interconnection costs…).
b. Variable (var) : retail costs which can be considered sensitive to (important) volume changes of a single product or a range of products, whereby this (range of) product(s) is considered to be the last increment in the product portfolio. Examples of costs which are considered variable based on these criteria: the sales departments, call center activities….
c. Fix (fix): retail costs are considered as fixed when they are likely to be inert to important volume variances. E.g.: Marketing spending. If the marketing campaigns can be directed to specific products, the amount of costs for these campaigns is not linked to volumes of the considered product.
d. Common (common): retail costs are considered common when they do relate to the ordinary course of business but have no relation with products. E.g.: Costs of litigations, branding & sponsoring expenses not directed to specific products, but well to Proximus image and trademark…

Sensitivity: Unrestricted

4.2.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies retail costs based on whether they can be attributed directly, or through a specific non generic key and/or driver, towards products.

We distinguish between 2 PS types:

a. PRODUCT_SPECIFIC (PS): these costs can be allocated directly to the products and thus are generated specifically for that related product. E.g. the costs of sale of a product.
b. NON_PRODUCT_SPECIFIC (NPS): Retail costs which do not have a clear causal relation with specific product.

In addition to the attribute PS_TYPE, all retail costs of RETAIL module are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

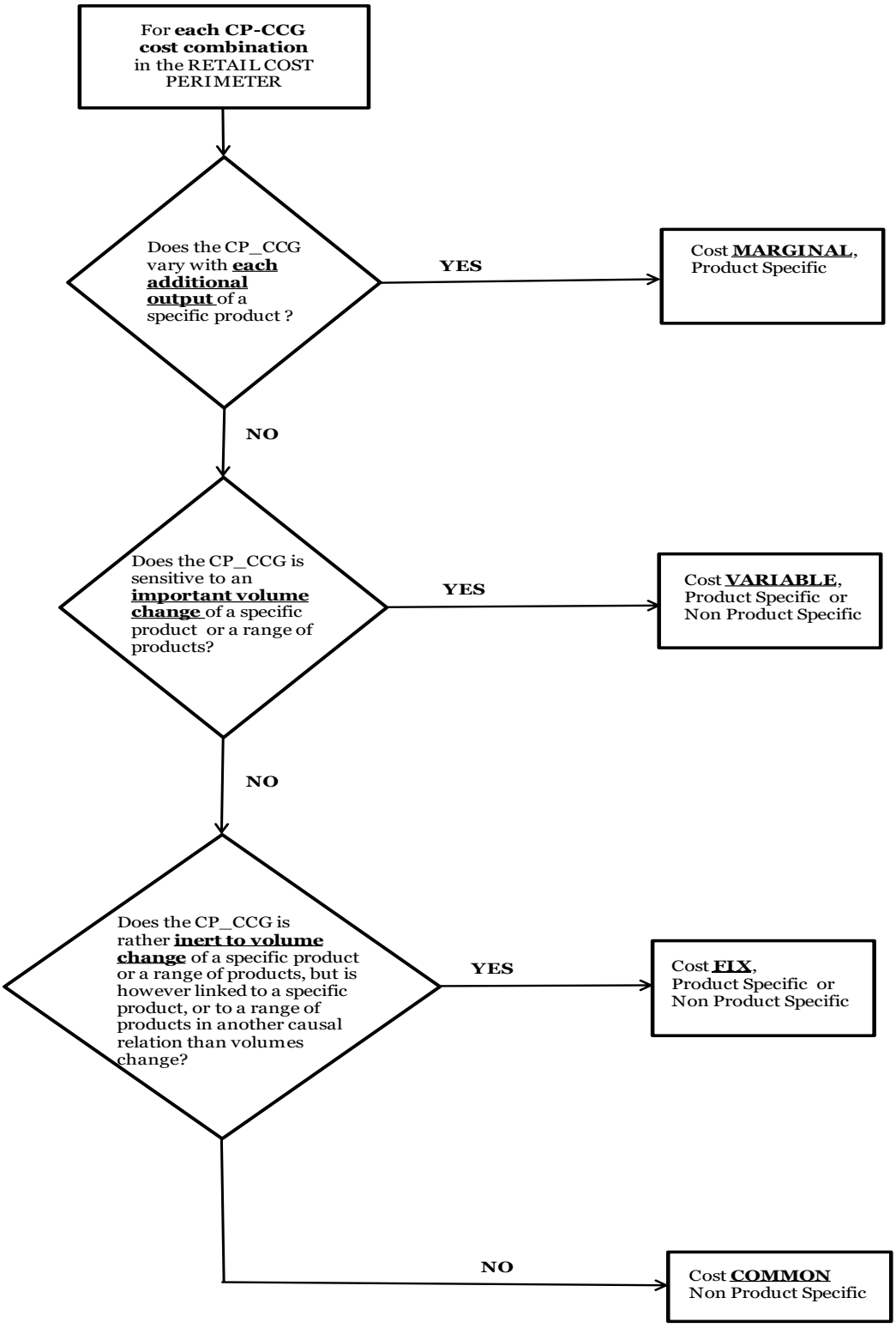
COST GROUP specifies the product, when the cost is product specific.
COST GROUP also gives the information on whether the costs are related to both Retail Business Units (CBU and EBU), or are only linked to one of them.

Used Cost Groups for the Retail costs are:

Non product specific	**Product specific**
All CBU&EBU products	All CBU Mobile products
ALL CBU&EBU mobile products	All EBU Mobile products
All CBU products	All EBU Advanced Telco Services products (*)
All EBU products	All EBU Fix data products
All CBU Fix products	All EBU Fix voice products
All CBU Mass market products	All EBU ICT products
All EBU Fix products	idTV
All EBU professional & Mass market products	(*) m2m&IOT, Big data, Mobile Payment&Ticketing
All EBU Telco products	
All EBU, CWS, SE products	

Sensitivity: Unrestricted

The qualification of the 2 attributes VAR_TYPE and PS_TYPE to all retail costs is illustrated in the following decision tree:



Sensitivity: Unrestricted

4.2.2.4 *Criteria for allocation of retail costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which correspond to their cost group (which is the product they relate to). This means that these costs will be either allocated to Market 0 – Residual Market or to Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards Markets based on volumes drivers. In practice, this means that these costs will be allocated either to:

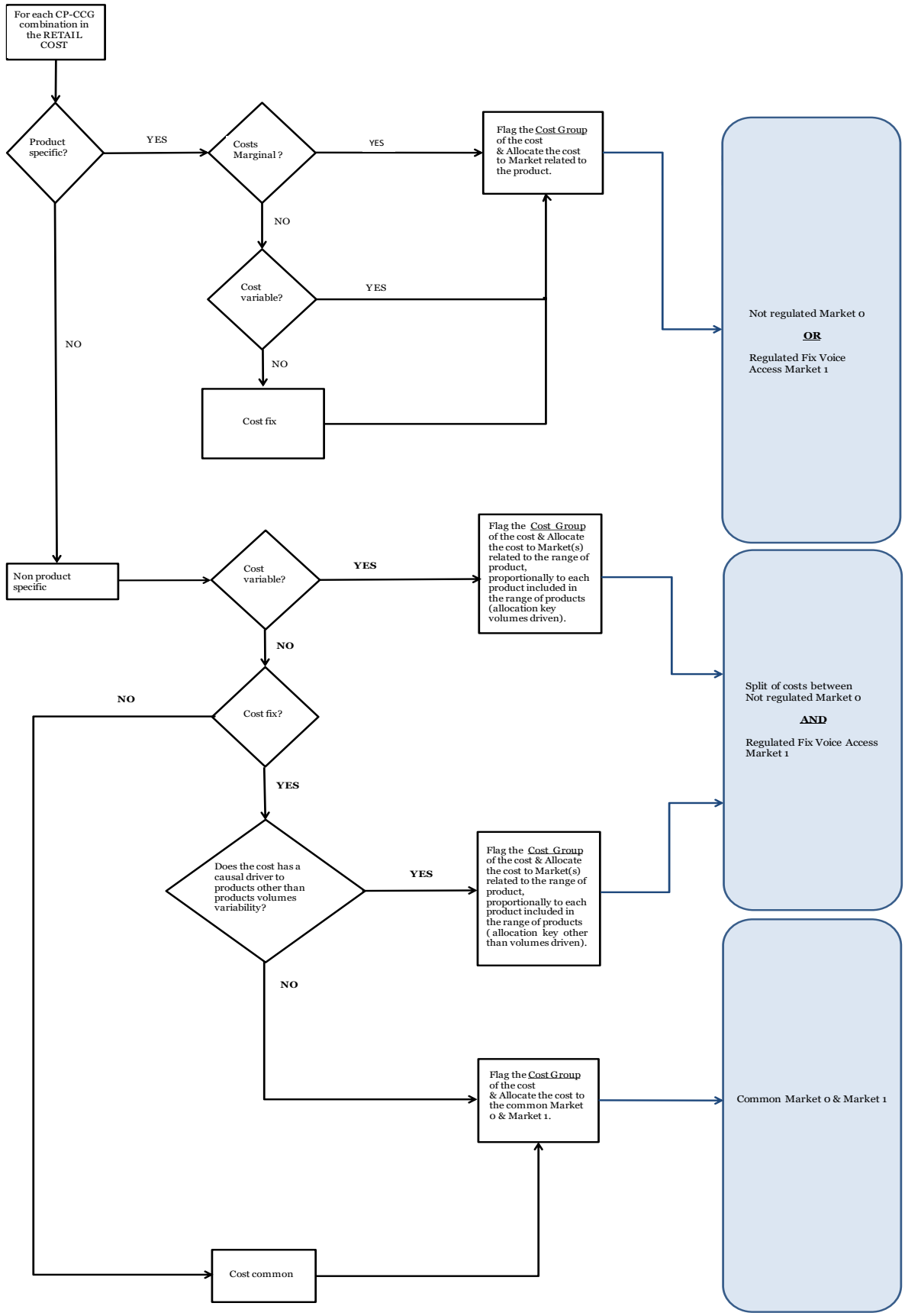
- Market 0 or to Market 1, if they relate to a panel of products related to the same market,
- Market 0 and to Market 1, with respect to volumes driven allocation key, if they relate to a panel of products related to both markets.

c. Non product specific Fix costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market', when they cannot be allocated to Market 0 and/or to Market 1, with a causal driver other than volumes of products.

d. Non product specific Common costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

Sensitivity: Unrestricted

Principles for retail costs allocation to Markets can be illustrated as follows:



Sensitivity: Unrestricted

4.2.3 Retail costs allocation flows

4.2.3.1 ***General principles***

As described above, the 4 blocks of costs included in the Retail cost perimeter are all specified with 2 cost type attributes (VAR_TYPE; PS_TYPE) prior to be allocated to Markets.

However, the 4 blocks of costs:

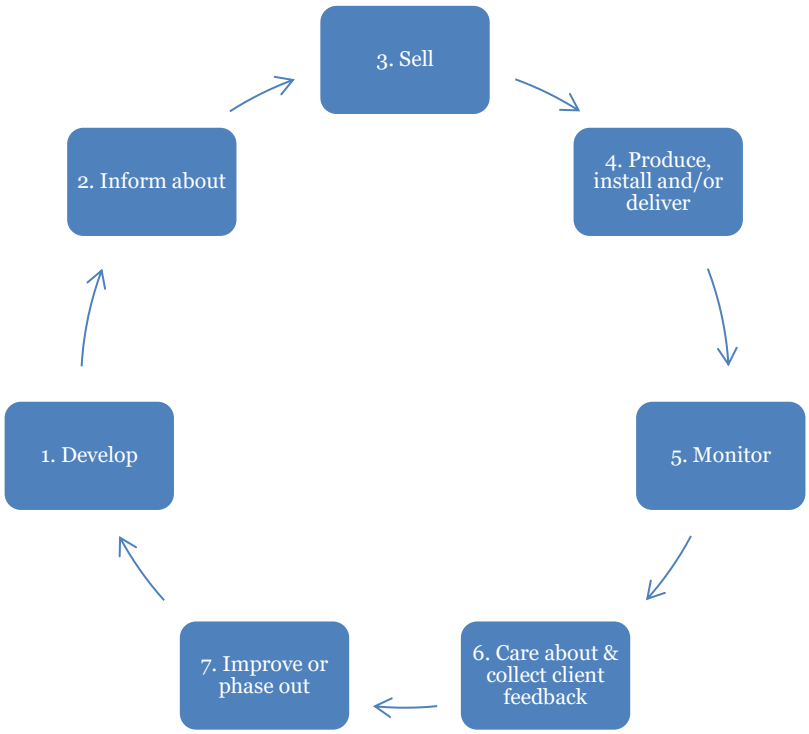
- Do not follow all the same path of allocation; some are directly allocated to Markets from the Cost basis,
- Are not all specified with VAR_TYPE and PS_TYPE within the module Retail.

The allocation flow followed by a Retail CCG_CP will depend on its block of costs (1->4).

Life cycle of products

Since the Cost model 2014, a new module, the LIFE_CYCLE module, was created, to catch part of the Retail costs that we find during the life cycle of a product.

Inside the 4 categories of Retail costs, as described in chapter 4.2.1., all the costs needed to launch, develop, monitor a product until its improvement/phase out, were identified and gathered in this new module, prior to be allocated to Markets.



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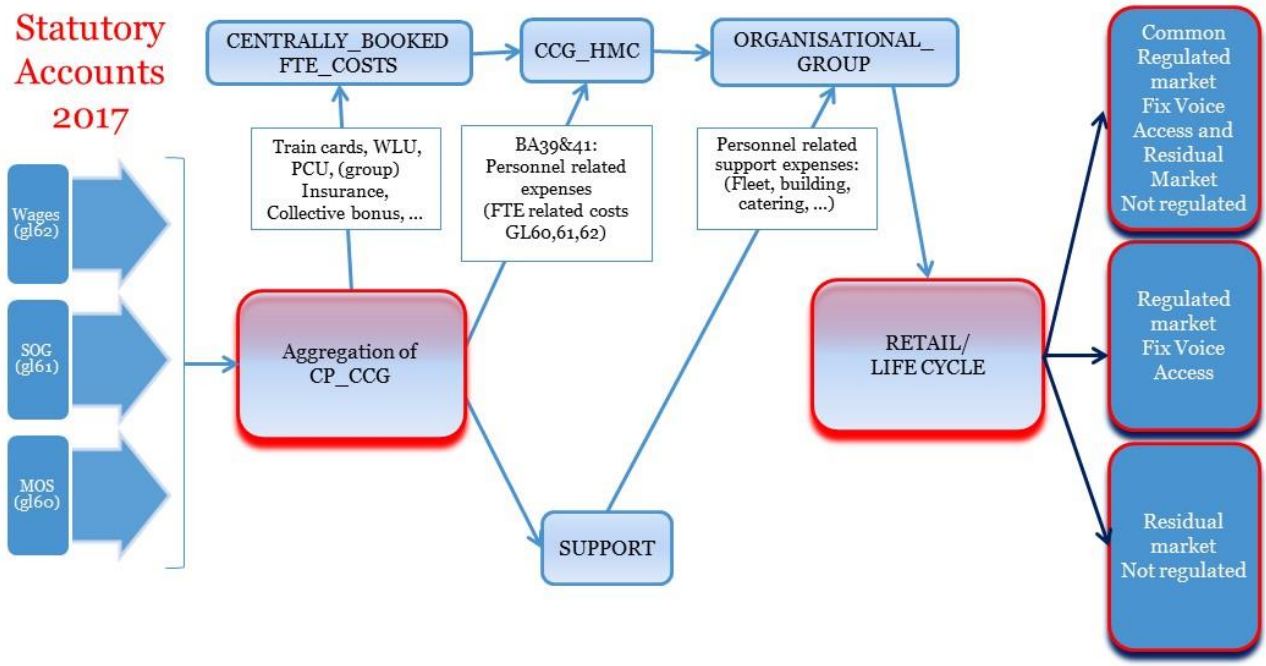
4.2.3.2 ***Retail FTE related costs (block 1)***



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

Starting from the Cost basis, Retail FTE related costs are at first gathered into module CCG_HMC. CCG_HMC module is simultaneously feeded with module Centrally_Booked_FTE_costs (Train cards, WorkLifeUnit costs, etc.).

Retail FTE related costs gathered in CCG_HMC are afterwards loaded into module ORGANISATIONAL_GROUP. In ORGANISATIONAL_GROUP module, FTE related costs are summed up with SUPPORT costs managed centrally (Fleet, building, catering, etc.) but that have to be allocated towards Proximus FTE costs.

This is also at this stage of allocation flow that attributes VAR_TYPE and where CCG_CP are renamed as "Organisational groups" (terminology specific to FTE costs).

Organisational groups costs are at last directed to module Retail, prior to be allocated to Markets (via LIFE_CYCLE module, for part of it), in accordance to criteria for allocation of Retail costs to Markets, as described in chapter 4.2.2.

With regard to the definitions of attribute dimension VAR, Retail FTE related costs can only be either Fix (FIX), either Variable (VAR) costs.

Sensitivity: Unrestricted

For what matters FTE costs, this variability sensibility has been defined taking the following assumption:

Are Fix FTE costs, all the FTE costs that are needed to ensure the Proximus going concern independently of products volumes, id est, costs needed to maintain the Proximus minimum organizational structure.

Two types of FTE costs were identified as needed to maintain the Proximus minimum organizational structure:

- Staff costs such as IT officers supporting DB and IT tools used, reporting and analysts teams, research staff such as Products&Solutions engineers, Marketing staff costs;
- All the Proximus hierarchy structure (team responsibles).

The classification of FTE costs for CBU and EBU between FIX and VAR costs, and whether product_specific or not, is as follows:

CBU Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	ALL CBU PRODUCTS
Sales - Top management	Fix	NPS	ALL CBU PRODUCTS
Direct sales	Var (*)	NPS	ALL CBU PRODUCTS
In charge Relations for indirect sales channels	Fix	NPS	ALL CBU PRODUCTS
Support staff for Sales department (all channels)	Fix	NPS	ALL CBU PRODUCTS
Marketing	Fix	NPS	ALL CBU PRODUCTS
Call Center Activities	Var	NPS	ALL CBU PRODUCTS
In charge for e-sales	Fix	NPS	ALL CBU PRODUCTS
idTV Content management	Fix	PS	idTV
Products & Solutions specialists	Fix	NPS	ALL CBU PRODUCTS
Strategic planning	Fix	NPS	ALL CBU PRODUCTS

(*) excluding Team responsible flagged as Fix costs.

Sensitivity: Unrestricted

EBU Organisational group	FIX/VAR	PS/NPS	Cost Group
EBU Top management	Fix	NPS	All EBU products
Strategic planning	Fix	NPS	All EBU products
Marketing	Fix	NPS	All EBU products
COR Top management	Fix	NPS	All EBU products
COR Direct sales	Var (*)	NPS	All EBU products
In charge Relations for COR (1) clients	Fix	NPS	All EBU products
COR ICT Project architects & Outsourcing mgmt	Fix	PS	All EBU ICT products
ME (2) top management	Fix	NPS	All EBU products
ME Direct sales	Var (*)	NPS	All EBU products
Support staff for ME Sales (all channels)	Fix	NPS	All EBU products
In charge Relations for ME indirect sales channels	Mix Fix/Var	NPS	All EBU products
Telco Solutions Top management	Fix	NPS	All EBU Telco products
Telco Solutions Specialists and Solutions sales	Mix Fix/Var	NPS	All EBU Telco products
IT Solutions Top management	Fix	PS	All EBU ICT products
IT Solutions Specialists and Solutions sales	Mix Fix/Var	PS	All EBU ICT products
OPS (3) top management	Fix	NPS	All EBU products
Financial reporting & IT Tools management	Fix	NPS	All EBU products
After Sales Back-office	Var (*)	NPS	All EBU products
Customer Project Management	Fix	NPS	All EBU products
Transformation, Process & Operations	Fix	NPS	All EBU products
ICT Outsourcing & industrialised services	Var (*)	PS	All EBU ICT products
ICT Customer service desk	Var (*)	NPS	All EBU, CWS, SE products

(*) excluding Team responsible flagged as Fix costs.

(1) COR, for CORPORATE, is the subdivision of EBU including big size enterprises.

(2) ME, for Medium Enterprises, is the subdivision of EBU including smaller size enterprises (from 10 to 50 employees).

(3) OPS, for OPERATIONS, is a Support division specific to EBU in charge of internal Process & IT optimization, financial reporting, customer projet management, as well as customer service: commercial and technical repair helpdesk.

Some EBU organisational groups have a mix of Fix/Var costs per type of activity. The scission of these teams into FIX and VAR costs is based on #FTE, in accordance with Proximus functional organization and Retail principles for determining if a cost is FIX or VAR.

E.g.:

Teams in charge for relations with indirect sales channels are made of Direct sales (VAR costs) and of people in charge of Sales channels optimization, strategy and budgeting (FIX costs).

Teams of Solutions Specialists and Solutions Sales are made of Direct sales (VAR costs) and Products&Solutions managers in charge of product catalogue and architecture (FIX costs).

- Retail FTE Fix costs non product specific are directly allocated to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

- Retail FTE Fix costs product specific are directly allocated to the Market of the product they relate.

- Retail FTE Var costs non product specific are split with volumes allocation keys between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market.

- Retail FTE Var costs product specific are allocated to the Market of the product they relate, with volumes, for information purpose only.

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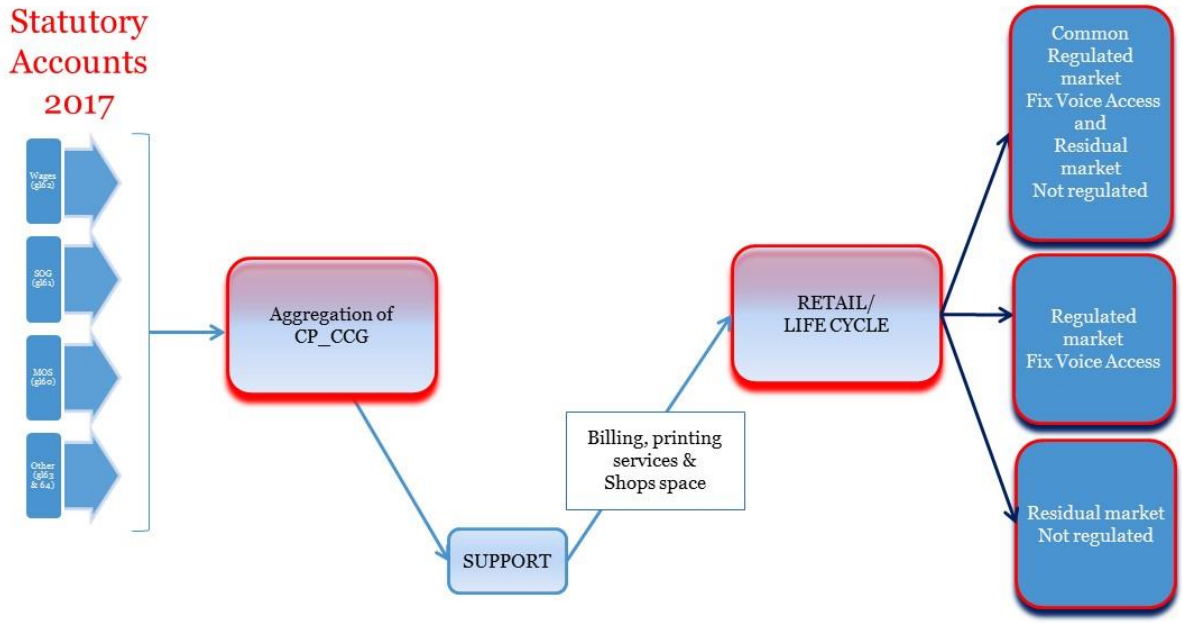
Retail FTE Var costs are allocated towards activities in the LIFE_CYCLE module, prior to be sent to Market(s). We refer to chapter 4.5 Allocation of Costs included in the Life cycle of products, for further developments on allocations keys for Retail FTE VAR costs.

4.2.3.3 ***Retail Support costs (block 2)***



Module SUPPORT identifies and collects the costs of a number of support objects which a.o. are retail related.

The retail related support objects primarily concern billing costs (invoice printing, stuffing and postage, as well as teams in charge of billing&collecting) and costs for shop space. These costs are primarily gathered in module SUPPORT.

Costs for shop space are considered fix. The costs of creation and maintain a shop is not linked to the volumes of products the shop offers, but well to other criteria such as geographical localisation, local withholding tax regulation, points of sales optimization, etc. The CBU shops sell all types of products. These costs are therefore assigned as non_product_specific.

Proximus shops are occupied mainly by Proximus Direct Sales teams and, in a lower extent, by part of the Indirect Sales who do not have their own shops. Costs for shop space were allocated towards those teams, via module RETAIL.

Billing costs are fix, non_product_specific costs. In the specific cases of clients who have only one product to bill (1Play customer), or clients who have a panel of products belonging all to the same market, billing costs were allocated towards the concerned Market, with number of clients billed as allocation key. Billing costs of clients multiplay were split between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market, according to billed items per client invoiced, for invoice printing and postage costs, and according to turnover for teams in charge of billing&collecting'.

Retail support costs, as they are materially considered as fix, non product specific costs, are mainly allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

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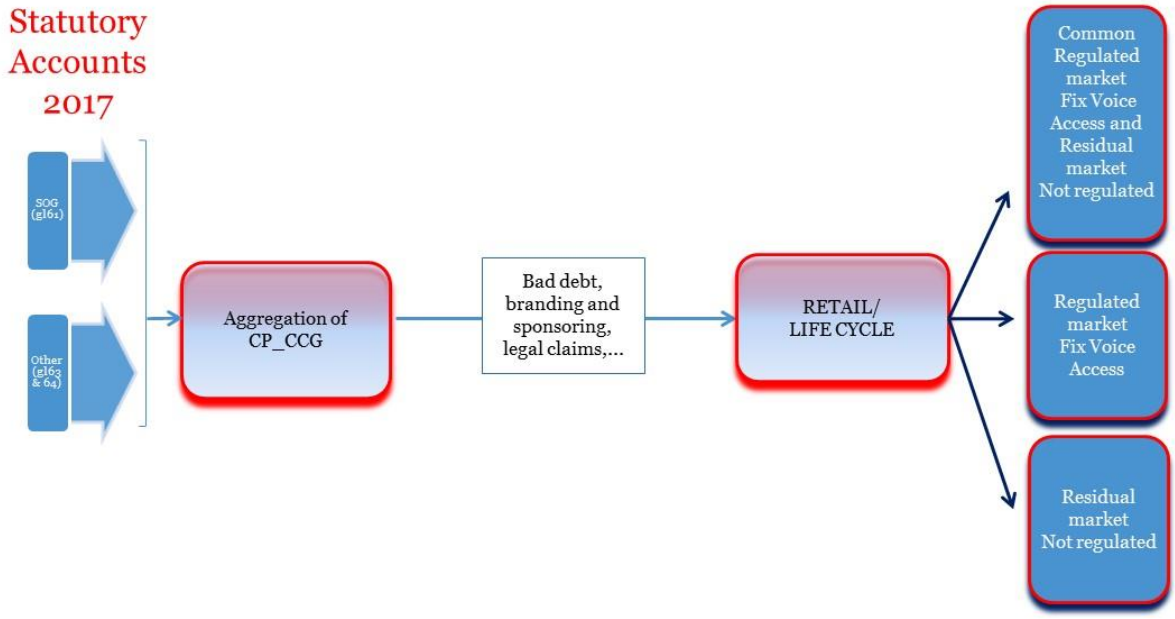
4.2.3.4 ***Retail costs which do not have a causal relationship with products (block 3)***



Per definition these costs are either fix (e.g. IT developments not capitalized for the internal needs of a Retail department, bad debt, etc.) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, etc.).

Per definition, these costs are non product specific.

Most of costs of block 3 are sent to module Retail, where linked to the activity of a Retail organisational group, prior to be routed to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

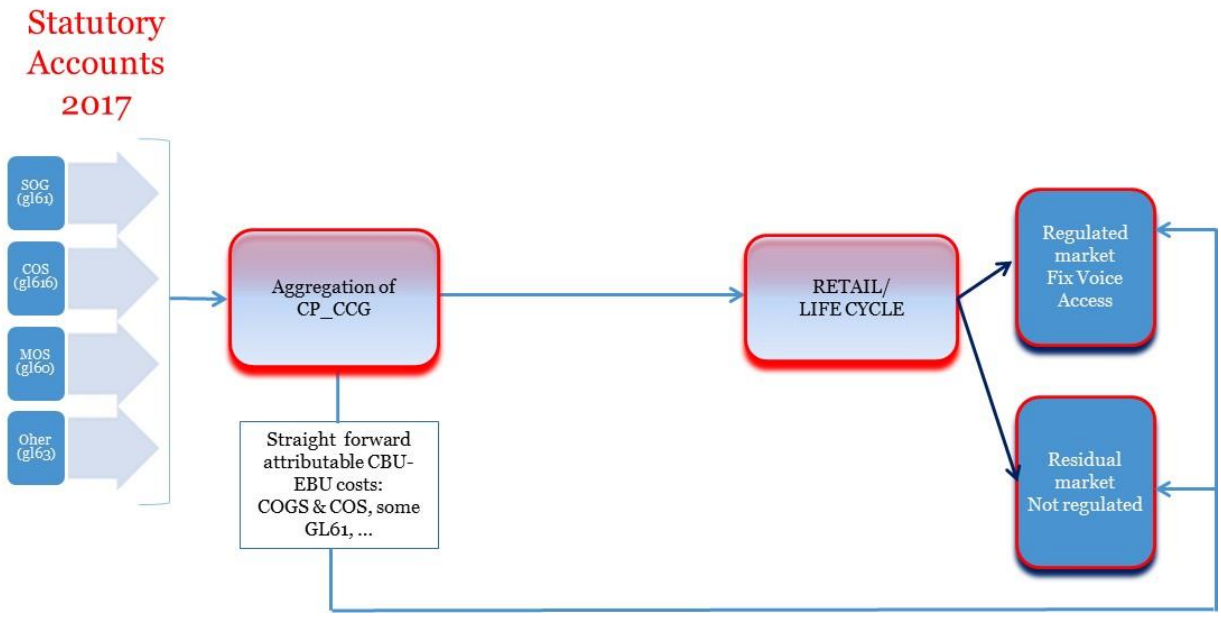
Bad debt is categorized as fix costs. Bad debt does not have a link to products but well to criteria such as competitive environment, regulatory framework (telecom laws), quality rating of the portfolio of clients, rather than to volumes of products.

Follow up and provision for bad debt is not done per products, but well per invoices and clients.

Bad debt tends to increase with turnover growth. Accordingly, we use the turnover as allocation key for bad debt to Market 0 or Market 1.

Sensitivity: Unrestricted

4.2.3.5 ***Retail costs which have a causal relationship with products (block 4)***



Are included in this block of Retail costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products.

Examples of costs of this category are Cost of goods sold, costs of sales (e.g: commissions indirect sales channels, interconnection fees), campaigns marketing directed on a product, and sales actions oriented on a dedicated products such as Outbound call sales actions..

Most of the costs of block 4 are gathered by similar categories into Retail and/or LIFE CYCLE modules, prior to be allocated to the Market they relate, some of them being however directly sent to the Market they relate.

Per definition, Retail costs of Block 4 have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are therefore included the following combinations of VAR_TYPE; PS_TYPE:

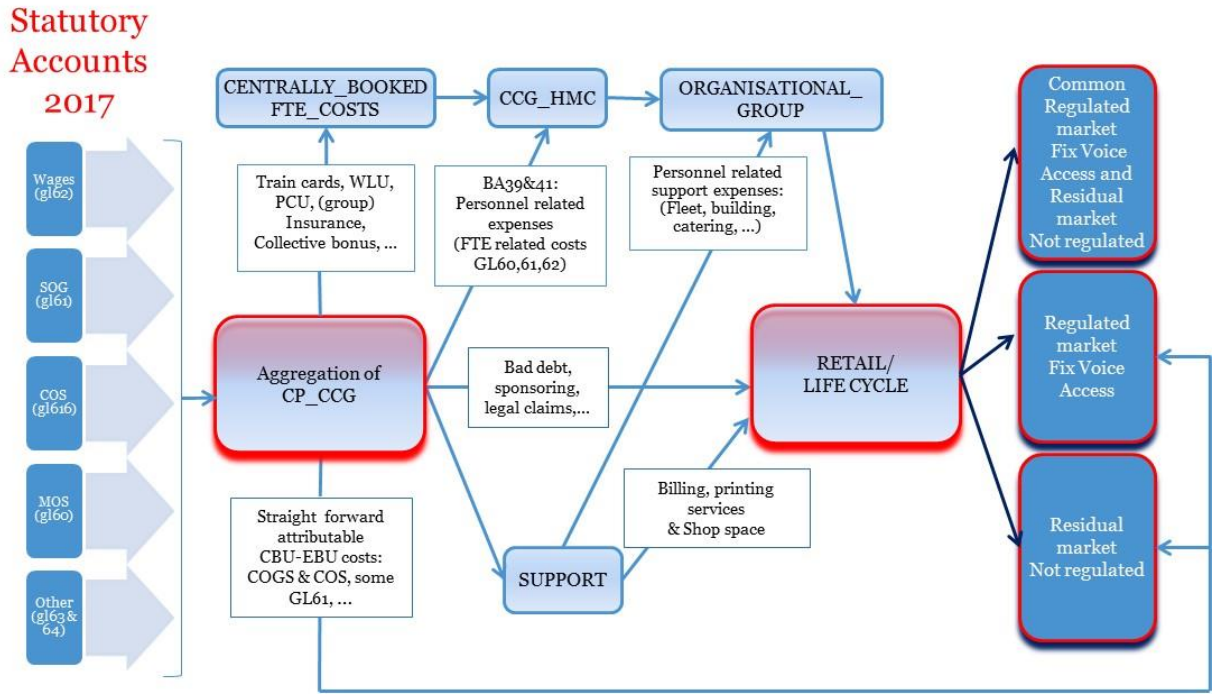
VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost of goods sold and Cost of sales have a direct link to product they relate. Therefore, they can be allocated directly.

Marketing expenses are per definition fix non_product_specific costs. Part of Marketing expenses can however be allocated to (specific) product(s) (Markets), in case of dedicated campaigns.

Sensitivity: Unrestricted

Retail allocation flows – all costs blocks (1->4), can be illustrated as follows:



Sensitivity: Unrestricted

4.3 Allocation of the CWS (Customer Wholesale division) costs

The allocation flow and principles are identical to the retail costs allocation flow.

4.3.1 Wholesale costs perimeter

All Wholesale activities are situated at the level of Business unit CWS (Customer Whole Sale).

The Proximus financial and accounting structure clearly registers (directly attributable) Wholesale costs on costcenters 40xxxx.

Starting from the Proximus organisational structure, we can identify 4 blocks in the Wholesale cost perimeter:

1. Wholesale FTE costs
2. Wholesale Support costs
3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Wholesale FTE costs

Includes all direct FTE related costs of Business unit 40 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Wholesale Business unit in the accounting books but do relate to Wholesale FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus personnel/FTE's (and thus also towards these residing under CWS). E.g.: costs re. Fleet, office building, traincards, bonus, training, gsm's in the context of the employee phone program…

2. Wholesale Support costs

Wholesale Support costs are non FTE related costs which are centrally booked and managed but relate to Wholesale activities. E.g.: Billing.

3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Wholesale departments, costs for legal claims, etc.

4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales and costs of goods sold, interconnection fee, etc;

Sensitivity: Unrestricted

4.3.2 Wholesale costs allocation principles

4.3.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each wholesale CP-CCG.

These attribute-qualifications are applied on all the wholesale CP-CCG combinations, but at different levels of modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Wholesale allocation process as described below.

4.3.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies wholesale costs based on their variability towards product volumes.

We distinguish between 4 var_types:

- Marginal (mar)
- Variable (var)
- Fix (fix)
- Common (common)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 4 var_types as described in chapter 4.2.2.2.

4.3.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies wholesale costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We distinguish between 2 PS_types :

- PRODUCT_SPECIFIC (PS)
- NON_PRODUCT_SPECIFIC (NPS)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 2 ps_types as described in chapter 4.2.2.3.

In addition to the attribute PS_TYPE, all wholesale costs are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

Sensitivity: Unrestricted

Used Cost Groups for wholesale costs are:

Non product specific	Product specific
All CWS products	Mobile Roaming
All CWS products excluding Mobile Roaming	Fastinternet,Profinternet
	LeasedLines,Explore
	ICT
	Mobile
	FixVoiceTraffic

Since this is stricto sensu the same decision tree to qualify wholesale CP_CCG with attributes VAR and PS, than for the Retail allocation process, we refer to the decision tree presented in chapter 4.2.2.3 of the Retail module to illustrate the wholesale costs qualification with attributes VAR and PS.

4.3.2.4 *Criteria for allocation of wholesale costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to). This means that the costs will be allocated towards one of these wholesale Markets:

   Market 0 - Residual Market
   Market 4 - Unbundling local loop
   Market 5 - Wholesale Broadband
   Market 6 - Wholesale BROTSOLL
   Auxiliary service Market 1 - Access PSTN&ISDN - CPS
   Auxiliary service BRxx - Colocation
   Auxiliary service BRIO - POI

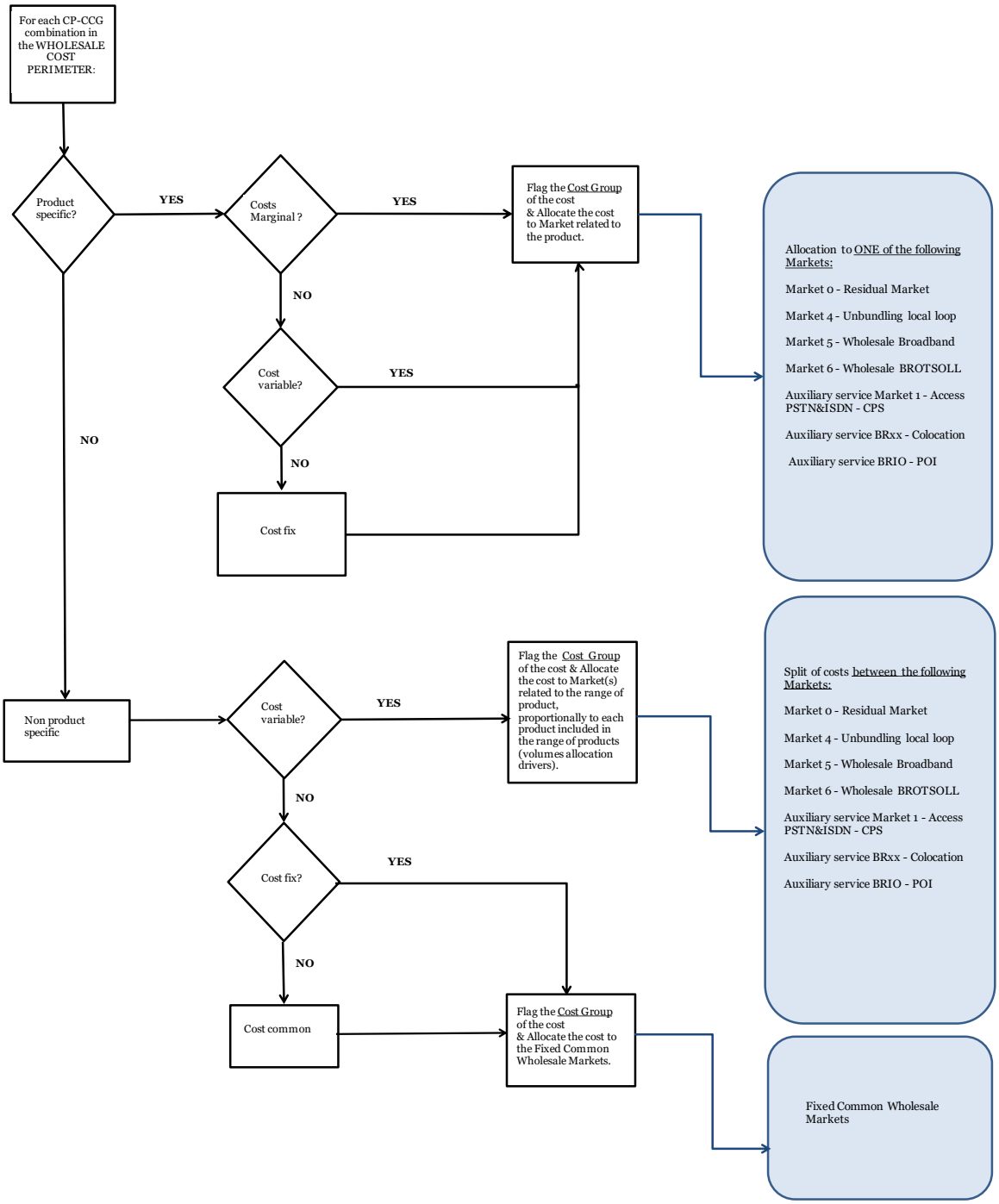
For simplification purpose in the definition of the markets in the Cost model, Auxiliary service Market 1 – Access PSTN&ISDN for Carrier Pre Selection (CPS) was included into Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards wholesale Markets (see list above) based on volumes drivers. The drivers for allocation of variable costs are documented further, per block of wholesale costs (1->4).

c. Non product specific Fix and Common costs are allocated towards Market 'Fixed Common Wholesale Markets'.

Sensitivity: Unrestricted

Principles for wholesale costs allocation to Markets can be illustrated as follows:



Sensitivity: Unrestricted

4.3.3 Wholesale costs allocation flows

4.3.3.1 *General principles*

As described above, the 4 blocks of costs included in Wholesale cost perimeter are all specified with 2 cost type attributes (VAR TYPE; PS TYPE) prior to be allocated to Markets. Similarly to the Retail allocation flow, the 4 blocks of costs do not follow all the same path of allocation. The allocation flow followed by a Wholesale CCG_CP will depend on its block of costs (1->4).

4.3.3.2 *Wholesale FTE related costs (block 1)*

The allocation flow of Wholesale FTE related costs is the same than the Retail one. We therefore refer to chapter 4.2.3.2. for presentation of the several modules whereby FTE related costs are centralized/allocated. As a reminder, the list of modules that deal with FTE related costs is as follows:

- Cost basis (GL62, as well as some GL60&61),
- CCG_HMC or SUPPORT ([1]),
- ORGANISATIONAL_GROUP,
- WHOLESALE.

With regard to the definitions of Attribute dimension VAR, Wholesale FTE related costs can only be either Fix (FIX), or Variable (VAR) costs.

Criteria to classify FTE related costs into FIX vs. VAR costs were similarly defined as for the Retail allocation flow, id est: are considered as FIX costs, all the FTE costs needed to maintain the Proximus minimum organisational structure, independently of products volumes. These ones include staff costs such as IT officers, reporting & analysts teams, research staff (e.g.: products & solutions managers), as well as the Proximus hierarchy structure (team responsibles).

Organizational groups dedicated to a specific product are categorized as product_specific (PS). We identified only one organizational group in the Wholesale organisation structure that is product specific, id est, the team involved exclusively in Roaming agreements.

Organizational groups covering a span of products are categorized as non_product_specific.

The classification of FTE costs for CWS between FIX and VAR costs, and whether product_specific or not, is as follows:

CWS Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All CWS products
Direct Sales	Var (*)	NPS	All CWS products
Call center activities	Mix Fix/Var	NPS	All CWS products
Roaming agreements	Fix	PS	Mobile Roaming
Products & solutions management	Fix	NPS	All CWS products excluding Mobile Roaming
Strategic planning, reporting and internal process	Fix	NPS	All CWS products

(*) excluding Team responsible flagged as Fix costs.

[1] Only FTE related support costs.

Sensitivity: Unrestricted

CWS Sales department is an organisational group defined as Var, non product specific. CWS sales FTE are responsible for regulated and non regulated products. The size of the department varies with the volumes of products (to be) sold.

CWS Call center activities include 3 main divisions:

- *Operational team* in contact with external clients. This division gathers the Front office and Back office in charge of the sales orders intake, answers to questions of clients, and support to the CWS Sales department in period of high business activity
- *Billing and credit collection team*
- *Reporting, IT tools management and process optimization team*.

Billing and credit collection team is qualified as "fix, non product specific"cost. Billing activity is a cost depending on volumes of clients, not on volumes of products. Billing costs is also a non_product_specific cost, as vast majority of CWS clients have more than one product by Proximus.

Reporting, IT tools management and process optimization team, as Support staff team, is identified as a "fix, non product specific" organisational group cost.

Front office and Back office costs are categorized as "variable, non product specific", considering the variability of these costs with volumes of products sold, and taking into account that CWS Call center activities handle all CWS products, regulated as well as non-regulated products.

Product specific organizational group Fix of the Roaming Team is allocated directly to non regulated Market 0.

Non product specific organizational groups Fix are routed directly towards the "Fixed Common Wholesale Markets".

Non product specific Variable organisational group's costs are split into CWS Markets based on the following volumes drivers:

1. CWS sales department costs are allocated to products (markets), according to provisioning volumes.

2. CWS Call center activities costs are allocated to products (markets) according to minutes of Voice Calls and number of BCI cases (*) handled, detailed per product
(*) BCI: Belgacom Channel Infrastructure: tool where call center registers a case (ordering, claim, complaint handling) to ensure appropriate follow up and treatment of the client request.

4.3.3.3 *Wholesale support costs (block 2)*

The wholesale support costs are identified firstly in Module "Support". Wholesale support costs specifically concern "CWS_Billing" (invoice printing, stuffing and postage).

Sensitivity: Unrestricted

We qualify CWS_Billing as a fix non_product_specific cost. Cost Group of CWS_Billing is All CWS products, since the CWS_Billing support costs include all the products of CWS, whether regulated or not.

As mentioned in chapter 4.3.3.2.3 related to the CWS CCA staff team in charge of Billing and credit collection follow-up, to the contrary of the Retail billing costs, the case that billing costs can be linked to some unique product is not met, since the vast majority of the CWS clients have more than one products billable. The absence or suppression of one product will not change the need for invoicing the client.

CWS_Billing costs are split between CWS Markets according to the park of CWS products.

4.3.3.4 *Wholesale costs which do not have a causal relationship with products (block 3)*

Wholesale costs that do not have a straightforward driver towards products are either grouped in module Wholesale, if they can be linked to the activity of a Wholesale organisational group, or they are directly routed to the Market "Fixed Common Wholesale Markets".

Per definition these costs are either fix (e.g. IT developments not capitalized for the internal needs of Sales departments) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, bad debt, etc.).

Per definition, these costs are non_product_specific.

Fix and common non_product_specific costs are allocated directly towards Market "Fixed Common Wholesale Markets".

4.3.3.5 *Wholesale costs which have a causal relationship with products (block 4)*

Are included in this block of Wholesale costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products. Costs of block 4 are either directly allocated to Market they relate, or they transit by Wholesale module, when the costs have to be gathered in the same Wholesale object at first, prior to be allocated to Market they relate.

Per definition, these costs have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are included in Wholesale costs - block 4, the following combinations of VAR_TYPE ; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_specific
Marginal	x	-
Variable	x	x
Fix	x	x

The main costs of this category are Cost of goods sold, cost of sales (e.g: interconnection fees), consultancy and outsourcing costs dedicated to specific products.

Cost of goods sold and Cost of sales, as MAR product specific costs, have a direct link to volumes of product they relate. Therefore, they can directly be allocated to the Market they relate.

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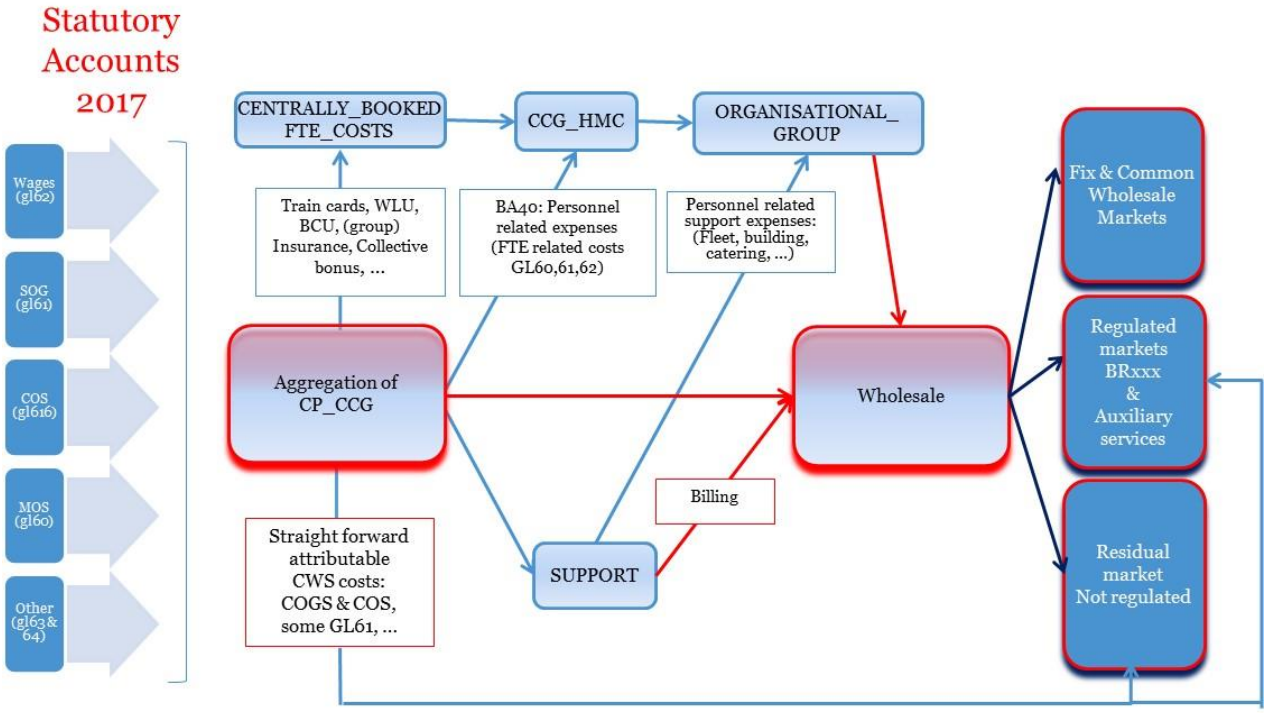
Consultancy and outsourcing costs, when related to a specific product, are allocated directly to the Market they relate. E.g.: Fees to Clearing Offices for roaming.

Wholesale allocation flows of all types of Wholesale costs is presented as follows:



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

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4.4 Allocation of the CUO (Customer operations) costs

4.4.1 Customer operations costs perimeter

Customer operations is a new Business unit created in 2014. The division gathers activities previously done inside these Business Units: Consumer Business Unit (CBU), Service Delivery Engine (SDE) and Staff and Support (S&S).

Objective of the creation of the Business unit Customer operations (CUO) was to join in the same Business Unit all the Proximus activities to the service of the customer.

CUO concerns both commercial retail (e.g. commercial call centers) and technical retail activities (e.g. technical call centers).

To ensure consistency with allocations of previous years, we allocate costs of CUO in the same way as done previously inside the separate Business Units CBU, SDE and S&S, for the CCG concerned.

The Proximus financial and accounting structure clearly registers (directly attributable) CUO costs on cost centers 49xxxx and 50xxxx.

However, a number of costs are not directly attributed to CUO in the accounting books but do relate to CUO activities.

It concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's.

E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

These costs are added up with the directly attributable FTE related costs and allocated to CUO CCG towards the organisational groups.

We refer to chapter 4.2.3.2 Retail FTE related costs, where the allocation flow is described for FTE related costs, as it is applicable to CUO FTE related costs.

For what matters human power costs, the CUO module is primarily sourced from the following modules:

1. **Organisational_Group**
   This concerns the CUO FTE related costs.

2. **CP1**
   This mainly concerns the outsourcing costs for the field and remote technical activities (provisioning and repair).

3. **CUO_SOG**
   This primarily concerns costs for the outsourcing of commercial call centers (front office and after sales).

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4.4.2 Customer operations costs allocation principles

4.4.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each Customer operations CP-CCG.

4.4.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies customer operations costs based on their variability towards product volumes.

We distinguish between 2 var_types:

- Variable (var)
- Fix (fix)

As they have the same definitions than for Retail allocation, we refer to the definitions of these 2 var_types as described in chapter 4.2.3.2. Retail FTE related costs.

4.4.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies CUO costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards specific products.

Considering the activities of CUO Business unit (activities of services to the customer), most of the costs are non product specific.

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4.4.3 Customer operations costs allocation flows

4.4.3.1 *Allocation of Organisational Group costs*

The classification of FTE costs for CUO between FIX and VAR costs, and whether product specific or not, is as follows:

CUO Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All Proximus products
Support services to the business unit			
Strategic planning	Var (*)	NPS	All Proximus products
E2E operations: IT tools, reporting & process	Var (*)	NPS	All Proximus products
Technical services to the customer			
After sales technical - provisioning (1)	Var (*)	NPS	All Proximus products
After sales technical - repair (1)	Var (*)	NPS	All Proximus products
Field Cable	Var (*)	NPS	All Proximus products
Commercial services to the customer			
After sales commercial (2)	Var (*)	NPS	All CBU and CWS products
Directory Information Services	Var (*)	PS	Directory Assistance Services and listing
Billing & Collecting invoices	Fix	NPS	All CBU and EBU products

(1) Remote and field

(2) Back office of Telesales agents for provisioning and complaints handling

(*) excluding Team responsible flagged as Fix costs

Technical services to the customer

The allocation for fix & var organizational groups is the same (fix is a copy of var through a generic key implemented in TCE tool). There are exceptions to this principle, in which case the fix allocation directly goes to common markets. The latter applies when variable costs of a team are sent to the life cycle.

The FTE related costs of organizational groups are mostly allocated to the LIFE_CYCLE, modules of Network elements or MARKETS based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Dispatch units for Field operations, Minutes of interactions with the customer for the remote repair of mass products, etc.).

Commercial services to the customer

- After Sales commercial costs are split between Market 1 – Access PSTN&ISDN & Market 0 – Residual Market for teams handling CBU products, and between Wholesale Markets for teams handling CWS products. The allocation is based on volumes of time or efforts spent for the respective products, as collected in ordering and complaints handling operational databases.
- Directory Information Services are allocated directly to Market 0.
- Billing and Collecting invoices activities are split between Market 1 – Access PSTN&ISDN and Market 0, according to turnover of the two divisions CBU and EBU, the two beneficiaries of this CUO service.

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Costs of Organisational groups of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. to more developments on allocation keys of CUO Organisational groups.

4.4.3.2 *Allocation of Outsourcing costs*

Outsourcing costs include:

- costs gathered in module CP1 for technical teams and
- the commercial call centers outsourced (front office and after sales).

When activity is similar, outsourcing costs are allocated with the same drivers (based on time/efforts) than used for the Organisational groups. When activity is specific, dedicated allocation keys were applied.

Outsourcing costs of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. for more developments on allocation keys of CUO Outsourcing costs.

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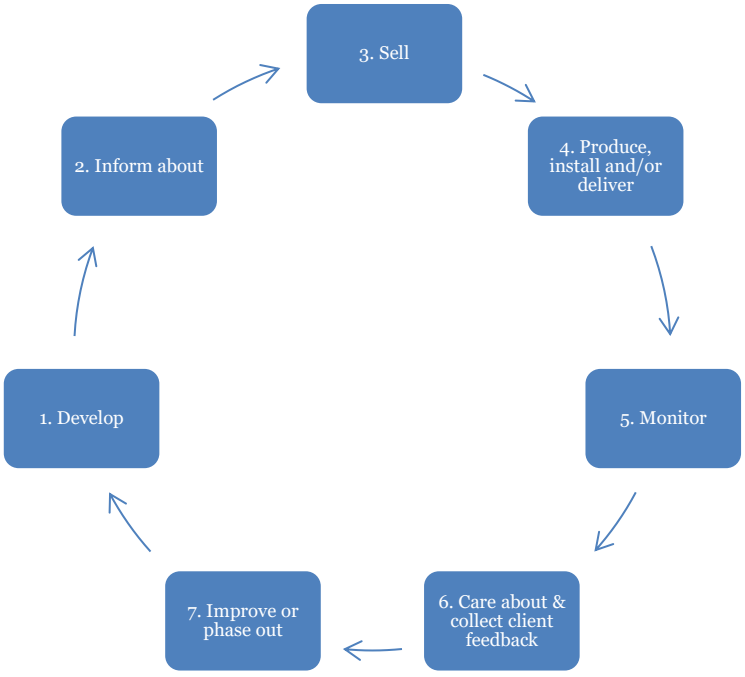
4.5 Allocation of Costs included in the Life cycle of products

4.5.1 Cost perimeter

Since the 2014 Cost model, all the costs included in the life cycle of a product/service were specifically gathered in a module, the LIFE_CYCLE MODULE, prior to be allocated to Markets.
The costs were sourced primarily from modules OTHER_MOS, OTHER_SOG, COMMERCIAL_RETAIL, AC and CUSTOMER_OPERATIONS.

The life cycle of a product includes the following stages:



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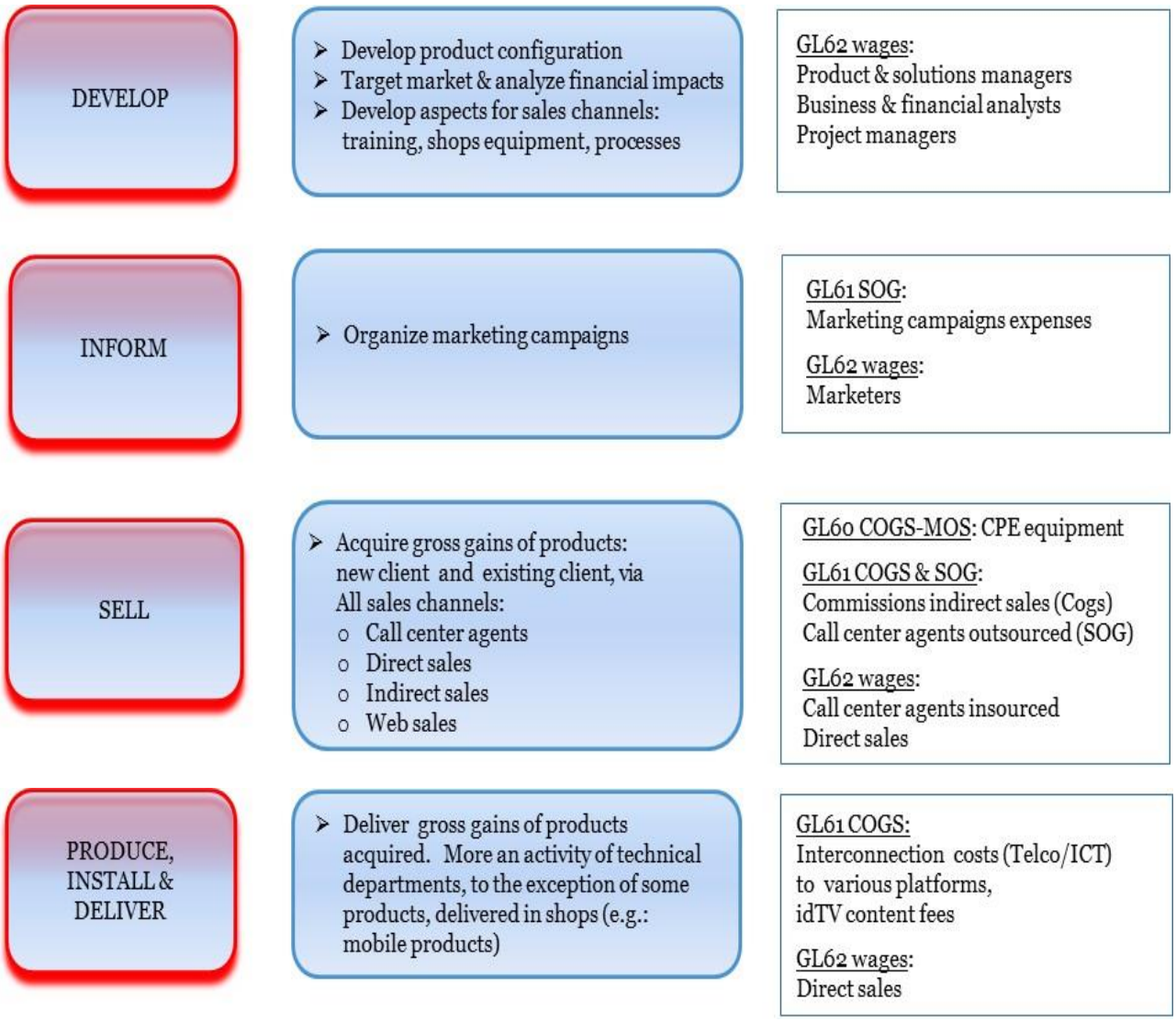
Following costs were identified in the life cycle of a product/service:



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DELIVER : Remote activation

- All products (mass or professional, fixed or mobile) must be remotely activated in the network.
- The remote activation may be sufficient to deliver the product in specific cases but in many cases, a field travel is necessary to complete the product delivery.
- Ideally, the remote activations would all be automatically executed further to an order from the customer in the IT systems but in reality, this process still requires manual interventions.
- The complexity of professional remote activations naturally requires a specific and important team (CNN). The activation activity in the life cycle refers to CNN.
- The PCD (Provisioning Coordination Desk) mass remote activation activity is consolidated with the dispatching activity in the DCO included in the field installation life cycle activity.

GL61 SOG:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

GL62 wages:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

DELIVER : Field installation

- A remote activation of the product in the network may not be sufficient, especially in the case of fixed products.
- In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions :
  - in the network up to the NTP (Network Termination Point in the customer house) (even DIY installations by the customer may require a field action in the network) and/or
  - outside of the network e.g. for mass products, the modem and/or TV decoder (FULL installation).
- The field installation activity in the life cycle relates to the work done by the technicians outside of the network.
- It also includes the remote activation (for mass products) as well as the dispatching activities from the DCO.

GL60 MOS-MAT:
Equipments like modems and/or TV decoders, located in "Terminals" life cycle various categories

GL61 SOG:
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

GL62 wages :
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

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MONITOR: Billing & Collecting Revenues	➢ Produce and send bills ➢ Manage bad debt: follow ageing balance, send reminders & bailiffs costs	GL61 SOG: Printing & postage costs Bailiffs costs GL62 w ages: Call center agents insourced (dedicated team Billing&Credit risk) GL 63&64 Other: Bad debt provision & write-off
MONITOR: Changes on products sold	➢ Adapt product configuration, in accordance with requirements of the client: swap, downgrade/upgrade of a pricing plan, additional option, churn, configure multiple products in a pack (pack configuration)	GL61 SOG: Call center agents outsourced GL62 wages: Direct sales, Call center agents insourced
CARE: Handling clients complaints	➢ Handle billing complaints ➢ Process request for changes of personal data (clients moves, etc.)	GL61 SOG: Call center agents outsourced GL62 wages: Call center agents insourced, Direct sales
CARE: Remote repair	➢ When a customer has a technical issue with a product/service, he/she can contact the appropriate call center (mass or professional). Whilst the customer is waiting on e.g. the CHC line, the DARE IT system already processes the customer data in order to test potential issue drivers. ➢ The first line call center agent may be able to fix the issue of the customer … or not. ➢ In the later case, the call center agent will call upon the second line agents who themselves will call upon a third line outside of CHC or ISO if they can 't fix the issue. ➢ The remote repair activity in the life cycle relates to the CUO CHC (Customer Operations, Customer Help Center, for mass products) and the EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology - for professional products)	GL61 SOG: CUO CHC (Customer Operations, Customer Help Center) for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products GL62 w ages: CUO CHC (Customer Operations, Customer Help Center for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products

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CARE: Field repair	➢ A remote repair of the customer technical issue for one or several products may be impossible, be it by the first, second or third line. ➢ In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions : ➢ in the network e.g. the ROP, the LEX, the NTP (Network Terminating Point, in the customer house) and/or ➢ outside of the network in the customer office for professional products or house for mass products (e.g. the modem, the TV decoder). ➢ The field repair activity in the life cycle relates to the work done by the technicians outside of the network. ➢ It also includes the dispatching activities from the DCO (Dispatch & Cordination Center).	GL61 SOG: *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair GL62 wages : *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair
CARE: Retention & Loyalties programs	➢ Inform about loyalties actions & facilities, ➢ Implement retention actions	GL60 MOS-MAT: Sales gifts and loyalties advantages GL61 SOG: Call center agents outsourced GL62 w ages: Call center agents insourced
IMPROVE or PHASE OUT	➢ Design product new configuration/phase out ➢ Target market & analyze financial impacts ➢ Develop aspects for sales channels: training, shops equipment, processes	GL62 wages: Product & solutions managers Business & financial analysts Project managers

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4.5.2 Allocation drivers

Allocation drivers for VAR costs to the Life_cycle module are the following ones:

	Sourced from Module(s)	Driver for allocation to Life_Cycle split per product and customer segment
Organisational groups costs		
Commercial services to the customer		
Marketing	Commercial_Retail	Detail of marketing expenses
Sales and after sales, insourced&outsourced, mass market products	Commercial_Retail/ Customer_operations(1)	Time&efforts spent per product according to operational volumes for ordering&complaints handling
Sales and after sales, insourced&outsourced, professional market products	Commercial_Retail	Time&efforts spent per product according to TTVA/revenues
Indirect sales, mass market and prof. market products	Commercial_Retail	Commissions paid
ICT dedicated ressources: governance&sourcing	Commercial_Retail	Direct
Billing&Collecting invoices: FTE costs	Customer_Operations	Turnover per business area and per product
Technical services to the customer		
Customer activation	Customer_Operations	SAP HR teams names and configured nodes
Customer field installation&repair on copper	Customer_Operations	DU (Dispatch Units) translating time spent on activity
Customer remote repair, mass market products	Customer_operations(2)	#FTE and minutes
Customer remote repair, prof. market products	Commercial_Retail(2)	#FTE and minutes
Assets and Cost of good sold/cost of sales		
CPE rented	AC	Direct
idTV content fees	AC;Other(*)_SOG	Direct
CPE sold	Other(*)_MOS; Customer_Operations_MOS	Direct
Interconnection	Other(*)_SOG	Direct
Outsourced ressources/IT platforms&applications	Other(*)_SOG	Direct
Sales gifts	Other(*)_MOS	Direct
Other		
Bad debt	Other(*)_DEPR;Other(*)_OTHER	Direct
Internal distribution costs	Support	Value of material moved out of stock (3)
Billing & Collecting invoices: Printing & stamps costs	Commercial_Retail	#billed clients, weighted when multiplay clients

(*) Commercial Retail costs.
(1) Commercial Retail:
Direct sales
Call centers insourced: Front office Telesales (Inbound calls)
Call centers outsourced: Front office Telesales (Outbound calls)
(1) Customer operations:
Call centers insourced: Back office Inbound calls
Call centers outsourced: Front office Telesales (Inbound calls) and Back office Inbound calls
(2) Commercial Retail: Customer_operations:
EBU OPS ISO (Operations - ICT Services operations) CUO CHC (Technical call center)
(3) Opex and Capex.

Commercial services to the customer:

Below, we give some specifications about drivers of sales and after sales costs.

1) Sales and after sales, insourced and outsourced, mass market products

This Life_cycle object includes all Sales and After sales channels handling "simple" products, i.e. mainly Telco products (fix voice, fix internet, idTV, mobile). This category includes also products for small size enterprises. In short, it includes all CBU consumer business unit sales channels (even is, as from 2014, some of these channels are in the new CUO business unit).

Call centers agents:

- *Front Office* is the department with FTE who are in contact with external clients. Activities of the Front office are primarily sales and sales orders intake, supported by the After Sales department.

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- *After Sales* department is the CCA Back office. Its tasks are primarily input in systems of sales orders, handling of clients billing complaints and requests (e.g.: change of invoicing address).

The IT managing system for tracking calls handling of the *Front office* is the **IVR** (Interactive Virtual Response), where calls passed and minutes of calls are recorded, for fix line products and mobile products.

The IT managing system for tracking activities of the *After Sales* is **BCI** (Belgacom Channels Infrastructure) where cases detailing activity of the agents (ordering, complaints handlings, requests), for fix line products and mobile products, are registered.

Usually, ordering is passed by Front office agent, simultaneously with the sales, but when the ordering takes longer time (because need for installation on field, or due to any longer issue), task is delegated to an After Sale agent who will create a case in BCI.

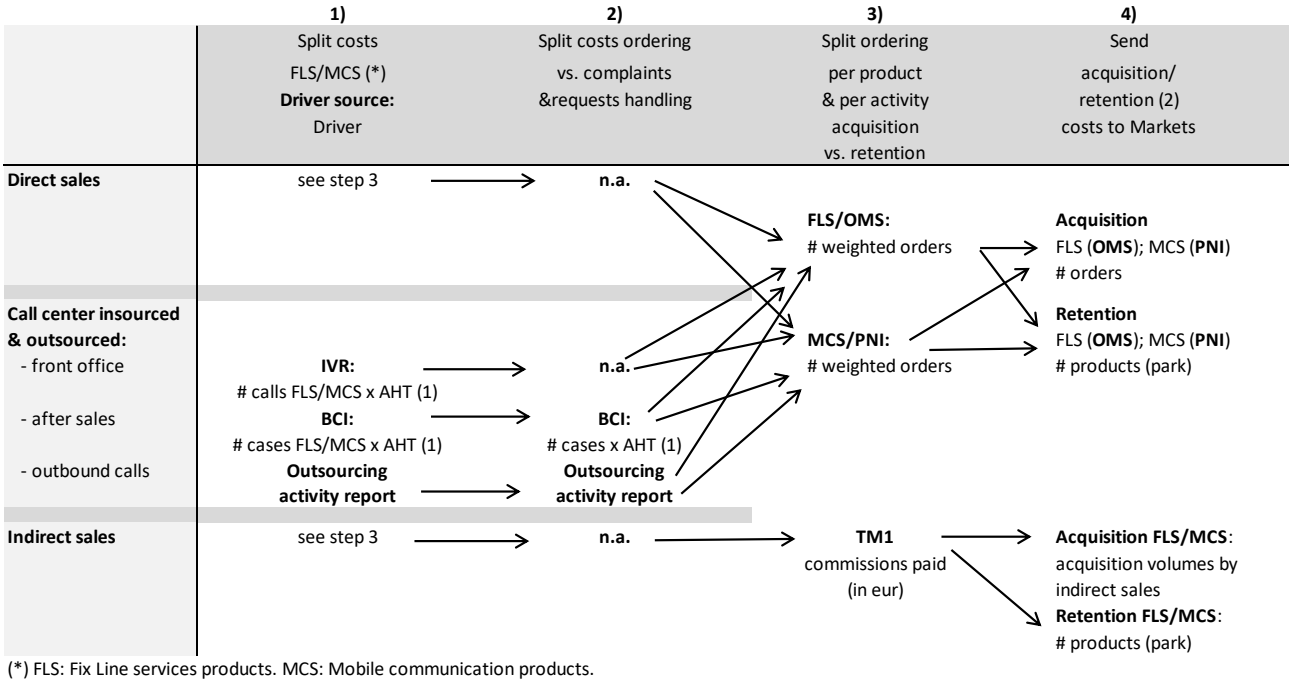
The IT managing system for ordering of the Front office and the Back office is **OMS** for fix line products, **PNI** for mobile products.

OMS and PNI track records of orderings per product and per type of ordering: acquisition (gross gains) vs. retention (additional option, swap of pricing plan, churns, change, pack configuration, etc.)

Cost model use OMS and PNI operational volumes as allocation drivers for ordering.

For After Sales agents, activity is at first split between ordering and complaints handlings, with BCI reports.

Allocation drivers of Sales and After Sales, mass market products, can be presented as follows:



(*) FLS: Fix Line services products. MCS: Mobile communication products.

(1) AHT: Average handling time. Effort spent per product are weighted, based on a study of time for handling products.

(2) Complaints handling are handled as ordering retention activities: allocation to market with # products - park.

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2) Sales and after sales, insourced and outsourced, professional market products

This life_cycle object includes all EBU business unit sales and after sales channels.

EBU owns his dedicated after sales department: Operations-Business Support Centre (OPS-BSC).

OPS-BSC deals as the back office of the EBU Direct sales for complex ordering, as well as front office towards EBU clients for all what concerns commercial issues on products, Telco, fix&mobile, and ICT. We referred to team's names to split OPS-BSC into Telco Fix, mobile and ICT costs, since OPS-BSC is organized in teams dedicated per product.

Like CBU, EBU sales and after sales can be split into 2 big categories: acquisition costs, and retention costs. We include in retention costs the complaints handling activity of OPS-BSC.

EBU sales activity of ICT cannot be declined in volumes. ICT solutions are offered to the clients as tailor-made contracts, declined in SLA (Sales level agreement) and quoted in EUR.

Besides, ICT contracts include most of the time One-time items. The need to split costs of EBU Sales between products led us to take another allocation key than volume driven.

On top of the fact that not all the EBU products can be declined in volumes, EBU sales efforts are quite different depending on the product. EBU Telco mass market products are quickly available to the client, to the contrary of projects ICT that are generally sold for a 2-3 years minimum period time. Such a long time period contract needs sales efforts deployed on longer period of time too.

To tackle this key point, we took 2 drivers to allocate EBU Sales and after sales costs:

- Total transaction value (TTVA) to measure acquisition sales costs,
- Yearly turnover to measure retention sales costs.

TTVA measures the total yearly value of a won contract. Taking the TTVA as driver enables to compare with a simple unit of measure (EUR) products with specificities very different such as Telco mobile subscription, ICT Data center hosting subscription, etc. Besides, inside EBU Business unit, the TTVA generated is the central driver for all what matters remuneration of direct and indirect sales channels, sales bonus calculations, etc.

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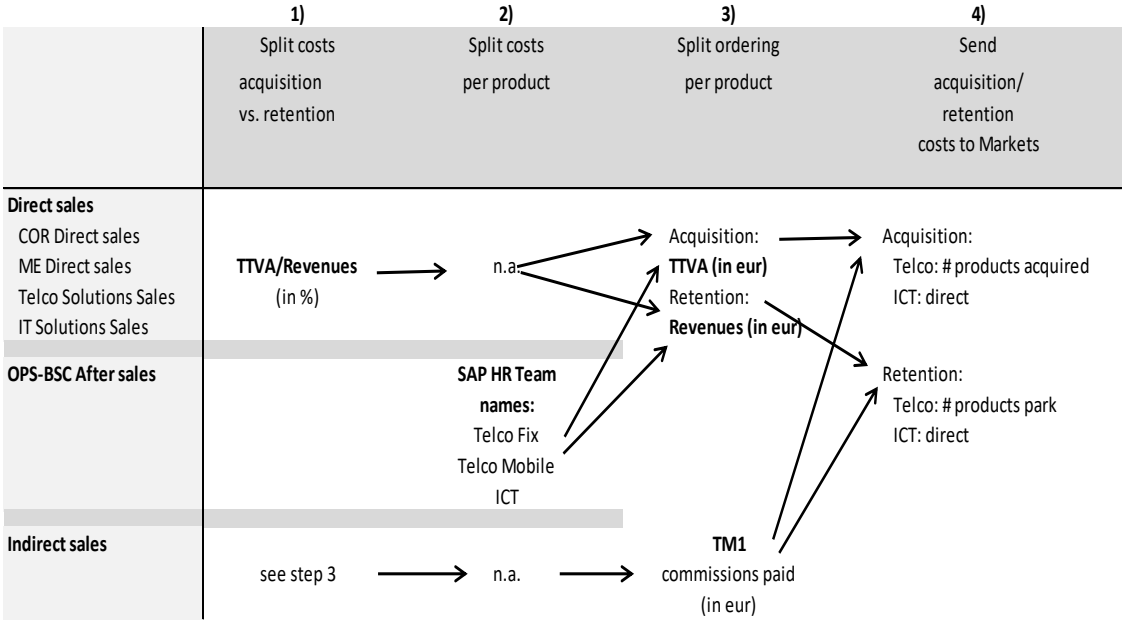
Allocation drivers of Sales and After Sales, professional products, can be presented as follows:



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4.5.3 Modern equivalent opex (MEO)

The 2014 Cost model introduced the concept of modern equivalent opex: a company will perform an activity with its own personnel, if the use of its own personnel is equivalent in costs to another business model such as partnership, outsourcing, interim workers, commissioning, etc.

The MEO introduces a new way to determine VAR costs. Objective of the MEO is to only keep as VAR costs the incremental, effective costs needed to perform an activity, by comparing unit cost of FTE Proximus with unit cost of Outsourcing.

MEO concept application requires some basics:

- comparison basis is reliable: activities insourced and outsourced must be of the same nature,
- same drivers must be available to compare both costs.

MEO application to Commercial activities:

Proximus outsources part of its commercial activities: direct sales, front office and after sales. These activities are also performed with Proximus FTE, as described above.

Direct sales and After Sales team cannot appropriately be compared to their outsourced equivalent teams: performance remuneration differs, tasks differ quite also.
E.g.: After sales outsourcers are used for specific tasks, often easier than the ones assigned to Proximus FTE, more trained and skilled about Proximus products and IT Tools.

The only sales channel where we can apply the MEO valuably is the Front office.

Front officers:

- use the same Proximus IT tools (**IVR**-see above), where volumes and minutes of calls are registered.
- perform the same tasks: receive phone calls of clients and promote Proximus products & services.

Unit cost/minute of the Front office Outsourced is applied to volumes of minutes of the Front office Insourced, to determine the MEO Front office VAR costs, other part of cost is considered as a Fix cost.

MEO application to Technical activities:

CUO outsources part of its VAR Retail activities: remote repair (by the CHC/Customer Help Center technical call center), field installation and field repair. These activities are also performed with Proximus insourced FTE, as described above.

The CUO CHC technical center second line may not come into consideration for MEO: tasks differ from the first line ones and cannot be measured the same way. However, tasks of outsourcers for both field installation and field repair do not differ and can be measured the same way, as well as tasks of outsourcers for the CUO CHC technical center first line.

MEO is thus valuably applied to the CHC technical call center first line as well as the field installation & the field repair.

Front officers (the first line of the CHC technical call center for remote repair):

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- use the same Proximus IT tools & volumes and minutes of calls are registered the same way.
- perform the same tasks: receive phone calls of clients and try to remotely repair the products.

Technicians (for both field installation and repair) :

- use the same Proximus IT tools & volumes and DU are registered the same way.
- perform the same tasks: install and repair products/services of customers on the field.

Unit cost/minute of the Outsourced Front office is applied to volumes of minutes of the Insourced Front office, to determine the MEO technical Front office VAR costs, other part of cost is considered as a Fix cost.

Unit cost/DU (measure of time) of the Outsourced Technicians is applied to volumes of DU of the Insourced Technicians, to determine the MEO Technicians VAR costs, other part of cost is considered as a Fix cost.

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5 TEC OPEX (network&IT) stream

5.1 Allocation of TEC OPEX costs going through the "TECHNOLOGY" INCA module

5.1.1 Determination of the TEC cost perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units :

- Consumer Business Unit (CBU) has the responsibility over the residential and small enterprise customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver (commercial and technical) services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential and small enterprise customers and at the level of Business unit EBU (enterprise business unit) for the other professional customers (medium and corporate enterprises).

Network & IT activities are situated at the level of Business unit TEC, as well as the carrier & wholesale activities (CWS).

The Proximus financial and accounting structure clearly registers (directly attributable) TEC costs on cost centers 50xxxx, separately from the wholesale costs booked on cost centers 40xxxx.

However, a number of costs are not directly attributed to TEC in the accounting books but do relate to TEC activities.

It concerns :

1. FTE related costs
   Support and centrally booked costs which need to be ventilated towards all Proximus personnel/FTE's (and thus also towards these residing under TEC).

   E.g. Proximus University, Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program.
2. Non FTE related costs
   Costs which are centrally booked and managed but relate to TEC activities such as space and power consumption.

The costs under point 1. above are added up with the directly attributable FTE related costs (essentially all payroll costs and costs categorized with Cost type 'personnel-related' in the cost base, in lesser extent a limited number of costs categorized as 'non personnel-related', i.e. primarily

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training costs, printing costs and cost for office equipment) and allocated towards the organisational groups (as a general rule, the organisational group corresponds with the cost center group - except for teams like hybrid network & IT CCG's (SPC NSC) or NEO IPP or NEO OPP).

The TECHNOLOGY module costs are primarily sourced from the following modules :

1. Organisational_Group
   This concerns the costs of "50xxx" organisational groups not belonging to CUO.

2. TEC_SOG
   This primarily concerns costs for consultancy, rent/buy equipment.

5.1.2 TEC cost allocation

5.1.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

For TEC, these attribute qualifications are not defined at the level of the cost base for all CP-CCG combinations but only for the FTE related costs at the level of the organisational groups (module "organisational_group").

5.1.2.2 *Criteria for Attribute dimension VAR_TYPE*

Dimension VAR_TYPE only qualifies TEC FTE-related costs in the TEC module, unlike in the commercial retail module.

Variability refers to the service volume produced by the company in the long-run. This variability has 2 dimensions : volume within a product or diversity of products. The considered increment is the whole product. E.g. PSTN : what if we stop PSTN, which costs do we avoid? This is very hard to reach, especially in a top-down model.

Therefore, we prefer to opt for a simple approach that is only an approximation of the minimum fixed costs, by only considering as fixed FTE-related costs the so-called overhead teams and the minimum organizational structure, represented by the persons attributed with a "team responsibility" or in an MST cost center, as officially reported in the SAP accounting system.

We distinguish between 2 var_types only (unlike Retail, with 4 var types):

1. Fix (fix) : TEC FTE-related costs are considered as fixed mainly when they are related to the minimum organizational structure (represented by the team responsibles and the Management & support teams) should there be a change in the long run.
2. Variable (var) : TEC costs which are not considered as fixed according to the definition hereabove (hence overestimated).

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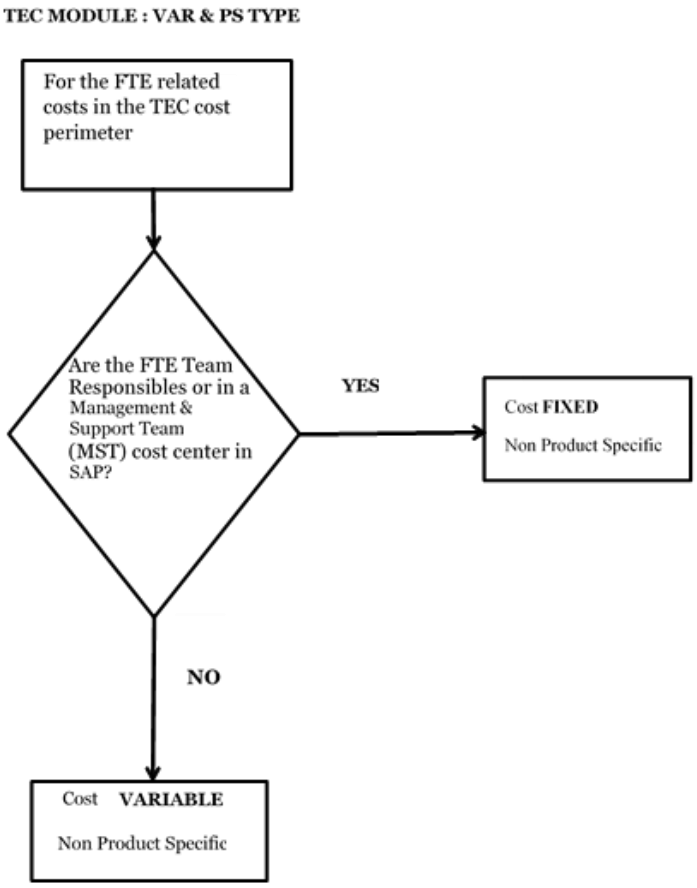
5.1.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies TEC costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We only have one category in the TEC module :

a. NON_PRODUCT_SPECIFIC : TEC costs which do not have a clear (causal) relation with specific products.



5.1.3 TEC allocation process

5.1.3.1 *Allocation of "Organisational_Group" costs*

For TEC, except for teams like NEO IPP or NEO OPP, the organisational groups correspond with the cost center groupings as introduced at the level of the cost base.

Sensitivity: Unrestricted

The criteria as set above (5.1.2.2.) regarding variability are currently translated towards organisational groups based on this decision table :

	Criteria	Justification
fix FTE	Assigned as Team responsible in SAP	Assumption of Proximus as ongoing concern on the long run, independent of Product mix : maintain the same organisational structure (reflected through team respo's)
	Assigned to an MSTcost center in SAP	MST cost centers are referring to Management & Support teams

Organisational groups dedicated to a specific product are categorized as product_specific.

Organisational groups covering a span of products are categorized as non_product_specific.

In TEC, all organisational groups have been defined as “non_product_specific”.

The allocation for fix & var TEC organizational groups is the same (fix is a copy of var through a generic key implemented in INCA).

The FTE related costs of organizational groups are allocated towards markets, network or IT elements based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Rapid for ITS and SPC…).

5.1.3.1.1 Technology (TEC) Organisational group allocation

5.1.3.1.1.1 TEC network & IT OPEX organizational group allocation

The network & IT teams of TEC are thus split into fix and var on the basis of objective criteria found in SAP but allocated the same way (var being a copy of fix) to the following elements :

- AC2
- BUSINESS_OVERHEAD
- CP2
- IT_SW_HW
- IT_STORAGE_DB
- NE
- OVH
- MARKET

In the TEC module, the organisational groups do not only encompass the costs of GL 62 wages (including the PFA, capex manpower), but also FTE-related costs from GL60 MOS or GL 61 SOG, as well as outsourcing costs.

In the later case, the driver is mostly the same (based on time/efforts) when it makes sense.

The allocation of the “operational” teams is done directly through the driver whilst the allocation of the “non operational” teams is done through generic keys taking into account the scope of the “non operational” team (driver is the remuneration cost allocation of all the teams in the scope of the “non operational” team).

The allocation of the “fix” part of the “operational” teams is done through generic keys (a simple copy of the remuneration cost allocation of the “var” part of the same operational team).

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5.1.3.2 *Allocation of TEC support costs*

Module 'Support' identifies and collects the costs of a number of support objects which a.o. are TEC related. The TEC related support objects primarily concern costs for telco power & space. However, telco power & space costs are not treated in the TEC module and are thus not described in this subchapter.

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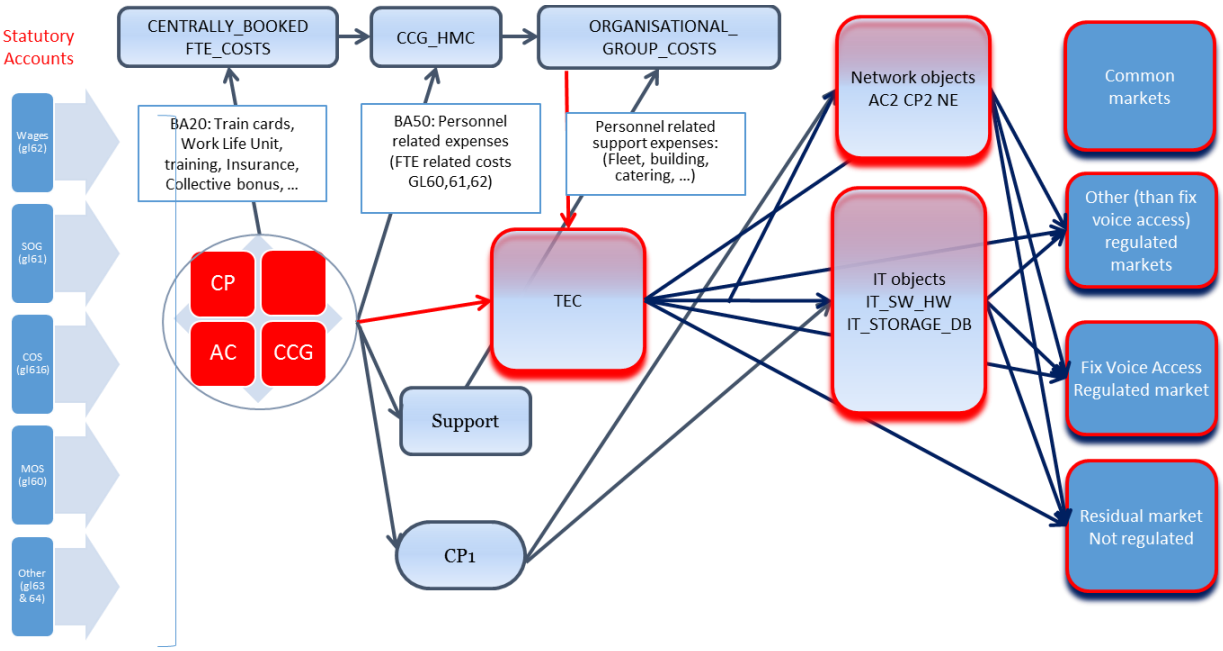
5.1.3.3 *Graphical view on TEC OPEX allocation flow*



CP = Cost Pool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs. Typically, the G/L accounts/costs consolidated in a single cost pool feature the same causal relation.
CCG = Cost Center Grouping = grouping of cost centers with comparable characteristics
AC = Asset Class

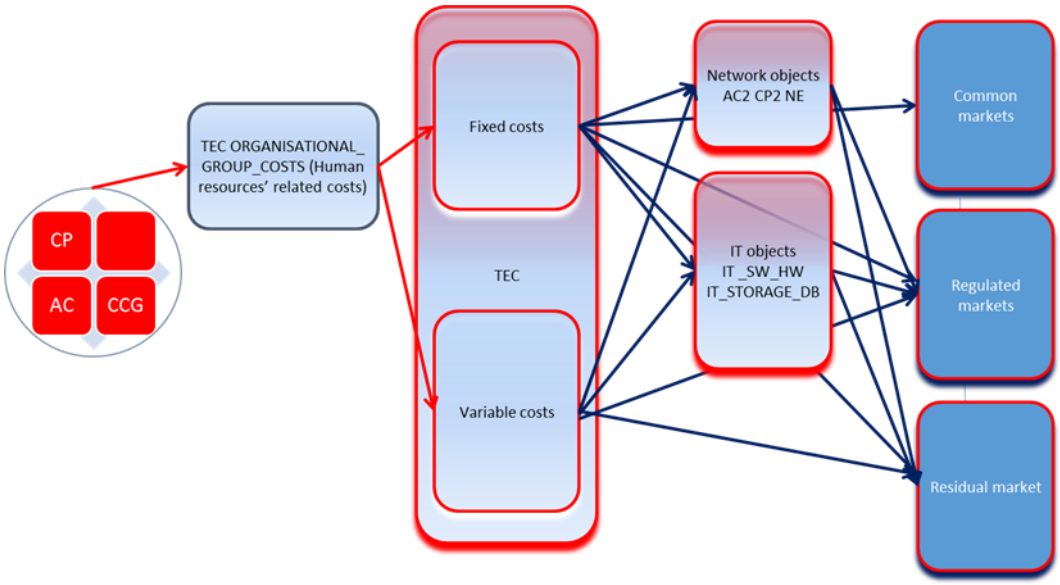


Figure 3: TEC OPEX Flow – General

Figure 4: TEC OPEX Flow – Fix / Var

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5.2 Allocation of TEC OPEX costs not going through the "TEC" TCE module

5.2.1 GL61 accounts – Services and Other Goods (SOG)

The GL accounts in the 61 range mainly register outsourcing, consultancy, renting & maintenance costs as well as miscellaneous costs driven by staff (GSM, memberships, office material, internal events etc.).

The GL61 accounts are at a sufficient detail level to allow for a direct allocation to one of the cost objects of the allocation flow. The destination cost objects are distributed over different allocation modules : CCG_HMC ,CP1,CP2,IT_HW_SW,Market,NE,Life_Cycle,Technology.

5.2.2 GL60 accounts – Material Out of Stock

The GL60 account costs cover the cost of all kinds of material taken out of the stocks of Proximus and used for the repair and provisioning of network or the cost of small items (office material, GSM,…) consumed by the staff in the context of their daily activities.

Note that movements from stock also occur for the construction of the network; these costs are capitalized. From SAP-MM, it is possible to filter out the movements to be capitalized and the others. The capitalized MOS costs are implicitly treated with the assets.

MOS costs are reported at CP/ GL account level per cost center.

This level doesn't always allow an accurate attribution of the costs to the model cost objects and therefore an analysis is performed at the cost base level together with detailed information out of the SAP database .

- The SAP records are reported among other detailed information such as the Material Item Number, where the amounts can be directly attributed to a cost object of the cost model based on the description of the material item.

  The SAP database contains more than 600.000 records.

This analysis results in an allocation towards: network related cost pools (CP1, CP2, NE), CCG_HMC and Lifecycle cost, market and Technology.

Once each material item is attributed to a cost object, it is easy to report an allocation from the CC/GL account aggregate to the model cost objects.

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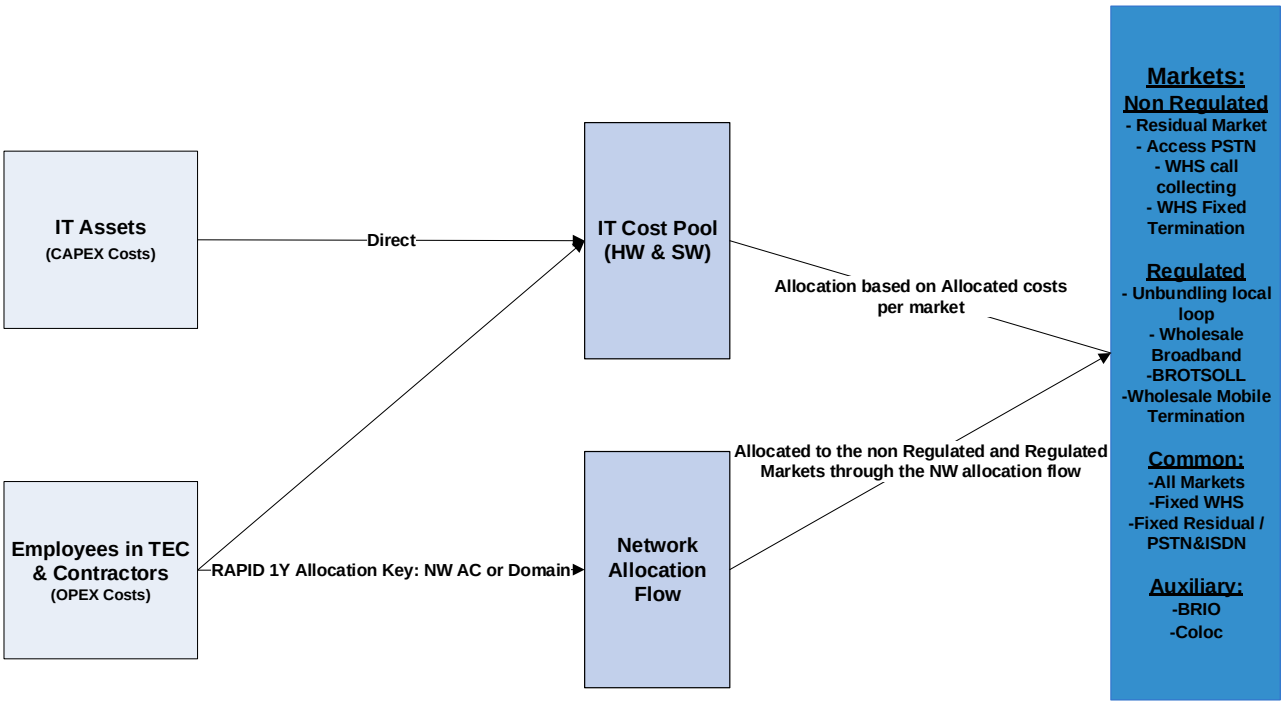
6 IT stream

6.1 IT Allocation flow

6.1.1 IT allocation flow: Introduction

The IT model can be summarized by the following drawing representing the different IT Modules as defined in the IT model, as well as describing objects contained in each of them. The creation of these modules and objects will be detailed in the following paragraphs as well as how they are allocated to each market through an allocation which uses causal and generic keys created with data available in different inventories or reporting systems within the company.

ICT is the use of programs with a specific infrastructure to deliver a requested service or product to the end-user (which can be a Proximus Client or a Proximus Employee/Contractors). In Telecommunications, an incumbent ISP will rarely develop an Application or invest in a project exclusively for one regulated product or market. Most of the time, its specifications will cover multiple usages. Therefore, the goal of this model is to regroup all capitalized and operational costs in order to allocate them to the network allocation flow or the regulated/residual markets



IT Allocation Schematics for 2016

Since 2016, the allocation of IT costs has been rationalized in its scope. This resulted in two main differences compared to last years: the merging of previous modules IT hardware and IT Software into one IT Cost pool and the allocation towards the Market module based on a generic key instead of volumes.

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The allocation stream goal stays the same as it is to link the costs for manpower and infrastructure that are used in order to create, run and maintain applications, components and projects to the markets defined in the regulatory model.

These costs can be of two different types: capitalized and therefore depreciated following accounting rules (for IT, depreciation length is generally 4 or 5 years), or operational and fully charged for the current year. Depending of the cost's nature, the allocation stream will follow different paths (IT, IT&NW and overhead) and use specific inventories and reporting systems in order to create the optimal allocation keys.

6.1.2 Data sources: IT Inventories and Reporting Systems:

Internal IT Databases:

The main database used in the model is the "Configuration Management Database" (CMDB) which populates and links together all IT related objects in Proximus, such as which databases are used by an application, or what is hosted on a server. This is used primarily for incident management. This repository is fed by operational inventories from each category of IT machine.

IT Asset Manager (ITAM) is the inventory for all IT equipment with a reference to its cost and is used by Finance to calculate yearly the costs for IT hardware Assets.

ARIS is a recent initiative to install a business process modeling tool which allows the aggregation of applications and to understand fully their purposes.

Reporting Systems:

Rapid[2] is a tool used for projects, budget and capacity management related processes, with interfaces to other core systems such as SAP HR (human resource & organization units data) , SAP Finance (actuals, purchase order..), IMD (release Management) and timesheets applications (used by TEC to report their day-to-day work). Rapid will be used to calculate allocation keys for most manpower costs for TEC regarding both Capex (allocation of Assets ranging from 2526 to 2573) and Opex. All assets tagged as pure IT are all pooled together in the IT SW HW module.

TM1 is an interface from excel to SAP allowing the extraction of Data coming from Finance and HR. It completes our asset reconstruction for the non-workload costs.

6.1.3 Modules and Objects composing the IT allocation flow

IT Servers

A server is a set of hardware running as a service to serve the needs or requests of others programs or users.

[2] **R**epository for the **A**dministration of **P**rojects and **I**nitiatives in a **D**ecentralized way

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Splitting the server asset between these families was achieved by using the cumulated purchase costs of these families which is provided by Finance. This calculation is made possible by the inventory maintained in ITAM.

IT Assets allocation:

All tagged IT assets that follow are directly allocated to the IT Software and Hardware module.

- **2500 Servers (Inclus. Tandem)**

Servers can be used by applications (software sold by a vendor or developed in-house) and databases or for interconnectivity and security. This asset pools most of servers families used within the company such as Windows, Linux, UNIX, Teradata and Tandem technologies. Accounting distinguishes the following families: Wintel (Windows for Telecommunication), UNIX (with Linux pooled in this family), Teradata and Tandem. Keys are created from Finance inventory analysis in order to allocate costs to each family.

- **2501 Storage:**

Storage is used both as a core business as well as a support for employees and customers. It is required in order to run applications and databases, create backup and archives to save an employee's work or a customer's information (regarding billing or call details records for instance).

- **2502 Mainframe BS2000 HW & 2503 BS2000 Software:**

Mainframes are powerful computing platforms used for critical applications. They can be considered as multiple servers within one machine. Sensitive applications and data that require heavy computing power are hosted on them. It requires specific software to run which costs are pooled in the 2503 BS2000 Software asset. The mainframe park has been updated to the Z-Series manufactured by IBM.

- **2504 IT Internal Network**

IT Internal Network is an asset representing Proximus Intranet, required to support the needs of employees as well as the interconnection needed in order for the different IT objects to communicate.

- **2505 Office Automation**

Office Automation pools IT costs and improves productivity such as development environment, printing servers and Digital Workspace.

- **2506 End user IT Device**

Concerns IT material made available to Proximus employees such as laptops and desktops.

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- **2523 Major Software Application:**

This is a specific asset that pools applicative mobile costs. It contains IT sub-assets as well as some network-related ones due to historical reasons. Timesheets reports from RAPID are used to allocate this asset.

- **2525 Application Software Other:**

"Application Software Other" is an asset for all Capex licenses costs that are not pooled in another IT asset (licenses costs for minor applications for instance). It is heavily related to productivity enhancements and office automation.

- **2526 Applic SW IMA:**

All costs related to the **I**dentify **Ma**nagement (IMA) application are assigned to this asset. IMA identifie all Proximus users.

- **2529 Appl SW Middleware:**

Although named Middleware, this asset is composed of developed applications playing the role of a middleware inside Proximus IT infrastructure. It has to be distinguished from some costs objects in System Software and Application Software Other that also have middleware costs such as Websphere licenses. This asset pools IT domains from:

- A **B**usiness **P**rocess **M**odeler which delivers a process integration platform for enterprise services based on service-oriented architecture.
- A **S**ervice **O**riented **A**rchitecture layer.
- A **S**OA **S**ervices **R**epository to document and describe all SOA services.
- And a **H**ub **C**ontract **S**oftware used as a middleware connectivity tool.

- **2530 Applic. SW PILA:**

Pila Asset is a cluster of applications and components related to the **O**rder handling **M**anagement **S**ystem (OMS) with all its bridges with provisioning systems and a customer relationship management interface with BCI as well. OMS is one of the main contributors to this asset, as is the **N**etwork **P**rovisioning **S**ystem linking OMS with provisioning systems and the **O**rder **F**low **A**pplication (an interface between BCI and OMS). In the process of being phased out and replaced by the MCOM system. (which is accounted in its related sub-asset from the 2547 asset)

- **2531 Applic. SW BCI:**

The Proximus Channel Integration (BCI) is a customer relationship management tool for all call-centers-enabling a real-time customer information input or output in order to improve the feedback a customer receives when calling Proximus helpdesks.

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- **2532 RID(Reference Inventory&Design):**

RID is an asset related to inventories and documentation.

- **2533 Applic. SW_WFMS**

The **W**ork **F**orce Capacity **M**anagement tools (WFM) asset pools all costs related to the automation of the dispatching on the field of all Proximus technicians including a scheduler and reporting system.

- **2534 Applic. SW_UTS**

The **U**nified **T**rouble **T**icketing System (UTS) is a system used in order to register and follow-up trouble tickets pro-actively and reactively.

- **2535 Applic. SW_Cust Relationship Management**

This asset is composed of two applications related to the selling process and are directly linked to CRM: **C**ustomer **S**ales **A**ssistant (CSA) and **C**ustomer **V**alue **M**anagement (CVM).

- **2536 Appl SW COB**

This asset pools costs from the **C**ustomer **O**riented **B**illing system (COB) is a cluster formed from three IT platforms: **C**ustomer **D**ata**B**ase (CDB) **I**ntercarrier **B**illing **I**nformation **S**ystem (IBIS) and the **C**all **D**etails **R**ecords **Flow** (CDRFLOW). Billing data is a sensitive matter for both customers and Proximus and requires real-time redundancy. Therefore, COB applications are hosted on dedicated technology: Tandem servers also called “Non-stop servers”. The CDB Application is retail related, IBIS wholesale related and CDRFLOW applies to both.

- **2537 Appl SW SAP**

The SAP Asset pools all costs coming from all modules used by Proximus. It is a typical business overhead costs.

- **2538 APPL SW-Number Portability**

Number Portability is composed of two main applications called **F**ixed **N**umber **P**ortability (FNP) and **C**arrier **P**re-**S**election (CPS). CPS is an important system as it is an interface with OLO’s requirements to deliver their services.

- **2539 Applic. SW ECA/ECM/VORTAL**

E-**C**hannel **A**pplications (ECA) and **E**-**C**ontent **M**anagement (ECM) are tools to manage and web-enable digital content for consumers (B2C) or enterprises (B2E). These are websites to engage customer relationship in order to conduct e-business via the Proximus websites.

- **2540 APPL SW – ROSY**

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ROSY is a core component of the IT infrastructure as it is the runtime engine for SDH, XDSL and IDTV provisioning and repair.

- **2541 APPL SW – NETCAM**

NETCAM is a dedicated asset for Rosy's workflow engine for SDH (BPEL). This is asset is purely network related and is not allocated to the IT Software and Hardware module. Instead it follows the network allocation stream through the CP2 module.

- **2542 Sales Handling Engine(SHE)**

The **S**ales **H**andling **E**ngine (SHE) is a sales application used as a layer in order to enable convergence between all selling applications so that our vendors and partners will have a global view on all products supplied by Proximus, improving order intake and rationalizing the IT selling infrastructure. Pre-Sales and Sales are activities in the fulfillment process being mostly allocated to the residual market.

2544 APPL SW -IT Security

IT Security asset pools heterogeneous costs that can be related to applications NFM (**N**ew **F**raud **M**anagement), Proximus IT security in general, IMS (Identify and authentify for provisioning engine) to protect user's privacy or overhead costs to protect the IT infrastructure from malicious harm (virus, hackers take-over…)

- **2547 Major software applications**

Major software applications are assets regrouping all new IT developments and applications since 2010.

- **2550 APPL SW ABC**

The **A**ccess **B**ackbone **C**onnectivity asset (ABC) is a core element of Proximus's infrastructure. SRW is an inventory for connectivity and equipment documentation and is used as an interface between IDMS and front-office applications such as OMS, WFM or COB/CDB. Three other core domains are also pooled in this asset: ABR[3] for the local loop connectivity and managing resources and services. ANA[4] (**A**utomated **N**umber **A**ssignment) supports service order provisioning of phone numbers through automation of the attribution of a phone number to a customer. Finally, ITR[5] (**I**nfrastructure **TR**ansmission) is the inventory of Proximus's backbone and optical network covering leased lines, physical equipment, trails, trunks, cables and the multiplexing hierarchy between all these elements. It should be noted that applications grouped in this asset use a special hardware in order to run

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properly as they are all linked to huge databases that require daily processing of data per batches. For the last years, BS2000 mainframes from Fujitsu were used but they were recently replaced by Z-Series from IBM[6].

- **2551 Operational Inventories**

Operational Inventories are applications used to maintain ATM, DSLAM, Ethernet and IP inventories and statistics.

- **2552 GraphDoc**

The Graphdoc asset pools all graphical documentation components which are tools used to create or modify the local loop network documentation. It allows an integration of the Autocad package which is a drawing software.

- **2561 APPL SW – NETCOOL**

Netcool is a software package sold by IBM and developed internally to suit Proximus needs. It is a set of alarms and probes used for monitoring to ensure both a pro-active and reactive service assurance process. It is divided in two main domains: **N**et**c**ool **T**ransmission (NCT) and **N**et**c**ool **D**ata (NCD).

- **2562 APPL SW - e-Health**

E-health is a reporting tool for bilan and is composed of e-health (A-EHT), Provisioning (A-PRO) which is an interface between e-health and umbrella/CMS and oblicore service layer (A-SLR).

- **2563 APPL SW-Customer Remote Support**

Applications used by the helpdesks or customers through the Proximus portal.

- **2566 APPL SW-DIAMON&CORRELATOR**

The diamond (DIA) and Correlator (CRL) asset regroups those two IT domains that enable the monitoring of network alarms. It also creates tickets to respond efficiently to problems.

- **2567 APPL SW – DARE**

DARE stands for **D**iagnose **A**nalyze **R**epair **E**ngine and is the main tool to analyze alarms and probes reports. It diagnoses problems through a root analysis, classifies incident by priority and forwards them to responsible persons for problem resolution.

- **2568 APPL SW-Learning & Mngt Syst.**

[6] One IBM z10 Mainframe is supposedly 1500 times more powerful than regular x86 servers while consuming 85% less power (source IBM).

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The learning management system asset is essentially a component of SAP HR (or SAP LMS for **L**earning **M**anagement **S**ystem).

- **2569 APPL SW-ECRM**

The E-CRM asset contains one application named **G**roup **C**ontent **M**anagement (GCM) which is a platform for contract, records and business process management.

- **2570 APPL SW Business Intelligence Tool**

All costs from the Microstrategy software are sent to the Business Intelligence Tool asset as the main software used by our business intelligence department (which is the Data Warehouse: DWH). It is heavily related to data warehouse and will be grouped with it so that the tools they use are represented in the total cost of the data warehouse.

- **2571 APPL SW ONE-Catalog**

The **Proximus P**roduct **C**atalog is an application that stores advice and information about all products and services. It is heavily used by Proximus Sales divisions and as a service assurance tool for customer care.

- **2573 Appl SW DWH**

The data warehouse department has heavy requirements in terms of hardware and software as it calculates statistics and indicators for Proximus products and network. Data warehouse uses a special hardware from the Teradata technology that helps with the treatment of large data volumes with the possibility for many users to analyze them.

Operational Costs:

There are 4 sources of IT opex costs:

A) Maintenance related:

Maintenance costs are regrouped into 2 different cost pools (G/L 61120 and 61130) on which allocations keys are applied in order to distribute these costs towards servers, IT Software & Hardware module, storage, servers CP2 and NEs.

B) OPEX Wages internal

Internal wages for IT OPEX costs were allocated by the use of the RAPID database. A report by cost centers giving a detailed output of OPEX projects was linked to the cost centers groups from the cost base allowing an allocation from all IT teams to the IT Software & Hardware module.

C) OPEX Contractors Bodyshopping and Fixed price:

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Bodyshoppers and fixed prices contractors are regrouped together and separated from internal employees.

Wages OPEX Costs are allocated using timesheets report from RAPID for the calculation of allocation keys for each cost center within ITS and SPC. Reports are designed in order to regroup OPEX costs based on the allocation it should follow (IT, Network, Overhead).

6.1.4 IT Software and Hardware to Markets

Since 2016, a new methodology is used to allocate IT costs: they are all pooled together based on the principle explained before hand and are allocated to the end objects contained in the Market module based on the total costs per related object.

Sensitivity: Unrestricted

7 Network stream

The network allocation stream is organized around the network investment structure (leading to network functional blocks in the allocation stream). The focus is on Capital Expenditure costs which are directly associated with the network equipment deployed ; these costs originate from the assets accounting system of Proximus and they are gradually cascaded by means of a variety of cost deaggregation keys and a variety of cost drivers up to the telecommunication services. By contrast, the SRW stream focuses on the operating expenditures of the business activities, which are directly allocated to end- markets by means of business drivers.

For the operating costs of the network itself however, an intermediate allocation approach is used : the remuneration costs and the personnel related OPEX costs are associated to typical network activities (as described in Chapter 5) which are finally attributed to network functional blocks . This part is discussed in section 7.3 hereafter.

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7.1 A layered allocation model

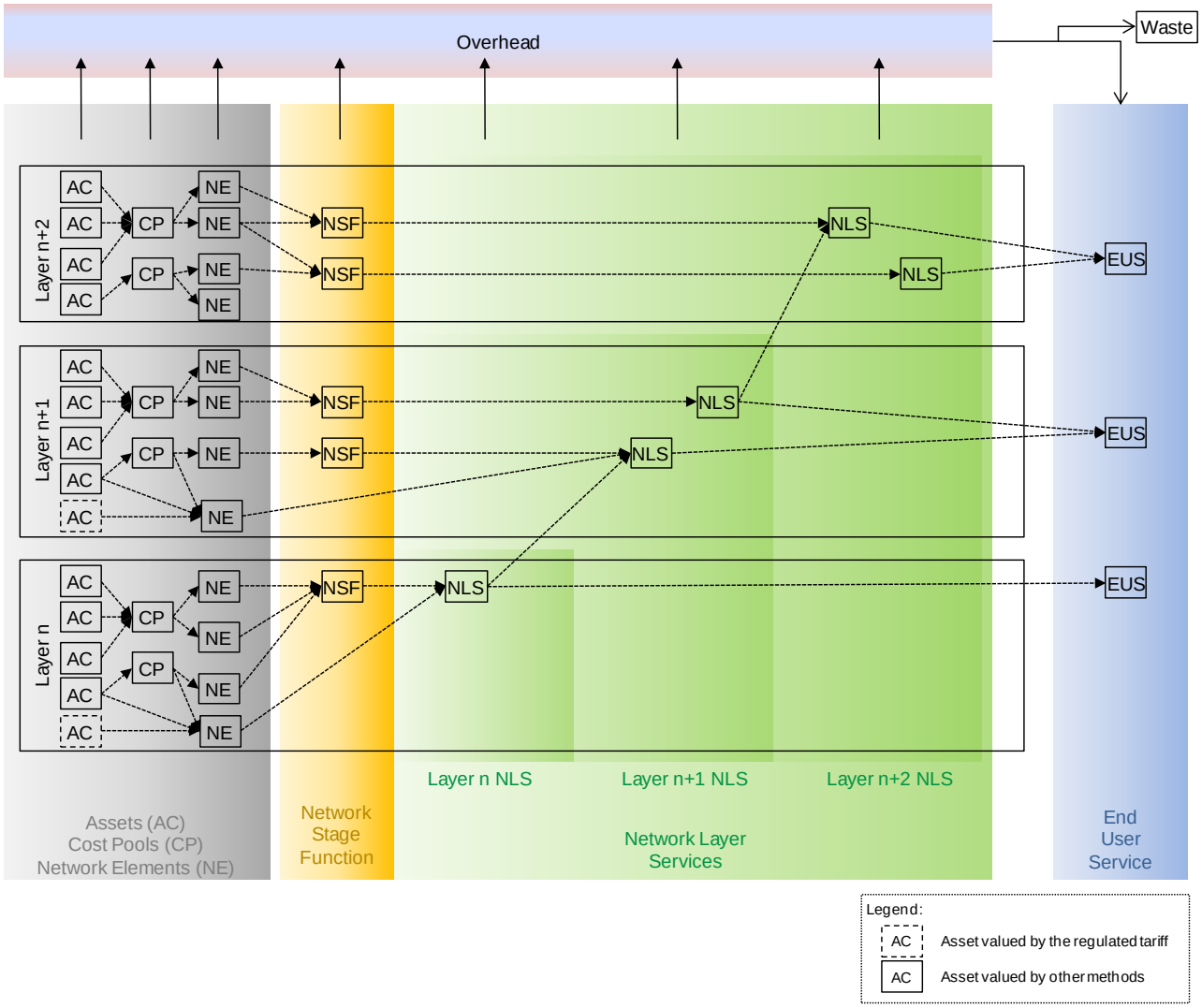

Figure 5: Layered allocation model

It is common practice in the telecommunication industry to separate investments in different logical levels; lower levels corresponding to basic (simple and general purpose) services, higher levels corresponding to complex higher valued and purpose oriented services. The pursued effect of such separation is to promote the reuse of basic lower level services by higher level services thereby bringing in the short term the volumes at each layer to levels that benefit from economies of scale. In the long term, the pursued effect is to benefit also from economies of scope.

The network cost allocation model is designed to reflect the layered functional structure of Proximus's telecommunication infrastructure , each layer offering services to the upper layers. In practice 5 layer levels are represented in the cost allocation model in order to allow each invested technology to be situated at the right level of its contribution in implementing the layer services.

In practice a network equipment may participate to several different layers especially in the interfacing boards towards other network equipment because it acts as a terminating point of lower level layer services.

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To avoid any ambiguity, a network equipment will be considered as belonging to the highest layer implemented in it and operated by it. For the example of the IP router, this simple criterium locates an IP router on the third layer (IP layer) above SDH.

Using this criterium all investments still in service of Proximus's infrastructure are distributed in one of the following layers:

Layer NLS1.0 : Passive infrastructure gathering investments in access copper, in ducts and fibre cables (access and backbone).

Layer NLS2.0 : Active transmission infrastructure based on Time Division Multiplexing technology gathering investments in PDH, SDH.

Layer NLS2.1 : Active data infrastructure based on Packet Based technology gathering investments in Ethernet/MPLS.

Layer NLS2.2 : Mobile backhauling infrastructure

Layer NLS3 : Active data infrastructure based on IP technology gathering IP routers , IPVPN routers.

Layer NLS4.0 : Active application infrastructure based on a variety of technologies gathering applicative equipment like telephony digital switches, VoIP platforms, Intelligent Network platforms, Broadcast TV platforms, Video on Demand platforms.

In the model layers are represented by a number of "standard" services (referred to in the sequel as Network Layer Services – NLS) offered to upper layers or directly used as retail/wholesale products (End User Services – EUS). In turn the services offered by a layer are the result of the combination of layer specific functions (referred to as Network Stage functions – NSF)* and services offered by lower level layers allowing the layer specific functions to interact with each other.

*Note: Except the following Network Elements that receive assets cost valuated by the regulated tariff. Those Network Elements include network stage functionality and directly offer services of the same level as their upper layer services. The driver used is "yearly direct CAPEX cost". The driver "yearly direct CAPEX cost" is in fact a by-product of the valuation exercise done for the assets valued by the regulated BIPT tariff.

For the asset valuation exercise a full integration of all the asset valuation components of the relevant technology was necessary (see paragraph 3.4.2.5.4), but in the case of the calculation of this driver the required aggregation degree is determined by the allocation key to be calculated.

The inventories used as input for the asset valuation contain many details allowing the grouping of the costs components based on any combination of such aspects.

Therefore, the driver "yearly direct CAPEX cost" refers to the sum of all the relevant technology valuation components from the appropriate models that meet the allocation requirements (for example, usage of the link or bandwidth or bandwidth and service span or concerned network layer…).

Due to the method used for the valuation of the SDH, the "yearly direct CAPEX cost" allocation driver for the NE_PDH SDH equipment can't be calculated as referred above. Instead it is calculated as the incremental SDH cost of the service for which the allocation is being computed.

> Incremental costs of one service are those costs that are avoided by not providing that service. See Figure 6 for an example specific to this context, where:

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- the cost incurred by all the SDH services equals the SDH asset value, resulting from running the "consolidated transport BROTSoLL engine" (see paragraph 3.4.2.5.7Transport PDH/SDH valuation) with the full set of services carried over SDH
- the cost incurred by an SDH network carrying all the SDH services except service X is the outcome of the dimensioning and costing done by the "consolidated transport BROTSoLL engine" when having as input all the SDH services but service X.
- the SDH incremental cost for service X is calculated as the difference between the two above costs

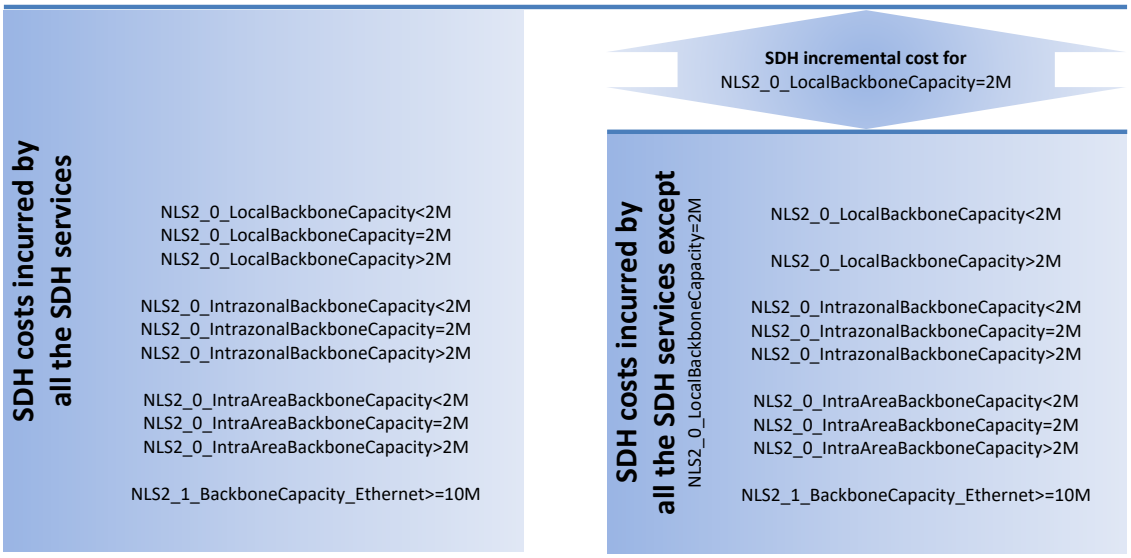

Figure 6: Incremental SDH costs calculation method, an example

NE receiving assets by the regulated tariff	offered services
NE_ADSL equipment	NLS2_1_ADSL_SDSL_Bitstream
NE_NGA Active equipment	NLS2_1_VDSL_Bitstream
NE_NGA Housing	NLS2_1_VDSL_Bitstream
NE_PDH SDH equipment	NLS2_1_LocalTailCapacity_Ethernet>=10M
	NLS2_1_BackboneCapacity_Ethernet>=10M
	NLS2_0_IntraAreaBackboneCapacity<2M
	NLS2_0_IntraAreaBackboneCapacity=2M
	NLS2_0_IntraAreaBackboneCapacity>2M
	NLS2_0_IntrazonalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity=2M
	NLS2_0_LocalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity>2M
	NLS2_0_LocalBackboneCapacity>2M

Sensitivity: Unrestricted

	NLS2_0_LocalBackboneCapacity=2M NLS2_0_LocalTail=2M NLS2_0_LocalTail<2M NLS2_0_LocalTail>2M
NE_Copper_Cables_Distribution	NLS1_0_Copper_Subloop NLS1_0_Raw_Copper
NE_Copper_Cables_Feeding	NLS1_0_Raw_Copper
NE_Copper_Blocks_and_Tie_Cables	NLS1_0_Continue_Raw_Copper NLS1_0_Copper_Localloop_testing NLS1_0_Copper_Subloop_testing
NE_Copper_Splitter	NLS1_0_Copper_Splitter

The use of BIPT Fixed voice NGN cost model enables to define the network element cost attribution to the underlying network stage function per asset category

NE receiving assets by the Fixed voice NGN cost model	attribution
NE_OwnNetwork_CallHandling	NSF_OwnNetwork_CallHandling
NE_Interconnecting_CallHandling	NSF_Interconnecting_CallHandling
NE_Voice_o_Broadband_SBC	NSF_Voice_o_Broadband_SBC
NE_VoiceIP_Router	NSF_VoiceIP_Router
NE_VoiceTrunks_TDM	NSF_VoiceTrunks_TDM
NE_VoiceTrunks_IP	NSF_VoiceTrunks_IP
NE_IP_Voice_Concentrator	NSF_PSTN_Voice_concentrator

The use of BIPT mobile cost model enables to define the network element cost attribution to the underlying network stage function per category of service : voice, data or SMS.

NE receiving assets by the mobile cost model	attribution
NE_RAN	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_GroundAntenna	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_MobileVoiceSwitching	NSF_Mobile_BackBone_Voice NSF_Mobile_BackBone_Data

Sensitivity: Unrestricted

	NSF_Mobile_BackBone_SMS
NE_MobileDataSwitching	NSF_Mobile_BackBone_Data
	NSF_Mobile_BackBone_SMS
NE_MobileLocationRegister	NSF_Mobile_BackBone_Voice
	NSF_Mobile_BackBone_SMS

Layer n--layer n+1 cost allocation mechanism:

Each layer represented in the model produces the defined NLS services with a certain amount of volume (the service amount); this amount is "consumed" by the upper layer services and it is used as a driver to allocate the costs to the consumer services in the upper layers.

Layer cost allocation cascade:

The 5 defined layers are put one after another according to their level generating a cascade of cost allocation mechanism.

Each layer is discussed in a specific chapter of this documentation.

Establishing costs of the Network Stage Functions

The "network stage functions" (NSF) are the direct constituents of a layer, they are intermediate network building blocks providing well defined logical network functions specific to that layer (also called network functional units) . A Network Stage Function can be limited to a node or it can be a cluster (distributed function) corresponding to "network stages". A network stage function is characterized by the amount of function it produces (volume).

Network Stage Functions are implemented in equipment, but the corresponding investment values are not always directly identifiable in the asset structure of Proximus : for example some assets aggregate investments per technology (not per function in the network) , some other do not cover the totality of a given technology due to the history of the accounting asset structure in SAP (reorganization of assets, transfers between assets, closing of asset classes and opening of new ones) .

Different methods are used and combined to constitute the investment costs of Network Stage Functions :

1. Aggregation of assets in a larger asset or a cost pool in order to gather investments of same technology and align them with operational inventories.
2. Deaggregation of cost pools in network elements : this step decomposes cost pools into network elements; a network element corresponds to an entire physical equipment as deployed in the Proximus infrastructure. Operational inventories of pieces of equipment and component prices are used.
3. Direct allocation of assets or cost pools to network elements when the assets or cost pools are directly identifiable with a network element of the model.
4. Composition of the network elements to form a network stage function covering one of the stages.

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The stepwise combination of these methods are discussed in the next section.

7.2 From Assets to Network Stage Functions.

Next table gives the list of the NSF present in the network allocation flow.

Layer_name	NSF_name	NSF description
L1_PASSIVE	NSF_Backbone_FibreConnectivity_express	backbone fibre connectivity of express ring
	NSF_Backbone_FibreConnectivity_Regional&Core	backbone fibre connectivity of regional&Core rings
	NSF_FTTC_FibreConnectivity	fibre connectivity between the central office (LEX) and ROP
	NSF_FTTO_FibreConnectivity	fibre connectivity between the central office (LEX) and customer office
L3_IP	NSF_BroadBand_Public_IP_Collect	Access authentication , data traffic accounting, attribution of public IP address to broadband customers and collection of customer traffic towards public internet service providers
	NSF_BroadBand_VoD_IP_Collect	Access authentication , data traffic accounting, attribution of IP TV address to IP TV customers and collection of IP video customer traffic towards Video On Demand platforms
	NSF_BroadBand_VoIP_IP_Collect	Access authentication , data traffic accounting, attribution of Voice over IP address to VoIP customers and collection of Voice over IP customer traffic towards VoIP platforms
	NSF_Dedicated_Access_to_PrivateIP	connectivity between customer and Proximus IP-VPN network
	NSF_Homegateway	Broadband CPE like b-box
	NSF_IP_security	
	NSF_PrivateIPSwitching	IP-VPN switching
	NSF_PublicInternetSwitching	Public Internet Routing
	NSF_Mobile RAN_Data	Mobile Radio Access function destinated to all Mobile data products
	NSF_Mobile_BackBone-Data	Mobile backbone function destinated to all Mobile data products
	NSF_Mobile_PrepaidData_Services	Intelligent platform services related to prepaid mobile data
L4_IDTV	NSF_BroadcastTV	Broadcast digital television functionalities
	NSF_VoD	Video On Demand (VOD) functionalities and user quality of experience functionalities.
L4_M2M	NSF_Machine_to_Machine	Related to M2M applications, enabling customers to remotely manage their M2M devices in the cloud or gather business data from the devices and to integrate and link it with business softwares.
L4_VOICE	NSF_Automated_call_distribution	intelligent distribution of calls towards call center

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	NSF_Advanced_Number_Translation_CallHandling	Voice Value Added network function
	NSF_CallerIdentity_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_InteractiveVoiceResponse_CallHandling	Voice Value Added network function
	NSF_ISDN_NetworkTermination	Functionalities related to the ISDN network termination equipment
	NSF_Mobile RAN_Voice	Mobile Radio Access function destinated to all Mobile voice products
	NSF_Mobile_BackBone-Voice	Mobile backbone function destinated to all Mobile voice products
	NSF_Private_Communication_Call_Handling	Intelligent platform service related to mobile closed user groups and virtual private networks
	NSF_Mobile_PrepaidTraffic_Services	Intelligent platform services related to mobile voice prepaid traffic
	NSF_NumberPortability_CallHandling	telephony ported number realtime translation
	NSF_OtherAdvanced_CallHandling	Voice Value Added network function
	NSF_PairGainSystem	Analog line multiplexing functions, used to concentrate narrow band analog signals on customer pairs to a 2Mb/s digital signal on a few feeding copper pairs. This is however an old technology not compatible with broadband.
	NSF_PSTN_Voice_concentrator	Aggregation of PSTN voice calls towards NGN IP Platform
	NSF_Public_NumberPortability_Database	telephony ported number repository
	NSF_Service_Announcements_Playing	Functionalities in order to announce to callers any requested value added services.
	NSF_Televoting_CallHandling	Voice Value Added network function destinated to Business customers
	NSF_VirtualPrivateNetwork_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_Voice_call_CAE_charging	generation of call detail records for interoperator voice traffic accounting
	NSF_Voice_call_CAE_Processing	handling of voice calls at transit level
	NSF_Voice_call_CAE_Trunks	multiplexing/demultiplexing voice circuits at transit level
	NSF_VoiceTrunks_TDM	multiplexing/demultiplexing voice circuits generated/terminated
	NSF_VoiceFeatures_SelfManaging	Voice Value Added network function destinated to residential customers
	NSF_Voicemail&Messaging	Voice Value Added network function destinated to residential customers
	NSF_WakeUp_CallHandling	Voice Value Added network function destinated to residential customers
L4_Messaging	NSF_Mobile RAN_SMS	Mobile Radio Access function destinated to all Mobile SMS products
	NSF_Mobile_BackBone-SMS	Mobile backbone function destinated to all Mobile SMS products
	NSF_SMS_Services	Intelligent platform service related to mobile SMS

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L4_WEB	NSF_EServices	NSF gathering SDE workload related to the E-services.

Investment costs of Proximus SA assets are mapped to these NSF, except investments related with network administration, and some other that cannot be related to any current product or service. The exceptions are not filed into the network allocation cascade, but are allocated like an overhead cost (i.e. with no direct causality) to a range of End User Services (depending on the kind of overhead cost) proportionally to the cascaded costs on these EUS.

Mapping asset cost sources to Asset objects of the model AC2

Network assets are 1-to-1 allocated to a homonymic AC2 object except for the 7 voice switching assets which are aggregated in AC2_TDM_Voice_Switching_Equipment.

Mapping AC2 objects to cost pools or Network elements

AC2 Aggregation.

At this stage, AC2 asset objects are aggregated into cost pools, network elements, overhead objects and eventually end user services (costs marginal end user services, or direct waste).

The aggregations into cost pools serve to form technology pools for which operational inventories can be queried for various statistics that are further used to decompose into network elements. The technology pools typically are (D)WDM equipment, Copper Cables, Broadband (xDSL) equipment, SDH equipment , PDH equipment, Ethernet equipment etc. Those cost pools include also the OPEX of SDE.

The aggregation into network elements concerns assets that are already a network element, and it serves also to gather assets that are individually more detailed than the definition of network elements and that can be easily associated to a network element. Typical examples are IP-VPN assets , broadcast TV assets, Analog Multiplexers, Metallic line testing assets etc.

AC2 Deaggregation.

By contrast, a set of AC2 assets are decomposed (deaggregated) into cost pools, Network elements, waste pool and marginal end user services.

Among these, some assets collect investments on network administration (Hardware and software supervision platforms) and on value added services platforms (IN, messaging, voice mail etc.): they need to be decomposed into the network technologies they supervise and into the value added service categories.

⇨ The driver used is the “cumulatedInvestedAmount” per technology obtained after deep analysis of historical investment data (TM1 financial reporting tool).

The asset 1680 “TPT-BBN-infra.elect/mécan in transmis rooms” collects internal cabling within technical buildings and is decomposed essentially into the following cost pools CP_Backbone_Coax_cabling, CP_Backbone_Optical_cabling, CP_(D)WDM_equipment and EUS_notAllocated (internal cabling of xDSL, switching and AGW equipments in LEX included in assets valued using the Proximus Reference Offer tariffs).

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- ⇨ The driver used is the “Current annualized cost” of the cost pools , calculated from a diversity of constituent volumes and corresponding prices (coax/fibre cables, connectors, copper pair cables , cable ways,etc) . The main volumes are extracted from the infrastructure inventory database (ITR), other volumes are derived under assumptions.

The AC2_TDM_VoiceSwitching_Equipment asset is considered as fully outphased and replaced by MEA AC2_20115 FixedVoice_NGN_Platform. This asset is valued based on BIPT Fixed Voice NGN platform cost model.

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Deaggregation of cost pools into network elements

In performing the previous steps cost pools are introduced in the model. They are now deaggregated into different Network Elements by means of following drivers:

cost pool	driver name	Deaggregated Network elements
CP_(D)WDM_equipment	Yearly Direct CAPEX Cost	regional&core DWDM network elements and express DWDM network elements
CP_Backbone_Optical_cabling	Nbr_Connections	pre-allocated to all inside network elements using fibre cabling
CP_Backbone_Coax_cabling	Nbr_Connections	pre-allocated to all inside network elements using coax cabling
CP_Copper_Burried_Cables&Splices	yearly direct CAPEX cost	distribution cables, feeding cables network
CP_DSLAM	yearly direct CAPEX cost	xDSL ATM based network elements and VDSL Ethernet based network elements
CP_Ducts&Manholes	Trenches cumulated length (km)	Ducts& manholes for Next Generation Access, Ducts & manholes for corporate /complex nodes in access
CP_EthernetMPLS_equipment	Yearly Direct CAPEX Cost	Ethernet Ports, Ethernet/MPLS switches
CP_Optical_Fibre_Cables	kmxfibre	Fibre cables for Next Generation Access, Fibre cables for corporate/complex nodes in access
CP_OSS_VoiceTraffic	fair split	Collecting, terminating and transit of voice network elements
CP_SDH	Yearly Incremental Cost	
CP_TDM_VoiceDigital_TransitUnit	Direct	Voice transit elements
CP_Mobile_RAN	Yearly capitalized manpower cost	Mobile Radio Access network, Ground antenna
CP_Mobile_Backbone	fair split	Mobile Voice and Data switching elements

From Network elements to Network Stage Functions

The previous steps populate the cost model with Network Elements. In the next step, they are allocated to the Network Stage Functions.

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7.3 End User Services

The network allocation model terminates when all network stage functions (or NEs) have been allocated to network layer services and when network layer services have been combined into a user level telecommunication service, the End User Service.

The End User must be understood as the telecommunication service party that will pay for the service. In case of a retail service the user is identical to the service consumer (residential service) or to the service provider (business service) , in case of wholesale service , the user is in principle another licensed operator , or a network service provider.

Being composed of network layer services, End User Services may emanate from different levels of network layers since interconnection between network operators is being unbundled . For retail services , the end user telecommunication services may arise from different layers : the more a service is oriented for a specific usage the higher the level of network layers involved. For example IP services are less usage oriented than voice telephony, the latter being a layer 4 service, the former a layer 3 service.

The End User Services represented in the model are listed hereunder.

End User Service Layer	Market	End User Service Name
L1_passive	**InterConnect**	EUS_Raw copper subscription
		EUS_Shared pair subscription
L2_packetBased	**InterConnect**	EUS_BROBA_EndUserLine subscription
		EUS_wholesale transport WBA subscription
	retail	EUS_X25
	Retail&Wholesale	EUS_Ethernet_Backhaul
L2_TDM	**InterConnect**	EUS_BROTSOLL_segment<2M
		EUS_BROTSOLL_segment>2M
		EUS_BROTSOLL_segment2M
	Retail&Wholesale	EUS_LL <2M subscription - International
		EUS_LL <2M subscription - National
		EUS_LL >2M subcription- National
		EUS_LL >2M subscription - International
		EUS_LL 2M subscription - International
		EUS_LL 2M subscription - National
		EUS_LL_Analog National Subscription - National
	Wholesale	EUS_Nat IC-Infra Wholesale subscription
L2_TDM&L1_ActiveAnalog	**Retail&Wholesale**	EUS_Trans LAN subscription
L3_IP	**retail**	EUS_BGC Mobile_Roaming Out data
		EUS_Homegateway
		EUS_Mobile_Data national
	Retail&Wholesale	EUS_DataManagedServices
		EUS_FastInternet subscription
		EUS_Private_IP&Ethernet_on_asymmetric subscription - National

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		EUS_Private_IP&Ethernet_on_backup
		EUS_Private_IP&Ethernet_on_international Subscription
		EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
		EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National
	Wholesale	EUS_ADSL_Carrier_wholesale subscription
		EUS_Mobile_Roaming IN_Data
		EUS_VDSL_Carrier_wholesale subscription
L4_iDTV	**retail**	EUS_IDTV_subscription
L4_M2M	**retail**	EUS_Machine_to_Machine
L4_messaging	**InterConnect**	EUS_SMS_inbound_intal
		EUS_SMS_inbound_national
	retail	EUS_SMS_on_net_national
		EUS_SMS_outbound_intal
		EUS_SMS_outbound_national
		EUS_SMS_Roaming_OUT_Origination
		EUS_SMS_Roaming_OUT_Termination
	Wholesale	EUS_SMS_Roaming_IN_Origination
		EUS_SMS_Roaming_IN_Termination
L4_voice	**all**	EUS_AUTOMATEDCALLDISTRIBUTION
	InterConnect	EUS_Carrier PreSelection
		EUS_voice_traffic_Fixed_inbound_intal
		EUS_voice_traffic_Fixed_inbound_intal_VAS
		EUS_voice_traffic_Fixed_inbound_national
		EUS_voice_traffic_Fixed_inbound_VAS_national
		EUS_voice_traffic_Mobile_inbound_intal
		EUS_voice_traffic_Mobile_inbound_intal_VAS
		EUS_voice_traffic_Mobile_inbound_national_from FOLO
		EUS_voice_traffic_Mobile_inbound_national_from MOLO
		EUS_voice_traffic_Mobile_inbound_VAS_national
	retail	EUS_Astrid
		EUS_voice_traffic_Fixed_on_net_national
		EUS_voice_traffic_Fixed_on_net_to Mobile_national
		EUS_voice_traffic_Fixed_on_net_VAS_national
		EUS_voice_traffic_Fixed_outbound_intal
		EUS_voice_traffic_Fixed_outbound_intal_VAS
		EUS_voice_traffic_Fixed_outbound_national_to FOLO
		EUS_voice_traffic_Fixed_outbound_national_to MOLO
		EUS_voice_traffic_Fixed_outbound_VAS_national
		EUS_voice_traffic_Fixed_transit_intal
		EUS_voice_traffic_Fixed_transit_national
		EUS_voice_traffic_Mobile_on_net_to Fixed
		EUS_voice_traffic_Mobile_on_net_to Mobile
		EUS_voice_traffic_Mobile_on_net_VAS_national
		EUS_voice_traffic_Mobile_outbound_intal
		EUS_voice_traffic_Mobile_outbound_intal_VAS

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		EUS_voice_traffic_Mobile_outbound_national_to FOLO
		EUS_voice_traffic_Mobile_outbound_to MOLO
		EUS_voice_traffic_Mobile_outbound_VAS_national
		EUS_voice_traffic_OPS
	Retail&Wholesale	EUS_Business voice channels - subscription
		EUS_ISDN-BA Access - subscription
		EUS_PSTN Access - subscription
	Wholesale	EUS_voice_traffic_Mobile_Roaming_IN_Origination
		EUS_voice_traffic_Mobile_Roaming_IN_Termination
		EUS_voice_traffic_Mobile_Roaming_out_Origination
		EUS_voice_traffic_Mobile_Roaming_out_Termination
L4_Web	**retail**	EUS_Eservices

Copper Termination

The network element Copper Termination groups costs related to fieldwork performed in the copper access network in order to realise broadband connections for end-users. These activities are mainly situated at the MDF, SC and the introduction up to the Network Termination Point (included).

7.4 Network services of the passive infrastructure layer : NLS1.0

7.4.1 Definition

This layer deals with the physical end-to-end connectivity between customers and the central sites (access), the physical connectivity inside the central site between access equipment and the physical connectivity between central sites (backbone).

Access Physical connectivity services (see Figure 7***):***

- NLS1_0_Continue_Raw_Copper : internal cabling for copper connectivity from Main Distribution Frame or broadband splitter equipment to other access active equipment like voice switches, leased lines access equipment, collocated access equipment (of other licensed operators).
- NLS1_0_Copper_Localloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper loop.
- NLS1_0_Copper_Splitter : resources to split the narrowband and broadband copper physical signal.
- NLS1_0_Copper_Subloop : end-to-end copper connectivity from the network termination point at the customer premises to a delivery point in the street (street cabinet).
- NLS1_0_Copper_Subloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper subloop.

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- NLS1_0_Raw_Copper : end-to-end copper connectivity from the network termination point at the customer premises to the Central site.
- NLS1_0_CentralOffice2Office_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and corporate customers office buildings .
- NLS1_0_CentralOffice2Office_Fibre : end-to-end fibre connectivity between the central sites and corporate customers office buildings or between central sites and Proximus mobile sites.
- NLS1_0_CentralOffice2RemoteOpticalNode_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.
- NLS1_0_CentralOffice2RemoteOpticalNode_Fibre : end-to-end fibre connectivity between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.

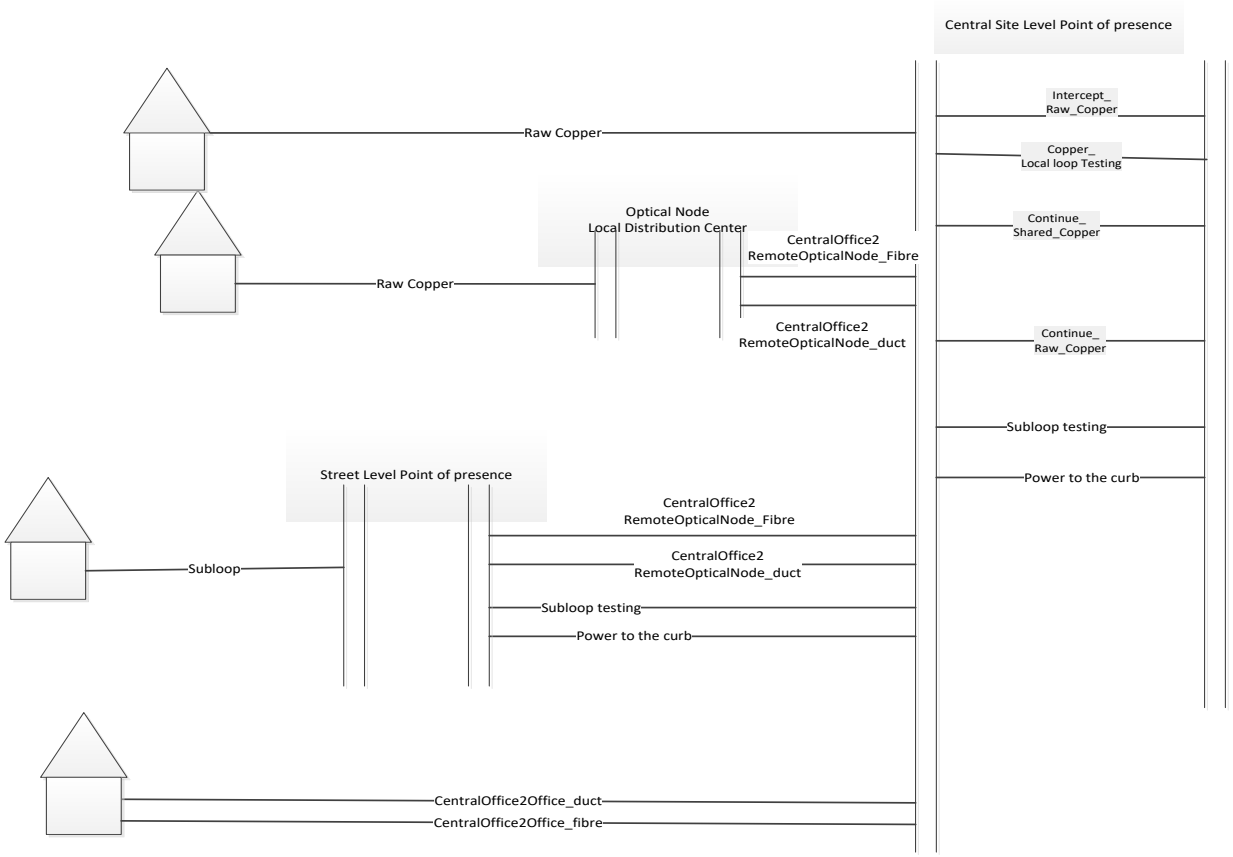

Figure 7: Access Physical connectivity services

Backbone Physical connectivity services

- NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core: end-to end fibre connectivity (fibre cables and duct and trenches) for SDH transmission networking between nodes

Sensitivity: Unrestricted

belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.

- NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Express : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the express (national level) network. These nodes correspond to the largest cities in the country.

7.4.2 Usage of the passive infrastructure

The physical connectivity services of this layer are used by upper layers in order to interconnect their specific equipment. The costs are distributed to the service users according to "consumption drivers" as listed in the table below.

Network layer Service	Driver	Service consumers
NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, BRUO Shared Pairs
NLS1_0_Copper_Localloop_testing	nbr of lex based broadband connections without voice	Broadband bitstream layer 2.1 services
NLS1_0_Copper_Splitter	Nbr of used shared pairs	BRUO Shared pairs
NLS1_0_Copper_Subloop	Direct	VDSL bistream layer 2.1 service
NLS1_0_Copper_Subloop_testing	Nbr of used pairs	VDSL bistream layer 2.1 service
NLS1_0_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, Broadband Bitstream layer 2.1 service
NLS1_0_CentralOffice2RemoteOpticalNode_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2RemoteOpticalNode_Fibre	Nb_access_fibres_used	
NLS1_0_CentralOffice2Office_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2Office_Fibre	Nb_access_fibres_used	
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)	Backbone services (leased lines/backhaul and Broadcast) delivered by the SDH equipment at regional and core level.
NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)	Regional&Core backbone services of layer 2.1 (Ethernet transport, unicast and multicast)
NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)	Express backbone services of layer 2.0 (leased lines) and layer 2.1 (Ethernet)

Sensitivity: Unrestricted

7.4.3 Contributors to the passive infrastructure layer

7.4.3.1 *Access*

The objective of the access network is the delivery of a connection between our customers and our telecommunication network where all services are implemented.

Copper infrastructure:

The access network services of the copper passive infrastructure layer are based on several network elements valued using the BIPT regulated cost price, as listed below. For these network elements, there is no change in the valuation methodology compared to previous model. As in the previous models, the former network element NE_Copper infrastructure has been split in several subparts, in order to enable the fix/variable analysis of the model results .

- ✓ NE_Copper_Cables_Distribution

  copper distribution pairs and access to distribution pairs in street

- ✓ NE_Copper_Cables_Feeding

  copper feeding pairs and access to feeding pairs in street and central site

- ✓ NE_Copper_Blocks_and_Tie_cables

  copper local loop testing for broadband customer connections without voice at the central site,

  copper subloop testing for ROP based VDSL customer connections without voice,

  continue copper feeding pairs based on the number of shared pairs in service,

  continue raw copper for all other copper pairs in use.

- ✓ NE_Copper Splitter

  For the BRUO shared pairs in service.

NSF_PSTN_Voice_concentrator:

Attributed to :

- copper local loop testing based on the number of broadband without voice customers connections at the central site,
- copper subloop testing for VDSL without voice customer connections at the street cabinet,
- PSTN Access based on the number of subscriptions

Customer connections without voice are connected to the Access Gateway (AGW) equipments in order to perform remote testing of the line.

Sensitivity: Unrestricted

Access Fibre Infrastructure:

The costs of the fibre deployed in the access network have been separated in the civil works related costs producing duct routes, and in the cable related works producing fibre connectivity inside the duct routes. Civil work related costs and cable related costs are subject to different assets within Proximus's asset accounting and can easily be identified. These assets do not distinguish the investments realized for connection of customer sites, mobile sites or remote optical nodes (at subtending level and street cabinet level). Therefore two drivers are used :

1. Kmxfibre : to separate the fibre cable costs between customer/mobile sites and remote optical sites
2. Amount km routes to physical sites : to separate the civil works costs between customer/mobile sites and remote optical sites .

Yielding following objects :

NSF_CentralOffice2RemoteOpticalNode_FibreCables

NSF_CentralOffice2Office_FibreCables

NSF_CentralOffice2RemoteOpticalNode_Track

NSF_CentralOffice2Office_Track

7.4.3.2 *Backbone*

The backbone fibre connectivity services are realized by the following Network Stage Functions embodying the resources in the fibre outside plant (ducts&manholes, and fibre cables):

- NSF_Backbone_FibreConnectivity_Regional&Core
- NSF_Backbone_FibreConnectivity_express

NSF	Driver	NLS1_0
NSF_Backbone_FibreConnectivity_express	**direct**	NLS1_0_Fibre_connect_Backbone_DWDM_Express
NSF_Backbone_FibreConnectivity_Regional&Core	**fair split of fixed cost**	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core

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7.5 Network services of the transmission infrastructure (NLS2_0)

7.5.1 Definition

This layer deals with the transmission services between customer sites and the Proximus Offices (access) also called local tail for leased lines , and it deals also with the transport segments services (also called backbone leased lines segments and backhaul capacity) between Proximus Offices (backbone).

The national wide transmission infrastructure collects transmission traffic in three aggregation stages: local level aggregation (circ 600 locations) , zonal level aggregation (circ 36 locations) , area level aggregation (20 locations) (see Figure 8: Transport Segments). Traffic at each stage can be cross-connected allowing to create transport segments from any location to any location.

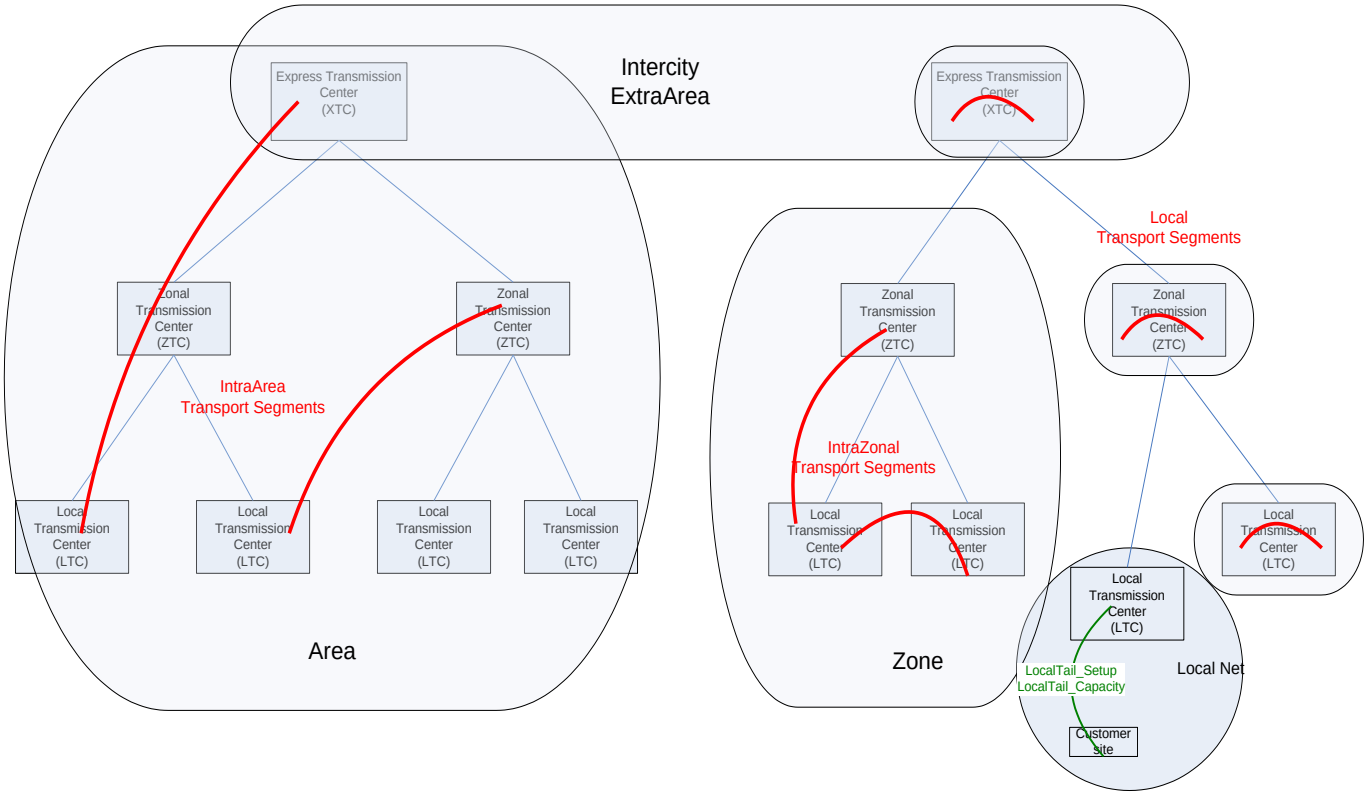

Figure 8: Transport Segments

Access services

The access services deliver the transmission between the customer site and the Proximus Office (access).

They capture costs related to the physical_dedicated link between the customer site and the central office and the equipment needed to activate the link in a capacity category.

Sensitivity: Unrestricted

Backbone services:

The backbone transport segments are classified in capacity (or bandwidth) categories -<2Mb/s, 2Mb/s, >2Mb/s- combined with distance categories -intraarea > intrazonal > local- depending on the end point situation in the aggregation hierarchy (see Figure 8).

The following NLS2.0 services are present in the model:

Network Layer 2.0 service
NLS2_0_LocalBackboneCapacity<2M
NLS2_0_LocalBackboneCapacity=2M
NLS2_0_LocalBackboneCapacity>2M
NLS2_0_IntrazonalBackboneCapacity<2M
NLS2_0_IntrazonalBackboneCapacity=2M
NLS2_0_IntrazonalBackboneCapacity>2M
NLS2_0_IntraAreaBackboneCapacity<2M
NLS2_0_IntraAreaBackboneCapacity=2M
NLS2_0_IntraAreaBackboneCapacity>2M
NLS2_0_InterCityBackboneCapacity<2M
NLS2_0_InterCityBackboneCapacity=2M
NLS2_0_InterCityBackboneCapacity>2M
NLS2_0_LocalTail<2M
NLS2_0_LocalTail=2M
NLS2_0_LocalTail>2M

7.5.2 Usage of the transmission infrastructure

The NLS2_0 Local tail services are used to bring transmission capacity to the customer sites and they are thus directly involved in leased line services between two customer sites, leased lines to data services, backhaul services to other licensed operators and monitoring of the access network.

The costs of these access services are distributed according to the number of customer sites per bandwidth category (driver name: “Nbr_of_Customer_sites”), whereas the backbone services costs are further allocated according to their bandwidth (driver name: “Bandwidth consumed (Mbit/s)”).

The model elements receiving costs from this network layer are exhaustively presented in the following table.

	Upper layer consumer or end user service
Backbone Virtual Paths (VP)	NLS2_1_Backbone_VirtualPath_InterArea
	NLS2_1_Backbone_VirtualPath_IntraArea
Proximus mobile	NLS2_2_Mobile_Access_Backhaul_Abis
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS2_2_Mobile_Backbone_Backhaul
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet

Sensitivity: Unrestricted

	NLS2_2_Mobile_Access_Backhaul_IuB
	NLS4_0_MobileTerminatingLinks
Proximus testing environments	OVH_Lab
Broadband access to public IP switching	NLS3_ADSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
Data services backbone (IP-VPN)	NLS3_Private_IP&Ethernet_Routing
Internal Proximus network	OVH_InternalCommunicationNetwork
	OVH_InternalIPNetwork
International access to data services (IP-VPN)	EUS_Private_IP&Ethernet_on_international Subscription
Leased line access to public IP switching	NLS3_Public_IP_Extension_on_symmetric
Leased line accesses to data services (IP-VPN)	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
Other	Business Overhead
	EUS_DataManagedServices
	EUS_Subsidiaries
	NLS4_0_VAS_signaling
	NLS4_1 BVAS - BGC Fixed
Public IP switching	NLS3_Public_IP_switching
Regulated broadband services	EUS_BROBA_accessLine
	NLS2_1_ADSL_SDSL_Bitstream
Regulated wholesale segments	EUS_BROTSOLL_segment<2M
	EUS_BROTSOLL_segment>2M
	EUS_BROTSOLL_segment2M
Retail&Wholesale leased lines	EUS_international_switchingTrunk
	EUS_LL <2M subscription - International
	EUS_LL <2M subscription - National
	EUS_LL >2M subcription- National
	EUS_LL >2M subscription - International
	EUS_LL 2M subscription - International
	EUS_LL 2M subscription - National
	EUS_LL_Analog National Subscription - National
	EUS_X25
Telephony access	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV services	NLS4_0_BroadcastTV
	NLS4_0_iDTV
Voice services in backbone	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC

Sensitivity: Unrestricted

	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
Wholesale transport capacity	EUS_Bandwidth_Wholesale subscription
	EUS_Nat IC-Infra Wholesale subscription

7.5.3 Contributors to the transmission infrastructure

7.5.3.1 *Local Tail*

A local tail transmission service is made of equipment installed at the customer premises extracting the digital signal from the physical line, of a physical link between the customer site and the central office and of grooming equipment in the central office (or subtended optical nodes).

Depending on the bandwidth of the local tail different equipment technologies are installed: PDH on copper , PDH on fibre or SDH on fibre. For the high bandwidth cases (>2Mb/s) a fibre based technology is required whereas for lower bandwidths the choice between fibre and copper technologies exists. However, since fibre local links are much more expensive than copper links, the preferred option for low bandwidth local tails is the copper based solution.

	Contributor to NLS2_0	**Driver name**
Equipment	NE_PDH SDH equipment	Yearly Incremental Cost
Physical inks	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

7.5.3.2 *Transport Segments*

Transport segments are realised by configuring the SDH clusters in different network stages. The transmission aggregation levels introduced hereabove (section 7.5.1 and Figure 8) are realised by different SDH clusters (regional, core and express SDH rings) interconnected by digital-crossconnects. The SDH rings are made of add-drop multiplexers deployed in LTC for the regional ones, in ZTC for the core ones and in the XTC for the express ones. The equipments within a ring are linked by fibre or by an optical wavelength.

To summarize, the building blocks for the transport segments are:

Contributor to NLS2_0	**Driver name**
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)
NE_PDH SDH equipment	Yearly Incremental Cost
NE_Express_SDH_equipment	Bandwidth (Mbps)

Sensitivity: Unrestricted

7.6 Network services of the packet based infrastructure (NLS2_1)

7.6.1 Definition

This layer deals with the data collection services (broadband or dedicated) between the customer and the central office (access) and the transport of data central office (backbone) . Two technologies coexist as well in the access part as in the backbone part : ATM technology and Ethernet/MPLS technology. Next picture summarizes the end point locations of packet based services. Remark : ATM is outphased and is no longer valuated.

This layer also integrates point to point dedicated Ethernet transparent connections delivered over the DWDM national backbone.

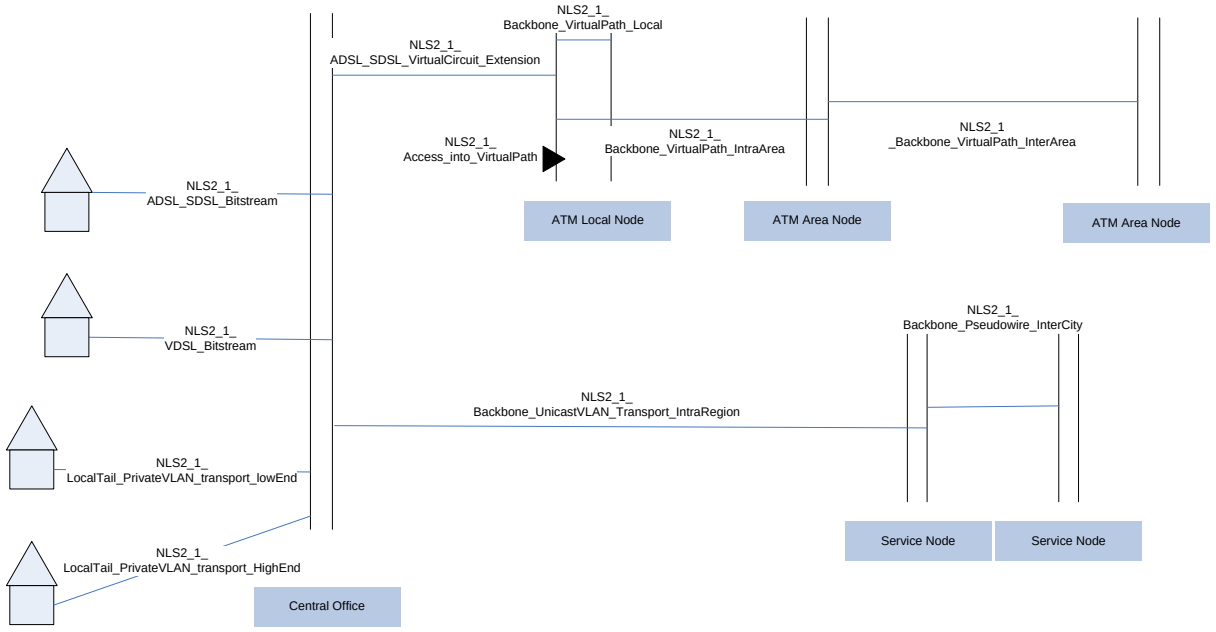

Figure 9: Network services of the packet based infrastructure 2.1

Access part

Layer 2.1 access service	Comment
NLS2_1_ADSL_SDSL_Bitstream	Broadband (ADSL-SDSL) end to end data streams between customer site and aggregation point in central office
NLS2_1_VDSL_Bitstream	Broadband VDSL end to end data streams between customer site and aggregation point in central office
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Ethernet symmetric dedicated link with central office over copper

Sensitivity: Unrestricted

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	Ethernet symmetric dedicated link with central office over fibre
NLS2_1_LocalTailCapacity_Ethernet>=10M	High bandwidth transparent Ethernet frame transport between customer and central office (BLES local tail)
NLS2_1_LocalTail_Eline_HighEnd	Ethernet symmetric dedicated link with central office

Backbone part

For data transport between central offices, the end point locations of the layer 2.1 services depend on the technology, the underlying networks having different topologies.

For the Ethernet/MPLS technology , the following services are defined:

Layer 2.1 Ethernet transport service	Comment
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	MPLS Transport of Ethernet VLANs between a central office and the service node of the region. These VLANs are unicast
NLS2_1_Backbone_Pseudowire_InterCity	MPLS Transport of Ethernet VLANs between service nodes of different regions. These VLANs are unicast
NLS2_1_Backbone_MulticastVPLS_IntraRegion	

Eventually , the dedicated Ethernet transparent connections also introduce backbone connectivity services :

Layer 2.1 Ethernet transparent transport	Comment
NLS2_1_Intra/InterZonalBackboneCapacity_Ethernet>=1G	Any combination of end points different that of the two of them being express transmission centers, bandwidth of 1/10Gbps.
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	End points are between two express transmission centers, bandwidth of 1/10Gbps.

7.6.2 Usage of the data packet infrastructure

The access services of the data packet infrastructure are combined with the data packet backbone services to deliver end-to-end connectivity between IP appliances at customer site (IP router in ADSL/VDSL modems, private LAN IP routers) and IP service nodes , primarily the broadband access servers and the IPVPN routers offering layer3 services like ADSL/SDSL IP collection, VoD IP collection, Private VLAN extensions up to IPVPN nodes.

Next table summarizes the drivers used expressing how NLS2.1 contribute in layer 3 services or directly to End user services.

NLS2.1 service	Driver Name	Upper layer services "consuming" NLS2.1 services

Sensitivity: Unrestricted

NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines	BROBA end user line, all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines	all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)	Symmetric accesses to IPVPN and BROBA access line
NLS2_1_Backbone_MulticastVPLS_IntraRegion	direct	For television
NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps) The PeakBandwidth is a realistic estimation (based on measurements in the network) of the traffic (Mbps) during peak hour.	Broadband public IP NLS3 service, VoIP , Broadcast TV, and private IPVPN routing.
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)	Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing, Ethernet backhaul and WBA transport.
NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps	BROBA transport, Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing
NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	BLES EUS services, High capacity accesses to IPVPN, IP-VPN routers interconnection, internal networks routers interconncetion
NLS2_1_IntraZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_InterZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)	
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	direct	Access to IPVPN layer 3 services
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	direct	Access to IPVPN layer 3 services

Sensitivity: Unrestricted

7.6.3 Contributors to the data packet infrastructure services

NLS2_1_ADSL_SDSL_Bitstream is the result of the central office (the Proximus technical building closest to the end customer) based network element NE_ADSL equipment. That function interacts with the broadband CPE equipment (at the customer site) by means of copper connectivity and potentially fiber connectivity to optical subtended nodes.

The Ethernet based layer 2.1 services (NLS2_1_Backbone_Uni/MulticastVPLS_IntraRegion and NLS2_1_Backbone_Pseudowire_InterCity) are implemented by the configuration of the Ethernet/MPLS network elements interacting with each other using lower layer connectivity services (see picture Figure 10).

NLS2_1_VDSL_Bitstream is the result of the function present in the deployed VDSL equipment (network elements NE_NGA Active equipment and NE_NGA Housing).

That function interacts with the broadband CPE equipment (at the customer site) by means of copper and fibre connectivity.

NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion is the result of the Ethernet/MPLS unicast function present in the deployed Ethernet equipment. The function is activated in different locations to form aggregation clusters, whose links are mainly deployed on DWDM and in a limited number by direct fibre connectivity. The NLS2_1_Backbone_Pseudowire_InterCity and the NLS2_1_Backbone_MulticastVPLS_IntraRegion are implemented in the exact same way.

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd_or LowEnd and
NLS2_1_LocalTail_Eline_HighEnd are the result of customer sited Ethernet equipment and the connectivity to the Proximus network. Such connectivity consists of a fibre based link for the high end cases and of a copper based link in the low end situation.

Sensitivity: Unrestricted

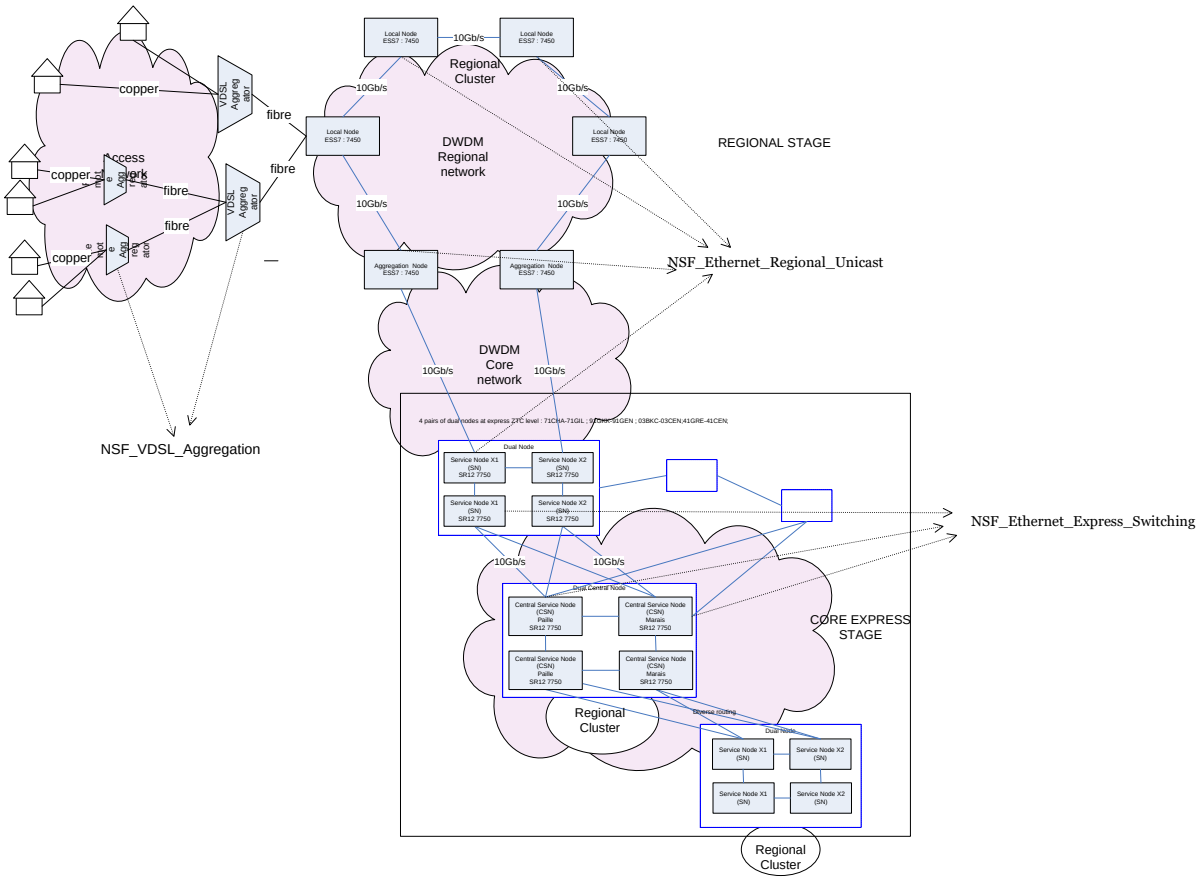

Figure 10: Ethernet layer 2.1

The dedicated Ethernet transparent backbone connection services (NLS2_1_xxxBackboneCapacity_Ethernet>=1G) are realized over the DWDM network with its Add Drop Multiplexers (ADM) or , when the capacity of the ADMs and rings is not sufficient, over point to point DWDM links.

The dedicated Ethernet transparent local tail connection services NLS2_1_LocalTailCapacity_Ethernet>=10M, is realized either on SDH equipment (up to 100 Mbps), reusing the SDH clusters deployed and already discussed in 7.5.3 (SDH over fibre) or for very high capacity connections (above 100 Mbps) they are directly realized on a wavelength (deployed as Fibre_connect_to_the_office for the local tail and as (D)WDM for the other cases).

The table hereunder summarizes the drivers used to distribute the cost contributors to the NLS2.1 services.

NLS2_1 service category	Building block of layer 2_1 service	Driver name
Ethernet transport	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Transponder	Number of Transponder

Sensitivity: Unrestricted

	NE_EthernetSwitch_Chassis	Usage of Switch in Percentage
	NE_EthernetSwitch_Port10GE	Number of Port
	NE_EthernetSwitch_Port1GE	Number of Port
	NE_EthernetSwitch_Port1GE_Adapter	Number of Adapter
	NSF_Express_EthernetSwitch_Chassis	Traffic in Mbps
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express DWDM equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
Broadband aggregation	NE_ADSL equipment	direct
	NE_NGA Active equipment	direct
	NE_NGA Housing	direct
	NLS1_0_Copper_Localloop_testing	nbr of broadband lex based without voice
	NLS1_0_Copper_Subloop	direct
	NLS1_0_Copper_Subloop_testing	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NSF_FTTC_FibreConnectivity	direct
Ethernet local tail	NE_ethernet equipment	Yearly Direct CAPEX Cost
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
Transparent Ethernet backbone connection services	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Point_to_Point_InterZonal	Direct
	NE_DWDM_Point_to_Point_IntraZonal	Direct
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Point_to_Point	Direct
	NSF_Express_DWDM_Transponder	Number of Transponder
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express_DWDM_equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

The cost relative to the building blocks and the driver values, for Ethernet transport and Transparent Ethernet backbone connection services, are determined in a top-down model, which was derived from the BIPT NGN-NGA model. (by Analysis Mason)

7.7 Network services of the mobile backhauling infrastructure (NLS 2.2)

7.7.1 Leased Lines infrastructure for mobile access backhauling

- NLS2_2_Mobile_Access_Backhaul_Abis is related to backhauling of the 2G network, providing connectivity by means of leased lines between the Base Station Transceiver (BTS) and the Base Station controller (BSC).

Sensitivity: Unrestricted

- NLS2_2_Mobile_Access_Backhaul_IuB is related to backhauling of the 3G network, providing connectivity by means of leased lines between the Node B antenna and the Radio Network Controller (RNC) in the Radio Access Network.

7.8 Network services of the IP infrastructure layer (NLS3-IP)

7.8.1 Scope

This layer provides the following basic IP services in the model.

Fixed IP service type	IP service
Collection of IP traffic for public internet or internal internet	NLS3_ADSL_Public_IP_collection
	NLS3_SDSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
	NLS3_VoD_IP_collection
	NLS3_VoIP_IP_collection
	NLS3_Public_IP_Extension_on_symmetric
Public Internet routing	NLS3_Public_IP_switching
Connection of IP sites to IP-VPN	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
	NLS3_Private_IP&Ethernet_Routing
	NLS3_Private_IP&Ethernet_Extension_on_asymmetric
	NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter
IP security	NLS3_IP_security

In addition, NLS3 also includes collection of mobile data traffic in the mobile access and backbone network.

The actual NLS3's are described further. A comprehensive listing of which NLS or EUS they contribute to together with a description of the driver utilized in each case is also presented.

7.8.1.1 *Public services*

7.8.1.1.1 IP_collection

Gathers all the data traffic, except that of the private networks, generated by the customers at their locations -homes and offices placed all over the country- at the highest network level where it can be further delivered to the Internet.

This gathering is achieved thanks to the broad and narrow band servers together with the connectivity capabilities of the MPLS backbone network.

This generic service is in fact divided in several actual NLS3, depending on the traffic type and/or underlying technology, as follows:

Sensitivity: Unrestricted

- Data traffic:
  - NLS3_ADSL_Public_IP_Collection
  - NLS3_SDSL_Public_IP_Collection
  - NLS3_VDSL_Public_IP_Collection
  - NLS3_Public_IP_Extension_on_symmetric: where the customer-IP router connectivity is provided by means of Leased Lines, as opposed to the other services which are based on broadband access technologies.
- Video on Demand traffic:
  - NLS3_VoD_IP_Collection
- Voice over IP traffic:
  - NLS3_VoIP_IP_Collection

Further, these NLS3's contribute to the following higher network layer services and end user services (EUS) as specified hereunder:

NLS3	Driver name	Target element
NLS3_ADSL_Public_IP_collection NLS3_ADSL_Public_IP_collection	Nbr_of_retail_wholesale_ADSL_lines	EUS_ADSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_ADSL_lines	EUS_FastInternet subscription
NLS3_SDSL_Public_IP_collection	Nbr_of_retail_wholesale_SDSL_lines	EUS_FastInternet subscription
NLS3_VDSL_Public_IP_collection NLS3_VDSL_Public_IP_collection	Nbr_of_retail_wholesale_VDSL_lines	EUS_VDSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_VDSL_lines	EUS_FastInternet subscription
NLS3_Public_IP_Extension_on_symmetric	Direct	EUS_Public_IP_Extension_on_Symmetric
NLS3_VoD_IP_collection	Direct	NLS4_0_VoD
NLS3_VoIP_IP_collection	Direct	NLS4_0_PSTN_access

7.8.1.1.2 Public_IP_switching

This service brings the intelligence to route the gathered traffic by the "IP_collection" generic NLS3 into the appropriate external network within the "public Internet".

This service, NLS3_Public_IP_switching, is fully and exclusively realized by the Proximus Internet Routers and is totally dedicated to the end user service EUS_FastInternet subscription.

7.8.1.2 *Private services*

7.8.1.2.1 Private_IP&Ethernet_Extension

This NLS transparently extends the customer's private local area networks, situated at any location within Belgium, to the edge of the Proximus's network, thanks to the routers installed at the customer premises (CPE) and the connectivity capabilities of the MPLS aggregation and core- clouds.

This generic service consists in fact of several actual services, specific to the access technology type, as follows:

- NLS3_Private_IP&Ethernet_Extension_on_symmetric_Datacenter

Sensitivity: Unrestricted

- NLS3_Private_IP&Ethernet_Extension_on_asymmetric
- NLS3_Private_IP&Ethernet_Extension_on_symmetric_lowEnd
- NLS3_Private_IP&Ethernet_Extension_on_symmetric _highEnd

The higher level NLS/EUS to which the above NLS3's deliver their services and their costs allocations are:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_asymmetric subscription – National
NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter	direct	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription – National
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription – National

7.8.1.2.2 NLS3_Private_IP&Ethernet_Routing

This NLS delivers the capability of routing the private networks traffic to the requested end point, within the Proximus private IPVPN network.

This service, NLS3_Private_IP&Ethernet_Routing, is completed by the Proximus IPVPN Routers and the core MPLS cloud and, in turn, supports all the following EUS:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_asymmetric subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_international Subscription
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National

Figure 11: Layer 3 topology and contributors exhibits the layer's basic topology and all the contributors to the Layer 3 services.

Sensitivity: Unrestricted

NLS3 - IP

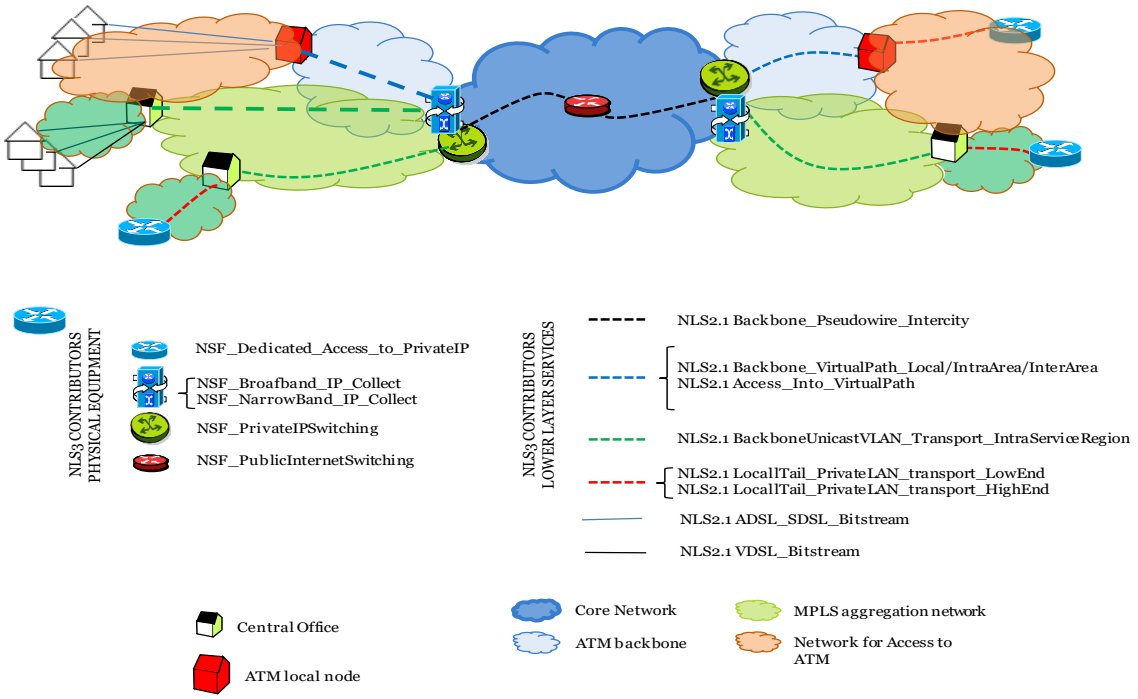

Figure 11: Layer 3 topology and contributors

7.8.1.3 *Mobile Data traffic*

The network layer 3 elements included at this level are :

- NLS3_o_BGC_Mobile_Access Data
- NLS3_o_BGC_Mobile_Backbone_Data

7.8.2 Contributors to the Network Layer 3 services

The table hereunder summarizes the contributors and the drivers used to distribute the costs to the NLS3 services.

NLS3 service category	Building block of layer 3 service	Driver name
Asymmetric Private_IP&Ethernet_Extension	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects

Sensitivity: Unrestricted

		are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_Dedicated_Access_to_PrivateIP	Number of Access
Symmetric Private_IP&Ethernet_Extension	NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalTail<2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail>2M	Nbr_of_Customer_sites
	NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)

Sensitivity: Unrestricted

	NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Direct
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_Dedicated_Access_to_PrivateIP	Nbr_of_Sites
Symmetric Public_IP_Extension	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
Public_IP_collection	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_Public_IP_Collect	PeakHour_PublicInternetTraffic(Gbps)
VoD_IP_collection	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_VoD_IP_Collect	PeakHour_VoDTraffic(Gbps)
VoIP_IP_collection	NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps)
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NSF_BroadBand_VoIP_IP_Collect	Direct
Public_IP_switching	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)

Sensitivity: Unrestricted

	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PublicInternetSwitching	TotalPeakHour_PublicInternetTraffic(Gbps)
Private_IP&Ethernet_Routing	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_Backbone_Pseudowire_InterCity	Bandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PrivateIPSwitching	Direct
IP_security	NSF_IP_security	Direct
Mobile Data Handling	NSF_Mobile_RAN_Data NSF_Mobile_Backbone_Data	Routed volumes Routed volumes

7.9 Network Services of the application layer

7.9.1 Definition

This layer deals with the telecommunication application services to end users. The application layer services are:

Sensitivity: Unrestricted

NLS4_0_BroadcastTV, NLS4_0_VoD, NLS4_0_iDTV and voice telephony related services classified as follows:

Class of Application Service	Application Service
Access to VoiceCallHandling	NLS4_0_Voice_traffic_PointOfInterconnect
Mobile IN Platform	NLS4_0_Mobile_PrepaidData_Services
	NLS4_0_Mobile_PrepaidTraffic_Services
	NLS4_0_Private_Communication_Call_Handling
	NLS4_0_SMS_Services
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_SMS
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS4_0_BGC Mobile_Access_Distribute_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice
	NLS4_0_BGC Mobile_BackBone_SMS
	NLS4_0_BGC Mobile_BackBone_Voice
	NLS4_0_MobileTerminatingLinks
NP	NLS4_0_FixedPortableNumberLocation
Special	NLS4_0_Automated_call_distribution
Telephony Access	NLS4_0_ISDN_access
	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV	NLS4_0_BroadcastTV
	NLS4_0_iDTV
	NLS4_0_VoD
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling
	NLS4_0_CallerIdentity_CallHandling
	NLS4_0_InteractiveVoiceResponse_CallHandling
	NLS4_0_OtherAdvanced_CallHandling
	NLS4_0_Service_Announcements_Playing
	NLS4_0_Televoting_CallHandling
	NLS4_0_VAS_signaling
	NLS4_0_VoiceFeatures_SelfManaging
	NLS4_0_Voicemail&Messaging
	NLS4_0_WakeUp_CallHandling
Voice transport	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
VoiceCallHandling	NLS4_0_Voice_traffic_Collect
	NLS4_0_Voice_traffic_OnNet
	NLS4_0_Voice_traffic_Terminate
	NLS4_0_Voice_traffic_Transit

Sensitivity: Unrestricted

For the access, the voice application services are end-to-end voice connections between the customer site and the central office (technical building closest to the user). For the backbone, voice applications are either pure call handling related and do not span over distant nodes, or they are voice transport applications between distant nodes. Next picture puts into perspective the services of the Voice application layer.

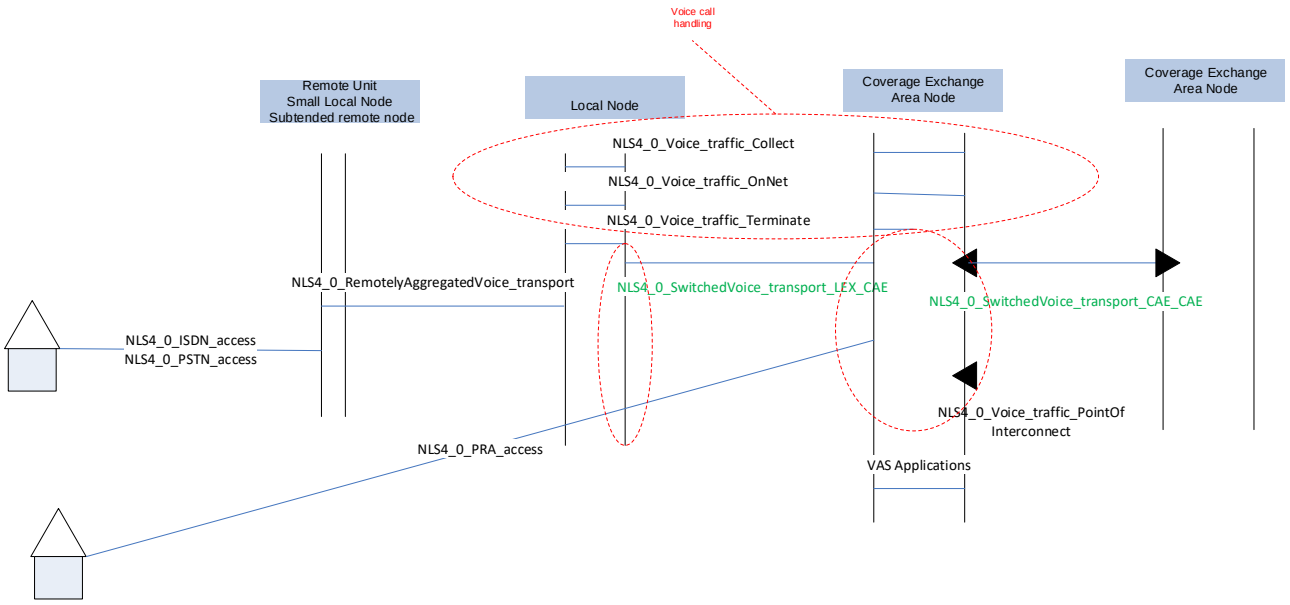

Figure 12: the services of the Voice application layer 4.0

7.9.2 Usage of the application layer

The TV related applications are completely used for iDTV end-user services, no specific consumption driver needs to be defined.

The voice application services are distributed to a variety of traffic types , each with a specific driver. The following table summarizes the used drivers per voice application service.

Class of Application Service	Application Service	Driver to distribute the NLS4.0 application service to EUS or NLS4.1
Access to VoiceCallHandling	NLS4_0_Voice_traffic_PointOfInterconnect	TimeSlot_capacity_used
Mobile IN Platform	NLS4_0_Mobile_PrepaidData_Services	cumulated invested value
	NLS4_0_Mobile_PrepaidTraffic_Services	cumulated invested value
	NLS4_0_Private_Communication_Call_Handling	cumulated invested value
	NLS4_0_SMS_Services	cumulated invested value
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_SMS	routed volumes

Sensitivity: Unrestricted

	NLS4_0_BGC Mobile_Access_Collect_Voice	routed minutes
	NLS4_0_BGC Mobile_Access_Distribute_SMS	routed volumes
	NLS4_0_BGC Mobile_Access_Distribute_Voice	routed minutes
	NLS4_0_BGC Mobile_BackBone_SMS	routed volumes
	NLS4_0_BGC Mobile_BackBone_Voice	routed minutes
	NLS4_0_MobileTerminatingLinks	routed minutes
NP	NLS4_0_FixedPortableNumberLocation	Nbr_calls
Special	NLS4_0_Automated_call_distribution	direct
Telephony Access	NLS4_0_ISDN_access	Nbr_lines_inUse
	NLS4_0_ISDN-PRA_access	Nbr_lines_inUse
	NLS4_0_PSTN_access	Nbr_lines_inUse
TV	NLS4_0_BroadcastTV	direct
	NLS4_0_iDTV	direct
	NLS4_0_VoD	direct
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling	NumberTranslationProcessedTime(min)
	NLS4_0_CallerIdentity_CallHandling	direct
	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
	NLS4_0_OtherAdvanced_CallHandling	direct
	NLS4_0_Service_Announcements_Playing	Nbr_calls
	NLS4_0_Televoting_CallHandling	Nbr_calls_explosive_traffic
	NLS4_0_VAS_signaling	direct
	NLS4_0_VoiceFeatures_SelfManaging	direct
	NLS4_0_Voicemail&Messaging	direct
	NLS4_0_WakeUp_CallHandling	direct
Voice transport	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet	routed minutes
	NLS4_0_FixedSwitchedVoice_transport_National_offnet	TimeSlot_capacity_used
	NLS4_0_RemotelyAggregatedVoice_transport	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_CAE	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_MSC	routed minutes
	NLS4_0_SwitchedVoice_transport_LEX_CAE	direct
	NLS4_0_SwitchedVoice_transport_LEX_MSC	direct
VoiceCallHandling	NLS4_0_Voice_traffic_Collect	routed minutes
	NLS4_0_Voice_traffic_OnNet	routed minutes
	NLS4_0_Voice_traffic_Terminate	routed minutes
	NLS4_0_Voice_traffic_Transit	routed minutes

The driver “routed minutes” (or “routed volumes” in the case of mobile SMS) consists in determining the average number of times (=routing factor) a traffic type is using the voice application service across all possible call scenarios compatible with the traffic type. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) of that traffic type.

The traffic types (“consumers”) of these voice applications are:

Sensitivity: Unrestricted

Class of Application Service	End User Service
Access to VoiceCallHandling	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
Mobile IN Platform	EUS_BGC Mobile_Roaming Out data
	EUS_Mobile_Data national
	EUS_SMS_inbound_intal
	EUS_SMS_inbound_national
	EUS_SMS_on_net_national
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_OUT_Origination
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Mobile_inbound_intal
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_to Mobile
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_out_Origination
Mobile Voice&Messaging Handling	EUS_SMS_inbound_intal
	EUS_SMS_inbound_national
	EUS_SMS_on_net_national
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_IN_Origination
	EUS_SMS_Roaming_IN_Termination
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Mobile_inbound_intal
	EUS_voice_traffic_Mobile_inbound_intal_VAS
	EUS_voice_traffic_Mobile_inbound_national_from FOLO

Sensitivity: Unrestricted

	EUS_voice_traffic_Mobile_inbound_national_from MOLO
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_to Mobile
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
	EUS_voice_traffic_Mobile_Roaming_out_Origination
	EUS_voice_traffic_Mobile_Roaming_out_Termination
NP	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
Special	EUS_AUTOMATEDCALLDISTRIBUTION
Telephony Access	EUS_Business voice channels - subscription
	EUS_ISDN-BA Access - subscription
	EUS_Private_IP&Ethernet_on_backup
	EUS_PSTN Access - subscription
TV	EUS_IDTV_subscription
VAS application	EUS_Carrier PreSelection
	EUS_notAllocated
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_intal_VAS
	EUS_voice_traffic_Mobile_inbound_national_from FOLO
	EUS_voice_traffic_Mobile_inbound_VAS_national
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_OPS
	OVH_Management_Network
Voice transport	EUS_Carrier PreSelection

Sensitivity: Unrestricted

	EUS_notAllocated
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_IN_Origination
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_VAS_national
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
	EUS_voice_traffic_Mobile_Roaming_out_Origination
	EUS_voice_traffic_Mobile_Roaming_out_Termination
VoiceCallHandling	EUS_Carrier PreSelection
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_VAS_national

Sensitivity: Unrestricted

EUS_voice_traffic_Mobile_on_net_to Fixed
EUS_voice_traffic_Mobile_on_net_VAS_national
EUS_voice_traffic_Mobile_outbound_national_to FOLO
EUS_voice_traffic_Mobile_outbound_VAS_national
EUS_voice_traffic_Mobile_Roaming_IN_Origination
EUS_voice_traffic_Mobile_Roaming_IN_Termination
EUS_voice_traffic_Mobile_Roaming_out_Origination
EUS_voice_traffic_OPS

7.9.3 Contributors to the application services

TV services

The broadcast TV application service is the result of the video streaming network stage function and the nationwide broadcast using the SDH clusters and simultaneously the multicast features of the Ethernet/MPLS regional clusters combined with the express pseudowires in order to reach all regional clusters.

Contributor to NLS4_0_BroadcastTV	**Driver**
NSF_BroadcastTV	Nbr_TV_users
NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_LocalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_1_Backbone_MulticastVPLS_IntraRegion	Direct
NLS2_1_Backbone_Pseudowire_InterCity	TotalPeakBandwidth_used(Gbps)
NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)

Sensitivity: Unrestricted

Similarly, the Video On Demand service is the result of Video Movie servers delivering the content and the transport services towards the closest local node to the customer . The transport is realized on the Ethernet/MPLS network.

Contributor to NLS4_0_VoD	Driver
NLS3_VoD_IP_collection	direct

Voice application services in the access

PSTN access services are the result of the voice concentrator function in the Access Gateways and the physical copper connectivity between the customer site and the Access Gateways (in ROP or in local exchange). In addition, the data connectivity required to transport Voice over IP signaling and traffic to the Voice over IP switching units is also included as a contributor to voice access.

PRA access services do not need a concentrator function (that function is typically realized within the customer site by private switches) but merely a voice transport link to the local exchange. This one is obtained directly from layer 2.0 transport segments and local tails.

Hereunder a summary of the contributors to voice access together with the drivers used to determine their level of involvement in the service

Voice Access Services	Contributor	Driver
NLS4_0_ISDN_access	[NLS1_0_Continue_Raw_Copper]	Nbr_of_used_pairs
	[NLS1_0_Raw_Copper]	Nbr_of_used_pairs
	[NSF_ISDN_NetworkTermination]	Nbr_of_accesses
NLS4_0_ISDN-PRA_access	[NLS1_0_CentralOffice2RemoteOpticalNode_Duct]	Number of physical site routes
	[NLS1_0_CentralOffice2RemoteOpticalNode_Fibre]	Number of physical site routes
	[NLS2_0_InterCityBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_InterCityBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_IntraAreaBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_IntrazonalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_IntrazonalBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_LocalBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_LocalTail=2M]	Number_of_customer_sites
NLS4_0_PSTN_access	[NLS1_0_Continue_Raw_Copper]	Nbr_of_used_pairs
	[NLS1_0_Raw_Copper]	Nbr_of_used_pairs
	[NLS2_0_IntrazonalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_LocalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS3_VoIP_IP_collection]	direct
	[NSF_PairGainSystem]	direct
	[NSF_PSTN_Voice_concentrator]	Nbr_lines_inUse

Voice application services in the backbone (see picture Figure 12: the services of the Voice application layer 4.0)

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The services in the group "Access to VoiceCallHandling" allow to access the Fixed Voice NGN Platform.

In summary the contributors are distributed using following drivers:

Network functions used to realize Access to Voice Call Handling services	Driver used to attribute network functions to access to VoiceCallHandling services
[NSF_Interconnecting_CallHandling	Attributed ecodep of capex from bottom up model
[NSF_OwnNetwork_CallHandling]	Attributed ecodep of capex from bottom up model
[NSF_Voice_call_CAE_Processing]	routed minutes
[NSF_Voice_call_CAE_Trunks]	Nbr Time Slots
[NSF_Voice_o_Broadband_SBC]	Attributed ecodep of capex from bottom up model
[NSF_VoiceIP_Router]	Attributed ecodep of capex from bottom up model

The driver "routed minutes" consists in determining the average nbr of times (=routing factor) a voice call handling type is using the network functions. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) exercising that voice call handling type.

The services in the group "Voice transport" are emanating from layer 2.0 Backbone transport capacity (<=2M) which are distributed according to the consumed bandwidth.

Contributor to NLS4_x	Driver	NLS4_x element
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_1 BVAS - BGC Fixed
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_ISDN-PRA_access
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BroadcastTV
		NLS4_0_ISDN-PRA_access
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks

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		NLS4_0_PSTN_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_VAS_signaling
		NLS4_1 BVAS - BGC Fixed
NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_MobileTerminatingLinks
		NLS4_0_PSTN_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_1 BVAS - BGC Fixed
NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_LocalTail<2M	Number_of_customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
NLS2_0_LocalTail=2M	Number_of_customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access

The services in the group “VAS application” are in fact directly identified with a network function:

NSF_CallerIdentity_CallHandling	NLS4_0_CallerIdentity_CallHandling	direct
NSF_CallingCard_CallHandling	NLS4_0_CallingCard_CallHandling	direct
NSF_InteractiveVoiceResponse_CallHandling	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
NSF_MessageWaitingIndicator_Inserting	NLS4_0_MessageWaitingIndicator_Inserting	direct
NSF_OtherAdvanced_CallHandling	NLS4_0_OtherAdvanced_CallHandling	direct
NSF_PrepaidCallingCard_CallHandling	NLS4_0_PrepaidCallingCard_CallHandling	direct
NSF_Service_Announcements_Playing	NLS4_0_Service_Announcements_Playing	direct
NSF_Televoting_CallHandling	NLS4_0_Televoting_CallHandling	direct
NSF_VirtualPrivateNetwork_CallHandling	NLS4_0_VirtualPrivateNetwork_CallHandling	direct
NSF_VoiceFeatures_SelfManaging	NLS4_0_VoiceFeatures_SelfManaging	direct

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NSF_Voicemail&Messaging	NLS4_0_Voicemail&Messaging	direct
NSF_WakeUp_CallHandling	NLS4_0_WakeUp_CallHandling	direct

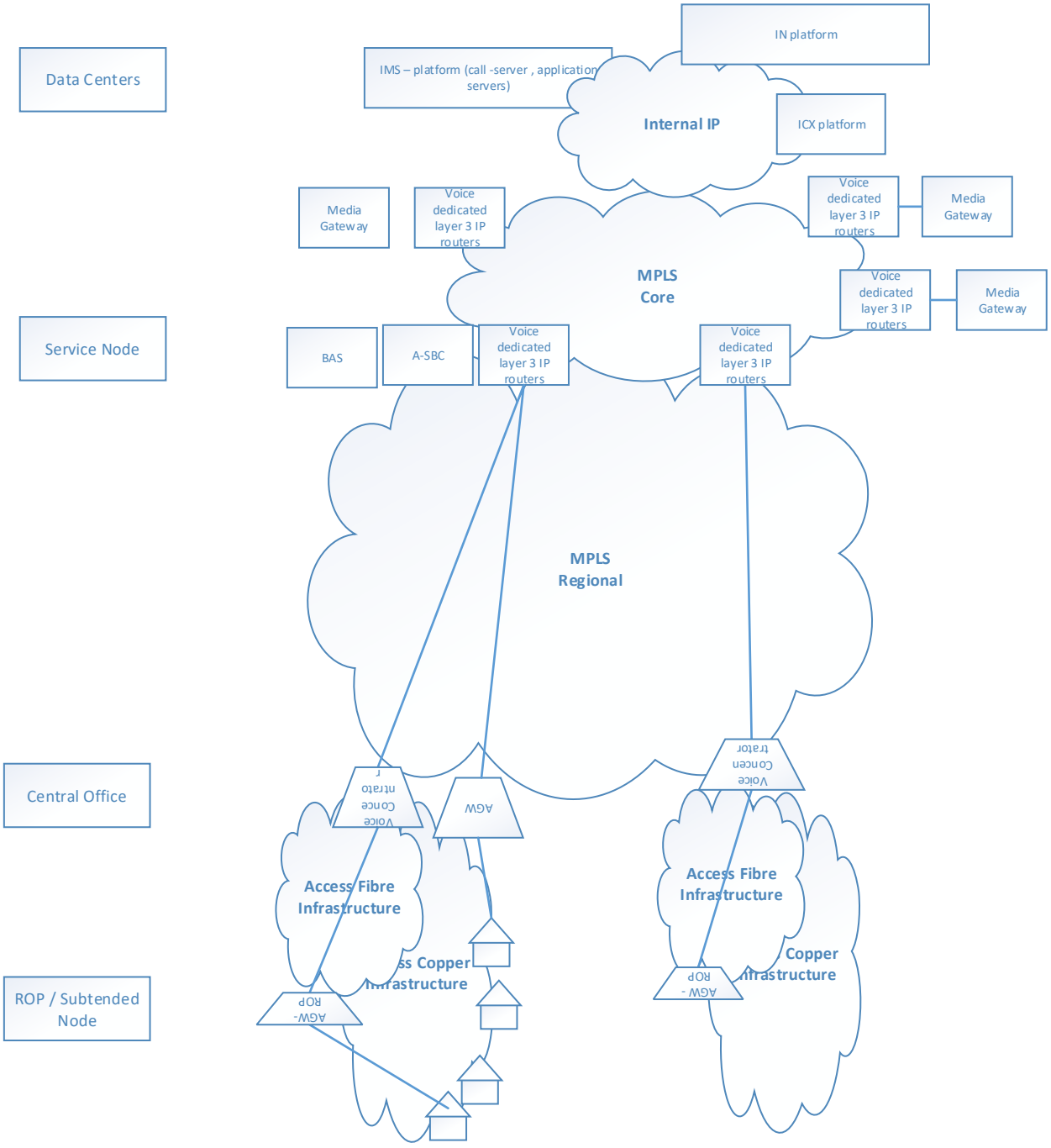

Figure 13: Fixed Voice NGN Network

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8 Annex I: SCF Flow Acronyms

SCF	Support and Customer Flow
BIPT	Belgian Institute for Postal services and Telecommunications
BTN	Business Transformation
CBU	Consumer Business Unit
CC	Costs Center
CCG	Costs Center Group
CP	Costs Pool
CWS	Carrier & WholeSale
CUO	Customer Operations
DIY	Do It Yourself
EBU	Enterprise Business Unit
FAC	Fully Allocated Costs
HCA	Historical Cost Accounting
HMC	Human Manpower Cost
MOS	Material Out of Stock
NRA	National Regulatory Authority
REG	(Proximus) Group Regulatory Affairs
SMP	Significant Market Power
SOG	Services & Other Goods
S&S	Staff & Support

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9 Annex II: Network and IT Flows Acronyms

AC	Asset Class
ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
BA	Basic Access
BAS	Broadband Access Server
BES	Proximus European Solutions
BGC	Proximus
BILAN	Proximus Interconnection of LANs
BLES	Proximus LAN Extension Service
BROBA	Proximus Reference Offer for Bitstream Access
BROTSOLL	Proximus Reference Offer for Terminating Segment of Leased Line
BVAS	Business Value Added Services
CAE	Coverage Exchange Area
CAPEX	CApital Expenditures
CP	Cost Pool
CPE	Customer Premises Equipment
CPU	Central Processing Unit
CWDM	Coarse Wavelength Division Multiplexing
DACS	Digital Analog Cross-connect System
DCN	Data Communication Network
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DU	Dispatch Unit
DWDM	Dense Wavelength Division Multiplexing
EAA	Extra Access Area
EAL	Ethernet Access Line
EFM	Ethernet First Mile
ESS	Ethernet Service Switch
Ethane	ETHernet Aggregation NETwork
EUS	End User Service
FAC	Fully Allocated Costs

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FIFA	Fast Internet Future Architecture
FTTC	Fiber To The Cabinet
FTTO	Fiber To The Office
Gb	Giga bit
Gbps	Giga bits per second
HW	HardWare
IAA	Intra Access Area
iDTV	interactive Digital TeleVision
IN	Intelligent Network
TCE	Telecom CostExpert
IO	In/Out
IP	Internet Protocol
IPVPN	Internet Protocol Virtual Private Network
ISAM	IP Subscriber Line Access Multiplexer
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LDC	Local Distribution Center
LEX	Local Exchange
LL	Leased Line
LTE	Line Terminating Equipment
Mbit	Mega bit
MEO	Modern Equivalent Opex
MOLO	Mobile Other Licensed Operator
MPLS	MultiProtocol Label Switching
MSR	Multi Server Router
MUX	Multiplexer
MVAS	Mass Value Added Services
MWE	MicroWave Equipment
NE	Network Element
NGA	New Generation Access
NGN	New Generation Network
NLS	Network Layer Service
NTE	Network Terminating Equipment

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NTP	Network Termination Point
NSF	Network Stage Function
OLO	Other Licensed Operator
OLTE	Optical Line Terminating Equipment
OPEX	OPerational Expenditure
OVH	Overhead
PDH	Plesiochronous Digital Hierarchy
PRA	Primary Access
PSTN	Public Switched Telephony Network
QoS	Quality of Service
RAM	Random Access Memory
ROP	Remote Optical Platform
SDH	Synchronous Digital Hierarchy
SDSL	Symmetric Digital Subscriber Line
STM	Synchronous Transport Module
TDM	Time Division Multiplexing
TV	TeleVision
VAS	Value Added Services
VDSL	Very high speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VP	Virtual Path
VPLS	Virtual Private Local area network Service
VPN	Virtual Private Network
WDM	Wavelength Division Multiplexing
SDE	Service Delivery Engine
CUO	Customer Operations
CFF	Customer Field Force
TEC	Technology
NEO	Network Engineering & Operations
TSI	Technology, Strategy & Innovation
ITS	Information Technology Services

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ARP	Architecture, Road map & Program Office
SPC	Services, Platforms & Cloud

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Proximus Regulatory Cost Model 2018

General Description

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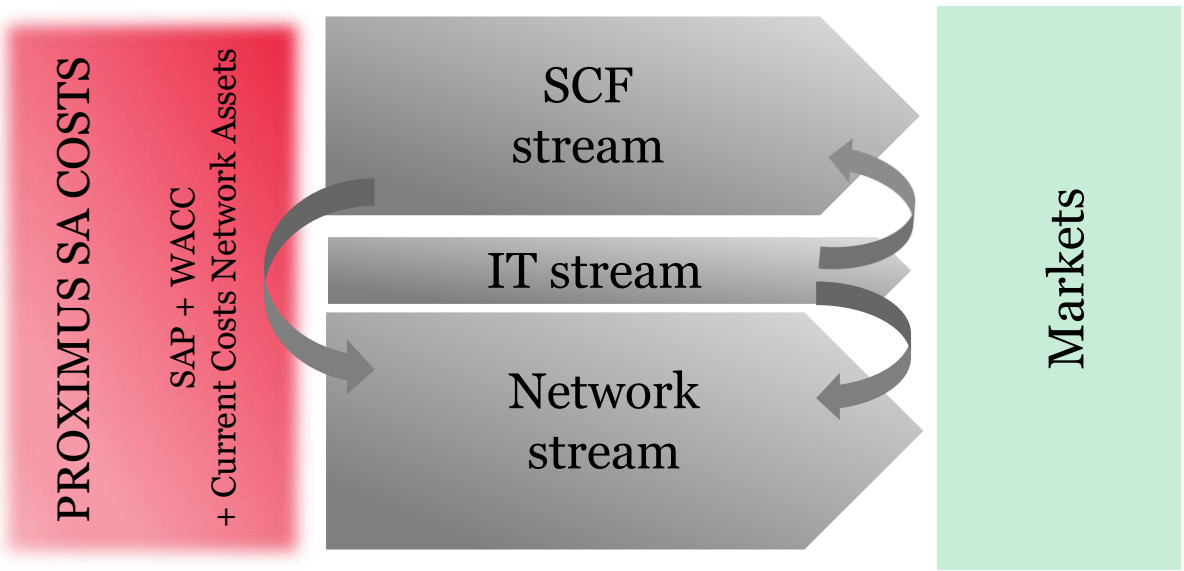
1 General description

REG (Group Regulatory Affairs) department ensures the preparation of separated accounts and sets up the Cost model inherent to the reporting of separated accounts, and used in other regulatory files. In accordance with European Commission recommendations, the entire costs of statutory accounts are taken into account in the cost model and reporting of separated accounts, to the exception of statutory accounts 65 to 68, as well as some other accounts excluded from the cost model perimeter. As said, the cost basis of the cost model is directly issued from the general accounting of Proximus SA, as recorded in SAP accounting tool. Statutory accounts of Proximus SA have been audited in 2018 by Deloitte, external auditors. Deloitte auditors issued an unqualified opinion on statutory accounts.

Separated accounts result from allocation flows of Network/IT and SCF (Support and Customer flow) costs, as included in the general accounting of Proximus SA, as well as the cost of capital of these two modules.

The following chart illustrates the accounting system of costs, as well as main allocation flows. The whole costs included in the allocation process are loaded in a tool (Telecom Costs Expert Software, referred as TCE) that runs accuracy tests and prevents double costs counting or multiple allocations.



SCF allocation flows include costs that are of service to the customer and other direct and indirect costs that are not included in the Network nor IT allocation flows.

Network and IT flows include all the costs related to the Network and Information & Communication technology.

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Costs allocated in allocations flows SCF, Network and IT have the same cost basis origin, this later being SAP statutory accounts of Proximus SA. IT tool TCE, in past models named INCA, makes validity checks to prevent any double counting and trace allocated costs from their unique SAP cost basis origin to their final destination.

The Cost model per Market is a top-down model.

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2 Model Allocation Structure

This section provides with a global view on the allocation structure of the model by walking through the major allocation flows and introducing the major building blocks and concepts in the model.

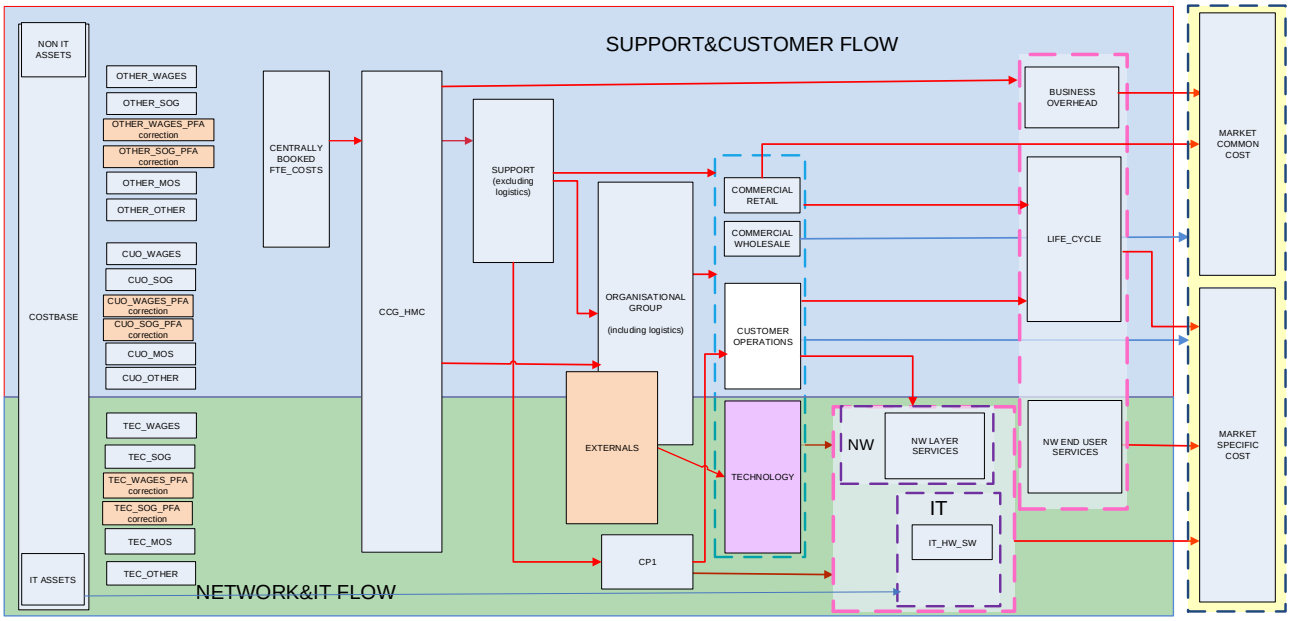
The following Figures will be the supporting tools for such discovery walk, where the major modules constituting the model as well as the global allocation flows among them are shown. The differentiation between SCF, Network and IT flows is also illustrated in the exhibit.

The overall objective of the model is allocating all the attributable costs present in the cost base to the markets as defined in the regulatory framework.

Therefore, the cost base constitutes the foundation of the model.

Further, the model allocation process is subdivided into three main streams, SCF, Network and IT.

The Cost base settings and the Non IT assets are presented in chapter 3.



The SCF stream has as objective to allocate all costs that are not part of the Network or IT model towards the markets.

SCF stream (chapter 4) encompasses Support, Commercial Retail, Commercial Wholesale and Customer operations costs.

The IT and Network streams, although having completely separated CAPEX basis, both share a common OPEX source.

OPEX of IT and Network streams are handled via allocation of costs of Technology business unit (chapter 5).

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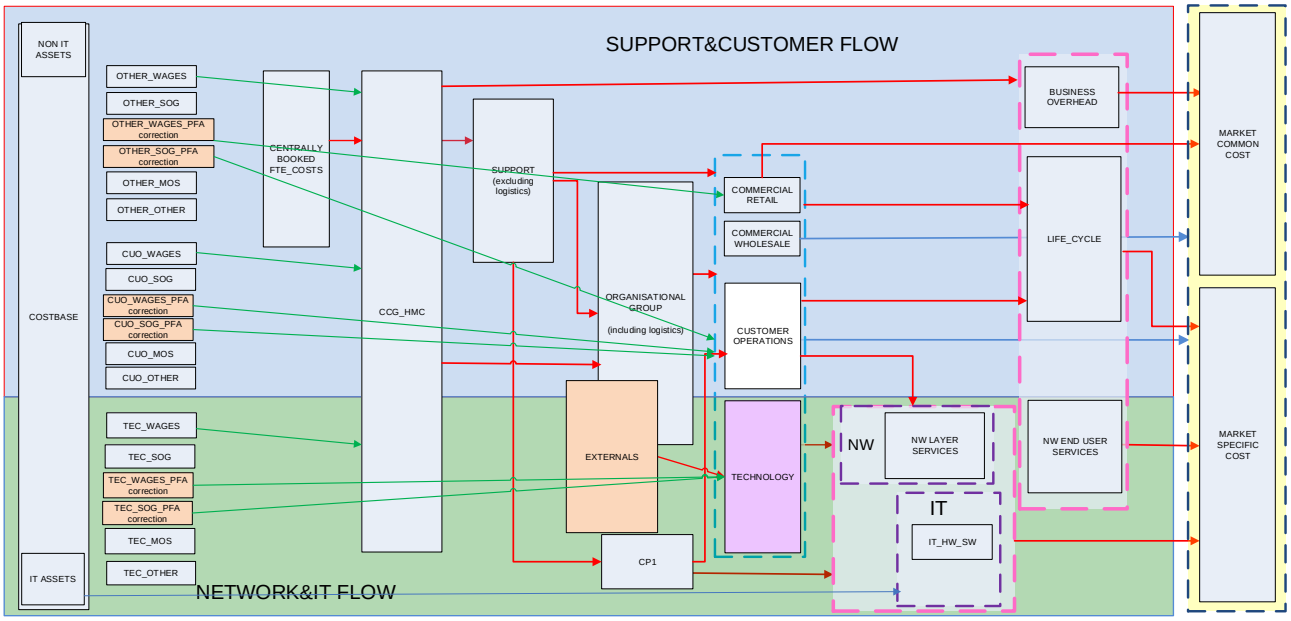
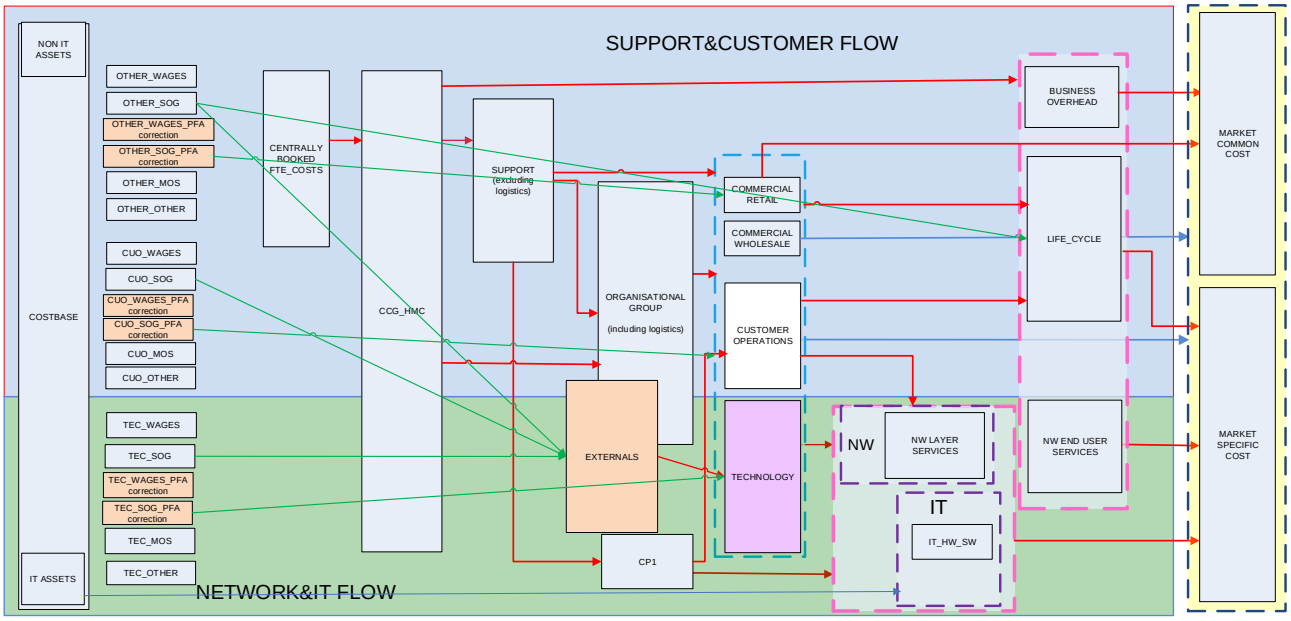
WAGES OPEX allocation flows are as follows:



Services and Other Goods OPEX allocation flows are as follows:



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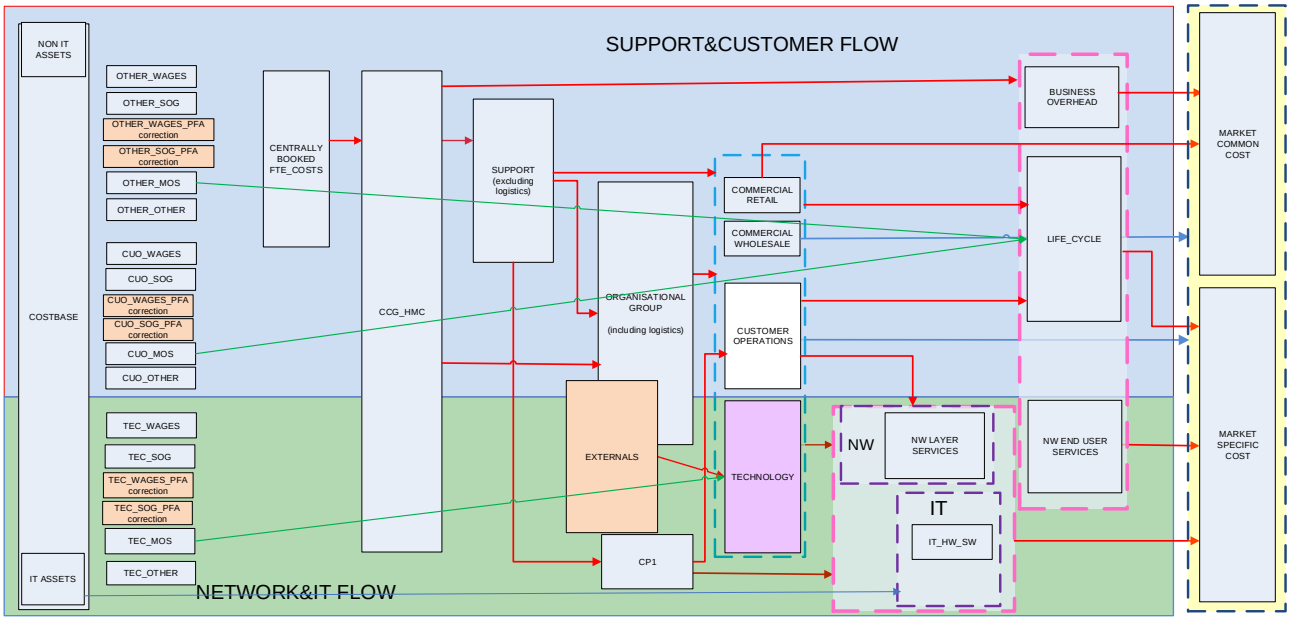
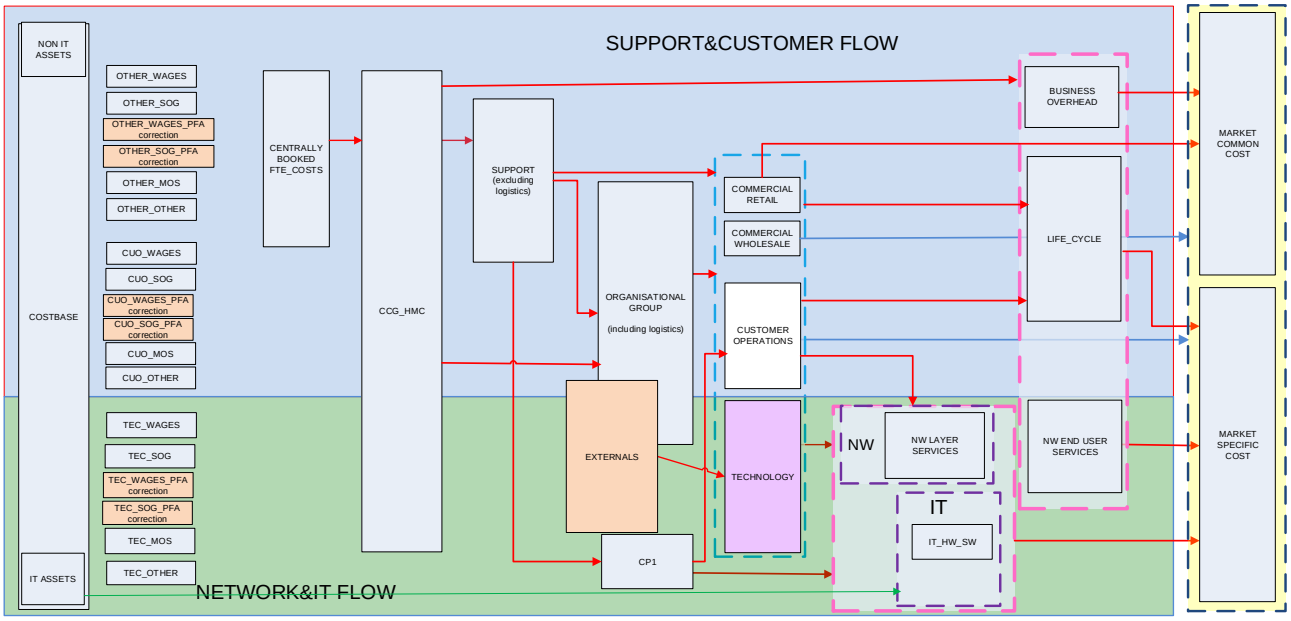
Materials out of stock and Other OPEX main allocation flows are as follows:



IT Assets allocation flows are as follows:



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3 Cost Base

3.1 Cost model perimeter

3.1.1 Determination of the Cost model perimeter

Costs included in the Cost model are operating charges, i.e. general ledger (GL) accounts 60 to 64 of statutory accounting, as well as part of GL 69.

GL 60 “cost of goods sold” includes mainly telecom equipment purchases (ADSL modem, handsets, cables, mobile SIM cards, etc.), small equipment (cpe, …) and stocks movements.

GL 61 « services and other goods » includes primarily costs linked to traffic (a.o. interconnection fees) and operating expenses such as maintenance, utilities, renting, marketing, representation allowances, consultancy, travel fees, etc.

GL 62 corresponds to all personnel costs (wages and other salary benefits).

GL 63 includes depreciation and amortization, stocks and trade receivable accruals for write-off and movements of provisions for liabilities.

GL 64 gathers other operating expenses, including a.o. write-off on trade receivables, immovable withholding tax and local taxes, taxes on pylons, etc.

GL 69 relates to company result appropriation corresponding to the part of personnel in the profit (collective bonus).

At last, GL 72 – « Produced Fixed assets » reduces the cost basis to cancel costs linked to produced fixed assets and to avoid a double counting of these costs with the corresponding depreciation charge.

To the costs perimeter from the general accounting is added the weighted average cost of capital (WACC) of 8,13% for Proximus Fix products and for Proximus Mobile products.

3.1.2 Costs excluded from the Cost model perimeter

Other costs than those mentioned above are excluded from the Cost model. It relates to GL 65 to 69 of general accounting, to the exception mentioned above, for part of GL 69 (share of personnel in profit).

Some costs are excluded since considered as having no causal link to the products and activities. This matters for extraordinary costs (GL 66) and tax costs (GL 67 and 68).

Other costs are excluded since already included in the WACC. This relates to financial costs (GL65) and dividends appropriation (GL 69).

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Costs excluded mentioned here above are costs excluded from the Cost model upstream (i.e., when defining Cost model perimeter with costs included in general accounting). On top of these ones, other costs will be excluded downstream in the Cost model, i.e. costs excluded via the allocation flow. E.g.: Support costs involving affiliates.

3.2 Cost regrouping

Proximus books the costs on one hand, on a general ledger account defined in general accounting, and on another hand, on a cost center defined in reporting and analytics accounting. This way to handle costs has for objective to gather data, in order to simplify data processing.

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Two types of aggregation are done:

- Aggregation of 705 GL of general accounting in 178 Cost pools (CP)
- Aggregation of 535 cost centers in 210 Cost Centers Groups (CCG).

A **Cost pool** is a group of costs with similar characteristics and issued from the same family of cost natures.

Regarding material resources, gathering of costs is based on the similar function that these costs have. E.g., cost pool "Training expenses" sums up costs of trainings organized inside Proximus, external trainings, training books and documentation costs.

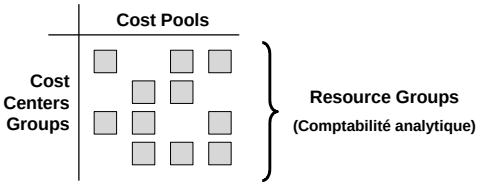
Regarding human resources (referred as FTE, or Full Time Equivalent), cost pools gather workers with the same profile. E.g., cost pool "Level S" includes wages and salaries of employees with level S (Sales force), as well as premiums and other wages benefits paid to these employees.

Costs included in the same cost pool have an identical causal link to the products and activities to which they related. They have the same "resource driver".

A **Cost Center Group (CCG)** sums up cost centers with similar characteristics and realizing similar activities and as a consequence, can be aggregated into the same cost center group.

Each Cost Center Group uses various cost pools.

Combinations cost pool/cost center group constitute the **Resource Groups**. The Resource Groups are the Cost basis of the Cost model.



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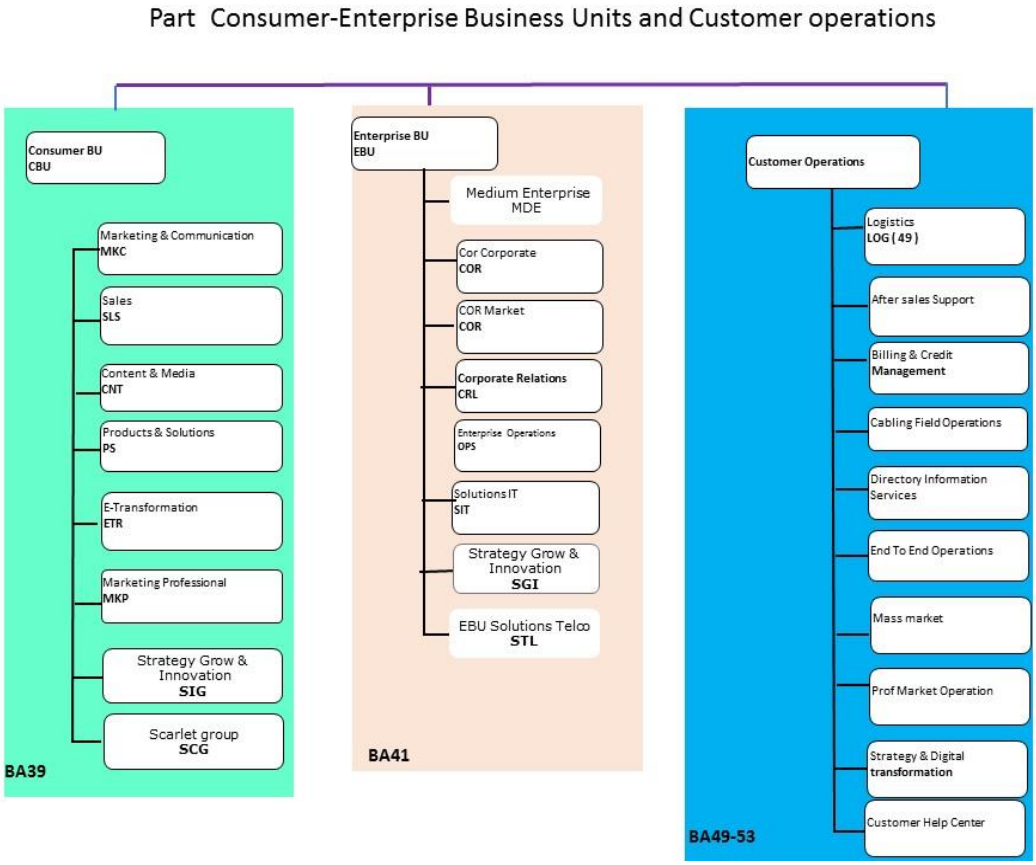
3.3 Organization

The organizational structure of Proximus SA, as on December 31, 2018 as used in the Cost base, is as follows:



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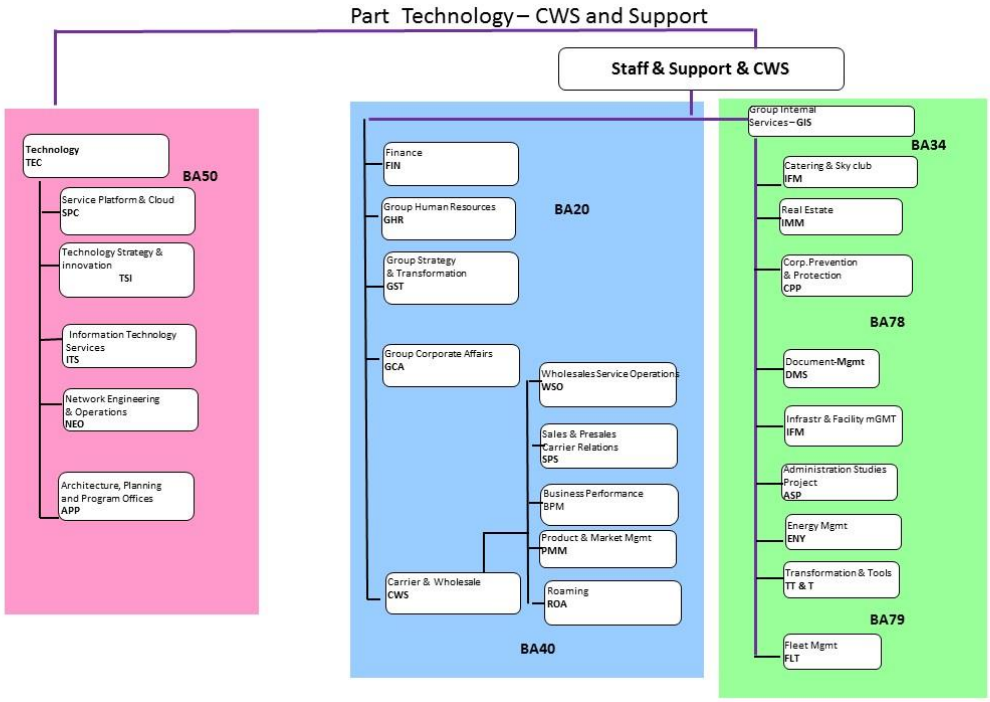

- This organisation has a clear split between the residential and professional customers by the divisions Consumer and Enterprises Business units, as well as the wholesale customers with Carrier & Wholesale Business unit,
- The Technology Business unit (TEC) brings together Network and IT services,
- The Customer Operations Business unit gathers all services in direct link with the customer, whether private consumer or enterprise,
- Within Staff & Support, the content (FIN, GHR, GST, GCA) remains the same.
- Group Internal Services groups internal services like Fleet, Facilities, Prevention &Protection, etc.

Cost perimeter is split by the REG department between allocation flows of Network/IT and Support and Customer flow, after completeness and accuracy checks (no double counting) on costs data from SAP. As mentioned in general description, allocation flow Network/IT allocates all costs and assets (capital expenditure) in IT and Network, while the allocation flow Support and Customer flow allocates costs and assets other than IT and Network related.

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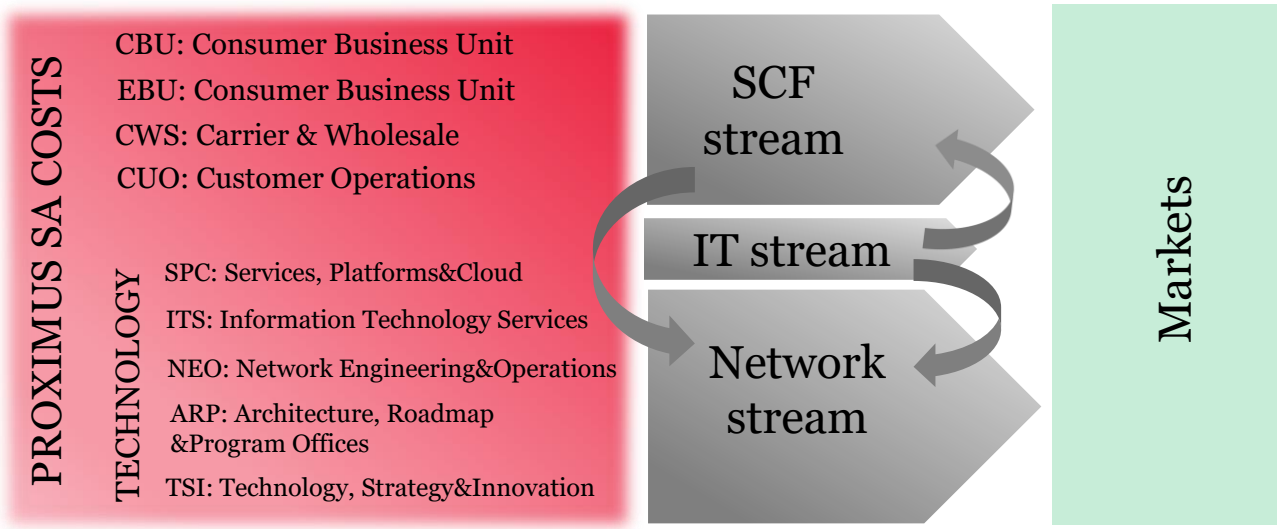

Split of cost perimeter between allocation flows Network/IT and SCF is processed as follows:

- All departments within TEC are treated within the Network / IT flow.
- Provisions for taxes on telecom equipment that are booked at the level of TEC management are downstream shared via allocation flows between assets classes to which they relate.
- All other costs, not mentioned above are treated within the SCF flow namely the divisions CBU (Consumer Business Unit), EBU (Enterprise Business Unit), CWS (Carrier Wholesale), CUO (Customer operations) and Staff & Support. The Staff & Support division comprises different departments, including Headquarters, GCA (Group Corporate Affairs) which includes Legal, Group Public Affairs, Regulatory, Internal audit, Group communications and Secretary General. Then we have departments like Finance, Group Human Resources, Group Strategy & Transformation and GIS (Group Internal Services) for departments like Real Estate, Business Services, Facilities, Prevention & Protection, Fleet and Catering.
- Regarding Assets (depreciation and WACC), repartition is done based on an analysis of assets classes: assets IT and Network are handled in the allocation flow Network/IT, while all other assets (buildings, utilities equipment, CPE, etc.) are allocated in the flow SCF.

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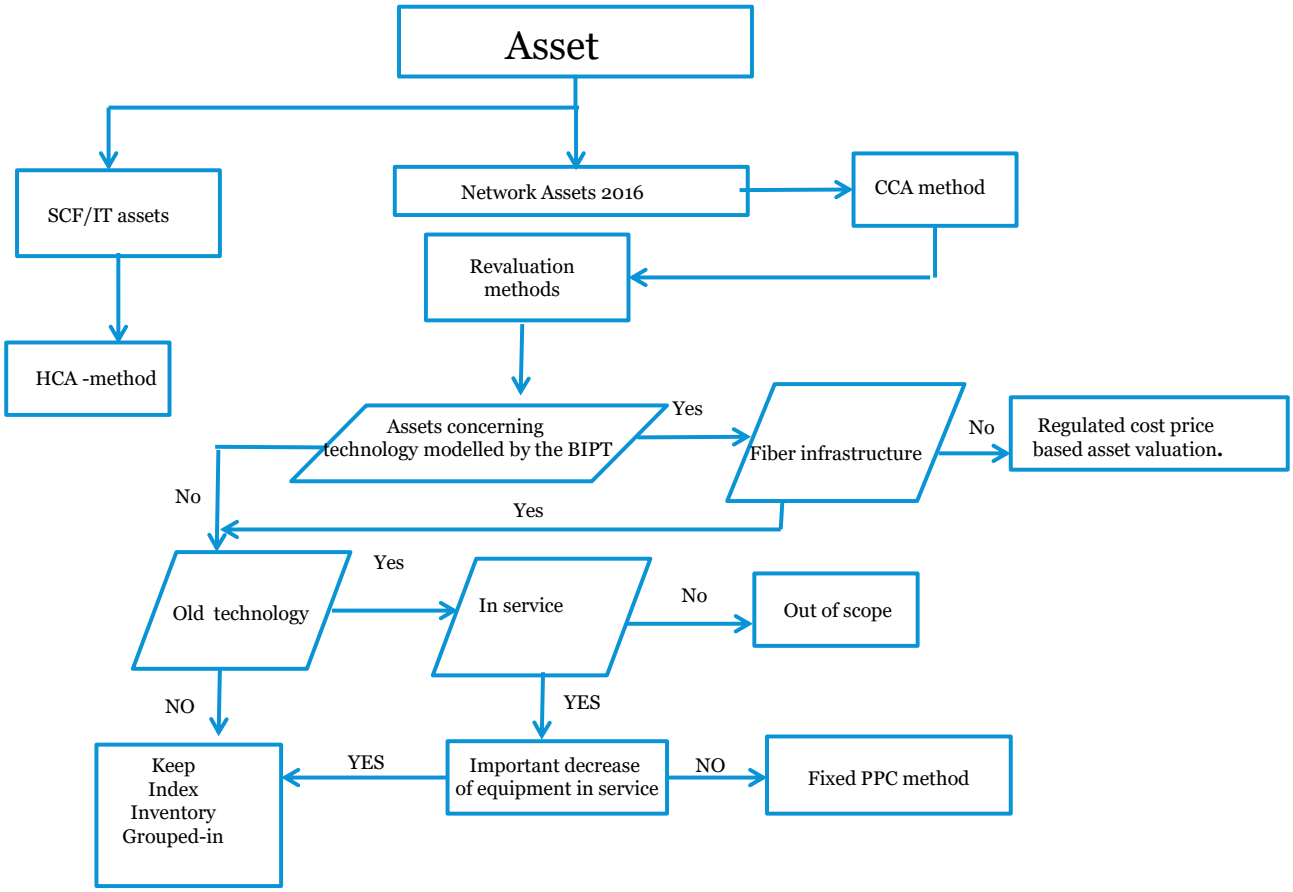
3.4 Assets revaluation

3.4.1 Decision tree



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3.4.1.1 *Split network - SCF and IT assets*

The assets base was split up in Network – SCF and IT assets. The cost of the network assets must be based, for operators being declared as dominant, on the Current Cost Accounting. For the SCF assets (EBU-CBU– CUSTOMER OPERATIONS- SUPPORT-Facilities-Sourcing-Fleet) and IT related assets the cost accounting systems is based on the Historical Cost Accounting method.

3.4.2 Methods used to reevaluate the network assets

The regulatory framework clearly states that the cost accounting systems of operators being declared as dominant on relevant markets must be set based on Current cost accounting for the network costs.

The network & IT flows within the top down model calculate the current costs for the network related assets. Current costs have been computed as explained hereafter.

There are five methods to evaluate the current value of the network: reassessment of the current inventory, price indexation, by default "keep everything as it is", index based on a fixed PPC and regulated cost price based. For old assets concerning technology still in service we use a method based on a fixed PPC2007. Each of these methods requires its own set of inputs. It is mainly the availability (or lack) of input which dictates the choice of the method. Nevertheless, each method has its advantages and disadvantages with respect to the others.

The inventory and price indexation methods assume that network departments replace the equipment of its assets by equivalent equipment. The notion of equivalent is quite fuzzy. An engineer would tell you that over time there are always more functions integrated in new equipment and that they are always more cost-effective. It makes the comparison between different generations of equipment difficult. The notion of equivalent has therefore been addressed through the term Modern Equivalent Asset (MEA). The assets must be replaced by their MEA. The MEA is the replacement cost of the technology expected to be in place within the planning horizon. Note that this notion takes into account the introduction speed of a new technology in the network. If network departments plan to have replaced 50% of an old technology by a new one within the planning horizon, it makes no sense to simulate the costs with higher percentages because the planning takes into account the availability of the resources to carry out the work.

Find hereafter the rules that have been used:

- Technology still in procurement: use current price, e.g. IP equipment

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- Technology to be replaced within the planning horizon: use current price of the modern equivalent asset, e.g. TDM based voice equipment are replaced by IP based voice equipment.
- Technology grouped in : those assets will be revaluated by another asset concerning the same technology
- Old technology not anymore in service : those assets are set out of scope and will not be revaluated
- Old technology still in service (in maintenance mode); those assets are revaluated by an index method based on a fixed PPC instead of index, keep or inventory method. Old assets revaluated by keep will keep the CAV value as GRC
- BIPT regulated technology : use the BIPT models to extract relevant unit costs or use BIPT bottom-up models to directly calculate CAPEX costs with 2018 demand volumes

3.4.2.1 *Price Indexation*

This is the most straightforward approach, provided historical costs are available. The investments for each year (from 1981 on) are multiplied by the price index of the year concerned. The price index is equal to the ratio of the current price to the historical price of the equivalent service/product.

The method is refined by defining price indexes depending on the nature of the cost. This is particularly true when costs of a different nature experienced a different price evolution. Three different types of price indices have been defined: the labour index, the indices for services delivered by external companies and the material index. Note that indices for services supplied by external companies vary according to the asset involved. For example, services supplied by external companies related to cable assets, are in fact outsourced labour costs for trenching and cable installation. In such case, a labour index has been applied. Other external services less labour intensive are resulting in other price indices, such as a fibre cable index.

3.4.2.2 *Inventory*

This is the best method to reflect accurately the price of assets currently in service in the network. The revaluation is merely performed by multiplying the volume of each specific type of equipment currently deployed in the network by its average current unit cost. The current unit costs are based on the prices defined in the current frame agreements we have with our suppliers.

In terms of inputs it is the most demanding method. It requires an extensive inventory of equipment.

For some assets that are currently being deployed, we have used a regression method to calculate the investment value of the fully deployed assets.

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3.4.2.3 *Keep as it is.*

The "keep as it is" method is merely what its name says. We keep the price we have in the historical accounting books. This method is only valid for costs with a very short depreciation period or for software intensive products. For the latter we assume that on the one hand software development is labour intensive but on the other hand the rapidly evolving programming environment improves the productivity compensating for the higher labour cost. This results in a stable software price. Another practical reason to select the "Keep as it is" method is the amount booked on the asset. If this amount is small, the method has also been applied. In this particular case, the effort to collect all the information about the cost evolution outweighs the impact on the service costs.

3.4.2.4 *Index Based on a fixed PPC*

Old technology still in service (in maintenance mode) ; those assets are revaluated by an index method based on a fixed PPC.

If Proximus has done some investments for keeping those technologies in service, we take those investments also into account.

If Proximus has done some great retirements, the revaluation method is revised.

- Formula :

$$GRCyearN = [(GRCyearN-1)*(1+ fixedPPC2007)] + investmentsYearN$$

Formula :

Index year = (1+ (ppc year))* (1+(ppc year -1))* (1+(ppc year -2))*……..

3.4.2.5 *Asset valuation based on the Proximus Reference Offer tariffs and BIPT bottom-up cost models*

3.4.2.5.1 Method background and rationale

The market for fixed telecommunication services, the related technologies and the competition have evolved through the years leading to the current situation where the vast majority of the telecom services provided by the Proximus's access and area backbone networks are regulated. This regulation has been enforced, amongst other initiatives, by clearly specifying the services and applying regulated tariffs, as reflected in the Proximus Reference Offers (BRUO, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA).

Since the regulated tariffs are cost oriented and determined by bottom-up costing models, it is reasonable to use the direct CAPEX component of these prices to calculate the annuity of the assets addressed by the Proximus Reference Offers.

For Fixed Voice telephony regulation focusing on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a voice call

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on the fixed network (FTR), BIPT has developed a bottom up NGN cost model, calculating this termination rate. The latest available version of this model has been used to value NGN assets of the Voice NGN Platform.

Mobile telephony regulation mainly focuses on the wholesale market for call termination rate, determining the maximum rate that each operator is allowed to charge for terminating a mobile call (MTR). In order to calculate this termination rate, BIPT has developed a bottom up mobile cost model, including all voice and data services 2G and 3G. The latest available version of this model was published by BIPT in November 2013, and has been used to value mobile assets.

3.4.2.5.2 Method description

All the fixed network assets, except optical fiber infrastructure, concerned by the technologies covered by the Proximus Reference Offer models (BRxx), namely BRUO, Block&Tie cables, BROBA, BROTSoLL, BROTSoLL Ethernet and WBA, are valued by applying the direct CAPEX component of the relevant BRxx tariff to the appropriate volumes extracted from the Proximus inventories.

For fixed voice NGN assets valuation, Proximus fixed voice volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting economic cost has been extracted in order to value the assets.

For mobile assets valuation, Proximus mobile volumes have been used as the demand for the BIPT cost model. Based on the demand, the network elements are dimensioned in the model. The resulting CAPEX economic cost has been extracted in order to value the assets.

3.4.2.5.3 Scope

The technologies to be valued by this method, since they are covered by the Proximus Reference Offers and BIPT fixed voice NGN and mobile cost models, are:

- Copper infrastructure: including trenching, ducting and copper cable.
- (D)WDM
- PDH/SDH
- xDSL: including ADSL, ADSL2+ and SDSL
- VDSL
- Ethernet
- Fixed Voice NGN Platform assets.
- Mobile network assets 2G, 3G.

However, some parts of the networks deployed with the above mentioned technologies are not covered by the BIPT tariffs for they provide non-regulated services. Consequently, they cannot be valued by means of the regulated tariffs.

These services are:

- Any service provided by the Proximus express network layer, also called intercity network.
- Multicast services, namely broadcast TV.
- Access lines for the Explore customers.
- Mobile network assets 4G.

The chosen alternative for valuing the network sections providing the non-regulated services has been the development of specific models in order to determine applicable direct CAPEX unit prices,

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at the exception of the mobile network assets related to 4G technology that have been integrated in the bottom-up mobile cost model.

3.4.2.5.4 Method implementation

- *Inputs Fixed Network*
  - *Broken down tariffs*
    - *Broken down tariff based on the BIPT BRxx models*

      By analyzing each of the current BRxx models, the direct CAPEX component of each product of each tariff has been isolated. Further, this constituent has been broken down into all its applicable technological contributors, so that a unit price per technology, per product and per tariff is extracted (Figure 1: Conceptual description of the BRxx tariff breakdown.).

      Although the above described process is applicable to the majority of the BRxx models, there is an exception to the rule, the BIPT BROBA transport model. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, is given in paragraph 3.4.2.5.10.

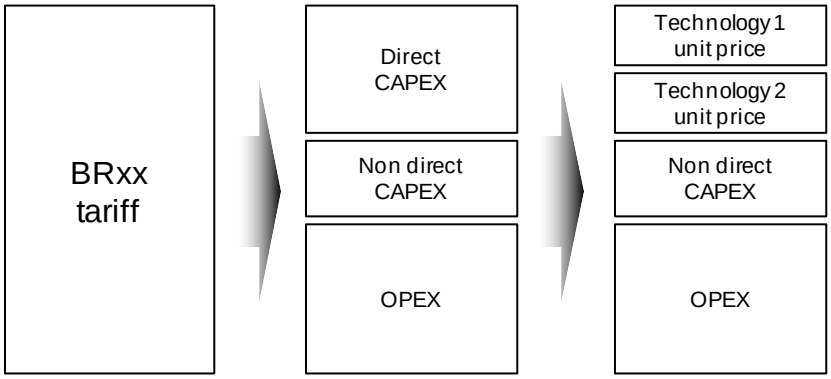

Figure 1: Conceptual description of the BRxx tariff breakdown.

Note: There is no relation between the size of the components and any broken down BRxx tariff.

    - *Broken down tariff for network areas not under the BIPT BRxx models scope*

      For those areas of the network not within the scope of the BIPT models, specific models have been developed in order to derive applicable broken down tariffs. These models have been built up on similar principles to those applied in the models developed by the BIPT. Whenever possible the actual BIPT tariff components have been re-used and existing BIPT models have been adjusted so that the obtained results are as comparable to those of the BIPT models as possible.

  - *Volumes*

    The volumes (demands) of all the telecommunication services utilizing the technologies subject to this valuation methodology are extracted from or determined based on Proximus inventory systems.

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- *Valuation (Fixed network)*
  - In a first step, each pair, line, VP, link or VLAN present in the volumes is valued by applying each and all of the technology unit prices of the relevant BRxx tariff. In this way, each telecom service's individual contribution to the assets valuation is calculated.
  - Finally, all the individual contributions are summarized per network asset, obtaining the final asset annuity.

- *Inputs mobile network*

  The latest version of the BIPT mobile cost model has been used in order to value mobile assets related to :

  - Radio Access network (RAN)
  - Ground Antenna
  - Mobile Voice Switching
  - Mobile Data Switching
  - Mobile Location Register

  Proximus mobile voice and data volumes, as determined based on Proximus inventory systems, have been used as the demand for the cost model. Based on this demand, the model dimensions the required network assets.

  Only capex economic depreciation has been taken into account, all opex values in the model have been set to 0.

  The WACC is based on BIPT's decision issued on February 26, 2015 (8,13%).

- *Valuation mobile network assets*

Capital expenditures are annualized according to BIPT's economic depreciation. This is a different methodology compared to the TAM used for fixed network related assets.

The economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2018, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output in the form of a net present value.

- *Inputs Fixed Voice NGN platform network*

  The latest version of the BIPT mobile cost model has been used in order to value fixed voice NGN platform assets related to :

  - Own Network Call Handling
  - Interconnecting Call Handling
  - Voice over Broadband Session Border Controllers (SBC)
  - Voice IP Router
  - Voice TDM Trunks
- *Valuation fixed voice NGN network*

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The economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2018, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business.

3.4.2.5.5 Exceptions to the generic implementation

Although the above described process is applicable to the majority of the tariffs and related technologies, there are two exceptions to the rule.

The breakdown of the BIPT BROBA transport tariff is made differently. A complete explanation on how this tariff is broken down, in order to obtain the direct CAPEX component, and how it is applied is given in paragraph 3.4.2.5.10.

The valuation of the transport SDH/PDH assets implementing the regulated part of the Proximus's SDH network, although based on the BIPT's BROTSoLL model, do not follow the above described generic process. The used methodology is described under the paragraph "Updated BROTSoLL model to the 2013 demand".

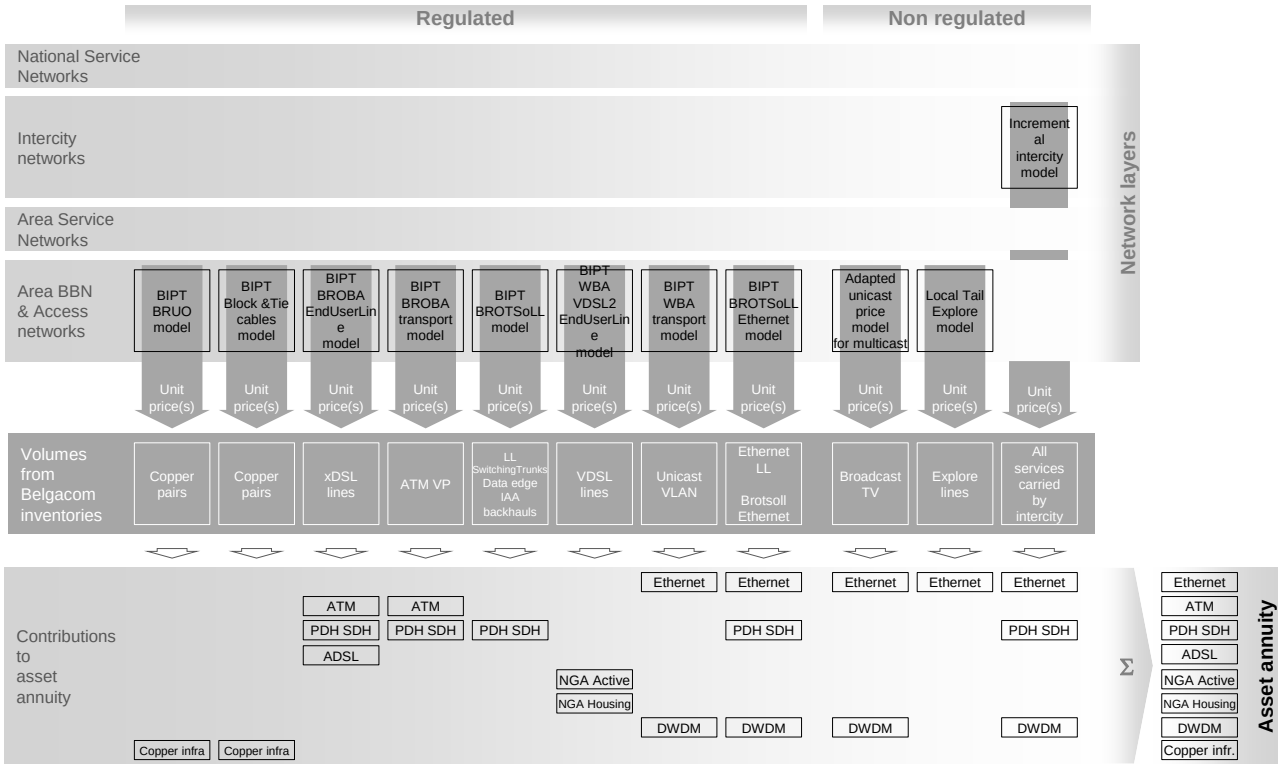

Figure 2: BRxx based valuation method. Scope and implementation.

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3.4.2.5.6 BIPT BRxx tariffs as base for asset valuation

3.4.2.5.6.1 BRUO

The BIPT BRUO model (decision of 9/11/2011) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure until the 2016 model. These assets have been valued based on the unit direct CAPEX cost in the BRUO model and the number of pairs used. It mainly includes the cost of copper cables, trenching and street cabinets and covers the copper distribution and copper feeding networks.

In 2017, the valuation BIPT model has been updated to reflect the current network situation. End 2017, Proximus announced internally that all telephony switches had been out-phased and replaced by AGW (Audio GateWay) technology. Therefor the method used for the valuation of the copper access network needed to be updated.

A separate document, explaining the updates made in the BIPT model and the new method of valuation is available in the folder containing the driver calculation files.

The yearly direct CAPEX cost of the following assets has been calculated based on BRUO tariffs:

- Raw Copper for PSTN/ISDN accesses connected to AGW-LEX, central site based broadband without voice accesses, local tails for leased lines type of connectivity, BRUO raw copper.
- Copper subloop, for VDSL connections without voice accesses and PSTN/ISDN accesses not connected to AGW-LEX.
- Copper subloop testing cost, which was formally used to ensure remote line testing of ROP based VDSL connections without voice accesses, is no longer valuated since this no longer uses separate copper pairs

In the frame of a possible fixed/variable analysis of the results of the model, copper distribution and feeding network costs are categorized as fixed. It should be noted that this has no impact on the results of the model itself.

Our analysis is based on the approach used by BIPT and its consultant, Analysys Mason, for the development of an NGN/NGA model. The dimensioning of the copper distribution and feeding network is dependent on the evolution of the number of households, reflecting the universal service obligation of Proximus. The evolution of the number of copper pairs actually used by customers subscriptions or internal usage, has no impact on the total copper access investment cost calculated by the BIPT NGN/NGA model. Copper access (distribution and feeding) is a fixed cost, with no causality of the volume of copper pairs actually used.

Its allocation method could be based on the market value of the different products using the network. However, in order to be conform to the approach used by BIPT in the BRUO/BROBA reference offers, we have attributed the copper access network cost towards the different end-user services and markets based on the number of consumed copper pairs.

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The cost of the copper splitters, to split narrowband and broadband signals for shared pairs has been valued based on the shared pairs inventory.

3.4.2.5.6.2 Blocks and tie cables

The BIPT Blocks and Tie cable model (decision 2/7/2008) has been used to valuate assets included in the asset AC2_20104 Copper infrastructure. This bottom-up model defines direct CAPEX prices for Main Distribution Frame blocks and for tie cables to other access network equipment.

The current value of following assets has been calculated based on Blocks and Tie cable tariffs:

- Copper local loop testing: internal cabling for copper connectivity to perform remote testing of broadband customer connections without voice accesses based at the central site.
- Copper subloop testing: internal cabling for copper connectivity of ROP based VDSL customer connections without voice accesses.
- Continue raw copper and shared feeding pairs: internal cabling for copper connectivity from the Main Distribution Frame or broadband splitter equipment to other access equipment or collocated access equipment.

3.4.2.5.6.3 BROBA rental per end-user line

The BROBA rental fee per end-user line is split by BIPT between the active part and the transport rental ATM or Ethernet part. This model is sometimes referred to as BROBA Bitstream.

3.4.2.5.6.3.1 Active part

The BROBA model (decision of 6/8/2010) has been used to valuate assets included in AC2_20102 ADSL equipment. It is related to DSLAM and Main Distribution Frame space yearly direct CAPEX costs.

The asset has been calculated based on the direct CAPEX part of the BROBA Bitstream tariff applied to ADSL, ADSL2+ and SDSL subscription volumes.

3.4.2.5.6.3.2 Transport rental ATM

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.4 BROBA ATM transport

- ATM is outphased and is no longer valuated in the model.

3.4.2.5.6.5 BROTSoLL (access line only)

The Proximus Reference Offer for Terminating Segments of Leased Lines (BROTSoLL) regulates the complete PDH/SDH transmission network of Proximus, with the exception of the highest hierarchy rings, the so called Intercity network or express layer. The current BIPT decision on this tariff dates from 10/3/2008.

Note that for this model the below explanation is only applicable to the valuation of the access lines to BROTSoLL services. The valuation of the transport costs has been done as described in the

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*paragraph "*Transport PDH/SDH valuation". The technologies covered by this reference offer and consequently to be valued through this tariff are:

- PDH/SDH : covering the costs of the access line equipment of this technology.

Further, this service can in fact make use of the copper infrastructure on the access side in case of small bandwidth lines. However, these costs are embedded in the BRUO based valuation.

The SDH access line valuation has been done by applying the above technologies direct CAPEX unit cost to all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR, the Proximus transmission inventory system.

3.4.2.5.6.6 WBA VDSL2 end user line

3.4.2.5.6.6.1 Passive part

The BIPT WBA model (decision 10/11/2010) has been used to value the assets AC2_20108 NGA Housing and part of the asset AC2_20106 fiber infrastructure related to external fiber connectivity to the cabinet (ROP ; Remote Optical Platform).

For the valuation of AC2_20108 NGA Housing, the BIPT unit direct CAPEX cost has been applied to the number of VDSL2 subscriptions. The main elements included are the cost of the ROP, the copper connectivity between the ROP and the street cabinet and power equipment.

3.4.2.5.6.6.2 Active part

The asset AC2_20107 NGA Active equipment has been valued based on the related BIPT direct CAPEX cost.

It is mainly related to the IP DSLAM installed in the ROP or in the local site, the equipment to aggregate the fiber cables connecting the ROP to the local exchange ("aggregators"), as well as the internal cabling and block positions on the optical main distribution frame (OMDF).

3.4.2.5.6.7 BROTSoLL Ethernet (access line only)

Being a special case of BROTSoLL, the services within the BROTSoLL Ethernet scope are the dedicated transparent Ethernet connections. The current BIPT decision on this tariff dates from 10/3/2008.

In principle these lines are implemented as Ethernet over SDH. However, due to the rather large bandwidth typical to this type of services -10 Mbps, 100 Mbps or 1Gbps- this implementation is neither always possible nor efficient. Therefore we distinguish two main technical executions:

- Ethernet over SDH: for the 10 or 100 Mbps lines, also named Ethernet and Fast Ethernet respectively
- Ethernet over DWDM: for the 1 Gbps or Gigabit Ethernet lines, where the DWDM wavelength is dedicated to the line. Note that no SDH equipment is used in this case.

The Ethernet over SDH services require SDH and optical fiber for their implementation. Therefore, and following the 2013 model logic, the SDH costs incurred by the implementation of such services

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will be valued by the "Updated BROTSoLL model to the 2013 demand". The optical fiber costs are not valued by the BRxx method anymore.

Regarding the Ethernet over DWDM services, the access tariffs are the same as in BROTSoLL and the transport cost is calculated as described in chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.7 Transport PDH/SDH valuation

The present BROTSoLL model is based on the Proximus SDH services inventory belonging to 2005. From 2005 until now the utilization of the SDH services has changed and new services consuming large bandwidth, typically Brotsoll Ethernet and the like products, have been implemented over SDH. These new services would alter the distribution of services per bandwidth, putting an extra weight on the higher bandwidths, imposing changes in the network dimensioned by the BROTSoLL calculation sheets which in turn will incur in (nonlinear) costs changes.

Therefore, in order to incorporate a more realistic SDH cost in the model, it was decided to re-play the current BROTSoLL model with the 2015 SDH services demand.

In order to do so, the relevant files of the cumbersome BROTSoLL model have been consolidated into two streamlined files that easily allow the dimensioning and costing of the required SDH network for any given demand.

Then the set of all the SDH based services running on the Proximus network at the end of the year 2013 (all the links implemented over SDH under the BROTSoLL and BROTSoLL Ethernet over SDH scope which are documented in ITR) was entered into the new consolidated transport BROTSoLL engine and the resulting SDH costs represent the value of the PDH/SDH asset in the 2013 model.

3.4.2.5.8 Transport Ethernet and DWDM valuation

The model used is based on the national network design module for NGN/NGA fixed LRIC model, by Analysis Mason for BIPT. A number of modifications to this module were done in order to support non-NGN (ADSL or SDSL via Ethernet switch) traffic and customer lambda services in a more realistic way. The adapted module is used to forecast investment costs for Ethernet and DWDM equipment to meet input level of demand.

The demand covers Voice over IP (VoIP), Fast Internet access (FIA, retail and wholesale), Bitstream (shared and dedicated), Video on Demand (VoD), Proximus TV (multicast), Business Data (Explore IPVPN and Eline) and lambda services (transparent ethernet 1Gbps and 10Gbps lines via DWDM for customers).

This bottom-up model takes into account the actual demand and calculates the needed backbone (regional and national-intercity) Ethernet and DWDM elements and their valuation.

3.4.2.5.9 Non regulated tariffs as base for asset valuation

3.4.2.5.9.1 Local Tail Explore

Local Tail Explore refers to the access line, this is to say the set of equipments and infrastructure entailed to provide the connectivity between the customer and the Proximus network, the Explore customers require. Given that Explore is not a regulated product and has specific technical

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requirements that are not contemplated by any of the existing BIPT models, a new model needed to be developed to cost this segment.

In fact, the model is very straightforward since it just consists of isolating the few different components in the offered technical solutions and applying their respective annualized costs. Since the infrastructure components present in this model have already been valued by existing BIPT models, the regulated direct CAPEX unit costs have been applied to them.

The only asset in which this model participates is Ethernet.

In principle, this model should also contribute to the Copper infrastructure, since there is a technical solution on copper, however this asset valuation component is fully taken into consideration by the valuation based on the BRUO model.

The valuation has been done by applying the fitting direct CAPEX technology to all access lines to Explore services documented in ITR, the Proximus transmission inventory system.

3.4.2.5.9.2 Incremental intercity model

We refer to the chapter 'Transport Ethernet and DWDM valuation'.

3.4.2.5.10 ATM equipment asset valuation

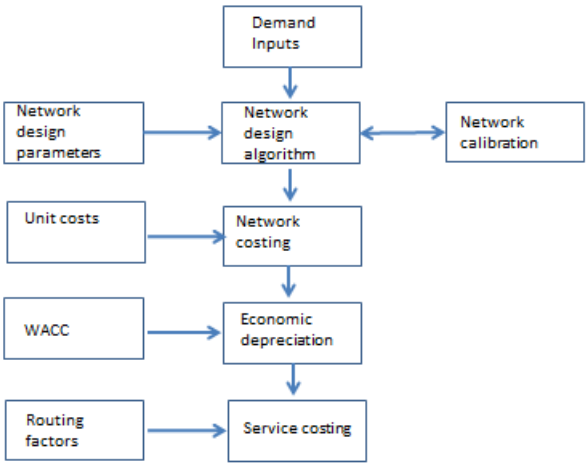
- ATM is outphased and is no longer valuated in the model.

3.4.2.5.11 Mobile cost model for network assets valuation

The BIPT bottom-up mobile cost model has been used to value assets :

- AC2_20110 RAN
- AC2_20111 Ground Antenna
- AC2_20112 Mobile Data Switching
- AC2_20113 Mobile Location Register
- AC2_20114 Mobile Voice switching

The flow diagram of BIPT mobile cost model can be summarized as follows :



Sensitivity: Unrestricted

Mobile cost model – flow diagram (source : Analysys Mason)

Proximus volumes (subscribers and mobile voice and data traffic) have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2018, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business (1994 – 2043 in BIPT model).

The level of economic cost is determined by total expenditure divided by output (volume generated by the network element) in the form of a net present value.

The calculation can be summarized as follows :

Calculation of net present value expenditures

NPV (Invest) = $\sum_{Years} Investment * discount\ rate\ multiplier$

Calculation of net present value output (recovery)

NPV (volume* ppc) = $\sum_{Years} PPC\ year * Vol\ year * \ discount\ rate\ multiplier$

ppc being the cost trend for the related network element

the discount rate multiplier is calculated based on a 8,13% WACC (BIPT's decision issued on February 26, 2015)

The capex cost per unit output can be defined as :

$p0_{1993}=\frac{NPV\ (Invest)}{NPV\ (Vol*ppc)}$

and

$pn_{year}=P0*ppc_{year}$

The total annualized economic cost for the year "year" is equal to :

$$p_{year*V_{year}}$$

3.4.2.5.12 Fixed Voice NGN platform cost model for network assets valuation

The BIPT bottom-up Fixed Voice NGN platform cost model has been used to value asset:

- AC2_20115 FixedVoice_NGN_Platform

Sensitivity: Unrestricted

Proximus fixed voice traffic volumes have been used as inputs for the model demand. Based on this, the model calculates the economic depreciation of all network elements. The calculation is based only on capex economic depreciation, as all opex costs in the BIPT model have been set to zero.

Economic depreciation reflects the recovery of past and future network investments, in order to maintain the level of business as of end 2018, in this case. The model accumulates cost recovery to achieve full cost recovery over the lifetime of the business.

3.4.3 TAM: Tilted Annuity Method

3.4.3.1 *Theory*

The purpose of this section is to describe how the Tilted Annuity Method (TAM) is finally implemented in the Current Cost Accounting (CCA) based network cost model.

As from the 2003 model, Proximus implemented the formula that BIPT suggested.

$$ACC\mu Y = F1, \mu Y \times F2, \mu Y$$

where

$$F1, \mu Y = (GRC\mu Y, begin + GRC\ \mu Y, end)/2$$

$$F2, \mu Y = \sqrt{}(1 + WACCY) \times [\ 1 - (1 + APC\mu)/(1 + WACCY)\ ] / [1 - [(1 + APC\mu)/(1 + WACCY)]\ \hat{}\ L\mu]$$

and where

- ACCμY: Annual CAPEX Cost of asset μ and year Y. It includes the annual depreciation and the cost of capital.
- WACCY: WACC of year Y.
- GRCμY, begin: Gross Replacement Cost of asset μ at the beginning of year Y.
- GRC μY, end: Gross Replacement Cost of asset μ at the end of year Y.
- APCμ : Annual Price Change of asset μ .
- Lμ : Lifetime of asset μ.

Remarks:

The formula assumes that:

- In the beginning of year Y was invested in an asset and that at the middle of each year of the lifetime of the asset revenues will be generated.
- The annual price change is constant over the lifetime of the asset.
- The asset price does not evolve during the year, i.e. price changes only appear at January 1st.

The factor F1, μY represents the value of asset μ in the middle of year Y.

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- The purpose of the arithmetic average of GRCμY, begin and GRC μY, end is to take into account investments or disinvestments of asset μ during the year Y.
- The arithmetic average of GRCμY, begin and GRC μY, end does not filter out the price evolution of the asset μ during the year Y.

The difference between the formula of BIPT and the formula of Exhibit 5, p. B3. of the white paper of Analysys is the factor $1 / \sqrt{(1 + APC\mu)}$, which filters out the price evolution of the asset μ during the year Y.

The gross replacement cost (GRC) of assets at any particular point in time is calculated as the sum over all assets owned by the business at that point in time, of the investment that would be necessary to purchase and install new replacements for those assets at that point in time (using modern equivalent assets if the existing assets are no longer available or efficient). The replacement value of assets, used for costing purposes should always include the gross value of every asset in use by the business (the current cost of replacing it with a new, possibly modern equivalent asset), irrespective of the history of depreciation of that asset in any financial accounts to date.

Lμ : Lifetime of asset μ, i.e. the expected useful lifetime of the new asset μ.

The depreciation period and the expected useful lifetime of a new asset are defined differently. The depreciation period refers to accounting. The expected useful lifetime of a new asset does not refer to accounting. It refers to the period that is expected that a new asset will be used. The main factor to determine the expected useful lifetime of a new asset is the evolution of the associated operational costs, i.e. the asset will be replaced when operating it becomes too expensive. Another factor is the appearance of new technology: if in the future new technology will come-up it could be that the asset will be replaced (even if it is not too expensive to operate).

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4 SCF (Support and Customer Flow) stream

4.1 Allocation of the support costs

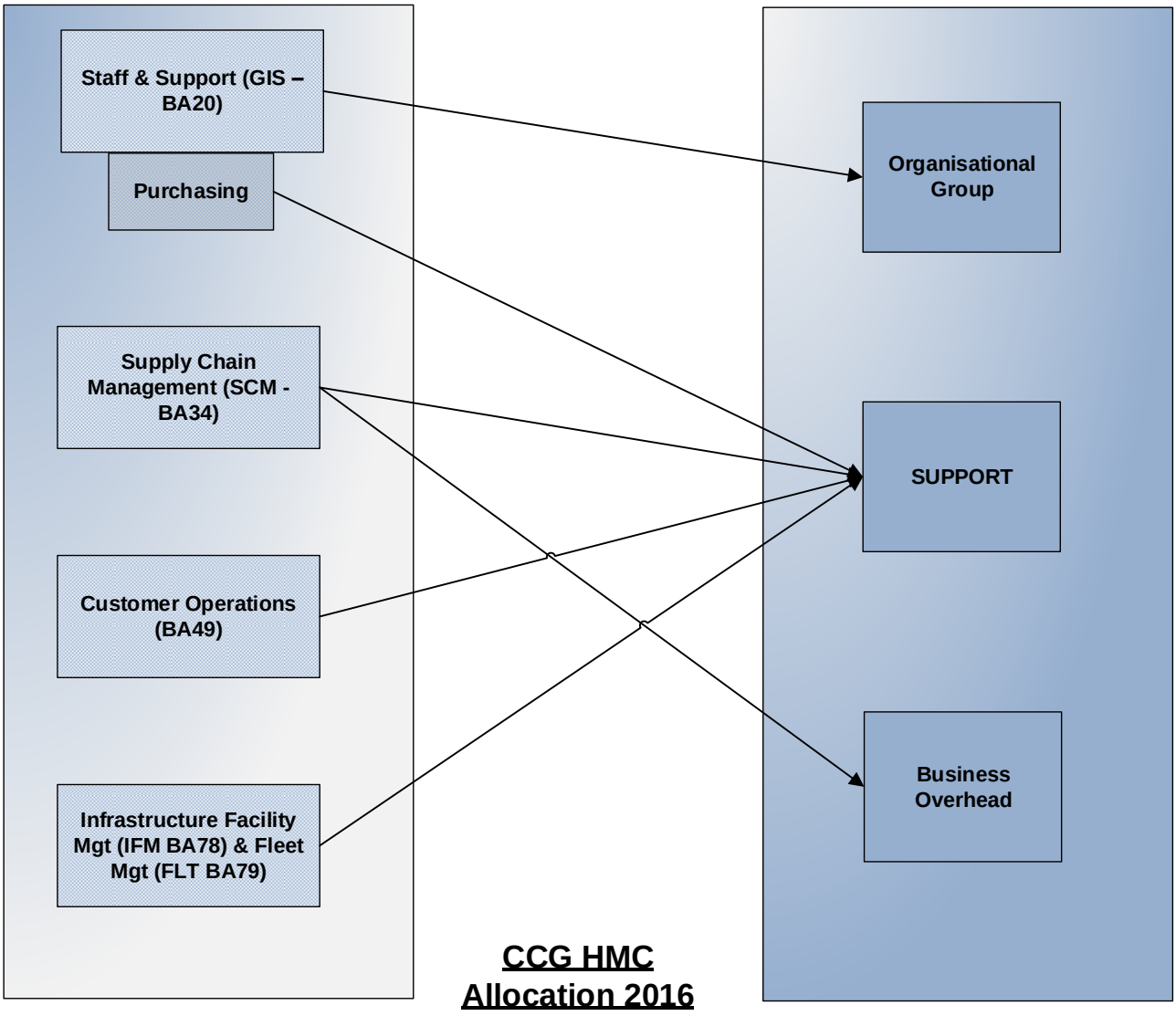
4.1.1 Support Scope

Since 2013, all support costs are treated within one SUPPORT module and as such, no cascade principle is used meaning that support costs, once in the SUPPORT module, can only be allocated to a non-support destination and to a non-support division. The divisions that are considered as support costs are:

- Group Internal Services (GIS – BA34) for departments like Real Estate, Business Services, Security, Safety & Environment, and Catering.
- Supply Chain Management responsible for warehousing, logistics and distribution is now part of the CUO division.
- Infrastructure Facility Management (IFM – BA78) encompasses a wide variety of support activities like building & technical services, print shops and copy shops, energy and operational centre of excellence.
- Fleet Management (FLT – BA79) for the support of all Proximus management, utility and sales vehicles.

They fall under the responsibility of FIN, the financial department from the Staff and Support division (S&S – BA20) where are located the GHR, Legal, Strategy, Public Affairs and Communications departments. The Staff & Support costs should avoid passing by the Support allocation flow as they are business overhead related costs. There can be some exceptions to this rule when a specific support cost is booked in the BA20 such as illustrated below:

Sensitivity: Unrestricted



4.1.2 Support Cost Objects

The following support objects were created in order to pool support-related costs within one module, before allocating them either directly to the cost's specific object located further on in the cost model, either to multiple objects using inventory-based allocation keys. This work is achieved by using reports from dedicated teams supporting an inventory from which specific volumes can be derived, such as the ones from fleet management regarding Proximus vehicle's park or Connect Immo regarding the building's occupation. A last group of support objects are allocated by the use of FTE keys in order to split these costs among all departments that benefit from them. The overall support allocation can be summarized as follows:

Summary of Driver type relation to Support Object allocation
Avg # FTE ALL LEVELS with office excl. support/centrally booked
Support_Manage moves
Support_Manage waste and scrap
Support_Manage, maintain and repair buildings (excluding moves) (office space)

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Support_Provide catering services
Support_Provide copy services

costs of shops buildings (in %)

Support_Manage, maintain and repair buildings (excluding moves) (shop space)

Direct

CBU_billing_fix products
CWS_Billing
EBU_billing_fix products
MOB_billing
Support_13001 Data Managed Services & Applications
Support_14001 TV and VoD
Support_22243 Nat. IC - infra. Co-location /Co-mingling
Support_30000 Subsidiaries & externals
Support_IT
Support_Power Chain for ROP
Support_Power Chain for telecom_SDE
Support_PROX_Pylons
Support_Telecom space_SDE

Estimated Nbr Management Cars

Support_Manage, maintain and repair fleet vehicles (management vehicles)

Estimated Nbr of Sales Cars

Support_Manage, maintain and repair fleet vehicles (sales vehicles)

Estimated Nbr of Utility Cars

Support_Manage, maintain and repair fleet vehicles (utility vehicles)

Stock Material return

SUPPORT_Reverse_Logistics

Stock Quantities

Support_Manage goods, warehouse & equivalents

Sum of Purchase Orders

Support_Purchasing, quality and ordering

total MOS value 2011

Support_Manage cables

Value of material transported from stock (in eur)

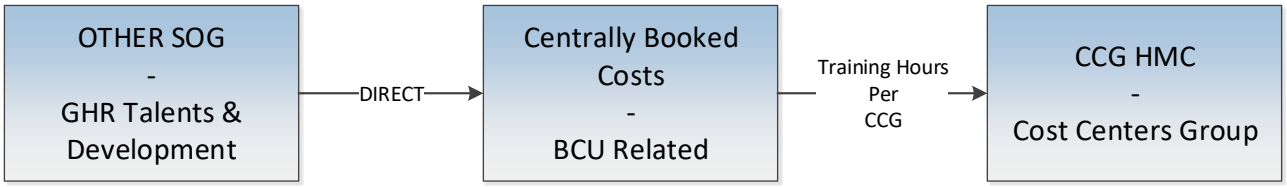
Support_Manage internal distribution

The driver named “Avg # FTE All Levels with office excl. support/centrally booked” is a specific driver calculated internally by the cost modelling team. It excludes from its scope all support divisions and teams that do not benefit from these costs such as employees not occupying a desk in Proximus Buildings. This is done in order to match the scope of these costs. In order to give coherence to such trade-off, the decision factor for the Customer Operation division was changed from the level of the employee within the company to the cost variability of the organisational group in question. The underlying reason being that fixed costs organisational groups are management

Sensitivity: Unrestricted

related while variable ones are field related. Therefore, only fixed organisational groups were considered in the scope of this driver as the field teams are by definition not in Proximus offices and should not benefit from the specific support costs this key is applied to.

It should be noted that training costs related to Proximus's Corporate University (PCU) have to avoid passing through the SUPPORT module but have to be pooled with their respective team's/CCGs. The grouping of these costs is done as illustred below:

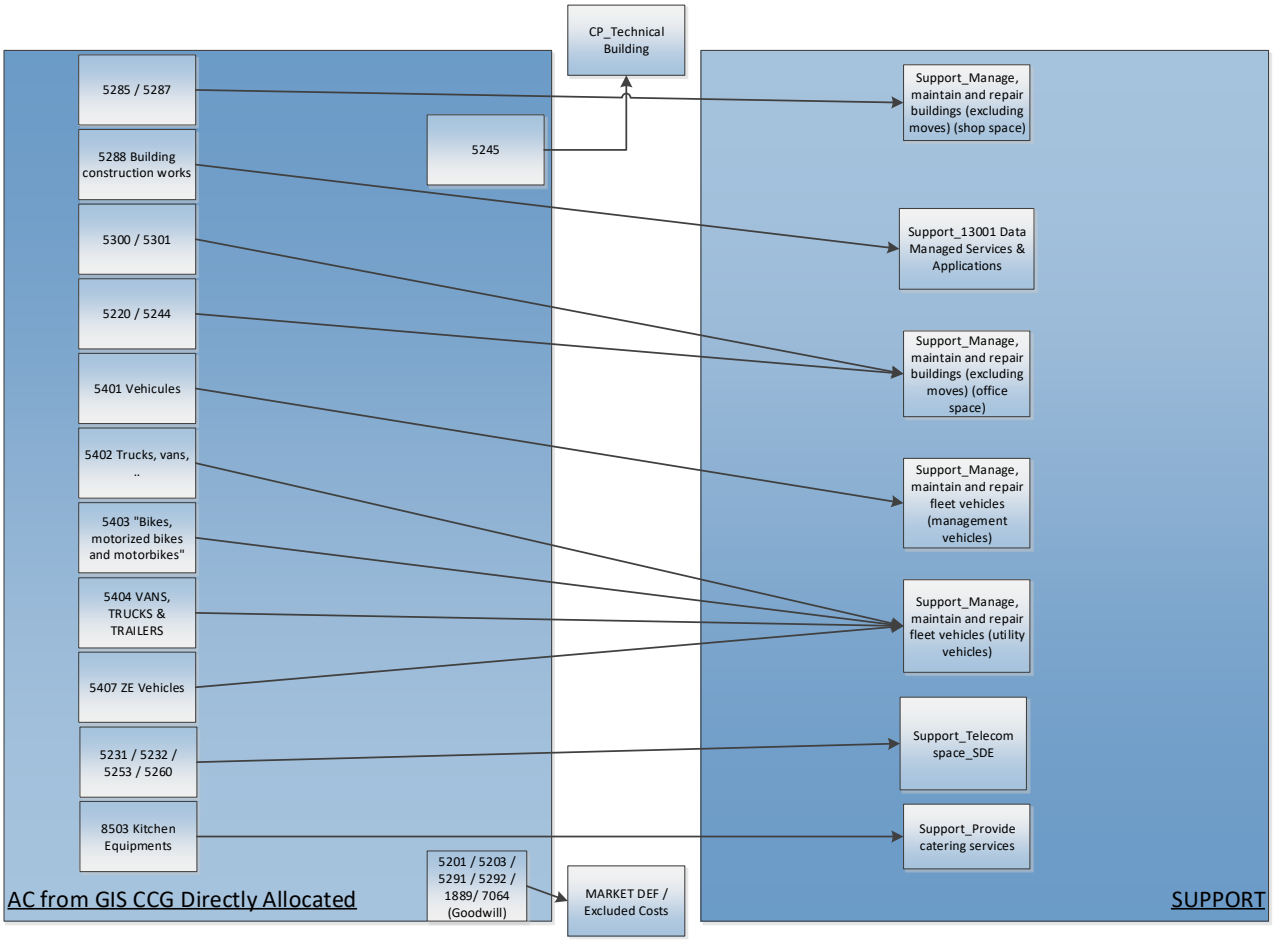


In 2015, Logistics and warehouse activities were reorganized within the CUO division in order to improve the quality of service by giving more consistency to the customer service chain as well as improving the systems of logistics controls in order to better the material flow in the Proximus group. The warehouse is where most equipment used by Proximus or by its clients are stored. Allocation keys are based on the inventories from their corresponding team registering which type of equipment in what type of quantities were stored and delivered.

4.1.3 Asset Support Allocation

Two types of assets allocations can be distinguished: The ones that can be directly linked to a support object from the previous list and allocated as shown by the following diagram:

Sensitivity: Unrestricted



Other assets affect multiple support activities where the use of a specific cost driver is required. Typically, buildings, fleet and energy are support activities that need to be ventilated on many support objects with the use of their corresponding driver: vehicles per category for fleet, square meters occupied per building type for buildings and electricity consumption per equipment or building for energy. The following diagram represents the logic behind asset allocation towards the support flow by presenting its main allocation drivers:

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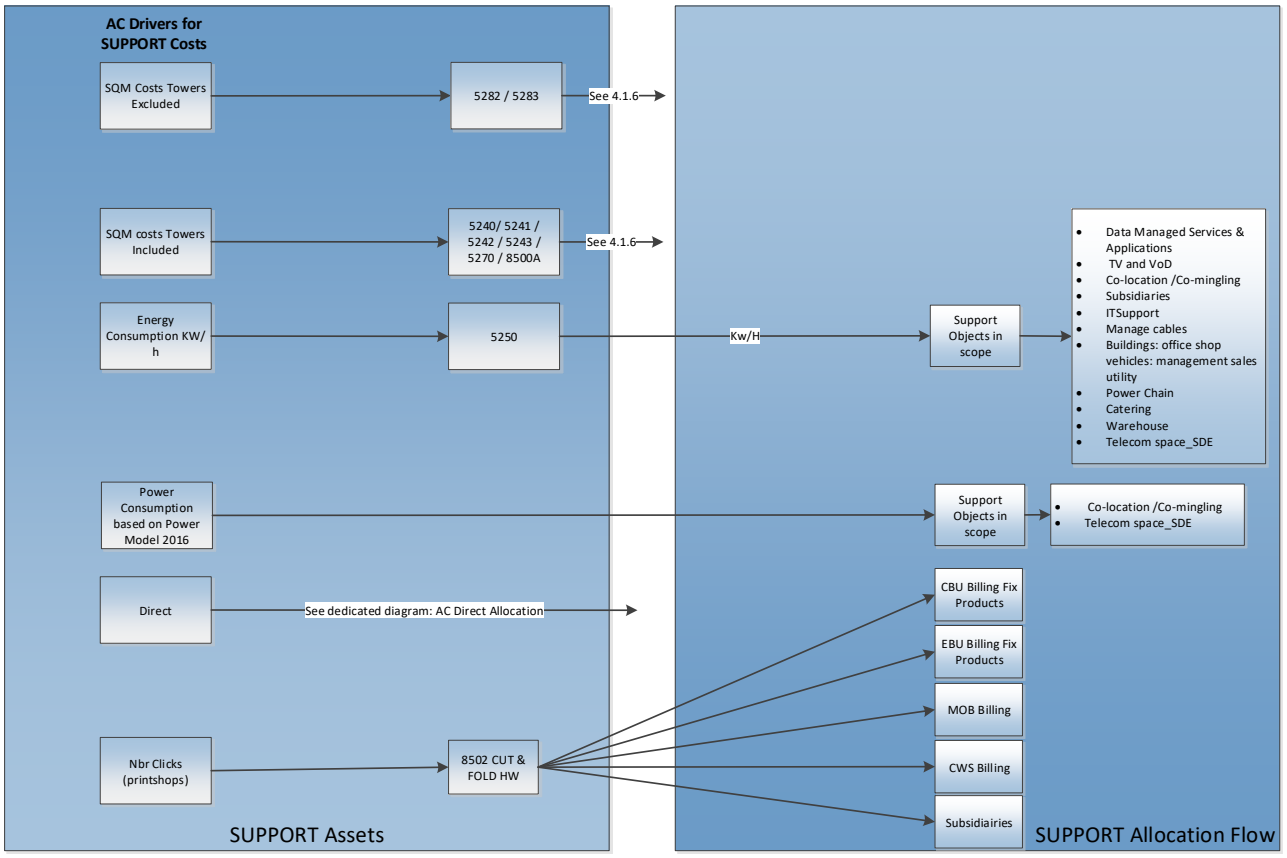
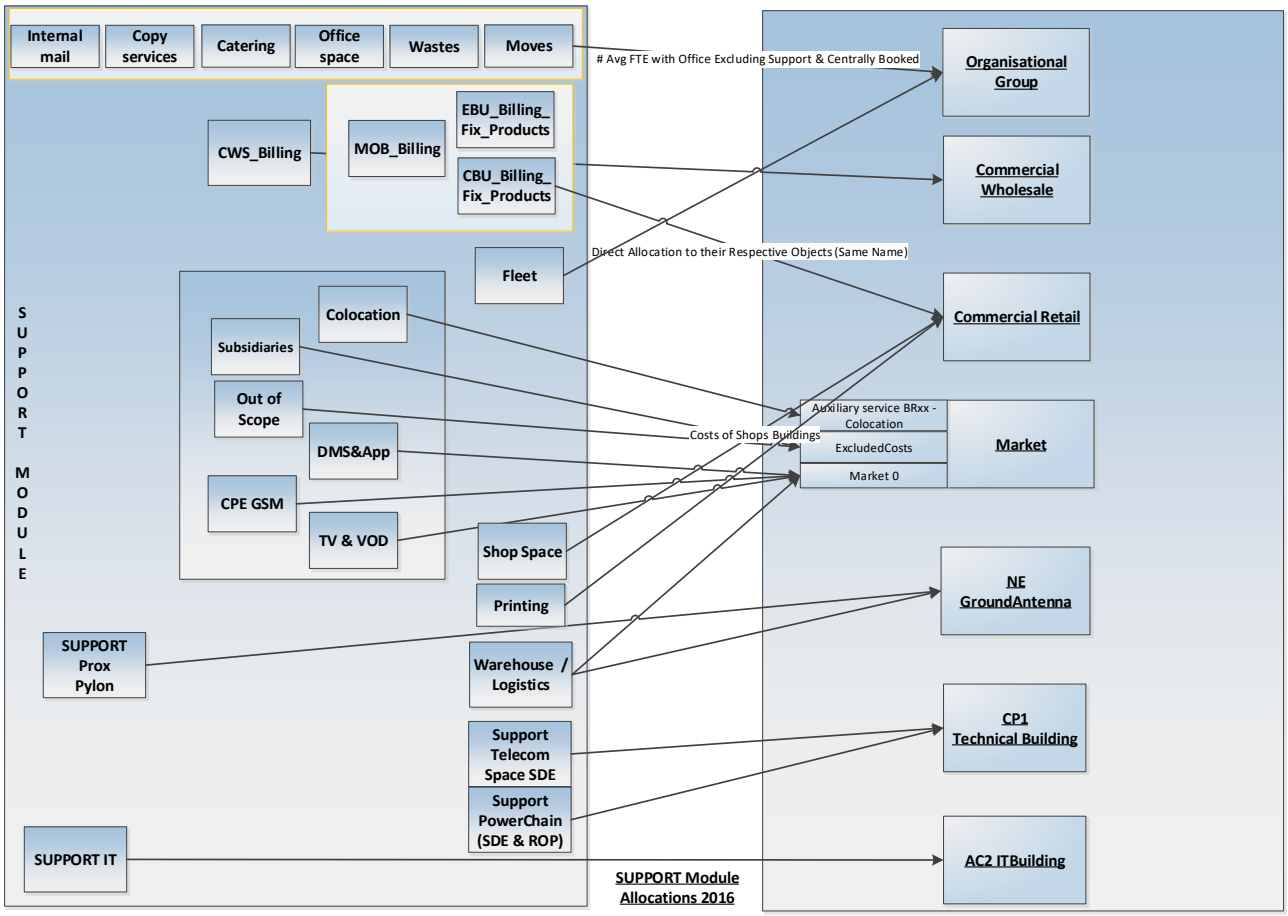


4.1.4 Allocation From the support module

The same principle as before is applied: if a support object can be directly linked to an object located further on in the cost model, it will be directly allocated to it. Such cases are illustrated in the following drawing:

Sensitivity: Unrestricted



4.1.5 Fleet case

All fleet related costs are pooled in the Support module within the three following objects:

- The support, maintenance and repair of management vehicles.
- The support, maintenance and repair of sales vehicles
- The support, maintenance and repair of Utility vehicles.

With the use of an inventory maintained internally by Proximus, the number of vehicles per type and organisational group is used as an allocation key for the fleet costs.

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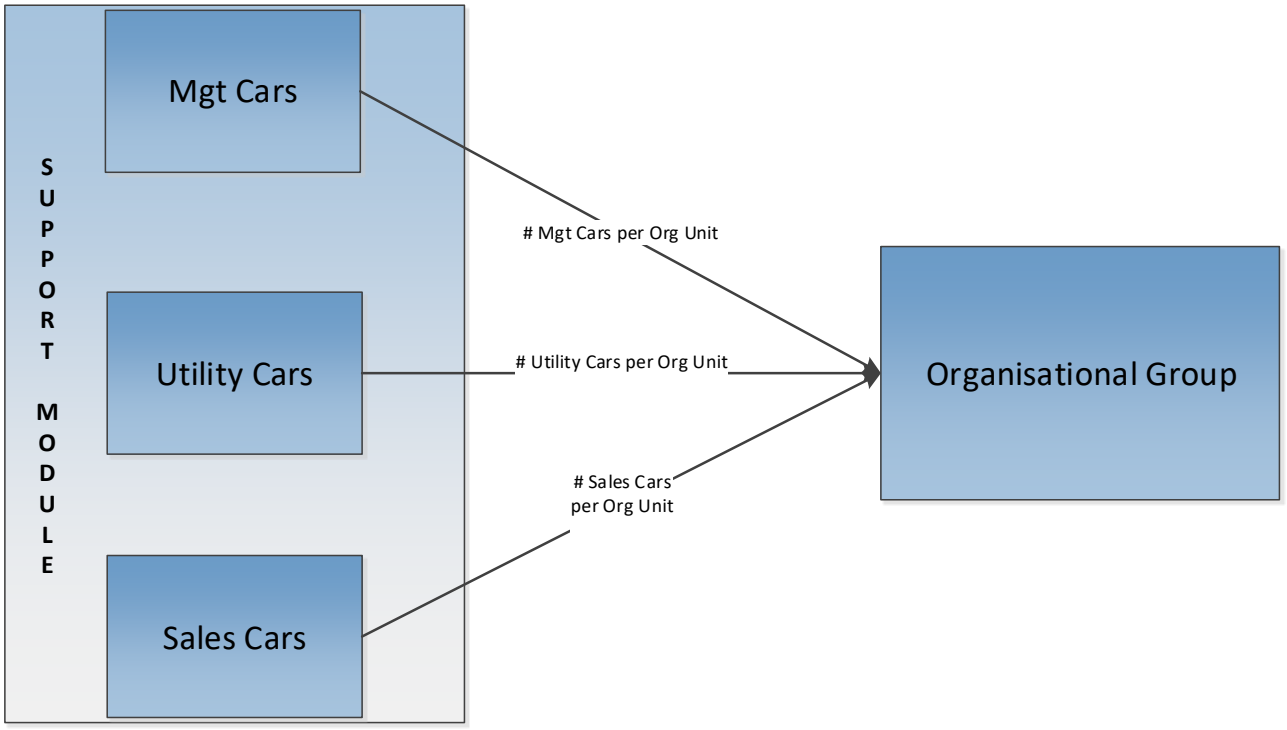

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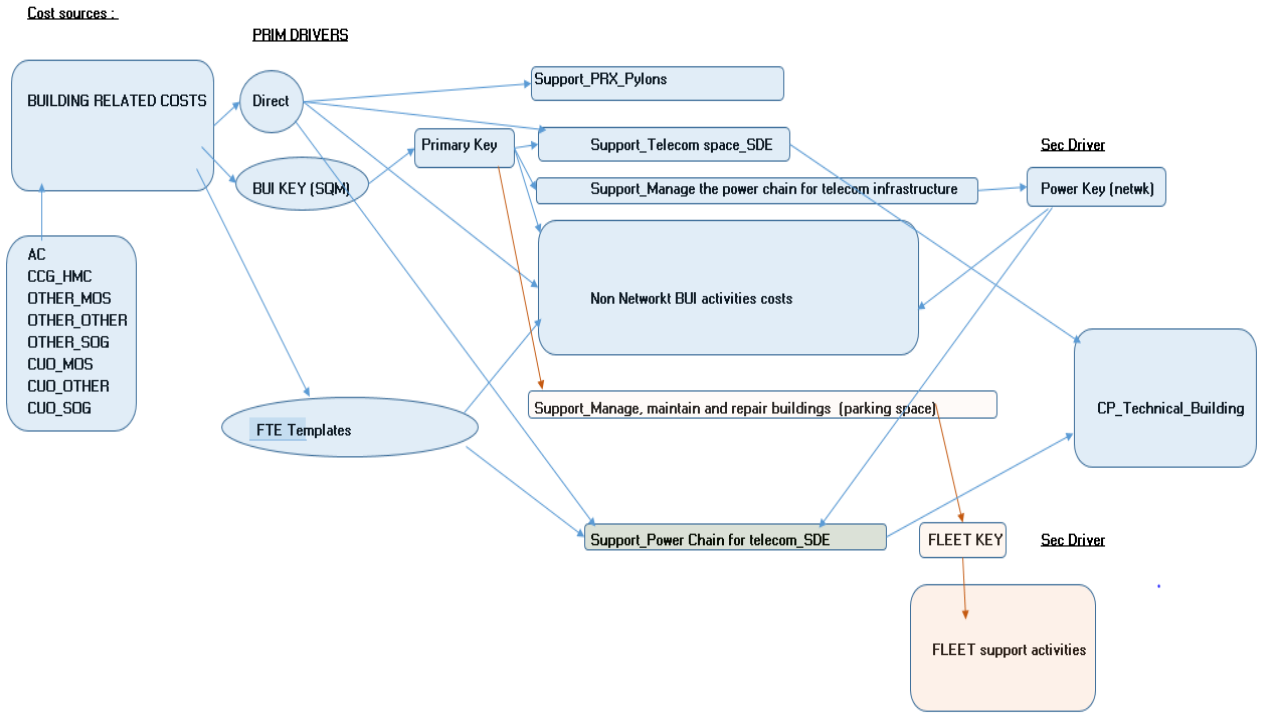
4.1.6 Buildings Support costs :

4.1.6.1 *Global picture of the allocation:*



4.1.6.2 *Source of the buildings costs :*

The BUI support costs are mainly coming from :

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COST NATURE	Source of costs
ASSET	5255 Heating,Ventilation & Air-Conditioning
	5220 Exploitation land
	5240 Exploitation buildings
	5282 Work in rented building
WAGES	78401 GIS - IFM - BTS-Building & Technical Services
	34300 GIS - CPP - Securit - Safety & Environment
	78003 GIS - ASP - PRO - Projects
OTHER_OTHER	GIS - IMM - Real Estate / 34100 / tax-building / 6401
	GIS - IMM - Real Estate / 34100 / local taxes / 6407
OTHER_SOG	GIS - IMM - Real Estate / 34100 / building / 61010
	GIS - ENY - Utilities & Support / 78610 / Pylons / 61195
	GIS - CPP - Securit - Safety & Environment / 34300 / building / 61010
	GIS - IFM - BTS-Building & Technical Services / 78401 / building / 61010
	GIS - ENY - Utilities & Support / 78610 / energy / 61060
	GIS - IMM - Real Estate / 34100 / CImmo & third party building & equipm. taxes / 61160
	GIS - MOB - IFM - OTH - PYLONS / 78501 / building / 61010
	GIS - MOB - IFM - OTH - PYLONS / 78501 / energy / 61060

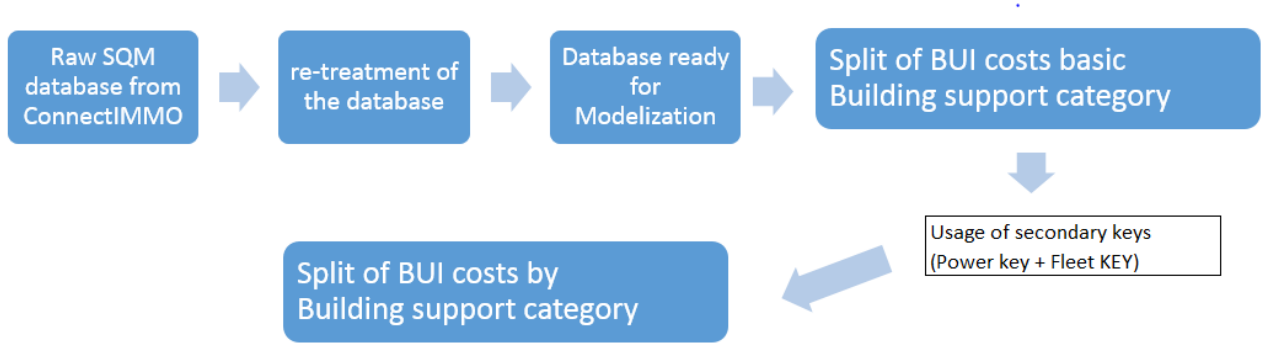
4.1.6.3 *Drivers used for the allocation*

4.1.6.3.1 The SQM (Tower included or excluded).

This key is based on a database provided by ConnectImmo, the Proximus separate entity that manages the PXS Building/SQM portfolios. Volumes (sqm) are valued by category (office, telecom, parking, catering,…) and the resulting keys are used to allocate the costs.

SQM Allocation

sources and process



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4.1.6.3.2 Direct:

Pylon related costs, Exploitation land (AC) to Support_Manage, maintain and repair buildings (excluding moves) (office space)

4.1.6.3.3 FTE Template completion

The following teams are allocated with the input of team leaders (split of FTE's by Building activities).

These teams are in charge of the management of the Proximus Buildings.

78001 GIS - ASP - PRO - Coordination
78003 GIS - ASP - PRO - Projects
78400 GIS - IFM - Infrastr. & Fac. Mgt & Support Staff
78401 GIS - IFM - BTS-Building & Technical Services

4.1.6.4 *The Destination of the BUI related costs :*

After usage of primary and/or secondary keys, the BUI related costs are allocated to following activities:

Activity	
Support_Telecom space_SDE	Network related
Support_Power Chain for telecom_SDE	Network related
Support_PROX_Pylons	Network related
Support_Manage cables	Network related
Support_Manage, maintain and repair buildings (excluding moves) (shop space)	Retail related
Support_Manage, maintain and repair fleet vehicles (utility vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (management vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair fleet vehicles (sales vehicles)	Fleet related (Parking space)
Support_Manage, maintain and repair buildings (excluding moves) (office space)	FTE related
Support_Provide catering services	FTE related
Support_IT	IT related
Support_Manage goods, warehouse & equivalents	Logistics related
Support_14001 TV and VoD	product related
Support_13001 Data Managed Services & Applications	product related
Support_30000 Subsidiaries & externals	product related

4.1.7 The power Key:

This key split the power related costs coming directly from power costs and from the buildings to different costs objects. It is based on the analytical split provided by the field:

The total KWH consumption is known is split in 4 categories:

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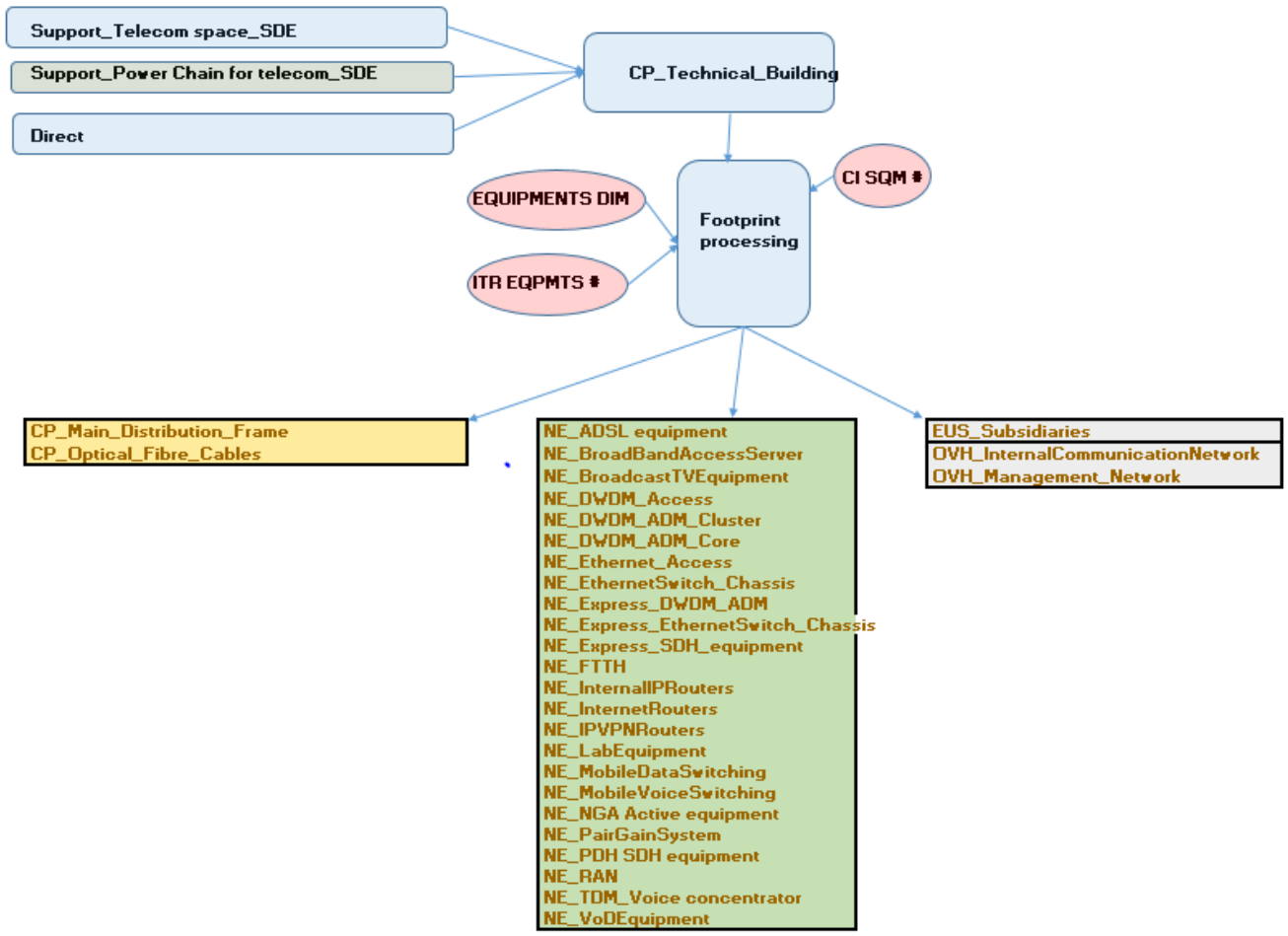
1. Mobile access (directly allocated to Support_PROX_Pylons)
2. Fixed access network (indirect allocation) to:
   Support_14001 TV and VoD
   Support_22243 Nat. IC - infra. Co-location /Co-mingling
   Support_30000 Subsidiaries & externals (for memory)
   Data centers, (split between SUPPORT_IT an Support_13001 Data Managed Services & Applications, based on real consumption)
   Support_Power Chain for telecom_SDE
   Support_Power Chain for ROP
3. Shops
4. Other (directly allocated to shops, or allocated to various element via generic key : offices, …)

Sensitivity: Unrestricted

4.1.8 Allocation of the Network building related costs : CP_Technical_Buildings

Based on the ConnectIMMO database (SQM), ITR (equipment), and some measurement and constants (footprint of equipments), the CP_Technical_Building is allocated via the running a access macro.

4.1.8.1 *Allocation Flow :*



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4.2 Allocation of the retail costs

4.2.1 Retail costs perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units, we recapitulate:

- Consumer Business Unit (CBU) has the responsibility over the residential customers and small enterprises (less than 10 employees)
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Retail costs relate to all commercial retail activities at the level of Business units CBU and EBU. The Proximus financial and accounting structure clearly registers (directly attributable) retail costs on cost centers 39xxx (CBU) or cost center 41xxx (EBU).

Starting from the Proximus organisational structure, we can identify 4 blocks in the Retail cost perimeter:

1. Retail FTE related costs
2. Retail Support costs
3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Retail FTE related costs

Includes all direct FTE related costs of Business units 39 and 41 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

Includes also a number of costs that are not directly attributed to Retail Business units in the accounting books but do relate to Retail FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's. E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

2. Retail Support costs

Retail Support costs are non FTE related costs which are centrally booked and managed but relate to Retail activities. E.g. Billing, Shop space…

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3. Retail costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

This block includes costs such as IT developments not capitalized for applications specific to Retail departments, costs for legal claims, mandatory professional contributions, market surveys, etc.

4. Retail costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales such as commissions paid on sales of identifiable products, cost of goods sold on equipment, dedicated outsourcing costs, etc.

4.2.2 Retail costs allocation principles

4.2.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

4.2.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies Retail costs based on their variability towards product volumes.

We distinguish between 4 var_types:

a. Marginal (mar): retail costs which can be considered variable with each additional unit of a single product. Typically it concerns costs of goods sold (e.g. handsets, customer premises equipment…) and costs of sales (commissions, interconnection costs…).
b. Variable (var) : retail costs which can be considered sensitive to (important) volume changes of a single product or a range of products, whereby this (range of) product(s) is considered to be the last increment in the product portfolio. Examples of costs which are considered variable based on these criteria: the sales departments, call center activities….
c. Fix (fix): retail costs are considered as fixed when they are likely to be inert to important volume variances. E.g.: Marketing spending. If the marketing campaigns can be directed to specific products, the amount of costs for these campaigns is not linked to volumes of the considered product.
d. Common (common): retail costs are considered common when they do relate to the ordinary course of business but have no relation with products. E.g.: Costs of litigations, branding & sponsoring expenses not directed to specific products, but well to Proximus image and trademark…

Sensitivity: Unrestricted

4.2.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies retail costs based on whether they can be attributed directly, or through a specific non generic key and/or driver, towards products.

We distinguish between 2 PS types:

a. PRODUCT_SPECIFIC (PS): these costs can be allocated directly to the products and thus are generated specifically for that related product. E.g. the costs of sale of a product.
b. NON_PRODUCT_SPECIFIC (NPS): Retail costs which do not have a clear causal relation with specific product.

In addition to the attribute PS_TYPE, all retail costs of RETAIL module are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

COST GROUP specifies the product, when the cost is product specific.
COST GROUP also gives the information on whether the costs are related to both Retail Business Units (CBU and EBU), or are only linked to one of them.

Used Cost Groups for the Retail costs are:

Non product specific	**Product specific**
All CBU&EBU products	All CBU Mobile products
ALL CBU&EBU mobile products	All EBU Mobile products
All CBU products	All EBU Advanced Telco Services products (*)
All EBU products	All EBU Fix data products
All CBU Fix products	All EBU Fix voice products
All CBU Mass market products	All EBU ICT products
All EBU Fix products	idTV
All EBU professional & Mass market products	(*) m2m&IOT, Big data, Mobile Payment&Ticketing
All EBU Telco products	
All EBU, CWS, SE products	

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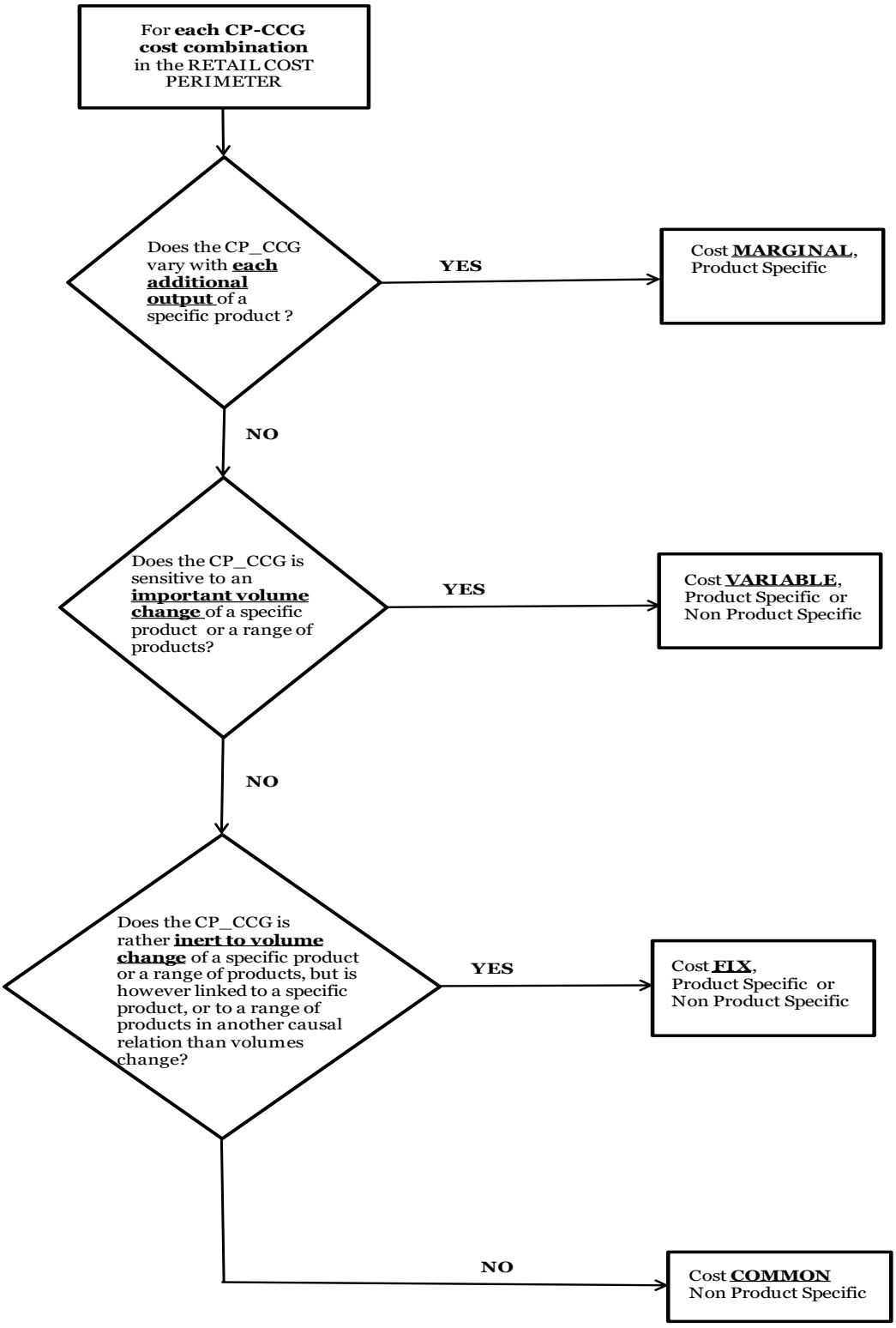
The qualification of the 2 attributes VAR_TYPE and PS_TYPE to all retail costs is illustrated in the following decision tree:



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4.2.2.4 *Criteria for allocation of retail costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which correspond to their cost group (which is the product they relate to). This means that these costs will be either allocated to Market 0 – Residual Market or to Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards Markets based on volumes drivers. In practice, this means that these costs will be allocated either to:

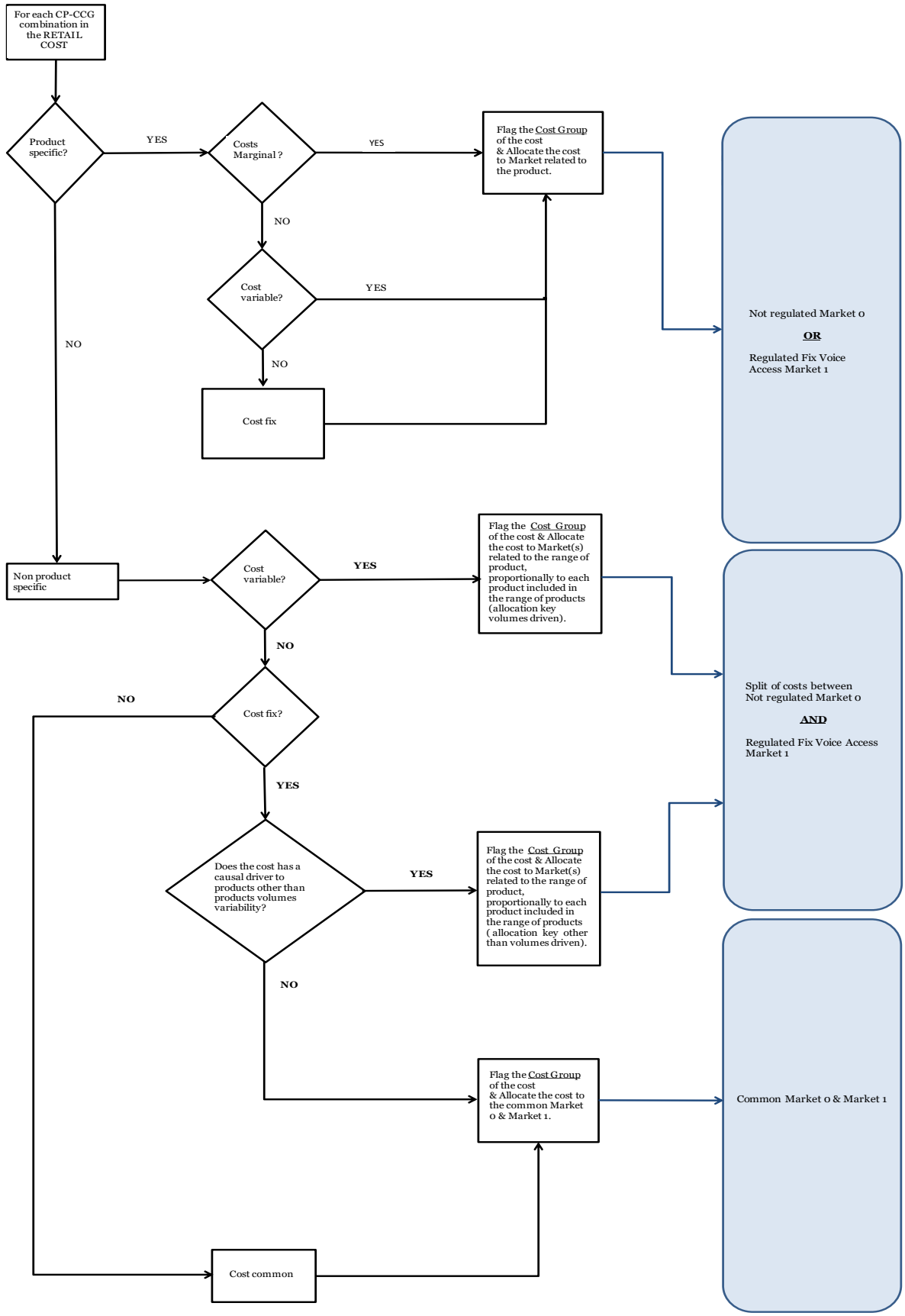
- Market 0 or to Market 1, if they relate to a panel of products related to the same market,
- Market 0 and to Market 1, with respect to volumes driven allocation key, if they relate to a panel of products related to both markets.

c. Non product specific Fix costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market', when they cannot be allocated to Market 0 and/or to Market 1, with a causal driver other than volumes of products.

d. Non product specific Common costs are allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

Sensitivity: Unrestricted

Principles for retail costs allocation to Markets can be illustrated as follows:



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4.2.3 Retail costs allocation flows

4.2.3.1 ***General principles***

As described above, the 4 blocks of costs included in the Retail cost perimeter are all specified with 2 cost type attributes (VAR_TYPE; PS_TYPE) prior to be allocated to Markets.

However, the 4 blocks of costs:

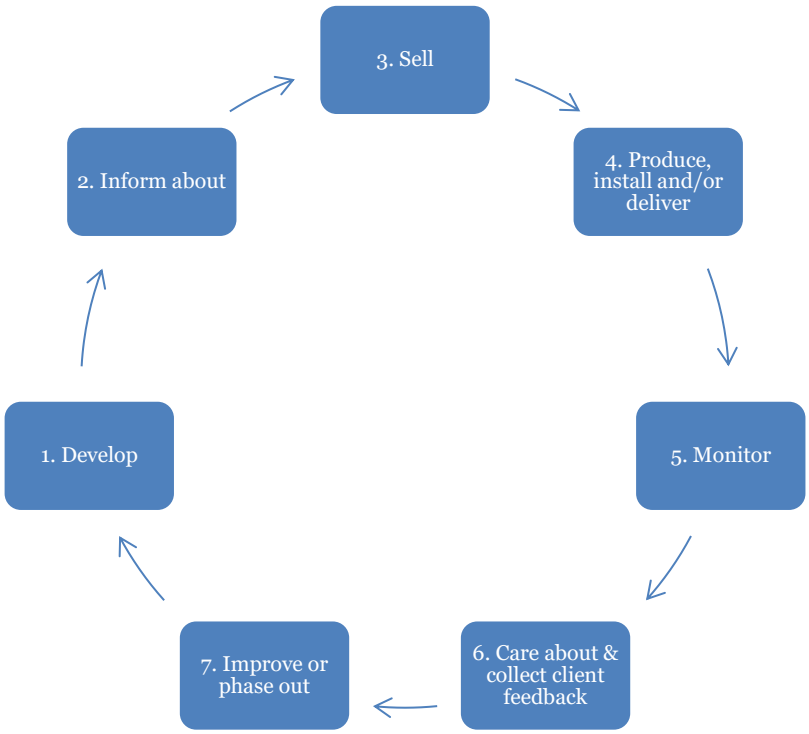
- Do not follow all the same path of allocation; some are directly allocated to Markets from the Cost basis,
- Are not all specified with VAR_TYPE and PS_TYPE within the module Retail.

The allocation flow followed by a Retail CCG_CP will depend on its block of costs (1->4).

Life cycle of products

Since the Cost model 2014, a new module, the LIFE_CYCLE module, was created, to catch part of the Retail costs that we find during the life cycle of a product.

Inside the 4 categories of Retail costs, as described in chapter 4.2.1., all the costs needed to launch, develop, monitor a product until its improvement/phase out, were identified and gathered in this new module, prior to be allocated to Markets.



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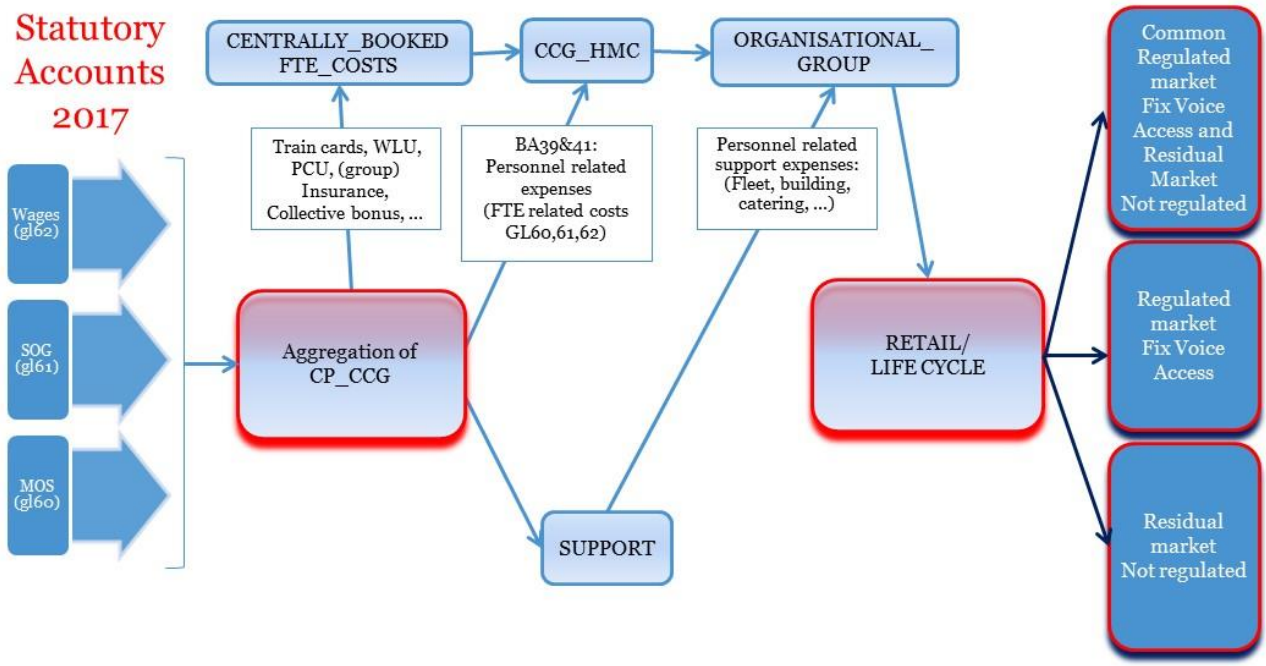
4.2.3.2 ***Retail FTE related costs (block 1)***



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

Starting from the Cost basis, Retail FTE related costs are at first gathered into module CCG_HMC. CCG_HMC module is simultaneously feeded with module Centrally_Booked_FTE_costs (Train cards, WorkLifeUnit costs, etc.).

Retail FTE related costs gathered in CCG_HMC are afterwards loaded into module ORGANISATIONAL_GROUP. In ORGANISATIONAL_GROUP module, FTE related costs are summed up with SUPPORT costs managed centrally (Fleet, building, catering, etc.) but that have to be allocated towards Proximus FTE costs.

This is also at this stage of allocation flow that attributes VAR_TYPE and where CCG_CP are renamed as "Organisational groups" (terminology specific to FTE costs).

Organisational groups costs are at last directed to module Retail, prior to be allocated to Markets (via LIFE_CYCLE module, for part of it), in accordance to criteria for allocation of Retail costs to Markets, as described in chapter 4.2.2.

With regard to the definitions of attribute dimension VAR, Retail FTE related costs can only be either Fix (FIX), either Variable (VAR) costs.

Sensitivity: Unrestricted

For what matters FTE costs, this variability sensibility has been defined taking the following assumption:

Are Fix FTE costs, all the FTE costs that are needed to ensure the Proximus going concern independently of products volumes, id est, costs needed to maintain the Proximus minimum organizational structure.

Two types of FTE costs were identified as needed to maintain the Proximus minimum organizational structure:

- Staff costs such as IT officers supporting DB and IT tools used, reporting and analysts teams, research staff such as Products&Solutions engineers, Marketing staff costs;
- All the Proximus hierarchy structure (team responsibles).

The classification of FTE costs for CBU and EBU between FIX and VAR costs, and whether product_specific or not, is as follows:

CBU Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	ALL CBU PRODUCTS
Sales - Top management	Fix	NPS	ALL CBU PRODUCTS
Direct sales	Var (*)	NPS	ALL CBU PRODUCTS
In charge Relations for indirect sales channels	Fix	NPS	ALL CBU PRODUCTS
Support staff for Sales department (all channels)	Fix	NPS	ALL CBU PRODUCTS
Marketing	Fix	NPS	ALL CBU PRODUCTS
Call Center Activities	Var	NPS	ALL CBU PRODUCTS
In charge for e-sales	Fix	NPS	ALL CBU PRODUCTS
idTV Content management	Fix	PS	idTV
Products & Solutions specialists	Fix	NPS	ALL CBU PRODUCTS
Strategic planning	Fix	NPS	ALL CBU PRODUCTS

(*) excluding Team responsible flagged as Fix costs.

Sensitivity: Unrestricted

EBU Organisational group	FIX/VAR	PS/NPS	Cost Group
EBU Top management	Fix	NPS	All EBU products
Strategic planning	Fix	NPS	All EBU products
Marketing	Fix	NPS	All EBU products
COR Top management	Fix	NPS	All EBU products
COR Direct sales	Var (*)	NPS	All EBU products
In charge Relations for COR (1) clients	Fix	NPS	All EBU products
COR ICT Project architects & Outsourcing mgmt	Fix	PS	All EBU ICT products
ME (2) top management	Fix	NPS	All EBU products
ME Direct sales	Var (*)	NPS	All EBU products
Support staff for ME Sales (all channels)	Fix	NPS	All EBU products
In charge Relations for ME indirect sales channels	Mix Fix/Var	NPS	All EBU products
Telco Solutions Top management	Fix	NPS	All EBU Telco products
Telco Solutions Specialists and Solutions sales	Mix Fix/Var	NPS	All EBU Telco products
IT Solutions Top management	Fix	PS	All EBU ICT products
IT Solutions Specialists and Solutions sales	Mix Fix/Var	PS	All EBU ICT products
OPS (3) top management	Fix	NPS	All EBU products
Financial reporting & IT Tools management	Fix	NPS	All EBU products
After Sales Back-office	Var (*)	NPS	All EBU products
Customer Project Management	Fix	NPS	All EBU products
Transformation, Process & Operations	Fix	NPS	All EBU products
ICT Outsourcing & industrialised services	Var (*)	PS	All EBU ICT products
ICT Customer service desk	Var (*)	NPS	All EBU, CWS, SE products

(*) excluding Team responsible flagged as Fix costs.
(1) COR, for CORPORATE, is the subdivision of EBU including big size enterprises.
(2) ME, for Medium Enterprises, is the subdivision of EBU including smaller size enterprises (from 10 to 50 employees).
(3) OPS, for OPERATIONS, is a Support division specific to EBU in charge of internal Process & IT optimization, financial reporting, customer projet management, as well as customer service: commercial and technical repair helpdesk.

Some EBU organisational groups have a mix of Fix/Var costs per type of activity. The scission of these teams into FIX and VAR costs is based on #FTE, in accordance with Proximus functional organization and Retail principles for determining if a cost is FIX or VAR.

E.g.:

Teams in charge for relations with indirect sales channels are made of Direct sales (VAR costs) and of people in charge of Sales channels optimization, strategy and budgeting (FIX costs).

Teams of Solutions Specialists and Solutions Sales are made of Direct sales (VAR costs) and Products&Solutions managers in charge of product catalogue and architecture (FIX costs).

- Retail FTE Fix costs non product specific are directly allocated to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

- Retail FTE Fix costs product specific are directly allocated to the Market of the product they relate.

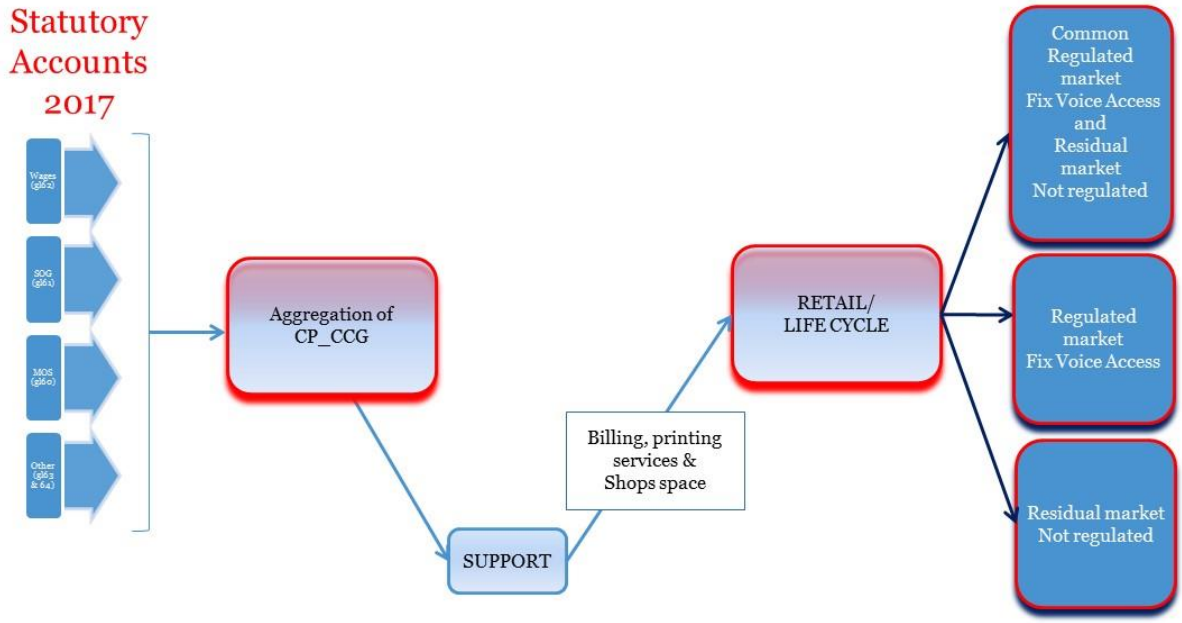
- Retail FTE Var costs non product specific are split with volumes allocation keys between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market.

- Retail FTE Var costs product specific are allocated to the Market of the product they relate, with volumes, for information purpose only.

Sensitivity: Unrestricted

Retail FTE Var costs are allocated towards activities in the LIFE_CYCLE module, prior to be sent to Market(s). We refer to chapter 4.5 Allocation of Costs included in the Life cycle of products, for further developments on allocations keys for Retail FTE VAR costs.

4.2.3.3 ***Retail Support costs (block 2)***



Module SUPPORT identifies and collects the costs of a number of support objects which a.o. are retail related.

The retail related support objects primarily concern billing costs (invoice printing, stuffing and postage, as well as teams in charge of billing&collecting) and costs for shop space. These costs are primarily gathered in module SUPPORT.

Costs for shop space are considered fix. The costs of creation and maintain a shop is not linked to the volumes of products the shop offers, but well to other criteria such as geographical localisation, local withholding tax regulation, points of sales optimization, etc. The CBU shops sell all types of products. These costs are therefore assigned as non_product_specific.

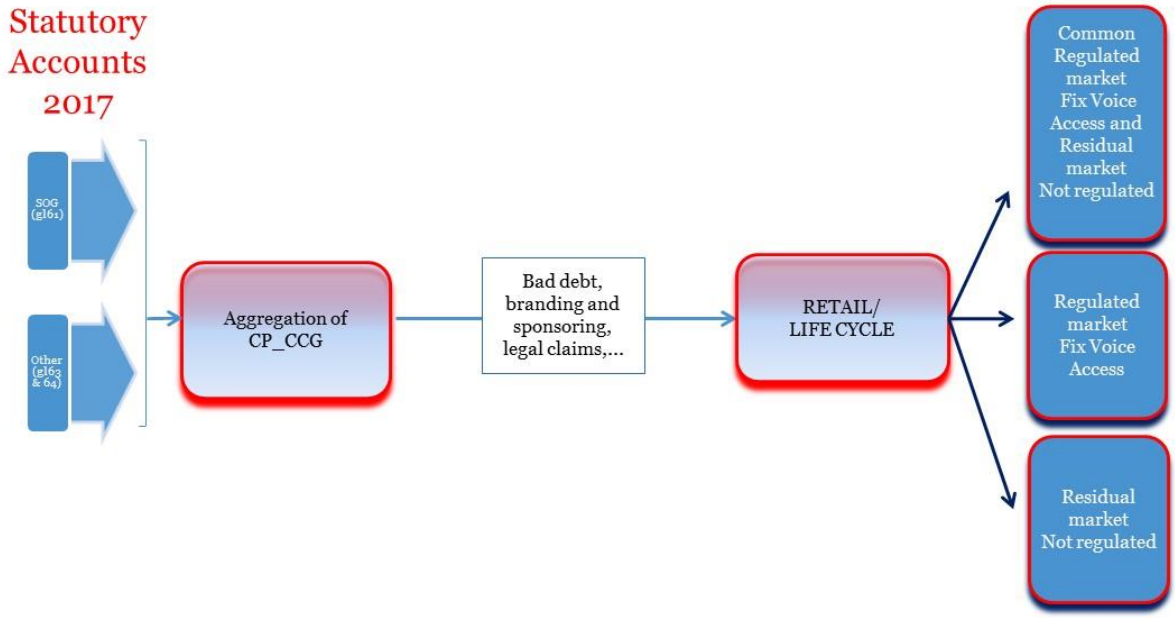
Proximus shops are occupied mainly by Proximus Direct Sales teams and, in a lower extent, by part of the Indirect Sales who do not have their own shops. Costs for shop space were allocated towards those teams, via module RETAIL.

Billing costs are fix, non_product_specific costs. In the specific cases of clients who have only one product to bill (1Play customer), or clients who have a panel of products belonging all to the same market, billing costs were allocated towards the concerned Market, with number of clients billed as allocation key. Billing costs of clients multiplay were split between Market 1 – Access PSTN&ISDN and Market 0 – Residual Market, according to billed items per client invoiced, for invoice printing and postage costs, and according to turnover for teams in charge of billing&collecting'.

Retail support costs, as they are materially considered as fix, non product specific costs, are mainly allocated towards Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market'.

Sensitivity: Unrestricted

4.2.3.4 ***Retail costs which do not have a causal relationship with products (block 3)***



Per definition these costs are either fix (e.g. IT developments not capitalized for the internal needs of a Retail department, bad debt, etc.) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, etc.).

Per definition, these costs are non product specific.

Most of costs of block 3 are sent to module Retail, where linked to the activity of a Retail organisational group, prior to be routed to the Market 'Fixed Common Market 1 – Access PSTN&ISDN & Market 0 – Residual Market' .

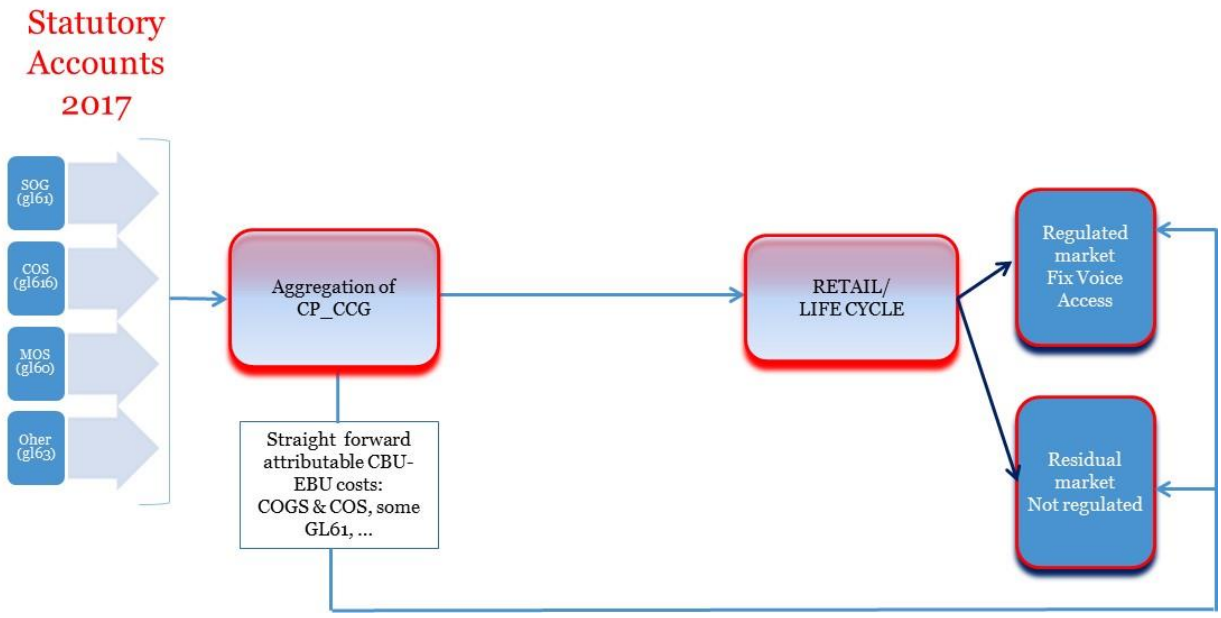
Bad debt is categorized as fix costs. Bad debt does not have a link to products but well to criteria such as competitive environment, regulatory framework (telecom laws), quality rating of the portfolio of clients, rather than to volumes of products.

Follow up and provision for bad debt is not done per products, but well per invoices and clients.

Bad debt tends to increase with turnover growth. Accordingly, we use the turnover as allocation key for bad debt to Market 0 or Market 1.

Sensitivity: Unrestricted

4.2.3.5 ***Retail costs which have a causal relationship with products (block 4)***



Are included in this block of Retail costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products.

Examples of costs of this category are Cost of goods sold, costs of sales (e.g: commissions indirect sales channels, interconnection fees), campaigns marketing directed on a product, and sales actions oriented on a dedicated products such as Outbound call sales actions..

Most of the costs of block 4 are gathered by similar categories into Retail and/or LIFE CYCLE modules, prior to be allocated to the Market they relate, some of them being however directly sent to the Market they relate.

Per definition, Retail costs of Block 4 have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are therefore included the following combinations of VAR_TYPE; PS_TYPE:

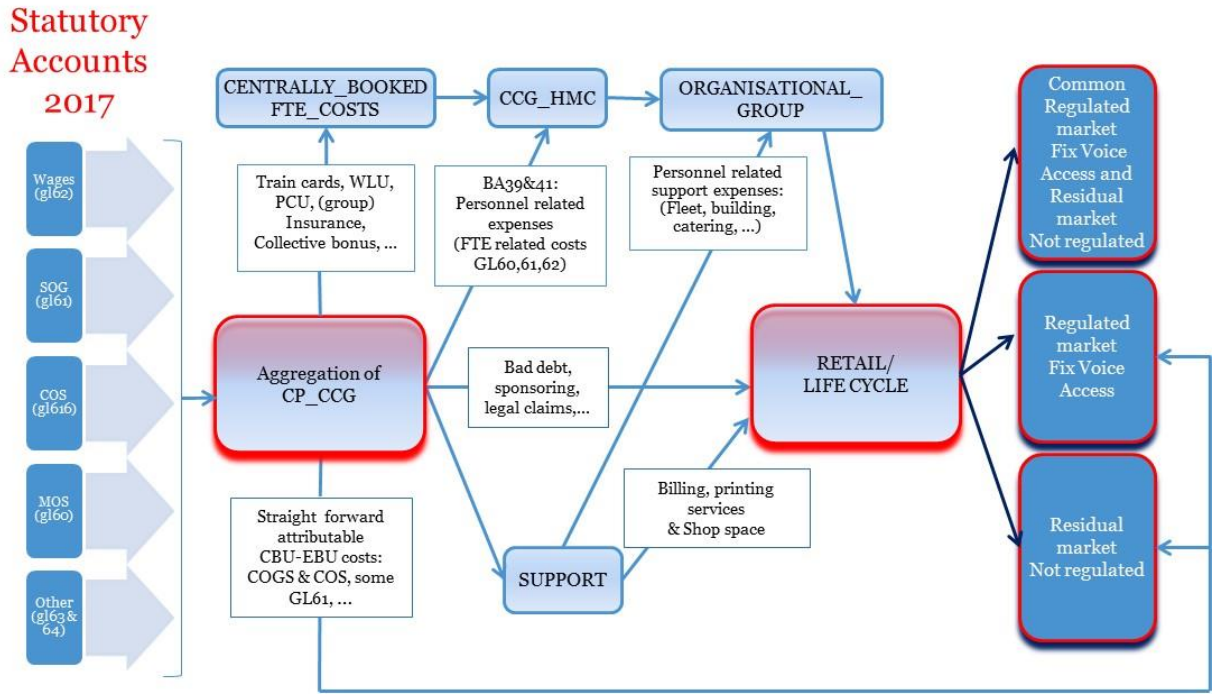
VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_ specific
Marginal	x	-
Variable	x	x
Fix	x	x

Cost of goods sold and Cost of sales have a direct link to product they relate. Therefore, they can be allocated directly.

Marketing expenses are per definition fix non_product_specific costs. Part of Marketing expenses can however be allocated to (specific) product(s) (Markets), in case of dedicated campaigns.

Sensitivity: Unrestricted

Retail allocation flows – all costs blocks (1->4), can be illustrated as follows:



Sensitivity: Unrestricted

4.3 Allocation of the CWS (Customer Wholesale division) costs

The allocation flow and principles are identical to the retail costs allocation flow.

4.3.1 Wholesale costs perimeter

All Wholesale activities are situated at the level of Business unit CWS (Customer Whole Sale).

The Proximus financial and accounting structure clearly registers (directly attributable) Wholesale costs on costcenters 40xxxx.

Starting from the Proximus organisational structure, we can identify 4 blocks in the Wholesale cost perimeter:

1. Wholesale FTE costs
2. Wholesale Support costs
3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products
4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products.

Definitions and examples

1. Wholesale FTE costs

   Includes all direct FTE related costs of Business unit 40 (GL 62, wages and other salary benefits) and indirect FTE related costs (some GL 61, as travel & representation costs, social benefits such as catering costs, etc.).

   Includes also a number of costs that are not directly attributed to Wholesale Business unit in the accounting books but do relate to Wholesale FTE activities. This concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus personnel/FTE's (and thus also towards these residing under CWS). E.g.: costs re. Fleet, office building, traincards, bonus, training, gsm's in the context of the employee phone program…

2. Wholesale Support costs

   Wholesale Support costs are non FTE related costs which are centrally booked and managed but relate to Wholesale activities. E.g.: Billing.

3. Wholesale costs that are not FTE related, nor Support costs, which do not have a direct causal relationship with products

   This block includes costs such as IT developments not capitalized for applications specific to Wholesale departments, costs for legal claims, etc.

4. Wholesale costs that are not FTE related, nor Support costs, which have a direct causal relationship with products

   Costs that have an identifiable causal relationship to the products. E.g.: Cost of sales and costs of goods sold, interconnection fee, etc;

Sensitivity: Unrestricted

4.3.2 Wholesale costs allocation principles

4.3.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each wholesale CP-CCG.

These attribute-qualifications are applied on all the wholesale CP-CCG combinations, but at different levels of modules, depending on the type of costs: FTE related, Support, etc., in accordance with the Wholesale allocation process as described below.

4.3.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies wholesale costs based on their variability towards product volumes.

We distinguish between 4 var_types:

- Marginal (mar)
- Variable (var)
- Fix (fix)
- Common (common)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 4 var_types as described in chapter 4.2.2.2.

4.3.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies wholesale costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We distinguish between 2 PS_types :

- PRODUCT_SPECIFIC (PS)
- NON_PRODUCT_SPECIFIC (NPS)

As they have stricto sensu the same definitions than for Retail allocation, we refer to the definitions of these 2 ps_types as described in chapter 4.2.2.3.

In addition to the attribute PS_TYPE, all wholesale costs are flagged with an additional dimension "COST GROUP" enabling to identify the (span of) product(s) it covers.

Sensitivity: Unrestricted

Used Cost Groups for wholesale costs are:

Non product specific	Product specific
All CWS products	Mobile Roaming
All CWS products excluding Mobile Roaming	Fastinternet,Profinternet
	LeasedLines,Explore
	ICT
	Mobile
	FixVoiceTraffic

Since this is stricto sensu the same decision tree to qualify wholesale CP_CCG with attributes VAR and PS, than for the Retail allocation process, we refer to the decision tree presented in chapter 4.2.2.3 of the Retail module to illustrate the wholesale costs qualification with attributes VAR and PS.

4.3.2.4 *Criteria for allocation of wholesale costs to Markets*

a. Product specific costs, whether Fix or Variable, are allocated towards the Market which corresponds to their costgroup (which is in casu the product they relate to). This means that the costs will be allocated towards one of these wholesale Markets:

   Market 0 - Residual Market
   Market 4 - Unbundling local loop
   Market 5 - Wholesale Broadband
   Market 6 - Wholesale BROTSOLL
   Auxiliary service Market 1 - Access PSTN&ISDN - CPS
   Auxiliary service BRxx - Colocation
   Auxiliary service BRIO - POI

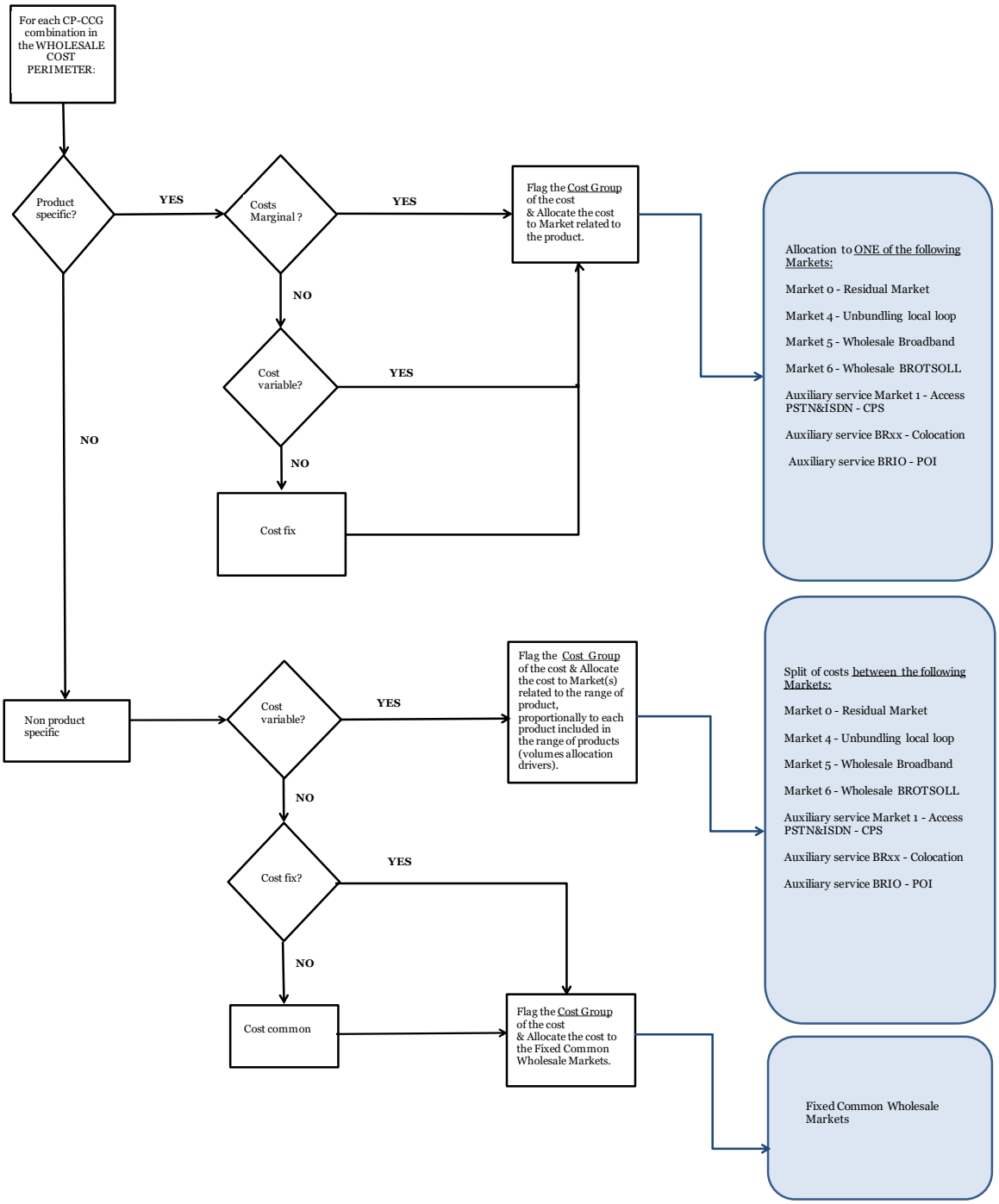
For simplification purpose in the definition of the markets in the Cost model, Auxiliary service Market 1 – Access PSTN&ISDN for Carrier Pre Selection (CPS) was included into Market 1 – Access PSTN&ISDN.

b. Non product specific Variable costs are allocated towards wholesale Markets (see list above) based on volumes drivers. The drivers for allocation of variable costs are documented further, per block of wholesale costs (1->4).

c. Non product specific Fix and Common costs are allocated towards Market 'Fixed Common Wholesale Markets'.

Sensitivity: Unrestricted

Principles for wholesale costs allocation to Markets can be illustrated as follows:



Sensitivity: Unrestricted

4.3.3 Wholesale costs allocation flows

4.3.3.1 *General principles*

As described above, the 4 blocks of costs included in Wholesale cost perimeter are all specified with 2 cost type attributes (VAR TYPE; PS TYPE) prior to be allocated to Markets. Similarly to the Retail allocation flow, the 4 blocks of costs do not follow all the same path of allocation. The allocation flow followed by a Wholesale CCG_CP will depend on its block of costs (1->4).

4.3.3.2 *Wholesale FTE related costs (block 1)*

The allocation flow of Wholesale FTE related costs is the same than the Retail one. We therefore refer to chapter 4.2.3.2. for presentation of the several modules whereby FTE related costs are centralized/allocated. As a reminder, the list of modules that deal with FTE related costs is as follows:

- Cost basis (GL62, as well as some GL60&61),
- CCG_HMC or SUPPORT ([1]),
- ORGANISATIONAL_GROUP,
- WHOLESALE.

With regard to the definitions of Attribute dimension VAR, Wholesale FTE related costs can only be either Fix (FIX), or Variable (VAR) costs.

Criteria to classify FTE related costs into FIX vs. VAR costs were similarly defined as for the Retail allocation flow, id est: are considered as FIX costs, all the FTE costs needed to maintain the Proximus minimum organisational structure, independently of products volumes. These ones include staff costs such as IT officers, reporting & analysts teams, research staff (e.g.: products & solutions managers), as well as the Proximus hierarchy structure (team responsibles).

Organizational groups dedicated to a specific product are categorized as product_specific (PS). We identified only one organizational group in the Wholesale organisation structure that is product specific, id est, the team involved exclusively in Roaming agreements.

Organizational groups covering a span of products are categorized as non_product_specific.

The classification of FTE costs for CWS between FIX and VAR costs, and whether product_specific or not, is as follows:

CWS Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All CWS products
Direct Sales	Var (*)	NPS	All CWS products
Call center activities	Mix Fix/Var	NPS	All CWS products
Roaming agreements	Fix	PS	Mobile Roaming
Products & solutions management	Fix	NPS	All CWS products excluding Mobile Roaming
Strategic planning, reporting and internal process	Fix	NPS	All CWS products

(*) excluding Team responsible flagged as Fix costs.

[1] Only FTE related support costs.

Sensitivity: Unrestricted

CWS Sales department is an organisational group defined as Var, non product specific. CWS sales FTE are responsible for regulated and non regulated products. The size of the department varies with the volumes of products (to be) sold.

CWS Call center activities include 3 main divisions:

- *Operational team* in contact with external clients. This division gathers the Front office and Back office in charge of the sales orders intake, answers to questions of clients, and support to the CWS Sales department in period of high business activity
- *Billing and credit collection team*
- *Reporting, IT tools management and process optimization team*.

Billing and credit collection team is qualified as "fix, non product specific"cost. Billing activity is a cost depending on volumes of clients, not on volumes of products. Billing costs is also a non_product_specific cost, as vast majority of CWS clients have more than one product by Proximus.

Reporting, IT tools management and process optimization team, as Support staff team, is identified as a "fix, non product specific" organisational group cost.

Front office and Back office costs are categorized as "variable, non product specific", considering the variability of these costs with volumes of products sold, and taking into account that CWS Call center activities handle all CWS products, regulated as well as non-regulated products.

Product specific organizational group Fix of the Roaming Team is allocated directly to non regulated Market 0.

Non product specific organizational groups Fix are routed directly towards the "Fixed Common Wholesale Markets".

Non product specific Variable organisational group's costs are split into CWS Markets based on the following volumes drivers:

1. CWS sales department costs are allocated to products (markets), according to provisioning volumes.

2. CWS Call center activities costs are allocated to products (markets) according to minutes of Voice Calls and number of BCI cases (*) handled, detailed per product
(*) BCI: Belgacom Channel Infrastructure: tool where call center registers a case (ordering, claim, complaint handling) to ensure appropriate follow up and treatment of the client request.

4.3.3.3 *Wholesale support costs (block 2)*

The wholesale support costs are identified firstly in Module "Support". Wholesale support costs specifically concern "CWS_Billing" (invoice printing, stuffing and postage).

Sensitivity: Unrestricted

We qualify CWS_Billing as a fix non_product_specific cost. Cost Group of CWS_Billing is All CWS products, since the CWS_Billing support costs include all the products of CWS, whether regulated or not.

As mentioned in chapter 4.3.3.2.3 related to the CWS CCA staff team in charge of Billing and credit collection follow-up, to the contrary of the Retail billing costs, the case that billing costs can be linked to some unique product is not met, since the vast majority of the CWS clients have more than one products billable. The absence or suppression of one product will not change the need for invoicing the client.

CWS_Billing costs are split between CWS Markets according to the park of CWS products.

4.3.3.4 *Wholesale costs which do not have a causal relationship with products (block 3)*

Wholesale costs that do not have a straightforward driver towards products are either grouped in module Wholesale, if they can be linked to the activity of a Wholesale organisational group, or they are directly routed to the Market "Fixed Common Wholesale Markets".

Per definition these costs are either fix (e.g. IT developments not capitalized for the internal needs of Sales departments) or common (e.g: branding and sponsoring costs, Corporate Social Responsibility enterprise costs, legal claims, bad debt, etc.).

Per definition, these costs are non_product_specific.

Fix and common non_product_specific costs are allocated directly towards Market "Fixed Common Wholesale Markets".

4.3.3.5 *Wholesale costs which have a causal relationship with products (block 4)*

Are included in this block of Wholesale costs, all the costs that are not FTE related costs, nor Support costs, that have a causal relationship with products. Costs of block 4 are either directly allocated to Market they relate, or they transit by Wholesale module, when the costs have to be gathered in the same Wholesale object at first, prior to be allocated to Market they relate.

Per definition, these costs have a causal link to products. The causal link to products can be volumes driven (MAR, VAR costs) or not.

Are included in Wholesale costs - block 4, the following combinations of VAR_TYPE ; PS_TYPE:

VAR_TYPE	PS_TYPE	
	Product_specific	Non_Product_specific
Marginal	x	-
Variable	x	x
Fix	x	x

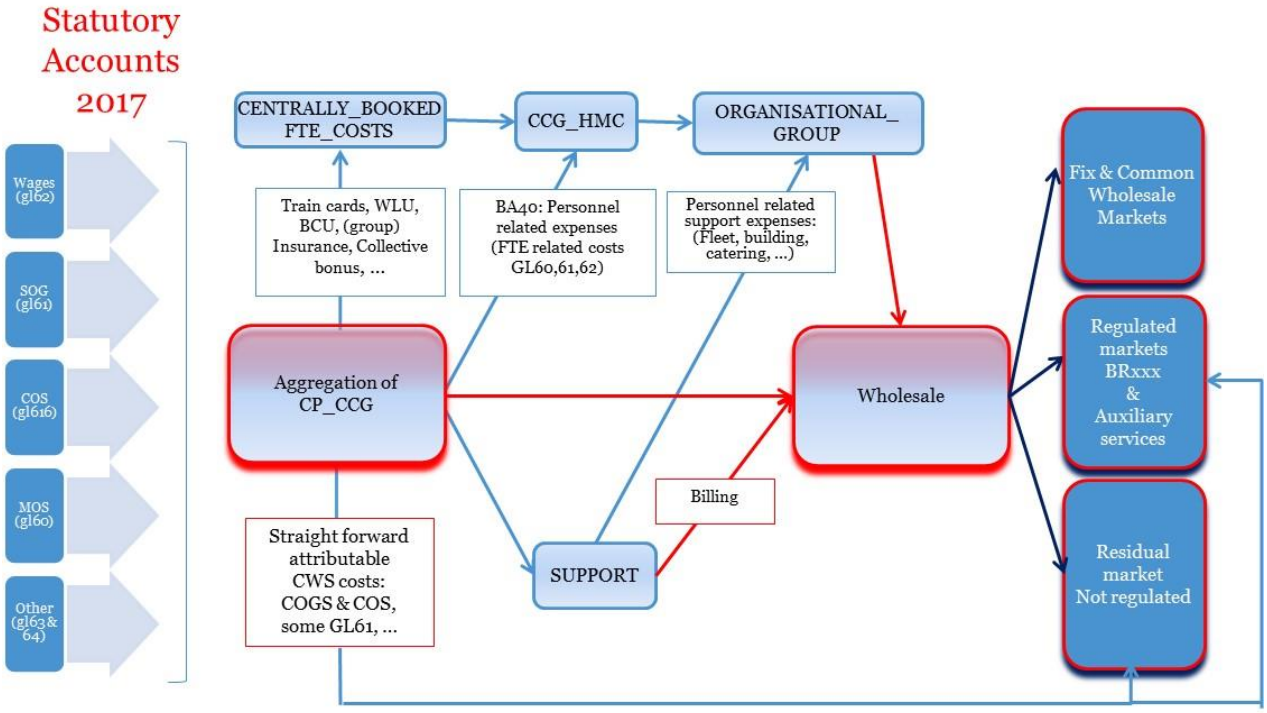
The main costs of this category are Cost of goods sold, cost of sales (e.g: interconnection fees), consultancy and outsourcing costs dedicated to specific products.

Cost of goods sold and Cost of sales, as MAR product specific costs, have a direct link to volumes of product they relate. Therefore, they can directly be allocated to the Market they relate.

Sensitivity: Unrestricted

Consultancy and outsourcing costs, when related to a specific product, are allocated directly to the Market they relate. E.g.: Fees to Clearing Offices for roaming.

Wholesale allocation flows of all types of Wholesale costs is presented as follows:



CP = costpool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
CCG = cost center grouping = grouping of cost centers with comparable characteristics.

Sensitivity: Unrestricted

4.4 Allocation of the CUO (Customer operations) costs

4.4.1 Customer operations costs perimeter

Customer operations is a Business unit created in 2014. The division gathers activities previously done inside these Business Units: Consumer Business Unit (CBU), Service Delivery Engine (SDE) and Staff and Support (S&S).

Objective of the creation of the Business unit Customer operations (CUO) was to join in the same Business Unit all the Proximus activities to the service of the customer.

CUO concerns both commercial retail (e.g. commercial call centers) and technical retail activities (e.g. technical call centers).

To ensure consistency with allocations of previous years, we allocate costs of CUO in the same way as done previously inside the separate Business Units CBU, SDE and S&S, for the CCG concerned.

The Proximus financial and accounting structure clearly registers (directly attributable) CUO costs on cost centers 49xxxx and 50xxxx.

However, a number of costs are not directly attributed to CUO in the accounting books but do relate to CUO activities.

It concerns costs which are centrally booked and/or managed but which need to be flagged towards all Proximus FTE's.

E.g.: costs re. Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program …

These costs are added up with the directly attributable FTE related costs and allocated to CUO CCG towards the organisational groups.

We refer to chapter 4.2.3.2 Retail FTE related costs, where the allocation flow is described for FTE related costs, as it is applicable to CUO FTE related costs.

For what matters human power costs, the CUO module is primarily sourced from the following modules:

1. **Organisational_Group**
   This concerns the CUO FTE related costs.

2. **CP1**
   This mainly concerns the outsourcing costs for the field and remote technical activities (provisioning and repair).

3. **CUO_SOG**
   This primarily concerns costs for the outsourcing of commercial call centers (front office and after sales).

Sensitivity: Unrestricted

4.4.2 Customer operations costs allocation principles

4.4.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE" and they constitute a unique combination for each Customer operations CP-CCG.

4.4.2.2 *Criteria for attribute dimension VAR_TYPE*

Dimension VAR_TYPE qualifies customer operations costs based on their variability towards product volumes.

We distinguish between 2 var_types:

- Variable (var)
- Fix (fix)

As they have the same definitions than for Retail allocation, we refer to the definitions of these 2 var_types as described in chapter 4.2.3.2. Retail FTE related costs.

4.4.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies CUO costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards specific products.

Considering the activities of CUO Business unit (activities of services to the customer), most of the costs are non product specific.

Sensitivity: Unrestricted

4.4.3 Customer operations costs allocation flows

4.4.3.1 *Allocation of Organisational Group costs*

The classification of FTE costs for CUO between FIX and VAR costs, and whether product specific or not, is as follows:

CUO Organisational group	FIX/VAR	PS/NPS	Cost Group
Top management	Fix	NPS	All Proximus products
Support services to the business unit			
Strategic planning	Var (*)	NPS	All Proximus products
E2E operations: IT tools, reporting & process	Var (*)	NPS	All Proximus products
Technical services to the customer			
After sales technical - provisioning (1)	Var (*)	NPS	All Proximus products
After sales technical - repair (1)	Var (*)	NPS	All Proximus products
Field Cable	Var (*)	NPS	All Proximus products
Commercial services to the customer			
After sales commercial (2)	Var (*)	NPS	All CBU and CWS products
Directory Information Services	Var (*)	PS	Directory Assistance Services and listing
Billing & Collecting invoices	Fix	NPS	All CBU and EBU products

(1) Remote and field

(2) Back office of Telesales agents for provisioning and complaints handling

(*) excluding Team responsible flagged as Fix costs

Technical services to the customer

The allocation for fix & var organizational groups is the same (fix is a copy of var through a generic key implemented in TCE tool). There are exceptions to this principle, in which case the fix allocation directly goes to common markets. The latter applies when variable costs of a team are sent to the life cycle and this team serves both retail & regulated products.

The FTE related costs of organizational groups are mostly allocated to the LIFE_CYCLE, modules of Network elements or MARKETS based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Dispatch units for Field operations, Minutes of interactions with the customer for the remote repair of mass products, etc.).

Commercial services to the customer

- After Sales commercial costs are split between Market 1 – Access PSTN&ISDN & Market 0 – Residual Market for teams handling CBU products, and between Wholesale Markets for teams handling CWS products. The allocation is based on volumes of time or efforts spent for the respective products, as collected in ordering and complaints handling operational databases.
- Directory Information Services are allocated directly to Market 0.
- Billing and Collecting invoices activities are split between Market 1 – Access PSTN&ISDN and Market 0, according to turnover of the two divisions CBU and EBU, the two beneficiaries of this CUO service.

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Costs of Organisational groups of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. to more developments on allocation keys of CUO Organisational groups.

4.4.3.2 *Allocation of Outsourcing costs*

Outsourcing costs include:

- costs gathered in module CP1 for technical teams and
- the commercial call centers outsourced (front office and after sales).

When activity is similar, outsourcing costs are allocated with the same drivers (based on time/efforts) than used for the Organisational groups. When activity is specific, dedicated allocation keys were applied.

Outsourcing costs of CUO being sent to module LIFE_CYCLE prior to be allocated to markets, we refer to Chapter 4.5. for more developments on allocation keys of CUO Outsourcing costs.

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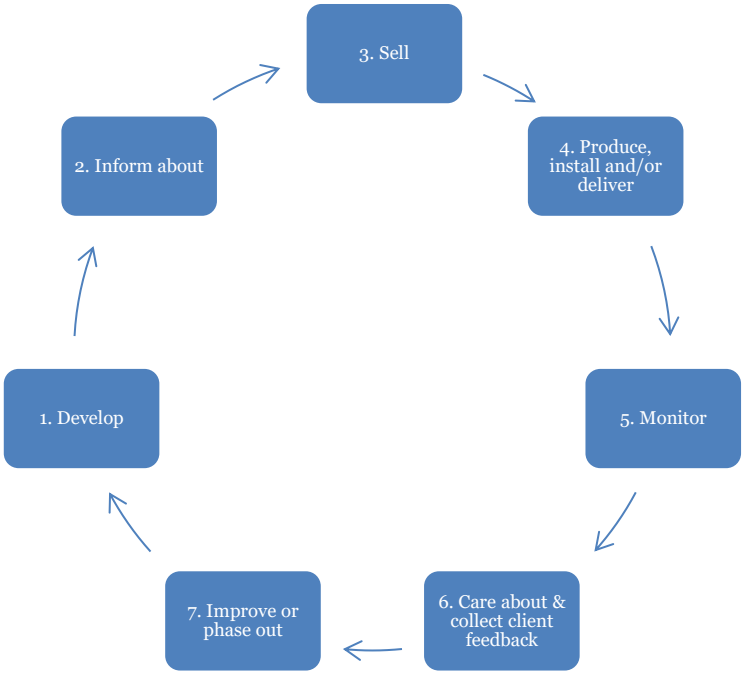
4.5 Allocation of Costs included in the Life cycle of products

4.5.1 Cost perimeter

Since the 2014 Cost model, all the costs included in the life cycle of a product/service were specifically gathered in a module, the LIFE_CYCLE MODULE, prior to be allocated to Markets.
The costs were sourced primarily from modules OTHER_MOS, OTHER_SOG, COMMERCIAL_RETAIL, AC and CUSTOMER_OPERATIONS.

The life cycle of a product includes the following stages:



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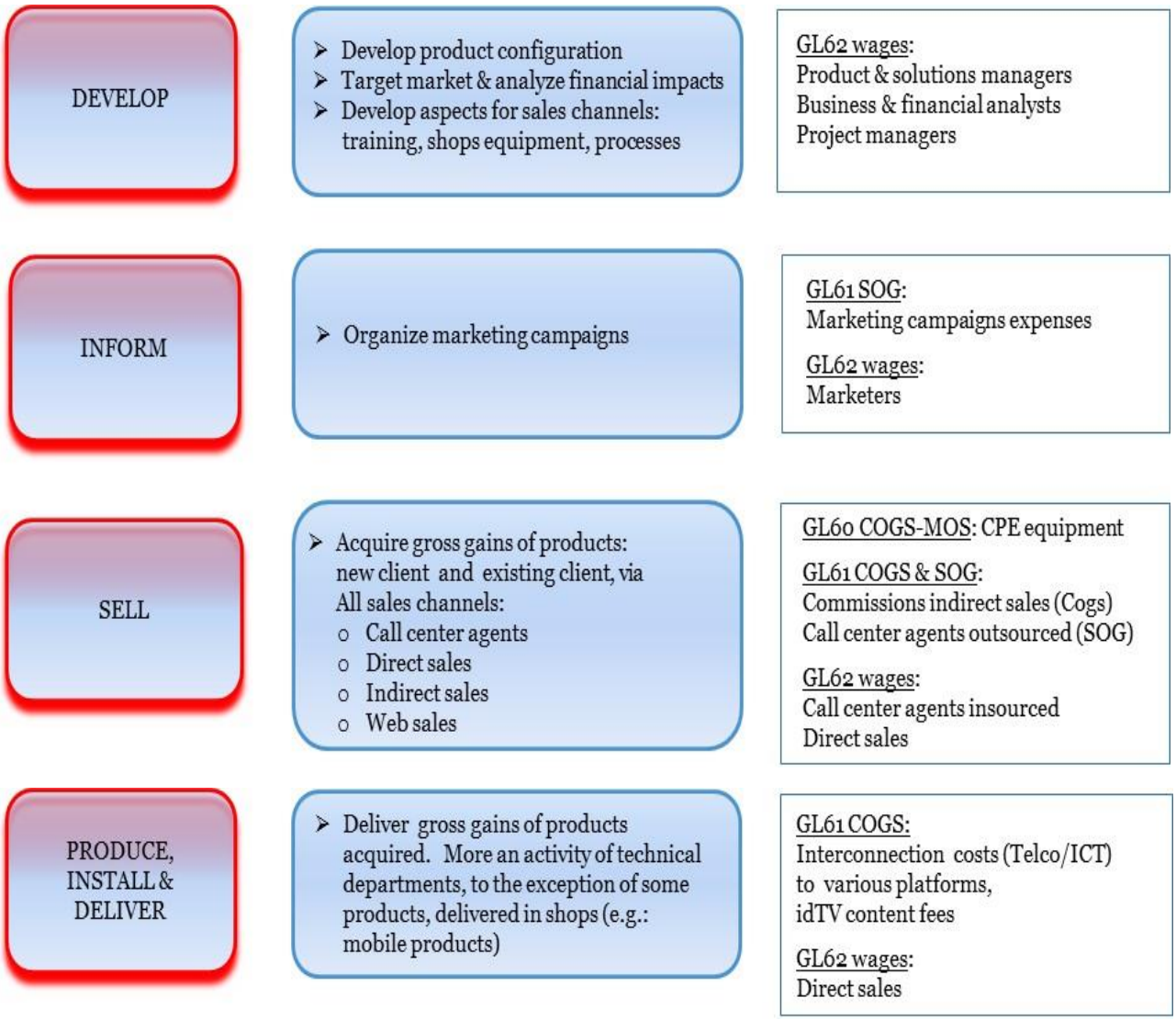
Following costs were identified in the life cycle of a product/service:



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DELIVER : Remote activation

- All products (mass or professional, fixed or mobile) must be remotely activated in the network.
- The remote activation may be sufficient to deliver the product in specific cases but in many cases, a field travel is necessary to complete the product delivery.
- Ideally, the remote activations would all be automatically executed further to an order from the customer in the IT systems but in reality, this process still requires manual interventions.
- The complexity of professional remote activations naturally requires a specific and important team (CNN). The activation activity in the life cycle refers to CNN.
- The PCD (Provisioning Coordination Desk) mass remote activation activity is consolidated with the dispatching activity in the DCO included in the field installation life cycle activity.

GL61 SOG:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

GL62 wages:
PCD (Provisioning Coordination Desk) in the DCO (Dispatch & Coordination Center) (CUO/ASA/DCO), CNN (Professional Connectivity)

DELIVER : Field installation

- A remote activation of the product in the network may not be sufficient, especially in the case of fixed products.
- In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions :
  - in the network up to the NTP (Network Termination Point in the customer house) (even DIY installations by the customer may require a field action in the network) and/or
  - outside of the network e.g. for mass products, the modem and/or TV decoder (FULL installation).
- The field installation activity in the life cycle relates to the work done by the technicians outside of the network.
- It also includes the remote activation (for mass products) as well as the dispatching activities from the DCO.

GL60 MOS-MAT:
Equipments like modems and/or TV decoders, located in "Terminals" life cycle various categories

GL61 SOG:
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

GL62 wages :
Copper
DCO (Dispatch & Coordination Center), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) fulfilment

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MONITOR: Billing & Collecting Revenues	➢ Produce and send bills ➢ Manage bad debt: follow ageing balance, send reminders & bailiffs costs	GL61 SOG: Printing & postage costs Bailiffs costs GL62 w ages: Call center agents insourced (dedicated team Billing&Credit risk) GL 63&64 Other: Bad debt provision & write-off
MONITOR: Changes on products sold	➢ Adapt product configuration, in accordance with requirements of the client: swap, downgrade/upgrade of a pricing plan, additional option, churn, configure multiple products in a pack (pack configuration)	GL61 SOG: Call center agents outsourced GL62 wages: Direct sales, Call center agents insourced
CARE: Handling clients complaints	➢ Handle billing complaints ➢ Process request for changes of personal data (clients moves, etc.)	GL61 SOG: Call center agents outsourced GL62 wages: Call center agents insourced, Direct sales
CARE: Remote repair	➢ When a customer has a technical issue with a product/service, he/she can contact the appropriate call center (mass or professional). Whilst the customer is waiting on e.g. the CHC line, the DARE IT system already processes the customer data in order to test potential issue drivers. ➢ The first line call center agent may be able to fix the issue of the customer … or not. ➢ In the later case, the call center agent will call upon the second line agents who themselves will call upon a third line outside of CHC or ISO if they can 't fix the issue. ➢ The remote repair activity in the life cycle relates to the CUO CHC (Customer Operations, Customer Help Center, for mass products) and the EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology - for professional products)	GL61 SOG: CUO CHC (Customer Operations, Customer Help Center) for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products GL62 w ages: CUO CHC (Customer Operations, Customer Help Center for mass products) and EBU OPS ISO (Operations,ICT Service Operations - Information & Communication Technology) for professional products

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CARE: Field repair	➢ A remote repair of the customer technical issue for one or several products may be impossible, be it by the first, second or third line. ➢ In that case, a technician (insourced or outsourced) must travel to the field in order to complete the necessary actions : ➢ in the network e.g. the ROP, the LEX, the NTP (Network Terminating Point, in the customer house) and/or ➢ outside of the network in the customer office for professional products or house for mass products (e.g. the modem, the TV decoder). ➢ The field repair activity in the life cycle relates to the work done by the technicians outside of the network. ➢ It also includes the dispatching activities from the DCO (Dispatch & Cordination Center).	GL61 SOG: *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair GL62 wages : *Copper* DCO (Dispatch & Coordination Center) (CUO/CFF/DCO), CUO CFF MP (Customer Operations Customer Field Force Mass Professional) repair
CARE: Retention & Loyalties programs	➢ Inform about loyalties actions & facilities, ➢ Implement retention actions	GL60 MOS-MAT: Sales gifts and loyalties advantages GL61 SOG: Call center agents outsourced GL62 w ages: Call center agents insourced
IMPROVE or PHASE OUT	➢ Design product new configuration/phase out ➢ Target market & analyze financial impacts ➢ Develop aspects for sales channels: training, shops equipment, processes	GL62 wages: Product & solutions managers Business & financial analysts Project managers

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4.5.2 Allocation drivers

Allocation drivers for VAR costs to the Life_cycle module are the following ones:

	Sourced from Module(s)	Driver for allocation to Life_Cycle split per product and customer segment
Organisational groups costs		
Commercial services to the customer		
Marketing	Commercial_Retail	Detail of marketing expenses
Sales and after sales, insourced&outsourced, mass market products	Commercial_Retail/ Customer_operations(1)	Time&efforts spent per product according to operational volumes for ordering&complaints handling
Sales and after sales, insourced&outsourced, professional market products	Commercial_Retail	Time&efforts spent per product according to TTVA/revenues
Indirect sales, mass market and prof. market products	Commercial_Retail	Commissions paid
ICT dedicated ressources: governance&sourcing	Commercial_Retail	Direct
Billing&Collecting invoices: FTE costs	Customer_Operations	Turnover per business area and per product
Technical services to the customer		
Customer activation	Customer_Operations	SAP HR teams names and configured nodes
Customer field installation&repair on copper	Customer_Operations	DU (Dispatch Units) translating time spent on activity
Customer remote repair, mass market products	Customer_operations(2)	#FTE and minutes
Customer remote repair, prof. market products	Commercial_Retail(2)	#FTE and minutes
Assets and Cost of good sold/cost of sales		
CPE rented	AC	Direct
idTV content fees	AC;Other(*)_SOG	Direct
CPE sold	Other(*)_MOS; Customer_Operations_MOS	Direct
Interconnection	Other(*)_SOG	Direct
Outsourced ressources/IT platforms&applications	Other(*)_SOG	Direct
Sales gifts	Other(*)_MOS	Direct
Other		
Bad debt	Other(*)_DEPR;Other(*)_OTHER	Direct
Internal distribution costs	Support	Value of material moved out of stock (3)
Billing & Collecting invoices: Printing & stamps costs	Commercial_Retail	#billed clients, weighted when multiplay clients

(*) Commercial Retail costs.
(1) Commercial Retail:
Direct sales
Call centers insourced: Front office Telesales (Inbound calls)
Call centers outsourced: Front office Telesales (Outbound calls)
(1) Customer operations:
Call centers insourced: Back office Inbound calls
Call centers outsourced: Front office Telesales (Inbound calls) and Back office Inbound calls
(2) Commercial Retail: Customer_operations:
EBU OPS ISO (Operations - ICT Services operations) CUO CHC (Technical call center)
(3) Opex and Capex.

Commercial services to the customer:

Below, we give some specifications about drivers of sales and after sales costs.

1) Sales and after sales, insourced and outsourced, mass market products

This Life_cycle object includes all Sales and After sales channels handling "simple" products, i.e. mainly Telco products (fix voice, fix internet, idTV, mobile). This category includes also products for small size enterprises. In short, it includes all CBU consumer business unit sales channels (even is, as from 2014, some of these channels are in the new CUO business unit).

Call centers agents:

- *Front Office* is the department with FTE who are in contact with external clients. Activities of the Front office are primarily sales and sales orders intake, supported by the After Sales department.

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- *After Sales* department is the CCA Back office. Its tasks are primarily input in systems of sales orders, handling of clients billing complaints and requests (e.g.: change of invoicing address).

The IT managing system for tracking calls handling of the *Front office* is the **IVR** (Interactive Virtual Response), where calls passed and minutes of calls are recorded, for fix line products and mobile products.

The IT managing system for tracking activities of the *After Sales* is **BCI** (Belgacom Channels Infrastructure) where cases detailing activity of the agents (ordering, complaints handlings, requests), for fix line products and mobile products, are registered.

Usually, ordering is passed by Front office agent, simultaneously with the sales, but when the ordering takes longer time (because need for installation on field, or due to any longer issue), task is delegated to an After Sale agent who will create a case in BCI.

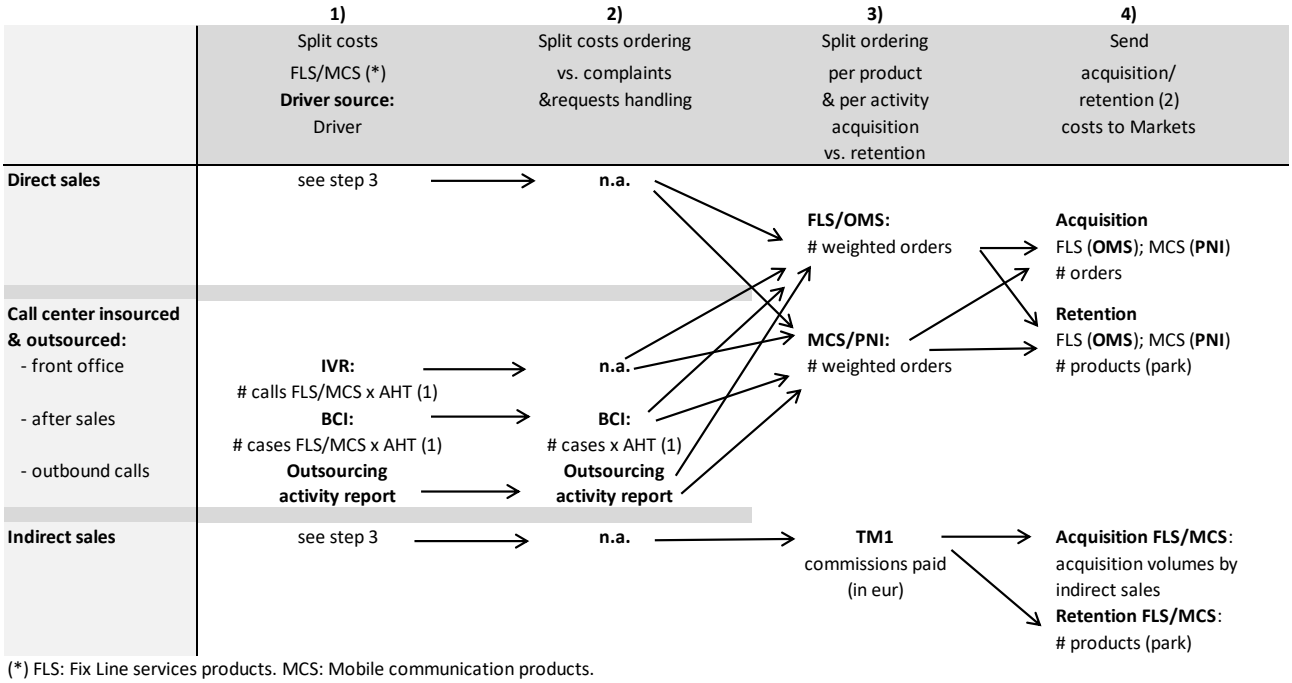
The IT managing system for ordering of the Front office and the Back office is **OMS** for fix line products, **PNI** for mobile products.

OMS and PNI track records of orderings per product and per type of ordering: acquisition (gross gains) vs. retention (additional option, swap of pricing plan, churns, change, pack configuration, etc.)

Cost model use OMS and PNI operational volumes as allocation drivers for ordering.

For After Sales agents, activity is at first split between ordering and complaints handlings, with BCI reports.

Allocation drivers of Sales and After Sales, mass market products, can be presented as follows:



(*) FLS: Fix Line services products. MCS: Mobile communication products.

(1) AHT: Average handling time. Effort spent per product are weighted, based on a study of time for handling products.

(2) Complaints handling are handled as ordering retention activities: allocation to market with # products - park.

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2) Sales and after sales, insourced and outsourced, professional market products

This life_cycle object includes all EBU business unit sales and after sales channels.

EBU owns his dedicated after sales department: Operations-Business Support Centre (OPS-BSC).

OPS-BSC deals as the back office of the EBU Direct sales for complex ordering, as well as front office towards EBU clients for all what concerns commercial issues on products, Telco, fix&mobile, and ICT. We referred to team's names to split OPS-BSC into Telco Fix, mobile and ICT costs, since OPS-BSC is organized in teams dedicated per product.

Like CBU, EBU sales and after sales can be split into 2 big categories: acquisition costs, and retention costs. We include in retention costs the complaints handling activity of OPS-BSC.

EBU sales activity of ICT cannot be declined in volumes. ICT solutions are offered to the clients as tailor-made contracts, declined in SLA (Sales level agreement) and quoted in EUR.

Besides, ICT contracts include most of the time One-time items. The need to split costs of EBU Sales between products led us to take another allocation key than volume driven.

On top of the fact that not all the EBU products can be declined in volumes, EBU sales efforts are quite different depending on the product. EBU Telco mass market products are quickly available to the client, to the contrary of projects ICT that are generally sold for a 2-3 years minimum period time. Such a long time period contract needs sales efforts deployed on longer period of time too.

To tackle this key point, we took 2 drivers to allocate EBU Sales and after sales costs:

- Total transaction value (TTVA) to measure acquisition sales costs,
- Yearly turnover to measure retention sales costs.

TTVA measures the total yearly value of a won contract. Taking the TTVA as driver enables to compare with a simple unit of measure (EUR) products with specificities very different such as Telco mobile subscription, ICT Data center hosting subscription, etc. Besides, inside EBU Business unit, the TTVA generated is the central driver for all what matters remuneration of direct and indirect sales channels, sales bonus calculations, etc.

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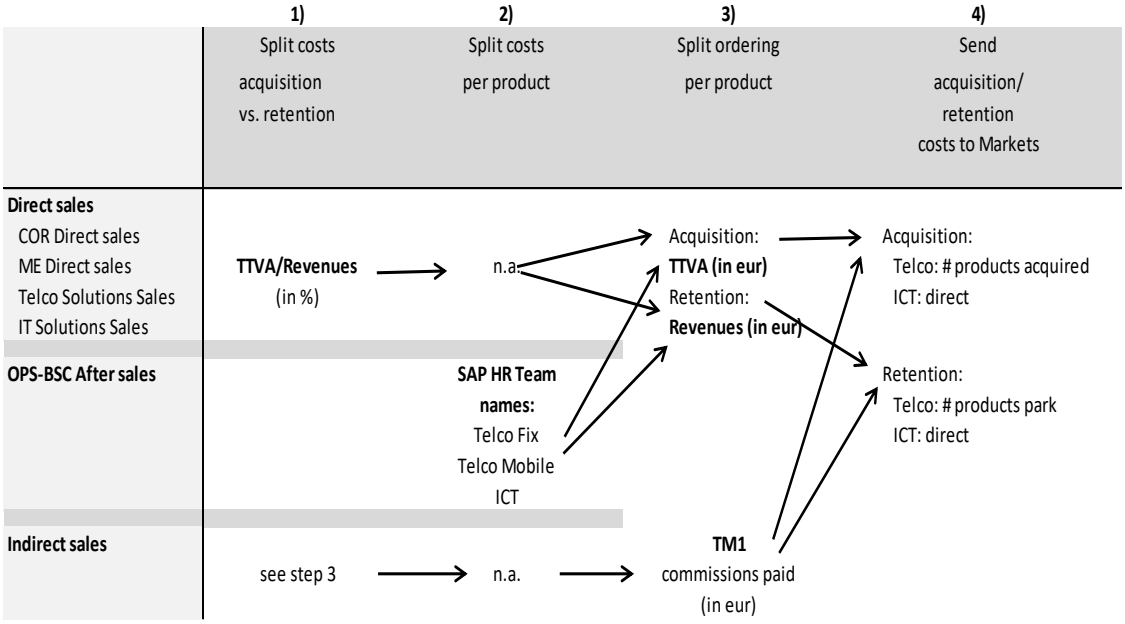
Allocation drivers of Sales and After Sales, professional products, can be presented as follows:



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4.5.3 Modern equivalent opex (MEO)

The 2014 Cost model introduced the concept of modern equivalent opex: a company will perform an activity with its own personnel, if the use of its own personnel is equivalent in costs to another business model such as partnership, outsourcing, interim workers, commissioning, etc.

The MEO introduces a new way to determine VAR costs. Objective of the MEO is to only keep as VAR costs the incremental, effective costs needed to perform an activity, by comparing unit cost of FTE Proximus with unit cost of Outsourcing.

MEO concept application requires some basics:

- comparison basis is reliable: activities insourced and outsourced must be of the same nature,
- same drivers must be available to compare both costs.

MEO application to Commercial activities:

Proximus outsources part of its commercial activities: direct sales, front office and after sales. These activities are also performed with Proximus FTE, as described above.

Direct sales and After Sales team cannot appropriately be compared to their outsourced equivalent teams: performance remuneration differs, tasks differ quite also.
E.g.: After sales outsourcers are used for specific tasks, often easier than the ones assigned to Proximus FTE, more trained and skilled about Proximus products and IT Tools.

The only sales channel where we can apply the MEO valuably is the Front office.

Front officers:

- use the same Proximus IT tools (**IVR**-see above), where volumes and minutes of calls are registered.
- perform the same tasks: receive phone calls of clients and promote Proximus products & services.

Unit cost/minute of the Front office Outsourced is applied to volumes of minutes of the Front office Insourced, to determine the MEO Front office VAR costs, other part of cost is considered as a Fix cost.

MEO application to Technical activities:

CUO outsources part of its VAR Retail activities: remote repair (by the CHC/Customer Help Center technical call center), field installation and field repair. These activities are also performed with Proximus insourced FTE, as described above.

The CUO CHC technical center second line may not come into consideration for MEO: tasks differ from the first line ones and cannot be measured the same way. However, tasks of outsourcers for both field installation and field repair do not differ and can be measured the same way, as well as tasks of outsourcers for the CUO CHC technical center first line.

MEO is thus valuably applied to the CHC technical call center first line as well as the field installation & the field repair.

Front officers (the first line of the CHC technical call center for remote repair):

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- use the same Proximus IT tools & volumes and minutes of calls are registered the same way.
- perform the same tasks: receive phone calls of clients and try to remotely repair the products.

Technicians (for both field installation and repair) :

- use the same Proximus IT tools & volumes and DU are registered the same way.
- perform the same tasks: install and repair products/services of customers on the field.

Unit cost/minute of the Outsourced Front office is applied to volumes of minutes of the Insourced Front office, to determine the MEO technical Front office VAR costs, other part of cost is considered as a Fix cost.

Unit cost/DU (measure of time) of the Outsourced Technicians is applied to volumes of DU of the Insourced Technicians, to determine the MEO Technicians VAR costs, other part of cost is considered as a Fix cost.

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5 TEC OPEX (network&IT) stream

5.1 Allocation of TEC OPEX costs going through the "TECHNOLOGY" INCA module

5.1.1 Determination of the TEC cost perimeter

As stated previously the Proximus organisational structure distinguishes between 5 distinct organisational pillars called Business units :

- Consumer Business Unit (CBU) has the responsibility over the residential and small enterprise customers
- Enterprise Business Unit (EBU) has the responsibility over the professional customers
- Customer Operations (CUO) has the responsibility to deliver (commercial and technical) services to customers such as provisioning, after sale and repair
- Technology (TEC) centralises Network and IT services
- Staff and support (S&S) groups all horizontal functions sustaining the Group activities

Commercial retail activities are situated at the level of Business unit CBU (consumer business unit) for the residential and small enterprise customers and at the level of Business unit EBU (enterprise business unit) for the other professional customers (medium and corporate enterprises).

Network & IT activities are situated at the level of Business unit TEC, as well as the carrier & wholesale activities (CWS).

The Proximus financial and accounting structure clearly registers (directly attributable) TEC costs on cost centers 50xxxx, separately from the wholesale costs booked on cost centers 40xxxx.

However, a number of costs are not directly attributed to TEC in the accounting books but do relate to TEC activities.

It concerns :

1. FTE related costs
   Support and centrally booked costs which need to be ventilated towards all Proximus personnel/FTE's (and thus also towards these residing under TEC).

   E.g. Proximus University, Fleet, office building, train cards, bonus, training, gsm's in the context of the employee phone program.
2. Non FTE related costs
   Costs which are centrally booked and managed but relate to TEC activities such as space and power consumption.

The costs under point 1. above are added up with the directly attributable FTE related costs (essentially all payroll costs and costs categorized with Cost type 'personnel-related' in the cost base, in lesser extent a limited number of costs categorized as 'non personnel-related', i.e. primarily

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training costs, printing costs and cost for office equipment) and allocated towards the organisational groups (as a general rule, the organisational group corresponds with the cost center group - except for teams like hybrid network & IT CCG's (SPC NSC) or NEO IPP or NEO OPP).

The TECHNOLOGY module costs are primarily sourced from the following modules :

1. Organisational_Group
   This concerns the costs of "50xxx" organisational groups not belonging to CUO.

2. TEC_SOG
   This primarily concerns costs for consultancy, rent/buy equipment.

5.1.2 TEC cost allocation

5.1.2.1 *Introduction of 2 cost type attributes*

Two cost type attributes are introduced in the cost model.

These attributes are "VAR_TYPE" and "PS_TYPE".

For TEC, these attribute qualifications are not defined at the level of the cost base for all CP-CCG combinations but only for the FTE related costs at the level of the organisational groups (module "organisational_group").

5.1.2.2 *Criteria for Attribute dimension VAR_TYPE*

Dimension VAR_TYPE only qualifies TEC FTE-related costs in the TEC module, unlike in the commercial retail module.

Variability refers to the service volume produced by the company in the long-run. This variability has 2 dimensions : volume within a product or diversity of products. The considered increment is the whole product. E.g. PSTN : what if we stop PSTN, which costs do we avoid? This is very hard to reach, especially in a top-down model.

Therefore, we prefer to opt for a simple approach that is only an approximation of the minimum fixed costs, by only considering as fixed FTE-related costs the so-called overhead teams and the minimum organizational structure, represented by the persons attributed with a "team responsibility" or in an MST cost center, as officially reported in the SAP accounting system.

We distinguish between 2 var_types only (unlike Retail, with 4 var types):

1. Fix (fix) : TEC FTE-related costs are considered as fixed mainly when they are related to the minimum organizational structure (represented by the team responsibles and the Management & support teams) should there be a change in the long run.
2. Variable (var) : TEC costs which are not considered as fixed according to the definition hereabove (hence overestimated).

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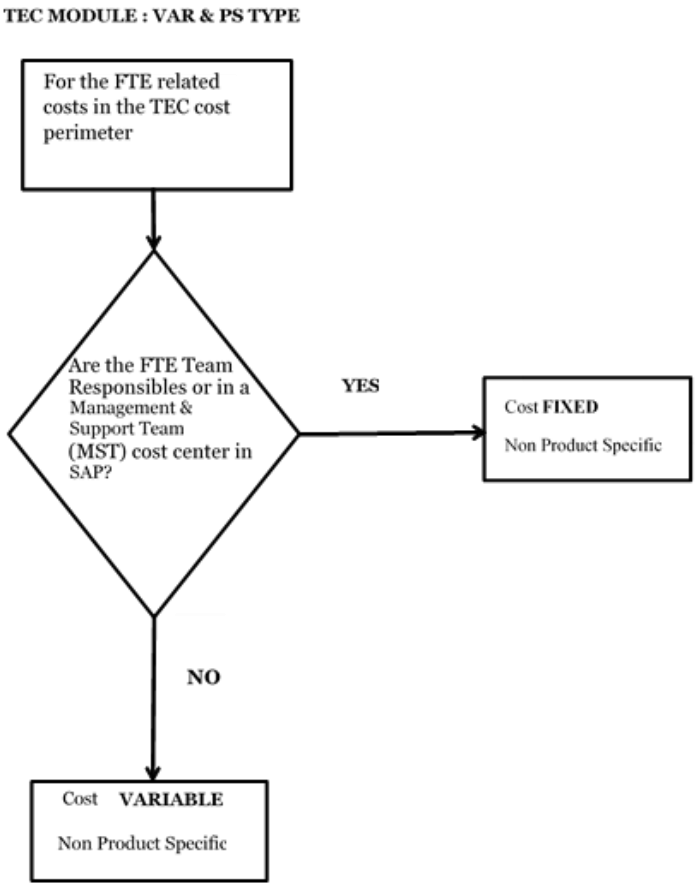
5.1.2.3 *Criteria for attribute dimension PS_TYPE*

Dimension PS_TYPE qualifies TEC costs based on whether they are specifically generated and/or can be attributed directly or through a specific non generic and/or non general driver towards the specific products.

We only have one category in the TEC module :

a. NON_PRODUCT_SPECIFIC : TEC costs which do not have a clear (causal) relation with specific products.



5.1.3 TEC allocation process

5.1.3.1 *Allocation of "Organisational_Group" costs*

For TEC, the organisational groups correspond with the cost center groupings as introduced at the level of the cost base.

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The criteria as set above (5.1.2.2.) regarding variability are currently translated towards organisational groups based on this decision table :

	Criteria	Justification
fix FTE	Assigned as Team responsible in SAP	Assumption of Proximus as ongoing concern on the long run, independent of Product mix : maintain the same organisational structure (reflected through team respo's)
	Assigned to an MSTcost center in SAP	MST cost centers are referring to Management & Support teams

Organisational groups dedicated to a specific product are categorized as product_specific.

Organisational groups covering a span of products are categorized as non_product_specific.

In TEC, all organisational groups have been defined as “non_product_specific”.

Except for the NEO (Network Engineering & Operations) department, where as of this year this parameter is used to give the type of network activity the team relates to (e.g. fixnetwork, radio& access network…).

The allocation for fix & var TEC organizational groups is the same (fix is a copy of var through a generic key implemented in INCA).

The FTE related costs of organizational groups are allocated towards markets, network, activities or IT elements based on time or efforts spent for these respective elements, as registered in various reporting systems depending upon the department (Rapid for SPC…).

5.1.3.1.1 Technology (TEC) Organisational group allocation

5.1.3.1.1.1 TEC network & IT OPEX organizational group allocation

The network & IT teams of TEC are thus split into fix and var on the basis of objective criteria found in SAP but allocated the same way (var being a copy of fix) to the following elements :

- AC2
- BUSINESS_OVERHEAD
- CP2
- IT_SW_HW
- IT_STORAGE_DB
- NE
- OVH
- MARKET

In the TEC module, the organisational groups do not only encompass the costs of GL 62 wages but also FTE-related costs from GL60 MOS or GL 61 SOG, whilst outsourced personnel costs (for 2 CP only : 61361 & 61362) have been consolidated into a new module (EXTERNALS).

The driver is based on time/efforts when it makes sense.

The allocation of the “operational” teams is done directly through the driver whilst the allocation of the “non operational” teams is done through generic keys taking into account the scope of the “non operational” team (driver is the remuneration cost allocation of all the teams in the scope of the “non operational” team).

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The allocation of the “fix” part of the “operational” teams is done through generic keys (a simple copy of the remuneration cost allocation of the “var” part of the same operational team).

5.1.3.2 *Allocation of TEC support costs*

Module ‘Support’ identifies and collects the costs of a number of support objects which a.o. are TEC related. The TEC related support objects primarily concern costs for telco power & space. However, telco power & space costs are not treated in the TEC module and are thus not described in this subchapter.

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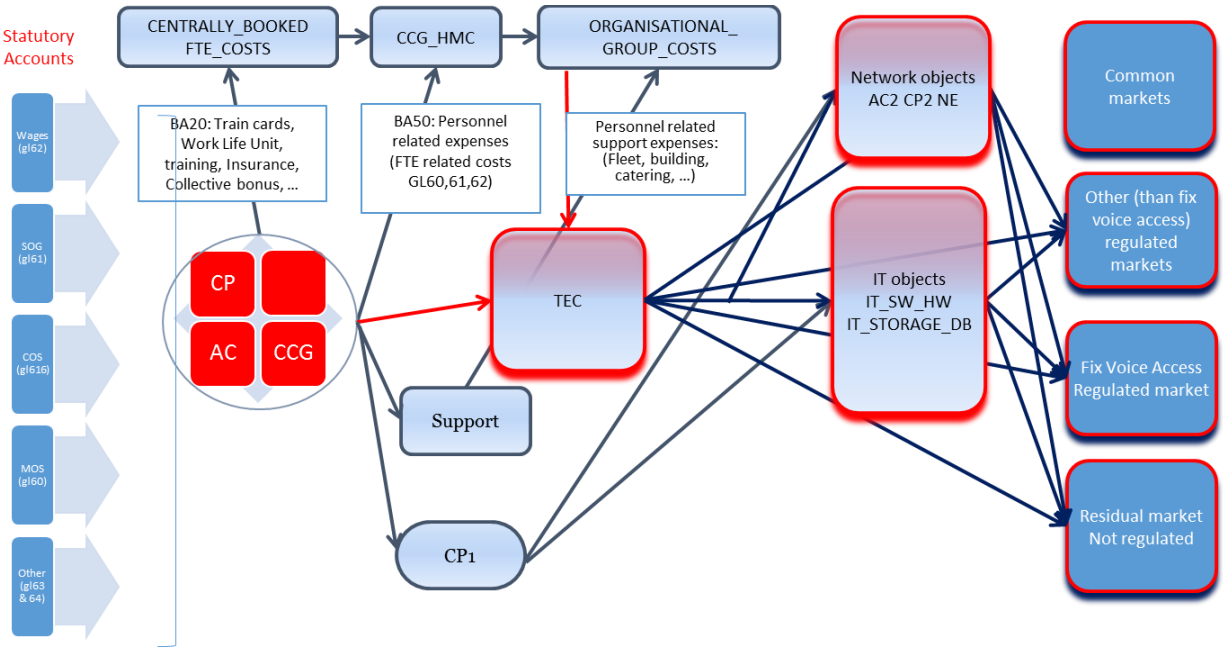
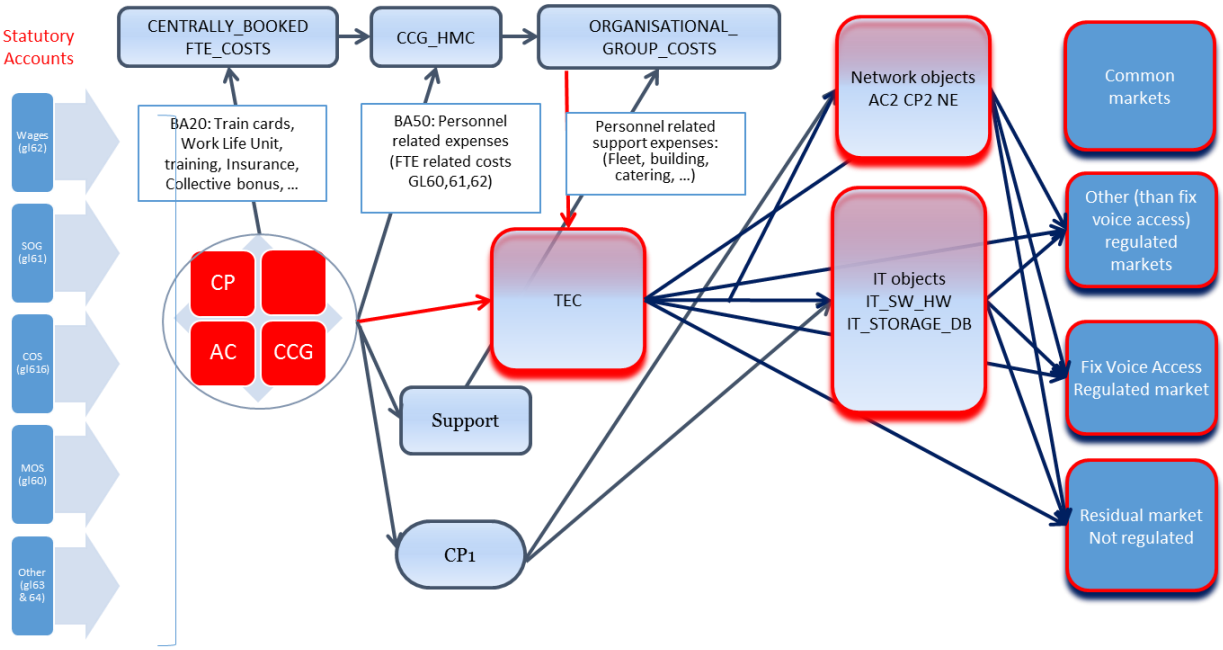
5.1.3.3 *Graphical view on TEC OPEX allocation flow*



CP = Cost Pool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
Typically, the G/L accounts/costs consolidated in a single cost pool feature the same causal relation.
CCG = Cost Center Grouping = grouping of cost centers with comparable characteristics
AC = Asset Class



CP = Cost Pool = a grouping of G/L accounts/costs which have similar characteristics and reside under the same nature of costs.
Typically, the G/L accounts/costs consolidated in a single cost pool feature the same causal relation.
CCG = Cost Center Grouping = grouping of cost centers with comparable characteristics
AC = Asset Class

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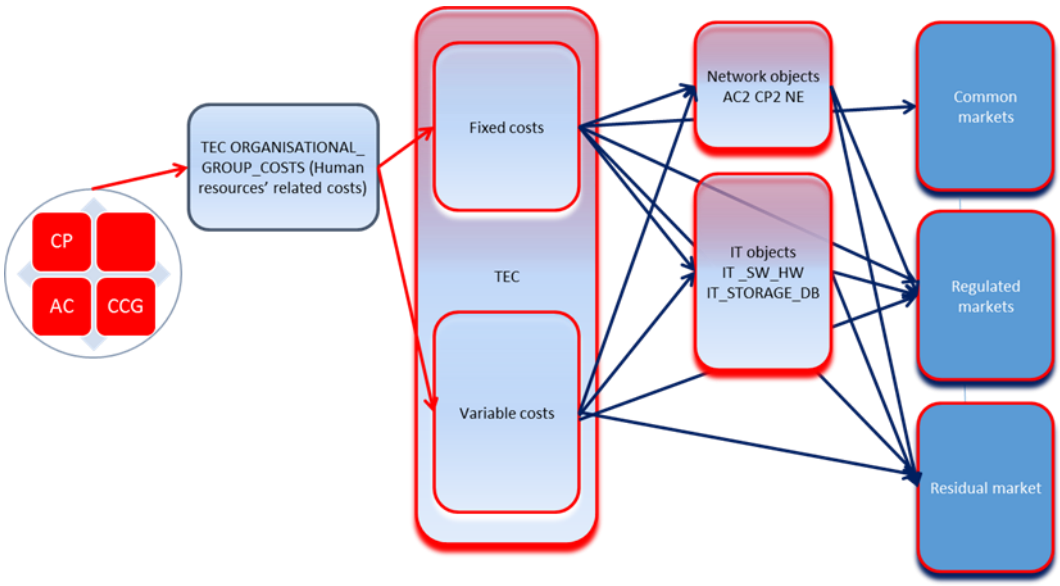


Figure 3: TEC OPEX Flow – General

Figure 4: TEC OPEX Flow – Fix / Var

5.2 Allocation of TEC OPEX costs not going through the "TEC" TCE module

5.2.1 GL61 accounts – Services and Other Goods (SOG)

The GL accounts in the 61 range mainly register outsourcing, consultancy, renting & maintenance costs as well as miscellaneous costs driven by staff (GSM, memberships, office material, internal events etc.).

The GL61 accounts are at a sufficient detail level to allow for a direct allocation to one of the cost objects of the allocation flow. The destination cost objects are distributed over different allocation modules : CCG_HMC ,CP1,CP2,IT_HW_SW,Market,NE,Life_Cycle,Technology.

5.2.2 GL60 accounts – Material Out of Stock

The GL60 account costs cover the cost of all kinds of material taken out of the stocks of Proximus and used for the repair and provisioning of network or the cost of small items (office material, GSM,…) consumed by the staff in the context of their daily activities.

Sensitivity: Unrestricted

Note that movements from stock also occur for the construction of the network; these costs are capitalized. From SAP-MM, it is possible to filter out the movements to be capitalized and the others. The capitalized MOS costs are implicitly treated with the assets.

MOS costs are reported at CP/ GL account level per cost center.

This level doesn't always allow an accurate attribution of the costs to the model cost objects and therefore an analysis is performed at the cost base level together with detailed information out of the SAP database .

- The SAP records are reported among other detailed information such as the Material Item Number, where the amounts can be directly attributed to a cost object of the cost model based on the description of the material item.

  The SAP database contains more than 600.000 records.

This analysis results in an allocation towards: network related cost pools (CP1, CP2, NE), CCG_HMC and Lifecycle cost, market and Technology.

Once each material item is attributed to a cost object, it is easy to report an allocation from the CC/GL account aggregate to the model cost objects.

Sensitivity: Unrestricted

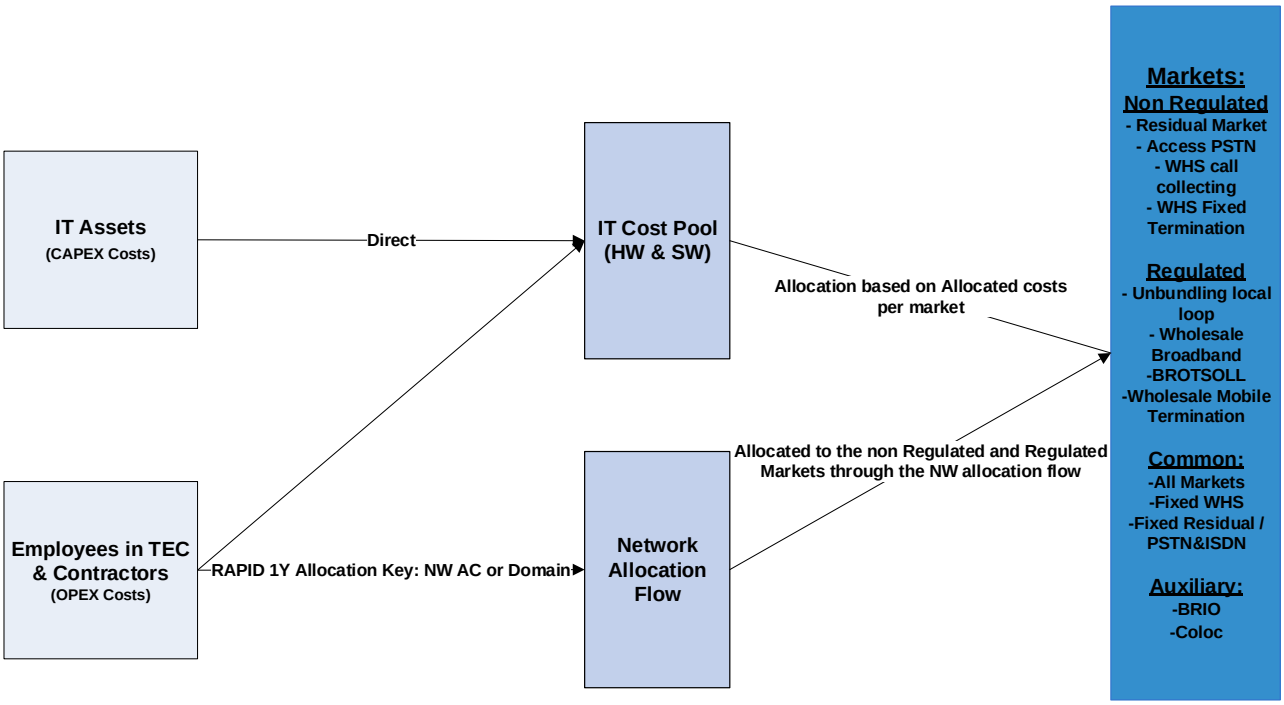
6 IT stream

6.1 IT Allocation flow

6.1.1 IT allocation flow: Introduction

The IT model can be summarized by the following drawing representing the different IT Modules as defined in the IT model, as well as describing objects contained in each of them. The creation of these modules and objects will be detailed in the following paragraphs as well as how they are allocated to each market through an allocation which uses causal and generic keys created with data available in different inventories or reporting systems within the company.

ICT is the use of programs with a specific infrastructure to deliver a requested service or product to the end-user (which can be a Proximus Client or a Proximus Employee/Contractors). In Telecommunications, an incumbent ISP will rarely develop an Application or invest in a project exclusively for one regulated product or market. Most of the time, its specifications will cover multiple usages. Therefore, the goal of this model is to regroup all capitalized and operational costs in order to allocate them to the network allocation flow or the regulated/residual markets



IT Allocation Schematics for 2016

Since 2016, the allocation of IT costs has been rationalized in its scope. This resulted in two main differences compared to last years: the merging of previous modules IT hardware and IT Software into one IT Cost pool and the allocation towards the Market module based on a generic key instead of volumes.

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The allocation stream goal stays the same as it is to link the costs for manpower and infrastructure that are used in order to create, run and maintain applications, components and projects to the markets defined in the regulatory model.

These costs can be of two different types: capitalized and therefore depreciated following accounting rules (for IT, depreciation length is generally 4 or 5 years), or operational and fully charged for the current year. Depending of the cost's nature, the allocation stream will follow different paths (IT, IT&NW and overhead) and use specific inventories and reporting systems in order to create the optimal allocation keys.

6.1.2 Data sources: IT Inventories and Reporting Systems:

Internal IT Databases:

The main database used in the model is the "Configuration Management Database" (CMDB) which populates and links together all IT related objects in Proximus, such as which databases are used by an application, or what is hosted on a server. This is used primarily for incident management. This repository is fed by operational inventories from each category of IT machine.

IT Asset Manager (ITAM) is the inventory for all IT equipment with a reference to its cost and is used by Finance to calculate yearly the costs for IT hardware Assets.

ARIS is a recent initiative to install a business process modeling tool which allows the aggregation of applications and to understand fully their purposes.

Reporting Systems:

Rapid[2] is a tool used for projects, budget and capacity management related processes, with interfaces to other core systems such as SAP HR (human resource & organization units data) , SAP Finance (actuals, purchase order..), IMD (release Management) and timesheets applications (used by TEC to report their day-to-day work). Rapid will be used to calculate allocation keys for most manpower costs for TEC regarding both Capex (allocation of Assets ranging from 2526 to 2573) and Opex. All assets tagged as pure IT are all pooled together in the IT SW HW module.

TM1 is an interface from excel to SAP allowing the extraction of Data coming from Finance and HR. It completes our asset reconstruction for the non-workload costs.

6.1.3 Modules and Objects composing the IT allocation flow

IT Servers

A server is a set of hardware running as a service to serve the needs or requests of others programs or users.

[2] **R**epository for the **A**dministration of **P**rojects and **I**nitiatives in a **D**ecentralized way

Sensitivity: Unrestricted

Splitting the server asset between these families was achieved by using the cumulated purchase costs of these families which is provided by Finance. This calculation is made possible by the inventory maintained in ITAM.

IT Assets allocation:

All tagged IT assets that follow are directly allocated to the IT Software and Hardware module.

- **2500 Servers (Inclus. Tandem)**

Servers can be used by applications (software sold by a vendor or developed in-house) and databases or for interconnectivity and security. This asset pools most of servers families used within the company such as Windows, Linux, UNIX, Teradata and Tandem technologies. Accounting distinguishes the following families: Wintel (Windows for Telecommunication), UNIX (with Linux pooled in this family), Teradata and Tandem. Keys are created from Finance inventory analysis in order to allocate costs to each family.

- **2501 Storage:**

Storage is used both as a core business as well as a support for employees and customers. It is required in order to run applications and databases, create backup and archives to save an employee's work or a customer's information (regarding billing or call details records for instance).

- **2502 Mainframe BS2000 HW & 2503 BS2000 Software:**

Mainframes are powerful computing platforms used for critical applications. They can be considered as multiple servers within one machine. Sensitive applications and data that require heavy computing power are hosted on them. It requires specific software to run which costs are pooled in the 2503 BS2000 Software asset. The mainframe park has been updated to the Z-Series manufactured by IBM.

- **2504 IT Internal Network**

IT Internal Network is an asset representing Proximus Intranet, required to support the needs of employees as well as the interconnection needed in order for the different IT objects to communicate.

- **2505 Office Automation**

Office Automation pools IT costs and improves productivity such as development environment, printing servers and Digital Workspace.

- **2506 End user IT Device**

Concerns IT material made available to Proximus employees such as laptops and desktops.

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- **2523 Major Software Application:**

This is a specific asset that pools applicative mobile costs. It contains IT sub-assets as well as some network-related ones due to historical reasons. Timesheets reports from RAPID are used to allocate this asset.

- **2525 Application Software Other:**

"Application Software Other" is an asset for all Capex licenses costs that are not pooled in another IT asset (licenses costs for minor applications for instance). It is heavily related to productivity enhancements and office automation.

- **2526 Applic SW IMA:**

All costs related to the **I**dentify **Ma**nagement (IMA) application are assigned to this asset. IMA identifie all Proximus users.

- **2529 Appl SW Middleware:**

Although named Middleware, this asset is composed of developed applications playing the role of a middleware inside Proximus IT infrastructure. It has to be distinguished from some costs objects in System Software and Application Software Other that also have middleware costs such as Websphere licenses. This asset pools IT domains from:

- A **B**usiness **P**rocess **M**odeler which delivers a process integration platform for enterprise services based on service-oriented architecture.
- A **S**ervice **O**riented **A**rchitecture layer.
- A **S**OA **S**ervices **R**epository to document and describe all SOA services.
- And a **H**ub **C**ontract **S**oftware used as a middleware connectivity tool.

- **2530 Applic. SW PILA:**

Pila Asset is a cluster of applications and components related to the **O**rder handling **M**anagement **S**ystem (OMS) with all its bridges with provisioning systems and a customer relationship management interface with BCI as well. OMS is one of the main contributors to this asset, as is the **N**etwork **P**rovisioning **S**ystem linking OMS with provisioning systems and the **O**rder **F**low **A**pplication (an interface between BCI and OMS). In the process of being phased out and replaced by the MCOM system. (which is accounted in its related sub-asset from the 2547 asset)

- **2531 Applic. SW BCI:**

The Proximus Channel Integration (BCI) is a customer relationship management tool for all call-centers-enabling a real-time customer information input or output in order to improve the feedback a customer receives when calling Proximus helpdesks.

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- **2532 RID(Reference Inventory&Design):**

RID is an asset related to inventories and documentation.

- **2533 Applic. SW_WFMS**

The **W**ork **F**orce Capacity **M**anagement tools (WFM) asset pools all costs related to the automation of the dispatching on the field of all Proximus technicians including a scheduler and reporting system.

- **2534 Applic. SW_UTS**

The **U**nified **T**rouble **T**icketing System (UTS) is a system used in order to register and follow-up trouble tickets pro-actively and reactively.

- **2535 Applic. SW_Cust Relationship Management**

This asset is composed of two applications related to the selling process and are directly linked to CRM: **C**ustomer **S**ales **A**ssistant (CSA) and **C**ustomer **V**alue **M**anagement (CVM).

- **2536 Appl SW COB**

This asset pools costs from the **C**ustomer **O**riented **B**illing system (COB) is a cluster formed from three IT platforms: **C**ustomer **D**ata**B**ase (CDB) **I**ntercarrier **B**illing **I**nformation **S**ystem (IBIS) and the **C**all **D**etails **R**ecords **Flow** (CDRFLOW). Billing data is a sensitive matter for both customers and Proximus and requires real-time redundancy. Therefore, COB applications are hosted on dedicated technology: Tandem servers also called “Non-stop servers”. The CDB Application is retail related, IBIS wholesale related and CDRFLOW applies to both.

- **2537 Appl SW SAP**

The SAP Asset pools all costs coming from all modules used by Proximus. It is a typical business overhead costs.

- **2538 APPL SW-Number Portability**

Number Portability is composed of two main applications called **F**ixed **N**umber **P**ortability (FNP) and **C**arrier **P**re-**S**election (CPS). CPS is an important system as it is an interface with OLO’s requirements to deliver their services.

- **2539 Applic. SW ECA/ECM/VORTAL**

E-**C**hannel **A**pplications (ECA) and **E**-**C**ontent **M**anagement (ECM) are tools to manage and web-enable digital content for consumers (B2C) or enterprises (B2E). These are websites to engage customer relationship in order to conduct e-business via the Proximus websites.

- **2540 APPL SW – ROSY**

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ROSY is a core component of the IT infrastructure as it is the runtime engine for SDH, XDSL and IDTV provisioning and repair.

- **2541 APPL SW – NETCAM**

NETCAM is a dedicated asset for Rosy's workflow engine for SDH (BPEL). This is asset is purely network related and is not allocated to the IT Software and Hardware module. Instead it follows the network allocation stream through the CP2 module.

- **2542 Sales Handling Engine(SHE)**

The **S**ales **H**andling **E**ngine (SHE) is a sales application used as a layer in order to enable convergence between all selling applications so that our vendors and partners will have a global view on all products supplied by Proximus, improving order intake and rationalizing the IT selling infrastructure. Pre-Sales and Sales are activities in the fulfillment process being mostly allocated to the residual market.

2544 APPL SW -IT Security

IT Security asset pools heterogeneous costs that can be related to applications NFM (**N**ew **F**raud **M**anagement), Proximus IT security in general, IMS (Identify and authentify for provisioning engine) to protect user's privacy or overhead costs to protect the IT infrastructure from malicious harm (virus, hackers take-over…)

- **2547 Major software applications**

Major software applications are assets regrouping all new IT developments and applications since 2010.

- **2550 APPL SW ABC**

The **A**ccess **B**ackbone **C**onnectivity asset (ABC) is a core element of Proximus's infrastructure. SRW is an inventory for connectivity and equipment documentation and is used as an interface between IDMS and front-office applications such as OMS, WFM or COB/CDB. Three other core domains are also pooled in this asset: ABR[3] for the local loop connectivity and managing resources and services. ANA[4] (**A**utomated **N**umber **A**ssignment) supports service order provisioning of phone numbers through automation of the attribution of a phone number to a customer. Finally, ITR[5] (**I**nfrastructure **TR**ansmission) is the inventory of Proximus's backbone and optical network covering leased lines, physical equipment, trails, trunks, cables and the multiplexing hierarchy between all these elements. It should be noted that applications grouped in this asset use a special hardware in order to run

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properly as they are all linked to huge databases that require daily processing of data per batches. For the last years, BS2000 mainframes from Fujitsu were used but they were recently replaced by Z-Series from IBM[6].

- **2551 Operational Inventories**

Operational Inventories are applications used to maintain ATM, DSLAM, Ethernet and IP inventories and statistics.

- **2552 GraphDoc**

The Graphdoc asset pools all graphical documentation components which are tools used to create or modify the local loop network documentation. It allows an integration of the Autocad package which is a drawing software.

- **2561 APPL SW – NETCOOL**

Netcool is a software package sold by IBM and developed internally to suit Proximus needs. It is a set of alarms and probes used for monitoring to ensure both a pro-active and reactive service assurance process. It is divided in two main domains: **N**et**c**ool **T**ransmission (NCT) and **N**et**c**ool **D**ata (NCD).

- **2562 APPL SW - e-Health**

E-health is a reporting tool for bilan and is composed of e-health (A-EHT), Provisioning (A-PRO) which is an interface between e-health and umbrella/CMS and oblicore service layer (A-SLR).

- **2563 APPL SW-Customer Remote Support**

Applications used by the helpdesks or customers through the Proximus portal.

- **2566 APPL SW-DIAMON&CORRELATOR**

The diamond (DIA) and Correlator (CRL) asset regroups those two IT domains that enable the monitoring of network alarms. It also creates tickets to respond efficiently to problems.

- **2567 APPL SW – DARE**

DARE stands for **D**iagnose **A**nalyze **R**epair **E**ngine and is the main tool to analyze alarms and probes reports. It diagnoses problems through a root analysis, classifies incident by priority and forwards them to responsible persons for problem resolution.

- **2568 APPL SW-Learning & Mngt Syst.**

[6] One IBM z10 Mainframe is supposedly 1500 times more powerful than regular x86 servers while consuming 85% less power (source IBM).

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The learning management system asset is essentially a component of SAP HR (or SAP LMS for **L**earning **M**anagement **S**ystem).

- **2569 APPL SW-ECRM**

The E-CRM asset contains one application named **G**roup **C**ontent **M**anagement (GCM) which is a platform for contract, records and business process management.

- **2570 APPL SW Business Intelligence Tool**

All costs from the Microstrategy software are sent to the Business Intelligence Tool asset as the main software used by our business intelligence department (which is the Data Warehouse: DWH). It is heavily related to data warehouse and will be grouped with it so that the tools they use are represented in the total cost of the data warehouse.

- **2571 APPL SW ONE-Catalog**

The **Proximus P**roduct **C**atalog is an application that stores advice and information about all products and services. It is heavily used by Proximus Sales divisions and as a service assurance tool for customer care.

- **2573 Appl SW DWH**

The data warehouse department has heavy requirements in terms of hardware and software as it calculates statistics and indicators for Proximus products and network. Data warehouse uses a special hardware from the Teradata technology that helps with the treatment of large data volumes with the possibility for many users to analyze them.

Operational Costs:

There are 4 sources of IT opex costs:

A) Maintenance related:

Maintenance costs are regrouped into 2 different cost pools (G/L 61120 and 61130) on which allocations keys are applied in order to distribute these costs towards servers, IT Software & Hardware module, storage, servers CP2 and NEs.

B) OPEX Wages internal

Internal wages for IT OPEX costs were allocated by the use of the RAPID database. A report by cost centers giving a detailed output of OPEX projects was linked to the cost centers groups from the cost base allowing an allocation from all IT teams to the IT Software & Hardware module.

Opex internal wages of ITS teams are now directly allocated to “IT_SW_HW – IT_Development_Infrastructure_Operations”.

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C) OPEX Contractors Bodyshopping and Fixed price:

Bodyshoppers and fixed prices contractors are regrouped together and separated from internal employees and consolidated into the new module as of the 2018 model (Externals).

Opex contractors bodyshopping and fixed price costs of ITS teams are now directly allocated to "IT_SW_HW – IT_Development_Infrastructure_Operations".

Wages OPEX Costs are allocated using timesheets report from RAPID for the calculation of allocation keys for each cost center within SPC. Reports are designed in order to regroup OPEX costs based on the allocation it should follow (IT, Network, Overhead).

6.1.4 IT Software and Hardware to Markets

Since 2016, a new methodology is used to allocate IT costs: they are all pooled together based on the principle explained beforehand and are allocated to the end objects contained in the Market module based on the total costs per related object.

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7 Network stream

The network allocation stream is organized around the network investment structure (leading to network functional blocks in the allocation stream). The focus is on Capital Expenditure costs which are directly associated with the network equipment deployed ; these costs originate from the assets accounting system of Proximus and they are gradually cascaded by means of a variety of cost deaggregation keys and a variety of cost drivers up to the telecommunication services. By contrast, the SRW stream focuses on the operating expenditures of the business activities, which are directly allocated to end- markets by means of business drivers.

For the operating costs of the network itself however, an intermediate allocation approach is used : the remuneration costs and the personnel related OPEX costs are associated to typical network activities (as described in Chapter 5) which are finally attributed to network functional blocks . This part is discussed in section 7.3 hereafter.

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7.1 A layered allocation model

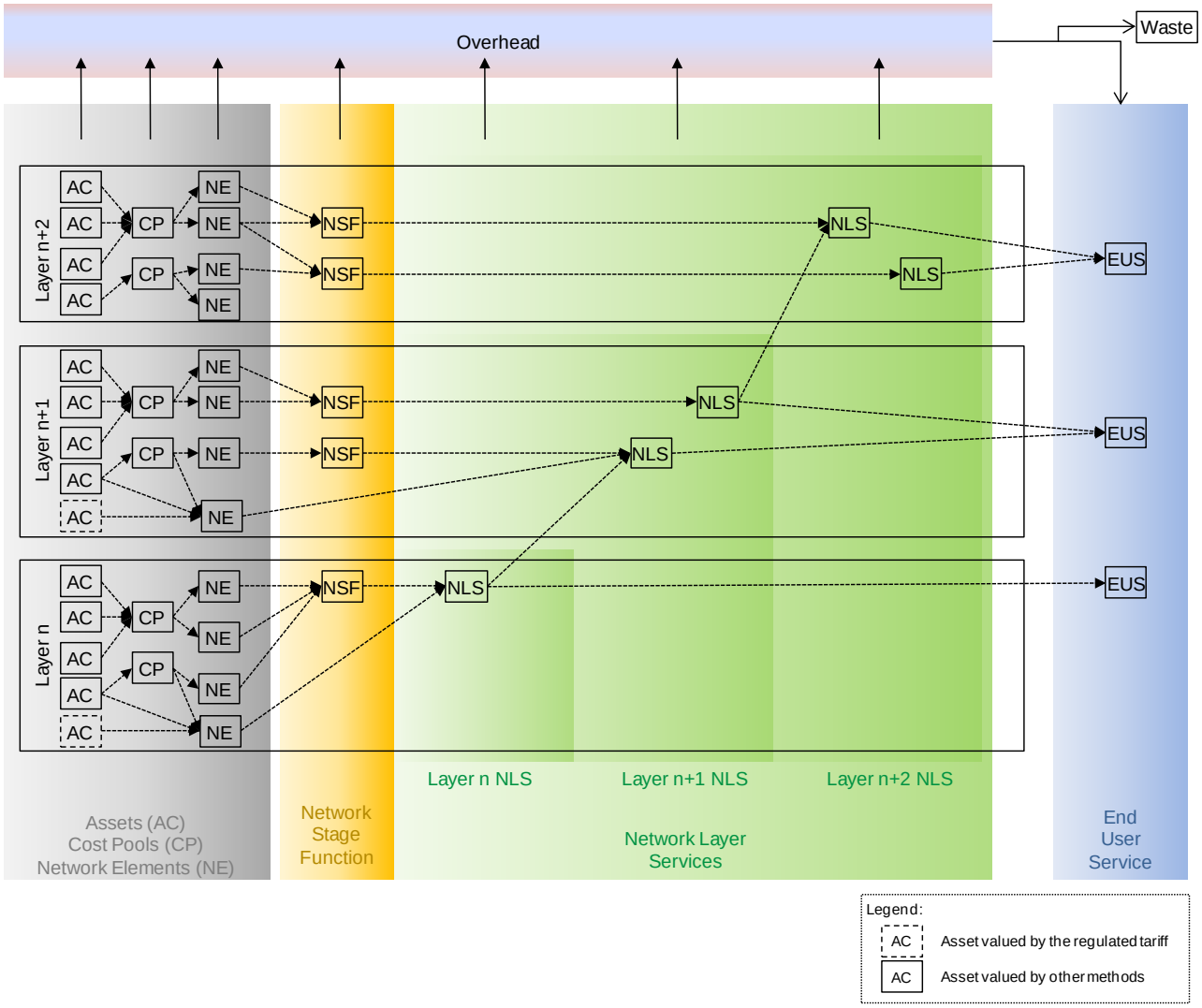

Figure 5: Layered allocation model

It is common practice in the telecommunication industry to separate investments in different logical levels; lower levels corresponding to basic (simple and general purpose) services, higher levels corresponding to complex higher valued and purpose oriented services. The pursued effect of such separation is to promote the reuse of basic lower level services by higher level services thereby bringing in the short term the volumes at each layer to levels that benefit from economies of scale. In the long term, the pursued effect is to benefit also from economies of scope.

The network cost allocation model is designed to reflect the layered functional structure of Proximus's telecommunication infrastructure , each layer offering services to the upper layers. In practice 5 layer levels are represented in the cost allocation model in order to allow each invested technology to be situated at the right level of its contribution in implementing the layer services.

In practice a network equipment may participate to several different layers especially in the interfacing boards towards other network equipment because it acts as a terminating point of lower level layer services.

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To avoid any ambiguity, a network equipment will be considered as belonging to the highest layer implemented in it and operated by it. For the example of the IP router, this simple criterium locates an IP router on the third layer (IP layer) above SDH.

Using this criterium all investments still in service of Proximus's infrastructure are distributed in one of the following layers:

Layer NLS1.0 : Passive infrastructure gathering investments in access copper, in ducts and fibre cables (access and backbone).

Layer NLS2.0 : Active transmission infrastructure based on Time Division Multiplexing technology gathering investments in PDH, SDH.

Layer NLS2.1 : Active data infrastructure based on Packet Based technology gathering investments in Ethernet/MPLS.

Layer NLS2.2 : Mobile backhauling infrastructure

Layer NLS3 : Active data infrastructure based on IP technology gathering IP routers , IPVPN routers.

Layer NLS4.0 : Active application infrastructure based on a variety of technologies gathering applicative equipment like telephony digital switches, VoIP platforms, Intelligent Network platforms, Broadcast TV platforms, Video on Demand platforms.

In the model layers are represented by a number of "standard" services (referred to in the sequel as Network Layer Services – NLS) offered to upper layers or directly used as retail/wholesale products (End User Services – EUS). In turn the services offered by a layer are the result of the combination of layer specific functions (referred to as Network Stage functions – NSF)* and services offered by lower level layers allowing the layer specific functions to interact with each other.

*Note: Except the following Network Elements that receive assets cost valuated by the regulated tariff. Those Network Elements include network stage functionality and directly offer services of the same level as their upper layer services. The driver used is "yearly direct CAPEX cost". The driver "yearly direct CAPEX cost" is in fact a by-product of the valuation exercise done for the assets valued by the regulated BIPT tariff.

For the asset valuation exercise a full integration of all the asset valuation components of the relevant technology was necessary (see paragraph 3.4.2.5.4), but in the case of the calculation of this driver the required aggregation degree is determined by the allocation key to be calculated.

The inventories used as input for the asset valuation contain many details allowing the grouping of the costs components based on any combination of such aspects.

Therefore, the driver "yearly direct CAPEX cost" refers to the sum of all the relevant technology valuation components from the appropriate models that meet the allocation requirements (for example, usage of the link or bandwidth or bandwidth and service span or concerned network layer…).

Due to the method used for the valuation of the SDH, the "yearly direct CAPEX cost" allocation driver for the NE_PDH SDH equipment can't be calculated as referred above. Instead it is calculated as the incremental SDH cost of the service for which the allocation is being computed.

> Incremental costs of one service are those costs that are avoided by not providing that service. See Figure 6 for an example specific to this context, where:

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- the cost incurred by all the SDH services equals the SDH asset value, resulting from running the "consolidated transport BROTSoLL engine" (see paragraph 3.4.2.5.7Transport PDH/SDH valuation) with the full set of services carried over SDH
- the cost incurred by an SDH network carrying all the SDH services except service X is the outcome of the dimensioning and costing done by the "consolidated transport BROTSoLL engine" when having as input all the SDH services but service X.
- the SDH incremental cost for service X is calculated as the difference between the two above costs

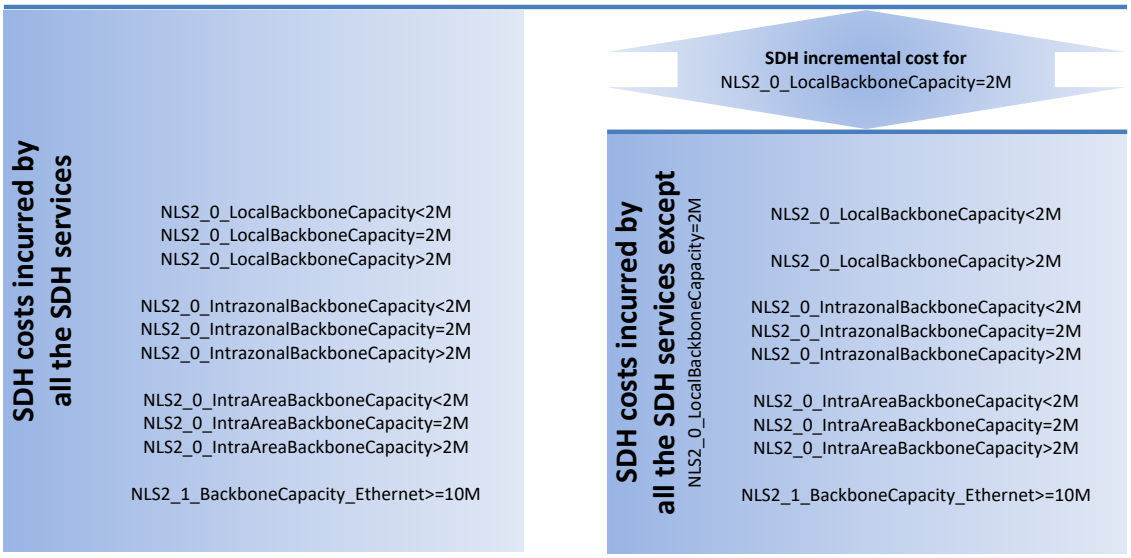

Figure 6: Incremental SDH costs calculation method, an example

NE receiving assets by the regulated tariff	offered services
NE_ADSL equipment	NLS2_1_ADSL_SDSL_Bitstream
NE_NGA Active equipment	NLS2_1_VDSL_Bitstream
NE_NGA Housing	NLS2_1_VDSL_Bitstream
NE_PDH SDH equipment	NLS2_1_LocalTailCapacity_Ethernet>=10M
	NLS2_1_BackboneCapacity_Ethernet>=10M
	NLS2_0_IntraAreaBackboneCapacity<2M
	NLS2_0_IntraAreaBackboneCapacity=2M
	NLS2_0_IntraAreaBackboneCapacity>2M
	NLS2_0_IntrazonalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity=2M
	NLS2_0_LocalBackboneCapacity<2M
	NLS2_0_IntrazonalBackboneCapacity>2M
	NLS2_0_LocalBackboneCapacity>2M

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	NLS2_0_LocalBackboneCapacity=2M NLS2_0_LocalTail=2M NLS2_0_LocalTail<2M NLS2_0_LocalTail>2M
NE_Copper_Cables_Distribution	NLS1_0_Copper_Subloop NLS1_0_Raw_Copper
NE_Copper_Cables_Feeding	NLS1_0_Raw_Copper
NE_Copper_Blocks_and_Tie_Cables	NLS1_0_Continue_Raw_Copper NLS1_0_Copper_Localloop_testing NLS1_0_Copper_Subloop_testing
NE_Copper_Splitter	NLS1_0_Copper_Splitter

The use of BIPT Fixed voice NGN cost model enables to define the network element cost attribution to the underlying network stage function per asset category

NE receiving assets by the Fixed voice NGN cost model	attribution
NE_OwnNetwork_CallHandling	NSF_OwnNetwork_CallHandling
NE_Interconnecting_CallHandling	NSF_Interconnecting_CallHandling
NE_Voice_o_Broadband_SBC	NSF_Voice_o_Broadband_SBC
NE_VoiceIP_Router	NSF_VoiceIP_Router
NE_VoiceTrunks_TDM	NSF_VoiceTrunks_TDM
NE_VoiceTrunks_IP	NSF_VoiceTrunks_IP
NE_IP_Voice_Concentrator	NSF_PSTN_Voice_concentrator

The use of BIPT mobile cost model enables to define the network element cost attribution to the underlying network stage function per category of service : voice, data or SMS.

NE receiving assets by the mobile cost model	attribution
NE_RAN	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_GroundAntenna	NSF_Mobile RAN_Voice NSF_Mobile RAN_Data NSF_Mobile RAN_SMS
NE_MobileVoiceSwitching	NSF_Mobile_BackBone_Voice NSF_Mobile_BackBone_Data

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	NSF_Mobile_BackBone_SMS
NE_MobileDataSwitching	NSF_Mobile_BackBone_Data
	NSF_Mobile_BackBone_SMS
NE_MobileLocationRegister	NSF_Mobile_BackBone_Voice
	NSF_Mobile_BackBone_SMS

Layer n--layer n+1 cost allocation mechanism:

Each layer represented in the model produces the defined NLS services with a certain amount of volume (the service amount); this amount is "consumed" by the upper layer services and it is used as a driver to allocate the costs to the consumer services in the upper layers.

Layer cost allocation cascade:

The 5 defined layers are put one after another according to their level generating a cascade of cost allocation mechanism.

Each layer is discussed in a specific chapter of this documentation.

Establishing costs of the Network Stage Functions

The "network stage functions" (NSF) are the direct constituents of a layer, they are intermediate network building blocks providing well defined logical network functions specific to that layer (also called network functional units) . A Network Stage Function can be limited to a node or it can be a cluster (distributed function) corresponding to "network stages". A network stage function is characterized by the amount of function it produces (volume).

Network Stage Functions are implemented in equipment, but the corresponding investment values are not always directly identifiable in the asset structure of Proximus : for example some assets aggregate investments per technology (not per function in the network) , some other do not cover the totality of a given technology due to the history of the accounting asset structure in SAP (reorganization of assets, transfers between assets, closing of asset classes and opening of new ones) .

Different methods are used and combined to constitute the investment costs of Network Stage Functions :

1. Aggregation of assets in a larger asset or a cost pool in order to gather investments of same technology and align them with operational inventories.
2. Deaggregation of cost pools in network elements : this step decomposes cost pools into network elements; a network element corresponds to an entire physical equipment as deployed in the Proximus infrastructure. Operational inventories of pieces of equipment and component prices are used.
3. Direct allocation of assets or cost pools to network elements when the assets or cost pools are directly identifiable with a network element of the model.
4. Composition of the network elements to form a network stage function covering one of the stages.

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The stepwise combination of these methods are discussed in the next section.

7.2 From Assets to Network Stage Functions.

Next table gives the list of the NSF present in the network allocation flow.

Layer_name	NSF_name	NSF description
L1_PASSIVE	NSF_Backbone_FibreConnectivity_express	backbone fibre connectivity of express ring
	NSF_Backbone_FibreConnectivity_Regional&Core	backbone fibre connectivity of regional&Core rings
	NSF_FTTC_FibreConnectivity	fibre connectivity between the central office (LEX) and ROP
	NSF_FTTO_FibreConnectivity	fibre connectivity between the central office (LEX) and customer office
L3_IP	NSF_BroadBand_Public_IP_Collect	Access authentication , data traffic accounting, attribution of public IP address to broadband customers and collection of customer traffic towards public internet service providers
	NSF_BroadBand_VoD_IP_Collect	Access authentication , data traffic accounting, attribution of IP TV address to IP TV customers and collection of IP video customer traffic towards Video On Demand platforms
	NSF_BroadBand_VoIP_IP_Collect	Access authentication , data traffic accounting, attribution of Voice over IP address to VoIP customers and collection of Voice over IP customer traffic towards VoIP platforms
	NSF_Dedicated_Access_to_PrivateIP	connectivity between customer and Proximus IP-VPN network
	NSF_Homegateway	Broadband CPE like b-box
	NSF_IP_security	
	NSF_PrivateIPSwitching	IP-VPN switching
	NSF_PublicInternetSwitching	Public Internet Routing
	NSF_Mobile RAN_Data	Mobile Radio Access function destinated to all Mobile data products
	NSF_Mobile_BackBone-Data	Mobile backbone function destinated to all Mobile data products
	NSF_Mobile_PrepaidData_Services	Intelligent platform services related to prepaid mobile data
L4_IDTV	NSF_BroadcastTV	Broadcast digital television functionalities
	NSF_VoD	Video On Demand (VOD) functionalities and user quality of experience functionalities.
L4_M2M	NSF_Machine_to_Machine	Related to M2M applications, enabling customers to remotely manage their M2M devices in the cloud or gather business data from the devices and to integrate and link it with business softwares.
L4_VOICE	NSF_Automated_call_distribution	intelligent distribution of calls towards call center

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	NSF_Advanced_Number_Translation_CallHandling	Voice Value Added network function
	NSF_CallerIdentity_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_InteractiveVoiceResponse_CallHandling	Voice Value Added network function
	NSF_ISDN_NetworkTermination	Functionalities related to the ISDN network termination equipment
	NSF_Mobile RAN_Voice	Mobile Radio Access function destinated to all Mobile voice products
	NSF_Mobile_BackBone-Voice	Mobile backbone function destinated to all Mobile voice products
	NSF_Private_Communication_Call_Handling	Intelligent platform service related to mobile closed user groups and virtual private networks
	NSF_Mobile_PrepaidTraffic_Services	Intelligent platform services related to mobile voice prepaid traffic
	NSF_NumberPortability_CallHandling	telephony ported number realtime translation
	NSF_OtherAdvanced_CallHandling	Voice Value Added network function
	NSF_PairGainSystem	Analog line multiplexing functions, used to concentrate narrow band analog signals on customer pairs to a 2Mb/s digital signal on a few feeding copper pairs. This is however an old technology not compatible with broadband.
	NSF_PSTN_Voice_concentrator	Aggregation of PSTN voice calls towards NGN IP Platform
	NSF_Public_NumberPortability_Database	telephony ported number repository
	NSF_Service_Announcements_Playing	Functionalities in order to announce to callers any requested value added services.
	NSF_Televoting_CallHandling	Voice Value Added network function destinated to Business customers
	NSF_VirtualPrivateNetwork_CallHandling	Voice Value Added network function destinated to residential customers
	NSF_Voice_call_CAE_charging	generation of call detail records for interoperator voice traffic accounting
	NSF_Voice_call_CAE_Processing	handling of voice calls at transit level
	NSF_Voice_call_CAE_Trunks	multiplexing/demultiplexing voice circuits at transit level
	NSF_VoiceTrunks_TDM	multiplexing/demultiplexing voice circuits generated/terminated
	NSF_VoiceFeatures_SelfManaging	Voice Value Added network function destinated to residential customers
	NSF_Voicemail&Messaging	Voice Value Added network function destinated to residential customers
	NSF_WakeUp_CallHandling	Voice Value Added network function destinated to residential customers
L4_Messaging	NSF_Mobile RAN_SMS	Mobile Radio Access function destinated to all Mobile SMS products
	NSF_Mobile_BackBone-SMS	Mobile backbone function destinated to all Mobile SMS products
	NSF_SMS_Services	Intelligent platform service related to mobile SMS

Sensitivity: Unrestricted

L4_WEB	NSF_EServices	NSF gathering SDE workload related to the E-services.

Investment costs of Proximus SA assets are mapped to these NSF, except investments related with network administration, and some other that cannot be related to any current product or service. The exceptions are not filed into the network allocation cascade, but are allocated like an overhead cost (i.e. with no direct causality) to a range of End User Services (depending on the kind of overhead cost) proportionally to the cascaded costs on these EUS.

Mapping asset cost sources to Asset objects of the model AC2

Network assets are 1-to-1 allocated to a homonymic AC2 object except for the 7 voice switching assets which are aggregated in AC2_TDM_Voice_Switching_Equipment.

Mapping AC2 objects to cost pools or Network elements

AC2 Aggregation.

At this stage, AC2 asset objects are aggregated into cost pools, network elements, overhead objects and eventually end user services (costs marginal end user services, or direct waste).

The aggregations into cost pools serve to form technology pools for which operational inventories can be queried for various statistics that are further used to decompose into network elements. The technology pools typically are (D)WDM equipment, Copper Cables, Broadband (xDSL) equipment, SDH equipment , PDH equipment, Ethernet equipment etc. Those cost pools include also the OPEX of SDE.

The aggregation into network elements concerns assets that are already a network element, and it serves also to gather assets that are individually more detailed than the definition of network elements and that can be easily associated to a network element. Typical examples are IP-VPN assets , broadcast TV assets, Analog Multiplexers, Metallic line testing assets etc.

AC2 Deaggregation.

By contrast, a set of AC2 assets are decomposed (deaggregated) into cost pools, Network elements, waste pool and marginal end user services.

Among these, some assets collect investments on network administration (Hardware and software supervision platforms) and on value added services platforms (IN, messaging, voice mail etc.): they need to be decomposed into the network technologies they supervise and into the value added service categories.

⇨ The driver used is the “cumulatedInvestedAmount” per technology obtained after deep analysis of historical investment data (TM1 financial reporting tool).

The asset 1680 “TPT-BBN-infra.elect/mécan in transmis rooms” collects internal cabling within technical buildings and is decomposed essentially into the following cost pools CP_Backbone_Coax_cabling, CP_Backbone_Optical_cabling, CP_(D)WDM_equipment and EUS_notAllocated (internal cabling of xDSL, switching and AGW equipments in LEX included in assets valued using the Proximus Reference Offer tariffs).

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- ⇨ The driver used is the “Current annualized cost” of the cost pools , calculated from a diversity of constituent volumes and corresponding prices (coax/fibre cables, connectors, copper pair cables , cable ways,etc) . The main volumes are extracted from the infrastructure inventory database (ITR), other volumes are derived under assumptions.

The AC2_TDM_VoiceSwitching_Equipment asset is considered as fully outphased and replaced by MEA AC2_20115 FixedVoice_NGN_Platform. This asset is valued based on BIPT Fixed Voice NGN platform cost model.

Sensitivity: Unrestricted

Deaggregation of cost pools into network elements

In performing the previous steps cost pools are introduced in the model. They are now deaggregated into different Network Elements by means of following drivers:

cost pool	driver name	Deaggregated Network elements
CP_(D)WDM_equipment	Yearly Direct CAPEX Cost	regional&core DWDM network elements and express DWDM network elements
CP_Backbone_Optical_cabling	Nbr_Connections	pre-allocated to all inside network elements using fibre cabling
CP_Backbone_Coax_cabling	Nbr_Connections	pre-allocated to all inside network elements using coax cabling
CP_Copper_Burried_Cables&Splices	yearly direct CAPEX cost	distribution cables, feeding cables network
CP_DSLAM	yearly direct CAPEX cost	xDSL ATM based network elements and VDSL Ethernet based network elements
CP_Ducts&Manholes	Trenches cumulated length (km)	Ducts& manholes for Next Generation Access, Ducts & manholes for corporate /complex nodes in access
CP_EthernetMPLS_equipment	Yearly Direct CAPEX Cost	Ethernet Ports, Ethernet/MPLS switches
CP_Optical_Fibre_Cables	kmxfibre	Fibre cables for Next Generation Access, Fibre cables for corporate/complex nodes in access
CP_OSS_VoiceTraffic	fair split	Collecting, terminating and transit of voice network elements
CP_SDH	Yearly Incremental Cost	
CP_TDM_VoiceDigital_TransitUnit	Direct	Voice transit elements
CP_Mobile_RAN	Yearly capitalized manpower cost	Mobile Radio Access network, Ground antenna
CP_Mobile_Backbone	fair split	Mobile Voice and Data switching elements

From Network elements to Network Stage Functions

The previous steps populate the cost model with Network Elements. In the next step, they are allocated to the Network Stage Functions.

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7.3 End User Services

The network allocation model terminates when all network stage functions (or NEs) have been allocated to network layer services and when network layer services have been combined into a user level telecommunication service, the End User Service.

The End User must be understood as the telecommunication service party that will pay for the service. In case of a retail service the user is identical to the service consumer (residential service) or to the service provider (business service) , in case of wholesale service , the user is in principle another licensed operator , or a network service provider.

Being composed of network layer services, End User Services may emanate from different levels of network layers since interconnection between network operators is being unbundled . For retail services , the end user telecommunication services may arise from different layers : the more a service is oriented for a specific usage the higher the level of network layers involved. For example IP services are less usage oriented than voice telephony, the latter being a layer 4 service, the former a layer 3 service.

The End User Services represented in the model are listed hereunder.

End User Service Layer	Market	End User Service Name
L1_passive	**InterConnect**	EUS_Raw copper subscription
		EUS_Shared pair subscription
L2_packetBased	**InterConnect**	EUS_BROBA_EndUserLine subscription
		EUS_wholesale transport WBA subscription
	retail	EUS_X25
	Retail&Wholesale	EUS_Ethernet_Backhaul
L2_TDM	**InterConnect**	EUS_BROTSOLL_segment<2M
		EUS_BROTSOLL_segment>2M
		EUS_BROTSOLL_segment2M
	Retail&Wholesale	EUS_LL <2M subscription - International
		EUS_LL <2M subscription - National
		EUS_LL >2M subcription- National
		EUS_LL >2M subscription - International
		EUS_LL 2M subscription - International
		EUS_LL 2M subscription - National
		EUS_LL_Analog National Subscription - National
	Wholesale	EUS_Nat IC-Infra Wholesale subscription
L2_TDM&L1_ActiveAnalog	**Retail&Wholesale**	EUS_Trans LAN subscription
L3_IP	**retail**	EUS_BGC Mobile_Roaming Out data
		EUS_Homegateway
		EUS_Mobile_Data national
	Retail&Wholesale	EUS_DataManagedServices
		EUS_FastInternet subscription
		EUS_Private_IP&Ethernet_on_asymmetric subscription - National

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		EUS_Private_IP&Ethernet_on_backup
		EUS_Private_IP&Ethernet_on_international Subscription
		EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
		EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National
	Wholesale	EUS_ADSL_Carrier_wholesale subscription
		EUS_Mobile_Roaming IN_Data
		EUS_VDSL_Carrier_wholesale subscription
L4_iDTV	**retail**	EUS_IDTV_subscription
L4_M2M	**retail**	EUS_Machine_to_Machine
L4_messaging	**InterConnect**	EUS_SMS_inbound_intal
		EUS_SMS_inbound_national
	retail	EUS_SMS_on_net_national
		EUS_SMS_outbound_intal
		EUS_SMS_outbound_national
		EUS_SMS_Roaming_OUT_Origination
		EUS_SMS_Roaming_OUT_Termination
	Wholesale	EUS_SMS_Roaming_IN_Origination
		EUS_SMS_Roaming_IN_Termination
L4_voice	**all**	EUS_AUTOMATEDCALLDISTRIBUTION
	InterConnect	EUS_Carrier PreSelection
		EUS_voice_traffic_Fixed_inbound_intal
		EUS_voice_traffic_Fixed_inbound_intal_VAS
		EUS_voice_traffic_Fixed_inbound_national
		EUS_voice_traffic_Fixed_inbound_VAS_national
		EUS_voice_traffic_Mobile_inbound_intal
		EUS_voice_traffic_Mobile_inbound_intal_VAS
		EUS_voice_traffic_Mobile_inbound_national_from FOLO
		EUS_voice_traffic_Mobile_inbound_national_from MOLO
		EUS_voice_traffic_Mobile_inbound_VAS_national
	retail	EUS_Astrid
		EUS_voice_traffic_Fixed_on_net_national
		EUS_voice_traffic_Fixed_on_net_to Mobile_national
		EUS_voice_traffic_Fixed_on_net_VAS_national
		EUS_voice_traffic_Fixed_outbound_intal
		EUS_voice_traffic_Fixed_outbound_intal_VAS
		EUS_voice_traffic_Fixed_outbound_national_to FOLO
		EUS_voice_traffic_Fixed_outbound_national_to MOLO
		EUS_voice_traffic_Fixed_outbound_VAS_national
		EUS_voice_traffic_Fixed_transit_intal
		EUS_voice_traffic_Fixed_transit_national
		EUS_voice_traffic_Mobile_on_net_to Fixed
		EUS_voice_traffic_Mobile_on_net_to Mobile
		EUS_voice_traffic_Mobile_on_net_VAS_national
		EUS_voice_traffic_Mobile_outbound_intal
		EUS_voice_traffic_Mobile_outbound_intal_VAS

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		EUS_voice_traffic_Mobile_outbound_national_to FOLO
		EUS_voice_traffic_Mobile_outbound_to MOLO
		EUS_voice_traffic_Mobile_outbound_VAS_national
		EUS_voice_traffic_OPS
	Retail&Wholesale	EUS_Business voice channels - subscription
		EUS_ISDN-BA Access - subscription
		EUS_PSTN Access - subscription
	Wholesale	EUS_voice_traffic_Mobile_Roaming_IN_Origination
		EUS_voice_traffic_Mobile_Roaming_IN_Termination
		EUS_voice_traffic_Mobile_Roaming_out_Origination
		EUS_voice_traffic_Mobile_Roaming_out_Termination
L4_Web	**retail**	EUS_Eservices

Copper Termination

The network element Copper Termination groups costs related to fieldwork performed in the copper access network in order to realise broadband connections for end-users. These activities are mainly situated at the MDF, SC and the introduction up to the Network Termination Point (included).

7.4 Network services of the passive infrastructure layer : NLS1.0

7.4.1 Definition

This layer deals with the physical end-to-end connectivity between customers and the central sites (access), the physical connectivity inside the central site between access equipment and the physical connectivity between central sites (backbone).

Access Physical connectivity services (see Figure 7***):***

- NLS1_0_Continue_Raw_Copper : internal cabling for copper connectivity from Main Distribution Frame or broadband splitter equipment to other access active equipment like voice switches, leased lines access equipment, collocated access equipment (of other licensed operators).
- NLS1_0_Copper_Localloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper loop.
- NLS1_0_Copper_Splitter : resources to split the narrowband and broadband copper physical signal.
- NLS1_0_Copper_Subloop : end-to-end copper connectivity from the network termination point at the customer premises to a delivery point in the street (street cabinet).
- NLS1_0_Copper_Subloop_testing : inside copper connectivity and equipment required to perform remote testing of the copper subloop.

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- NLS1_0_Raw_Copper : end-to-end copper connectivity from the network termination point at the customer premises to the Central site.
- NLS1_0_CentralOffice2Office_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and corporate customers office buildings .
- NLS1_0_CentralOffice2Office_Fibre : end-to-end fibre connectivity between the central sites and corporate customers office buildings or between central sites and Proximus mobile sites.
- NLS1_0_CentralOffice2RemoteOpticalNode_Duct : end-to-end underground hole connectivity (duct routes in trenches) between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.
- NLS1_0_CentralOffice2RemoteOpticalNode_Fibre : end-to-end fibre connectivity between the central sites and the Proximus subtended optical nodes and Proximus optical nodes at street cabinet level.

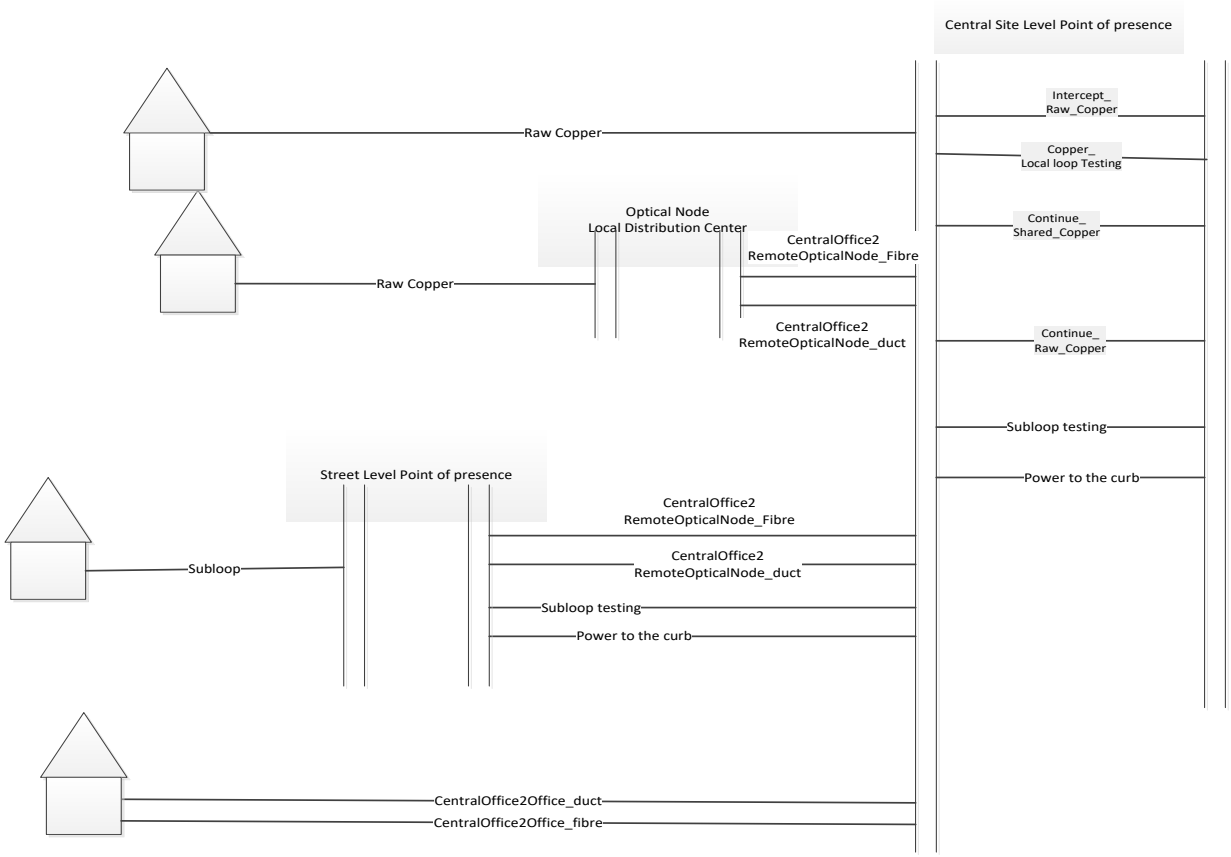

Figure 7: Access Physical connectivity services

Backbone Physical connectivity services

- NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core: end-to end fibre connectivity (fibre cables and duct and trenches) for SDH transmission networking between nodes

Sensitivity: Unrestricted

belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.

- NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the regional and core backbone (WAN) network. These nodes are central offices at local level, zonal level.
- NLS1_0_Fibre_connect_Backbone_DWDM_Express : end-to end fibre connectivity (fibre cables and duct and trenches) for DWDM optical networking between nodes belonging to the express (national level) network. These nodes correspond to the largest cities in the country.

7.4.2 Usage of the passive infrastructure

The physical connectivity services of this layer are used by upper layers in order to interconnect their specific equipment. The costs are distributed to the service users according to "consumption drivers" as listed in the table below.

Network layer Service	Driver	Service consumers
NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, BRUO Shared Pairs
NLS1_0_Copper_Localloop_testing	nbr of lex based broadband connections without voice	Broadband bitstream layer 2.1 services
NLS1_0_Copper_Splitter	Nbr of used shared pairs	BRUO Shared pairs
NLS1_0_Copper_Subloop	Direct	VDSL bistream layer 2.1 service
NLS1_0_Copper_Subloop_testing	Nbr of used pairs	VDSL bistream layer 2.1 service
NLS1_0_Raw_Copper	Nbr_of_used_pairs	BRUO raw copper, Local tails for leased linestype of connectivity, ISDN/PSTN accesses, Broadband Bitstream layer 2.1 service
NLS1_0_CentralOffice2RemoteOpticalNode_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2RemoteOpticalNode_Fibre	Nb_access_fibres_used	
NLS1_0_CentralOffice2Office_Duct	Number of physical sites	Local tails services of layer 2.0 (for leased lines), of layer 2.1 (Ethernet local tails).
NLS1_0_CentralOffice2Office_Fibre	Nb_access_fibres_used	
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)	Backbone services (leased lines/backhaul and Broadcast) delivered by the SDH equipment at regional and core level.
NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from NE_(D)WDM equipment)	Regional&Core backbone services of layer 2.1 (Ethernet transport, unicast and multicast)
NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from NE_Express_DWDM_equipment)	Express backbone services of layer 2.0 (leased lines) and layer 2.1 (Ethernet)

Sensitivity: Unrestricted

7.4.3 Contributors to the passive infrastructure layer

7.4.3.1 *Access*

The objective of the access network is the delivery of a connection between our customers and our telecommunication network where all services are implemented.

Copper infrastructure:

The access network services of the copper passive infrastructure layer are based on several network elements valued using the BIPT regulated cost price, as listed below. For these network elements, there is no change in the valuation methodology compared to previous model. As in the previous models, the former network element NE_Copper infrastructure has been split in several subparts, in order to enable the fix/variable analysis of the model results .

- ✓ NE_Copper_Cables_Distribution

  copper distribution pairs and access to distribution pairs in street

- ✓ NE_Copper_Cables_Feeding

  copper feeding pairs and access to feeding pairs in street and central site

- ✓ NE_Copper_Blocks_and_Tie_cables

  copper local loop testing for broadband customer connections without voice at the central site,

  copper subloop testing for ROP based VDSL customer connections without voice,

  continue copper feeding pairs based on the number of shared pairs in service,

  continue raw copper for all other copper pairs in use.

- ✓ NE_Copper Splitter

  For the BRUO shared pairs in service.

NSF_PSTN_Voice_concentrator:

Attributed to :

- copper local loop testing based on the number of broadband without voice customers connections at the central site,
- copper subloop testing for VDSL without voice customer connections at the street cabinet,
- PSTN Access based on the number of subscriptions

Customer connections without voice are connected to the Access Gateway (AGW) equipments in order to perform remote testing of the line.

Sensitivity: Unrestricted

Access Fibre Infrastructure:

The costs of the fibre deployed in the access network have been separated in the civil works related costs producing duct routes, and in the cable related works producing fibre connectivity inside the duct routes. Civil work related costs and cable related costs are subject to different assets within Proximus's asset accounting and can easily be identified. These assets do not distinguish the investments realized for connection of customer sites, mobile sites or remote optical nodes (at subtending level and street cabinet level). Therefore two drivers are used :

1. Kmxfibre : to separate the fibre cable costs between customer/mobile sites and remote optical sites
2. Amount km routes to physical sites : to separate the civil works costs between customer/mobile sites and remote optical sites .

Yielding following objects :

NSF_CentralOffice2RemoteOpticalNode_FibreCables

NSF_CentralOffice2Office_FibreCables

NSF_CentralOffice2RemoteOpticalNode_Track

NSF_CentralOffice2Office_Track

7.4.3.2 *Backbone*

The backbone fibre connectivity services are realized by the following Network Stage Functions embodying the resources in the fibre outside plant (ducts&manholes, and fibre cables):

- NSF_Backbone_FibreConnectivity_Regional&Core
- NSF_Backbone_FibreConnectivity_express

NSF	Driver	NLS1_0
NSF_Backbone_FibreConnectivity_express	**direct**	NLS1_0_Fibre_connect_Backbone_DWDM_Express
NSF_Backbone_FibreConnectivity_Regional&Core	**fair split of fixed cost**	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core

Sensitivity: Unrestricted

7.5 Network services of the transmission infrastructure (NLS2_0)

7.5.1 Definition

This layer deals with the transmission services between customer sites and the Proximus Offices (access) also called local tail for leased lines , and it deals also with the transport segments services (also called backbone leased lines segments and backhaul capacity) between Proximus Offices (backbone).

The national wide transmission infrastructure collects transmission traffic in three aggregation stages: local level aggregation (circ 600 locations) , zonal level aggregation (circ 36 locations) , area level aggregation (20 locations) (see Figure 8: Transport Segments). Traffic at each stage can be cross-connected allowing to create transport segments from any location to any location.

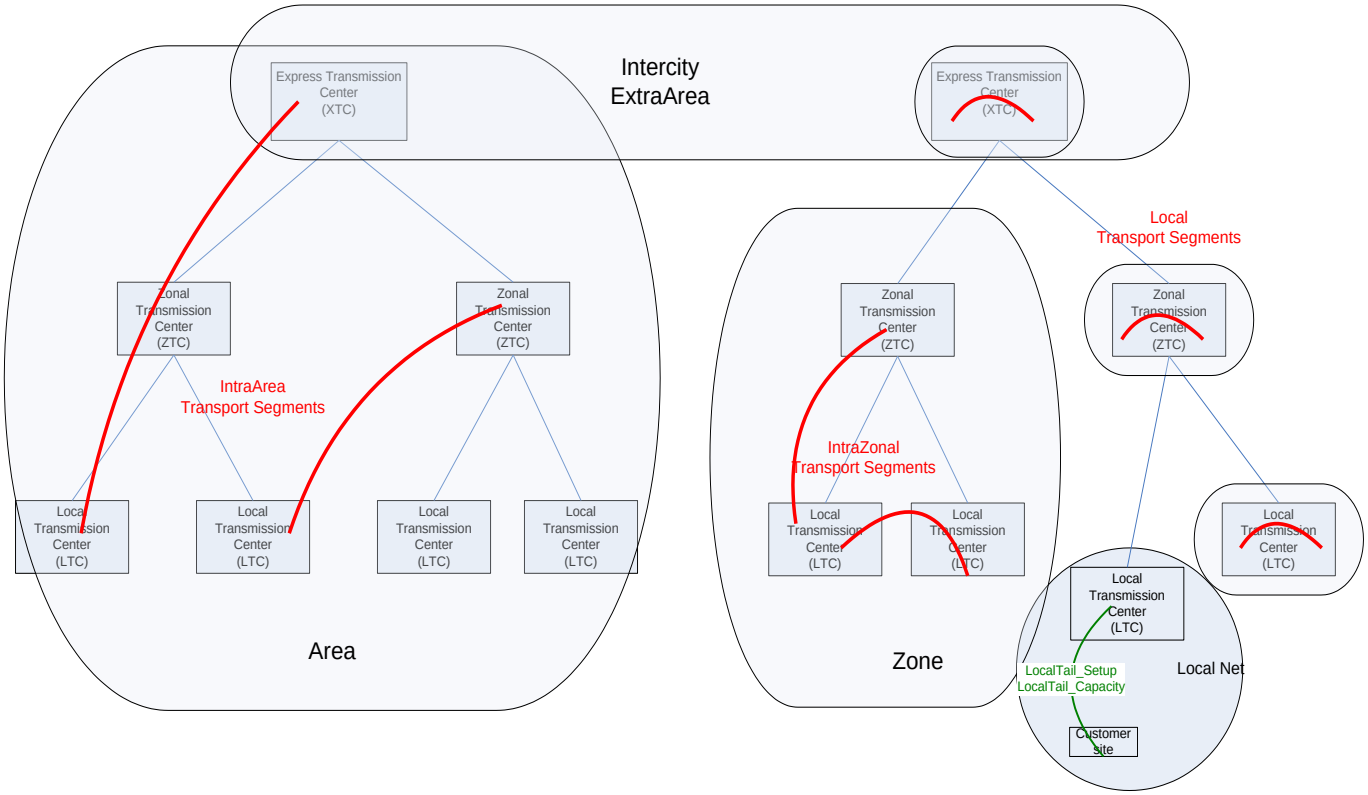

Figure 8: Transport Segments

Access services

The access services deliver the transmission between the customer site and the Proximus Office (access).

They capture costs related to the physical_dedicated link between the customer site and the central office and the equipment needed to activate the link in a capacity category.

Sensitivity: Unrestricted

Backbone services:

The backbone transport segments are classified in capacity (or bandwidth) categories -<2Mb/s, 2Mb/s, >2Mb/s- combined with distance categories -intraarea > intrazonal > local- depending on the end point situation in the aggregation hierarchy (see Figure 8).

The following NLS2.0 services are present in the model:

Network Layer 2.0 service
NLS2_0_LocalBackboneCapacity<2M
NLS2_0_LocalBackboneCapacity=2M
NLS2_0_LocalBackboneCapacity>2M
NLS2_0_IntrazonalBackboneCapacity<2M
NLS2_0_IntrazonalBackboneCapacity=2M
NLS2_0_IntrazonalBackboneCapacity>2M
NLS2_0_IntraAreaBackboneCapacity<2M
NLS2_0_IntraAreaBackboneCapacity=2M
NLS2_0_IntraAreaBackboneCapacity>2M
NLS2_0_InterCityBackboneCapacity<2M
NLS2_0_InterCityBackboneCapacity=2M
NLS2_0_InterCityBackboneCapacity>2M
NLS2_0_LocalTail<2M
NLS2_0_LocalTail=2M
NLS2_0_LocalTail>2M

7.5.2 Usage of the transmission infrastructure

The NLS2_0 Local tail services are used to bring transmission capacity to the customer sites and they are thus directly involved in leased line services between two customer sites, leased lines to data services, backhaul services to other licensed operators and monitoring of the access network.

The costs of these access services are distributed according to the number of customer sites per bandwidth category (driver name: “Nbr_of_Customer_sites”), whereas the backbone services costs are further allocated according to their bandwidth (driver name: “Bandwidth consumed (Mbit/s)”).

The model elements receiving costs from this network layer are exhaustively presented in the following table.

	Upper layer consumer or end user service
Backbone Virtual Paths (VP)	NLS2_1_Backbone_VirtualPath_InterArea
	NLS2_1_Backbone_VirtualPath_IntraArea
Proximus mobile	NLS2_2_Mobile_Access_Backhaul_Abis
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS2_2_Mobile_Backbone_Backhaul
	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet

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	NLS2_2_Mobile_Access_Backhaul_IuB
	NLS4_0_MobileTerminatingLinks
Proximus testing environments	OVH_Lab
Broadband access to public IP switching	NLS3_ADSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
Data services backbone (IP-VPN)	NLS3_Private_IP&Ethernet_Routing
Internal Proximus network	OVH_InternalCommunicationNetwork
	OVH_InternalIPNetwork
International access to data services (IP-VPN)	EUS_Private_IP&Ethernet_on_international Subscription
Leased line access to public IP switching	NLS3_Public_IP_Extension_on_symmetric
Leased line accesses to data services (IP-VPN)	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
Other	Business Overhead
	EUS_DataManagedServices
	EUS_Subsidiaries
	NLS4_0_VAS_signaling
	NLS4_1 BVAS - BGC Fixed
Public IP switching	NLS3_Public_IP_switching
Regulated broadband services	EUS_BROBA_accessLine
	NLS2_1_ADSL_SDSL_Bitstream
Regulated wholesale segments	EUS_BROTSOLL_segment<2M
	EUS_BROTSOLL_segment>2M
	EUS_BROTSOLL_segment2M
Retail&Wholesale leased lines	EUS_international_switchingTrunk
	EUS_LL <2M subscription - International
	EUS_LL <2M subscription - National
	EUS_LL >2M subcription- National
	EUS_LL >2M subscription - International
	EUS_LL 2M subscription - International
	EUS_LL 2M subscription - National
	EUS_LL_Analog National Subscription - National
	EUS_X25
Telephony access	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV services	NLS4_0_BroadcastTV
	NLS4_0_iDTV
Voice services in backbone	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC

Sensitivity: Unrestricted

	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
Wholesale transport capacity	EUS_Bandwidth_Wholesale subscription
	EUS_Nat IC-Infra Wholesale subscription

7.5.3 Contributors to the transmission infrastructure

7.5.3.1 *Local Tail*

A local tail transmission service is made of equipment installed at the customer premises extracting the digital signal from the physical line, of a physical link between the customer site and the central office and of grooming equipment in the central office (or subtended optical nodes).

Depending on the bandwidth of the local tail different equipment technologies are installed: PDH on copper , PDH on fibre or SDH on fibre. For the high bandwidth cases (>2Mb/s) a fibre based technology is required whereas for lower bandwidths the choice between fibre and copper technologies exists. However, since fibre local links are much more expensive than copper links, the preferred option for low bandwidth local tails is the copper based solution.

	Contributor to NLS2_0	**Driver name**
Equipment	NE_PDH SDH equipment	Yearly Incremental Cost
Physical inks	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

7.5.3.2 *Transport Segments*

Transport segments are realised by configuring the SDH clusters in different network stages. The transmission aggregation levels introduced hereabove (section 7.5.1 and Figure 8) are realised by different SDH clusters (regional, core and express SDH rings) interconnected by digital-crossconnects. The SDH rings are made of add-drop multiplexers deployed in LTC for the regional ones, in ZTC for the core ones and in the XTC for the express ones. The equipments within a ring are linked by fibre or by an optical wavelength.

To summarize, the building blocks for the transport segments are:

Contributor to NLS2_0	**Driver name**
NLS1_0_Fibre_connect_Backbone_SDH_Regional&Core	generic (CAPEX costs from PDH SDH MWE Technology)
NE_PDH SDH equipment	Yearly Incremental Cost
NE_Express_SDH_equipment	Bandwidth (Mbps)

Sensitivity: Unrestricted

7.6 Network services of the packet based infrastructure (NLS2_1)

7.6.1 Definition

This layer deals with the data collection services (broadband or dedicated) between the customer and the central office (access) and the transport of data central office (backbone) . Two technologies coexist as well in the access part as in the backbone part : ATM technology and Ethernet/MPLS technology. Next picture summarizes the end point locations of packet based services. Remark : ATM is outphased and is no longer valuated.

This layer also integrates point to point dedicated Ethernet transparent connections delivered over the DWDM national backbone.

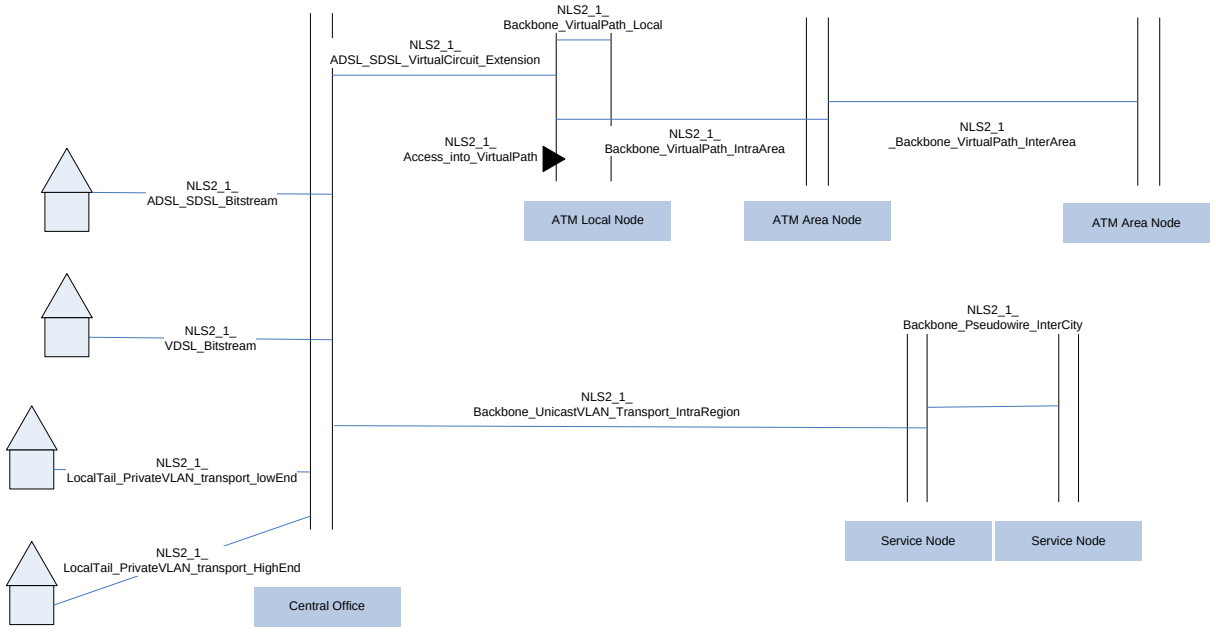

Figure 9: Network services of the packet based infrastructure 2.1

Access part

Layer 2.1 access service	Comment
NLS2_1_ADSL_SDSL_Bitstream	Broadband (ADSL-SDSL) end to end data streams between customer site and aggregation point in central office
NLS2_1_VDSL_Bitstream	Broadband VDSL end to end data streams between customer site and aggregation point in central office
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Ethernet symmetric dedicated link with central office over copper

Sensitivity: Unrestricted

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	Ethernet symmetric dedicated link with central office over fibre
NLS2_1_LocalTailCapacity_Ethernet>=10M	High bandwidth transparent Ethernet frame transport between customer and central office (BLES local tail)
NLS2_1_LocalTail_Eline_HighEnd	Ethernet symmetric dedicated link with central office

Backbone part

For data transport between central offices, the end point locations of the layer 2.1 services depend on the technology, the underlying networks having different topologies.

For the Ethernet/MPLS technology , the following services are defined:

Layer 2.1 Ethernet transport service	Comment
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	MPLS Transport of Ethernet VLANs between a central office and the service node of the region. These VLANs are unicast
NLS2_1_Backbone_Pseudowire_InterCity	MPLS Transport of Ethernet VLANs between service nodes of different regions. These VLANs are unicast
NLS2_1_Backbone_MulticastVPLS_IntraRegion	

Eventually , the dedicated Ethernet transparent connections also introduce backbone connectivity services :

Layer 2.1 Ethernet transparent transport	Comment
NLS2_1_Intra/InterZonalBackboneCapacity_Ethernet>=1G	Any combination of end points different that of the two of them being express transmission centers, bandwidth of 1/10Gbps.
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	End points are between two express transmission centers, bandwidth of 1/10Gbps.

7.6.2 Usage of the data packet infrastructure

The access services of the data packet infrastructure are combined with the data packet backbone services to deliver end-to-end connectivity between IP appliances at customer site (IP router in ADSL/VDSL modems, private LAN IP routers) and IP service nodes , primarily the broadband access servers and the IPVPN routers offering layer3 services like ADSL/SDSL IP collection, VoD IP collection, Private VLAN extensions up to IPVPN nodes.

Next table summarizes the drivers used expressing how NLS2.1 contribute in layer 3 services or directly to End user services.

NLS2.1 service	Driver Name	Upper layer services "consuming" NLS2.1 services

Sensitivity: Unrestricted

NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines	BROBA end user line, all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines	all broadband IP collections (public internet, VoD, VoIP), and broadband access to IP VPN
NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)	Symmetric accesses to IPVPN and BROBA access line
NLS2_1_Backbone_MulticastVPLS_IntraRegion	direct	For television
NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps) The PeakBandwidth is a realistic estimation (based on measurements in the network) of the traffic (Mbps) during peak hour.	Broadband public IP NLS3 service, VoIP , Broadcast TV, and private IPVPN routing.
NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)	Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing, Ethernet backhaul and WBA transport.
NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps	BROBA transport, Broadband public IP NLS3 service, VoIP , VoD and access to private IPVPN routing
NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)	
NLS2_1_InterCityBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	BLES EUS services, High capacity accesses to IPVPN, IP-VPN routers interconnection, internal networks routers interconncetion
NLS2_1_IntraZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_InterZonalBackboneCapacity_Ethernet>=1G	Bandwidth (Mbps)	
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)	
NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd	direct	Access to IPVPN layer 3 services
NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	direct	Access to IPVPN layer 3 services

Sensitivity: Unrestricted

7.6.3 Contributors to the data packet infrastructure services

NLS2_1_ADSL_SDSL_Bitstream is the result of the central office (the Proximus technical building closest to the end customer) based network element NE_ADSL equipment. That function interacts with the broadband CPE equipment (at the customer site) by means of copper connectivity and potentially fiber connectivity to optical subtended nodes.

The Ethernet based layer 2.1 services (NLS2_1_Backbone_Uni/MulticastVPLS_IntraRegion and NLS2_1_Backbone_Pseudowire_InterCity) are implemented by the configuration of the Ethernet/MPLS network elements interacting with each other using lower layer connectivity services (see picture Figure 10).

NLS2_1_VDSL_Bitstream is the result of the function present in the deployed VDSL equipment (network elements NE_NGA Active equipment and NE_NGA Housing).

That function interacts with the broadband CPE equipment (at the customer site) by means of copper and fibre connectivity.

NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion is the result of the Ethernet/MPLS unicast function present in the deployed Ethernet equipment. The function is activated in different locations to form aggregation clusters, whose links are mainly deployed on DWDM and in a limited number by direct fibre connectivity. The NLS2_1_Backbone_Pseudowire_InterCity and the NLS2_1_Backbone_MulticastVPLS_IntraRegion are implemented in the exact same way.

NLS2_1_LocalTail_PrivateVLAN_transport_HighEnd_or LowEnd and
NLS2_1_LocalTail_Eline_HighEnd are the result of customer sited Ethernet equipment and the connectivity to the Proximus network. Such connectivity consists of a fibre based link for the high end cases and of a copper based link in the low end situation.

Sensitivity: Unrestricted

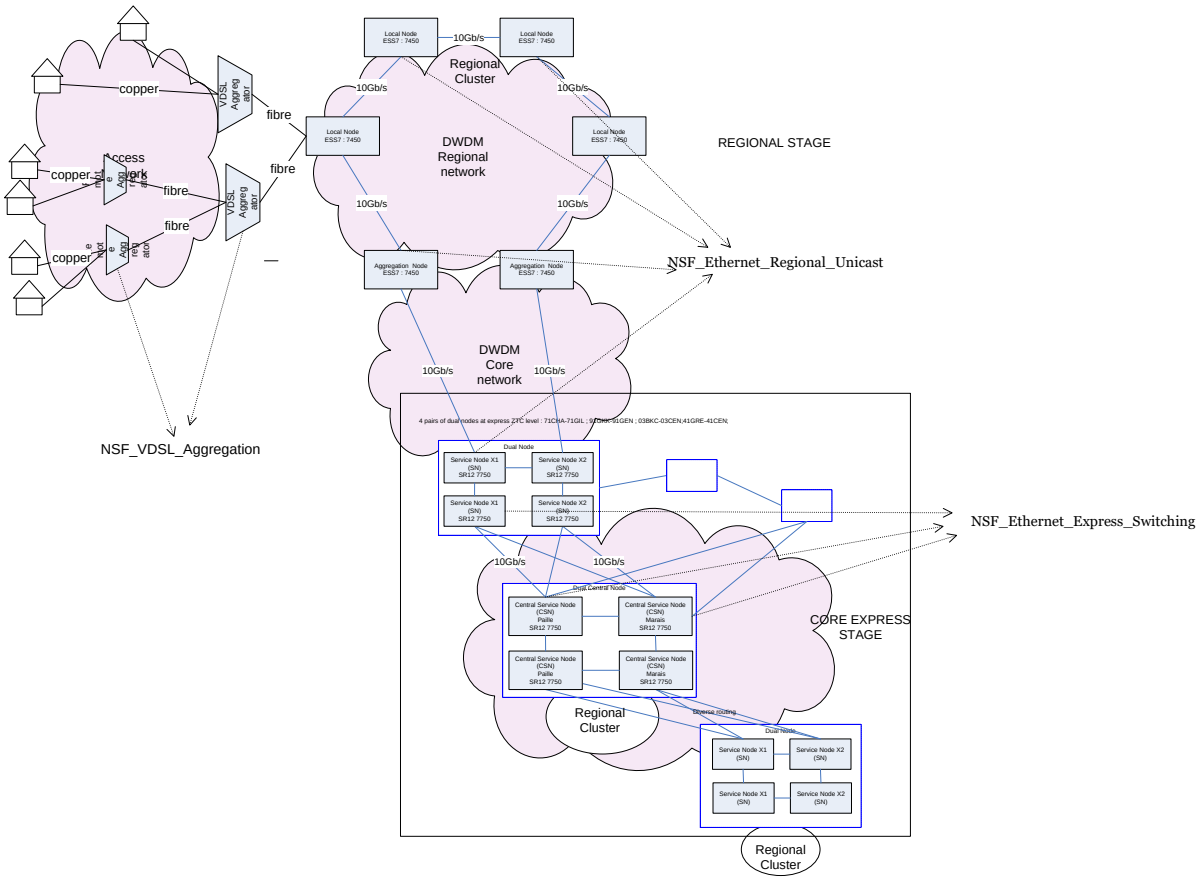

Figure 10: Ethernet layer 2.1

The dedicated Ethernet transparent backbone connection services (NLS2_1_xxxBackboneCapacity_Ethernet>=1G) are realized over the DWDM network with its Add Drop Multiplexers (ADM) or , when the capacity of the ADMs and rings is not sufficient, over point to point DWDM links.

The dedicated Ethernet transparent local tail connection services NLS2_1_LocalTailCapacity_Ethernet>=10M, is realized either on SDH equipment (up to 100 Mbps), reusing the SDH clusters deployed and already discussed in 7.5.3 (SDH over fibre) or for very high capacity connections (above 100 Mbps) they are directly realized on a wavelength (deployed as Fibre_connect_to_the_office for the local tail and as (D)WDM for the other cases).

The table hereunder summarizes the drivers used to distribute the cost contributors to the NLS2.1 services.

NLS2_1 service category	Building block of layer 2_1 service	Driver name
Ethernet transport	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Transponder	Number of Transponder

Sensitivity: Unrestricted

	NE_EthernetSwitch_Chassis	Usage of Switch in Percentage
	NE_EthernetSwitch_Port10GE	Number of Port
	NE_EthernetSwitch_Port1GE	Number of Port
	NE_EthernetSwitch_Port1GE_Adapter	Number of Adapter
	NSF_Express_EthernetSwitch_Chassis	Traffic in Mbps
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express DWDM equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
Broadband aggregation	NE_ADSL equipment	direct
	NE_NGA Active equipment	direct
	NE_NGA Housing	direct
	NLS1_0_Copper_Localloop_testing	nbr of broadband lex based without voice
	NLS1_0_Copper_Subloop	direct
	NLS1_0_Copper_Subloop_testing	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NSF_FTTC_FibreConnectivity	direct
Ethernet local tail	NE_ethernet equipment	Yearly Direct CAPEX Cost
	NLS1_0_Continue_Raw_Copper	Nbr_of_used_pairs
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used
	NLS1_0_Raw_Copper	Nbr_of_used_pairs
Transparent Ethernet backbone connection services	NE_DWDM_ADM_Cluster	Number of Lambda
	NE_DWDM_ADM_Core	Number of Lambda
	NE_DWDM_Point_to_Point_InterZonal	Direct
	NE_DWDM_Point_to_Point_IntraZonal	Direct
	NE_DWDM_Transponder	Number of Transponder
	NSF_Express_DWDM_ADM	Number of Lambda
	NSF_Express_DWDM_Amplifier	Number of Lambda
	NSF_Express_DWDM_Point_to_Point	Direct
	NSF_Express_DWDM_Transponder	Number of Transponder
	NLS1_0_Fibre_connect_Backbone_DWDM_Express	generic (CAPEX costs from Express_DWDM_equipment)
	NLS1_0_Fibre_connect_Backbone_DWDM_Regional&Core	generic (CAPEX costs from DWDM equipment)
	NLS1_0_Fibre_connect_to_the_office	Nb_access_fibres_used

The cost relative to the building blocks and the driver values, for Ethernet transport and Transparent Ethernet backbone connection services, are determined in a top-down model, which was derived from the BIPT NGN-NGA model. (by Analysis Mason)

7.7 Network services of the mobile backhauling infrastructure (NLS 2.2)

7.7.1 Leased Lines infrastructure for mobile access backhauling

- NLS2_2_Mobile_Access_Backhaul_Abis is related to backhauling of the 2G network, providing connectivity by means of leased lines between the Base Station Transceiver (BTS) and the Base Station controller (BSC).

Sensitivity: Unrestricted

- NLS2_2_Mobile_Access_Backhaul_IuB is related to backhauling of the 3G network, providing connectivity by means of leased lines between the Node B antenna and the Radio Network Controller (RNC) in the Radio Access Network.

7.8 Network services of the IP infrastructure layer (NLS3-IP)

7.8.1 Scope

This layer provides the following basic IP services in the model.

Fixed IP service type	IP service
Collection of IP traffic for public internet or internal internet	NLS3_ADSL_Public_IP_collection
	NLS3_SDSL_Public_IP_collection
	NLS3_VDSL_Public_IP_collection
	NLS3_VoD_IP_collection
	NLS3_VoIP_IP_collection
	NLS3_Public_IP_Extension_on_symmetric
Public Internet routing	NLS3_Public_IP_switching
Connection of IP sites to IP-VPN	NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd
	NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd
	NLS3_Private_IP&Ethernet_Routing
	NLS3_Private_IP&Ethernet_Extension_on_asymmetric
	NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter
IP security	NLS3_IP_security

In addition, NLS3 also includes collection of mobile data traffic in the mobile access and backbone network.

The actual NLS3's are described further. A comprehensive listing of which NLS or EUS they contribute to together with a description of the driver utilized in each case is also presented.

7.8.1.1 *Public services*

7.8.1.1.1 IP_collection

Gathers all the data traffic, except that of the private networks, generated by the customers at their locations -homes and offices placed all over the country- at the highest network level where it can be further delivered to the Internet.

This gathering is achieved thanks to the broad and narrow band servers together with the connectivity capabilities of the MPLS backbone network.

This generic service is in fact divided in several actual NLS3, depending on the traffic type and/or underlying technology, as follows:

Sensitivity: Unrestricted

- Data traffic:
  - NLS3_ADSL_Public_IP_Collection
  - NLS3_SDSL_Public_IP_Collection
  - NLS3_VDSL_Public_IP_Collection
  - NLS3_Public_IP_Extension_on_symmetric: where the customer-IP router connectivity is provided by means of Leased Lines, as opposed to the other services which are based on broadband access technologies.
- Video on Demand traffic:
  - NLS3_VoD_IP_Collection
- Voice over IP traffic:
  - NLS3_VoIP_IP_Collection

Further, these NLS3's contribute to the following higher network layer services and end user services (EUS) as specified hereunder:

NLS3	Driver name	Target element
NLS3_ADSL_Public_IP_collection NLS3_ADSL_Public_IP_collection	Nbr_of_retail_wholesale_ADSL_lines	EUS_ADSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_ADSL_lines	EUS_FastInternet subscription
NLS3_SDSL_Public_IP_collection	Nbr_of_retail_wholesale_SDSL_lines	EUS_FastInternet subscription
NLS3_VDSL_Public_IP_collection NLS3_VDSL_Public_IP_collection	Nbr_of_retail_wholesale_VDSL_lines	EUS_VDSL_Carrier_wholesale subscription
	Nbr_of_retail_wholesale_VDSL_lines	EUS_FastInternet subscription
NLS3_Public_IP_Extension_on_symmetric	Direct	EUS_Public_IP_Extension_on_Symmetric
NLS3_VoD_IP_collection	Direct	NLS4_0_VoD
NLS3_VoIP_IP_collection	Direct	NLS4_0_PSTN_access

7.8.1.1.2 Public_IP_switching

This service brings the intelligence to route the gathered traffic by the "IP_collection" generic NLS3 into the appropriate external network within the "public Internet".

This service, NLS3_Public_IP_switching, is fully and exclusively realized by the Proximus Internet Routers and is totally dedicated to the end user service EUS_FastInternet subscription.

7.8.1.2 *Private services*

7.8.1.2.1 Private_IP&Ethernet_Extension

This NLS transparently extends the customer's private local area networks, situated at any location within Belgium, to the edge of the Proximus's network, thanks to the routers installed at the customer premises (CPE) and the connectivity capabilities of the MPLS aggregation and core- clouds.

This generic service consists in fact of several actual services, specific to the access technology type, as follows:

- NLS3_Private_IP&Ethernet_Extension_on_symmetric_Datacenter

Sensitivity: Unrestricted

- NLS3_Private_IP&Ethernet_Extension_on_asymmetric
- NLS3_Private_IP&Ethernet_Extension_on_symmetric_lowEnd
- NLS3_Private_IP&Ethernet_Extension_on_symmetric _highEnd

The higher level NLS/EUS to which the above NLS3's deliver their services and their costs allocations are:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_asymmetric	Number of Access	EUS_Private_IP&Ethernet_on_asymmetric subscription – National
NLS3_Private_IP&EThernet_Extension_on_symmetric_Datacenter	direct	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_HighEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription – National
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_backup
NLS3_Private_IP&Ethernet_Extension_on_symmetric_LowEnd	Number of Access	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription – National

7.8.1.2.2 NLS3_Private_IP&Ethernet_Routing

This NLS delivers the capability of routing the private networks traffic to the requested end point, within the Proximus private IPVPN network.

This service, NLS3_Private_IP&Ethernet_Routing, is completed by the Proximus IPVPN Routers and the core MPLS cloud and, in turn, supports all the following EUS:

NLS3	Driver name	Target element
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_asymmetric subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_HighEnd Subscription - National
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_international Subscription
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_DataManagedServices
NLS3_Private_IP&Ethernet_Routing	PeakBandwidth (Mbps)	EUS_Private_IP&Ethernet_on_symmetric_lowEnd Subscription - National

Figure 11: Layer 3 topology and contributors exhibits the layer's basic topology and all the contributors to the Layer 3 services.

Sensitivity: Unrestricted

NLS3 - IP

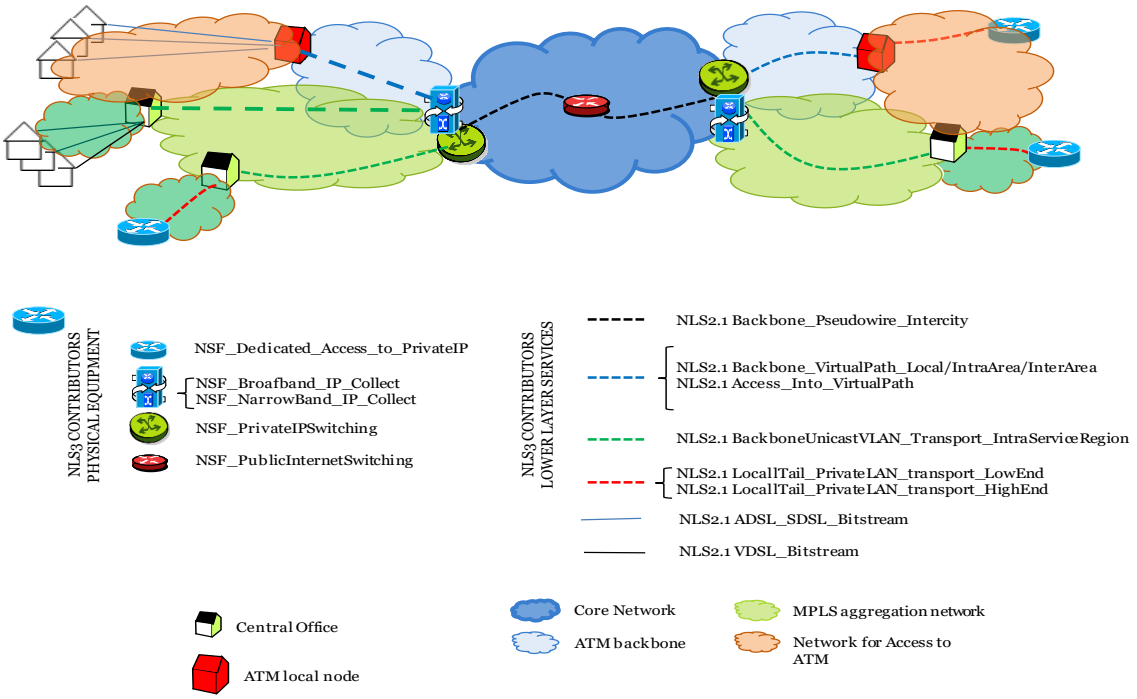

Figure 11: Layer 3 topology and contributors

7.8.1.3 *Mobile Data traffic*

The network layer 3 elements included at this level are :

- NLS3_o_BGC_Mobile_Access Data
- NLS3_o_BGC_Mobile_Backbone_Data

7.8.2 Contributors to the Network Layer 3 services

The table hereunder summarizes the contributors and the drivers used to distribute the costs to the NLS3 services.

NLS3 service category	Building block of layer 3 service	Driver name
Asymmetric Private_IP&Ethernet_Extension	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects

Sensitivity: Unrestricted

		are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_Dedicated_Access_to_PrivateIP	Number of Access
Symmetric Private_IP&Ethernet_Extension	NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalTail<2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_0_LocalTail>2M	Nbr_of_Customer_sites
	NLS2_1_Access_into_VirtualPath	Configured_Bandwidth(Gbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)

Sensitivity: Unrestricted

	NLS2_1_LocalTail_PrivateVLAN_transport_lowEnd	Direct
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_Dedicated_Access_to_PrivateIP	Nbr_of_Sites
Symmetric Public_IP_Extension	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalTail=2M	Nbr_of_Customer_sites
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
Public_IP_collection	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_Public_IP_Collect	PeakHour_PublicInternetTraffic(Gbps)
VoD_IP_collection	NLS2_1_ADSL_SDSL_Bitstream	Nbr_of_used_xDSL_BROBA_lines
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NLS2_1_VDSL_Bitstream	Nbr_of_used_VDSL_lines
	NSF_BroadBand_VoD_IP_Collect	PeakHour_VoDTraffic(Gbps)
VoIP_IP_collection	NLS2_1_Backbone_Pseudowire_InterCity	PeakBandwidth (Mbps)
	NLS2_1_Backbone_UnicastVLAN_Transport_IntraRegion	PeakBandwidth (Mbps)
	NSF_BroadBand_VoIP_IP_Collect	Direct
Public_IP_switching	NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)

Sensitivity: Unrestricted

	NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PublicInternetSwitching	TotalPeakHour_PublicInternetTraffic(Gbps)
Private_IP&Ethernet_Routing	NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)
	NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)
	NLS2_1_Backbone_Pseudowire_InterCity	Bandwidth (Mbps)
	NLS2_1_Backbone_VirtualPath_InterArea	VP bandwidth Gbps
	NLS2_1_Backbone_VirtualPath_IntraArea	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_Backbone_VirtualPath_Local	VP equivalent bandwidth Gbps (Topological efficiency and QoS aspects are translated in bandwidth +or-committed bandwidth)
	NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth (Mbps)
	NSF_PrivateIPSwitching	Direct
IP_security	NSF_IP_security	Direct
Mobile Data Handling	NSF_Mobile_RAN_Data NSF_Mobile_Backbone_Data	Routed volumes Routed volumes

7.9 Network Services of the application layer

7.9.1 Definition

This layer deals with the telecommunication application services to end users. The application layer services are:

Sensitivity: Unrestricted

NLS4_0_BroadcastTV, NLS4_0_VoD, NLS4_0_iDTV and voice telephony related services classified as follows:

Class of Application Service	Application Service
Access to VoiceCallHandling	NLS4_0_Voice_traffic_PointOfInterconnect
Mobile IN Platform	NLS4_0_Mobile_PrepaidData_Services
	NLS4_0_Mobile_PrepaidTraffic_Services
	NLS4_0_Private_Communication_Call_Handling
	NLS4_0_SMS_Services
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_SMS
	NLS4_0_BGC Mobile_Access_Collect_Voice
	NLS4_0_BGC Mobile_Access_Distribute_SMS
	NLS4_0_BGC Mobile_Access_Distribute_Voice
	NLS4_0_BGC Mobile_BackBone_SMS
	NLS4_0_BGC Mobile_BackBone_Voice
	NLS4_0_MobileTerminatingLinks
NP	NLS4_0_FixedPortableNumberLocation
Special	NLS4_0_Automated_call_distribution
Telephony Access	NLS4_0_ISDN_access
	NLS4_0_ISDN-PRA_access
	NLS4_0_PSTN_access
TV	NLS4_0_BroadcastTV
	NLS4_0_iDTV
	NLS4_0_VoD
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling
	NLS4_0_CallerIdentity_CallHandling
	NLS4_0_InteractiveVoiceResponse_CallHandling
	NLS4_0_OtherAdvanced_CallHandling
	NLS4_0_Service_Announcements_Playing
	NLS4_0_Televoting_CallHandling
	NLS4_0_VAS_signaling
	NLS4_0_VoiceFeatures_SelfManaging
	NLS4_0_Voicemail&Messaging
	NLS4_0_WakeUp_CallHandling
Voice transport	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
	NLS4_0_FixedSwitchedVoice_transport_National_offnet
	NLS4_0_RemotelyAggregatedVoice_transport
	NLS4_0_SwitchedVoice_transport_CAE_CAE
	NLS4_0_SwitchedVoice_transport_CAE_MSC
	NLS4_0_SwitchedVoice_transport_LEX_CAE
	NLS4_0_SwitchedVoice_transport_LEX_MSC
VoiceCallHandling	NLS4_0_Voice_traffic_Collect
	NLS4_0_Voice_traffic_OnNet
	NLS4_0_Voice_traffic_Terminate
	NLS4_0_Voice_traffic_Transit

Sensitivity: Unrestricted

For the access, the voice application services are end-to-end voice connections between the customer site and the central office (technical building closest to the user). For the backbone, voice applications are either pure call handling related and do not span over distant nodes, or they are voice transport applications between distant nodes. Next picture puts into perspective the services of the Voice application layer.

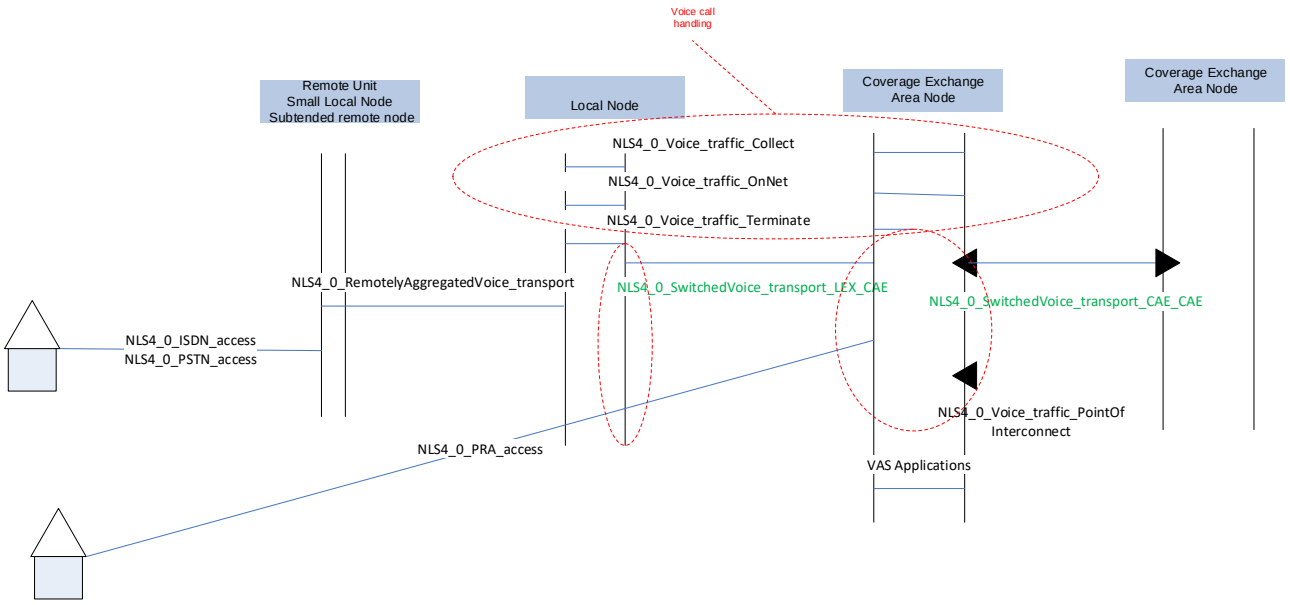

Figure 12: the services of the Voice application layer 4.0

7.9.2 Usage of the application layer

The TV related applications are completely used for iDTV end-user services, no specific consumption driver needs to be defined.

The voice application services are distributed to a variety of traffic types , each with a specific driver. The following table summarizes the used drivers per voice application service.

Class of Application Service	Application Service	Driver to distribute the NLS4.0 application service to EUS or NLS4.1
Access to VoiceCallHandling	NLS4_0_Voice_traffic_PointOfInterconnect	TimeSlot_capacity_used
Mobile IN Platform	NLS4_0_Mobile_PrepaidData_Services	cumulated invested value
	NLS4_0_Mobile_PrepaidTraffic_Services	cumulated invested value
	NLS4_0_Private_Communication_Call_Handling	cumulated invested value
	NLS4_0_SMS_Services	cumulated invested value
Mobile Voice&Messaging Handling	NLS4_0_BGC Mobile_Access_Collect_SMS	routed volumes

Sensitivity: Unrestricted

	NLS4_0_BGC Mobile_Access_Collect_Voice	routed minutes
	NLS4_0_BGC Mobile_Access_Distribute_SMS	routed volumes
	NLS4_0_BGC Mobile_Access_Distribute_Voice	routed minutes
	NLS4_0_BGC Mobile_BackBone_SMS	routed volumes
	NLS4_0_BGC Mobile_BackBone_Voice	routed minutes
	NLS4_0_MobileTerminatingLinks	routed minutes
NP	NLS4_0_FixedPortableNumberLocation	Nbr_calls
Special	NLS4_0_Automated_call_distribution	direct
Telephony Access	NLS4_0_ISDN_access	Nbr_lines_inUse
	NLS4_0_ISDN-PRA_access	Nbr_lines_inUse
	NLS4_0_PSTN_access	Nbr_lines_inUse
TV	NLS4_0_BroadcastTV	direct
	NLS4_0_iDTV	direct
	NLS4_0_VoD	direct
VAS application	NLS4_0_Advanced_Number_Translation_CallHandling	NumberTranslationProcessedTime(min)
	NLS4_0_CallerIdentity_CallHandling	direct
	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
	NLS4_0_OtherAdvanced_CallHandling	direct
	NLS4_0_Service_Announcements_Playing	Nbr_calls
	NLS4_0_Televoting_CallHandling	Nbr_calls_explosive_traffic
	NLS4_0_VAS_signaling	direct
	NLS4_0_VoiceFeatures_SelfManaging	direct
	NLS4_0_Voicemail&Messaging	direct
	NLS4_0_WakeUp_CallHandling	direct
Voice transport	NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet	routed minutes
	NLS4_0_FixedSwitchedVoice_transport_National_offnet	TimeSlot_capacity_used
	NLS4_0_RemotelyAggregatedVoice_transport	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_CAE	routed minutes
	NLS4_0_SwitchedVoice_transport_CAE_MSC	routed minutes
	NLS4_0_SwitchedVoice_transport_LEX_CAE	direct
	NLS4_0_SwitchedVoice_transport_LEX_MSC	direct
VoiceCallHandling	NLS4_0_Voice_traffic_Collect	routed minutes
	NLS4_0_Voice_traffic_OnNet	routed minutes
	NLS4_0_Voice_traffic_Terminate	routed minutes
	NLS4_0_Voice_traffic_Transit	routed minutes

The driver “routed minutes” (or “routed volumes” in the case of mobile SMS) consists in determining the average number of times (=routing factor) a traffic type is using the voice application service across all possible call scenarios compatible with the traffic type. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) of that traffic type.

The traffic types (“consumers”) of these voice applications are:

Sensitivity: Unrestricted

Class of Application Service	End User Service
Access to VoiceCallHandling	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_Voice_traffic_IAA_PointOfInterconnect subscription
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
Mobile IN Platform	EUS_BGC Mobile_Roaming Out data
	EUS_Mobile_Data national
	EUS_SMS_inbound_intal
	EUS_SMS_inbound_national
	EUS_SMS_on_net_national
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_OUT_Origination
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Mobile_inbound_intal
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_to Mobile
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_out_Origination
Mobile Voice&Messaging Handling	EUS_SMS_inbound_intal
	EUS_SMS_inbound_national
	EUS_SMS_on_net_national
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_IN_Origination
	EUS_SMS_Roaming_IN_Termination
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Mobile_inbound_intal
	EUS_voice_traffic_Mobile_inbound_intal_VAS
	EUS_voice_traffic_Mobile_inbound_national_from FOLO

Sensitivity: Unrestricted

	EUS_voice_traffic_Mobile_inbound_national_from MOLO
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_to Mobile
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
	EUS_voice_traffic_Mobile_Roaming_out_Origination
	EUS_voice_traffic_Mobile_Roaming_out_Termination
NP	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
Special	EUS_AUTOMATEDCALLDISTRIBUTION
Telephony Access	EUS_Business voice channels - subscription
	EUS_ISDN-BA Access - subscription
	EUS_Private_IP&Ethernet_on_backup
	EUS_PSTN Access - subscription
TV	EUS_IDTV_subscription
VAS application	EUS_Carrier PreSelection
	EUS_notAllocated
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_intal_VAS
	EUS_voice_traffic_Mobile_inbound_national_from FOLO
	EUS_voice_traffic_Mobile_inbound_VAS_national
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_OPS
	OVH_Management_Network
Voice transport	EUS_Carrier PreSelection

Sensitivity: Unrestricted

	EUS_notAllocated
	EUS_SMS_outbound_intal
	EUS_SMS_outbound_national
	EUS_SMS_Roaming_IN_Origination
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_VAS_national
	EUS_voice_traffic_Mobile_on_net_to Fixed
	EUS_voice_traffic_Mobile_on_net_VAS_national
	EUS_voice_traffic_Mobile_outbound_intal
	EUS_voice_traffic_Mobile_outbound_intal_VAS
	EUS_voice_traffic_Mobile_outbound_national_to FOLO
	EUS_voice_traffic_Mobile_outbound_to MOLO
	EUS_voice_traffic_Mobile_outbound_VAS_national
	EUS_voice_traffic_Mobile_Roaming_IN_Origination
	EUS_voice_traffic_Mobile_Roaming_IN_Termination
	EUS_voice_traffic_Mobile_Roaming_out_Origination
	EUS_voice_traffic_Mobile_Roaming_out_Termination
VoiceCallHandling	EUS_Carrier PreSelection
	EUS_voice_traffic_Fixed_inbound_intal
	EUS_voice_traffic_Fixed_inbound_intal_VAS
	EUS_voice_traffic_Fixed_inbound_national
	EUS_voice_traffic_Fixed_inbound_VAS_national
	EUS_voice_traffic_Fixed_on_net_national
	EUS_voice_traffic_Fixed_on_net_to Mobile_national
	EUS_voice_traffic_Fixed_on_net_VAS_national
	EUS_voice_traffic_Fixed_outbound_intal
	EUS_voice_traffic_Fixed_outbound_intal_VAS
	EUS_voice_traffic_Fixed_outbound_national_to FOLO
	EUS_voice_traffic_Fixed_outbound_national_to MOLO
	EUS_voice_traffic_Fixed_outbound_VAS_national
	EUS_voice_traffic_Fixed_transit_intal
	EUS_voice_traffic_Fixed_transit_national
	EUS_voice_traffic_Mobile_inbound_VAS_national

Sensitivity: Unrestricted

EUS_voice_traffic_Mobile_on_net_to Fixed
EUS_voice_traffic_Mobile_on_net_VAS_national
EUS_voice_traffic_Mobile_outbound_national_to FOLO
EUS_voice_traffic_Mobile_outbound_VAS_national
EUS_voice_traffic_Mobile_Roaming_IN_Origination
EUS_voice_traffic_Mobile_Roaming_IN_Termination
EUS_voice_traffic_Mobile_Roaming_out_Origination
EUS_voice_traffic_OPS

7.9.3 Contributors to the application services

TV services

The broadcast TV application service is the result of the video streaming network stage function and the nationwide broadcast using the SDH clusters and simultaneously the multicast features of the Ethernet/MPLS regional clusters combined with the express pseudowires in order to reach all regional clusters.

Contributor to NLS4_0_BroadcastTV	**Driver**
NSF_BroadcastTV	Nbr_TV_users
NLS1_0_Fibre_connect_to_the_OpticalNode	Nb_access_fibres_used
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity<2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_IntrazonalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_0_LocalBackboneCapacity>2M	Bandwidth consumed (Mbit/s)
NLS2_1_Backbone_MulticastVPLS_IntraRegion	Direct
NLS2_1_Backbone_Pseudowire_InterCity	TotalPeakBandwidth_used(Gbps)
NLS2_1_BackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_InterCityBackboneCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)
NLS2_1_LocalTailCapacity_Ethernet>=10M	Bandwidth consumed (Mbit/s)

Sensitivity: Unrestricted

Similarly, the Video On Demand service is the result of Video Movie servers delivering the content and the transport services towards the closest local node to the customer . The transport is realized on the Ethernet/MPLS network.

Contributor to NLS4_0_VoD	Driver
NLS3_VoD_IP_collection	direct

Voice application services in the access

PSTN access services are the result of the voice concentrator function in the Access Gateways and the physical copper connectivity between the customer site and the Access Gateways (in ROP or in local exchange). In addition, the data connectivity required to transport Voice over IP signaling and traffic to the Voice over IP switching units is also included as a contributor to voice access.

PRA access services do not need a concentrator function (that function is typically realized within the customer site by private switches) but merely a voice transport link to the local exchange. This one is obtained directly from layer 2.0 transport segments and local tails.

Hereunder a summary of the contributors to voice access together with the drivers used to determine their level of involvement in the service

Voice Access Services	Contributor	Driver
NLS4_0_ISDN_access	[NLS1_0_Continue_Raw_Copper]	Nbr_of_used_pairs
	[NLS1_0_Raw_Copper]	Nbr_of_used_pairs
	[NSF_ISDN_NetworkTermination]	Nbr_of_accesses
NLS4_0_ISDN-PRA_access	[NLS1_0_CentralOffice2RemoteOpticalNode_Duct]	Number of physical site routes
	[NLS1_0_CentralOffice2RemoteOpticalNode_Fibre]	Number of physical site routes
	[NLS2_0_InterCityBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_InterCityBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_IntraAreaBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_IntrazonalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_IntrazonalBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_LocalBackboneCapacity=2M]	Bandwidth (Mbps)
	[NLS2_0_LocalTail=2M]	Number_of_customer_sites
NLS4_0_PSTN_access	[NLS1_0_Continue_Raw_Copper]	Nbr_of_used_pairs
	[NLS1_0_Raw_Copper]	Nbr_of_used_pairs
	[NLS2_0_IntrazonalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS2_0_LocalBackboneCapacity<2M]	Bandwidth (Mbps)
	[NLS3_VoIP_IP_collection]	direct
	[NSF_PairGainSystem]	direct
	[NSF_PSTN_Voice_concentrator]	Nbr_lines_inUse

Voice application services in the backbone (see picture Figure 12: the services of the Voice application layer 4.0)

Sensitivity: Unrestricted

The services in the group "Access to VoiceCallHandling" allow to access the Fixed Voice NGN Platform.

In summary the contributors are distributed using following drivers:

Network functions used to realize Access to Voice Call Handling services	Driver used to attribute network functions to access to VoiceCallHandling services
[NSF_Interconnecting_CallHandling	Attributed ecodep of capex from bottom up model
[NSF_OwnNetwork_CallHandling]	Attributed ecodep of capex from bottom up model
[NSF_Voice_call_CAE_Processing]	routed minutes
[NSF_Voice_call_CAE_Trunks]	Nbr Time Slots
[NSF_Voice_o_Broadband_SBC]	Attributed ecodep of capex from bottom up model
[NSF_VoiceIP_Router]	Attributed ecodep of capex from bottom up model

The driver "routed minutes" consists in determining the average nbr of times (=routing factor) a voice call handling type is using the network functions. The routed minutes result from multiplication of the routing factor with the amount of calls (expressed in minutes) exercising that voice call handling type.

The services in the group "Voice transport" are emanating from layer 2.0 Backbone transport capacity (<=2M) which are distributed according to the consumed bandwidth.

Contributor to NLS4_x	Driver	NLS4_x element
NLS2_0_InterCityBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_1 BVAS - BGC Fixed
NLS2_0_InterCityBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_ISDN-PRA_access
NLS2_0_InterCityBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_IntraAreaBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BroadcastTV
		NLS4_0_ISDN-PRA_access
NLS2_0_IntraAreaBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_IntrazonalBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks

Sensitivity: Unrestricted

		NLS4_0_PSTN_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_0_VAS_signaling
		NLS4_1 BVAS - BGC Fixed
NLS2_0_IntrazonalBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalBackboneCapacity<2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_BGC MobileSwitchedVoice_transport_National_offnet
		NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_MobileTerminatingLinks
		NLS4_0_PSTN_access
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_CAE_MSC
		NLS4_0_SwitchedVoice_transport_LEX_CAE
		NLS4_0_SwitchedVoice_transport_LEX_MSC
		NLS4_1 BVAS - BGC Fixed
NLS2_0_LocalBackboneCapacity=2M	Bandwidth (Mbps)	NLS4_0_BGC Mobile_Access_Collect_Voice
		NLS4_0_ISDN-PRA_access
		NLS4_0_MobileTerminatingLinks
		NLS4_0_SwitchedVoice_transport_CAE_CAE
		NLS4_0_SwitchedVoice_transport_LEX_CAE
NLS2_0_LocalBackboneCapacity>2M	Bandwidth (Mbps)	NLS4_0_BroadcastTV
NLS2_0_LocalTail<2M	Number_of_customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
NLS2_0_LocalTail=2M	Number_of_customer_sites	NLS4_0_FixedSwitchedVoice_transport_National_offnet
		NLS4_0_ISDN-PRA_access

The services in the group “VAS application” are in fact directly identified with a network function:

NSF_CallerIdentity_CallHandling	NLS4_0_CallerIdentity_CallHandling	direct
NSF_CallingCard_CallHandling	NLS4_0_CallingCard_CallHandling	direct
NSF_InteractiveVoiceResponse_CallHandling	NLS4_0_InteractiveVoiceResponse_CallHandling	direct
NSF_MessageWaitingIndicator_Inserting	NLS4_0_MessageWaitingIndicator_Inserting	direct
NSF_OtherAdvanced_CallHandling	NLS4_0_OtherAdvanced_CallHandling	direct
NSF_PrepaidCallingCard_CallHandling	NLS4_0_PrepaidCallingCard_CallHandling	direct
NSF_Service_Announcements_Playing	NLS4_0_Service_Announcements_Playing	direct
NSF_Televoting_CallHandling	NLS4_0_Televoting_CallHandling	direct
NSF_VirtualPrivateNetwork_CallHandling	NLS4_0_VirtualPrivateNetwork_CallHandling	direct
NSF_VoiceFeatures_SelfManaging	NLS4_0_VoiceFeatures_SelfManaging	direct

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NSF_Voicemail&Messaging	NLS4_0_Voicemail&Messaging	direct
NSF_WakeUp_CallHandling	NLS4_0_WakeUp_CallHandling	direct

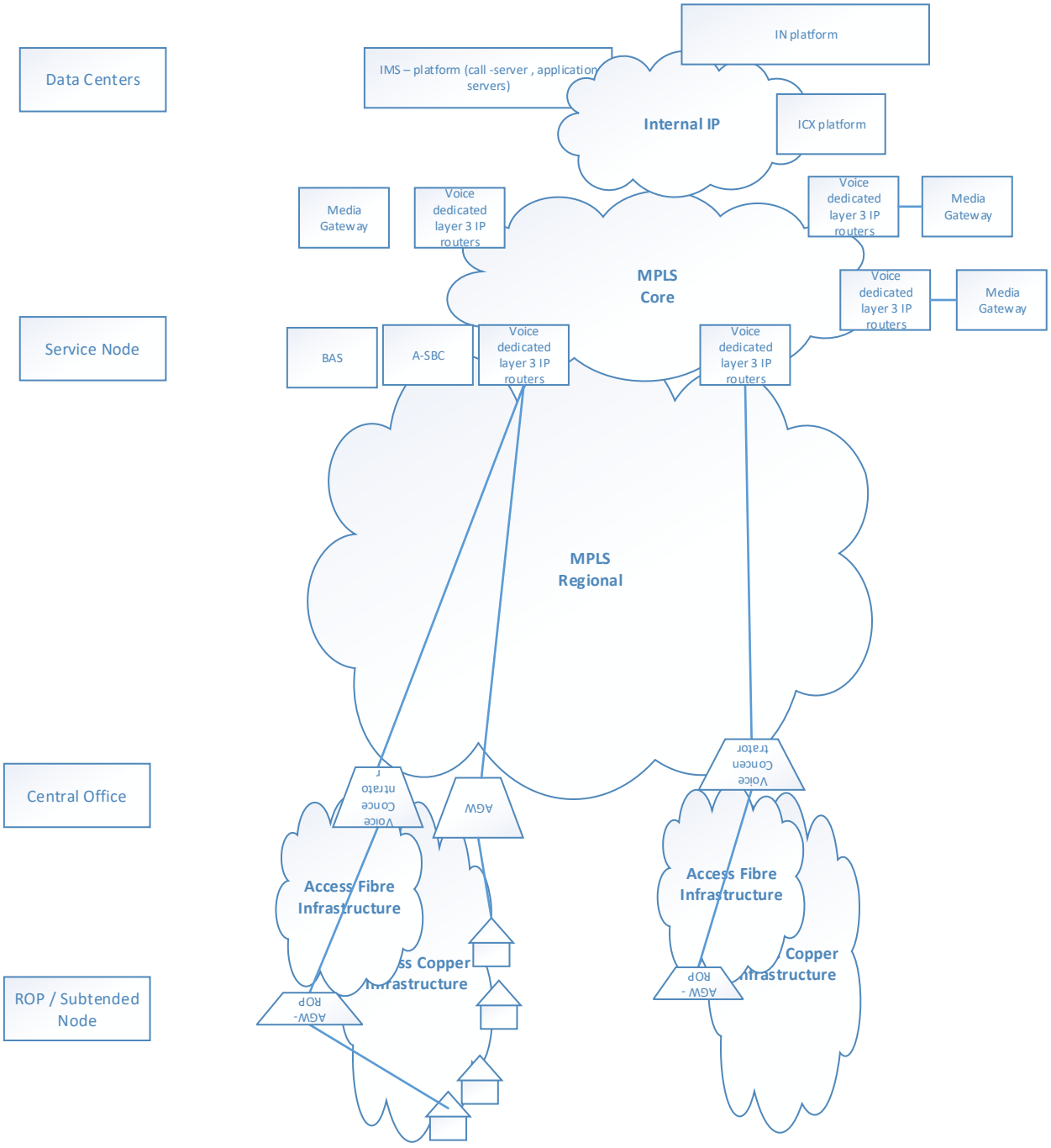

Figure 13: Fixed Voice NGN Network

Sensitivity: Unrestricted

8 Annex I: SCF Flow Acronyms

SCF	Support and Customer Flow
BIPT	Belgian Institute for Postal services and Telecommunications
BTN	Business Transformation
CBU	Consumer Business Unit
CC	Costs Center
CCG	Costs Center Group
CP	Costs Pool
CWS	Carrier & WholeSale
CUO	Customer Operations
DIY	Do It Yourself
EBU	Enterprise Business Unit
FAC	Fully Allocated Costs
HCA	Historical Cost Accounting
HMC	Human Manpower Cost
MOS	Material Out of Stock
NRA	National Regulatory Authority
REG	(Proximus) Group Regulatory Affairs
SMP	Significant Market Power
SOG	Services & Other Goods
S&S	Staff & Support

Sensitivity: Unrestricted

9 Annex II: Network and IT Flows Acronyms

AC	Asset Class
ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
BA	Basic Access
BAS	Broadband Access Server
BES	Proximus European Solutions
BGC	Proximus
BILAN	Proximus Interconnection of LANs
BLES	Proximus LAN Extension Service
BROBA	Proximus Reference Offer for Bitstream Access
BROTSOLL	Proximus Reference Offer for Terminating Segment of Leased Line
BVAS	Business Value Added Services
CAE	Coverage Exchange Area
CAPEX	CApital Expenditures
CP	Cost Pool
CPE	Customer Premises Equipment
CPU	Central Processing Unit
CWDM	Coarse Wavelength Division Multiplexing
DACS	Digital Analog Cross-connect System
DCN	Data Communication Network
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DU	Dispatch Unit
DWDM	Dense Wavelength Division Multiplexing
EAA	Extra Access Area
EAL	Ethernet Access Line
EFM	Ethernet First Mile
ESS	Ethernet Service Switch
Ethane	ETHernet Aggregation NETwork
EUS	End User Service
FAC	Fully Allocated Costs

Sensitivity: Unrestricted

FIFA	Fast Internet Future Architecture
FTTC	Fiber To The Cabinet
FTTO	Fiber To The Office
Gb	Giga bit
Gbps	Giga bits per second
HW	HardWare
IAA	Intra Access Area
iDTV	interactive Digital TeleVision
IN	Intelligent Network
TCE	Telecom CostExpert
IO	In/Out
IP	Internet Protocol
IPVPN	Internet Protocol Virtual Private Network
ISAM	IP Subscriber Line Access Multiplexer
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LDC	Local Distribution Center
LEX	Local Exchange
LL	Leased Line
LTE	Line Terminating Equipment
Mbit	Mega bit
MEO	Modern Equivalent Opex
MOLO	Mobile Other Licensed Operator
MPLS	MultiProtocol Label Switching
MSR	Multi Server Router
MUX	Multiplexer
MVAS	Mass Value Added Services
MWE	MicroWave Equipment
NE	Network Element
NGA	New Generation Access
NGN	New Generation Network
NLS	Network Layer Service
NTE	Network Terminating Equipment

Sensitivity: Unrestricted

NTP	Network Termination Point
NSF	Network Stage Function
OLO	Other Licensed Operator
OLTE	Optical Line Terminating Equipment
OPEX	OPerational Expenditure
OVH	Overhead
PDH	Plesiochronous Digital Hierarchy
PRA	Primary Access
PSTN	Public Switched Telephony Network
QoS	Quality of Service
RAM	Random Access Memory
ROP	Remote Optical Platform
SDH	Synchronous Digital Hierarchy
SDSL	Symmetric Digital Subscriber Line
STM	Synchronous Transport Module
TDM	Time Division Multiplexing
TV	TeleVision
VAS	Value Added Services
VDSL	Very high speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VP	Virtual Path
VPLS	Virtual Private Local area network Service
VPN	Virtual Private Network
WDM	Wavelength Division Multiplexing
SDE	Service Delivery Engine
CUO	Customer Operations
CFF	Customer Field Force
TEC	Technology
NEO	Network Engineering & Operations
TSI	Technology, Strategy & Innovation
ITS	Information Technology Services

Sensitivity: Unrestricted

ARP	Architecture, Road map & Program Office
SPC	Services, Platforms & Cloud

Sensitivity: Unrestricted