

TLN WRO Architecture type Document

< High level network and service architecture
overview of the TLN Broadband Services **(ROBB)**
Wholesale Reference Offer >



Document Housekeeping

Document Category and type

CAT	TYPE	DOC ID	Comment
Broadband	ARCH	TLN-WRO-TA-B-A-PAAA	Architecture type documents (ARCH) mainly have an informational/explanatory purpose to highlight the overall technical set-up.

Document Authorization

EDITION	DATE	APPRAISAL AUTHORITY	STATUS	ORIGINATOR
0.5	01.02.2012	Director TLN Wholesale	Draft	TLN WRO Engineering

Document Maturity State

EDITION	DATE	APPRAISAL AUTHORITY	STATUS	ORIGINATOR
0.1	30.11.2011	Director TLN Wholesale	Concept(CO)	TLN WRO Engineering
0.5	01.02.2012	Director TLN Wholesale	Draft(DR)	TLN WRO Engineering
0.9	xx.xx.2012	Director TLN Wholesale	Final Submit(FS)	TLN WRO Engineering
1.0	xx.xx.2012	Director TLN Wholesale	Approval(AP)	TLN WRO Engineering

Document Effective Date

This document has come into effect as of xx/xx/2012 and remains valid until a valid subsequent Telenet Wholesale Reference offer, substituting this document is published.

Legal Disclaimer

"This document constitutes an integral part of the Telenet Reference Offer for Basic TV / IDTV / BB and should be fully complied with by the Beneficiary at all times. Non compliance, incomplete or deviating application of this document by the Beneficiary, or his authorized agent, results in the suspension and ultimately termination of the Contract between Telenet and the Beneficiary.

At any time this document is susceptible to change by Telenet, Regulator's decision or by decision of a relevant judicial authority. Changes to this document will, depending on the circumstances for change, be appropriately notified to the Beneficiary and published on the Telenet website.

Telenet has appealed the CRC decisions of the VRM, BIPT and CSA of 1 July 2011 concerning the market analysis of the broadcasting market in Belgium and it consequently reserves all its rights in relation to this document."

Table of Contents

1	Abstract	5
2	Glossary and Abbreviations	6
3	TLN WRO Overall Reference Architecture	7
4	TLN WRO Broadband Reference Architecture	9
4.1	GENERAL APPROACH.....	9
4.2	KEY BROADBAND NETWORK ELEMENTS.....	10
4.2.1	<i>GTC</i>	10
4.2.2	<i>PEP</i>	10
4.2.3	<i>Rest of network element</i>	10

Table of Figures

Figure 3-1	8
Figure 4-1	9

List of Appendixes

This document may refer to further detailed documents that are added in Appendixes to this document.

A reference to an appendix is in this document highlighted with grey background.

The list with appendixes of this document:

None.

List of References

This document may refer to external documents or information sources.

A reference to an external document or information source is in this document highlighted with grey background.

The list of referred external documents or information sources in this document:

None.

Restricted information

This document may contain sections that are not public information and that can be made available only to parties that have executed specific NDA's.

Information that is subject to NDA is marked in this document as follows:

NDA
NDA

The information in this text box is available only under NDA

Before conversion to PDF format for publication of the document, the information will be made unreadable by converting the background of the text box to black.

1 **Abstract**

This document provides a high level network and service architecture overview of the Telenet Broadband Services Wholesale Reference Offer. It describes the main building blocks and building blocks on a conceptual level.

The feasibility of the technical designs and methods described in this document are subject to verification by a Proof of Concept (POC) test organized by Telenet and may be changed or updated depending on the outcome of this POC.

2 Glossary and Abbreviations

AOTC: Alternative Operator Testing & Compliance
CAS: Conditional Access System
CMTS: Cable Modem Termination System
CRM: Customer Relationship Management
DSL: Digital Subscriber Line
GRE: Generic Routing Encapsulation
GTC: GRE Tunnel Concentrator
HFC: Hybrid Fiber Coax
IP: Internet Protocol
L2GRE: Layer 2 GRE Tunnel
NCP: Network Control Platform
NE: Network Element
NIU: Network Interface Unit
OAM: Operations and Maintenance
PEP: Policy Enforcement Point
STB: Set top box
VHE: Video Head end
VOD: Video on Demand

3 TLN WRO Overall Reference Architecture

This section displays in figure 1 below the overall architecture and block diagram of the Telenet Wholesale Reference Offer technical set-up. This figure is repeated in each “service specific” architecture document with as purpose to have a clear common reference and a strict application of naming conventions on building blocks and building blocks which are then further described in “specification” type documents which will allow the beneficiaries to implement the required building blocks on their end-user equipment, network and IT CRM systems.

Naming Conventions:

Each Network building block on the overall (General) level has a unique reference naming in the format: NE.G.xy, where xy is the number of the block. (xy <= 50 means TLN Network Element(NE) and xy >= 60 means AO NE

Each Network Building block on the overall (General) level has a unique reference naming in the format: IF.G.xy, where xy is the number of the building block.

Four main domains are defined:

- Wholesale Operator (TLN) domain: this is the set of all systems that are/will be present in the Telenet infrastructure to implement the TLN Wholesale reference offer. Per convention they will always be depicted as boxes with yellow borders in all documents.
- Alternative Operator (AO) domain: this is the set of all systems that are/will have to be present in the AO infrastructure to make use of the TLN Wholesale reference offer. Per convention they will always be depicted as boxes with green borders in all documents. Obviously TLN does not impose by any means how the AO should organize its own infrastructure, hence the AO domain components must be mainly seen as an example how the AO could organize its infrastructure to make use of the TLN WRO and for clarity of the TLN WRO by describing clearly the building blocks.
- Household domain: this is the set of all systems that are/will have to be present in the customer home to make use of the TLN Wholesale reference offer. Per convention they will be depicted as boxes with yellow or green borders in all documents, depending if they are TLN owned and/or provided equipments or AO owned and/or provided equipments. Obviously additional equipment may be present in the household, typically owned by the customer and where relevant for the technical explanations these equipments have been depicted as boxes with black borders. The household domain is for clarity reasons always bordered by red dotted lines. Obviously TLN does not impose by any means how the AO should organize its own household equipment, hence the AO elements in this domain components must be mainly seen as an example how the AO could organize this to make use of the TLN WRO and for clarity of the TLN WRO by describing clearly the building blocks.
- Third party domain (3rd party): this is the set of all systems that will be provided and operated by third parties on common behalf of the AO's and that require interfacing with TLN systems to enable use of the TLN Wholesale reference offer by AO. Per convention they will always be depicted as boxes with blue borders in all documents. Currently only the AO CAS system belongs to this category.

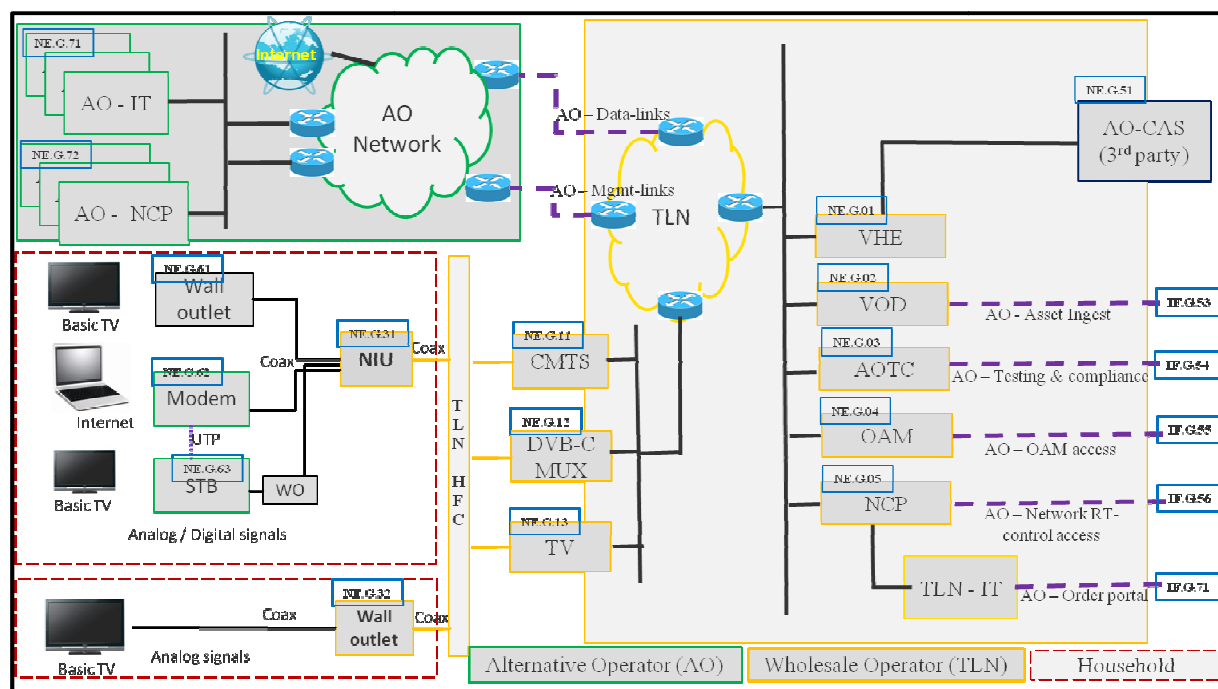


Figure 3-1

4 TLN WRO Broadband Reference Architecture

- (1) This section provides a high level network and service architecture overview of the Telenet Broadband Services Wholesale Reference Offer (ROBB). It shows how the broadband part fits in the overall architecture referenced in section 3 above in this document.

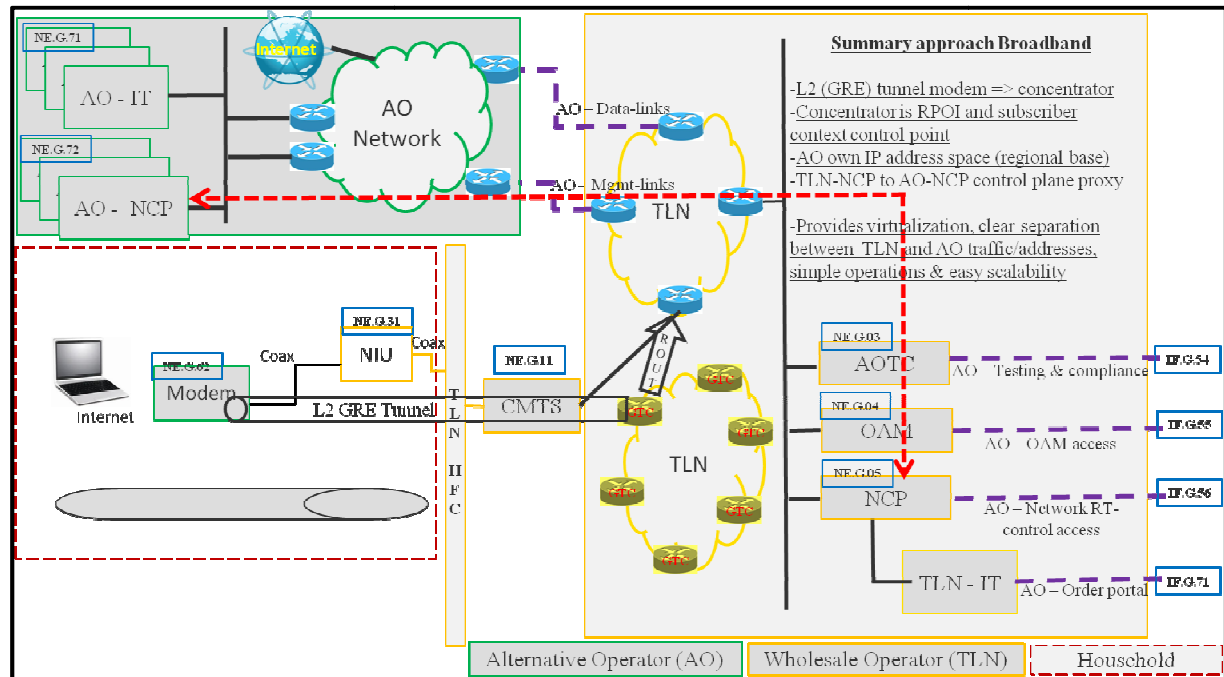


Figure 4-1

4.1 General Approach

- (2) The generic approach (see figure above) that has been chosen is to create layer 2 like tunnels across the Telenet infrastructure to carry the broadband traffic of AO customers towards the AO domain in a transparent way as such implementing on the HFC network an architecture that has a lot of similarity with the way wholesale on a Telco DSL network is mostly realized.
- (3) This approach has the advantage that Telenet interference with AO end-user functionality is minimized, offering maximum “service differentiation” freedom towards the AO’s
- (4) In addition it uses a clean virtualization approach that will allow the “hosting” of multiple AO’s on the TLN network and also limiting interferences between different AO’s.
- (5) In order to make use of the TLN ROBB the AO will have to interconnect its network to the TLN network in each of the Regional Points of Interconnect (RPOI) where the tunneled traffic will be handed over to the AO for all AO customers residing in the geographical area covered by the RPOI.
- (6) The AO will be required to have its own IP address range and IP address pools of sufficient size will have to be provided upfront to TLN to allow proper routing set-up configuration in each of the RPOI’s.

4.2 Key Broadband Network Elements

- (7) This section gives a brief overview of the purpose and function of some key building blocks involved in the implementation of the broadband wholesale offer which have not yet been explained in the overall architecture document

4.2.1 *GTC*

- (8) The GRE Tunnel Concentrator (GTC) is a new network element that will be introduced in the TLN network to support wholesale broadband traffic.
- (9) Using the parameter settings in the Docsis modem configuration file, the AO cable modem will upon start, initiate a GRE tunnel to the appropriate tunnel concentrator. The TLN-NCP to AO-NCP message exchange flow will ensure that this tunnel is established with the appropriate transport characteristics according to the broadband tier profile that has effectively been ordered for the specific AO customer.
- (10) The GTC will forward the traffic towards the appropriate interconnection link for delivery in the AO domain.
- (11) The GTC will also be responsible for accounting purposes and as such it will keep record off all traffic that passes on behalf of AO customers and as such it will be for TLN the source of volume accounting information.

4.2.2 *PEP*

- (12) The AO customers' traffic will be subject to policy enforcement and bandwidth management just like the traffic for Telenet customers.
- (13) The Policy Enforcement Point (PEP) function is distributed over several TLN network components and hence, is as such not shown as a separate network element

4.2.3 *Rest of network element*

- (14) The rest of the network elements functions have already been discussed in the overall architecture document