

# **TLN WRO Architecture type Document**

< High level network and service architecture  
overview of the TLN WRO >



## Document Housekeeping

### Document Category and type

CAT	TYPE	DOC ID	Comment
General	ARCH	TLN-WRO-TA-G-A-PAAB	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

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## 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.

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

Reference 1 : <identification of reference>

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# 1 **Abstract**

This document provides a high level network and service architecture overview of the Telenet Wholesale Reference Offer (TLN WRO). 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  
CDR: Call Detail Record  
CMTS: Cable Modem Termination System  
CPE: Customer Precise Equipment  
CRM: Customer Relationship Management  
DOCSIS: Data over Cable Service Interface Specification  
DTV: Digital Television  
DVB-C: Digital Video Broadcasting - Cable  
eMTA: Embedded Multimedia Terminal Adapter  
HFC: Hybrid Fiber Coax  
iDTV: interactive Digital Television.  
MUX: Multiplex  
NCP: Network Control Platform  
NE: Network Element  
NIU: Network Interface Unit  
OAM: Operations and Maintenance  
STB: Set top box  
VHE: Video Head end  
VOD: Video on Demand  
WO: Wall Outlet

### 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 (3<sup>rd</sup> 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.

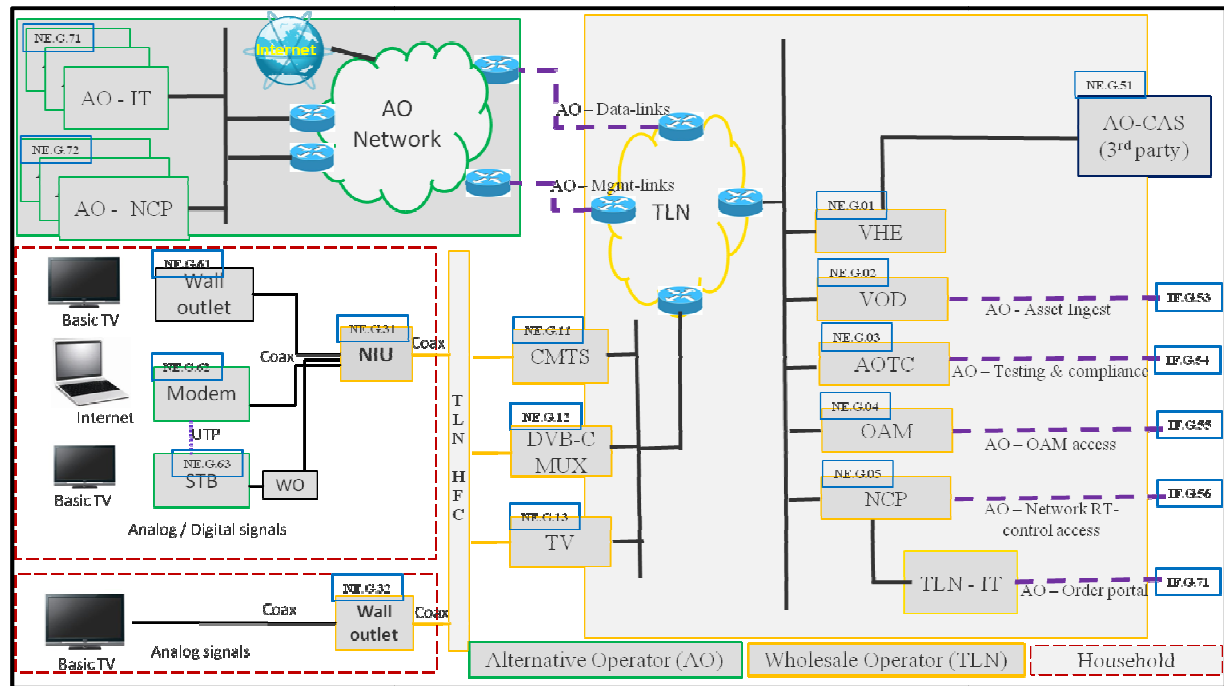


Figure 1

### 3.1 NE building blocks described in this document

This section list all Network Element Building blocks described in this document, together with a cross reference list of the identification tags of the TLN WRO specification type documents in which those building blocks are described in detail.

- (1) **NE: CMTS (NE.G11)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (2) **NE: DVB-C MUX (NE.G12)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (3) **NE: TV (NE.G13)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (4) **NE: VHE (NE.G01)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (5) **NE: VOD (NE.G02)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (6) **NE: AOTC (NE.G03)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (7) **NE: OAM (NE.G04)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (8) **NE: NCP (NE.G05)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z



- (9) **NE: TLN-IT**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (10) **NE: AO-IT (NE.G71)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (11) **NE: AO-NCP (NE.G72)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (12) **NE: NIU (NE.G31)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (13) **NE: Wall Outlet (NE.G32)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (14) **NE: Wall Outlet (NE.G61)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (15) **NE: Modem (NE.G62)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (16) **NE: STB (NE.G63)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z
- (17) **NE: AO-CAS(3<sup>rd</sup> party) (NE.G51)**; This building block is described in documents : <fill in specification type document reference list (if applicable)>doc x, doc y, .... doc z

## **4 TLN WRO Overall Reference Architecture**

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

### **4.1 Architecture Wholesale Operator (TLN) domain sub blocks**

(19) This section gives a brief overview of the purpose and function of the building blocks in the TLN domain.

#### **4.1.1 CMTS (NE.G11)**

(20) The CMTS communicates with Docsis type CPE (Cable modems, eMTA, Home Gateways) over the TLN HFC network and as such provides the basic transport services that allow communication between Docsis CPE and the TLN network.

#### **4.1.2 DVB-C MUX (NE.G12)**

(21) The DVB-C Multiplexers provide transport for digital TV broadcast and VOD signals over the HFC access network using MPEG Transport Stream protocols.

#### **4.1.3 TV (NE.G13)**

(22) The TV modulation equipment injects the standard analog TV signals on the HFC access network for transport to the Wall Outlets in the customer homes.

#### **4.1.4 VHE (NE.G01)**

(23) The Video Head-end contains all required systems to capture, encode and multiplex the Digital TV broadcast signals and add the required signaling information to make them ready for transport over the Telenet network towards the DVB-C multiplexers

#### **4.1.5 VOD (NE.G02)**

(24) The VOD subsystem contains all components which includes content management systems, encoding systems, streaming systems and session control and resource management systems

#### **4.1.6 AOTC (NE.G03)**

(25) The AOTC environment provides testing facilities that enables the beneficiaries to test and certify their end-user equipment and systems building blocks prior to deployment in the TLN network.

#### **4.1.7 OAM (NE.G04)**

- (26)The OAM environment provides facilities that enable the beneficiaries to operate and maintain their end-user equipment connected to the TLN network as well as to supervise status information about the health of building blocks between AO systems and the TLN network and about TLN network components involved in delivering service to their customers.

#### **4.1.8 NCP (NE.G05)**

- (27)The network control platform (NCP) is involved in the real-time session set-up and tear-down interactions between AO CPE and the network components. As such it handles the control plane message flows originated from AO CPE that wants to initialize and build-up (or tear down) and transport connection (or session) with the network. The TLN NCP will contact its counterpart at the AO side (AO-NCP) to pass those parts of the control flows that require AO interaction. . In addition to the real-time flows the TLN NCP will also interact with the AO NCP via non real-time transactions such as pre-loading of AO Docsis modem configuration files. In practice the NCP is a collection of platforms, using different protocols that are together addressed as NCP for clarity and simplicity of the reference offer.

#### **4.1.9 TLN-IT**

- (28)TLN-IT is used as an umbrella name for the set of systems that together implement the Telenet OSS/BSS system modules involved in supporting the TLN WRO in the broad sense of the definition

#### **4.1.10 TLN Converged Network**

- (29)The TLN converged network means the complete set of converged backbone and access network infrastructure that transports and routes data, video and voice to its destination and provides interconnection to the Internet. It is in the technical annexes of the TLN WRO often referred to with the generic term “network”.

## 4.2 Architecture Alternative Operator (AO) domain sub blocks

This section gives a brief overview of the purpose and function of the building blocks in the AO domain.

### 4.2.1 AO-IT (NE.G71)

(30)AO-IT is used as an umbrella name for the set of systems that together implement the AO CRM and OSS/BSS systems in the broad sense of the definition. The TLN WRO does not make any assumption on the nature or architecture of the AO IT system. The main purpose of including this building block in the architecture drawings is highlighting possible ways of implementing the requirements of the TLN WRO.

### 4.2.2 AO-NCP (NE.G72)

(31)The network control platform (NCP) is involved in the real-time session set-up and tear-down interactions between AO CPE and the network components. As such it handles as a destination for control plane message flows originated from AO CPE that are “proxied” by its counterpart the TLN NCP. The TLN WRO does not make any assumption on the nature or architecture of the AO NCP system. The main purpose of including this building block in the architecture drawings is highlighting possible ways of implementing the requirements of the TLN WRO.

## 4.3 Architecture Household domain sub blocks

This section gives a brief overview of the purpose and function of the building blocks in the household domain.

### 4.3.1 NIU (NE.G31)

- (32) The Network Building block Unit (NIU) is a device that provides the termination and hand-over point between the HFC network plant and the in customer home coaxial network. This device is always owned by TLN. One of its important functions is to protect the network against ingress of inappropriate signals on the RF level.

### 4.3.2 Wall Outlet (NE.G32)

- (33) The Wall Outlet (WO) is the signal transfer point for TV and radio signals (both digital and analog). In households where historically never a digital TLN service was present, typically no NIU will be present and in this case the first in line WO acts as the termination and hand-over point for TV and radio signals. In some cases also a hand-over connector or hand-over device may be present, in which case this device is the formal termination and hand-over point. Also in this case a WO will have to be present after this hand-over connector / device, so for the sake of keeping the technical architecture documents of manageable complexity, the first in line WO will be referred as performing the role of signal transfer point for TV and radio signals.

### 4.3.3 Wall Outlet (NE.G61)

- (34) The Wall Outlet (WO) is the signal transfer point for TV and radio signals (both digital and analog). It is connected to a downstream TV port on the NIU.

### 4.3.4 Modem (NE.G62)

- (35) Docsis compliant modem, eMTA or Home gateway to enable communication between the customer in home LAN side network and the TLN CMTS

### 4.3.5 STB (NE.G63)

- (36) Digital TV STB to enable AO (i)DTV service delivery

## 4.4 Architecture Third Party (3<sup>rd</sup> party) domain sub blocks

This section gives a brief overview of the purpose and function of the building blocks in the 3<sup>rd</sup> party domain.

### 4.4.1 AO-CAS

- (37) Common Conditional Access System (CAS) operated by a third party CAS provider in joint interest of multiple beneficiaries of the TLN ROTV and TLN AIDTV. The CAS system is responsible for protecting the premium content and providing selective access on an individual AO subscriber basis to premium packages.

## 4.5 Logging, tracing, audit architecture

- (38) All TLN WRO components will provide logging, tracing and audit capabilities. The details of those are described in the specific building block documents

## 4.6 Billing and CDR architecture

- (39) The relevant TLN WRO components will have capabilities to produce billing and CDR information. The details of those are described in the specific building block documents

## 4.7 Security architecture

- (40) All TLN and AO network and CPE components will be subject to strict security requirements to protect the network integrity and avoid fraud. The details of those are described in the specific building block documents

## 4.8 OAM architecture

- (41) The relevant TLN WRO components will have capabilities to provide OAM information and access towards the AO to enable operation and maintenance. The details of those are described in the specific building block documents

## 4.9 Redundancy and defense architecture

- (42) TLN and AO network and CPE components will be subject to redundancy and defense requirements to protect against failure and network overload conditions. The details of those are described in the specific building block documents