

TLN WRO Architecture type Document

< High level network and service architecture
overview of the TLN Basic TV (**ROTV**) Wholesale
Reference Offer >



Document Housekeeping

Document Category and type

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

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List of Appendixes

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

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None.

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1 **Abstract**

This document provides a high level network and service architecture overview of the Telenet Basic TV Wholesale Reference Offer (ROTV). It describes the main building blocks and interfaces 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

AAA: Authentication, Authorization and Accounting
AOTC: AO Testing and Compliance
CAS: Conditional Access System
CDN: Cable Delivery Network
CMTS: Cable Modem Terminating System
CPPS: CAS Proxy Provisioning System
CRM: Content Resource Management
CSP: Content Service Provider
DTV: (non-interactive)Digital Television
ECM: Entitlement Control Message
EIC: EPG Ingest Control
EIT: Event Information Table
EMM: Entitlement Management Message
EPG: Electronic Program Guide
HFC: Hybrid Fiber Coax
IEC: Immediate Event Charging
IP: Internet Protocol
IT: Information Technologies
MPEG: Moving Pictures Experts Group
MPTS: MPEG Transport Stream
MUX: Multiplexer
NCP: Network Control Platform
NE: Network Element
NIU: Network Interface Unit
OAM: Object Administration and Maintenance
PPV: Pay per view
SC: Smartcard
SIG: Service Integration Gateway
STB: Set-top-box
VHE: Video Head-end
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 (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.

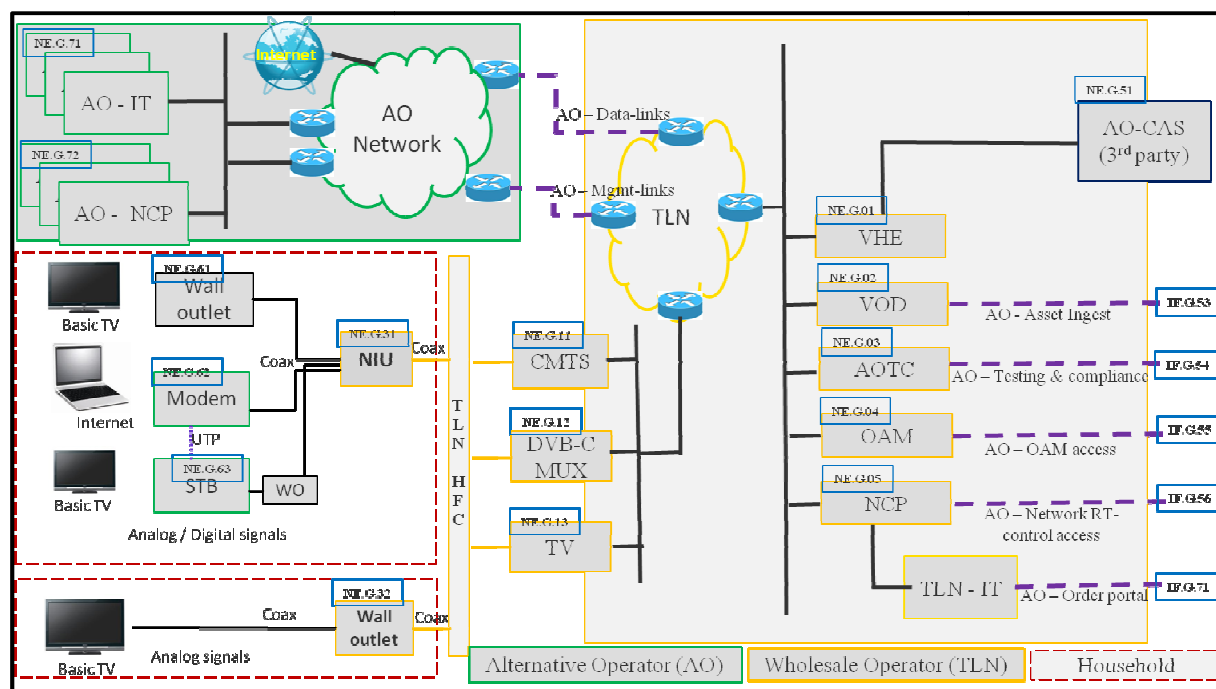
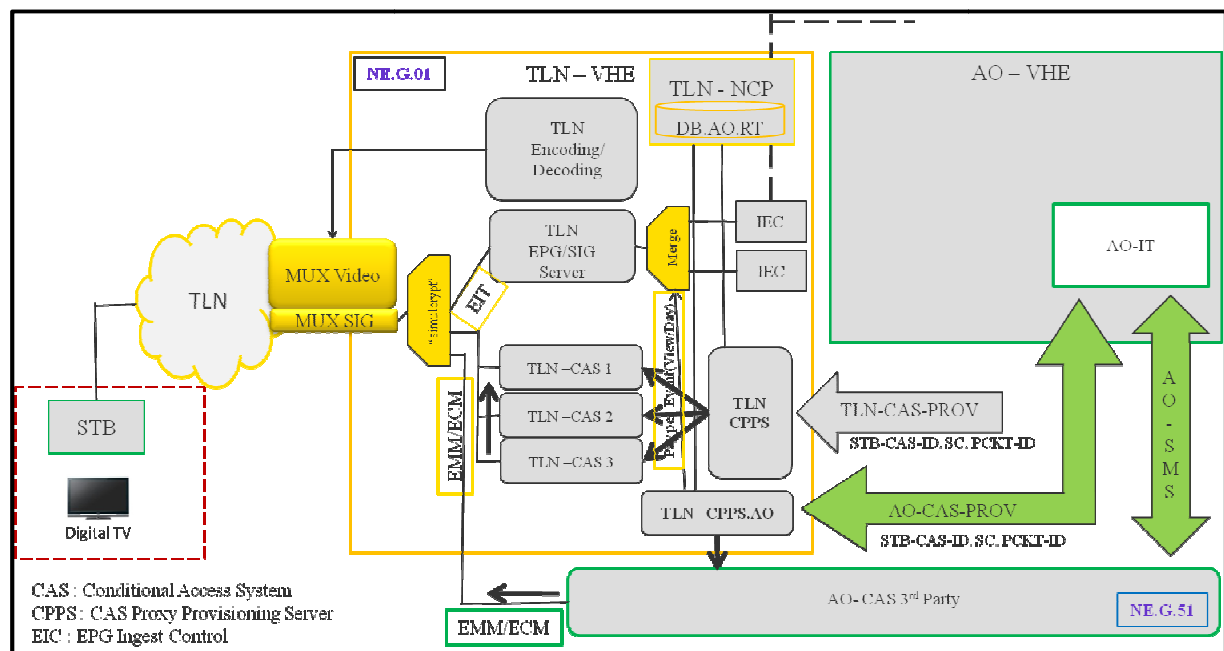


Figure 3-1

4 TLN WRO Basic TV (ROTV) Reference Architecture

- (1) This section provides a high level network and service architecture overview of the Telenet Basic TV (ROTV) Wholesale Reference Offer. It shows how the Digital TV part fits in the overall architecture referenced in section 3 above in this document.
- (2) Note: this document describes the non interactive variant (DTV variant) of the architecture where the AO STB's are one way STB without IP data return path. The interactive variant is described in the document with identification **TLN-WRO-TA-I-A-PIAA**

Figure 4-1



4-1

4.1 General Approach

- (3) The generic approach (see figure above) that has been chosen is to create an architecture that enable the AO systems to take control of the business logic for its customers in its own systems and applications. The TLN Video Headend merely supports the basic secure transport and multiplexing of the video signals over the network towards the AO STB in a transparent way as such implementing on the HFC network an architecture that has a lot of similarity with the way Digital TV wholesale on a Telco DSL network is mostly realized (IP Multicast).
- (4) This approach has the advantage that Telenet interference with AO end-user functionality is minimized, offering maximum “service differentiation” freedom towards the AO’s.
- (5) 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.

4.2 Key Digital TV (DTV) Network Elements

- (6) This section gives a brief overview of the purpose and function of some key building blocks involved in the implementation of the Digital TV part of the ROTV which have not yet been explained in the overall architecture document

4.2.1 VHE : Statistical Multiplexers (MUX)

- (7) The statistical multiplexers combine digital video streams with variable bit rate characteristics, received from the encoders with signaling information and CAS information into a combined MPTS streams that fits into a fixed bandwidth stream that can be transported over the HFC network towards the STB's.

4.2.2 CAS servers and AO 3rd party CAS system

- (8) The CAS servers generate the security control messages (EMM, ECM) that allow the multiplexers to encrypt the video content streams before transmission on the network, as well as the messages that individual STB's need to decrypt those parts of the video content streams to which they are entitled, based upon their subscriptions stored in the AO CRM systems.
- (9) The 3rd party CAS system performs identical functions as the TLN own CAS systems. Only one distinct 3rd party CAS system can be present that operates on behalf of all different AO's together.
- (10) The signaling output of all CAS servers is "merged" into a "simul-crypt" approach and injected into the transport streams by the multiplexers, enabling an architecture where different STB's can use different CAS system while still sharing the same content streams.
- (11) The provisioning interface to make the link between the AO CRM and the CAS systems is realized on the CPPS server. Just like towards the TLN CRM, Telenet also offers this same interface with the same capabilities to the AO CRM's enabling an efficient wholesale architecture.

4.2.3 EPG/Signaling server

- (12) This server generates the DVB-C signalling streams to be inserted into the multiplexers, containing information on the location of the MUX in the spectrum, the MPTS services present in a MUX and the related EPG information. The IEC also perform quality control on incoming EPG content data feeds that are typically provided by 3rd party providers.

4.2.4 Rest of network element

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