

# **TLN WRO Specification type Document**

< Requirement specification for AO VoD content library hosting on TLN VoD CMS to enable usage of TLN AIDTV >



## Document Housekeeping

### Document Category and type

CAT	TYPE	DOC ID	Comment
i(DTV)	SPEC	TLN-WRO-TA-I-S-PIAF	Specification type documents (-SPEC) are documents specifying logical / physical interfaces / protocols, etc., to which AO equipment/systems need to comply

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### 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:

A. Appendix A, <APP-I-C-PIAF-A> contains :

- 1) Appendix A1 - <VoD toolkit for content providers>

The appendix(es) referred to in this section List of Appendixes, contain(s) detailed technical information which is only relevant when a Beneficiary enters in a concrete implementation project to become Beneficiary of the Telenet Reference Offer and/or Annex.

## **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:

Reference 1: TLN-WRO-TA-I-C-PIAF

Reference 2: TLN-WRO-TA-T-T-PAAB

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## 1 Abstract

This document describes the requirements the AO must meet in order to upload and manage its own VoD content in the TLN VoD content management system.

This document has a corresponding certification document with reference: **TLN-WRO-TA-I-C-PIAF** which is used to test AO WO equipment compliance against this specification.

**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

AC3: Audio Compression-3  
AIDTV : Annex Interactive Services for DTV  
AO: Alternative(Other) Operator  
CBR: Constant Bit Rate  
CDN: Content Delivery Network  
CMS: Content Mnagement System/Server  
dB : Decibel  
EPG: Electronic Program Guide  
FTP: File Transfer Protocol  
GOP: Group Of Pictures  
HD: High Definiton  
ID: Identifier  
IDR: Instantaneous Decoding Refresh  
IDTV: interactive Digital Tv  
IPSEC: Internet Protocol Security  
Kbps: Kilobit per second  
Mbps: Megabit per second  
MPEG: Motion Picture Experts Group  
MPEG-2: Motion Picture Experts Group 2 (Standard - Compressed Video at 4-9 Mbps)  
MPEG-4: Moving Picture Experts Group 4 (Standard - Compressed Video at 64 Kbps)  
PAT: Program Association  
PCR: Program Change Request  
PID: Program Identifier  
PKI: Public key infrastructure/information  
PMT: Program Map Table  
QoS: Quality of Service  
ROTV: Telenet reference offer Basic TV  
SD: Standard Definiton  
SPS/VUI: Service Provisioning System/Video User Interface  
SPTS: Single-Program Transport Stream  
STB: Set-top-box  
TC: Transaction Count  
TLN: Telenet  
TS: Transport Stream  
VDP: Video Data Pump  
VoD: Video on Demand  
VSA: Vod Serving Area  
VSP: Vod Service Proxy  
XML: Extensible Markup Language

### 3 AO Content Library Hosting Functional Description

- (1) AO is allowed to access provision of AO hosted content (media, meta data) catalogue space, including management(upload, add/change/remove assets) and media distribution to network delivery points via TLN CDN.
- (2) Access includes delivery under session control by AO of AO customer initiated media streams from TLN CDN egress point until AO STB according to same principles on QoS level (Network stream resource management provided by TLN) as applied to streams initiated by TLN retail customers.

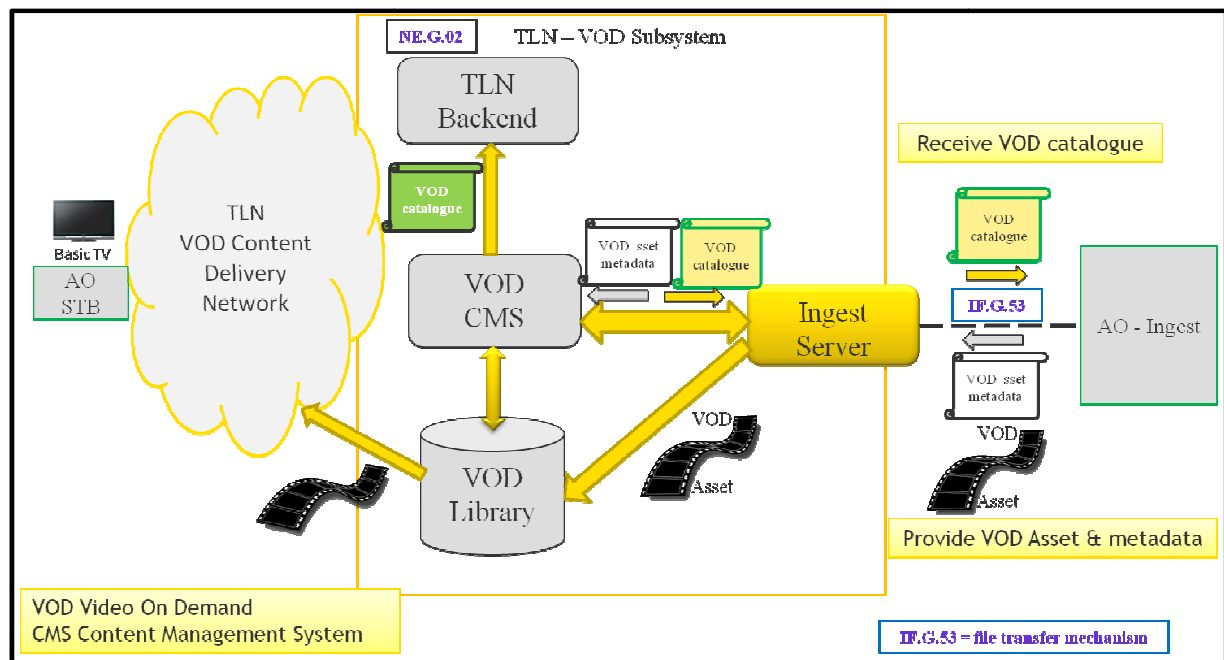


Figure 3-1

## 4 AO Content Library Hosting Functional Requirements

### 4.1 TLN VoD CMS Setup General Overview

- (3) Telenet creates an on demand environment for selected AO as a content provider. This content provider can supply the necessary content, metadata and support material in different ways. Per item to publish, the AO content provider will give Telenet:

- The asset: encoded in MPEG-2 TS
- Metadata (eg title, , ...) in XML format
- 

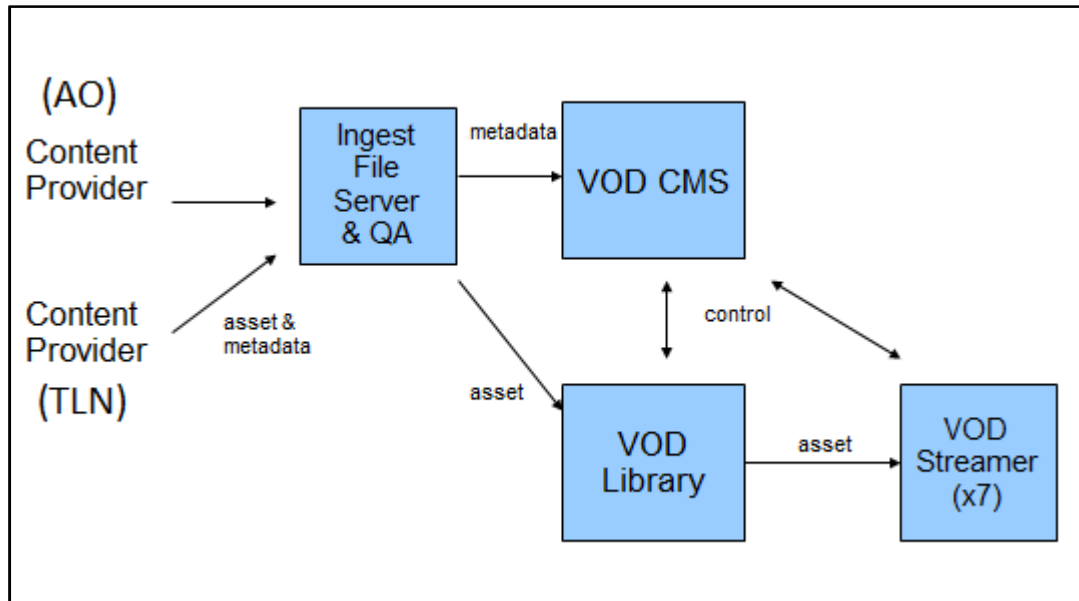


Figure 3-2



## 4.2 TLN content server hosting AO content library

### 4.2.1 *General*

- (4) TLN content server hosting AO content library describes all the requirements for content that's going to be published on Telenet Digital TV's VoD-platform. It will guide AOs to deliver all the requested material in a correct way to Telenet.

### 4.2.2 *Physical Transport connections*

- (5) There is a secure connection between AO-VSP and TLN-VoD systems as described in separate annexes.

### 4.2.3 *Content library upload host*

- (6) All the content data will be uploaded to a Telenet FTP server in predefined directories or delivered to Telenet according to the predefined arrangements that are made. Telenet provides some IDs which are standardized in the same way for naming both XML and video-asset. The ProviderID is an ID provided by Telenet to separate content from different AOs. The content provider is not allowed to change this.
- (7) The AO provides the asset to the staging server by using FTP. File location details can be asked to TLN project manager.

### 4.2.4 *Content library capacity*

- (8) The content has to comply with the following specifications:
- luminance no higher than 100%;
  - chrominance no higher than 100%
  - black level no less than 0%;
  - conversations between -20db and -10db, single;
  - sound effects (explosions, shouting, gun shots, ...) between -10db and 0db.
- (9) Content library capacity is subject to system limitations and forecasting and agreements with individual AO during implementation phase.

## 4.3 TLN content server operational procedures

### 4.3.1 General

(10)The AO content provider supplies content according to the distribution agreement. The AO content provider can send the content in 2 different ways:

- FTP encoded content to server at Telenet premises
- Deliver content to Telenet (encoded)

(11)At the moment Telenet does not do any content transcoding, it is therefore up to the partner to submit an SD (and optionally HD) file, each with its own XML, if maximum reach and quality is the objective.

### 4.3.2 Upload server scheduling mechanism and time tables

(12)A schedule mechanism provides unique ID,Name and scheduleDate which are mandatory and not allowed to change by AO. There are also some other mandatory ID/titles xml files.Detailed metadata XML specification will be made available during implementation phase to the beneficiary.

### 4.3.3 Propagation of content in CDN and schedules

(13)Content metadata will be provided in an XML file. This XML will be uploaded to the FTP-server, together with the corresponding video-asset. The XML file should be generated in the UTF-8 encoding.

### 4.3.4 TLN Project Manager and interface with AO Project Manager

(14)In case an AO is unable to access FTP,further arrangements has to be made between the AO Project Manager and TLN Project Manager.

## 4.4 TLN content encoding specifications

### 4.4.1 General

- (15) This specification defines the video, audio, and related encoding parameters for both Standard and High-Definition content for distribution to cable television systems.
- (16) The specification defines the content specifications for use with encoding systems, asset management, and distribution. Detailed specifications for this format can be found in the Cablelabs specifications, which can be found on the Internet following the link below. <http://www.cablelabs.com/projects/metadata/downloads/specs/MD-SP-VoD-CEP-I01-040107.pdf>

### 4.4.2 SD VoD encoding specifications

- (17) Content providers encode the content to MPEG-2-TS/3,75 Mbps CBR format.  
SD VoD Assets are at the time of writing supported with following encoding requirements:

- Assets are delivered as MPEG TS files
- The total transport stream rate should be fixed at 3.75 Mbps (CBR).
- Video encoding uses MPEG-2
- The video component should be encoded as MP@ML with a constant bit rate (Elementary stream) at the preferred rate of 3.18 Mbps.
- The PCR and video PIDs must be the same.
- PMT PID = 0x1E0 (480)
- Video (and PCR) PID = 0x1E1 (481), stream type is 0x02
- Audio and subtitling start from PID 482
- The transport stream must carry only a single program (SPTS)
- Aspect ratio to be included in MPEG header (aspect\_ratio\_information)
- Asset can be preceded by a maximum of 1 second of black video.
- Audio level: peak 0dB, mean -9dBFS
- The TS should start with PAT and PMT, and they should be repeated (unchanged) around 8 times per second.
- The PCR interval should be around 30-40 msec, and no more than 90 msec.
- The Audio component bit rate (Elementary stream) should be fixed at 256 Kbps for dual channel stereo audio (Layer 2).
- For each audio stream, the reference in PMT must include a Language Descriptor
- Only aspect ratios of 4:3 and 16:9 anamorphic allowed. (16:9 letterbox is not allowed)
- Video resolution of 720x576 for both 4:3 and 16:9 aspect ratios.
- PAL encoding (50 fields/sec interlaced)
- Frame rate of 25.
- Group Of Pictures (GOP) must be closed structure GOP of fixed (constant) length 12
- The PMT identifies video as type 0x02 and video stream is in byte stream format
- If possible, noise/grain filtering/reduction should be performed on the video before compression to improve the quality at the given bitrate.
- For now, one or two audio streams are supported with MPEG1/2 level1/2 (stream types 0x03, 0x04)
- Closed captioning or subtitling, if present, must be encoded as data stream in a separate PID as private data (type 0x06, descr type 0x56 for teletext or 0x59 for subtitling). DVB Subtitling must follow norm EN 300 743.

### 4.4.3 HD VoD encoding specifications

- (18) HD VoD Assets are at the time of writing supported with following encoding requirements:

- Assets are delivered as MPEG TS files
- The total transport stream rate should be fixed at 10 Mbps (CBR).
- Video encoding uses H.264/AVC (aka MPEG-4 Pt 10), with Main or High Profile, Level 4.
- The video component should be encoded with a constant bit rate (Elementary stream) at the preferred rate of 9.2 Mbps.
- The PCR and video PIDs must be the same. It is recommended to carry PCR timestamp at the start of a video access unit.
- PMT PID = 0x1E0 (480)
- Video (and PCR) PID = 0x1E1 (481)
- Audio and subtitling start from PID 482
- The transport stream must carry only a single program (SPTS)
- Aspect ratio to be included in MPEG header (aspect\_ratio\_information)
- Asset can be preceded by a maximum of 1 second of black video.
- Audio level: peak 0dB, mean -9dBFS
- The TS should start with PAT and PMT, and they should be repeated (unchanged) around 8 times per second.
- Video resolution/encoding should follow either 720p or 1080i norms.
- Constant frame rate of 25 fps (will be checked from SPS/VUI timing info).
- Group Of Pictures (GOP) (in frames - double for fields) is minimum 3, average or fixed 12, maximum 24; using a fixed GOP of 12 frames is preferred (for trick play)
- The PMT identifies video as type 0x1B and video stream is in byte stream format
- The video stream must start with SPS and PPS describing a single sequence (they may be repeated but must remain unchanged) and an IDR.
- Pictures may be encoded as Field or Frame with only a single slice per picture
- Field pictures are coded as complementary pairs (top/bottom of same type)
- Interlaced content should use Field encoding rather than Frame encoding
- To facilitate trick play, the video stream should have an IDR or I picture every two seconds on average (hence the average or fixed GOP 12), of which an IDR (instead of I picture) is preferred for random access applications.
- While video streams must start and stop with an IDR, care is to be taken in edited content to never have two consecutive IDRs or I pictures in the same stream (minimum gop is 3).
- The maximum number of consecutive B pictures is 10 (Frame enc: M=11; Field enc: M=6); and a maximum of 6 reference pictures is supported
- If possible, noise/grain filtering/reduction should be performed on the video before compression to improve the quality at the given bitrate.
- For now, one or two audio streams are supported with MPEG1/2 level1/2, or AC3 2.0/5.1 encoding (stream types 0x03, 0x04, 0x81 0x06); in future up to four audio streams may be supported. If AC3 is included, then also a regular stereo audio stream must be included in the same language.
- For each audio stream, the reference in PMT must include a Language Descriptor
- Closed captioning or subtitling, if present, must be encoded as data stream in a separate PID (not in the MPEG-4 video stream) as private data (type 0x06, desc type 0x56 for teletext or 0x59 for subtitling). DVB Subtitling must follow norm EN 300 743.

## 4.5 AO VoD catalogue structure requirements

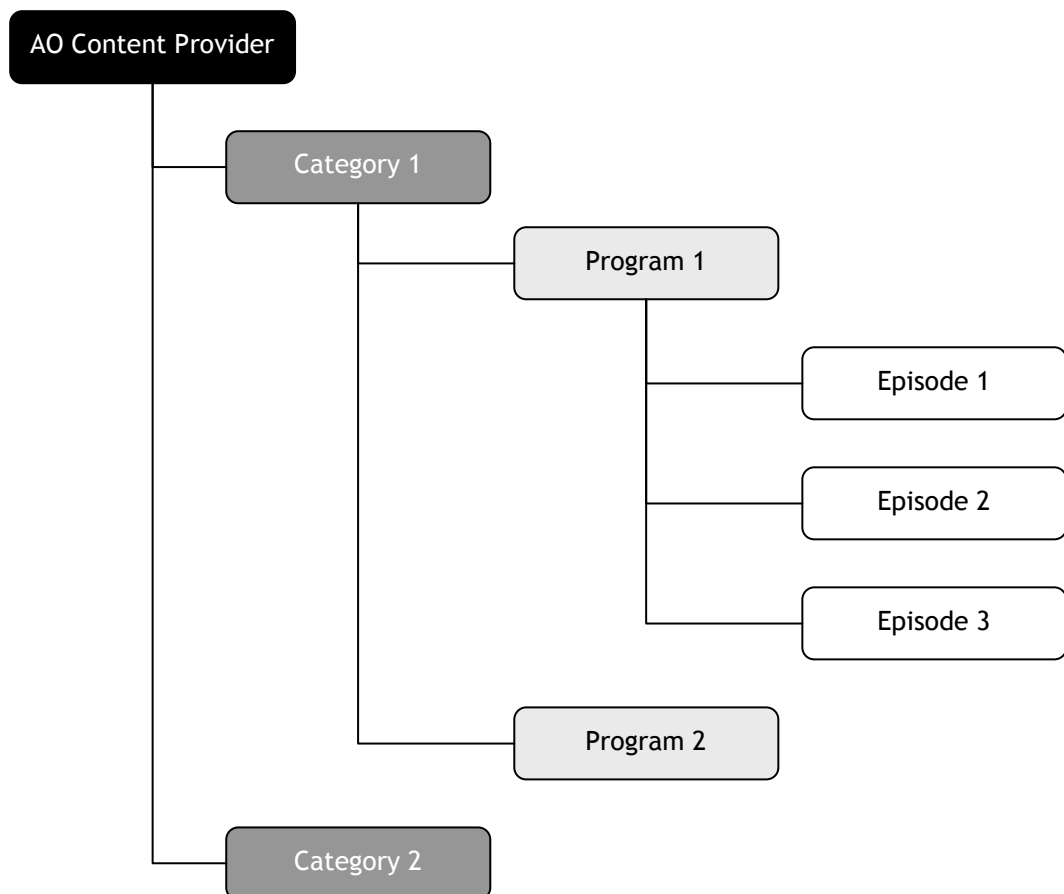
### 4.5.1 General

- (19) Before being able to publish content on the iDTV platform, the structure of the catalogue has to be set up. This allows the content provider to link assets to the catalogue structure, which is necessary to publish the content.

### 4.5.2 VoD catalogue structure

- (20) Before being able to publish content on the iDTV platform, the structure of the catalogue has to be set up. This allows the content provider to link assets to the catalogue structure, which is necessary to publish the content.

- (21) AO content providers can add maximum 2 levels in the structure. On the third level the titles of the program will appear.



- (22) The catalogue structure is based on channels, linked (one-on-one) to an AO content provider. The catalogue tree (categories & subcategories per channel) are defined by the content supplier themselves, in cooperation with Telenet Project Manager. These categories and subcategories are called: nodes.

- (23) If an AO content provider wants to request a new node, he has to forward this request to Telenet Project Manager, so they can provide the content provider with the necessary node references. These references are required in the metadata XML-file, which is covered later on in this document.

## 4.6 TLN content Meta data specifications

### 4.6.1 *General*

- (24) Metadata will be provided in an XML file. This XML will be uploaded to the FTP-server, together with the corresponding video-asset.
- (25) The metadata XML format follows TV-Anytime (TVA) standard as defined in ETSI TS 102 822-4 and ETSI TS 102 822-3-1. The exact usage implementation of Telenet will be provided during implementation phase to the beneficiary.

## 4.7 Restrictions

(26)AO needs to foresee in its own VoD content and will not have access to TLN existing VoD catalogues including “net gemist”, Iwatch and Cmore like.

## 4.8 Operational Procedures

(27) Telenet will execute from time to time operational changes on the VoD CMS infrastructure. An AO making use of the TLN ROTV VoD part should be prepared at all time to adapt its infrastructure, devices and systems, as well as its operational procedures to handle those changes. In addition it is strongly recommended by TLN that AO will take this into account in the design of its solution, so that impact of future changes will be limited. Below a non exhaustive list is given, showing some examples of operational changes that TLN has executed in the past and which will be repeated likely in the future :

- Creation of new VoD content, or re-organisation of existing ones
- Updates to the VoD content library
- Re-organization of the VoD catalogue data structures
- Changes in VoD catalogue publishing schedules
- Changes in CDN distribution and propagation schedules and delays.
- Changes to the metadata format and/or requirements
- Changes to the supported asset encoding formats

## 4.9 AO Device Management by TLN Requirements

(28)The applicable requirements are described in [TLN-WRO-TA-I-S-PIAA](#).

## **5 AO STB interactive Data Return path - Non Functional Requirements**

(29) The applicable requirements are described in **TLN-WRO-TA-I-S-PIAA**.