

**WHOLESALE REFERENCE OFFER
OF SMP OPERATOR**

TV SERVICES OVER CABLE

MAIN BODY

Table of contents

1	GLOSSARY	3
2	SCOPE OF THIS DOCUMENT	4
3	DESCRIPTION OF WHOLESALE CABLE ANALOG TV	5
3.1	GENERAL	5
3.2	WHOLESALE SERVICES	7
3.3	ROLES AND RESPONSIBILITIES OF SMP OPERATOR.....	10
3.4	ROLES AND RESPONSIBILITIES OF BENEFICIARY.....	10
4	DESCRIPTION OF WHOLESALE DIGITAL TV	12
4.1	GENERAL	12
4.2	CONTENT OFFER.....	14
4.3	ADDITIONAL FACILITIES.....	16
4.4	CAL: CAS ACCESS LINE	16
4.5	CONDITIONAL ACCESS (CAS).....	16
4.6	DIGITAL DECODER ("SETTOP BOX")	17
4.7	EPG (ELECTRONIC PROGRAM GUIDE).....	19
4.8	ROLES AND RESPONSIBILITIES OF SMP OPERATOR.....	19
4.9	ROLES AND RESPONSIBILITIES OF BENEFICIARY.....	19
5	INTERACTIVITY: VIDEO ON DEMAND	20
5.1	SCOPE.....	20
5.2	DESCRIPTION OF THE SERVICE	20
5.3	TECHNICAL ASPECTS.....	24
5.4	ROLES AND RESPONSIBILITIES OF SMP OPERATOR.....	27
5.5	ROLES AND RESPONSIBILITIES OF BENEFICIARY.....	28
6	DESCRIPTION OF WHOLESALE BROADBAND	30
6.1	GENERAL	30
6.2	SERVICE ASPECTS	30
6.3	TECHNICAL ASPECTS.....	33
6.4	ROLES AND RESPONSIBILITIES OF SMP OPERATOR.....	35
6.5	ROLES AND RESPONSIBILITIES OF BENEFICIARY.....	36
7	OTHER DOCUMENTS	37
7.1	GENERAL TERMS & CONDITIONS.....	37
7.2	TECHNICAL SPECIFICATIONS.....	37
7.3	OPERATIONAL PROCESSES	37
7.4	SLA	37
7.5	PRICING AND BILLING	ERROR! BOOKMARK NOT DEFINED.
7.6	REFERENCED DOCUMENTS	37

1 GLOSSARY

BAL	Beneficiary Access Line, one or more physical network links between SMP operator and Beneficiary over which all network traffic required to operate the wholesale services will be organized
Bouquet	A group of digital TV services that are together sold as a Product
CA	Conditional Access
CAL	CAS Access Line, a network link between SMP operator and the externally hosted CAS for Beneficiaries
CAS	Conditional Access System, the system that secures DTV content streams such that they can only be accessed by customers authorized thereto
CASV	Beneficiary's (externally hosted) CAS Vendor
CATV	Cable Analog TV
CPE	Customer Premises Equipment
DTV	Digital TV
DVB	Digital Video Broadcast standard
DVB-C	Digital Video Broadcast standards specific to cable networks
EIT	Event Information Table, part of DVB SI metadata that is typically used to carry the EPG data
EU_ID	End User Identified, the unique ID used to identify a service account between SMP operator and Beneficiary. The EU_ID is created upon initial activation of CATV service after which all communication (orders, billing, status) between SMP operator and Beneficiary is based on this EU_ID.
EuroDOCSIS	Family of industry standards used for IP data services over cable networks in Europe
EMM	Entitlement Management Message
EMC	Entitlement Control Message
HFC	Hybrid Fibre Cable network
IHN	In Home Network
MPEG	A family of video compression standards
MPTS	Multi Program Transport Stream, a digital audio/video transport stream that groups multiple channels and typically is broadcast to fill up one frequency on the cable network.
NIU	Network Interface Unit
NTP	Network Termination Point (as defined in section 3.1)
PSI	Program Specific Information the metadata for transport streams as defined by the MPEG standards
PVR	Personal Video Recorder
QAM	Quadrature/Amplitude Modulation, the modulation technique used on DVB-C networks
SI	Service Information, additional metadata for transport streams as defined by the DVB standards, complements the PSI from MPEG
SMS	Subscriber Management System, the IT system of SMP operator, Beneficiary or CASV responsible for management of subscribers
STB	Settop Box (the digital TV Decoder)
VHE	Video Head-End, the main facility in the SMP operator network where the DTV signals are prepared for broadcast over the HFC network
VoD	Video on Demand
WRO	Wholesale Reference Offer

2 SCOPE OF THIS DOCUMENT

1. This document provides a description of the wholesale TV Services offered by SMP operator.
2. Three main wholesale services are offered:
 - 2.1. Cable Analog TV (CATV)
 - 2.2. Digital TV (DTV) including interactivity (VoD)
 - 2.3. Broadband internet services.
3. These Service offers are described in Section 4, 5 and 6 respectively.

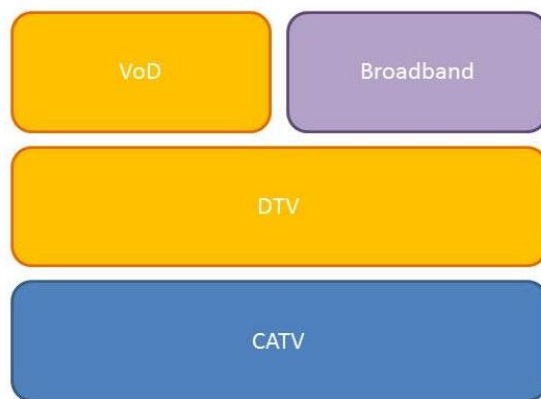


Figure 1: Wholesale Products in the Scope of this WRO

4. The following restrictions apply:
 - 4.1. Any end user wanting to obtain DTV service needs to be activated for CATV service first.
 - 4.2. Any end user wanting to obtain Broadband service needs to be activated for CATV and DTV first.
5. The DTV Service offer includes Interactivity (which in practice means: VoD), however it will be possible for Beneficiary to sign up for a DTV Wholesale Agreement without VoD also, which reduces cost and complexity.

3 DESCRIPTION OF WHOLESALE CABLE ANALOG TV

3.1 GENERAL

3.1.1 CATV Service Description

6. CATV (Cable Analog TV) Service allows the Beneficiary to resell the Analog TV and Radio Channels transmitted on the Cable Network of SMP operator.
7. The CATV Service is a uni-directional broadcast service whereby Television and radio signals are modulated by SMP operator on its HFC network and delivered to a NTP (Network Termination Point) in the End User Home.
8. Apart from physical connection, there is no access control on the CATV service: any home physically connected to the cable network can use the service. Likewise, deactivating the service requires an intervention to remove the physical connection (this is done by disconnecting the “drop cable” into the home from the SMP operator network at the network “tap”).
9. The content offer is the same for all users, though it may be slightly diversified per region. Indeed, while most analog channels are the same for the whole territory of SMP operator, there are a few regional differences. For example the regional broadcast channels and some ethnical channels may vary between regions.
10. The content offer for a particular region on the cable network is determined in the cable head ends, where the signals are modulated and inserted on the HFC cable network. It is not possible to differentiate the content offer on an individual (per-home) basis.

3.1.2 Network Termination Point (NTP)

11. The NTP belongs to and terminates the SMP operator Network.
12. This NTP can be either:
 - 12.1. A Network NIU (Network Interface Unit), typically consisting of several “ports”: “distributive” ports for “unidirectional” services (CATV, downstream component for DTV) and “interactive” ports for “bidirectional” services (broadband internet, telephony, iDTV return channel). Please note that on the Coditel’s network, there is no NIU with distributive ports, all ports are always interactive, except the FM port that is rarely used.
 - 12.2. If no NIU is present - this is the typical legacy case in Houses where no additional services like DTV, Broadband Internet, Telephony, etc... over cable have been delivered yet: the first network element encountered; Please that this never happened on Coditel’s network, there is always a Wall Outlet or NIU.

- 12.3. Or in the absence of network elements: the Wall Outlet, from where connection to the CPE (usually a Television set) can be made with Coax patch cord.
13. Beyond the NTP, the IHN (In Home Network) starts.
14. In the context of this WRO, when the Broadband service is activated or in the case of new connections to the cable network, an NIU will always be installed by SMP operator. For existing connections and as long as the End User is only signing up for the (non-interactive) CATV and DTV services, the End User can keep his existing NTP (SMP operator can however still decide to install an NIU but in that case the installation will not be invoiced to Beneficiary).

3.1.3 End User Identity

15. For the operations between SMP operator and Beneficiary, End Users will be identified by a unique identifier: the EU_ID. The EU_ID is created by SMP operator upon receipt of a valid order for Installation, Activation or Change Provider of the CATV service. From that moment, all communication (like activation/deactivation of additional services, repair, billing) about a service account will be based on the EU_ID.
16. SMP operator does not know the identity of the End User corresponding to the EU_ID, which is only known to Beneficiary. For the operations between SMP operator and Beneficiary, the EU_ID in reality corresponds rather to the NTP where the services of SMP operator are terminated and not to a particular End User .

3.1.4 CATV Service Prerequisites

17. The prerequisites for Beneficiary for reselling the CATV Service are:
 - 17.1. Beneficiary must be integrated with the SMP operator web application for processing orders and getting feedback.
18. The prerequisites for benefitting from the CATV Service are:
 - 18.1. The End User's Home must be connected to the SMP operator cable network with an individual connection. Individual connection means that the NTP terminating the network in the End Users home has its individual tap from the cable network, i.e. the NTP can be connected and disconnected without affecting other End Users on the cable network.
 - 18.2. A proper NTP must be installed to terminate the network.

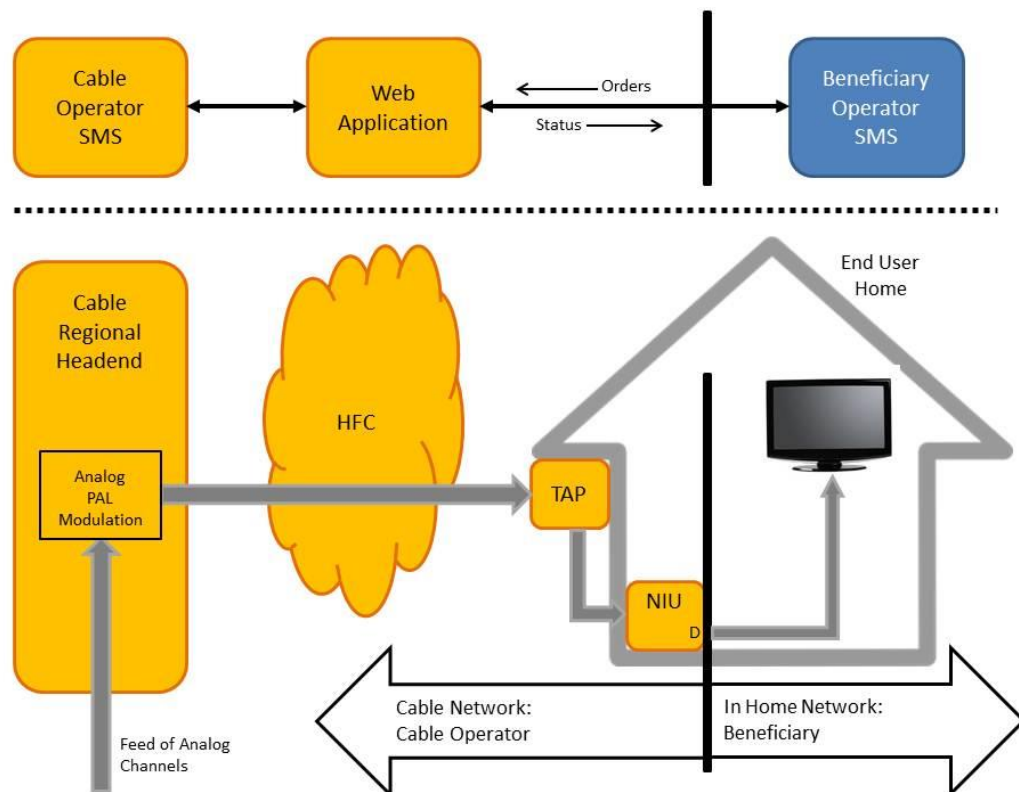


Figure 2: End-to-End Overview of CATV

3.2 WHOLESALE SERVICES

19. The Wholesale CATV Service offered by SMP operator covers:

- 19.1. The content offer of analogue TV and radio channels;
- 19.2. End User Connection;
- 19.3. Additional facilities.

3.2.1 Content Offer: Analog TV and Radio Channels

- 20. The Content Offer consists of the collection of Television and Radio Channels modulated on the SMP operator CATV Network. The Content Offer will be the same for Beneficiary as for SMP operator.
- 21. No additions, modifications or omissions to the SMP operator Content offer (like e.g. additional niche channels, a modified or removed Mosaic/Barker channel, ...) will be possible.

22. **The CATV Content Offer is documented by SMP operator in Annex 2.4.1.** This Annex specifies the names and network frequencies of all TV and Radio channels carried as well as the regionalization (if any) of the content offer.
23. SMP operator autonomously decides upon the content offer, both in terms of channels carried as in network frequencies used. SMP operator has the right to change the Content Offer for its own End Users (subject to any regulations applicable) and such changes will naturally impact also the End Users of Beneficiary.
24. However, in order to allow Beneficiary to adequately inform and communicate about the CATV Product with its End Users, SMP operator will notify Beneficiary at least 2 months in advance of any changes it will apply in the Content Offer.
25. The service rendered by SMP operator to Beneficiary is the transfer of the Content Offer over its network to the NTP. Beneficiary is free to re-distribute the Content Offer in house but only to residential customers (provided Beneficiary has obtained the required Content and other rights to do so).
26. In particular, Beneficiary can only sell the Content Offer to a residential home with only one or few connected end user devices;
27. Beneficiary may decide to resell the CATV service on all or part of the Territory where SMP operator CATV service is deployed.

3.2.2 User Connection

28. SMP operator is responsible for connecting End Users to the CATV Service.
29. This User Connection includes:
 - 29.1. Installation: is required in the following cases:
 - 29.1.1 In situations where the End user's Home is not yet equipped with an individual connection to the SMP operator network (via an individual drop cable into the Home), SMP operator will have to install such a connection to bring the cable signal into the End User's Home, if this request is reasonable and concern only residential customer. SMP operator may conduct a study to investigate the case and come back with a commercial offer to Beneficiary to make the network Installation. The Installation will only take place after approval by Beneficiary of the Offer for Network Installation issued by SMP operator. An NIU will be installed to terminate the network.
 - 29.1.2 If an individual connection is already present, but the drop cable is currently not connected at the tap, a site intervention by SMP operator will also be required to make the connection at the tap.

- 29.1.3 If the End User wants to subscribe to the Broadband service via Beneficiary, but his Home is not yet equipped with an NIU: a site intervention by SMP operator is required to install a NIU.
- 29.2. Activation: to activate the CATV Service for a certain End User's home (if that Home already has an individual connection to the cable network but does not currently have the service Active). SMP operator may conduct a site visit to inspect the existing NIU (if any) and install a proper NIU if required. Activation is immediate upon order if no installation is required. Activation is performed by the SMP operator technician upon completion of site visit. This starts the billing cycle for that End User.
- 29.3. Change Provider: this is an operation on a customer that already has CATV service active (from SMP operator or another Beneficiary) but wants to change service provider. In this case, no site visit will be required.
- 29.4. Deactivation: to deactivate the CATV Service for a certain End User's home. This stops the billing for that End User. SMP operator may plan an intervention to disconnect the network for that End User's home at the network tap.
- 29.5. Network Modification: In some cases it may be desirable that modifications are made to the network connection of an end user. Modifications take place upon request by the Beneficiary (on behalf of an End User). SMP operator may conduct a study to investigate the case and come back with a commercial offer to Beneficiary to make the network modification. The Modification will only take place after approval by Beneficiary of the Offer for Network Modification issued by SMP operator.
- 30. SMP operator manages, maintains and – when necessary – repairs the SMP operator network (ending at the NTP). SMP operator is the sole party having access to the SMP operator network.

3.2.3 Additional Facilities

- 31. SMP operator provides the following additional facilities:
 - 31.1. Check Service Status: to determine whether a particular street address is connected to the SMP operator network and whether a proper NTP is installed there. A secure web site will be developed for this purpose.
 - 31.2. Treatment of Incoming Orders and feedback on Status: The following Operational Processes need to be implemented by SMP operator and supported by a Web Application to allow Beneficiary to trigger these processes and receive feedback on their status:

- 31.2.1 Network Modification Request/Accept/Cancel;
 - 31.2.2 Network Installation Order/Cancel;
 - 31.2.3 Provider Change Order;
 - 31.2.4 Service Activation/Deactivation;
 - 31.2.5 Repair Order/Cancel;
 - 31.2.6 Notification of outage or planned maintenance.
- 31.3. Certification of staff, procedures and equipment utilized by Beneficiary: for CATV, if the IHN will be properly connected to a “distributive” port of the NIU, no impact on the network of SMP operator is to be expected, hence no certification process will be required. But this is never the case on Coditel’s network, so all interventions need a certificated technician.
- 31.4. Maintenance and Repair of CATV Network: second line support
- 31.5. Exchange of Crucial Information with Beneficiary: SMP operator will inform Beneficiary regarding crucial events affecting the Service, such that Beneficiary can properly inform and support its End Users. In particular, SMP operator will notify Beneficiary of major network outages and will make announcements of planned maintenance activities that affect service availability.

3.3 ROLES AND RESPONSIBILITIES OF SMP OPERATOR

32. SMP operator assumes the following roles and responsibilities:

- 32.1. Delivery of wholesale services, as defined in section 3.2;
- 32.2. Maintenance and treatment of disturbances;
- 32.3. Order Management;
- 32.4. Wholesale Beneficiary Billing.

3.4 ROLES AND RESPONSIBILITIES OF BENEFICIARY

33. Beneficiary shall assume the following roles and responsibilities:

- 33.1. Integrate with the Service Availability Check and Web Application Tools provided by SMP operator

- 33.2. Secure independently of SMP operator any rights (including, without limitation, content and copy rights), licenses and authorizations required to distribute the Content Offer on the Territory where it wishes to re-sell CATV product. Beneficiary only has to obtain the rights for Content distributed in the Territory where Beneficiary deploys CATV service. Beneficiary will have to prove to SMP operator that it has obtained the necessary rights after the Contract between Beneficiary and SMP operator is signed but before the launch of the CATV Service.
- 33.3. First line customer support
- 33.4. Communication with end users
- 33.5. Billing of end users

4 DESCRIPTION OF WHOLESALE DIGITAL TV

4.1 GENERAL

4.1.1 DTV Service Description

34. DTV Service allows the Beneficiary to resell the Digital TV signals transmitted on the Cable Network of SMP operator.
35. DTV (Digital TV) is a unidirectional broadcast service whereby Television signals are digitized, compressed (using standards such as MPEG2/4), scrambled and modulated by SMP operator on its HFC network (using standards such as DVB-C/QAM) and delivered to a NTP (Network Termination Point) in the End User Home. The NTP belongs to and terminates the SMP operator Network.
36. An End User can only be activated for the DTV service if he is also activated for the CATV service. Once the End User is connected to the CATV service, Activation and Deactivation by SMP operator of the DTV service just marks the wholesale customer (as identified by his EU_ID) as activated for DTV in the SMP operator SMS systems (such that corresponding wholesale invoicing can take place). Activation and Deactivation of individual customers for DTV service do not require actions on the technical network systems of SMP operator and do not require on-site intervention by SMP operator in End Users premises.
37. For Beneficiary, activating an End User will require the installation and activation of a Decoder (or "Settop Box") at End User's premises.
38. With this decoder, the End User has access to two broad categories of services:
 - 38.1. Digital Broadcast service: a large collection of digital TV channels (general, thematic, ethnical, etc...) grouped and sold as a number of bouquets;
 - 38.2. Interactivity: Video-on-Demand (requires a interactive decoder, that could not be the case all the time)
39. Beneficiary can contract with SMP operator for the Digital Broadcast Service only, without Interactivity.

4.1.2 DTV Service Prerequisites

40. The CAS prerequisites for Beneficiary to deploy DTV are:
 - 40.1. Coditel will choose a common CAS for all the OA, see our security note, knowing that the best, efficient and cheaper case is to use the current Coditel's CAS.

- 40.2. CA Host of this CAS is integrated in the VHE of SMP operator;
 - 40.3. Connection is made between the Beneficiary customer management system and the SMS of the common OAs CAS in the SMP VHE;
 - 40.4. Beneficiary has integrated his IT systems with the SMS of CASV for provisioning CA clients.
41. The STB prerequisites for Beneficiary to deploy DTV are:
- 41.1. Beneficiary has developed a STB and Beneficiary has integrated this STB with the SMP operator network, as described in section 4.6.1;
 - 41.2. This STB has integrated the CA client function of selected CASV
42. The prerequisites for benefitting from the DTV Service for a particular End User are:
- 42.1. The End User must be activated for CATV.

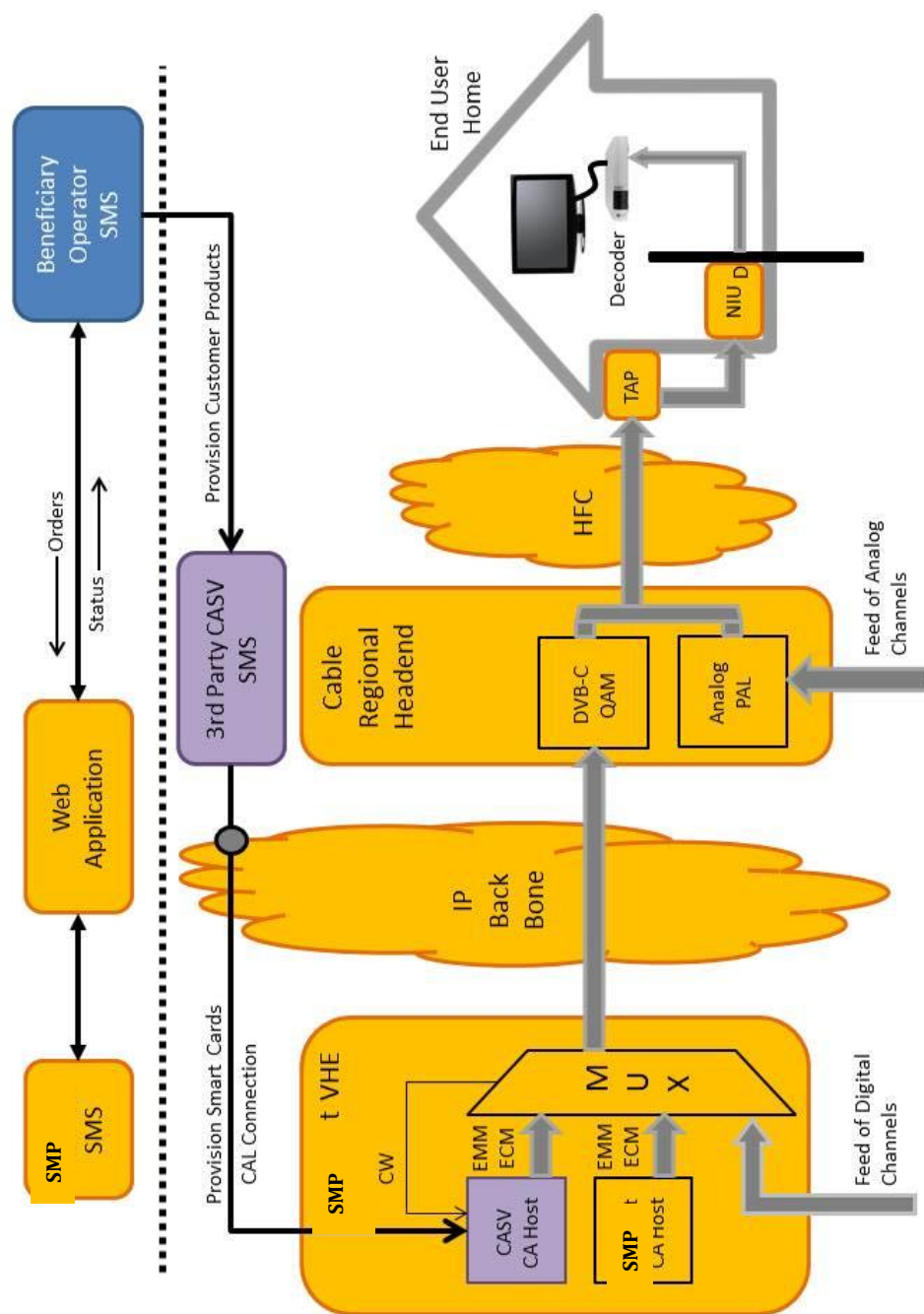


Figure 3: End-to-End Overview of DTV

4.2 CONTENT OFFER

4.2.1 Digital Channels

43. The Content Offer consists of a large collection of digital TV, Radio and Music channels (general, thematic, ethnic, etc...) also called digital "Services". These channels are usually grouped and sold as a number of "Bouquets".

44. **The SMP operator DTV Content Offer is documented by SMP operator in Annex 2.5.1**

45. SMP operator can change the Content Offer for its own End Users and such changes may impact also the End Users of Beneficiary.

46. However, in order to allow Beneficiary to adequately inform and communicate about the DTV Product with his End Users, SMP operator will notify Beneficiary 2 months in advance of any remove it will apply in the Content Offer that under his decision. Any adds can be done without communication to the OAs.

47. Beneficiary is free to define his own Bouquets from the collection of digital channels carried on the SMP operator Network. Beneficiary can choose to omit certain digital channels from his bouquets or can also ask SMP operator to carry additional digital channels on its Network if enough bandwidth is available.

4.2.2 **Extra Broadcast Services**

48. Beneficiary can request SMP operator to add a digital channel to the collection of channels carried on the SMP operator Network. SMP operator shall investigate and accept any reasonable request by Beneficiary to add digital channels to the SMP operator network, if enough bandwidth is available

49. Most additional services will be available on satellite and in that case, in the VHE of SMP operator needs to be equipped with a channel decoder to descramble and decode the digital channel from satellite and a digital encoder to re-encode the signal in the desired format. SMP operator will use similar equipment for this as it is using for its other satellite captured TV channels.

50. SMP operator will also make it possible to carry the signal feed for additional channels to its digital TV platform over the BAL connection in a similar technical way as it is accepting signal feeds from its current channel partners, whereby the most economic option will always be chosen.

51. In particular, Beneficiary can supply SMP operator with digital service feeds and SMP operator will reserve a reasonable amount of network bandwidth to carry these on the SMP operator DTV MPTs to allow Beneficiary to add his own data services for EPG data and/or software update – if this is requested by Beneficiary. Today, Coditel's network is completely full and cannot accept any adds without removing additional analog channels, most of the remaining analog channels are part of the "must-carry" channels.

52. In particular, Beneficiary can only sell the Content Offer to a residential home;

4.2.3 Territory

53. Beneficiary may decide to resell the DTV service on all or part of the Territory where SMP operator DTV service is deployed.

4.3 ADDITIONAL FACILITIES

54. SMP operator provides the following additional facilities (in addition to those already described for CATV):
 - 54.1. Certification of staff, procedures and equipment utilized by Beneficiary: for DTV, if the IHN will be connected to a “distributive” port of the NIU, no impact on the network of SMP operator is to be expected, but this is never the case on Coditel’s network. If however Beneficiary decides to introduce a digital decoder (STB) with built-in cable modem and to connect this decoder to an interactive port of the NIU, then negative influence of the IHN on the cable network can result and SMP operator will apply more stringent certification procedures on the staff and processes deployed by Beneficiary. On Coditel’s network, all NIU are interactive, so even for CATV, stringent certification procedures on the staff and processes deployed by Beneficiary will always apply.
 - 54.2. Provisioning of DTV activations through web application;
 - 54.3. Maintenance and Repair of DTV Network: second line support.

4.4 CAL: CAS ACCESS LINE

55. The CAS Access Line is a network connection to be established between the SMS of the external CAS system hosted for all Beneficiaries and the CA Host function of the CAS which will be integrated in the SMP operator VHE.

4.5 CONDITIONAL ACCESS (CAS)

Please refer to our reference offer March 2012 point 2.2.8 and our confidential security note

- 55.1. DVB Simulcrypt integration into DVB VHEs;
- 55.2. Content security.

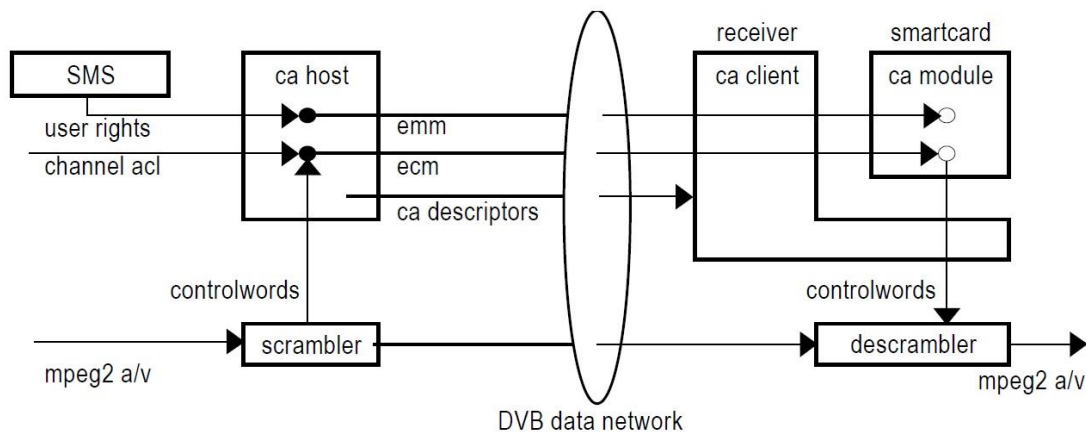


Figure 4: CAS Components

56. Upon selection of the CAS, SMP operator will support the chosen CAS vendor to:
 - 56.1. Integrate the EMM/ECM generators and any other required equipment of the CAS vendor in its VHE according to the implementation of Simulcrypt by the CAS vendor.
 - 56.2. Provide a network interface point through which the CAS vendor can establish the CAL connection for secure network connectivity between the 3rd party CAS vendor's SMS (Subscriber Management System) – which is hosted outside the network of SMP - and the CA Host equipment (ECM/EMM generator and potentially other components) in the VHE of SMP.
57. The following topics need to be arranged between the Beneficiary and the CAS vendor and fall outside the scope of this WRO:
 - 57.1. Integration between the CAS SMS (Subscriber Management System) and the IT systems of the individual Beneficiaries for provisioning of CA Clients (e.g. smart cards);
 - 57.2. Define and configure the content bouquets desired by Beneficiary on the CAS system ;
 - 57.3. Smart card logistics;
 - 57.4. Activation of smart cards;
 - 57.5. Reporting on smart cards and content bouquets activated.

4.6 DIGITAL DECODER (“SETTOP BOX”)

58. The selection and integration of a decoder is the responsibility of Beneficiary. Integration of this decoder with the Digital TV network of SMP operator holds the following main challenges:

58.1. Integration into STB of the CA client of the CAS selected;

58.2. Integration into of the network parameters and schemes implemented by SMP operator.

4.6.1 Integration in the SMP operator Network

59. The STB of Beneficiary will have to be compliant with the digital TV signals as they are transmitted on the SMP operator DTV Network.

60. This requires:

60.1. Compatibility with the audio/video compression formats used

60.2. Compatibility with the DVB SI/PSI scheme implemented, which is the “Table of Contents” of the collection of services implemented on that Network.

61. **All relevant technical characteristics of the SMP operator DTV network will be described in Annex 2.5.1 during the specifications phase as described in our reference offer “5.1 Macro planning”.**

4.6.2 Integration of CA Client

62. To be able to decrypt the AV signals, the STB will have to integrate the CASV CA Client. This is a matter between Beneficiary and his STB/CAS vendors and SMP operator is not involved in this process.

4.6.3 STB Software Update

63. **SMP operator will provide a mechanism and procedure to allow Beneficiary to perform SW update of firmware software of its STBs. This mechanism will be described in Annex 2.5.2 during the specifications phase as described in our reference offer “5.1 Macro planning”..**

4.6.4 Personal Video Recorder (PVR)

64. PVR is the Service whereby the STB has internal storage (usually a Hard Disk Drive), that allows the recording of broadcast channels. The recorded streams can then be played back afterwards by the End User. Playback enables the use of “trick modes” (play/pause/stop/fast forward/fast backward). Also the ability to “pause” live broadcast by implementing a time-shift video buffer on the STB is included in the PVR Service.

65. The implementation of this type of PVR functionality on the STB is the responsibility of the Beneficiary with his STB manufacturers. It does not require involvement from SMP operator and it does not require the Beneficiary to sign up for the Interactive product.

4.7 EPG (ELECTRONIC PROGRAM GUIDE)

66. Since Beneficiary will have to develop his own Decoder, he can also develop his own EPG Application. Beneficiary may decide to use the EPG data supplied by SMP operator (proprietary). In this case, Beneficiary will have to obtain all content rights for this EPG data independently from SMP operator. Alternatively, Beneficiary may decide to use his own EPG data, by retrieving them over the out-of-band return path (if available).

4.8 ROLES AND RESPONSIBILITIES OF SMP OPERATOR

67. SMP operator assumes the following roles and responsibilities:
- 67.1. Transport of wholesale services, as defined in section 4.2;
 - 67.2. Support CASV in the integration of CA Host in SMP operator VHE;
 - 67.3. Delivery of CAL connection up to the transit points.

4.9 ROLES AND RESPONSIBILITIES OF BENEFICIARY

68. Beneficiary shall assume the following roles and responsibilities:
- 68.1. Integrate with the Service Availability Check and Web Application Tools provided by SMP operator;
 - 68.2. Secure independently of SMP operator any rights (including, without limitation, content and copy rights), licenses and authorizations required to distribute the Content Offer on the Territory where it wishes to re-sell DTV product. Beneficiary only has to obtain the rights for Content distributed in the Territory where Beneficiary deploys DTV service. Beneficiary will have to prove to SMP operator that it has obtained the necessary rights after the Contract between Beneficiary and SMP operator is signed but before the launch of the DTV Service.
 - 68.3. First line customer support;
 - 68.4. Communication with end users;
 - 68.5. Billing of end users.

5 INTERACTIVITY: VIDEO ON DEMAND

Please refer to our « offre de reference March 2012 » regarding the coordination to organised with Numericable France or OTT as an alternative solution as described in our comments

5.1 SCOPE

69. Interactivity is the term used to denote a group of Services that allow the End User to interact with the TV screen and network instead of passively watching linear TV channels being broadcast.
70. Typically, the following main categories can be distinguished:
- 70.1. The service menus implemented on the STB, including an EPG. In this WRO these menus and the EPG can be freely implemented by Beneficiary who develops his own STB. Under this WRO, Beneficiary can make use of the EPG data carried in the EIT tables on the SMP operator DTV network, and this is part of the DTV service offer, but EITs does not contain the complete EPG that use a proprietary system.
 - 70.2. PVR, as described in section 4.6.2, which in this WRO is also up to the Beneficiary to implement on the STBs that Beneficiary deploys under the DTV wholesale service..
 - 70.3. Video on Demand (VoD): The ability to order an on-demand video stream that is narrowcast on the network to a particular STB on request of the End User, with trick mode control by the End User over the video being streamed.
 - 70.4. “Apps”: applications that run on the STB and that can be loaded in the STB either via the broadcast network (DVB carousel) or via the IP return path. Typical examples are games, information applications, etc... This type of interactive applications is outside the scope of this WRO.
71. **So for the scope of this WRO, Interactivity shall mean VoD.**

5.2 DESCRIPTION OF THE SERVICE

5.2.1 General Description

72. The VoD Service allows the Beneficiary to resell the VoD streaming services over the Cable Network of SMP operator.
73. VoD is a streaming service whereby video assets (compressed using standards such as MPEG2/4) are streamed from a video server in the SMP operator network and modulated by SMP operator on its HFC network (using standards such as DVB-C/QAM) and delivered to a NTP (Network Termination Point) in the End User Home. The NTP belongs to and terminates the SMP operator Network.

74. The streaming of the video server is controlled by the End User through the controls of a VoD client running on the End User STB. This allows for trick modes such as start/stop, pause, fast/slow forward and fast/slow backward to be realized.
75. An End User can only be activated for the VoD service if he is also activated for the CATV and DTV service. Once the End User is connected to the CATV service, issuing an Activation order for the VoD service for an End User already activated for DTV will mark the EU_ID account for that End User as Activated for VoD services. No on-site intervention by SMP operator or Beneficiary is required.
76. For the VoD service to work, a network return channel is required, as explained in section 5.3.2.

5.2.2 Content Offer

77. The VoD service as offered under this WRO is restricted to the storage, management, distribution and streaming of VoD assets over the SMP operator network. It does not include access to the VoD Content Library of SMP operator or to the corresponding VoD Catalog.
78. It is the responsibility of Beneficiary to acquire a content offer of VoD content and to organize the corresponding VoD catalog.

5.2.3 Additional Facilities

79. SMP operator provides the following additional facilities:
 - 79.1. Treatment of Incoming Orders and feedback on Status: The following Operational Processes need to be implemented by SMP operator and supported by a Web Application to allow Beneficiary to trigger these VoD processes and receive feedback on their status:
 - 79.1.1 Registration of NTP for VoD;
 - 79.1.2 Repair Order/Cancel;
 - 79.1.3 Notification of outage or planned maintenance;
 - 79.1.4 Reporting back of customer detailed usage records.
 - 79.2. Certification of staff, procedures and equipment utilized by Beneficiary: the certification procedures for DTV and for the installation of Broadband service (if the return channel is realized via SMP operator broadband service) are sufficient and no additional certification procedures apply specifically for VoD.

- 79.3. Implementation support for the various protocols between Beneficiary and SMP operator systems and between the End User STB and SMP operator video servers.
- 79.4. Maintenance and Repair of VoD Network: second line support.
- 79.5. Exchange of Crucial Information with Beneficiary: SMP operator will inform Beneficiary regarding crucial events affecting the Service, such that Beneficiary can properly inform and support its End Users. In particular, SMP operator will notify Beneficiary of major network outages and will make announcements of planned maintenance activities that affect service availability.

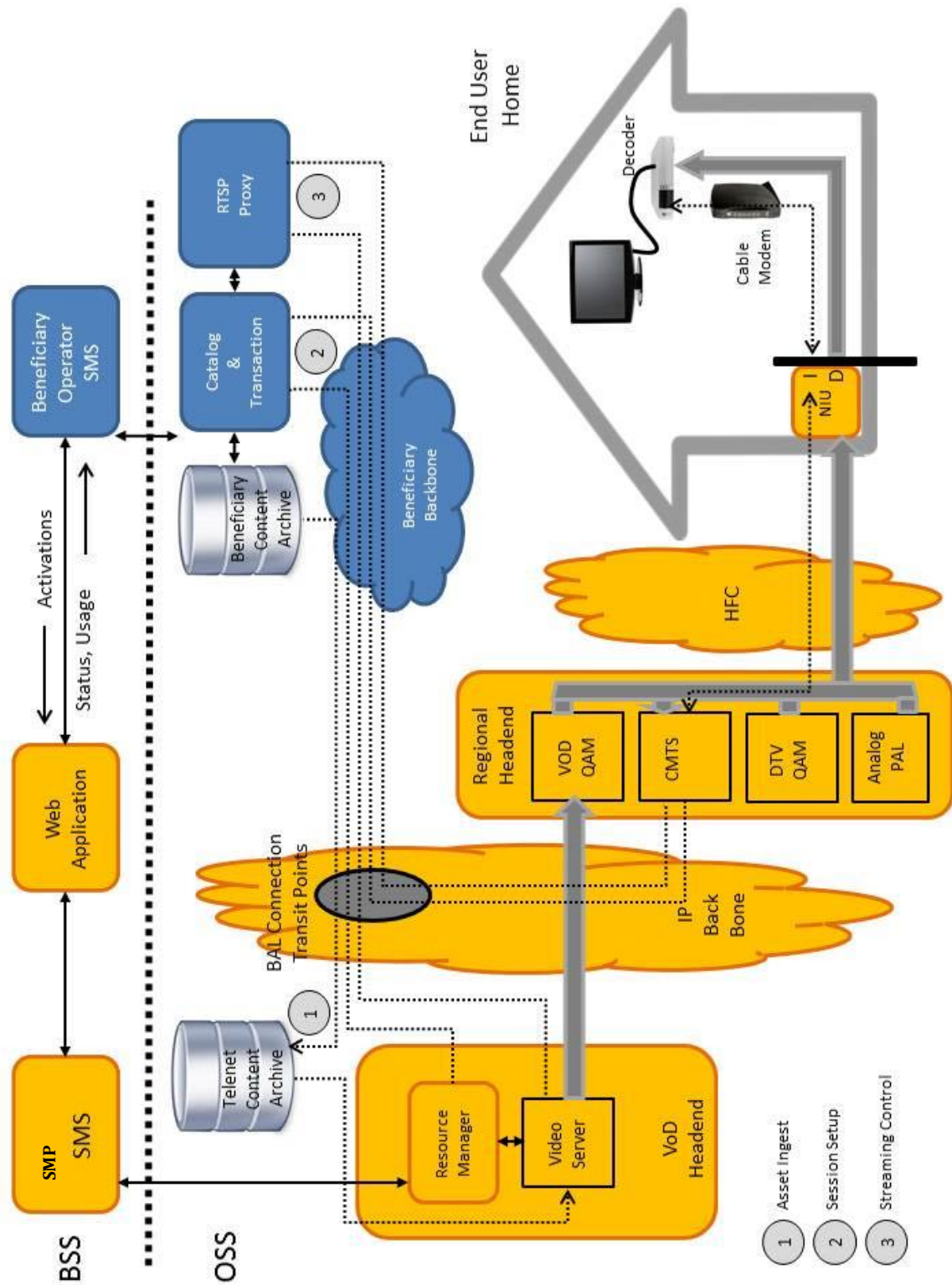


Figure 5: End-to-End Overview of VoD

5.3 TECHNICAL ASPECTS

5.3.1 Network Connections

80. The following network connections between Beneficiary and SMP operator are required to operate the VoD service:
 - 80.1. A connection for ingest of VoD assets and their metadata
 - 80.2. A connection between Beneficiary transaction server and the SMP operator systems for VoD capacity management to reserve streaming capacity on the VoD network streaming segment for a particular End User STB
 - 80.3. A connection between End User STB and the control of the SMP operator video streaming servers to allow the End User to control his streaming session. This connection will be organized in two steps: the End User STB will talk to a proxy server in the network of Beneficiary and this proxy server will relay all control requests for the VoD streaming sessions to the network of SMP operator. This setup enables the use of the SMP operator network as return channel but also allows the use of any other network as return channel for the VoD service.
81. **All these required connections will be realized as different logical connections over the same physical BAL network connections, by virtualizing the various logical connections. How this is done will be specified in Annex 2.3.1 during the specifications phase as described in our reference offer “5.1 Macro planning”. depending on the option that the Beneficiary will have chosen (VOD or VOD OTT)**

5.3.2 Return Channel

82. To be able to start and control a VoD streaming session, the End User STB needs to have a return channel. It is possible to organize this return channel via the SMP operator Wholesale Broadband service, but this is not a requirement. Beneficiary can use any other IP network connection to get responses back from the End User STB and perform all required actions to use the VoD Wholesale service via the BAL connections.

5.3.3 Asset Storage and Ingest

83. Beneficiary needs to encode his video content in a format compatible with the SMP operator VoD streaming system.
84. Beneficiary then needs to ingest this properly encoded video file together with the required content metadata to the network of SMP operator.
85. **The compatible audio/video content formats together with the required asset metadata and the ingest protocols will be specified in Annex 2.6.1 during the specifications phase as described in our reference offer “5.1 Macro planning”..**

5.3.4 Catalog and Transaction Server

86. Beneficiary needs to set up a catalog and transaction server. The catalog server contains a list of VoD assets with their metadata organized in a form such that the VoD catalog browser application in the End User STB allows the End User to select the content he wants to stream.
87. When the user has made his selection, he needs to close a transaction to “buy” the content.
88. These two steps take place between the End User STB and the servers of Beneficiary and SMP operator is not involved.
89. As soon as the End User has closed a transaction to “buy” the right to view content a network streaming session needs to be setup.

5.3.5 Streaming Session Setup

90. Session setup is the process taking place when an End User has chosen to view a particular piece of video content (“asset”) and has “bought” or otherwise obtained the rights to do from the transaction servers of Beneficiary.
91. At this point, the SMP operator systems need to be notified that an End User of Beneficiary wants to setup a streaming session.
92. A request for session setup must be sent by Beneficiary’s systems, and this request must contain at least:
 - 92.1. The VoD service area of End User STB, i.e. the area on the network where the video content needs to be streamed out (since VoD is a narrowcast service)
 - 92.2. The asset ID of the audio/video content to be streamed.
93. The SMP operator Resource Manager will then investigate whether streaming capacity in the specified service area is available. If so, they will grant a positive answer containing the following info:
 - 93.1. The network transport stream ID and service number where the VoD asset will be streamed;
 - 93.2. The session ID and IP address for sending the control commands for controlling the VoD streaming session.

94. It needs to be noted here that availability of VoD streaming capacity is never guaranteed: all VoD users share a pool of limited streaming capacity and in moments of peak usage it is possible that no capacity is available. This is the same for End Users of Beneficiary and SMP operator, without discrimination.
95. **Session setup will be specified in detail in Annex 2.6.2 during the specifications phase as described in our reference offer “5.1 Macro planning”..**

5.3.6 Streaming

96. The information received during session setup needs to be passed back to the End User STB, which can then start a streaming session.
97. For that, the STB needs to:
- 97.1. Tune to the transport stream and service number specified;
 - 97.2. Issue the streaming start command to the specified video server.
98. This will cause the video server to start streaming and will make sure that the End User STB is tuned to the proper digital channel to decode and show the requested video content.
99. After this the video streaming session can be controlled by the STB client to start/stop/pause/rewind/forward the video streaming.
100. **The exact control protocol for controlling the video streaming is based on RTSP and will be specified in detail in Annex 2.6.3 during the specifications phase as described in our reference offer “5.1 Macro planning”..**

5.3.7 STB

101. Following issues are important when developing a STB that must be compatible with the SMP operator VoD service:
- 101.1. VoD video formats: the STB must be able to deal with the video formats, encoding, bit rates, etc.. used in the SMP operator VoD system. **These formats will be specified in Annex 2.6.1 during the specifications phase as described in our reference offer “5.1 Macro planning”.**
 - 101.2. Catalog browser: the STB VoD application must be able to browse through and select an asset from the VoD catalog. This is an area completely under control of Beneficiary and SMP operator does not interfere here.

- 101.3. Transaction system: the STB VoD application must be able to make a transaction to “buy” the permission to stream an asset. Upon successful closure of a transaction, this will return the parameters to be used for the streaming session: transport stream ID and channel number where the video stream will be played and the IP parameters to control the video server.
- 101.4. Streaming protocol
- 101.5. Scrambling or DRM system in place on the VoD content.
102. The interfaces with catalog browser and transaction system are interfaces to systems hosted by Beneficiary and do not involve SMP operator (although **the transaction server itself should talk to the SMP operator systems to reserve streaming capacity on the network using the protocol specified in Annex 2.6.2 which will be specified during the specifications phase as described in our reference offer “5.1 Macro planning”.**).
103. It is advisable that also the RTSP streaming protocol to control the video servers is not implemented by direct interfaces between End User STB and the SMP operator video servers but are handled and relayed by a proxy server owned by Beneficiary. In that case Beneficiary can use his protocol of choice between the STB and this proxy server. **The protocol for streaming control to be used towards the SMP operator systems will be specified in Annex 2.6.3 during the specifications phase as described in our reference offer “5.1 Macro planning”.**

5.4 ROLES AND RESPONSIBILITIES OF SMP OPERATOR

104. SMP operator assumes the following roles and responsibilities, please note that in Coditel’s case, all the VoD platform is hel by a third party supplier who will be responsible if a contract can be concluded between the OA and them:
- 104.1. Delivery of wholesale services,as defined in section 5.2;
- 104.2. Configuration of BAL connections to support the required network routes and connections for VoD;
- 104.3. Setup, operations and maintenance of storage for VoD content;
- 104.4. Asset propagation, i.e. the caching of VoD content from the central content archive into the video streaming servers according to the desired availability time windows;
- 104.5. Reservation of capacity for streaming on the VoD servers through a protocol between Beneficiary transaction server and SMP operator systems;

- 104.6. Streaming of VoD content from SMP operator video servers;
- 104.7. Maintenance and treatment of disturbances;
- 104.8. Order Management;
- 104.9. Temporary reporting back of customer detailed usage records.

5.5 ROLES AND RESPONSIBILITIES OF BENEFICIARY

105. Beneficiary shall assume the following roles and responsibilities:

- 105.1. Web Application Order Tools provided by SMP operator;
- 105.2. secure independently of SMP operator a VoD content library and all corresponding rights (including, without limitation, content and copy rights), licenses and authorizations required to distribute the VoD Content Offer on the Territory where it wishes to re-sell VoD product. Beneficiary only has to obtain the rights for Content distributed in the Territory where Beneficiary deploys VoD service. Beneficiary will have to prove to SMP operator that it has obtained the necessary rights after the Contract between Beneficiary and SMP operator is signed but before the launch of the VoD Service;
- 105.3. Implement a return channel from the End User STB (this return channel can be via the SMP operator Broadband wholesale service, but this is not a requirement);
- 105.4. Organise a catalog and transaction server where End Users can choose and buy content;
- 105.5. Implement the protocol from End User STB to the catalog and transaction server of Beneficiary;
- 105.6. Implement the protocol from Beneficiary transaction server to the SMP operator systems for VoD capacity reservation;
- 105.7. Implement the protocol from End User STB to SMP operator video servers for control of streaming sessions;
- 105.8. Implement the descrambling system compatible with the VoD scrambling system in place in the End User STB.
- 105.9. First line customer support;
- 105.10. Communication with end users;

105.11.Billing of end users.

6 DESCRIPTION OF WHOLESALE BROADBAND

6.1 GENERAL

106. DTV Service allows the Beneficiary to resell the Broadband Internet service over the Cable Network of SMP operator.
107. BroadBand Internet is a bi-directional service offering internet access to End Users. It requires two-way IP traffic over a cable HFC network. The technology used to realize this is well standardized by a family of industry standards called EuroDOCSIS.
108. An End User can only be activated for the Broadband service if he is also activated for the CATV and DTV service.
109. For Broadband service, the NTP needs to be a NIU. If no NIU is present yet in End User premises, a NIU will have to be installed by SMP operator first. If a NIU is already present, no on site intervention by SMP operator is required prior to activating the End User.
110. For Beneficiary, activating an End User for Broadband service will require the installation and activation of a Cable Modem ("Modem") at End User's premises.
111. With this modem, the End User has access to broadband internet access, according to a certain Service Profile. A Profile typically consists of:
 - 111.1. Connection speed (downstream and upstream);
 - 111.2. Download volumes (downstream and upstream);
 - 111.3. Service policy (blocking the use of certain internet applications or protocols).
112. Apart from internet access, No additional services (mail, security, interception for the legal authorities, dns blocking etc) are provided by SMP operator under this WRO.
113. The service rendered by SMP operator to Beneficiary is the transport of IP data over its network, from the NTP (NIU) in the End User's Home to a limited number of "Transit Points" between SMP and Beneficiary. It is the responsibility of Beneficiary to establish connectivity to the Internet from these transit points.

6.2 SERVICE ASPECTS

6.2.1 Service Profiles

114. Beneficiary will be able to offer a number of service profiles in terms of internet speed and download/upload volumes.

115. The following conditions shall apply:

- 115.1. Beneficiary will be able to offer the same service speeds and volumes as are offered by SMP operator to its own customers.
- 115.2. Beneficiary can request additional service speeds/volumes and SMP operator will take into account any such reasonable request.
- 115.3. SMP operator can never be obliged to offer higher service speeds to Beneficiary than it offers to its own customers
- 115.4. SMP operator can apply similar technical parameters to the Beneficiary requested service profiles as it uses for its own service profiles (e.g. upstream/downstream speed and volume ratios).
- 115.5. A special service profile will be offered by SMP operator for the case where the cable modem will exclusively be used for establishing a return path for realizing the interactivity of a DTV or VoD subscription. SMP operator will apply restrictions on this service profile in terms of speed and download volumes but also in terms of the network addresses, protocols and services that are “whitelisted” (as only the EPG data servers and the VoD proxy servers should be reachable for this profile), to avoid abusive use of this return path as a piracy internet connection.
- 115.6. SMP operator can take all the necessary measures on the connection speed of a particular modem, group of modem or all modems of a zone to guarantee the fluidity on his network without discrimination based on the operator.

116. **The service profiles offered will be agreed between SMP operator and Beneficiary and documented in Annex 2.7.1.**

6.2.2 **Residential versus Professional Offer**

6.2.3 **Lawful Intercept**

117. Any obligations regarding lawful intercept and other legal requests shall be the sole responsibility of Beneficiary.

118. This includes:

- 118.1. Data retention of internet activities by Beneficiary's End Users;
- 118.2. IP/Mac Address interception if requested by the authorities.
- 118.3. DNS Blocking

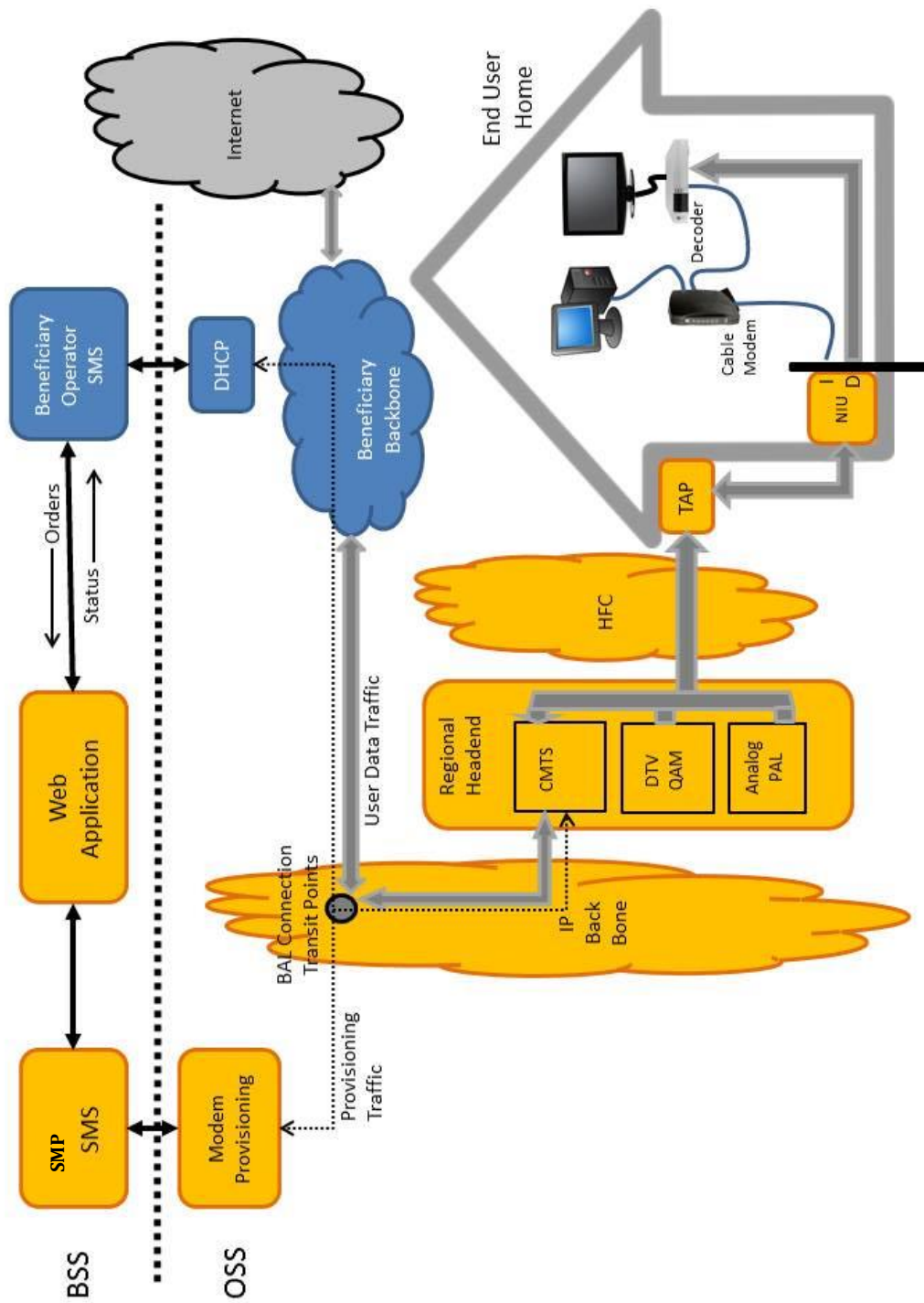


Figure 6: End-to-End Overview of Broadband

6.3 TECHNICAL ASPECTS

6.3.1 Transit Points

119. SMP operator shall aggregate all IP data traffic to/from Beneficiary End Users and transport it to a limited number of Transit Points on the BAL connections between SMP operator and Beneficiary.
120. At these Transit Points, IP traffic will be handed over to/from a Single Mode fiber link of SMP operator from/to a Single Mode fiber link of Beneficiary.
121. Beneficiary will have to establish fiber connections to each of the transit points agreed with SMP operator.
122. For reasons of economy, the number of transit points needs to be limited. At initial launch, one or two transit points will be deployed. As traffic requirements increase, additional transit points may be introduced. The amount of transit points will never exceed 5. The locations for these transit points are chosen if it is possible such that there is already connectivity to a number of carrier providers (such as Colt, Level3, BCS) there. In this way, Beneficiary has the choice to either hire capacity on a fiber link of these carrier providers or to bring its own “dark fiber” to the transit points.

6.3.2 Internet Connectivity

123. It is the responsibility of Beneficiary to arrange connectivity to the Internet from the transit points. Beneficiary can freely decide how to achieve this Internet connectivity.

6.3.3 Cable Modem

124. The selection of a Cable Modem is the responsibility of Beneficiary, but will have to be approved by SMP operator.
125. **Annex 2.7.2 to this WRO will specify during the specifications phase as described in our reference offer “5.1 Macro planning” what are the minimum requirements for the cable modem of Beneficiary, and especially, what is the version of EuroDOCSIS standard to which to modem needs to comply.**
126. SMP operator will accept any cable modem selected by Beneficiary if it is certified by Excentis for the specified version of EuroDOCSIS standard.

6.3.4 Provisioning of Cable Modem

127. Provisioning of a cable modem is done by downloading the appropriate configuration files in the modem when it comes active on the network. SMP operator could host the required servers for provisioning of Beneficiary's cable modems on its network and make sure that cable modems of Beneficiary's End Users receive the appropriate configuration files.
128. The Technical Solution proposed in the WRO of SMP operator allows Beneficiary to control which IP addresses are assigned to the CPE or the CPE part in the modem (case of a router) of Beneficiary's End Users. The private part of the modem that's is needed to do management of it will receive an IP controlled by the SMP. Beneficiary will also have access to that IP. The SMP need also that access to control the fluidity on his network.
129. This is required to enable Beneficiary to fulfill its Lawful Intercept obligations.
130. To achieve this, relevant end-user session establishment events (such as DHCP address acquisition requests from the cable modems of Beneficiary's End Users) will be relayed to the DHCP servers of Beneficiary (via the BAL connections).
131. **Annex 2.7.2 and Annex 2.7.3 to this WRO will specify the requirements for Beneficiary cable modems and the specifications for provisioning during the specifications phase as described in our reference offer "5.1 Macro planning".**

6.3.5 Performance and Quality of Service (QoS)

132. SMP operator applies similar QoS for the End Users of Beneficiary as it applies for its own internet customers. This means that Internet services are "best effort".

6.3.6 Additional Facilities

133. SMP operator provides the following additional facilities:
 - 133.1. Check Service Status: the web application will allow Beneficiary to check whether resell of the Broadband service is possible on a particular connection already activated for CATV and DTV.
 - 133.2. Treatment of Incoming Orders and feedback on Status: The following Operational Processes need to be implemented by SMP operator and supported by a Web Application to allow Beneficiary to trigger these processes and receive feedback on their status:
 - 133.2.1 Network Modification Request/Accept/Cancel;
 - 133.2.2 Network Installation Order/Cancel;

133.2.3 Provider Change Order;

133.2.4 Service Activation/Deactivation;

133.2.5 Repair Order/Cancel;

133.2.6 Notification of outage or planned maintenance.

133.3. Certification of staff, procedures and equipment utilized by Beneficiary: For the Broadband Service, the installers of Beneficiary will install a cable modem and connect it to the interactive ports of the NIU which terminates the SMP operator network. This action can impact the integrity of the SMP operator network if it is not done properly. Therefore installers, equipment and procedures used by Beneficiary will have to work according to guidelines imposed by SMP operator. **SMP operator will specify these guidelines for staff, processes and equipment in Annex 3.1 during the specifications phase as described in our reference offer “5.1 Macro planning”.**

133.4. Maintenance and Repair of Broadband Network: second line support

133.5. Exchange of Crucial Information with Beneficiary: SMP operator will inform Beneficiary regarding crucial events affecting the Service, such that Beneficiary can properly inform and support its End Users. In particular, SMP operator will notify Beneficiary of major network outages and will make announcements of planned maintenance activities that affect service availability.

6.4 ROLES AND RESPONSIBILITIES OF SMP OPERATOR

134. SMP operator assumes the following roles and responsibilities:

134.1. Delivery and configuration of BAL connection for various type of traffic (end user traffic, management and provisioning traffic, etc..) up to the transit points;

134.2. Transport of IP data of Beneficiary's End Users over its network, from the NIU to the transit points;

134.3. Setup of SMP operator provisioning servers to provision the cable modems of Beneficiary's End Users (in cooperation with provisioning servers of Beneficiary for DHCP);

134.4. Maintenance and treatment of disturbances;

134.5. Order Management;

134.6. Wholesale Beneficiary Billing.

6.5 ROLES AND RESPONSIBILITIES OF BENEFICIARY

135. Beneficiary shall assume the following roles and responsibilities:

135.1. Integrate with the Service Availability Check and Web Application Tools provided by SMP operator;

135.2. Integrate with the provisioning systems of SMP operator;

135.3. First line customer support;

135.4. Communication with end users;

135.5. Billing of end users.

7 OTHER DOCUMENTS

7.1 GENERAL TERMS & CONDITIONS

136. The General Terms & Conditions governing this WRO are described in Annex 1.

7.2 TECHNICAL SPECIFICATIONS

137. The Technical Specifications are described in Annex 2.

7.3 OPERATIONAL PROCESSES

138. The Operational Processes are described in Annex 3.

7.4 SLA

139. The Service Level Agreement is described in Annex 4.

7.5 NOT PROVIDED TO US. REFERENCED DOCUMENTS

140. The following documents may be referenced in this document and together with it form the complete WRO:

Documents of which an example is provided by BIPT:

SMP operator Wholesale Reference Offer - TV Services over Cable – Main Body
Annex 1: General Terms and Conditions
Annex 2: Technical Specifications
Annex 3: Planning and Operations
Annex 4: SLA

Documents to be written by SMP operator to complete the WRO:

Annex 2.3.1: Network Connections and Configuration
Annex 2.3.2: Network Connections – Configuration Form
Annex 2.4.1: CATV Content Offer => please refer to our reference offer or website
Annex 2.5.1: DTV Content Offer => please refer to our reference offer or website
Annex 2.5.2: DTV Network Description – AV Formats, Services, SI/PSI Scheme
Annex 2.5.3: DTV Specification for CA Host Integration in SMP operator VHE
Annex 2.6.1: VoD Asset Ingest – Content Formats, Metadata and Ingest Protocol
Annex 2.6.2: VoD Session Setup
Annex 2.6.3: VoD Control Protocol for Video Streaming
Annex 2.7.1: Broadband Internet: Service Profiles and Modem Configuration Files
Annex 2.7.2: EuroDOCSIS Cable Modem Specifications
Annex 2.7.3: Specifications for Cable Modem Provisioning
Annex 3.1: Specifications for Installation and Repair of Wholesale Services
Annex 3.2: Certification Procedures on Staff, Procedures and Equipment
Annex 3.3: Web Application – Description of XML Content Formats
Annex 3.4: Beneficiary ID Card - Template
Annex 3.5: Device Monitoring & Management

All these documents and templates will be made available on the SMP operator Wholesale Secured website **during the specifications phase as described in our reference offer “5.1 Macro planning”**.