

**Telecommunications and Internet converged Services and
Protocols for Advanced Networking (TISPAN);
Specification of Protocols for Customer Network Devices
enabling the IMS-based IPTV service usage**



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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

1 Scope

The present document describes the protocols used on the reference points defined for the Customer Network Device (CND) enabling the IMS-based IPTV service usage.

This description is based on the architecture and stage 2 information flows contained in TS 185 009 [4], the architectural specifications of the Customer Network Gateway (CNG) described in TS 185 003 [3] as well as the protocol suites defined for the reference points between the CPN itself and the NGN in TR 185 007 [i.3]. The present document is to be regarded in close conjunction with TS 185 010 [5] as it covers only the IP TV related specifics.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI TS 182 027 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; IPTV functions supported by the IMS subsystem".

NOTE: The latest version in the V2.y.z series applies.

- [2] ETSI TS 183 063 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based IPTV stage 3 specification".

NOTE: The latest version in the V2.y.z series applies.

- [3] ETSI TS 185 003 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Customer Network Gateway Architecture and Reference Points".

NOTE: The latest version in the V2.y.z series applies.

- [4] ETSI TS 185 009 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Architecture and reference points of a customer network device for IMS based IPTV services".

NOTE: The latest version in the V2.y.z series applies.

- [5] ETSI TS 185 010 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Customer Premises Networks: Protocol Specification (Stage 3)".

NOTE: The latest version in the V2.y.z series applies.

- [6] UPnP™ AV 1.0 Specifications, UPnP Forum.

NOTE: Available at <http://www.upnp.org/standardizeddcp/mediaserver.asp>.

- [7] DLNA Networked Device Interoperability Guidelines v 1.5 expanded Oct 2006.

NOTE: Available at <http://www.dlna.org/members/guidelines/>.

- [8] ETSI TS 182 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Organization of user data".

- [9] ETSI ES 283 003 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) Stage 3".

NOTE: The latest version in the V2.y.z series applies.

- [10] ETSI TS 129 228: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents".

- [11] ETSI TS 183 065 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networks (TISPAN); Customer Network Gateway Configuration Function; e3 Interface based upon CWMP".

NOTE: The latest version in the V2.y.z series applies.

- [12] ETSI TS 183 019 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network Attachment; User-Network Interface Protocol Definitions".

NOTE: The latest version in the V2.y.z series applies.

- [13] ETSI TS 123 228: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS); Stage 2".

- [14] ETSI ES 282 003 (V2.y.z): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control Sub-System (RACS): Functional Architecture".

NOTE: The latest version in the V2.y.z series applies.

- [15] IETF RFC 2131: "Dynamic Host Configuration Protocol".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI TR 185 004: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); High level customer network architectures".
- [i.2] ETSI TR 185 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Services requirements and capabilities for customer networks connected to TISPAN NGN".

- [i.3] ETSI TR 185 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Analysis of protocols for customer networks connected to TISPAN NGN".
- [i.4] TR-135 specifications: "Broadband Forum TR-135 "Data model for TR-069 enabled Set-Top Box".
- [i.5] TR-069 specification Annex G: "Broadband Forum TR-069 amendment 2 "CPE WAN Management Protocol v1.1".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Customer Premises Network (CPN): in-house network composed by customer network gateway, customer network devices, network segments, network adapters and nodes

NOTE 1: See TR 185 004 [i.1].

NOTE 2: Network segments are physical wired or wireless connections between customer premises network elements; network adapters are elements performing a L1/L2 conversion between different network segments; nodes are network adapters with L3 routing capabilities.

CPN Device: device that is physically installed in the CPN allowing user access to network services; this can be a Customer Network Gateway with gateway functionalities towards the NGN, or a Customer Network Device being the end user terminal

NOTE: See TR 185 005 [i.2].

Customer Network Gateway (CNG): CPN device acting as a gateway between the CPN and the NGN

NOTE 1: See TR 185 004 [i.1].

NOTE 2: CNG is able to perform networking functions from physical connection to bridging and routing capabilities (L1-L3), but also possibly implementing functions related to the service support (up to L7).

Customer Network Device (CND): CPN device enabling the final user to have direct access to services through a specific user interface

NOTE 1: See TR 185 004 [i.1].

NOTE 2: CNDs can be dedicated to the internet, conversational and audio-video services. But they could be also Consumer Electronics equipment and other devices which may have nothing to do with these premium services (e.g. services performing a content sharing within a CPN, typically between a PC and a music system).

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ALG	Application Layer Gateway
B2BUA	Back-to-Back User Agent
BC	BroadCast
CDS	Content Directory Service
CND PPF	CND Plug and Play Function
CND	Customer Network Device
CND-AtF	CND Attachment Function
CNG	Customer Network Gateway
CNG-ACF	CNG-Admission Control Function

CNGCF	Customer Network Gateway Configuration Function
CNG-NFF	CNG NAPT and Firewall Function
CNG-PCF	CNG Policy Control Function
CoD	Content on Demand
CPN	Customer Premises Network
CWMP	CPE (Customer Premises Equipment) WAN Management Protocol
DHCP	Dynamic Host Configuration Protocol
DNS SRV	Domain Name Server Service
FW	Firewall
IETF	Internet Engineering Task Force
IGMP	Internet Group Management Protocol
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPTV	IP Television
NAPT	Network Address and Port Translation
NAT	Network Address Translation
NGN	Next Generation Network
NPVR	Networked Personal Video Recorder
P-CSCF	Proxy-Call Session Control Function
PSI	Public Service Identifier
QoS	Quality of Service
RTP	Real-time Transport Protocol
SDF	Service Discovery Function
SIP	Session Initiation Protocol
STB	Set Top Box
UPnP	Universal Plug and Play
URI	Uniform Resource Identifier
WAN	Wide Area Network

4 Overview

The clause briefly describes applicability of the protocols discussed further in the present document to the Reference Points and Functional Entities defined in TS 185 003 [3] and TS 185 009 [4].

NOTE: The IPTV CND functions are described within the specification document reference TS 185 009 [4].

4.1 Overview of IPTV CND Operating Modes and Reference Points

There are 3 operating modes defined in TS 185 009 [4] and to be considered here.

- **Bridged mode:** In this mode, the IPTV CND is working in compliance with TS 183 063 [2] and is connected to the NGN network or connects to the NGN via a CNG operating in bridged mode. In bridged mode of operation, the CNG provides only L1-L2 functionality. The CND connects over Gm to the NGN.
- **Routed mode:** In this mode, the IPTV CND connects to the NGN via a CNG operating in routed mode and is capable to interact with other devices in the CPN with other protocols above L3. In routed mode of operation, the CNG includes routing and service layer functionality as well (L3 and above). The routed mode shall be related to an authentication session. A session operating in one of the following routed modes can only operate in one of them at the same time:
 - NGN mode: IPTV CND connects directly to the NGN through the CNG over Gm. The CNG-PCF and CNG-NFF as defined in TS 185 003 [3] may perform functionality such as NAPT and CNG internal QoS.
 - CPN mode: IPTV CND connects to the NGN through CNG over Gm'. The CNG-SIP Proxy B2BUA, CNG-ACF, CNG-PCF as defined in TS 185 003 [3] may perform functionality such as NAT/FW traversal, CNG internal QoS or IETF SIP to IMS SIP conversion.

In the routed mode, e1' and e3' are sharing a similar procedure for routed NGN and routed CPN modes; e1' and e3' are therefore described in a common section for these two modes.

On the other hand, interface C will have different procedures for these two modes and are therefore described in separate clauses.

4.1.1 Bridged mode

Reference points Gm, Xc, Xd, Ut, Xa all conforms to TS 183 063 [2].

Reference point e1 conforms to TS 183 019 [12].

Reference point e3 conforms to TS 183 065 [11].

4.1.2 Routed mode

Reference points Xc, Xd, Ut, Xa conforms to TS 183 063 [2].

The e1 reference point is described in clause 5.

The e3 reference point is described in clause 6.

4.1.2.1 Routed NGN mode

The C reference point is described in clause 14.1.

The Gm reference point is described in clause 7.2.

4.1.2.2 Routed CPN mode

The C reference point is described in clause 14.2.

The Gm' reference point is described in clause 15.1.

4.2 Data model information

Table 1 summarizes parameters to be provisioned in the CND, thanks to the CNGCF (reference point e3), through DHCP options (reference point e1') or by pre-configuration. Some kinds of data are grouped together, according to the SIP message types in which they are used:

The table describes the data to be provisioned and some related information:

- **Entity responsible for the provisioning:** the entity which is responsible for the provisioning in the TISPAN IMS network. In specific cases an entity can be responsible for the provisioning as a relay. This means that such an entity has been provisioned by another equipment during a previous phase (e.g. provisioning of the SDF Address through DHCP option 125 by the CNG in a routed NGN mode to the IPTV CND, while the CNG has been provisioned with this parameter by the CNGCF).
- **Requirement level:** gives the level of the required parameter as it is mentioned in TISPAN specifications. This means that the table informs whether the parameter must or may be provisioned in the CND.

Table 1

Data	Description (ref)	Entity responsible for the provisioning	Parameters manageable by TR-069/TR-104	Requirement level
IMPI	Authentication Username for IMS authentication	CNGCF	Yes	Mandatory
IMPU	SIP URI	CNGCF	Yes	Mandatory
P-CSCF Address	Host name or IP address of the SIP Proxy	CNGCF or DHCP server	Yes	Mandatory

Data	Description (ref)	Entity responsible for the provisioning	Parameters manageable by TR-069/TR-104	Requirement level
Registrar Server	Host name or IP address of the SIP registrar server	CNGCF	Yes	Mandatory
Registration period	Timer to send Register messages periodically	CNGCF	Yes	Mandatory
Vendor Class Id	Device identifier	Pre-configured	Not applicable	Optional
IPTV service provider name (see note 1)	service provider name	CNGCF or DHCP server	No	Mandatory
IPTV service provider domain name (see note 1)	service provider domain name	CNGCF or DHCP server	No	
IPTV service provider URI (see note 1)	service provider URI	CNGCF, DNS SRV or DHCP server of the CNG (option 43 or 125), pre-configured not provisioned (S-CSCF routes the subscribe to the SDF)	No	Mandatory
Service Discovery Server (see note 1)	SDF Address	CNGCF or DHCP server	No	Mandatory
Content type identifier (see note 1)	includes the content-type identifier that corresponds to the registered MIME type of XML documents representing application/vnd.etsi.iptvdiscovery+xml "	Pre-configured	Not applicable	Mandatory
Event header (see note 1)	shall be set to the "ua-profile" event package	Pre-configured	Not applicable	Mandatory
UE Capabilities (see note 1)	This defines the set of UE capabilities	Pre-configured (sent via Subscribe/Notify)	Not applicable	Mandatory
BC PSI (see note 2)	well known PSI (Public Service Identifier) of the BC service (used by S-CSCF to route to the AS)	Not defined (Not retrieved from SSF), it should be pre-configured	Not applicable	Mandatory
Delay timer (see note 3)	When the delay timer expires, the network shall be informed of the currently viewed channel with a SIP INFO message	Not defined, it should be pre-configured	Not applicable	Optional
BC PSI (see note 4)	PSI (Public Service Identifier) of the BC service	Not defined, it should be pre-configured	Not applicable	Mandatory
<p>NOTE 1: Parameters dedicated to the IPTV Service attachment, via <i>Subscribe/Notify</i> to the SDF.</p> <p>NOTE 2: Parameters dedicated to the IPTV Session initiation/modification, via <i>Invite/Update for BC service</i>.</p> <p>NOTE 3: Parameters dedicated to the Procedure for retrieving missing parameters before session initiation, via <i>Option</i>.</p> <p>NOTE 4: Parameters dedicated to the IPTV Session initiation/modification, via <i>Invite/Update for CoD service</i>.</p>				

NOTE: The mention "Not applicable" in table 1 refers to the provisioning by pre-configuration, in case CWMP protocols are not used.

5 Procedures at the e1 reference point

5.1 IPTV-CND Operating in Bridged Mode

5.1.1 Procedures for Network Attachment

The IPTV-CND follows network attachment procedures over the e1 reference point as defined in TS 183 019 [12].

5.1.2 Procedures for SDF Discovery

The IPTV-CND should use vendor class ("ETSI_TISPAN_IPTV_SDS") DHCP options 43/60 or DHCP options 124/125 to fetch addresses of SDF and associated service provider information during network attachment as per procedures defined in TS 183 063 [2].

5.1.3 Data model information

Table 2 summarizes the parameters which may be provisioned by the NGN network DHCP server or DNS SRV procedure to the IPTV-CND, through the e1 reference point.

Table 2

Data	Description (ref)
P-CSCF Address	Host name or IP address of the SIP Proxy
IMS_IPTV_SP	service provider name
IMS-IPTV-SPDOMAIN	service provider domain name
IMS-IPTV-SDF	SDF Address

NOTE: Every parameters listed in table 2 can be provisioned in another way than by the DHCP procedures (see clause 4.2).

6 Procedures at the e3 reference point

6.1 IPTV-CND Operating in Bridged Mode and Routed NGN mode

6.1.1 Procedures for remote management

The IPTV-CND is remotely managed over the e3 reference point using the CPE WAN Management Protocol (CWMP) as described in TS 183 065 [11].

The IPTV-CND should support the device data model for remote management as defined by the Broadband Forum, the TR-135 [i.4] model for STB published in December 2007.

Additionally, any relevant TR135 object extensions specified in TS 183 063 [2], ES 283 003 [9], TS 182 005 [8], TS 182 027 [1], TS 129 228 [10] and required to support IPTV Services should be supported, when they have to be provisioned by the CNGCF.

6.1.2 Procedures for SDF Discovery

The IPTV-CND may be optionally provisioned with the addresses of the SDF server and associated service provider information by the CNGCF using the CWMP protocol over the e3 reference point. The procedures are as described in TS 183 063 [2].

NOTE: The exact format of the IPTV objects will be as specified by appropriate amendment to existing TR-135 specifications [i.4].

6.1.3 Procedures for NAT traversal (applicable only in routed mode)

The NAT-traversal procedures described in the TR-069 specification Annex G [i.5] should be used to manage a CND through the CNG NAT.

6.1.4 Data model information

Table 3 summarizes the parameters provisioned by the CNGCF to the IPTV-CND through the e3 reference point.

Table 3

Data	Description (ref)
IMPI	Authentication Username for IMS authentication
IMPU	SIP URI
P-CSCF Address	Host name or IP address of the SIP Proxy
Registrar Server	Host name or IP address of the SIP registrar server
Registration period	Timer to send Register messages periodically
IPTV service provider name (see note)	service provider name
IPTV service provider domain name (see note)	service provider domain name
IPTV service provider (see note)	service provider URI
Service Discovery Server (see note)	SDF Address

NOTE: See clause I.4 "TR-069 Based Discovery" of TS 183 063 [2].

NOTE: Both P-CSCF Address and IPTV service provider URI can be provisioned in another way than by the CNGCF (see clause 4.2).

7 Procedures at the Gm reference point

7.1 IPTV-CND Operating in Bridged Mode

The procedures for IMS registration, Service Attachment, BC Service, CoD Service, IPTV Presence, BC with trick plays, NPVR Service and Service Configuration follow TS 183 063 [2].

7.2 IPTV-CND Operating in Routed NGN Mode

7.2.1 Procedures for IMS Registration

Conforms to TS 183 063 [2].

7.2.2 Procedures for Service attachment

Conforms to TS 183 063 [2].

7.2.3 Procedures for BC service

Conforms to TS 183 063 [2].

7.2.4 Procedures for CoD service

Conforms to TS 183 063 [2].

7.2.5 Procedures for Services Configuration

Conforms to TS 183 063 [2].

7.2.6 Procedures for IPTV Presence

Conforms to TS 183 063 [2].

7.2.7 Procedures for NPVR service

Conforms to TS 183 063 [2].

7.2.8 Procedures for NAT traversal

The CNG NAT-traversal may be performed using the P-CSCF functionalities described in TS 123 228 [13], annex G and RACS specified in ES 282 003 [14].

NOTE: The SIP ALG in the CNG-SIP Proxy B2BUA may be an alternative to the network-based NAT-traversal mechanism, in this case the CND should use the Gm' reference point.

7.3 Data model information

To retrieve parameters provisioned through Gm reference point, see TS 183 063 [2], clause 5.2.2.3.

8 Procedures at the Ut reference point

8.1 IPTV-CND Operating in Bridged Mode

The procedures for managing service action data follow TS 183 063 [2].

8.2 IPTV-CND Operating in Routed NGN Mode

The procedures for managing service action data follow TS 183 063 [2].

8.3 Data model information

To retrieve parameters provisioned through Ut reference point, see TS 183 063 [2], annex C.

9 Procedures at the Xa reference point

9.1 IPTV-CND Operating in Bridged Mode

The procedures for service selection follow TS 183 063 [2].

9.2 IPTV-CND Operating in Routed (NGN/CPN) Mode

The procedures for service selection follow TS 183 063 [2].

9.3 Data model information

To retrieve parameters provisioned through Xa reference point, see TS 183 063 [2], annex J.

10 Procedures at the Xc reference point

10.1 IPTV-CND Operating in Bridged Mode

The procedures for media control for CoD service and BC with trick plays follow TS 183 063 [2].

10.2 IPTV-CND Operating in Routed NGN Mode

The procedures for media control for CoD service and BC with trick plays follow TS 183 063 [2].

10.2.1 Procedures for NAT traversal

NOTE: NAT traversal support on Xc is out of the scope of the present document.

10.3 IPTV-CND Operating in Routed CPN Mode

The procedures for media control for CoD service and BC with trick plays follow TS 183 063 [2].

11 Procedures at the Xd reference point

11.1 IPTV-CND Operating in Bridged Mode

All procedures at this reference point follow TS 183 063 [2].

11.2 IPTV-CND Operating in Routed NGN Mode

The procedures for media delivery for CoD service, BC service, NPVR service and BC with trick play follow TS 183 063 [2].

11.2.1 Procedures for NAT traversal

To keep NAT bindings and firewall pinholes open with unidirectional RTP traffic early media (empty RTP packets) shall be sent by the IPTV CND so as to open CNG NAT pinholes before receiving media flows from the NGN. This is described in ES 283 003 [9], annex F.4a.

11.3 IPTV-CND Operating in Routed CPN Mode

The procedures for media delivery for CoD service, BC service, NPVR service and BC with trick play follow TS 183 063 [2].

11.3.1 Procedures for NAT traversal

NAT traversal for media delivery in CNG may be performed by the CNG - SIP Proxy B2BUA TS 185 010 [5] based on Gm' signalling. This mechanism performs a NAT binding between the IPTV CND receiver IP address (and port) and the NGN side CNG receiving port, for incoming media delivery.

NOTE: The solution above works for CoD where Gm' signalling is used for each change of service. For broadcast services where IGMP is used there are situations without Gm' signalling. Therefore the use of an IGMP proxy is needed.

12 Procedures at the e1' reference point

12.1 IPTV-CND Operating in Routed (NGN/CPN) Mode

12.2 Procedures for network attachment

The e1' reference point serves the CND-AtF with appropriate configuration data to connect to a local IP network and attach to some selected services such as the P-CSCF. The protocol of choice is DHCP (RFC 2131 [15]). The DHCP options needed to implement this procedure are described in TS 185 010 [5].

In addition to these options, e1' serves to provide the IPTV CND with SDF discovery information. The procedure conforms to TS 183 063 [2], annex I to implement the related DHCP options.

NOTE: Other methods to configure P-CSCF and SDF addresses exist, see clause 4.2.

12.3 Data model information

In the case the IPTV-CND does not go through the CNG-SIP B2BUA (Routed NGN Mode), the IPTV-CND shall be provisioned with the following parameter.

Table 4

Data	Description (ref)	Entity responsible for the provisioning
P-CSCF Address	Host name or IP address of the SIP Proxy	CNG DHCP server (option 120)

12.4 CNG

12.4.1 Procedures for network attachment

When the IPTV CND is sending the DHCP request to the CNG including options to get SDF discovery information, the CNG should provide the requested information to the IPTV CND as described TS 183 063 [2], annex I.

NOTE: Other methods to configure P-CSCF and SDF addresses exist, see clause 4.2.

12.4.2 Data model information

In the case the IPTV-CND goes through the CNG-SIP B2BUA (Routed CPN Mode), the CNG has to be provisioned with the following parameters, so as to connect non-IMS CND to the IMS Network (e.g. replacing the CNG-SIP proxy Address by the P-CSCF Address).

Table 5

Data	Description (ref)	Entity responsible for the provisioning
P-CSCF Address	Host name or IP address of the SIP Proxy	CNG DHCP server (option 120)

13 Procedures at the e3' reference point

NOTE: This clause is not elaborated in Release 2.

14 Procedures at the C reference point

Utilization of reference point C in Release 2 for IPTV services is limited to three service offers: Broadcast, CoD and NPVR offers. In such a limited scope of offers, reference point C is only partially described within the present document.

Routed NGN and Routed CPN modes can be used in parallel.

14.1 IPTV-CND Operating in Routed NGN Mode

14.1.1 Procedures for Content description Functions

14.1.1.1 Procedures for Synchronization of Device List

The IPTV-CND PPF can collect available UPnP™ devices either at a regular interval (polling mode) or by listening to proper events (notification mode) in accordance with UPnP™ Device Architecture 1.0 (UPnP™ AV 1.0 Specifications, UPnP Forum [6]). This is done using M-SEARCH and NOTIFY messages.

14.1.1.2 Procedures for Collecting Media List

The IPTV-CND PPF can collect available UPnP™ media items either at a regular interval (polling mode) or by listening to proper events (notification mode) in accordance with UPnP™ AV 1.0.

This is done using UPnP AV messages. The IPTV-CND PPF should use UPnP™ AV CDS::Browse and CDS::Search actions to retrieve the list of media items proposed by an UPnP™ AV Media Server device. Those actions can be called at regular interval (polling mode) in order for the IPTV-CND PPF to refresh its media item lists. The IPTV-CND PPF can use the SystemUpdateID event to be notified when a change occurs in the whole list of items (change of the content or change of the metadata) of the UPnP™ AV Media Server. The IPTV-CND PPF may use (if implemented by the UPnP™ AV Media Server device) the ContainerUpdateID event to be notified of changes that occur on a container basis granularity.

If an UPnP™ Media Server exposes itself as a DLNAVIRT Media Server, it means that it aggregates media items from other UPnP™ Media Server devices, as defined in DLNA 1.5 [7], clause 7.5.2 (DDC UPnP™ Device Description of Virtualized Device). The IPTV-CND PPF can then retrieve media items lists of several Media Servers at once by browsing/searching this DLNAVIRT device. The IPTV-CND PPF shall be compliant with DLNA 1.5 [7], clause 7.3.80 (MM CDS DLNA PlaySingle URI values) for access to the media item.

14.1.1.3 Procedure for Exposing Media List

The IPTV-CND PPF can expose available UPnP media items. Three cases are possible:

- Those media items can be locally stored within the device where the IPTV-CND PPF resides. The UPnP™ AV architecture is used. The Content Directory Service exposes the list of media items.

- Those media items come from other devices in the home network. The IPTV-CND PPF then acts as an "aggregator" for those media items. It can list those media items using DLNA Guidelines 1.5:
 - The IPTV-CND PPF exposes its DLNAVIRT device capability in its UPnP device description document, as defined in DLNA 1.5 [7], clause 7.5.2. (DDC UPnP Device Description of Virtualized Device).
 - The media item can have a <res> element:
 - That points to the original media item in the original device where it is stored. In this case, the PlaySingle URI shall be used, as defined in DLNA 1.5 [7], clause 7.3.80 (MM CDS DLNA PlaySingle URI values).
 - That points to a local media item. This is used to perform transformation on the media item to extend the rendering capabilities on other devices.
- Those media items come from NGN (e.g. IPTV service coming from the NGN). The IPTV-CND PPF should be able to adapt the DVB formatted service selection data coming from the NGN into a format compliant with the UPnP™ AV.

15 Procedures at the Gm' reference point

15.1 IPTV CND Operating in Routed CPN Mode

In routed CPN mode the IPTV CND utilizes Gm' for SIP signalling with CNG-SIP Proxy B2BUA TS 185 010 [5]. The CNG-SIP Proxy B2BUA may perform NAT/FW-traversal and QoS management based on this signalling.

Signalling conforms to TS 183 063 [2] with two limitations:

- SIP messages shall be sent to the CNG-SIP Proxy B2BUA (discovery procedures as usual, e.g. DHCP, but not of the P-CSCF but instead discovery of the CNG-SIP Proxy B2BUA's IP address and port). Parameters such as SIP request URI, To headers etc. are as in TS 183 063 [2], e.g. the Public Service Identifier of the BC Service.
- Signalling shall be unencrypted, otherwise CNG-SIP Proxy B2BUA cannot read it.

Authentication is performed by the P-CSCF, i.e. CNG-SIP Proxy B2BUA keeps state of sessions, performs NAT-t and only acts when requests has been authorized by the IPTV Service Functions. A typical action would be to perform FW-opening, NAT-bindings and QoS management (CNG internal) after a successful SIP INVITE for IPTV media and control streams.

16 Procedures at the au reference point

Procedures at the au reference point are as specified by TS 185 010 [5].

17 Data to be provisioned in the IPTV-CND by pre-configuration

This clause is dedicated to the pre-configured data, which are presented in table 6.

Table 6

Data	Description (ref)
Vendor Class Id	Device identifier
IPTV service provider URI	service provider URI
Content type identifier	includes the content-type identifier that corresponds to the registered MIME type of XML documents representing "application/vnd.etsi.iptvdiscovery+xml"
Event header	shall be set to the "ua-profile" event package
UE Capabilities	this defines the set of UE capabilities
BC PSI	well known PSI (Public Service Identifier) of the BC service (used by S-CSCF to route to the AS)
Delay timer	when the delay timer expires, the network shall be informed of the currently viewed channel with a SIP INFO message

NOTE: The IPTV service provider URI can be provisioned in the IPTV-CND in another way than by pre-configuration (see clause 4.2), whereas the BC PSI and Delay Timer are assumed to be pre-configured, as no more information are given in the Network TISPAN specifications.

Annex A (informative): Bibliography

ETSI TS 185 006: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Customer Devices architecture and interfaces and Reference Points".

History

Document history		
V2.1.1	July 2009	Publication