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Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Dedicated IPTV subsystem stage 3 specification

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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).

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1 Scope

The present document provides the stage 3 description of the dedicated IPTV subsystem based on the architecture and stage 2 information flows described in TS 182 028 [4].

The protocol enhancements will form the scope of new or enhanced protocol specifications.

The interaction with other NGN subsystems such as PES, IMS and RACS will be considered.

The current release is applicable to:

- the interface between the User Equipment (UE) and the SD&S;
- the interface between the User Equipment (UE) and Customer facing IPTV Applications (CF-IPTV-Apps);
- the interface between the User Equipment (UE) and IPTV Control (IPTV-C);
- the interface between the User Equipment (UE) and Media Control Functions (MCF);
- the interface between the User Equipment (UE) and Media Delivery Functions (MDF);
- the interface between the Customer facing IPTV Applications (CF-IPTV-Apps) and IPTV Control (IPTV-C);
- the interface for access to IPTV User Data Function (IPTV UDF);
- the interface between the IPTV Control (IPTV-C) and Media Control Functions (MCF);
- the interface for access to NGN User Data Access Function (NGN UDAF).

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 ES 282 001 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture".
- [2] ETSI ES 282 004 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture; Network Attachment Sub-System (NASS)".
- [3] ETSI ES 282 003 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control Sub-System (RACS): Functional Architecture".
- [4] ETSI TS 182 028 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; Dedicated subsystem for IPTV functions".
- [5] ETSI TS 102 034: "Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks".
- [6] IETF RFC 2326 (April 1998): "Real Time Streaming Protocol (RTSP)".
- [7] IETF RFC 2617 (June 1996): " HTTP Authentication: Basic and Digest Access Authentication".
- [8] ETSI TS 102 539: "Digital Video Broadcasting (DVB); Carriage of Broadband Content Guide (BCG) information over Internet Protocol (IP)".
- [9] IETF RFC 2616 (June 1999): "Hypertext Transfer Protocol - HTTP/1.1".
- [10] IETF RFC 3428 (December 2002): "Session Initiation Protocol (SIP) Extension for Instant Messaging".
- [11] ETSI TS 183 041 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Messaging service using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3: Protocol specifications [Endorsement of 3GPP TS 24.247 Release 6]".
- [12] IETF RFC 3856 (August 2004): "Presence Event Package for the Session Initiation Protocol (SIP)".
- [13] ETSI TS 182 008 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Presence Service; Architecture and functional description [Endorsement of 3GPP TS 23.508 Release 7 and OMA-AD-Presence_SIMPLE-V1_0]".
- [14] IETF RFC 4662 (August 2006): "Session Initiation Protocol (SIP) Event Notification Extension for Resource Lists".
- [15] IETF RFC 4825 (May 2007): "The Extensible Markup Language (XML). Configuration Access Protocol (XCAP)".
- [16] IETF RFC 5025 (December 2007): "Presence Authorization Rules".
- [17] ETSI TS 183 063 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based IPTV stage 3 specification".
- [18] IETF RFC 3265 (June 2002): "Session Initiation Protocol (SIP)-Specific Event Notification".
- [19] IETF RFC 1321 (April, 1992): "The MD5 Message-Digest Algorithm".
- [20] IETF RFC 3376 (October 2002): "Internet Group Management Protocol, Version 3".

- [21] IETF RFC 3810 (June 2004): "Multicast Listener Discovery Version 2 (MLDv2) for IPv6".
- [22] ETSI TS 183 017 (Release 2): "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control: DIAMETER protocol for session based policy set-up information exchange between the Application Function (AF) and the Service Policy Decision Function (SPDF); Protocol specification".
- [23] IETF RFC 4585 (July 2006): "Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/AVPF)".
- [24] IETF RFC 4588 (July 2006): "RTP Retransmission Payload Format".
- [25] IETF RFC 3261: "SIP: Session Initiation Protocol".
- [26] ETSI TS 184 009 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) Rules covering the use of TV URIs for the Identification of Television Channels".

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 TS 187 003 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Security; Security Architecture".

3 Definitions and abbreviations

3.1 Definitions

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

UE (converged): end user device, eg set top box or enhanced TV, capable of supporting IPTV services and services provided by other NGN subsystems

3.2 Abbreviations

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

ASF	Application Server Function
BC	BroadCast
BCG	Broadband Content Guide
BTV	Broadcast TV
CF	Customer Facing
CFIA	Customer Facing IPTV Applications
CoD	Content on Demand
CoD-MF	Content on Demand Media Functions
CSS	Cascading Style Sheets
Ct2	interfaces name defined in TS 182 028 [4]
Di	interfaces name defined in TS 182 028 [4]
DVB	Digital Video Broadcast
DVBSTP	Digital Video Broadcasting Service discovery and selection Transport Protocol
ECF	Elementary Control Function
EFF	Elementary Forwarding Function
EPG	Electric Program Guide
FB	FeedBack
FE	Functional Entity
HTTP	HyperText Transfer Protocol

IGMP	Internet Group Management Protocol
IGMPv2	Internet Group Management Protocol version 2
IGMPv3	Internet Group Management Protocol version 3
IMS	IP Multimedia Subsystem
IPTV	Internet Protocol TeleVision
IPTV-C	IPTV Control
IPv4	Internet Protocol version 4
IUDF	IPTV User Data Function
LMB	Linear Media Broadcast
MBwTM	Media Broadcast with Trick Modes
MC	Multicast
MCF	Media Control Function
MDF	Media Delivery Function
MLD	Multicast Listener Discovery (protocol)
MLDv1	Multicast Listener Discovery version 1
MLDv2	Multicast Listener Discovery version 2
NGN	Next Generation Network
nPVR	network-side Personal Video Recorder
PS	Presence Server
PUA	Presence User Agent
RACS	Resources Admission Control Sub-system
RLS	Resource List Server
RR	Receiver Report
RSI	Receiver Summary Information
RTCP	Real Time Control Protocol
RTCPSSM	RTCP extension for Source Specific Multicast
RTP	Real Time transport Protocol
RTSP	Real Time Streaming Protocol
Sa	interfaces name defined in TS 182 028 [4]
SD&S	Service Discovery and Selection
SDES	Source Description RTCP Packet
SDP	Session Initiation Protocol
Sh	interfaces name defined in TS 182 028 [4]
SIP	Session Initiation Protocol
SMTP	Simple Mail Transfer Protocol
SSRC	Synchronization SouRCe
TCP	Transmission Control Protocol
Tr	interfaces name defined in TS 182 028 [4]
TsTV	Time-shift TV
Ud	interfaces name defined in TS 182 028 [4]
UDP	User Datagram Protocol
UE	User Equipment
UPSF	User Profile Server Function
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
WEB4CE	Web-based Protocol and Framework for Consumer Electronics
Xc	interfaces name defined in TS 182 028 [4]
XCAP	XML Configuration Access Protocol
Xd	interfaces name defined in TS 182 028 [4]
XDMS	XML Data Management Server
XML	Extensible Markup Language

4 Applicability

The following clauses explain the concept and approach used to define the protocols for the dedicated IPTV subsystem.

4.1 Concept and Approach

This clause outlines concept and approach adopted in the present document. The approach is then applied to protocol selections, mapping to interfaces and protocol extensions.

The document focuses on defining protocols for flexible functional architecture described in [4], which can:

- Allow development of new IPTV subsystem in NGN;
- Integrate existing IPTV subsystem in NGN;
- Extend both to support other NGN services.

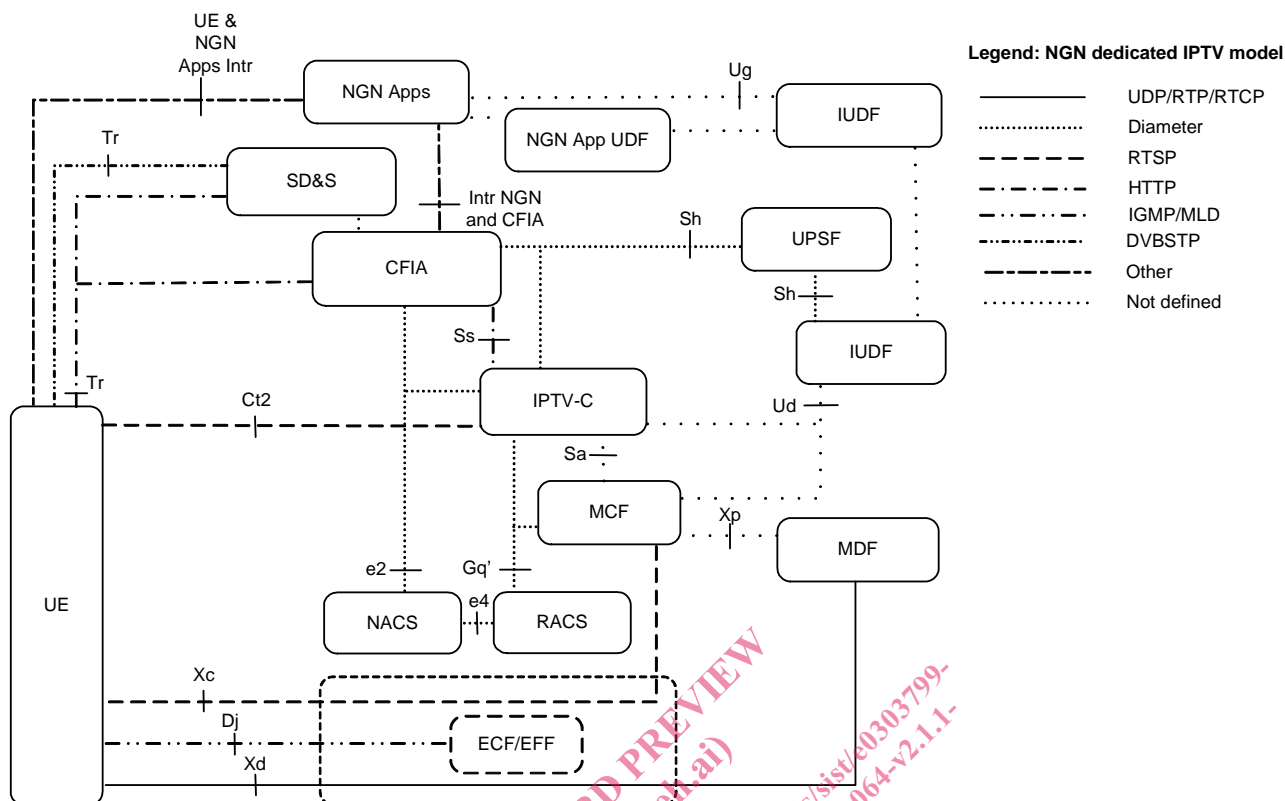
In order to achieve high level of flexibility and support integration of existing subsystems, the work is focused on evaluating and endorsing protocols already defined for similar functions in [5] and other standard bodies. Protocol extensions are defined where applicable as well as overall applicability to the end-to-end architecture [4].

For example, recommendations are made how to integrate DVB compliant UE without modifications and DVB compliant system with minimal modification to the service layer.

4.2 Overview

The clause describes applicability of the protocols discussed further in the present document to reference points defined in TS 182 028 [4]. The overall functional architecture for the dedicated IPTV service conforms to [4].

Figure 1 presents mapping of protocols to interfaces in dedicated NGN-IPTV and to interworking with other NGN subsystems and common components.



NOTE: Xc and Xd are logical interfaces that can be decomposed into Dj and optionally Di, Ds or Iz interfaces depending on the location of the MCF or MDF as described in [4] clause 5.2.5 for Xc and clause 5.1.6 for Xd.

Figure 1: Protocols mapped to NGN dedicated IPTV functional architecture

Table 1: NGN dedicated IPTV functional entities and protocols used on interfaces

FE/ Reference point (protocol)	UE	IPTV-C	CFIA	SD&S	UPSF	IUDF	MCF	MDF	ECF/ EFF
UE	---	Ct2 (RTSP), (HTTP, Optional)	Tr (HTTP)	Tr (HTTP, DVBSTP)	---	---	Xc (RTSP)	Xd (UDP/ RTP /RTCP)	Dj, Di IGMP/ MLD
IPTV-C	Ct2 (RTSP), (HTTP, Optional)	---	Ss (HTTP)	---	Sh (Diameter)	Ud (not defined)	Sa (RTSP)	---	---
CFIA	Tr (HTTP)	Ss (HTTP)	Sh (Diameter)	(not defined)	---	---	---	---	---
SD&S	Tr (HTTP, DVBSTP)	---	(not defined)	---	---	---	---	---	---
UPSF	---	Sh (Diameter)	Sh (Diameter)	---	---	---	---	---	---
IUDF	---	Ud (not defined)	---	---	---	---	Ud (not defined)	---	---
MCF	Xc (RTSP)	Sa (RTSP)	---	---	---	Ud (not defined)	---	Xp (not defined)	---
MDF	Xd (UDP/ RTP/RTCP)	---	---	---	---	---	Xp (not defined)	---	---
ECF/ EFF	---	---	---	---	---	---	---	---	---

NOTE 1: NGN dedicated IPTV protocol model is required to comply with standards applicable for NGN dedicated IPTV as defined below.

Usage of the HTTP protocol across the following interfaces is described in clause 5:

- interface Tr;
- interface Xc;
- interface Ct2 (Optional).

Usage of the HTTP protocol for interactions between NGN Applications and UE is described in annex E.

Usage of the RTSP protocol across the following interfaces is described in clause 6:

- interface Ct2;
- interface Xc.

Usage of the IGMP/MLD protocol across the following interfaces is described in clause 7:

- interface Dj, Di.

Usage of the SIP protocol for interactions between NGN Applications and UE is described in the clause 8.

Usage of the DVBSTP across the following interfaces is described in clause 9:

- interface Tr.

Usage of the RTP/RTCP protocol across the following interface is described in clause 10:

- interface Xd.