

# ETSI TS 182 028 V2.0.0 (2008-01)

---

*Technical Specification*

## **Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; Dedicated subsystem for IPTV functions**

---

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/0e522d49-e1e3-4061-aa28-5af2a0ba2eda/etsi-ts-182-028-v2.0.0-2008-01>



---

**Reference**DTS/TISPAN-02049-NGN-R2

---

---

**Keywords**architecture, IP, TV

---

**ETSI**

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

---

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

---

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

[http://portal.etsi.org/chaicor/ETSI\\_support.asp](http://portal.etsi.org/chaicor/ETSI_support.asp)

---

**Copyright Notification**

---

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2008.  
All rights reserved.

DECT™, PLUGTESTS™, UMTS™, TIPHON™, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

# Contents

Intellectual Property Rights .....	5
Foreword.....	5
Introduction .....	5
1 Scope .....	6
2 References .....	6
2.1 Normative references .....	7
2.2 Informative references.....	7
3 Abbreviations .....	8
4 NGN IPTV subsystem.....	8
4.1 Concept and Architectural Approach .....	8
4.2 High Level Architecture Overview .....	9
4.3 Functional groups.....	9
4.3.1 Application Functions.....	9
4.3.2 IPTV Service Control and Media Delivery Functions.....	10
4.3.3 Transport Functions .....	10
4.3.4 End User Functions.....	10
4.3.5 Management Functions.....	10
4.3.6 Content Provider Functions .....	10
5 NGN dedicated IPTV subsystem functional architecture.....	10
5.1 Functional entities .....	12
5.2 Reference points .....	14
5.2.1 Tr - IPTV transactional .....	14
5.2.2 Ct2 - UE facing IPTV control.....	15
5.2.3 Sa - IPTV control and Media Control Function.....	15
5.2.4 Ss - Service selection .....	15
5.2.5 Xc - UE and IPTV Media Control Function .....	15
5.2.6 Xp - IPTV Media Control Function and IPTV Media Delivery Function .....	16
5.2.7 Xd - UE and IPTV Media Delivery Function .....	16
5.2.8 e2 - NASS access.....	16
5.2.9 e4 - NASS and RACS.....	16
5.2.10 Gq' - RACS .....	17
5.2.11 Sh - IPTV applications and UPSF .....	17
5.2.12 Ud - IPTV applications and IUDF.....	17
5.2.13 Ug - access to federalized NGN data.....	17
6 Operational framework.....	17
6.1 IPTV delivery modes.....	17
6.2 Operational modes.....	18
6.2.1 Coupled mode .....	18
6.2.2 Decoupled mode .....	19
6.2.3 Redirect mode .....	20
6.2.4 Proxy mode .....	21
6.3 Service initialization.....	22
6.3.1 Functional steps for UE start-up .....	22
6.3.2 Service discovery and selection .....	23
6.4 Nomadism .....	24
7 Security.....	24
8 Management.....	25
9 User data.....	25
9.1 IPTV profiles.....	25
9.2 User data location.....	26

10	Charging .....	26
11	Procedures .....	27
11.1	Linear TV .....	27
11.2	Multimedia content on demand (CoD) .....	28
11.3	Media broadcast with trick modes .....	29
11.4	Near CoD .....	31
<b>Annex A (informative):</b>	<b>Interactions between other NGN services and IPTV services .....</b>	<b>34</b>
<b>Annex B (informative):</b>	<b>Interaction procedure between IPTV and other service level subsystems .....</b>	<b>35</b>
<b>Annex C (informative):</b>	<b>Presence attributes for IPTV .....</b>	<b>37</b>
History .....		38

**iTeh STANDARD PREVIEW**  
 (standards.iteh.ai)  
 Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/0e522cd49-e1e3-4061-aa28-5af2a0ba2eda/etsi-ts-182-028-v2.0.0-2008-01>

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

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

The present document defines the TISPAN NGN Release 2 IPTV architecture: Dedicated subsystem for IPTV functions in NGN.

---

## Introduction

The present document provides an architectural framework for the end-to-end Internet Protocol Television (IPTV) subsystem within the Next Generation Networks architecture. The IPTV framework is designed for interoperability with other NGN service subsystems and components.

The present document identifies functional entities and reference point, which needs to be exposed from IPTV subsystem.

---

# 1 Scope

The present document describes the IPTV functional architecture and functions of an IPTV system by and incorporating integration of IPTV functions subsystem within into the NGN architecture. For example, interactions and information flows between the IPTV system functional entities with and other functional entities will be specified. The specification starts from outlining high-level IPTV functional architecture, functional groups and is further developed into the more detailed functional architecture, reference points and operational modes.

The architecture is intended to support requirements defined by the respective ETSI TISPAN requirement definitions [1] and allow integration new or existing IPTV solutions (such as those defined by DVB, ATIS IIF, ITU etc) within the NGN architecture.

The resulting architecture should, should rely as much as possible on common components and integrates, coexist with other TISPAN NGN services.

The following areas are covered:

- Authentication and authorization.
- Content Protection (including DRM).
- Capability exchange.
- Resource Management.
- Policy Management.
- Charging.
- User Profiles.

---

# 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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

## 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 181 016: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Service Layer Requirements to integrate NGN services and IPTV".
- [2] ETSI TS 102 034: "Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks".
- [3] ETSI TS 122 240: "Universal Mobile Telecommunications System (UMTS); Service requirements for 3GPP Generic User Profile (GUP); Stage 1 (3GPP TS 22.240)".
- [4] ETSI TS 123 240: "Universal Mobile Telecommunications System (UMTS); 3GPP Generic User Profile (GUP) requirements; Architecture (Stage 2) (3GPP TS 23.240)".
- [5] ETSI ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture Release 1".
- [6] ETSI TS 182 027: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; IPTV functions supported by the IMS subsystem".
- [7] ETSI ES 282 019: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Functional Architecture; Resource and Admission Control Subsystem (RACS)".
- [8] IETF RFC 2782: "A DNS RR for specifying the location of services (DNS SRV)".
- [9] ETSI ES 282 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Functional architecture".
- [10] ETSI ES 282 004: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture; Network Attachment Sub-System (NASS)".
- [11] ETSI ES 282 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control Sub-system (RACS); Functional Architecture".
- [12] ETSI TS 187 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Security; Security Architecture".
- [13] ETSI ES 282 010: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Charging [Endorsement of 3GPP TS 32.240 v6.3.0, 3GPP TS 32.260 v6.3.0, 3GPP TS 32.297 v6.1.0, 3GPP TS 32.298 v6.1.0 and 3GPP TS 32.299 v6.4.0 modified]".
- [14] ETSI TS 132 240: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Charging management; Charging architecture and principles (3GPP TS 32.240)".

## 2.2 Informative references

- [15] ETSI TR 187 008: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NAT traversal feasibility study report".

## 3 Abbreviations

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

BC	Broadcast
BTV	Broadcast TV
CA	Conditional Access
CF	Customer Facing
CoD	Content On Demand
DNG	Delivery Network Gateway
DRM	Digital Rights Management
FE	Functional Entity
GUP	Generic User Profile
IMS	IP Multimedia Subsystem
IPTV	IP Television
IUDF	IP User Data Function
MCF	Media Control Function
MDF	Media Delivery Function
NASS	Network Attachment SubSystem
RACS	Resource and Admission Control Subsystem
SD&S	Service Discovery & Selection
UDAF	User Data Access Function
UDF	User Data Function
UE	User Equipment
UPSF	User Profile Server Function

## 4 NGN IPTV subsystem

This clause outlines architectural approach adopted in the present document. The approach is then applied to introduce high level IPTV architecture and functional groups in NGN architecture.

### 4.1 Concept and Architectural Approach

The document focuses on defining flexible functional architecture, which can:

- allow development of new IPTV subsystem in NGN;
- integrate existing IPTV subsystem in NGN;
- extend both to support other NGN services;

as defined in the service level requirements [1].

The support for other NGN services has a wide meaning, e.g. the functional architecture would allow coupling functionality of IPTV subsystem with functionality of PES or IMS subsystem, which in-turn may support some IPTV features as defined in [6].

In order to achieve high level of flexibility, the work is focused on identifying and standardizing functional entities and reference points, which needs to be exposed from IPTV subsystem to the rest of NGN. Internal IPTV functional entities and reference points are identified and described for the completeness of the end to end architecture without intend to standardize them.

The architectural approach considers IPTV subsystem as a functional area, which is integrated into NGN via standardized reference points and delivers service level requirements, while allowing internal flexibility and extensions for new service types.

The IPTV dedicated subsystem is based upon IPTV domains defined in TS 181 016 [1], clause 4.1 IPTV Roles.



## 4.2 High Level Architecture Overview

Figure 1 presents high-level NGN IPTV functional overview and location of IPTV capabilities in the TISPAN NGN. The high level overview illustrates principal functional groups for NGN IPTV services. The functional groups map to IPTV roles as defined in clause 4.3.

The functional groups are used to derive more detailed functional architecture, however, allocation of functions across operational and organizational boundaries will vary between implementations.

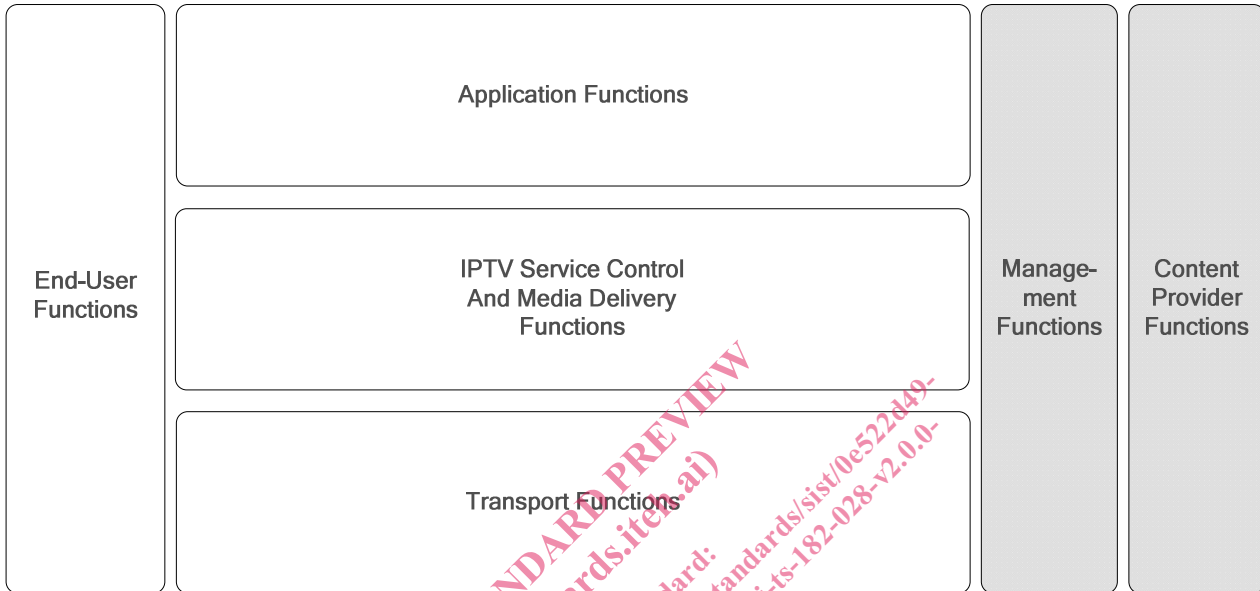


Figure 1: High-level NGN IPTV functional architecture

## 4.3 Functional groups

In the context of the present document functional groups are used to describe several functional entities grouped together according to some condition, e.g. location in the certain functional layer.

### 4.3.1 Application Functions

Within the present document, the term "Application Functions" includes IPTV and NGN Application Functions.

**NGN Applications:** provides the user with rich multimedia applications distributed across multiple NGN subsystems. For example, session follow up or messaging exchange between fixed and mobile terminals, presentation of incoming calls and phone list management on TV, IPTV or gaming applications based on user presence. NGN applications also provide operators with centralized NGN management interface to multiple subsystems for content management, charging, interactions with IMS services, others. NGN applications may include application functions used across multiple service domains for applications interactions, e.g. IMS and IPTV interactions. NGN applications may include service mediation and coordination functionality.

**IPTV Applications:** customer facing and operator facing.

Customer facing IPTV applications provides the server side functions to enable customer facing IPTV applications, expose IPTV services to other NGN application and manage IPTV subsystem. Customer facing IPTV applications provide service provisioning, selection and authorization of IPTV services.

Operator facing IPTV applications provide operator control over IPTV subsystem in NGN, content preparation and media management, content licensing, subscriber management, offer creation, user profiles.

Server side IPTV applications expose IPTV services to NGN.

### 4.3.2 IPTV Service Control and Media Delivery Functions

Enables operation of IPTV services in NGN. The key functionality of this layer is to provide, but not limited to, media distribution, selection and allocation of media delivery units, IPTV session control and management, interactions with other NGN components for admission control and resource allocation, as well as collecting charging and QoS information.

### 4.3.3 Transport Functions

**Transport Control Functions:** contains common NGN components RACS and NASS, provides policy control, resource reservation and admission control as well as IP address provisioning, network level user authentication and access network configuration as defined in TISPAN. Transport layer definition includes definition from [5].

**Transport Processing Functions:** the Transport Process Functions represents network access links and IP core. The IP core is in charge of data transmission with quality of service support.

### 4.3.4 End User Functions

**Customer transport:** provides connection to one or multiple access networks and one or multiple home network segments.

**UE:** provides user interactions and control over delivery of IPTV and other NGN services. IPTV terminal processes serviced multimedia and presents it in user acceptable format. User interactions may include service discovery, selection and authorization. Multimedia processing may include requesting multimedia asset in supported encoded format, decoding and presenting it to the user in acceptable format, trick mode operators, channel change.

### 4.3.5 Management Functions

The IPTV Management Functions include:

**Service Fulfilment:** the functions required to fulfil the IPTV service to the End-User.

**Service Assurance:** the functions required to assure the IPTV service provided to the End-User.

**Service Billing:** the functions required to ensure proper billing to the end user of delivered IPTV services.

### 4.3.6 Content Provider Functions

The functions provided by the entity that owns or is licensed to sell content or content assets. These are normally the sourcing of content, metadata and usage rights.

---

## 5 NGN dedicated IPTV subsystem functional architecture

The context of the IPTV architecture is represented "end to end" for completeness, starting from the UE on the left to the management functions and content providers functions on the right. However, the functions on the right (e.g. management and content provider) are outside this release of the specification.

Dedicated NGN IPTV functional architecture is presented in figure 2.

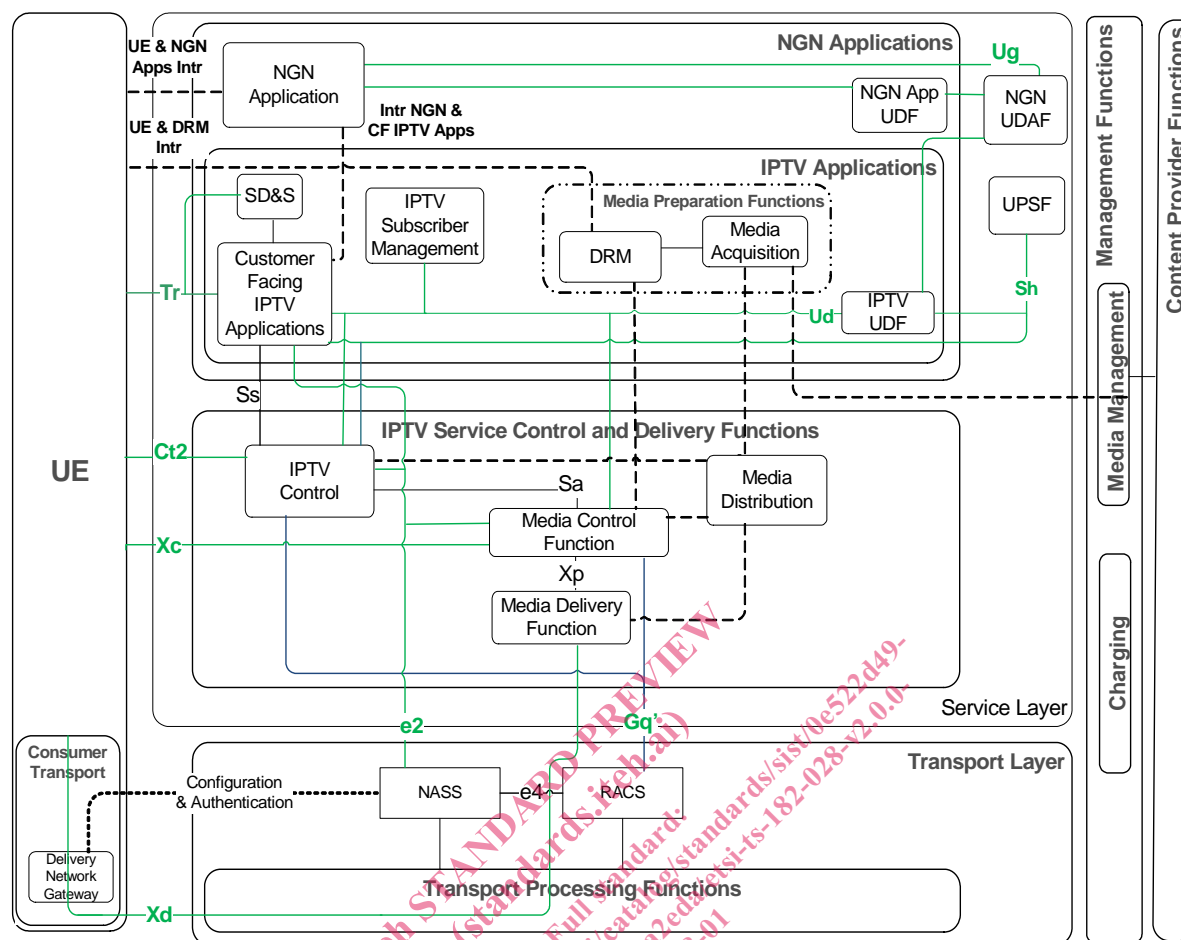


Figure 2: NGN IPTV functional architecture

The figure also includes reference points using dotted lines, which are shown for completeness and outside the present document: examples are provided in informative annex showing how such reference points can be used. The two reference point outside the scope of the present document shown for completeness are NGN & Customer facing IPTV application interactions and Configuration and Authentication.

The focus of the current specification is on the functions in the middle, namely IPTV functions in the **service layer** and in the **transport layer** for integration into NGN.

The functions performed by the **service layer** are grouped into two levels:

- the application functions for **provisioning** an IPTV service consumption by a given user (e.g. service selection, where 'selection' is used in a wide sense, e.g. including the parental control rules, others);
- the IPTV service control and delivery functions for the **execution** of a given instance of an IPTV service during service consumption (e.g. the user can experience and control the delivery of a given media content) and for the **selection** of Media Control Function and media delivery during the IPTV service establishment.

The functions performed in the transport layer apply the principles of TISPAN NGN networks transport layer (see definition in [5]) to enable policy control, resource reservation, admission control, IP address provisioning, network level user authentication. The relationship between media management, media distribution and media preparation functions are presented for the completeness. However, interface definitions are outside the scope of the current release, which is represented by the dotted lines.