

# ETSI TS 181 016 V3.3.1 (2009-07)

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*Technical Specification*

## **Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Service Layer Requirements to integrate NGN Services and IPTV**

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## Reference

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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 is to describe the Service Layer requirements for IPTV service within NGN especially focusing on the integration of IPTV services with the communication services defined in TISPAN.

This work complements the working item initiated for addressing the transport layer network capabilities in order to support IPTV services.

The present document is complementary to the TS 181 014 "Requirements for Network Transport Capabilities to support IPTV Services" [3].

The present document shall not preclude the service to be supported in a converged (fixed - mobile) scenario.

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# 2 References

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

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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] OMA-RD-BCAST-V1\_0-20090212-A: "Mobile Broadcast Services Requirements".

NOTE: Available at [http://member.openmobilealliance.org/ftp/Public\\_documents/BCAST/Permanent\\_documents/OMA-RD-BCAST-V1\\_0-20090212-A.zip](http://member.openmobilealliance.org/ftp/Public_documents/BCAST/Permanent_documents/OMA-RD-BCAST-V1_0-20090212-A.zip).

- [2] ETSI TS 181 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Videotelephony over NGN; Stage 1 service description".

- [3] ETSI TS 181 014: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Requirements for network transport capabilities to support IPTV services".

- [4] ETSI TS 182 008: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Presence Service; Architecture and functional description [Endorsement of 3GPP TS 23.141 and OMA-AD-Presence-SIMPLE-V1-0]".

- [5] ETSI TS 181 006: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Direct Communication Service in NGN; Service Description [Endorsement of OMA-ERELD-PoC-V1]".

- [6] ETSI TS 122 340: "Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS) messaging; Stage 1 (3GPP TS 22.340 version 7.0.0 Release 7)".
- [7] ETSI TS 181 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services".
- [8] ETSI TS 187 001 (V2.1.5): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN SECURITY (SEC); Requirements".
- [9] ETSI TS 181 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Services and Capabilities Requirements".

## 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 180 000: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Terminology".
- [i.2] ETSI TS 187 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Release 2 Lawful Interception; Stage 2 definition".
- [i.3] ETSI TS 182 019: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Content Delivery Network (CDN) architecture - Interconnection with TISPAN IPTV architectures".

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## 3 Definitions and abbreviations

### 3.1 Definitions

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

**broadcast TV:** television programming transmitted and intended for reception by anyone within range of the transmitter or lawfully connected to a cable distribution system but where the consumer has no control over the content or timing of what he receives, apart from the ability to select a particular channel

NOTE: There is no interactivity between user and the service or content providers. It is sometimes referred to as "Linear TV".

**channel change:** specific action initiated by an end-user (e.g. push remote control button) at time  $t_0$  through which the presentation of a previous channel is replaced by the presentation of the new channel of broadcast TV service, as selected by the end-user

**channel change time:** time elapsed between the moment the end-user selects a new channel and the moment this channel is presented at the final quality level of the channel

**consumer:** domain where the IPTV services are consumed

NOTE: The consumer domain may consist of a single terminal used directly for service consumption or may be a complex network of terminals and related devices, including consumer operated mobile devices. The domain itself may also be a mobile end device. In this case, the delivery system of a transport provider would be a Wireless Wide Area Network (WWAN). A single consumer domain may be connected via two or more networks to a number of service providers obtaining content from multiple content providers.

**consumer network:** network owned and operated by an end-user relying on the services of a transport provider for external connectivity; in this context, the definition includes home networks, wireless "hot spots", hotel networks, etc.



**Consumer-Originated Content (COC):** content generated by a user for the purpose of making it available to other users

NOTE: The content may be private, or intended for a restricted audience or intended for unrestricted audience. It is the equivalent of User-Generated Content.

**content aggregation:** aggregation of Broadcast Channels (BC) and content titles (CoD) among content and service providers

**Content on Demand (CoD):** users can select their required content with the assistance of the Electronic Programme Guide (EPG) at the user preferred time

NOTE: The content is then transmitted uniquely (unicast) to that consumer who can usually use VCR-like functionalities (for example, fast-forward, rewind or pause) to control their viewing of the content. A special form of Content on Demand (CoD) is Video on Demand (VoD).

**Content Provider (CP):** entity that owns or is licensed to sell content or content assets

**downloadable applications:** interactive applications downloaded to IPTV Terminal device if and when invoked by subscriber, or service provider

**Electronic Programme Guide (EPG):** assistance tool which helps users to locate the content they want and to facilitate the selection of IPTV services for watching, recording, etc.

**Electronic Service Guide (ESG):** enables service and content providers to describe the services and content they make available, or offer for subscription or purchase

NOTE: It also enables a method for describing how to access the services. From the user perspective the ESG can be seen as an entry point to discover the currently available or scheduled services and content and to filter those based on their preferences. Furthermore, the ESG provides the entry point to interactive services. The ESG consists of both EPG and interactivity data.

**external content:** content which the consumer acquires from a CP which is not the IPTV SP, but which is acquired via the IPTV SP

NOTE 1: A business relationship needs to exist between the CP and the IPTV SP prior to the acquisition. The IPTV SP delivers the content to the consumer making use of the services capabilities provided by the NGN SP. External content may be recommended by the IPTV SP or integrated into the IPTV SP content offers.

NOTE 2: The content provider role includes content brokers acting as CP and is not limited to content producers.

**interaction channel:** logical channel for point-to-point communication through which the UE interacts with the IPTV Services

**interactive TV:** delivers functionality beyond that generally associated with the traditional television reception where the consumer can interact with the program content

**interactivity data:** contains information that is used by the UE to offer interactive services to the user, where the services are associated with the broadcast or on-demand content

**inter-destination media synchronization:** synchronization of media units such that they are outputted simultaneously at different destinations

NOTE: These interactive services enable users to e.g. vote during TV shows or to obtain content related to the broadcast content.

**IPTV Service Provider:** entity that offers IPTV services to the Customers making use of the services capabilities provided by the NGN Service Provider

**IPTV solution:** composition of functions and interfaces needed to provide the IPTV service

**media action data:** information about actions that are performed to control the media

NOTE: These actions may have been performed by the user, by network elements that constitute the IPTV solution or by external applications.

**native applications:** interactive applications that are part of the in-built software or permanently downloaded with the IPTV Terminal Device software in order to interact with the IPTV Terminal device hardware and to provide a quick response

**NGN Service Provider:** entity that offers NGN based services which shares a consistent set of policies and common technologies

**near CoD:** similar to CoD but sent to the user by multicast rather than unicast

NOTE: Service providers often transmit the same material over several channels, each with a different start time and may decide to open channels to successive users can receive the content from whatever point it has reached when they join (much like Broadcast TV). Users can also opt to join the programme at its next scheduled start time.

**non-IPTV terminal device applications:** web or mobile applications that interact with the IPTV system to modify the settings of the IPTV environment or extend the IPTV experience to these devices

**non-linear AV services:** any audiovisual media services where the user decides upon the moment in time when a specific programme is transmitted on the basis of a choice of content selected by the service provider

**Pay Per View (PPV):** offering of pay-television broadcasts to consumers in such a manner that they can make a "one-off" purchase of a particular programme event (for example, a boxing match) separately from their regular package or subscription

NOTE: The programme event is shown at the same time to everyone ordering it (as opposed to a CoD programme event).

**Personalized Channel:** particular list of programs that is scheduled on the basis of the user profile, in which each program is selected from the EPG/ESG that is available to the user, including BC channels or packages and CoD categories

NOTE: Personalized Channel is equivalent to Virtual Channel or Personal Channel.

**Personalized Service Composition:** service offering alternative streams, either alternative video streams (e.g. camera-angles), audio streams (e.g. audio languages) or text streams (e.g. subtitles), where users can select their preferred content streams for personalized consumption

**Personal Video Recorder (PVR):** service whereby the user can store video content from Broadcast TV and replay it at any convenient time

NOTE: This can be achieved using either a client device or cPVR where the storage device forms part of the consumer network or a network facility (nPVR). Consumers can lease disk space from a provider and select content for storage, as required. Recording takes place at the network server and can be downloaded at a later time as required, again using VCR-like functionality.

**Push CoD:** service where content is pre-loaded to the IPTV terminal equipment local storage by the IPTV Service Provider based on user subscription

NOTE: The user may have no direct control of what content is downloaded. The IPTV Service Provider may make the choice based on users' preferences and habits. Content is available on local storage for direct consumption by user and the user has control over viewed content.

**Quality of Experience (QoE):** purely subjective measure from the user's perspective of the overall value of the service provided

NOTE: Apart from its being user dependent, it will invariably be influenced by the user's terminal device (LD or HDTV), his environment (in the car or at home), his expectations (mobile or corded telephone), the nature of the content and its importance (a simple yes/no message or an orchestral concert). Mean Opinion Score used for assessing the quality of telephone connections is a limited form of QoE measurement process, relating to a specific media type, in a controlled environment and without specific user expectations. For video, the methods of monitoring objective performance are discussed in other organizations such as ITU-T. For example, there exists related work on "FR"(Full Reference), "RR"(Reduced Reference) and "NR"(No Reference) concepts.

**Scalable Video Coding:** video coding scheme that allows for hierarchical compression in the sense that decoding a particular layer depend on one or more enhancement layers

NOTE 1: Scalability may be in three dimensions, i.e. spatial (resolution), temporal (frame rate), and quality (SNR).

NOTE 2: Such encoding schemes depend on the targeted application. Depending on the context, the enhancement layers could be transmitted or filtered in any node the stream crosses, including the sender and the receiver.

**server-based applications:** network-accessible interactive applications that are accessed via remote terminal services, for example to save on the processing and storage requirements on the IPTV Terminal equipment, these can be run externally on Interactive Application Servers

**service discovery:** process through which the UE acquires the information about available services including location of Electronic Service Guide (ESG)

**Service Provider (SP):** entity providing a service to the subscriber

NOTE: Different types of service providers may be relevant for television services on IP, see IPTV Service Provider and NGN Service Provider.

**time-shift TV:** facility whereby audio visual information can be stored in the network (see nPVR) whilst it is being broadcast and remain available for later viewing

NOTE: The user is able to start the playback before or after the recording finishes, or use any of the usual VCR functions, as required.

**transport provider:** entity connecting consumers and Service Providers

NOTE: The delivery system usually is composed of access networks and core or backbone networks, which may use a variety of network technologies and be owned by a number of different operators.

**trick modes:** facility to allow the user to control the playback of content, such as pause, fast and slow playback, reverse playback, rewinding, jumping forwards or backwards, playing at double speed, etc.

**User-Generated Content (UGC):** content generated by a user for the purpose of making it available to other users

NOTE: The content may be private, or intended for a restricted audience or intended for unrestricted audience. It is the equivalent of Consumer-Originated Content.

**VCR functions:** common functionalities of a video cassette recorder, such as select/cancel, start, stop, pause (with or without freeze frame), fast forward, reverse, scan forward or reverse (both with or without image), and setting and resetting memory marks

## 3.2 Abbreviations

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

|     |                                   |
|-----|-----------------------------------|
| API | Application Programming Interface |
| AV  | AudioVisual                       |
| BC  | Broadcast Channels                |
| CB  | Content Broker                    |

|         |  |
|---------|--|
| CBMS    | Convergence of Broadcast and Mobile Services         |
| CDN     | Content Delivery Network                             |
| COC     | Consumer-Originated Content                          |
| CoD     | Content on Demand                                    |
| CP      | Content Provider                                     |
| cPVR    | client Personal Video Recorder (see also PVR, nPVR)  |
| DRM     | Digital Rights Management                            |
| DVB     | Digital Video Broadcasting                           |
| DVB-H   | Digital Video Broadcasting - Handheld                |
| DVB-SI  | Digital Video Broadcasting - Service Information     |
| DVD     | Digital Video Disk                                   |
| EPG     | Electronic Programme Guide (see also IPG)            |
| ESG     | Electronic Service Guide                             |
| FR      | Full Reference                                       |
| HD/HDTV | High Definition (TV)                                 |
| HLFR    | High-Level Functional Requirement                    |
| IMS     | IP Multimedia Subsystem                              |
| IP      | Internet Protocol                                    |
| IPG     | Interactive Programme Guide (see also EPG)           |
| IPR     | Intellectual Property Rights                         |
| IPTV    | Internet Protocol TeleVision                         |
| ISDN    | Integrated Services Digital Network                  |
| LD      | Low Definition (TV)                                  |
| LI      | Lawful Interception                                  |
| MCD     | Media Content Distribution                           |
| nCoD    | near Content-on-Demand (see also CoD)                |
| NGN     | Next Generation Network                              |
| nPVR    | network Personal Video Recorder (see also PVR, cPVR) |
| NR      | No Reference   |
| PAP     | Picture and Picture                                  |
| PDA     | Personal Digital Assistant                           |
| PIP     | Picture In Picture                                   |
| PPV     | Pay Per View   |
| PSTN    | Public Switched Telephone Network                    |
| PVR     | Personal Video Recorder                              |
| QoE     | Quality of Experience                                |
| QoS     | Quality of Service                                   |
| RR      | Reduced Reference                                    |
| SD      | Standard Definition (TV)                             |
| SD&S    | Service Discovery and Service selection              |
| SNR     | Signal to Noise Ratio                                |
| SP      | Service Provider                                     |
| SR      | Special Report                                       |
| STB     | Set-Top Box  |
| TR      | Technical Report                                     |
| TS      | Technical Specification                              |
| UE      | User Equipment                                       |
| UGC     | User-Generated Content                               |
| UMTS    | Universal Mobile Telecommunications System           |
| UP      | User Profile   |
| VCR     | Video Cassette Recording                             |
| VoD     | Video on Demand                                      |
| VoIP    | Voice Over Internet Protocol                         |
| WWAN    | Wireless Wide Area Network                           |

## 4 Overview on TISPAN IPTV services

Several standards on IPTV services are evolving in other standards organizations, including DVB, ATIS IIF and OMA. The ETSI TISPAN architecture shall provide the necessary capabilities to support the IPTV service requirements considering the services covered by the present document.

The TISPAN-NGN network should be aware of an ongoing IPTV service provision in order to be able to provide the correct handling of IPTV service.

IPTV services require that the video be stored in multiple coding schemes (and DRM methods) to support a variety of screen resolutions and access bandwidths. IPTV services support in Fixed Mobile Convergence network is required.

The present document is complementary to TS 181 014 [3].

## 4.1 IPTV roles

To provide IPTV services to the users, different roles could be identified within an NGN. Figure 1 represents all the roles identified for IPTV service.

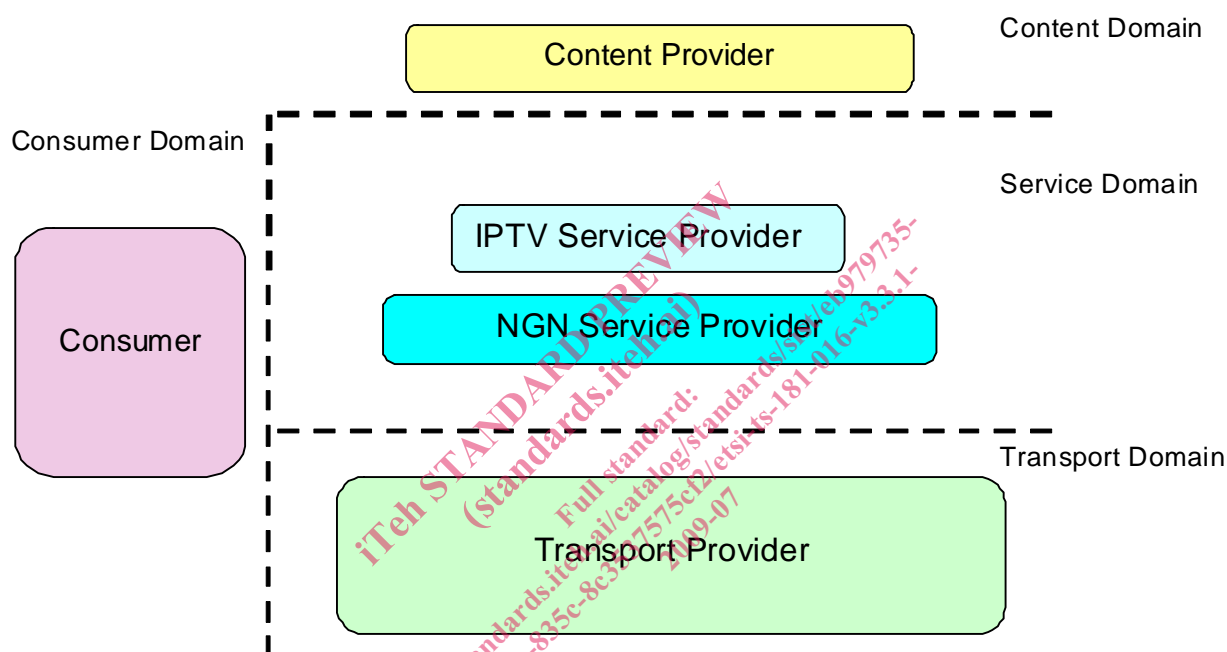


Figure 1

Grouping of some or all of the different roles under the same administrative environment is an operator option, as defined in **NGN operator role** in [9]. For example the IPTV Service Provider and the NGN Service Provider may belong to the same administrative environment, or the Content Provider, the IPTV Service Provider, the NGN Service Provider and the Transport Provider may all belong to the same or different administrative environments.

The roles are described as follows:

The **Content Provider** is the entity that owns or is licensed to sell content or content assets. Although the IPTV Service Provider is the primary source for the Consumer, a direct logical information flow may be set up between Content Provider and Consumer, for example for rights management and content protection. How the Content Provider receipts content from its owners is outside the scope of the present document. Consumers may also be originators of content. The **IPTV Service Provider** is the entity that offers IPTV services to the Customers making use of the services capabilities provided by the NGN Service Provider. It can perform user authentication at the application level. This entity may also provide metadata, content encryption and physical binaries. How the IPTV Service Provider receipts content from the Content Provider is outside the scope of the present document. The IPTV Service Provider may offer wholesale content aggregation services to Content Providers enabling the dynamic delivery of Broadcast Channels (BC) and content titles (CoD) between Content Domain and Service Domain.

NOTE 1: This role is based on the Application Provider role defined in [9] and it is specialized in the context of the IPTV service.