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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

Internet protocol aspects – IPTV over NGN

Requirements for the support of IPTV services

Recommendation ITU-T Y.1901

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Recommendation ITU-T Y.1901

Requirements for the support of IPTV services

Summary

Recommendation ITU-T Y.1901 specifies the high level requirements to support IPTV services. These include IPTV requirements for service offering, network aspects, QoS and QoE, service and content protection, end system, middleware and content.

Source

Recommendation ITU-T Y.1901 was approved on 23 January 2009 by ITU-T Study Group 13 (2009-2012) under the WTSA Resolution 1 procedure.

Keywords

Accounting and charging, content, content discovery and selection, home network, IPTV, IPTV architecture, IPTV service, IPTV terminal device, metadata, middleware, mobility, multicast, QoE, QoS, security, service and content protection, service discovery and selection, service navigation, traffic management.

FOREWORD

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Recommendation ITU-T Y.1901

Requirements for the support of IPTV services

1 Scope

This Recommendation specifies the high level requirements to support IPTV services. These include IPTV requirements for service offering, network aspects, QoS and QoE, service and content protection, end system, middleware and content.

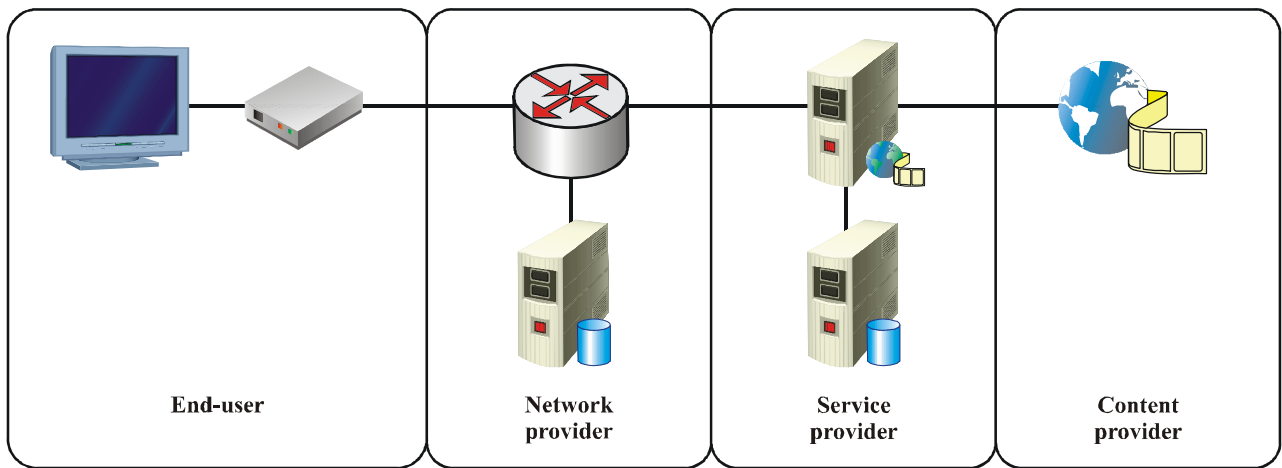
1.1 Organization

The taxonomy that articulates this Recommendation is therefore twofold:

- A functional taxonomy, which aims at reflecting the fact that IPTV services are deployed and operated according to the combined activation of a set of elementary capabilities – IPTV traffic forwarding and routing, IPTV quality of service and quality of experience, IPTV security, IPTV middleware, etc.
- Within each of the aforementioned functional areas, a further classification organizes the requirements into mandatory requirements, recommended requirements and optional requirements.

1.2 IPTV domains

Figure 1-1 shows the main domains that are involved in the provision of IPTV services [ITU-T Y.1910]. It is provided in this Recommendation to help the understanding of requirements which in some way relate to these domains. These domains do not define a business model. Also, one provider may play in multiple domains in the provision of an actual service.



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Figure 1-1 – IPTV domains

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the

currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T Y.1541] Recommendation ITU-T Y.1541 (2006), *Network performance objectives for IP-based services*.

[ITU-T Y.1910] Recommendation ITU-T Y.1910 (2008), *IPTV functional architecture*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 aspect ratio [b-ITU-T T.101]: The ratio of the width to the height of a rectangular area, such as the defined display area.

3.1.2 broadcast [b-ITU-T M.60]: One-way transmission from one point to two or more other points.

3.1.3 content provider [ITU-T Y.1910]: The entity that owns or is licensed to sell content or content assets.

3.1.4 elementary stream [b-ITU-T H.222.0]: Generic term for either the coded video, the coded audio, or other coded bit stream in the PES packet.

NOTE – PES stands for packetized elementary stream.

3.1.5 end-user [ITU-T Y.1910]: The actual user of the products or services.

NOTE – The end-user consumes the product or service. An end-user can optionally be a subscriber.

3.1.6 home network [b-ITU-T H.622]: Home network is the collection of elements that process, manage, transport, and store information, thus enabling the connection and integration of multiple computing, control, monitoring, communication and entertainment devices in the home.

3.1.7 mobility [b-ITU-T Q.1706]: The ability for the user or other mobile entities to communicate and access services irrespective of changes of the location or technical environment.

3.1.8 network provider [ITU-T Y.1910]: The organization that maintains and operates the network components required for IPTV functionality.

NOTE 1 – A network provider can optionally also act as service provider.

NOTE 2 – Although considered as two separate entities, the service provider and the network provider can optionally be one organizational entity.

3.1.9 service information [b-ITU-T J.200]: Data which describes programs and services.

3.1.10 service provider [b-ITU-T M.1400]: A general reference to an operator that provides telecommunication services to customers and other users either on a tariff or contract basis. A service provider may or may not operate a network. A service provider may or may not be a customer of another service provider.

NOTE – Typically, the service provider acquires or licenses content from content providers and packages this into a service that is consumed by the end-user.

3.1.11 subscriber [b-ITU-T M.3050.1]: The subscriber is responsible for concluding contracts for the services subscribed to and for paying for these services.

3.1.12 subscription [b-ITU-T Q.1741.3]: A subscription describes the commercial relationship between the subscriber and the service provider.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 accessibility feature: An additional content component that is intended to assist people hindered in their ability to perceive an aspect of the main content. Examples: captions for the hard of hearing, subtitles in various languages, sign-language interpretation video and descriptive audio.

3.2.2 acquisition: The process of obtaining content by the end-user.

NOTE – For content with accessibility features, this means that the content will be available in a form that can be used by the end-user.

3.2.3 audio description: This service provides a commentary describing the visual events pertinent to the content and augments the dialog in the content.

NOTE – Audio description is primarily intended to assist users who are unable to see the video content clearly. The narrative passages fit between the dialogue and other significant audio content so as not to interfere with it. Ideally, the user can control the volume and spatial positioning of the audio or derive it from a separate output.

3.2.4 captions: Captions provide a real-time on-screen transcript of the dialogue as well as any sound effects.

NOTE – This service can be provided by means of either textual or graphical supplementary content. The captions and the dialogue are usually in the same language. The service is primarily to assist users having difficulty hearing the sound. Ideally, users may have some control over the position and size of the presentation. Different speakers are distinguished, usually by different colours.

3.2.5 channel: Content formatted as a selectable set of data and transported as part of a data stream.

3.2.6 channel changing: The act of changing from one channel to another.

3.2.7 client personal video recorder (cPVR): Same as PVR except that the recording device is located at the end-user's premises.

3.2.8 content protection: Ensuring that an end-user can only use the content they have already acquired in accordance with the rights that they have been granted by the rights holder.

3.2.9 content segment: A continuous portion of a piece of content, for example, a single topic in a news programme.

3.2.10 content tracing: A process to enable the identification of the (arbitrary) origin of content, and/or the responsible party (e.g., the end-user), to facilitate subsequent investigation in the event of unauthorized content copying or distribution.

NOTE – Content tracing information may be attached to content either as metadata, or as a forensic watermark.

3.2.11 delivery network gateway functions (DNGF): Set of functions that mediate between the network and service provider domains and the IPTV terminal function (ITF).

NOTE – A device implementing the DNGF is commonly referred to as the residential gateway (RG) or delivery network gateway (DNG).

3.2.12 delivery network gateway (DNG): A device implementing the DNGF.

NOTE – DNG also is commonly referred to as the residential gateway (RG).

3.2.13 electronic program guide (EPG): A structured set of data, intended to provide information on available content that may be accessed by end-users.

3.2.14 end system: A single or set of consumer devices that support IPTV services (e.g., delivery network gateway, display).

3.2.15 Internet Protocol Television (IPTV): Multimedia services such as television/video/audio/text/graphics/data delivered over IP-based networks managed to support the required level of QoS/QoE, security, interactivity and reliability.

3.2.16 IPTV terminal function (ITF): The end-user function(s) associated with a) receiving and responding to network control channel messages regarding session set-up, maintenance, and tear-down, and b) receiving the content of an IP transport from the network and rendering.

3.2.17 IPTV terminal device: A terminal device which has ITF functionality, e.g., a STB.

3.2.18 linear TV: A television service in which a continuous stream flows in real time from the service provider to the terminal device and where the user cannot control the temporal order in which contents are viewed.

3.2.19 metadata: Structured, encoded data that describe characteristics of information-bearing entities to aid in the identification, discovery, assessment, and management of the described entities.

NOTE – EPG metadata has many applications and may vary in depth from merely identifying the content package title or information to populate an EPG to providing a complete index of different scenes in a movie or providing business rules detailing how the content package may be displayed, copied, or sold.

3.2.20 middleware: A layer of software between applications and resources, which consists of a set of service enablers that allow multiple functionalities running on one or more devices in an IPTV system to interact across a network.

3.2.21 multi-channel audio: Audio signal with more than two channels.

3.2.22 network personal video recorder (nPVR): Same as PVR except that the recording device is located at the service provider premises.

3.2.23 package: A collection of content components that in some combination (either all or a subset) together provide an end-user experience and are intended to be used together.

NOTE – A package can be instantiated with or without audiovisual content depending on scenarios, in which audiovisual content and package can be tightly associated or can be loosely coupled enough to be handled (generation, delivery, consumption) independently.

3.2.24 pay per view (PPV): A TV service where a particular program event (e.g., a hockey match) can be bought separately from any package or subscription. The transmission of the program event is made at the same time to everyone who has ordered it.

3.2.25 personal video recorder (PVR): An end-user controlled device that records, stores and plays back multimedia content. PVR is also known as personal digital recorder (PDR).

3.2.26 picture-in-picture: One program is displayed on the full-seized IPTV TD screen, one or more other programs are simultaneously displayed in inset windows.

3.2.27 place shifting: A function which allows subscribers to see the content without placing limitations.

3.2.28 push VoD: A TV service where multimedia content is packaged and delivered at the discretion of the service provider to the end-user's storage system.

3.2.29 random access point: A point in the content from which playback can begin.

NOTE – For example, in MPEG encoding, this would be an I-frame, as opposed to a P-frame or B-frame.

3.2.30 rights: One or more legal or business entitlements to use or employ content, e.g., to view, record, redistribute content.

3.2.31 re-transmission broadcast service: A service in which content is provided from various broadcasting environments including, but not limited to, terrestrial, satellite and cable, and re-transmitted into IP network simultaneously or otherwise.

3.2.32 SCP: A combination of service protection and content protection.

3.2.33 service: A set of functionalities enabled by a provider for end-users.

NOTE – Example provisioned functionalities include IP connectivity with managed quality of service, video-on-demand.

3.2.34 service protection: Ensuring that an end-user can only acquire a service, and, by extension, the content contained therein, that he or she is entitled to receive.

3.2.35 sign language interpretation: A video service showing an interpreter who uses hand gestures and facial expression to convey the main audio content and dialogue to sign language and lip readers.

NOTE – This service comes in the form of supplementary video content, usually smaller in image size to that of the main video content. Ideally, the user can control the position, size and background properties (solid or transparent and the colour, if solid). It is of sufficient temporal and spatial quality to enable sign reading and lip reading.

3.2.36 skin: A customized graphical appearance (the visual aspect of a graphical user interface (GUI)) applied to certain software and websites for aesthetic reasons or ease of use.

3.2.37 subtitles: Subtitles provide a real-time on-screen transcript of dialogue for the purpose of language translation or to clarify speech that is unclear.

NOTE – This service can be provided by means of either textual or graphical supplementary content. The subtitles and the dialogue are usually in different languages. The assumed audience for subtitling is hearing people who do not understand the language of the dialogue.

3.2.38 supplementary content: Video, audio, textual, graphical or other forms of content that can be optionally accessed by the end-user and rendered by the terminal. It has the following features:

- It only works in conjunction with the main content.
- It is synchronous with the main content.

3.2.39 terminal device (TD): An end-user device which typically presents and/or processes the content, such as a personal computer, a computer peripheral, a mobile device, a TV set, a monitor, a VoIP terminal or an audiovisual media player.

3.2.40 terminal device protection: Ensuring that a terminal device employed by an end-user in the reception of a service can reliably and securely use content while enforcing the rights of use granted for that content, and while physically and electronically protecting the integrity of the terminal device, and the confidentiality of the content and critical security parameters not otherwise protected by encryption or watermarking.

3.2.41 third party metadata: Metadata provided by an entity (which may be a person) not directly tied to the primary service provider by whom the end-user is being served.

3.2.42 time shifting: A function which allows playback of content after its initial transmission.

3.2.43 trick mode functionality: The ability to pause, rewind or forward stored content.

3.2.44 TV with trick mode: TV service with trick mode functionality.

3.2.45 universal design: It is the design of the products and environments to be useable by all people, to the greatest extent possible by including accessibility features in the original design to prevent the need for adaptation after deployment.

NOTE – The intent of universal design is to simplify life for everyone by making products, communications, and the built environment more usable by as many people as possible at little or no extra cost. Universal design benefits people of all ages and abilities.

3.2.46 usage environment description: The usage environment description includes the description of end-user characteristics, terminal capabilities, network characteristics and natural environment characteristics.

NOTE – These various dimensions of the usage environment description, which originate from end-users, can be used for accommodating, for example, the adaptation of contents for transmission, storage and consumption.

3.2.47 user privacy protection: Ensuring that information considered to be private (or confidential) by an end-user be maintained in confidence, while remaining subject to mandatory disclosure due to legal processes.

3.2.48 video-on-demand (VoD): A service in which the end-user can, on demand, select and view a video content and where the end-user can control the temporal order in which the video content is viewed (e.g., the ability to start the viewing, pause, fast forward, rewind, etc.).

NOTE – The viewing may occur some time after the selection of the video content.

3.2.49 wireless network characteristics: The characteristics of a wireless network expressed in terms of the current available bandwidth, packet loss and possibly other wireless network information parameters for a specific wireless link type, e.g., WLAN, cellular, WPAN or WMAN.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AES	Advanced Encryption Standard
API	Application Programming Interface
CBC	Cipher Block Chaining
cPVR	Client PVR
DNG	Delivery Network Gateway
DNGF	Delivery Network Gateway Function
DoS	Denial of Service
DRM	Digital Rights Management
DTS	Digital Theatre System
DVD	Digital Versatile Disc
EAN	Emergency Alert Notification
ECB	Electronic CodeBook
ECM	Entitlement Control Message
EMM	Entitlement Management Message
EPG	Electronic Program Guide
FCAPS	Fault, Configuration, Accounting, Performance, and Security
FTA	Free To Air
GUI	Graphical User Interface
HD	High Definition
HE-AAC	High-Efficiency Advanced Audio Coding
HTML	HyperText Markup Language
ID	Identifier
IP	Internet Protocol
IPTV	Internet Protocol Television

IPTV TD	Internet Protocol Television Terminal Device
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISDN	Integrated Services Digital Network
ITF	IPTV Terminal Function
LAN	Local Area Network
MIKEY	Multimedia Internet KEYing
MPEG	Moving Picture Experts Group
n/cPVR	Network and Client PVR
NAPT	Network Address Port Translation
NAT	Network Address Translation
NGN	Next Generation Network
nPVR	Network PVR
OAMP	Operate, Administer, Maintain, and Provision
OFB	Output FeedBack
OS	Operating System
PDA	Personal Digital Assistant
PDR	Personal Digital Recorder
PES	Packetized Elementary Stream
PPV	Pay Per View
PSTN	Public Switched Telephone Network
PVR	Personal Video Recorder
QoE	Quality of Experience
QoS	Quality of Service
QoSM	Quality of Service Measurement
RACF	Resource and Admission Control Function
RG	Residential Gateway
SCP	Service and Content Protection
SD	Standard Definition
SI	Service Information
SIM	Subscriber Identification Module
STB	Set Top Box
TD	Terminal Device
TS	Transport Stream
TV	Television
UCC	User Created Content
UI	User Interface

UMF	Uniform Media Formats
URL	Uniform Resource Locator
USB	Universal Serial Bus
VBI	Vertical Blank Interval
VoD	Video-on-Demand
WAN	Wide Area Network
WLAN	Wireless Local Area Network
WMAN	Wireless Metropolitan Area Network
WPAN	Wireless Personal Area Network
xDSL	Any of the various types of Digital Subscriber Lines (DSL)
XML	eXtensible Mark-up Language

5 Conventions

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.

The keywords "is prohibited from" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

The keywords "is not recommended" indicate a requirement which is not recommended but which is not specifically prohibited. Thus, conformance with this Recommendation can still be claimed even if this requirement is present.

The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option, and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with this Recommendation.

Requirements are identified using the following conventions:

- Requirement number xx in subclause n.m is of the form R n.m-xx;
- Recommended requirement number yy in subclause n.m is of the form RR n.m-yy;
- Optional requirement number zz in subclause n.m is of the form OR n.m-zz.

NOTE – Future issues of this Recommendation should never reuse previously assigned numbers.

6 Requirements

6.1 General aspects

General requirements

- R 6.1-01: The IPTV architecture is required to support multiple content resolutions and multiple content aspects ratios.
- R 6.1-02: The IPTV architecture is required to allow for a two-way communication between the end-user and the service provider.

- R 6.1-03: The IPTV architecture is required to support mechanisms to support on demand services.
NOTE 1 – Further information regarding "on Demand service" can be found in [b-ITU-T Y-Sup.5].
- R 6.1-04: The IPTV architecture is required to support navigation capability for IPTV content.
- R 6.1-05: The IPTV architecture is required to support the ability of the ITF to display and allow user selection of program, content, and service descriptions.
- R 6.1-06: The IPTV architecture is required to support service selection mechanisms.

NOTE 2 – Further information regarding service selection can be found in clauses 6.6.5 and 6.6.6.

General recommendations

- RR 6.1-01: The IPTV architecture is recommended to support content segmentation.
- RR 6.1-02: The IPTV architecture is recommended to ensure content and segment data integrity.
- RR 6.1-03: The IPTV architecture is recommended to support a mechanism for obtaining information pertaining to terminal device capabilities.
- RR 6.1-04: The IPTV architecture is recommended to present an open interface for 3rd party applications to use the capabilities and resources of the service and network functional components.
- RR 6.1-05: The IPTV architecture is recommended to support 3rd parties metadata (e.g., content recommendations) in addition to metadata from service/content providers.
- RR 6.1-06: The IPTV architecture is recommended to support the display of multiple supplementary video streams and layouts.
- RR 6.1-07: The IPTV architecture is recommended to support various encapsulation types including MPEG-2 TS.
- RR 6.1-08: The IPTV architecture is recommended to allow the delivery of IPTV services to any type of IPTV terminal device, e.g., mobile phone, PDA, set top box.
- RR 6.1-09: The IPTV architecture is recommended to support functions in order to adapt dynamically to changes in wireless networks characteristics when the service is delivered over a mobile network, e.g., bandwidth, packet loss rate.
- RR 6.1-10: The IPTV architecture is recommended to support viewership data tracking while protecting the user's privacy as required in clause 6.3.6.

NOTE 3 – For example, this tracking may allow content provider and service provider to provide audience rating service, track popular programs, craft and target specific advertisements to particular groups of users demonstrating certain surfing patterns.

- RR 6.1-11: The IPTV architecture is recommended, if viewership data tracking is supported, to have the ability to configure it on a per user basis, a per content basis and a combination of both.
- RR 6.1-12: The IPTV architecture is recommended to support (remote) software upgrade and (e.g., configuration data) download.
- RR 6.1-13: The IPTV architecture is recommended to support XML encoding for application signalling.
- RR 6.1-14: The IPTV architecture is recommended to have a means to allow content to be seen only by the appropriate audience. This means it may be triggered by the service provider and/or the user.

- RR 6.1-15: The IPTV architecture is recommended to support mechanisms for allowing the integration of other telecommunication services (e.g., instant messaging, telephony) into IPTV services.

General options

- OR 6.1-01: The IPTV architecture can optionally support separate content and segment metadata storage and distribution.
- OR 6.1-02: The IPTV architecture can optionally support the replacement of the content caching and distribution algorithm.
- OR 6.1-03: The IPTV architecture can optionally support advertisement insertion.
- OR 6.1-04: The IPTV architecture can optionally support the time-shift TV functionality.
- OR 6.1-05: The IPTV architecture can optionally support usage environment description.
- OR 6.1-06: The IPTV architecture can optionally support content presentation adaptation to the usage environment.

6.1.1 Service offering

Architecture requirements

- R 6.1.1-01: The IPTV architecture is required to support the ability for the service provider to prevent the sending of bulk unsolicited content to end-users.
- R 6.1.1-02: The IPTV architecture is required to support interactive services such as educational applications, entertainment applications (such as games), communications services (such as mail, chat, and messaging), and information services (such as stock and weather services).
- R 6.1.1-03: The IPTV architecture is required to support mechanisms for the delivery of interactive and downloadable contents including games.
- R 6.1.1-04: The IPTV architecture is required to support mechanisms to block transmission of content to specified geographical areas whenever blackout requirements are applicable.
- R 6.1.1-05: The IPTV architecture is required to support the service provider to be able to push content onto the terminal device (content requested or not by the end-user).
- R 6.1.1-06: The IPTV architecture, if cPVR is supported, is required to support the service provider to be able to insert additional contents in content played from the cPVR.

Architecture recommendations

- RR 6.1.1-01: The IPTV architecture is recommended to allow seamless IPTV service provision and operation across different networks supporting IPTV services.
- RR 6.1.1-02: The IPTV architecture, if retransmission broadcast service is supported, is recommended to support geographical regionalization of content.
- RR 6.1.1-03: The IPTV architecture is recommended to support mechanisms for the receipt of content from different sources, e.g., satellite, dedicated IP connections.
- RR 6.1.1-04: The IPTV architecture is recommended to support mechanisms for the content provider to perform content management such as uploading content or deleting content or modifying the relevant attributes of content.
- RR 6.1.1-05: The IPTV architecture, if retransmission broadcast service is supported, is recommended to provide comparable quality of experience to the end-user as the direct reception.
- RR 6.1.1-06: The IPTV architecture is recommended to support real-time encoded and pre-encoded stored programs.

Architecture options

- OR 6.1.1-01: The IPTV architecture can optionally support a cPVR function.
- OR 6.1.1-02: The IPTV architecture can optionally support a nPVR function.
NOTE – The nPVR function may be subject to national regulation as far as service and content protection aspects are concerned.
- OR 6.1.1-03: The IPTV architecture can optionally support means for the content provider to define a set of language options for its content.
- OR 6.1.1-04: The IPTV architecture can optionally support mechanisms to capture and utilize user profiles and preferences to target/restrict content items.
- OR 6.1.1-05: The IPTV architecture can optionally convert video content from its stored format into one that is compatible with that required to be displayed on the devices implementing the ITF.
- OR 6.1.1-06: The IPTV architecture can optionally support mechanisms that allow private entities, e.g., residential users, to act as content providers for the purpose of sharing their own content.
- OR 6.1.1-07: The IPTV architecture can optionally support the ability to trace the source of incoming content, e.g., messages that have been a cause for complaint by an end-user.
- OR 6.1.1-08: The IPTV architecture can optionally support for the insertion of content into VoD content.
- OR 6.1.1-09: The IPTV architecture can optionally have the capability to support insertion of appropriately scoped advertisements (e.g., geographically or demographically).
- OR 6.1.1-10: The IPTV architecture can optionally support mechanisms for targeted advertising (e.g., based on user profile preferences).

6.1.2 Accounting and charging

Architecture requirements

- R 6.1.2-01: The IPTV architecture is required to support IPTV services accounting and charging. This includes charging through various charging methods (such as prepay, post pay, advice of charge, and third-party charging).
- R 6.1.2-02: The IPTV architecture is required to not preclude the use of NGN charging architectures for all IPTV services accounting and charging functions.
- R 6.1.2-03: The IPTV architecture is required to support mechanisms for the collection of data for accounting and reporting purposes, partner settlements, and reconciliation of end-user usage, such as service subscriptions, purchases, and transactions.
- R 6.1.2-04: The IPTV architecture is required to include capabilities for transferring settlement information between service providers.
- R 6.1.2-05: The IPTV architecture is required to support the acquisition of appropriate VoD accounting data, to fulfil licensing agreements.
- R 6.1.2-06: The IPTV architecture is required to support the service provider to be able to authenticate, authorize and charge the subscriber.

Architecture recommendations

- RR 6.1.2-01: The IPTV architecture is recommended to allow service providers to integrate IPTV services accounting and charging functions with accounting and charging components that can be used across multiple NGN services and applications.

6.1.3 Service consumption

Architecture requirements

- R 6.1.3-01: The IPTV architecture is required to support a means for the service provider to provide an integrated presentation of content received at the ITF via out-of-band (to IP) delivery methods and via IP networks, i.e., hybrid methods.
- R 6.1.3-02: The IPTV architecture is required to support mechanisms so that the end-user can filter unwanted contents.
- R 6.1.3-03: The IPTV architecture is required to support the end-user with the ability to move between a free-to-air (FTA) and a pay per view (PPV) environment.
- R 6.1.3-04: The IPTV architecture is required to support the end-user with the ability to choose a preferred language option (audio, subtitles, captioning, supplementary video and supplementary descriptive audio) from various languages that the content provider pre-defined and the service provider delivered.
- R 6.1.3-05: The IPTV architecture is required to support the ability for the end-user to turn on and off the audio, the subtitles, captioning, supplementary video, and supplementary descriptive audio at anytime without altering any of the default setting options.
- R 6.1.3-06: The IPTV architecture is required to support the capability to store and retrieve multiple profiles containing sets of user interface preference settings and language settings so that it will be easy to switch to different personal preferences for different viewers.

Architecture recommendations

- RR 6.1.3-01: The IPTV architecture is recommended to support the capability for the subscriber to query his or her usage detail record lists.
- RR 6.1.3-02: The IPTV architecture is recommended to support the ability for the end-user to independently select a default language for each of the following: audio, subtitle, captioning, supplementary video and supplementary descriptive audio.
- RR 6.1.3-03: The IPTV architecture is recommended to support the capability for the end-user to switch audio, subtitles, captioning, supplementary video, and supplementary descriptive audio back and forth when the user is watching the program without having to change his or her preferred language settings.
- RR 6.1.3-04: The IPTV architecture is recommended to allow the end-user, according to his or her rights, to replace an IPTV terminal device without inherently affecting his or her rights to consume content.

Architecture options

- OR 6.1.3-01: If the end-user's language option cannot match the predefined content languages, the IPTV architecture is recommended to support the capability for the IPTV terminal device to present the content with default audio, default subtitles, default captioning, default supplementary video and default supplementary descriptive audio.

6.1.4 Miscellaneous

Architecture requirements

- R 6.1.4-01: The IPTV architecture is required to support a means to present the ITF with the time of day reference.
- R 6.1.4-02: The IPTV architecture is required to support mechanisms for the service provider to operate, administer, maintain, and provision (OAMP) IPTV devices.
- R 6.1.4-03: The IPTV architecture is required to facilitate the ability of the service provider to manage the IPTV services with regard to fault, configuration, accounting, performance, and security (FCAPS).