

INTERNET PROTOCOL TELEVISION (IPTV) FUNCTIONAL ARCHITECTURE

The XIV Meeting of the Permanent Consultative Committee I: Telecommunications,

CONSIDERING:

- a) That advanced services and new technologies are essential tools for the region's social and economic development;
- b) That such services and technologies are in constant evolution and accordingly, we must continue to develop models of practical cases for consultation by the countries of the region;
- c) That IPTV technology is becoming part of the development of communications, which are essential for individual and community growth;
- d) That IPTV technology is producing major changes in the way in which video and multimedia digital services are provided, promoting the development of communications, and providing new tools that bring us ever closer to other communities in the world, and
- e) That the IPTV vision includes the delivery of multimedia services across a large variety of delivery modes, including wireline, fiber, fixed wireless, and mobile wireless,

RECOGNIZING:

- a) That IPTV offers the promise of new innovative video entertainment experiences to the public;
- b) That the integration of IPTV video services and telecommunications services will offer benefits with enhanced value to the public, and
- c) That IPTV has been deployed or is to be deployed in many regions and in a number of countries of the Americas,

RESOLVES:

1. To endorse ITU-T Recommendation Y.1910 "IPTV Functional Architecture" with no deletions, additions or modifications.
2. That the Rapporteur Group on Standards Coordination continues to monitor IPTV telecommunications developments and determines its applicability for America as this work evolves.

¹ CCP.I-TEL/doc.1681/09

ANNEX TO RESOLUTION CCP.I/RES. 145 (XIV-09)

SUMMARY

A Standards Coordination Document is proposed which addresses ITU-T Recommendation Y.1910 – “IPTV Functional Architecture”. This Recommendation provides a functional architecture to support IPTV service requirements and definitions. Starting from a basic description of IPTV roles and services, a high level IPTV functional model is outlined. This model is then developed into a set of functional architectures which support NGN and non-NGN transport networks, as well as operation modes with or without IMS.

STANDARDS COORDINATION DOCUMENT

Internet Protocol Television (IPTV) Functional Architecture

1. EXECUTIVE SUMMARY

IPTV, defined by ITU-T as “multimedia services such as television/video/ audio/text/graphics/data delivered over IP-based networks managed to support the required level of quality of service (QoS)/quality of experience (QoE), security, interactivity and reliability”, is one of the most significant business cases and drivers for the deployment of Next Generation Networks (NGN).

ITU-T Recommendation Y.1910 “IPTV Functional Architecture” [1] describes the IPTV functional architecture intended to support IPTV services based on the IPTV service requirements and definitions. Starting from a basic description of IPTV roles and services, a high-level IPTV functional model is outlined. This model is then developed into a set of functional architectures, which support Next Generation Networks (NGN) and non-NGN transport networks, as well as operation modes with or without the IP Multimedia Subsystem (IMS).

This functional architecture can support multiple service providers, if this is allowed by regulation and the end user is able to connect over the network to another provider or providers. Those service providers, in turn, can have multiple relationships with different content providers. The architecture can also support new services, such as user-generated content, where the end users themselves can push the content up into the network and make it available to other users.

The Working Group on Standards Coordination started to study IPTV at the X PCC.I meeting in Buenos Aires, Argentina in March 2007 [2]. These studies continued [4] at the XI PCC.I meeting in Mendoza, Argentina in September 2007 in which the PCC.I Plenary approved the creation of a Technical Notebook on Practical Cases of Implementation of Internet Protocol Television (IPTV) Technology [3].

In addition, during the XII PCC.I meeting in Washington DC, United States of America, in March 2008, the Working Group on Standards Coordination considered documents dealing with IPTV standards [7], convergence considerations [5] and deployment matters [6]. Section 3 of the Next Generation Networks - Standards Overview Technical Notebook (CCP.I-TEL/doc. 1438/08) provides a comprehensive description of IPTV.

This CSD proposes that ITU-T Recommendation Y.1910, “IPTV Functional Architecture” approved by the ITU-T SG 13 on September 12th 2008, be endorsed by the PCC.I for the region of the Americas.

2. BACKGROUND

Recommendation ITU-T Y.1910 provides a standard reference model of the component functions needed in an end-to-end IPTV solution and how they interact with each other. The IPTV functional architecture framework shown in Figure 1 identifies the principal functional groups for IPTV.

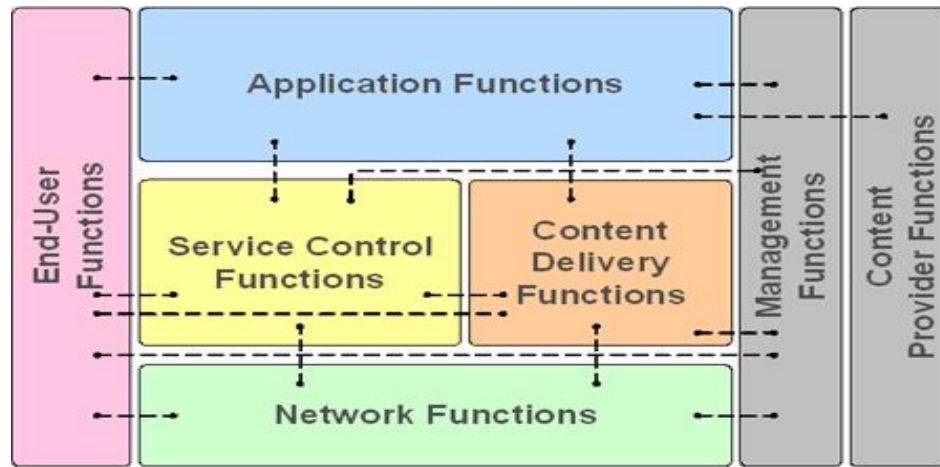


Figure 1: IPTV functional architecture framework

On the extreme left are the end-user functions, which perform mediation between the end-user and the IPTV infrastructure. They cover things like the set-top boxes, home gateways, mobile devices, and PC clients – effectively, the hardware and software components that allow the end user to receive and consume content.

On the extreme right are the content-provider functions that are provided by the entity that owns or is licensed to provide (i.e., sell, rent or give free usage permission) content or content assets (i.e., owner of the content, metadata and usage rights). In other words, these are the functions needed to provide the movies, TV channels; music downloads, and so on, that are made available over the service.

At the bottom of Figure 1 is the IP network – the network functions – that delivers the content from its source, which is provided by the content-delivery functions. These functions deliver, for example, video-streams as multicast TV channels; to multiple users, or as unicast service to individual users, over the network.

The service control functions provide the functions to request and release network and service resources required to support the IPTV services. These functions manage the QoS, network resources, and delivery resources to ensure that the content is received correctly by the end user. The service control functions can optionally obtain end-user's current location from the network functions.

The application functions enable the end-user functions to select and purchase or rent a content item. They basically provide such things as the traditional program guide, advertising, interactive capabilities, and so on. This is where the new features and functions of IPTV services will be developed and provided.

Finally, between the service-provider domain and the content-provider functions are the management functions that perform overall system management (i.e., operations, administration, maintenance and provisioning (OAM&P)). The management functions do not include the functions that provision the behavior within applications or the functions that gather accounting information within applications.

Architectural Approaches

An important characteristic of the architecture is that it works across all network technologies. In particular, this means that network providers have several broad options in handling current network-technology issues. Recommendation Y.1910 identifies three IPTV architecture that enable service providers to deliver IPTV services:

- 1. Non-NGN IPTV functional architecture:** The architecture does not depend on a Next-Generation Network (NGN) architecture. The technology components, protocols and interfaces used in this IPTV architecture are already in use and hence this approach is a representation of typical existing networks providing IPTV services. This architectural approach can optionally be used as the basis for evolution towards the other IPTV architectures listed below.
- 2. NGN-based and non-IMS IPTV functional architecture:** An IPTV service component is drawn on top of the other NGN service components in an NGN architecture as identified in [ITU-T Y.2012], while the IPTV service component is obtained without using the IP Multimedia Subsystem (IMS) technology standards.
- 3. NGN IMS-based IPTV functional architecture:** An IPTV service component is drawn on top of the other NGN service components in NGN architecture, while the IPTV service component is obtained by using IMS.

3. CONCLUSIONS

The Working Group on Technology recommends that PCC.I endorses ITU-T Recommendation Y.1910 “IPTV Functional Architecture” with no deletions, additions or modifications.

4. FUTURE WORK

The Rapporteur Group on Standards Coordination will continue monitoring the progress of the IPTV as CITEL Members State can benefit from these developments.

5. RESOURCE DOCUMENTS

- [1] ITU-T Recommendation Y.1910, IPTV Functional Architecture.
- [2] “IPTV Standards: ATIS IPTV Interoperability Forum (IIF)”, CCP.I-TEL/doc. 986/07, Buenos Aires, Argentina, March 2007.
- [3] “Creation of a Technical Notebook on Practical Cases of Implementation of Internet Protocol Television (IPTV) Technology”, CCP.I-TEL /doc.1128/07 rev.1, Mendoza, Argentina, September, 2007.
- [4] “Internet Protocol Television (IPTV)”, CCP.I-TEL /doc.1130/07, Mendoza, Argentina, September, 2007.
- [5] “IPTV in a World of Convergence”, CCP.I-TEL /doc.1245/08 cor.01, Washington, DC, USA, March, 2008.
- [6] “IPTV Developments in Canada”, CCP.I-TEL /doc.1246/08, Washington, DC, USA March, 2008.

- [7] “IPTV Standardization Activities in ITU-T”, CCP.I-TEL /doc.1227/08, Washington, DC, USA March, 2008.