

Open IPTV Forum – Toward an open IPTV standard

Mats Cedervall, Uwe Horn, Yunchao Hu, Ignacio Más Ivars and Thomas Näsström

To exploit new business opportunities in the area of IPTV, the service must evolve from “TV over IP” into an interactive, personalized application that runs on several devices and can easily be integrated with other services.

This article gives an overview of the Open IPTV Forum, whose aim is to work out a future-proof standard for evolving IPTV services. The authors summarize the main features and requirements addressed by the Open IPTV Forum and present Ericsson’s take on how some of the challenges raised by the forum ought to be resolved.

Introduction

Fixed and mobile broadband access networks enable new, internet-based media services for consumption on PCs, portable devices, and mobile phones. Two examples of video-centric services are YouTube and Joost.^{1,2} Moving ahead, home networks will also have an increasingly important role. Indeed, Strategy Analytics states that the most significant home technology trend of the next five years will be the ability of fixed and portable devices to exchange media with each other over a multimedia home network.³

By way of example, Sony’s LocationFree concept addresses this trend by making content from different sources (for instance, live TV channels, DVD and DVR) available on all kinds of devices, including large-screen TVs, PCs/laptops, and portable players.⁴ Forums such as the Digital Living Network Alliance (DLNA) are working on guidelines and specifications to guarantee interoperability between consumer devices from vendors in networked home environments.⁵

Advances made in access and home network technologies have already led to a significant shift in the way many young people consume media. Studies show that this category of users prefers online media to traditional, linear media such as TV, radio, CD/DVD, and newspapers.⁶ A study conducted by Ofcom in the UK, for example, found that on average the time that youth aged 16-24 watch TV each week has declined by seven hours.⁷

These are clear indications that traditional TV services must compete with other media services that are perhaps more relevant in terms of delivery and content to the lifestyle of young consumers. The advertising industry has already recognized this phenomenon and is spending increasingly more money on online ads and less on traditional media, including newspapers and TV.

IPTV is being billed as an enabler of new business models in the media service landscape. However, it has to provide more than just TV over IP; indeed, to succeed, IPTV must evolve into an interactive, personalized application framework for creating multi-

media-centric applications that can be used and controlled from several devices and easily integrated with other services. To achieve this goal, future-proof IPTV solutions are needed that support

- media transport over managed networks and the public internet;
- fixed-mobile convergence;
- integration with communication services; and
- integration with home networks and associated devices.

Open IPTV Forum

Although several standardization bodies recognized the importance of IPTV, the landscape in 2006 was still quite fragmented. Notwithstanding, it was understood that open, standardized solutions would be needed to stimulate the emerging market. Moreover, it was agreed that turning fixed-mobile convergence and home network integration into simple-yet-attractive consumer offerings would require collaboration among companies from different market segments. Consequently, as a result of an initiative driven by Sony and Ericsson, the Open IPTV Forum was formed and announced in March 2007. The founding members consisted of established players in relevant market segments, such as consumer electronics, fixed and mobile network infrastructure, and telecom operators (Box A). The members all share the same vision of how IPTV will evolve and agree that quick market adoption of IPTV services requires an appropriate standard.

As of August 2007, the Open IPTV Forum is open to new members, and numerous operators, consumer electronics providers, home-equipment providers and content providers have expressed interest in belonging. The Forum is thus growing into a representative body for all key stake holders in the IPTV area.

A guiding principle of the work by the Open IPTV Forum is an architectural design that acknowledges different roles in the IPTV value chain. The two most important business models are called Managed Network and Open Internet (Figure 1).

In the Managed Network business model, one entity (for instance, a telecommunications operator) has three roles: it provides the IPTV service, operates the service platform, and delivers the service over the operator’s access network. This is the

TERMS AND ABBREVIATIONS

AJAX	Asynchronous JavaScript and XML	IMS	IP Multimedia Subsystem
ATIS	Alliance for Telecommunications Industry Solutions	IP	Internet protocol
DLNA	Digital Living Network Alliance	IPTV	IP television
DSL	Digital subscriber line	NGN	Next-generation network
DVB	Digital video broadcasting	PVR	Personal video recorder
ETSI	European Telecommunications Standards Institute	QoS	Quality of service
GUI	Graphical user interface	RTSP	Real-time streaming protocol
HDTV	High-definition television	SIP	Session initiation protocol
HTTP	Hypertext transport protocol	SVG	Scalable vector graphics
IETF	Internet Engineering Task Force	TISPAN	Telecommunications and Internet converged Services and Protocols for Advanced Networking (a technical committee of ETSI)
IGMP	Internet group multicast protocol	UNI	User-network interface
IIF	IPTV Interoperability Forum	VoD	Video on demand

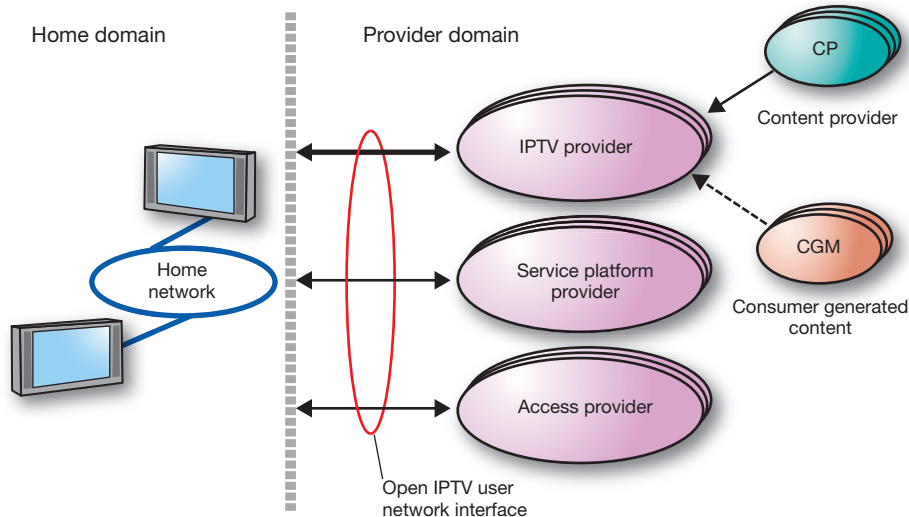


Figure 1
Open IPTV common user-network interface (UNI).

typical setup for triple-play or walled-garden offerings. Quality-of-service (QoS) issues (for instance, network dimensioning, bandwidth split between different services, and resource reservation) are easier to manage in this business model because the same entity operates the access network and provides the service.

In the Open Internet business model, the same entity operates the IPTV service and service platform, but the service is delivered over the public internet.

Although the Managed Network and Open Internet business models are distinct, they share a common user-network interface (UNI) between user premises and the network.

To speed up market adoption, the Forum calls for the reuse of existing technologies and standards. Examples of select technologies are DLNA, IMS, DVB-IP, internet portals, web browsers, and multimedia middleware. Extensions can be added when these technologies do not adequately fulfill specific requirements. The Forum also intends to establish procedures for interoperability testing, and a logo program, to further promote the use of compatible products. In addition, the Forum is establishing a technology baseline that defines key technologies for reaching the long-term objectives of new consumer experiences based on personalization and interactivity. The requirements for the first release have already been approved; the ar-

chitecture is in draft version; and the protocol specification is scheduled for completion by the end of 2007.

Key features and requirements

The Open IPTV standard will support ordinary IPTV functionality, such as broadcast and video-on-demand (VoD) services delivered at standard definition (SD) and high definition (HD) quality. It will also support video recording functionality in the network and in consumer devices. Furthermore, a special guide will help consumers to find the

content that interests them. Content can be protected by means of service access, digital rights management (DRM), and parental control.

Apart from these standard functionalities, the Forum has identified areas of strategic importance for the evolution of IPTV.

Home networking

As mentioned above, multimedia home networks will play an important role in coming years, and forums such as DLNA are drafting guidelines and specifications to guarantee interoperability between consumer devices from different vendors in networked home environments.

BOX A, OPEN IPTV FORUM

Created: March 2007

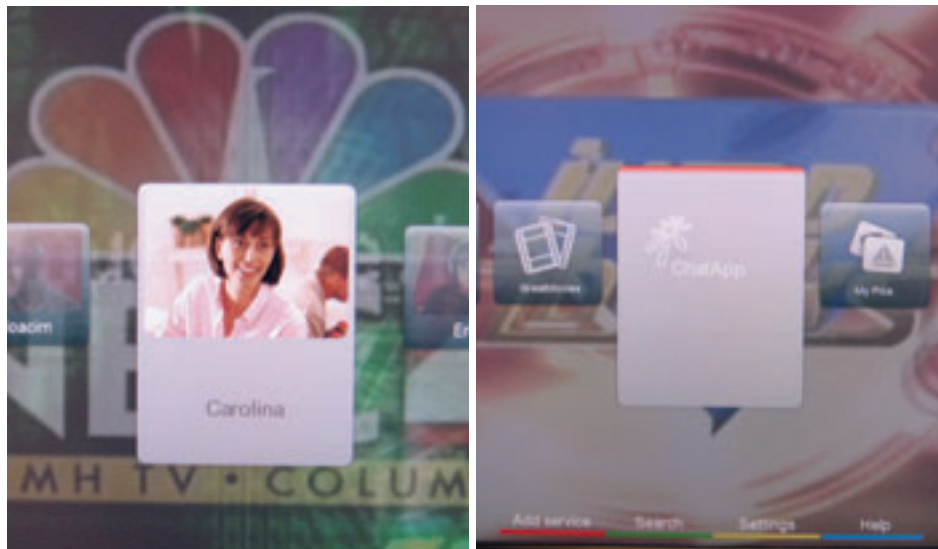
Founding members: AT&T Inc., Ericsson, France Telecom, Panasonic, Philips, Samsung, Siemens Networks, Sony, and Telecom Italia.

Goal: To develop open standards in order to accelerate the deployment of IPTV services that maximize the benefits of IPTV for consumers, network operators, content providers, service providers, consumer electronics manufacturers, and infrastructure providers.

While standardization bodies address specific elements of IPTV, the pan-industry Open IPTV Forum will work to aggregate today's diverse standards into a complete delivery solution, with the goal of accelerating the full standardization of IPTV-related technologies. The Open IPTV Forum is also establishing requirements and architecture as well as protocol specifications.

For more information on the Open IPTV Forum, including the procedure for joining it, please visit www.openiptvforum.org.

Figure 2
Screenshots of an Ericsson IMS IPTV prototype.



The strong presence of the consumer electronics industry in the Open IPTV Forum enables it to specify solutions for seamless interworking between home networks and next-generation IPTV services.

The Open IPTV Forum has formulated requirements that should enable access to IPTV content not only from TV sets but also from other home devices, such as portable multimedia players, laptop computers,

and so on. This will include the ability to transfer an ongoing IPTV session from one home device to another. A common goal is to keep the cost of consumer devices affordably low.

BOX B, IMPORTANT IPTV STANDARDIZATION ACTIVITIES

ITU-T

In 2006, ITU-T established an IPTV Focus Group with the mission to coordinate and promote the development of global IPTV standards while taking into account the work of ITU study groups as well as that of other standardization organizations, forums and consortia.

ETSI TISPAN

TISPAN is an ETSI standardization body whose focus is on next-generation networks (NGN), which are characterized by the convergence between PSTN and IP-based data networks. The aim is to reuse IMS in the fixed domain (3GPP developed IMS for mobile networks). TISPAN is also addressing the development of standards for an IPTV system that makes use of the NGN IMS architecture and its features (user and network authentication, multimedia session control, user profiles, charging, and so on) and integrates IPTV solutions defined by other organizations (ATIS IIF, DVB, and so on) into an IMS-based architecture.

DVB Project

The industry-led DVB Project has standardized the delivery of TV services over satellite, cable, and terrestrial distribution networks. In 2006,

DVB also began addressing the delivery of TV services over bidirectional broadband access networks. ETSI has adopted and published the DVB-IP Phase I specifications, which cover the simplest IPTV scenarios. The focus of DVB-IP Phase II is on the integration of IPTV with traditional IP services, including TV delivery over the public internet.

ATIS IIF

The goal of the IPTV Interoperability Forum (IIF) within ATIS is to develop standards and related technical activities that enable the interoperability, interconnection and implementation of IPTV systems and services, including video on demand (VoD) and interactive TV services. The forum puts special emphasis on the needs of North American and ATIS member companies in coordination with other regional and international standardization organizations. The initial focus will be on the creation of an overall reference architecture for IPTV. Special attention will be given to content delivery with guaranteed QoS, and DRM; interoperability standards and testing requirements for components; reliability and robustness of service components; and the establishment of user expectations.

User identities

At present, IPTV subscriptions are typically associated with a device or smartcard that can be shared by an entire household. Open IPTV, by contrast, has stipulated the requirement to support individual user identities. The idea is that by being able to authenticate themselves on an individual basis, users can enjoy greater personalization, even when a household shares a subscription. A default family identity is always used when individuals have not authenticated themselves.

Service portability

Service portability refers to the ability of different kinds of devices to access a service over a variety of access networks, including fixed and mobile access networks. The concept also includes “roaming” – for example, access to a service in a home network over a visited network.

Session continuity

Session continuity is the ability to start a session on one device and to continue it on another device. For instance, users who start a video-on-demand (VoD) session on a mobile or portable device should be able to transfer the session to, and continue it on, their home TV.

Integration with communication services

Two strong trends call for the integration of IPTV services with communication services. First, many people already use communications services, such as instant messaging (chat), telephony, and e-mail, while they are watching TV. A range of devices are frequently used for this kind of multitasking. In the future, however, many people will want to manage their services from the same device they use to consume IPTV services.

A second trend, which is more closely related to new TV formats, engages viewers in the programs they watch by adding, say, voting or chatting as integral parts of the format. Better integration between IPTV and communication services will help redefine the social rather than viewing experience.⁶

User-generated content

Present-day IPTV services solely deliver professional content. However, user-generated content is growing in popularity and can become an additional source of entertainment. The Open IPTV Forum is thus addressing the capabilities that will be needed to enable individuals to inject and consume user-generated content.

New advertising formats

IPTV has great potential for new advertising formats and associated revenue streams. The Open IPTV Forum has thus formulated requirements that address new advertising formats along with regionalized and personalized advertisements.

Open IPTV and IMS

The Open IPTV Forum has selected IMS as the enabling architecture for the Managed Network model. This way, Open IPTV can build on ongoing next-generation network (NGN) standardization activities in ITU-T and ETSI TISPAN.

In particular, ETSI TISPAN, which addresses the next-generation network specification in Europe, recently started to work together with 3GPP on an IMS-centric next-generation network specification that suits wireless as well as fixed networks.

IMS brings the following main advantages to the Managed Network model in Open IPTV:

- IMS provides mechanisms that support

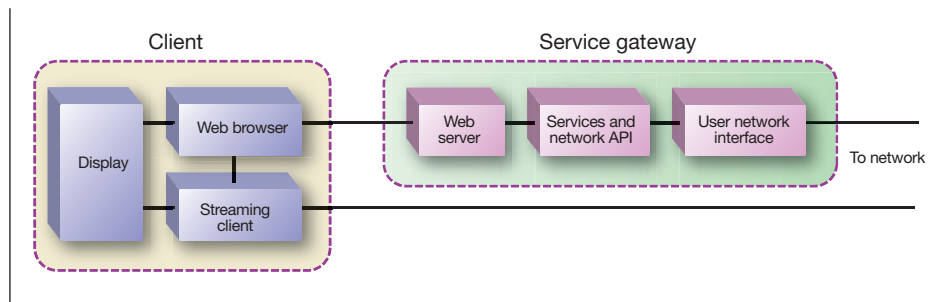


Figure 3
Functional split in the home domain.

the delivery of multiple services over a common managed transport and give control over quality of service.

- Communication services provided by IMS can be reused and integrated into an IPTV service offering.
- IMS identity management, authentication, and authorization functions can be reused for DRM and for protecting service access.
- IMS user profile management can be reused for the personalization of IPTV services.

Within IMS, SIP is used as an application layer request-response protocol to establish and manage sessions.¹² It may also be used for controlling the core IPTV service as well as all integrated communications services. Obviously, this greatly simplifies implementation and testing (compared with using different protocol stacks). SIP stacks, which are available from a variety of companies, run on a range of devices including mobile phones.

Ericsson's solution strategy

Many of the features now under standardization by the Open IPTV Forum have been tested by Ericsson in the IMS IPTV prototype. Figure 2 shows two screenshots. The first (left) shows how different user profiles can be selected for achieving greater personalization. The second (right) shows how a chat application is selected from the main menu.

Support for the Open Internet and Managed Network business models

Ericsson will provide solutions both for the Open Internet and Managed Network business models specified by the Open IPTV

Forum. For the Managed Network model, IPTV services will be integrated into the existing IMS product portfolio.

Functional split in the home domain

As mentioned above, consumer devices for home applications must be affordable and easy to use. These requirements stand in stark contrast to the demand for new capabilities. One solution, however, is to split user interface-related functions from the full application logic.

Figure 3 shows the basic idea behind this thin-client approach, which Ericsson advocates in its IPTV solution. The client consists primarily of a web browser and an integrated streaming client. The application logic resides in a gateway mode that can be located in the home (for instance, as part of the broadband access router) or in the service provider's network. Support of asynchronous JavaScript and XML (AJAX) technologies and rich media enablers, such as scalable vector graphics (SVG), will create a responsive and appealing user experience.

TRADEMARKS

DLNA is a registered trademark of the Digital Living Network Alliance.

Joost is a trademark of Joost N.V.

Sony and LocationFree are trademarks and/or service marks of Sony.

YouTube Broadcast Yourself is a trademark of Google, Inc.

Broadband architecture tailored to IPTV

IPTV services put unique demands on all nodes in the broadband access network. As part of the IPTV solution strategy, Ericsson has therefore developed a broadband architecture that addresses the needs of bandwidth intensive, high-quality IPTV services. For additional details, see *Network infrastructure for IPTV* in this issue.⁹

Conclusion

The Open IPTV Forum, launched in March 2007, is made up of established players in relevant market segments, such as consumer electronics, fixed and mobile network infrastructure, and telecom operators. These members all share the same vision of how IPTV will evolve.

A guiding principle of the work by the Open IPTV Forum is an architectural design that acknowledges different roles in the IPTV value chain. The two most important business models are called Managed Network and Open Internet.

The requirements have already been approved for the first release of Open IPTV; the architecture is in draft version; and the protocol specification is scheduled for completion by the end of 2007. What is more, work is already underway to specify the requirements for a second release.

As of August 2007, the Open IPTV Forum is welcoming new member applicants.

Ericsson will provide a solution for both the Open Internet and the Managed Network business models addressed by Open IPTV. In line with the approach taken by the Open IPTV Forum, the solution that targets the Managed Network IPTV business model will be based on IMS.

To keep the costs of consumer devices low, Ericsson advocates a thin-client approach in which most of the application logic resides on a gateway server located in either the home domain or the service provider's network.

As part of the IPTV solution strategy, Ericsson has also developed a broadband access architecture that addresses the needs of future IPTV services.

REFERENCES

1. <http://www.joost.com/>
2. <http://www.youtube.com/>
3. Strategy Analytics, Connected Home Devices: Global Market Forecast, Oct 2004
4. Sony, LocationFree™ web site, <http://products.sel.sony.com/locationfreetv/flash.html>
5. Digital Living Network Alliance, <http://www.dlna.org/home>
6. mobileYouth06 – Video, Wireless World Forum, 2006
7. Ofcom, "The Communications Market 2006", 2006, <http://www.ofcom.org.uk/research/cm/cm06/main.pdf>
8. Cagenius, T., Fasbender, A., Hjelm, J., Horn, U., Más, I. and Selberg, N.: Evolving the TV experience: Anytime, anywhere, any device. Ericsson Review, Vol. 83(2006)3, pp 107-111
9. Arberg, P., Cagenius, T., Tidblad, O., Ullerstig, M. and Winterbottom, P.: Network infrastructure for IPTV. Ericsson Review, Vol. 84(2007)3, pp 79-83
10. <http://www.openiptvforum.org/>
11. Interactive content and convergence Implications for the information society, October 2006
12. Gonzalo Camarillo, SIP Demystified, McGraw-Hill Professional Book Group, 2001
13. ITU-T, Definition of Next Generation Network, http://www.itu.int/ITU-T/studygroups/com13/ngn2004/working_definition.html, 2004
14. Jesse James Garrett, Ajax: A New Approach to Web Applications, 2005, <http://www.adaptivepath.com/publications/essays/archives/000385.php>