Open IPTV Forum Whitepaper

Open IPTV Forum

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1 Executive Summary

The Open IPTV Forum is a pan-industry initiative with the purpose of producing end to end specifications for IPTV that will take the next generation of IPTV into the mass market. The Forum, which is fully open to participation from the communications, entertainment and other relevant industries, will focus on the development of open standards that will help streamline and accelerate deployments of IPTV technologies, and maximize the benefits of IPTV for consumers, network operators, content providers, service providers, consumer electronics manufacturers and home and network infrastructure providers.

The main objective of the Open IPTV Forum is to produce open, end-to-end specifications for IPTV including:

- Architecture and interfaces
- Network and terminal functionality
- Interactive and personalized services
- Technology choices for all major functionalities
- A common UNI (User-Network Interface) for Open Internet and Managed Networks
- Certification of equipment including end user devices and service provider offerings

The end-to-end specifications shall support:

- A variety of IPTV and internet multimedia services
- Managed networks and open Internet
- Integration with communication services
- Convergence of IPTV and multimedia services across different access technologies
- Easy integration of 3rd party content offerings
- Various devices in the home network

This whitepaper provides an overview of the world of IPTV in general and the vision of the Open IPTV Forum, including its objectives, specifications and its relationship with existing standardization bodies.

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2 World of IPTV

2.1 Vision

There are many definitions of IPTV, but, in general, it stands for Internet Protocol Television, where television service is delivered using Internet Protocol over a broadband network. The evolving IPTV service has many advantages and potential over the traditional broadcast TV service because it can provide a more personalized and interactive environment. As IPTV is delivered using Internet Protocol, it can be delivered using a variety of networks, including Managed Networks (end-to-end network managed by an operator) and the Open Internet.

Figure 1: The Vision of IPTV

2.1.1 IPTV with Interactive Services

With traditional TV services, consumers are able to watch scheduled programs where the only interaction possible is the ability to change channels. IPTV not only allows users to interact with scheduled programs such as voting with their remote control, but also provides Content on Demand, where users select items they want to watch at a time of their choosing. The Content Guide will not only be customizable by the user, but can also integrate scheduled programs and on-demand items. For example, this integration will allow users to search for the name of stars on TV shows and watch on-demand movies by the same person on the spot. IPTV services connected to service providers on the Open Internet

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would not only allow users to search for related articles and blogs on the Internet, but also, for example, let users buy the same products, such as clothing or furniture, used by celebrities on TV programs. All these features could be provided without using any additional or dedicated device.

2.1.2 Integration of Communication Services & IPTV

Integration of communication services and IPTV could allow users to interact more actively. At this time, users call on the phone or use the PC to interact with others while watching TV. IPTV integrated with communication services, such as presence and text messaging, will allow users not only to see if they are online, but also to chat or share information about the show that they are watching on TV. By integrating IPTV with other multimedia communication services, users may receive on-screen notifications about incoming calls or requests for video chat.

2.1.3 Integration of Mobile & Fixed TV

In the past, TV was something to be enjoyed within the home. As more mobile devices become available and integrated with IPTV, it will bring more interactivity and flexibility. For example, a child may ask for permission to watch pay-per-view contents and a parent away from the home could check the content and unlock it remotely, using cellular or wireless network capabilities. IPTV integrated with home network will also allow easier transferring of contents to mobile terminals. In the near future, it may even be possible to watch TV in the living room, pause the display, and resume playback on a mobile terminal while commuting to work.

2.2 Market Figures

IPTV is a television service, which is delivered over the broadband network. The bundle of broadband access and IPTV is becoming more familiar and affordable to consumers due to the fact that network operators have begun offering “triple play”, which is the combined offer of high-speed internet access, TV service, and telephony services over a broadband connection, and “quadruple play”, which adds a mobile wireless service to the bundle.

The number of IPTV subscribers has been increasing worldwide almost in parallel to the penetration of broadband network capabilities (Figure 2, 3). The numbers differ depending on the research firms, but on average, the number of expected worldwide IPTV subscribers in 2010 is expected to reach nearly 55 million.

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Figure 2: IPTV Subscribers Forecast, 2005-2011

Figure 3: Broadband Subscribers Forecast, 2005-2011

As the number of worldwide IPTV subscribers increase, the revenue related to the purchase of IPTV equipment is also expected to increase. IPTV related equipment, such as set-top boxes, middleware, encoders, servers and platforms, is projected to reach a total revenue of over $2.8 billion in 2010. (Figure 4).

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Figure 4: Worldwide IPTV Equipment Market Size and Forecast

2.3 Opportunities

The Open IPTV Forum's specifications will specify a common and open end-to-end solution for IPTV for both Managed Network and the Open Internet models. This will bring new opportunities to players in the IPTV value chain, as described below.

2.3.1 Consumers

At present, consumers have to go through the hassle of implementing dedicated equipment, such as a gateway and a set top box in order to enjoy a specific operator's managed IPTV service on their TV sets. As this equipment is usually tethered to a specific service provider, extra effort is necessary to change operators or to subscribe to additional new services. There is also some difficulty in making the service available in various additional devices within the same household.

The Open IPTV Forum's specifications will ensure the interoperability between consumer equipment and services by defining a common User-Network Interface (UNI). Open IPTV Forum compliant equipment will no

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longer be tethered to a specific service provider but will be interoperable with all compliant services offered by other service providers. This will not only allow consumers to enjoy managed IPTV services from various operators using the same equipment, but also allow them to enjoy services from the Internet on TV sets, which thus far have only been accessible via a PC. By deploying a home network with devices conforming to the Forum's specifications, consumers will also be able to enjoy various IPTV services from other connected devices.

2.3.2 Content / Service / Network providers

The interoperability ensured by the Forum's specifications will also benefit content, service and network providers in that they will not have to develop and/or distribute equipment dedicated to specific services for their subscribers. It will also lead to more subscribers utilizing their existing Open IPTV compliant equipment and devices. In addition, content, service, and network providers will be able to create additional business models or revenue schemes by utilizing advertisements, information services, communication services integrated with IPTV, etc.

2.3.3 Consumer Equipment Manufacturers

Open specifications for accessing IPTV and related services on CE equipment platforms are an important enabler for a mass market of next-generation mainstream CE equipment. The addition of useful and attractive user interfaces and features will enable a variety of interoperable, yet differentiated products on which manufacturers can compete to offer a rich choice to end consumers. The demand for additional functions such as gateways, storage and home network connectivity also opens up the opportunity for manufacturers to expand their existing product categories.

2.3.4 Infrastructure Vendors

As the number of Open IPTV Forum compliant services increases and becomes more attractive, the demand for related network and service infrastructure will increase. Flexibility in features, services and connectivity offered by the Open IPTV Forum specifications is likely to enhance the usability and attractiveness of IPTV services. As the specifications will support not only devices in the home, but also those used from different locations using different access networks, it will create additional demand for remote connectivity from the network and service infrastructure.

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3 Open IPTV Forum

3.1 Scope

The main objective of Open IPTV Forum is to specify a common and open end-to-end solution for supplying a variety of IPTV and internet multimedia services to retail based consumer equipment in the home. The Forum will define the architecture and a common UNI (User-Network Interface) for IPTV and internet multimedia services accessible from both the Open Internet and over a Managed Network.

Figure 5: Open IPTV Forum Scope

The Forum will focus on the development of open specifications that will help streamline and accelerate deployments of IPTV technologies, and help maximize the benefits of IPTV for consumers, network operators, content providers, service providers, consumer electronics manufacturers and infrastructure providers. The Forum is open for participation by companies that share the goals of the Forum and are willing to actively contribute to the development of such specifications..

The Forum will work on specifications that will ensure the interoperability between consumer equipment and services to be delivered over both Managed Networks as well as the Open Internet. Ensuring the interoperability between consumer equipment and services compliant to the Open IPTV Forum's specifications will make it possible for the end users to easily access their choice of content and services from multiple service providers. The Forum's plan is to establish a certification and logo program to ensure end-to-end interoperability.

To provide interactive, personalized, and value added services for consumers, the Forum will define the necessary functions and interactions needed as

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requirements and guidelines. This will ensure interoperability between the various services and devices. The aspects to be defined include service categories, application deployment and execution environment, security, remote management, billing, roaming, protocols and data formats. The Forum will also drive the convergence of IPTV services and multimedia services across different technologies and networks that will allow users to enjoy IPTV services with various devices and in different locations.

The Forum will base its specifications on existing technologies and open standards as much as possible. The intention of the Forum is not to create yet another standardization initiative, but to define a complete delivery solution by filling the gaps found in current standardization. The Forum will work closely with the existing standardization efforts and address those areas which need enhancements in existing standards by actively contributing the work of the Forum.

In particular, the scope of the Forum includes all aspects of the IPTV service, ranging from low level specifications for media formats and coding, to the network and service architectures that enable the business models of interest to its members. The proposed model is described in Figure 5 above.

Suitable service access and content protection technologies must also be defined, and in a manner that allows IPTV enabled terminals to access services and contents from different providers using a openly defined technical base, while avoiding proprietary solutions that limit this flexibility.

A proper architecture will be defined within the Forum, as it is needed to support best quality service in conjunction with appealing price offers allowed by suitable charging capabilities and integration with next generation networks communication services. IMS technology is seen as an important enabler in this respect, in particular for Managed Network services.

To be able to implement a service with the characteristics mentioned earlier, the user's home network must have the appropriate features. Discovery and interworking capabilities of terminals offered by the DLNA standard will be exploited by the Forum to define how contents can be consumed or stored by different devices.

The core functionality in the consumer network for the IPTV service, named IPTV Terminal Function (ITF), will be specified by the Forum to enable service and content access. This will include sharing of content on different terminals, allowing access to the Content Guide and access to integrated communication and notification services. Both Managed and Open Internet service models will be addressed in the definition of the ITF.

3.2 Services and functions

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The Release 1 specifications of the Open IPTV Forum will cover the services and functions defined below.

SERVICES

Scheduled Content Service (also known as Broadcast or Linear TV Service)
Scheduled Content Service is an audio and video content service where the play-out schedule is fixed. The content is delivered to the user for immediate consumption or recording. Service and Content protection mechanisms may be applied to the content.

Content on Demand (also known as Video on Demand and including Content Download)
Content on Demand is a service where a user can select individual content items they want to watch from a list of available content. Play-out of the content is started at the user's request. Content can be streamed from network-based storage for immediate consumption, or played out from the local storage of the customer equipment after user or service provider initiated download to the customer equipment.

Personal Video Recorder (PVR)
PVR is a function or service which enables a user to record scheduled content program events using local or network-based storage. The recorded items can be played back under the control of the user

Content Guide
Content guide is an information service tailored to user preferences that provides a searchable list of Scheduled Content Service and Content on Demand items. The presentation to the user can be created from metadata available on local equipment or received over the network in a form equivalent to web pages.

Notification service
The Notification service enables a user to be informed of events, including emergency alert notifications. This service also enables a user to set reminders and be informed of scheduled content program events. Reminder notifications will be displayed on the customer equipment at the pre-configured time before the program event starts.

Communication services interworking
This service provides IPTV users with access to person-to-person communication services. Aspects of such communication services may be integrated with the IPTV service, providing a richer experience to both. Examples of communication services include presentation of Caller ID, textual messaging, chatting and presence.

Web access
Allows IPTV users to navigate and display information provided on the World Wide Web in a manner dependent upon the presentation capabilities of the display equipment.

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Information service
Portal for presenting tailored information to the IPTV user with or without relation to the content.

Interactive Applications
Interactive applications are those that allow user interaction via the IPTV terminal function (ITF) device or other user devices. Both network-based applications, which interact with the ITF device using web technologies, as well as local applications in the home network are supported. The applications can be either related or unrelated to the content. Applications might interact with the IPTV services using standardized APIs. Applications might be authenticated to prevent misuse and the service provider might charge for applications.

Parental control including remote control
This service limits access by minors to certain content and services based on parental ratings and spending limits. Parents should be capable of using remote devices to check the usage and grant access to requested items.

Home networking
The ITF device will provide access to DLNA content stored on other devices in the home as well as offering IPTV content to DLNA devices.

Support of hybrid services
The ITF device may provide access to TV services delivered over traditional broadcast networks (satellite, cable or terrestrial broadcast) in addition to, or as a substitute for, IPTV services.

FUNCTIONS

Access networks
The release R1 supports only fixed line access networks such as DSL and PON networks.

Advertising
Advertisements can be delivered as part of the content, in the content guide or in a separate window. Advertisements can include links to further information, such as web pages. Regional advertisements are supported for the Managed Network model.

Content formats
Audio, video, subtitles/closed captions and images in Standard definition and High definition formats shall be supported.

QoS
The IPTV solution shall provide the means to guarantee the delivery of IPTV services with appropriate QoS in the home network, on the access line and in the network. Guaranteeing network QoS is not applicable for the Open Internet model.

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Service Platform Provider
A service platform provider offers, through the use of a portal, common functionalities such as authentication, charging and access control on behalf of the IPTV service. A service provider can offer its service directly without the support of a service platform provider.

Charging
The IPTV service includes a common charging mechanism capable of interacting with billing systems.

Service usage
The Open IPTV Forum shall allow users concurrent access to Managed Network and Open Internet IPTV services with their ITF devices.

User interface
The means by which the user interacts with the IPTV services on the ITF device. The IPTV user interface might be branded by the service (platform) provider.

User management
Single user and family accounts with several individual users shall be supported. Each user shall have their own IPTV profile which they can manage.

Security
Unauthorized access to and usage of services and content shall be prohibited. Users and device authentication shall be supported to prevent malicious access or fraudulent use.

Service portability
A user may access IPTV services from different ITF devices in the home and from different locations using different access networks supported by their service (platform) provider. Access to the IPTV services via a different service (platform) provider is not supported in this release.

Remote management
Remote management of the ITF devices supplied by the service provider is supported in the Managed Network model in order to support maintenance, trouble shooting and control of service delivery. Configuration, fault and performance management shall be supported.

Firmware upgrades for the ITF devices shall be supported both for the Managed Network and Open Internet model.

The choices made for Release 1 of the Open IPTV Forum specifications cover all the most important aspects of the service. Future releases will continue to add more features in order to fulfill the Forum's vision.

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3.3 Key Technology Components

The following is a list of technological components:

- **Video codecs**
- **Audio codecs**
- **Content Metadata**
- **Media Transport Format**
- **Media Transport Protocols**
- **Home Network**
- **GUI Client**
- **Application Execution Environment**
- **Service Discovery and Selection**
- **Content and Service Protection**
- **Session Setup and Network Session Management and Control**
- **User identity management**
- **User authentication**
- **Service Authorization**
- **Service Charging**
- **Service roaming, portability and session continuity**
- **User personalization of profiles and services**
- **Notifications**
- **Blended IPTV and Communication Services**
- **Remote Management**

3.4 Relationship with Existing Fora and Specifications

The Open IPTV Forum will work on the specifications for an innovative, market driven end to end IPTV solution considering where possible the existing and emerging technologies and specifications from other Standard Bodies (SDO) and interest groups as a value on which to base the new solution.

Where necessary to accomplish a suitable technological solution, the Forum will take all the needed actions, directly or via its members, to promote the proper activities for developing new standards that cover lacking aspects and technologies, directly or by agreeing on formal collaborations.

The following table provides a non exhaustive list of SDOs and interest groups with activities of interest for the Forum's work.

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SDO	Activities of interest
3GPP	General work on IMS and MBMS.
ATIS IIF	Overall activities on an end-to-end IPTV solution.
CEA	Activities on home networking with a focus on remote user interface
DLNA	Overall activities on content distribution in the home network
DSL Forum	Activities on remote management, access networks and QoE
DVB Project	Activities on IPTV, Mobile TV, meta-data, video and audio coding, interactive applications and content and service protection
ETSI TISPAN	General activities on NGN with a focus on the work on the integration of IPTV and NGN
HGI	Overall work on the home gateway with a focus on IPTV and IMS support.
IETF	Activities on audio and video transport, session control, and multicast just to name the most important.
ISMA	Overall activities on content distribution over the internet and content and service protection.
ITU-T IPTV FG	Overall activities on an end-to-end IPTV solution.
Marlin Developer Community (MDC)	Overall work on content and service protection
MPEG	Activities on video and audio coding
OMA	Activities on Mobile TV enablers
UPnP Forum	Activities on media distribution, QoS and remote UI in the home network
W3C	Activities on enhanced graphics capabilities for the user interface

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3.5 Timeline

Release 1 specs of the Open IPTV Forum will be ready in the mid 2008.

3.6 Membership

The Forum has been created with the aim of being an open group benefiting from the contributions of all companies interested in working on a common specification for IPTV services. Since September 2007, after the definition of the formal rules for admission were put in place, the Open IPTV Forum has started admitting new member companies which are actively involved in the IPTV business and want to contribute their experience and skill. This ensures that the Forum will become a strong industry initiative for IPTV, with the ability to define suitable and widely accepted specifications.
Information about membership can be found on the Forum website.

3.7 Website Information

Information about the Open IPTV Forum can be found on the web site www.openiptvforum.org. It provides a description of the Forum's intent and the current status of its activities. Information on membership procedures and required documentation are also provided.

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3.8 Contacts

Open IPTV Forum official contacts are:

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4 Definitions, Acronyms, & Abbreviations

4.1 Definitions

Term	*Definition*
Access Network	The network infrastructure used by the Access Provider to deliver IPTV services to the Consumer. The access network infrastructure (which may include the Internet) is used for the delivery of the content and may include quality of service management to ensure that appropriate network resources are available for the delivery of the content.
Actors	Any Entity that can provide an interactive application.
Application	Collection of assets and logic that together provide a Service to the User. Assets and logic may reside either in an application Server or in the ITF or both.
Back-in-time	Back-in-time TV: scheduled program events that are already running or finished are made available to the user for viewing and/or recording from the start or a certain time into the past. They are available similar to Content on Demand including optional trick mode support (e.g. pause, fast-forward, rewind). In case the schedule program event is still running the play out cannot go beyond the actual program play out. Selection is possible from the scheduled content program guide. The service might be available for one or more channels (e.g. for the selected channel in case of local storage, a fixed or selected channel list in case of network storage)
Channel	A single instance of Scheduled Content.
Consumer(s)	See End User(s)

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Consumer equipment	All devices that the consume can have and use in connection with IPTV service
Consumer Generated Media	Media generated by a User for the purpose of making it available to other Users. This includes video, music, and photography etc. see User Content
Consumer Network	The local area network in which the IPTV Terminal Function is located. Consumer networks include home networks, hot spots, hotel networks etc.
Content	An instance of audio, video, audio-video information, or data.
Content on Demand (CoD)	The service of immediate delivery of specific content to a specific user upon explicit demand
Content Protection	Means to protect content from unauthorized usage, such as re-distribution, recording, playback, duplication etc.
Content Provider	Entity that provides Content and associated usage rights to the IPTV Service Provider.
Deferred Download CoD	A type of Content on Demand where the user first selects the content and then it is downloaded to the ITF some time later (e.g. over night). Consumption is possible after the content is fully downloaded, or after enough content is downloaded to ensure that the remaining content can be downloaded while the user is consuming the content.
End User(s)	The individual(s) (e.g. members of the same family) who actually use the IPTV Services.
Enterprise Network	A local area network provided under some agreement that can be utilized by the User to obtain connectivity, e.g. hotel networks.
Fixed Network	Access Network for a fixed location, such as ADSL or FTTH.
Forum Specification	Output document of the Open IPTV Forum.

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Home Network	Residential consumer network.
Hybrid Device	Terminal devices able to connect to IPTV services delivered over the broadband access interface and also receive digital broadcast TV and radio services via other delivery networks. e.g. DVB-S, DVB-C and DVB-T.
Implementation-dependent application	An application specific to a particular device implementing some or all of the IPTV Solution. For example, one compiled to native code for the processor and operating system used by the device.
Internet	The Internet is the worldwide, publicly accessible network of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP).
IMS Provider	An IPTV Service Platform Provider that uses IMS for providing the supporting functions.
IPTV Service Platform Provider (SPP)	Entity which, based on a contractual relationship want IPTV Service Providers, provides supporting functions for the delivery of IPTV Services, such as charging, access control and other functions which are not part of the IPTV Service, but required for managing its delivery.
IPTV Service Provider (SP)	Entity that offers IPTV Services and which has a contractual relationship with the Subscriber.
IPTV Terminal Function (ITF)	The functionality within the Consumer Network that is responsible for terminating the media and control for an IPTV Service.
Local Storage	Content storage within the administrative realm of the IPTV Service Provider, but not in their physical environment (for example, local storage could be a partition of storage located in the home network and allocated to the Service Provider to pre-load CoD).

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Mobile Network	A cellular access network, such as GSM or WCDMA networks.
Mobile Terminal	A terminal device (ITF), e.g., a cellular phone, connected to IPTV Services via a Mobile Network
Network Provider	The entity providing the network infrastructure an its operation to the Service Provider
Network storage	Content storage located in the physical environment or administrative realm of the IPTV Service Provider
nPVR	Provision of PVR functionality whereby the content is stored in the Service Provider domain. The nPVR allows a user to schedule recording of scheduled content programs. The user can later select the content they want to watch from the recorded content.
Pay Per View	The user is charged per selected and/or consumed content item. Can apply to both CoD and Scheduled Content Service.
Personal Content	Content owned by the User. This includes video, music, and photography etc. See Consumer generated media
Portable Terminal	A handheld terminal device (ITF), such as a notebook PC or a portable game machine, connected to services via a Fixed Network. (The device may use wireless technology, e.g., WiFi, WiMax, to access the Fixed Network.)
Portal	A function of a Service Platform that provides an entry point to individual IPTV Services to Users via a GUI.
Program	A segment of Scheduled Content with a defined beginning and end.
Program Guide	See Content Guide.
Public Access Network	A network that can be used by the Consumer to obtain connectivity. Public access networks include hot spots, etc.
Push CoD	A type of Content on Demand where the content is pre-loaded to the ITF local storage by the Service Provider.

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	The user has no direct control of what content is downloaded; however the Service Provider may make the choice based on user preferences and habits. Content is available for direct consumption after the user selection is confirmed.
Service	Content and applications provided by Service Platform Providers and Service Providers.
Service Discovery	The procedure by which IPTV enabled consumer equipment can discover information about IPTV services offered by an IPTV service provider, in both the managed and unmanaged models
Service Handover	Providing service to an IPTV user when the user roams from one access platform
Service Protection	Means to protect IPTV Services from unauthorized usage/access, such as • Access from unsubscribed consumers • Access that is not covered by the subscription • DOS attack
Service Roaming	Providing service to an IPTV user when the user roams from one access, platform, or service provider to another. (note: non real time)
Session Portability	Ability of a given service/application to be switched from one device to another for a continuation of a session in real time.
Subscriber	The individual that makes the contract with a Service Provider for the consumption of certain services.
Subscriber Profile	Subscription information associated with an account.
Time Shift	Allows a user to halt a scheduled content service and continue watching this service later supporting pause and rewind. In time shift mode, trick play

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	functionality (fast-forward, rewind, pause) is limited by the time shift window (i.e. cannot go further than the actual scheduled content play out, cannot go before the start of time shift).
Trick Mode	Facility to allow the User to control the playback of Content, such as pause, fast and slow playback, reverse playback, instant access, replay, forward and reverse skipping.
User(s)	See End User(s)
User Profile	Subscription information associated with a specific User, e.g., viewing preferences.
User Storage	Storage capability which could be inside or outside the ITF and outside the physical and administrative control of the IPTV Service Provider

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4.2 Acronyms & Abbreviations

Abbreviation	*Definition*
ADSL	Asymmetric Digital Subscriber Line
API	Application Programming Interface
ATIS	Alliance for Telecommunications Industry Solutions
ATIS-IIF	ATIS - IPTV Interoperability Forum
CAGR	Compound Annual Growth Rate
CE	Consumer Equipment
CEA	Consumer Electronics Association
CGM	Consumer Generated Media
CoD	Content on Demand
CP	Content Provider
CPI	Content Provider Interface
DLNA	Digital Living Network Alliance
DOS	Denial of Service
DSL	Digital Subscriber Line
DVB	Digital Video Broadcasting
DVB-C	Digital Video Broadcasting - Cable
DVB-S	Digital Video Broadcasting - Satellite
DVB-T	Digital Video Broadcasting - Terrestrial
EPG	Electronic Program Guide
ETSI	European Telecommunications Standards Institute
ETSI-TISPAN	ETSI - Telecoms & Internet converged Services & Protocols for Advanced Networks
FWA	Fixed Wireless Access
FTTH	Fiber to the Home
GSM	Global System for Mobiles, formerly Groupe Spécial Mobile
GUI	Graphical User Interface
HGI	Home Gateway Initiative
IAI	Internet Access Interface
ID	Identitiy
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPTV	Internet Protocol Television
ISMA	Internet Streaming Media Alliance
ITF	IPTV Terminal Function
ITU-T	International Telecommunication Union - Telecommunication

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	Standardization Bureau
ITU-T IPTV FG	ITU-T IPTV Focus Group
MDC	Marlin Developer Community
MPEG	Moving Picture Experts Group
NGN	Next Generation Network
nPVR	Network Personal Video Recorder
OMA	Open Mobile Alliance
PC	Personal Computer
PON	Passive Optical Network
PVR	Personal Video Recorder
QoS	Quality of Service
SDO	Standard Developing Organization
SLA	Service Level Agreement
SP	Service Provider
SPI	Service Provider Interface
SPP	Service Platform Provider
TCI	Transport and Control Interface
TV	Television
UI	User Interface
UNI	User Network Interface
UPnP	Universal Plug and Play
VoD	Video on Demand
WCDMA	Wideband Code Division Multiple Access
WiFi	Wireless Fidelity Alliance
WiMax	Worldwide Interoperability for Microwave Access
W3C	World Wide Web Consortium
3GPP	Third Generation Partnership Project

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