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Cable modems

Functional Requirements for Advanced Cable Set-Top Box

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Draft New Recommendation ITU-T J. 295 (J.adcstb-req)
Functional Requirements for Advanced Cable Set-Top Box

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Functional Requirements for Advanced Cable Set-Top Box

Summary

This Recommendation defines functional requirements for the advanced cable set-top box. The advanced cable set-top box is equipped with not only reception functionalities for broadcasting services, but also functionalities for IP-based interactive services. In addition, the advanced cable set-top box supports many up-to-date functions to enable cable television operators to provide advanced services. Primary functions are portal screen, application software plug-ins, and interface device capability between cable television access networks and in-home network, and so on.

1. Scope

This Recommendation defines functional requirements for the advanced cable set-top box to enable cable television operators to provide advanced services to their subscribers. The advanced cable set-top box is intended to apply to cable television operators' service provision, where many types of access network technologies have been recently introduced, e.g. HFC, PON, RFoG. Cable television operators have a capability of providing both broadcasting and interactivity over its own network originally intended to distribute broadcasting television programs, and the advanced cable set-top box is a core device for the delivery of attractive advanced services.

Functionalities to be implemented in the head-end systems of cable television operators are outside the scope of this Recommendation.

The advanced cable set-top box is primarily equipped with reception functionalities for broadcasting services and IP-based interactive services. In addition, the STB performs as an interface device between cable television access networks and in-home network devices by being equipped with wireless LAN and IP routing capabilities.

In this Recommendation, portal screen support and application software plug-ins capability are also required to the STB to allow cable television operators to provide various types of services to their subscribers not only from their own service delivery platforms but also from other 3rd parties' platforms interconnected to cable operators' platforms.

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; all users of this Supplement 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 J.190] Recommendation ITU-T J.190 (2007), *Architecture of MediaHomeNet that supports cable-based services*

[ITU-T J.205] Recommendation ITU-T J.205 (2012), *Requirement for Integrated Broadcast and Broadband DTV Application Control Framework*

[ITU-T J.218] Recommendation ITU-T J.218 (2004), *Cable modem IPv4 and IPv6 eRouter specification*

[ITU-T J.700] Recommendation ITU-T J.700 (2007), *IPTV Framework for Secondary Distribution*

[ITU-T J.701] Recommendation ITU-T J.701 (2008), *Broadcast Centric Terminal Middleware*

[ITU-T F.790] Recommendation ITU-T J.790 (2007), Telecommunications accessibility guidelines for older persons and persons with disabilities

[ITU-T H.222.0] Recommendation ITU-T H.222.0 (2006), Information technology - Generic coding of moving pictures and associated audio information: Systems

[ITU-T X.1191] Recommendation ITU-T X.1191 (2008), *IPTV Service Security and Content Protection Aspects*

[ITU-T Y.1901] Recommendation ITU-T Y.1901 (2008), *IPTV Service Requirements*

[BBF TR-069] Broadband Forum TR-069 (2007), *CPE WAN Management Protocol v1.1*

3. Terms and definitions

3.1. Terminology defined in this Recommendation

Term	Definition
Advanced cable STB	A STB that satisfies the requirements defined in this Recommendation. Unless specifically noted, STB shall mean the advanced cable STB in this Recommendation.
IR type RCU	RCU operating on infrared rays. Only uni-directional operation is supported.
RF type RCU	RCU using wireless technology such as RF4CE.
HN type RCU	RCU connected to the STB via IP home network. Interactive operation is supported. In addition to communicating and controlling with the STB, the HN type RCU can be also accessible directly to services provided by cable operators or other content and/or service providers.
Internet type RCU	A terminal with RCU functionalities that allows users to control the STB from remote location via the internet, e.g. remote setting of schedule recording. This type of RCU is supposed to be mobile phones (smart phones, feature phones, etc.), tablet devices, PCs, etc. In addition to communicating

	and controlling with the STB, the Internet type RCU can be also accessible directly to services provided by cable operators or other content and/or service providers.
Second screen	It refers to a display screen of mobile phones or other network enabled devices that show services associated with the television screen.
Multi-task	Simultaneous process of live viewing or playback and one or multiple recording of broadcasting content; the viewing of IP streaming content; and other applications such as games.
User	The user of device connected to the STB and HN. Not only human being, but also includes logical element for the communication and usage of applications between devices.
Subscriber	The registered subscriber (representative) to the cable TV service; shall include all persons in the household.
Viewer	A subscriber who is receiving video, audio and/or other information services.
Operator	The cable TV service operator.
IP interactive service	A type of service provided by the cable operator or service provider where the subscriber requests and/or responds to services.
Target advertising	Advertising service from the operator targeted at an individual or a viewer segment, specific markets, specific areas, facilities, etc.
Network	A wired or wireless communication network to provide broadcasting and communication services. In this requirements, it shall include the in-house communication network, in addition to the access network operated by the cable operator.
Provisioning	Automated initial setting activity.
DRM	Digital Rights Management to protect digital content. In these requirements, use within HN is assumed.
Plug-in	Software for displaying, installed independently from the browser.
Terminal	Equipment consisting of hardware and software with communication means, equipped with a user interface to enable the user to connect to the network.
User Interface (UI)	The basic UI is provided by the OS and defines the display format of information to the user and the data input and

	operation methods by the user. These requirements assume the use of both character based CUI and graphics based GUI.
Cloud terminal	A terminal having at least client function, browser and internet connectivity for cloud network connection.
Content	Information content transmitted via various media through the communications network, including the broadcasting network and IP.
Transcoder	Image conversion process to convert images to match the display capability of the terminal.
Cable platform	Shall mean the entire provision infrastructure of the cable business, including the service distribution platform (SDP), cable network, advanced cable STB, home network and others.
Cross platform	Coordination service between platforms.
Digital Terrestrial Television Broadcasting	Digital Terrestrial Television Broadcasting defined in ITU-R BT.1306
Satellite Broadcasting	Digital satellite television broadcasting defined in ITU-R BT1306.
Multichannel Video Distribution	Digital television distribution service over cable networks that provides wide range of multichannel television programs to subscribers.
Emergency Alert Broadcasting	Emergency Alert Broadcasting defined in ITU-R BT.1774
Social Television	General term for technology that supports communication and social interaction in either the context of watching television, or related to TV content. It includes the study of television-related social behavior, devices and networks. Social television systems can for example integrate voice communication, text chat, presence and context awareness, TV recommendations, ratings, or video-conferencing with the TV content either directly on the screen or by using ancillary devices.
Personal Information	Recorded information about an identifiable individual that may include his or her (1) name, address, email address, phone number, (2) race, nationality, ethnicity, origin, color, religious

	or political beliefs or associations, (3) age, sex, sexual orientation, marital status, family status, (4) identifying number, code, symbol, (5) finger prints, blood type, inherited characteristics, (6) health care history including information on physical/mental disability, (7) educational, financial, criminal, employment history, (8) others' opinion about the individual, and (9) personal views except those about other individuals.
Home Network	A network within a home compliant with J.190 consisting of IP-based transport including wired LAN (Ethernet: IEEE 802.3) and wireless LAN (WiFi: IEEE 802.11a/b/g/n) and non-IP based communication method such as ZigBee (IEEE 802.15.4), where the advanced cable STB is equipped with all of the HA, HB, HC and HD functionalities defined in J.190.
Cable Television Operator	A service provider and/or network provider providing television programs and other interactive services via cable television network with radio frequency (RF) signals through coaxial cables or digital light pulses through fixed optical fibers.

3.2. Terminology defined in other Recommendations

3.2.1. Integrated Broadcast and Broadband DTV Service [ITU-T J.205]: Simultaneous provision for integrated experience of broadcasting and interactivity consisting of media content, data and applications from multiple sources, where the interactivity is sometimes associated with broadcasting programs.

3.2.2. Cable Integrated Broadcast and Broadband DTV Service [ITU-T J.205]: Integrated Broadcast and Broadband DTV Service managed by cable operators.

4. Abbreviations, acronyms and convention

4.1. Abbreviations and acronyms

Abbreviation/Acronym	Definition
API	Application Program Interface
CAS	Conditional Access System
CPE	Customer Premises Equipment
DOCSIS	Data over Cable System Interface Specification

DTCP	Digital Transmission Content Protection
FEC	Forward Error Correction
EPG	Electronic Program Guide
HFC	Hybrid-Fiber/Coax
HN	Home Network
H-STB	Hybrid Set-Top-Box
HTML	Hyper Text Mark-up Language
IP	Internet Protocol
LAN	Local Area Network
MVPD	Multichannel Video Programming Distributor
QoS	Quality of Service
RCU	Remote Control Unit
RF	Radio Frequency
SDP	Service Delivery Platform
STB	Set-Top-Box
UI	User Interface
VOD	Video On Demand
WAN	Wide Area Network

4.2. 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 document 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 prohibited from**” indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

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 the specification.

In the body of this document and its annexes, the words *shall*, *shall not*, *should*, and *may* sometimes appear, in which case they are to be interpreted, respectively, as *is required to*, *is prohibited from*, *is*

recommended, and *can optionally*. The appearance of such phrases or keywords in an appendix or in material explicitly marked as *informative* are to be interpreted as having no normative intent.

5. General Requirements

Figure 5-1 illustrates overall cable architecture which consists of service delivery platform, cable network, mobile network, home network and the advanced cable STB as a core device for advanced cable services. The figure 5-1 also shows some service aspect and collaboration of application based on this architecture.

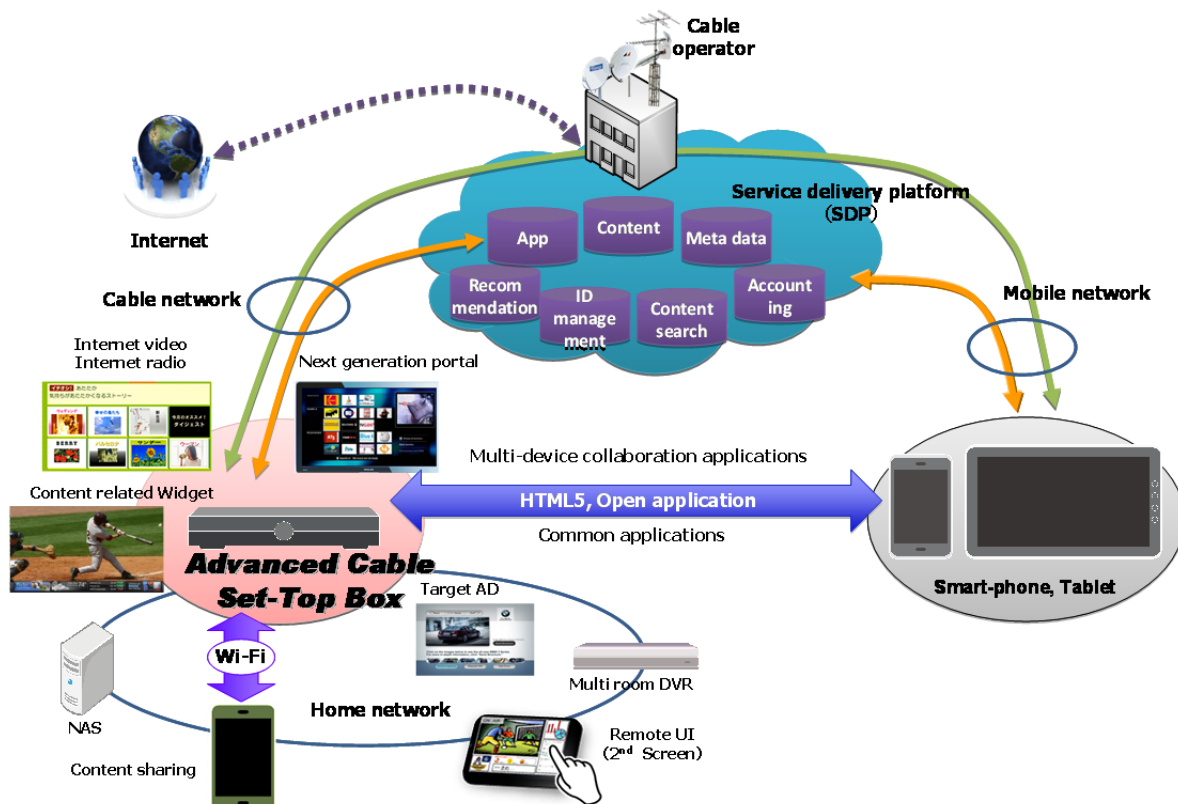


Figure 5-1: Overall cable architecture supported by the advanced cable STB

The advanced cable STB assumes the following conditions in the actual deployment stage.

5.1. Services provided

The advanced cable STB is required to support cable Integrated Broadcast and Broadband DTV services.

The STB is required to receive terrestrial and satellite broadcasting re-transmitted (by trans-modulation) over RF (not over IP) on the cable access network. The STB is required to receive RF-based multichannel video programs and can optionally support IP-based ones. The STB is also required to support interactivity such as VOD, Voice over IP, TV telephony and electronic commerce.