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Working Group on Service and Application

**questionnaire on**

**deployment of interactive multimedia services on IPTV/ CATV**

**Section 1: Elementary Part**

1. **Introduction:**

In the converged industries of telecommunications and broadcasting, interactive multimedia services are not new. Even in the pre-convergence era, both industries developed and delivered these services. In Europe, broadcasters started delivering interactive ‘Teletext’ services as early as the 1970s, and the first attempts by telecom operators to browse the Internet and deliver web content over ‘connected’ televisions were recorded in the 1990s - the latter limited by Internet speeds and applications to access content.

With the widespread availability of broadband Internet and powerful connected devices, the service propositions and traditional roles in the converged value chain have changed dramatically. This availability has made it possible to efficiently distribute and consume data heavy services (i.e. video or television like services) anywhere and anytime. Consumers now have a choice of watching video content over connected, smart television sets, set-top-boxes, tablets or smart phones. They can choose what, when, and where they would like to consume their audio-visual services, combined with services such as voice, text, Internet and social network access.

From the supply side, broadcasters and content providers have access to a wide range of networks and connected devices to deliver their content. Network and service providers can enter into content provisioning (more) easily as delivery networks have become (more) technically independent from the content they carry. This broadband development comes along with the digitization of the entire value chain, from content production to consumption, lowering unit costs and entry barriers. Market players now often have multiple roles, change their roles more easily and enter into multiple alliances for delivering interactive multimedia services.

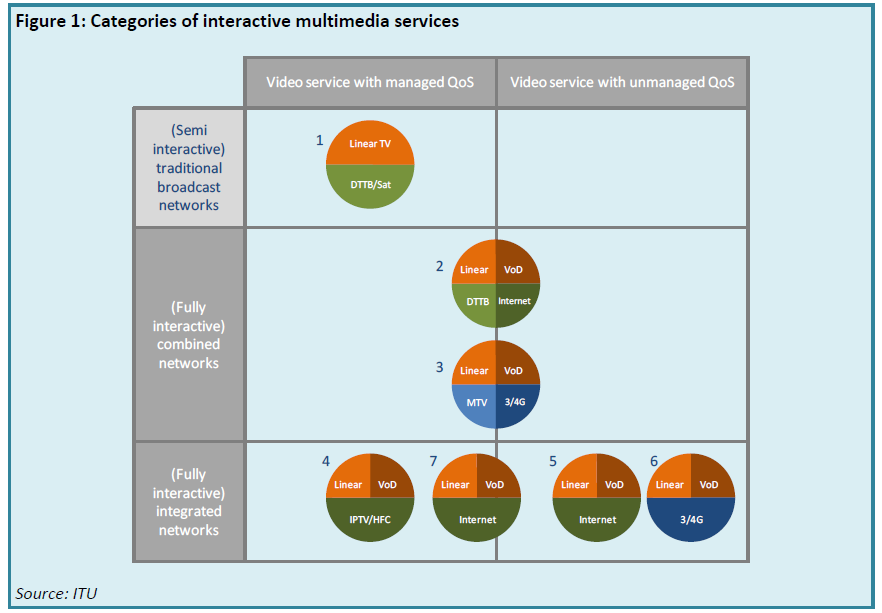
The ITU Asia-Pacific Regional Initiative (2011-2014) on Digital Broadcasting has the objective of the Provision of assistance in the field of interactive multimedia services to broadcasters in the Asia-Pacific region. Their report contributes to this objective by providing insights into the trends in the field of interactive multimedia services to broadcasters, telecom operators providing broadcast services, and national regulatory authorities (NRAs) [1]. It covers market, technical and regulatory trends in this field and builds on the work carried out by ITU on digital broadcasting, broadband Internet, and convergence.

However, the report includes the limited country cases such as Austria, Hong Kong (China), India, Japan, Republic of Korea, and Thailand. These countries have been introducing interactive multimedia services. Countries that are considering the introduction and deployment of such services are not included. And the report focuses on digital broadcasting, mobile application and IPTV. The problems to introduce IPTV and to deploy it are not described. EG MA is interested in the interactive multimedia services on IPTV/CATV and the problems to be overcome.

1. **Objective of the Questionnaire:**

The objectives of the questionnaire are to collect the IPTV deployment situation and goal of countries in Asia-Pacific region. For examples, Figure 1 shows categories of interactive multimedia services (see Appendix 1)[1].

After collecting the questionnaires and analyzing them, we would like to identify the problems to be overcome, to share the ideas to solve the problems, and to identify the standardization topics in order to spread interactive multimedia services in Asia-Pacific region.



1. **Responsible Group:**

WG SA / EG MA

1. **Rapporteur of the Questionnaire:**

Name and contact detail of the person of the WG/EG who will deal with the responses

1. **Meeting at which the Questionnaire was approved:**

EG MA and WG SA in ASTAP-29

1. **Target Responder:**

APT Members/Associate Members/Affiliate Members

1. **Deadline for Responses:**

15 December 2017

**Reference**

[1] REGIONAL INITIATIVES – ASIA-PACIFIC in ITU-D, “Interactive multimedia services in Asia-Pacific: Trends and insights” (2015). <http://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Publications-Reports/Interactive_MM_service_EBAT3-376880.pdf> (Table of contents appears in Appendix 2).

[2] ITU-T Q.1741, “IMT-2000 references to Release 9 of GSM-evolved UMTS core network” (11/2011)

**Section 2: Questionnaire Part**

**deployment of interactive multimedia services on IPTV/CATV**

## **Contact information**

## 1.1 Primary contact information

|  |  |  |  |
| --- | --- | --- | --- |
| *Date* |  | *Country* |  |
| *Organization* |  | | |
| *Title* |  | *Name* |  |
| *Email* |  | *Telephone* |  |

* 1. Secondary contact information

(Please copy the following table, if there are two or more secondary contact persons)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Date* |  | | | |
| *Organization* |  | | | |
| *Title* |  | | *Name* |  |
| *Email* |  | | *Telephone* |  |
| *Answered section Q. No.* | |  | | |
| *Notes* | |  | | |

1. **Questions**

**Question 1: Broadcasting services**

* 1. **In your capital city, how many broadcasting services are available?**
  2. **In broadcasting services, are digital broadcasting services available?**
  3. **If you have the roadmap of the migration from analogue TV to digital TV services, when would you terminate analogue broadcasting services?**
  4. **What is the penetration ratio of TV sets in households?**

**(1-5) Would you explain your future roadmap of broadcasting service in your country?**

**Question 2: (Mobile) broadband services**

**(2-1) In your country, what is the coverage ratio of Internet and broadband?**

**(2-2) What is the coverage ratio of each access network (xDSL, FTTx, HFC(CATV), WiFi, Mobile(3G/LTE))?**

* xDSL
* FTTx (What is x?)
* HFC
* Mobile

**(2-3) How fast is the speed of current access network services?**

* xDSL
* FTTx (What is x?)
* HFC
* Mobile

**(2-4) Would you explain your future roadmap of high speed broadband network?**

**Question 3: Interactive TV services by CATV operators**

* 1. **How many CATV operators provide TV services in your country?**
  2. **How many subscribers do they have in average?**
  3. **Are they interested in IP based interactive TV services by themselves or OTT services such as YouTube?**
  4. **Which technologies are they interested in to provide IP based interactive TV services, DOCSIS, FTTH(PON), or others?**
  5. **What are the problems or what are the important points(\*) to realize IP based interactive TV services in these years?**

**(\*) For examples, cost, quality of video, resolutions, number of contents, quality of contents, and so on.**

* 1. **When will you plan to deploy IP based interactive TV services? And how do you solve the problems described in the response of the above (3-5)?**
  2. **What services other than retransmission of broadcasting do they consider as interactive TV services? For examples, digital signage, e-learning, e-health, e-government and so on.**
  3. **What will be the killer services in your IP based interactive TV services, and when will it be expected to realize?**
  4. **Regarding the above services you are concerning, do you they, or part of them, support accessibility functions, such as captions, sign-language interpretations, and audio descriptions? Or how do you think about the importance or deployment of these accessibility functions for interactive TV services? (\*)**
  5. **What is the goal of your IP based interactive TV services, if you defined it.**
  6. **How do you think about the relationship between OTT services and your future services?**
  7. **What do you expect that International or domestic standardization body do in order to deploy interactive TV services? For examples, what kind of requirements or solutions should be standardized or what kind of use-cases do you expect to learn from handbooks or guidelines published by such standardization bodies?**

**Question 4: Interactive TV services by telecom operators or others (broadband operators and/or mobile operators)**

* 1. **How many operators provide TV services in your country?**
  2. **How many subscribers do they have in average?**
  3. **Are they interested in IP based interactive TV services by themselves or OTT services such as YouTube?**
  4. **Which technologies are they interested in to provide IP based interactive TV services, FTTH(PON), or others?**
  5. **What are the problems or what are the important points (\*) to realize IP based interactive TV services in these years?**

**(\*) For examples, cost, quality of video, resolutions, number of contents, quality of contents, and so on.**

* 1. **When will they plan to deploy IP based interactive TV services? And how do you solve the problems described in the response of the above (4-5)?**
  2. **What services other than retransmission of broadcasting do they consider as interactive TV services? For examples, digital signage, e-learning, e-health, e-government and so on.**
  3. **What will be the killer services in your IP based interactive TV services, and when will it be expected to realize?**
  4. **Regarding the above services you are concerning, do you they, or part of them, support accessibility functions, such as captions, sign-language interpretations, and audio descriptions? Or how do you think about the importance or deployment of these accessibility functions for interactive TV services? (\*)**
  5. **What is the goal of your IP based interactive TV services, if you defined it.**
  6. **How do you think about the relationship between OTT services and your future services?**
  7. **What do you expect that International or domestic standardization body do in order to deploy interactive TV services? For examples, what kind of requirements or solutions should be standardized or what kind of use-cases do you expect to learn from handbooks or guidelines published by such standardization bodies?**

**Question 5: Policy and regulation concerns to start and deploy IP based interactive TV services in your country**

**(5-1) What is your policy and regulation concern to start and/or deploy IP based interactive TV services in your country?**

**(5-2) How do you think about institutional convergence in order to start and/or deploy IP based interactive TV services?**

**(5-3) Are there other regulatory issues about it?**

**(5-4) Are there any ideas that the standardization bodies should do to solve the above issues?**

.

**Question 6: This project and questionnaire**

**(6-1) How do you feel about this survey project?**

**(6-2) Are you interested in the report of this project in future? And why do you feel so?**

**(6-2) How do you feel about this questionnaire?**

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**Appendix 1**

**categories of interactive multimedia services [1]**

This Appendix 1 is excerpted from [1].

**A.1.1 Scope of interactive multimedia services**

ITU defines multimedia services as “Services that handle several types of media such as audio and video in a synchronized way from the user's point of view. A multimedia service may involve multiple parties, multiple connections, and the addition or deletion of resources and users within a single communication session.[2]”

The scope of interactive multimedia services considered in this questionnaire include audio-visual services intended for public distribution and consumption and does not cover user generated content (such as YouTube) or content that is not designed for consumption by the general public (such as intercompany broadcasts).

In principle, this approach is technology neutral as these services can be delivered by any telecommunication or broadcast network and consumed by any device, including television sets, portable and mobile devices. The concept of interactive multimedia is not new and many people are already familiar with interactive video services like the ‘red button’ or ‘teletext’ functionality embedded in television broadcasts and sets.

This questionnaire focuses on an interactive audio-visual service delivered by broadband and Internet networks and, or combined with, traditional broadcast networks. Broadband and Internet networks include mobile networks (like IMT) and fixed networks (like HFC, xDSL and IPTV networks). Traffic management based on Internet Protocol (IP) remains the core technology across these networks. The traditional broadcast networks include digital terrestrial, cable and satellite networks. These networks can have various transmission technology standards like ATSC, DVB, ISDB or DMB.

The scoping of interactive multimedia services includes services and applications like cable/IPTV offerings as well as content providers and broadcasters offering their video content over the Internet directly to the end-consumers (the latter also referred to as over-the-top (OTT)). This scoping also includes connected devices (like smart televisions and phones) offering access to audio-visual services over the Internet (often on the basis of device specific apps) and traditional broadcast networks (like digital terrestrial and satellite networks). Often device manufacturers have agreements with content providers for the delivery of these services on connected televisions, smart phones or other connected devices (like tablets and laptops).

**A.1.2 Categorizing interactive multimedia services**

The scope of interactive multimedia services as outlined in Section A.1.1 still includes many different services, applications and technologies and a further categorization may help to understand differences. From a service perspective (i.e. the service offered to the end-user) interactive multimedia services can be split into two basic forms:

1. Linear services: the service provider schedules the audio-visual content, plays-out and distributes the audio-visual content accordingly. The most widely known example is linear television services from Public Service Broadcasters (PSB) and commercial broadcasters. This category also includes TV services whereby the end-user can temporarily pause and restart the broadcast or can restart the beginning of the broadcast. With this type of ‘delay’ or ‘catch-up’ features the essence of scheduled play-out remains unchanged. These features became possible with Personal Video Recorders (PVR) and also with PVR functionality sitting in the cloud (i.e. storage made available via the Internet) or broadcast network (e.g. IPTV network). Linear services can be offered free of charge4 or on the basis of payment.

2. Non-linear services: the end-user determines what audio-visual content (often from a structured content library) and when this content is to be played out. A commonly known service in this category is video-on-demand (VoD)5. VoD like services are often paid services and providers can dice and slice the video content in many difference ways and apply different payment arrangements (e.g. Pay per View –PPV or periodical subscriptions) but they leave the end-user in command for scheduling the audio-visual content. These non-linear services also include time shifting the content. Time shifting is intended to view the content at the viewer’s convenience. It can include pausing and rewinding linear television services (i.e. live television) as well as playback of the content after the initial broadcast.

The above service categories can be offered in many commercial arrangements and they don’t differ in this aspect. However, they may differ in how standard service levels, i.e. service availability and picture quality are managed by the provider of the interactive multimedia service. The focus here is on service levels of the audio-visual or video service. Two basic forms can be distinguished:

1. Video services with managed Quality of Service6 (QoS): in this category the service provider sets, manages and offers end-users (minimum) picture quality and service availability levels. The classic example is a Public Service Broadcaster (PSB) that distributes its television service over its own terrestrial broadcast network. However, it is also possible that the service/content provider distributes over the third party networks. The service/content provider agrees to the (minimum) service levels with the network operator in a distribution agreement or contract. Such a contract may include guaranteed service levels whereby a form of financial compensation is agreed in case of underperformance.

2 Video services with unmanaged QoS: the service/content provider does not set/manage service levels and consequently does not offer any to end-users. An example that falls in this category is content providers offering their audio-visual content over the Internet. The Internet service provider (ISP) that offers the Internet access to the end-user manages service levels. However, the ISP does not manage picture quality and service availability specifically for the individual service/content provider.

Considering these two basic forms of QoS management, a recent market development is relevant, whereby content provider (like Netflix) agreements with ISPs include service levels (i.e. minimum download speeds) and financial compensation7. The content provider can set minimum service levels and offer their clients packages with different picture quality levels (e.g. ‘Silver’ and ‘Gold’ packages). It could be argued that these content providers move towards audio-visual services with managed QoS and that these services are no different from television services over, let us say, IPTV networks. The last dimension for categorizing interactive multimedia services is the technical platform carrying these services. As discussed in section 1.1 and focusing on video services there are two basic forms:

1. Traditional broadcast networks: these networks are specifically designed and deployed for

distributing audio-visual services. They are based on international transmission standards (such

as ATSC, DVB, ISDB and DMB) and are essentially one-way networks. They can offer a semi-interactive component by broadcasting content in carousels (for example Teletext). They can be wired and wireless, including respectively coax cable networks and satellite, terrestrial and mobile networks. The latter referred by as Mobile Television (MTV).

2. IP-based networks: these networks route traffic (i.e. data) over routers to addressable end-user equipment. These networks are two-way (i.e. duplex) and switched networks whereby traffic is managed by IP protocols. The data can represent audio-visual services. They include networks like HFC and IPTV networks but also the Internet as offered by ISPs. Again, they can also be wireless like IMT or IMT-Advanced, e.g. HSPA, LTE and LTE-A.

These platforms come with different end-user equipment (or one could say with different network terminating equipment). The traditional broadcast networks require transmission standard compliant receivers such as set-top-boxes (STB) or Integrated Digital Televisions (IDTV). For IP-based networks the range of end-user equipment is much wider and range from smart phones, tablets, phablets, laptop/desktop computers to game consoles. However, receivers from both platforms can be integrated into one single device, combining broadcast and IP functionality. The two most prominent examples are connected or smart televisions and mobile phones with ISDB-T/DMB-T receivers8. The HbbTV standard has been developed for connected televisions for integrating broadcast and Internet services. The standard enables content/service providers to develop manufacturer independent applications for offering a seamless customer experience. Such a standard is (still) absent for MTV services.

A recent development in end-user equipment is the introduction of a wide range of devices that can (re)distribute television/audio-visual services to any IP device at home or anywhere in the world. Examples include Chromecast and Roku dongles converting simple televisions into connected televisions and also ‘Slingbox’ devices redistributing a (paid) television stream over the Internet to anywhere in the world where the end-user logs in with an IP connected device.

Figure 1 shows the different types of interactive multimedia services categorized along three dimensions: the platform dimensions comes back twice as network and device are interrelated on the vertical axis of the grid and the bottom half of the circles. The top half includes the type of service; linear (TV) and nonlinear (indicated with VoD).

Observing Figure 1, the following market examples can be given for each of the circles:

**Type 1.** BSkyB or FreeView television services over a digital satellite (DVB-S2) or terrestrial television networks (DVB-T/DVB-T2) respectively, the latter also referred to as Digital Terrestrial Television Broadcasting (DTTB). These are semi interactive as viewers can access the redbutton or Teletext services. QoS are set, managed and offered to the end-user by the service providers (for example by offering HD services). Network services are provided by contracted third parties (i.e. SES Astra/Eutelsat and Arqiva). As stated in Section 1.1 this type of services is not the focus of this questionnaire.

**Type 2.** Linear TV services from national PSB/commercial broadcasters and the Netflix type service. All services are received with a connected television. In this example, the linear broadcast service is delivered over DTTB. It is also possible that the linear broadcast service is carried over a digital satellite network. Netflix is made available over the Internet and through a proprietary app on the connected television. Apps for this type of audio-visual services can also be made available on the basis of the HbbTV standard10. QoS of the linear TV service is managed as under service example 1. For the VoD service QoS is unmanaged. The Internet and digital terrestrial television network delivering both services are independently managed form each other.

**Type 3.** As example 2 above, here the services are offered on a mobile device with a MTV receiver (for example on the basis of the ISDB-T standard) and 3G/4G functionality. For example, NOTTV, a Japanese company of the NTT Docomo group, can broadcast their linear TV services and make the catch-up-TV app available on the 3G/4G platform. Both services can be offered in an integrated manner allowing the end-user to seamlessly switch between platforms/services.

**Type 4.** Telecom or cable network operators (like Telstra, Comcast, Orange or elecom Malaysia TM HppTV) offering triple play services including linear TV services, VoD, telephony and Internet access or quadruple play (with further addition of mobile to fixed voice, Internet and Video). All service levels are actively managed and controlled (including picture quality but also Internet access speeds). All services are carried over a single integrated network.

**Type 5.** As service example 4 but all services are offered over the Internet. The end user subscribes to Amazon Prime or Hulu and watches linear TV from the Dutch PSB (NPO) over any IP connected device (for example an Xbox or AppleTV box). Picture quality and availability is not guaranteed of any of the services. Another example is TONTON of Media Prima in Malaysia, a commercial broadcaster operating an OTT service.

**Type 6.** As service example 5 but the connected device is a 4G enabled smartphone. All audio visual services are delivered over the Internet. Although Internet access and speeds are managed by the mobile network operator, the operator does not manage picture quality and service availability specifically for the individual service/content provider. On-the-Go service from Astro, a commercial content service provider in Malaysia, is an example of mobile OTT.

**Type 7.** As service example 5 but the content provider (e.g. Netflix) has agreed contracts with ISPs whereby service levels (i.e. minimum download speeds) and financial compensation are agreed. Not included in Figure 1, but another service can be where VoD services are offered on a mobile 3G/4G platform

**Appendix II**

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**“Interactive multimedia services in Asia-Pacific:**

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