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Focus Group on Audiovisual
Media Accessibility
Technical Report

**Part 16: Interworking and digital audiovisual
media accessibility**



FOREWORD

The procedures for establishment of focus groups are defined in Recommendation ITU-T A.7. The ITU-T Focus Group on Audiovisual Media Accessibility (FG AVA) was proposed by ITU-T Study Group 16 for creation in-between TSAG meetings and it was established on 22 May 2011. The Focus Group was successfully concluded in October 2013.

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Summary

This Technical Report of FG AVA outlines the issue of interworking and digital audiovisual media accessibility that the FG AVA has foreseen as a future work item for ITU-T Study Group 16 (SG16) "Multimedia" and ITU-R SG9 "Broadcasting service".

1 Introduction

When broadcast technologies were introduced in the last century, first for radio and then for television services, a limited number of platforms¹ were used to distribute these media.

Within the last 30 years, the number of platforms for distributing linear and non-linear audiovisual services such as broadcast television and video on demand (VoD) has grown rapidly.

An example of this is the BBC i-player service that allows viewers to hear radio and watch TV content on demand. The BBC provides this non-linear service via multiple distribution networks to more than 600 different kinds of devices capable of handling audiovisual (AV) content. Theoretically, each of these networks and devices could be treated as a unique platform. From an economic perspective, however, the cost of delivering the same content on multiple platforms could increase exponentially if steps were not taken to ensure interoperability².

The capacity of the hardware and/or software architecture to handle content for multiple distribution platforms to ensure interoperability requires some kind of interworking³.

From an accessibility perspective, it is necessary to consider what the constituent components of 'content' are. FG AVA noted that there are three important areas:

- The audiovisual content itself (a TV programme or a video recording, or for that matter a computer game).
- Access services associated with a specific piece of audiovisual content that are delivered as an integral part of the content (open captions/subtitles, open sign language interpretation) or as optional services that can be selected or deselected by the user (closed captioning/subtitles for the deaf and hard of hearing, described video/audio description).

These services may be distributed as an integral part of the end-to-end content service (for example, closed captions/subtitles delivered in a digital broadcast television transport stream) or delivered on a separate platform and integrated on use in the device.

An example is to use internet to provide access services for broadcast television programmes. These might be, for example, subtitles (aka captions) or signing. The subtitles or signing are transmitted via Internet at the same time as the program is broadcast, and the two are combined with the television program on the TV screen. The subtitles or signing need to arrive at the display at exactly the right moment, so a way of synchronizing them is needed. New technical systems known as 'Integrated Broadcast Broadband' (IBB)⁴ systems can be used to combine content from the internet and television."

¹ Platform is used in the sense of "A hardware and/or software architecture that serves as a foundation or base for realizing a certain functionality." Recommendation [ITU-T G.1081 \(10/2008\)](#)

² "Interoperability: The capacity of one or more elements intended for use via one delivery media to be also used for other delivery media, or be passed on without modification to other systems." Recommendation ITU-R BT. 1378 (1998)

³ "Network interworking: Interworking between two similar (like) networks via an intermediary network with dissimilar characteristics." Recommendation ITU-T Y.1401 (02/2008).

⁴ In a media scenario where convergent TV receivers are able to handle the broadcast signal and applications delivered by broadband IP telecommunication services, there are opportunities to drive user engagement and to maximize the end-user's satisfaction by offering a range of new services.
A system which enables to offer such services is called integrated broadcast-broadband (IBB) system. Two examples of this are the HbbTV and the HybridCast standards explained in detail in the ITU-R report. Integrated broadcast-broadband systems. BT Series. Broadcasting service (television). Report ITU-R BT.2267 August 2013, ITU. Geneva, Switzerland. <http://www.itu.int/pub/R-REP-BT.2267-2013>.

- The 'meta-content': The metadata about the content that accompanies it on a given distribution platform but also meta-content in the form of data for an electronic program guide (EPG), spots and trailers used to promote the content on a given platform before or after its publication.

The key observations here are that:

- Platforms for the distribution and use of digital audiovisual content have increased in number.
- The proliferation of such platforms is likely to continue.
- Distributing content will require media companies to formulate clear production and distribution strategies to prevent costs from escalating as the result of a fragmented media market.

The points in the value chain at which interworking takes place in connection with commissioning, production, distribution and use of audiovisual media are discussed with reference to Figure 1.

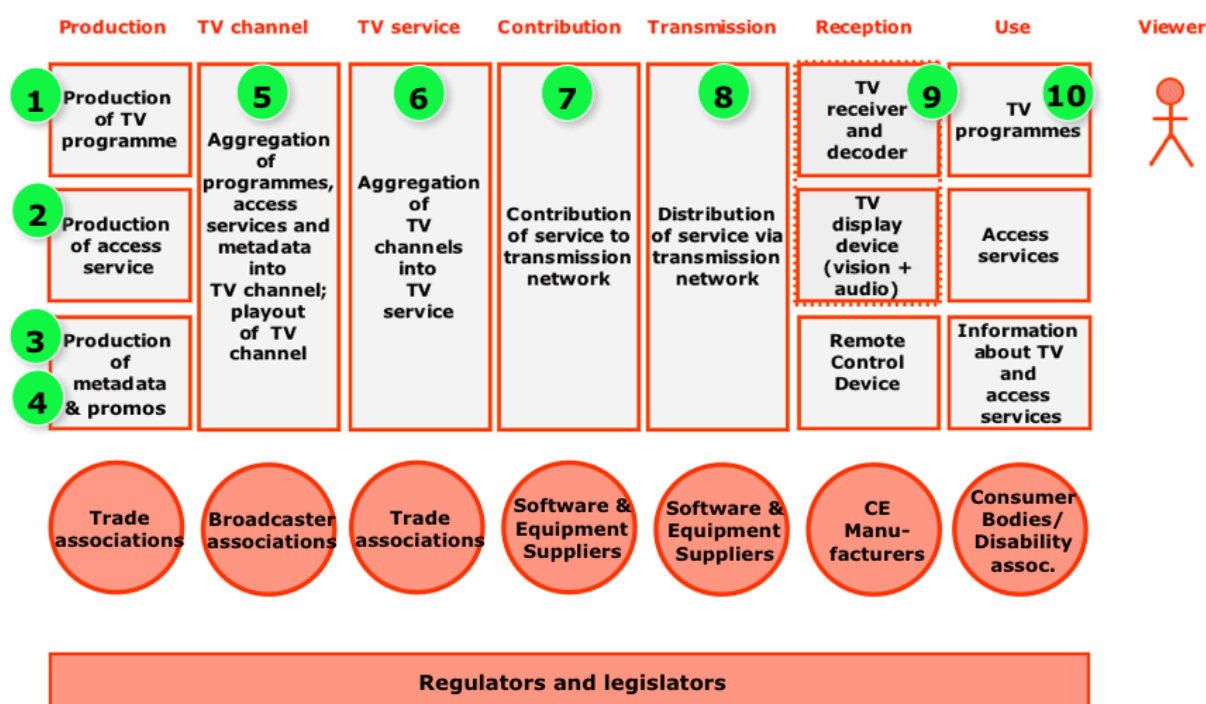


Figure 1 - Value chain for television content

The figure is a block diagram to show the value chain for television content. It should be read from left to right.

Traditionally, interworking has involved architectures for handling TV programmes themselves: TV access services and TV meta-content services. In the case of (1), interworking involved collaboration between internal producers, external content producers or a mix of both and a commissioning editor at the TV channel (5).

Interworking is also involved in the production of access services (2) and meta-content such as the metadata for EPGs (3) and spots and trailers (4). All of these entities have to collaborate with the commissioning body at the broadcaster (5) and also with those concerned with play-out, contribution and distribution (7, 8).

The TV service has to be extracted from the transport stream in the device (9). Depending on whether the access services are open or closed (part of the assets or under some degree of viewer

control), the access service has to be displayed along with the content to which it refers. The meta-content such as EPG, spots and trailers also need to be accessible to allow persons with disabilities to discover, use and enjoy the programme or series.

Interworking thus involves both the commissioning and production of content (1 to 5) and its subsequent delivery to users via one or more distribution systems (7-8) so that it can be decoded (9) and the content (10) used and enjoyed by the viewer.

2 Scenarios

2.1 Open access services, one platform

As television evolves and the provision of content moves from content on TV channels to the delivery of TV content on multiple platforms for use both as linear and non-linear services, several interworking scenarios should be considered:

Scenario 1: Open access services, one platform

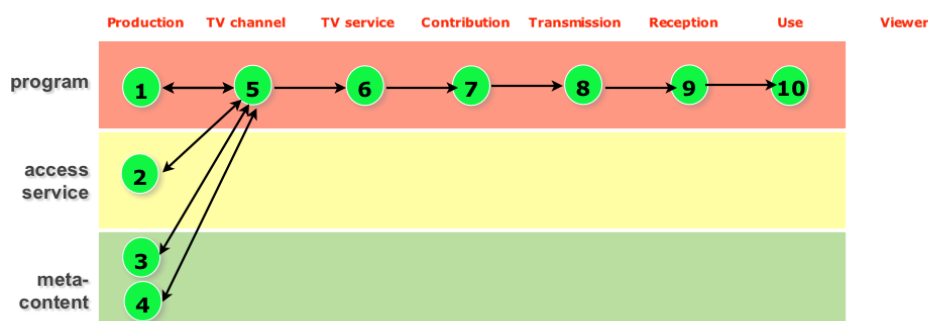


Figure 2 – Scenario 1: captioning-open access services, one platform

In this scenario, the example of captioning is used. The service is provided to all viewers, whether they want it or need it. This is also the case for sign language on many TV stations.

Interworking requires production tools for captioning/subtitles that can generate and present the captions/subtitles with the appropriate formatting and be handled by the broadcaster. The broadcaster incorporates the captions/subtitles into the television picture, typically standard definition.

This is a simple value chain in which captions/subtitles may be exchanged on a variety of storage media or using various communication channels among those involved in production and play-out.

2.2 Current multiplatform

In the scenario in Figure 3, the broadcaster typically has to parse the captions/subtitles for delivery via three or four different managed networks. For those with networks and devices allowing for closed captions/subtitles, the text has to be parsed to take into consideration the display of the access service on the viewer's device.

For terrestrial TV in Europe, this may involve teletext or bitmap graphics that can be delivered as closed captions/subtitles. Some less modern satellite or satellite antenna TV networks may require that the captions/subtitles are displayed in an open format in the TV channel.

Scenario 2: Current multiplatform

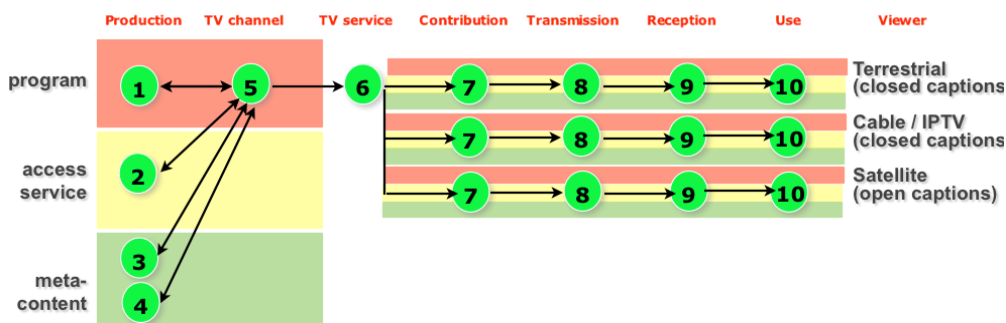


Figure 3 – Scenario 2: captioning-current multiplatform

In scenario 2, the focus is on the end-to-end delivery of captions/subtitles on platforms with very different service architectures and life cycles. Television platforms tend to have a longevity measured in years if not decades. Internet protocol-based systems tend to go through more rapid iterations involving changes in the operating system and in the application programming interfaces (APIs). Interworking will have to take these salient differences into account.

2.3 Future multiplatform

To date (end of 2013), there has been limited interworking among media companies when it comes to the production of access services, although good examples of this among francophone public service broadcasters and in connection with the sale of TV drama to other English-speaking countries do exist. The challenge here are the downstream differences in requirements at the national level: regulators in various countries airing the same content with access services have different regulations governing the presentation of, for example, captions/subtitles.

As television consumption moves from watching when the programme is aired to increasingly watching when it suits the audience, the number of delivery platforms will continue to increase.

These will include managed networks, unmanaged networks and IBB networks where the delivery of content, access services and meta-content will require the synchronization of content delivered on, for example, broadcast and IP networks and displayed as a single service on the viewer's device in the home (IBB one screen) or on a main screen and a second screen (mobile phone or computer tablet) that allows the viewer to interact with the TV service and benefit from access services on this second screen.

Scenario 3 provides illustrated in Figure 4 new challenges that include:

- Producing access services such as captioning/subtitles that keep the access service and its presentation separate. This is one of the drivers for the recent emergence of extensible markup language (XML)-based solutions of captions/subtitles.
- Delivering services such as captioning/subtitles on devices with radically different screen resolutions requiring mechanisms to compensate for the presentation of text on very small or very large screens.
- Allowing some degree of viewer customization to cater for differences in capability that hitherto have not been addressed by the "one size fits all" approach to text on screens.
- Ensuring a broadly similar user experience (UX) when delivering access services on multiple platforms, some of which are managed and others are not.

Scenario 3: Future multiplatform

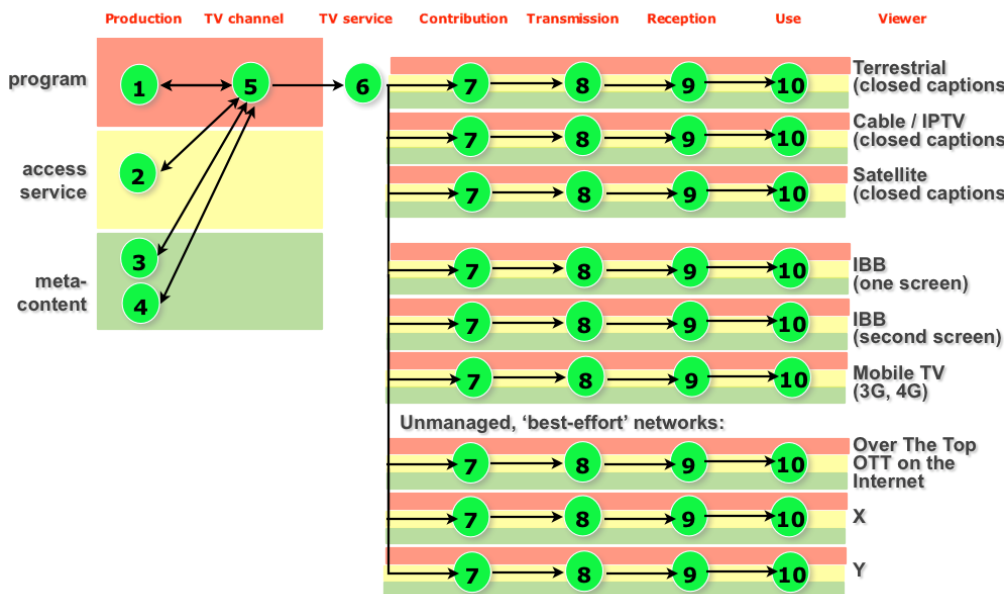


Figure 4 – Scenario 3: captioning-future multiplatform

- Accountability, in that legislators and regulators are increasingly asking broadcasters for evidence that access services comply with service level agreements (not only the presence of captioning/subtitles but also compliance with quality metrics such as the synchronicity and accuracy of the on screen text).

3 Conclusions

As audiovisual media mature and develop into both linear and non-linear services, interworking will have to address the challenges listed above. They will gradually change status from optional to mandatory requirements in a multiplatform world.

Standardization efforts are already underway to look at interworking on managed, unmanaged and IBB networks.

Interworking will thus have to come up with service architectures that allow for the effective and efficient exchange and transformation of access services so that these can be delivered with content and meta-content on the platforms that emerge as the result of market forces.

4 Possible Actions

ITU should be encouraged to support actions to promote interworking not only of audiovisual media content but also for the associated access services that enhance audiovisual content accessibility.

Given its global reach, ITU should be encouraged to study service architectures that allow for the effective and efficient exchange and transformation of access services among AV media stakeholders so that access services can be delivered with content and meta-content on the platforms that emerge as the result of market forces.