# Introduction

This document describes a number of use cases where JSR 272 API may be involved. Use cases 1, 2, 3 and 4 are referenced from the DVB-H specifications: http://www.dvb-h-online.org/PDF/a097.tm3349r2.cbms1166r11.IPDC_Use_Cases.pdf.

# 1 Interactive TV

**Scenario Description**

Provided regular broadcast services are carried in DVB-H, the viewer will expect the same sort and range of services as available via DVB-T (e.g. broadcast on-line services). Digital broadcast content includes additional data services offered by the broadcast content providers (e.g. in form of interactive middleware based applications). Additional services can consist of either local interactivity on the terminal or interactivity by using the interactive channel.

A typical example for the first case is additional information on a sports AV program like team statistics, results, player history etc. For the latter, participating in a quiz show or voting are attractive examples for remote interaction.

**Pre-conditions**

After navigating in the ESG the user has selected one of the offered FTA Audio/Video services that is linked to an interactive application.

**Post-conditions**

**Flow**

1. The end user utilizes the ESG to get the entire service offer of available (FTA) services. He chooses an AV service that is linked to an interactive application.
2. (optional) For remote interactivity the usage of the interactive channel is triggered and confirmed by the user. The cellular network (by TCP/IP, SMS, etc.) is used to connect with the Service Management or Service Application entity.

# 2 Download of audiovisual content / applications / services / software to devices

**Scenario Description**

It is thinkable that specific content (e.g. a video clip) can be downloaded triggered by a user request. The content would be available on a server hosted by the Public Service Broadcasters. Once the content has been received, the user chooses to consume it whenever he wants.

**Pre-conditions**

After navigating in the ESG the user has selected one of the offered FTA services for downloading. He is then immediately able to access the desired content, especially Audio and Video without any restrictions, to consume the content later or to distribute it (see next scenario).

**Post-conditions**

**Flow**

1. The end user utilizes the ESG to get the entire service offer of available (FTA) services. Once he has chosen one service of interest he is immediately in the position to download the desired content.
2. The content that was selected for download is stored on the CBMS-terminal. It can for example consist of Audio/Video or applications.

# 3 Broadcast of audiovisual streams along with auxiliary information streams to be rendered synchronously and (optionally) containing interaction entry points

**Scenario Description**

The End User receives a linear audiovisual stream carrying a TV programme or other content. Along with the live stream auxiliary data (containing text, images etc) is received, which is synchronized with the main content (A/V stream). The client application on the terminal renders the service for the display of the device so that the auxiliary data is presented within the main context (links or hotspots in the A/V stream) or next to the main context. This creates additional rich information available to the End User. Moreover, the information may contain interaction entry points.

**Pre-conditions**

The End User has finished the service discovery phase and selected a IP Datacast Service. If required, the End User has also acquired rights to access the selected IP Datacast Service and related content.

**Post-conditions**

The End User continues receiving the selected IP Datacast Service delivered with auxiliary data. The End User may have concluded a service interaction.

**Normal flow**

1. The End User discovers a IP Datacast Service of interest and chooses it for immediate consumption. A dedicated application may be required and started on the End User Terminal.

2. (Optionally) The End User acquires rights for receiving the service / consuming the content.

3. The End User receives a IP Datacast Service and associated auxiliary data. The auxiliary data is rendered within the service or next to the service in the End User Terminal. The auxiliary information may consist of text, images, animations and more. An example is the display of a ticker, sports/voting result lists, or subtitles

**Alternative flow**

Same as Normal Flow for steps 1 to 3.

4. The End User accesses the interactive element delivered within the auxiliary data. The interactive element may be, for example a web link or a voting button.

5. There are two options:

    a. The interaction is internal to the IP Datacast Service and does not initiate an outbound data connection from the End User Terminal. In this case the End User explores the auxiliary information by navigating through navigation elements presented on the display; or

    b. The interaction results in an outbound data communication from the End User Terminal, for example, the Service Provider. Examples of this are:

        - The browsing a web link pointing to a resource not stored on the terminal.

        - The initiation of voice calls.

- The initiation of transactions, such as placing orders or bets and purchases. Interaction may be based on all sorts of communications available on the interaction channel, including phone calls, SMS, MMS, WAP, HTTP, SOAP and other TCP/IP communications.

6. The End User possibly resumes the main IP Datacast Service.

**Actor Specific Issues**

*End User*

May want to be able to toggle the display of auxiliary services “on” or “off” or to select from a set of auxiliary services. An example of this case is the selection of subtitles “on/off” or then the selection of subtitling language.

*Service Provider*

Wants to be able to provide End Users with IP Datacast Services that allow the End User to interact with the service (e.g. voting), or to initiate separate services (e.g. browsing).

*Content Provider*

Wants to provide content or data elements as complementary to the main content, for example, tickers, subtitles, result lists, shopping information. He may do so in order to attract the End User to additional services.

**Actor Specific Benefits**

*End User*

The End User experiences an enhanced broadcast programme on his EUT with auxiliary information that is displayed in a legible manner and allowing to navigate this information in a certain depth locally.

The End User can conveniently access dedicated interactions offered through the auxiliary information.

*Service Provider*

The broadcast bandwidth is used efficiently for video content. Extra information is not image-encoded and therefore transmitted efficiently.

The service interaction will generate traffic on the Service Provider’s system. Through the interaction links delivered with the IP Datacast service, it may serve as a portal to additional service offerings by the SP.

**Operational and Quality of Experience requirements**

None specified.

# 4 Unattended information download with off-line consumption and interaction entry points.

**Scenario Description**

A potentially large information base is downloaded over the broadcast channel to the terminal. After reception the user can access information at his discretion. The information retrieved by the end user may contain interaction entry points.

The information offered in such a way may include

- Information database(s)
- All sorts of multimedia information, such as images, movies, and audio content.
- The service access may be protected and subject to a purchase/subscription fee.
- Individual content elements may be protected and End User access may require the purchase of a separate rights object.

**Pre-conditions**

The End User has finished the service discovery phase and selected a IP Datacast Service. If required, the End User has also acquired rights to access the selected IP Datacast Service and related content.

**Post-conditions**

The End User has a set of files stored at the terminal for immediate consumption. It may be required that the End User acquire the rights to access the content, if the content or parts of it are delivered in encrypted form. Optionally, the End User may have concluded a service interaction.

**Actor Specific Issues**

*End User*

Wants to be able to access the information service at any time and in any place. Delivering files and later displaying them provides this flexibility.

**Actor Specific Benefits**

*End User*

The user has a large information base available for instant consumption at any time. No additional interaction is necessary to retrieve from the stored information. The basic service can be attractively priced.

At the End User's convenience, he may make use of interaction entry points embedded in the information to obtain additional services that require the interaction channel.

**Flow**

An information base is downloaded over the broadcast channel to the terminal. This should take place unattended, i.e. no user interaction is involved other than:

1. The End User discovers a IP Datacast Service of interest and subscribes to it (expresses interest in it). In this case it is a content delivered via the file distribution service.

2. (Optionally) The End User acquires rights for receiving the service.

3. The Terminal automatically and unattended receives the file set over a broadcast channel, provided it is ready for reception (i.e. it must be switched on and within the reach of the broadcast network). All other configuration set-up, such as scheduling the broadcast reception is handled automatically by the EUT. The Terminal stores the files (this may include version management). The data may be received repeatedly, e.g. for daily updates.

4. (Optionally) The Terminal alerts the End User that new files have been received / the service has new content.

5. The End User may use the information at any time, even when he is off-line (i.e. not connected to either the broadcast and interactive network). A dedicated application may be required to access/use the information base.

6. (Optionally) The application may be enhanced with live broadcast(s) that are displayed when the user interacts with the application.

7. The information accessed by the user through the information retrieval application contains interaction entry points, which will involve outbound communication on the interaction channel, in order to initiate transactions such as

    - Obtaining up-to-the-minute information updates

    - Links to additional information that is available over the interaction network

    - Initiate transactions, such as

        - Purchase of tickets (e.g. for public transportation, museums, cinemas, theatre and music performances and other events).

- Purchase of ‘electronic vouchers’, which can be redeemed at locally accessible businesses for merchandise and/or services.
- Purchase of rights for content that has been downloaded but is still DRM-protected
- Reservations for restaurants and other facilities.

Interaction may be based on all sorts of communications available on the interaction channel, including phone calls, SMS, MMS, WAP, HTTP, SOAP and other TCP/IP communications.

(Optionally) All charges (basic subscription and later user-initiated purchases) may be handled by the interaction network’s accounting and billing services.

**Operational and Quality of Experience requirements**

None specified.

# 5 Simple Recording

**Scenerio Description**

User is viewing a program he really likes. He is thinking that it would be nice to view it again later, to show it to his friends on his phone or to distribute the streamed content to them. The MobileTV application provides in the standard menu the possibility to start recording of streamed content. This function is available for selected programs for which the service/content provider decided to let the user record the content. This information is available in the ESG.

User selects the recording menu item and starts recording. The Menu provides also pause and stop items. After a while user stops recording. Alternatively if during recording the maximum size of recorded content/file has been exceeded the application automatically stops recording.

User continues to see the program. When he wants to access recorded content he selects another Menu item in the MobileTV application that provides access to the gallery of files of recorded content.

# 6 Time-shifting

**Scenerio Description**

User is viewing a program he really likes. Because of different possible reasons (he receives a call, an SMS, he want to make immediately a call, to send an SMS,…) he need to stop for a while the viewing experience. The MobileTV application provides in the standard menu the possibility to “pause” the viewing of streamed content. He selects the pause menu item and the application stops the video and starts recording. The user answers the incoming call (or perform any other action…) and when he desires to start again the viewing experience he select the “continue” item on the menu.

The program starts again immediately from the same ‘frame’ where it was frozen, independent of the live transmission at that time. In practice the MobileTV application is playing the recorded content and continuously recording the rest of the program. The time shift is the elapsed time between the “continue” and “pause” actions done by the user and can’t be more that the corresponding file size of registered content.

# 7 Timer (or planned) Recording

**Scenerio Description**

The user is browsing the ESG rendered by the MobileTV application and finds a future program event he is very interested in.

He knows that at the time the event will start he would not able to watch it or he is thinking that it would be nice being able to watch it several times.

The MobileTV application provides in the standard menu the possibility to schedule the recording of the program event he is looking at in the ESG. This function is available for program events for which the service/content provider decided to let the user record the content. This information is available in the ESG.

The user selects the timer recording menu item and a popup is shown to ask him to enter the date/time when the recording will start and the date/time when the recording will stop.

When the popup is first shown to the user, it may be already filled with the start and end time of the program event as they are reported in the ESG, and the user can decide to modify the proposed interval. The popup may also notify the user if the recording interval would result in a recorded file that exceeds the maximum size of recorded content/file. The popup may also ask the user to enter the name that will be assigned to the recorded file. The popup must notify the user if the recording interval overlaps with an already planned recording.

If all conditions are met and the user confirms the recording, the MobileTV application at the planned recording start time will select the service corresponding to the requested event and start the recording until either the planned recording end time is reached or the maximum size of recorded content/file has been exceeded.

Note that during the recording the MobileTV application is not requested to render the streamed content but must clearly show the recording state in order to avoid an unwanted shutdown.

At a later time, when the user wants to access the recorded content, he selects another menu item in the MobileTV application that provides access to the gallery of files of recorded content.

At a given time, if the planned recording has not stopped yet, the user can either activate the rendering of the streamed content while recording proceeds or play the incomplete recorded file from the beginning while the recording continues or prematurely stop the recording (e.g., if he wants to select a different service).

At any time, the user may select another menu item in the MobileTV application that provides access to the list of planned recordings. An entry in the list shows at least the title of the event and the recording interval.

# 8 Service Purchase

**Scenerio Description**

User is browsing ESG and selects a service he does not have acquiring rights for. The application tells that the user doesn't have rights and ask if the user wants to purchase them.

The ESG contains information about where the service can be bought from. This includes a URL and a "bearer" selector and the price of the service. Bearer can be interactive connection (HTTP), SMS, voice etc. The user can be presented a choice if more than one are available.

User chooses to purchase the rights.

The implementation tells the user the actual price and the content of the purchase and confirms that he wants to do the purchasing. If the user accepts then the implementation does the transactions and reports the success to the user. After the successful purchase operation, the user can start to watch the service.