

JSR-272 Expert Group

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JSR-272 Mobile Broadcast Services for Handheld Terminals

Requirements

Abbreviations

API	Application Programming Interface
CLDC	Connected Limited Device Configuration
DAB	Digital Audio Broadcasting
DVB	Digital Video Broadcasting
ESG	Electronic Service Guide
J2ME	Java 2 Micro Edition
J2SE	Java 2 Standard Edition
JCP	Java Community Process
JSR	Java Specification Request
JVM	Java Virtual Machine
KVM	K Virtual Machine, small virtual machine of J2ME
MIDP	Mobile Information Device Profile
MMAPI	Mobile Media Application Programming Interface

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1. REQUIREMENTS

The requirements are divided into sections. In each section, there is first a descriptive text just to introduce the field and then the actual requirements are listed in a compact table.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#).

1.1 Preamble

The API will probably be first implemented on broadcast bearers DVB-H, DMB, DXB, MBMS, BCMCS (the 3GPP 2 counterpart to the MBMS), and WiFi. It may also be implemented on top of broadcast bearers developed in the future.

1.2 General

This chapter lists general issues common to all the features API has. The requirements here include the relations to other packages such as CLDC and MMAPI, and general programming practices.

Num	Requirement description
G1	The API MUST be implementable on top of CLDC 1.1 and MMAPI 1.1.
G2	The API SHOULD be agnostic to protocols.
G3	The API SHOULD be agnostic to broadcast bearers.
G4	The API SHOULD be agnostic to codecs.
G5	Security-related issues TBD (service protection and content protection)
G6	DRM-related issues TBD
G7	The API MUST be able to deal with resource limitations of the device. (for example, number of currently available tuners)

1.3 Controlling the receiver

Num	Requirement description
C1	It MUST be possible to scan the available service providers and to store the results into an internal service provider database.
C2	It MUST be possible to access data from service provider database.
C3	It MUST be possible to select a specific service provider
C4	The API MUST model the different states of the radio receiver.

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C5	It MUST be possible to query the state of the receiver.
C6	It MUST be possible to change the state of the receiver.
C7	It MUST be possible to query the signal quality indicator, network information, and terminal profile information and its version
C8	The API MUST allow choosing among different broadcast bearers if there are multiple bearers available in the device.
C9	The API SHOULD allow simultaneous receiving of multiple services from different broadcast bearers.

1.4 Rendering and recording a service

1.4.1 Rendering

Num	Requirement description
RN1	It MUST be possible to utilize acquisition information (that may be previously obtained from the Electronic Service Guide) to choose a service to consume.
RN2	Playback of the service MUST utilize MMAPI (JSR-135) framework as a basis wherever appropriate.
RN3	Playback of the service MUST utilize AMMS (JSR-234) framework as a basis wherever appropriate.
RN4	Setting of the audio level MUST be possible.
RN5	Setting of the brightness, contrast and gamma MUST be possible.
RN6	Cropping, positioning and scaling of the video image MUST be possible.
RN7	It MUST be possible to query the following parameters of the source material: the width and the height of the picture, and the aspect ratio.
RN8	It MUST be possible to render overlay graphics on top of the content.
RN9	It SHOULD be possible to render interactive UI components on top of the content.
RN10	It MAY be possible to do limited time shifting (utilizing buffered stream)
RN11	It MAY be possible to do instant replays (utilizing buffered stream)
RN12	It MUST be possible to choose which subtitles to render (or none of them).
RN13	It MUST be possible to choose which audio track(s) to render.
RN14	It MUST be possible to choose which video track(s) to render.
RN15	It MUST be possible to play the service without rendering the visual content (i.e. only the audio is heard) and it MUST be possible to play audio-only services.

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1.4.2 Recording

Num	Requirement description
RC1	It MUST be possible for the API to provide recording of the broadcasted media. (Take into account A088 [6] and A087 [7].)
RC2	It MAY be possible to record the broadcast media outside the life cycle of the Java application.
RC3	There MUST be a unique identifier for each recorded data.

1.5 Electronic service guide

Num	Requirement description
E1	It MUST be possible to query ESG data always. (That is, in all receiver states.) (Not all the ESG data MAY be available immediately.)
E2	It MUST be possible to request (asynchronously) updating of the ESG.
E3	It MUST be possible to notify the application when the ESG (in the device) has been updated. The notification MAY tell which part of the ESG was updated (e.g. program start time update)
E4	It MUST be possible to query a list of available ESG service providers.
E5	It MUST be possible to choose an ESG service provider.
E6	It MUST be possible to access at least the following kinds of objects from ESG (if they are available in the system): Service, ScheduleItem, Content, Access, File and ExtensionURL (as specified in Service Guide for Mobile Broadcast Services [5]) (To be confirmed (look into several different specifications to define the objects))
E7	It MUST be possible to extend the ESG data model with system-specific extensions.
E8	It MUST be possible to initiate a purchase of a service using ESG.
E9	It MUST be possible to cancel the subscription of a service using ESG.
E10	It MUST NOT be possible to setup the system to allow the purchasing. (The assumption is that user of the device already has the possibility to do the purchasing. Infrastructure to setup the services, like registering the device to the operator, is out of the scope of this API.)
E11	It MAY be possible to make query and filter services, programs and events based on the metadata (including subscription info) in the ESG.

1.6 Receiving objects, auxiliary streams and Java applications (and launching Java applications)

1.6.1 Receiving data objects

Num	Requirement description
D1	It MUST be possible to receive any data objects from the broadcast.

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D2	The object directory structure MUST be available via the API.
D3	All relevant available metadata of the received objects MUST be available via the API. (There is not necessarily metadata available in the underlying stream.)
D4	A unique identifier MUST be available to access the object.
D5	Objects MAY be queried based on metadata.
D6	There MUST be a unified way to identify at least images and hypertext links.
D7	It MUST be possible for an application to get a notification when a new identified object is received.
D8	It MAY be possible for an application to get a notification when a new object belonging to a named type is received.
D9	It MUST be possible for an application to get a notification when there are changes in the object directory structure. (No detailed information about the change is given.)
D10	It MUST be possible to register an application to listen to the changes in an application-defined set of identified objects.

1.6.2 Receiving data streams

Num	Requirement description
S1	The API MUST provide access to application-specific data streams.
S2	The API MUST be able to handle synchronized data streams. (synchronized with the service content)

1.6.3 Receiving and launching Java applications

Num	Requirement description
J1	It MAY be possible to receive Java applications.
J2	It MAY be possible to launch Java applications.
J3	It MAY be possible to set the parameters of the Java application.

2. REFERENCES

- [1] "CLDC Specification, V1.0 ", <URL: <http://jcp.org/aboutJava/communityprocess/final/jsr030/>>
- [2] "Mobile media API 1.1 specification", JSR-135, 2002. <URL: <http://jcp.org/aboutJava/communityprocess/final/jsr135/index2.html>>
- [3] "Advanced Multimedia Supplements specification", JSR-234, 2005 <URL: <http://www.jcp.org/en/jsr/detail?id=234>>

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- [4] Digital Video Broadcasting Project home page, <URL: <http://www.dvb.org/>>
- [5] Service Guide for Mobile Broadcast Services, OMA-TS-BCAST_ServiceGuide-V1_0_0-20050512-D
- [6] Digital Recording Extension to Globally Executable MHP (GEM), DVB Document A088, April 2005
- [7] PVR/DVR Extension to the MHP, DVB Document A087, April 2005