Rich-Media Environment Requirements

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Open Mobile Alliance

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1. Scope   (Informative)

This work takes into account the global environment of the mobile industry in the field of enhanced rich-media services: from rich-media content and service creation, deployment, diffusion and display.

By enhanced rich-media services we understand:

- Services aggregating in a single interface any kind of content (graphics, text, audio, video) allowing:

  • A rendering and behaviour of the service on the device conforming with the developer wishes and adaptable to the end-user device characteristics (screen size, input...)

  • A progressive rendering and fast display of data: there should always be something going on the terminal.

  • An intuitive and easy user interaction with the content for navigation.

  • A frame-accurate synchronisation of content, stream and interaction.

  • Receiving data from various networks at the same time and displaying all together in a single service interface.

- Service logic based on client server real-time interaction with:

  • Dynamic updates of content and interface triggered by the service logic and/or by end-user requests without reloading a complete interface to provide to the end-user low latency and a best quality of service.

  • Adding data at any time in the delivery process, even to an already started progressive download, to decrease end-user latency.

  • Managing data both on client and server side for storage and temporal live cycle of data in conformance with the logic and delivery of the service.

  • Packaging data in a convenient way to decrease network requests and server resources.

Such rich-media services remain network, device, OS and codec independent.

The objectives of this work are:

  • describing use-cases and new requirements that will lead to improved end-user experience through use of enhanced rich-media services

  • defining requirements to optimise rich-media services

  • identifying new functionality to enable the support of enhance rich-media services on existing devices

  • if necessary, identifying the need of new OMA enablers to realize such use cases and requirement

  • releasing a requirements document for rich-media content services which will be released as a public document.

2. References

2.1   Normative References

[RFC2119]   "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997,
URL:http://www.ietf.org/rfc/rfc2119.txt

2.2   Informative References

UAPROF   "User Agent Profile Specification" 2.0, WAP Forum™, WAP-248-UAProf

URL:http://www.openmobilealliance.org/release_program/uap_v20.html

URL:http://www.openmobilealliance.org/tech/affiliates/wap/wap-248-uaprof-20011020-a.pdf

uDOM   "Micro Document Objet Model", W3C, 2004

URL:http://www.w3.org/TR/SVGMobile12/svgudom.html

DOM   "Document Object Model", W3C, 2004

URL:http://www.w3.org/DOM/

3. Terminology and Conventions

3.1 Conventions

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 [RFC2119].

All sections and appendixes, except "Scope" and "Introduction", are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Rich-Media Enabler	The enabler that renders RM content and that support the rich-media services.
Rich-media data	Any audio, video, graphics, text, images…
Rich-Media scene	The composition of different RM data types at the client.
Rich-Media content	Includes RM scene information and synchronization and presentation meta data, which ensures correct display of RM scene at the client.
Rich-media service	Local or distant application used by the end-user to consume RM content.
Dynamic Update	Dynamic updates are understood as small packet of RM scene/data providing dynamic modification of RM data/scene and their integration in the current scene.
Aggregation	Aggregation is defined as the packaging of RM scene and data in a manner allowing download, streaming and media interleaving.
Progressive Rendering	The ability to start rendering the content as soon as a piece of content is available and before the content has been completely received and to keep updating the rendering as more datas arrive.
uDOM API	The uDOM API is a restriction of the DOM API suitable for small embedded implementations.
DOM API	The Document Object Model API is a platform- and language-neutral interface that allows scripts to access and modify the scene.
Time Code	A time code is a sequence of numeric codes generated at regular intervals by a timing system. Time codes are used extensively for synchronization, e.g. SMPTE time codes, i.e. a family of timecodes used in film, video and audio production. A time code is usually understood as an absolute time, i.e. a clock value, as opposed to a duration since some event.
Relative Time	In the context of this document, relative time, as opposed to absolute time or time code, is a specification of one point of a media expressed as a duration since the beginning of the media or since another reference point (e.g.:such as chapter beginning).
Rendering	In the context of RME, rendering is understood as the transformation of RM data into user experience, i.e. audio and video presentation
Constrained Terminal	In the context of RME, a terminal which cannot support all the RM functionality due to limitations in resources (e.g. CPU, memory, display size) or capabilities (e.g.: no video codec).
Unconstrained Terminal	In the context of RME, a terminal which can support all the RM functionality.
AV stream	Streamed media comprising audio and video
Metadata stream	Metadata delivered in a streamed form
Bundle of streams	A set of streams which are semantically related by the fact that they are referenced by some service.

3.3   Abbreviations

OMA	Open Mobile Alliance
RME	Rich-Media Environment
OTA	Over The Air
DRM	Digital Right Management
RM	Rich-Media

4. Introduction   (Informative)

Today's mobile devices are capable of delivering a rich user experience with good and continually improving definition, colour, sound, resolution, etc. The challenge is how to deliver services to take advantage of this rich user experience. The work of OMA and others has already provided the means to enable rich media services, e.g. browsing, MMS, etc. This requirement document aims at describing how to enable further enhanced rich-media services for such devices.

Today rich-media content services are in trials and available in the market on various networks (from GPRS to DVB-H). Some use-cases demonstrate the need for new functionalities and features to improve and further enhance end-user experience. These use-cases and associated derived requirements form the basis part of this requirement document.

5. Use Cases

The following sections discuss the various use cases for Rich-Media Environment.

5.1 Use Case, I&E, Karaoke

Affected Areas				
Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**

Tickmarks (X)	X		X		X

Additional Keywords

Table 1: Affected Areas for <karaoke>

5.1.1   Short Description

The Karaoke service allows to display along with a music TV channel or a video clip catalog, the speech of a song with a very fluid animation on the characters to be singing (font color changing smoothly, text scrolling). The End-user must be able to choose song in its language (Arabic, Chinese, English…) and must be able to manage the audio level within the karaoke service interface. The end-user can download the song with the complete animation or as a ring-town and a picture as a wall paper by selecting an interactive button.

5.1.2   Actors

End -User: individual using the karaoke services

Service Providers: Company providing the karaoke service

Content providers: Company providing the content

5.1.2.1   Actor Specific Issues

End – User wishes to use a rich-media capable device to access a Karaoke service.

Service providers: may need Content generation, DRM tools and suitable devices to provide Karaoke services.

5.1.2.2   Actor Specific Benefits

End -User: The end-user is provided with a convenient and natural navigation within rich-media content. The animation will be provided with no perceived latency thanks to new delivery mechanisms such as progressive download and dynamic update. Content will be provided in a more readable manner, whatever are languages and sizes of screens.

Service providers: Subscription to services may increase thanks to a high quality of service for which the end-user will be ready to pay for. They will have a better ROI on such services that can be available on various networks.

Content providers: Mobile networks become a new distribution channel for their content. Content will be provided with value-add context and enriched with additional information, interactivity can provide new revenue and business models.

5.1.3   Pre-conditions

End – User: Must have a mobile device that can display rich-media content and access to rich-media services and support streaming. This could be a browser integrating rich-media codecs as plug-in or the ability to receive a rich-media enabler OTA or by download. The End –User may need to subscribe to the karaoke service.

Service providers and content providers: Need to find an agreement to protect content if necessary.

5.1.4   Post-conditions

End – User : The end- user can replay off line the downloaded animated song.

5.1.5   Normal Flow

The following flow shows the interaction of all actors involved in a karaoke service.

Steps and behaviours	End-user	Service provider	Content provider
The End-User selects the karaoke service and browses the song catalog.	X		
The Service provider aggregates the AV content from the content provider with subtitles in various languages and provides the service to the end-user.		X	X
The end-user selects the arabic language.	X		
The video clip and subtitles are progressively displayed and synchronised on a frame accurate basis. The color of the words is changing and the text is scrolling with a speed conforms to the song and to the screen size.		X	X
The End-user change the audio level (from 0 to 10) while singing, in the karaoke interface.	X		
The end-user can stop the song and play it from the beginning at anytime. Subtitles follow.	X	X	
The end-user can go to the next/previous synchronisation point by a suitable widget (e.g.: physical button, graphical button, other). Subtitles and animation follow.	X		
Before the end of a song a new UI widget (e.g.:button "send SMS") is presented to the user in the scene to download ringtones and wallpaper of the song		X	
The end-user accepts and clicks on the button, and receives by MMS ringtone and wallpaper, while staying in the karaoke interface.	X	X	X
The end-user decides to store the animated song (with the karaoke animation) on his device.	X		

5.1.6   Operational and Quality of Experience Requirements

The end-user shall have no or minimal perceived latency when using service with rich-media data (video, audio, graphics, text…) and shall be provided with convenient navigation through the content in a single interface.

Appropriate synchronisation of subtitles with audio and video content shall be possible as well as linking the rich-media scene and animation to some reference point in the AV content while the karaoke song is streamed or played back.

The end-user will benefit from the possibility to have the complete animation with all data stored, in order to replay the karaoke song when not connected.

Quality of service, server and client resources will be benefits of an optimised transmission, displayed thanks to compression, dynamic updates within the service and packaging of data.

As text is an important part of this service, the font shall be adaptable and provided with a good readability whatever are languages, designer choices and screen size.

5.2 Use Case, P2P, live chat, rich-media blog service

	Affected Areas				
	Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**
Tickmarks (X)	X		X	X	X
Additional Keywords					

<div align="center">

Table 2 : Affected Areas for <live chat, rich-media blog service>

</div>

5.2.1 Short Description

The live chat service can be incorporated within a webcam or video channel, or a rich-media blog service. End-users can register, save their surname and exchange messages. Messages appear dynamically in the dating service along with rich-media data provided by the end-user.

5.2.2 Actors

End -User: individual using the live chat service

Service Provider: Company providing the live chat service

Cellular Operator: Company providing the network and SMS infrastructure.

5.2.2.1 Actors Specific Issues

End – User: wishes to use a rich-media capable device to access a Karaoke service.

5.2.2.2 Actor Specific Benefits

End -User: The end-user is provided with a convenient and natural navigation within rich-media content. Text must be provided with a readable font whatever are language and screen size. No perceived latency will be provided thanks to advance delivery mechanisms such as dynamic update and progressive download.

Service provider: Subscription to services may increase thanks to a high quality of service for which the end-user will be ready to pay for. Networks that have such services available will have a better ROI.

Cellular operator: Will have an increasing traffic of SMS and data.

5.2.3 Pre-conditions

End – User: Must have a mobile device that can display rich-media content and/or access to rich-media services. This could be a browser integrating rich-media codecs as plug-in or a local application supporting content updates or the ability to receive a rich-media enabler OTA or by download. The End –User may need to subscribe to a data service.

5.2.4 Post-conditions

End – User: shall be able to save and restore his personal data when reconnecting to the service

Service providers: shall be able to forward undelivered messages when the end-user reconnects to the service

5.2.5 Normal Flow

The following flow shows the interaction of all actors involved in a live chat service.

Steps and Behaviours	End-user/ device	dating service provider	Cellular Operator
The end-user receives an MMS with an animation and a link to a live-chat service.	X	X	X
The end-user connects to the livechat service.	X	X	
The end-user registers to the livechat service and enters a surname, personal information, picture uploaded from his phone.	X	X	
The personal data are stored on the service providers side		X	
The end-user browses users profile registered in the livechat service and views photo, text, video…	X	X	
The end-user selects a contact (another user) and view their details.	X	X	
The end-user requests to chat	X		
The text inbox of the SMS client is open within the livechat service and the end-user tips its SMS. The calling number is already fill in with a generic number provided by the service providers to preserve personal data of subscriber.	X		X
The SMS is processed and sent to the service provider.		X	X
The text of the new SMS is displayed dynamically in the live chat area of the service.	X	X	
The two users decide to chat on a private channel in parallel with the public chat channel and can exchange pictures, video…	X	X	
Alerts of new incoming message on private channel are dynamically displayed.	X	X	
Users can switch in real time from one channel to an other.	X		
After a while, the end-user makes a call to the selected contact. A general phone number available on the server platform is used to preserve personal data.	X	X	X
At the end of the live chat/call the end-user chooses to add/remove his new contact in his preferred field.		X	
The end-user see in his UI who is available at anytime	X	X	
When reconnecting to the live chat service, the identifying surname and preferences are available for the end-user to be validated or changed as well as incoming message not read.	X		

5.2.6 Alternative Flow

The chat service can be done without SMS.

In this case the flow changes and is as follow:

Steps and Behaviours	End-user	Live chat service provider	Cellular operator
The end-user requests to chat	X		
A text inbox pop up within the livechat area of the service and the end-user tips his text message.	X		
The text string is processed in an url and sent over http to the service provider.		X	
The service provider sends back the text which is displayed dynamically in the live chat area of the dating service.		X	

5.2.7 Operational and Quality of Experience Requirements

The live chat service can be available and link to a video channel or webcam channel.

The difference between the live chat service described and a rich-media blog is that data are deleted (removing old messaging and displaying new ones) in the first case and they need to be stored in the second case. The two possibilities shall be provided.

Multiple Chat channel shall be rendered simultaneously in the same user interface. End-user shall being dynamically alerted of new messages from other users.

Dynamic update of message shall be possible within the service without reloading a complete page.

The quality of service shall benefits of a data management both on server and client in order to decrease the necessary memory and CPU resources on mobile terminal.

It shall be possible to invoke external application eg MMS SMS clients within the livechat service and it may be possible to integrate those clients visually within the livechat service interface.

Interactivity between client and server shall be possible.

5.3 Use Case I&E, Interactive mobile TV services

Affected Areas				
Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**
X		X	X	X
		Client -Server		Aggregation and updates

Left row labels: **Tickmarks (X)**, **Additional Keywords**

Table 3: Affected Areas for <Interactive Mobile TV service>

5.3.1   Short Description

The interactive mobile TV service provides access to TV content and to additional services along with this TV program. The Rich-media services provided can be tightly related to the TV program (e.g.: voting in a live show) or independent (e.g.: sport service provided in submenu of a sport channel or geo-localisation advertising service broadcasted along with the TV service)."

Definition:

iTV (interactive TV): TV program including content with which the end-user can interact (e.g.: using hyperlink)

This use case is described in 3 steps corresponding to 3 services and subservices available in a itv mobile service:

- Mosaic menu: TV Channel landscape

- Interactive voting service

- Personalised Menu "sport news"
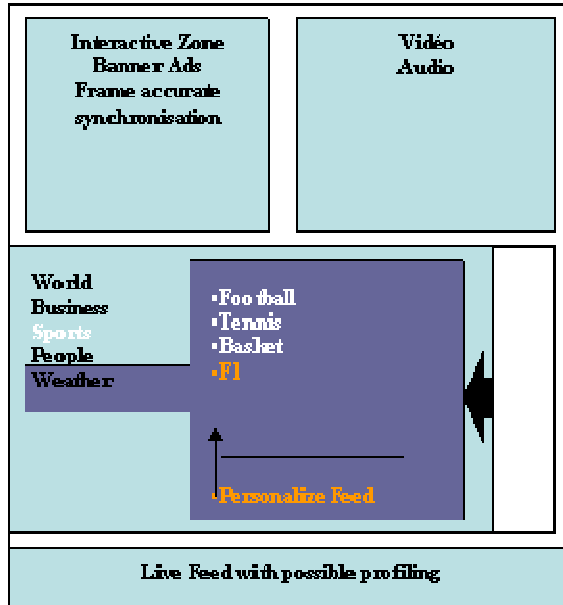
Figure 1: Example of an iTV Mobile service.

5.3.2   Actors

End -User: individual using an iTV services

Service Providers and operators: company providing the service and the access to the service.

Content providers: company providing the TV channel and associated datas.

5.3.2.1   Actor specific issues

End – User: wishes to use a rich-media capable device to access an iTV Mobile service.

Service providers and operators: may need content generation, DRM, authentification tools and devices capable to provide iTV Mobile services

5.3.2.2 Actor Specific benefits

End -User: The end-user is provided with a convenient and natural navigation within rich-media content. Content will be provided in a more readable manner, whatever are the sizes of the screen. The interactivity provided within iTV mobile service can be relative to the content and/or relative to the end-user personalised menu and profile. The end – user can interact with local communication client (e.g.: MMS, SMS clients) within and during the itv mobile service.

Service providers and operators: Subscription to services may increase thanks to a high quality of service for which the end-user will be ready to pay for. Will have a better ROI on such services that can be available on various networks and even more can federate the use of various networks.

Content providers: Mobile networks become a new distribution channel for their content. Content will be provided with add-value context and enriched with additional information.

Broadcast Operator: company providing the broadcasting distribution system which contains the ability to transmit the same IP flow to multiple Terminal devices simultaneously

5.3.3 Pre-conditions

End – User: Must have a mobile device that can display rich-media content and/or access to rich-media services. This could be a browser integrating rich-media codecs as plug-in or a local application supporting content updates or the ability to receive a rich-media enabler OTA or by download. The End –User may need to subscribe to a data service and to the itv mobile service.

Service providers and operators: May need to find an agreement with content providers to provide DRM tools.

Content providers: May be willing to protect their content with DRM tools

5.3.4 Post-conditions

End – User: can store its personalised menu and requested data

Service providers, operators: may ensure that rights have been provided to the end-user and allow him to reconnect, can store end-user preferences.

5.3.5 Normal Flow

The following flow shows the interaction of all actors involved in a complex iTV mobile service.

5.3.5.1 Mosaic main page

Definitions:

Mosaic: The mosaic is a number of small size areas in which channels are shown (displayed in the form of small videos or graphics or rich-media data) to represent available channels. Note: Mosaic does not imply overlapping or non overlapping as well as any particular shape.

Channel: A set of content that may be acted upon as a group, e.g. for the purpose of subscription, delivery, display, charging. The set of content in a channel may vary based upon the sources of the content, e.g. a single discrete content feed (e.g. RSS feed), a combination of multiple feeds, or an aggregation of content feeds and other discreet data such as personalised information."

Steps and behaviour	End User Local application	iTV Mobile Service Provider	Broadcast Operator	Cellular Operator, Billing, Access control	Content provider: TV Channel, video and audio catalog…	Content Provider: other RichMedia content
1. In order to watch TV, the End User accesses to the mosaic menu on his device. When End-user access the mosaic menu a request is send to the service provider.	X					
2. The Service Provider receives the request and dynamically updates the local application "mosaic" with new items of new channels availables (from broadcast and from cellular networks).		**X**				
The local application stores the new updates.	X					
3. The end-user selects a new channel from the updated mosaic and subscribes, without leaving the mosaic menu, to that channel. The service provider send a request to the billing, access control, service provider, which is accepted and relevant information are sent back.	X	**X**		**X**		
. The local application and/or the service provider store the end-user autentification details to provide him with an instantaneous access when he will reconnect to the service. In the UI the allowed channels can be rendered according to the service provider's preferences.	X	**X**				

5.3.5.2   Interactive voting service

This use case describes an interactive TV service, in which the end-user can visualize a TV Program, view associated rich-media data and interact in real-time through the interactive voting service proposed with this program.

Steps and behaviours	End User Local application	iTV Mobile Service Provider	Broadcast Operator	Cellular Operator, Billing, Access control	Content provider: TV Channel, video and audio catalog…	Content Provider: other RichMedia content
The End-user watches a TV Channel, subtitles are provided and synchronised on a lip synch basis in the text ticker area.	X	**X**	**X**		**X**	**X**
An alert pop-up to invite the end-user to access (eg by a click on the alert) the itv service related to the program	X	**X**	**X**			
The end-user access and visualises the interactive rich-media service associated with the TV program.	X					
The rich-media data are displayed along with the AV content and the size of the video area is reduced. (eg half screen)	X	**X**			**X**	**X**
The End-user can switch from one TV channel to an other without leaving the itv mobile application. The rich-media datas are updated consequently.	X	**X**			**X**	**X**
The Service provider aggregates content from content providers		**X**			**X**	**X**
Two voting buttons are displayed.	X	**X**				
The end user selects one and his choice is send back over http to the service provider	X	**X**		**X**		

As soon as the vote is done the two buttons disappeared dynamically. If the end-user does not vote, the buttons disappeared after the allowed "voting period"	X					
The end-user clic on the video to display it full-screen	X	**X**				
The Service provider processes the vote and includes it in the rich-media feed and send it back to the broadcast operator.		**X**	**X**			
The end-user can visualise the final results of the vote of all participants in the service.	X					
A SMS button appears in the scene to allow the end-user to make a comment on the results of the vote		**X**		**X**		
The end-user types an SMS in the text window and send it	X					
The operator process the SMS and sends back the text to the service provider		**X**			**X**	
The service provider processes the text with additional images and sends it back to the end user via the back channel in a single connection.		**X**			**X**		**X**
The local application display transparently all content in the relevant part of the scene in a single interface.	X					

5.3.5.3 Personalized menu: sport news

The personalized menu can be repeated for my favorite TV channels, my favorite radio, my favorite weather…

Steps and behaviour	End User Local application	iTV Mobile Service Provider	Broadcast Operator	Cellular Operator, Billing, Access control	Content provider: TV Channel, video and audio catalog…	Content Provider: other RichMedia content
The end user watches a sport tv channel	X	**X**	**X**		**X**	
The end-user selects a sport menu and decides to personalise the sport submenu by choosing the items to be displayed. The End user browses the service provider's catalog and selects "NBA"	X	**X**		**X**		
The local application on the end-user device stores the information and dynamically updates the submenu	X					
The service provider aggregate NBA data from its content provider and return it to the end-user	X	**X**		**X**	**X**	**X**
New NBA news is dynamically push while oldest are dynamically removed. Updates can be available on request or scheduled (by the end-user, or service provider or content provider…), the complete page does not have to be downloaded.		**X**		**X**		**X**
The end-user repeats the process for golf. Any variable can be modified at any time.	**….**	**…..**	**....**	**….**	**….**	**…..**
The information available in the ticker is personalised with the subscriber profile (eg: no more general information but a combinaison of NBA + golf advertising,)	X	**X**		**X**		**X**

The end-user does not allow the service provider to store his preferences. When the end-user comes back after a while to this service the list of its personalized submenu items (NBA+golf+…) are transmitted to the service providers to maintain a continuity of experience.	X	**X**				
A minimal number of news are stored when the device is not connected.	X					
When reconnecting, updates continue at the next news and not from the beginning.	X					

5.3.6   Alternative flow

Various alternative flows are possible:

- Some actors will take in charge multiple functions: e.g.: Content provider and itv mobile service provider.

- The service can be available only on one network: e.g.: UMTS.

As these alternatives are simpler, no alternative flows will be described.

5.3.7   Operational and Quality of Experience Requirements

Synchronisation, delivery mechanism, interactivity and dynamic updates of content are key functionalities in such use cases.

The end-user shall be able to switch from one TV channel to another without leaving the service, the video content shall be displayed full screen or not on user request.

Articles (large part of text) can be viewed in such service. Readable font shall be provided.

Data can be provided from various networks at the same time, management of multi input and scenes and sub-scenes has to be provided.

Rich-media streaming and progressive download shall be possible over a mobile network.

Personalisation of content, delivery and presentation within the service or of some part of the service by the end-user shall be possible.

Switching from a local mode (browsing stored content when not connected) to a connected mode shall be possible.

Content protection shall be possible.

Packaging of data and of update shall be possible to decrease the number of necessary network request (e.g.: HTTP request).

Data management both on client and server side and compression will enhance the quality of experience and the operational possibilities of the use cases.

End-User privacy shall be respected

5.4   Use Case active wall paper services

Affected Areas				
Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**

	Device	Connectivity	Enabling Services	Applications	Content
Tickmarks (X)	X		X	X	X
Additional Keywords					

Table 4: Affected Areas for <Active wall paper>

5.4.1   Short Description

The active wall paper is understood as the ability to render rich-media contents including AV content, Text, graphics, images, altogether on the wall paper of mobile phones. These contents can be retrieved from distant sources, like web servers, RSS feeds and from local sources as well, like the last SMS or MMS received by the user, contacts or meetings from the agenda for instance. The service must provide ways to build a consistent scene taking into account the screen size and multimedia capabilities. It must also provide the user with customisation features like skin mechanism to modify easily the theme of the global scene. Such themes could be downloaded from operators' portals or from service editors.

5.4.2   Actors

End -User: Individual setting and using the active wall paper

Service Providers and operators: Company providing the service and the access to the service.

Content providers: Company providing the data and themes for the active wall paper.

5.4.2.1   Actor Specific Issues

End – User: wishes to use a rich-media capable device to set and use an active wall paper.

Service providers and operators: may need Content generation, DRM, authentication tools and devices capable to provide the active wall paper Mobile services

5.4.2.2   Actor Specific Benefits

End -User: The end-user is provided with a convenient aggregation of rich-media content. The global scene will be built in an optimized (because it always active and consumes some resources) and consistent manner, whatever are the sizes of the screen. The end – user can set up and customize easily the wall paper by specifying distant or local sources for contents and applying thematic skins.

Service providers and operators: subscription to this service may rapidly grow thanks to these personalization features which the end-user will be ready to pay for. It can be seen as an extension of the ring tones and logos services.

Content providers: A lot of thematic contents could be delivered through such a service.

5.4.3   Pre-conditions

End – User: Must have a mobile device that can display rich-media content and/or access to rich-media services. This could be a browser integrating rich-media codecs as plug-in or a local application supporting content updates or the ability to receive a rich-media enabler OTA or by download. The End –User may need to subscribe to a data service and to the wall paper mobile service. This service could be originally supplied by the manufacturers.

Service providers and operators: May need to find an agreement with content providers to provide DRM tools.

Content providers: May be willing to protect their content with DRM tools

5.4.4   Post-conditions

End – User: can store its parameters for the wall paper locally or in the network for use on another device.

Service providers, operators: may ensure that rights have been provided to the end-user and allow him to display contents, can store end-user preferences.

5.4.5   Normal Flow

The following flow shows the interaction of all actors involved in an active wall paper mobile service.

Steps and behaviour	End User Local application	Wall paper Service Provider	Cellular Operator, Billing, Access control	Content provider: Rich Media content	Content Provider: other content (RSS feeds for instance)
1. The user retrieves the active wall paper software from the network or the mobile itself if supplied by the manufacturer.		X	X		
2. The user set up its wall paper with local resources or distant resources for which he may have to subscribe first. Access and billing is ensured by the operator.	**X**		X	X	X
3. The parameters are stored locally or in the network by the operator.	X		X		
4. The contents are dynamically and regularly retrieved from the various sources.	X		**X**	**X**	**X**
5. The user can customize the wall paper through thematic skins supplied by the service provider	X	**X**	**X**		

5.4.6   Operational and Quality of Experience Requirements

Synchronisation, delivery mechanism and dynamic updates of content are key functionalities in such use cases.

The end-user shall be able to set up easily the wall paper by adding or deleting elements.

Small articles can be viewed in such service. Readable small fonts shall be provided.

Data can be provided from various networks at the same time, management of multi input and scenes and sub-scenes has to be provided. RSS feeds should be supported.

Video rendering should be supported for specific events or contents. Other contents like vector graphics, still images shall be supported as well.

Personalisation of content, delivery and presentation within the service or of some part of the service by the end-user shall be possible, especially through skin mechanisms.

Switching from a local mode (browsing stored content when not connected) to a connected mode shall be possible.

Content protection shall be possible.

Parameters of the wall paper shall be stored locally or in the network.

Packaging of data and of update shall be possible to decrease the number of necessary network request (eg HTTP request).

End-User privacy shall be respected

5.5 Use Case rich mobile application

	Affected Areas				
	Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**
Tickmarks (X)	X		X	X	X
Additional Keywords			Client–Server	Online/offline	Data updates

Table 5: Affected Areas for <Rich mobile application>

5.5.1 Short Description

A Rich Mobile Application is a service (As defined in the 'Definitions' section) that is downloaded and stored on the user's device once or at a low frequency. This service can be provided through the network, a cradle plugged to the PC, a Wi-Fi hotspot, etc… or supplied by the manufacturer. The application is specific to a usage (watching a sports magazine or managing photos stored on the mobile for instance) and has a dedicated, powerful and relevant rich-media interface for that usage.

It displays contents retrieved regularly from the network or other downloading mechanism and is supplied by a content provider that could be the application supplier or partners. The user can browse the downloaded content off line. Because it is a local application, it can access to local contents and merge them with downloaded ones if needed (in the case of a photo album client for instance).

The service renders the data in a consistent and rich-media manner. It can be skinned with various mechanisms. The data may be modified by the user and should be uploaded back to the content provider through synchronisation mechanisms.

5.5.2 Actors

End -User: individual using a Rich Mobile Application

Service Providers and operators: company providing the service and the access to the service.

Content providers: company providing data for the service.

5.5.2.1 Actor Specific Issues

End – User: wishes to use a rich-media capable device to access Rich Mobile Application.

Service providers and operators: may need Content generation, DRM, authentification tools and devices capable to provide Rich Mobile Applications

5.5.2.2 Actor Specific Benefits

End -User: The end-user is provided with a dedicated and powerful navigation within rich-media content. Content will be provided in a more readable manner, whatever are the sizes of the screen. The interactivity provided within the service is optimized for the content the service has been built for. The end – user can access to local resources and store the downloaded data locally. He can customize through skin mechanism or update the service with add-ons as well.

Service providers and operators: by providing powerful and specialized rich-media services to the user, they may increase their revenues and generate more data traffic while the data packages or downloaded.

Content providers: have the opportunity to provide added-value contents which the user is ready to pay for and customisation tools.

5.5.3 Pre-conditions

End – User: Must have a mobile device that can display rich-media content and/or access to rich-media services. This could be a browser integrating rich-media codecs as plug-in or a local application supporting content updates or the ability to receive a rich-media enabler OTA or by download. The End –User may need to subscribe to a data service to download the application and the data updates.

Service providers and operators: May need to find an agreement with content providers to provide DRM tools.

Content providers: May be willing to protect their content with DRM tools

5.5.4 Post-conditions

End – User: can store the downloaded data and browse them off line.

Service providers, operators: may ensure that rights have been provided to the end-user and allow him to reconnect, can store end-user preferences.

5.5.5 Normal Flow

The following flow shows the interaction of all actors involved in a Rich Media Application.

Steps and behavior	End User Local application	RMA Service Provider	Cellular Operator, Billing, Access control	Content provider: Rich Media content
1.The user access to the service to download the application (not needed if supplied by the manufacturer)		X	X	
2. Once the service is available on the device, the user can retrieve content for that service.	**X**		X	X
3. The user browses the content locally.	X			

4. The user can be notified if a new data package is available (content or upgrade of the RM enabler to a new version).	X	**X**	**X**	
5. The user can customize the service thematic skin supplied by the service provider	X	**X**	**X**	

5.5.6 Operational and Quality of Experience Requirements

Synchronisation, delivery mechanism, interactivity and dynamic updates of content are key functionalities in such use cases.

Articles (large part of text) can be viewed in such service. Readable font shall be provided.

Video, vector graphics and still images can also be viewed

Rich-media streaming and progressive download shall be possible over a mobile network.

Personalisation of content and presentation within the service or of some part of the service by the end-user shall be possible, especially through skin mechanism.

Switching from a local mode (browsing stored content when not connected) to a connected mode shall be possible.

Content protection shall be possible.

Packaging of data and of update shall be possible to decrease the number of necessary network request (e.g.: HTTP request).

Data management both on client and server side and compression will enhance the quality of experience and the operational possibilities of the use cases.

End-User privacy shall be respected

5.6 Open Issues

6. Requirements   (Normative)

These requirements can apply to various use cases (such as dynamic rich-media screen saver, rich-media geolocalisation services), and not only the one describe.

6.1   High-Level Functional Requirements

RME-FUNC-001	The RM enabler SHALL support methods to minimize the latency perceived by the end user.	
RME-FUNC-002	It SHALL be possible to present multiple RM data sources within a single scene.	
RME-FUNC-003	The RM enabler SHALL be able to render, within one scene, data and updates received from different sources (eg:networks and delivery mechanisms, content provider). Note: the servide provider should be the same.	
RME-FUNC-004	It SHALL be possible for the service provider to aggregate RM data	
RME-FUNC-005	It SHOULD be possible for the service provider to aggregate RM updates	
RME-FUNC-006	RM data rendering time and synchronisation SHALL be controllable by the RM enabler.	
RME-FUNC-007	The service provider SHALL be able to express an appropriately accurate synchronisation for the RM data which SHOULD be honoured by the enabler.	
RME-FUNC-008	Progressive rendering of RM data SHALL be provided	
RME-FUNC-009	RM content SHALL be dynamically updatable in real time by the RM enabler	
RME-FUNC-010	Efficient transmission (low delay, low overhead) of RM data and updates SHALL be provided	
RME-FUNC-011	RM content SHALL be available in streaming, progressive download and download.	
RME-FUNC-012	The service provider SHALL be able to create links between RM content at arbitrary times or places in the scene	
RME-FUNC-013	It SHALL be possible for the RM enabler to Interact with the source of the rich-media content	
RME-FUNC-014	Interactivity and interaction SHALL be possible on a frame accurate basis (time code or relative time).	
RME-FUNC-015	The RM enabler navigation and interaction SHALL be agnostic to the type of MMI provided (eg using any input device)	
RME-FUNC-016	The RM enabler SHALL be able to discard RM data when it has been identified as no longer useful in the service.	
RME-FUNC-017	The content creator or the service provider SHALL be able to define the lifecycle of RM data.	

RME-FUNC-018	The storage of RM data and the privacy to be applied to the stored information SHALL be possible on the client and/or on the server side	
RME-FUNC-019	RM data and update SHALL be cachable locally i.e.: on the end user device.	
RME-FUNC-020	The RM enabler SHOULD be able to manage preference data (user and/or application) locally.	
RME-FUNC-021	The RM enabler SHALL NOT allow to share private data from one service to an other (e.g.:allocation of data to a dedicated service based on cookies-like functionality)	
RME-FUNC-022	End-User privacy SHALL be respected	
RME-FUNC-023	The service provider SHOULD be able to protect the RM content.	
RME-FUNC-024	The RM enabler SHALL be codec, network, terminal, browser, middleware, OS agnostic.	
RME-FUNC-025	The RM enabler SHALL allow an end to end optimizations to be applied (eg: compression, preparsing, data preconditionning)	
RME-FUNC-026	The RM enabler functionality SHOULD be scalable from constrained terminals to unconstrained terminals.	
RME-FUNC-027	It SHALL be possible to invoke an external application (eg MMS SMS clients) from within the service and it MAY be possible to integrate those applications visually within the service interface.	
RME-FUNC-028	Personalisation by the end-user of content, delivered within the service SHALL be possible.	
RME-FUNC-029	Text scrolling and slideshow SHALL be provided	
RME-FUNC-030	The RM enabler SHALL allow best effort font management regardless of screen size language and fontstyle.	

Table 6: High-Level Functional Requirements

6.1.1   Security

RME-SEC-001	The RM enabler SHALL be able to store permanently private data in a memory area reserved by the RM enabler.	
RME-SEC-001.1	The RM Enabler SHALL be able to securely store permanently a small amount of information for personal information purposes and RM session contexts (i.e., stateful session, icons,,user preferences…)	
RME-SEC-001.2	The RM Enabler SHOULD be able to securely store temporary a large amount of persistent information for content cache process and offline navigation.	
RME-SEC-001.3	The RM Service SHOULD be able to define content storing mechanisms and the storing priority according to the rich-media service logic.	
RME-SEC-002	The RM enabler SHOULD be able to interface with DRM client	

Table 7: High-Level Functional Requirements – Security Items

6.1.2   Reliability

RME –REL-001	The RM enabler SHALL support graceful handling of packet loss.	
RME-REL-001.1	The RM enabler SHALL be able to support re synchronisation with an existing active stream.	
RME-REL-001.2	The RM enabler SHALL support arbitrary access points to tune in the middle of content	
RME-REL-001.3	The RM Enabler SHOULD handle duplicated data provided for error recovery purposes.	
RME-REL-001.4	The RM service SHOULD be able to accept content with a range of packet size limits, as defined by the content provider.	

Table 8:High-Level Functional Requirements – Reliability Items

6.1.3   Usability

RME-USA-001	The RM enabler functionality SHOULD be scalable from constrained terminals to unconstrained terminals, in the form of nested sets of features supporting content adaptation.	
RME-USA-002	The RM Enabler SHOULD use a very small footprint and require very limited performance when using the smaller sets of features.	
RME-USA-003	The RM Enabler SHOULD continue to render the RM service while content requested by the end user is not yet available (triggered by a click on an url, or a press on a key).	
RME-USA-003.1	The author SHOULD have the choice of specifying what should happen between the request and the arrival of the content or during buffering. Eg: continue to play the current scene, play a specific pre-buffered animation or transition, or do nothing.	

Table 9: High-Level Functional Requirements – Usability Items

6.1.4   Interoperability

RME-IOP-001	Newer versions of the RM enabler SHALL be backward compatible	
RME-IOP-002	Old versions of the RM enabler SHALL be forward compatible	
RME-IOP-003	Service enabled by the RM Enabler SHALL be available whilst the user is roaming on a different network which is capable of RME services.	

Table 10: High-Level Functional Requirements – Interoperability Items

6.2   Overall System Requirements

RME-SYS-001	The RM enabler SHOULD be able to interface with other resident clients on the phone. Some are described in the system elements section.	
RME-SYS-002	The RM enabler capabilities SHALL be expressable within UAPROF	
RME-SYS-002.1	The RM enabler capabilities SHALL be advertisable by the browser or by the rich-media enabler depending on the usage scenario	
RME-SYS-002.2	The RM enabler and the rich-media service SHOULD benefit from underlying support of dynamic UAPROF service.	

Table 11: High-Level Functional Requirements – Security Items

6.3   System Elements

RME - System Element A (browser)	The RM Enabler SHOULD be able to interface with browser client	
RME - System Element B (AV codec)	The RM Enabler SHALL be able to address and to provide a tight integration with AV codec.	

Table 12: System Elements

6.3.1   System Element A (browser)

RME-SEA-001	The RM Enabler SHALL be able to launch the browser	
RME-SEA-002	The RM Enabler SHALL be able to be launched by the browser.	
RME-SEA-003	The RM Enabler SHOULD be integrated as a plugin into a browser	
RME-SEA-004	The RM Enabler SHALL expose the uDOM API to the browser	
RME-SEA-005	The RM Enabler MAY provide other API to the browser	

Table 13: Requirements for System Element <A>

6.3.2   System Element B (AV codec)

RME-SEB-001	The RM Enabler SHOULD be able to reference and to access AV Stream	
RME-SEB-002	The RM Enabler SHOULD be able to access Metadata stream.	
RME-SEB-003	The RM Enabler SHALL be able to specify multiple synchronisation masters. (E.g.: This is required to deal with situations dealing with multiple synchronized groups of streams, such as video-on-demand.)	

Table 14: Requirements for System Element <B>

6.3.3   Network interfaces

RME-NI-001	The RM enabler SHOULD be able to be interface with any and/or multiple bearers simultaneously	
RME-NI-002	The RM enabler SHOULD be able to address bundle of stream	

Table 15: Requirements for Network Interfaces

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2   Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-RD-Rich-Media Environment-V1_0	29/03/2005		Initial document to address the basic starting point
	24 Jun 2005		Document including all use cases and requirements
	30 Jun 2005		Document addressing commentsd from the unformal review
	17 Aug 2005		Document addressing comments from the formal review. RDRR document, REQ: OMA-RDRR-RME-V1_0-20050817-D
	19 Aug 2005		Editorial modification on the document: OMA-RD-Rich-Media Environment-V1_0-20050817-D
	25 Aug 2005		Clean document (without track changes) of the document: OMA-RD-Rich-Media Environment-V1_0-20050819-D
Candidate Versions OMA-RD-Rich-Media Environment-V1_0	23 Sep 2005		Status changed to Candidate Ref TP Doc# OMA-TP-2005-0280R01-RME-RD-for-Approval