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Interactive Multimedia Messaging Service

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Interactive Multimedia Messaging Service

----A New Approach to Application Oriented Messaging System

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1. Introduction

Short Messaging Service (SMS) has made an extreme success in the mobile communication market today. Evolving from the text-oriented SMS, Multimedia Messaging Service (MMS)[1] is a system for delivering rich contents such as graphics, pictures, and streaming audio/video in a messaging context via wireless networks between mobile terminals. It is one of the most important basic services in 2.5G and 3G networks and is expected to have a long-term impact to the communication market.

In spite of its growing success, the current MMS is still mainly a person-to-person service. It is regarded as a natural extension to its predecessor, SMS. Although it supports rich content such as longer texts, color pictures, animations, even audios and video streams, it doesn't solve the messaging user interface problems that SMS is facing. Both SMS and MMS deal with only the message presentation to the end user, either pure text based or multimedia content based. The message contents are still static and less user interaction is involved. Compared to the user interface with web browser where the user can fill the forms, make selections, click buttons to send requests to the web applications, the MMS user interface is rather poor because the current MMS presentation language does not support those interactive elements.

We believe that the communication between persons and applications is important to the success of MMS and should be addressed. It has been estimated that application-to-person MMS usage will dominate the future MMS traffic. However, because of the limited interfacing capability in MMS, MMS-based applications so far are limited to only ring tone download, MMS picture download, etc. By means of the current MMS features it is difficult to extend its usage into more diverse and sophisticated business application scenarios.

In this paper, an improved version of MMS, the Interactive Multimedia Messaging Service (iMMS), is introduced. It enhances the presentation capability of the current MMS with richer user interactive features. Without changing the existing MMS

architecture and network infrastructure, iMMS could give users better experience and its usage could be extended to more business applications.

2. An Overview of the Interactive Multimedia Messaging Service

2.1 MMS Presentation

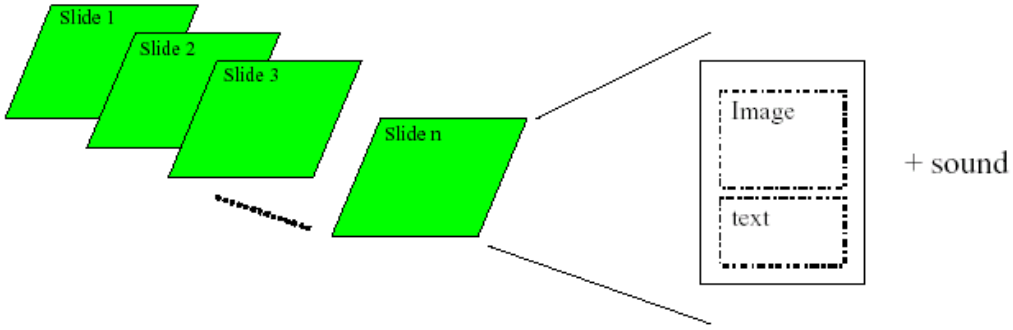

Figure 1. Structure of a MMS message

A Multimedia Messaging Service (MMS) message consists of several slides as shown in Figure 1. In each slide, there are at most two presentation regions. One region is for carrying the image and the other is for the text. Current MMS specification adopts a subset of SMIL (Synchronize Multimedia Integration Language)[2] named as MMS SMIL as its presentation language. MMS SMIL is used to describe the layout of a MMS message. It can also be used to describe the timing and synchronization relationships among the multimedia objects within a MMS message. MMS SMIL well solves the issues of playing and displaying the multimedia objects on the mobile terminals in a harmonize way. However, being used as the user interface presentation language, it has less capability to enable the user interactions with the message itself. The lack of the interaction capability significantly limits the scope of the MMS based applications. In order to overcome this shortcoming, we propose some user interactive features to the current MMS presentation language. The MMS enhanced by the new presentation language is called Interactive Multimedia Messaging Service (iMMS).

2.2 Basic Control Elements of iMMS

Basically, the iMMS client is the enhanced client side (software module) of the MMS residing on the user mobile terminals. A set of visual control elements, for example, form, text input, button, selection list, radio and check box, etc., are supported by iMMS to provide the interactive dialog between the MMS user and the iMMS client.

As shown in Figure 2, an iMMS control element possesses three attributes: visual presentation, control logic, and logic data. The visual presentation describes the control's outlook to a messaging user. The control logic describes all the necessary logic processes to be executed and the consequent visual presentation control after the user action upon this element. The logic data defines the data model that contains the structured data information as the result of the user action. The back-end application could further process the user requirement based on the logic data.

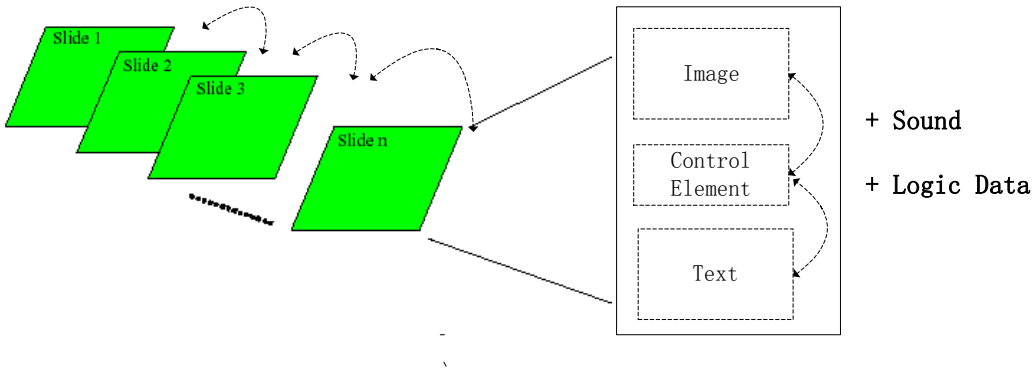

Figure 2 Structure of an iMMS message

With the introduction of control elements into the MMS presentation language, the message content is no longer static but more locally responsive. The control element acts as a bridge that logically connects the object elements in an iMMS message. It also helps the back-end messaging applications to extract the user input by structuring the user interaction data.

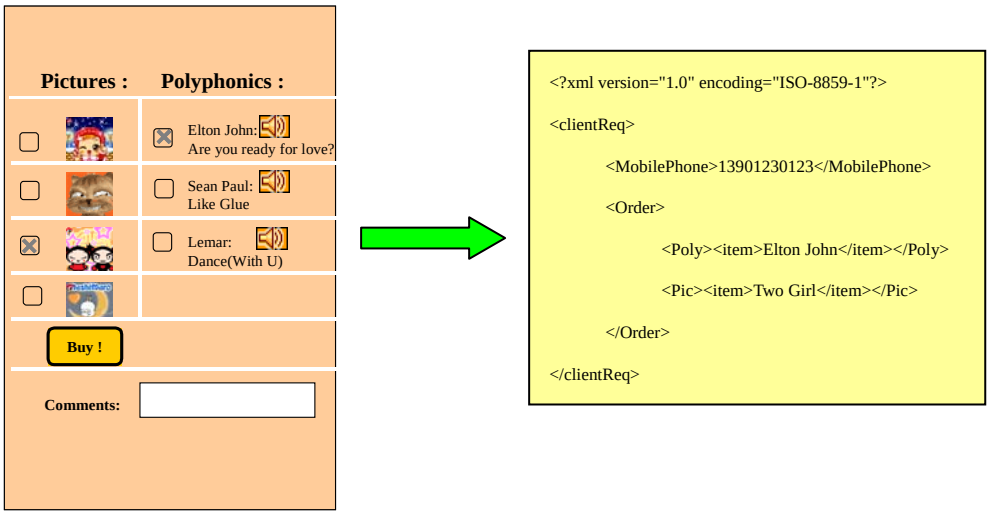

Figure 3. An example of the iMMS message

Figure 3 shows an example of the iMMS message. The left side in the Figure 3 is the display of an iMMS message. This iMMS message contains different categories of the newest and hottest downloading stuffs including the wallpaper for mobile phone and the ring tone trial clips. It allows the user to select, browse and play the interested

items in the message. For example, when the user clicks the picture icon, the corresponding enlarged picture will be displayed on the screen. When the user clicks on the icon of a ring tone trial clip, the ring tone will be played on the iMMS client. If the user wants to subscribe the interested items, he could mark these items first and then click the send button to send out his request to the back-end application. The right side of the figure 3 shows the format of possible returned data caused by the actions upon the iMMS message. After the user makes the selections and clicks the send button, the returned data is generated in the iMMS client. Its structure is defined in the data model described in the iMMS message control elements. The adoption of structured data facilitates the back-end applications to extract the user input information.

2.3 Technical Improvements to the MMS Conformance

iMMS inherits the MMS architecture. The current MMS infrastructure can also be used by iMMS without changes. The only requirement in implementing iMMS is to improve the MMS conformance[3]. The current MMS conformance standard 1.2 adopts Synchronized Multimedia Markup Language (SMIL) as its presentation language. SMIL is a simple XML-based language consisting of a set of modules that define the semantics and syntax for certain functionality. Examples of these modules are layout module, timing and synchronization module, and animation module.

Although SMIL enriches the capabilities for displaying multimedia components, it does not provide the framework for describing the logical relationships among elements in one message. A more descriptive tool, XHTML (Extensible Hyper Text Markup Language) Mobile Profile[4], has been accepted by the Open Mobile Alliance (OMA) as the presentation language for Wireless Application Protocol (WAP) applications. Therefore, we adopt XHTML Mobile Profile as the approach to implement the Interactive MMS conformance.

In order to add interaction descriptive capability while being compatible with the current MMS conformance standard, two kinds of presentation languages are supported in iMMS conformance: MMS SMIL and XHTML Mobile Profile. MMS SMIL and XHTML Mobile Profile can be used in a mixed or nested pattern. MMS SMIL is required by the default MMS presentation, while XHTML Mobile Profile is used as the interaction description language. Therefore, iMMS applications can obtain capabilities of both MMS SMIL and XHTML Mobile Profile, that is, the capability from MMS SMIL for describing layout and timing in displaying multimedia objects and the capability from XHTML Mobile Profile for describing logic relationships among objects. .

Figure 4 is a comparison between the MMS message package and the iMMS message package. The iMMS message package is similar to MMS message package except that the iMMS message body allows XHTML as an alternative message presentation

language. The corresponding logic control and logic data are also supported in an iMMS message.

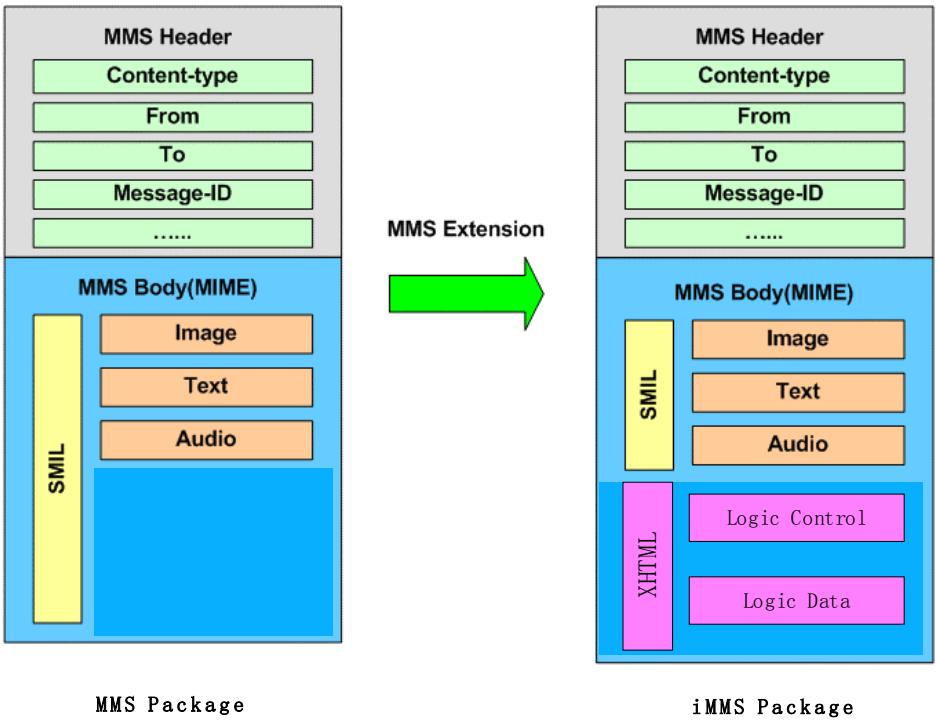

Figure 4 Comparison between the MMS package and the iMMS package

2.4 New Interaction Patterns for Messaging Applications

Traditional messaging system like SMS or MMS is mainly designed for person-to-person usage. In this pattern a user simply composes the message content and sends it to the other user. This message exchange model works well for the person-to-person message communication but is not suitable for person-to-system message communication. For example, when the messaging user wants to get the services from the messaging applications, he should compose the message manually following the application-specific requirements and provide the corresponding application short code so that the message could be routed to the correct messaging applications and the content could be parsed correctly.

In design a user-service interface, we are facing two facets of the problem. At the current stage of computing technology, it is hard to provide natural user interface. Flexibility in user request format will certainly add difficulties in processing the input data by the application program. The predefined format of the service requesting data will simplify the jobs of the messaging application in parsing and understanding the

user demand, but causes unsatisfied user experiences for the following reasons. First, the user has to remember the application-specific message syntax in order to make a valid request to the messaging application. Second, the user has no choice but to input all the required message contents manually. Since there is no separation for the message presentation and user feedback in the traditional messaging conformances, it is also difficult for the messaging applications to retrieve the user input from the return message.

With the introduction of iMMS, the message application could pass an application request template to the end user. The application request template itself is also an iMMS message. It is generated by the application and includes the message visual presentation like the service descriptions, graphics and audio, message control logic like the possible service selections, and logic data like the corresponding text input fields for the user to input the parameters required by the service. With the application request template, the iMMS user no longer needs to remember and input the syntax data and short code. All these information have been included in the iMMS and are transparent to the iMMS user. When the user wants to request a service from the messaging application, he can raise the request by interacting to the application request template. The application request template predefines the interaction pattern and related service request data format by means of control elements. The service request message will be generated if the user issues a service request. The iMMS client software extracts the necessary information such as the requested service id, the user id, and the corresponding user input data from the iMMS message and packages them in the data structure defined by the data logic. This packaged data will then be delivered to the messaging applications for further processing.

In general, the request template provides a better person-to-system interface since it frees the user from remembering the rigid machine understandable format. The user can concentrate on providing meaningful data under the guidance of the template. On the other hand, the machine understandable logic and data are embedded in the template, which also reduces the difficulty in processing user requests.

2.5 An Example of Using iMMS

Let’s take an iMMS-based voting as the example of using iMMS in some business applications. Supposing a user subscribes the iMMS service from a music video program provider, he gets the service request template including both the names, short introduction, trial clips of the hottest music video contents and the voting options for each of the songs. The subscriber navigates, plays and selects the song he likes on this iMMS based service request template. The selected song is sent back to the voting service via iMMS. With the enhancement of interactive features in iMMS, the user could navigate among the message elements (the audio clips) very easily. When the user wants to reply the application for his voting, he does not need to compose a new message, but simply mark the specific item on the message and send the result back to

the application.

3. Conclusion

With the rapid progress of the wireless network, MMS becomes one of the most compelling data services. Compared with the web browser, the MMS client has the following advantages: it possesses a larger user population and has the notification capability. It also supports offline operation and has a simple billing model. Lacking of the user interactive ability makes it difficult for developing MMS-based business applications and therefore hinders the MMS market growth. With the proposed iMMS improvement, MMS could not only keep its inherent advantages but also embrace more and more attractive business opportunities. iMMS is part of the on going working item in OMA MMS Group and has aroused the interests of both MMS service providers and MMS device manufactures.

[1] “WAP MMS Architecture Overview”, WAP Forum, WAP-205-MMSArchOverview.
[2] "Synchronized Multimedia Integration Language (SMIL 2.0)", W3C Recommendation, August 2001.
[3] “MMS Conformance Document 1.2”, Open Mobile Alliance, OMA-MMS-CONF-v1_2-20030623-D.
[4] “XHTML Mobile Profile 1.1”, Open Mobile Alliance, OMA-WAP-XHTMLMP-V1_1-20020904-D.s