

FOMA 906i Application Functions

*By developing the Decome Anime function, Flash^{®*1}-compatible full-browser capabilities, a technique for establishing faster PushTalk connections and a file upload function, we have implemented richly expressive and user-friendly applications that can take advantage of high-speed data communication infrastructures.*

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1. Introduction

Over the last few years, the content available on the Internet has become much richer and more diverse. This trend has had wide-ranging effects, including a greater need for user-friendly interfaces and improved expressive capabilities through the use of video content and the like.

Even mobile terminals have had to adapt to this trend. Therefore, for the new FOMA 906i series, we have developed a range of functions: Decome Anime, which surpasses the expressive capabilities of Deco-mail^{*2} in mail body text through the use of Flash animation, Flash-compatible full-browser capability which allows the Flash content of ordinary Web sites to be viewed in a PC Web browser, a technique for reducing the connection time of PushTalk^{*3} com-

munication which makes it possible to contact people more quickly by using PushTalk, and an i-mode browser file upload function that people can use to upload their favorite photos and videos to blogs and other online services.

In this article, we describe an overview of these four new functions.

2. Decome Anime

2.1 Background

Since the Deco-mail service was introduced, we have made functional improvements to enhance the user experience, and the utilization rate of this service has increased as Deco-mail functions are installed on a growing range of terminals. To offer our users a richer range of expression, we have developed our capability to provide mail services with new added value by extending the inline Flash playback

functions of Deco-mail with functions that allow users to customize Flash content with text and images, and functions for the interactive playback of Flash content that are implemented in i-mode browsers.

2.2 Decome Anime Functions Overview

Decome Anime is a mail service in which the mail body itself consists of a Flash file. However, Flash files are usually created on PCs, and it is complicated and troublesome for the users of mobile terminals to construct these files by combining each of the constituent parts and assembling them on a time sequence. This limitation reduces the usefulness of the service. To facilitate the production of Flash files on mobile terminals, we therefore provide background Flash files in the form of tem-

*1 **Flash[®]**: Software for producing content containing embedded voice and animated vector graphics, and content produced using this software. Flash is a registered trademark of Adobe Systems Inc. in the United States and other countries.

*2 **Deco-mail**: An HTML formatted mail service for mobile terminals provided by NTT DOCOMO.

plates (hereinafter referred to as “Decome Anime templates”) that the user can customize by adding text and images (Figure 1).

A Decome Anime template consists of a Flash file that forms the mail background, and area information containing place markers for regions where text and image elements can be inserted into this Flash background. Users can import these templates into their mobile terminals by downloading them with a browser or by receiving them wirelessly over infra-red connections or the like. Based on this area information, the user interface guides the user through the process of creating Decome Anime content by indicating how many additional elements can be added to a template, and how many characters can be inserted in a particular location.

A synthesis engine then converts the background Flash file and the additional elements provided by the user into a single Flash file. During this conversion, the area information in the Decome Anime template tells the synthesis engine where the additional elements should be embedded into the background Flash file to match the areas designated by the user. When the user chooses an image to embed, it is possible to prevent the user from selecting images that are too large based on rough calculations of the size of the resulting Flash file based on the specifications of the synthesis engine.

When a Flash file made according

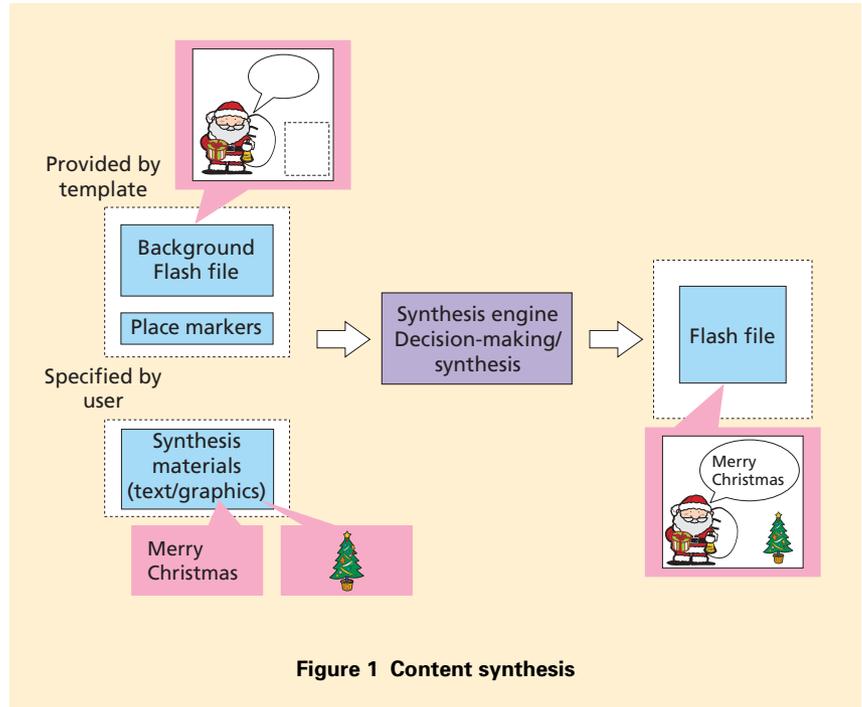


Figure 1 Content synthesis

to the above procedure is sent in a mail format and flagged as a Decome Anime mail, it can be displayed as the main body at the receiving mobile terminal.

Furthermore, by extending the interactive playback functions of i-mode browsers so that they also work in mail applications, we have made it possible to implement interactive mails where the user presses a key to play back a Flash file, and then different scenes are played back depending on which key the user pressed.

3. Flash-compatible Full-browser Capabilities

3.1 Background

Full browser capabilities have been available as add-on functions in some of our products since the FOMA 901iS

series, but due to constraints on the performance of mobile terminals and a lack of compatibility with PCs in terms of functionality, these terminals were not able to display Flash content.

But compared with the conventional Flash Lite™⁴ 1.1 player, the Flash Lite 3.0 player installed in the FOMA 905i series is more compatible with the PC-oriented Flash content of ordinary Web sites, and can even display content such as Flash video. We therefore made the FOMA 906i series terminals compatible with popular PC-oriented Web sites by enabling them to play back Flash content in full-browser mode, albeit subject to certain performance constraints. The advantages of Flash-compatible full-browser capabilities are described below.

*3 **PushTalk**: A half-duplex one-to-many transmission scheme implemented using packet-switched communication. Provides a walkie-talkie style of communication whereby users can talk simultaneously to multiple recipients while holding down a “talk” button.

*4 **Flash Lite™**: A trademark of Adobe Systems Inc. which refers to Flash-based software that has been customized for application to mobile terminals, or to content produced using this software.

3.2 Implementation of PC-like Operability and Playback Performance

In a conventional i-mode browser, the up, down, select and dial keys are used to interact with Flash content. However, Flash content in Web sites is generally operated using a mouse pointer in PC environments, so in full-browser mode we made it possible for users to move and click a mouse pointer instead.

Next, since the Flash content in Web sites presumes the availability of PC processing performance, it is not possible to obtain the expected level of performance when the content is played back on a mobile terminal. This degradation is particularly prominent in Web sites where multiple items of Flash content are displayed on the screen simultaneously. To avoid this problem, the full-browser mode only allows one item of Flash content to play back at a time so that the mobile terminal can concentrate its processing power on a single item of Flash content. This is imple-

mented by playing back the Flash content underneath the mouse pointer, and stopping the playback of all other Flash content. This provides the user with an intuitive way of specifying which Flash content should be played back (**Figure 2**).

In conventional mobile terminals, it was only possible to view video content by first downloading it with a browser and then playing it back in a separate application. The Flash Lite 3.0 player includes functions for playing back FLash Video (FLV)^{*5} content, and in the full-browser mode of the FOMA 906i series, this function can be used to play back video content directly from Web pages.

4. Faster PushTalk Connections

4.1 Background

PushTalk is a service that uses a packet switched network to deliver voice signals [1]. Compared with conventional telephony which uses a circuit-switched network, PushTalk takes

longer to establish a call, so users have been demanding shorter connection times for PushTalk calls.

4.2 Additional Functions

Before a PushTalk call can be established, the calling and receiving mobile terminals must both establish a packet bearer for PushTalk traffic. However, the receiving mobile terminal rarely has a packet bearer already established for PushTalk traffic. Thus to achieve shorter PushTalk connection times we decided to make the receiving mobile terminal establish a packet bearer faster by sending the PushTalk reception notification Short Message Service (SMS)-Push to the receiving mobile terminal earlier than before.

We did this by adding a function whereby when the calling mobile terminal is establishing a packet bearer for PushTalk traffic, it embeds into the packet bearer set-up request the information that invokes a PushTalk reception notification at the network node. The development of a complete system

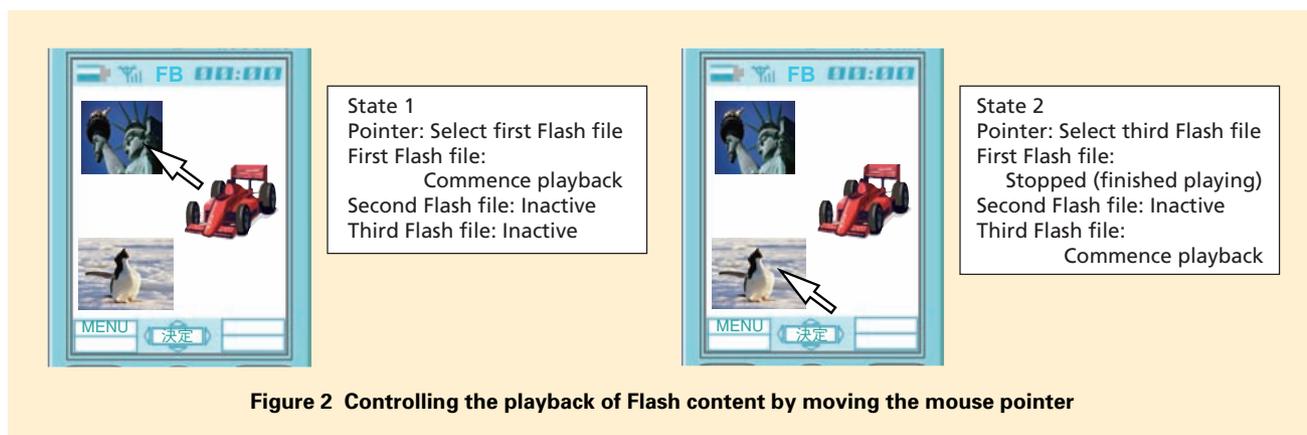


Figure 2 Controlling the playback of Flash content by moving the mouse pointer

*5 FLV: A video file format used in Flash.

that supports this function is described in reference [2].

4.3 Key Considerations

According to the standard specifications of packet-based voice communication services such as Voice over IP (VoIP), the destination of a connection is specified by transmitting a Session Initiation Protocol (SIP) INVITE message over the packet bearer. The same procedure is also used in PushTalk communication, so we had to find a way of reducing connection times without changing this implementation. This was achieved by adding parameters to the packet bearer set-up request so as not to affect the operation according to the basic specifications after the packet bearer has been set up (**Figure 3**).

The minimum required parameters from a consequential INVITE message are added into the packet bearer set-up request to perform PushTalk reception notification and are set to the same values. These parameters include a parameter indicating whether to initiate a new call or rejoin an existing call, a parameter indicating whether the call is personal or for corporate use, a parameter indicating whether or not to reveal the caller's phone number, and a parameter (phone number) specifying the person being called.

The maximum amount of transmittable data in the packet bearer set-up request is limited, so when more than one person is being called it might not

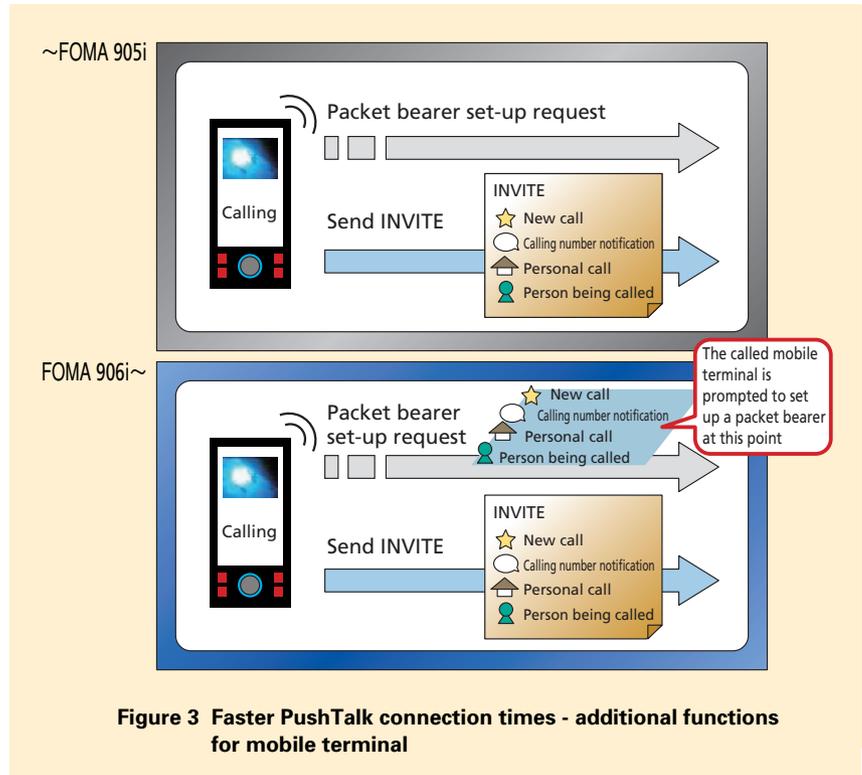


Figure 3 Faster PushTalk connection times - additional functions for mobile terminal

be possible to include all the phone numbers. We added another parameter to indicate such situations. Even though all the phone numbers are still included in the INVITE message transmitted after setting up the packet bearer in this case, it is still possible to reply to and participate in this call. However, the transmission timing is slower than for a mobile terminal included in the parameters.

4.4 Other Connection Time Reduction Factors

Although most of the reduction is achieved by implementing these additional functions, one cannot ignore either the hardware performance factors of the mobile terminals which has kept

improving from one series to the next, or the middleware performance factors of the improved response times that have been made possible through ongoing improvements to the OS processes. Together, these hardware and middleware performance improvements have ultimately resulted in the FOMA 906i series having PushTalk connection times that are almost the same as the connection times for regular voice calls.

5. i-mode Browser File Upload Function

5.1 Background

Hitherto, i-mode browsers have mainly been used for applications such as browsing the Web and downloading contents such as music files, and did not

support file uploads. Therefore to upload files, users have had to send them as e-mail attachments or use special applications.

However, due to increased communication speeds and improvements in the performance of mobile terminal cameras, there is likely to be an increase in the use of services involving user-generated content such as blogs and auction Web sites, so users will have more opportunities to upload files. Thus for the FOMA 906i we developed an upload function for the i-mode browser, making it easy for users to upload contents to their diaries or product data to auction sites and so on.

5.2 File Upload Function Specifications

To upload files, the user must first choose the file to be uploaded to the Web site. For this purpose, we added a file selection control element as defined in the HTML 3.2 specification of the World Wide Web Consortium (W3C)^{*6} to the set of i-mode compatible HTML elements, thereby allowing users to upload files to Web sites by selecting them in an input forms (**Photo 1**).

Next, we looked into increasing the size of files that can be transmitted from i-mode browsers. Hitherto, i-mode browsers have been limited to an overall HTTP message-body size of 80 kB

when transmitting POST requests. However, the latest mobile terminals generally have cameras with a resolution of several megapixels, so it is not possible to guarantee sufficient image quality when users upload images at the current size to blogs and auction sites and the like.

We conducted network trials to investigate the maximum file size that can be handled by these mobile terminals, and found that the transmission speeds and loads do not cause problems up to 2 MB, including on the treasure Casket of i-mode service, high Reliability platform for CUSomer (CiRCUS)^{*7} platform. We also confirmed that 2 MB offers users sufficient capacity to transmit photos from the cameras incorporated into modern mobile terminals without any substantial degradation or downsizing, so we extended the maximum data size to 2 MB. More precisely, we made it possible to transmit up to 2,048 kB of file data in a message body with an overall size of up to 2,128 kB, thereby ensuring that large files do not result in the loss of other items of form data.

These developments have made it possible to upload images and videos to Web servers from i-mode browsers.

6. Conclusion

For the FOMA 906i series we have developed a Decome Anime function,

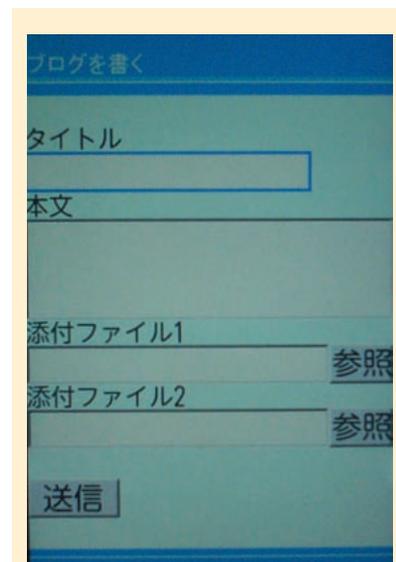


Photo 1 Example of a blog editing page

full-browser Flash compatibility, shorter PushTalk connection times, and an i-mode browser file upload function.

In the future we will continue to introduce the latest technologies and to develop our products to improve their user interfaces and other aspects so as to provide high-quality content to our users.

REFERENCES

- [1] N. Yoshida et. al: "PushTalk Service System," NTT DoCoMo Technical Journal, Vol. 7, No. 4, pp. 4-12, Mar. 2006.
- [2] B. Yamauchi et. al: "Reduction of PushTalk Connection Times," NTT DoCoMo Technical Journal, Vol.16, No. 1, pp. 69-70, Apr. 2008 (In Japanese).

*6 **W3C**: An international organization that promotes the standardization of technologies used on the WWW.

*7 **CiRCUS**: A device that serves as an interface between the NTT DOCOMO core network and the Internet, provides i-mode mail, i-mode menu, ordinary Internet access, and other functions.