

## **M-stage visual Service –Entertainment on Your Palm–**

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*DoCoMo launched the world's first mobile video distribution service, M-stage visual, as a step to achieve the 2010 VISION "MAGIC".*

*This article reviews the M-stage visual service, system configuration and terminals.*

### **1. Introduction**

In December 2000, DoCoMo launched the M-stage visual, which is a video distribution service that enables users to watch video on demand anywhere, anytime, based on the "entertainment on your palm" concept.

Owing to the recent success of i-mode, an information distribution service targeting mobile phones over the Internet, DoCoMo is attracting worldwide attention as a leading mobile multimedia company. M-stage visual aims to establish a visual communications market through the distribution of video which is rich in contents, in contrast with the text-information-oriented i-mode.

This article reviews the service, system configuration and compatible terminals.

### **2. M-stage visual Service**

#### **2.1 Service Overview**

M-stage visual is a service in which contents providers (CP) who own video data offer the information through DoCoMo's networks using streaming technology. The service uses circuit switching for the distribution of contents. In addition to streaming, users have the option to download the contents, although the number of downloadable contents are limited.

Contents are available under a channel system, in which each CP offers its contents through its own channel. Users can access the M-stage visual portal from the M-stage visual terminal, and select the content by the following 4 search methods:

- ① Categories (Entertainment, movies/music, news/sports, information, shopping)
- ② Channel list
- ③ Feeling Search (Search by feeling word)
- ④ Channel recommended by DoCoMo

If the user chooses the content and presses the button linked to the video data, a viewer will be activated to playback the video.

The contents line-up is led by movie trailers, information on TV programs and other entertainment contents, followed by news, sports, recipes, restaurant search and other useful information for everyday life. The contents cover a wide range of infotainment fields, to satisfy many user preferences.

The video compression technology adopted by the service is Moving Picture Experts Group (MPEG)-4, which is the international standard for next-generation mobile phones. The video file format is Advanced Streaming Format (ASF), which is widely used in the Internet.

## 2.2 System Architecture

This section describes the system architecture and development policies of M-stage visual. **Figure 1** illustrates the system configuration of M-stage visual. Contents produced by the CP are hosted by the video distribution server installed in the Mobile OPERATION Radio Assistant (mopera), and are distributed to M-stage visual terminals either by International Mobile

Telecommunications-2000 (IMT-2000) or PHS.

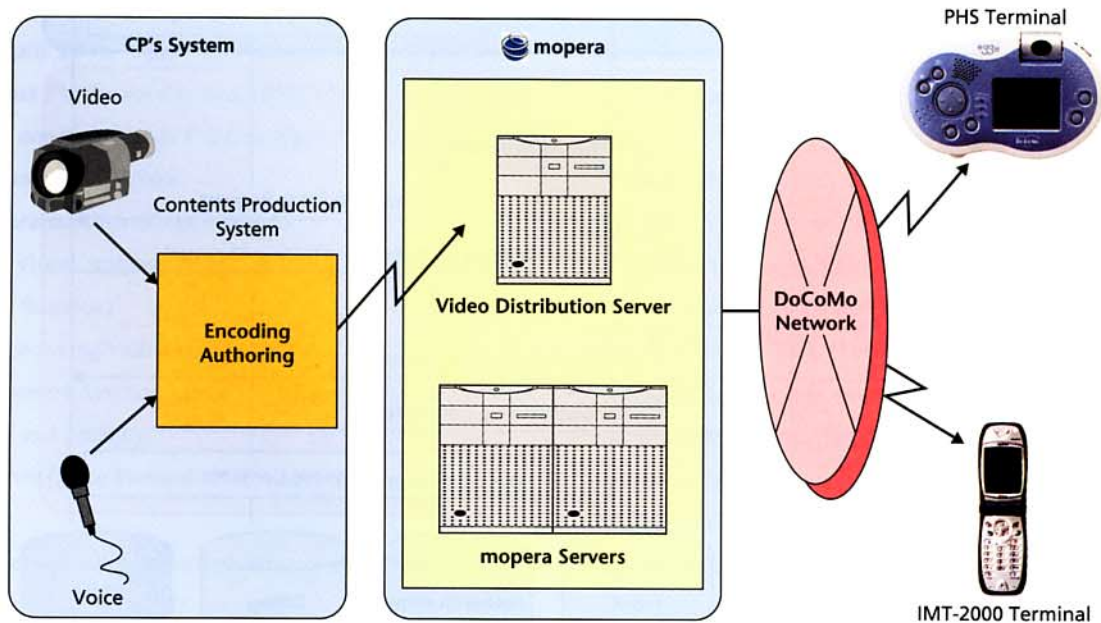
In regard to the development of the M-stage visual system, the following requirements have to be met by the contents distribution system in compliance with the conditions under which services are provided.

- The system must have user authentication and distribution control functions so that only M-stage visual subscribers can access all pages and video contents, including the portal.
- The system must limit the distribution of all pages and video contents, including the portal, only to M-stage visual terminals (dedicated terminals) (It must deny access from normal PCs and Personal Digital Assistants (PDA)).
- The system must be able to collect the contents fee as information brokering charges.
- The system must automatically identify the connection speed of the PHS terminal (32K/64K) to distribute optimal video contents from the server through streaming.

In order to meet these requirements, the M-stage visual system is designed as an application system based on the common platform provided by mopera Step3 [1].

The mopera common platform used in the system has the following three functions:

- An access server to which the user connects, and a backbone network;
- Authentication function for M-stage visual usage agreement; and



IMT-2000: International Mobile Telecommunications-2000  
 mopera: Mobile OPERATION Radio Assistant  
 CP: Contents Provider

**Figure 1 System Architecture**

- Agency billing of contents charges associated with pay contents (Hot's).

The video distribution server is equipped with terminal-type authentication functions and video streaming functions that are uniquely required by M-stage visual, which are outside the scope of the mopera common platform.

Figure 2 illustrates how contents are provided in detail, with reference to the M-stage visual contents distribution sequence.

All request messages sent from the user terminal goes through the mopera platform to check whether the user subscribes to the service in relation to video contents in all pages.

- The user terminal requests the front server to acquire the portal page. In response, the front server executes user authentication, to make sure that the user is an M-stage visual subscriber.

If this process involves contents billing, the user is prompted

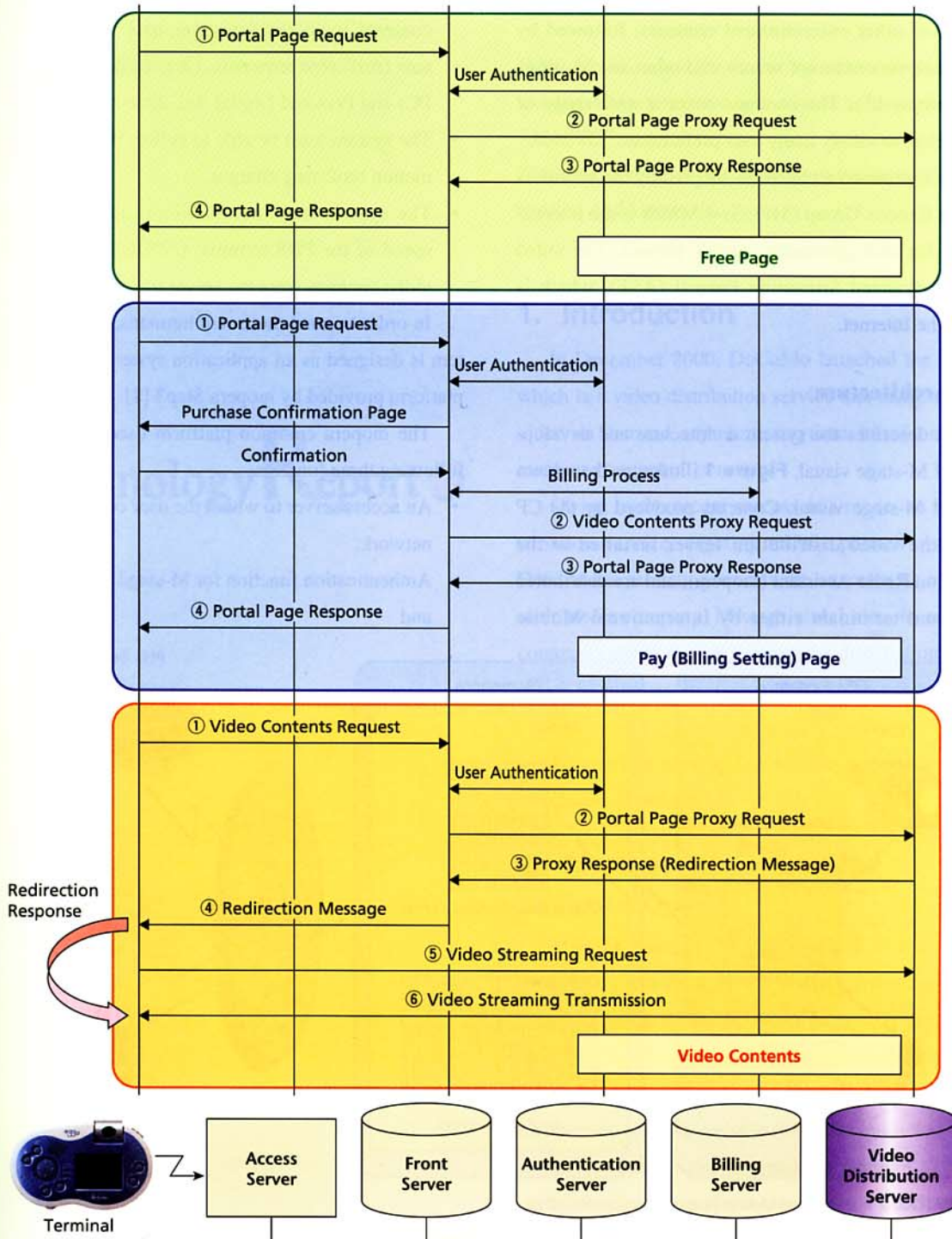


Figure 2 Contents Distribution Sequence

to confirm the purchase. After the purchase is confirmed by the user, the billing server bills the predetermined contents fee. Refer to [1] for the billing sequence.

- ② The front server requests the video distribution server to acquire files.
- ③ The video distribution server authenticates the terminal type, and if the terminal is compatible, it sends the file to the front server.
- ④ The front server transmits the file sent from the video server to the user terminal.

For video contents, a redirection message is sent to the user terminal via the front server in steps ③ and ④.

- ⑤ The user terminal sends a request to the video server, depending on the redirection message.
- ⑥ The video server directly executes video streaming to the user terminal.

As shown above, the M-stage visual system uses the mopera platform to execute functions shared by multiple applications, such as authentication and billing. On the other hand, the system achieves exclusive functions through a newly developed application server. This approach shows a way of developing a mobile multimedia system, which is expected to expand in variety in the future.

### 2.3 M-stage visual Terminals

Terminals compatible with M-stage visual are required to use the M-stage visual service.

As of April 2001, "eggy" is a compatible terminal, which has a Compact Flash card slot and a PHS connector. The terminal must be connected with P-inComp@ct or an existing PHS terminal to access the service.

Main characteristics of eggy include:

- ① M-stage visual support (MPEG-4 streaming and download playback function);
- ② Internet browsing with a simple browser;
- ③ Digital camera function (recording, playing back and editing of videos and photos);
- ④ Internet Post Office Protocol (POP) mail transmission/reception function;
- ⑤ Mail address book with face photos;
- ⑥ Easy connection with PHS terminal;
- ⑦ External memory (Compact Flash) support; and
- ⑧ TFT (Thin Film Transistor liquid crystal) display loaded.

These features are not designed independently of each other.

They have been developed carefully to ensure user-friendliness by linking to each other.

For example, videos and photos taken by using the camera function in ③ can be sent to eggy or a PC by using the mail function in ④. In addition, users can attach a frame, affix a stamp and even scribble on the photo, like pictures generated by "Print Club" (an instant photo machine that develops photos in the form of a sheet of tiny stickers). It also has a function to stop video recording automatically when the video file size reaches 40kB, 100kB and 300kB, because sending a file of a recorded video by mail incurs communication costs which are proportionate to the file size (recording time). This restriction is able to be nullified if the user wishes to record video as long as the memory would permit.

Users can record a larger file (longer hours) by using the external memory (Compact Flash) referred to in ⑦. The external memory is an easy way to transfer recorded videos and photos to a PC.

In terms of connection referred to in ⑥, eggy has a Compact Flash card slot. Hence, it can be used together with P-in Comp@ct as an integrated unit, enabling easy communication.

Eggy can also be connected with an existing PHS terminal for communications, with the use of a PHS connector and a special cable.

"Record and send" functions with a PC and a camera required complex, troublesome settings. But because the eggy enables these functions all by itself, video communication has become much more accessible, and has contributed to expanding the user base.

DoCoMo intends to offer M-stage visual terminals that support IMT-2000 networks in the future.

**Table 1** shows the functions of eggy.

## 3. Future Service Implementation

DoCoMo will improve the quality of the service to enable the smoother distribution of higher resolution videos, and further enhancement of the service, including live video distribution services, video mail, and the development of interactive contents using video telephones.

## 4. Conclusion

This article reviewed the M-stage visual service and system configuration.

**Table 1 Functions of eggy**

Item	Basic Specifications
Dimensions/Weight	131(W) x 81(H) x 39(D)mm (excluding projection) /approx. 225g (including rechargeable lithium battery)
Display	2.0 type color low-temperature poly-silicon TFT LCD (backlit)
Camera/Lens	350,000 pixel progressive CCD
Line	NTT DoCoMo PHS line (64kbit/s / 32kbit/s)
Functions	·M-stage visual support ·Simple browser ·Internet POP mail ·Address book ·Recording, playback and editing of videos and photos
Storage Media	Main memory (approx. 6MB)/Compact Flash™ (memory card, commercial product)
Cable Connector	PHS cable connector (used with 32K/64K Paldio)
Maximum Number of Sequential Photos	Photos: Approx. 140 (Conditions: One photo was taken every 30 seconds using Compact Flash™ 16MB. When the memory became full, the data in the memory was erased to continue taking photos.)
Continual Communication Time	Approx. 70 minutes (using 32K/64K Paldio and special connection cable) Approx. 60 minutes (using P-in Comp@ct and Paldio 611S/341S)

CCD: Charge Coupled Diode  
POP: Post Office Protocol  
TFT: Thin Film Transistor liquid crystal

With the introduction of broadband communication lines and changes in people's lifestyles, the use of video-based communication is likely to increase in everyday life, and the visual communications market is expected to expand rapidly in the years to come. The market penetration of the distribution of video contents and the video mail through M-stage visual and

video telephone is expected to accelerate the establishment of the visual communications market, and significantly contribute towards new traffic.

REFERENCE

- [1] Sato, et al: Overview of mopera Step3, NTT DoCoMo Technical Journal, Vol.9, No.1, pp.56-61, Apr. 2000 (in Japanese).

GLOSSARY

ASF: Advanced Streaming Format  
CCD: Charge Coupled Diode  
CP: Contents Provider  
IMT-2000: International Mobile Telecommunications-2000  
mopera: Mobile OPERation Radio Assistant  
MPEG: Moving Picture Experts Group  
PDA: Personal Digital Assistant  
POP: Post Office Protocol  
TFT: Thin Film Transistor liquid crystal