

Special Article on Information Distribution Services

M-stage music Service —Music Distribution Service—

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DoCoMo launched the M-stage music, a music distribution service using PHS, with the aim to provide mobile multimedia services in the concrete.

This article reviews the M-stage music service, system configuration and contents.

1. Introduction

In January 2001, DoCoMo launched the M-stage music, which is a service that enables subscribers to download and purchase CD-quality music and listen to music samples through streaming. The service uses a PHS 64K data communications service, which DoCoMo has been providing since April 1999. With M-stage music, subscribers can easily buy high-quality music online. The service also has sufficient copyright management functions aimed at preventing the infringement of copyrights to music, including illegal copying, tampering and impersonating, as well as preventing subscribers from accessing illegal contents.

This article reviews the service based on PHS, and discusses the configuration of the distribution system, concepts of copyright management and contents.

2. M-stage music Service

2.1 Service Overview

M-stage music is a service that enables subscribers to download music provided by contents providers (CP) who have the rights to distribute them via DoCoMo's network. It also allows subscribers to listen to music samples provided by CPs through streaming.

First, the subscriber access the M-stage music portal from the M-stage music terminal. The portal contains new information, music search, music information pages, etc. On the music search page, the subscriber can select a music by artist name, music title, or categories. After selecting the music, the sub-

subscriber can playback a sample by pressing the “Listen to Sample” button on the browser. At this stage, the music is not stored in the terminal, and its quality is equivalent to FM radio. The subscriber can download the music in CD quality and keep it in the memory media inside the terminal by pressing the “Buy” button, in which case the contents fee will be billed to the subscriber together with the communication fee. The subscriber can playback and listen to the downloaded music as many times they want.

As the memory media, M-stage music adopts SD memory card and MG memory stick. As the compression format, the SD card uses Advanced Audio Coding (AAC), which is used in digital satellite broadcast, and the memory stick uses Adaptive Transform Acoustic Coding (ATRAC) 3, which is an extension of MD compression technology.

Contents stored in the memory media can be copied and transferred only with a special tool. Without the special tool, it cannot be played back properly.

2.2 System Configuration

Figure 1 illustrates the system configuration of M-stage music.

The subscriber connects to the music distribution platform server (MMD-PF) installed in DoCoMo’s Internet connection service Mobile OPERATION Radio Assistant (mopera) from an M-stage music terminal. The MMD-PF executes subscriber authentication at this stage. Once the subscriber is successfully

authenticated, the terminal displays a portal in compact-HyperText Markup Language (c-HTML) format stored inside the MMD-PF. If the subscriber selects a music on the portal, the music registered with the music distribution application server (MMD-AP) will be sent to the terminal. If the subscriber chooses to listen to the music via streaming, it will immediately be played back on the terminal. If the subscriber chooses to buy and download the music, it will be stored in the memory media in the terminal.

For streaming, 32K-oriented contents and 64K-oriented contents are registered with the MMD-AP server to cater for different PHS data transmission speeds, so that it can identify the data transmission speed of the accessing terminal and automatically provide the appropriate streaming contents according to the data transmission speed.

Each of the music provided by CP are compressed and encrypted by the contents processing system to make them available for distribution. Music title, artist name and other music-related information, as well as lyrics, cover photo and other information provided by the CP can also be attached to the contents. The music can be distributed after the contents are stored in the MMD-AP server.

2.3 Copyright Management System

M-stage music has a mechanism to protect music copyrights, to block illegal access to music contents. The basic concepts of protecting copyrights are as follows.

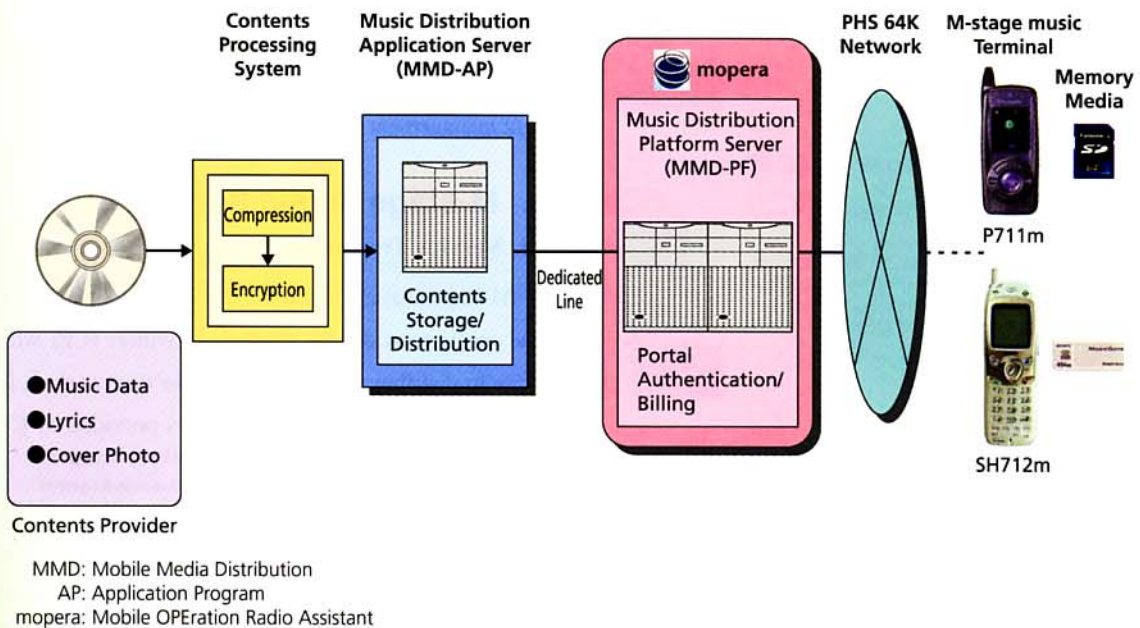


Figure 1 System Configuration of M-stage music

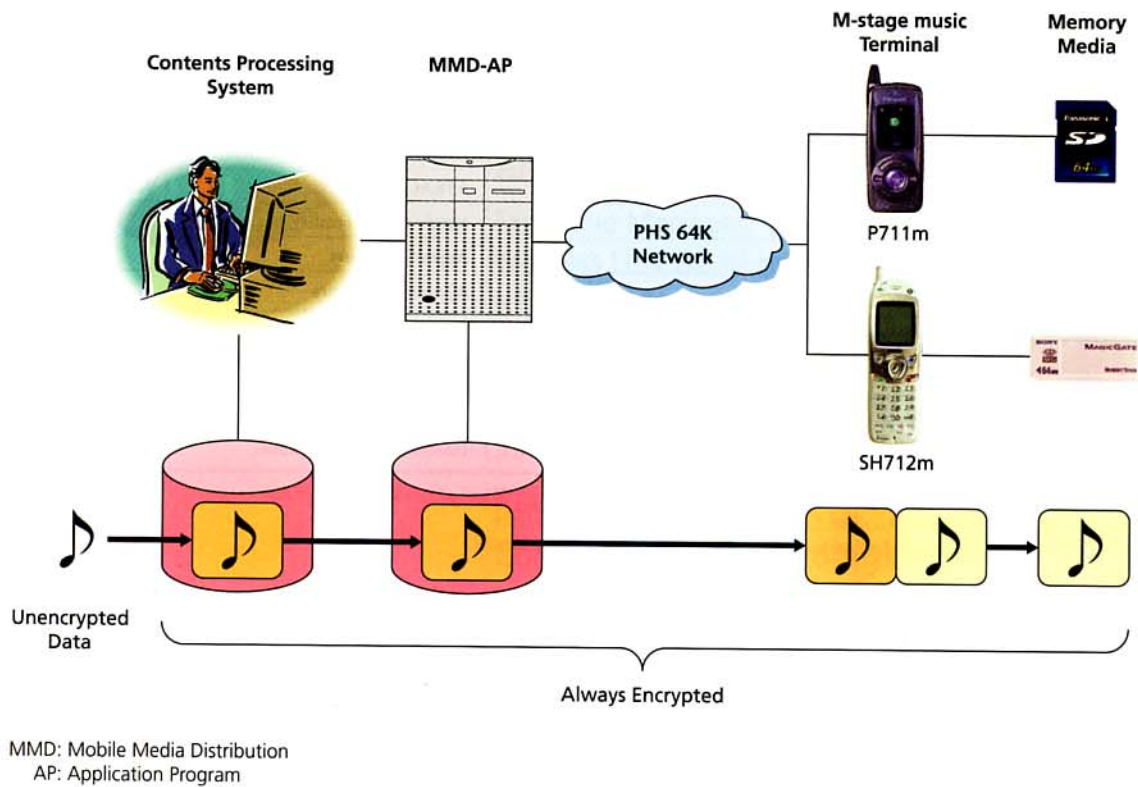


Figure 2 Mechanism of Secure Contents Distribution

- (1) Only the official M-stage music subscribers who access the service from authorized terminals are allowed to receive contents distributed by the MMD-AP.
- (2) M-stage music terminals should not be able to receive contents unless distributed by the MMD-AP server.
- (3) No music pieces should be uploaded to the MMD-AP server without distribution rights.
- (4) There must be a mechanism that prevents illegal copying and tampering of contents when they are stored in the MMD-AP server, or when they are being distributed, and also when they are stored in the memory media in the terminal.

(1) aims to prevent unauthorized subscribers and unauthorized terminals from making illegal copies. The purpose of (2) and (3) is to prevent the distribution of illegal contents. The object of (4) is to prevent illegal copies and copyright infringement by tampering.

DoCoMo resorts to the following functions to protect copyrights (**Figure 2**). First, the CP with proper rights encrypts the contents, and registers the encrypted musics with the MMD-AP server. The MMD-AP server distributes the contents to the rightful access request from rightful subscribers. Upon distribution, the contents are encrypted with a distribution key. In addition,

before the contents are stored in memory media, they are encrypted with a key unique to each media type. This prevents illegal copying, so that the stored contents cannot be decrypted without the key unique to that media type.

2.4 Specifications of Terminals

Currently, there are two types of terminals supporting M-stage music: P711m and SH712m (**Table 1**). These M-stage music terminals have music downloads and player functions, so that subscribers can listen to the downloaded music on the spot. They are equipped with a color LCD (256 colors), so that subscribers can browse the Internet on a color screen by connecting to mopera. The terminals can also be used as PHS 64K/32K data communication terminals when connected with a PC.

In addition to above, P711m has an automatic downloading resume function and an automatic power-off function, as a dedicated M-stage music terminal. On the other hand, SH712m is equipped with a voice function, meaning that it can be used as a normal PHS phone. These terminals offer a choice to subscribers with different preferences.

2.5 Available Contents

M-stage music offers a wide range of music, which are

Table 1 Basic Specifications of M-stage music Terminals

	P711m	SH712m
Dimensions	H104 x W48 x D22mm	H123 x W42 x D29mm
Weight	Approx. 88g	Approx. 99g
Distribution Format	EMDLB	EMMS/OpenMG
Compression Format	AAC	ATRAC3
Storage Media	SD memory card	Magic Gate memory stick
Continual Call Time	No voice function	Approx. 7 hours
Continual Playback Time	Approx. 5.5 hours	Approx. 5.5 hours
Main Functions	Internet browsing 64K/32K data communications Music-related information (pictures, text) display Player, automatic download resume, Automatic power-off	Internet browsing 64K/32K data communications, phonebook with Chinese characters support Quick link, Paldio e-mail, Harmony melody, player

AAC: Advanced Audio Coding

ATRAC: Adaptive TRansform Acoustic Coding

EMDLB: Electronic Media Distribution License Body

EMMS: Electronic Media Management System

MG: Magic Gate

SD: Secure Digital

available for downloading and streaming. In cases when the CP provides lyrics and cover photos with the downloadable contents, these will also be downloaded with the contents. As of April 4, 2001, more than 1,000 music pieces have been registered with the MMD-AP server.

3. Future Service Implementation

DoCoMo is planning to make the M-stage music service available in FOMA^{★1}. Music pieces that are currently available in PHS will also be offered by M-stage music in FOMA and the collection of music and the portal will be enhanced step by step. In addition to music contents, DoCoMo is also planning to provide speech contents such as English conversation lessons and comic monologues.

4. Conclusion

This article reviewed the service and system of M-stage music, which was launched in January 2001. The market penetration of M-stage music is expected to help expand non-package sale businesses. As M-stage music enables subscribers to enjoy music wherever they are, the service is likely to change people's music-listening habits.

★1 FOMA: The brand name of DoCoMo's third-generation mobile communications system (IMT-2000). The abbreviation of Freedom Of Mobile multimedia Access.

GLOSSARY

AAC: Advanced Audio Coding

AP: Application Program

ATRAC: Adaptive TRansform Acoustic Coding

c-HTML: compact-HyperText Markup Language

CP: Contents Provider

EMDLB: Electronic Media Distribution License Body

EMMS: Electronic Media Management System

FOMA: Freedom Of Mobile multimedia Access

MG: Magic Gate

MMD: Mobile Media Distribution

mopera: Mobile OPEration Radio Assistant

PF: Platform

SD: Secure Digital