Smart Device Content Distribution Platform Service Using the BIGLOBE Hosting

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Abstract

This paper introduces a platform service for use in distributing content to smart devices. The main targets are the enterprises that want to distribute proprietary content (music, movies, etc.) to consumers via smart devices. The service includes functions such as one that is available by integrating and connecting with the authentication and billing functions of mobile phone carriers, and also one that can protect content by linking with applications running on smart devices. These functions are provided by being incorporated in the enterprise-oriented web hosting environment prepared in the BIGLOBE Data Center. This paper is intended to describe the mechanisms of these functions and to consider points to be noted when the service is applied to smart devices.

Keywords

content distribution, music distribution, movie distribution, carrier billing, smart device, hosting

1. Introduction

There is now a need among those content providers (CPs) that distribute music and movie content mainly to consumers to expand content distribution services to smart devices. This has resulted from a general trend in shifting the terminals of mobile users from traditional mobile phones (feature phones) to smart devices. In addition, the increase in the share of smart devices among personally-owned mobile phone users is increasing the number of enterprises that are considering the introduction of new content distribution services.

BIGLOBE has been providing a service for building official carrier sites for feature phones. We have thereby accumulated expertise and achievements by producing and running many sites using BIGLOBE while providing services to CPs.

Based on our content distribution R&D for mobile phones, we provide the BIGLOBE Contents Director (hereinafter referred to as Contents Director) service as a platform for content distribution to smart devices.

2. Details of the Contents Director Services

The Contents Director is an ASP service provided by BIGLOBE, which prepares a server domain for each customer enterprise in the BIGLOBE Data Center (web hosting) and provides dedicated functions for content distribution to smart devices in the form of a preset package (**Fig. 1**). The provided functions include the following:

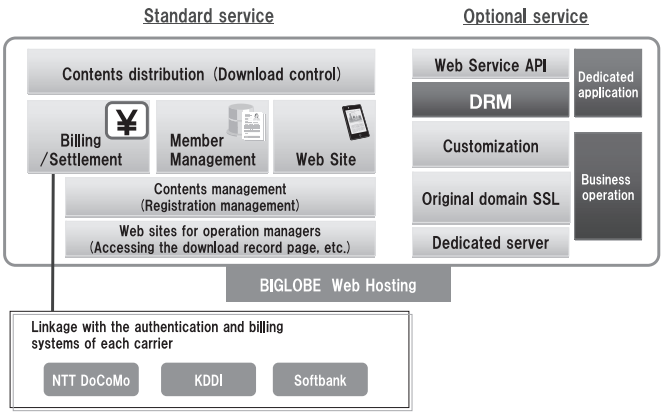

Fig. 1 Contents Director service details.

- **Member management + Carrier billing**
  By connecting to the systems of three of the Japanese mobile phone carriers (NTT DoCoMo, KDDI (au) and SoftBank Mobile), the Contents Director conducts user authentication and billing confirmation services.
- **Contents management + Distribution**
  Content such as music, movie, etc. provided by the customer enterprises are registered in their servers and opened to users. The users can then download the selected contents via their smart devices.

- **Download records**
  Counts the monthly download results of individual content inside sites and displays them on a website. These results can also be output as data.
- **Content DRM + Terminal playback application provision**
  In a case when a customer enterprise wants to sell its own produced content, a function to add DRM (Digital Rights Management) to each content is provided in order to prevent illegal copy being circulated after the content is downloaded. An encryption tool, the server function for license management and the terminal application (also used for content playback) controlled by interlocked control from the smart device are provided as a set. The DRM and terminal application are provided as options only for those customers requesting them.

3. Provided Functions

3.1 Operating Platform

The Contents Director constructs, provides and sets the environment for each customer enterprise in the enterprise-oriented web hosting environment of BIGLOBE.

The server is configured on a platform composed of two kinds of hosts, the Web/AP and DB servers, and the NAS (Network Attached Storage) (**Fig. 2**). The web servers use Apache products, the servlet container uses Tomcat products and the database management system uses a MySQL database.

In the server environment described above, the functions are composed in the web applications written in Java. These web applications run on the Tomcat servers.

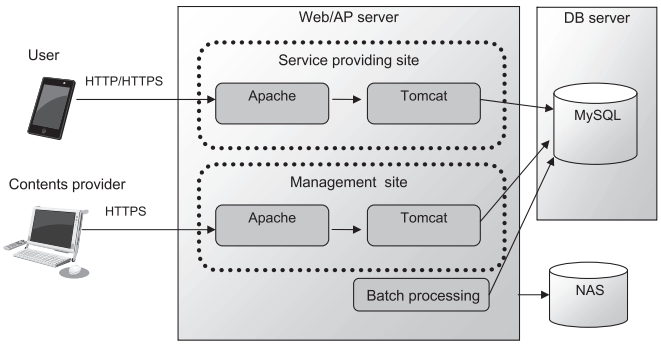

Fig. 2 Server configuration.

3.2 Provided Function Details

As described above, the Contents Director provides a series of functions for use in building a content distribution site for smart devices. The next section describes the most characteristic functions, which are the carrier billing and DRM functions.

(1) Carrier billing

The mobile phone carriers provide the CP with a "contracted billing service" that bills the smart device and feature phone users on behalf of the CP. The Contents Director links with the contracted billing service provided by each mobile phone carrier, and bills users when they download content. The Contents Director can provide the following contracted billing services.

- NTT DoCoMo: sp mode Contents Payment service
- KDDI: au *kantan Kessai* (Easy Payment)
- SoftBank Mobile: SoftBank *matomete* (lump-sum) payment

Every carrier provides a contracted billing service to its own specifications. The connection sequences of the Contents Director are designed to absorb the differences in specifications between carriers and to handle the billing of all carriers in a unified manner.

The billing mode can be selected from monthly billing and pay-as-you-go billing. With the monthly billing, the user pays a certain amount automatically every month and receives points according to the paid amount. With the pay-as-you-go billing, the user pays the necessary amount at the moment of downloading and receives points according to the paid amount. In either mode, the user can download content by consuming the obtained points.

Some carriers provide users who switched their models from feature phones to smart devices with a function for taking over the previous billing registrations. This function allows users who already utilize the monthly billing in the official site for feature phones to transfer automatically to the corresponding official site for smart devices after switching their models to smart devices. This function serves to prevent losses caused by withdrawal from membership at the time of terminal model switching. The Contents Director is compatible with these billing takeover functions run by carriers. Simply by registering the official site of the user's feature phone, the user transfer to the corresponding smart device site can be completed without the need for customer enter-

prises to develop the relevant functions.

(2) DRM service

To prevent the distributed content from being copied to another medium and reproduced via other terminals, the Contents Director provides the original DRM service as an option.

The original content is encrypted in advance using the dedicated authoring tool provided by BIGLOBE, and it is registered in the content distribution server (DB). In this process, a content ID is generated for each encrypted content and the ID is registered automatically in the license management server (DB) by the authoring tool. A content downloaded into a terminal cannot be reproduced as it is because the file is encrypted. When a user attempts to reproduce the content, an inquiry on whether the user is the legal one is sent to the license management and content distribution servers. And, when the user is identified as a legal user, the content is decoded using the decoding key separately distributed from the license management server and reproduced in the streaming format. The factors used for judging a legal user include the content ID, the user ID (this corresponds to the UID of the carrier) and the terminal's serial number (a unique number for each terminal). These operations allow the content to be reproduced only by the user who obtained it (by purchase) and on the terminal used in downloading it. As the confirmation and decoding operations above are indispensable for reproducing content via DRM, we provide a customer enterprise with a unique player application incorporating the DRM check function as a terminal application to be distributed to their end users.

With the Contents Director, the DRM mechanism is independent from the content distribution function itself, and a distribution server and a DB server for license management are installed independently. This configuration makes it possible for example to meet a need of using only the DRM part (while using the existing servers of the customers for content distribution) (**Fig. 3**).

3.3 Differences from Services for Feature Phones

The Contents Director is an extended version of services based on the rich achievements in the operation of content

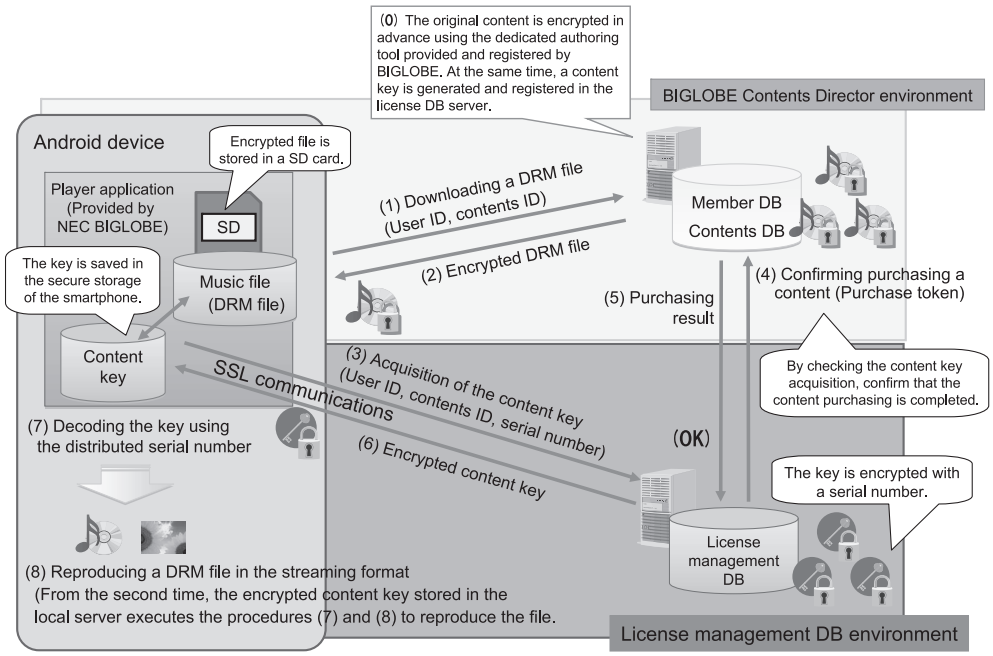

Fig. 3 Outline of DRM.

distribution sites for feature phones and of their functions and configurations, in aiming at applying this service to smart devices. In the building of a smart device-oriented system, it was sometimes necessary to employ different processing procedures than for the feature phone-oriented system. The following section describes them.

(1) User authentication

In the case of the feature phones, the user information is sent every time an HTTP request is made so that the information can be used to identify and authenticate the user. With smart devices, however, such a simple user authentication is not possible. So the carriers provide the authentication system based on OpenID 2.0 and the Contents Director authenticates users in the method that corresponds to it.

With feature phones, the connection source IP address has been limited to the gateways of the carriers in order to prevent user ID impersonation by a terminal other than a mobile phone. On the other hand, with smart devices, the connection source IP address cannot be limited considering the access via Wi-Fi. Therefore, the Contents Director does not limit access based on the IP address and adopts instead an authentication method without IP address limitation.

For the user authentication, it can be said that the feature phones employ an original system unique to mobile phones, while the smart devices have changed the system to one that is almost equivalent to general websites or websites for PCs.

(2) Distinction by terminal model information

With websites for feature phones, it is basically necessary to collect and register the information on all of the terminal models.

This is because the compatible file formats and specifications vary between terminal models, and the websites have to select the optimum content for the terminal before distribution. On the other hand, the smart devices can handle the general file format of each content type uniformly and regardless of the terminal model, thereby making it unnecessary to register the information on each terminal model.

If special processing per terminal type is required, a determination function based on the User Agent can be added separately.

(3) DRM

For the feature phones, only the built-in software can access the downloaded content. As it performs unique copy control for this purpose it is easy to inhibit the copying of content. With the smart devices, users may use the downloaded files freely, so if contents providers want to inhibit copying, they should introduce the DRM by themselves. As described in (2) in section 3.2, illegal content copying is prevented by limiting access for reproducing contents to the dedicated application.

4. Conclusion: Future Orientation as a Distribution Platform

The Contents Director has been providing the functions required for the CPs of traditional feature phones to meet the need to expand the content distribution service to smart devices. Nevertheless, the fact that smart devices have a wide variety of functions and that their main usages are based on applications, expands the market range of content business for smart devices, which could be greater than the conventional content business for feature phones. In the expansion toward new business functions, "what can be distributed" to smart devices is becoming the key issue for the future of the Contents Director.

For the orientation of the expansion of distribution variations, we are planning R&D on the following topics.

- Distribution of the application itself - dedicated sites for special terminals.
- Distribution of data used within a single application - component distribution.
- Matching locations between several providers and the receiver (user).

In addition to the measures above, we will also extend billing methods and advance the CMS (Content Management system) so that we can continue to provide effective platform services, thereby matching the current needs of customer enterprises.

Service platforms

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Vol.7 No.3 Smart Device Solutions

Vol.7 No.3
March, 2013

Special Issue TOP