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Design and Implementation of the Home Service Delivery and Management System Based on OSGi Service Platform

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Abstract-- **Traditionally, the digital home services have been provided separately by each service providers that have closed service delivery infrastructure for delivering home services. Because of this, small companies that do not have the infrastructure to deploy home services have difficulties in participating in the home network market. To solve this problem, we propose the digital home service delivery system that provides open service delivery platform that small business companies need to provide various home services to users. By using the proposed system, the service aggregator using the proposed system can lead competition of the 3rd party service providers in the home network service market, and help it grow rapidly.**

I. INTRODUCTION

The service providers need the outdoor infrastructure such as the security system, the accounting system, and the portal system as well as the indoor home infrastructure to provide the services to the users. Thus, it is difficult for small business companies that do not have the service delivery infrastructure to deploy the home services because of the expensive overhead cost of building an infrastructure. Thus, small business service providers need the open service delivery platform to provide basic functions for service provisioning.

The traditional service delivery architecture is closed because service providers deploy services such as the home security, the home automation, and the contents delivery to the users directly. Thus, the 3rd party service providers have difficulties in participating in the home services market. Furthermore, it is difficult for the service users to find necessary services among many available services. To solve this problem, we propose the open home service delivery system. This system delivers various services to service user through a logical single path based on Open Service Gateway initiative (OSGi) Platform [1]-[3]. Through the path, the 3rd party service providers can easily participate in the home service market, and service users can easily search necessary home services among many available services, also the home device manufacturers do not need to develop service dependent devices.

In the following section, we propose the Digital home Service delivery and Management system (DSM) based on the OSGi service platform.

II. DSM DESIGN

Figure 1 illustrates the DSM functions. DSM consists of the Control Module (CM), the Management Module (MM), the Service Provider Module (SPM), and the Management Agent (MA). The CM module monitors the MM status and balances the load of the MM. Thus, when the home gateway sends registration request message to the CM, the CM balances the load of the MM based on the number of home gateways it manages. The MM is the main engine for the service delivery and management, the home gateway management, the user authentication, and the account management. Lastly, the MM also contains portals to the service provider, the service user, and the system manager.

The SPM uses the open APIs that are provided by the MM. The Open APIs consists of the service registration API, the accounting API, and the authentication API. By using these APIs, the service provider can register the service bundle on the DSM, authenticate service users accessing through a service provide server, and request the accounting information of service users to the DSM.

Last, the MA acts as the agent to home service delivery and management control of the MM. It also bootstraps to initialize the home gateway, installs a service bundle on a home gateway, and supports home portals to control the home devices.

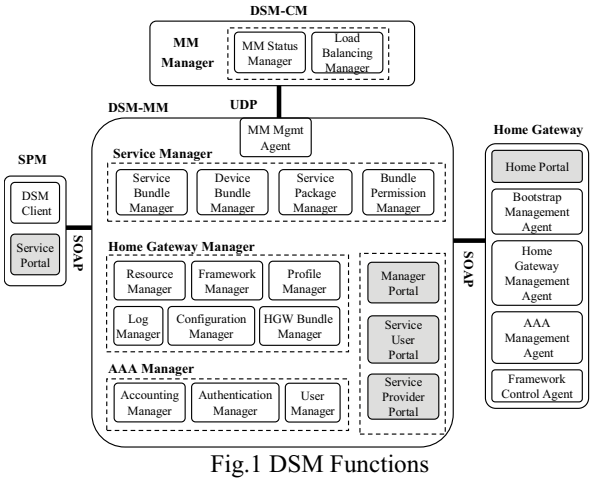

Fig.1 DSM Functions

Next, we describe the service delivery process from service registration by the service provider to the service usage by the service user.

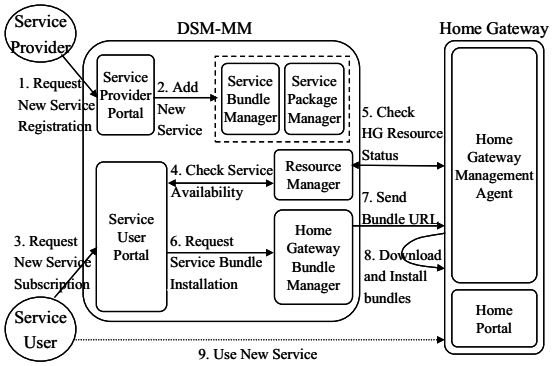

Fig.2 Service delivery process

First, the service provider registers developed service bundle via the service provider portal of the MM as figure 2 illustrates. During the registration process, the service provider inputs detailed information such as the bundle URL, the bundle description, and the bundle platform profile that are managed by the service bundle manager. The service provider creates new service by packaging registered service bundles and inputting detailed service information such as the service accounting policy, the service description, and the bundle list. The inputted data is then processed by the service package manager. The service user can subscribe to the services after the service registration. After gateway registration and initialization, the service user can subscribe service, which is illustrated in figure 2. After service users log into service user portal of the MM, they can search categories of services that are registered by service provider

After the service user subscribe to services in the service categories, the resource manager checks the available disk space and the processing power of service user's home gateway. If the service user's home gateway has sufficient resource for installation, service bundle that matches the home gateway platform profile will be installed. After the service bundle is installed, the service user can use the services via the home portal.

III. DSM IMPLEMENTATION

We implemented the DSM which includes the web interfaces for service bundle registration, service creation, service subscription, and service usage as the following figures illustrate.

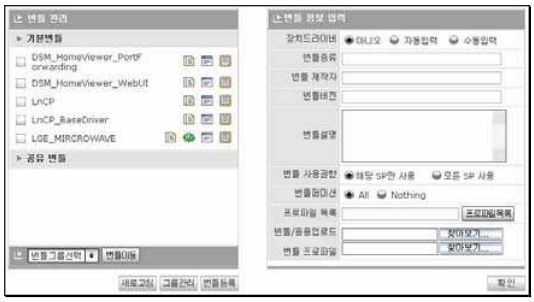

Fig.3 Service bundle registration

Fig.4 Service Creation

Fig.5 Service subscription

Fig.6 Service Usage

IV. CONCLUSIONS

In this paper, we proposed the digital home service delivery and management system (DSM) to integrate home service provider's servers. We described the functional modules of the DSM, and showed how home services of the service providers can be delivered to the service user via the DSM. The implemented DSM can lead competition of the 3rd party service provider in home services market. The Service user can be provided with various services through reliable service aggregator, and receive a single bill for the subscribed services.

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