Private Cloud Using Service Catalog

● Takahiro Nakai

Enterprises are centralizing their in-house systems at data centers to reduce the total cost of ownership by using fewer servers and less power. However, such centralization requires solutions to problems such as the increased workload of the data center manager, resource usage regulation related to information and communications technology (ICT), and visualization of ICT resource usage. To solve those problems, Fujitsu has developed Systemwalker Service Catalog Manager (CT-MG). CT-MG can manage its resources in a data center as items for automated rental services. This reduces the burden on the data center manager by letting ICT resource users select the desired service items from a service catalog. The users can easily select them on the Website driven by CT-MG. CT-MG was developed by reflecting the requirements that are characteristic of private clouds and using the expertise acquired in developing and operating public cloud systems. This paper describes what has been achieved with CT-MG.

1. Introduction

Though enterprises have so far been managing their systems by each of their departments, they are now centralizing their systems at data centers to reduce the total cost of ownership by using fewer servers and less power. However, a simple integration of each department's systems leads to a significant increase in workload and management costs borne by data center managers due to the greater number of systems to be operated in a data center.

In conventional systems, a dedicated system manager has been assigned to each department and system operation has been supported by the expertise of each system manager. Once these systems are integrated in a data center, the data center manager needs to master the skills necessary to operate business systems that have so far been managed by each department. On top of this, the data center manager must manage the leasing and returning of the integrated systems to ensure resources are effectively used. As a consequence, pressure on data center managers in terms of operating data centers will increase. To address this issue, we need a mechanism where fewer data center managers can operate and manage huge amount of services efficiently.

In this paper, we will introduce Fujitsu's approach to improving the convenience of users while decreasing the workload associated with data center operation. In this approach, resources of information and communications technology (ICT) are published as items in a service catalog.

2. Challenges in system integration

When integrating each department's systems in a data center, we need to address the series of challenges shown below:

1) Reduction of operation workload for data center manager

A simple integration of ICT resources in a data center leads to a significant increase in operation workload for data center managers.

This is because they need to manually carry out setting and management for leasing and returning ICT resources when users submit requests for renting or returning resources.

For this reason, an environment must be built where each user can use the required ICT resources whenever he or she wants, without increasing the operation workload of data center managers.

2) Regulation of ICT resource usage

In an environment where every user can use ICT resources integrated in the data center, there is a risk that a data center will have insufficient ICT resources if they are leased out unnecessarily.

Therefore, when leasing ICT resources, after the users' requests, some regulatory procedures are necessary, such as obtaining the approval of the superiors in a requesting department or of the data center managers.

3) Visualization of ICT resource usage

For optimal use of ICT resources, a data center manager needs to check whether ICT resources are used effectively by each user or department and whether there is any deficiency in ICT resources. Further, to charge a fee for leasing out ICT resources to each department, the data center manager should collect billing information.

Therefore, the data center manager needs to have a way to facilitate billing for each department by identifying the amount of services used by each department.

To address this challenge, Fujitsu has developed Systemwalker Service Catalog Manager (CT-MG). You can use this software in order to itemize ICT resources on your private cloud environment into a service catalog. It helps data center managers deliver or lend them efficiently to user departments, and reduces data center managers' workload (**Figure 1**).

CT-MG was developed including the requirements that are characteristic of private clouds. In this product, Fujitsu incorporated the expertise acquired in developing and operating public cloud "Fujitsu Global Cloud Platform" that has already been launched. Most functions in this product were designed so that their

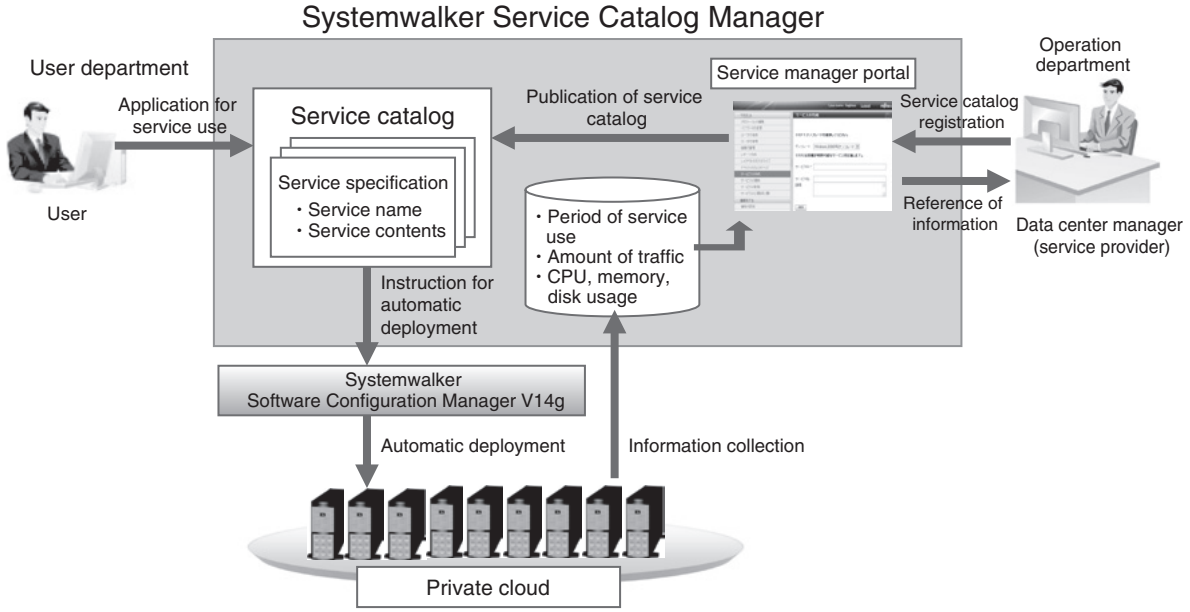


Figure 1
Outline of Systemwalker Service Catalog Manager.

specifications (in terms of UI) suit both public and private clouds.

In the following sections, details of this product that offers solutions to the above-mentioned challenges are described.

3. Service management by service catalog

In CT-MG, a service provider (i.e. a data center manager who offers services) publishes the available services to service users after registering the ICT resources in a service catalog. With this configuration, users can rent ICT resources within a short time (a few hours). This improves the efficiency of the procedures necessary for managing and leasing ICT resources in the service catalog.

The ICT resources that can be registered in the service catalog are IaaS resources (server, OS), middleware (Webserver, application server, etc.) and business systems including business applications.

The functions required for these features are described below.

3.1 Registration and publication of service catalog

Service providers can easily register their ICT resources in a service catalog from a Web screen to publish them as some kind of services for service users. The ICT resources that can be registered in a service catalog can be roughly categorized into the following two types (IaaS resources and business applications).

3.1.1 IaaS resources (server, OS)

CT-MG offers a function to register IaaS resources to a service catalog by specifying their content in the form of the template created by Systemwalker Software Configuration Manager, and publish them.[1)] When registering the resources in a service catalog, it is possible to add the details of the service in addition to the template so that the users can understand service specifications (optional service name, service descriptions, service fee, service policy). When you create your service catalogs, you choose the way you publish them from the following two options. You need to take your organization's policies and users' requirements into consideration.

1) Standardized, moderately limited number of fixed choices

This assumes that the service provider defines the type of set of IaaS resources to be published. The total number of those types would be up to some dozens. Unimportant variations are removed. This can reduce the workload for service providers in terms of preparing and managing ICT resources because the types of resource set to be offered can be narrowed down.

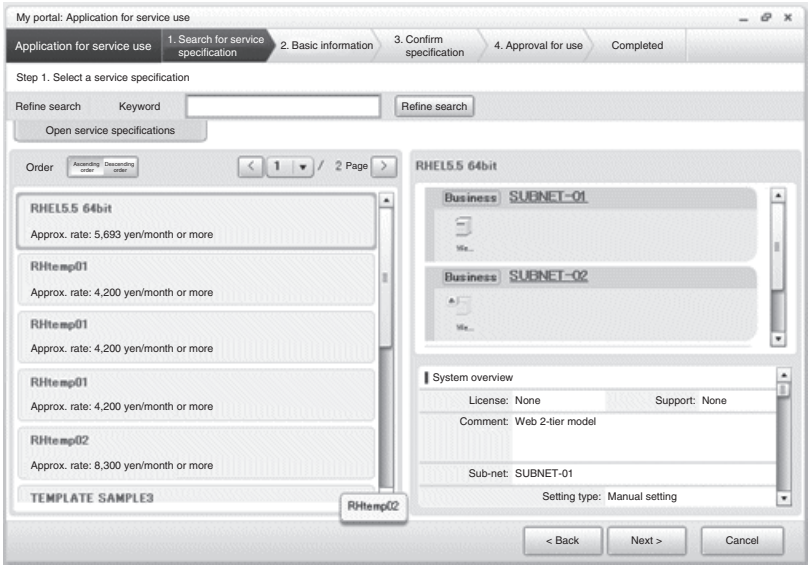
2) Free selection of IaaS resources by users

This approach refers to a method of offering services where users are permitted to add severs, CPUs, memories, and disks to the templates in the service catalog. They can do this by using the self-service function of CT-MG. Depending on the intended use, users might need to use ICT resources of a range that exceeds those offered by standardized choices. This approach can address such a request.

Users can use this leasing service function with the same UI as those for Fujitsu Global Cloud Platform (**Figure 2**).

3.1.2 Business applications

Service providers publish business applications for their users by registering business applications in service catalogs. So as to make business applications available to users, in many cases, service providers need to register business application-specific information (user ID for representative of user department, number of users, etc.) to the business applications. Further, because these types of information vary depending on each user department, service managers need to manage a large amount of information for each application.



(Original is in Japanese.)

Figure 2
Use of service catalog with Web.

With CT-MG, users themselves can set their information necessary to use business applications in a service catalog as input items when filling in the application form. CT-MG offers an application program interface (API), that allows business application programs to get those pieces of information inputted by users. Based on this configuration, service providers can offer business applications to user departments within a short time.

3.2 Customization of service catalog screen

Because CT-MG offers another set of APIs to develop UI for service catalogs, service providers can develop their own screens instead of the ones that CT-MG offers. This means they can change the configurations of screen layout and brand logo so as to keep consistency with other services that have already been offered by the data center.

4. Standardization of application and approval processes

With CT-MG, service providers can use an automated template for the application and approval process of leasing IaaS resources or business applications. These processes include manual operations of users. Based on this function, it is possible to standardize mechanisms used to regulate usage by user departments or service providers.

The features required for this function are described below.

4.1 Feature to register approval process

At the stage of the above-mentioned service catalog registration either of the following approval processes can be registered to be executed:

1) Approval of a manager of a user department is essential when applying for use
2) Both approval of a manager of a user department and approval of a service provider are essential when applying for use

Further, the service provider can register types of approval process other than above-mentioned ones (e.g., a process requiring multiple approvers of the service provider's department) by using Systemwalker Runbook Automation.[2)] With this feature, an approval process can be customized based on any operation policy of any

company.

4.2 Feature to register approver by applicants

When registering an approval process at the time of creating a service catalog, a specific approver can be selected as an approver in the service provider department for each service catalog registration. On the other hand, the approver in the user department cannot be set specifically in the service catalog in advance of the applications to be leased, because the approver of the user department varies depending on each user department. Therefore, in CT-MG, the applicants can set the approver (representative of each user department) when applying for service usage. Any approver can be selected from an approver list of the applicant's own department.

4.3 Feature for unified management of application for rent

CT-MG manages all the histories of applications for rent in a unified way. In this way, a service provider can easily identify each status of any application. It is also possible for users to see the status of their own applications for rent in the approval process.

5. Visualization of use status and self-service feature

CT-MG offers features to support visualization of service (ICT resources) use status and self-service features for managing the services in use.

With these features, service providers can identify the use status service by service, and this allows ICT resources to be optimized by detecting ICT resources that are not effectively used. On the other hand, users can see the current status of services they are using and perform operations for the services (e.g. start-up, shutdown) currently in use by themselves.

The functions required for these features are described below.

5.1 Functions for visualization of service use status

CT-MG offers a feature that enables a service provider to see the services currently in use based on a list and to check the status of service usage from a Web screen. To be specific, the status of use for the following parameters can be seen (**Figure 3**).

1) Usages of CPUs, memories and disks
2) Amount of network traffic
3) Hours of use
4) Optional usage information specific to business applications (number of simultaneous users etc.)

Service providers and service provider departments can see the above-mentioned information for all the services in use. Users and user departments can see these types of information as far as the services are within the scope of their own application for rent.

Further, the service providers can set a price per unit time for service usage in the service catalog. It is then possible to bill each service user department by using this information as a baseline for billing.

5.2 Function for self-service by users

CT-MG offers a feature for service users to issue operations for each service after they select the intended service in use from a self-service portal (Web screen). To be specific, users can issue the following operations:

1) Start-up and shutdown of virtual machines (VMs)
2) Back-up and restoration of VM images

The aforementioned application and approval processes can also be applied compulsively to the self-service operations by users. So as to prevent erroneous shutdown of any service currently in use, the manager of the user department can monitor the self-service operations.

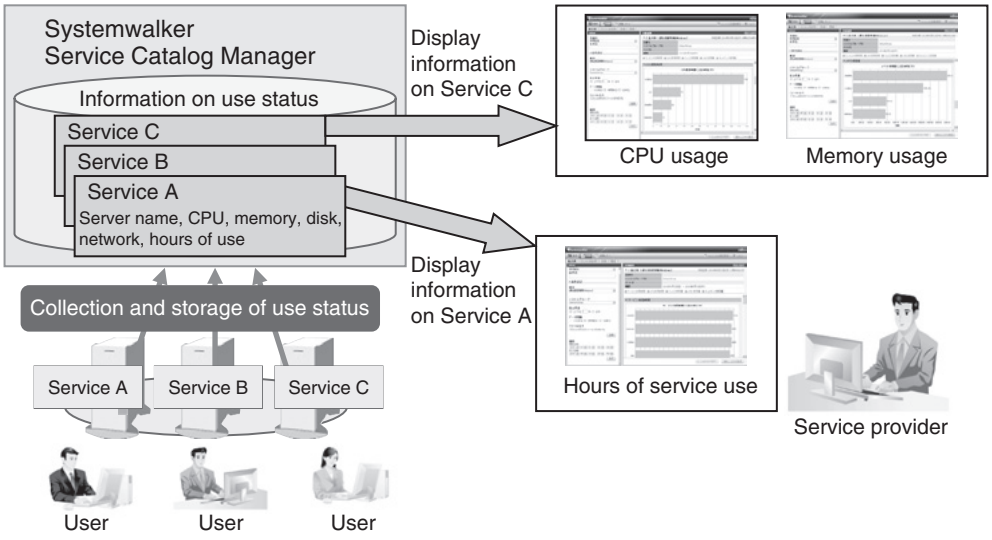


Figure 3
Visualization of service use.

6. Conclusion

This paper introduced Fujitsu's approaches to achieving comprehensive management and visualization of ICT resources integrated in the private cloud environment. Abilities to register ICT resources including business applications and publish them for users, as well as the visualization and self-service features under authorization control are some features of CT-MG. With these features, the operation workload and operation costs for service providers are minimized, while providing the ICT resources at any time in any amount requested by users.

The ability to make business applications into services in addition to making an IaaS layer into a service is one of the features of this product. We plan to introduce a self-service mechanism for operational tasks (the bulk handling of start-up and shutdown of Web, application and DB systems, patch application) in future.

Further, we will continue to keep the functions common to both CT-MG and public cloud "Fujitsu Global Cloud Platform" services so that we can meet customers' requests for hybrid environments by offering UI and operability that are compatible with both private and public cloud environments.

References

1) K. Murata et al.: Provisioning of Standardized Business Systems. *Fujitsu Sci. Tech. J.,* Vol. 47, No. 3, pp. 293–299 (2011).
2) H. Ito: Operation Efficiency Improvements for IT Infrastructure through Runbook Automation Technology. *Fujitsu Sci. Tech. J.,* Vol. 47, No. 3, pp. 300–304 (2011).

Takahiro Nakai
Fujitsu Ltd.
Mr. Nakai is currently engaged in development of management software for cloud services.