"BIGLOBE Cloud Hosting" Supports Building of High Quality Services

SHIBANO Sumiko, TANAKA Eiko, MATSUMOTO Koujirou

KAWASAKI Hiroshi, OISHI Tougo, MATSUE Satoshi

Abstract

"BIGLOBE Cloud Hosting" is a public cloud of a genuine Japanese IaaS type, which has been awarded numerous prizes by major business magazines. BIGLOBE has been providing various modes of high quality hosting services to businesses for ten years, cultivating servers, networks, storage and virtualization technologies, while improving the functions of a variety of service platforms, as an ISP business. This paper introduces BIGLOBE Cloud Hosting, a high quality service capable of providing hosting services on demand, built in a short period of time by combining technologies and know-how.

Keywords

Cloud, IaaS, public, hosting, virtualization, on demand, service provider, SOA

1. Introduction

Although "Cloud" was once considered a buzzword in the IT industry, it is now firmly established, with services released one after another by vendors in Japan. Even though services will expand in the future through the use of smart devices, the utilization of "Cloud" is what becomes important in building high quality services cheaply and quickly. This paper introduces BIGLOBE Cloud Hosting, a public cloud of a genuine Japanese IaaS type, provided by NEC BIGLOBE, as well as the cloud technology that configures such systems, along with operational know-how and future initiatives.

2. Trends of Cloud Market and Characteristics of BIGLOBE

Although the year-to-year growth rate of Cloud in the Japanese market is slowing down, it is predicted to expand steadily. Cloud is classified into "AaaS/SaaS," "PaaS" and "IaaS" categories, according to the layers of services provided, with all categories continuing to expand in a similar manner.

BIGLOBE Cloud Hosting is a public cloud (IaaS), with utilizations and applications in the domain classified in the manner depicted in **Fig. 1** .

First of all, a public cloud is often used for social applications, since its adoption by social vendors and online game vendors early on, due to its on-demandability and scalability,
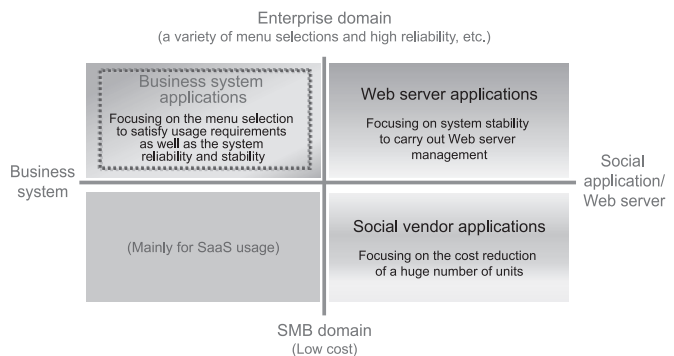

Fig. 1　Domain and classifications of public cloud.

which are characteristics of cloud. Furthermore, its use is also increasing for web server applications that utilize conventional rental servers and hosting services.

BIGLOBE Cloud Hosting is a public cloud, however it is significantly different from services provided by the competition in that the selection in the menu of available services, as well as service specifications, can be utilized in the infrastructure of business systems, with "business system applications for business corporations" cited as a slogan since the service was launched. BIGLOBE Cloud Hosting first of all operates in our corporate data center (public certifications: ISO/IEC27001, Privacy Mark and PCI DSS certifications) providing stable operations and where the know-how and the backbone of this service provider has been condensed. The reliable and proven
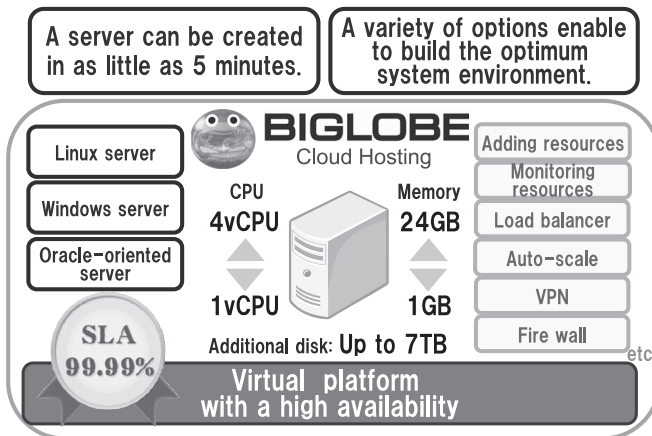
Fig. 2   Characteristics of BIGLOBE Cloud Hosting.

Fig. 3   Configuration of BIGLOBE Cloud Hosting.

VMware has been adopted as the highly available virtualiza-tion platform under the SLA (Service Level Agreement) with a server availability factor of more than 99.99%. Since this is an IaaS type service, its operation is easy. Creating a server and adding resources (CPUs, memories, disks) can be performed from a web browser in as little as five minutes, whereas the monitoring feature can be added and business opportunity los-ses reduced during peak times, with rapid responses (**Fig. 2**).

Furthermore, security services for networks, which provide private LAN for each user and logically separate each custom-er from others, are also available. Firewall, WAF, VPN (IP-Sec-VPN and SSL-VPN), dedicated lines and other necessary options, can be selected in fine detail, whereas the pricing structure features are available not only with metered rates but also with monthly charges that allow for easier expense budg-eting. There are no charges for the use of private LAN or on the amount of data transferred on networks. This service is suitable for use with business systems of corporations, with such features as those outlined above.

3. Technical Superiority of BIGLOBE

3.1 Overall Structure

(1) Virtualization

BIGLOBE Cloud Hosting provides virtual servers, addi-tional disks, firewall, etc., for users. The infrastructure sup-porting BIGLOBE Cloud Hosting is configured as depicted in **Fig. 3** .
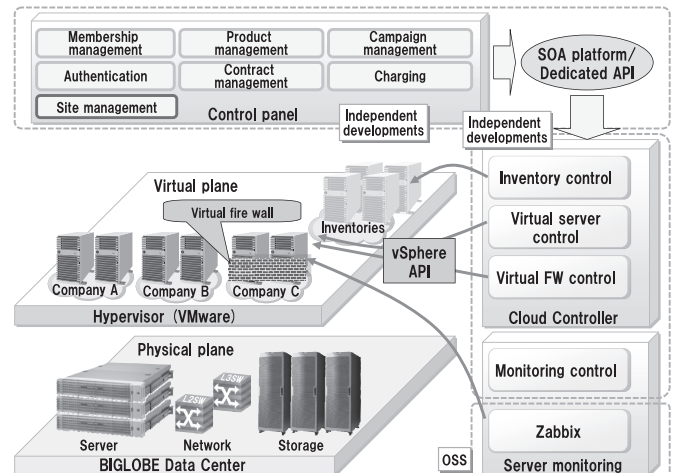
1) Server virtualization

Physical and virtual planes needed to be highly availa-ble in order to satisfy the high SLA requirements of BIGLOBE Cloud Hosting.

A highly available physical plane was achieved by cre-ating a redundancy of the physical hardware within the data center. A highly available virtual plane was ach-ieved through the adoption of VMware, which offers plenty of highly available features, such as vMotion and VMware HA. The vSphere API is used for the automat-ic control of VMware.

BIGLOBE had already been using a concentrated con-trol system (Cloud Controller), which was independent-ly developed for Xen and KVM (Kernel-based Virtual Machine) of OSS hypervisor, but a VMware control module was added to the Cloud Controller in order to achieve a centralized administration of VMware with the system. This made it possible to offer functions for con-trolling the virtual environment, such as the creation of virtual machines or turning the power on and off.

2) Networks

The "Private LAN Feature," which provides a closed network for each user, is available as an attribute that can be provided to users. The Private VLAN feature is used to utilize this attribute, with a unique Private VLAN ID set for each user. This allows for a virtual partition of large L2 segments, which can be allotted exclusively to individual users.

The Cloud Controller automatically controls the alloca-tion of VLAN IDs, as well as the VLAN settings for

virtual servers. Special network configurations, such as those involving VPN connections, however, are not supported. The development and application of SDN (Software-Defined Networking) is planned in order to enable the automatic building of such complex requirements as well.

3) Virtual firewall

Firewalls of a physical type had been used in the past, but these created problems, such as longer lead times, due to the requirement of physical construction work at the data center. The Juniper vGW (hereinafter referred to as the "vGW"), which can operate in the hypervisor layer of VMware, was adopted to enable the implementation of firewalls online.

Since the GUI screens of vGW products do not support the multi-tenant feature, a GUI for user operations was developed to enable individual users to change the settings of their firewall by themselves. This made it possible for users to change settings for purchases and the rules of their firewalls on their own and on-demand.

(2) Provisioning

BIGLOBE Cloud Hosting offers a new server creation function to provide a virtual server within five minutes of a request being made, a server duplicating function that creates an identical server as the virtual server to which the user had customized, as well as a server image function intended for the storage and distribution of the virtual server.

These features are utilized by controlling the basic functions of the server virtualization, provided by the VMware, using the Cloud Controller developed by BIGLOBE. The Cloud Controller has an inventory of servers for each OS (virtual servers created in advance, with the power turned off) so that these can be allocated to users in response to their requests, in order to provide new servers in a short time. The mechanism is such that whenever an inventory diminishes it is automatically replenished by the Cloud Controller. The Cloud Controller also improves convenience for users by providing a feature that automatically sets IP addresses and private VLANs for created virtual servers.

(3) Control panel

Since the BIGLOBE Cloud Hosting service is provided as a public cloud service for a fee, a mechanism for retail services, such as product agreements or charging, must also be set up at the same time as the provisioning described above. The Control Panel used for a whole series of processes, such as the creation of a server and changes to specifications or deletions, was developed by utilizing the architecture for internet connection services and product sales nurtured by BIGLOBE as an ISP.

1) Authentication and membership management

The ID used for logging onto the Control Panel is the membership ID of BIGLOBE. The functions of authentication platforms and membership management platforms at BIGLOBE are utilized for authentication and membership management infrastructure. For instance BIGLOBE Cloud Hosting can be made available immediately, through an online sign up process using a credit card.

Furthermore, although the Control Panel is used for certain purposes, such as the building and monitoring of servers or to verify usage fees, individual customers are expected to assign different users for each role, such as server builders, administrators and payment managers. Members are therefore grouped into units of customers through the implementation of the concept of the site by expanding the membership management infrastructure.

2) Product management and contract management

The features of products provided by BIGLOBE Cloud Hosting are as follows:

- Servers are configured with an OS type, as well as an expansion CPU and memory, which are separate products. Furthermore, the number of expandable CPUs and memory capacities vary, depending on the type of OS.
- Deleting a server also deletes monitoring and any additional disks linked to the server.
- Contract operations and contract establishment times differ. The time at which a contract is established is the point in time when a virtual server was actually successfully created.

The aforementioned is achieved by utilizing the mechanism of the "Set Sale," the "Linked Cancellation," and the "Contract Booking," which is used with assets of BIGLOBE.

3) Campaign management

The revision of charges and discount campaigns are employed in response to trends of the competition. Furthermore, the service is provided free of charge for a fixed duration and number of servers, in order to determine in advance whether or not a customer is able to use our servers. In order to realize such campaigns the Charge Master, for setting fixed term offerings, as well as mechanisms for limiting resources, such as the number of servers that can be created, are all built in at the onset of a service offering.

4) Charging

The charging method for products, such as servers, can be selected at the time they are created from two charging method options, monthly and metered (unit time rate). When a change is implemented once a server has been created, the charging method for expanded CPUs or memories also changes as they are linked to the charging method that applies to the server. Furthermore, an economical inactive mode charge can be applied by setting the server to the Inactive mode when the server is not used for a certain period of time. Four types of pricing are available for each product by combining the charging methods and the inactive mode.

The mechanism for charging has been expanded to accommodate metered charging, in addition to the frequency charging and monthly charging used with our existing sales services.

(4) Architecture

The common system platform, built and operated by the ISP business at BIGLOBE, is diverted from the Control Panel for the operation of authentication, member management, product management, contract management and charging. A large business system can be built easily by connecting the whole system with APIs, since these subsystems have been built using SOA (Service Oriented Architecture). Furthermore, subsystems, such as product management or contract management, have mechanisms for accommodating the addition of new products without any development work, thereby facilitating shorter development cycles. BIGLOBE Cloud Hosting therefore succeeded in offering a menu of services that feature not only functions equivalent to those provided by cloud systems, offered by the competition, but also incorporating unique functions in a short period of only about one year.

3.2 Agile Development Model Initiative

Even though the efficiency in development was improved by diverting the common system platform, as described above, it will be necessary to enhance the speed at which the entire offerings are implemented, from planning to the releasing of services. Since the current development is carried out according to the waterfall development model, some issues must be resolved urgently, such as the inability to develop or evaluate until the requirements have been fixed to a certain degree. The implementation of the agile development method (Scrum), which encompasses the planning department to the development department, is therefore being considered as a future

initiative, in pursuit of further shortening the development cycles (once a month).

3.3 Comparison with OSS Cloud Platforms

"CloudStack," "OpenStack" and "Eucalyptus," representative cloud platform software provided with open source, now have an increased number of functions and their operations are starting to become more stable, however, they have not been used in part because they lacked available functions and they were unstable to operate. The Cloud Controller and Control Panel, as well as independently developed server monitoring features operated by BIGLOBE, have all been diverted for independent developments. The Control Panel in particular, underwent function development that fully utilized the know-how of our ISP business and as a result it is significantly different from the OSS cloud, which is lacking in too many functions to be offered in a service business. Since expansion, which takes into consideration links among cloud systems, such as multi-hypervisor or intercloud, will be needed in the future, implementation and linkages of the OSS cloud platform will likely be moved forward.

4. Future Initiatives and Conclusion

BIGLOBE Cloud Hosting, introduced thus far, will be enhanced to become a public cloud service of a genuine Japanese IaaS type, which is undefeatable by the competition, through enhancements to the service linking menu that utilizes the strengths of BIGLOBE, such as access lines and mobile lines, as well as MVNO (Mobile Virtual Network Operator), while accelerating the incorporation of the OSS cloud platform and SDN, the implementation of which has started at BIGLOBE, will gain an advantage over the competition.

*CloudStack and Xen are registered trademarks or trademarks of Citrix Systems, Inc.

*Eucalyptus is a registered trademark or trademark of Eucalyptus Systems, Inc.

*Juniper is a registered trademark or trademark of Juniper Networks, Inc.

*Linux is a registered trademark or trademark of Linus Torvalds in Japan and other countries.

*OpenStack is a registered trademark or trademark of OpenStack Foundation.

*Oracle is a registered trademark of Oracle Corporation and/or its affiliates.

*VMware, VMware vSphere and vMotion are registered trademarks or trademarks of VMware, Inc. in the U.S. and other countries.

*Windows is a registered trademark of Microsoft Corporation in the U.S. and other countries.

*Zabbix is a registered trademark of Zabbix SIA.

"BIGLOBE Cloud Hosting" Supports Building of High Quality Services

Authors' Profiles

SHIBANO Sumiko
Assistant Manager
Net Services Division
NEC BIGLOBE, Ltd.

TANAKA Eiko
Assistant Manager
Net Services Division
NEC BIGLOBE, Ltd.

MATSUMOTO Koujirou
Assistant Manager
Services Application Systems
NEC BIGLOBE, Ltd.

KAWASAKI Hiroshi
Manager
Services Application Systems
NEC BIGLOBE, Ltd.

OISHI Tougo
Manager
Platform Systems Division
NEC BIGLOBE, Ltd.

MATSUE Satoshi
Manager
3rd Software Division
NEC System Technologies, Ltd.

Information about the NEC Technical Journal

Thank you for reading the paper.
If you are interested in the NEC Technical Journal, you can also read other papers on our website.

Link to NEC Technical Journal website

Japanese	English

Vol.7 No.3 Smart Device Solutions

Remarks for Special Issue on Smart Device Solutions

NEC Group Paves the Way for Smart Devices

◇ Papers for Special Issue

Service platforms

Smart Device Management/Security Solutions Regardless of OS or Carrier

Solutions Supporting the Utilization of Smart Devices: System Introduction Case Studies

Authentication Solution Optimized for Smart Devices

"Smart Mobile Cloud" Contributing to the Use of Smart Devices

"BIGLOBE Cloud Hosting" Supports Building of High Quality Services

"Contents Director," Content Distribution Service for Smart Devices

UNIVERGE Mobile Portal Service: A Smart Device Utilization Platform Optimized for BYOD

Remote Desktop Software that Supports Usability of Smart Devices

SystemDirector Enterprise - A Business System Construction Platform to Facilitate Development of Applications Compatible with Smart Devices

Smart Device Content Distribution Platform Service Using the BIGLOBE Hosting

Smart devices

Overview of "LifeTouch" Series Android Tablets

VersaPro Type VZ - A Windows 8-based, Large-screen Tablet PC

Development of an Android-based Tablet(Panel Computer series)

Solutions

ConforMeeting: A Real-time Conference System Compatible with Smart Devices for Conducting Paperless Meetings

BusinessView Maintenance Work Solutions Utilizing Smartphones

Application of the UNIVERGE Remote Consultation Solution to Elderly Care

Introduction of the GAZIRU Image Recognition Service

Tablet Concierge- An Ultimate Customer Service Solution -

Development of a Business Systems Template for Use with Smart Devices

Introduction of Video Communications Cloud Services Compatible with Multiple Devices

Technical researches

Towards a User-Friendly Security-Enhancing BYOD Solution

Implementing Secure Communications for Business-Use Smart Devices by Applying OpenFlow

Human-Computer Interaction Technology Using Image Projection and Gesture-Based Input

Noise Robust Voice UI Technology and Its Applications

◇ General Papers

Efforts to Solve the Congestion Problems of Mobile Communications Services during Major Natural Disasters

NEC Technical Journal

Smart device Solutions

NEC Group Paves the Way for Smart Devices
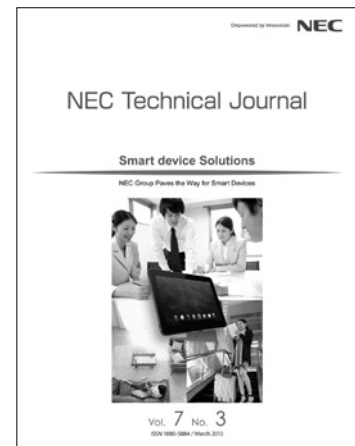
Vol. 7 No. 3

Vol.7 No.3

March, 2013

Special Issue TOP