A Hybrid Server Hosting Which Have Broader Range of Applications

YAMAMOTO Daisuke, TANAKA Motoki, FUJIKAWA Yoshikazu, MASUMOTO Shigeo, WATANABE Shou

Abstract

The NEC Cloud IaaS systematizes hybrid type server hosting in order to deal flexibly with the needs of the SIers (system integrators) who are providing cloud-based services. The NEC Cloud IaaS provides virtual server services with high cost efficiency (STD) and with high performance and reliability (HA) as well as physical server hosting, all of which can be linked in the same NW segment with the colocation service. This paper is intended to introduce the features of these server services.

Keywords

OpenStack, bare metal, iStorage, ECO CENTER, vDC Automation, cloud, IaaS, VMware

1. Introduction

As the dissemination of the term "cloud first" indicates, the cloud system has now become a popular option. However, the cloud system is actually expected to meet various needs, including the optimization of cost, the ability to deal flexibly with changes in demand and emphasis on reliability.

To deal flexibly with the needs of SIers, the NEC Cloud IaaS provides two kinds of "virtual server services"; these are the Standard (STD) service and the High Availability (HA) service. In addition, the physical server hosting are provided to deal with business needs that cannot be met with the virtual server service alone. All of these server services can be linked on the same NW segment with the colocation service.

2. Standard (STD) Service

2.1 Configuration of the Standard (STD) Service

At NEC, we have accumulated technologies to employ OpenStack for the practical market in advance of any of the other Japanese cloud vendors, and we have been first in the market to commercialize the OpenStack-based cloud platform service. The STD service fully employs OSS (Open Source Software) such as OpenStack, etc. To ensure practical availability and performance, the STD service is provided as a system by being combined with our hardware products of proven stable quality and excellent performance. Their technological advancement can also be seen in the significant sizing capability that can withstand large-scale configurations, in which tens of thousands of virtual servers are employed. This technology was implemented in cooperation with Canonical Ltd. and the STD service consists of three parts (**Fig. 1**).

Both the execution system and the control system adopt OpenStack. The execution system provides the computing resources, which are controlled by the control system. Consequently, the backup and log management software for administrating and maintaining them adopt the OSS.

The storage system is organized by combining the Ceph, which is the distributed storage of the OSS, and the iStorage series. In order to use the iStorage with Cinder which is the block storage management component of the OpenStack, a dedicated iStorage driver has recently been developed. This driver is presently planned to contribute to the OpenStack community and will be marketed as a service pack that supports all of the functions provided by Cinder.

2.2 Follow-up to the OpenStack Advancement

The OpenStack version is upgraded every half year to cope with modifications for troubles and enhancement of functionalities, therefore, it is important to select the appropriate version to be employed.

The quick correspondence to the functionality enhancement is one of the advantages of OpenStack. However, this also means that versions become obsolete quickly. To provide stable services continually, it is necessary to adopt the latest version by evaluating and verifying it promptly.

The STD service adopts this advancement. It was built with the Grizzy version when it started the official service in April 2014, and the one released in February 2015 adopted the Icehouse version.

The OSS lacks the maintenance support such as is provided for general software products. Therefore, if a trouble occurs, the user (business use) is required to identify the cause by analyzing the trouble situation and source codes and take on the responsibility for the repair, evaluation and implementation.

The support system organized within the NEC Group's activities to deal with the OpenStack community and the LTS (Long Term Support) service provided by Canonical Ltd. are employed in order to provide stability for the STD service and to establish effective administration and maintenance systems.

These support systems are also used to modify the OSS in use even during STD service provision. We believe that feeding the modifications back to the community is an important function of the STD service.

2.3 Challenging the New Technologies

The STD service is progressively introducing innovative technologies. One of these is the SDN (Software-Defined Networking). Specifically, this technology employs the Open vSwitch which is an OpenFlow switch, develops an OpenStack plug-in for linkage with the SDN platform and uses the VXLAN in place of the previous VLAN. It improves the SDN service to provide flexible, large-scale cloud services.

Another technology is the provision of a physical server (bare metal) service. This can implement convenience that enables construction, deletion and power control of servers via portals, which are generally available with the virtual servers. It also achieves high performance and robust security due to the private use of physical servers.

In implementing this service, we have decided to provide it as a bare metal service dedicated to each customer by developing a new portal based on the MAAS (Metal as a Service) of Canonical, Ltd. MAAS is a bare metal provisioning software that is superior to other services in terms of securing a commercially viable service quality.

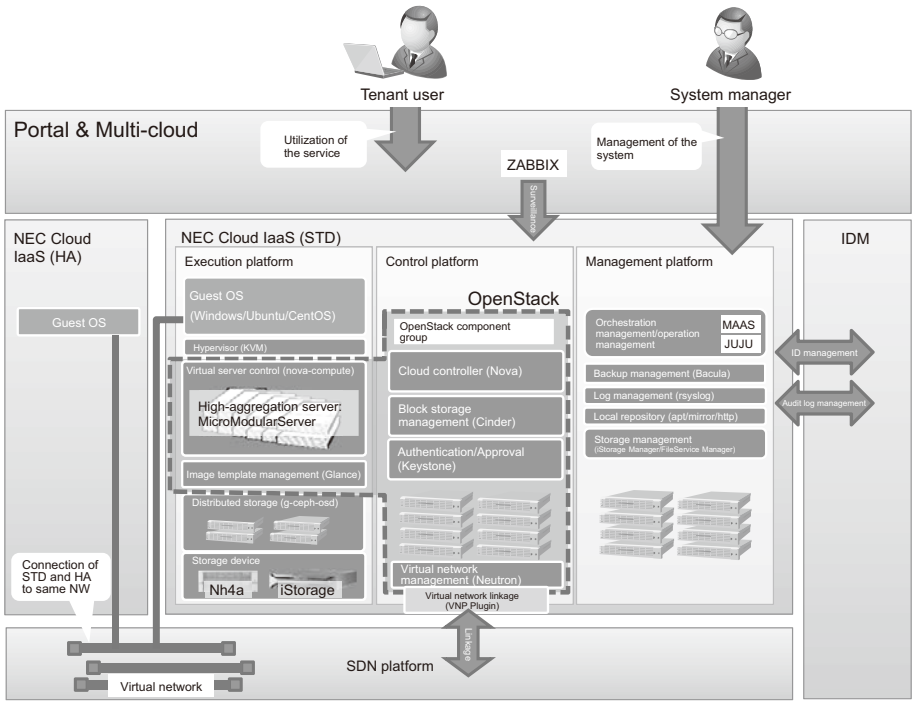

Fig. 1 Overall configuration of the STD service

3. High Availability (HA) Service

3.1 Configuration of the High Availability (HA) service

The major components of the HA service adopt NEC products by prioritizing high performance, availability and stability.

(1) An execution server with high cost efficiency
The execution server is the Express 5800/ECO CENTER featuring large-scale integration, low power consumption and stable cloud platform operation. Four of 2-socket Xeon servers are accommodated in a 2U space.

(2) SAN storage employs the highest model
The data storage using SAN employs the iStorage M5000 that has been developed for mainframes and subsequently extended for open purpose. iStorage M5000 features a 12 times higher I/O performance than the M300 that was adopted by previous cloud services and also a significant increase in the number of mountable disks. Thus, it enables more freedom in server/storage combinations and configuration according to needs. The 4-controller configuration also makes it possible to avoid degradation of the write performance in the case of a controller fault.

(3) HW configuration for flexible, fast and stable services
The NAS service is implemented by employing the iStorage Nh for the NAS head and the iStorage M5000 for the storage system (**Fig. 2**). iStorage M5000 can be used as a unified storage. VMware vShare that has been approved with the RIACUBE-V is employed for the hypervisor software. The NetApp FAS storage system, which features a high linking performance with the VMware and is capable of high-speed provisioning, is used for the system domain of virtual servers.

(4) SW configuration automating server provisioning
The HA service assumes that there will be 20 applications for up to 20,000 virtual servers per day, Therefore, it employs NEC's MasterScope Virtual DetaCenter Automation as the virtualized management platform software for auto VM (Virtual Machine) creation and functionality execution via the portal operation (**Fig. 3**).
The linkage with the portal makes it possible that the control API can be executed to the vDC Automation via the independently-developed automation layer.

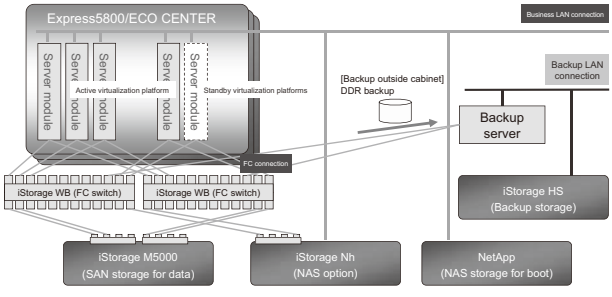

Fig. 2 Diagram of the HW configuration of an HA service execution platform.

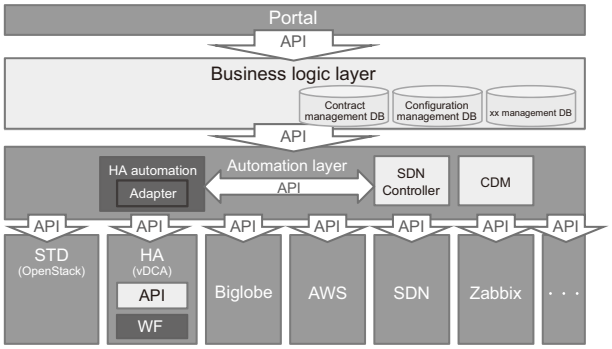

Fig. 3 Diagram of the implementation of an auto-provisioning service.

3.2 Implementation of Availability and Extendibility

(1) Availability configuration achieves a utilization ratio of 99.9%
The HA service specifies an utilization ratio of 99.9% per virtual server in the SLA (Service Level Agreement) regarding the stoppage of service in case of a fault, and adopts a redundancy configuration of hardware/software combinations to achieve this SLA.
The execution server provides redundancy of hardware components and network passes for each cabinet in order to eliminate the SPOF (Single Point of Failure), and employs the VMware HA cluster function. Therefore, even in the case of a fault with an individual cabinet, the availability is maintained by the auto fail-over of the virtual servers. The virtualized platform management server employs NEC's Express Server and CLUSTERPRO to achieve the administration with uninterrupted operation.

(2) Extension without affecting existing services
When any of resources of a cloud service is extended to meet the demands of a user, the extension should not affect users of existing services. The HA service employs NEC's hardware/software to enable online extension of server and storage resources.

4. Various Server Services Supplementing Virtual Servers

The business systems requirements of customers vary widely. Even if the virtual server service alone is not enough to meet the requirements, NEC Cloud IaaS links the Physical server hosting and colocation service to create a mechanism of implementing customer-specific business systems on cloud computing. This system does not need to run the cloud and specific systems at two locations so that the network management costs can be reduced.

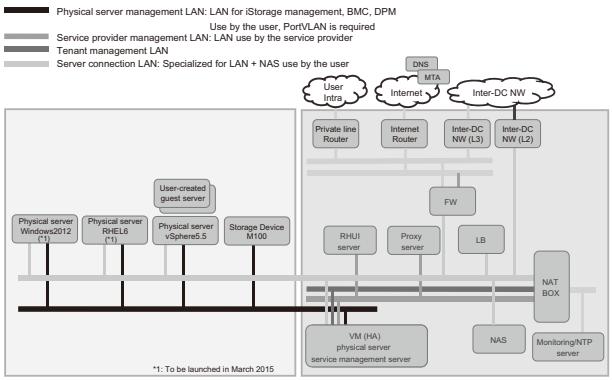

Fig. 4 Diagram of a physical server network configuration.

(1) Physical server hosting

The physical server hosting provides the customer-dedicated IA servers and storage device (**Fig. 4**). The user can organize the storage freely by selecting the disk type (SSD/SAS/NL SAS) and RAID configuration.

This service can deal with requirements for (1) the high-performance functions (CPU, large-capacity memory, high-speed disk) for DB and BI servers that cannot be handled with the virtual server service, (2) owning servers and hard disks physically from the viewpoint of security and (3) use software that are not compatible with virtual servers.

In addition, this service can utilize all of the network services provided by NEC Cloud IaaS for the virtual server service. Consequently, it is possible to implement a system combining the virtual and physical server hosting in the same segment and can create a system that can deal flexibly with the system requirements of the user's system environment.

(2) Colocation service

The colocation service allows users to use their arbitrary appliances and existing hardware assets in the data center. Users install their equipment in the data center so that they can operate them in the same network segment as the server service.

This service makes it possible to build the whole system of the user as a cloud system and to therefore eliminate the waste of possessing equipment at multiple locations.

5. Plans for a Future Service Extension

For the future, we are planning to improve performance and expand the range of the NEC Cloud IaaS by adopting new hardware for both the STD and HA services. We also plan to provide a remote console function and performance-guaranteed storage so that our IaaS services can further improve convenience and performance.

In addition, we intend to open a new region in the Kansai District, Japan, in 2016. This will not only widen access to the system to cover the users in the Kansai District but will also make it possible to build a system based on mutual linkage between the Kanto and Kansai Districts. The system will thus be established as a cloud platform that can continue to operate even in the case of a large disaster.

6. Conclusion

In the above, we describe features of the NEC Cloud IaaS server hosting, including the Standard (STD) and High Availability (HA) services. In the future, too, we intend to continue provision of IaaS services that can satisfy customer needs by enhancing the services in a timely manner and according to changes in needs and market trends.

Authors' Profiles

YAMAMOTO Daisuke
Assistant Manager
Cloud Platform Service Department
Platform Services Division

TANAKA Motoki
Assistant Manager
Cloud Platform Service Department
Platform Services Division

FUJIKAWA Yoshikazu
Assistant Manager
Cloud Platform Service Department
Platform Services Division

MASUMOTO Shigeo
Senior Expert
Platform Services Division

WATANABE Shou
Executive Specialist
Platform Services Division

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.9 No.2 Special Issue on Future Cloud Platforms for ICT Systems

Vol.9 No.2
June, 2015

Special Issue TOP

NEC Information