Yahoo Japan Deploys an OpenStack-based Private Cloud for Service Developers with Brocade

Yahoo Japan Corporation (Yahoo) is an information technology provider that operates Japan’s largest portal site, Yahoo! Japan. Yahoo! Japan offers a variety of online services including a search engine, auctions, news, weather reports, sports news, e-mail, and shopping.

Yahoo had already built a private cloud environment that enabled them to deliver services including compute, storage, and networks in the early days of its network-building history. But it was configured to heavily depend on hardware and Yahoo began facing challenges that included limited flexibility, inefficient resource utilization, and poor price-performance.

To address these issues, Yahoo planned to eliminate hardware dependence by abstracting the hardware, including compute, storage, and networks, in order to maintain the optimal data center hardware life cycle. In order to abstract the hardware, Yahoo decided to deploy a cloud infrastructure using OpenStack software, as it is becoming increasingly prominent and driving robust innovation with its open-source characteristics.

EXECUTIVE SUMMARY

Challenge
Build a system infrastructure that eliminates hardware dependence and increases resource flexibility and efficiency without performance degradation

Solution
- Brocade VDX 8770 Switch
- Brocade VDX 6740 Switch
- Brocade ADX Application Delivery Switch
- Brocade MLXe Router

Results
- Ensured high communication performance and stability while maintaining simplicity by adopting Brocade products for networking equipment for the OpenStack-based infrastructure
- Delivered advanced virtual network services such as LBaaS and FWaaS without degrading network performance by leveraging Neutron plug-ins that directly control Brocade products

Figure 1. Test Results 50VM
OpenStack is rapidly gaining adoption, doubling every six months and giving us peace of mind because it is actively deployed by various enterprises and organizations. It is also highly open and abundant and the strong development team is helping to make it a networking standard. We saw more and more hardware supporting OpenStack in the market and concluded that OpenStack was the quickest way to abstract hardware,” said Norifumi Matsuya, Executive Vice President, Cloud Infrastructure Engineering Division, YJ America.

Engaged in designing a cloud infrastructure based on OpenStack, Yahoo began searching for a vendor that would be able to co-create the infrastructure with them. Yahoo chose Brocade for its proven track record as a key solution component of its large-scale Apache Hadoop-based infrastructure, as well as its corporate-wide commitment to open technologies. In Yahoo’s OpenStack-based infrastructure, Brocade® MLXe® Routers for core switches underpin a higher layer of the data center network and Brocade VDX® Switches are deployed at the aggregation layer to converge racks and Top-of-Rack (ToR) switches.

“The Brocade OpenStack Plug-in, for the Brocade VDX product family, was co-developed by Yahoo and Brocade to deliver virtual network services and FWaaS without sacrificing performance. Yahoo determined that it was able to achieve throughput that was eight times faster with half the latency, compared to software-based GRE (Generic Routing Encapsulation) tunneling.

Brocade VCS® Fabric technology underpins the deployment with several enhancements to the OpenStack plug-in, providing significant fabric advantages. These include Firewall-as-a-Service (FWaaS), Switch Virtual Interface (SVI), VRRP Support, and logic-based resiliency improvements during cluster formation. Additionally, the deployment took full advantage of VCS Fabric technology by deploying it as a single fabric with the Brocade VDX 8770 used in the aggregation layer for significant scalability.

“In the world of OpenStack, it is common to abstract Layer 2 network services with a software-based tunneling model. If it’s fully software-based, however, network performance would greatly deteriorate and monitoring and troubleshooting become complicated due to an increased amount of layers that need to be managed. If we can directly control the Brocade VDX Switch’s virtual network capability with the integrated multitenancy support delivered with Brocade VCS Virtual Fabrics, we can gain enhanced flexibility brought by software-based control, while obtaining the network performance equivalent to hardware-based models,” said Takuya Ito, Senior Manager, Site Operations Division, Yahoo Japan Corporation.
DELIVERING LBAAS WITH AN OPENSTACK PLUG-IN

Yahoo also deployed the Brocade ADX® Application Delivery Switch load balancer to manage and load balance virtual servers running on the OpenStack-based infrastructure. The Brocade ADX Switch was installed to directly connect with the Brocade MLXe. Yahoo uses the Brocade ADX Switch for load-balancing, but it required manual operations that burdened network administrators. Therefore, when building the OpenStack-based infrastructure, the company sought to operate with LBaaS, which is free from performance degradation because of the load-balancing capability abstracted with the Brocade Neutron plug-in.

“Since we operate many and diverse services, we have over 100 requests a day for changing the configuration of the load balancer and firewall used for each service. Considering that our system will expand further with the OpenStack-based infrastructure, we will not be able to handle the tasks manually any longer. That’s why we sought to eliminate performance degradation by implementing LBaaS. When the Neutron plug-in that can control the Brocade ADX Switch became available, we worked together with Brocade to develop the plug-in from scratch,” said Rui Takagi, Infrastructure Engineer, Site Operations Division, Yahoo Japan Corporation.

Yahoo started collaborating with Brocade in the spring of 2013, co-developing plug-ins together with the Brocade development team. The two companies released functions one after another, developing plug-ins for LBaaS and FWaaS over a year and a half.

SIMPLIFYING NETWORK OPERATIONS WITH THE OPENSTACK-BASED INFRASTRUCTURE

Yahoo will continue to expand the OpenStack-based infrastructure by adding an average of 5,000 virtual servers a month. Additionally, the company is expected to scale to provide 100,000 virtual servers in 2015, anticipating significantly simplified network operations, through the use of virtual network services with Brocade products, LBaaS, and FWaaS.

WHY BROCADE

“Our own business need triggered the co-development of the plug-ins for the Brocade VDX Switch and Brocade ADX Switch, which will be distributed to other users by Brocade. The world of open-source should be created, used, and advanced by everyone. Brocade shared this vision with us and supported the development of the plug-ins. We are deploying our business under a mission of ‘Creating excitement with global standards.’ This project was a good example of that, through jointly creating an infrastructure with Brocade by using a global standard, OpenStack.”

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For more information, visit www.brocade.com.

Figure 2. Yahoo! JAPAN’s OpenStack Private Cloud System.