Keio University Selects Nutanix as Optimal Virtualization Platform

慶應義塾
Keio University

Leading-Edge Enterprise Cloud OS Supports Multiple Platforms for Educational Research and Healthcare

CHALLENGE

Keio University has separate divisions that manage, operate, and support the information technology platforms for each campus and the university hospital. This service is managed by the Information Technology Center (ITC) for the educational divisions as a whole, and by the Hospital Information System Division for the hospital. In addition, ITC Headquarters operates and manages the overarching campus system used by the entire Keio network, while campus ITCs handle the system for each campus.

The issue faced by each campus ITC was in the operation and management of virtual environments run by the education and research systems. Susumu Nakamura, who previously worked for Shiba-Kyoritsu ITC and now is the Administration Manager of Hiyoshi ITC, said, "When I worked at Shiba-Kyoritsu ITC, we migrated from a physical server environment installed for each system, to a virtual environment that used shared storage. However as time went on, we experienced disk failures, leading to a lack of consistency between the RAID controller and firmware. This resulted in the need to replace disk after disk, and situations when we had no choice but to shut down the virtualization platform. Because the time for equipment replacement was approaching, we began searching for a framework with higher fault tolerance."

Although it took place at a different time, Takashi Yamagata of Shonan Fujisawa ITC, says his team deliberated on a new virtualization platform when they upgraded the VPS (virtual private server) environment. That upgrade provided a virtual server for graduate school students, run with a physical server. "In the past, the virtualization platform on campus had VMware vSphere ESXi hypervisor installed for each physical server, directly connected and managed with VMware vCenter. So we migrated to a blade server from a situation of management complexity. We also considered using cloud platform software that could be efficiently managed," said Yamagata. On the occasion of the new VPS environment upgrade, they would again deliberate on an optimal virtualization platform.

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> – Yasuo Miyamoto, Keio Information Technology Center

ITC Headquarters also considered replacing the virtualization platform run by a 3-tier configuration system for the entire Keio network that had been redundantly deployed on multiple campuses. "We were looking for an easily scalable platform that didn't require a shutdown during replacement," said Yasuo Miyamoto of ITC Headquarters. Akira Onuki, Director of the Hospital Information System Division at Keio University Hospital, added, "We had been operating the hospital's system on a virtual environment run on a blade server, but there were limitations regarding scaling and with the SAN itself, so we began considering a new platform." While the issues faced were different, the search was on for a new framework that would simplify operation and management of the virtualization infrastructure.

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INSTITUTION SPECIFICS

Keio University is a private university located in Minato-ku, Tokyo, Japan. As the oldest institute of modern higher education in the country, it serves students ranging from elementary school to university and graduate school, and also includes a university hospital.

INDUSTRY

Education

BUSINESS NEED

- Deploy a high fault tolerance framework
- Move to a simple platform that can be operated with limited human resources
- Eliminate difficult-to-manage blade server configuration
- Obtain framework that reduces costs
- Deploy a solution where system replacement can be done without shutting down systems
- Migrate to a platform that can be easily scaled up

SOLUTION

- Nutanix Enterprise Cloud
  - Acropolis, including AHV virtualization
  - Prism management
- Nutanix NX series appliances Dell EMC XC Series (OEM running Nutanix Enterprise Cloud OS)Lenovo Think Agile HX Series (OEM running Nutanix Enterprise Cloud OS)

SOLUTION

The first division to install Nutanix was the Shiba-Kyoritsu Campus. This came about after Nakamura learned of Nutanix Enterprise Cloud at a seminar. "Shiba-Kyoritsu ITC has been more conservative in its selections to date, but we wanted to move away from our high-risk shared storage operation. We also have limited human resources, so we wanted a framework that could simplify operations," said Nakamura. Even though they felt somewhat uneasy about migrating to a leading-edge framework, the fact that Shonan Fujisawa ITC, which was more proactive in selecting new architecture, had started to consider Nutanix.

During this same time period, the Shonan Fujisawa Campus was also planning a platform upgrade. "If VMware is used for the hypervisor, it is inevitable that the licensing costs will be large. As we were considering ease of operation and scalability, Nutanix Enterprise Cloud emerged as an option. This is when we focused on the Nutanix AHV virtualization solution that is included with the platform at no additional license cost," said Yamagata.

The virtual environment running services for the entire Keio University at ITC Headquarters was distributed on multiple campuses, using a 3-tier configuration with shared storage at each site. Miyamoto said, "Although it was possible to migrate data between campuses without stopping services, we wanted to build an environment that allowed flexible migration without shutting down the system, even when replacing or future scaling out. As a result, Nutanix Enterprise Cloud was the most suitable solution for the environment."

An operations review was performed in each department of Keio University Hospital in 2017. In addition, because a new hospital building was being opened in 2018, increases in new equipment and system deployments were expected. Onuki explained why they decided to move away from a blade server environment that presented scaling issues and seek a new, flexibly scalable environment. "When we heard about Nutanix from ITC Headquarters, we were very impressed by its support for deduplication, even on ordinary disks, and also its greater compression efficiency. After considering factors such as high scalability and space efficiency, we concluded that the benefits we could obtain from Nutanix Enterprise Cloud were significant," said Onuki.

After deliberating on a virtualization platform that would fulfill the requirements of the different campuses and the university hospital, the decision was made to select Nutanix Enterprise Cloud as the virtualization infrastructure for each system.

RESULTS

All of Keio University's critical applications now run on the virtualization platform at each location, using Nutanix Enterprise Cloud software on Nutanix NX, Dell EMC XC, and Lenovo HX appliances. Using multiple platforms is made easier since the Nutanix software provides the same management experience, regardless of chosen hardware platform.

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BENEFITS

- Simplified operation, eliminating concerns about stable operation of virtualization platform

- Improved system response, doubling internal processing speed

- Eliminated the need to shut down services during version upgrades

- Obtained Nutanix AHV hypervisor with no licensing fees

- Cut rack space in half

Keio University is also using Nutanix for various workloads at its Shiba-Kyoritsu and Shonan Fujisawa campuses. "Deploying Nutanix using hardware suited for smaller remote office or branch office workloads was ideal for our needs as a server that could be set up very quickly without any effort. It operates very stably and is as 'noticeable as air'," said Yamagata approvingly.

At ITC Headquarters, many of the systems provided to the entire Keio network that were installed at multiple campuses—including its web system, verification platform, and LMS (Learning Management System) framework that supports learning and is directly tied to instruction—are now running on Nutanix. Keio University Hospital's operational management systems, including its medical equipment management, health examination, nurse call, and transfusion management systems, will be running on the Lenovo ThinkAgile HX Series cluster, also powered by Nutanix software. Additional nodes have been installed for PACS (Picture Archiving and Communication Systems), and migration is currently in progress for that application.

As for the effect of upgrading to the new environment, Miyamoto says that system response speed has become noticeably faster. "Even with the interface alone, improvement in response is evident at a level users can experience. Hundreds of thousands of people are using services that are running on the platform for all campuses, and compared to before, most of the processing inside the system can be handled in less than half the time. Snapshots can also be acquired instantly, and this has led to considerable work efficiency." The migration to Nutanix has also enabled fast deployment of virtual machines, which they appreciate. In addition, they are hopeful that future version upgrades can be conducted without shutting down services, and that there will be improved efficiency on use of the management tools. "The ideal situation is for 'nothing to happen' in a good sense, and Nutanix has certainly built that environment for us," said Miyamoto.

Nakamura has now been transferred to the Hiyoshi ITC group. Even though he is no longer involved in operation of the Shiba-Kyoritsu Campus, he said, "I have heard from people there that the system is operating stably. This is ongoing evidence of a very stable product."

Yamagata, who installed AHV on the VPS environment for graduate students, says that the user interface is at a level equal to VMware's ESXi hypervisor. "Operating OpenNebula and OpenStack are a handful, but as someone who has done it, I think AHV operates almost no differently than ESXi, and the Nutanix management tool Prism operates with the same feeling as vCenter, so it is a big help. The virtualization infrastructure portion has become something that operates with almost no special attention required." On the Shonan Fujisawa Campus, there are virtualized platforms from multiple vendors in addition to Nutanix, but Yamagata says that Nutanix can be commended on many aspects, including a lower failure rate compared to systems from other companies and for its service support.

Onuki said, "Until recently, it was common in the medical industry to procure hardware, while being somewhat dependent on in-house operation applications

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due to the restrictions of the law. However, because of changes in the law and other reasons, it is now possible to run operation applications on flexible enterprise clouds, such as the one from Nutanix. There are more options compared to before, and it is becoming possible to procure hardware at optimal costs." As for space efficiency with Nutanix, he added, "We cannot easily increase physical space, so we appreciate that Nutanix enables us to improve space efficiency. We were able to construct the system using less than half of the space needed for our previous infrastructure."

NEXT STEPS

Moving forward, Keio University's campuses and hospital want to continue expansion of their flexible virtualization solutions, while accelerating movement towards an integrated platform. ITC Headquarters has already begun discussing the integration of the operations platforms, and the plan is to have the current system running about 200 virtual machines, eventually expanded to about 500 VMs. As for the Hiyoshi Campus, they are considering migrating the current virtual environments with multiple small-scale shared storage systems to Nutanix, sequentially transitioning them at the timing of lease expiration, and ultimately integrating them all together.

"Although the Hiyoshi Campus is large, it has a limited number of operational staff. Recently, resources have become needed for network operation, including our wireless LAN, so we want to make our server platform operation as simple as possible. In addition, we want to integrate the framework operating on physical servers with a virtualization platform," said Nakamura.
On the Shonan Fujisawa Campus, the subject of desktop virtualization has been discussed, and a migration project currently in progress at the university hospital continues. As a result, expectations will be placed on Nutanix for several other big projects, such as upgrading the electronic charting system in a few years, according to Nakamura.

Moving forward, Miyamoto is looking forward to the network virtualization features integrated with AHV, as well as public cloud integration using the Nutanix Calm application orchestration tool. "Service continuity will be increased by using Nutanix Calm to manage applications running on-premise and in public cloud environments. We want to create a framework that will automatically scale and adjust resources if infrastructure resources are lacking," said Miyamoto. Given that Keio University has a rich network that connects its campuses, Miyamoto says candidly that it would be fun to create a configuration that spans the campuses with Nutanix scaled out across all locations.

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