Cisco Unified Computing Systems Case Study

Nagano Chuo Hospital

Renewal of Server Environment with the Upgrade of the Electronic Medical Chart System Forming the Basis of Medical Safety and Business Improvement

Creation of “Non-stop Infrastructure” in Hospitals Using Cisco UCS and a Virtualized Environment

Installation Solution

Cisco UCS C-Series Rack-Mount Server (Cisco UCS C220 M3)
Cisco Nexus 5548 Data Center Switch
Cisco Catalyst 3750-X Series Switch
Cisco Catalyst 2960-S Series Switch

Issues and cases for review prior to installation

- Upgrading the electronic medical chart system as the platform for supporting the provision of safer medicine required high processing performance using a server environment.
- In the course of making improvements to operations in the hospital, it was necessary to upgrade the system.
- Running the electronic medical chart system in a virtualized environment was a prerequisite, and consideration was given to connectivity and compatibility with networks, storage and servers.

Benefits of Installation

- Performance has been increased more than in the past using Cisco UCS C Series rack-mounted servers, enabling the new electronic medical chart system to be used with almost the same operational feeling as before.
- By building the electronic medical chart system in a virtualized environment it was possible to improve reliability of the hospital’s infrastructure at the same time as providing a promising configuration in terms of scalability and limiting costs.

Nagano Chuo Hospital, which plays a key role in regional medicine as a medical institution with a high level of specialization, upgraded its electronic medical chart system to provide safer medical services and improve operations in the hospital. The hospital determined that a server environment meeting the high required specifications was required, and adopted the Cisco Unified Computing System (Cisco UCS) equipped with Intel® Xeon® processors. Running the electronic medical chart system in a virtual environment provides reliability as hospital infrastructure and a platform that takes the future into consideration.

Details of installation

▪ Higher performance servers were required due to the electronic medical chart system being upgraded

Nagano Chuo Hospital located in central Nagano-shi, Nagano is a highly specialized medical institution aimed at equally providing medical services to patients who visit, while at the same time operating as a regional medical center functioning as a primary care provider. The buildings and facilities have been actively expanded as a measure to provide better medical services, and the construction on the 9th expansion was completed in 2013. In this process, IT infrastructure was also upgraded such as utilizing Cisco products in the overhaul of the hospital’s network.

When upgrading the electronic medical chart system (software), the hospital determined that it would be necessary to raise the performance of the server environment serving as the infrastructure. As a result of considering the available options from the perspectives of performance, networking and cost, the Cisco Unified Computing System (Cisco UCS) equipped with Intel® Xeon® processors was adopted, and operation began in December 2013.

Deputy Director of Administration, Kenichi Isono said the following concerning the upgrade of the electronic medical chart system that led to the implementation of Cisco UCS.

“A decade had passed since we installed the previous system, and reasons include the fact that there were many shortcomings and insufficient areas in terms of medical safety. One example is patient authentication (to prevent mix-ups and administration errors). It had also become difficult for the system to cope with improving the efficiency of operations in the hospital. It was clearly affecting the workplace, so we felt that we should heighten awareness in improving operations by renewing the system, and also work to establish an environment with an eye to the future.”

When overhauling the system, emphasis was placed on performance. Akira Nakanishi, who was responsible for the hospital’s systems said the following while mentioning the reason for considering Cisco UCS.

“We had decided to run the new electronic medical chart system in a virtualized environment, so the first thing we needed to consider was performance. Furthermore, increasing the functionality of the software and

Nagano Chuo Hospital
Deputy Director of Administration
Kenichi Isono

Nagano Chuo Hospital
Systems Manager
Akira Nakanishi

being able to do what you want to do has an impact on performance. To do this, it was necessary to increase the performance of the server itself in order to maintain the same operational feeling as before in the new system.
Networking and storage have a greater degree of importance in the creation of a system architecture assuming the use of a virtualized environment. When we began to think that it would be better to proceed with different server selection than in the past, Cisco UCS was recommended to use as a new proposal by the systems integrator who handles the hospital's network, etc. This led to the commencement of full consideration of the solution."

Installation process

- **It was determined that Cisco UCS was suitable for creating a system assuming the use of a virtualized environment**

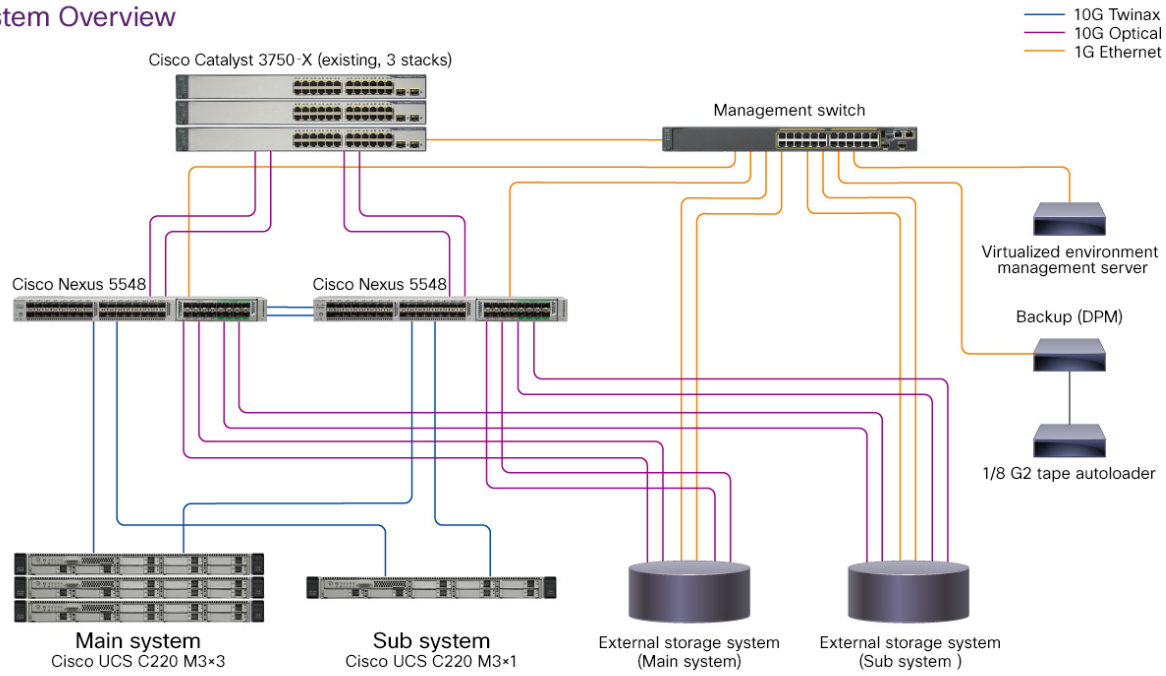
Information on Cisco UCS had begun to be collected after hearing about it through systems integrators from the time of its release. Nakanishi says that the greatest reasons for selecting Cisco UCS were not only the steadily increasing track record and performance, but also the presence of Cisco Nexus switches.
"In a conventional server environment, there was a general awareness that storage is connected to servers, but this is significantly different in an environment using Cisco UCS and Cisco Nexus switches. Due to the high level of importance of storage in maintaining performance in a virtualized environment, this was a key point. You could say that we chose Cisco UCS because of the presence of Cisco Nexus switches.
In a virtualized environment, the presence of physical servers is hidden under the hypervisor, so we were not actually too particular about server and storage vendors. However, the network is often the bottlenecks in virtualized environments, so we thought that we could make a configuration providing an advantage if the network had more flexibility. I felt quite convinced when we received the Cisco UCS proposal from an systems integrator."

Validation process

- **Joint implementation after receiving equipment from Cisco**
- **Virtualization should be used because it is hospital infrastructure**

When implementing the new system, validation was carried out in advance through collaboration between the hospital, the systems integrator and the software vendor for the electronic medical chart system. Equipment was borrowed from Cisco, and validation was carried out over a period of about one month. There were no defects or problems with the architecture, and it was concluded that there would not be any problems with the system, but Nakanishi reflects that he would have liked to validate the storage for a little longer.
"It had been mentioned that using RAID6 for data protection would have an impact on system performance, and the hard disk rotation speed was specified so perhaps a little more time was required for assessing those aspects properly. As a result of the validation, it was found that RAID 6 did not present any problems, but the actual results definitely differed from the predictions and estimates made in advance in some areas. If we had more time to further validate the RAID configuration and hard disk specs, we may have gone with another option."
Moreover, the software vendor for the electronic medical chart system checked whether the hospital's infrastructure of electronic medical charts would be run in a virtualized environment, and suggested consideration of running it in a physical server environment. In response to this, Nakanishi said that there were absolutely no concerns about virtualization, and a choice was made to stick with a virtualized environment because the system would provide the hospital's infrastructure.
"The hospital's information systems were already running in a virtualized environment, and many aspects had already been experienced, so there was no resistance to putting the electronic medical chart system in a virtualized environment.This is because we believed that electronic medical charts should be run in a virtualized environment because it is " a system that must not be stopped."
If a physical server and software are directly associated, the burden is increased when this is broken, replaced or harmed. Virtualization is a very effective means to eliminate such constraints and restrictions, and improve the reliability of hospital infrastructure.
Setting up a server in a virtualized environment is easy, and I think that being able to manage everything including the OS was a step forward from the situation in which we had to rely upon systems integrators such as the addition and renewal of systems until now. It is a system that governs our own operations, so being able to manage it ourselves is significant. This has brought about many possibilities.

System Overview



Results of the installation - Future development

- **The true effects are expected to be made visible through the operation of these**
- **We wish to maintain the latest environment utilizing the flexibility of a virtualized environment**

The transition to the new electronic medical chart system is proceeding smoothly, and operation has started without any problems. Isono says that the improvements that need to be made have already begun to be understood through actual operation.

"We have maintained the same level of performance as in the past in the new system, but we are aware that there are still areas that need to be improved. There are also detailed requirements from the workplace, and validation and feedback on information including the screen design and number of clicks required for operation are carried out when necessary to improve performance on a sensory level.

Nakanishi believes the effects of implementing the system will emerge in five or six years.

"Even if we are unable to sense the effects immediately, I would like us to notice as we use the system in the future. How many times has the system stopped in the past six years? And how much of an improvement will there be over the next six years after switching to Cisco UCS?If we can ensure that the operating rate infinitely approaches 100%, we will be able to appraise it as being a good system.

This system was brought about not only by Cisco UCS, but also the strengths of those involved. I think it is important that we work properly to produce good results not simply as an electronic medical chart server but as hospital infrastructure created by everyone."

Consideration is also being given to upgrading the hospital's picture archiving and communication system server (PACS server). Nakanishi says that maintaining operability and scalability has become easier by running the electronic medical chart system in a virtualized environment.

"If we install a higher performance server in the future, it is possible to easily migrate the virtual machine in a virtualized environment. The portion related to electronic medical charts can be migrated to the new server, and portions that do not require much performance can be used on the current server, so the electronic medical chart system can always be run in the best environment. Being able to do such things ourselves is a significant benefit of virtualization, and Cisco UCS, which provides the infrastructure for that, will also evolve. We want Cisco to continue producing good products and technologies, and we expect them to make new appeals aimed at the future concerning how using these will transform medicine and hospital systems."

Nagano Chuo Hospital

長野医療生活協同組合
長野中央病院
Nagano Chuo Hospital

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1570 Nishitsurugamachi, Nagano-shi, Nagano

Established
in 1961

Number of beds
322

URL
http://www.nagano-chuo-hospital.jp/ [Japanese Only]

Departments
24
Internal Medicine, Respiratory Medicine, Gastroenterological Medicine, Cardiovascular Internal Medicine, Endocrinology and Diabetes, Nephrology,Dialysis, Radiology, Pediatrics, Obstetrics and Gynecology, Anesthesia, Surgery, Breast Surgery, Colorectal Surgery, Thoracic Surgery, Orthopedic Surgery, Cardiovascular Surgery, Dermatology, Neurosurgery, ENT, Ophthalmology, Rehabilitation, Emergency, Rheumatism

Nagano Chuo Hospital is a 24-hour emergency hospital for primary and secondary care, and is the third largest hospital in Nagano-shi (within the old city boundaries). The hospital is also focused on specialized medicine, and boasts top-class figures in Nagano prefecture especially in terms of the number of patients and the number of tests in the Cardiovascular Internal Medicine Department and for diabetes. Newly graduated medical students are also actively accepted and trained.

[Philosophy]
- We will conduct medical activities that respect people as people.
- We will support building the health of people in the community.
- We will contribute to making Nagano a better place to live.

The hospital operates and works with the human rights and safety of patients and users as its greatest priorities based on the ideal of enabling anyone to safely receive medical treatment anywhere at any time. The characteristics and goals of these medical activities are outlined in the “Medicine and Welfare Declaration” which has been published in full.
(http://www.nagano-chuo-hospital.jp/byouin/declaration.html)
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