Kansai Medical University

Installation Solution

- Cisco Unified Computing Systems (UCS)Edition 9.0
- Cisco Advanced Services (AS)

Issues and cases for review prior to installation

- Improvement of cost efficiency through the separation of software and hardware in the procurement of departmental systems Edition 9.0
- More rational maintenance of departmental systems through the separation of software and hardware

Benefits of Installation

- Progress in efforts to separate hardware and software with the cooperation of certain system vendorsEdition 9.0
- Progress in cost reduction through virtualization due to the utilization of Cisco's servers and consulting services (A) suitable for virtualization

The procurement of departmental systems in hospital information systems has been carried out in the form of batch purchases of software and hardware. This has led to a significant excess of IT costs. Kansai Medical University has three associated hospitals, and KMU Hirakata Hospital, which is the core of these, is escaping from such conditions by separating software and hardware through the use of virtualization technology.

KMU Hirakata Hospital located near Hirakatashi Station in Osaka is a large-scale facility with 750 beds, and serves as the central hospital for the Kitakawachi region. The hospital has begun a significant challenge that is virtually unprecedented for a Japanese medical institution. It is migrating its departmental systems, which are the systems supporting medical services in each department, from physical servers to virtualized infrastructure. Why is virtualized integration a significant challenge? The reason is that it will provide an opportunity to essentially transform the way medical systems are procured.

Hakuo Takahashi, Director Kansai Medical University's University Information Center, provided the following explanation on the migration of departmental systems at KMU Hirakata Hospital to virtualized infrastructure.

"A hospital aims to provide safe and secure medical services. IT is positioned as mission-critical medial information infrastructure for achieving this. In this respect, IT is extremely important, but this is why we want to increase cost efficiency to utilize IT more widely. Virtualizing and integrating departmental systems that used conventional physical servers as much as possible is expected to result in effective utilization of surplus server resources and a significant reduction in costs."

Details of installation

▪ Virtualization is a tool for making system maintenance more rational

KMU Hirakata Hospital opened in January 2006. It is an advanced treatment hospital with the latest facilities, and is actively implementing the latest medical systems. In recent years, there has been an increase in computerization of medical equipment and medical support systems, and the hospital was quick to adopt these.

"This hospital has worked around the concept of fully utilizing IT for medical safety, such as using electronic medical charts from the time it opened. As a result of improving departmental systems for providing safe, high-quality medical services, we came to have over 100 servers from around 309 vendors," says Associate Professor Toshiaki Nakano of the Medical Information Department in the University Information Center.

The departmental systems that are applications for supporting the operations of the central treatment division and diagnosis and treatment departments are connected to various medical devices, and make up a part of the medical equipment used by

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Director, University Information Center,
Kansai Medical University
Hakuo Takahashi

Associate Professor, Medical Information Department,
University Information Center
Toshiaki Nakano

the hospital. High levels of safety and stability are required because each system is specialized for diagnosis and treatment in each respective department. However, when using batch purchasing of software and hardware, it is not possible for the procuring department to sufficiently check whether the hardware configuration is appropriate.

The departmental systems implemented by KMU Hirakata Hospital were obtained through batch procurement of software and hardware based on vendor guidance.However, server maintenance periods begin to end several years after implementation. Once the maintenance period has elapsed, it is not easy to replace damaged parts. Furthermore, it is necessary to address the risk of this occurring simultaneously because these systems are procured at the same time. Frequently, users face the risk presented by the contradiction of batch procurement due to the expiry of hardware maintenance periods despite software functions sufficiently meeting the hospital's needs not posing any problems for continued use.

A common response is to move the applications to new servers. As described above, this results in the need to purchase high-spec servers again without being able to determine whether the configuration is important. Furthermore, it is also necessary to replace the OS or database in some cases, which could mean the application must be updated. This results in a negative cost spiral at the whim of vendors, says Yoshihisa Shingai, Assistant Manager of the Academic Operations Division of the University Information Center.

"Now we are able to separate hardware and software by using virtualization technology. Using this, we are able to determine whether the system really needs to be updated without being dragged down by the hardware. This leads to the reduction of wasted costs. For us, virtualization is another effective tool for making system maintenance more rational."

First, existing departmental systems will be gradually migrated to virtualized infrastructure to establish a track record. Based on this, Kansai Medical University eventually aims to create a situation in which it is normal to only assume the software configuration when procuring new systems.

Installation process

▪ Careful promotion of an unprecedented initiative in the medical world

This is how the project to migrate departmental systems in KMU Hirakata Hospital to virtualized infrastructure began. Instead of simply starting with virtualization, it is important to ensure rational system updates and maintenance of functionality. Because it is an initiative that is unprecedented in medicine, the hospital is proceeding a little by little after meticulous preparation.

Firstly, systems deemed to be medical equipment under the Pharmaceutical Affairs Act and those that need to be physical servers due to connections with equipment were excluded from the scope of the project. Meanwhile, hearings were conducted for all vendors of departmental systems on their policy for supporting virtualization. We are working with cooperative vendors to conduct the work required for virtualization. At this time, the virtualization of six servers from two vendors has been completed. The initial plan is to virtualize a third to half of the hospital's servers that number more than 100.

In the hearings, many vendors provided positive responses such as "We support virtualization with the current version or are considering support for virtualization from the next version."

For vendors of departmental systems, delivering software and hardware together makes it possible to increase product sales and maintenance fees. However, the servers are not their own products.They are in the same position as users with regard to being at the mercy of the product lifecycle of servers. Reviews need to be performed each time a company's application is being moved to a different server. On the other hand, the application can be separated from physical hardware once virtualization has been implemented, providing the benefit that subsequent reviews of each type of hardware are no longer required.

However, some vendors are concerned about dealing with faults. In the past, software and hardware were used as boundaries of responsibility and vendors of departmental systems showed one contact point to users. With virtualization, some vendors don't know who to separate and deal with these because the vendor's software is run on virtualized infrastructure operated by the user organization. However, this could be considered to be an issue that must be resolved through clear agreements between vendors of departmental systems and user organizations based on experience.

What to the departments in the hospital think? Norihiro Nishino, Assistant Manager of the Academic Operations Division of the University Information Center, made the following comment.

"When a server's maintenance period expires and parts actually run out, it could stop any day. We are running out of options and virtualization is quite an effective way of dealing with the issue. Because of this, each of the departments has been very cooperative. For departments, systems are fine at the time of their launch, but subsequent maintenance is difficult and they are appreciative of the Medical Information Department working with them. However, I think the most important thing is to have a dialogue with the department and not force the issue.

Assistant Manager, Academic Operations Division, University Information Center
Yoshihisa Shingai

Validation process

▪ Things made possible because of Cisco's focus on virtualization

KMS Hirakata Hospital chose the Cisco Unified Computing System (UCS) server series from Cisco equipped with Intel**®** Xeon**®** processors as the servers for supporting its virtualization infrastructure.When asked about the reason for the choice, Shingai said, "Cisco is well known for its network products and has established a track record of use throughout the entire university. It is a latecomer as a computer manufacturer, but its target is focused on virtualization.It is significant that this resulted in the server construction itself being suitable for virtualization."

Nishino also added the following comment.

"Cisco believes that virtualized environments can maximize the value of their own servers, so the talks went smoothly. Also, VMware (used as the virtualization platform software at KMS Hirakata Hospital) and Cisco have a close-knit partnership covering technical aspects. When we chose VMware vSphere**®**, choosing Cisco for the servers was the natural direction to go."

Nishino and Shingai also have high regard for Cisco Advanced Services (AS). This is a service providing technical consulting, technical support and transfer of know-how in various areas where Cisco does business. Cisco provided consulting and workshops on integration of virtualized environments using UCS, system migration, testing, and operation.

"In an organization working with virtualization for the first time, everybody has concerns and is feeling their way forward. In these circumstances, it is helpful to have the analytical ability to determine which data to collect and how to find problems when a problem occurs in migration from a physical environment to a virtual environment, and to be able to receive powerful technical support providing accurate instructions for resolving problems and efficiently guidance to the next step." (Nishino)

"The university staff also accumulated much technical knowledge due to the support provided by Cisco's consulting engineers who are well versed in both hardware and VMware. System migration is being carried out as part of the curriculum. When doing this, we received advice and skills for investigating problems and reviewing responses. Advice was also given directly to the vendor of the first departmental system to be migrated. This is one of the reasons the migration went smoothly." (Shingai)

The actual migration work (virtualization migration) was not necessarily without incident. Due to the nature of a hospital system running 24 hours a day all year, the basic method used is hot clone P2V (Physical to Virtual) for migration while the system is still operating. System stoppages are kept to a minimum for final synching and switching over, but the finalization work needs to be planned and follow a detailed work schedule. It is also necessary to respond to errors that occur during migration, and the work required is more advanced that building a new system on virtualized infrastructure, such as switching back to the physical server, implementing investigative tools, analyzing performance and performing fault isolation of potential faults that even the vendors of departmental systems are not aware of. However, if these techniques are used, virtualization migration can be carried out at low cost surprisingly smoothly. This is just a glimpse, but a variety of advanced know-how is utilized.
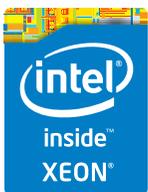
Assistant Manager, Academic Operations Division, University Information Center
Norihiro Nishino

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Results of the installation – Future development

▪ Virtualization because of the need for secure and reliable operation

As mentioned above, the virtualization of the departmental systems of KMS

Kansai Medical University

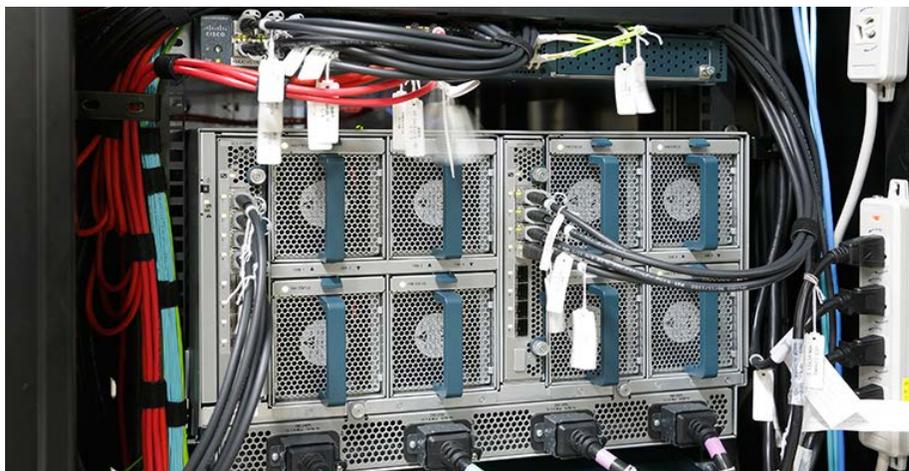**Location**
2-5-1 Shin-machi, Hirakata-shi, Osaka 573-1010

Established:
June 30, 1928

URL
http://www.kmu.ac.jp

Departments

It is evident that Cisco UCS is designed with virtualization in mind based on the lack of cables on the back

Hirakata Hospital was carried out after consideration of whether stable operation and rational administration could be ensured for each system. The cooperation of vendors of departmental systems is essential, and the most important thing is that the people in each department who are the users of the systems are convinced.

On the other hand, there is also a reason for promoting virtualization because security and reliability are the highest priorities in the systems. It is because VMware vSphere® has functions for easily migrating virtual machines for planned maintenance of servers, a restart failover function and a synchronous failover function. For example, "There are probably many cases in which application availability requirements can be met by using VMware HA for automatically restarting virtual servers without the need to make server hardware redundant or implement expensive clustering middleware." (Nakano)

Virtualization is not simply a means of reducing costs. Using the power of abstraction and automation, it serves as infrastructure for flexibly and stably operating systems. That means the potential benefits of integration through virtualization are substantial in the world of medicine.

University Information Center Director Takahashi believes that virtualization is the key to strategizing IT investment. Because of this, he says, "It is fine to quickly proceed with integration from areas where there is little impact. We are considering the integration of the departmental systems of the university's three hospitals. We think that KMS Hirakata Hospital can serve as the data center for this."

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