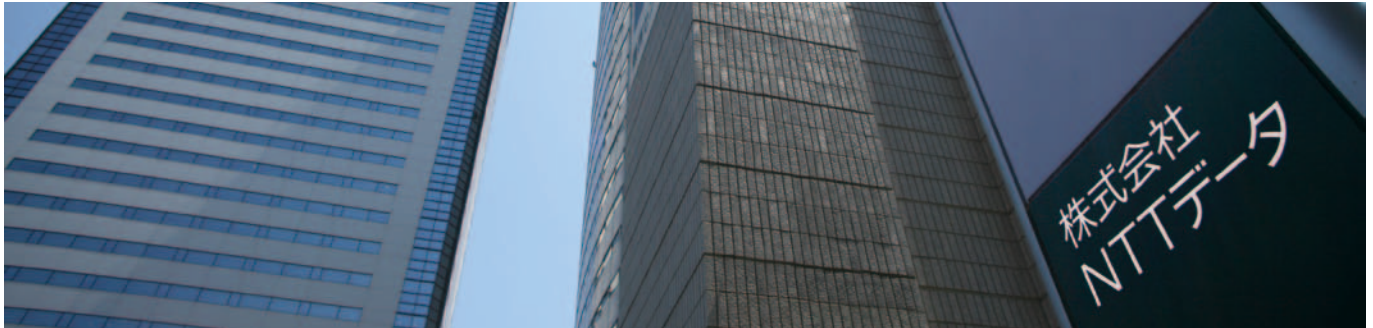


NTT Data Uses Cisco UCS to Carry Out Integrated Virtualization of In-House IT System Platforms and Reduce TCO

–The experience and expertise thus gained will also be applied to its own total cloud service, BIZXAAS™–



Installation Background and Challenges

- NTT Data's in-house IT systems, which had been comprehensively redesigned in 2006, were facing problems in the form of expiring hardware and software maintenance contracts along with spiraling costs for system upkeep and management.
- In the past, the company had optimized and standardized its platforms on a piecemeal basis. In order to reduce the TCO and make more effective IT investment with regard to these platforms, the company decided that it needed to optimize them by means of integrated virtualization.
- As one of its system platform optimization initiatives, the adoption of Cisco UCS was considered. Having conducted the necessary advance assessment and verification in-house, the company satisfied itself that the product's performance and reliability were easily high enough and that the architecture was suited to "scaling out". NTT Data consequently adopted Cisco UCS.
- The plan was to complete the migration of the company's internal IT infrastructure (main system) by the end of FY2012.

Installation Solution

- Cisco Unified Computing System (UCS)
 - Cisco UCS 6120 Fabric Interconnect
 - Cisco UCS 5108 Blade Server Chassis
 - Cisco UCS B200 M2 Blade Server
- Cisco Nexus 7000 Switch
- Cisco Catalyst 3560 Switch
- Cisco Catalyst 2960 Switch
- Cisco MDS 9100 Fiber Channel Switch
- Cisco ASA 5500 Adaptive Security Appliance (As of August 2011)

Effects of Installation

- By means of integrated virtualization of servers, and network integration using Fabric Interconnect, the number of hardware units was dramatically reduced. By introducing a cloud platform, TCO has been slashed to half the pre-installation level.
- Central management of servers and the use of the profile function have increased operational efficiency. The provisioning lead-time has also been shortened to less than half what it was prior to installation.
- By adopting power-saving products and reducing the number of hardware units, CO₂ emissions have also been reduced. The reduction now stands at 79%, and it has been estimated that over a five-year period the cumulative reduction in CO₂ will amount to 3,540 tons.

Defining its group vision as, "Becoming a Global IT Innovator," and possessing a wealth of experience as well as proven track-record in developing and operating IT platforms, NTT Data Corporation is a global company with bases in 145 cities in 34 countries. With the aim of reducing the total cost of ownership (TCO) of its in-house IT system and strategically ramping up its IT investment, the company is pursuing the integrated virtualization of its own system platforms. The platform it is using to support this move is Cisco Unified Computing System (UCS). NTT Data chose Cisco UCS because of its highly-innovative architecture, which is optimized for virtualization, and also because of its outstanding cost-performance. Since Cisco UCS was installed, its stability and reliability have also been rated highly by NTT Data. Thanks to this integrated virtualization, both the lead time for server provisioning and the TCO have been halved. NTT Data is now applying the valuable experience and expertise gained from this implementation process to its own total cloud service, BIZXAAS™. This will further enhance the firm's capacity to suggest solutions to client companies as their innovation partner.

Integrated virtualization of NTT Data's infrastructure in order to reduce TCO Adoption of Cisco UCS as the platform for this process

The question of how to reduce the TCO of in-house IT infrastructure is one of the crucial issues numerous companies have been wrestling with for many years. One solution which has gained a high profile in recent years is to virtualize and integrate the IT infrastructure. This means that instead of preparing a system platform for each administrative application, a system platform integrated on a company-wide basis is built, and administrative applications are run thereon.

One company that is putting this approach into practice, using Cisco UCS, is NTT Data. This firm is a system integrator with abundant experience and a long track record in developing administrative systems and building and operating shared data centers for industry. It owns more than 100 systems itself, and actively utilizes IT.

However, Mr. Hitoshi Kirita, Senior Executive Manager of NTT Data's Information Technology Management Office, recalls that "in the past, we designed and built system platforms for individual business applications, so servers and other machines proliferated, and operation got complicated as well." The systems were mainly built using Unix and Linux servers, and the number of servers was over 130. Many functions were duplicated in each system, and the hardware took up a lot of space and consumed a lot of power. "Most of these systems had been introduced in 2004 to 2005, so we faced a major problem in that the hardware was becoming obsolete

"In the past, we designed and built system platforms for individual business applications, so servers and other machines proliferated, and operation got complicated as well. By modeling the required service levels according to availability and administrative process priority, and using an integrated virtualized system platform to deliver them, we aimed to slash our system development and operating costs."



Mr. Hitoshi Kirit a
Senior Executive
Manager
Information Technology
Management Office
PMP (Project
Management
Professional)
NTT Data Corporation

and the software was no longer supported by the manufacturers. To move ahead with strategic IT investment in the future, we also needed to reduce spending on system upkeep and operation."

In September 2009, NTT Data set about planning a next-

generation system platform to solve these problems. "By modeling the required service levels according to availability and administrative process priority, and using an integrated virtualized system platform to deliver them, we aimed to slash our system development and operating costs," explains Mr. Kirit a.

"At first, we thought about installing 2U rack-mounted servers," adds Mr. Masakazu Yamada, Deputy Manager, System Engineering Business Unit, System Platforms Sector, NTT Data Corporation. However, having determined that 2U servers would not deliver enough of a reduction in maintenance costs in an integrated virtual environment of moderate size or larger, the company changed its mind and made plans to install blade servers instead. After carrying out a theoretical comparison of products provided by a number of leading server vendors, in terms of function, operation and cost, NTT Data ultimately decided to adopt Cisco UCS.

Cisco UCS's radically-innovative architecture was rated highly Good cost-performance was another point in its favor

So, why did NTT Data adopt Cisco UCS for its company-wide information system platform? "The fact that Cisco UCS offered functions such as service profile and fabric integration, enabling us to adopt a new approach in the development and operating phases, was a big attraction," says Mr. Yamada. He explains how this prompted the company to use integrated virtualization in order to maximize TCO-reduction benefits. He then points out that this architecture offered, broadly speaking, three advantages.

First, it makes for a very simple system structure. Cisco UCS is designed for extreme architectural simplicity, and the system as a whole has far fewer structural elements than a regular blade server. The network is carried by the Fabric Interconnect, so there are very few cables. The storage network can also be integrated with the Fabric Interconnect, so fewer SAN switches and storage connection cables are needed. Also, because UCS Manager can be used for integrated management of the whole system, operation management is simplified, which helps cut costs.

The second advantage of the architecture is its pronounced network-affinity. In order to "cloudify" a system platform through integrated virtualization, it is crucial to

■ Attractions of Cisco UCS



Simple architecture

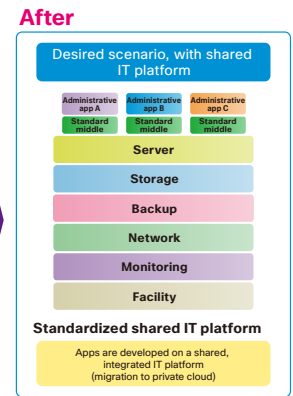
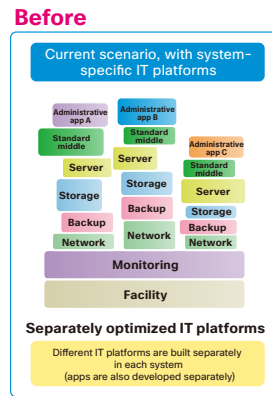
In terms of eliminating complexity in design and building, and for maintainability, a simple architecture is best. Cisco UCS offers simplicity in its product architecture and product policy.

Pronounced network affinity

In cloud-building, eliminating network complexity is key. The architecture of Cisco UCS was designed with network interoperability in mind.

Pronounced affinity with virtualization technology

In order to reduce overheads and eliminate operational complexity through virtualization, interoperability with the virtualized layer is important. Because Cisco UCS products have always been based on virtualization, they're one step ahead of the competition.



"I firmly believe that this in-house IT system reform project will become an exemplary model of cloud-platform development in the industry. The expertise we gained here is also being applied to our BIZXAAS cloud business."



Mr. Makoto Yoshioka
 Senior Executive Manager
 System Engineering Business Unit
 System Platforms Sector
 NTT Data Corporation

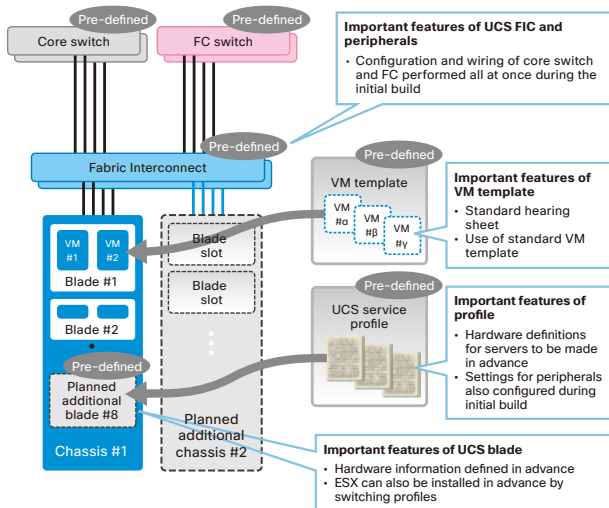
eliminate network complexity. Cisco UCS was designed with this very much in mind, so complexity is eliminated by employing fabric-extender technology, in which the abovementioned input/output integration and management points are greatly reduced, facilitating network interoperability.

The third advantage of the architecture is its pronounced affinity with virtualization technology. The Cisco UCS hardware was designed to maximize the benefits of virtualization technology. For example, it has a virtual interface card (VIC) for controlling the QoS bandwidth for each virtual NIC, and scalability allowing up to 6,400 physical cores (as of August 2011) to be integrated in a single layer 2 network. Additionally, using the service profile function, the operational burden of installing and swapping out servers can also be significantly reduced.

Nor is that the end of it: Mr. Yamada also points out that the ability of Cisco UCS to keep down the TCO of the private cloud environment was also a big attraction. "With Cisco UCS, we could utilize the service profile function to reduce the number of man-hours and the lead time required when scaling out the virtual servers," he explains. "And because the CPU is also powerful on its own, there was the potential for big reductions in the number of licenses in the case of software such as Oracle, where the license fee varies depending on the number of CPUs."

NTT Data's decision to adopt Cisco UCS was made in April 2010. It started designing the hardware configuration right away, and in July, the machines were brought in. In August, the unit-testing was carried out, and in October, the product-testing of the whole UCS solution was completed. From November 2010 to March 2011, the system including administrative applications was tested, and from April 2011 into early May, the system migration was carried out. Then in May 2011, several systems including purchase management, electronic decision support and employee attendance management went live in this environment. The migration of the human resources and payroll management system, and the meetings support (project-specific decision-making workflow) system, was also completed in August 2011.

■ Shortening of Lead Times Using UCS



**Server-provisioning lead-times halved
 TCO down by more than 50%**

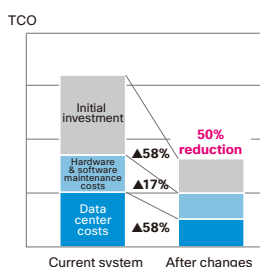
By performing integrated virtualization on system platforms, using Cisco UCS, maintainability and operability have been dramatically improved. According to Mr. Yamada, the shortening of server-provisioning lead-times by means of the service profile function is particularly noteworthy. "As long as we create the profile and install the virtualized host in advance, when we add a new blade, the setup is finished in about thirty minutes," he says. "Of course, we still need to install the OS, check the running, and do various tests like before, but even with all this combined, the lead times are less than half what they were."

Sustaining the service level has also become easier. First, the use of VIC now makes it possible to control the network bandwidth for each virtual machine and also to secure bandwidth for high-priority applications in the virtual environment. Even if there are major fluctuations in traffic on the other virtual machines, stabilized access is possible.

Also, when maintenance needs to be carried out on a physical server, this can be handled by migrating the virtual machine to another physical server using the live migration function. Using VM-FEX technology made feasible by VIC, the virtual machine's network policy can be kept even after migration, which makes things much easier. This has done a lot to shorten lead-times.

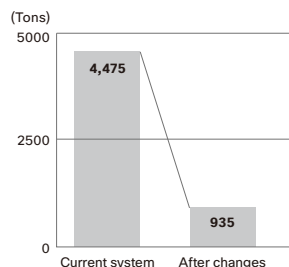
TCO has also been dramatically reduced. Compared to the previous system, initial investment has been reduced by 58%, while maintenance costs have been reduced by 17%, and rack costs by 58%. The combined total reduction in TCO is over 50%.

■ Comparison of TCO over a five-year period UCS



TCO reduction (cumulative total over five years)
 Relative to current system: **50% reduction**

■ Comparison of CO₂ emissions over a five-year period



CO₂ reduction (cumulative total over five years)
 Relative to current system: **-3540 tons (79% reduction)**

NTT Data Corporation



Address:

Toyosu Center Building, 3-3, Toyosu
3-chome, Koto-ku, Tokyo

Established:

May 1988

Capital:

142,520 million yen (as of March 2011)

Number of employees:

10,139 (as of March 2011)

Sales:

1,161,900 million yen (results for FY2010)

NTT Data Corporation is one of Japan's leading IT companies. Defining its group vision as, "Becoming a Global IT Innovator," (a company that uses IT to transform society on a global scale), it has a wealth of experience and a proven track-record in developing and operating platform systems and shared data centers for industry. Besides expanding its solutions and providing cross-group services, the company has established a workforce roughly 24,000 strong in 145 cities in 34 countries, and is also engaged in an aggressive global business roll-out. By using IT to create new systems and new value, NTT Data continues to contribute to the realization of a more affluent and harmonious society.

Note: "BIZXAAS" is a registered trademark of NTT Data Corporation in Japan.

Nor should the energy-saving benefits be overlooked. Less energy is used because the system as a whole consists of fewer constituent elements and because Cisco UCS is itself designed to save power. CO₂ emissions have also been reduced by 79%. It has been estimated that over a five-year period, the cumulative reduction will be 3,540 tons.

"We definitely saw Cisco UCS as an advanced product, but to be honest, what with Cisco being a network vendor, we had some misgivings about whether Cisco servers would really be OK," admits Mr. Kirita. In 2009, evaluation on the actual machines had already been carried out within NTT Data's in-house R&D department and the company had concluded that there were no problems with reliability or performance. He recalls, however, that until the hardware was actually in use, some unease remained. Nevertheless, once the servers were up and running these doubts proved completely unfounded. "We have not had any trouble with our hardware since we installed the system. Its operation is very stable" he says.

At present, the migration of the in-house IT system is proceeding in an orderly fashion and extra blade servers have also been installed. As of August 2011, there are 24 blades. The whole system migration is scheduled to be completed by the end of FY2012 and at that point a total of 32 blades should be in place.

Expertise acquired on in-house IT system also applied to cloud-based BIZXAAS service

"I firmly believe that this in-house IT system innovation project will become an exemplary model of cloud-platform development in the industry," says Mr. Makoto Yoshioka, Senior Executive Manager, System Engineering Business Unit, System Platforms Sector, NTT Data Corporation. He explains that the expertise acquired on this project is also being applied to the BIZXAAS service provided by NTT Data. BIZXAAS is a comprehensive cloud service covering a wide range of areas from optimization consulting to migration, cloud development, operation management, and platform services. Released in February 2010, the service was launched in April of the same year.

"'Cloud' has been around as a buzzword and in concept. With the arrival of Cisco UCS, the platform has finally caught up to the buzz," says Mr. Yoshioka. He goes on to explain how, by combining Cisco's leading-edge technology with the social information infrastructure and the extensive track-record in IT system-development accumulated by NTT Data, they will be able to deliver optimal cloud-platform-development solutions. "Japanese businesses are in an ever more difficult economic environment, and increasingly demand an optimized cloud platform. Cisco is a critical business partner as we drive this opportunity forward."

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