Developing a future-oriented infrastructure with Cisco solutions...
Accelerating IT innovations based on cloud

Hanyang University (university president Lee Yeongmu), which prides itself as the best in university informatization, making a great achievement again. Hanyang University is implementing the “New Hanyang 2020” project to become one of the top 100 global universities in 2039 when it will celebrate its centennial year. As part of laying the foundation for the project, Hanyang University completed phase 1 of the Hanyang Cloud Center project that integrates data centers at the Hanyang University Seoul campus, ERICA campus, and Hanyang Women’s University. It is significant that Hanyang Cloud Center is designed to implement SDN (Software Defined Networking) to respond to the rapidly changing environment, and upgraded the IT infrastructure (wired/wireless backbone, server farm, security) in a future-oriented way. Hanyang Cloud Center plans to provide the optimal service to all school members by continuously advancing its infrastructure to improve cost structure, as well as system operation efficiency by concentrating its IT resources on the Hanyang School Foundation at Hanyang Cloud Center. <Editor>
Hanyang University was established by Dr. Kim Yeongjun based on a pragmatic approach to national technological development and his patriotism to the country. Beginning with Dongah Engineering School in 1939, the school was renamed Hanyang Engineering University in 1948 and became a university in 1959. Hanyang University is renowned for its high competitiveness in engineering, with its engineering college producing many famous alumni members.

Hanyang University has continuously developed educational and research areas and became a prestigious school, ranking various academic areas (engineering, natural science, humanities, and language studies) among the world’s top 100. Hanyang University has 20 areas listed in the top 200 of the 2011 world university rankings released by the UK’s Quacquarelli Symonds across 46 academic areas, which is five more than in 2010. The engineering and structural engineering area ranked 43rd. With this result, Hanyang University has achieved a top-50 ranking for the first time.

Hanyang University is preparing for a giant leap forward for creativeness and shared management based on its ethos of practicing love. They have been implementing the New Hanyang 2020 Project since 2008, which aims to develop the school as one of top 100 global universities by 2039 (its centennial celebration year), by significantly strengthening its brand power, human resources, and asset capabilities in line with its academic and administrative plans. Hanyang University is working hard to become a global prestigious school by carrying out various projects in line with its 8 strategic directions: strengthening educational competitiveness, academic affairs system innovation, improving ease of research, enhancing its global ranking, tightening responsible management, improving administrative capability, increasing performance-oriented appraisal, and building up core assets.

**Hanyang Cloud Center completed phase 1**

Hanyang University, a leader of university IT in Korea, has further differentiated itself by taking the lead in the development of a university informatization project. Over the years, it has consistently adopted new technologies and been widely benchmarked by other universities. While implementing the advancement of the campus data center based on New Hanyang 2020 Project in the mid-to-long term, Hanyang University recently set another milestone in university informatization by completing the phase 1 of the Hanyang Cloud Center project that supports SDN (Software Defined Networking).

“Universities are required to make continuous innovation and change across their organisation because of the challenges posed by a declining school age population. The IT area is no exception. In 2008, Hanyang Cloud Center has established and implemented the comprehensive plans and strategic tasks of New Hanyang 2020 Project. We have already developed the next-generation integrated information system in 2013, and re-established the mid-to-long term development road map for the infrastructure area in 2014. Since then, we have taken on the challenge of developing Hanyang Cloud Center with the awareness that duplicate investments need to be avoided and IT innovation is what’s needed,” said Kim Wanggi, manager of the information and communication department, Hanyang University.

He added that “We have identified improvement tasks for cost saving and efficient operation, by removing duplicate investments through system and infrastructure integration with the affiliated organization of Hanyang School Foundation. We succeeded in dramatically improving the structure of cost needed for the infrastructure area and securing the flexibility, stability, and efficiency of system operation. We selected the cloud as the best solution for our situation. Even though the public cloud is good enough for small-scale services, we decided to construct a private cloud center that’s optimized for the characteristics of the university, such as its many small-scale independent duties and a thriving educational and research environment.”

Hanyang University started the construction of the cloud center in April 2016 after much contemplation and discussion, and launched the official service in April 2017. With no precedent in college, there was a heavy burden and considerable risks. However, they have been able to innovate the IT infrastructure based on the cloud by making a basic design frame with meticulous preparation and active consulting and technical support from Cisco.

**Implemented cloud infrastructure with Cisco “Next/UCS/HyperFlex”**

Many Cisco solutions were applied to the Hanyang Cloud Center such as the x86 server, network, security, and video collaboration, with the only exception being Unix. Hanyang University selected Cisco for its superior technical skills as well as the confidence it developed.
“Providing the best service by integrating all IT resources inside the Foundation”

What is the background to the establishment of the Hanyang Cloud Center?

Hanyang University developed the next-generation integrated information system in 2013 while implementing campus data center advancement in the mid-to-long term based on the New Hanyang 2020 Project established in 2008. When we re-established the mid-to-long term development roadmap in the infrastructure area in 2014, we selected the cloud as a solution for improving the structure of costs needed for the infrastructure area to secure the flexibility, stability, and efficiency of system operation, and removed duplicate investments with system and infrastructure integration with the affiliated organization of Hanyang School Foundation. With no precedent in the college, there were considerable risks to the project. However, we successfully completed the Hanyang Cloud Center project, which is optimized for the unique characteristics of the university, through meticulous preparation.

Why did you select Cisco and what solutions did you introduce?

Many Cisco solutions were applied to Hanyang Cloud Center, including the x86 server, network, and security. We selected Cisco for its superior technical skills as well as the confidence we developed while building up the Gigabit Ethernet backbone network. The active consulting and technical support provided by Cisco helped us in making the basic design frame. We advanced the backbone network using Cisco Nexus 9000 and Catalyst Switch, and implemented server virtualization using Cisco UCS and HyperFlex. Security was also strengthened by replacing worn-out equipment using the Cisco’s next-generation IPS and SSL VPN solution.

The foundation for switching to the SDN environment was laid by applying the SDN-based Nexus switch. We will continuously innovate the cloud center network by verifying SDN with the pilot operation of Cisco ACI. The cost of implementation and maintenance can be optimized by implementing the integrated virtualization of all x86 servers using the hyperconverged solution: Cisco HyperFlex.

What is the impact of establishing Hanyang Cloud Center

Providing Best Services to Members at Minumum Cost. Hanyang Cloud Center is designed to provide services by comprehensively integrating IT resources in the Hanyang School Foundation. During the first step, cost can be saved and system operation efficiency can be enhanced by integrating the IT resources in the Hanyang University Seoul campus, ERICA campus, and Hanyang Women’s University. The completion of Hanyang Cloud Center is expected to bring about considerable innovation to the cost structure of the infrastructure area, and the best services can be provided to all school members and external customers at minimum cost.

What is the advancement plan for establishing the Hanyang Cloud Center

Analyzing the result of phase 1, we will integrate the IT resources of the Hanyang University Medical Center and Hanyang Cyber University, and search for a method for developing the IT area in the ERICA campus so that the growth of the two campuses can be solidified. Cisco will build a hybrid cloud on the ERICA campus to support the promotion of the industry-university-institute cluster and build deeper links with the local community. We will concentrate on efficient infrastructure management and security, such as the integrated control system that enables us to control all systems efficiently from the center, while integrating the Internet inside Hanyang School Foundation, and security equipment and main equipment in the server farm.

Kim Wanggi, manager of the information and communication department, Hanyang University.
while building up the Gigabit Ethernet backbone network. There were technical difficulties in the early 2000’s when the backbone network transit from ATM to Gigabit Ethernet, and Hanyang University also had the same issue. Hanyang University was indeed able to successfully migrate the backbone network by adopting Cisco Catalyst Switch Series that guarantees availability and providing the optimal performance.

“The cloud environment we have implemented can optimize operation efficiency and cost by switching to the virtualization environment using Cisco UCS and HyperFlex. This effectively solves the problem of inefficiency in operation and cost caused by the necessary increase in the number of racks for the existing physical server and decrease in usage rate. We now have the foundation for switching to the SDN environment. Introducing the SDN-based Cisco Nexus switch enables the efficient and optimized operation of the cloud center network,” said Kim Jintae, manager of Information Infrastructure Team, Information and Communication Department, Hanyang University.

Hanyang University Cloud Center implemented server virtualization using UCS and HyperFlex, while advancing the backbone network using Cisco Nexus 9000 Series and Catalyst Switch Series. They tightened security by replacing legacy equipment with Cisco’s next-generation IPS and SSL VPN solution, and solved the problem of duplicated investments by each organization with a complete solution set.

**Ready to implement SDN with the first implementation of Cisco HyperFlex in Korea**

Hanyang University plans to continuously innovate the cloud center network through SDN verification with the pilot operation of the Cisco ACI (Application Centric Infrastructure) using SDN-based Cisco Nexus 9000 Series switches. They have also integrated the system of each organization through server virtualization by adopting Cisco UCS with x86 servers. The exception was Unix servers: although Unix is currently more important, they will gradually increase the number of x86 servers by continuously carrying out server virtualization and cost optimization by installing major applications such as xxxx in x86 servers.

Cisco HyperFlex introduced in Hanyang Cloud Center is attracting industry attention as the first case in Korea. Cisco HyperFlex is a hyper-converged solution that integrates server and storage based on the Cisco UCS architecture, and network. This solution has many advantages, such as policy-based network automation, computing, and storage for a variety of application services by overcoming the limitations of existing hyper-converged solutions that lack performance, flexibility, and simplified operations.

“Even though we had the pressure, and the risk, of being the first Cisco HyperFlex customer in Korea, we decided to go ahead with it as the system can support intelligent automation, independent expansion, and flexible infrastructure. HyperFlex will enable us to optimize implementation and maintenance cost, and give us the stability of triple backup by implementing integrated virtualization of x86 servers in Hanyang University,” said Kim Jintae, team manager.

Hanyang University has shown it is fully committed to managing its infrastructure efficiently and securely. They plan to develop an integrated control system that will enable them to control all systems from the center, while integrating the Internet inside Hanyang School Foundation, along with security equipment and network equipment in the server farm. What’s more, they will also upgrade the network of each building continuously, so that Cisco ACI can be implemented based on the development of core networks.

**Optimizing cost and securing system operation efficiency by integrating IT resources**

Analyzing the result of phase 1, Hanyang University will integrate the IT resources of the Hanyang University Medical Center and Hanyang Cyber University, and search for a method for developing the IT area in the ERICA campus to consolidate the growth of both campuses. In particular, they will build a hybrid cloud on the ERICA campus to support the promotion of the industry-university-institute cluster and build stronger links with the local community. The hybrid cloud will link government organizations (Gyeonggi Techno Park, Korea Institute of Industrial Technology), small sized research centers, businesses, and the Business Incubator Center.

“The cloud project was designed to provide a comprehensive service by integrating all IT resources within Hanyang School Foundation in the Hanyang Cloud Center. We are now able to save cost and secure system operation efficiency by integrating IT resources in the Hanyang University Seoul campus, ERICA campus, and Hanyang Women’s University. The completion of Hanyang Cloud Center will provide a strong foundation for us to innovate the cost structure of our infrastructure, optimize system operation, and provide the best service to all school members and external customers at minimum cost,” said Kim Wanggi, department manager.