Smarter IT for Smart Cities

Liaocheng University in China drives Smart City research with modular architecture that enhances innovation 30 percent, cuts energy consumption 40 percent and slashes IT management time in half

Business need

To help drive Smart City research, Liaocheng University wanted to improve desktop services to the China Smart City Research Institute, located in the university's central lab building.

Solution

The university implemented a modular VDI infrastructure from Dell, featuring Dell PowerEdge FX architecture powered by Intel® Xeon® processors. It also deployed Dell Storage with Intel Xeon processors and Dell Networking at the back end, as well as a SonicWALL next-generation firewall and Wyse endpoints.

Benefits

- Greater Smart City productivity with 50 percent reduction in IT management time
- Enhanced innovation with 30 percent faster mathematical modeling
- Improved efficiency, cutting IT costs by 20 percent
- Greener environment with energy consumption down 40 percent
- Expected ROI of 300 percent in five years

Solutions at a glance

- Modular Infrastructure
- Cloud Client-Computing
- Networking
- Network Security
- Storage
- Enterprise & Client Support

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Yu Bo, Information Center Director, China Smart City Research Institute

With the world urbanizing rapidly, cities have to get smarter. Populations can no longer consume resources at the current rate, and institutions are turning to technology to help reduce the environmental impact.

In China, Smart Cities are a hot topic, and the China Smart City Research Institute, established jointly by the Liaocheng City People's Government, the National Mapping and Geographic Information Bureau, and Liaocheng University, is working on a number of eco-friendly projects.

The institute occupies the entire fifth floor of the central laboratory building at Liaocheng University, and there are some 120 researchers working on government projects. The goal is to devise Smart City solutions with commercial potential to export to the rest of the world as well as support China's own development. With urbanization such a concern, the university wanted to maximize the creative potential of the 120 institute staff and focus its attention on enhancing the desktop experience.

Breaking with tradition

When stakeholders at the university assessed the performance of the existing PC-based environment, they identified a number of challenges, not the least of which was slow performance. The management overheads were significant and energy consumption was high. Furthermore, there was a lack of security on the desktops – all of which contained commercially sensitive information – with data residing on local drives.

Yu Bo, information center director at the China Smart City Research Institute, says, "The key goal was to establish a safe, easy-to-operate and manageable office and research environment. We aimed to create an innovative environment that was cost-effective and energy-efficient."

When Liaocheng University looked for an IT partner to support the

project, it had a clear set of criteria. Speed of deployment was a key since stakeholders wanted to improve things fast. The university also wanted to work with as few IT vendors as possible,

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> *Yu Bo, Information Center Director, China Smart City Research Institute*

Products & Services

Services

Dell Support Services - Dell ProSupport Plus for Enterprise

Hardware

Dell PowerEdge FX2 chassis featuring Intel® Xeon® processors

Dell PowerEdge FC630 server modules featuring Intel Xeon processors

Dell PowerEdge FN410S IO Aggregator

Dell Storage SC4020 array featuring Intel Xeon processors

Dell Networking N2048 and N4032f switches

Dell SonicWALL NSA 2600 next-generation firewall

Dell Wyse 5030 PCoIP zero client

Dell P2714H monitors

Integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller

Dell Chassis Management Controller

Partner

VMware Horizon® View™

ideally deploying an end-to-end, single vendor solution.

Close engagement and partnership
After considering proposals from HP and Lenovo, the university chose Dell. It already had a relationship with the IT solution vendor, having bought a number of Dell OptiPlex desktops in the past. "We looked for collaborative and responsive support, and we got that from Dell," says Yu. A number of meetings took place so the Dell team could fully understand the needs of the institute before it came back with a high-performance virtual desktop infrastructure (VDI) solution. "We had a lot of detailed exchanges with Dell. The engagement was very professional, and we felt as though we were working in a real partnership," comments Yu.

Choosing modular infrastructure
In coming to its decision, the university compared the HP C3000 blade system with the Dell PowerEdge FX modular architecture, featuring Intel® Xeon® processors, which puts servers, storage, networking and management into a single 2U chassis. The beauty of the Dell solution for the university was that it could rapidly deploy an energy-efficient, highly scalable VDI. Says Yu, "Even the test configurations for the Dell PowerEdge FX running Dell PowerEdge FC630 server modules exceeded our expectations. We saw how we could maximize power and management efficiency with the solution. We also calculated that we could deploy our VDI around 85 percent faster – in a single day instead of our initial estimate of seven days."

Density rises 300 percent and delivers US$245,000 in savings
Working with Dell, the university IT team designed the VDI to support 120 institute staff. The design included a Dell PowerEdge FX2 chassis with four Dell PowerEdge FC630 modules, featuring Intel Xeon processors, on the back end. Next, the team added a Dell Storage SC4020 hybrid flash array with

Intel Xeon processors, SAS drives and solid-state drives for data tiering, and Dell Networking N2048 and N4032f switches. The N2048 switches would sit at the network edge, while the N4032f would be at the core. Finally, Dell and the university chose Dell Wyse 5030 PCoIP zero clients as the endpoints with Dell P2714H monitors and VMware Horizon® View™ as the VDI software.

Yu says, "Because our design was based on the Dell FX2 modular infrastructure instead of rack servers, we increased the density of our IT by 300 percent. We estimate the savings to be RMB 1.6 million (US$245,000)."

Greater modeling with 30 percent improvement in desktop performance
Today, the university is helping institute staff realize their creative potential through a high-performance VDI. Much of the institute's work involves computational modeling as personnel test their Smart City theories and ideas. Processing speeds and network performance are key to productivity, and according to Yu, the power of the Dell FC630 modules, featuring Intel Xeon processors, and the Dell networking switches have greatly improved the experience of personnel. He says, "The time taken to test a typical mathematical model for us has decreased by just over 66 percent as a result of our Dell PowerEdge FX modular solution."

He continues, "We believe that IT can inspire personnel to be more creative and the end-to-end Dell VDI solution is doing just that."

According to the university, the success of the Dell solution can also be attributed to the performance of the Dell PowerEdge FN410S IO Aggregators inside the FX2 chassis. The aggregator is preconfigured to deliver a 10GbE network for virtualized traffic inside the FX2. Its plug-and-play capabilities make it easy to use, and it has reduced cabling by two-thirds. The PowerEdge FN410S

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IO Aggregators connect over IPSAN to the N4032f core switches, which link up to the Dell Networking N2048 at the network edge.

Enhanced data security

By moving to VDI and centralizing data, the university has improved data security. Furthermore, it has implemented a Dell SonicWALL NSA 2600 next-generation firewall to the network for added protection. The firewall appliance offers advanced security and networking features to maximize application performance while keeping the network free from viruses. With features such as deep packet inspection, the IT team can be sure that internal and external threats are dealt with. "Data is safe and secure, helping staff stay focused on their projects, free from concerns about viruses," comments Yu.

Greater Smart City productivity with 50 percent reduction in IT management time

By selecting a modular infrastructure, the university has been able to significantly reduce the management time for a platform of this size. Administrators use the integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller embedded in the server modules to control the servers and the centralized Dell Chassis Management Controller (CMC) to administer the overall platform.

Comments Yu, "In the past, we would have needed three people to manage a virtualized platform such as the one supporting our VDI, but now we need just one. Modular infrastructures are designed to be easier to manage, and the Dell FX solution is a great example

of what modularity brings to IT. Plus, the centralized CMC and preconfigured 10GbE network as part of the solution reduces administration workloads. I believe we've lowered management time by at least 50 percent, leaving more resources to invest in research."

Improved efficiency with operational costs down 20 percent

For now, the VDI back end supports 60 virtual machines (VMs), but it has the capacity to run up to 200 VMs if required. The big advantage for the university is that it will be able to run those 200 VMs without having to add new air conditioning units or extra power supplies to the data center. Plus, management time won't be increased in any real way. Comments Yu, "We can scale our VDI dramatically without increasing our IT footprint thanks to our Dell PowerEdge FX architecture, featuring Intel Xeon processors. We've calculated that these factors will save 30 percent in operational costs."

The operational costs will be further reduced now that the university is using Dell Wyse 5030 PCoIP zero clients connected to the Dell P2714H monitors across the institute. All software patching is completed centrally, simplifying administration even more. In addition, the endpoints have a longer life cycle than traditional PCs, saving further funds for the university. "We centrally manage our Dell Wyse clients, ensuring maximum performance for personnel at a lower IT cost," says Yu.

Greener environment with energy consumption cut 40 percent

The combination of the modular Dell solution and zero-client endpoints

has dramatically lowered energy consumption for the research institute. The Dell PowerEdge FX architecture, featuring Intel Xeon processors, was designed with energy efficiency in mind. The servers and storage share cooling, and the Intel Xeon processors within the FC630 server modules are some of the most power-efficient processors to date. Moreover, the Dell Wyse zero clients draw 8-15.5 watts of power — significantly less than a standard PC. Says Yu, "We're achieving energy savings in the region of 30 percent a year with our Dell end-to-end VDI featuring the Dell PowerEdge FX modular architecture. It has helped us align our operation with the goals of Smart City technology and reduce our impact on the environment."

Expected return on investment of 300 percent in five years

Yu is confident that the university will achieve a high ROI from the Dell solution. He points to the stability of the platform and the extended lifecycle of the Dell Wyse endpoints before estimating that the ROI will reach 300 percent in five years with the Dell platform. In addition to the stability of the infrastructure, it is also well supported by Dell. The university chose Dell ProSupport Plus, which provides a Dell technical account manager as a single point of contact and access to an elite team of engineers. "In essence, we have created a platform to really drive our Smart City research, so I think our relationship with Dell will be a long one," concludes Yu.

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