

How Seattle Children's Ensures Effective Enterprise-wide Virtualization

Deploys Proven Hitachi and Cisco Technologies for VMware
in High-Return, Low-Risk, Virtualized Data Center

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Executive Summary

Seattle Children's is a highly specialized hospital, research and foundation group responsible for saving lives and improving healthcare for children. To ensure reliability, flexibility and scalability for its enterprise-wide virtualization strategies, Seattle Children's selected a proven solution known as Hitachi Unified Compute Platform (UCP) Select for VMware vSphere with Cisco UCS..

UCP Select for VMware vSphere with Cisco UCS offers a blueprint for creating a cloud-ready infrastructure that integrates compute, network and storage resources. As industry leaders in storage, server, network and virtualization infrastructure software solutions, Hitachi, Cisco and VMware have the expertise to create a comprehensive virtualization solution that can be deployed quickly and safely.

Introduction

Seattle Children's is consistently ranked among America's best children's hospitals because it delivers world-class child healthcare from infancy to young adulthood to thousands of patients each year. Internationally recognized for pioneering pediatric medical research and achieving extensive grant funding, Seattle Children's provides inpatient, outpatient, diagnostic, surgical, rehabilitative, behavioral, emergency and outreach services, with nearly 60 pediatric subspecialties.

A group of philanthropic, compassionate women founded the hospital over 100 years ago. Today, Seattle Children's is teaming with renowned physicians, researchers, nurses and staff who are dedicated to serving every child who needs medical care. The Seattle Children's Research Institute includes 9 major centers and is at the forefront in cancer, genetics, pathology and bioethics. The Seattle Children's Foundation works with thousands of donors and guild members to provide millions of dollars in under- and uncompensated care.

Information is at the core of each child's care, every medical breakthrough and all that Seattle Children's undertakes to support excellence across the organization. "Gone are the days of keeping information on paper, in files, and verbally passing information from person to person. Healthcare today is about information that's digitized and accessible at any time across many devices. In IT, we help in the provisioning of healthcare by making sure that information is where it needs to be, when it needs to be," says Wes Wright, vice president and CTO at Seattle Children's.

Health Practitioners on the Move Require Enhanced Information Access

Every minute counts in the medical field, so Seattle Children's is focused on ensuring an uninterrupted flow of information, including access to patient records, cutting-edge research data and transactional accounts. The IT department supports all of the data for the hospital's overarching operational systems. This includes Cerner clinical, Epic revenue and patient systems, GE picture archiving and communication systems (PACS), and Microsoft Exchange Server. IT also manages 6,000 workstations and 400 applications through a system that has become increasingly difficult to use, and complicated to effectively support. The organization has a primary data center, as well as a smaller center used for proof-of-concept efforts and disaster recovery, and it uses VMware for its server virtualization environments.

The mission of Seattle Children's IT has been to get out of the way of the care provider. "We want IT to be there to enhance the patient visit, not to detract from it. The mobility of our practitioners is significant. The information needs that they have now, in this connected generation, are a challenge. A provider typically moves from one exam room to another exam room, to another, and then goes upstairs to an inpatient ward. He or she still needs all that information right away at each patient's bed: that's the challenge. But through that challenge, through us meeting that challenge, we can really see the impact that IT can have on the care of a patient," Wright explains.

His vision for Children's was to create a virtualized infrastructure from the server to the desktop. In this infrastructure, all server, storage and network resources would be pooled and dynamically moved as needed. The solution would move forward with a virtualized desktop infrastructure (VDI) implementation.

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*John Amato
Vice President and Publisher
Computerworld*

Children's had already standardized its workstation deployment using Citrix Provisioning Server and the Citrix XenApp environment. Now the hospital wanted to deploy a Citrix XenDesktop-hosted VDI for faster, easier cohesive user access to Microsoft Windows 7 desktops and clinical applications, anywhere in the hospital. The end-to-end Citrix VDI would allow the desktop to follow users, meaning that wherever and whenever practitioners logged on, they would find their desktop exactly as they left it.

To effectively support a constantly changing and growing healthcare entity, Wright also wanted to simplify IT management while improving efficiency, resiliency and scalability of systems across the organization. Virtualized environments of this magnitude can present complexities because multiple desktops, systems and applications demand large amounts of computing memory, power and operating costs.

VDI Deployment With World-Class Technology

As the Children's IT team planned for its VDI implementation, it was evident that much higher performance and scalability would be needed. The overarching goal was to incorporate best-of-class hardware, software, networking gear and storage to ensure a flawless deployment.

"We've been doing server virtualization for quite a while here at Seattle Children's with VMware, the predominant leader in server virtualization. As we looked to expand our virtualization investments, we needed the best server hardware platform to host our desktop virtualization initiative, and the best, most dependable and flexible storage to map to our performance and scalability goals. My team came back with solutions from Cisco and Hitachi, no question," explains Wright.

VMware Virtualization

The Citrix XenDesktop would be deployed on VMware vSphere 4.1 with VMware vCenter Server, for the most complete virtualization platform to transform IT hardware into a high-performance shared computing resource. VMware vSphere uses progressive application services to enable the highest levels of availability, security and scalability; it allows multiple virtual machines to be consolidated on a single physical server without sacrificing performance or throughput. Using vSphere, the Children's IT team can create both multicore virtual machines and virtual machine clusters that span multiple physical servers to support heavy application demands.

The vCenter Server creates a scalable and extensible virtualization management hub for hosts and virtual machines. The inventory and performance information gets stored in a database, and agents provide connectivity between the host and management server. The vCenter Server simplifies administrative access to multiple instances from 1 console, and reduces the time spent finding virtual machines, hosts and other inventory objects located anywhere in the enterprise.

Cisco Unified Computing System and Switches

For the best server hardware platform to support the VDI implementation, Children's turned to Cisco. The existing server configuration could not meet the performance demands or memory scalability that a large VDI deployment would require. During testing on the incumbent blade server infrastructure, VDI clients were scaled to a full load of approximately 60 users per server. At this load, performance relative to an existing desktop was decreased by 30% to 40%, and user log-on

times increased 2 to 10 seconds. Because of this impact to the user experience at a low virtual desktop density per blade server, it was apparent an alternate solution was required. Based on Seattle Children's assessment of the VDI implementation requirements, it became readily apparent that the Cisco Unified Computing System (UCS) platform was the way to go. Cisco UCS is a data center platform that unites computing, networking and storage access for comprehensive optimization of virtualized environments. The Cisco unified fabric is a low-latency, lossless, virtualization-aware 10Gb/sec Ethernet network. With centrally managed computing power, Cisco UCS securely isolates, carries and controls all IP, FCoE and virtual machine traffic, as do physical networks. That is because fabric extenders pass all network traffic to parent fabric interconnects for central processing and management, which boosts performance and simplicity. And by eliminating the need for multiple sets of adapters, cables and switches for LANs, SANs and high-performance computing networks, the Cisco UCS lowers the total cost of ownership (TCO) and improves business agility across the data infrastructure.

"The Cisco team installed the system and stayed onsite with us to help bring us up to speed on the Cisco Unified Computing System platform. When we implemented our VDI test environment, the ease of deployment, performance and scalability exceeded our expectations," says Jake Hughes, Children's chief technical architect.

Children's was able to deploy and scale the hosting environment using Cisco UCS Manager and preconfigured service templates. The virtual desktops are hosted on dual-socket, 6-core Cisco UCS blade servers, and are running Windows 7 for cohesive user access to productivity and clinical applications provisioned through Citrix XenApp.

To maximize traffic flows between UCS and the hospital's existing core switch infrastructure, and to increase performance and stability, Children's is using Cisco Nexus 5000 Series Switches. Nexus Switches include a virtual services appliance, a virtual switch and a choice of physical switches. In this case, Children's is using the Cisco Nexus 5010 switch, built around high-performance 10 Giga-bit Ethernet, Data Center Bridging (DCB) for lossless Ethernet, Fibre Channel over Ethernet (FCoE) and virtual-machine-optimized networking.

Storage networking for a diverse, performance-sensitive medical enterprise requires industry-leading scalability, availability, security, and ease of management. To provide all of this and still deliver long-term investment protection, Seattle Children's uses the Cisco MDS 9509 Multilayer Director SAN switch. Several of these switches collectively orchestrate the multifaceted requirements of their large virtualized data center storage environment. Sharing the same operating system and management interface with other Cisco data center switches, the MDS 9000 Family enables seamless deployment of unified fabrics with high-performance Fibre Channel and FCoE connectivity for lower TCO. "Our Cisco UCS decision is a game changer. I can fully load the system, and no one can detect a difference. It enables the hospital to fully utilize what we paid for and receive performance that exceeds our expectations. It's not just ideal for desktop virtualization, but it's also proved to be the right platform for our server virtualization, security infrastructure and management efficiency," Hughes extols.

Hitachi Storage

Seattle Children's approached Hitachi Data Systems with a series of storage issues, including siloed environments, legacy storage systems and a need for the highest I/O available.

The emphasis was on consolidating the storage infrastructure to meet very high performance and reliability requirements for IT's pervasive virtualization and architectural direction.

"We all know that there's an ever-increasing demand for storage. The more stuff we digitize, the more we have to store. We have some pretty big consumers of storage services, a lot of imaging, and significant requirements for some of the research activities that produce very large data sets. So, at the same time as we were working on finding our next-generation storage architecture to manage it all, the VDI project came to the forefront with its own set of storage demands. Hitachi had an offering that we were very much interested in: Hitachi Universal Storage Platform® V. Right as we got ready to purchase, the Hitachi Virtual Storage Platform (VSP) became available and we went in that direction," says Rich Carter, systems architect at Children's.

Wright adds, "When we jumped with both feet into this level of critical VDI project, we went with the best in class for all components, including storage. We wanted to look at storage from a fresh perspective: a targeted, uncomplicated solution that would deliver rock-solid reliability for the VDI initiative as well as future data growth. We chose Hitachi Data Systems for outstanding reliability, performance, technologies and price. We leaned toward the Hitachi Virtual Storage Platform as a solution that could swiftly address our dynamic data environments, one that we could easily scale without affecting performance or users."

Seattle Children's installed a Hitachi Virtual Storage Platform in its primary data center to function as the centralized storage solution. The storage sits behind the Cisco and VMware infrastructure so that as each virtual desktop device boots up, it pings the Virtual Storage Platform to obtain its virtual image.

VSP provides 3-dimensional scaling to dynamically scale up, out and deep. It uses Hitachi Dynamic Tiering to manage external storage resources as a whole, and to dynamically move data throughout virtual tiered storage for block, file and content data. Hitachi Command Suite v7 pitches in with comprehensive management to unify and simplify administrative tasks across the storage enterprise for the highest levels of operational efficiency. In addition to facilitating the virtualization of Children's existing assets, the VSP also supports solid state drives to further equip a flawless virtual desktop deployment.

"One of the reasons we went with Hitachi and the VSP is because we could make any number of adjustments in storage on the back end that would never affect our partners out there. It's transparent. Now, we can scale extensively and simply, going deep by externalizing storage, wide with our drive count, and up for performance with the capabilities of the processors. And the Virtual Storage Platform lets us go to very granular levels so we can grow as needed and better meet planning horizons and grow to meet future needs," says Wright.

At its secondary location, Seattle Children's installed a VSP in front of a Hitachi Adaptable Modular Storage (AMS) 2100 storage system. This allows storage to connect through VSP and access the virtualization layer, thereby facilitating a single common replication solution for addressing disaster recovery. The AMS 2000 family provides flexible, scalable storage for Microsoft and VMware environments and all enterprise mission-critical applications. The AMS 2000 family also natively supports VMware vStorage APIs for Array Integration (VAAI) for faster, more efficient data center network architecture.

Integrate Success With Three Technology Pillars

The integration of VMware, Cisco and Hitachi technologies using Hitachi Unified Compute Platform Select for VMware vSphere with Cisco UCS at Seattle Children's is something of a hallmark event. With the VDI project, Children's architected this combined solution to play a mission-critical role in supporting the hospital. The IT team performed a full set of failure mode analyses and effects, as well as extensive testing without flaw. According to Carter, the results show a very, very reliable and interoperable solution.

“In the medical world, we have about 80 bazillion different vendors. So when we were able to ratchet down a critical piece of infrastructure to just 3 vendors, I was pretty happy. When those 3 vendors combine to create the UCP Select for VMware vSphere with Cisco UCS, and it is supported from end to end, I'm ecstatic.”

*Wes Wright
Vice President and CTO
Seattle Children's*

"We were able to immediately begin leveraging the features that we built with VDI. The Hitachi Virtual Storage Platform is immensely scalable. The Cisco UCS infrastructure is immensely scalable. And VMware's cluster architecture really lends itself well to that usage. So we immediately began scaling out this VDI solution set for all of our infrastructure activities. Within a matter of months, it had displaced all other purchases within our data center," Carter explains.

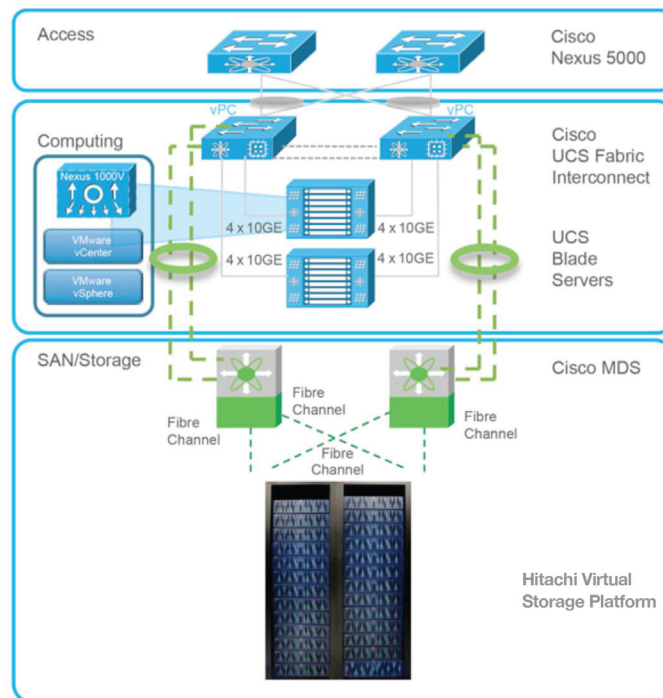
With the displacement of existing infrastructure by UCP Select for VMware vSphere with Cisco UCS, Children's also realized immediate benefits. "We saw instant improvements in the storage arena, with significant cost savings from our new ability to do thin provisioning with Hitachi Dynamic Provisioning, and about 50% to 60% less footprint, cooling and power consumption. With the Cisco UCS, we were actually able to buy minimum configurations and then move storage profiles to the most appropriate server system. Now we have advantages in the storage area networking integration, moving from 1 gigabit architecture to a 10 gigabit architecture. And then with VMware, we were able to leverage the distributed virtual switch on Cisco technology, as well as the VAAI architecture that allows us to deploy templates more quickly; and we were able to complete storage provisioning tasks for VMware systems at a much more effective capability level," Carter furthers.

"From a management perspective," adds Wright, "one of the major benefits we're realizing with this UCP Select for VMware vSphere with Cisco UCS offering is the lack of interruption for our users. And users can now move around the hospital and instantly access applications from any location, minus the wait times they had to endure previously. We can do everything from move, reallocate and provision storage without downtime, and with storage virtualization, we're reclaiming a good percentage of the storage that we used to have just sitting idle. I chalk that up to the reliability that our solution affords. I mean, we're pushing 3,000 desktops over the wire right now, running on Cisco UCS backed by Hitachi storage. That's a lot of eggs in one basket. If my VDI goes down, I lose 3,000 users all at one time, and that would really affect patient care. Reliability and performance were paramount in our choices to go with Cisco and Hitachi. We've gone from stability to agility in the data center, but in the middle is always reliability."

Seattle Children's Private Infrastructure Cloud Solution

The IT team at Seattle Children's internally researched, tested, validated and implemented its VDI solution based on Hitachi Unified Compute Platform Select for VMware vSphere with Cisco UCS. Wright, Hughes and Carter knew that they had a winning solution. What they didn't know was that several months after the successful launch of their VDI deployment, their trio of solution providers would formalize an integrated, preconfigured, storage reference architecture (see Figure 1).

Figure 1. Hitachi Unified Compute Platform Select for VMware vSphere with Cisco UCS



UCP Select for VMware vSphere with Cisco UCS offers a blueprint for creating cloud-ready infrastructure that integrates compute, network and storage resources. As industry leaders in storage, server, network and virtualization infrastructure software solutions, Hitachi, Cisco and VMware have the expertise to create a comprehensive virtualization solution that can be deployed quickly and safely.

Unlike custom-integrated approaches that require exhaustive testing and integration costs, the UCP Select for VMware vSphere with Cisco UCS is a fully validated framework for speeding deployments and reducing risks across data center deployments.

Administrators can simply select the options that meet their needs, with the assurance of built-in flexibility and interoperability to scale the architecture as business needs change.

In addition to the technical and economic advantages, organizations benefit from a coordinated relationship with 3 respected industry leaders, each known for innovative solutions and outstanding service and support.

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"The fact is that Seattle Children's put together a world-class, best-of-breed solution for our VDI

deployment, based on the same partners ... pretty much the same solution, actually, as the UCP Select for VMware vSphere with Cisco UCS. I'd say it was pretty serendipitous. I mean we put a great deal of energy and thought and research into the solution we chose, the technologies we integrated, and it turns out we now have something in place that other large organizations can simply lock and load through the UCP Select for VMware vSphere with Cisco UCS," he concludes.

For More Information

To learn more about Hitachi Unified Compute Platform Select for VMware vSphere with Cisco UCS, please visit www.HDS.com.

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