Radiology Services Provider Creates Highly Available Environment

NightHawk Radiology Services built data center using Unified Computing System and Nexus switch platform.

EXECUTIVE SUMMARY

NightHawk Radiology Services

- Healthcare
- Scottsdale, Arizona
- 500 Employees

CHALLENGE

- Ensure availability of critical healthcare service
- Minimize data center costs
- Avoid service disruption during transition

SOLUTION

- Deployed Cisco Unified Computing System, using services from WWT, a Cisco Gold Certified Partner, and Cisco Advanced Services
- Used Cisco Nexus 1000V software switch for switching within the VMware vSphere environment
- Implemented Cisco Nexus 5010 Switches with Fibre Channel over Ethernet (FCoE) support

RESULTS

- Reduced physical server count by more than 50 percent
- Lowered per-chassis cabling requirements by a factor of five
- Gained ability to provision physical servers in 15-20 minutes

Challenge

NightHawk Radiology Services, headquartered in Scottsdale, Arizona, is leading the transformation of the practice of radiology by providing high-quality, cost-effective services to radiology groups and hospitals throughout the United States. NightHawk provides a complete suite of solutions, including professional services, business services, and an advanced, proprietary clinical workflow technology, all designed to increase efficiencies and improve the quality of patient care and the lives of physicians who provide it. NightHawk's team of U.S. board-certified, state-licensed, and hospital-privileged physicians, located in the United States, Australia, and Switzerland, provides services 24 hours a day, seven days a week, for approximately 1600 sites, or 26 percent of all hospitals in the United States.

When NightHawk decided to relocate one of its main data centers to Scottsdale, Arizona, the IT department sought to create a highly available and scalable environment. "Systems availability is a paramount concern," says Ken Brande, vice president of IT for NightHawk Radiology Services. "In some businesses, the cost of a server outage is revenue loss. In our business, server outages, even brief ones, are unacceptable because the cost is not measured not in dollars, but rather in delayed delivery of patient care."

In designing the new center, NightHawk looked for technology with the highest level of redundancy and resiliency. If any single server failed, a local redundant server would take its place. For additional protection, the company would pair the new data center with an existing data center in Chicago in an active-active configuration. If either data center experienced a total failure, the other data center could take over its workload.

Solution

After evaluating computing platforms, NightHawk chose the Cisco Unified Computing System® (UCS), which combines compute, network, storage access, and virtualization in a cohesive system that can be managed as a unified entity. “One of the biggest attractions for us was FCoE [Fibre Channel over Ethernet] support, which halves the number of cables we’ll need to manage,” says Jordan Kojouharov, IT director, NightHawk Radiology Services.

NightHawk needed to implement the Cisco® UCS quickly and be prepared to manage it from day one. Therefore, the IT team engaged Cisco Advanced Services to deliver the Cisco UCS Starter Kit service, which includes installation and configuration of hardware and software, deployment of physical and virtual servers, and knowledge transfer. WWT, a Cisco Certified Gold Partner, helped implement the Cisco Nexus® Switches and NetApp storage, and worked alongside Cisco Advanced Services and the NightHawk IT team to prepare service profiles for NightHawk’s VMware vSphere environment.

The Cisco UCS consists of four chassis, currently housing 18 Cisco UCS B200 M1 Server Blades. A single pair of Cisco 6100 Fabric Interconnects provides Ethernet and storage area network (SAN) connectivity for all chassis and blades, eliminating the need for separate network interface cards, cables, and switch ports for application and storage traffic (see “Technical Implementation”).

NightHawk configured eight Cisco UCS blades as VMware ESX servers, each hosting approximately 10 virtual machines. The company expects to double the number of virtual machines per host to 20 after further testing. To apply consistent network and security services to all virtual machines as they move between blades, NightHawk uses the Cisco Nexus 1000V Switch, a software switch that operates inside the VMware ESX hypervisor to give the network team complete visibility into the virtual machine environment.

The Cisco UCS coexists with NightHawk’s existing servers, which connect to the Cisco Nexus 5010 Switches using FCoE. This arrangement has enabled the company to gradually move new application components onto the Cisco UCS, after thorough testing.

> “With Cisco UCS Manager service profiles, we can very quickly reconfigure any server blade so that it’s ready for production in 15-20 minutes. Rapid configuration is critical in our environment, where a server outage is simply unacceptable.”
>
> **— Ken Brande, Vice President, IT, NightHawk Radiology Services**

Results

Competitive Advantage Through High Availability

“The Cisco UCS delivers the high availability we need to attract and retain customers,” Brande says. If a server blade should fail, for example, the IT department can use Cisco UCS Manager to move the virtual machines on that blade to any other available blade, in the same or a different chassis.

The ease of moving virtual machines between servers on the Cisco UCS helps ensure that adequate compute capacity is available between midnight and 5:00 a.m., when the company receives three-quarters of its images. “If we want to apply an operating system upgrade to a server blade in the afternoon, we can quickly move the virtual machines to another blade, and then just as quickly move them back when the upgrade is complete,” says Brande. “We no longer have to postpone software updates out of concern that we will have reduced production capacity during our peak nighttime hours.”

Simplified Management

Using Cisco UCS Manager service profiles, an administrator can change an operating system configuration and then apply it to multiple server blades at the same time, saving time and reducing configuration errors. Cisco UCS Manager can also send alerts based on specified conditions. The service profiles and templates in Cisco UCS Manager will become increasingly useful as NightHawk adds server blades, according to Kojouharov. “VMware ESX servers are easier to deploy on Cisco UCS,” he says. “We simply insert the blade, attach a server profile, and the installation is complete.”

Firmware upgrades are easier as well, because the IT team simply attaches the upgrade to the template, and then Cisco UCS Manager automatically updates all server blades associated with that template. Cisco UCS Manager templates enable the IT team to update all servers in just 30 minutes, compared to 20 hours with the previous computing platform.

Lower Costs

The new data center costs less to maintain than NightHawk’s other data center, for the following reasons:

- **Fewer physical servers:** With Cisco UCS, all application components reside on a single Cisco UCS with 18 server blades. “When we fully migrate our data center to the Cisco UCS, the number of devices we need to power, cool, and manage will decrease dramatically,” Brande says.
- **Fewer cables and network interfaces:** Any other computing system would have required six to eight Gigabit Ethernet network connections to support virtualization. “With Cisco UCS, we need only two 10 Gigabit Ethernet interfaces, which significantly reduces cabling and port costs,” says Chris Smith, manager of datacenter operations, NightHawk Radiology.
- **Fibre Channel over Ethernet:** Network traffic and storage traffic travel from the Cisco UCS server blades to the Cisco UCS 6100 Fabric Interconnects over FCoE instead of separate Ethernet and Fibre Channel cables. Therefore, NightHawk decreased per-chassis cables by a factor of five, overall Ethernet switch ports by a factor of ten, and Fibre Channel switch ports by a factor of four. “The FCoE support in the Cisco UCS reduces Ethernet and Fibre Channel infrastructure costs, and also enables us to use more of our power and cooling budgets on servers,” says Smith.

Increased Business Agility

Cisco UCS Manager has decreased the time needed to deploy and manage servers by 80 percent, while also increasing stability and availability. “With Cisco UCS Manager service profiles, we can very quickly reconfigure any server blade so that it’s ready for production in 15 to 20 minutes,” says Brande. “Rapid configuration is critical in our environment, where a server outage is simply unacceptable.”

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Next Steps

After NightHawk deploys a Cisco UCS in its Chicago data center, the IT department will implement the active-active design between Scottsdale and Chicago, for even greater resiliency. The IT department also plans to connect the Cisco UCS directly to the Fibre Channel storage network, eliminating the need for fibre-channel storage area network switches.

Kojouharov concludes, “With the Cisco UCS, we’re managing less equipment and fewer cables in our new data center, which minimizes the things that can go wrong. We expect the benefits to multiply as the business grows and we add new servers.”

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> **— Chris Smith, Manager of Datacenter Operations, NightHawk Radiology Services**

Technical Implementation

The Cisco 6100 Fabric Interconnects separate NightHawk’s application and storage traffic, directing application traffic through a pair of Cisco Nexus 5010 Switches to Cisco Catalyst® 4900 Switches in the network core, and storage traffic through a Cisco MDS 9124 Multilayer Fabric Switch to NetApp fibre-channel storage. More than a dozen additional data center servers connect to the Cisco Nexus 5010 Switches through Cisco Nexus 2000 Fabric Extenders, which are managed through the Cisco Nexus 5010.

PRODUCT LIST

Data Center

- Cisco Unified Computing System
- Cisco Catalyst 4900 Switches
- Cisco Nexus 5010 Switches
- Cisco Nexus 1000V Switches
- Cisco MDS 9124 Multilayer Fabric Switch

For More Information

To find out more about the Cisco Unified Computing System, visit: http://www.cisco.com/go/ucs.

To find out more about Cisco Data Center 3.0 solutions, visit: http://www.cisco.com/go/datacenter.

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