Health Care System Meets Storage Demands with Converged Infrastructure

Customer Case Study

Adventist Health System deploys high-density infrastructure to maximize flexibility in unpredictable health care environment.

EXECUTIVE SUMMARY

Customer Name:
Adventist Health System

Industry: Healthcare

Employees: 70,000

Location: Altamonte Springs, FL

Business Challenge:

- Design scalable data center
- Meet demands associated with rapidly increasing volumes of health care data
- Gain flexibility in supporting wide range of device access protocols

Network Solution:

- Cisco Nexus 7000 Series Switches with Multi-hop Fibre Channel over Ethernet
- Cisco Nexus 5000 Series Switches
- Cisco Nexus 2000 Series Fabric Extenders
- Cisco Nexus 1000v Series Switches
- Cisco MDS 9000 Series Multilayer Directors
- Cisco Data Center Network Manager and Cisco Fabric Manager

Business Results:

- Reduced cabling and equipment racks
- Significantly reduced infrastructure cost, which enabled funding a refresh of server environment supporting virtualized applications
- Gained flexibility, agility, and a new level of collaboration among technology teams

Business Challenge

Adventist Health System is a large, faith-based health care provider. The system's hospitals include nearly 8300 licensed beds and provide care for 4.5 million patients each year in inpatient, outpatient, and emergency room visits. The IT department, AHS Information Services (AHS-IS), provides technology systems and services for 32 of Adventist Health System's 45 campuses over nine states. Recently, while planning for its new data center, the AHS-IS team had several criteria for its new infrastructure.

Storage demand has escalated rapidly over the past several years. AHS currently supports 400 terabytes (TBs) of structured and application data and adds three TBs per month of unstructured data. It also maintains 500 TBs of backup storage, which does not include storage at the disaster recovery site. AHS needed the ability to support third-party vendor solutions that attach to its network but have widely varying connection interfaces. The team needed the flexibility to support diverse storage technologies with Ethernet or Fibre Channel (FC) connectivity without having to reconfigure the network.

"We are dealing with a rapid increase of data," says Ed Diaz, architect for networks at AHS. "Diagnostic modalities now employ high-resolution cameras, which create huge imaging files that place new demands on our transport and storage resources."

Adventist Health System's business goals include growing the number of affiliated physician practices. Therefore, the new architecture had to support increasing storage volumes and mission-critical clinical systems for widely dispersed hospitals and physician practices.

Previously, AHS had separate LAN and SAN infrastructures within the data center. They used Cisco® MDS 9509 Multilayer Directors for SAN core and access switching and Cisco Catalyst® 6500 Series Switches for LAN core and access

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"Over time, as we refresh our storage environment, we can retire FC ports and move to FCoE without wasting any of our investment. The new converged infrastructure has delivered many technical and non-technical benefits to our team."

Ed Diaz
Network Architect

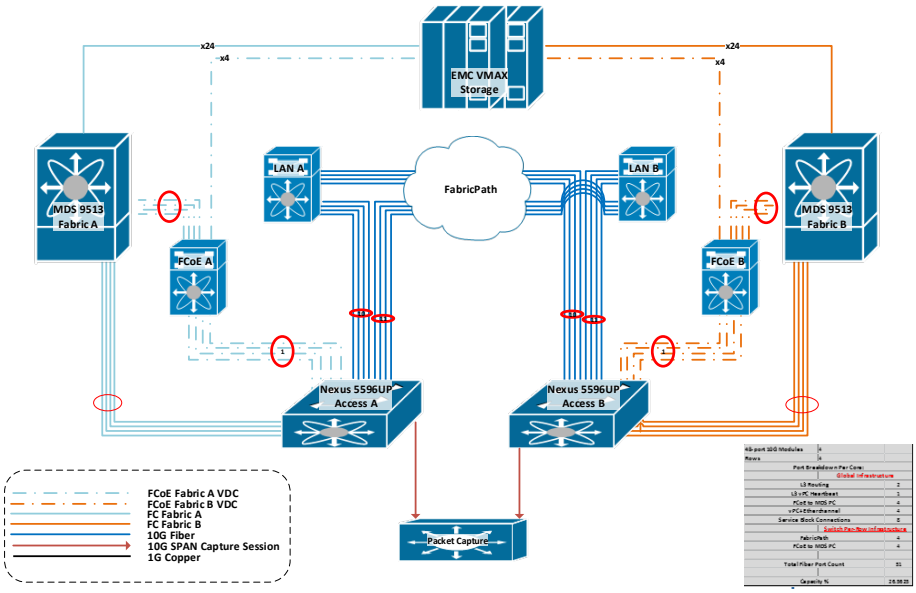
switching. When it came to potential solutions for the new data center, Fibre Channel over Ethernet (FCoE) technology offered an option for converging LAN and SAN infrastructures and conserving valuable rack space by sharing the access layer.

The team wanted to preserve existing FC connections while gaining the benefits of a converged data and storage fabric. Without converging network and SAN fabrics, this option would not be possible. To address these business challenges, Cisco collaborated with AHS to define a vision and future state architecture incorporating unified storage and data networks with consolidated blade server infrastructure.

Network Solution

AHS chose Cisco Nexus® Switches with FCoE capabilities to build a high-density, high-performance converged data center infrastructure. Cisco Nexus® Series Switches feature the state-of-the-art Cisco NX-OS operating system, which supports aggregation, high density, and end-of-row/top-of-rack server connectivity to deliver high resiliency and scalability.

Figure 1. Enterprise Technology Planning and Architecture: Converged Access Per Row



AHS implemented redundant Cisco Nexus 5500 Series Switches and Cisco Nexus 2000 Fabric Extenders for the access layer. They connect to a redundant pair of Cisco Nexus 7010 Series Switches over 80-Gbps Ethernet links using Cisco FabricPath technology. The FabricPath infrastructure provides scalable Layer 2 multipathing, which improves resiliency by increasing bandwidth, enabling multiple parallel paths between nodes, and load-balancing traffic where alternative paths exist.

The Cisco Nexus 5500 systems also connect to the Cisco Nexus 7010 systems through Multi-Hop FCoE fabrics, which AHS implemented at 4 links of 10 Gbps. These fabrics are implemented within virtual device contexts (VDCs), which allow switches to be virtualized and presented as multiple logical devices. VDCs run as separate logical entities within the switches, maintaining their own unique set of running software processes, having their own configurations, and being managed by separate administrators. With separate VDCs, the LAN and SAN teams can each manage their portions of the switch without compromising the activities of the other team.

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The Cisco Nexus 5500 Series Switches provide access to traditional FC SAN resources using Cisco MDS 9000 Series Multilayer Directors. The Nexus 5000 unified port feature enables AHS to switch ports for either FC or FCoE, maintaining investment protection and offering a migration path to FCoE. Cisco MDS 9000 systems deliver the performance, availability, scalability, and security needed for mission-critical applications and massive amounts of data in the storage environment.

"The Cisco MDS 9000 Series systems give us the backward compatibility we needed to support vital legacy systems that work with our tape backup libraries," says Jose Figueroa, SAN architect for AHS. "They also give us tremendous scalability for growth. We need the ability to quickly be flexible as new business initiatives are implemented."

AHS manages the converged infrastructure using Cisco Data Center Network Manager (DCNM), which combines management of Ethernet and storage networks into a single dashboard. AHS uses Cisco DCNM to manage bulk configurations, for alerting and reporting, and to gain holistic visibility across the infrastructure.

Business Results

The new infrastructure supports Adventist Health Systems' mission-critical applications and data, including email, electronic health records, virtualization, and imaging system archives.

By adopting the future state architecture proposed by Cisco, AHS was able to reduce cabling infrastructure and the number of server racks needed in their new data center. AHS ended up needing only 40 cabinets instead of the estimated 70 cabinets originally planned. As a result, the data center today is 39 percent full instead of 61 percent full, giving AHS tremendous capacity for growth without affecting the infrastructure.

Traditionally, virtualization host servers required seven 1-Gbps data network links and two FC links. AHS greatly reduced cabling requirements with high-density chassis and 10-Gbps links. With storage and data traffic converged over one interface, each server requires only two cables.

"The financial savings were extraordinary," says Diaz. "The ability to converge and share the access layer infrastructure saved $600,000 on networking costs alone."

The converged infrastructure yielded sufficient savings to replace aging servers. AHS will gain more cabling and space savings as additional servers are refreshed and all are eventually migrated to FCoE.

The new converged infrastructure also enabled better collaboration between storage, server, and network teams. The LAN and SAN teams now share access layer management. VDCs offer a secure network partition, enabling each team to administer and maintain its own configurations to avoid compromising each other's domains.

"A converged access fabric allowed us to close a big gap in our ability to collaborate successfully," says Figueroa. "Our teams interact more, and we are able to coordinate more efficiently, communicate better, and back each other up. We have better synergy and a more collaborative environment, which was a significant goal."

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PRODUCT LIST

- Cisco Nexus 7000 Series Switches with Fibre Channel over Ethernet
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Finally, AHS gained the agility that it needs for accommodating a wider range of vendor appliances and devices in the data center. Switch ports can be almost instantly repurposed if needed. If more bandwidth for FCoE traffic is needed, it can be moved quickly and soft-provisioned without having to re-wire systems. AHS can easily provide whatever access protocol is needed to attach to the network.

Next Steps

"Over time, as we refresh our storage environment, we can retire FC ports and move to FCoE without wasting any of our investment," says Diaz. "The new converged infrastructure has delivered many technical and non-technical benefits to our team."

With requirements constantly changing in the health care environment, this new infrastructure provides AHS the ability to easily manage and continue to meet the health care system's goals of delivering better care to its patients.

For More Information

To find out more about Cisco Fibre Channel over Ethernet visit: http://www.cisco.com/en/US/netsol/ns1060/index.html.

To learn more about Adventist Health System, visit https://www.adventisthealthsystem.com.

This customer story is based on information provided by Adventist Health System and describes how that particular organization benefits from the deployment of Cisco products. Many factors may have contributed to the results and benefits described; Cisco does not guarantee comparable results elsewhere.

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