

CARILION CLINIC ADVANCES PATIENT CARE AND ENSURES ELECTRONIC HEALTH RECORDS AVAILABILITY WITH JUNIPER INFRASTRUCTURE

Summary

Industry: Healthcare

Challenges: Build a secondary data center to ensure the availability of Carilion Clinic's electronic medical records and other life-critical systems, as well as a high-performance network to support the needs of its patients and new medical school.

Selection Criteria: Price, performance, and ease of operations in a multivendor network environment

Network Solutions:

- EX Series Ethernet Switches
- M Series Multiservice Edge Routers

Results:

- High-performance, highly reliable data center infrastructure to meet business continuity objectives
- High-performance network to support operations at the comprehensive clinic and medical school
- Ease of operations in a multivendor network
- Competitive leverage and the avoidance of vendor lock-in by adding a second networking vendor

Carilion Clinic has evolved from a traditional network of hospitals to a comprehensive clinic that is leading the industry with patient-centered care, innovative medical education, and cutting-edge clinical research. By following the principles of patient-centered care, the clinic ensures that it delivers the right care, the highest quality care, and the most effective care for each individual patient. Carilion has more than 600 physicians in a multi-specialty group practice and eight not-for-profit hospitals in the Roanoke, VA area.

Carilion Clinic's new Riverside Center, which embodies the comprehensive clinic model, opened in September 2009. Patients have access to numerous specialties in one location, which streamlines and improves care. Riverside Center is home to orthopedic, internal medicine, rheumatology, gastroenterology, neurosurgery, physical medicine, neurology, general and breast surgery, and trauma surgery physicians. By allowing physicians, nurses, and staff to work collaboratively, and by taking advantage of the most advanced medical technology, patients spend less time looking for care and more time receiving the care they need.

Carilion Clinic partnered with Virginia Tech to create the Virginia Tech Carilion School of Medicine and Research Institute, which opened in August 2010. VTC, as it is known, is housed in a 150,000 square foot facility at Riverside Center. The school's curriculum is unlike a traditional classroom focused medical school; instead, students participate in patient-centered, case-based learning and regularly interact with physician faculty while spending less time attending lectures.

Carilion is a demonstrated leader in healthcare IT. Three of its hospitals are ranked as Stage 6 in electronic medical records (EMR) adoption (out of a possible eight stages) by HIMSS Analytics, which puts it on a par with facilities such as the Mayo Clinic and Johns Hopkins. It was named one of the "100 Most Wired" hospital systems by Hospitals & Health Networks in 2009. Daniel Barchi, senior vice president and CIO, was honored in the 2009 CIO 100 Awards from CIO magazine.

Challenges

When Carilion Clinic moved to a comprehensive clinic model, its healthcare IT systems needed to transform with the business. "When we made the decision to go from a healthcare system to a clinic model, similar to the Mayo Clinic or Cleveland Clinic, we had to unify the systems we used in our different hospitals and ambulatory clinics," says Mike Smith, director of technical services at Carilion Clinic.

Carilion Clinic replaced multiple electronic and paper systems with a single EMR system. The Epic EMR is used for all patient history, physician documentation, and billing across all of its hospitals and physician practices. Patients can schedule appointments, see their medical history, and interact online with their doctors.

Epic is central to the operations of all its hospitals, clinics, and physicians, and so Carilion Clinic needed a secondary data center to ensure the ongoing availability of its IT systems. It also needed a high-performance, flexible network infrastructure that supported the as yet unknown needs of its new medical school. “All of our facilities are dependent on Epic, so we needed to build a secondary data center so if anything happened to our primary data center, operations wouldn’t come to a complete halt,” says Smith.

Selection Criteria

While a backup data center would ensure that Carilion Clinic met its business continuity requirements, it also wanted to support the ability to roll out new applications and services in support of the medical school. “We’re building a research institution at the medical school, and the researchers can’t predict in advance what they’ll need from the network,” says Smith. “The network has to be extremely high performance and flexible.”

Carilion decided to use Juniper Networks products for the secondary data center and its Riverside Center. The migration to Juniper products hinged on price, functionality, and operational simplicity in a multivendor network.

“We liked the manageability and flexibility of Juniper’s EX Series switches,” says Smith, who already knew of Juniper’s reputation for high performance and carrier-class reliability because the Clinic used Juniper’s remote access and firewall products. “We already had a relationship with Juniper, but the secondary data center moved that relationship into switching and routing,” says Smith.

“Junos OS fits nicely into our change management process.”

Mike Smith,
director of technical services, Carilion Clinic

Solution

The architecture for the secondary data center mirrors the primary data center, with the exception that Juniper Networks® EX8208 Ethernet Switch serves as end-of-row switches to support the server racks. The Juniper Networks EX8200 line of Ethernet switches delivers the port densities, scalability, and high availability required for demanding data center and campus core environments. Using an end-of-row approach is cost effective in terms of switch and port density and also provides flexibility to support a broad range of servers.

Carilion Clinic uses Juniper Networks EX4200 Ethernet Switch with Virtual Chassis technology at Riverside Center, both to support clinic operations and the medical school. The medical school infrastructure is built for high performance and flexibility. Desktops have Gigabit Ethernet connections, and there are

multiple 10GbE connections to the campus core. Virtual Chassis technology enables up to 10 interconnected EX4200 switches to operate as a single, logical device, combining the availability and reliability of modular systems with the economics and flexibility of stackable switches to deliver a high-performance, scalable solution for data center and campus environments.

Carilion Clinic uses a Juniper Networks M10i Multiservice Edge Router to connect its primary and secondary data centers at OC-12 speeds. The M10i Multiservice Edge Router, a compact and fully redundant routing platform, supports 16 Gbps of throughput and is ideal for enabling reliable and secure services in small and medium-sized service provider points of presence (POPs) and enterprise networks.

A metro area OC-192 SONET ring connects Carilion’s major hospitals, primary and secondary data centers, and Riverside Center. Ethernet traffic is transmitted over the SONET ring using Ethernet Packet Ring Service (EPRS). Its other hospitals and clinics are connected to the SONET ring via MPLS.

All of the Juniper products run the Juniper Networks Junos® operating system, a reliable, high-performance network OS for routing, switching, and security. Running Junos OS in a network improves the reliability, performance, and security of existing applications. It automates network operations on a streamlined system, allowing more time to focus on deploying new applications and services. And it’s scalable both up and down.

Results

Carilion Clinic now has a state-of-the-art data center and campus network that can meet its operational needs today while adapting to accommodate future services and applications. Carilion has plans to use quality of service (QoS) to ensure the performance of all business critical applications over the network, including voice. With Junos OS’ advanced QoS capabilities, Carilion can enforce QoS policies for its EMR, voice, video, and other mission critical applications across its MPLS network. The Clinic also plans to expand its use of video, and thus IP multicast on its routing infrastructure.

By adding a second vendor to its enterprise network infrastructure, Carilion Clinic has achieved competitive leverage and avoided vendor lock-in. Integration of Juniper switches into the existing infrastructure was well planned and smooth. The operational impacts of introducing Juniper for networking infrastructure were modest and easily handled—as they must be, since Smith and his team of five engineers support both voice and data systems for more than 12,000 employees.

The migration to the open OSPF routing protocol also went smoothly. OSPF allows for a more efficient, scalable, and interoperable network. “We didn’t have any problems migrating to OSPF,” says Smith. “We mapped out our transition strategy in advance, and phased it in.”

The IT team quickly adapted to the single Junos OS platform. "It was easy to learn the Junos operating system," says Smith. In particular, Smith appreciates the flexibility of the EX Series Virtual Chassis capabilities. "It's much easier to manage," he says.

With its strong discipline in IT service management, Carilion's IT staff manages its multivendor environment without adding complexity to network operations. "We're very ITIL-oriented," says Smith. "Junos OS fits nicely into our change management processes. With Juniper, we can automate management with scripts, turn capabilities on and off, support multiple switch configurations, and easily roll back configuration changes."

Junos OS brings operational efficiencies to everyday activities. "With Junos OS, our senior engineers can create the switch configurations and put them into HP® Service Manager," says Smith. "A lower tier engineer can apply the change at the appropriate time. If there's a problem, the first tier engineer knows what was supposed to happen and can roll back the change. My more experienced engineers don't have to be available all the time, which is better for retention and their quality of life."

And of course, Carilion Clinic has met its high-performance and high availability requirements. "We've had zero downtime since we put in the secondary data center," says Smith.

Next Steps and Lessons Learned

Looking back on a massive overhaul of its healthcare IT systems, data center, and campus networks, Smith offers other IT managers a few words of advice on ensuring successful projects: "Make sure you plan ahead. If you do it right the first time, you'll save yourself a lot of rework. Many IT managers jump in feet first, and then they have to rework."

For More Information

To find out more about Juniper Networks products and solutions, visit www.juniper.net.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

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