State Pioneers Network Virtualization to Save Taxpayers Money

Oregon meets mandate with network virtualization solution that saves money, strengthens security, and enhances services.

EXECUTIVE SUMMARY
State of Oregon
• **Industry:** Government
• **Location:** Oregon, USA
• **Number of Employees:** 45,000 state and local government staff
BUSINESS CHALLENGE
• Maintaining separate IT infrastructures for state agencies was costly and inefficient
• State legislature needed to meet federal government consolidation standards
• Legislative mandate required establishment of one state-operated facility to replace 11 agency data systems
NETWORK SOLUTION
• Cisco Catalyst 6500 Series Switches and Cisco 7600 Series Routers support high-performance core and virtualized network using MPLS VPN
• Catalyst Firewall Services Modules provide high-density, flexible, cost-effective security for state and all agencies
BUSINESS RESULTS
• State of Oregon is saving over $50,000 a month in WAN circuits, while creating fully redundant network infrastructure
• Agencies can now add virtual firewalls anywhere without dedicating circuits to isolate traffic, strengthening security while allowing for greater operational flexibility
• State Data Center (SDC) network group is delivering services faster, and has foundation for delivering new types of services to enhance communications and collaboration

Business Challenge

The Oregon Trail, which stretched 2000 miles from Missouri to Oregon, played a major role in settling the America frontier. Today Oregon is at the forefront of a new frontier: using virtualization technology to create a shared-information technology infrastructure that is transforming the way government agencies collaborate and communicate.

The Oregon state legislature mandated the consolidation of separate agency data centers to meet federal government standards. IT professionals from 11 state agencies worked with Cisco and other vendors on a multiyear initiative to create a single State Data Center (SDC). In 2008, the new SDC was recognized by the Computerworld Honors Program as "the most far-reaching technology initiative undertaken by Oregon or any other state."

Prior to the groundbreaking program, one state legislator described the state government's IT culture as "a very expensive hodgepodge of isolated systems, redundant functions, and architecture customized to serve hundreds of different applications."

The largest state agencies, including Administrative Services, Transportation, Corrections, and Oregon State Police, operated autonomous IT operations. Separate data networks, close to 2000 WAN circuits crisscrossed the state, yet agencies had very limited ability to share information with each other. Even in buildings housing multiple agencies, there was no common infrastructure. Despite the proliferation of circuits, few agencies had fully redundant networks, leaving agencies vulnerable to outages. There were close to 200 physical firewalls deployed by agencies, with no common way to manage them; extending the protection of physical firewalls to new offices or locations was difficult, hampering flexibility and growth.

To plan the consolidation, cross-agency workgroups were formed to analyze all aspects of the state's IT needs, from security to software applications. There were three requirements for the consolidation: 1) security policies for each agency had to remain intact, 2) existing IP addresses had to be maintained, and 3) the new SDC had to deliver the same level of services, or better, to agencies.

Network Solution

Prior to consolidation, the Department of Administrative Services (DAS) was charged with providing IT services to smaller state agencies, boards, and commissions without technical resources of their own. To serve these agencies at a lower cost and with greater flexibility, DAS had begun using Cisco network virtualization technology based on Multiprotocol Label Switching (MPLS) VPN. On a small scale, virtualization had been a great success, allowing DAS to connect users and resources at any location in the network, and eliminating manual reconfiguration when groups are added or changed. In effect, through the DAS initiative, the State of Oregon had a successful pilot for virtualization, and this cemented the recommendation to move to network virtualization to serve all of the state agencies from the new SDC.

The SDC uses a three-layer core, access, and distribution architecture. The 10 Gigabit core is based on Cisco Catalyst® 6500 Switches and Cisco® 7200 Series Routers. The core is completely redundant, providing a higher level of statewide reliability than the isolated agencies could achieve independently. Reliability has been enhanced by standardizing on Cisco equipment end-to-end, phasing out unmanageable devices in the network, reducing the number of management systems, and working in a virtualized environment. SDC has been able to implement service-level agreements (SLAs) for agencies based on three 9s availability.

The SDC set up points of presence (POPs) in larger cities, such as Portland and Salem, extending service from the POPs to state office buildings. A single building might house multiple agencies and thousands of employees, including smaller boards and commissions with only a handful of people. "Prior to consolidation and network virtualization, one building might have multiple, discrete networks, and one agency could not take advantage of another agency's resources," says Frank Hoonhout, a senior network engineer lead for the SDC. "It was tremendously inefficient and expensive. With network virtualization technology, we have eliminated the siloed and overlapping agency networks. We have one statewide network that is divided into logical, secure sub-networks for each agency, even the smaller authorities."

Historically, some larger agencies have provided network services to county boards, departments, and commissions, and Internet access to the community as well. With virtualization, adding these types of constituents is as simple as assigning a new VPN Routing and Forwarding (VRF) instance to give a group its own logical network, complete with a virtual firewall enabled by the Cisco Firewall Services Modules (FWSM) in the Catalyst 6500 chassis. A single Cisco FWSM in a Catalyst 6500 provides firewall protection for multiple departments, even if the departments are not part of the same agency or even co-located. Nearly 200 physical firewalls operated by state agencies have been eliminated. The virtual firewalls save on equipment costs, while making it easier and faster to add firewall protection anywhere in the network.

From finance to forestry, security policies can vary widely across departments. Agency administrators can configure a virtual firewall to meet their specific needs, maintaining the same level of policy control that they had with physical firewalls, as mandated by the consolidation project. "With the Cisco FWSM modules, we can create security policies based on a user group, service, or even an application. We have a lot more flexibility, and at the same time more ubiquitous security," says Hoonhout.

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>
> **—Frank Hoonhout, Senior Network Engineer Lead, Oregon State Data Center**

Business Results

According to Oregon state representative Chuck Riley, one of the most important benefits of the consolidation project was saving money. "Cost containment is critical when you're dealing with other people's money: the taxpayers." Within the first 6 months of the network consolidation and conversion to Ethernet project the state realized over $50,000 a month in savings. With network virtualization, we have reduced the number of circuits from about 2000 to about 600," says Hoonhout. The WAN savings are continuing to grow as the network team migrates from expensive Frame Relay circuits to Ethernet circuits.

Standardization was another important goal, and now the statewide network is managed by a 14-person team using one management system. "Previously, each agency had its own suite of management tools," says Hoonhout. "With the Cisco end-to-end network, we have a smaller set of tools with greater visibility across the entire network."

The SDC can now use the consolidated, virtualized network infrastructure as the foundation for better service. For example, video surveillance is an important consideration for the physical security of state buildings, staff, and citizens. In the past, the isolated networks of each agency made it difficult to provide networked video surveillance within a building or across geographic areas. Now, the SDC can add video surveillance in any location, over one network, while restricting monitoring access to authorized personnel by facility, function (such as law enforcement), or agency.

"In the past, the reliance on installing physical circuits to support office moves and changes meant a month or two of waiting for new services," says Hoonhout. "Now we no longer have to dedicate a circuit and install a router to isolate traffic; we simply configure a VRF and virtual firewall. In some cases, moving people and offices is as simple as a configuration change to a VRF that takes minutes."

For the first time, too, there is also a state-level firewall. Previously, each agency secured its own information. Now each agency is secure, and there is another layer of security in the SDC. "Security used to rest with the individual agencies, and the results were inconsistent," says Hoonhout. "Now security belongs to all of us. Consolidation is raising everyone up to a higher level of security."

"The SDC endeavor will play a critical role in the future of our agencies' operations," says Representative Riley, "Cisco's expertise enabled us to implement our SDC initiative, and our collaboration with Cisco and other vendors will help us accomplish our business goals."

Next Steps

"This project not only saves money, but makes more forward-looking projects possible," says Representative Riley. For example, the SDC has announced that it will be deploying voice over IP and end-to-end encryption. Hoonhout says that the logical network will support further applications consolidation to save money and enhance communications and collaboration within and across agencies, such as moving all agencies to one email system. "Instead of asking for more funding, we can use the money we are saving with network virtualization technology to fund new projects to serve the citizens of our state."

PRODUCT LIST
Switching and Routing
• Cisco Catalyst 6500 Series Switches
• Cisco 7200 Series Routers