



Customer Case Study

Power Company Transforms Data Center and Tailors Services

Arizona Public Service eliminates cabling complexity and gains flexibility with top-of-rack server aggregation switches.

EXECUTIVE SUMMARY
ARIZONA PUBLIC SERVICE (APS) <ul style="list-style-type: none"> • Industry: Energy/Utilities • Headquarters: Phoenix, Arizona, United States • Employees: 6,400
BUSINESS CHALLENGE <ul style="list-style-type: none"> • Cost-effectively deliver differentiated network services for different parts of the company • Rapidly deploy applications and servers to support growing business needs • Streamline and reduce operating costs in the data center
NETWORK SOLUTION <ul style="list-style-type: none"> • Deploy Cisco Catalyst 4948-10GE Switches for top-of-rack server aggregation • Use Cisco Catalyst 4948-10GE Switches to tailor bandwidth and security, and create zones to isolate network problems and minimize impact of network failures
BUSINESS RESULTS <ul style="list-style-type: none"> • Cuts cabling deployment time by 92 percent, a savings of \$21,000 per year • Allows IT to rapidly deploy new servers to support business needs • Improves system reliability • Simplifies network management and delivers differentiated services to business units

BUSINESS CHALLENGE

The electric utility Arizona Public Service (APS) serves more than 1 million residential and business customers throughout the Southwest. APS generates and delivers electricity to meet the region’s growing energy demands. This growth in turn is driving growth in APS business applications and data center server deployment.

David Hirschak, senior network engineer and his staff support 6,400 employees working in locations all over Arizona. Last year Hirschak was looking to better serve the business needs of his company by redesigning the data center. First he needed a simple, cost-effective way to separate and support the different lines of business within APS.

He also wanted to isolate mission-critical servers and departments that require 99.999 availability, such as customer service and engineering, from less critical functional areas. Segmenting the network into zones would also protect the network against widespread outages, because a component failure would affect a single zone rather than the entire data center.

Finally Hirschak needed to reduce the amount of time that his small staff spent routing and rerouting cabling between the server racks and core switches in the data center. According to Hirschak, he and his staff performed at least 300 server changes and upgrades last year, and most of those changes involved new cabling. The situation became urgent when the staff determined that they needed to upgrade their Category 5e structured wiring solution to provide gigabit bandwidth. “We were faced with a huge task of pulling long wiring pair runs from every server to our core switches 250 feet away across the data room floor,” he says.

NETWORK SOLUTION

The corporate APS network supports more than 200 service centers and business offices—from huge power plants to two-person sites—all with different security and bandwidth needs. Each location must be securely connected to the corporate data center.

The previous APS data center configuration connected 300 servers directly into a pair of Cisco® Catalyst® 6500 Series Switches, which functioned as distribution switches uplinked to eight additional Cisco Catalyst core switches. Hirschak wanted a network design that would accommodate smaller groups that could be provided with differentiated services.

After comparing several one-rack unit (RU) switches, Hirschak chose the Cisco Catalyst 4948-10GE-10, a 10-Gigabit Ethernet switch designed for data center aggregation services. This high-performance, low-latency aggregation switch offers a 136-Gbps switch fabric, two 10-Gigabit Ethernet uplink ports, and 48 10/100/1000-Mbps Ethernet ports in a one-RU footprint.

Now deployed as “top-of-stack” aggregation switches, a pair of interconnected Cisco Catalyst 4948-10GE Switches—one a primary, the other a secondary fail-over switch—are installed at the top of server racks that each comprise a network zone. Dozens of the Gigabit Ethernet server connections are aggregated into a single routed 10-Gb uplink port on the Catalyst 4948 switch, connected over two 10 Gigabit Ethernet switches to the Catalyst 6500 distribution switches.

The consolidation replaces the hundreds of long cabling pairs that connected the servers to the distribution switches with short intra-stack connections, drastically reducing cabling complexity. Ten-gigabit interconnections support wire-speed traffic transmission and intelligent load balancing over dual-homed, equal-cost paths to the distribution layer. This configuration redundancy helps eliminate the potential for any single point of failure.

For customers like APS that wish to use routing for networkwide traffic management, the Catalyst 4948-10GE supports Layer 3 configuration. If an uplink goes down, fast convergence L3 protocols, Enhanced Interior Gateway Routing Protocol, or Open Shortest Path First respond within milliseconds to reroute traffic.

The Catalyst 4948-10GE Switches also enable APS to divide the network into different zones based on lines of business, deploy services and security selectively based on L2 and L3 capabilities, and administer the zones through centralized policy management. The switches support a range of security features: 802.1X user authentication and access lists, MAC and Dynamic Host Configuration Protocol port security to thwart spoofing attacks, and network access control capabilities that lock out or quarantine end devices that do not meet company security policy standards.

“The Cisco Catalyst 4948-10GE switches are a great fit for us, equipped with all the features that we required—comprehensive feature set with segmentation, advanced security and routed access support, 10-Gb capability, small area affected, low power usage, and so far 100 percent reliability—at a very reasonable price point,” says Hirchak. “And we did not need to purchase new cabinets because the switches fit within our existing server stacks.”

He is not alone in his appreciation of the switch’s qualities. The Cisco Catalyst 4948-10GE recently won Network World’s “Best of the Test” award in the Network Infrastructure category for its record low latency, wire speed throughput, and advanced built-in security features.

“The data center top-of-rack aggregation solution cut our deployment hours significantly and allows us to tailor our support services to meet the needs of our different lines of business.”

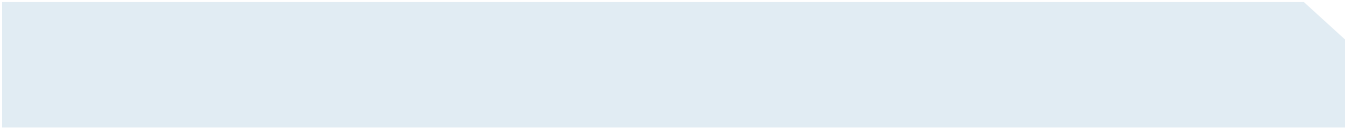
— David Hirchak, senior network engineer, Arizona Public Service

BUSINESS RESULTS

By deploying Cisco Catalyst 4948-10GE switches, APS implemented a top-of-rack server aggregation solution that addresses its data center capacity problems and cabling challenges. The solution has cut staffing requirements, and supports customized services to meet the needs of different lines of business within the company.

Cuts cabling time by 92 percent—According to Hirchak, server aggregation has cut what had been a two-hour cable pull to a 10-minute patch cable job. He estimates that his IT staff will recover a minimum of 550 hours in maintenance alone, at a cost savings of \$21,000 per year.

Eliminates cabling complexity—The new network architecture optimizes valuable data center space and significantly simplifies troubleshooting. “Trying to find that one cable label among several hundred cables was challenging sometimes, and in a critical situation, every second counts,” says Hirchak. Technicians now have to sort through only 48 cables, instead of 300, for a match.



Simplifies network security and management—The ability to segment the network and provide centralized but differentiated services allows Hirchak and his staff to tailor security needs by implementing different intrusion detection system or firewall requirements for specific lines of business or application zones. It also allows them to deploy new services and make changes more quickly and effectively.

Enhances system resiliency—Network segmentation has improved overall network resiliency: a major network component failure is now more likely to affect a single zone rather than the entire data center. Fault-tolerant IP routing capabilities mitigate the threat of network failures and help to deliver the 99.999 network uptime required for APS’s critical customer support applications.

Hirchak is happy with the Cisco data center solution targeted for organizations like APS. He says, “The data center aggregation solution cut our deployment hours significantly and allows us to tailor our support services to meet the needs of our different lines of business.”



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