

NETWORK OVERHAUL EXPANDS WI-FI COVERAGE AT SPOKANE COUNTY FAIR AND EXPO CENTER

Spokane County upgrades its wireless network to provide visitors and vendors with expanded coverage and heightened wireless experiences at the Fair and Expo Center



About the Spokane County Fair and Expo Center

The Spokane County Fair & Expo Center, located on 97 acres in the City of Spokane Valley, offers ample parking, excellent exhibition space, multiple indoor and outdoor arenas, an RV Park, and spacious lawns. It has a wide variety of buildings and facilities well suited for diverse events and functions, from large trade shows to regional and national conventions. With almost 145,000 square feet of exhibit space and 3,000 square feet of meeting rooms, the Fair & Expo Center accommodates roughly 450,000 visitors every year.

The Challenge

For well over a decade, Cerium has been a trusted technology partner to Spokane County. Helping them design, deploy, optimize, secure, and support their networks and phone systems. When the County was ready to enhance the wireless capabilities and coverage areas for guest Internet and production networks at the County Fair and Expo Center, they called on Cerium to help.

The existing “free to customer” guest Wi-Fi network at the fairgrounds was undersized, performed poorly, and was advertising heavy. The County was losing campers who were disappointed with the lack of wireless coverage to campsites in the RV park. Additionally, vendors who rely on wireless devices to process bank card payments and scan event tickets were frustrated due to the poor quality and coverage of the Fair and Expo Center’s enterprise wireless network.

SOLUTION OVERVIEW

The existing “free to customer” guest Wi-Fi network at the Fairgrounds was undersized, performed poorly, and was advertising heavy. The County needed a solution that provided high bandwidth coverage for vendors, campers and visitors. Cerium provided:

- A high-density Wi-Fi network based on the Cisco Unified Wireless Network solution
- Centralized Cisco Wireless LAN Controllers with Lightweight Access Point Protocol (LWAPP)-enabled access points
- Meraki next-generation firewall with advanced security
- AccelTex antenna solutions
- Switching infrastructure and cabling

The County’s goals included providing visitors with basic wireless guest access to the Internet via inexpensive and pervasive technology throughout the fairgrounds, and enhancing the wireless network used by vendors working at the fairgrounds.

The County had rigorous requirements for the Wireless LAN at the fairgrounds, which included:

- Delivering secure wireless guest internet access for up to 22,000 visitors at a time
- Providing coverage across 20 acres indoors and outdoors, from the arenas to the RV park.
- Supporting all types of devices, including old laptops, modern devices, and ticket scanners
- Enabling bandwidth control to limit high-bandwidth applications and minimize congestion when the network is under heavy load
- Enabling content filtering tools that block users from accessing inappropriate material
- Ensuring the network is fully upgradeable to grow and adapt over time
- Ensuring the network is programmable, so that new features can be added
- Offering a separate feed for vendors that meets PCI compliance requirements and has the reliability and predictability needed for running critical business applications

The Solution

Cerium's Cisco Business Practice Lead, Kevin Mayo, along with Senior Network Engineer Brett Larkins, and Implementation Engineer Len Ledford, set about designing a high-density Wi-Fi network capable of providing excellent quality of service (in terms of RF signal strength) to all the designated areas. The design included a next-generation layer 7 firewall to protect the network from being misused. For example, users are prevented from accessing peer-to-peer websites (such as BitTorrent) and downloading huge files over the network.

The design process started with an on-site survey to gain an understanding of the unique RF propagation characteristics of the Fair and Expo Center's environment. With the knowledge gained from the on-site survey and a Google Earth satellite image of the fairgrounds, the team employed predictive modeling to make a preliminary determination of the best placement and types of access points (APs), to provide adequate coverage throughout the environment, with sufficient capacity to meet aggregate demand and enable satisfactory user experiences. Once the preliminary design was complete, the team went back to the fairgrounds to perform a pre-deployment survey and inspect each of the proposed AP sites.

The design was very complex. The different types of APs included internal and external, directional and omnidirectional antennas. Jason Rinaldi at AccelTex Solutions provided the antenna solutions. His far-reaching expertise in antennas and RF issues proved invaluable to the success of the

project. When asked about the fairgrounds project and his experience working with Cerium, Jason remarked, "*Working with the Cerium team on this project was a treat. AccelTex is usually a small, yet impactful, piece of the puzzle with our antenna solutions. It takes great partners like Kevin Mayo and his team at Cerium, to put the whole package together. They have an excellent, well-rounded group over there! We are pleased, and not at all surprised that the results were nothing less than excellent.*"

The sheer size of the coverage area with access points indoors and outdoors and the large number of concurrent users the County expected, necessitated special design considerations, including:

- Switching infrastructure and necessary cabling
- Universal POE or Power Injectors
- Installing ancillaries such as hardware mounts, stand-offs, and enclosures
- Ensuring all AP installations and AP mounting hardware were grounded
- All outdoor installations required lightning arrestors
- Physical installation, and the ladders and booms required to run cable and install APs

For example, the ticket booths at the back gate are over 800 feet from the nearest cabling. To provide the performance and reliability required to ensure wireless ticket scanners can work flawlessly, installing a high-gain directional (patch) antenna with a narrow, focused beam was required.

After determining the type and placement of the APs, the next step was planning and designing the cable layout. Cabling plays an important role in Wi-Fi network design and implementation. We consulted with a cable design professional experienced with large Wi-Fi deployments to minimize the potential for equipment interference. Our cabling partner for this project was John McNamara, project manager at Electric Smith Inc. John is an RCDD (Registered Communications Distribution Designer). Consulting with John gave us peace of mind that all our cabling would be up to the highest industry standards and fire code specifications were accounted for.

Once the final design was reviewed and approved by the County, the deployment team went to work transforming the Fairground's wireless network infrastructure into a more available, stable, and secure network. The Fairground's new wireless LAN is based on the Cisco Unified Wireless Network solution, combines centralized Cisco Wireless LAN Controllers with Lightweight Access Point Protocol (LWAPP)-enabled access points, and a Meraki next-generation firewall with advanced security features.

The project began with the cabling upgrade. The existing wired network needed to be upgraded to support the bandwidth and power requirements of the new access points. The fairground's single mode fiber backbone was extended to four additional outdoor distribution cabinets. 10G Cat6A cabling was installed from each cabinet to support the access points. The agricultural and outdoor environment required infrastructure that could stand up to the elements and keep operating 24X7. Proper grounding and lightning protection was installed to keep fairground's personnel and their equipment safe.

When the cabling was completed and all the access points were installed, Cerium provided cutover services and applied the optimal configuration settings for getting the most from the network. After the wireless LAN was up and running, the Cerium team went back to the Fair and Expo Center to perform an on-site Validation Survey to ensure the network was working as designed. A heat map depicting signal strength across the fairgrounds was generated to get a ground-level view of coverage and performance. The Validation Survey verified the network meets or exceeds the design requirements stipulated by the County and allows for future expansion in harder-to-reach areas of the fairgrounds.

When asked about the deployment Kevin said, "These types of projects make being an enterprise network architect rewarding." He went on to say, "When I attend the rodeo at the Fair and Expo Center this summer, accessing the web while sitting in the grandstands will have special meaning."

The Results

People attending events at the Fair and Expo Center and campers in the RV park are getting better wireless experiences from the higher bandwidth and broader coverage offered by the upgraded network. Vendors can seamlessly scan tickets and process bank cards on a PCI compliant system from new areas of the fairgrounds.

When asked about the benefits of the upgrade, Pat Ferrell Assistant Director, Information Technology Dept. for Spokane County said "The best thing about the network is it just works. Uptime has been phenomenal. Patrons are getting the wireless experiences they expect, and vendors are happy. I'm very pleased with the expertise Cerium brings to the table. Len, Brett, and Kevin went above and beyond. Coverage is great across the entire complex!"

Cerium is proud of the results of the project. The upgraded network is proving to be remarkably reliable and resilient. It provides fairgoers with secure, dependable wireless access from virtually every corner of the Fair and Expo Center, inside and out. The network is exceeding today's requirements and positions the County for future growth.

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— Pat Ferrell Assistant IT Director, Spokane County

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