

High Stakes Networking For Safety and Reliability

Company: Caesar's Entertainment

Location: Las Vegas, U.S.A

Project Challenges

The High Roller is the world's tallest observation wheel with 28 spherical cabins that ride outside the rim of the 550 ft. wheel. Both Moxa equipment and expertise proved essential in establishing the mission-critical networking infrastructure connecting the cabin safety and control systems to the main control room.

Control and safety systems in each cabin must communicate reliably with a central control room on the ground. Emergency communication systems with video capability in each cabin must be instantly available at all times.



The High Roller presents unique challenges for establishing reliable communications:

- The network topology is highly complex and relies heavily on wireless communication, due to the rotation of both the individual cabins and the main wheel.
- The size and layout of the wheel makes installation and troubleshooting extremely difficult.
- The unique and record-breaking features of the project introduced communication issues that had never been encountered before.
- Extremely reliable hardware is required for very low maintenance and maximum up-time under harsh operating conditions.

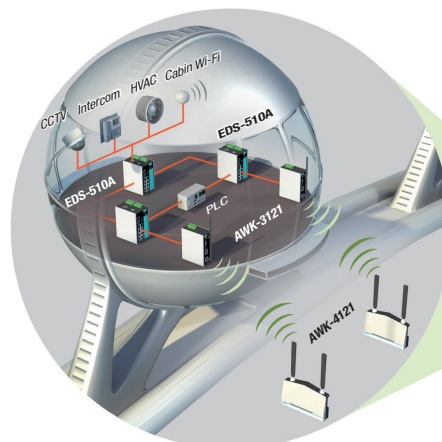


Application Requirements

- High level of communications redundancy and reliability for passenger safety
- Highly complex network topology due to rotating cabins and wheel
- Extreme reliability for minimum downtime under harsh desert conditions
- Highly responsive support team
- Live, on-demand management from central control room

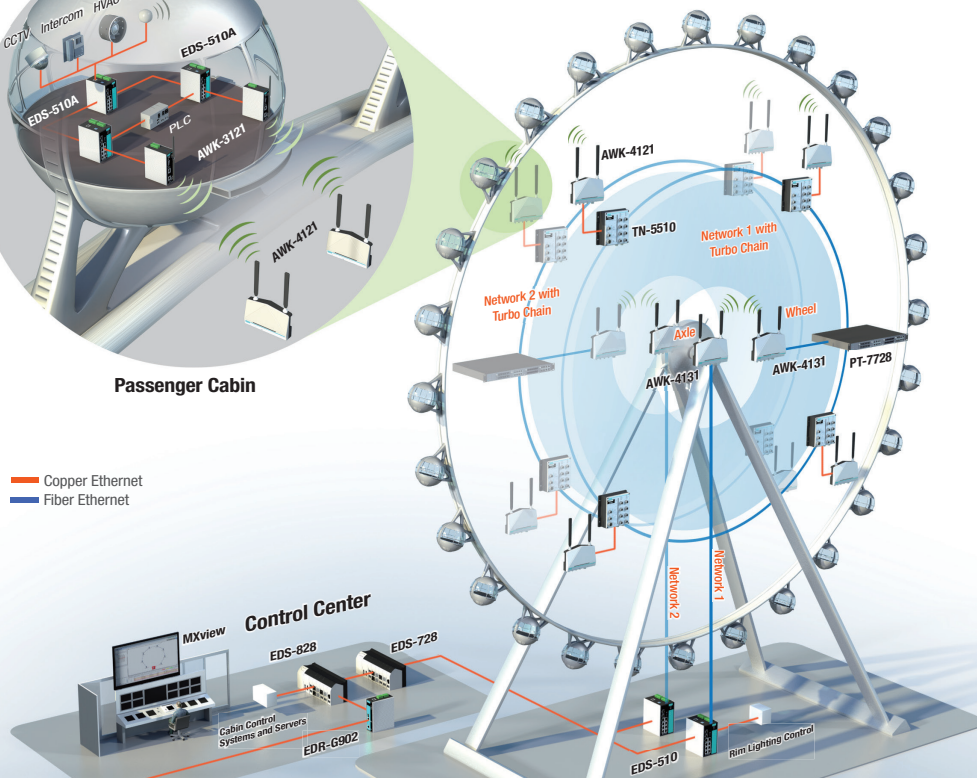
Moxa Products Used

- AWK-3121-T industrial wireless access point/bridge/client
- AWK-4121-T and AWK-4131-T outdoor wireless access point/bridge/client
- EDS-510A-3GT-T industrial managed Gigabit Ethernet switch
- MXview-1000 network management software
- PT-7728-R-24-24 28-port managed rackmount switch with ruggedized Gigabit SFP modules
- TN-5510-2GLSX shock and vibration-rated managed Ethernet switch
- EDR-G902 Gigabit network security router
- EDS-728 and EDS-828 28-port managed Ethernet switches



Passenger Cabin

— Copper Ethernet
— Fiber Ethernet



Solution

Moxa's industrial-grade wireless and wired networking hardware were used for the communications infrastructure connecting each cabin on the High Roller to the central control room. To ensure the greatest degree of reliability, two separate, fully redundant networks were established for all wheel and cabin communications.

- Moxa's compact DIN-rail mounted Gigabit managed switches were used for the dual redundant network within each cabin that connected to that cabin's fire and life safety systems, intercom systems, and drive control systems.
- Specialized Moxa Wi-Fi access points were used to bridge communications between the rim and each cabin. Instead of traditional wireless antennas, leaky coax cable was used to ensure the most stable and reliable connection as the wheel and cabins rotated.
- A redundant, self-healing fiber Ethernet network around the rim connected to each of the Wi-Fi access points on the wheel. Moxa switches designed for high shock and vibration resistance were used for this network and for communication and control of the wheel's outdoor LED lighting system. In addition, Moxa's high-performance Turbo Ring network topology provided additional network resiliency with a 20 ms recovery time.
- At two opposite ends of the wheel, Moxa rackmount switches with hardened Gigabit SFP modules were used to send network communications over fiber cables to the spindle at the center of the wheel. Moxa wireless access points were used to bridge communications between the spindle and the axle of the wheel.
- The backbone network to the central control center utilized Moxa's high performance Layer 2 and Layer 3 switches with industrial-grade redundancy and security features. Moxa's easy-to-use network management software enables operators to identify any communication issues in the entire network at a glance.

"The fact that Moxa specializes in industrial networking was key. They aren't just a networking manufacturer – they are familiar with industrial equipment and know how to connect to things like PLCs. They understand the difference between reliability in a business setting and reliability when it is a life safety critical system."

–Lance Heywood, Integrated Control System Designer, Heywood Engineering

"Moxa really came through for us with their experience and their responsiveness to help us achieve extremely high network reliability."

Randy Printz
Project Manager, Themed
Development Management



Business Benefits

The IP-based communications infrastructure makes every aspect of the control and emergency systems accessible to operators at the central control room, enabling the High Roller to meet the highest standards for operational reliability and passenger safety.

The High Roller can enjoy years of uninterrupted communications, even in the punishing Las Vegas heat, thanks to Moxa's experience in engineering for wide temperatures and fanless operation. The dual redundant network topology ensures an exceptionally reliable wireless connection with no performance loss even with heavy wireless interference from the surrounding casinos and hotels.

Moxa's technical expertise with industrial communications was also an invaluable asset during the project's deployment. The High Roller faced many complex and unanticipated communication issues involving multiple vendors and systems. Moxa's field application engineers were able to use their extensive experience in both control systems and networking technology to overcome these challenges. This was a service that no other component supplier was able to provide and proved essential in the ultimate success of the project.

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Moxa is a leading manufacturer of industrial networking, computing, and automation solutions. With over 25 years of industry experience, Moxa has connected more than 30 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for automation systems.

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