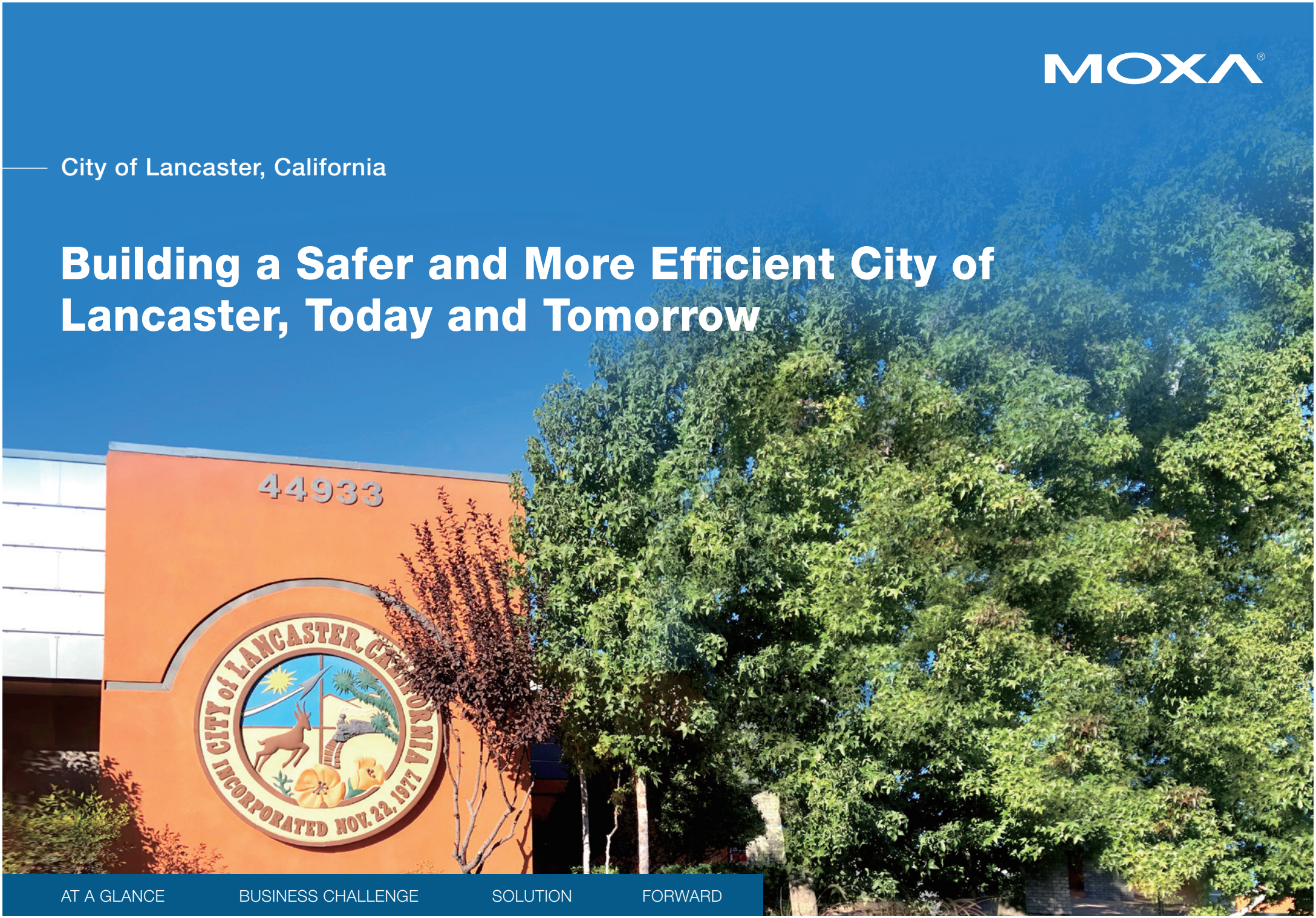
City of Lancaster, California

Building a Safer and More Efficient City of Lancaster, Today and Tomorrow



Focused on People, Enabled by Transport, Powered by Technology

Forward-thinking cities like the City of Lancaster recognize the importance of using advanced networking technology to enhance interconnectivity between residents, as well as between personnel who provide the ongoing services that keep the community operating and progressing. Lancaster is a charter city in northern Los Angeles County with a growing population of over 172,660. The city has been taking significant steps to leverage smart technologies to improve the lives of their citizens.

In accordance with the city's vision of Strategic Technology, Innovation, and Resilience (STIR), the City of Lancaster launched a number of projects and initiatives towards becoming a smart city, and continues to implement changes that advance accessibility, engagement, infrastructure, safety, and sustainability.

These smart city implementations range from data-driven energy conservation and management to citizen engagement platforms. One of these is the Inform Lancaster app, which allows residents to use their mobile device to easily access information and report issues. Another is the use of video cameras on LED street lights to help law enforcement improve public safety. These implementation projects also involve building a new Advanced Traffic Management System (ATMS) solution that uses smart devices to help cities work smarter to detect and report traffic conditions back to the remote Traffic Management Center (TMC). This provides the city with real-time data and predictive intelligence to improve operations, such as management of signalized intersections and allowing traffic operators to adapt to traffic incidents and congestion.

In order to achieve all of this, upgrading to high-speed fiber optic communications was required to serve as the foundation for these smart city implementations.

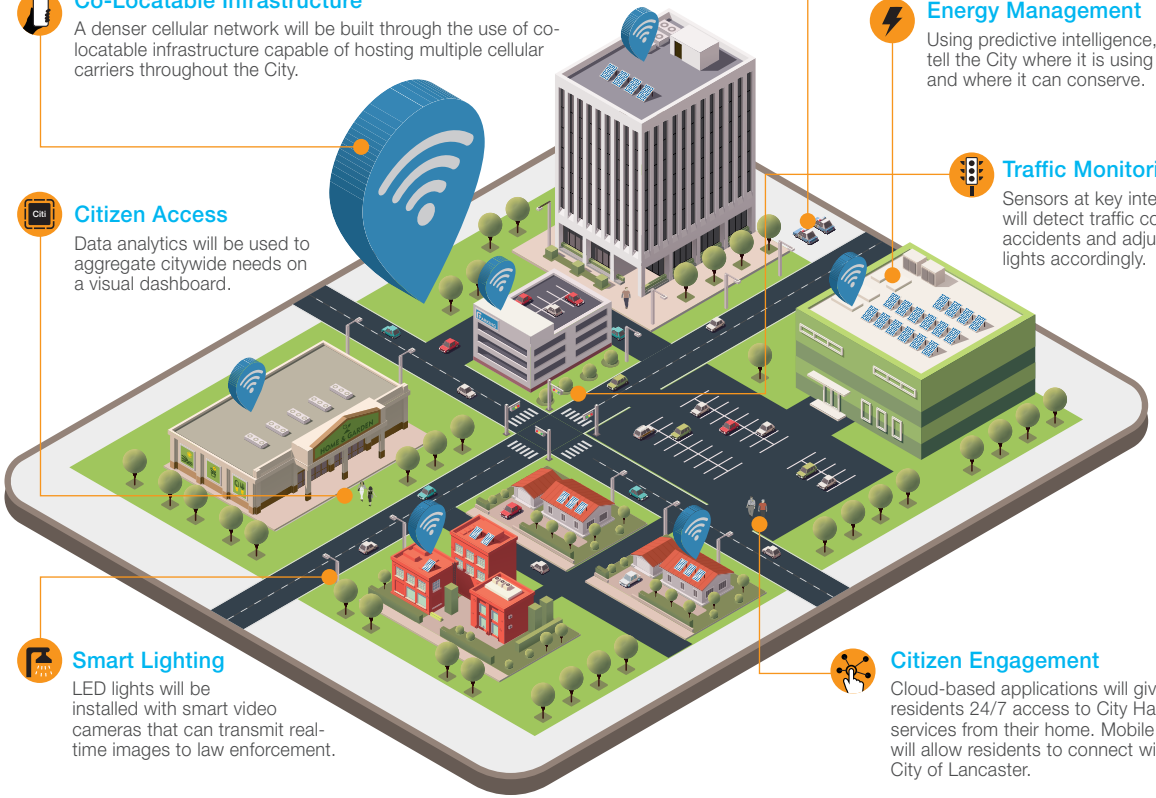
City of Lancaster, California

Country: United States
State: California
County: Los Angeles

Area: 94.56 sq. mi
Population: 172,660
Website: www.cityoflancasterca.org

What is a SMART CITY?

The City of Lancaster is using advanced techology data and predictive intelligence to improve operations.



Wi-Fi
High-speed fiber installation across the City creates a foundation that allows Smart City elements to work together and also provides public Wi-Fi for residents.

Co-Locatable Infrastructure
A denser cellular network will be built through the use of co-locatable infrastructure capable of hosting multiple cellular carriers throughout the City.

Citizen Access
Data analytics will be used to aggregate citywide needs on a visual dashboard.

Smart Lighting
LED lights will be installed with smart video cameras that can transmit real-time images to law enforcement.

Public Safety
Data management will be used to identify public safety trends and hot spots.

Energy Management
Using predictive intelligence, data will tell the City where it is using energy and where it can conserve.

Traffic Monitoring
Sensors at key intersections will detect traffic congestion/ accidents and adjust traffic lights accordingly.

Citizen Engagement
Cloud-based applications will give residents 24/7 access to City Hall services from their home. Mobile apps will allow residents to connect with the City of Lancaster.

CHALLENGE

Aging Infrastructure Was Limiting Operational Efficiency

A major component of the fiber upgrade was to migrate the existing copper traffic network to fiber in order to transform the traffic signal communication infrastructure from analog to digital, enhancing connectivity and transparency. With aging 30-year-old analog copper wiring and sparsely deployed fiber, over half of the city's 140+ traffic signals were either offline or had no active communication with the traffic management system. Mitch Megas, Traffic Engineering Technician, noted that “With the legacy infrastructure, the communications would go down 10-15 times per week. And when exposed to harsh weather such as high temperatures or heavy rain, communication would go down completely.” This meant that city administration frequently needed to dispatch technicians to check on equipment, sometimes in the middle of the night, taking up a lot of time and resources.

Furthermore, the aging infrastructure did not allow for remote monitoring of traffic conditions, making it impossible to promptly react to traffic incidents or large traffic jams as they occurred.

With the legacy infrastructure, the communications would go down 10-15 times per week.

Smart Network Infrastructure Paves the Road to Centralized Traffic Management

The City of Lancaster consulted with engineering design firm ADVANTEC Consulting Engineers Inc. to provide ITS services that included the design of a citywide traffic network and implementation of a modern ATMS. A total of 146 traffic cabinets needed to be connected to the fiber network and ATMS, so all traffic cabinets and remote assets could be managed from one central location. Since the entire system was designed from the ground up, a company with reliable, sustainable products and ample experience were top concerns when ADVANTEC Consulting Engineers Inc. chose their partner. Moxa's product performance, long-term value, and local support made them stand out during the evaluation process.

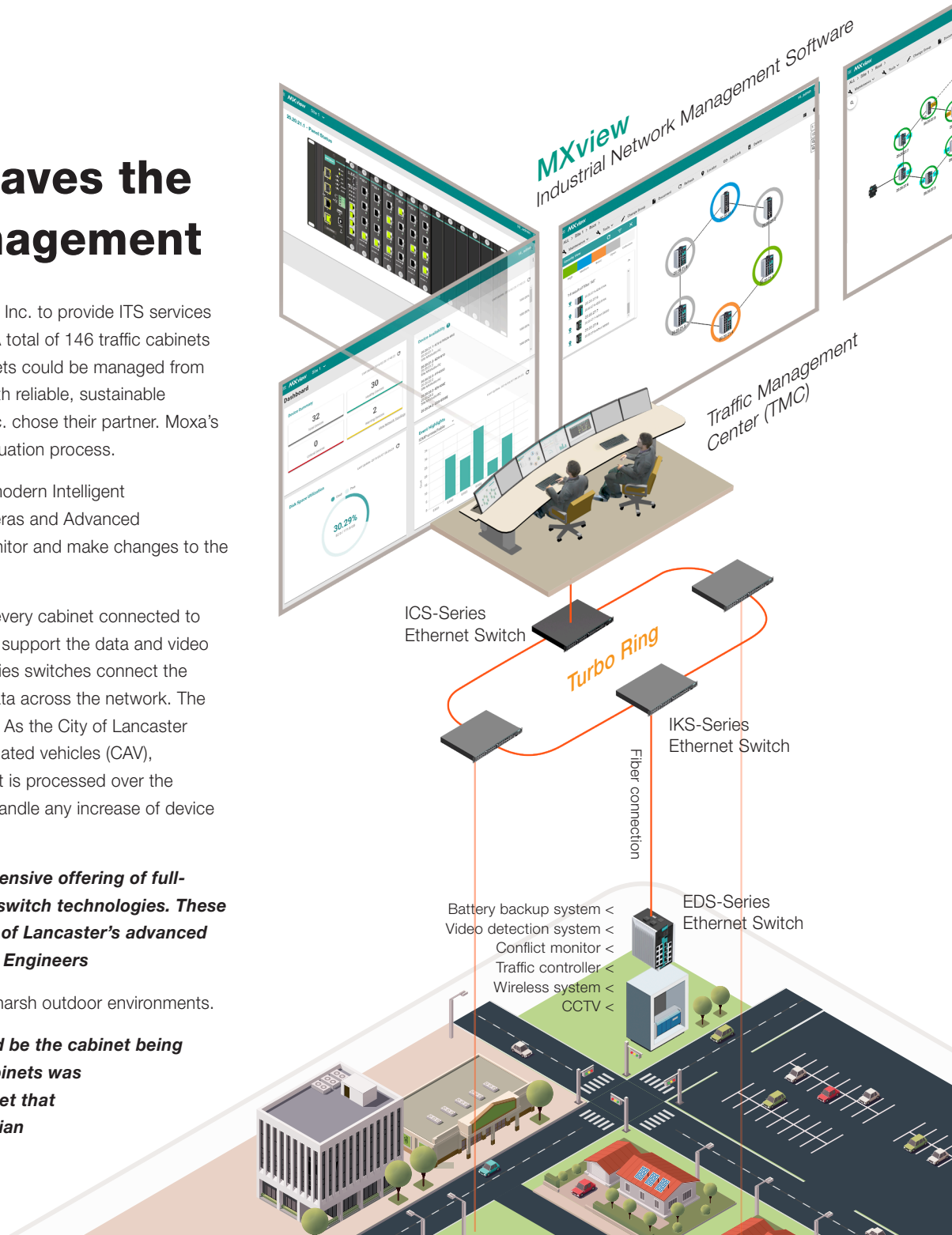
With a Moxa hardware and software solution, the city could now take full advantage of many modern Intelligent Transportation System (ITS) technologies, such as high-definition (HD) CCTV surveillance cameras and Advanced Transportation Controller (ATC) units. By creating a centralized operations center, staff can monitor and make changes to the system in real time.

The Moxa hardware solution brought full Gigabit speed all the way out to the edge—reaching every cabinet connected to the fiber infrastructure—future-proofing the network and providing the bandwidth necessary to support the data and video needs of today and tomorrow. Moxa high-performance EDS- Series, IKS- Series, and ICS- Series switches connect the fiber network, capable of quickly and reliably transferring large amounts of video, voice, and data across the network. The core switch's two 10G uplink capabilities also provide future expansion possibilities for the city. As the City of Lancaster implements more CCTV applications alongside the expected increase of connected and automated vehicles (CAV), more devices will need to be connected to the network, adding to the total amount of data that is processed over the network. Having a high-speed fiber optic communications network ensures they are ready to handle any increase of device connections in the future.

"We were happy to select Moxa hardware and monitoring software based on their extensive offering of full-Gigabit hardened edge switches, 24-port aggregation switches, and full Layer 3 core switch technologies. These hardened-grade products are perfect for ITS deployments and bring value to the City of Lancaster's advanced traffic management network." John Cox, Systems Engineer of ADVANTEC Consulting Engineers

Furthermore, product reliability was an essential factor, especially for traffic cabinets placed in harsh outdoor environments.

"Since installing the Moxa switches, the only thing that would take them offline would be the cabinet being hit in a traffic accident and causing the fiber to become disconnected. One of our cabinets was energized with high voltage from an Edison line, and the only component in the cabinet that was still functioning was the Moxa switch." Mitch Megas, Traffic Engineering Technician for the City of Lancaster



Easing the Burden of Network Management

Moxa's industrial network management software, MXview, makes it possible for staff to configure, monitor, and diagnose the network from one central location. A custom dashboard enhances transparency and efficiency while reducing the need for time-consuming manual configuration. In addition, MXview allows monitoring staff to overlay the network topology on top of a geographic map of the city to create accurate visual geographical representations of all deployed equipment.

"Moxa MXview comes in very handy for my team to manage the traffic network. It can be accessed through any web browser. We can upload the city map to view where Moxa networking devices are located and identify bottlenecks, making it easier to set network traffic thresholds."

Mitch Megas

Traffic Engineering Technician for the City of Lancaster

As more and more devices are required to be connected to the network, security of the traffic communication system becomes a concern. Moxa's MXview enables city staff to conduct a network security audit with a simple click of a mouse, allowing them to manage remote device security from the central control room. For instance, if a device fails the security policy audit, MXview can remotely update the device's configuration or send out security alert notifications whenever it detects an authentication failure.

In summary, Moxa's edge-to-core solution enables smart cities to create a traffic network infrastructure that is future-ready, highly reliable, secure down to the device level, and easy to manage with smart, intuitive management tools.

Transforming Into a Future-ready Smart City

“Through the adoption of Smart City technology, the City of Lancaster continues its strong tradition of innovation. The new tools being implemented, including Moxa’s hardware and software solutions, will enable city staff to better serve Lancaster residents, today and in the future.”

R. Rex Parris,
Mayor, City of Lancaster

With their Traffic Management Center (TMC) connected with a new fiber infrastructure, the city now has access to valuable data to monitor operations and remotely address issues without needing to send technicians out to check and fix the problem. This significantly reduced the need for human intervention by 67% and eased personal workloads. Furthermore, it dramatically improved the response time for completing any necessary repairs and minimized inconvenience to the public. For example, the city installed a battery backup at every intersection in case there is a loss of power. Now, with the new network in place and providing remote access to all intersections, if a battery’s charge level drops below a certain point, it will proactively send a notification to the TMC so an engineer can be sent out to recharge the battery immediately.

The city has also started installing cameras that will send real-time traffic data to a centralized management site. Having the right infrastructure ensures that multiple video streams can be transmitted smoothly across the network. This will allow city authorities to actively monitor traffic and incidents as well as the amount of vehicles, pedestrians, and bicycles, providing essential insights to help manage traffic on the spot in real time.

With a sustainable network infrastructure, the City of Lancaster is now using advanced technology data and predictive intelligence to improve operations and kick-start their forward-thinking applications. All of these efforts and resulting benefits are intertwined and are integral pieces to shaping the bigger picture of the city’s future as a thriving community.

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