Centralizing Traffic Control With High-performance Networks

Country: USA

System Requirements

- Gigabit network for large volumes of signal and video data over long distances
- Network redundancy to avoid packet loss
- Protect critical data on the network from unwanted access
- NEMA TS2 compliance for network components

Why Moxa

- Reliable Gigabit data transmission over fiber with recovery times under 50 ms (with 250 switches)
- Secure connections for existing serial devices
- NEMA TS2 certified and a -40 to 75°C operating temperature

Moxa Products

NPort 6450-T ↗
Secure Terminal Server

EDS-510A-T ↗
Managed Ethernet Switch

A state Department of Transportation (DOT) in the United States planned to centralize the traffic control and monitoring of highways across five central Traffic Management Centers (TMC). TMC operators will have access to real-time traffic information from DOT personnel, state police, emergency response units, cameras, sensors, and other tools to ensure traveler safety by notifying drivers of traffic conditions and emergencies via variable message sign (VMS) broadcasts.

The traffic control systems use Moxa's NPort 6450-T secure terminal servers to collect serial data from sensors such as vehicle loop sensors and transmit encrypted serial data to the IP network. Our EDS-510A-T managed switches form the Gigabit fiber network that supports millisecond network recovery with Turbo Ring functionality so that signal and video data can be transmitted reliably to each TMC over distances of up to 120 km. Moxa's devices are certified with NEMA TS2 and feature a -40 to 75°C wide temperature range to endure harsh operating conditions.

MOXA
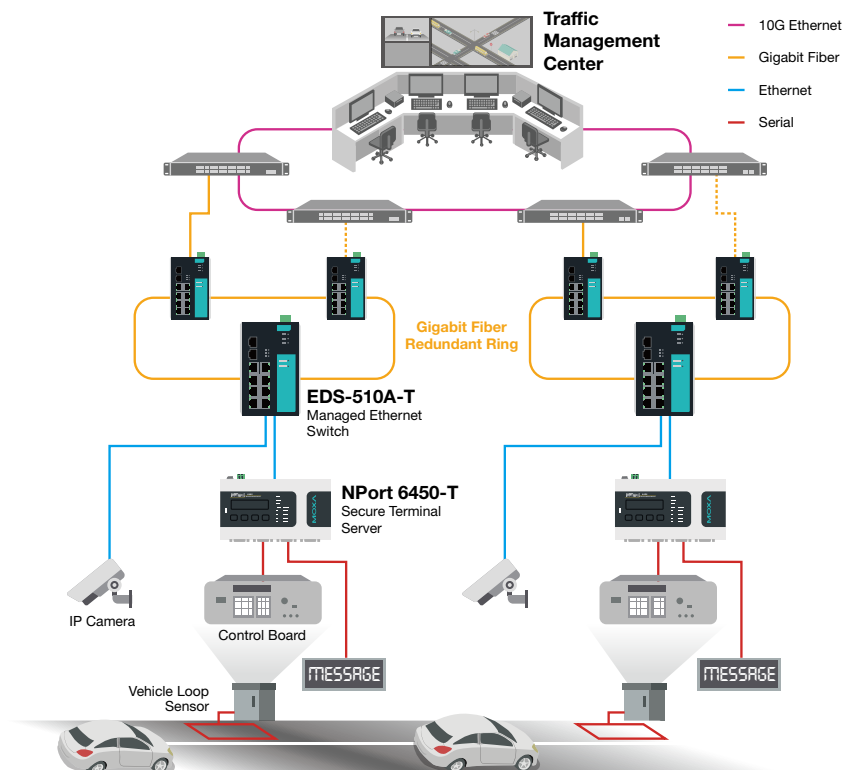
Securing Interconnected Traffic Signal Communications

Country: USA

System Requirements

- Secure communication over public networks

- Real-time status updates for traffic signals

- Increased data communication coverage for 140 intersections

- A fully distributed system with NEMA TS2 compliance

Why Moxa

- Secure connections with 20 Mbps VPN bandwidth between remote sites and the control center

- Turbo Ring technology delivers real-time status with milliseconds recovery time

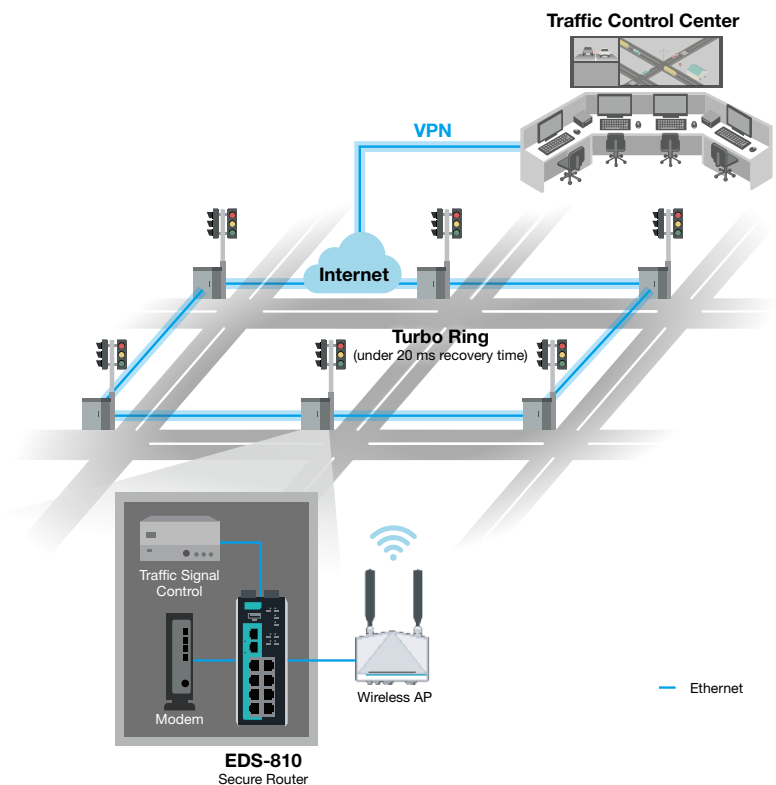- 2 Gigabit ports for handling large volumes of traffic signal data

- NEMA TS2 compliance

Moxa Products

EDR-810 ⬀
Secure Router

Henrico County, USA, decided to upgrade its existing closed-loop traffic signaling control systems to a distributed traffic management system designed to manage the traffic signals at 140 intersections. Before upgrading, only 25 intersections were interconnected while the remaining 115 intersections used isolated signal control circuits. The new signaling network would have a distributed architecture, with the central operations center communicating with each local traffic signal controller over a public network for real-time monitoring and emergency response.

The EDR-810 industrial multi-port secure router, an all-in-one VPN/NAT/Firewall/Router/Switch device, was installed in the roadside cabinet of each intersection for data communication and data security. The EDR-810 supports Turbo Ring technology for network recovery times of less than 20 ms to ensure reliable communication in a ring-type network. The EDR-810 also supports VPN and firewall functions that provide secure remote access and critical field device protection.

Traffic Control Center

VPN

Internet

Turbo Ring
(under 20 ms recovery time)

Traffic Signal Control

Wireless AP

Modem

EDS-810
Secure Router

— Ethernet

MOXA®

Building Future-proof Traffic Infrastructure for a Safer and More Efficient City

Country: USA

System Requirements

- Reliable backbone networks to transform the traffic signal communication infrastructure from analog to digital

- Configure, monitor, and diagnose the network from one central location

- Remotely manage device security from the central control room

Why Moxa

- Reliable, extensive product portfolio ranging from edge Ethernet switches to core backbone switches

- Industrial-grade, full Gigabit product lineups for durable, future-proof applications

- Timely response and local support

- Ample experience in industrial networking

Moxa Products

MXview ⧉
Industrial Network Management Software

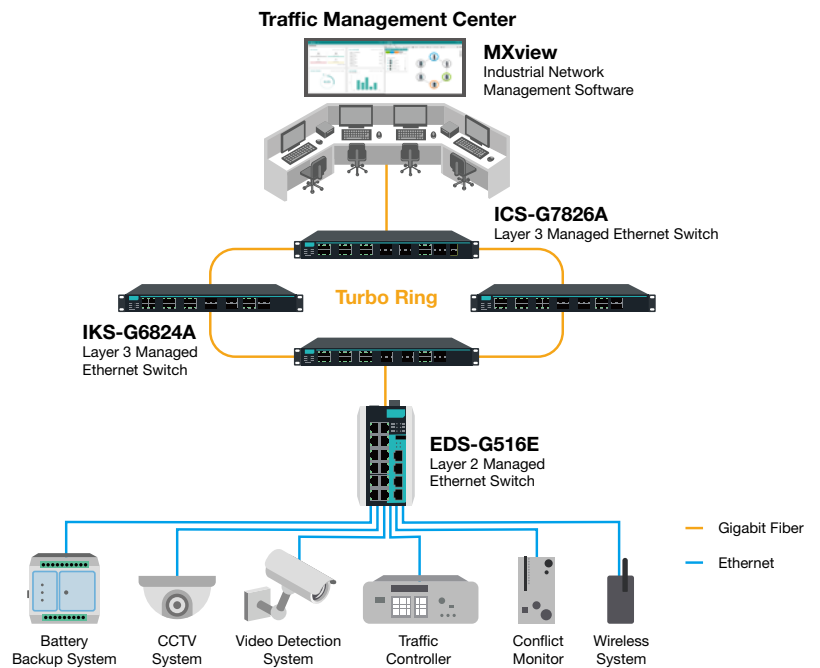**ICS-G7826A** ⧉
Layer 3 Managed Ethernet Switch

IKS-G6824A ⧉
Layer 3 Managed Ethernet Switch

EDS-G516E ⧉
Layer 2 Managed Ethernet Switch

The City of Lancaster wanted to convert its existing copper traffic network to fiber in order to transform the traffic signal communication infrastructure from analog to digital, enhancing connectivity and transparency. This involved designing a citywide traffic network and implementation of a modern Advanced Traffic Management System(ATMS). More than 140 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.

Our Moxa hardware solution brought full Gigabit speed all the way out to the edge— connecting every cabinet 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's high-performance EDS-G516E, IKS-G6824A, and ICS-G7826A switches connect the fiber network and are capable of quickly and reliably transferring large amounts of video, voice, and data across the network. The core switch's two 10G uplink interfaces also provide future expansion possibilities for the city.

Traffic Management Center

MXview
Industrial Network Management Software

ICS-G7826A
Layer 3 Managed Ethernet Switch

Turbo Ring

IKS-G6824A
Layer 3 Managed Ethernet Switch

EDS-G516E
Layer 2 Managed Ethernet Switch

Battery Backup System | CCTV System | Video Detection System | Traffic Controller | Conflict Monitor | Wireless System

— Gigabit Fiber
— Ethernet

See What Our Customer Says
Read More ▶

MOXA®

Developing Gigabit Fiber Networks for Toll Enforcement

Country: France

System Requirements

- High-performance network backbone to transmit large volumes of data back to the traffic control center

- Wide-temperature tolerance for outdoor operation

- Rugged and compact remote I/O for roadside cabinet monitoring

Why Moxa

- Gigabit fiber network backbone for massive video and data transmissions over long distances

- -40 to 75°C wide temperature range

- Compact remote I/O for environmental monitoring inside space-limited cabinets

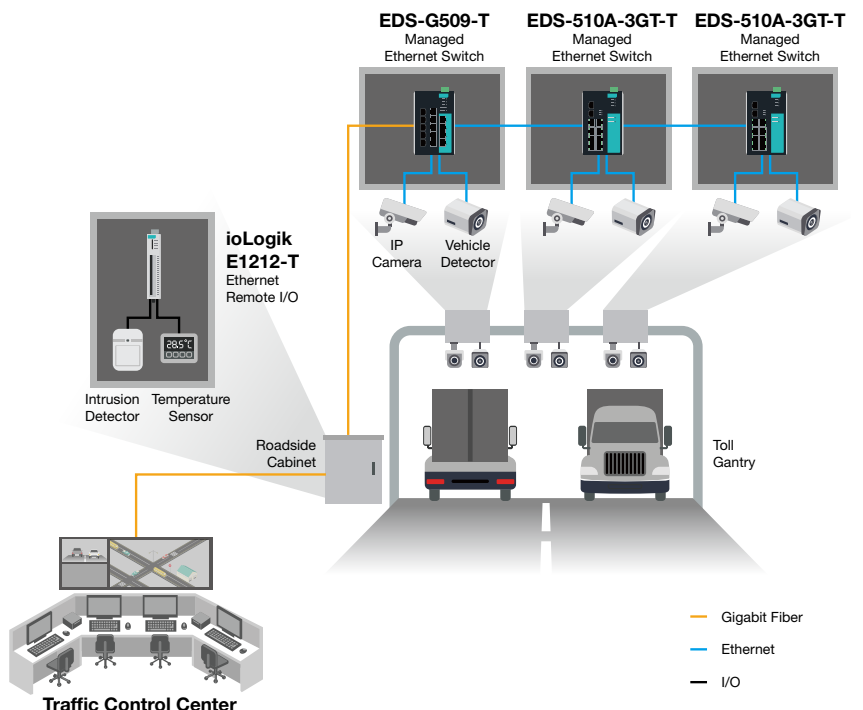## Moxa Products

EDS-G509-T
Managed Ethernet Switch

EDS-510A-3GT-T
Managed Ethernet Switch

ioLogik E1212-T
Ethernet Remote I/O

Transportation authorities in France have instituted an environmental tax for all Heavy Goods Vehicles (HGVs) traveling on a national highway network that stretches over 1,500 km. The tax payment of each HGV will be determined by the onboard GPS devices. When a HGV is not compliant with the tax program, a separate system will capture a snapshot of the license plate and send it back to the traffic control center for toll enforcement.

To collect data from numerous vehicle detectors and cameras of over 150 toll gantries, Moxa's EDS-G509-T and EDS-510A-3GT-T Gigabit managed switches are deployed to transmit large volumes of images and transaction data to the traffic control center. The EDS-G509-T is also equipped with 5 fiber ports to enable long-distance transmissions along national highways. Inside roadside cabinets, our compact ioLogik E1212-T remote I/O connects to temperature sensors and intrusion detectors for monitoring the cabinet conditions to enhance equipment safety and reliability.

EDS-G509-T
Managed Ethernet Switch

EDS-510A-3GT-T
Managed Ethernet Switch

EDS-510A-3GT-T
Managed Ethernet Switch

ioLogik E1212-T
Ethernet Remote I/O

Intrusion Detector

Temperature Sensor

IP Camera

Vehicle Detector

Roadside Cabinet

Toll Gantry

Traffic Control Center

— Gigabit Fiber
— Ethernet
— I/O

MOXA®

Enabling Highly Accurate Data Acquisition for Toll Collection

Country: Taiwan

System Requirements

- A high I/O scanning rate to capture pulse signals from detection sensors
- Simple front-end control logic for event triggering, such as camera snapshots or intrusion detection
- Large bandwidth to transfer high volumes of data and images

Why Moxa

- Low I/O latency under 4 milliseconds for data accuracy and integrity
- Easy logic control to trigger specific events
- Gigabit bandwidth for efficient transmission of data and images
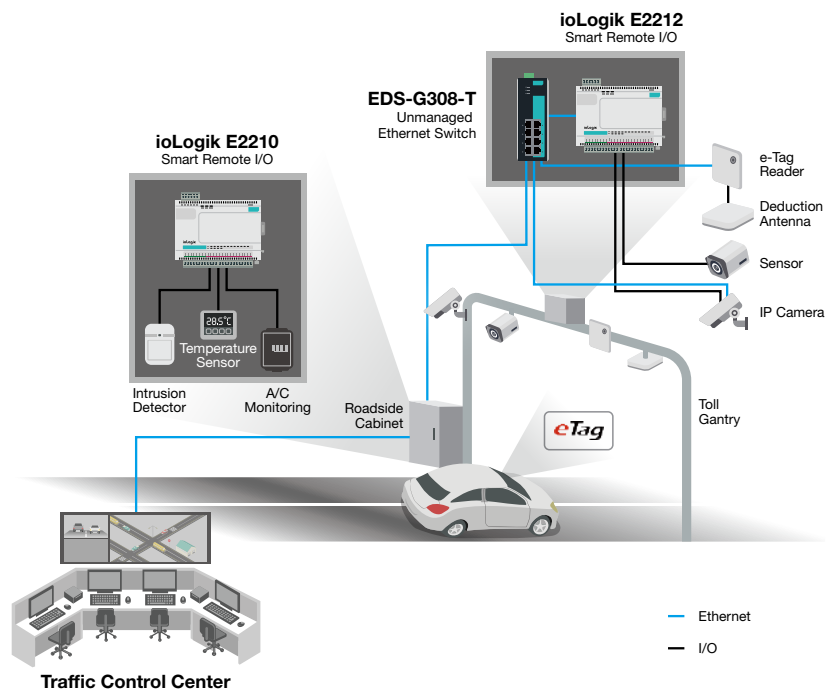
Moxa Products

ioLogik E2210/E2212
Smart Remote I/O

EDS-G308-T
Unmanaged Ethernet Switch

Commissioned by the Taiwan Area National Freeway Bureau (TANFB), FETC (Far Eastern Electronic Toll Collection Company) designed a nationwide Electronic Toll Collection (ETC) system that allows freeway users to pay toll fees without stopping at tollgates. To collect distance-based toll charges and trip data when vehicles pass by, Moxa's ioLogik E2212 remote I/Os are used to receive pulse signals from detection sensors which trigger the IP cameras to take snapshots of the passing vehicles within 4 milliseconds. Meanwhile, ioLogik E2210 remote I/Os are also deployed to collect condition data such as from intrusion detectors to safeguard the roadside cabinets and ensure the integrity of vital data.

To overcome the challenges of managing 325 gantries, our EDS-G308-T unmanaged switches feature 8 Gigabit ports and a -40 to 75°C operating temperature to transmit large amounts of vehicle data and snapshots smoothly in demanding outdoor environments.

ioLogik E2212
Smart Remote I/O

EDS-G308-T
Unmanaged Ethernet Switch

ioLogik E2210
Smart Remote I/O

e-Tag Reader

Deduction Antenna

Sensor

IP Camera

Intrusion Detector

Temperature Sensor 28.5°C

A/C Monitoring

Roadside Cabinet

Toll Gantry

eTag

Traffic Control Center

— Ethernet
— I/O

MOXA®

Building Reliable Connectivity for Road Condition Monitoring

Country: Lithuania

System Requirements

- Connect various sensors inside space-constrained roadside cabinets

- Simple control logic to trigger alarms when needed

- Receive real-time information through cellular networks

Why Moxa

- One-stop shop for serial device servers, remote I/Os, and cellular routers

- Supports IF-THEN-ELSE control logic rules with our Click & Go function

- Dual-SIM design for cellular link redundancy by providing a backup connection when one link goes down

Moxa Products

**ioLogik E2242-T** ⬈
Ethernet Remote I/O

NPort 5150A-T ⬈
Serial Device Server

OnCell 5104-HSPA ⬈
Cellular Router

The Lithuanian road administration wanted to provide drivers with real-time road and weather condition updates on their website to improve the travel experience. To achieve this, a system integrator helped develop road condition monitoring systems across 500 stations in Lithuania. Each station had sensors and IP cameras installed at roadside cabinets. Our OnCell 5104-HSPA cellular routers, ioLogik E2242-T remote I/Os, and NPort 5150A-T serial device servers were used to connect these field devices and transmit both sensor and image data back to traffic control center via cellular networks.

Our remote I/O features a smart function called Click & Go that allows operators to set up simple control logic rules during system operation without additional programming. For smooth data transmissions, our cellular routers support 4 Ethernet ports to get serial, I/O, and video data online and built-in dual-SIM redundancy so that operators can create a backup cellular link in case one of the telecom services becomes unavailable.

MOXA®
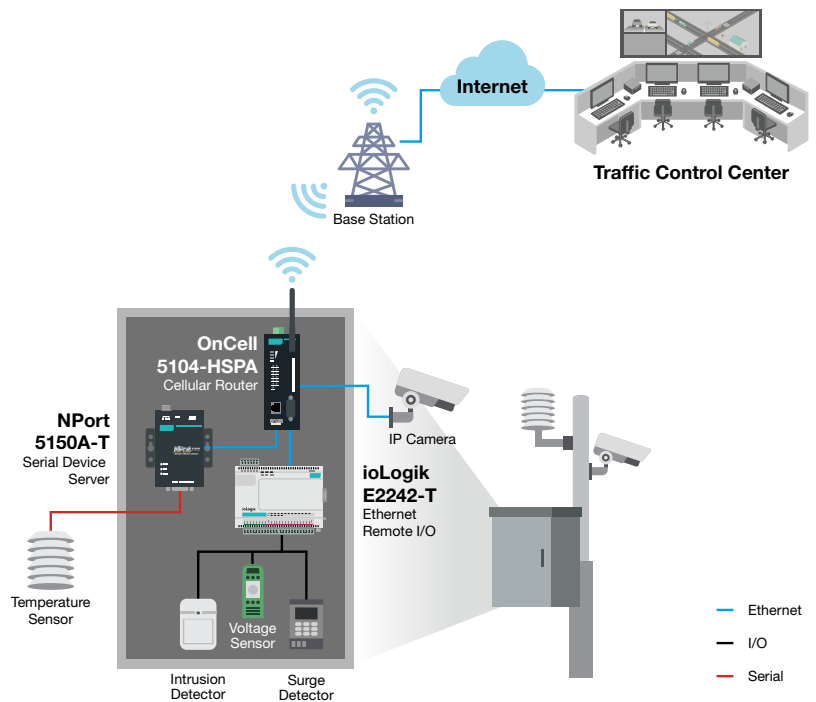
Receiving Real-time Sensor Data From Roadside Weather Stations

Country: Turkey

System Requirements

- Various I/O interfaces for connecting sensor nodes used in roadside weather stations
- Secure communication for remote monitoring through public networks
- Support for IT protocols that can be easily integrated into city infrastructure networks
- Reliable data acquisition devices that can operate in roadside cabinets

Why Moxa

- Modular design makes it easy to connect a variety of sensors
- Built-in serial interfaces to make integration easy for serial-based sensors
- Supports SMNPv3 for secure communication between roadside weather stations and the traffic control center
- - 40 to 75°C wide operating temperature

Moxa Products

ioThinx 4510 ☐
Modular Remote I/O

To enhance road safety, a system integrator helped their client develop Road Weather Information Systems (RWIS) to collect sensor data from roadside weather stations, so that road condition updates can be provided to commuters instantly. There are multiple sensors deployed in roadside weather stations to collect different data types, including temperature, wind speed, and humidity. Since each data type requires a different I/O interface, the Moxa ioThinx 4510 Series, with its easy-to-install I/O modules, is ideal for collecting all of the I/O signals over the same network.

The traffic control center is part of the city infrastructure network, which typically uses IT-based network management systems that are not inherently compatible with the sensors used in roadside weather stations. Our ioThinx 4510 Series modular remote I/O supports SMMPv3, which encrypts data before it is transmitted over public IP networks to enhance the security of data generated by the field devices.

Road Weather Information System

Cellular Gateway

ioThinx 4510
Modular Remote I/O

Wind Speed Sensor · Humidity Sensor · Temperature Sensor · Rain Detector Sensor · Remote Road Sensor · Pressure Sensor

Cellular
Ethernet
I/O
Serial

MOXA®