



Connected Transportation

Building a secure, real-time sensor fabric for your existing network

Did you know that state and local government agencies are now able to enhance their existing networks to better serve personnel and the public? Powered by the exploding growth of the Internet of Things (IoT), agencies like yours are increasing services, improving efficiencies and lowering costs - all without an expensive network rebuild. Plus, this Digital Transformation can also enable a more secure, reliable and empowered network environment.

Executive Summary

Customer

- Tennessee Department of Transportation (TDOT)
- State of Tennessee, USA

Challenges

- Outdated technology that required regular and costly maintenance
- High failure rate of existing terminal servers
- Lack of automation + integration within existing network
- Lack of real-time data and capabilities
- Cybersecurity

Solution

- Cisco Kinetic Edge Fog Processing Module as a management platform
- Deployment of industrial grade routing and switching
- Field Network Director to manage the gateway
- Cisco Prime Infrastructure to simplify management of network

Key Results

- Enhanced management services via single-pane-of-glass interface
- Built a foundation for secure and agile deployment of roadside services
- Option for automation of formerly manual operations
- Decreased road accidents by improving traffic management in adverse conditions
- Future expandability to improve data collection and road safety

Hidden Costs of Outdated Technologies

For the Tennessee Department of Transportation (TDOT), it all started with ongoing safety issues in the eastern part of the state, where mountainous conditions would result in the development of rapid fog, creating dangerous driving conditions. TDOT installed a network of fog sensors along impacted roadways to help manage the situation. But this approach relied upon serial connections via a buried cable to multiple roadside servers and carried high hidden costs, including regular and time-consuming maintenance for the terminal servers.

TDOT's fog sensor network was also suffering a high failure and replacement rate. Plus, there was a lack of network automation that meant data had to be sent back to a Regional Traffic Center for human review to determine the best response. And worst of all, even when the system did work perfectly, the lack of real-time capabilities meant that the data gathered would often be outdated (up to two hours old) by the time action was taken. In the end, this left TDOT with an inefficient and high cost system, one also increasingly prone to the growing ransomware and other malware threats faced by state and local governments today.



The Solution

Updating the existing system, including the network, would be cost prohibitive for TDOT. So they turned to Cisco and our Connected Roadways solutions. In partnership with our Advanced Services team, we are helping them build an innovative solution that uses much of their existing network infrastructure while delivering the results staff and citizens demand. The solution includes:

- Cisco Kinetic Edge Fog Processing Module as a management platform
- Industrial grade routing/switching
- Field Network Director to manage the gateway
- Cisco Prime Infrastructure to simplify management of the network.

A Truly Empowered Network

By deploying the Cisco Kinetic Edge Fog Processing Module as a network overlay, TDOT will be able to process and analyze data where it originates. This will create a virtual machine that eliminates the need for costly new infrastructure, and that features:

- Open architecture with a well-tested/validated design



The 829 Industrial Integrated Services Router

Easy to Use

- Supports Cisco IOS Software
- Uses existing 3G/4G networks
- Easily and rapidly deployable
- Highly available, very secure and reliable

Built to Last

- Built to handle tough environments including shock, vibration, dust, humidity and water spray
- Tolerates temperature extremes
- Compact and portable

The Flexibility you Need

- Enterprise class features
- Industry leading cybersecurity
- Can also provide real-time data, voice and video communications to stationary and mobile network nodes
- Can serve as mobile hub
- Dynamic multipoint VPN capability
- Supports Cisco IOx software for open, extensible hosting of additional OS and apps directly at the network edge

Also supports dual-radio WLAN so that your access points can serve as both access and client to a wireless mesh network.

- Scalability to grow as TDOT needs change
- Capability to collect and act on data in a flexible and repeatable manner, critical for weather related functions
- Industry-leading security and reliability.

TDOT's solution will also include the Cisco 829 Industrial Integrated Services Router, a compact and "ruggedized" design field tested by the US Department of Defense for harsh environments including ice, sleet, humidity and vibration. It has the capability to use existing fiber and it can be connected using 3G/4G LTE WAN cellular and Wireless LAN. It will even allow other departments, such as Fire and Rescue or Law Enforcement, to access the data from their own vehicles, even while in transit.

An Automated and Integrated Network

This innovative new approach will turn TDOT's existing network into a real-time automated and integrated network environment. Their enhanced network will be able to implement automated responses for a variety of real-world conditions by using preset policies to determine actions, all in real-time as conditions warrant. TDOT's network will also have the capability to alert drivers to rapidly changing conditions in real-time by automatically messaging digital road signage, sending smartphone alerts and changing speed limits displayed on dynamic speed signs. Plus, the enhanced network is designed so that it can be easily expanded when needed to include sensors for frost, temperature and other roadway hazards.

A Threat-Centric and Secure Network

As the industry-leader in cybersecurity, Cisco will be providing TDOT one of the most comprehensive advanced threat protection portfolios across the broadest set of attack vectors. Our threat-centric and operationalized approach to security reduces complexity and fragmentation while providing superior visibility, consistent control and advanced threat protection before, during and after an attack. By deploying Cisco solutions, TDOT will benefit from a global collective of cybersecurity researchers, analyst and real-time defenders under a single umbrella. We also offer the industry's leading threat intelligence, using telemetry obtained from a vast footprint of devices and sensors, public and private feeds, and the open source community at Cisco.

This intelligence amounts to a daily ingestion of billions of web requests and millions of emails, malware samples, and network intrusions. Our sophisticated infrastructure and systems consume this telemetry, enabling machine-learning systems and researchers to track threats across networks, data centers, endpoints, mobile devices, virtual systems, web, email, and from the cloud to identify root causes and scope outbreaks. The resulting intelligence is then translated into real-time protections for TDOT and agencies like yours to help keep sensors, signage, signals and communications secure.

The Results

By partnering with Cisco, the Tennessee Department of Transportation is creating a secure, real-time sensor network without the expense associated with a full network upgrade. Our innovative solutions, including Cisco's Kinetic Edge Fog Processing Module and 829 industrial routers, have let TDOT benefit from:

- Enhanced network management services via a single-pane-of-glass interface
- Secure and agile roadside services
- Options for automation of formerly manual operations
- Improved traffic management in adverse weather, helping save lives
- Scalability and future expandability as their needs require.

Learn More

To learn more about our Connected Transportation solution and how it can help improve safety and efficiency on your roadways, please visit:

<http://www.cisco.com/c/en/us/solutions/industries/transportation/roadways.html>