

Digitizing traffic control for smooth and efficient transportation.

Gwinnett County, Georgia, is the metropolitan area northeast of Atlanta. It is home to nearly one million residents, a population that has almost doubled over the past 20 years.



Industry:
Government

Location:
Georgia, United States of America

Organization:
180 employees

Solution:
Cisco Industrial Switches
Cisco Industrial Routers
Cisco Catalyst Center

Cisco ISE

Orchestrating the road network

Effective transportation management is key for Gwinnett County to thrive. The county's Department of Transportation (DOT) is responsible for planning, building, regulating, and maintaining roads, bridges, signs, sidewalks, and traffic signals. Intelligent transportation systems (ITS) network technology provides the infrastructure for efficient and accessible transportation for Gwinnett County residents and interstate commerce. This is a mammoth undertaking. The DOT maintains more than 2650 centerline miles of roadway, 100,000 signs, 750 traffic signals, and 463 traffic control beacons.

Ken Keena, the traffic management systems section manager at Gwinnett County says, "Digitizing and automating means instead of waiting an hour or two for someone to call and tell us a signal is flashing or malfunctioning; it automatically goes through the network and software, and an email notification is sent so technicians can quickly respond. There could be a long delay before a call came in because everybody assumes someone else has called."

Digitization is a journey in progress for Gwinnett County. While it may not happen overnight, the county is making positive strides towards achieving its goals. To start, Gwinnett DOT plans to standardize connectivity to all traffic signals. This will lead to improved network uptime and establish a platform for the intelligent transportation systems of the future.

Gwinnett DOT has the flexibility to choose and operate its own network, separate from the county's core office enterprise network. While this independence allows the DOT to determine its own course, it is increasingly challenging where the two networks are expected to integrate. Cisco technology had been integral to the IT infrastructure for many years, and it had been clear that choosing uniform network standards would help eliminate duplicate management efforts and varying approaches to security.

Establishing consistent connectivity

The network upgrade at Gwinnett County DOT is built on ruggedized Cisco industrial switches, recognized in the industry as leading roadway switches that are built to withstand outdoor environmental conditions. Ongoing security management is critical for ITS networks, and it's important that ongoing updates are done in a streamlined and easy-to-manage process. If updates are left unmanaged, gaps can occur where the latest security updates are not implemented.



"One of the benefits of a traffic control center is being able to view things remotely and do remote troubleshooting. There's time savings and efficiency when an engineer can adjust traffic light timings without driving to the location."

— Ken Keena, Traffic Management Systems Section Manager

Technology standardization establishes a single family of Cisco switches to update, which simplifies management of patches, fixes, and upgrades. The engagement consolidates solution providers and coordinates the county's network strategy.

"We decided early on that our DOT network would not be in a bubble, and that it would be tied to our IT network," Keena says. "This would give us flexibility to access it from anywhere in the county."

Cisco networking—specifically, Cisco Industrial Ethernet (IE) 4000 Series Switches and Cisco Industrial Ethernet 4010 Series Switches—provide both Layer 2 access connectivity as well as Layer 3 aggregation. Gwinnett County IT-approved configuration templates are deployed by DOT teams using Cisco Catalyst Center, which enables operators to easily provision, configure, monitor, and diagnose the network remotely. Gwinnett County IT then manages Layer 3, while the DOT manages Layer 2 switches. With the recent addition of Cisco Catalyst IE3300, IE3400, and IE9300 Rugged Series switches to the Georgia Department of Transportation's qualified product list, the county can choose these offerings and continue its path of ongoing improvement focused around next-generation technology poised for the future. Lab testing is the next step.

Additionally, Cisco Identity Services Engine (ISE) is implemented to provide endpoint authentication, authorization, and accounting in network access control for network segmentation and secure operations. An approved administrator connecting to a switch is authenticated through ISE and authorized to make changes. An audit trail is kept for record-keeping purposes.

360ns (Network Solutions), the Gwinnett County's long-term provider of ITS integration and network services, was instrumental in planning and delivering the upgrade. Further ahead, network infrastructure enhancements will include the deployment of managed access across Gwinnett DOT's Layer 3 field hub cabinets using the 360ns SmartLock 8000.

The SmartLock 8000 allows security policies to be enforced in real time with all card and key holders. Access will be controlled via a 360ns web interface access control dashboard that will be accessible through the county network.

Laying the foundations for a connected transport system

The immediate impact, says Keena, is on maintenance efficiency and network uptime. With one standard vendor of network technology, versus five previously, support is more consistent. Service teams arrive on site knowing what is needed.

"We can give the automatic notification information to the technicians. They pull up information from the traffic signal controller and know what equipment to bring on their first trip out. They no longer have to make multiple trips or send multiple trucks because they're working from a vague phone call," says Keena. "The team can do some other initial troubleshooting remotely and really save time out on the street, which is a big benefit."

Reliable connectivity, coupled with real-time monitoring of traffic signals, controllers, and cameras, can contribute to smoother traffic flow and potentially improve the driver experience. The engagement with Cisco paves the way for a wider, integrated approach to transportation management, Keena explains. The future may involve push notifications to connected cars, and real-time updates to smart road signs.

Gwinnett County is already planning to explore how traffic signals can be coordinated to allow emergency vehicles to pass through on a green light. It then wants to apply the same management to improve bus routes, creating a more effective public transport option for residents. "Everything we do is for the benefit of Gwinnett County citizens," he says. "Having a robust network opens the door for opportunities to be on the forefront of technology. The county and all our departments benefit. People collaborate with each other and we're more efficient all around."