

City Deploys Wireless Mesh to Control Traffic Signal System

City of San Antonio staff remotely communicates with traffic signal system to improve traffic flow.

EXECUTIVE SUMMARY

CITY OF SAN ANTONIO

- State and Local Government
- San Antonio, Texas USA
- 2,031,445 citizens

BUSINESS CHALLENGE

- Outdated traffic signal system controllers
- Inability to alleviate strained traffic flow

NETWORK SOLUTION

- Single, integrated, secure and high-speed network
- Synergy of all communications between public works and traffic departments
- Installation of closed-circuit television cameras at intersections

BUSINESS RESULTS

- Ability to address transportation issues remotely and in real-time
- Improvement of traffic signal timing, increase in traffic flow, reduction of gas emissions, and help reducing citizens' commute
- Ability for network infrastructure to support broad range of future mobile initiatives

Business Challenge

The City of San Antonio is the second-largest city in the state of Texas and the seventh-largest city in the United States, covering over 412 square miles. The city is a popular tourist destination, with global visitors coming to see the Alamo, River Walk, and historic Menger Hotel. Due to the number of people who live and visit San Antonio, there is a consistently high volume of traffic throughout the city.

City officials were determined to create an intelligent traffic signal communication network in an effort to help traffic flow, and alleviate traffic problems associated with large cities and dense populations. The original traffic signal system in place was equipped with outdated controllers that did not allow for remote management. City technicians had to travel to the actual traffic signals across the city in order to investigate reported issues. Sending city staff to the reported site was both costly and time consuming. In

turn, addressing the reported issues became slow and inefficient. The only way San Antonio was made aware of faulty traffic signals and/or issues with traffic flow was through citizen calls, most of which were false or inaccurate.

The city installed a wireless infrastructure based upon Cisco technologies at San Antonio's city hall in 2005, so officials understood and trusted Cisco technology. Bart Mulcahy, communications manager for the City of San Antonio, looked to Cisco to design the city's Traffic Signal System Modernization/Synchronization (TSSM) program. The goal of the program was to create an integrated structure that allows city staff to communicate remotely with the entire traffic signal system directly from the city's traffic management center. The key objectives of the program was to improve the timing of the traffic signals in the city, build on the existing communications network, increase traffic flow, reduce gas emissions, and help alleviate the overall time for citizens to commute.

Network Solution

Mulcahy managed the project to test the probable success of the Cisco® Wireless Mesh Networking Solution. This solution is a single, integrated, secure, and high-speed network that is ideally suited for metropolitan networks, such as San Antonio, because it is easily installed on

building and streetlight posts, and is designed to scale large outdoor deployments. The solution includes the Cisco Aironet® 1500 Series lightweight outdoor mesh access points that can be deployed with zero-touch configuration. The proposed Cisco solution had the potential to synergize all communication projects between the public works and traffic departments, ranging from radio to network and voice systems.

“We decided to run a pilot project throughout a one-mile radius of the AlamoDome in the Central Business District area of San Antonio just prior to the 2007 NCAA Final Four basketball tournament to see how the system worked on a smaller scale,” Mulcahy says. “The new communications network was installed in 36 signalized intersections, and approximately two-thirds of the locations were connected via fiber-optic cable. The remaining locations were connected via a high-speed wireless location. All of these connections allowed the traffic signals to remain in sync and have their timings adjusted remotely.”

Additionally, closed-circuit television cameras were installed at several intersections with video feeds being observed at TransGuide by the city’s Public Works Traffic Operations Division. “The pilot project was deemed a great success as TransGuide was able to monitor traffic flow and remotely manage the traffic signals and lane directional changes,” Mulcahy says. “We received only positive feedback from citizens on how the traffic situation was handled throughout the highly congested time during the Final Four tournament. Based on this, we decided to move forward with the implementation of the wireless technology throughout the city.”

The city, using technology from Cisco with partner Alvarion, Ltd., deployed a wireless backhaul to the city’s radio towers, affecting approximately 1300 traffic signals and 150 facilities throughout the city. The mesh deployments were installed along the street corridors with no more than three “hops” from the mesh access points to the rooftop access points. The rooftop access points were connected either via fiber or high-speed bridges to the nearest city facility or tower.

“Our new wireless system and TSSM program give us the capacity to remotely and efficiently address changes in traffic demands. There is no question that we are better able to keep San Antonio’s traffic moving as smoothly as possible, reduce traffic congestion and delays, and keep motorists’ frustrations at the lowest possible level.”

— Bart Mulcahy, Communications Manager, City of San Antonio

Business Results

The City of San Antonio has seen several benefits as a result of the implementation of the Cisco Wireless Mesh Solution and the TSSM program. City traffic technicians are now able to address transportation issues in real time. If a complaint is received through the 311 non-emergency call system, it can be investigated immediately, and city staff can assess whether the problem can be fixed remotely or if a technician needs to physically travel to the intersection. This convenience gives the city technicians more time to address preventive maintenance issues, which in turn, reduces the number of complaints that are received. Additionally, the new system has built in alarms that automatically notify staff when there is a problem.

The ability for TransGuide to view the city’s intersections via closed-circuit television cameras allows engineers to make timing adjustments to better accommodate traffic flow. These

adjustments can be in response to either recurring daily congestion patterns or an incident that is diverting traffic. “Our new wireless system and TSSM program give us the capacity to remotely and efficiently address changes in traffic demands,” says Mulcahy. “There is no question that we are better able to keep San Antonio’s traffic moving as smoothly as possible, reduce traffic congestion and delays, and keep motorists’ frustrations at the lowest possible level.”

PRODUCT LIST

Routing and Switching

- Cisco Catalyst® 2955 Series Switches
- Cisco 7200 Series Routers

Network Management

- Cisco Optical Network Solution 15454

Wireless

- Cisco Wireless Mesh Networking Solution
- Cisco 1522 Access Points
- Cisco ME 3400 Series Ethernet Access Switches

Next Steps

The reliable and flexible mesh technology is able to support a broad range of future mobile initiatives, ranging from first responder communications to video surveillance to high-speed mobile broadband technology. “We hope soon to have video access available to San Antonio’s emergency responders, police officers, firefighters, and other public safety

officials,” Mulcahy says. “These groups will be able to assess situations before arriving on the scene and make proactive public safety decisions. We also hope to enable public safety vehicles with access to the mesh for remote access to VPN databases, video, dispatch, and high-speed data.”

For More Information

To find out more about the Cisco Wireless Mesh Network Solution for local governments, go to:

http://www.cisco.com/en/US/netsol/ns621/networking_solutions_package.html



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