Case Study :: Transportation

The City of Sacramento

Actelis Keeps Traffic Moving Safely in California's State Capital

Many cities in the U.S. and around the world are installing a new generation of IP-based traffic cameras and controllers to improve road safety, reduce congestion and help drivers avoid traffic jams. Often, as in the city of Sacramento, California, traffic systems installed during the 1990s needed upgrading to provide more sophisticated monitoring and control capabilities. But doing so overburdened the network. . In many cases, relatively slow, legacy communication links needed to be replaced with state-of-the-art carrier Ethernet over copper access equipment.

New IP Cameras Require Bigger Pipes

Like many other municipalities, the City of Sacramento at one time had been managing nicely with dial-up modem links operating at speeds as low as 1200 baud for managing traffic signals. However, traffic monitoring cameras – particularly new high definition traffic monitoring cameras - require far more bandwidth than ever before. In addition, Sacramento wanted to move to IP-based devices and was in the process of a deploying a new IP network. According to Shad Bennett, the City's head of traffic engineering & operations, "The whole system is moving to IP, so we needed bigger pipes and had to bring in new controllers."

The City of Sacramento had deployed a limited number of fiber-optic rings in the ground that could provide high bandwidth connections, but this was a cost effective solution only for those IP cameras and devices that were nearby. . However, the City needed the a cost effective way to get enough bandwidth to high-speed IP-based cameras at locations distributed throughout the entire metro. Copper cabling was already widely available throughout the metro, having initially been installed for telephone services. Ryan Billeci, Telecommunications Engineer for the City of Sacramento, realized the advantages of the ubiquity of copper. According to Billeci, "We have 50-80 miles of fiber in the ground, but hundreds of miles of copper."

The challenge was turning this aging copper plant into a strategic asset capable of supporting high-bandwidth communications more cost effectively in many more locations that fiber could economically be used to reach. Sacramento needed a solution that could effectively complement its fiber network while supporting existing and emerging applications at more locations more cost effectively using copper.

Reach, Rate and Reliability

The City evaluated a number of options before selecting a field-proven Carrier Ethernet access solution from Actelis Networks. Using standards-based G.SHDSL bonded copper, the Actelis solutions offered symmetrical bandwidth at bit rates up to 100 Mbps, and exploits Actelis' expertise and patented EFM*plus*™ transmission technologies to dynamically mitigate the effects of crosstalk and increase the bandwidth and distance possible for any given number of pairs. The result is that Actelis' Ethernet over bonded copper gave the City of Sacramento all the bandwidth that was required….quickly, easily and less expensively. For municipalities such as Sacramento, exploiting the ubiquity and cost advantages of copper is a huge advantage, because it allows them complement fiber and cost optimize their network metro-wide.

"We looked at a few vendors, and Actelis was the leader in the carrier Ethernet over copper space," says Billeci. "The choice was also made because of the proven robustness of the Actelis solution, because the hardened switch is able to operate in harsh environments. Equally as important was the ability of the Actelis EAD to bond up to eight copper pairs together, creating high bit rate pipes at 45 Mbps in capacity."

Requirements

- Upgrade traffic monitoring and control platform to Ethernet-based network system
- Upgrade to large bandwidth to accommodate current and future equipment.
- Must be used in existing copper and fiber-optic infrastructure

Equipment Used

- ML600 Ethernet Access Device and ML100 Series in Point-to-Multipoint

Benefits

- Ease of deployment
- Ease of management
- Total IP-based traffic system control
- Capacity to handle current and future infrastructure demands

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IP Monitoring and Control Cutting Journey Times

The City's new IP-based cameras are already starting to make a significant difference to citizens in the Sacramento area, according to Bennett, even if people are not directly aware of the technology. "These systems are going to be invisible to the public. It's all about efficiency and detection. If a traffic signal fails, we can now pick that up easily and get it fixed more quickly and cost effectively."

The City of Sacramento tunes the timing of the traffic signals in response to changing conditions using Actelis Networks' Carrier Ethernet over Copper™ solution.

The City of Sacramento fine tunes the timing of the traffic signals in response to changing conditions to enhance traffic flow and minimize congestion, and relies on Actelis Networks' broadband over copper solution to provide reliable, high performance Carrier Ethernet connectivity.

The foundation for this was first laid in 2001 when the City opened its Traffic Operations Center to monitor traffic conditions in four major transportation corridors in the Sacramento area: Watt, Sunrise, Madison and Greenback. Three hundred intersections were controlled by signals. Now the use of more sophisticated cameras combined with an IP network is enabling staff to respond to events such as hazardous spills, accidents, or just general congestion by changing the timing of traffic signals. Increasing automating of processes has enhanced the efficiency of the traffic network significantly. These corridors are now monitored by 37 cameras communicating via the fiber-optic and copper network using machine vision technology to identify and count vehicles.

IP Monitoring May Be Recruited for Law Enforcement

This ability to optimize traffic flow is crucial because congestion has increased enormously in the Sacramento area over the last decade. The result is that sophisticated monitoring and control capabilities are also attracting interest for other agencies within the district, notably law enforcement. "We are looking to use the network for other surveillance purposes, and can cost-effectively deploy cameras and other broadband tools using our existing copper infrastructure," comments Bennett.

This trend is also evident in larger cities such as New York and London, where cameras originally installed to enforce toll roads, speed limits, and lane restrictions can also be used by police for real-time traffic monitoring with automatic number plate recognition for tracking suspect vehicles.

Actelis Networks Ethernet over Copper portfolio

There is little doubt that cities such as Sacramento will derive ever greater benefits from their increasingly sophisticated traffic monitoring, surveillance and control networks, made possible by the ability to extend high bandwidth connections across complete districts.

Corporate Headquarters
Americas Sales Office
47800 Westinghouse Drive
Fremont, CA 94539, USA
t. +1 510-545-1045 or toll-free in U.S. 1-866-ACTELIS

Company and General Information: info@actelis.com
Asia Pacific Sales: apacsales@actelis.com
Central and Latin America Sales: calasales@actelis.com
Europe, Middle East and Africa Sales: emeasales@actelis.com
North America Sales: nasales@actelis.com

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