High Performance
High Quality

Case Study :: City of San Jose

"Actelis Networks has been a longtime good corporate citizen when it comes to developing products that are environmentally friendly," according to Eric Vallone, vice president of marketing at Actelis. "For years, Actelis has been shipping Ethernet access products that are in compliance with EU Directive 2002/95/EC on Reduction of Hazardous Substances. Actelis has been successfully implementing a comprehensive plan to support our environment and comply with the RoHS directives as evidenced by the fact that our products have been RoHS-5 compliant since 2006, and in 2009, became fully compliant with the RoHS-6 lead (Pb) free directive."

RoHS 6 Compliant
Actelis Networks
Goes Green

Did you know?
Actelis has been RoHS compliant for more than seven years, creating "green" products that are good for the environment and our industry.

The new Actelis ITS network will play an important role in San Jose's ambitious Green Mobility strategy, a core plank of the overall green vision, which is bold by aiming to reduce per capita energy consumption by 50% and create 25,000 jobs in clean energy applications by 2022. With transportation accounting for over 40% of greenhouse gas emissions, it figures prominently in the strategy, with one aim being to have all public transportation vehicles powered totally by fuels from renewable sources by the same time. Such ambitious targets can only be met through an integrated approach that encourages more walking or cycling by creating new safe comfortable trails that intersect conveniently with public transportation, and also with roads.

> " In addition to Actelis' superior rate, reach, and reliability, their ML platforms' ease of deployment, scalability and manageability were also key strengths, and reinforced our decision to select Actelis for the project. "

Yet while the aim is to reduce car journeys dramatically, the Green Mobility strategy recognizes that cars will continue to play an important part in the transportation scene. There will still be journeys that cannot be made easily by other means, and so Green Mobility must ensure that these are kept to a minimum by having convenient and affordable alternatives for all other journeys with seamless integration between the different modes of transport. The Actelis ITS network will make a massive contribution here by providing a common infrastructure shared by railways, roads, and public trails for cyclists and pedestrians, facilitating signaling, traffic control and provision of information.

City of San Jose
A Case Study on ITS Networking

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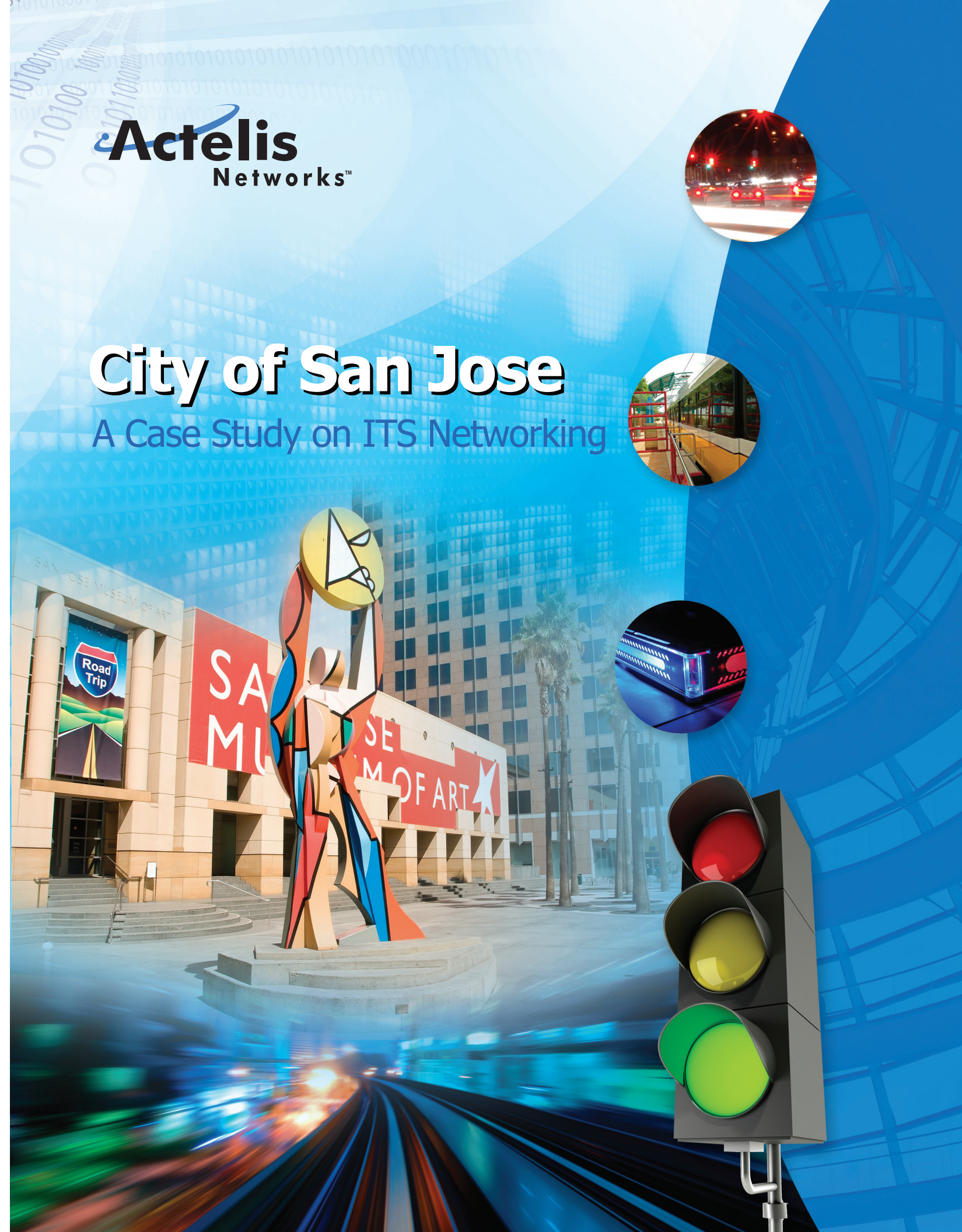
High Bandwidth

Actelis Delivers All-IP ITS Networking to City of San Jose

The epicenter of Silicon Valley turns to world's leading Ethernet over copper company to improve traffic congestion and "Go Green"

The City of San Jose in Northern California has been at the heart of the state's high-tech boom, bringing unparalleled prosperity and a 25% growth in population over the last two decades. In fact, San Jose now has a population of one million people, making it the 10th largest city in the U.S., along with the highest average income of any U.S. city larger than 300,000 people. With this accelerated growth, a common problem of economic and technological prosperity has emerged: fast-growing traffic congestion and high pollution levels, collectively bringing an increase in carbon emissions.

San Jose, however, has not stood idly by watching the city's air become more polluted. On the contrary, it has been harnessing technology to reduce emissions from automobiles by introducing a new IP-based ITS network. As an important part of the city's strategy to tackle emissions and congestion while more efficiently managing transportation, San Jose installed real-time IP-based traffic signal controllers in response to changing roads conditions. This deployment strategy is cutting commute times by private cars and public muni buses significantly, enabling pedestrians to enjoy cleaner air, and at the same time, helping the city reduce its carbon footprint.

The key to efficient traffic management lies in dynamic, real-time control of traffic lights that give priority to public transportation while avoiding unnecessary "waits on red" for cars when there is no vehicle crossing through the intersection. This requires high-speed, two-way data communications over an IP-based Ethernet network to obtain feedback from IP traffic cameras and then to change stoplights in real time to override their normal settings.

The City of San Jose, like many U.S. metropolises, relied on legacy modems running at just 1200 bps to derive small amounts of monitoring information from traffic signals, which ran independently according to pre-set timing that could only be changed manually. Subsequently, the city's network was nowhere near fast or reliable enough to support ITS, which must run continuously day and night since it is managing traffic in real time on the basis of live information.

San Jose soon realized it needed a new network. Initially, the city's network architects thought they might need to dig up roads to lay new fiber-optic lines in order to build a next-generation IP-based ITS network with the required performance and reliability. They soon found, however, that they could meet all their objectives by leveraging the city's existing copper infrastructure. But the network planners still needed a solution capable of delivering high bit rates in excess of 10 Mbps per copper pair – about 5,000 times the speed of the existing modem network – while also being available 99.999% of the time (the hallowed "five nines") over a physical infrastructure of varying quality. This led San Jose to Actelis Networks, the #1 global supplier of EFM over bonded-copper solutions, and its family of industry-leading ML Ethernet access systems, which are built on the company's patented and award-winning EFM*plus*™ technology.

"When evaluating our options for upgrading to an all-IP ITS network, we found that utilizing the city's existing copper interconnect in combination with fiber-optic cable backbones was the most beneficial and cost-effective solution," said Ho Nguyen, associate engineer for San Jose's Transportation Operations System Management group. "With the Actelis solution, we were able to leverage our existing copper without sacrificing our need to implement a wide breadth of emerging applications over our new IP network."

The 3 R's of EFM are critical for ITS networks

San Jose deployed Actelis' ML600 series of intelligent EADs (Ethernet Access Devices) and its point-to-multipoint Ethernet Aggregation Systems for ITS applications to improve traffic flow and road safety while reducing greenhouse gas emissions. San Jose's new all-IP ITS network is bound together by Actelis' ML230 EFM Aggregation Systems connecting to ML688 EADs back into the core network. Once physically installed, the Actelis' systems can be turned up in minutes, and speed to deployment was just one of various factors confirming for San Jose that the choice of Actelis was a good one. "This has given us the ability to quickly deploy and manage the new applications," commented Nguyen.

This deployment is part of a major migration from a legacy communication system to a new state-of-the-art, all-IP-based Ethernet over copper ITS network capable of supporting a variety of intelligent traffic monitoring and control applications. These include:

- IP-based Ethernet traffic signal controllers being replaced at each of the city's
- Backhaul of IP video from cameras monitoring traffic flow;
- Dynamic Message Signs that include directing traffic for downtown events; and
- Providing information on the availability of downtown parking spaces from the city's Parking Guiding Systems (PGS) signs.
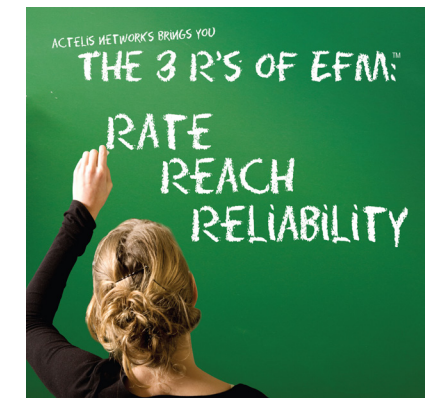
Underlying San Jose's ITS network is Actelis' powerful spectral management extensions called EFM*plus*, which overcomes limitations of *Rate, Reach* and *Reliability* imposed by variable line quality and cross-talk interference among neighboring copper pairs. Actelis refers its unprecedented *Rate, Reach* and *Reliability* as "The 3R's of EFM™," which are just as essential for next-generation broadband applications as the 3R's of reading, writing and arithmetic are to education. San Jose's Nguyen also acknowledged the importance of Actelis' 3R's of EFM for San Jose's ITS network, as well as the company's easy-to-use Element Management System, MetaASSIST™.

"In addition to Actelis' superior *Rate, Reach* and *Reliability*, their ML platform's ease of deployment, scalability and manageability were also key strengths, and reinforced our decision to select Actelis for the project," said Nguyen. "Actelis' bandwidth availability matched our field requirements and their MetaASSIST allowed our field engineers and electricians to deploy and provision the systems easily."

"Green Mobility"

San Jose's migration to a new all-IP-based ITS network is helping the city achieve its vision of what it dubs "Green Mobility" (to decrease its carbon footprint by helping to reduce traffic congestion on roadways, allowing Valley Transportation Authority (VTA) buses, for example, priority at traffic signals. San Jose is also improving the movement of VTA's Light Rail Trains (LRT), while simultaneously reducing the time vehicles spend waiting for the LRT to pass. The end result is better traffic flow for vehicles, buses and LRT, leading to less time commuting to and through the city and, therefore, helping to reduce emissions into the atmosphere from idling vehicles stuck in heavy commuter traffic.

Highlights

- Centrally Managed & Secure All-IP ITS Network
- Improved Safety, Road Conditions & Communications for Everyone
- 24/7/365 Real-Time Monitoring
- Reduction in Car Emissions
- IP Traffic Controllers
- IP Video Backhaul
- Dynamic Message Signs
- Parking Guidance Systems
- Improved Public Transportation
- Rapid Service Deployment
- Superior Rate, Reach, Reliability
- Fiber Quality Transmission
- MEF Certified Ethernet Capabilities

Equipment Used

- ML688 Ethernet Access Device
- ML230 Point-to-Multipoint Aggregation Platform
- MetaASSIST EMS and Craft GUI

Ethernet Access Over Copper
ITS Networking Solutions