Now and in the Future

Tacoma, Wash., deploys an MPLS-based network to meet growing demands for capacity and new services.

For some years now, Tacoma, Wash., has been running just to keep in place. Even with ongoing improvements to its IT backbone, demand has steadily exceeded network capacity. To solve the problem, the city deployed a new Gigabit Ethernet (GigE) multiprotocol label switching (MPLS) network. The network provides ample communications capacity for city agencies, ensures quality of service and — perhaps most importantly — serves as a solid foundation for innovative new services.

A significant number of city offices and agencies in Tacoma depend on CityNet, the metro network, from bridge engineering to schools, metropolitan parks to county government. But capacity limits of the old network restricted the ability of these agencies to serve the public.

Until recently, for example, the Pierce County television station broadcast video over telephone wires with unacceptable quality. "It was like a dial-up modem versus a broadband connection. It just took so long to do anything," said Donnie Claunch, Tacoma's telecommunications technical administrator.

Agencies also needed the many new and improved services — such as VoIP, video surveillance and video conferencing — an enhanced network would provide. For Tacoma network managers, MPLS provided much-needed network redundancy, backup controls, and the ability to direct network traffic and monitor the system for potential problems.

Tacoma found a solution in an MPLS-based network delivered by Alcatel-Lucent. Besides speeding the flow of network traffic considerably with its 10-gigabit backbone, MPLS gives Tacoma substantially greater capacity, allowing city agencies to manage the growing communications requirements for voice, video and data applications.

The new network technology enables services that previously were unavailable and improves those that were insufficient. Citizens can now watch broadcast-quality government- and educational-access television. Better video performance across the network also increased Tacoma's use of time-saving video conferencing to support interagency communications. And finally, users throughout the city government can access critical data faster than ever before.

Out With the Old

Tacoma ran into capacity challenges despite its best intentions. The city had deployed two network infrastructures in recent years, yet requirements for capacity, speed and management tools continued to challenge the network managers.

In 2001 and 2002, the city implemented a synchronous optical network (SONET) architecture — a robust platform — yet as fast as planners could build the technology, network demands were surpassed. The city's technology staff then developed an Ethernet ring structure, expanding the structure steadily until it too was overtaxed by growing bandwidth demands.

Both networks were unable to meet Tacoma's long-term growth requirements. It was time to issue an RFP for a more scalable solution. The city needed a network that could meet its current demands for speed, capacity and ease of management — and scale to accommodate future connectivity requirements.

The Road to MPLS

Network managers found numerous reasons to support MPLS, especially its ability to deliver a broader range of service possibilities. Planners also liked the technology's performance and ease of implementation and integration. They were equally taken by MPLS's ability to bring together existing services and new MPLS-based functionality as elements within a common network-migration strategy. The ability to migrate seamlessly was

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a significant issue for network planners, according to Claunch, who was a key figure in the rollout of the new network.

It took them about half a year to gradually phase in MPLS. Their strategy was to break down the existing network ring in segments, layering in MPLS one segment at a time. The conversion took place with minimal disruption; it was virtually invisible to users. "We didn't have to forklift out our existing network and bring in a new one, which meant we had very minimal downtime during the migration, nothing more than a couple of minutes for a site," Claunch said.

The changeover was not without hurdles. In one case, a software glitch halted progress, but Alcatel-Lucent quickly fixed the problem, Claunch said. "They had people here. They pinpointed what was going on, and they corrected it."

Today things go even more smoothly in the rare event of a hiccup. Redundancy and monitoring, inherent within MPLS, ensure that problems are identified, isolated and resolved with complete transparency. "The sites never even know anything is wrong," according to Jeff Lueders, the city's cable communications and franchise services manager.

With all the pieces in place, Tacoma now has the network architecture it needs: a system well provisioned to meet the growing needs of a complex municipal infrastructure. A 10-gigabit backbone connects four hubs with service loops at each hub connected to multiple users. Network managers can control the speed and determine the volume of gigabits per subscriber.

Operationally, "tunneling" has already proven to be a valued feature. MPLS allows for the creation of private connections from one location to another, essentially letting an entity form its own VLAN.

"Suppose the police department has one group that talks together, and the fire department has a group, and administration has a group," Claunch said. "They can all send their traffic without it ever getting intermingled. Agency traffic is separate going through that tunnel and it stays separate, so the police department is never going to see what the fire department is seeing." The ability to manage and prioritize traffic also improves the overall quality of service.

From the end-user's perspective, the network delivers on the promises of simplicity and speed. "Users open up a database, and it opens up for them immediately," Lueders said. "They don't have to go and get a cup of coffee while they wait for it."

Most significantly, Tacoma's newfound networking muscle enables not just action but also productivity. To name just one example, justice is served more swiftly these days because the county juvenile justice center can call up documents and court records faster than ever before. With the new services and innovative tools made possible by MPLS, all of Tacoma's networked offices and agencies — rescue workers, sanitation operations, engineering corps, administrative personnel and many more — are more efficient and ultimately cost-effective.

Alcatel-Lucent Ethernet Switch/Router platforms are designed to deliver scalable, reliable and predictable service quality metro Ethernet services over an IP/MPLS network. The carrier-grade **7450 Ethernet Service Switch (ESS)** and **7250 Service Access Switch (SAS)** routers overcome the limitations imposed by traditional Ethernet switches by providing industry-leading density and performance, while minimizing operating expenses to reduce the total cost of ownership.

Alcatel-Lucent **5620 Service Aware Manager (SAM)** provides integrated network and service management for converged IP/Ethernet/MPLS multiservice networks.