



CUSTOMER SUCCESS STORY

UTAH DEPARTMENT OF TRANSPORTATION CREATES COMMUTERLINK TO HELP UTAH RESIDENTS “KNOW BEFORE YOU GO”

EXECUTIVE SUMMARY

CUSTOMER NAME

- Utah Department of Transportation

INDUSTRY

- Transportation

BUSINESS CHALLENGE

- Current infrastructure was not able to sustain the planned Intelligent Transportation System upgrades, specifically the addition of hundreds of cameras
- Complete the TMC upgrade to integrate public transit, traffic control, and incident response centers

NETWORK SOLUTION

- Provide hardened switches and wireless devices for the roadside video surveillance to deliver information back to the Cisco core network located along hubs on the roadside and the traffic management center

BUSINESS VALUE

- Provide streamlined operations and maintenance by reducing three networks down to one
- Provide unified communication capabilities between transit, roadways, and incident response teams

Originally designed to provide signal coordination across jurisdictional boundaries within the Salt Lake Valley, the Utah Department of Transportation’s Advanced Traffic Management System (ATMS)—CommuterLink—has grown substantially since it was established five years ago. Today, CommuterLink integrates more than 800 traffic signals, 1400 detector stations, 250 closed-circuit television (CCTV) cameras, and 70 Variable Message Signs, saving Utah travelers US\$179 million and 9.8 million hours annually and preventing 948 traffic accidents and 3 traffic-related deaths each year.

BACKGROUND

Utah Department of Transportation (UDOT) maintains more than 5800 miles of roadway worth tens of billions of dollars. With increased travel demand, population growth, and wear on the system, UDOT wanted to enhance the efficiency of its existing roadways by improving traffic management and safety, increasing traveler information, and providing greater access management.

CommuterLink, Utah’s Intelligent Transportation System (ITS), is a network of resources designed to maximize the efficiency of transportation in the state and help residents “Know Before You Go” a transportation services information program designed to keep travelers updated about road conditions and delays. CommuterLink is a cooperative effort among several organizations, including UDOT, Salt Lake City, Salt Lake County, the Federal Highway Administration, Federal Transit Administration, Utah Transit Authority, Wasatch Front Regional Council, Mountainland Association of Governments, and the Department of Public Safety.

Based on ITS successes in other cities, UDOT developed three primary goals for the ‘Know Before You Go’ initiative. First they wanted to reduce freeway delays by 20 percent, increase peak-hour freeway speeds by 15 percent, and reduce signal stops and intersection delays by 20 percent. Second, they wanted to enable emergency personnel to identify and respond quicker to traffic incidents. And third, they wanted to provide traffic, weather, and accident information to Utah travelers via radio, television, the UDOT Website, electronic message signs, and a toll-free telephone travel information line.

“Our top priority is to be more efficient with the resources that we have and making sure we’re using them in the most effective way. With our expanded network we can reduce traffic congestion, deal with incidents, and minimize traffic delays. We are also able to coordinate and share information on incidents with other agencies, such as the media and law enforcement, emergency services, and other transportation agencies through our Traffic Operations Center.”

— Richard Manser, ITS Deployment Engineer, Utah DOT

CHALLENGE

To manage and communicate with all of these devices in the ITS system, UDOT installed its own dedicated fiber optic communications network that encompasses most of the valley north to Ogden, south to Spanish Fork, and spans all major cities in between. However, with the rapid growth and immense success of their ITS initiatives, UDOT faced a new decision.

“Our video switch had 200 inputs and 300 outputs and it was basically full,” says Richard Manser, Utah DOT ITS deployment engineer. “We were looking at expanding the system two or three times its current size and were faced with a decision of either buying a bigger switch or moving to another technology.”

Capacity was not the only issue. UDOT was operating three parallel networks concurrently—a proprietary analog video network, a SONET/T1 network used for low-speed data and voice, and an ATM network used primarily for LAN traffic. In addition, the team also wanted to conserve fiber. “We’re all about being more efficient with the resources we have and making sure we are using them in the most effective way,” Manser says.

UDOT hired TransCore to perform an in-depth analysis to identify new and proven state-of-the-art video technologies as well as conduct a future needs assessment for CommuterLink. After doing research, TransCore recommended a replacement of the existing video matrix switch and both the SONET/T1 and ATM backbone networks. It was replaced with an IP over Ethernet solution.

“To me, the most significant thing we found was that everyone liked the technical solution with IP over Ethernet,” Manser says. “It allowed us to standardize our communications protocol and put us in the mainstream, technology-wise. There’s a lot of support for IP over Ethernet outside of the transportation area, so it gives us some real advantages and long term cost savings.”

SOLUTION

With UDOT’s established relationship with Cisco Systems®—using Cisco® products for the network core, TransCore evaluated the Cisco Catalyst® 2955 industrial Ethernet switch for the edge of the network to support the expansion of cameras along the roadside. “We had a couple of hard technical requirements when we were looking for a supplier,” recalls Anthony Torres, TransCore communications specialist. “One of the most significant was the support for IGMP Snooping and support for IP Multicast. That played a large part in our decision to go with the Cisco switch.”

The communication and video switching solution for UDOT includes a digital IP communications network with IP Multicast for the switching and distribution of video. This approach completely eliminated the need for new video matrix switches, representing a potential cost savings of more than US\$1 million over a two-year period; and integrating more than 1000 traffic signals. Working with Cisco also allows UDOT the ability to install devices where in the past they could not due to the fact they could not install a fiber network in some areas. With the suite of Cisco wireless and mobility solutions, Utah can work towards new solutions in the future utilizing the existing infrastructure.

“A significant benefit of converting to IP is the reduction of operation and maintenance costs,” Torres says. “Large numbers of existing components are simply eliminated, making it much easier to maintain; support staff can remotely monitor and manage field equipment; and the equipment is internationally standardized. All of these factors support significant operations and maintenance savings now and into the future.”

UDOT also saw a distinct advantage in Cisco’s management tools. “If you have 1500 Ethernet switches and you need to do a software upgrade or change the password on all of them, that represents a real challenge,” Manser observes. “However with CiscoWorks, those types of tasks are no longer labor intensive.” CiscoWorks also remotely monitors the health of UDOT’s system and supports the remote configuration of these devices.

“As we looked at the cost of deployment into the future, going with IP over Ethernet architecture was significantly lower than staying with our existing architecture,” Manser says. “So we were able to make that business case to our executive team and get support for the project.”

RESULTS

Recently, UDOT celebrated CommuterLink’s fifth birthday with a celebration at the UDOT Traffic Operations Center. “CommuterLink cameras are an invaluable resource for the Department of Public Safety,” says Colonel Claron Brenchley, Utah Department of Public Safety. “With our communication center established at the Traffic Operations Center, we can see in real-time what is happening at the scene. This helps us dispatch Highway Patrol Troopers much more efficiently, and the troopers are much more informed before they arrive on the scene.”

CommuterLink and its components have expanded in the past five years to encompass Weber, Davis, Salt Lake, Summit, and Utah counties. “We now have enough fiber strands feeding into this building to reach halfway around the earth,” says John Njord, UDOT executive director. “No wonder CommuterLink is recognized by industry experts across the country for its efficiency and success. In fact, CommuterLink was awarded the 2004 “Best of ITS Award” from the Intelligent Transportation Society of America for the best ‘Return on Investment’ in the nation.”

Even with the expansion and planned growth, UDOT will be able to manage the network without additional headcount. “We have suffered cutbacks in state government at a time when we’re growing significantly,” Manser notes. “This has helped us accommodate that growth.”

Currently, the system is used specifically for monitoring and responding to traffic incidents by several different agencies, including Salt Lake City, Salt Lake County, the Utah Transit Authority, the Department of Public Safety, the University of Utah, Utah 511, and the state’s Comprehensive Emergency Management Center. The system has saved travelers US\$179 million and 9.8 million hours each year due to fewer delays, increased safety, and higher fuel efficiency. In addition, officials attribute the prevention of 948 traffic accidents and 3 traffic-related deaths every year to the success of CommuterLink.

Additional benefits of the new, expanded network include:

- **Cost effective:** 80 percent reduction in fiber requirements; 90 percent savings in rack space; significant savings in deployment costs when multiple devices will be connected to the field cabinets.
- **Scalable:** Increased capacity on existing data channels supports future video applications.
- **Reliable:** Eliminates single point of failure by removing the need for a central video switch.
- **Standardized:** Standards-based equipment supports interoperability between different brands.
- **Efficient:** Supports remote device management and remote diagnostics of the field equipment and communication network.

NEXT STEPS

Plans are already underway to extend the area covered by CommuterLink, incorporating vehicle location-based schedule information from Utah Transit Authority (UTA) buses and light-rail vehicles. Train and scheduled arrivals by station for TRAX light-rail trains will also soon be available, along with real-time transit alerts via the Web, the 511 telephone Travel Information Line, and wireless Web on mobile phones at <http://www.ut511.com>. Advanced electronic payment services on buses and at light-rail stations are also planned to make public transit even easier to use.

FOR MORE INFORMATION

To find out more about Cisco Intelligent Roadways Solutions, go to: <http://www.cisco.com/go/transportation>



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