

GarrettCom 6K Switches Network THEA's CrossTown Expressway with Fiber Rings, Redundancy

A Transportation Application



ABOUT THE THEA CROSSTOWN EXPRESSWAY PROJECT

The Tampa-Hillsborough Expressway Authority (THEA) in Tampa, Florida, currently owns and operates the nine-mile Reversible Lanes Bridge built in the median of the existing Selmon Crosstown Expressway. To alleviate congestion, traffic on the new three-lane expressway flows westbound into downtown during morning commute times and reverses to eastbound during evening peak travel times. The new structure gives commuters a non-stop route from Brandon to downtown via the new Tampa Downtown Gateway at Meridian Avenue.

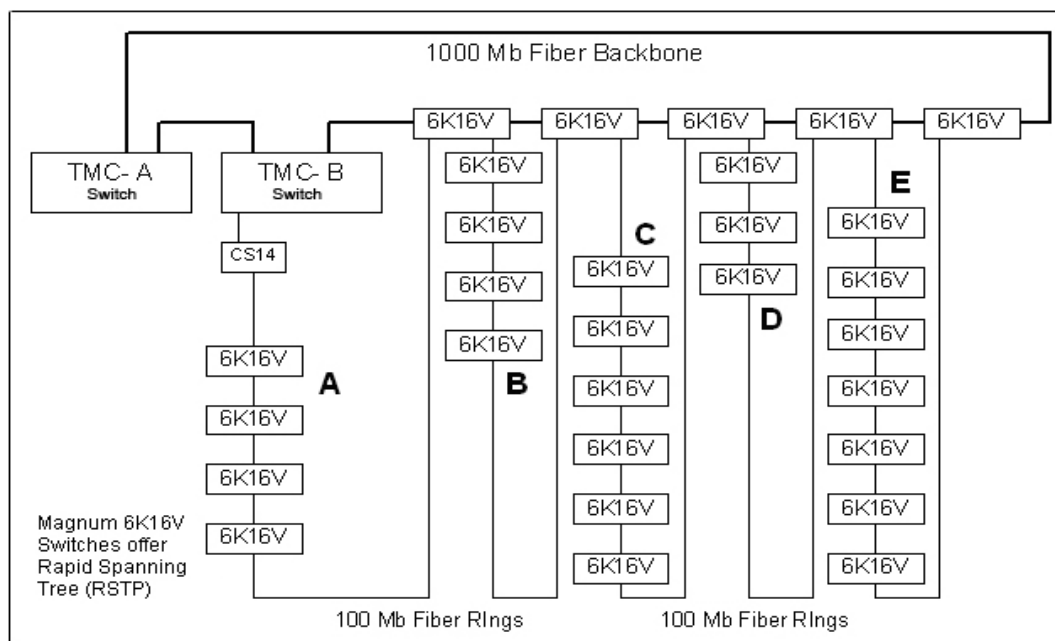
THE CHALLENGE

Transdyn is responsible for the design, development, integration, commissioning, and support of the project requiring a number of Intelligent Transportation Systems (ITS) components to manage, control and operate the roadway. The new system integrates and automates various ITS functions such as warning gates, barrier gates, variable and changeable message signs, video surveillance, vehicle detection and verification, and traffic information dissemination.

THE SOLUTION

The primary network is a 1000 Mb fiber ring using single-mode fiber cabling. From the Traffic Management Center (TMC), Ethernet fiber switches are used to connect the TMC networking devices (such as video monitors) to the THEA network.

In the field, there are (5) Magnum 6K16V switches with dual gigabit single-mode transceivers, dual 100Mb fiber transceivers and (4) 10/100 RJ45 port connections. These Magnum 6K16V switches are the primary ring switches that connect the Gigabit fiber ring to the sub-rings A, B, C, D and E (see diagram). These rings are made up of 100 Mb single-mode fiber cabling installed in the bridge structure. The Magnum 6K16V is used because of its ability to have both dual Gigabit and dual 100 Mb fiber ports.



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THE SOLUTION (CONT.)

The sub-rings have (24) Magnum 6K16V's in a ring configuration with four Magnum 6K16V in A and B rings, six in C ring, three in D ring and seven in E ring. These rings all control and monitor the network traffic flow, the traffic signals, and they carry the video data across the network for real-time monitoring of the actual vehicle flow and the conditions on the elevated expressway and toll plaza. Video quality is maintained by providing and managing data priority using industry standard Internet Group Management Protocol (IGMP and IGMP-L2).

The network can automatically recover from most fault conditions. Using a redundant ring configuration for both the backbone primary ring and the field rings, THEA and Transdyn implemented fault-tolerant Rapid Spanning Tree Protocol (RSTP) on both the Gigabit and 100 Mb fiber rings. To easily monitor the network operations and performance, THEA and Transdyn implemented a graphical network management platform, SNMPc by CastleRock Software.

THE RESULTS

Using a unique Reversible Express Lanes system, THEA increased the traffic-carrying capacity of the Selmon Cross-town Expressway by 150% to eliminate congestion during peak commuting hours. The nine miles of elevated toll lanes on the expressway between Interstate 75 and downtown Tampa utilizes a concrete segmental bridge with reversible express lanes that required only six feet of space within the existing Expressway median. The system, which includes reversible cashless multi-lane open road toll collection, is electronically controlled.

A weatherproof, hollow core in the bridge conceals utilities, fiber optics and specialized ITS equipment used to control the reversible lanes and to facilitate electronic motorist information services and emergency response. More than 40 variable message signs along with 25 all-weather video cameras, 30 warning gates, and 5 impenetrable barrier gates are controlled from the Traffic Management Center (TMC) to support the traffic managers who oversee the change of direction for the lanes.

THE RESULTS (CONT.)

The application uses multiple 100 Mb Ethernet rings using GarrettCom 6K16V managed switches to link the video cameras, with each of the rings connected to a Gb backbone link to the TMC.

ABOUT MAGNUM PRODUCTS

Magnum 6K Managed Switches are highly configurable switches, providing modular slots for user selection of 100Mb, 10 Mb, or Gigabit Ethernet fiber or copper ports, and are hardened for use in harsh environments such as outdoor traffic control boxes. Power input choices include AC, 125VDC, 24VDC, -48VDC, and dual DC input for power redundancy.

MNS-6K Managed Network Software provides the latest technology for switch management, network monitoring and security. Based on network standards, it is easily integrated into existing industrial Ethernet networks and features standards-based redundancy functionality and Secure Web Management (SWM).



ABOUT GARRETTCOM

GarrettCom, Inc. is the leading manufacturer of industrial, transportation, and power utility networking products. The company's management software supports redundant rings and secure web-based access to local and remote networks. GarrettCom markets its products through a network of resellers, OEMs, integrators, and distributors worldwide.



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