

THE U.K. IS USING ETHERNET INFORMATION TECHNOLOGY IN MOTORWAYS

A Transportation Systems Application

TECHNOLOGY TODAY

Traffic monitoring is extremely critical in controlling the congestion of the roads and preventing accidents. In the past, most companies in the transportation sector have used legacy technology such as SDH which is expensive and optimised for slow-growing narrowband voice traffic. Today, Ethernet is more widely used in the traffic field for its ability to provide greater bandwidth in demanding applications.

ABOUT UK HIGHWAYS AGENCY

The Highways Agency (HA) is an executive agency for the Department for Transport (DfT), and is charged with the responsibility for operating, maintaining and improving the UK's motorways and trunk roads.

THE CHALLENGE

In a bid to decrease congestion and increase safety on the UK's roads the Highways Agency decided to try a new approach.

In partnership with professional services group Mouchel Parkman, a strategic plan was developed to improve traffic flow within the UK's existing infrastructure and road systems. The project, codenamed Active Traffic Management attempts to:

- Reduce congestion by part time use of hard shoulder and use of variable speed limits
- Increase safety using video data
- Enhance driver information about traffic flow
- Give more reliable journey times
- Respond faster to accidents

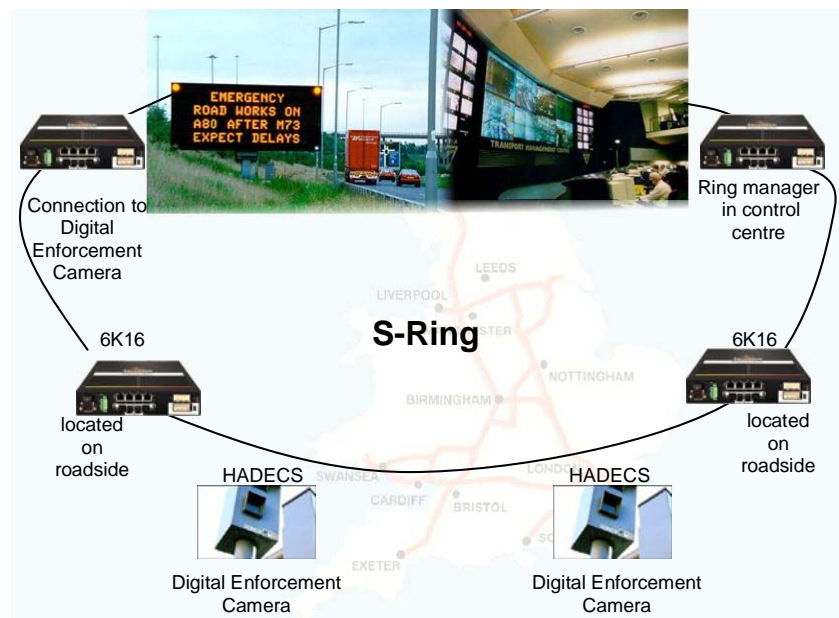
These objectives are achieved via a dynamic monitoring system. When traffic reaches a certain level and is in danger of slowing or suffering stop-start traffic jams, variable speed limits are introduced on electronic Advanced Motorway Indicators (AMI) situated on overhead gantries, with driver information relayed on Variable Message Signs (VMS).

If these measures are insufficient the VMS mounted above the motorway will indicate that the hard shoulder is now open as a running lane. In addition to these congestion and information provision improvements, safety is enhanced by the introduction of the Highways Agency Digital Enforcement Camera System (HADECS).

These Safety cameras will be installed at the same locations as the VMS, the Safety cameras will communicate via an IP over fibre network that Mouchel Parkman has designed.

The detailed system design by Mouchel Parkman highlighted the requirements for IP over fibre transmission via field-hardened Ethernet switches on fault tolerant fibre optical rings. Specification requirements for the switch included AC power inputs, rack mount capability, secure web management, modularity of copper, fibre and gigabit ports, as well as tag based VLAN functionality.

Mouchel Parkman chose GarrettCom's field hardened 6K16 managed switch and innovative redundancy manager S-Ring. GarrettCom's 6K16 Switch is housed in a tough steel casing and is designed for temperature uncontrolled environments, and so is ideally suited to connect the locations on the roadside together.



UK Highways Agency, Traffic

THE SOLUTION (continued)

Each section of road has a 6K16 operating as master optical switch connecting the fibre optical ring with a transmission station.

Active Traffic Management (ATM) is a mission critical application with millions of cars driving on the UK's roads every day. The fibre optical ring structures therefore required the highest standard in fault tolerance technology. Mouchel Parkman chose GarrettCom's unique and innovative S-ring Redundancy Manager Software. S-Ring is built upon networking industry standards including IEEE802.1d Spanning Tree Protocol and enables the 6K16 switches to simplify and speed up recovery from faults with sub-second recovery times. Using S-Ring software Mouchel Parkman were able to connect the switches over long distances with fibre at gigabit capacity in a fault tolerant ring structure.

Due to the geographic area served being large, most of the ATM sites are located in remote areas. The maintenance and repair costs can be very high, therefore, it was crucial for Mouchel Parkman to have a reliable and cost-effective solution.

THE RESULTS

GarrettCom's Secure Web Management functionality provides a method for the Highways Agency to remotely monitor and manage the fibre switches using a graphical user interface from any location using a web browser. The aspect of Security is also vitally important to the Government based, Highways Agency. Secure Web Management software provided the perfect solution with built-in authentication and encryption for remote connections via Secure Socket Layer (SSL) and Transport Layer Security (TLS) technology.

Further security measures were required to protect the flow of data as multiple services are running over the ATM network including HADECS which has certain legal implications.

VLAN Tagging is an integral part of GarrettCom's managed switch software and provided the perfect method of segregating the data streams.

ABOUT MAGNUM PRODUCTS

The **Magnum™ 6K-Series Managed Switches** Ethernet Switches offer modularity, supporting a mix of fibre and copper ports, and advanced management features including standards-compatible support for self-healing rings and the most comprehensive set of web management and security features to be found in an industrial switch. A small footprint and flexible mounting hardware allow the 16, 25, and 32 port 6K-Series units to fit easily into control room spaces.

The **Magnum™ Secure Web Management (SWM)** offers users a safe and secure method for accessing mission-critical Magnum Switches from the convenience of a web browser. SWM monitors switch activity and supports changing configuration settings from a web browser.

The **Magnum S-ring™ Redundancy Manager** for Magnum 6K Switches provides fast fault-recovery in Ethernet LAN ring structures. It can be used in multi-vendor LANs running standard STP on the Magnum 6Ks along with other switches and hubs in any redundant LAN topology, including rings and meshes.

ABOUT GARRETTCOM

GarrettCom, Inc., is the leading manufacturer of industrial and carrier-class Ethernet LAN products. GarrettCom offers a comprehensive line of ETSI and NEBS-certified switches and hubs for use in telecommunications, industrial, and automated environments. Software applications, embedded in the company's MNS-6K Ethernet management software support redundant rings and secure web-based access to local and remote networks. GarrettCom markets its products through a network of resellers, OEMs, system integrators, and distributors worldwide. For more information on GarrettCom and its products, visit www.GarrettCom.com.

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