Billion M500
LTE Industrial Multi-Carrier Router

The Billion M500 Regional Signal Coordination System Enables Smart Transportation

APPLICATION
Dual Network Backups and VPN

Data Connectivity
LTE Wireless Service

Product
Billion M500 LTE Industrial Multi-Carrier Router

MARKET
Traffic Management System

The free Public Wi-Fi is not only boosting the people's shopping experience but more importantly, will create a long-term positive impact on the local communities. According to Mayor Byron Brown, "Our senior citizens who are retired, who come to the supermarket to hang out, will now be able to get onto Wi-Fi easily. And we might even now start seeing parents in the neighborhood bring children to do their homework here at the supermarket."

Executive Summary

Developing societies and increasing city populations have resulted in serious rush hour traffic congestion on major roads, and this is affecting the quality of modern life. To combat this traffic congestion, the government has teamed up with Telecommunication Company and Transportation solution providers to set up "Reginal Signal Coordination System" which is part of the "Intelligent Transportation System (ITS)" solution.

This system is designed to monitor traffic conditions through various traffic data which are from Vehicle Detectors (VD) and eTags, to adjust traffic signals in real-time. Furthermore, it also provides guidance for alternative routes, reduces traffic congestion, increases traffic speed, and shortens travel time.

Challenge

To accomplish real-time control of traffic signals, the signal control module must calculate the best combination of traffic signals based on data collected within a very short time. Instructions must be given to quickly change the next signal control cycle. For example, if too much traffic arrives at an intersection making it impossible for enough cars to pass within a single cycle, the duration of the next green light can be extended to allow more vehicles to pass. To allow these systems to run smoothly, customers must choose a 4G LTE router that provides a stable and secure connection to overcome the following challenges:

> Installation should be cost-effective and deployment should be easy.
> The installation costs of underground cabling for fixed network connections are very much higher.

> It must be possible to install with existing equipment in outdoor cabinet located in the intersection,
> and operation must be stable under rapidly changing day/night temperatures
> and other kinds of the harsh outdoor environment.

> The system must check all traffic signal control packets to avoid the possibility of
> data misidentification which would cause flashing yellow traffic lights to disrupt traffic control and route guidance.

> A secure connection (via a VPN tunnel) must be provided to prevent any kind of malicious intrusion.

How Billion Helped

Billion M500 Enables Network Connection for a Regional Signal Coordination System

The Billion M500 is a high-performance, industrial-grade, multi-function, in-vehicle LTE router that enables highly reliable and secure wireless connectivity for remote control and digital data integration.
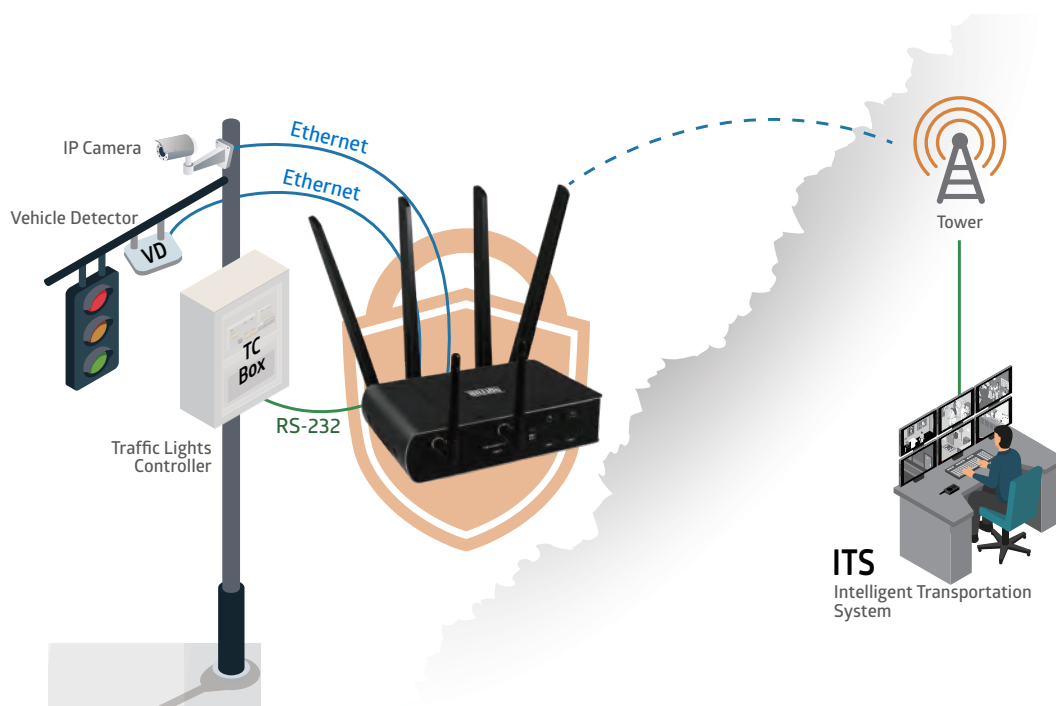
Wireless Connectivity Replaces High-Cost Fixed-line Networks

The embedded LTE module design provides LTE connectivity, reduces the cost of fixed-line network, and eliminates the inconvenience of underground cabling.

Withstands High Summer Temperatures

The Billion M500, enclosed in a tough metal casing, is rugged, operates in temperatures from -40°C to 60°C, and can withstand large day/night temperature swings. Its wide range of operating voltage (DC 10V~56V) can meet the needs of all environments.

Multi-Device Data Integration

Equipped with 4 Gigabit Ethernet ports, Wi-Fi, and USB Host, its high-scalability allows it to be easily integrated with surveillance and traffic signals for remote management.

Secure, Real-Time Data

The intersection signal module can send collected data back to the control center. Based on the data, the best signal control solution can be calculated and quickly issued. VPN support provides a secure connection that ensures the system is protected from malicious intrusion.

A Simpler, More Agile, Flexible Approach to Meeting Customer Needs

At present, all communication agreements for traffic signals in Taiwan comply with the Urban Area Traffic Control Communications Protocol Version 3.0. The R&D team at Billion Electric has developed its own firmware that targets the needs of traffic signal control. The firmware not only integrates signal packets, but also checks for signal control packets to avoid the flashing yellow traffic light caused by data errors.

Results

To improve traffic flow, in addition to existing infrastructure plan, we have built up a platform that integrates intelligent traffic systems such as an IP Camera, RFID sensors and eTags . With all participants' effort, the traffic network capacity is increased through traffic diversion. The results include a reduction of average traffic running time of about 3 minutes (40.9%), an increase in traffic flow of 30.3% and travel speed by 41%. Intersection delays have also been reduced by 15%, and the road users now can reach their destinations faster and more conveniently.

Dual Network Backups and VPN Construct an Intelligent Traffic Management System

The Billion M500 has enabled the government, telecommunications company, and Transportation solution provider to integrate stable wireless intelligent traffic signal coordination with the existing systems. An intersection monitoring image and central control increase the reliability of communications equipment to provide a safer and smoother traffic environment.