In a previous article, we discussed data communications for transportation networks. Our traffic communication networks have transformed from the classic point-to-point city-owned cable or leased lines to the sharing of a data transmission infrastructure operating at speeds up to 100 Mbits per second.

In recent years, more options have become available for data communications in our traffic management systems. For example, we now have Ethernet-over-Copper, a multitude of wireless options including Spread Spectrum, high speed cellular, and many others. Consequently, getting information from here-to-there has never been easier! Mostly because of standards developed by the communications industry, we can inter-mix media formats - fiber to copper to wireless and back to fiber - to get communications where we need it.

When we are dealing with only one media, fiber for example, it is a relatively simple matter to calculate bandwidth, latency and speeds. But when we mix different media, challenges begin to present themselves. For example, your IT department has just completed the deployment of a city-wide network, and the finance department comes along and requests that you stop using the Telco leased lines you have relied upon for years and switch to their new infrastructure - to save money of course. Your first thoughts are great! Now I can get video back to my TMC; add additional devices; and not have to worry about those pesky delays when you’re viewing real-time monitoring of your signal.

You have used the leased lines for years and therefore know what to expect and understand where the boundaries of the system performance are set. However, some of your traffic signals are located in IT ‘deserts’. Now what? Well, you will have to use mixed media, fiber to wireless for example, to traverse those deserts. What are performance impacts?

The new IT backbone runs Ethernet. Your traffic signal controllers mostly use RS-232 serial data to communicate. That means data conversion and that generally means RS-232 at central has to be converted to Ethernet over the network and then converted back to RS-232 at the controller end. Our traffic data then must travel along with Voice-over-IP (VoIP), video, and general organizational information. It must compete for its share of the available bandwidth and deal with the latency issues that may result. For most users of the shared backbone, latencies of 200, 300 or even 1000 milliseconds is not a big deal. However, for our traffic/ITS applications it can be substantial.

See Figure 2: Mixed-Media Communications Configuration on page 22.

It is important to appreciate that most traffic signal systems operate with the master as the commander. It alone initiates communications and the local devices only respond when addressed. We call this method a polling protocol. At the master, one to several channels are outputs that each can have 1-30 intersections or so drops. With 10 channels and each having 25 intersections, we can have 250 intersections in the system. Each traffic signal controller is usually polled at fixed time intervals to get status and data (i.e. detector information) back to central. In a closed-loop environment the polling usually takes place every 30-60 seconds however in monitoring mode it may be polled every 1-2 seconds. In the UTCS system architecture, each intersection is polled every second.

With the above information as background, in the next article we will investigate how data

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This standard covers luminaires used for illuminating roadway tunnels and underpasses. Requirements in this standard are limited to general attributes of tunnel luminaires due to the wide variety of designs possible. Based upon the state of the industry, updates to referenced documents, terminal block, terms and definitions have been made in this 2012 edition.


NEMA is the association of electrical equipment and medical imaging manufacturers, founded in 1926 and headquartered in Arlington, Virginia. Its member companies manufacture a diverse set of products including power transmission and distribution equipment, lighting systems, factory automation and control systems, and medical diagnostic imaging systems. Worldwide annual sales of NEMA-scope products exceed $120 billion.

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conversion is accomplished and what are the implications for converting from your tried and true private network to a shared own.

Something to think about!