DIGITAL TRANSFORMATION DRIVES ROAD TRANSPORTATION INTO THE FUTURE

Research into the Intelligent Transportation Systems (ITS) market estimates the connected roadways segment will reach a value of more than $21 billion USD this year. Connected devices are becoming cheaper, smaller and easier to deploy as the ITS concept matures, allowing highway agencies to play catch-up with other industries on digital transformation.

By Chris Lee, Direct Touch Sales, Taiwan Country Manager Alcatel-Lucent Enterprise.

Recent developments in mobility and IoT are enabling road operators to implement systems such as automated signalling and digital signage, which rail and airport operators have had for years. The fundamental goals for smart road networks are similar and include: increasing capacity to ensure efficient traffic flow and enhance the end user experience, improving safety and decreasing cost and risk. Considering that transportation networks are distributed across large areas, and the need to support large volumes of both private vehicles and public transportation, an extensive and resilient digital infrastructure is critical.

BRINGING PEOPLE AND PROCESSES CLOSER TOGETHER

In a smart city, stakeholders in the transportation network, such as highways agencies or public transport operators, government bodies and businesses, all need a high degree of connectivity to improve efficiency and interoperability for day-to-day collaboration and operations. This can be achieved with borderless communications and collaboration tools for immediate file and information sharing, workflow co-ordination and interactions.

This heightened level of interconnectivity is continuing to be refined and ALE is at the heart of it. ALE has already developed a proof of concept for the EU’s eCall system, which receives detailed information from ‘connected cars’ in the event
of a crash and transmits it to the communications platform of the most appropriate emergency services. With developments such as this, ITS projects are raising the bar for technology-ensured road safety, with the EU projecting that eCall will potentially save hundreds of lives every year.

At the traveller level, information and notifications about the transportation network can be pushed out in real-time to travel apps, social media channels and mobile devices, helping to notify travellers of planned maintenance, delays or even adverse weather conditions. Dedicated mobile applications, powered by the underlying network’s communications platform, will put this real-time traffic and travel information in the palm of their hands.

SMARTER VEHICLES NEED SMARTER ROADS

Vehicles are also becoming smarter and increasingly connected — think about the connected cars and autonomous “big rig” convoys that are being trialled on public roads. At the same time, travellers expect digitized services, from traffic push notifications to electronic toll payments. Highway agencies are looking to ITS to help converge, digitize and adapt traditional road communication infrastructures to handle these technology developments, particularly for the many devices that are already IP-capable, or soon will be.

With ITS, highway agencies can better handle rising traffic volumes, tackle road congestion through advanced transportation management systems (ATMS) and promote greater road safety. ITS projects offer huge potential to roll out new services, such as digital road signs, IP cameras and embedded road sensors to monitor traffic flow and conditions, sensors to monitor bridge integrity or variable speed limits to improve road safety. These devices can be deployed anywhere along the road network — by the roadside, suspended from light poles or even embedded in the road surface itself.

As intelligent road networks spread out beyond urban population centers, more network infrastructure resources are needed to effectively connect, secure, monitor and manage them, and this is placing a greater burden on the edge of the network.

AVOIDING ROADBLOCKS ON THE DIGITIZATION JOURNEY

A primary challenge for the Department of Transport is how to best gather and transmit continuous data flows generated from these devices and applications — and then make them actionable. Can critical and non-critical data be distinguished? Is there a ‘single pane of glass’ view to monitor status and performance of dispersed network hardware? Is there spare bandwidth that can be allocated in the event of emergencies?

The answer to these questions comes from the intelligent network which must provide a suitable and secure foundation from edge to core, and support the deployment of large numbers of connected devices and sensors. Data can be harnessed and actioned through transportation-specific APIs, leveraging data from various stakeholders in real-time, for use in travel planning, ticketing and maintenance notifications.

SMART ROADS MEAN A NEW APPROACH TO CYBER SECURITY

There are clear dangers to rolling out large numbers of unsecured “headless” IoT devices. Networks have been compromised through cyber security lapses as trivial as poorly-secured fish tanks. So, although IoT deployments in ITS projects offer widespread benefits, such as real-time visibility of operational and customer-facing assets and efficient maintenance and repair, they also come with a string of potential cyber security concerns. Interconnected subsystems running on a single infrastructure have to be properly safeguarded from external threats. Any compromised device can be a backdoor into the network, so while exploits of poorly secured electronic highway signs can seem innocuous, they can pose a wider threat.

Introducing IoT containment to create virtual, isolated environments on a single converged, network infrastructure can reduce the threat of a single device on the IP network edge that may compromise an entire transportation network. These virtual containers allow the Department of Transport and authorized third-party contractors to safely and securely access designated areas of the network without exposing the entire infrastructure.

IoT containment also allows policy enforcement of IoT devices. This means traffic monitoring cameras positioned on the network edge could be configured to only transmit IP video data back to the core network, and only allow access and commands from the surveillance teams in the operations center. The time and management burden caused by mass on-boarding of devices such as IP cameras and traffic monitoring sensors can be eased by automatically fingerprinting and profiling device types.

GREEN LIGHT FOR ITS ROLLOUT

Digital transformation of the transportation sector is now in full swing. However, each mode of transportation brings unique requirements and challenges that must be addressed before value can be extracted from digitalization. The rising availability of IoT devices coupled with the ability to bring all communications stakeholders together to address cyber security, capacity and interoperability means that the day of trailing behind air and rail transportation are gone.

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ABOUT CHRIS LEE

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