Digital Age Networking
in Transportation
Transportation

The Transportation industry has many sub-segments, however, they all share similar challenges. Increasing safety and security, improving operational efficiency with the Internet of Things (IoT), and delivering a better passenger experience are all top of mind in the transportation industry today. Transportation operators know they need to become smarter to support the exponential increase in traffic and passenger volumes as populations grow.

The industry is moving towards being smarter. This is not just a technology play but also environmental as well as integration with the local community and across different transportation systems.

The ultimate smart transport system will be fully automated where all devices are connected via the IoT. This drive towards a smarter transportation future will require seamless interaction between machines, objects and people, using automation, IoT and Artificial Intelligence (AI) to bring these elements together. A holistic approach to becoming a smart transportation system is a must, and all forms of transport and its sub-systems must be considered.

In transportation operations, we see an integration of various infrastructures, both physical and IT. This includes different network technologies such as radio, LAN, WAN and WLAN, RFID and Geo-positioning technologies.

The effectiveness of the smart transportation environment lies in the technology and smart practices’ ability to work together to effectively share information, both for the benefit of transportation operators and for its customers. Information sharing is a must when citizens and business partners require information to reinforce a relationship with a particular transport operation.

Rail networks traditionally deploy multiple networks, one for mission-critical applications such as control, signaling, security and SCADA, and another for business applications such as ticketing, turnstiles, platform Wi-Fi, and retail. This has led to an increase in the number of IoT devices connected to the network. The need to provide more services to improve the passenger experience, digitalize interactions, and increase safety, while supporting growing passenger demand is changing the network requirements.

Airports require a multi-service, multi-tenant network to support many different applications and uses such as, check-in desks, security, baggage handling, operations, passenger Wi-Fi, and retail shops, to name a few. All of these clients require their own security, Quality of Service (QoS), and bandwidth requirements. With the exponential growth in connected IoT devices, the network must adapt more quickly than ever before. They also need to drive operational efficiencies while increasing safety and improving the passenger experience. This is increasing the adoption of IoT and new technologies such as asset tracking and location-based services.

Technological developments present road administration organizations around the world with the opportunity to transform the way they manage and operate highway and road networks. ITS provide a combination of leading-edge information and communication technologies required for transportation and traffic management. These technologies can improve the safety, efficiency, and sustainability of transportation networks. They can also reduce traffic congestion and enhance drivers’ experiences.

Modern ports have become multimodal distribution megahubs which link sea, river, canal, road, rail and air transport routes, vital for international trade and linchpins for the global economy. IoT will become a huge driver in ports and the move to more autonomous ships and systems to drive efficiencies which are expected within the next ten years.
The challenges faced by the transportation industry can only be addressed with digital age networks. ALE Digital Age Networking provides efficient, proven, end-to-end solutions for transportation businesses including airports, rail stations, intelligent roads, tunnels, ports and logistics. ALE Service Defined Network technologies for the transportation industry enable IoT digital business transformation as well as provide the necessary security, segmentation capabilities, and high availability. A Service Defined Network provides the reliable infrastructure to ensure mission-critical applications run smoothly. It is designed to improve passenger safety and comfort, and increase system capacity while at the same time, reducing cost and risk.

Investigation into the four components identified below can help explain how Digital Age Networking enables digital transformation in the transportation sector.

**Connectivity**
- **IoT**
- **Augmented intelligence**
- **Cloud economics**

**Service defined network**
- **IoT digital business**
- **Proactive analytics**
- **IT as a business engine**

Connect people, devices, objects and applications seamlessly and securely with multitenant, multiservice networks.

Improve business processes and the passenger experience by enabling simple and secure deployments of IoTs.

Increase operational efficiencies using analytics and machine learning.

Increase passenger satisfaction, increase revenues and decrease costs with innovative cloud-based services and applications.
A transportation data network is mission-critical and therefore must be highly resilient, and support many different types of applications, objects and users, with high levels of security. Transportation networks can be complex. With a Service Defined Network, the network is simplified, tasks are automated, and IT teams can deliver a better level of service and improve SLA’s, to provide an enhanced traveler experience.

All devices (passengers, staff, applications and IoT) can automatically be connected, with the correct level of access, security, and QoS. Network provisioning can also be automated, simplifying the network, and reducing human error, to provide greater operational efficiency throughout the transportation systems and processes.

In addition, the Alcatel-Lucent OmniAccess® Stellar WLAN uses the same onboarding principles as the Alcatel-Lucent OmniSwitch® LAN equipment. This creates a true end-to-end solution for all devices, applications and users, with support for indoor and outdoor ruggedized switches, and access points (APs) that can withstand the harsh environmental conditions. Further, the Stellar WLAN can scale up to 20000 AP’s in a single infrastructure, which is sufficient for most transportation deployments. Stellar WLAN also allows new business models to be introduced to reduce costs.

Service Defined Networking provides the foundation for the mission-critical network. It creates virtual connectivity among all the active physical links by choosing the best route for all the packets. It is resilient to physical damage and can manage the segmentation and automation for the connectivity of every user, device, and IoT. A Service Defined Network also enables transport operators to host multiple services and multiple tenants in a single physical network infrastructure.
IoT

IoT is driving efficiencies across all transportation segments. It can increase safety, improve the passenger experience, as well as drive down operational costs. However, with the exponential increase in IoTs, transport operators may struggle to cope with the demand to connect, and manage potentially hundreds of thousands of IoTs.

Digital Age Networking IoT enablement allows transportation operators to automatically onboard IoTs, from the provisioning of bin sensors in an airport, to deploying CCTV systems for an ITS system.

Device fingerprinting capabilities and support for millions of IoT devices provides transportation operators with the ability to automatically identify, classify, and provision devices with very little administrator intervention. This is achieved by leveraging the power of the unified network management application. The IoT will be authorized and added to the correct IoT container with a pre-defined policy for users, protocols, and QoS, thereby reducing human error and ensuring maximum security from cyber-attacks and external or internal threats.

Remote control of the IoT devices
Augmented intelligence

Artificial Intelligence (AI) is a major trend in every industry, including transportation. Supporting IoT deployments with AI is key for augmenting human intelligence. Industry analysts predict that by 2023, AI will be essential for smarter transportation operations.

Augmented intelligence, using smart analytics and machine learning from ALE, provides a framework to improve all areas of the business. The unified management platform can detect the hardware and software revisions, while also providing warranty and support information.

With machine learning as part of the framework, issues can be detected early and best practice configurations can be suggested and applied across the transportation network. Additionally, leveraging analytics can provide Quality of Experience (QoE) statistics to improve the passenger experience, and improve efficiencies.

Transport operators, in particular railway operators, have extensive predictive maintenance schedules for equipment such as rolling stock. Leveraging IoT and proactive analytics, together with ALE machine learning capabilities, can bring significant value to the maintenance cycle, and to the business.
Cloud economics

As part of a digitalization strategy, more and more transportation operators and authorities are leveraging the cloud. This allows operators to be more agile and flexible, bring new services online quickly and efficiently and be able to scale as required, as they become smart railways, ports, airports and roads.

Location-based services (LBS) is just one example of the importance of cloud solutions in the transportation industry. The ability to locate people and assets using LBS technology is key to the continued digitalization of the transportation industry. LBS can provide operational efficiencies and savings; while at the same time improving the passenger experience. In airports, support for passengers with reduced mobility can be costly and time consuming and in the end, provide an unsatisfactory experience for the passenger. The addition of LBS, with real-time asset and person tracking, can reduce the time for the airport support staff to locate a wheelchair, an operator, and the passenger. This can greatly improve the passenger experience and drive down operational expenses. The asset and the operator are where you need them, when you need them, and the passenger is informed at all stages.

LBS can also provide wayfinding. It can automatically notify passengers and provide information about the best routes to the gate, and how long it will take to get there. LBS can also help travelers find their vehicle in the car park, and even help them locate their friends and family within the airport, railway or bus terminal. Retail outlets can use the LBS solution to send geo-notifications about special offers to increase foot traffic in the retail outlet area.

Another example of an ALE cloud solution is Network on Demand (NoD), a highly flexible procurement model that helps streamline the financial burden of network infrastructure projects. NoD allows the operator, or authority, to procure network equipment on a monthly basis, with the flexibility to expand or reduce the system, to meet business demand. NoD is managed in the cloud using Alcatel-Lucent OmniVista™ Cirrus Network Management as a Service, and can be procured for a minimum period of two years. This allows fast growing organizations to shift to an OPEX model and reduce capital expenditures while maintaining leading edge technology advances such as 802.11ax.
We are Alcatel-Lucent Enterprise.
We make everything connect by delivering technology that works, for you. With our global reach, and local focus, we deliver networking and communications.

#WhereEverythingConnects