Keeping the Global Supply Chain Connected

Mobile Performance Management in Intermodal Operations

When shippers plan their trade routes, a port's ability to move goods quickly and the efficiency of its interconnections to the consumer market receive far more emphasis than in the past. As containerized traffic has grown at a clip of 8.5% annually since 2000 and container vessel sizes more than doubled over the same period, global ports have needed to continuously improve their infrastructure to keep up with demand as well as the competition. Ports with capacity constraints have lost business to ports with modern infrastructure that are better-poised to compete, and uninterrupted access to data about containers, logistics assets and their locations is a key piece. That data is essential to orchestrating the flow of goods in a modern supply chain.

The Role of Mobile Performance Management. Real-time data communications over wireless links ensures that the interwoven matrix of containers, truck chassis, rail cars, quay cranes, yard cranes and over-the-road trucks moves efficiently. Mobile Performance Management is an essential element. It optimizes, accelerates and secures data traffic, assuring delivery and preventing interruptions in the flow of data.

In the Container Terminal

The signal blocking problem in container terminal ports is well-known. Terminals typically install wireless access points overhead on buildings and light masts, but shipside cranes, yard cranes and stacks of steel shipping containers constantly move and create unpredictable coverage gaps and shortfalls. And while higher traffic and more-efficient movement through the terminal is good for business, it only exacerbates the problem with more container moves and higher stacks. Adding new access points, introducing mesh networks or adopting highly specialized Wi-Fi access points and antenna arrays are a possible solution, but rely on lighting masts in the right locations. Otherwise, the facility faces an interruptive and highly expensive buildout – and elimination of the problems is still not necessarily guaranteed.

Mobile Performance Management solves this problem in two ways: One, it optimizes the connections, delivering reliable performance despite coverage gaps and weak-signal areas. It pauses the connection, then simply resumes when signal is again available. Two, it allows multiple networks to be used and transparently switches between the connections. This allows 3G or 4G cellular data connections to be used as the primary connection or a backup to onsite Wi-Fi. Because it maintains a single, secure and persistent tunnel regardless of which combination of networks is used – private or public – terminal operators can be assured of reliability and security.

A Key Enabling Technology for Intermodal Operations

Mobile Performance Management handles the complexities of connection performance in dynamic environments that are challenging for RF signals. It also supports any application that runs in a wired environment including terminal operating systems, ERP and other systems, whether accessed as a terminal session or via a web interface. This allows port facilities and others in the supply chain to quickly make existing mobile environments more seamless and reliable, as well as implement new initiatives.

Traffic Optimization ensures applications and resources are optimized for weak and intermittent network coverage, and workers can roam freely between networks as conditions and availability change.

Adaptive Policies fine-tune the mobile user experience, prioritizing applications and network access based on network, situation and location parameters specified by IT.

Performance Analytics and Diagnostics deliver constantly updated analytics on data use by devices, applications and networks, so IT can fine-tune the user experience. Root-cause detection quickly pinpoints problems for fastest troubleshooting to get workers productive again.

Security supports highly flexible and programmable secure access capabilities. IT can configure secure tunnels per-app or device-wide, securing access to enterprise applications and resources.

At the Quay

The ship-to-shore cranes set the tempo for the entire operation, and turnaround time for the containerships is one of the key metrics for port operations. At this critical point in the terminal, Mobile Performance Management software at the checker stations ensures that the flow of data about container moves and locations remains constantly available for other parts of the operation.

In the Intermodal Yard

Where gantry cranes are used to load and unload containers onto truck chassis and railcars, the changing locations of the cranes relative to the containers and to each other make signal availability unpredictable. When reach-stackers, bomb carts and straddle carriers work in and around container stacks, they encounter unpredictable coverage due to the constantly shifting containers. Mobile Performance Management optimizes the connections through the inevitable gaps and intermittent signal quality, so workers can gather and transmit information to keep up with the dynamically moving environment. This is even more important in yards where location technology is relied on to track not just container moves, but their precise positions as well.

At the Gate

Many terminals have moved to automated ID systems using truck-mounted RFID tags to implement post-9/11 security and "clean truck" initiatives. Some also detect trucks when they pass checkpoints on the access roads, to ensure that containers, lifting equipment or both are at the ready before the truck enters the port. Typically tag reads can be accomplished with a fixed-mount reader. However, mobile devices are still used at some gates, and Mobile Performance Management makes connections more reliable when working around the trucks for confirming containers seals haven't been tampered with and for other inspections.

In Rail Yards

Railcars in North America have been fitted with RFID tags for more than 20 years. In train yards and for trains in transit, the railcars pass by known locations which are appropriate for fixed-mount readers, and wireless connectivity to fixed locations can be made robust and reliable. However, Mobile Performance Management still has its place for workers who are more mobile, such as those performing inspections and for wireless devices used for perimeter security.

For Truck Fleets

Beyond the ports, equipping drayage trucks with onboard computers that exchange data via cellular networks, with optimization and security delivered via Mobile Performance Management delivers all manner of efficiencies:

- Signature captures for proof of delivery
- Entering and tracking driver hours of service
- Automatic vehicle location for dispatching and calculating more-precise arrival times
- Engine data for truck-servicing and maintenance
- Navigation systems for route-planning and reduced fuel consumption

For Logistics Personnel

Mobile devices allow logistics professionals to manage their operations from anywhere. Mobile Performance Management allows them to access any application written for a wired network, over any network connection. This allows them to access terminal management, enterprise resource planning or transportation management systems; track shipments and assets; and access reports and business intelligence no matter where the business takes them.

Toward a Globally-Integrated Supply Chain

Container terminals, shippers, railways and trucking companies are part of an interdependent global supply chain but to a large degree, each remains siloed. Industry experts predict the day that all shipping containers will have an RFID tag, and participants across the industry will use that tag to track each container regardless of the carrier. Every container will also have an e-seal with an RFID tag to detect tampering from beginning to end. While Mobile Performance Management is a piece of ensuring real-time reliable connectivity and visibility today, it will be vital tomorrow because of its ability to ensure ubiquitous, secure and reliable connectivity regardless of where a container travels.