

The Power of Fusion!

-- Smartly combine local and wide area wireless networks to achieve maximum cost-savings

In The last 5 years, we've witnessed many Transportation companies fast integrating their systems with wireless connectivity, GPS (**Global Positioning System**), mobile computing, bar code scanning etc. that help interconnect the warehousing, distribution and transportation operations. The business case? Time-definitive delivery, optimized operations, improved asset management and minimized inventory.

Facing a bumpy ride with new standards frequenting the marketplace, the WLAN (**Wireless Local Area Network** / **WWAN** (**Wireless Wide Area Network**) industry has now begun to fulfill its long-heralded potential, especially for less-than-truckload (LTL) companies in the wireless transportation continuum.

In this article I tried to provide a glimpse of the WLAN/WWAN market trend, its significant performance along with other wireless technologies and its future prospects in the transportation and logistics industry.

Technology – At a Glance

Wireless LAN, as the name suggests, is a data communication system that allows the connection of computers without any wires, mostly using Radio and infrared Frequency (RF). When installed in mobile equipment, WLAN is capable of sending and receiving data within a specific range, say, a building or terminal, or yard etc.

Whereas, Wireless WAN is a data network that extends over large geographical areas (in miles rather than feet), i.e., CDPD (**Cellular Digital Packet Data**), GSM (**Global System for Mobile Communications**), GPRS (**General Packet Radio Service**), CDMA (**Code Division Multiple Access**), satellite communications etc.

Current Scenario

Some hardware vendors, including Symbol Technologies has recently launched wireless adapters that provide voice and data communications over both local and wide area wireless networks. This dual-mode wireless connectivity reduces the number of components inside next generation handhelds, Personal Digital Assistants, vehicle mount computers, laptops etc.

Many leading edge solution providers have taken the lead in this space, and announced support of WLAN for their transportation logistics management systems, supporting full-function on-board computing, vehicle tracking, highly integrated back-office software and real-time wireless communications.

When WLAN and WWAN applications are complemented with other technologies (such as on-board computers, GPS, printers etc.), it helps in significantly improving operational costs. Thanks to high throughput, medium range and medium power consumption of 802.11b - the standard given by Federal Communications Commission (FCC) - for WLAN operating in 2.4 GHz range, a number of applications have come into being.

Why WLAN/WWAN?

One of the foremost wireless applications that the transportation industry has pioneered early on is, the use of satellite-based information systems that are integrated into wireless devices – of all types - to perform locator functionality for their vehicles on the move.

The significant advantage of WLAN/WWAN combination is its “anytime, anywhere” communications capability. The e-mail and Internet-based applications are the most widely utilized applications over WLAN. This, when combined with cost-effective implementation, WLAN is by far the most strongly perceived technology in improving LTL’s business efficiency.

How does WLAN minimize cost for LTLs?

Wireless LANs involve an upfront investment for equipment, and installation, but unlike Wireless Wide Area Networks, doesn’t involve any monthly fees. Any data that is transmitted over a WLAN is essentially free.

Mobile communications systems using WLAN technology provide greater functionality than current wireless tracking systems used by most carriers and package delivery companies. This revolutionary method involves installing wireless vehicle systems in fleets / trucks with WWAN (GPRS, CDPD, MobiTex, Satellite, etc.) and wireless LANs (also known as Wi-Fi), and wirelessly networking their entire terminals/hubs/yards and their vicinities with WLAN capability – the dual effect! The Result: It allows LTLs to minimize WAN bandwidth usage that reduces cost drastically.

What’s amazing is that, LTLs can now manage dispatch operations, perform remote diagnostics on the vehicles in transit/in terminal via a combination of WWAN and WLAN networks, record / capture delivery data, automate back-end accounting and inventory systems etc. – all without creating a hole in their wallet! This method allows the vehicle mounted mobile system to deduce which data transmission is available, and use it, to minimize the cost.

A case in point

A Texas-based trucking company has rolled out a ***dual-mode wireless vehicle system***, wherein, the delivery fleets / trucks are equipped with mobile computers with satellite and wireless LAN communication systems that are tightly integrated into the enterprise back-end systems.

The wireless system offers a “paperless process” managing all functions including invoicing and delivery transactions, capture of electronic signatures for proof of delivery, manage dispatch operations, automate driver logs and provide the dispatcher with the ability to perform remote diagnostics on the vehicle via satellite.

With handhelds, drivers record delivery information with a bar-code scanner and capture electronic signatures. On completion of a delivery, the driver returns to the truck and restores the handheld into a cradle on the onboard communications system.

When the truck passes by one of the company’s terminals equipped with WLAN infrastructure, the onboard communications system senses the WLAN and automatically starts downloading data stored in the handheld for the day. The information from the terminal WLAN is fed into the company’s wide area network (WAN) and into the back-end accounting and inventory systems.

It is a cost-effective method for LTLs to capture and manage information on a delivery vehicle - while drivers are at the wheels!

Applications Perspective

A few of WLAN/WWAN applications in transportation are:

Dispatch Management

*** Information dissemination to drivers** - Drivers can wirelessly receive information such as route, GPS-based driving directions, electronic bills of lading (BOLs) through the WWAN technology, where the devices are connected to a wireless network such as satellite, CDPD, GPRS etc. Most of the WWAN setups include an antenna situated on the truck, which connects to a “cradle” of the device. This limits the drivers when they step out of the truck, and are trying to perform delivery/pickup functions, such as electronic Proof-of-Delivery (PODs) with signature capture, printing a BOL, update the pallet information, update any status of the shipment, or truck etc. By enabling communication between the “cradle” and the device, via WLAN, the drivers can be connected to the wireless network at all times, in and around the vehicle.

*** Multi-mode operations** – WLAN, when coupled with WWAN and GPS, helps drivers to complete electronically all invoicing and delivery transactions including electronic capture of signatures for paperless proof-of-delivery using wireless handheld devices. This enables mobile workers to work in the most efficient manner. When trucks come within the range of their company’s network access points, i.e., terminals equipped with WLAN, the onboard communication system automatically starts downloading data stored in handhelds.

Cargo security

Nearly 85% of cargo losses happen in transit. WLAN-based systems can be used to detect security breaches. When WLAN is used along with WWAN connectivity, the drivers, when out of the vehicle, can monitor the vehicle for engine warning lights, open door switches, seat occupancy, cargo temperature and vehicle weight. A WLAN enabled handheld, which is connected to the vehicle’s on-board communication systems, can alert the driver of any anomaly that is detected when the driver is away from the vehicle, and in vicinity of the WLAN connection. Furthermore, these warning signals can be automatically sent to the dispatchers/office personnel with WWAN communication.

Warehouse Management

PDA’s with dual mode card (Wireless LAN and Wireless WAN) and handheld scanners are integrated with Warehouse Management Systems (WMS) and Yard Management systems, to automate operations like picking, packing, shipping, restocking, cross docking, yard checking etc. These PDA’s can feature live video from security cameras, issue notification and instant messaging services. These come in handy when the warehouses/distribution centres are located in multiple buildings, separated by a few metres distance. To install a wireless LAN system that covers all the buildings within a facility, and the space between them can become too expensive. However, by smartly combining WLAN with WWAN, the continuous communication to the handheld can be achieved at a much lower cost.

Core Benefits

- Cost-effective
- Time Savings
- Seamless Roaming
- Increased mobility
- Highly flexible and scalable
- Streamlined Reporting

- Ease of installation and ready-to-use
- Reduced cost of ownership

WLAN/WWAN - Today & Tomorrow

Though WLAN/WWAN is turning out to be lucrative, care should be taken to determine how the deployment would impact an enterprise in terms of improved asset utilization, user productivity and cost savings.

Due to 802.11b's power demand to sustain high throughput and medium range, only laptops can supply power for long hours. Pagers, handhelds, mobiles etc. don't possess the energy to withstand for long periods without impacting on performance. There are some new technologies, which are being developed offering better power management, and much stronger integration between WWAN and WLAN, for seamless communication handoffs.

"Bluetooth", is another technology to watch for, which enables short-range wireless (around 30 feet) connection between computers, and other peripherals like printers, scanners, personal digital assistants, digital cameras etc. This technology could bring an end to the "cable clutter" we all face in life, working with multiple devices and peripherals.

How can Bluetooth help the transportation industry? More often than not, the mobile solutions in the vehicle involve multiple devices connected to each other, example a GPS receiver, a printer, a scanner etc. based on the solution's breadth and capabilities. While Bluetooth can connect all of these devices, without having to use any cables, it can also help the drivers handle each device independently, while they are communicating with each other.

UPS, an industry leader in adopting mobile technologies, is implementing a mobile solution that involves drivers carrying a Bluetooth enabled key-ring scanner, which lets them scan the packages while communicating that to the handheld device that they carry. This can boost the productivity of the driver since there are no extra cables to be lugged, and they can reach those hard to reach spaces in the distribution centers, and warehouses without having to use lengthy cables.

This is only the beginning of an exciting era, that's unveiling before us, in the space of mobile solutions, and as the WLAN/WWAN industry becomes more mature offering value added services for customers, it is sure to revolutionize into a dynamic environment for information capture and display in the wireless communication networks arena!

Experience the dollar-to-dollar savings... at fleet speed!

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