



## How LoRa Technology Makes Supply Chains and Asset Management Smarter



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## EXECUTIVE SUMMARY

By 2020, Gartner\* predicts that more than half of major new business processes will incorporate some element of the Internet of Things (IoT) and believes a thirty-fold increase in internet-connected physical devices will “significantly alter how the supply chain operates.” This is not surprising since IoT has long been an obvious area of focus for organizations looking to reap more value from the supply chain. Global corporations recognize the transformational role of IoT and many deployments are focused on identifying, locating and tracking the status of assets.

However, very often IoT solutions and devices have been expensive or impractical to implement. The main difficulty has been linking remote sensors wirelessly to the Internet across various sites or countries (with indoor and outdoor locations) in a seamless manner that follows all steps of the supply chain. The ideal wireless linking technology should be inexpensive and secure, work over long distances and have a substantial battery life. Short-range technologies like ZigBee®, Bluetooth® and Wi-Fi® do not meet these requirements and cellular is obviously longer range, but the battery life is very short. In addition, carriers’ cellular data plans are too expensive and cellular chipsets cost too much for massive item-level deployments (i.e. cartons on a truck).

*“LoRa Technology has really been a game changer for us. Previously, the companies that were supplying uplink technology were limited to a cellular link which could be very expensive. Each unit might have been \$8 or \$10 a month just for the data service, so if you have hundreds of pieces, it adds up very quickly, but with LoRa Technology, the uplink monthly service has been close to zero.”*

*- Marco Mularoni, Director of Business Development, Adveez*

To overcome these drawbacks, Semtech’s LoRa® devices and wireless RF Technology (LoRa Technology) and the LoRaWAN™ open protocol is an ideal wireless link solution for smart supply chain and logistics IoT applications. LoRa Technology features long-range (30 miles in open country) and low-power (over 10 years of battery life) capabilities that can monitor in-motion assets with real-time location tracking. Additionally, LoRa Technology and the LoRaWAN open protocol has a robust ecosystem of LoRa-enabled sensors, gateways, network servers, networks, and service providers — a ready-made resource for integrators looking to tailor and scale an optimum solution quickly while leveraging the economics of open standards based competition.

## TRENDS IN SUPPLY CHAIN & LOGISTICS

How can a business determine if LoRa Technology is a good candidate for a wireless IoT supply chain solution? One way to start is to look at typical examples of solutions and trends already at work in the marketplace and see how closely they align to your own particular set of challenges and requirements. Below are the main trends occurring in the supply chain industry:

- **Asset tracking.** Monitor the location of inexpensive assets such as rolls or cartons and more expensive assets such as trailers, trucks, rail train cars, and shipping containers so that these assets will be readily available when needed and are not unused, lost or stolen.

- **Fleet operation.** Monitor fleets of vehicles and drivers, and integrate this with the supply chain ERP system that helps to optimize the capacity utilization, the delivery times, in respect of the Corporate Social Responsibility duties such as the vehicle maintenance periods, the driver rest periods, the CO2 emission and other factors affecting the cost, and the efficiency and the optimal use of fleets.
- **Preventive and predictive maintenance.** Monitor the health (temperature, vibration, wear, etc.) of engines or other equipment used in manufacturing and supply chain processes to enable predictive maintenance. Equipment is, therefore, more likely to have better uptime and a longer lifetime. Optimizing maintenance operations and spare part costs, plus reducing unattended stops in production, help to protect investments and reduce risks.
- **Theft prevention.** From factory floors to store shelves, theft is the most common way for items to go missing — another reason to track items throughout the supply chain.

IoT use case applications for the smart supply chain and logistic industry are endless. Both Advvez, a manufacturer of data capture and hands-free access control hardware and software, and GlobalSat, a major supplier of GPS and other location-aware electronic and communication solutions, utilizes LoRa Technology to track valuable assets including vehicle fleets and on-ground equipment at airports and construction sites. LoRa Technology solves the problem of how to cost-effectively connect remote sensors in the supply chain to the Cloud.

*“LoRa Technology actually affords a very cost effective, technology rich, low bandwidth, long range, and low power consumption solution. There are other field technologies that have similar capabilities, but they are limited in terms of range and more expensive to deploy.”*

- Larry Liang, Chief Operating Officer, GlobalSat Worldcom

With LoRa-based tracking for fleets and equipment, businesses can reduce cost by keeping these items in the field longer with better visibility for maintenance issues and close monitoring of real-time location. Data from LoRa-based sensors can integrate with business information systems to provide rich business intelligence, which in return, improves overall operations and gives companies a return in investment (ROI).

## Tracking assets at Airports and Construction Sites

Advvez, headquartered in Toulouse, France, leverages LoRa Technology to help airports globally to reduce the costs of maintaining ground support equipment including pallet loaders, belt loaders, catering vehicles, and ground power units. Advvez’s LoRa-enabled end-devices capture usage and location data from the equipment and send it wirelessly to LoRa-based gateways. The data is then sent to the Cloud where operations personnel can view the business intelligence on the Advvez web dashboards.

Since implementing LoRa Technology, Advvez has dramatically reduced the cost and effort needed to collect remote data. The requirement to capture data from a device has been around forever, but the competitive advantage is the uplink technology from the device to the Cloud. With LoRa Technology, the monthly uplink service cost is close to zero compared to previous companies that supplied similar solutions with a higher cost.

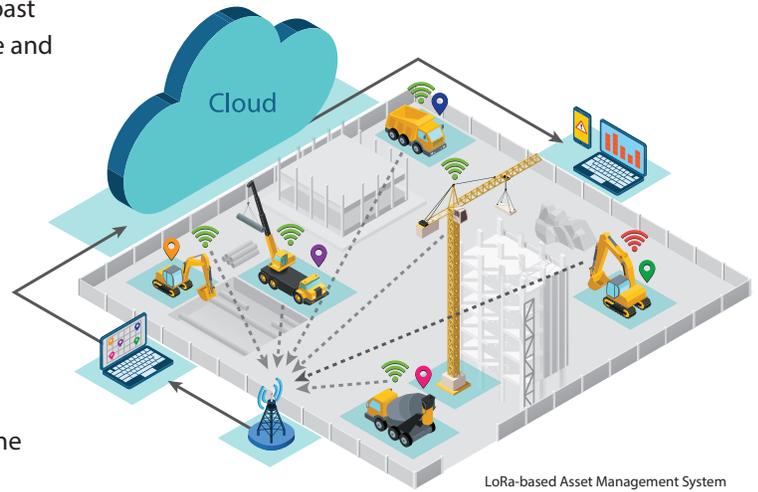


LoRa-based Smart Fleet and Asset Tracking Management System

Depending on whether the gateway connects to the Cloud through a cell card or direct, a customer is spending hypothetically maybe \$20 USD over 300 vehicles which is low cost in the supply chain industry.

Established in 2000, GlobalSat Worldcom is a major supplier of GPS and other location-aware electronic and communication solutions. In the past decade, GlobalSat has delivered a GPS tracking system, wearable and bike mount GPS personal training devices, GPS engine boards/modules, and a GPS receiver. The company has expanded its product line into healthcare and the IoT market.

GlobalSat is currently collaborating with a major U.S. heavy construction equipment manufacturer to help stage the components for final assembly to complete a customer order. The LoRa-based solution tracks major pieces of equipment, such as cranes, cabs, backhoes, and dump trucks, across the manufacturer's sprawling 100+ acre yard. This ensures that the correct parts of an order can be brought together efficiently at the right location and at precisely the right time for final assembly.



## KEY BENEFITS OF LoRa TECHNOLOGY SMART SUPPLY CHAIN & ASSET TRACKING:

- **Geolocation:** LoRa Technology utilizes a GPS-free geolocation technology that does not require additional power.
- **Low connection costs:** LoRa Technology operates in the unlicensed ISM band, which means no or very low spectrum costs (there may be a very low connection fee if using an external service provider).
- **Open standard:** The LoRaWAN™ open specification is supported and maintained by the LoRa Alliance™ allowing seamless and easy scalability.
- **Available today:** Public and private networks ready for implementation and widely deployed.
- **Leverage deployed assets:** LoRa Technology's robust signaling can penetrate for wide ranging coverage even in rural areas.
- **Growing ecosystem:** The fast-growing LoRa Alliance™ currently comprises over 500 companies that are creating solutions using the LoRaWAN open specification. The LoRa Alliance™ includes major industry players and many other start-ups and network operators. Combined, this ecosystem offers multiple sources of supply from communications ICs to networks to server-based application platforms. The LoRa Alliance also certifies sensors and other devices for interoperability.
- **Secure:** AES-128 encryption is built in, allowing for secure data transmission in rural areas and large industry fields.

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## CONCLUSION

As companies move towards efficiency, supply chain and logistics tracking technologies can provide new solutions for smarter and improved operation management. A scalable and low cost IoT network is the foundation of improving a supply chain and LoRa-based devices and the LoRaWAN open specification provide high capacity, low power networks that can provide the flexibility that companies and organizations need.

For more information about Semtech's LoRa devices and wireless RF technology for supply chain and logistic applications, go to [www.semtech.com/loT](http://www.semtech.com/loT) or scan the quick response code on the right.



## ABOUT SEMTECH

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Data provided by "Gartner Says the Internet of Things Installed Based Will Grow to 26 Billion Units By 2020," Gartner, 2013.

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