

How advances in cellular IoT are enhancing smart logistics

CONNECTIVITY

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When online orders backed up or stuck in shipping containers became front page news during the pandemic, ordinary people suddenly began thinking about the complexities of global supply chains. But major logistics players have been working on optimizing supply chain monitoring for years. Today, smart logistics powered by progress in cellular IoT – especially 5G connectivity – are changing the game across a wide range of industries.

A ubiquitous, secure network for connected sensors and devices

Both indoor and outdoor smart logistics use cases rely on connected sensors and devices to track items and boost both transportation and inventory management efficiency. When we consider that a single company could have **hundreds or thousands of devices scattered around the globe** – in remote warehouses, on shipping containers in the middle of the ocean, or on delivery vehicles in busy cities – it becomes clear that these devices, which often have limited power and resources, **require secure and global network access** in order to communicate location and other useful data once they are within the coverage area. This is where cellular network connectivity comes in.

Cellular IoT connection for any and every situation

While products can already be tracked and monitored inside warehouses using Bluetooth connectivity, **cellular IoT, powered by 5G high-band spectrum**, provides superior coverage, bandwidth, flexibility and mobility. This ensures that a product can be seamlessly tracked within the walls of the warehouse and once it leaves the premises.

Take the example of a product that needs to be shipped from a warehouse to another country. With cellular IoT connectivity, warehouse workers or automated guided vehicles (AGV) can rapidly track down a product equipped with a connected sensor to **within 20 cm of its location**. This provides accuracy and ensures that the right product is picked up from the warehouse shelves. It also avoids AGV collisions and ultimately increases business operation efficiency and productivity. Once outside the warehouse, connected sensors can **send real time monitoring alerts** to facilitate cold chain temperature management or to signal a gas leak, for example. This data may be used to take immediate action to either adjust temperature according to product specifications, or select certain products for quality control – particularly useful for perishable items such as ice cream or pharmaceuticals.

Cellular IoT connectivity paves the way for **countless other use cases**. For example, geo-fencing can be enabled to prevent supermarket carts from being removed from a stipulated area. Cellular IoT connectivity can also help fleet managers to **predict vehicle maintenance** or to **optimize route planning** to reduce CO2 emissions. Aside from location tracking, cellular IoT can also **boost inventory management capabilities**, allowing businesses to use automated reordering systems when stocks are low and to remove expired products. In rural areas, **5G drones** also rely on cellular IoT connectivity to deliver products faster and more efficiently than ever before.

Smart logistics at home and abroad

Cellular IoT also makes it possible to operate across the globe. It relies on a **combination of multi-IMSI and eSIM technologies** to facilitate connections to local networks across multiple countries. With **global cellular connection**, a company can track a product across any border. This continuous cellular IoT connectivity allows companies to optimize supply routes and even enables vehicle-to-vehicle communication.

All of this is made possible by **partnerships with multiple operators**—enabling devices to seamlessly switch between local connectivity providers when crossing a border. The **continuity of service** provided by cellular IoT means that a device can always reconnect to a network when it is within range — a huge win as connectivity problems can set off a ripple effect regardless of whether you're managing supplies and equipment within a warehouse, across borders or at an industrial/mining compound.

A safe and secure smart logistics network

Regardless of the workflow, goods or pieces of equipment in question, **data security is paramount** in smart logistics. Whether it is highly-sensitive or non-critical data that is being communicated, the entire smart logistics network infrastructure can be massively impacted by a security breach, causing production to slow down or grind to a halt, damaging a company's reputation, or exposing it to ransomware attacks.

Cellular connectivity is ideal for smart logistic devices because it is inherently secure. It makes it possible to implement **advanced security and cryptographic features** such as authentication and encryption. IoT manufacturers can use cellular connectivity to **secure every end-point device** in a smart logistics infrastructure. They can also ensure safe device-to-device and device-to-cloud communication and protect data exchanged between devices using cellular connectivity to guard against interception and tampering. Furthermore, the credentials of IoT eSIMs can be provisioned and updated remotely, enhancing product lifecycle management and ensuring that IoT devices and servers are always authenticated using the most up-to-date set of valid credentials.

In short, cellular connectivity offers clear security benefits to IoT players, including OEMs and enterprises looking to protect their brand and business by eliminating weak points in their device network.

The future of smart logistics

While the connectivity and security requirements and challenges of smart logistics vary considerably depending on the use cases, cellular IoT connectivity arguably **provides the best service quality, flexibility and mobility, and the highest level of security** for enhanced inventory management, supply chain monitoring and deliveries. As both use cases and the range of devices available continue to increase exponentially, connectivity solutions focused on sustainability, efficiency and security will continue to adapt to the specific needs of all type of cellular IoT projects.