Berg Insight™

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ANALYST REPORT

Asset Tracking in Transport & Logistics

October 2025

Introduction

Asset tracking is one of the largest IoT verticals, encompassing various subsegments such as fleet management, transport & logistics, inventory management and agriculture. IoT solutions for these segments enable real-time tracking and monitoring of the location and status of various vehicles, machinery, equipment, personnel and livestock. This paper focuses on tracking solutions within transport & logistics, specifically for cargo and assets carrying cargo such as intermodal containers, trailers, rail freight wagons, Unit Load Devices (i.e. aircraft containers) and pallets.

The use of asset tracking solutions adds several benefits for stakeholders in the transport & logistics industry. Access to real-time data on the location and condition of cargo facilitates supply chain management for both the shipper and the receiver and can prevent cargo from being stolen, lost or spoiled. The data provided by tracking devices and sensors also contribute to more efficient inventory management. A higher certainty of goods arriving on schedule enables stakeholders in the supply chain to minimise safety stock and cycle stock levels, thereby lowering working capital requirements and warehousing costs. Real-time data on cargo-carrying assets, such as containers, trailers and pallets, empowers owners of these assets to increase utilisation, reduce the number of assets in their fleet and achieve cost savings.

Cellular connectivity, GNSS technology and software platforms are essential enablers for asset tracking solutions. The functional requirements of the network infrastructure vary depending on the application. Area coverage, network latency, data bandwidth and power consumption are key technical parameters. Cellular technology has sufficient performance in these areas. Traditional cellular technologies, i.e. 2G/3G/4G, form the backbone of asset tracking connectivity and offer comprehensive global coverage. However, these technologies consume relatively high amounts of battery power and are therefore not optimal for battery-constrained asset tracking applications. Low-Power Wide-Area (LPWA) network technologies, which are developed specifically for low-power IoT devices, have emerged in recent years. LPWA technologies can be divided into two main segments – cellular LPWA and non-cellular LPWA. There are two main types of cellular LPWA technologies, LTE-M and NB-IoT. These technologies utilise the existing mobile network infrastructure. Sigfox and LoRaWAN, the primary non-cellular LPWA technologies, offer cost-effective deployments but have limitations in coverage and reliability compared to cellular technologies.

Figure 1:
Asset tracking subsegments within transport & logistics

Cellular connectivity, GNSS technology and software platforms are essential enablers for asset tracking solutions

Characteristics of different asset tracking use cases within transport & logistics

No one tracking solution caters to all possible use cases and deployment environments within transport & logistics. While the overarching infrastructure is shared across the various applications, there are widely different requirements in terms of battery life, data message frequency as well as connectivity coverage and reliability. There are also diverse requirements in tracking device form factor and size, Ingress Protection (IP) rating and whether the device should be permanently installed on the asset or removed once the shipment is completed. Non-permanent tracking devices may need to be returned to the owner when a shipment is fulfilled.

A key characteristic of asset tracking devices in transport & logistics is the need for autonomous power. In most cases, the power is accommodated by batteries, in some cases together with solar power to extend operation times. The batteries can be built-in, external, removable, non-removable, rechargeable or non-rechargeable, and the battery lifetime can range from days to several years. Battery size, position update intervals, transmission frequency and power management impact battery life. Tracking devices developed for speciality assets, such as generator-powered refrigerated containers, can utilise the power from the generator and may therefore not include a battery. Once the hardware specifications have been settled, connectivity providers can help streamline deployments, for instance through automated provisioning and configuration, SIM management and cloud-based orchestration. An additional use case with asset tracking solutions is with providing unique business opportunities for companies providing cargo assurance data. This allows businesses to provide new insights for their customers to track their cargo, providing new revenue streams through the use of IoT.

No one tracking solution caters to all possible use cases and deployment environments within transport & logistics

Why asset trackers reach end-of-life and how to avoid it

There are several reasons why asset tracking devices reach end-of-life, including battery depletion, damage, theft and technological obsolescence. For asset tracking devices designed for 5-10 years of maintenance-free operation, e.g. on a shipping container or rail freight wagon, the greatest risk is most often battery depletion. Preventing premature end-of-life for asset tracking devices requires solution providers to take multiple factors into consideration. Managing the power consumption is key. Preferably, the data message frequency is dynamic, meaning that when the asset is not moving, e.g. a shipping container in a port or a trailer in a yard, the device only sends one update per day. Once the container or trailer is being prepared for transport, the data frequency increases to once per hour or even more frequently. This is enabled by built-in accelerometers and sensors that can detect movement. Reducing the data message frequency during times of no movement not only conserves battery life but also minimises data usage and costs. Another important factor influencing battery performance is how devices manage network selection. Devices configured to always follow a priority list may consume more energy than those designed to connect to the strongest available signal. Furthermore, designing devices with remote update capabilities and connectivity fallback options can help prevent devices from reaching end-of-life caused by shifting cloud providers or network sunsets.

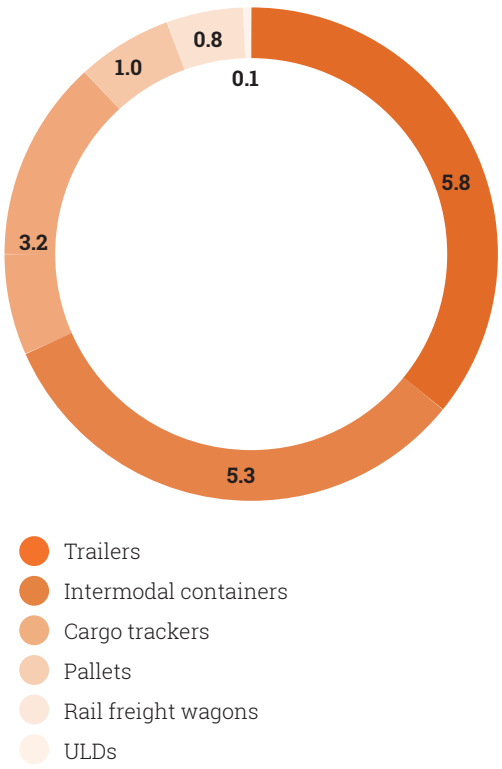
Figure 2:
Comparison of asset tracking devices and use cases within transport & logistics

	Dry container devices	Pallet devices	Cargo devices
			
Device lifetime	5-10 years	1-10 years	20-100 days/charge
Device cost	€ 100-300	€ 50-150	€ 20-100
Message interval	1-12 hours	1-12 hours	5-60 min
Communications	Cellular/satellite	Cellular/Sigfox/LoRa	Cellular

At the other end of the asset tracking solution spectrum are small cargo tracking devices, designed for one or a few shipments only. These devices typically pose a greater risk of getting lost, damaged or mishandled. These risks can be mitigated if solution providers develop solutions that are inconspicuous and can be concealed, easy to mount and with a small footprint. For multi-use and single-use cargo tracking devices, it is also vital to have established processes and clear instructions for logistics personnel on how to activate, mount and handle the devices.

Once the container or trailer is being prepared for transport, the data frequency increases to once per hour or even more frequently

Figure 3:
Active devices by subsegment
(Million units, World 2024)

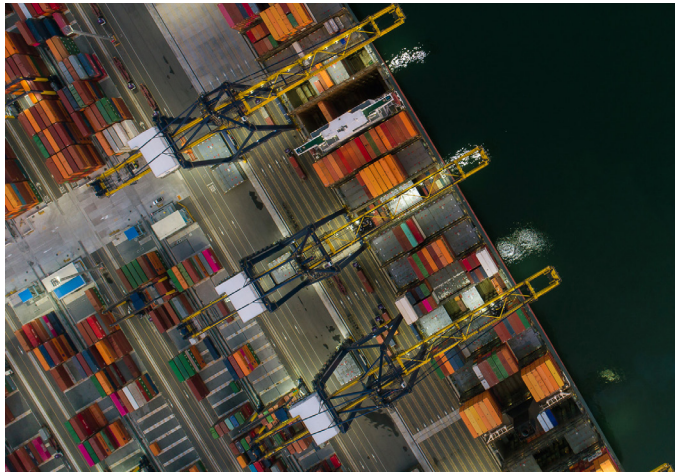


Where are the opportunities for tracking solution providers within transport & logistics?

According to Berg Insight's research, the largest asset tracking sub-segments in transport & logistics are trailer and intermodal container tracking, reaching 5.8 million and 5.3 million active devices globally at the end of 2024 respectively. The number of active devices used for rail freight wagons, Unit Load Devices (i.e. aircraft containers) and pallets is substantially lower. The number of tracking devices used for general cargo applications, where the devices are typically placed with the cargo or attached to the cargo box, reached about 3.2 million units at the end of 2024.

The market for tracking solutions in the transport & logistics vertical is growing across all subsegments, but the growth rate and opportunities vary. Trailers and intermodal containers are the most developed markets, especially refrigerated trailers and containers where the penetration rate of tracking devices is now above 50 percent. But in most other segments, the market is in an early stage and the penetration rate is very modest.

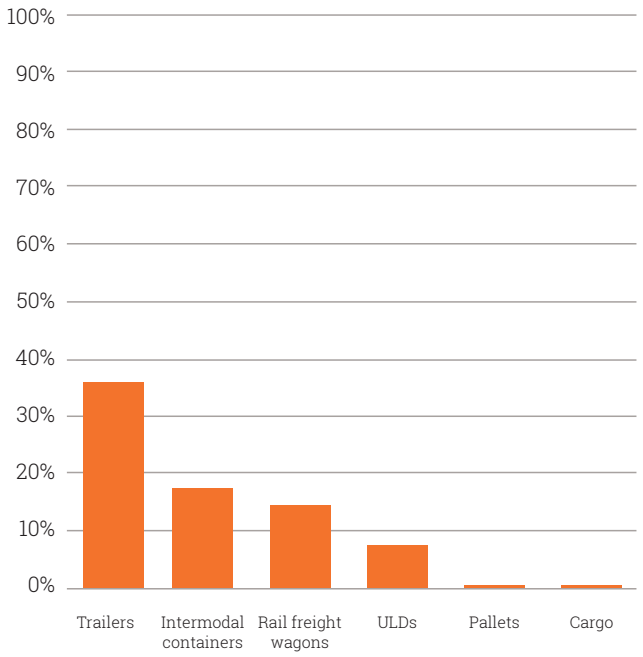
There are several reasons why the adoption in certain subsegments has not yet picked up speed. One of the main obstacles is the perceived imbalance between costs and tangible returns. For example, the cost of deploying asset tracking devices on pallets has exceeded the cost of new pallets. Using tracking devices to recover lost pallets has therefore not been a viable business case. However, new LPWA network technologies enable solution providers to develop significantly more cost-effective solutions, which opens up new asset tracking business cases. It is also important for logistics companies to know what to do with the data generated by the tracking devices. Companies analysing the data in detail to discover supply chain bottlenecks and having clear escalation processes in case of a shipment deviation can make more use of the data and find it more valuable. However, not all possible beneficiaries in the supply chain industry are aware of what data can be harnessed from tracking devices and how it can positively impact their operations. Creating awareness of the benefits of real-time location and condition data is therefore paramount for wider adoption.

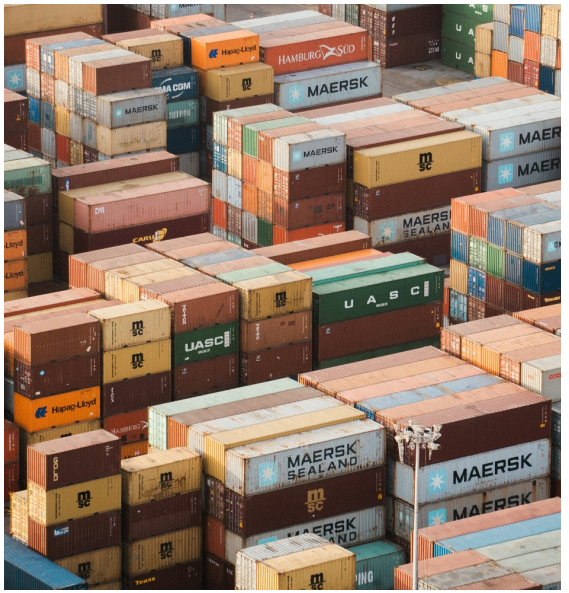


Smart labels may revolutionise parcel tracking

The components used for tracking location and environmental data in real-time decrease in size every year and can be housed in ever smaller devices. New IoT networks and the use of new business models with single-use, disposable trackers also make it possible to use a much smaller battery. In recent times, new solutions have been launched that can be categorised as smart labels. A traditional shipping label contains the information the carrier needs to send a package from its origin to its destination. The label often includes a scannable barcode and has adhesive, making it easy to attach to the package. A smart label functions as a traditional shipping label but also contains environmental sensors and a cellular modem, enabling real-time tracking of the package. Smart labels are similar to real-time data loggers and tracking devices, but are designed to be attached to the package. This is made feasible due to a smaller and lighter device. The price per smart label is expected to decrease heavily going forward as the costs for components and sensors decrease and smart label companies benefit from economies of scale. In addition, software SIM technologies are being introduced, such as Onomondo's SoftSIM, which removes hardware costs associated with traditional SIMs. As the cost decreases, it becomes economically viable to track also low-value goods. The potential addressable market for smart labels is enormous as hundreds of millions of packages are shipped every day across the world.

Figure 4:
Penetration rate of active tracking devices by subsegment
(World 2024)





Smart labels are similar to real-time data loggers and tracking devices, but are designed to be attached to the package

Checklist: Key Considerations for Asset Tracking Connectivity

When building or scaling an asset tracking solution, selecting the right connectivity partner is just as important as choosing the right device or platform. It starts with asking the right questions when you are evaluating a network provider. Below is a checklist of factors Onomondo recommends solution builders should weigh to ensure resilience, scalability, and cost-effectiveness:

1. **Coverage and Reliability**
   a. Does the provider offer access to multiple networks in each country?
   b. Can devices switch automatically to the strongest available network to avoid downtime?
   c. Is there a plan to maintain coverage in remote or hard-to-reach areas?

2. **Power Efficiency**
   a. How does the provider's connectivity approach impact battery life in real-world use cases?
   b. Does the network setup minimise wasted energy during connection attempts?
   c. Are there features like signal-based steering to prevent unnecessary battery drain?

3. **Flexibility and Futureproofing**
   a. Will devices remain operational through 2G/3G network sunsets and future rollouts?
   b. Are there fallback technologies to ensure long device lifetimes without replacement?
   c. Can connectivity settings be updated remotely without draining batteries or recalling devices?

4. **Costs and Procurement**
   a. Are there hidden costs beyond data, such as SIM logistics or hardware fees?
   b. Can options like a software SIM reduce per-device costs at scale?
   c. How predictable is the total cost of ownership over the device lifecycle?

5. **Deployment and Provisioning**
   a. How quickly can new devices be activated and connected in the field?
   b. Does the provider support automated provisioning to reduce manual setup?
   c. Are there cloud-based tools to simplify installation and cut deployment costs?

6. **Lifecycle Management**
   a. What tools are available to monitor and manage devices across their lifetime?
   b. Can device fleets be managed with centralised policy and subscription controls?
   c. How does the provider handle security and software updates at scale?

7. **Security and Data Assurance**
   a. Is the data path secured end-to-end from device to application?
   b. Can the provider ensure data integrity to support compliance?
   c. How is sensitive data protected during transmission?

Takeaway:
The right connectivity provider should answer "yes" to most of these questions. If not, businesses risk higher costs, shorter device lifetimes, and lost opportunities for growth.

Case study: Maersk

A.P. Møller – Maersk orchestrates a massive IoT setup: a fleet of 700+ vessels and millions of containers, alongside global terminal infrastructure (cranes, trucks, sensors).

Challenges:

- Needed consistent, global connectivity across both marine and land-based hardware.
- Wanted greater visibility and debugging from manufacturing through deployment.
- Needed to optimise battery use and data efficiency at massive scale.
- Required a unified platform for connectivity and device management, without burdening devices with extra logic.

How Onomondo Helped:

- **Global infrastructure with efficient management:** A single platform supports connectivity for all assets while offering deep insights into connectivity performance from end-point to cloud.
- **Battery and data optimisation:** By shifting endpoint logic (e.g., encryption, SDK functions) into the network and cloud connectors, Maersk reduced data transmission significantly-some use cases saw up to a 600x reduction.
- **Simplified scalability and security:** With network-level controls and cloud connectors, device logic is minimised, security policies and routing are handled centrally, easing firmware complexity across a huge device fleet.

Case study: Moeco

Moeco is a German supply chain visibility specialist deploying disposable 5G trackers across industries worldwide, covering temperature, humidity, shocks, and location data.

Challenges:

- Required reliable global cellular connectivity across diverse locations, often remote or cross-border.
- Needed real-time troubleshooting and fleet monitoring without complex hardware or external tools.
- Wanted cost-effective, scalable deployment, keeping SIM and network fees low while scaling.

How Onomondo Helped:

- **Network flexibility:** Platform features like "Network Marketplace" and "Network Lists" enabled Moeco to customise coverage maps per customer, deploying in over 25 countries with ease.
- **Technical insights & debugging:** Logs, signalling data, and traffic monitors built into the platform allowed rapid troubleshooting, so Moeco could spot connectivity issues quickly without requiring sending support out in the field.
- **Usage-based SIM model:** "Magic Mode" data billing meant SIM cards incurred no cost until data was sent. Combined with dynamic selection of low-rate networks, this enabled Moeco to manage cost as they scaled.

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Onomondo is a leading provider of global IoT infrastructure. Headquartered in Copenhagen, we connect businesses across 180+ countries with a single software-based network that unifies 600+ operators, replacing the complexity of legacy telecom. Our approach makes it simpler, more secure, and more transparent to connect devices anywhere. Trusted by global brands like Maersk, Bosch, and Carlsberg, Onomondo powers applications in logistics, mobility, energy and beyond, clearing the way for smarter and more sustainable operations worldwide.

Berg Insight™

Berg Insight is an independent industry analyst and consulting firm, providing research, analysis and consulting services to clients in the areas of IoT and digital technologies. Our analysts possess deep expertise in major IoT verticals such as fleet management, automotive telematics, smart metering, smart homes, mHealth and connected industry. Founded in 2004, we operate on a global basis from our head office in Sweden.

Our clients include many of the world's largest mobile operators, vehicle OEMs, fleet management solution providers, wireless device vendors, content providers, investment firms and venture capitalists, IT companies, technology start-ups and specialist consultants. We have provided analytical services to 1,400 clients in 72 countries to date.

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