

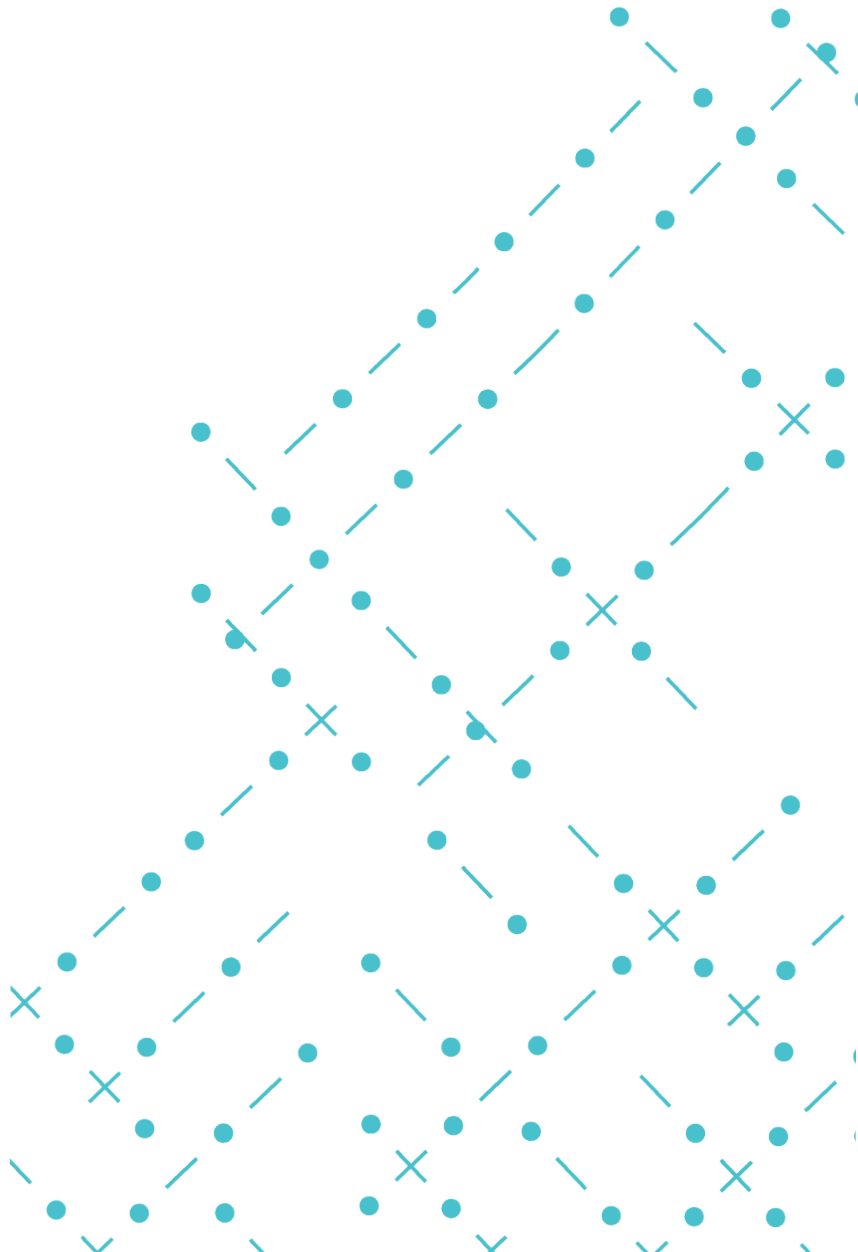
Your Assets Deserve Better



A Complete Guide to
Asset Tracking with IoT

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Asset Tracking Solutions are Only as Reliable as the Networks That Connect Them.

The reliability, security, and cost-effectiveness of an asset-tracking system hinge on the right connectivity choices.

That's why we've written this guide. In it, we will explore types of asset-tracking tools and their uses. We will clarify what businesses should consider when investing in asset-tracking technology.

Rising Demand for Asset Tracking:

A Growing Trend in Various Industries

Asset tracking is on the rise globally - and for a good reason! Good asset tracking helps companies save on costs, enhance their profits, and improve returns on investments.

The network of devices, sensors, and communicative systems that make up the Internet of Things (IoT) allows businesses to track their assets' location, movement, and condition periodically or in real time if needed. By monitoring these assets, companies can gain valuable insights into the efficiency and effectiveness of their operations, allowing them to make informed decisions that can optimise their processes and increase productivity.

But the benefits of asset tracking go beyond just operational efficiency and improved RoI. Asset tracking can also help businesses prevent asset loss and theft, ensure compliance with industry regulations, and improve safety by enabling real-time monitoring of equipment and personnel.

- In the logistics industry, asset tracking can optimise supply chain management by providing information on the location and status of goods, reducing inventory costs, improving delivery times, and minimising losses due to theft or damage.
- In agriculture, asset tracking helps farmers protect valuable equipment, monitor their crops, soil, and weather conditions and optimise irrigation and fertiliser applications.
- And in the energy sector, asset tracking helps companies monitor and manage their energy consumption, reducing energy waste and costs.

Smart asset tracking is also a key driver in the quest for a more sustainable future. By enabling businesses to optimise their operations, reduce waste, and make better use of resources, IoT-enabled asset tracking can help an organisation lower its carbon footprint and minimise the environmental impact of industry.

Asset Tracking Industry Sees Staggering Growth as Market Reaches

\$15.4 billion

with a Projected Increase of
12.7% in the Coming Years.*

* iMarc Impactful Insights, Asset Tracking Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2023-2028



Mastering the Three Pillars:

Hardware, Connectivity, and Platform

1 The Hardware or Assets Being Tracked

Many IoT devices track the location, performance, and condition of mobile and stationary assets. These assets can range from tools and equipment to reusable containers, to livestock, and vehicles, with tracking accomplished via specialised hardware, such as sensors and RFID trackers.

- Sensors attached to assets collect data such as temperature, humidity, vibration, and movement. They typically work by measuring these physical or environmental conditions, and then converting that data into an electronic signal that can be transmitted to a monitoring system. This monitoring system compares the collected data to a baseline or predetermined threshold to determine whether the asset is operating within acceptable parameters. If the data falls outside the acceptable range, the system can trigger an alert or notification, allowing appropriate action to be taken.

For example, a temperature sensor attached to a refrigeration unit may measure the temperature and convert that data into an electronic signal, which is then transmitted to a monitoring system. The system compares the measured temperature to a pre-set threshold or baseline. If the temperature falls outside of the acceptable range, an alert may be sent to a maintenance team or facility manager, indicating that the refrigerator needs to be inspected or serviced.

- Many devices used to monitor the location and status of assets use technologies such as radio-frequency identification (RFID). RFID trackers provide accurate location data and are useful for indoor applications (warehouses, for example) and for tracking hours-of-operation when billing for rental equipment. They are also cost-effective and have a long battery life.
- Location trackers use satellite technology and beacon-based signals to determine the location of assets in real time. The tracker receives signals from global positioning satellites to calculate its own position and picks up signals from beacons attached to assets. Once the tracker determines its location, it transmits that information to a central monitoring system. This allows asset managers to track the movements of their assets and optimise logistics, prevent theft, or ensure timely delivery.

Sensors attached to assets can collect data on various parameters, including:

- Location and GPS coordinates
- Speed and direction of movement
- Altitude and proximity
- Shock and impact
- Light and temperature changes
- Battery life and power usage
- Pressure and load capacity
- Environmental factors like air quality, temperature, and humidity
- Inventory levels (e.g using “smart mats” that measure the weight)
- ...and many more.



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An IoT Network

An IoT network is critical for asset tracking, providing a reliable and secure connectivity infrastructure for transmitting data between devices and the monitoring platform. The network is built on various connectivity technologies such as Cellular, Satellite, LPWAN, Wi-Fi, Bluetooth and RFID, depending on the asset being tracked and the location.

IoT devices communicate location, performance, and condition data through these connectivity technologies, and the infrastructure transmits data back to a management platform, including information about the location, operational status, and usage of assets.

Without a reliable IoT network, the data transmitted between devices and the monitoring platform may be incomplete or delayed, leading to inaccurate or missing information about the location, status, and usage of assets. On the other hand, a robust IoT network built on various connectivity technologies offering a blended connectivity solution ensures that businesses have access to real-time, accurate, and complete data about their assets. This allows companies to optimise their operations and make informed decisions based on up-to-date information.

3 An Asset Tracking Management Platform

Data transmitted by assets deployed remotely are made meaningful through asset-tracking platforms. These platforms enable businesses to gather, analyse, and present data from their connected devices in a clear and concise manner. They are often customised to meet the specific needs of a business, providing valuable insights that can be used to optimise operations and make more informed decisions. This might include optimising maintenance schedules for equipment based on usage patterns and performance data, identifying areas where energy usage can be reduced, and predicting equipment failures before they occur.

By leveraging insights gained from IoT data analysis through intuitive interfaces and real-time monitoring, businesses can more easily track their assets and receive alerts if an issue arises. This allows them to address potential problems and maintain smooth running operations quickly.

These platforms may include features such as alert notifications, reporting, and data visualisation tools. Notifications could include an alert for when an asset has moved outside of your defined boundaries or when an asset has been inactive for a certain period of time.

Customised dashboards can display this information in an easily digestible format, enabling businesses to identify recurring issues and trends and make data-driven decisions.

Comprehensive asset tracking platforms can also generate reports on the location and condition of assets and their usage and performance over time. These reports can provide insights into asset utilisation and inform maintenance needs, including when maintenance is due and what type is required. This can help businesses optimise maintenance schedules, reduce downtime, and extend the lifespan of their assets.



Building the Perfect Connection

There are various connectivity options for asset tracking. The best choice for your deployment will depend on your needs, circumstances, and the specifics of your deployment.

Long Range



Cellular Connectivity

This is the most common type of connectivity used for asset tracking as it provides reliable, widespread coverage, is cost-effective and is easily implemented. This makes cellular connectivity perfect for tracking cargo and equipment on the move, cases in which location stamps and asset status data are needed at regular intervals.

Cellular IoT technology has advanced significantly in recent years, introducing low-power options that can provide both long battery life and dependable long-range connectivity. Low-power NB-IoT, LTE-M, and 5G developments offer perfectly balanced speed, bandwidth, and cost options to enable IoT solutions specifically, making them perfectly viable solutions for most applications. Deployments relying purely upon cellular connectivity in some remote locations, however, may face challenges in connecting M2M devices and sensors, as coverage areas will vary.



Satellite Connectivity

As the IoT landscape continues to expand, many organisations find that their connectivity needs have outgrown the capabilities of any single technology. Cellular networks are often the go-to solution for IoT connectivity. Still, reliable coverage and uptime cannot always be guaranteed when assets travel through or are based in remote, uninhabited areas. Naturally, this can be a major concern for mission-critical applications in rural, remote, and other non-connected locations.

For businesses tracking assets as they cross the ocean, monitoring remote agricultural and environmental installations, or the generators, switchgear, and power infrastructure that keep remote, large-scale renewable energy sites connected, traditional connectivity solutions may not always be able to support such complex deployments at scale. In these cases, Satellite IoT (SatIoT) can offer a compelling and reliable alternative.

SatIoT uses a network of satellites and ground stations to provide coverage across even the most remote and inaccessible areas, ensuring that businesses can track their assets no matter where they are located. SatIoT can also support a range of applications beyond traditional asset tracking, such as environmental monitoring and disaster response. And with the rise of low-earth orbit satellite constellations, SatIoT is becoming more affordable and accessible than ever before.



Low-Power Wide-Area Networks (LPWANs)

LPWAN technologies, (such as Sigfox and LoraWAN) are long-range wireless communication technologies designed to connect low-power devices over a large geographic area, typically covering distances of a few kilometres in urban settings to as many as 15 km in rural areas. They utilise lower data speeds than cellular networks, which can make data-heavy asset tracking applications a tricky fit.

In areas with strong LPWAN coverage, however, they can be the ideal low-cost, low-energy solution for an asset tracking application. An organisation could also create and maintain the necessary infrastructure in the locations in which it needs to operate if that's a route it chooses to go down.

LPWAN can be a cost-effective option for tracking a large number of objects over long distances. They're also good for tracking applications where the devices have extended periods of dormancy, waking only to transmit data when necessary. This is because LPWAN boasts a low-duty cycle (meaning devices are only active for a fraction of the time), which helps to extend battery life. This makes LPWAN an excellent fit for asset tracking deployments where only basic sensor readings or simple location alerts are needed.

Short Range



Wi-Fi

WiFi-based asset tracking is suitable for deployments set in defined locations like warehouses. These applications utilise WiFi access points and tags to track and monitor the location of the assets, which provides highly accurate location data within the coverage area, making it ideal for indoor environments. However, its range is limited to a few hundred feet, making it less suitable for tracking moving assets.



Bluetooth

Bluetooth (or Bluetooth-low Energy - BLE) is a short range wireless communication technology that typically operates within a range of up to 10 metres, though newer versions of Bluetooth (such as Bluetooth 5.2) can have a range of up to 800 feet (240 metres) under ideal conditions.

Bluetooth can be used for asset tracking in scenarios where the range of coverage is relatively short. For example, Bluetooth beacons can be attached to assets, have their signals picked up by Bluetooth-enabled devices such as smartphones or gateways, and then relay the location data back to a central server. This approach is often used in indoor asset tracking applications, such as for inventory management in warehouses or tracking equipment in hospitals and office buildings. Because of its limited range, however, Bluetooth is not suitable for outdoor or long-range asset tracking applications.



RFID Tagging

RFID-based asset tracking requires specialised tags to be affixed to assets and RFID scanners to detect and read them. The system reports on whether an RFID tag is in range of a scanner, rather than pinpointing the exact location of the asset. While this might be suitable for some asset tracking applications, it may not provide the necessary precision for every use case.

Additionally, RFID systems are susceptible to interference from materials such as metal or other radio-frequency emitting objects. This can affect the accuracy and reliability of the tracking system. Because of these limitations, RFID can be a cost-effective solution for environments such as warehouses but may not be the best choice for tracking assets in complex or dynamic settings.

Blended Connectivity

While cellular connectivity currently covers around 90 percent of the world's population, this only accounts for around 15% of the earth's surface. They often exclude rural areas, oceans, deserts, mountainous regions, and other remote and largely uninhabited areas.

For deployments largely reliant upon cellular networks, Blended connectivity can help. By using multiple types of connectivity to communicate with assets, a blended network allows devices to take advantage of the best technologies available in whatever setting it may find itself. This could be a combination of cellular, satellite, and LPWAN technologies. This approach improves coverage, reliability, and flexibility, placing global monitoring well within reach.

For example, a blended connectivity system may use LPWAN networks in buildings, around cities and warehousing sites, cellular networks when assets are on the move, especially when they're installed or travelling between urban areas, and satellite connectivity in remote or hard-to-reach locations. This helps ensure that tracking devices can transmit data consistently, regardless of their location.

Blended connectivity systems are used in a variety of asset-tracking applications. These include fleet management, logistics, and supply chain management.

Connected and in Control

What exactly are these “assets” that we refer to?
What items and applications benefit most from
asset-tracking technology?

The IoT asset tracking universe is vast and encompasses everything from containers to livestock and anything in between. In this section, we’ll explore the diverse range of “things” that can be tracked with IoT, showcasing the many benefits and possibilities of this cutting-edge technology.

Agriculture

One of the most notable growth areas for IoT asset tracking adoption has been in the agriculture sector. Take livestock, for example. IoT asset tracking technology has made it possible to easily and remotely monitor the movements, location, and health of groups of cattle. This has led to better management of these herds, increased productivity, and improved animal welfare.

Beyond tracking livestock, IoT technology can be used to monitor crops, farming equipment, and even irrigation systems. IoT sensors and other connected devices allow farmers to collect valuable data on soil moisture levels, temperature, plant health, and even weather patterns. This allows them to make more informed decisions on when to plant, how much water to give their crops, and when to harvest. This information can also be used to optimise the use of fertilisers and pesticides, reducing waste and improving the overall health of the crops, leading to increased yields and more efficient use of resources.

Similarly, farming equipment can be equipped with sensors and GPS tracking devices to monitor its usage and maintenance needs. This can help farmers plan their maintenance schedules more effectively and minimise downtime, allowing them to focus more on their crops and livestock.





Supply Chain & Logistics

Another industry that has greatly benefited from IoT asset tracking is the supply chain. Returnable Transport Items (RTI) such as pallets, glass stillages, crates, kegs, and bulk containers can be easily tracked and monitored throughout their journey, providing valuable insights into the supply chain. This has reduced the number of lost or damaged assets and helped identify and resolve supply chain bottlenecks or inefficiencies, resulting in cost savings and improved customer satisfaction.

In maritime logistics, asset-tracking technology is used to trace the movements of cargo containers as they are loaded onto ships, transported across oceans, and offloaded at ports. With remote monitoring, shipping companies can keep track of their cargo as it makes its way across the ocean, ensuring that they arrive at their destinations on time and in good condition.

But sensors have a wide range of capabilities beyond just location tracking. Modern IoT sensors are capable of tracking light, shock, temperature, humidity, and more. Sticking with the example of the maritime industry, sensors are often deployed to ensure the integrity of assets during transport. Temperature sensors can monitor refrigerated cargo, while shock sensors can detect any impacts or drops during loading and unloading. Light sensors can detect if a container has been opened or tampered with, while humidity sensors can ensure that the cargo is not exposed to excessive moisture. These readings can all provide valuable data that can be used to ensure the safety and quality of assets throughout the supply chain.



eMobility and the Sharing Economy

In the realm of eMobility, IoT asset tracking has been instrumental in the growth of sharing services like e-Scooters and bicycles. With real-time tracking, these services can be managed more efficiently, ensuring that vehicles are available when and where needed. IoT asset tracking can also provide valuable insights into the usage patterns of these devices, as well as maintenance needs to help optimise the allocation and management of these assets.

The most common eMobility challenge that asset tracking solutions are deployed to address is theft prevention and asset retention. With the increasing popularity of these shared mobility vehicles, the risk of theft has also increased, making it vital for businesses to keep track of their assets.

Construction

On construction sites, it can be difficult to keep track of equipment. IoT asset tracking can provide visibility into the location and movement of equipment, making it easier to manage and deploy assets as needed. Trackers are often attached to vehicles, heavy machinery and specialised equipment, allowing contractors to ensure that their assets are where they are supposed to be and are being used effectively and efficiently. This can also reduce downtime and optimise the management of their fleet by allowing managers to track equipment usage and monitor maintenance schedules to avoid disruption and prevent the breakdown of critical assets.

Perhaps most famously, IoT-enabled trackers can monitor the movement of equipment and vehicles on construction sites to deter theft and ensure that only authorised personnel have access to restricted areas.

Construction sites can be hazardous environments, and ensuring the safety of workers is a critical concern for construction companies. The construction industry has a high rate of accidents and injuries, resulting in significant days lost due to work-related illness or injury. However, wearable devices with embedded IoT sensors can monitor a worker's health, detect hazards, and alert managers in the event of an emergency. Furthermore, IoT devices can help locate and track on-site workers during emergency evacuations.

Energy management is another area where asset tracking can significantly benefit construction. Smart metres can track energy and fuel consumption at construction sites, and embedded IoT sensors can monitor vehicle performance, fuel usage, idling time, driving habits, and more.





Smarter Cities Through Asset Tracking

IoT asset tracking can play a critical role in supporting the development and management of smart cities and infrastructure. By connecting and monitoring assets such as street lighting, traffic controls, and city maintenance equipment, cities can gain insights into their operations and improve the delivery of essential services to citizens.

For example, mobile traffic signs, used for temporary road signage, can be equipped with IoT sensors to allow for remote monitoring and management. This can improve road safety, reduce the costs associated with manual monitoring, enable cities to optimise their deployment and reduce waste. Tracking temporary road signage with IoT can not only help prevent theft or misuse, it could potentially eliminate the need to search for misplaced signs. By knowing the precise location of these signs at all times, businesses and authorities can quickly identify when a sign has been moved or stolen and take action to recover it. This saves time and resources that would otherwise be spent searching for and replacing missing signage.

Additionally, by tracking the movement and utilisation of city maintenance equipment such as dumpsters and snow ploughs, cities can optimise their deployment and reduce the cost of overstocking or underutilising equipment.

IoT-enabled sensors in street lights connected to cloud management solutions can help cities save power through smart lighting solutions that collect data on movement and link it to historical data to optimise the lighting schedule. These smart lighting solutions can analyse conditions and direct street lights to turn on, turn off, brighten, or dim as needed.



Equipment Rental & Leasing

The use of asset tracking devices in the equipment leasing and rental industries brings many benefits. These devices allow companies to monitor the usage and location of their equipment, ensuring that the equipment is being used in accordance with the lease agreement. This information can be used to prevent overuse or abuse, schedule maintenance and repairs, and improve customer relations by providing real-time access to usage and location data.

Asset tracking enables companies to quickly locate and recover their equipment in the event of a default in payment or violation of the lease agreement. By providing a comprehensive view of equipment utilisation and performance, asset tracking helps leasing and rental companies optimise their operations, reduce costs, and enhance the overall value of their equipment. The significance of using asset tracking in these industries cannot be overstated, as it provides a level of visibility and control that helps secure your bottom line.

Manufacturing

In manufacturing, attaching tags to individual parts and components is a common practice that allows factory managers to track inventory levels and monitor the movement of materials through the production process. These tags, whether they are RFIDs or barcodes, enable the collection of data about the location and status of individual items.

Manufacturers can gain critical insights into their operations and equipment performance by connecting and monitoring fixed assets like machinery and equipment. Monitoring and data analysis can identify and resolve inefficiencies, such as downtime or bottlenecks, reducing costs and increasing productivity.

Predictive maintenance can be implemented in manufacturing businesses by collecting and analysing equipment usage and performance data. This analysis helps to identify potential problems before they occur, reducing unscheduled downtime and prolonging the life of the equipment.

In manufacturing and industrial settings, many individuals work remotely or without direct supervision, often in environments that are considered hazardous. This can encompass a wide range of settings, such as mining operations, construction sites, factories, oil and gas facilities, and utility companies. These environments can present a variety of risks to workers, including exposure to dangerous chemicals, heavy machinery, and extreme temperatures. Lone workers also face considerable risk of accidents or medical emergencies, making it essential for others to be able to locate them and provide assistance in a timely manner. These lone workers can be equipped with wearable devices that allow them to be quickly located in the event of an emergency.

Visit soracom.io for more information.





Vehicle & Fleet Tracking

Utilising IoT to track vehicle fleets has revolutionised the transportation industry, bringing a new level of efficiency and accuracy to fleet management. From lorries and shipping vans to public buses and medical vehicles, IoT asset tracking has proven to be a game-changer in managing these assets and streamlining operations to improve the efficiency and availability of these services. With real-time monitoring, fleet managers can access critical information, such as vehicle locations, speeds, and routes, optimising itineraries, reducing fuel consumption, and increasing productivity.

Fleet managers can more accurately predict potential malfunctions by tracking maintenance schedules and performance. This means IoT solutions can help reduce costly downtime and prolong the life of vehicles. The result of these improvements can include increased safety and security, improved customer satisfaction, and reduced environmental impact.



Environmental Monitoring & Wildlife Tracking

IoT-enabled asset tracking can be applied to various environmental monitoring and wildlife preservation areas. For instance, it can be used to monitor air and water quality in a preserved area, allowing for the timely and accurate detection of pollutants and changes in water temperature, pH, and dissolved oxygen levels. These applications are crucial in identifying potential threats to aquatic life and the environment.

Lightweight trackers can be attached to wildlife to track their movements and monitor their behaviour, providing valuable insights into their habitat preferences and migration patterns.

IoT-enabled sensors can even be used to monitor the temperature, humidity, and other environmental conditions in heavily wooded areas to detect and prevent forest fires and monitor the growth and health of trees.

A woman with dark hair and bangs, wearing a white apron over a light-colored long-sleeved shirt, is smiling and looking down at a tablet computer she is holding. She is in a retail or kitchen environment, with shelves of jars and containers visible in the background. The image is partially overlaid with a dark grey semi-transparent box containing text.

Retail & Point-of-Sale

Retailers most often deploy IoT asset tracking to monitor inventory levels and keep tabs on the movement of goods through their supply chain, from the warehouse to the sales floor. IoT-enabled asset tracking in the retail industry is particularly prominent when it comes to vending machines and point-of-sale equipment. By providing visibility into the usage of these assets, retailers can streamline their operations and improve the customer experience by optimising product placement and restocking schedules, reducing downtime and increasing sales.

With the ability to monitor the performance and health of vending machines, payment terminals, digital signage, interactive shop-floor experiences and other point-of-sale equipment, retailers can also proactively address maintenance and repair issues, avoiding costly equipment failures and improving the reliability of their operations.



Wholesale & Logistics Centres

Data provided by IoT-empowered asset tracking can help wholesalers optimise their supply chain management, reduce lead times and inventory costs and improve accuracy. With the ability to track inventory levels, wholesalers can ensure that the right products are always in stock, reducing the risk of shortages and potentially increasing sales.

Wholesalers can improve inventory management and reduce the risk of lost or misplaced items by using IoT sensors to track the location and status of pallets, roll cages, and crates in a warehouse. They could also help monitor the condition of perishable goods, such as food or medicine, ensuring that they are stored at the correct temperature and humidity levels in the warehouses.

In logistics centres, IoT sensors can also be used to track the movement of goods between different areas of the facility, providing real-time data on inventory levels and enabling staff to locate specific items quickly. Additionally, by using predictive maintenance, wholesalers can analyse equipment usage and performance data to identify potential issues before they become critical, reducing the risk of unexpected downtime and costly repairs.



Optimising Postal & Courier services

Optimising delivery routes by leveraging asset tracking data is a common benefit across multiple industries, including postal and courier services. This can help them to reduce transportation costs, minimise delivery times, and streamline the management of returnable transport items (RTIs). RTIs such as pallets, crates, and other reusable packaging materials utilised in postal and courier services are typically used to transport packages between different locations and are designed to be returned and used again after each delivery. Deploying sensors on RTIs help prevent the loss or damage of these items, reducing the need for replacements and resulting in effective stock management.

In addition to the operational benefits, tracking returnable transport items can positively impact sustainability and reduce an organisation's carbon footprint by eliminating the need to replace lost items used in delivery operations.

... any many more

While we've covered some examples in this section, there are many more applications that can benefit from this technology. As IoT asset tracking continues to evolve and mature, we can expect to see new and innovative applications that we may not even be able to imagine yet. The possibilities are endless, and the potential benefits are enormous, making IoT-enabled asset tracking an essential tool for any business.

Zooming in on Returnable Transport Items, Non-powered Mobile Assets & Fixed Equipment

Now that we've taken a broad look at some common applications across industries, let's zoom in on three typical asset categories in greater detail to summarise the key benefits of smart tracking.

Returnable Transport Items

Returnable Transport Items (RTIs) transported along a supply chain are frequently misplaced, stolen, or misdirected at a huge cost to the business. Some examples of RTIs include:

- Drums, barrels, kegs, and crates
- Gas cylinders, pallets, roll cages, and racks
- Stillages
- Intermediate bulk containers and shipping containers

The Benefits of Tracking RTIs Include:

- ✓ Helping to settle disputes with trading partners across the supply chain when looking for missing assets
- ✓ Reducing waste and environmental impact in logistics operations
- ✓ Better managing stock levels to free up capital
- ✓ Lowering capital costs by reducing asset losses





Non-Powered Mobile Assets

The phrase “Non-Powered Mobile Assets” refers to a group of critical assets for a business that don’t require an external power source to operate their tracking devices. Examples of non-powered assets include:

- Trailers
- Commercial generators
- Shipping containers
- Water and frac tanks
- Mobile traffic signs.
- This also includes expensive tools such as city maintenance equipment and specialised construction and field equipment.

The Benefits of Tracking Non-Powered Mobile Assets Include:

- ✔ They won’t get lost. Visibility is automated.
- ✔ The threat of theft and tampering is reduced.
- ✔ You’re in control of stock – no need to maintain “just-in-case” items.
- ✔ Asset scheduling is optimised. No more double-booking equipment!
- ✔ You can make data-driven decisions on how to best deploy assets by gaining operational insights, including how workers use assets and how much time it takes to complete tasks.

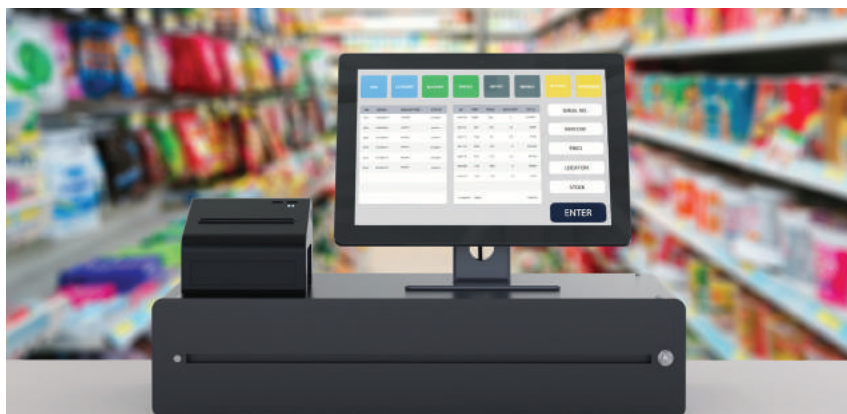
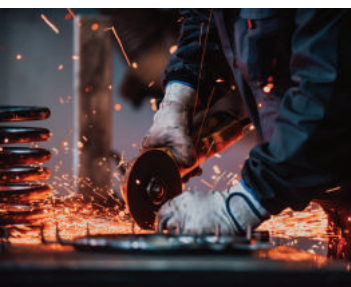
Fixed Equipment

Sensors on stationary equipment monitor condition, performance, and use. Data can include information about temperature, humidity, and energy use. Examples of equipment that can be monitored include:

- Commercial and industrial refrigeration
- Appliances and vending machines
- Point-of-sale equipment
- Heavy plant and industrial equipment

The Benefits of Tracking and Monitoring Fixed (or stationary) Equipment Include:

- ✓ Increased equipment efficiency and performance through remote monitoring and analysis of data.
- ✓ Improved maintenance and preventive maintenance scheduling through early detection of potential problems.
- ✓ Enhanced equipment utilisation and optimisation by identifying underutilised or idle assets.
- ✓ Better inventory management by tracking the location and usage of equipment in real time.
- ✓ Increased customer satisfaction through faster and more efficient service response times.



Choosing the Right Asset Tracking Solution:

IoT Connectivity and Platform Considerations

What capabilities of an asset-tracking solution are essential for your business? The answer will depend on how your asset-tracking system is to be used.

Use the questions below to guide you on choosing the right IoT connectivity solution for your specific use case.

What Kind of Connectivity Do I Need?

How Data-Heavy Are Your Needs?

The answer to this lies in how often you need to transmit and receive information. How frequently does each asset need to send updates? Do you need constant updates, hourly transfers, or only once a day? Do you only need location time stamps, or are atmospheric conditions and asset status information a necessary part of your application?

The update rate required for each asset will depend on the type of asset being tracked and the specific needs of your business. Some tracking solutions may require a backhaul connection to transmit data, which can impact the overall cost of the system.

What Kind of Battery Life Do You Need?

Your application's power needs will differ based on how dynamic your assets are and how frequently you need updates.

IoT devices are often battery-powered, so their operating lifetime depends on the longevity of those batteries. Battery life is affected by factors such as the type of communication link, the time required for location updates, power consumption when the device is inactive, and the frequency of updates. Read more [here](#).

Options to extend battery life include:

- Reducing bandwidth to keep battery-powered devices powered down and on standby more often
- Reducing the number of sensor readings and updates. I.e. Switching to daily updates rather than hourly
- Transmitting data over low-power protocols such as MQTT or UDP
- Transmitting using optimised message protocols, consuming less power

Where Are You Tracking Your Assets?

This is about how much granularity of location data is needed. Are your assets moving in a small, local area? Are they moving nationally or even globally? Indoors or outdoors? Above or below ground? All of these?

When it comes to tracking indoors or below ground, you may need specialised connectivity solutions such as RFID tags or Bluetooth beacons to ensure accurate tracking. On the other hand, for assets that are moving within a defined geographic area (such as a warehouse or construction site), you may be able to use a simple GPS tracking system. Similarly, if you have a fleet of vehicles used for deliveries within a specific city, you could create a geofence around that city to track movements within that specific boundary.

However, if you plan to track assets globally, you will need an IoT connectivity solution that supports roaming and will help to ensure that your assets can stay connected and transmit location data regardless of their location.

What Is The Cost vs Risk Calculation?

You'll need to take into account the costs associated with implementing and maintaining your asset-tracking system. This includes everything from the cost of the tracking devices themselves to the connectivity solution and any required infrastructure. You will have to weigh these expenses against the type and value of the assets tracked, the value of the data being collected, and any potential insurance and liability claims.

What Kind Of Platform And Vendor Do I Need?

What do you need from your management platform and vendor? It is important to carefully evaluate the capabilities of a tracking system to ensure that it can meet your specific business needs.

What Do You Want To Measure?

It's important to consider what metrics you want to track when choosing an asset tracking solution. This could include the number and value of tracked assets and metrics such as usage data, distance travelled, speed, and device performance.

The update rate required for each asset will depend on the type of asset being tracked and the specific needs of your business. Some tracking solutions may require a backhaul connection to transmit data, which can impact the overall cost of the system.

Do I Need Remote Diagnostics And Asset Health Monitoring?

Asset-tracking systems can provide valuable insights into the health and performance of assets, helping businesses identify potential issues before they become major problems. This may involve using sensors to collect data on the condition and performance of assets, as well as alerts to notify businesses of potential issues.

What Am I Going To Use The Data For?

Asset-tracking systems can provide valuable insights into the health and performance of assets, helping businesses identify potential issues before they become major problems. This may involve using sensors to collect data on the condition and performance of assets, as well as alerts to notify businesses of potential issues.

- **Business intelligence:** You may want data simply to understand your supply chain, or inform decisions about materials based on temperature, humidity, or acceleration readings. A smart connectivity management platform can organise data into a reporting structure for easy business feedback.
- **Operational efficiency:** Asset tracking data can be used to improve stock management. For example, decision-makers can use the data to visualise inventory on hand and make more informed ordering decisions.
- **Improving customer relations:** An asset-tracking system enables you to share real-time location information with your customers. This way, you can keep them informed every step of the way, from order placement to delivery.



Asset Tracking Creates New Opportunities

Asset tracking opens opportunities to use data-based insights to create new revenue streams by tailoring customer service packages and establishing new business models.

New service packages

These could include offering predictive maintenance and remote monitoring as a customer service. Data from asset tracking systems can be used to allow businesses to proactively schedule maintenance and repairs, so providing customers with steady reminders could be monetised. Alternatively, data can be used to identify patterns and trends in how customers' equipment is used and create service packages tailored to their specific needs.

New business models

Offering customers access to your solution in an equipment-as-a-service model allows customers to only pay for usage. This is fairly popular in construction and manufacturing businesses that use expensive equipment for short periods.

Sale of data

Businesses can collect and analyse data on the usage and performance of their equipment and then sell this to other companies. For example, a company that operates a fleet of vehicles could sell data on the performance and fuel efficiency of their vehicles to other transportation companies or organisations researching ways to improve fuel efficiency.



How Much Security Do I Need?

Do you need high-level security? Should users have limited access to your system? Effective asset-tracking systems require end-to-end security so that you can prevent unwanted parties from obtaining the data and ensure business continuity. They need password protection and regular schedules for reviewing legacy systems. This ensures that firmware and related software are up-to-date with the latest security patches.

To protect data from being accessed via public IP addresses, use private networks for data transfer between cellular IoT devices and the cloud. This eliminates significant attack vectors. [Read more here.](#)

Can The System Change In Line With My Business Needs?

Customisation and scalability are essential for a company's longevity. To ensure that a system meets the changing needs of your business, your chosen solution should have the ability to add or remove devices from an application. Expanding your deployed device fleet may even mean taking on additional connectivity solutions to support it.

It should also be able to customise the data being collected and integrate with other systems. This can help your system remain effective over time as you will be able to take a long view of future business needs.

Do I Need A Cloud-Integrated Solution?

Cloud-based tracking systems allow you to transmit data from any device, anywhere in the world, directly into your cloud-based platform. Cloud integration is useful for organisations that have assets spread across multiple locations and for real-time tracking.

What Kind Of Support Do I Want?

To ensure that an asset-tracking system is reliable and effective, choosing a solution that includes comprehensive support is important. This may involve training and onboarding support to help businesses get up and running with the system. It may also include ongoing technical support. A provider offering a range of support options, such as phone, email, and online resources, helps ensure you have the assistance you need to get the most out of your system.

Is It Hassle-Free?

Choose an asset-tracking solution that is easy to use and install. This involves considering the user interface of the platform, as well as the ease of installation and setup of tracking devices. A solution that is intuitive and straightforward to use can get you up and running quickly and easily. It can also help the system to be more readily adopted and used effectively by all stakeholders.

Decide how much you want to lean on a supplier that has complete infrastructure responsibilities versus self-deploying your infrastructure. The latter option requires that you consider the costs, time, and resources needed to take care of ongoing maintenance as part of your business plan.

Avoiding IoT Asset Tracking Pitfalls: The Role of Hardware

It's important to understand the limitations and potential pitfalls of using off-the-shelf hardware. While these products may seem like a cost-effective solution, they may have limited battery life, coverage constraints, and other compatibility issues that would make it challenging to track your assets efficiently. To ensure the reliability and accuracy of your asset tracking system, it's crucial to choose a quality IoT hardware provider that offers certified, reliable and scalable solutions specifically designed for asset tracking.



Wherever Your
Assets Go, We've
Got You Covered

SORACOM Provides IoT Connectivity You Can Count On

To truly enable broad expansion of IoT use cases, Soracom seeks to offer the smartest possible path from device to cloud. Any device, any cloud, any wireless bearer, anywhere in the world.

Soracom are experts in blended connectivity built on a backbone of international roaming cellular. We integrate local LPWAN solutions for inside-warehouse connectivity and satellite connectivity to ensure data paths for offshore and remote locations.



A Platform You Can Count On

Here's why 20k technical innovators like you choose Soracom as their IoT connectivity platform:



Totally Futureproof

Deploy thousands of devices on a scalable IoT platform using futureproof technology like eSIM.



Unhackable IoT Security

Every element of the Soracom IoT network has been designed to eliminate any outside risks.



Global IoT Connectivity

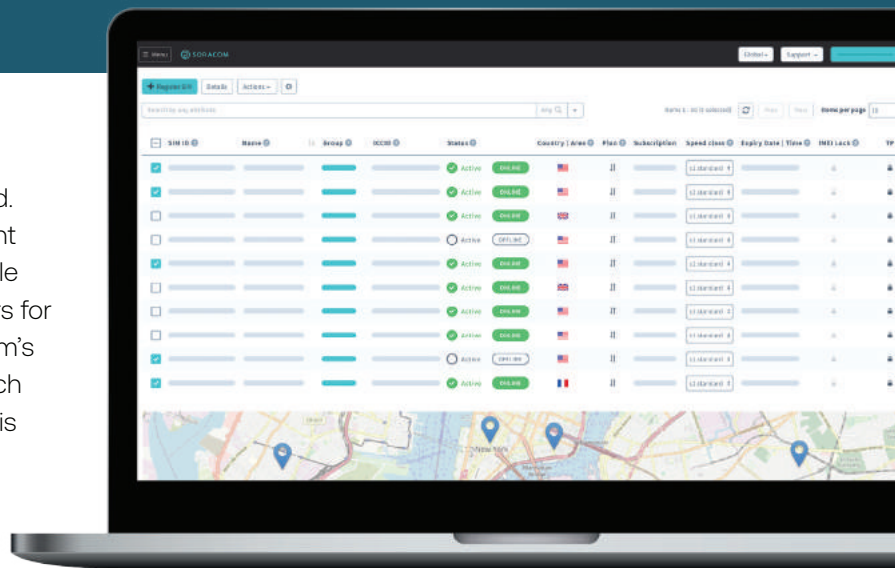
Deploy IoT devices in over 160 countries, all with a single SIM.



Complete Control

Manage every aspect of your deployment with an easy-to-use IoT dashboard that can be managed from anywhere in the world.

Our IoT platform presents data from one tracker device, irrespective of the connectivity solution used. This simplifies the work of allocating data to the right item in transit. You won't need to sift through multiple connectivity suppliers with different device identifiers for a single multi-radio connectivity tracker. The platform's tools minimise the amount of data transmitted, which in turn maximises battery life. This means data that is cost-optimised, transformed into a rich data format before it is sent on for processing.



Expertise And Security You Can Count On

Our team leverages years of experience in advising on connectivity methods to suit specific businesses and use cases. We have extensive experience with the security aspects of IoT designs at the device-to-service level and service-to-cloud data link level. This ensures our customers receive the right fit of security, privacy, tunnelling, and administrative control. The result is peace of mind – full confidence in your devices, data, and cybersecurity. Contact us to upgrade your asset-tracking capabilities by connecting to a reliable IoT network – cellular, LPWAN, satellite, or a mix that keeps you covered everywhere, anywhere, all the time.



We are **SORACOM**

Soracom was founded in 2015 with a mission to accelerate global connection by democratising the technologies that technical innovators need to create new products, services, and experiences.

We envision a more harmonious and prosperous world, made possible by increasing the number and fidelity of connections between people and things. We're working to bring that world to life by making IoT connectivity more accessible and affordable for developers and teams of any size.

Today, we keep more than 5 million IoT devices connected around the globe, from multinational enterprises to fast-growing startups, and enable IoT solutions across virtually every industry, from agriculture, transportation, construction, and utilities to consumer electronics, real estate, and healthcare.

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