MONETISING IoT DATA IN THE ASSET MONITORING BUSINESS

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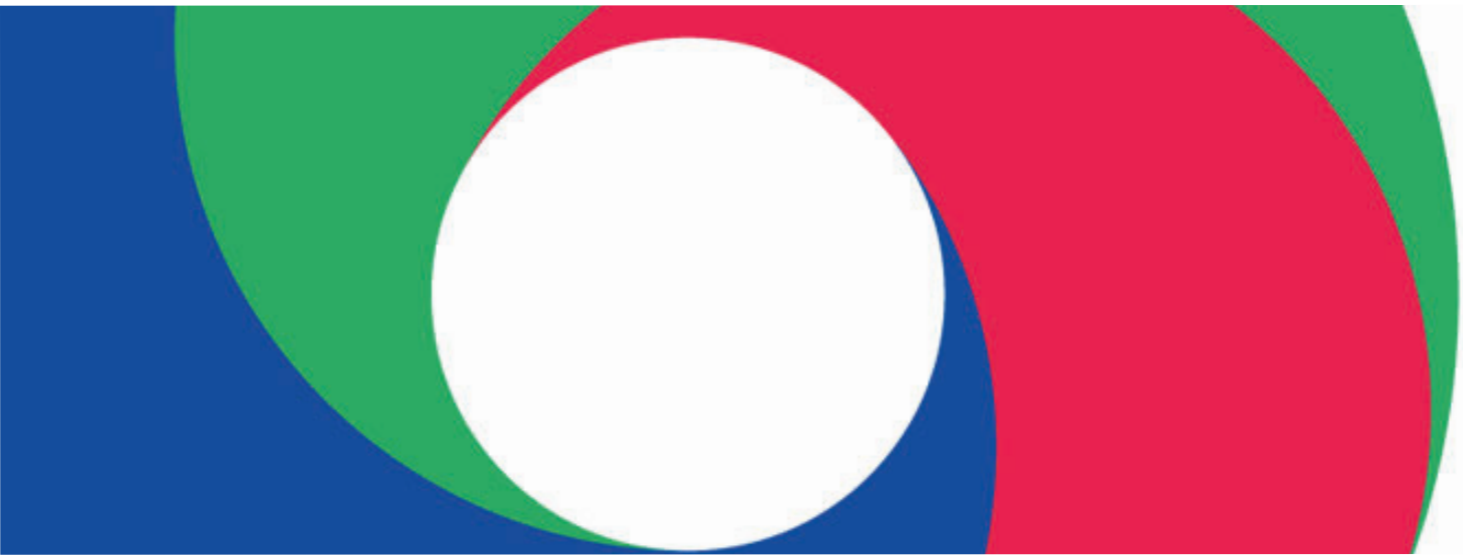

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1. MONETISING IOT DATA IN THE ASSET MONITORING BUSINESS

Asset management is a cross-industry preoccupation, as the storage, moving, and maintenance of assets represents a significant cost for most businesses. Similarly, the ability to more rapidly deliver products and services to customers enables organizations in most industries to create additional value. All of that said, the optimisation of asset management and logistic flows is an important operational initiative.

1.1. CONCEPTS AND USE CASES

Digital technologies, and IoT solutions in particular, present an opportunity to improve asset management, reduce logistics costs and timelines, integrate supply chains more tightly, as well as provide new services through the use of collected data. These expectations are based on a variety of services and technologies.

Figure 1: Asset tracking and management - definitions
Source: IDATE DigiWorld

Asset tracking and management concepts

Asset tracking solutions apply to physical assets through different criteria

- Asset identification – Digital technologies are used to assign a unique identifier to an asset, such as RFID tags (passive or active), or barcodes (traditional or 2D QR codes). Sometimes this implies storing additional static information on the asset alongside this identifier. This enables efficient inventory control and it is the minimum basis necessary to set up an asset management solution.
- Asset localisation – This can be done through various technological solutions, often with limitations on the covered scope (indoor / outdoor, 2D/3D, or precision of the localisation). It enables many additional use cases such as real-time follow-up of movement along the supply chain or distribution networks, as well as route optimisation and predictive solutions.
- Asset monitoring – This implies the active monitoring of some of the characteristics of the asset itself or aspects of the immediate environment in which the asset is located such as temperature, pressure, or light. This additional data can be used to ensure that the transport of the asset respects predefined regulations (as in the cold chain) or provides additional services to the asset owner or user.

Asset management covers a wide range of solutions dedicated to the optimised usage of a company's assets, both internally and throughout its supply chain and distribution networks.

The digital solutions targeting asset management build upon tracking and monitoring solutions but focus more significantly on comprehensive solutions to organise and rationalise the company asset portfolio. They can extend to big data and analytics technologies to optimise a company's operational activities. By integrating asset management capabilities with enterprise IT, additional value can be gained.

Applications and benefits
Connecting assets enables applications such as:

- Location tracking, can be implemented on a small perimeter (such as a factory) or a global scale (shipping). Depending on the technology, indoor and/or outdoor tracking is available. Connecting the asset can be necessary to enable more precise location information (indoors) or to enable location tracking of assets across numerous, diverse transport modes and operators.
- Asset monitoring, ensures that the asset is preserved in optimal conditions (temperature, light exposure, shock, vibrations) throughout its journey along the logistics chain. Asset monitoring can also be applied to critical systems and components of equipment, machinery, or vehicles to implement predictive maintenance, ensure optimal functionality, and reduce downtime. Taking asset monitoring a step further, organizations can leverage the data collected via the asset monitoring solution to offer existing services or expand their business to offer new business models (-as-a-Service).

These applications can have different goals for asset owners:
- Save time (easier to find items)
- Theft protection (enabled by tracking and access to location history)
- Help with insurance claims (factual data on the environment of assets and their usage)
- Ensure product traceability and quality to the end customer
- Improve logistics and operational efficiencies in general
- Reduce vehicle, equipment, or asset downtime
- Generate new revenue streams

Asset management and tracking can apply to most industries as they are always dependent in one way or another on logistic flows and efficient use of owned assets. An analysis by vertical in the following figure shows some of the specific needs of several industries.

Industry	Asset Tracking Use Cases
Health	**Localisation of medical equipment** Respect of regulations on medications transport (cold chain) Remote health monitoring Human patient localisation (elderly)
Agriculture and Food	**Fleet Management** Respect of food safety regulation (cold chain) Animal tracking and monitoring Supply chain and distribution network optimization
Automotive and Transport	**Fleet Management** Supply chain and distribution network optimization
Manufacturing	**Fleet Management** Indoor Localisation of equipments and tools Warehouse and factory automation On demand manufacturing Supply chain integration Supply chain and distribution network optimization
Retail	**Inventory** Storage / capacity management Supply chain and distribution network optimization

Table 1: Asset tracking main use cases, by vertical industries
Source: IDATE DigiWorld

Optimum interpretation of the data collected

There are clear limits to the direct value of asset tracking in itself, with its full potential only being reached through the application of additional data analysis technologies. The full range of data analytics, visualisation, big data, and artificial intelligence solutions are now in development, and with them comes the ability to make full sense of the data collected.

1.2. KEY OPTIONS TO CONNECT THE ASSETS

Identification, localisation, and communication technologies are essential to provide asset tracking and management.

However, depending on the use cases through the vast diversity of industries, and underlying conditions (indoor, outdoor, land, sea, or air) in which asset tracking scenarios need to deploy leads to a similar diversity in the range of technologies involved.

The technology selection is mainly based on the use cases' requirements, whether the asset to monitor is mobile or static, how it is powered, etc. The following table summarizes the main options. Connectivity costs mainly depend on volume commitment and use cases (need for real time tracking or not).

The bulk of asset tracking is still conducted without a direct connection of the asset. Instead, use is made of identifiers in barcodes and RFIDs and the connectivity of vehicles and premises. However, tracking a connected asset is developing rapidly, especially in use cases requiring highly precise location tracking of assets and monitoring of their status or transport conditions.

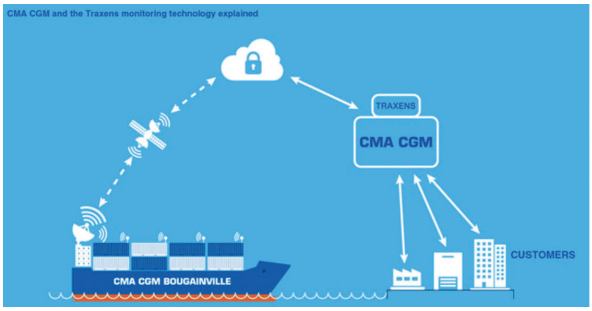


Figure 2: Tracking system architecture at CMA CGM
Source : Traxens

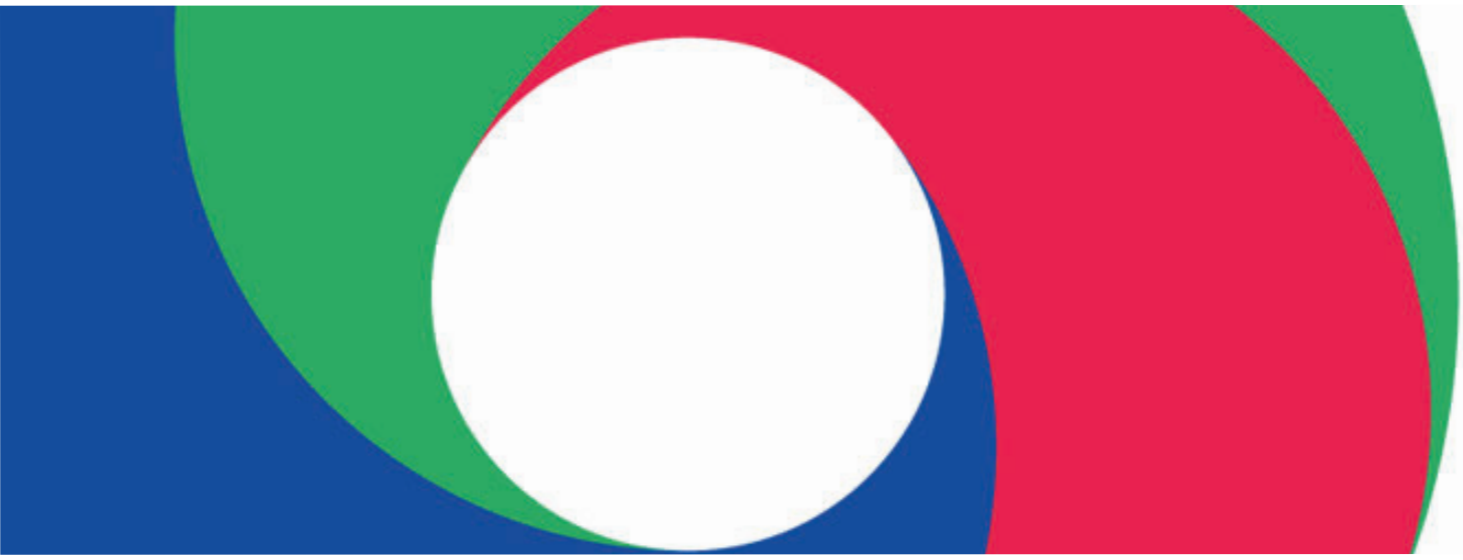
Main options are included in the table below.

Technology	Communication range	Localisation accuracy	Coverage	Connectivity cost	Device cost	Throughput
Short range connectivity solutions						
Bluetooth	10-20 m	< 1 m	Specific deployment required	Free (gateway)	Low	Medium
Wifi	300 m	1 m	May rely on existing Wifi deployment	Free (gateway)	Low	Good
UWB	10-20 m	< 0.5 m	Specific deployment required	Free (gateway)	Relatively high	Good
Zigbee	100 m	< 1 m	Specific deployment required	Free (gateway)	Relatively high	Low
End-to-end connectivity solutions						
Unlicensed LPWA	30-50 km	200 m	Still limited to a few countries	Low	Relatively low	Very low
Licensed LPWA	10-20 km	500-1000 m	Depending on technologies (LTE M/NB-IoT) and MNO strategies	Low	Relatively low	Low
Traditional cellular (2G/3G/LTE	10-15 km	500-1500 m	Globally very good worldwide	2-3 EUR per month	Relatively	Good
5G	10-15 km	500-1500 m	Not deployed yet	To be assessed	To be assessed	Good to High
Satellite	Hundreds of km	< 10m (GPS)	Global	High	High	Variable

Table 2: Overview of communication technology features
Source: IDATE DigiWorld

Short range connectivity

Short range connectivity refers to a communication requiring an intermediate gateway to connect to the Internet. In the case of asset tracking, this gateway can be another part of the logistics infrastructure (warehouse, buildings) or the vehicle itself. In such cases, the gateway can act as a relay for a large number of devices. Indirect connectivity is typically applied for use cases that are mostly local, such as equipment localisation indoors.



End-to-end connectivity
End-to-end connectivity enables the asset to be directly connected to the cloud, making it fully autonomous for asset tracking. The main drawback is that they are not free of charge, in opposition to the short range technologies mentioned in the previous section.

LPWAN
The value proposition of the LPWAN communication technology aims to meet one of the most critical requirements in the IoT world : energy consumption.
Two types of solutions currently exist:

- **Unlicensed LPWAN** – They mainly refer to the SIGFOX and LoRa technologies, although in all some thirty such players currently provide LPWAN offerings. Overall, these solutions still suffer from a lack of the global coverage which is a key requirement for asset tracking applications. The limitation of the unlicensed bands do not allow them to enable real-time asset tracking solutions.
- **Licensed LPWAN**. Recently published versions of the LTE standard allow better coverage, improved battery life and lower costs to better address IoT scenarios. The two following versions are licensed LPWA technologies in response to the unlicensed technologies seen above :
  - CAT-M1 or LTE-M: a version with a low bandwidth, a variable throughput, and mobility support. Note that a software update is sufficient for the deployment of this version;
  - CAT-NB1 or NB-IoT: a lower throughput version without mobility support.

Traditional cellular (2G/3G/LTE)
Traditional cellular technologies are another option in asset tracking scenarios relying either on legacy 2G/3G networks or LTE networks. A rather recent release referred to as LTE Cat 0 was published and is characterised by a large bandwidth and a speed up to 1 Mbps.

5G
In parallel to their existing offers, many major cellular operators are working on the integration of IoT in the 5G umbrella. Unlike 4G, 5G will be designed for IoT applications from the outset.

In addition to faster mobile broadband (enhanced 4G bitrate), 5G design will integrate requirements of major IoT applications. Leading vertical industrials have been involved in the 5G standardisation process since the beginning.5G introduction is planned for the end of 2020 with eMBB use case to be deployed at first.

In terms of the introduction timeline, the standardisation of 5G is planned for the end of 2020. with the first commercial launches foreseen a year earlier. The eMBB use case (extreme mobile broadband, evolution of traditional cellular connectivity) would be the first to be deployed, followed by the mMTC in a second time frame while the deployment of uMTC cases will take longer.

Satellite
Satellite-based solutions are also used in asset tracking especially for their ability to provide global coverage without relying on ground deployments (even for ships and airplanes). These solutions are cost prohibitive and they are therefore used where other network are out of coverage.

1.3. THE INCREASING VALUE OF THE DATA

Asset tracking and monitoring comes primarily as a way to cut costs for asset owners by improving their asset management. However, there are also opportunities for creating new revenue sources by exploiting the data gathered through asset tracking and management.

1.3.1. A MARKET FOR ASSET TRACKING DATA

The data gathered from asset tracking and asset monitoring scenarios, in addition to uses in asset management, can be directly sold to a third party. This can be the case when a logistics provider is reselling information on the assets it is transporting to the asset owner or to the final customer (improving the traceability).

In addition, it can also reach other stakeholders in the ecosystem as asset tracking data can be used to estimate infrastructure usage statistics. For instance, some mobile operators sell anonymised localisation data and statistics to third parties (cities, shops, infrastructure owners) to estimate usage and frequentation. Service are based not only on the smartphone location data gathered directly by the operator, but other sources including vehicle location data gathered by telematics services (through partnerships with automakers).

1.3.2. THE PROSPECTS OF SERVICISATION

Beyond selling asset tracking data, its collection from asset tracking and monitoring scenarios can enable new business models for extra revenue or help shift existing models into recurring service-based models.

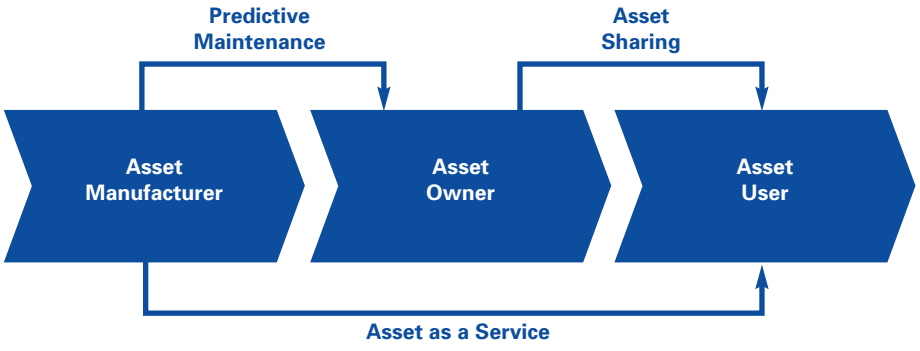


Figure 3: Asset tracking and servicisation business models

Source: IDATE DigiWorld

This can take several forms such as:

- **Predictive maintenance:** Asset monitoring can be used by the asset manufacturer to offer predictive maintenance services to the asset owner.
- **Asset-as-a-service:** The manufacturer can make a full switch from a product to a service model, keeping ownership of the asset and selling asset usage time (on the kilometre basis at Michelin).
- **Asset sharing:** The asset owner can optimise their usage by reselling usage time to other stakeholders in the ecosystem. For instance, the owner of a fleet of vehicles has the possibility to easily rent its unused vehicles to third parties, thus generating new revenue.

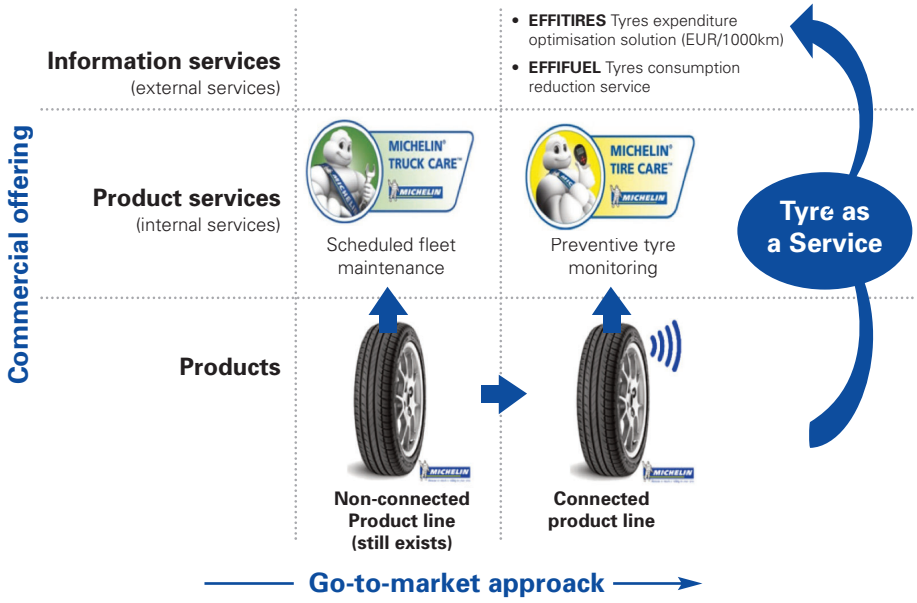


Figure 4: Go-to-market approach at Michelin

Source: IDATE Digiworld

The potential development of these service offerings, and the possibility of reselling collected data can also be an incentive for both asset manufacturers and owners to equip them with asset tracking solutions.

1.4. CONCLUSIONS

In the near future, in most cases, asset tracking and monitoring will be deployed in the guise of cost-cutting initiatives. However, there are also promising opportunities for monetising data, especially in localisation data and for new services related to asset monitoring. They are still limited for the time being but the trend toward servicised business models, or collaborative logistics, is expected to continue to develop rapidly.

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