CIRCULATING ASSETS CHECKPOINTING:
## Railway Cars, Truck trailers and Containers

GEFCO

The challenges of circulating assets

In the logistics sector, many business cases involve massive capital immobilization of circulating assets. Transport Rail companies need to invest in freight railway cars, Car logistic companies such as GefCo need to invest in truck trailers, and of course there are the standard containers and pallets.

The profitability of such business cases directly depends on the immobilization time of these circulating assets: every day or hour lost in a warehouse, parking or rail station reduces the number of times the circulating asset will generate a profit in a year.

However, measuring this immobilization time is also a challenge. Traditional solutions involved cellular or satellite trackers, which require significant CAPEX, but perhaps more importantly also ongoing OPEX due to battery changes and connectivity costs. These costs made it difficult to justify mass adoption in the logistics sector.
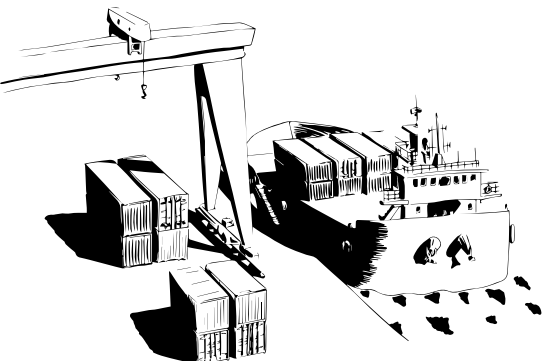
LPWAN trackers: a game changer

LPWAN technologies, an acronym for "Low Power Wide Area Networks" are very recent. They create a disruption both in the technology and business model.

On the technology front, the main impact in on drastic reduction of power consumption, which reduces battery usage and ultimately also OPEX related to ongoing maintenance. It also creates new opportunities for more dynamic tracking, as communication events are less costly.

On the business model side, logistic companies can now arbiter between CAPEX and OPEX : most LPWAN systems operate in unlicensed band, for example the leading LoRaWAN™ technology operates in the 915MHz band in the US, the 868MHz band in Europe and equivalent bands in other parts of the world. This means that logistic companies can invest in their own wireless networks to reduce or eliminate variable connectivity costs. The cost of LPWAN radio network gateways has decreased due to higher production volume, and is now affordable even to very small logistic centers, such a car distributor.

Next generation LPWAN trackers

The potential of LPWAN enabled tracking requires a new generation of hardware. The lower RF power consumption is only a part of a massive effort to decrease overall power consumption of the whole system. This means that super-low power technologies such as network triangulation, WiFi sniffing, or BTLE beacons, will be used whenever possible. Even the classic GPS can be optimized through techniques such as LP-GPS and DAGPS. Trackers from Abeeway were the first to reach sufficient maturity to be deployed in use case requiring tens of thousands of units, with relatively low cost assets (such as scooters), which mean that reliability and low power were absolute must.

In the case of circulating asset tracking, dedicated modes such as Start/Stop reporting have been developed : logistic application developpers, such as Wakeo in the case of Gefco, can trigger the reporting events only when motion stops or starts, but also periodically to increase resiliency.
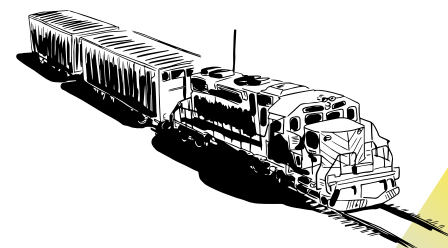
Next gen circulating tracking : a system view

The first step in design a circulating asset monitoring system is to list all potential stop points for the asset. For railway cars, these will be all the freight railway stations and triage/transit centers. In the case of car distribution companies these will be all distributors, etc. Stop points may below to multiple organizations.

> ❝ **Tracking valuable circulating assets is a pain point in most large distributed organizations involved in logistics, typically relying on partners such as distributors to correctly signal check-in and check-out events. LPWAN trackers, because of their low cost and lightweight infrastructure, solve this issue and allow us to reduce immobilization time** ❞
>
> *Wakeo*

The second step is to deploy an over the top wireless data collection system : each stop point will be equipped with one, and rarely two or three, radio base stations connected to the Internet, usually leveraging existing on-site connectivity or cellular modems. All base stations are coordinated by a central network server, hosted by a service company or owned by the logistic company.

The last step is to equip all circulating assets with a LPWAN tracker, typically with a long lasting primary battery. These trackers will typically report stop and start events, so that immobilization time may be measured, but may also periodically report at rest or in transit. In some countries, roaming agreements with public LPWAN networks also allow precise monitoring during transit.