NB-IoT: The Cornerstone of Effective High-Value Asset Tracking

The increasing pervasiveness of technology has meant that the world around us is becoming more intelligent too, because of this, the Internet of Things (IoT) has come to be one of the fastest growing trends in technology, to date.

Market research company Gartner estimated that:

"8.4 billion connected things were in use worldwide in 2017, with 3.1 billion devices connected in businesses alone. By 2020, Gartner predicted that businesses would have 7.6 billion IoT connected devices."

Out of an inherent need to evolve and become more digitally connected, IoT has emerged as a prolific ally for businesses in the Food, Manufacturing, Agriculture, Telecommunications, Healthcare, and Building technologies sectors, to name but a few.

Businesses in these varying sectors have recognised that by making use of an IoT solution they can streamline previously complex data monitoring processes through improved automation, which in turn promotes rapid responses, and less down time in operational productivity.

Shifting into High Gear with NB-IoT

Narrowband IoT (NB-IoT) is a fast-growing wireless cellular technology that addresses the LPWA (Low Power Wide Area) requirements of the IoT.

At its core, NB-IoT is used to improve the power consumption of IoT devices, system capacity and spectrum efficiency, especially in deep coverage.

Often, potential "connected things" are found in remote or hard-to-reach areas, at long distances from the next cellular base station, or deep within buildings or underground structures. When there is coverage, it is often poor and requires the device transmitter to operate at high power, draining the battery. NB-IoT has the ability to connect many more devices to the Internet of Things and make many new applications a reality. It is optimized for applications that need to communicate small amounts of data over long periods of time. Since it operates in a licensed spectrum, it is secure and reliable, providing guaranteed quality of service.

This impressive technology will ultimately bridge the gap between the physical and digital world to improve operational efficiency, data monitoring and improve the life cycle of devices.

On the Right Track

According to a report by Mobile Experts:

"One of the biggest sectors to benefit from the use of IoT is the Asset Tracking Sector, it is estimated that by 2022 the asset tracking IoT device market will have tripled."

Asset intensive industries like Manufacturing, Industrial Machinery, Logistics and Transportation, Oil and Gas, Heavy Machinery and Construction, reported that they were constrained by lack of visibility of their assets. To operate more effectively most of these industries have expressed a clear interest in wanting to implement a solution that enables them to monitor their assets, at any given time.

When it comes to high-value asset tracking, companies invest large sums of money into their assets and a loss of an asset due to poor performance, theft or vandalism can be devastating. Therefore, knowing where assets are or how they are performing, at any moment or place is critical to transforming business operations.

NB-IoT enablement can create measurable value by mitigating and minimising these discernible losses and disruptions but can also help address the more abstruse losses companies experience when assets are not fully or properly utilised.

Furthermore, a properly implemented NB-IoT solution can provide critical information which can be used for investigative purposes should a device be stolen or vandalised and offer options for recovery. The data will also enable businesses to compile risk

profiles for different types of assets in different scenarios, allowing them to change the way they operate to minimise their exposure to the risk factors.

Example:

If a battery powering a Traffic light is running too low to operate, due to a power outage, it can result in traffic congestion or worst-case, multiple accidents. This can be avoided if the battery is fitted with an NB-IoT sensor which can send an immediate alert to a municipality notifying them of the issue and have them make the necessary provisions.

Additionally, if the battery powering a traffic light has been stolen, an alert will be sent to the municipality immediately and the asset can be tracked and recovered.

Putting Things into Perspective

Commonly, operators of assets have been utilising specific technology solutions to monitor asset operations. These solutions habitually co-exist in parallel within an organization and have acted as standalone functions or processes.

Having NB-IoT enabled smart asset monitoring allows for better and smarter network connectivity, as the signal transmitted has a better chance of reaching the smart platform. It also provides cost-effective connectivity to billions of IoT devices, supporting low power consumption, the use of low-cost devices, and provision of excellent coverage – all rolled out as software on top of existing LTE infrastructure.

In many locations, NB-IoT devices will be limited by signal strength rather than transmission bandwidth. These devices can concentrate their transmission energy to a narrower bandwidth without loss of performance, which frees up bandwidth for others. The possibility of allocating small amounts of bandwidth to specific devices increases system capacity without loss of performance. This can boost flexibility while lowering costs.

NB-IoT utilizes a power saving mode, smaller data payloads, and typically longer reporting intervals, all of which translate to lower power consumption. IoT devices on NB-IoT simply don't need to operate on more intensive LTE networks, and so don't require expensive batteries.

This transformational technology can disrupt business processes and enable organizations to transform their operations, digitally. What is of interest is that this type of technology is not a standalone or unique to one type of business or structure, a lot of

derived solutions or variations of this innovative technology can be implemented for a specific industry or business process. For example, asset condition monitoring can be as simple as monitoring if the battery at a traffic light is working optimally, has been stolen or is low on power.

NB-IoT Benefits

NB-IoT is considerably optimized for cost, unlike conventional GSM tracking solutions, it eliminates the need for constant up-time and high data rates.

Asset tracking with Narrowband-IoT ensures that costs can be better managed, differentiating it from the more traditional approaches by:

- Using low-cost sensors with a high-performance battery, leveraging both the low power capability of the NB-IoT network and automatic battery life optimization.
- Eliminating constant maintenance.
    - NB-IoT tracking devices won't need a battery change for years.
    - There's little need for preventive maintenance; the devices send alerts if something is wrong and maintenance can be performed remotely
    - Use of the same sensor to monitor the asset location both within facilities and in between them. Moreover, it doesn't just track asset location, it can also track asset condition.
- Reducing costs. Larger enterprises more often than not have hundreds or thousands of vendor and supplier facilities, and traditionally require a team of field technicians to perform equipment maintenance and testing. Using NB-IoT, Field technicians can regulate and monitor all equipment remotely.

Twin for the Win

Simply put, a digital twin is a virtual image of an asset, maintained throughout the lifecycle and easily accessible at any time.

Via IoT technologies, a digital twin can provide dynamic updates on the condition and operational parameter states of any asset. Operating in the digital age allows organizations to view assets differently, not just as physical entities that require repetitive maintenance, but also as digital representations that can administer the intelligence for advanced decision making and new automated processes.

The idea of a "digital twin" is not new, however companies can leverage today's technologies to make it a reality. These include graphical 3D visualization and virtual

reality, sensor-based monitoring technology, advanced analytics, networks, and geographic Information systems including satellite positioning.

The result is the ability to maintain a digital twin that truly reflects the physical asset. To enrich it and keep it accurate over time, to make it available across a network of operators, and to make it "live" with real-time sensor feeds. Having a network of digital twins can enable winning efficiencies and new business processes.

The Game Changer

The Fastcomm hellothing IoT solution, built on the foundation of the digital twin, has the potential to enhance existing operations when it comes to the effective managing and tracking of high value assets.

By installing IoT sensors on these assets, ensures that any subsequent abnormalities in behaviour can easily be detected, whereby an alert will instantly be communicated. With this constant monitoring in place, preventative maintenance is enabled, and down-time is invariably reduced.

All data collected from the asset tracking devices is transferred via the NB-IoT network to the hellothing cloud platform. Upon receipt, the asset's digital twin, on hellothing, is updated, an in-depth analysis is performed, real-time alerts are raised, and notifications are sent to the correct department, according to the fault classification.

The real-time overall system health is reported on the client interface and can be drilled down to individual asset tracking devices. Operators are then able to review and monitor current data, historical data as well as trends, and subsequently provide insights into the device performance.

Asset life cycle tracking is done on the asset tracking devices and statistics are recorded and built up over time. Data is prepared and saved to be available immediately to the hellothing portal used. At any given time, a view of all asset's location can be seen on the portal. Having the powerful tools of a modern IoT platform at hand allows for a wider range of possibilities, such as predictive analytics, pro-active detection of asset theft and asset condition.

Other impressive IoT components such as Machine Learning, Artificial Intelligence, Big Data and Cloud Computing can provide accurate real-time analytics, as well as, provide future predictions for efficiency, based on the historical tracking and sensor data recorded.

With the help of an informative and responsive IoT solution, assets can be tracked and monitored in real-time to ensure the safe transport of these valuable assets.

The Fastcomm Advantage

Fastcomm's business is to build technology platforms that empower its clients to digitally transform their businesses and therefore to understand and address the growing needs of their customers. Our mission is to build long-term technology partnerships that help transform companies, allowing them to concentrate on their core business.

We have a proven track record of understanding disruptive technologies and the effect that they have on businesses. We have built platforms in the IoT and OTT technology domains that allow us to connect people, places and things successfully.

The Fastcomm group of companies have been providing solutions to its partners, since 2002. We have offices in the USA, Europe and South Africa, allowing us to produce innovative solutions, utilizing know-how and skills acquired worldwide. Our skilled engineering teams have, over many years, created platforms and building blocks that allow for rapid development and deployment of solutions.

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