Tech Mahindra

ASSET TRACKING AND INTELLIGENCE

Connected World. Connected Experiences.

Introduction

Industrial Manufacturing industry is asset-intensive. For manufacturing organizations, one of the critical areas of focus is asset management & tracking. Most importantly how to create efficiencies and provide insight into the whole production chain. It is also very important & logical to optimize the utilization, location and tracking of the assets, which is a key priority in Industry 4.0 Principles with increased focus on predictive maintenance.

The solutions for advanced asset tracking, asset management, remote monitoring and remote/predictive maintenance is evolving every day, due to the technologies like IOT, Data Intelligence and Artificial Intelligence (AI). In this POV, let us go through some of the main challenges and how they are being addressed.

Challenges

Manufacturing organizations are exploring ways to reduce costs associated with producing and distributing products. Until recent past, manufacturers were relying on manual, error prone track-and-trace processes to determine asset status. Any system that relies on manual input, is prone to human error, which leads to decrease in productivity and increase in labor costs, as employees spend time looking & locating the misplaced critical assets.

Traditionally in an Industrial manufacturing, assemblies/tools which are critical assets is manually catalogued to location and feature set. The employees trying to locate a particular assembly/tool in a vast facility or warehouse or big yard filled with hundreds of nearly identical assets, end up in spending lot of time in locating/tracking the asset affecting the productivity, misidentification of the asset or searching/placing in a wrong storage location potentially impacting the through put & shipment delays.

Solution

Combining "Data Intelligence" & technologies like RFID, BLE, RTLS help in tracking of critical assets helping manufacturers to reduce, recover or in some organizations reverse the costs associated with asset. As technology is evolving, critical asset tracking is consolidated at a central place at a secure cloud based environment. The deployment takes less time and the data/system can be viewed/accessed by the authorized executives, anywhere on their mobile devices. The IOT enabled asset management system can offer real time insight into the condition, location and history of any assets by capturing and maintaining the real time data from the assets. This result manufacturing organizations to save up to tens of thousands of dollars and hundreds or thousands of hours.

"Data Intelligence" plays a critical role to provide actionable information, visibility, and accuracy to measure and predict operational performance across the manufacturing value chain.

Asset tracking systems built with these technologies offer significant benefits across manufacturing in the areas of shop floor, supply chain and logistics by bringing in visibility. For example, a complex supply chain of automobile manufacturing requires seamless coordination and on time delivery of auto components. IoT enabled asset tracking can help us to monitor the entire lifecycle of the assets, enabling visibility across the supply chain. In the case of a medical device manufacturing, the precise tracking helps the manufacturers to support some of the mandatory regulatory logistics & shipment requirements.
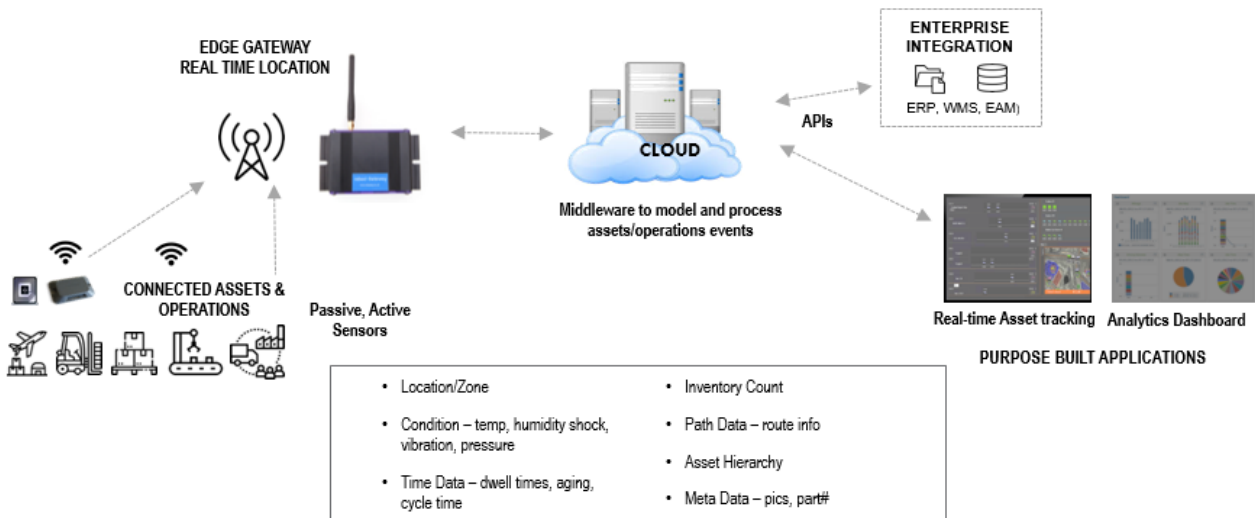
There are variety of Real-Time Locating System (RTLS) technologies including BLE, GPS, and RFID depending on the requirement of the manufacturer. RTLS solutions enable manufacturers with visibility into the precise, real-time location of an asset, tool or equipment, which in turn improves the efficiency of the workforce as well as increase in productivity.

A RTLS asset tracking system reduces the time spent in locating the misplaced assets, helps to streamline the asset maintenance, monitor and improve asset KPI's and prevent equipment losses.

In a RTLS asset-tracking system, there will be tags (indoor/outdoor) attached to the assets (tag selection depends on the type of asset) which are tuned to a particular frequency. There will be network of readers aligned to the frequency of the tags that will track the movement of the assets, which is captured in the RTLS software. A RTLS system can track material movement assets like forklifts, manufacturing equipment, power tools, sub-assemblies, and medical equipment both indoor as well outdoor. The telemetry capability of RTLS tags helps in easy use of a wide variety of applications ranging from simple "on-time" monitoring to sophisticated machine operation monitoring

The RTLS system provides information pertaining to the physical location of assets by zone, slot, shelf and/or intelligent interactive graphical plotting. The historical data pertaining to the asset's location, with accuracy of within a few feet can be also captured.

Manufacturing organizations can attach RTLS tags to assets of many processes like production WIP, material movement assets, parts car, assembly frames, rolling stock, tools and forklifts that are used in the logistics process.

EDGE GATEWAY
REAL TIME LOCATION

CONNECTED ASSETS &
OPERATIONS

Passive, Active
Sensors

ENTERPRISE
INTEGRATION

ERP, WMS, EAM)

APIs

CLOUD

Middleware to model and process
assets/operations events

Real-time Asset tracking   Analytics Dashboard

PURPOSE BUILT APPLICATIONS

- Location/Zone
- Condition – temp, humidity shock, vibration, pressure
- Time Data – dwell times, aging, cycle time
- Inventory Count
- Path Data – route info
- Asset Hierarchy
- Meta Data – pics, part#

Asset Intelligence

The latest RTLS technology has taken asset tracking to the next level; location information of the asset has become minimum functionality available for manufactures. With the power of IoT, chip and sensor technology has seen the emergence Real Time Asset Intelligence Systems providing insight into much more than just location. Asset Intelligence is promising by embedding a range of sensors in the tracking and monitoring hardware. In addition to location, the advanced RTLS system enable manufacturers to collect data on some of the vital parameters of the asset regard to temperature, humidity, vibration and pressure

The outcome from this asset intelligence will be different from one industry to another, depending upon the processes, materials and product manufactured. However, common use case like optimization and smoothing of asset utilization benefits across all the industries. This ensures the manufacturers have the correct number of spare assets, tools and they get the equal usage. The system can also provide predictive maintenance alerts, enabling exact servicing before any failure ensuring the asset uptime & improving the overall efficiency.

Asset Intelligence turn out to be valuable when it includes effective integrations of various systems, enabling of alerts and communications between devices, systems and humans which is called, Human machine interface. The Asset Intelligence aims to support fully automated real-time optimization of processes, which is something not to too far into the future.

One possible area is Predictive Asset Supply in a WIP tracking. Integrated Asset Intelligence can use an upcoming MES schedule to ensure all assets and resources are assembled in the relevant location required for completion of certain task before time. The assets or sub-

assemblies may be spread across multiple units and storage locations, this takes us beyond the efficiency of asset tracking and reducing time to find, and truly optimizes the whole process. The predictive intelligence will also help spot the most suitable time for maintenance.

Benefits

The benefits of a connected asset tracking, asset intelligence and predictive maintenance:

- The RTLS based Asset tracking solution enables connected assets, that eliminates the manual searching of assets at any given point
- Enhanced visibility, location accuracy and reporting of assets condition across the manufacturing organization enables informed decisions related to the asset/spares inventory. This improves the productivity and reduces inventory-carrying costs, resulting in the increased production throughput
- Real-time location systems enable smooth audit processes. It enhances the ability to convert the asset intelligence gathered into predictive, operational intelligence resulting in improved reporting & analysis
- The connected system helps in avoiding the manual inventory audits and cycle counts resulting in inventory visibility, decrease in inventory carrying costs, which also influences in the higher utilization of manufacturing physical space without foregoing safety.
- The automated data capture provides opportunities for business process and product quality improvements.
- The system helps in moving towards an uninterrupted production process and better connected operational flows.
- An integrated Asset tracking system increases the performance of assets and production efficiency.
- The system enables reducing asset downtime and asset failure, which saves cost, including maintenance costs
- Asset Intelligence helps the manufacturer to improve the asset maintenance and helps in planning the services around it.
- The predictive analytics capabilities of the system will enable to proactive decision making
- Enhances the supply chain collaboration and planning with ecosystem partners in an real time environment.

In the current Fourth Industrial revolution, it is important that manufactures reap the benefits of connected assets & asset intelligence by combining the power of RTLS, IoT & enterprise integration with the MES & ERP system. This enables visibility across the supplier, factories, distribution and customers to provide real time insights.

About author:

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Ram is a Digital transformation Leader focused on IIOT enabled solutions across factory
& Digital Supply chain initiatives.
He has rich experience in providing solutions across factory to improve Asset utilization, optimization
using the Digital Automation tools. Possess rich experience on Digital technologies like RFID, BLE that
are extensively used as part of Digital Supply Chain