Infosys Asset Efficiency Solution
Segment: Enterprise IoT
Overview:

Heavy industries, Rail, Oil & Gas, aerospace, automotive and manufacturing companies suffer heavy losses if their critical assets undergo maintenance or worse, fail. Over the last few years, equipment and systems have become intelligent. They generate data, which if monitored and analyzed well, can help engineers predict system failures accurately and prevent these failures beforehand. This reduces the bottom-line damage significantly, by minimizing or eliminating the downtime of critical assets. The Infosys Asset Efficiency Solution is developed to specifically address the challenges. Approved by Industrial Internet Consortium (IIC) and co-innovated by Industry Pioneers like Bosch, GE, IBM, Intel and PTC, this solution should help all these industries in improving the overall efficiency of critical assets.

Challenges in the industry

In the aviation industry, any downtime or failure of an asset like landing gear turns out to be very expensive. Additional maintenance costs are involved. Rescheduling staff delays other activities. Staff productivity is reduced and there is additional monetary burden due to refunds and reimbursements resulting from delays and cancellation of flights.

In the rail industry, the locomotive is a key asset. Breakdown of a locomotive can delay the freight trains, resulting in losses, customer dissatisfaction and increased maintenance costs. In mining, Oil & Gas industries, drills and other assets are mission critical and downtime of such equipment has to be minimized. Most companies realize the importance of asset efficiency. Recently Infosys and FIR Institute at the University of Aachen conducted a study to shed light on the maturity levels of asset efficiency, aligned to discrete asset efficiency maturity levels (1 - not implemented; 2 – potential recognized; 3 - partly implemented; 4 - systematically implemented and benefits realized). We found that although 85% of respondents – companies in the mechanical engineering, automotive, processing, chemical, aerospace, and electronics industries – are aware of the potential of asset efficiency, only 15% have put such principles into practice in their workflows.

There is a major gap between the aspirations and the reality of the maturity of asset efficiency across industries. This gap is predominantly due to the following challenges faced by enterprises:

- Lack of instrumentation of the assets
- Missing real-time data analytics
- Lack of context due to missing information from other systems
- Lack of a holistic approach towards asset efficiency which includes tenets such as maintenance, energy, utilization, operations, and service efficiencies.
Infosys Asset Efficiency Solution:
Infosys Asset Efficiency solution measures asset efficiency in a holistic manner across the various tenets of the asset efficiency. For example, maintenance efficiency is about condition monitoring and predictive maintenance of assets. Operations efficiency provides the real time visibility of the operational environment and prescribes the way assets should perform their operations. Service efficiency determines the critical service life cycle management aspects of supply chain. Lastly, the energy aspect is another critical aspect of the overall efficiency and needs to be monitored on a continuous basis in order to improve the overall productivity of assets.

In a nutshell, the solution collects asset information in an ongoing manner that helps in improving the asset model and getting better insights. This will be useful in predicting the maintenance schedule and determining serviceable life of assets.

As an example, a railroad locomotive monitoring system should not only monitor the health parameters and ensure the safety of the locomotive, but also should get information about weather, speed limits, freight loads, track conditions, etc. and prescribe the operating instructions to the driver. It should monitor the fuel efficiency, plan supply chain and predict the maintenance schedule to avoid unplanned downtime.

The solution carries out instrumentation of the asset after studying various operational parameters and failure modes. It gathers the data across asset, geography, weather conditions, external systems, scheduled events, etc., and identifies anomalies, determines the remaining useful life and predicts the maintenance schedule for the asset. It also provides the recommendations related to energy usage and operational instructions to make the asset efficient holistically.
The solution architecture follows Industrial Internet Reference Architecture (IIRA) and it comprises of three tiers:

- **Edge tier**: this tier physically hosts the asset, sensors and edge gateways
- **Platform tier**: it consists of one or more components doing data acquisition, data management, data storage, data analytics and application enablement
- **Enterprise tier**: it consists of application, domain specific work and connectivity with other applications.

### Solution Architecture

The solution is reviewed by Industrial Internet Consortium (IIC) to ensure alignment with the industry’s best practices.
Infosys Asset Efficiency Solution in action:
Infosys helped a leading materials producer enhance capacity utilization. Infosys lowered the company’s energy consumption through the deployment of process automation, monitoring, analysis, and control automation for furnaces and a casting plant. This led to an 8 percent increase in throughput and a 10 percent reduction in energy consumption.

Infosys helped one of the largest mining companies in the world, with a global fleet of autonomous trucks, improve its fleet’s operational and maintenance efficiency. The Infosys Information Platform (IIP) processed data from more than 200 sensors which stream 27,000 messages per second. We performed real-time analyses of production plans, maintenance schedules, energy costs, machine availability, and reliability. We helped to reduce machine breakdowns, optimized asset utilization, and increased both efficiency and profitability. This led to the tripling of the company’s unmanned truck fleet.

Infosys is helping a major power company develop an automated, real-time, and safety-critical application. This application is based on an industrial Ethernet business solution and Infosys has developed a multi-rate scheduler for optimized process control. This delivers improved response times and achieves 100 percent more availability, meaning the customer is establishing greater leadership in the utility market.

Asset Efficiency and Aircraft Landing Gear
The Aircraft Landing Gear use case stems from challenges to enhance flight safety and reduce operational and maintenance costs. The current practice of scheduled maintenance increases the cost of maintenance steeply, especially in the case of an aircraft operating beyond its designed service life. Hence organizations need to adopt Condition-based Maintenance (CBM), which is possible only with an effective health monitoring system. This aircraft landing gear use case, which is based on the Infosys Asset Efficiency solution, enables automatic detection, diagnosis, prognosis, and mitigation of adverse events arising from component failures; ensures flight safety; reduction in the overall operational and maintenance costs.

The key features of the solution include:
- Mapping and modelling based on information collection
- Failure mode analysis and prediction using engineering knowledge
- Real time data collection
- Processing of holistic data by integrating the asset with overall system
- Large data processing and informed decision making

Benefits
The Infosys Asset Efficiency solution offers numerous benefits as mentioned below:
- Condition monitoring that helps in determining an optimal maintenance schedule of assets
- Downtime reduction that improves the overall asset productivity. This helps in maximizing production and predictable delivery of service
- Reduction in capital and operational expenditures
- Efficient energy utilization
- Improved availability of the asset
- Greater customer satisfaction