IOT, Analytics and Manufacturing – Can GE make these work together?

In manufacturing plants, unscheduled downtime has always been the No. 1 reason for lost productivity. Critical asset failures are top contributors to these unplanned shutdowns. And finding effective ways to predict and prevent asset failures at the factory floor has always been a hard-to-win battle.

Today the evolving framework of Internet of Things (IOT) enables us to better manage physical assets using smart sensing, scaled connectivity and data-driven predictability.

Can IOT minimize unplanned downtime in manufacturing? Can IOT help maximize equipment utilization and yield?

Based on General Electric's ongoing Industrial IOT breakthroughs, the answer seems to be an emphatic **"YES".**

At the 2015 *Minds+Machine* conference, GE announced the next generation of *Brilliant Manufacturing Suite*. This suite leverages IOT to integrate and aggregate data at every phase of the production cycle. And implements advanced real-time analytics to support data-based decision-making.

This suite has been field tested and optimized within GE factories and results demonstrate a significant jump in production performance. This is surely a big promise for manufacturers across industries to finally realize their vision of a "*Brilliant Factory*".

"In the past, manufacturers may have instrumented a critical piece of equipment or optimized one aspect of the manufacturing process," said Jennifer Bennett, General Manager for GE Digital's Manufacturing Software initiatives. "However, what we have learned is that connecting information upstream and downstream is critical when optimizing the factory. It is important to create a repeatable, consistent and cost effective approach to connecting machines. Thereby providing the visibility necessary to form the foundation of the Digital Thread. A digital thread across the complete enterprise where projects flex with business changes and priorities."

Using Industrial IOT framework, manufacturing plants can deploy instrumentation across the factory processes. To establish the digital thread, connect information and generate actionable data.

Real-time analytics of this data enables early fault detection and data-driven decision-making. This in turn helps minimize unplanned downtime and improve performance.

In case of GE's BMS, this is achieved with:

OEE Performance Analyzer - transforms real-time machine data into actionable production efficiency metrics so that Plant Managers can reduce unplanned downtime, maximize yield and increase equipment utilization.

Production Execution Supervisor - digitizes orders, process steps, instructions, and documentation with information pulled directly from ERP and PLM systems. This streamlines processing and prioritization of manufacturing tasks, improving both product quality and time-to-market.

Production Quality Analyzer - real-time identification of quality data boundaries that catch non-conforming events before they occur. Using predictive analytics, defect patterns and trends are proactively addressed, quality of shipped products improved.

Product Genealogy Manager - builds a record of all personnel, equipment, raw materials, sub-assemblies and tools used to produce finished goods. Service personnel are thus equipped with information of who, what, when, where and how in order to confidently respond to customer and regulatory inquiries.

Converged IT and OT = Robust Industrial IOT

The convergence of IT and OT is a key enabler in realizing the promises of industrial IOT. GE's partnership with Cisco to deploy BMS in Cisco's IT environment is a step in that direction. This deployment can provide a reference architecture for manufacturing IOT network, which combines big data, software, sensors, controllers and robotics to help increase productivity and deliver optimization in assets and operations.

GE also teamed up with PTC to deliver a manufacturing solution by leveraging PTC's *ThingWorx* technology as part of GE's Brilliant Manufacturing Suite. This will provide manufacturing optimization capabilities coupled with role-based manufacturing dashboards presenting:

1) Real-time manufacturing KPIs;

2) Standardized KPI models for plants connecting to heterogeneous system landscapes;

3) Collaboration, alerts, notifications and

4) Access to actionable data

The GE-PTC solution will be implemented within GE's internal manufacturing plants as part of its Brilliant Factory initiative.

Innovations at factory and design labs, partnerships building out a collaborative Industrial IOT ecosystem, and proper alignment of corporate priorities are key to unleash the promise of Internet of Things and Analytics in manufacturing. And of course, to realize the business results that's potent in "*Intelligent Manufacturing*".