

## GE's Industrial Internet of Things Journey

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### Keywords

IIoT, Cloud, Downtime, Asset, Management, Analyze, Optimize, Predict

### Summary

Based on the company's media blitz, its recent Minds & Machines event, and the mission of its leadership as driven and articulated by CEO Jeff Immelt, General Electric today has a singular focus. This is to use the Industrial Internet as a conduit to help manufacturers increase production

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The company's primary target appears to be to help industrial organizations solve two of the biggest challenges they face: improving overall

asset performance and preventing or minimizing unscheduled downtime. GE feels that the proof is in the success it has experienced in its own factories, where the company has applied advanced, real-time analytics to maximize manufacturing production performance. This involves leveraging the Industrial Internet of Things (IIoT) to collect, aggregate, and integrate data from design to service and leveraging analytics to support real-time decisions and actions.

### Partnerships Focus on Reducing Unscheduled Downtime

GE and Cisco teamed up to develop a set of best practices for deploying GE's Brilliant Manufacturing Suite within a secure, Cisco IT environment. The two companies developed an IoT reference architecture for manufacturing networks. This provides a blueprint for combining GE's digital industrial solutions with Cisco's networking infrastructure to create a "digital thread" that will capture machine data on the factory floor. The solution will combine GE manufacturing software that provides real-time, role-based dashboards with Cisco's networking technology using Big Data,



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software, sensors, controllers, and robotics to help optimize industrial asset performance and availability.

This go-to-market partnership builds on GE's and Cisco's strategy to connect the growing number of machines to the Industrial Internet. Last year, GE and Cisco announced they are integrating Predix software on Cisco networking products to enable stakeholders to collect and analyze asset performance and operational data in the network. One of the first of these devices is a Predix-ready Cisco router in a ruggedized form-factor for use in harsh environments, such as oil & gas facilities.

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GE and PTC also teamed up to deliver a manufacturing solution that will be available within GE's Brilliant Manufacturing Suite. This new GE-branded manufacturing solution leverages PTC's ThingWorx IoT application enablement environment to connect disparate systems, from the factory floor to ERP, to provide an "industrial-strength" data analytics solution that combines role-based manufacturing dashboards with real-time manufacturing KPIs for decision support. GE and PTC will work together to certify ThingWorx for the Predix ecosystem.

### **Brilliant Manufacturing Suite Leverages Predix Platform**

GE's Brilliant Manufacturing Suite provides a powerful toolset, including:

- an overall equipment effectiveness (OEE) performance analyzer to transform real-time machine data into actionable production efficiency metrics
- a production execution supervisor to digitize orders, process steps, and instructions and documentation with information pulled directly from ERP and PLM systems
- a production quality analyzer for real-time identification of quality data boundaries that catch non-conforming events; and
- a product genealogy manager that builds a record of personnel, equipment, raw materials, sub-assemblies and tools used to produce finished goods

According to the company, this suite leverages GE's Predix platform for edge-to-cloud connectivity, security, and manufacturing analytics. A partner ecosystem that includes Cisco and PTC extends Predix capabilities.

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Together, these solutions are key components of the suite, which can be delivered through flexible deployment and software as a service (SaaS) delivery models.

GE's SmartSignal predictive analytics solution provides another tool. SmartSignal will be available as part of GE Digital's Asset Performance Management (APM) solutions on the Predix industrial cloud platform. SmartSignal is designed to detect production anomalies and provide early warning to support condition-based maintenance.

## The Digital Power Plant

GE is also leveraging its Digital Power Plant, a software and hardware solution that creates a virtual "Digital Twin" of an industrial power plant complex. Powered by Predix, "Digital Twin" is a collection of physics-based methods and digital technologies that can be used to model the present state of assets in a power plant or wind farm. This technology lets utilities monitor and manage aspects of the power generation ecosystem to generate electricity with real-time control.

GE estimates that centralized energy generation will still account for up to 95 percent of the energy mix by 2025, and GE's Digital Power Plant will enable the company's customers to harness information technologies to help optimize the underlying generation infrastructure and minimize environmental impact. GE anticipates savings of up to \$230 million for a new combined-cycle gas power plant and up to \$50 million for an existing combined-cycle gas-powered plant.

As a major supplier of power generation equipment, GE has been able to combine a hardware and software solution to digitize complex power assets and systems. Once an entire power plant is digitized, it can deploy applications powered by the secure, cloud-based Predix industrial platform to help continuously improve assets and operations in the highly regulated power industry.

## Conclusion

For suppliers in the IIoT space, it's important to have appropriate platforms, products, and partnerships to help customer effectively deploy IIoT to help solve the problem of underperforming assets and unscheduled

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downtime. However, to succeed in this, the supplier must be “on the same page,” from top to bottom.

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GE is on a mission to prove it can succeed here. It appears to have the commitment from the CEO on down driving the entire business towards that goal. Sixteen hundred people participated in the company's recent Minds & Machine event, and it had to turn away 500 people due to the capacity constraints of the facility in which it was held. Jeff Immelt is changing GE's portfolio, divesting 60 percent of the company he took over in 2001. Through strategic acquisitions and organic growth, Mr. Immelt has reinvented GE as a predominantly industrial company. GE has developed these IIoT-based solutions, the Predix platform, its Brilliant Manufacturing Suite, and partnerships with Cisco and PTC to carry out its mission.

The company has re-invented many of its own factories with these solutions and seen the impact on its own bottom line results. Now, ARC Advisory Group will closely follow GE's journey of demonstrating and deploying these solutions at other manufacturers.

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