GE & OPC UA
Realizing the Industrial Internet with OPC UA

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GE Intelligent Platforms gets you Connected

- **Connected Machines**: power and digital tools at the source
- **Connected Data**: islands of information aggregated
- **Connected Insights**: analytics in real-time
- **Connected People**: cloud-based, mobile access, collaboration

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Market dynamics

In the next five years ...

40% of skilled manufacturing workers will retire\(^1\)

50b machines will connect to the Internet\(^2\)

#1 priority of CIOs is to drive more business insight\(^3\)

A new generation of workers expects answers at their fingertips


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An emerging new wave of Industrial IT

Local automated control and real time visualization

1980s Growth of PLC and DCS Systems

1990s Growth of HMI/SCADA Software

2000s Turbulent Growth of Manufacturing Software

2010s Emergence of the Industrial Internet & Cloud assisted automation

Fleet optimization in a service economy
Driven by cloud enabled automation
Ubiquitous computing & new experiences enabled by ambient intelligence

Collect → Transmit → Store → Analyze → Present → Optimize
GE’s Industrial Internet vision (October 2012)

“I always think about what’s next. The ability in our world to go man-to-machine, to marry real-time customer data with real-time performance data of our products... that is the holy grail.”

- Jeffrey Immelt, GE CEO
The Industrial Internet

**BRILLIANT MACHINES**
Connect machines, facilities, fleets and networks with advanced sensors, controls and software applications

**ADVANCED ANALYTICS**
Combine the power of physics-based analytics, predictive algorithms, and deep domain expertise

**PEOPLE AT WORK**
Connect people at work any place, any time for intelligent operations

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GE Controls Convergence strategy (Nov 2013)

- Device to cloud connectivity
- Security
- Plug & Play configuration
- Fast deployment
- 21st century UX
- Collaboration centric
- Data to actionable intelligence
- Standards based

http://www.iiconsortium.org/
Why it matters

The value is already there...capture it.

- **20%** REDUCTION IN DEVELOPMENT TIME.  
- **40%** LOWER SUPPORT COSTS.  
- **30%** INCREASE IN GROSS MARGIN.

The machines you sell create millions of data points – what could you do with them?

**OWN**
- the data to accelerate design cycles & create the next generation of product.

**SHARE**
- the data from a high-performance control system to calibrate service & warranty programs.

**SELL**
- the data to grow your business with high-performance automation for a connected world.

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4, 5 & 6. Big data: The next frontier for innovation, competition, and productivity, McKinsey Global Institute, June 2011

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What it can do for you

*Industrial Internet @ work*

**Improve asset performance**
- Process visibility & optimization
- Asset availability

**Enhance customer experience**
- Fleet data and analytics to predict and prevent problems

**Create new service and support models**
- Improved profitability and serviceability
- Data access to end users
GE Wind’s Fleet Monitoring & Diagnostic Services
Solving problems before they impact performance

$30 Million
Saved in avoided repairs, lost production, and maintenance costs
GE’s Industrial Performance & Reliability Center
Maintaining critical asset operations

Our experienced equipment and software engineers monitor 6000+ assets, 7 days/week more than 70 sites globally in Mining, Oil & Gas, Power Generation, and Aviation

Each month:
3000 customer advisories
500 cases
200 catches

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**GE’s Equipment Insight Solution**

*Helping OEMs deliver improved service & asset performance*

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**Data collection**

Machine data collection uses encryption and firewall friendly communications to send data to the Equipment Insight historian.

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**Data analytics**

Data analytics enable prediction of downtime events – contact your customer before the process goes down.

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**Role based geo intelligence**

Get the right information to the right person, wherever they are, on any device.

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Cloud for efficiency and agility

Going mobile: anytime/anywhere Access

End-to-end Security

Predictive insights from Big Data

Industrial Internet platform requirements

Consistent and meaningful User experience

Cloud based Integrated Asset Management

Transition to “Brilliant machines”
Architecture matters

GE’s Connected Controls architecture

**Requirements**

1. Acquire, Collect and Visualize Data in Real Time
2. Transmit & Store the Data Efficiently
3. Present Data in Context & Control Process
4. Analyze Data for Operational Value

**How we do it**

- Development & Operation in the Cloud
- OPC-UA Smart Connectivity
- High-Performance controllers
- PROFINET Networked I/O

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OPC UA
GE’s interoperability standard

Industry Standard Protocols
Controllers that speak the same language

Security
Trusted communications

Data Models
Turn data into knowledge
OPC UA on GE products
GE’s interoperability standard

RXi
An advanced, high-performance, small footprint control and computing platform for distributed applications

MkVle
A flexible, high-availability, Triple Modular Redundant (TMR) solution with end-to-end architecture that optimizes assets & operations & reduces costs.

CIMPICIETY
Client/server based visualization & control solution that enables visualization of operations, perform supervisory automation.

Predix
GE’s software platform for the Industrial Internet. Enables asset & operations optimization by providing a standard way to run industrial-scale analytics & connect machines, data, and people.

ADAPT 3701
ADAPT (Advanced Distributed Architecture Platform Technology) pinpoints system problems & shows how to fix them before costly shutdowns.

System1
Condition monitoring software enables identification of events, evaluate, and respond.

8 Series
Primary or backup protection for underground & overhead medium voltage feeders in industrial and distribution utility applications.

3 Series
Innovative & intuitive multifunctional feeder relay offering protection, control & monitoring in one integrated, economical & compact package.
OPC UA on GE products

In action...
The Industrial Internet end-game

No unplanned downtime

Optimized profitability

Technology Transformation

Insight into equipment function allows companies to take proactive action for proactive support

Using analytics for operational efficiencies can deliver even greater uptime & productivity from industrial machines

Leveraging advances in cloud computing technologies can create new profit opportunities

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Thank You