Industrial Internet: Constructive Intersection of Technology and Business

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Overview

1. Rise of the Industrial Internet
2. Forces shaping & challenges facing
3. GE Today—Our business and scale
4. Current and future applications
5. Customer value
Rise of the Industrial Internet
History of transformation and change

Wave 1: Industrial revolution
Machines and factories that power economies of scale and scope

Wave 2: Internet revolution
Computing power and rise of distributed information networks

Wave 3: Industrial internet
Internet, big data, analytics + integration with machines, facilities, and fleets

Time
Innovation

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Forces shaping the Industrial Internet

1. Internet of things
   A living network of machines, data and people

2. Intelligent machines
   Increasing system intelligence through embedded software

3. Big Data
   Transforming massive volumes of information into intelligence

4. Analytics
   Generating data-driven insights and enhancing asset performance
Challenges facing the Industrial Internet

1. Performance
   Must be able to keep up with the needs of users

2. Cyber Security
   Like in Maslow’s hierarchy of needs security is foundational to higher level actualization

3. Maintenance
   At scale, cost here could limit the value created

4. Inter-Operability
   Open standards need to continue
GE Today - Our business and scale
A lot of things powered by intelligence, data, analytics

Power & Water

Oil & Gas

Energy Management

Transportation

Aviation

Healthcare

GE Capital

Home & Business Solutions
Current Applications...
Attacking Waste with M2M & Analytics

No More Waiting...
Industrial Internet @ Healthcare
Hospital operations management

Early warning system created using real-time data and clinical workflow patterns to:

• Predict capacity bottlenecks
• Improve patient flow
• Enable remote monitoring to reduce liability
• Facilitate intelligent decisioning

Mount Sinai Hospital, NYC
1,171 bed, 2.7 million square foot hospital
Moving from Reactive to Proactive

No More Blackouts...
Industrial Internet @ Power & Water
Remote Monitoring & Diagnostics

Everything from the biggest machines generating power to transformers on power poles can providing status updates and performance data to:

- Reduce infrastructure maintenance
- Enable faster response – early detection
- Reduce trips (unplanned outages)

~8,000+ units monitored by M&D today
24x7x365 coverage
Future Applications...
Wind Power that is Brilliant

How do you define brilliance? GE is redefining the future of wind power and marrying the Industrial Internet with its advanced technology platform. By helping to manage the variability of wind, GE is providing smooth, predictable wind power to the world regardless of what Mother Nature throws its way.

**Farm to Grid**
When the grid needs more voltage, wind farms take action. Every second, 150,000 data points on a farm are analyzed to integrate 400MW onto the grid.

**Wind Farm to Wind Farm**
Farm to farm communication allows automated control of a wind farms’ voltages to the grid, providing stability to a broader regional area through optimizing multiple farms.

**Turbine to Battery**
Battery storage makes predictable power a reality, driving wind farm output, improving service productivity and creating new revenue streams for customers.

**Turbine to Turbine**
If a turbine loses wind speed or wind direction, it simply asks its neighbor what it’s doing and replicates the action, improving availability and power output.

**Turbine to Remote Monitoring**
GE turbines are monitored and analyzed 24x7 using 150+ unique software rules to detect, prioritize, and identify the best fix for wind turbine operation issues. It’s like having a team of experts around the world solving issues real time.

**Wind Turbine to Service Tech**
In the event of an issue, a tech is notified of an issue and automatically knows what needs to be fixed or looked at without having to perform a diagnostic inspection, saving time and costs for customers.
Spaces that care - IntelliRoom 360°
Patient Safety Platform

What:
Real-time safety protocol monitoring system

Why:
To improve patient safety and save lives

How:
Fully automated and integrated system of sensors and advanced computing and decisioning analytics

Scope:
Hand hygiene
Rounds
Fall prevention
Pressure ulcers
+ many more
Automated Perioperative Sterilization System

Tackling Surgical Site Infections Through Automation

Partnering with the US Department of Veteran’s Affairs to develop and end-to-end system to automate hospital surgical implement sterilization incorporating:

- Robotics
- Multi-Agent Systems
- Auto-ID
- Computer Vision
- M2M
- Operations Research
- Software and Systems Integration
Customer Value...
The value to customers is huge
Connected machines could eliminate up to $150 billion in waste across industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Segment</th>
<th>Type of savings</th>
<th>Estimated value over 15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation</td>
<td>Commercial</td>
<td>1% fuel savings</td>
<td>$30B</td>
</tr>
<tr>
<td>Power</td>
<td>Gas-fired generation</td>
<td>1% fuel savings</td>
<td>$66B</td>
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<tr>
<td>Healthcare</td>
<td>System-wide</td>
<td>1% reduction in system inefficiency</td>
<td>$63B</td>
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<tr>
<td>Rail</td>
<td>Freight</td>
<td>1% reduction in system inefficiency</td>
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<tr>
<td>Oil and Gas</td>
<td>Exploration and development</td>
<td>1% reduction in capital expenditures</td>
<td>$90B</td>
</tr>
</tbody>
</table>

Note: Illustrative examples based on potential one percent savings applied across specific global industry sectors. Source: GE estimates
The real opportunity for change... surpassing the magnitude of the consumer Internet... is the Industrial Internet, an open, global network that connects people, data and machines.
Thank you!

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