Overview of the Industrial Internet Consortium

Dr. Richard Mark Soley
Executive Director
17 June 2015
“A fundamental new rule for business is that the Internet changes everything.”

-Bill Gates, 1999

Or has it?
Where We’ve Been

<table>
<thead>
<tr>
<th>Activity</th>
<th>15 Years ago</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening to music</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Watching a movie</td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>Contacting people</td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>Reading the news</td>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td>Making music</td>
<td><img src="image9.png" alt="Image" /></td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
</tbody>
</table>
Discrete Manufacturing

1980
Programming a 584 Programmable Controller

2015
Programming a 984 Programmable Controller
Energy Management

1950
Energy grids delivered power (not information) from small number of plants to millions of businesses & homes

2015
Energy grids deliver power (and a little information) from small number of plants to millions of businesses & homes
Jet performance data is downloaded by hand
No, the Internet Didn’t Change Everything

There is much more to be done:

- Oil & Gas Exploration
  - Geological data integration from multiple sensing sources
- Rail & other transportation
  - Failure sensing and automatic rerouting of multimodal systems, far more extensive than JapanRail automatic stop
- Smart homes & smart energy usage
- And on... and on... and on...

- “Internet Thinking” is key to Smart Manufacturing, Smart Connected Products, and Smart Product Data
The Industrial Internet is leading the next economic revolution

GDP data extracted from the Futurist 2007
There are key differences between the Industrial Internet and Consumer IoT.
The Measurable Outcome will be in the Trillions of Dollars

GE: $32.3 trillion opportunity representing 46% share of GDP today.
Cisco: Internet of Things (IoT) will increase private sector profits 21% and add $19 trillion to the global economy by 2020
Gartner: IoT product and service suppliers will generate incremental revenue exceeding $300 billion in 2020.
McKinsey Global Institute: $36 trillion operating costs of key affected industries could be impacted by IoT

The convergence of Internet of Things, Industrie 4.0, Cyber-Physical Systems presents an enormous opportunity.
Making Sense of the Numbers

Revenue Generation
• Revolutionary new products & services → Creating new markets
  → Changing the way the world works

New Operational Efficiencies that drive down costs
• Workforce productivity gains → digitization of tasks, better deployment of resources
• Reduced maintenance costs → predictive maintenance
• Material, energy savings → reduced need for product over-engineering
• Reduced waste → Precision monitoring to predict and control machines

Improved Customer Satisfaction
• Improved service levels → fewer unplanned disruptions

June 17, 2015
Opportunities across every industry: GE’s 15-year outlook

$30B fuel cost saving in aviation industry

$66B fuel cost saving in gas powered fleets

$63B productivity improvement in healthcare

92M vehicles with Internet connectivity on the road by 2016

68% decrease in crime rates with video surveillance

$90B reduction in Cap X in oil & gas exploration and development

Beyond the numbers, the Industrial Internet is changing how things work.

Source: Industrial Internet: Pushing the Boundaries (2012, Evans & Annuzziata)
Yet there are current roadblocks to widespread adoption
The IIC: Things are coming together

Standards
Big Data
Government
Technology
Research
Security
Systems Integration
Industries
Academia

June 17, 2015
Mission

To **accelerate growth** of the Industrial Internet by **coordinating ecosystem** initiatives to connect and integrate objects with **people, processes and data** using common architectures, interoperability and open standards that lead to **transformational business outcomes**.

Launched in March 2014 by five founding members:

![At&T](image)  ![Cisco](image)  ![GE](image)  ![IBM](image)  ![Intel](image)

The IIC is an open, neutral “sandbox” where industry, academia and government meet to collaborate, innovate and enable.
IIC Nonprofit/Academic Members

Carnegie Mellon University
UL
TIA
NAED
ICT Austria
Center for Business Technology
Auburn University
KETI
Johns Hopkins University
University of Pittsburgh
CIT
Vanderbilt University
ITRI
Industrial Technology Research Institute
The Open Group
Eclipse
QualiCAL
Sl
UI Labs
Draeger Laboratory
Fraunhofer
SINTEF
MITRE
CSIRO
TECHNISCHE UNIVERSITAT DARMSTADT
Institute for Information Industry

IIC  Nonprofit/Academic  Members

15-06-17
Activities fall into three main areas that ultimately drive new opportunities for IIC members:

**The IIC Ecosystem**
*Companies joining together to advance innovation, ideas, best practices, thought leadership and insights*

**Technology & Security**
*Architectural frameworks, standards requirements, interoperability, use cases, privacy & security of Big Data*

**Testbeds**
*Innovation to drive new products, processes, services*

Innovative products!
Why now?

Driving the OT – IT Convergence:

Low cost, powerful technology
- Cheap sensors & devices
- Low-cost processing power, data storage

Connected everything
- By 2020, the number of things connected to the internet will be approximately 7x the number of people on earth today.¹

Big Data
- Collecting, storing and analyzing data is now more cost effective

Smarter Machines
- Equipment is increasingly embedded with sensor & software

¹Source: Cisco Systems June 17, 2015
What about Standards? And Open Source?

Already plenty of standards at the communications level (e.g., OMG DDS)

**Semantic standards are going to be critical in all verticals**

IIC is a *source* for standards requirements & priorities
The Future

How will we reduce jet engine failure & maintenance costs?

How will we save lives through better patient care?

How will we minimize unplanned factory downtime?

How will we reduce passenger fatalities?

How will we reduce waste of natural resources?

Things are coming together.

Things are coming together.

www.iiconsortium.org
For More Information

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