IoT: The 4th Industrial Revolution

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Internet of things
The 4\textsuperscript{th} industrial revolution
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IOT: Why Now?

Market opportunities
IoT opportunities
Impact of IoT

Save Lives

Improve Quality of Life

Protect the planet

Increase Productivity

improve efficiency

reduce cost
The Internet of Things is:
Pervasive, Real-Time Intelligence

- 50B Devices
- 85% Unconnected
- 44 zetabytes

The Internet of Things: WHY NOW?

Industrial, Energy & Buildings Opportunity

Global Economic Impact of IoT in 2025**

$ Trillion, Annually

Industrial and Energy

$1.2 – $3.1T

$3 – $6T

** Source: McKinsey Global Institute* analysis
4TH industrial Revolution

1st
1760’s
Steamp and Coal, Mechanical Production

2nd
1860’s
Electrification, Oil, Mass Production

3rd
Late 1900’s
IT and Automation

4th
NOW
IoT
Industrial customers are asking.....

How Can I Better Innovate?

I need to improve Product Quality.

How Do I Improve workforce productivity?

I need to achieve Real Time Visibility

How Can I Introduce new IOT solutions faster?

How Can I Reduce Downtime?

How can I have better visibility to manage my Global Supply Chain?

How can I capture knowledge for my transitioning workforce?
CUSTOMER CHALLENGES

Technical POV
- Interoperability
- Data Analytics

BUSINESS POV
- Solution
- Scalability
- Business model

OT/IT Integration
Security + Trust
Today’s Factory - and the Barriers to Smart Factory

- **Preserve infrastructure**: Can’t Forklift be upgraded!
- **Customize Solution Scale**: No one size fits all, Small/Medium/Large requirements
- **Talking the talk, Interoperability**: 40+ Fieldbus protocols, Different Middleware, Heterogeneous devices
- **Increasing Complexity**: Complexity of Industry 4.0
- **Enterprise Security**: Direct intrusion in to the Enterprise
Intel’s IoT Approach: Things Through Cloud

Approach
- Create Vertical Solutions
- Build on Horizontal Platform & Products
- Build Strong Ecosystem

Things ➔ network ➔ cloud
Why Choose Intel-based Technology for **Industrial IoT/Industry 4.0**

**Open Platform**
built with interfaces and APIs that enable integration with legacy systems and devices and with platforms from multiple vendors.

**Interoperability**
is designed into IA CPUs to offer backward compatibility to help SW and application reuse thus reducing development time and resources.

**Performance at the Edge**
that enables near-real-time analytics, local decision making, and tighter process controls.

**Advanced Security**
for trusted data from edge to cloud and protection from costly attacks.

**Scalability**
for varying levels of gateway performance, with a broad range of support from Intel® Quark™, Intel® Atom™, Intel® Core™ and Intel® Xeon® processor D and E families.

**Manageability**
for secure remote upgrades and services.

**Faster, More Flexible Deployment**
with a platform that supports your choice of operating systems and ecosystem applications.
### Intel ingredients in Industrial Automation

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Scalable product roadmap that spans the Smart Factory

**Programmable Logic Controller**
- Sequencing
- Process Control
- Distributed Control

**Robotics**
- Determinism
- Safety

**Test and Measurement**
- Compute Intensive
- "Analog" and Digital Data:
  - Often a IA host controller.
  - Many modular IA blades.

**Machine Vision**
- Image Process
- Position sensor
- Trigger

**Industrial PC**
- Motion Drive
- IOT Gateway
- Robots

**PLC**
- Machine Vision
- Industrial Data Center

**HMI**
- IT Data Center
the “eye” for smart manufacturing

CHALLENGES FACING

Precision production

Real-time feedback

intelligent

Industrial vision solutions

▪ All-in-one industrial smart camera and embedded vision system

▪ Wide range of referenced platforms - IA only, IA+FGPA or Movidius

▪ Video analytics with ML/DL capability

Intel® Media SDK
Intel® Computer Vision SDK
Intel® Machine Learning SDK
Intel: Partnering with the Entire Ecosystem

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Intel & sas partnership
Analytic Modernization – Intel & SAS

Our collaboration

▪ Joint Engineering for features & performance optimization
  – SAS uses Intel Parallel Studio for performance optimization
  – SAS ships custom built libraries based on Intel Math Kernel Library as part of their distribution, providing math functions that are highly tuned for Intel processor silicon

▪ Joint product enablement to take advantage of complementary advances between SAS & Intel

“More capable analytics are giving businesses the ability to innovate on a foundation of insight. By revealing patterns and significance in data, solutions based on SAS and Intel® architecture help decision makers to better understand the past, fine-tune the present, and anticipate the future.”

– Lisa Davis, Vice President and General Manager, IT Modernization Group, Intel
Analytic Modernization – Intel & SAS

Business value:

✓ Customers can run more complex analysis in even less time . . .

✓ . . . across large data sets - to gain deep insight into critical business issues.

Note: The SAS tasks being used in the SAS mixed analytic workloads represents the type of SAS processing used today by roughly 60 percent of SAS customers.

“Harnessing the power of Intel innovation, SAS customers are using a modernized analytics platform to quickly turn their data into insights and make confident decisions. The new Intel® Xeon® Scalable processor and Intel® Optane™ technology help make analytics faster, easier, and more powerful in cutting-edge areas such as artificial intelligence, IoT, and machine learning.”

– Craig Rubendall, Vice President of Platform R&D at SAS

Speed time to insight for better decision making
Analytic Modernization – Intel & SAS

SAS & Intel: A powerful combination for modern analytics

Bring stronger, faster analytics to your organization with Intel® architecture.

Intelligent Analytics for Smart Machines

ABSTRACT

SAS® Analytics for IoT makes the flood of Industrial Internet of Things (IIoT) data work for you. This end-to-end analytics platform satisfies SAS® expertise with Intel’s leading data center technologies to:

- Process millions of events per second
- Identify problems in near real time
- Filter data to reduce bandwidth and storage costs
- Enable deep analysis to produce business intelligence

When sensors, data analytics, and cloud infrastructure are all humming along together, manufacturers can better monitor, manage, and control their machines.

The data deluge

The Industrial Internet of Things (IIoT) promises major benefits like better factory efficiency and uptime. But to fulfill this promise, manufacturers need a way to sift through the noise and identify the patterns that matter.

The solution lies in analyzing streaming data, data in motion before it reaches your warehouse (e.g., data at exit). By doing so, you can detect patterns in the real-time data to understand what is happening and take corrective action.

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