Deep Dive: The Industrial Internet

Graphic based on NI “Escalating Complexity of Systems”

Ahmed Mahmoud, Sr. Group Manager, NI
Our Mission

We equip engineers and scientists with systems that accelerate productivity, innovation, and discovery.
A Snapshot of Our Long-Term Track Record of Growth

Revenue: $1.2 billion in 2013

Global Operations: Approximately 7,100 employees; operations in almost 50 countries

Broad customer base: More than 35,000 companies served annually

Diversity: No industry >15% of revenue

Culture: Ranked among top 25 companies to work for worldwide by the Great Places to Work Institute

Strong Cash Position: Cash and short-term investments of $402M at June 30, 2014
NI’s Role in the Current IIoT Market
Based on Moor Insights & Strategy's report *Segmenting the Internet of Things (IoT)*
The Industrial Internet Applications

Condition Monitoring

Smart Grid

Factory of the Future

Industrial Control
The Escalating Complexity of Systems
Requires a Platform-Based Design
Requires a Platform-Based Design
NI’s Platform-Based Approach to Embedded System Design

Traditional Design Approach vs. Flexible Off-The-Shelf Solution
Industrial IOT System

**Computation**
- Real-Time
- High Performance
- Scalability

**Communication**
- Time Synchronization
- Determinism
- Interoperability

**Control**
- Adaptive Control
- Design Methodology
- Models of Computation
Challenges for Industrial IOT System

- Computation
  - Heterogeneous Processing
  - Advanced Sensing
  - Modularity

- Communication
  - Bandwidth/Latency
  - Synchronization
  - Security

- Design Approach
  - Complexity
  - Abstraction
  - Simulation
Industrial Internet Application Framework
Online Monitoring and Industrial Control

**Sensors/Actuators**
- Accelerometers
- Temperature Sensors
- Electrical Power
- Imaging
- Motors
- Miscellaneous

**System Nodes**
- Monitoring/Control Systems

**IT Infrastructure (Big Analog Data Analytics/Mining)**
- Plant Servers
  - Online Monitoring, Analysis, and Systems Management Software
- Corporate Monitoring, Control, and Diagnostics
  - Advanced Pattern Recognition
  - Efficiency Monitoring and Modeling
- Database Historian
- Fault Signature Database
Embedded Monitoring and Control
Airbus reduced development time by 10X with NI solutions.
National Grid increased measurement capability by 400% with NI solutions.
Technology Disruptors Tomorrow

Smart Sensors  Cloud  Mobility  Embedded Intelligence
## Industry Wants, Needs and Wishes Today

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