Intel: a Thought Leader
Helping IoT Scale Out

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A Look Ahead: Confident Predictions

- New generations: Born connected
- Rise of Mega-cities
- A new middle class is emerging
- 10Bn people by 2050, 1 Planet Pressure on resources
- Healthcare and Education For Billions of People
Generate Value with Intelligent Solutions

THINGS × DATA = VALUE

- Ubiquitous
- Engaged Customers
- Personalized

= New Ventures

New Solutions

- Revenue Growth
- Higher Productivity
- Higher Efficiency
- Cost Savings
- Margin Gain
- Value Innovation

- Personalized
- Ubiquitous
- New Ventures
- Better Products
- New Solutions

- Engaged Customers
- Value Innovation
- Higher Productivity
- Higher Efficiency
- Cost Savings
- Margin Gain

50 Billion

THINGS

35 ZB

DATA
IoT x Big Data = Unprecedented Challenges

Intel is delivering integrated, scalable hardware and software solutions specifically designed to meet diverse market needs from devices to the cloud.
The Internet of Things is Everywhere

50B DEVICES*

Sensors

Mobile

Home/Industrial

Gateway

Network

DC/Cloud

44 ZETABYTES**

COST OF SENSORS PAST 10 YEARS 2X

COST OF BANDWIDTH PAST 10 YEARS 40X

COST OF PROCESSING PAST 10 YEARS 60X

* IDC
** IMC/EDC: The Digital Universe of Opportunities
*** Goldman Sachs
We are Here!

The Hype curve...
Essential Tenets of Edge to Cloud IoT Solutions

Services: Infrastructure to Monetize HW, SW, and Data Management from Edge to Cloud
- Managing Systems and Monetizing the Value Data Provides Customers

Customer Value Visualized by Broad Analytics Infrastructure from Edge to Cloud
- Real-Time, Insightful, and Secure Analytics

Seamless Data Ingestion, Compute Processing, and Control from Edge to Cloud
- Broad Protocol Normalization Support, Real-Time Data Streaming, Closed-Loop Control Systems, OTA Device Management

Edge Devices and Gateways Securely Discovered by Cloud in Seconds
- Broad OS and Comms Support, HW-level Identity, APIs + API Management

Edge Devices and Gateways Setup from Box to Cloud in Minutes
- Enabled by Interoperable “Building Block” Architecture with Robust yet Efficient Middleware Agents

Security as the Foundation with Embedded HW and SW-Level Protection
- Secure Boot, Identity Protection, Whitelisting, & Encryption from Edge to Cloud
Intel: Thought Leader
Challenges Slowing IoT Growth

- Security, Privacy, and Compliance
- Fragmentation of Vertical Markets
- IT/OT and Legacy Infrastructure Integration
- Connectivity
- Underutilized Data
- Interoperability and Standards
A Horizontal Platform Helps IoT to Scale Out

- Vertical Specific Analytics, Applications, and Services
- Device to Cloud Security
- Manageability
- Data Mgmt and Analytics
- API Management
- Distributed Compute
- Developer Tools
- Sensors
- Protocols
- Actuators
Intel® IoT Platform (December 2014)

Value Proposition

**Security:** Intel ensures a chain of trust is rooted in silicon and linked throughout the software.

**Manageability:** Intel enables discovery, provisioning and management from edge to cloud.

**Connectivity:** Intel supports signal, control, data, and application flexibility on open standards-based networks.

**Performance:** Intel provides standard hardware platforms optimized for workload, performance, and cost.

**Interoperability:** Intel enables applications and services to scale across diverse platforms using secure APIs.

**Analytics:** Intel develops algorithms, architectures, and tools for predictive analytics.

**Reusable** Building Blocks for Faster TTM

**Actionable** Intelligence from the Edge to the Cloud

**Secure,** Open and Scalable Compute

Revenue Growth

Cost Savings

Customer Experience
Intel® IoT Platform is About...

- **Re-usable, pre-configured, pre-validated building blocks** that the ecosystem can use to design and deploy IoT solutions across different vertical markets.
- **Seamless and secure** connected devices; delivering trusted data to the cloud, and delivering value through analytics and enabling new services.
- **Interoperable hardware, software and services portfolio** spanning from the edge to the cloud.
- **Standardized hardware platforms** that are optimized for workload, performance, and cost.
IoT Platform Capabilities

IoT solutions bring increased intelligence and value over time

Connect

“Things” easily connect, communicate and work together

Secure & Manage

“Things” and networks are monitored, secure and managed

Analyze & Expose

Analyze, expose, and manage data to provide business insights

Predict

Predict how the devices or processes perform and take actions

Optimize

Innovate, optimize end to end systems, autonomous behavior

Product Experience - Consistency - Interoperability
Analytics: The Road to New Revenue

Use Cases
- Electrical energy consumption analysis
- Vibrational analytics to predict machine failure

Current Customers

Compatibility
- Enhances accuracy of Business Intelligence Applications (i.e. SAP, Oracle & IBM) – with more accurate input data
- TAS is not Business Intelligence Analytics; it is providing analytics about the device conditions (probability of failure, energy consumption, etc.)

Actionable business intelligence to open new revenue streams

Changing the conversation from BOM to value

*Other names and brands may be claimed as the property of others.
Wind River* Edge Management System
Centralized console for securing and managing edge devices and data

- Telemetry and data services
- Device management
- Security
- Device-side API and Cloud-side API development tools
- Accelerating sales with Sample Code, Professional services

- Intel has entered the IOT Edge Management category and we are leading with this solution to customers
- EMS is sold as a standalone offering through Wind River*
- The Intel® IoT Gateway includes the EMS agent, or can be bypassed during configuration if a customer desires an alternate 3rd party cloud service

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Framing IOT Security

**Anti-Malware**
Malware finds nowhere to run or hide

**Resiliency**
Always updated resilient systems

**Identity**
Simple access with enhanced security

**Data Protection**
Data safe from theft or alteration

With Management and Situational Awareness
End-to-End Security Solution

Critical Infrastructure Example

Device Security
- Physical Security
- Cyber Security
- Identity

Secure Communication
- Machine-to-Machine authentication, authorization, and accounting
- Confidentiality & Integrity

Security Monitoring & Management
- Security Policy Management
- Security Event Monitoring
Embedded Security Deployment Models

- Process Separation
  - Security in same OS as other components
  - Separate security processes
- Containerization Separation
  - Security in same OS, but in software containers (jails)
  - Application separation (apps)
- Virtualization Separation
  - Security in separate OS
- Physical Separation
  - Gateway or Bump-in-the-Wire

Create separation of concerns to manage security apart from the Operational components
Saved $1M in 1 Building / Year
$.50/sq ft.

Di-BOSS (Digital Building Operating System) + Cisco Energy Management: Electrical, Steam and Water

Potential US Benefits:
38 Million Tons of CO₂

Vnomics solution: 6% increase in fuel economy across 100% of fleet = $15M / Year

Potential US Benefits:
$9M/ year

Measured Benefits: $9M/ year

NCR POS w/ Intel® DPT and vPro for Transactions: Reducing fraud through e2e encryption.

Potential US Benefits: 100M credit card numbers stolen in 2013

Intel’s Assembly / Test – sensors and analytics help maintain productivity.

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Intel IoT Case Studies: Results
Smart Retail
Smart Industry
Smart Transportation
Smart Buildings

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Intel IoT Ignition Labs Enabling First Deployments

• Provide secure scalable platforms
• Collaborate with innovators & partners
• Develop Breakthrough End to End solutions
• Demonstrate and scale globally

EMEA 2014
• Munich
• Stockholm
• Istanbul
• Swindon
Intel's new offerings and relationships will make it easier for solution providers to move IoT from pockets of pilots to mainstream deployments with a repeatable foundation of building blocks that can be customized for limitless solutions. Data will be unlocked faster to extract meaningful information and value for consumers and businesses.