Agenda

• Introduction
• Intel® IoT Platform Architecture
• Roadmap and Products
• Case Studies
• Summary and Call to Action
There are Challenges to IoT Scale ...

- Security, Privacy, and Compliance
- Fragmentation of Vertical Markets
- IT/OT and Legacy Infrastructure Integration
- Connectivity
- Underutilized Data
- Interoperability and Standards
And, Intel’s Approach Will Help Accelerate Growth

Reusable Building Blocks for Faster TTM
Actionable Intelligence from the Edge to the Cloud
Secure, Open and Scalable Products

Revenue Growth
Cost Savings
Customer Experience
**Intel® IoT Platform Capabilities:**
Increasing IoT 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**
Agenda

• Introduction
• Intel® IoT Platform Architecture
• Roadmap and Products
• Case Studies
• Summary and Call to Action
Critical Tenets to Drive IoT Leadership

- Services Ecosystem to Monetize HW, SW, Data & Analytics from Things to Cloud
  - Managing Large E2E Systems and Monetizing the Value Data Provides for Customers

- Distributed Analytics from Things to Cloud for Intelligent Operations and Decisions
  - Comprehension, Actions, and Decisions Driven by Real-Time Contextual and Insightful Analytics

- Seamless Data Ingestion, Processing, and Management from Things to Cloud
  - Interoperability with Broad Set of Open Protocols, Real-Time Data Processing, Big Data Capabilities, Closed-Loop Control

- Efficient Device Provisioning, Security & Management E2E to Enable Massive Scale
  - Scalable & Full-Feature Lifecycle Device Security & OTA Mgmt to Enable Box to Cloud Setup in <2 Min and Discovery in <2 Sec

- Interoperable HW & SW Capabilities to Enable Intelligent and Autonomous Things
  - Portfolio of Interoperable Compute, Comms, Storage HW Assets & Security, Protocol, Data/Device Mgmt, Analytics SW Assets

- World-Class Security with Embedded HW & SW-Level Protection from Things to Cloud
  - Secure: Boot, Runtimes, Identity, Execution, Communication, Data, Storage, Policy Mgmt & Apps from Things to Cloud
The Intel® IoT Platform is an end-to-end reference model and family of products from Intel—that works with third-party solutions—to provide a foundation for seamlessly and securely connecting devices, delivering trusted data to the cloud, and delivering value through analytics.

INTELLIGENT INTERCONNECTED THINGS
Secure and manage machines and data
Sense, filter, process, analyze, and actuate

THINGS

DEVELOPER KITS, TOOLS & SDKs
Rapidly move KIt; tools & SDKs for developers to rapidly move to prototyping, piloting, and productizing

CLOUD MANAGEMENT

CONNECT THE UNCONNECTED
Capture, filter, process, and store data
Perform analytics at the edge
Securely connect to legacy infrastructure

DATA AND DEVICE MANAGEMENT
Onboard, monitoring, diagnostics, and remote control of devices

GATEWAYS

UNLOCKING THE VALUE OF DATA
Process, store, and analyze data globally
Perform complex analytics on large datasets
Secure and manage millions of endpoints
Policy, metadata, and network management

DATACENTER & STORAGE

APIS AND THIRD-PARTY CLOUD CONNECTIONS

END-TO-END SECURITY
Secure hardware, software, and data
Secure device and policy management
Threat detection
Safeguarding scalable compute

VISUALIZE DATA AND MONETIZE INSIGHT
Provide actionable information
Automate operations and create services
Intel®: Leading in IoT Standards and Consortia

185+ Reference Architecture + Frameworks and Testbeds = Interoperability

80+ Industry Standards + Open Source Solutions = Interoperability

*IIC Founder Companies

IOT END-TO-END WORLDWIDE STANDARDS

*Other names and brands may be claimed as the property of others.
Logical Definition of The Intel® IoT Platform

On-Premise or Off-Premise Data Center or Cloud


Security on all Devices, Data, & Comms from Things to Cloud
(Identity Protection, Integrity, Confidentiality, Trusted Execution, Attestation)

*Other names and brands may be claimed as the property of others.
Agenda

- Introduction
- Intel® IoT Platform Architecture
- Roadmap and Products
- Case Studies
- Summary and Call to Action
The Intel® IoT Platform is a family of products that seamlessly and securely connect and manage devices, deliver trusted data to the cloud, and deliver value through analytics.

Other names and brands may be claimed as the property of others.
### Intel® IoT Platform Highlights

- **Intel® IoT Gateway:**
  - Expanded OS options
  - Expanded connectivity options
  - Integration of McAfee ePO Agent

- Enhanced Privacy ID (EPID) for specific use cases
- Enhanced security with Intel® Security Critical Infrastructure Protection
- Analytics options available both for the Edge and the Cloud
- On-Premise API Traffic Management with the Intel® Service Gateway

---

**Note:** Future versions include all the features of prior versions, new features highlighted.

**1.** Not all features/capabilities shown in this slide is applicable or interoperable with an Ecosystem OS

**2.** Ecosystem partner

---

**Other names and brands may be claimed as the property of others.**

---

**Intel® IoT Platform Roadmap**

<table>
<thead>
<tr>
<th>2H 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expose</strong></td>
</tr>
<tr>
<td>Intel® Service Gateway with Intel® API Management Portal</td>
</tr>
<tr>
<td>App Developer Portal Software for API Management</td>
</tr>
<tr>
<td><strong>Analyze</strong></td>
</tr>
<tr>
<td>trusted analytics platform (codename Discovery Peak)</td>
</tr>
<tr>
<td>For deploying domain-specific apps driven by Big Data</td>
</tr>
<tr>
<td>IoT Analytics Software</td>
</tr>
<tr>
<td>Analytics for Energy</td>
</tr>
<tr>
<td><strong>Secure</strong></td>
</tr>
<tr>
<td>McAfee — Security (Device, Network, Cloud, Management)</td>
</tr>
<tr>
<td>ePolicy Orchestrator manages and connects E2E security components</td>
</tr>
<tr>
<td>Enterprise Security Manager (ESM)/M</td>
</tr>
<tr>
<td>Next Gen Firewall (NGFW) — N, C</td>
</tr>
<tr>
<td>Threat Intelligence Exchange (TIE) — M</td>
</tr>
<tr>
<td>McAfee Embedded Control — D</td>
</tr>
<tr>
<td>Intel® Security Critical Infrastructure Protection</td>
</tr>
<tr>
<td>Virtualized security-architected platform to protect, attest, consolidate, and manage legacy and new operations SW / apps</td>
</tr>
<tr>
<td><strong>Manage</strong></td>
</tr>
<tr>
<td>Wind River® Helix® Device Cloud (v1.3)</td>
</tr>
<tr>
<td>Control and manage apps/devices with a centralized control point</td>
</tr>
<tr>
<td>OTA updates with rollback capabilities</td>
</tr>
</tbody>
</table>

**Intel® IoT Gateway**

- Pre-integrated & pre-validated HW with critical SW components

**Agent(s):**
- Wind River Helix Device Cloud Agent, McAfee ePO Agent

**Intel OS:**
- Wind River IOST (Flex, Pro)

**Ecosystem OS:**
- Microsoft® Windows® 10, Canonical® Snap! Ubuntu Core

**Security:**
- McAfee Embedded Control

**Processors:**
- Intel® Quark®, Intel® Atom®, Intel® Core® Processors

**NEW**

**Connect**

- Wi-Fi / BT:
  - 602.11ac, 2.4, 5, BT 4.0, Commercial & Ext Temp (w/ Hard API), Auto

- Ethernet:
  - 1G, 1-Port, PCIe® v2.1, Commercial, Industrial

- Cellular:
  - 2G/3G/4G/LTE/4G/C/G5, Commercial, Industrial (via Module)

- 802.15.4:
  - Zigbee®
The Intel® IoT Gateway Advantage

**Intel® IoT Gateway**

- Strengthen security through silicon-based security capabilities
- Enable near-real-time edge analytics for actionable insight at the edge
- Support vertical and horizontal binaries and packages
- Enable deployment of new applications/services
- Choose from a variety of OS & Processors
  - Wind River* IDP, Flex or Pro
  - Microsoft* Windows* 10 IoT, Core or Enterprise
  - Canonical Snappy Ubuntu* Core
  - Intel® Quark™, Intel® Atom™, Intel® Core™ Processors

**Intel® IoT Gateway with Wind River**

- Linux 7*, 3.14 Kernel*
- 64bit WRL7
- OS runtime image
- 7 Atom™ BSPs updated, 1 Core™ (ADLink*)
- Wind River Helix* Device Cloud OTA OS update
- Enabled generic script-based mechanism to execute boot time
- Intel® Edge Update Service (app updates)
- Intel® IoT Gateway Developer Hub (Beta)
- Updated McAfee Embedded Control (6.6) and Triage Tool*

---

*Other names and brands may be claimed as the property of others.
Wind River* Helix* Device Cloud

- **Shorten IoT system** development time from months to days
- **End-to-end** development environment
- **Robust, elastic, scalable** to millions of devices
- **Device to cloud** integration
- **Business system** integration
- **Desktop, tablet, mobile** interfaces
- **Extensibility** via RESTful interfaces

*Early Insider release for v2.0 in Q4 2015*

*Other names and brands may be claimed as the property of others.*
Intel® Security - IoT Portfolio

**Event Management and Threat Intelligence**
- **McAfee Security Information and Event Monitoring System (SIEM)**
- **McAfee Threat Intelligence Exchange & Data Exchange Layer**

**Central security intelligence system for IoT's heterogenous architecture**
- **Tailors comprehensive threat intelligence from multiple intelligence data sources**

**Private / Public Cloud Security**
- **McAfee ePolicy Orchestrator (McAfee ePO)**
- **McAfee Next Generation Firewall**

**Security agent that connects with the McAfee security infrastructure for monitoring and managing security of the IoT**
- **Helps detect and block attacks by enforcing security policies at the application, port and protocol levels**

**Network Security**
- **McAfee Next Generation Firewall**

**Helps block unauthorized applications and changes in IOT devices**

**Device Level Security**
- **McAfee Embedded/ Integrity Control (Whitelisting Technology)**
- **Intel Silicon Hardened Foundation**

**Security capabilities that include Secure Boot, HW Root of Trust and EPID**

**Provides comprehensive protection of Critical infrastructure from physical and cyberattacks**
A Fast, Flexible, and Scalable Path to IoT Solutions

Evaluate
- Easy out of box setup experience
- Get started quickly with tools, libraries and samples
- Open source software and hardware
- Cloud connectors and mobile UX

Develop
- Easily port to production hardware with minimal changes
- Device to device connectivity
- Cloud analytics and connectivity
- Vertical use case samples/examples

Deploy
- Performance optimization
- Scale your hardware and software solution
- Device management / manageability
- Integration & Security
Intel® IoT Platform – Developer Roadmap

Highlights

• **UX:** Continue to improve UX for Galileo, Edison and Industrial gateway including docs and samples

• **Commercial:** IO/Sensor libraries, industrial sensors (20+), Intel® XDK support for Intel® IoT Gateway.

• **Cloud:** Make it easy to use IBM* Bluemix*, Microsoft* Azure* and Amazon* AWS*.

• **Edge:** Analytics use case/solution example

• **Java***: Support Java programming language. Libraries, Eclipse IDE, Samples and docs

• **Connectivity:** OIC/ IoTVity framework integration

• **Others:** Field testing, solution blueprints/use cases and Helix* Device Cloud
Agenda

• Introduction
• Intel® IoT Platform Architecture
• Roadmap and Products
• Case Studies
• Summary and Call to Action
A Case Study – Taiwan’s YouBike System

Develop a setup where temperature sensor data is plotted in the cloud and when the temperature goes above a certain value send out an email.
The Architecture

Sensor physically connected to Edison Analog port
Setup the cloud service

- Open an account at developer.att.com
- This will create accounts for you at
  - m2x.att.com (a time series database service)
  - flow.att.com (a cloud service programmable in node-red visual language)
- Setup m2x
  - Edison device in m2x.att.com
  - Add a stream to it called Temperature
  - Make a note of deviceid and apikey
Node Flow on Flow Designer

From previous slide
Spin up the service in flow

Pressing this will spin up a machine in cloud with appropriate services.

After a few mins (some times it may take longer) a machine instance is created for you at bottom you will see the details.

This goes into the node-red program on Edison in node send-to-cloud.
View in m2X once data starts flowing
Create Triggers

Triggering Condition

HTTP Post message with payload sent out url is from flow configuration in next slide
Flow to Handle Triggers to send email

If using google smtp make sure https://www.google.com/settings/security/lesssecureapps is turned on.
Agenda

- Introduction
- Intel® IoT Platform Architecture
- Roadmap and Products
- Case Studies
- Summary and Call to Action
Summary

• IoT presents one of the next big business opportunities; engaging now can give early mover advantage
• Intel is investing to win in IoT with an open and standards-based reference model and a broad, expanding product portfolio
• Intel’s ecosystem is critical for success: planning, deploying and managing end-to-end solutions

Call to Action

• Evaluate the Intel® IoT platform products to determine how you can innovate, speed your TTM, and expand your market opportunity
• Reach out and make connections with others in the value chain
• Use the familiar IA architecture from edge to cloud and accelerate IoT adoption
Additional Sources of Information

• IDF is Intel® annual conference (http://www.intel.com/content/www/us/en/intel-developer-forum-idf/san-francisco/2015/idf-2015-san-francisco.html) and lot of information is available
  - Classes and training on Intel® products
  - Video recordings of the presentations and materials
• More info on the web at: www.intel.com/IoT
Q&A
What will you develop?
Legal Notices and Disclaimers

Intel technologies’ features and benefits depend on system configuration and may require enabled hardware, software or service activation. Learn more at intel.com, or from the OEM or retailer.

No computer system can be absolutely secure.

Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit http://www.intel.com/performance.

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

This document contains information on products, services and/or processes in development. All information provided here is subject to change without notice. Contact your Intel representative to obtain the latest forecast, schedule, specifications and roadmaps.

Statements in this document that refer to Intel’s plans and expectations for the quarter, the year, and the future, are forward-looking statements that involve a number of risks and uncertainties. A detailed discussion of the factors that could affect Intel’s results and plans is included in Intel’s SEC filings, including the annual report on Form 10-K.

The products described may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

No license (express or implied, by estoppel or otherwise) to any intellectual property rights is granted by this document.

Intel does not control or audit third-party benchmark data or the web sites referenced in this document. You should visit the referenced web site and confirm whether referenced data are accurate.

Intel, Atom, Core, Quark, Curie, vPro, and the Intel logo are trademarks of Intel Corporation in the United States and other countries.

*Other names and brands may be claimed as the property of others.

The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by Intel is under license.

© 2015 Intel Corporation.
Risk Factors

The above statements and any others in this document that refer to plans and expectations for the second quarter, the year and the future are forward-looking statements that involve a number of risks and uncertainties. Words such as "anticipates," "expects," "intends," "plans," "believes," "seeks," "estimates," "may," "will," "should" and their variations identify forward-looking statements. Statements that refer to or are based on projections, uncertain events or assumptions also identify forward-looking statements. Many factors could affect Intel's actual results, and variances from Intel's current expectations regarding such factors could cause actual results to differ materially from those expressed in these forward-looking statements. Intel presently considers the following to be important factors that could cause actual results to differ materially from the company's expectations. Demand for Intel's products is highly variable and could differ from expectations due to factors including changes in business and economic conditions; consumer confidence or income levels; the introduction, availability and market acceptance of Intel's products, products used together with Intel products and competitors' products; competitive and pricing pressures, including actions taken by competitors; supply constraints and other disruptions affecting customers; changes in customer order patterns including order cancellations; and changes in the level of inventory at customers. Intel's gross margin percentage could vary significantly from expectations based on capacity utilization; variations in inventory valuation, including variations related to the timing of qualifying products for sale; changes in revenue levels; segment product mix; the timing and execution of the manufacturing ramp and associated costs; excess or obsolete inventory; changes in unit costs; defects or disruptions in the supply of materials or resources; and product manufacturing quality/yields. Variations in gross margin may also be caused by the timing of Intel product introductions and related expenses, including marketing expenses, and Intel's ability to respond quickly to technological developments and to introduce new products or incorporate new features into existing products, which may result in restructuring and asset impairment charges. Intel's results could be affected by adverse economic, social, political and physical/infrastructure conditions in countries where Intel, its customers or its suppliers operate, including military conflict and other security risks, natural disasters, infrastructure disruptions, health concerns and fluctuations in currency exchange rates. Results may also be affected by the formal or informal imposition by countries of new or revised export and/or import and doing-business regulations, which could be changed without prior notice. Intel operates in highly competitive industries and its operations have high costs that are either fixed or difficult to reduce in the short term. The amount, timing and execution of Intel's stock repurchase program could be affected by changes in Intel's priorities for the use of cash, such as operational spending, capital spending, acquisitions, and as a result of changes to Intel's cash flows or changes in tax laws. Product defects or errata (deviations from published specifications) may adversely impact our expenses, revenues and reputation. Intel's results could be affected by litigation or regulatory matters involving intellectual property, stockholder, consumer, antitrust, disclosure and other issues. An unfavorable ruling could include monetary damages or an injunction prohibiting Intel from manufacturing or selling one or more products, precluding particular business practices, impacting Intel's ability to design its products, or requiring other remedies such as compulsory licensing of intellectual property. Intel's results may be affected by the timing of closing of acquisitions, divestitures and other significant transactions. A detailed discussion of these and other factors that could affect Intel's results is included in Intel's SEC filings, including the company's most recent reports on Form 10-Q, Form 10-K and earnings release.