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Internet of Things Group

Lead the industry in transforming businesses and the way we live by making it simple to create exciting, new IoT solutions

SILICON, SOFTWARE AND SECURITY
SCALABILITY

THE INTERNET OF THINGS: Devices that connect to the Internet integrating greater compute capabilities using data analytics to extract information

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What is a Gateway?

A basic gateway features two or more interfaces:
• Interface(s) to devices and sensors to collect data
• A connection to a LAN, Cellular, or Wi-Fi network that will transmit data to the cloud

Gateways need to provide security features like proper authentication of the devices and services, as well as data encryption.

Gateway devices may support a broad range of connectivity protocols to satisfy vertical specific requirements: e.g. Industrial Ethernet for manufacturing automation
Why Should Gateways Be Smart?

• 85% of existing industrial “things” are not

• Apps & Services can offer predictive maintenance, energy savings, and more ..

• Gateways translate data from specific protocol

Why Intelligent Gateways?

• Storage & Connectivity are Expensive

• Connectivity Introduces Risk

*IHS, IDC Research

*Other names and brands may be claimed as the property of others.
Intel’s Approach to IoT Gateways:

Aligning Assets to Deliver Value

Integrated, highly optimized platforms

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Industries with the Highest Potential Value for Gateways...Have Long Replacement Cycles

- **Industrial Automation**: 5-25 Years
- **Energy Grid**: 10+ Years
- **Transportation**: 5-10 Years

Gateways “bolt on” to existing assets
Capture existing data and address the installed base
Intel® Gateway Solutions for the Internet of Things

Family of scalable gateway platforms:
Intel® Quark™ Processor -> Intel® Atom™ Processor-based SoCs
Connect and aggregate data sources and secure hardware, applications and data

- Integrated, validated solution with McAfee* and Wind River* SW
  Unified software licensing model and Intel support

- Optimized to meet specific vertical markets
  Open platform integrates with ecosystem applications and services

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Intel® Gateway Solutions for the Internet of Things

Value Proposition

• Fast Time to Market
• Integrated Security Features
• Unmatched Scalability
Benefits of Intel® Gateway Solutions

Connectivity
- Pre-integrated connected capabilities enable rich network options to save development time and costs.
- Provides an extensive network of connectivity
  - Wired
  - Wireless
  - Cellular
  - Short-range

Security Features
- Helps protect devices for trust and control
- Helps protect the Device
- Helps protect the application
- Helps protect the data at rest and in flight

Manageability
- Enable common provisioning frameworks
- Enable remote, secure upgrades
- Provide web-based configuration utilities

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Intel® Gateway Solutions Software Stack

**Cloud Connector**
- Ecosystem
  - Apps & Services
    - SI/ITOs, Customers

**Manageability**
- OMA DM
- TR-069
- Web Config

**Security**
- OpenSSL* TPM Engine
- SRM Signing Tool
- Certificate Management
- Secure Boot
- Application Integrity Monitor
- Application Resource Control
- Remote Attestation
- Secure Package Management
- Encrypted Storage
- FIPS 140-2 OpenSSL Lib

**Communications**
- 2G/3G/4G
- Bluetooth® Technology
- Ethernet
- Zigbee* Stack
- Serial / USB
- VPN
- WiFi Access Point
- MQTT

**Runtime**
- Prosys* OSGi
- OpenJdk
- Sqlite3
- LUA Scripting

**Intel® Security**
- Embedded Control

**Intel BSP: Board and Modules**
- Intel® Quark™ SoC
- Intel® Atom™ Processor

**Development Environment**

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SAIA Trucking wanted a solution to:

- Connect the vehicle's siloed systems
- Optimize driver behavior and fuel
- Provide fleet wide data to HQ
Intel® technology enabled Vnomics to provide SAIA a complete solution:

- Manage all of their inventory holistically
- Increasing their trucks efficiency via real time alerts
- Providing a cleaner and safer environment for SAIA drivers

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® Gateway Solutions Development and Deployment**

**Purchase Dev Kit**
- Purchase development kits (typically 1-5 systems)
- Download and register software with perpetual development license

**Develop Software**
- Build target image, develop SW and Services
- Connect to sensors and the cloud
- Host third party applications and services
- Develop security policies and beta test

**Deploy**
- Buy *production gateways from ODM*
- Integrate & provision gateway with apps and services and provisioned
- Deploy gateway in production environment; deploy services

**Intel Branded Dev Kits**
- System + Development Environment and Tools

**ODM Branded Dev Kits**
- System + Development Environment and Tools

**ODM Branded Production Gateways**
- Device + SW Entitlement
## Intel® Gateway Solutions for the Internet of Things Development Kits

<table>
<thead>
<tr>
<th>Approved Countries for shipment: US, Canada, EU</th>
<th>DK 50 Series</th>
<th>DK 100 Series</th>
<th>DK 200 Series</th>
<th>DK 300 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target Markets</strong></td>
<td>Developers, Enthusiasts</td>
<td>Industrial &amp; Energy</td>
<td>Transportation</td>
<td>Multi Vertical</td>
</tr>
<tr>
<td><strong>Compute</strong></td>
<td>Intel® Quark™ SoC X1000</td>
<td>Intel® Quark™ SoC X1020D</td>
<td>Intel Quark SoC X1020D</td>
<td>Intel® Atom™ Processor E3826</td>
</tr>
<tr>
<td><strong>Kit Contents</strong></td>
<td>Board and Power Supply Only</td>
<td>Board, radio(s), chassis, power supply</td>
<td>Board, radio(s), chassis, power supply</td>
<td>Board, radio(s), chassis, power supply</td>
</tr>
<tr>
<td><strong>Software Components</strong></td>
<td>Wind River* Linux* OS, IDP XT, Wind River Workbench Tools, McAfee* Embedded Control</td>
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<td></td>
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</tr>
<tr>
<td><strong>SW License</strong></td>
<td>Non-production, 6 Month Term License; Includes 6 months of SW Support from Intel to ODM</td>
<td>Perpetual License; Includes 1 year of SW Support from Intel to ODM</td>
<td></td>
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</tr>
<tr>
<td><strong>Security</strong></td>
<td>Open SSL* Library, McAfee Embedded Control</td>
<td>Open SSL Library, SRM Signing Tool, Certificate Management, SecureBoot, Application Integrity Monitor, Application Resource Control, Secure Package Management, Encrypted Storage, McAfee Embedded Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Manageability and Provisioning</strong></td>
<td>OMA DM, TR-069, Web-based configuration interfaces</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communications and Connectivity</strong></td>
<td>Serial, USB, VPN, MQTT</td>
<td>Bluetooth®, Serial, USB, VPN, Wi-Fi Access Point, MQTT, ZigBee*†</td>
<td></td>
<td>Cellular 2G/3G/4G, Bluetooth, Serial, USB, VPN, Wi-Fi Access Point, MQTT</td>
</tr>
<tr>
<td><strong>Memory and Storage</strong></td>
<td>512KB SRAM; 256MB DDR3, onboard microSD card</td>
<td>512KB SRAM; 1 GB ECC DDR3, onboard microSD card</td>
<td>512KB SRAM; 512MB ECC DDR3, onboard microSD card</td>
<td>Up to 8 GB DDR3, 2.5¨ SSD via onboard SATA</td>
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Online catalogue of Intel® Gateway Solutions for the Internet of Things from ODMs

Select “Intel® Gateway Solutions for the Internet of Things” under Intel Technologies (left hand side of screen under Characteristics).

http://intelintelligentsystemsalliance.com/solutions-directory
CALL TO ACTION

✓ Want to learn more about Intel® Gateway Solutions for the Internet of Things? Go to www.intel.com/iotgateways

✓ ODMs interested in building Intel Gateway Solutions for the Internet of Things or Development Kits? Contact your local Intel representative

✓ OEMs and SI’s visit the Solutions Directory to learn more about currently available Intel Gateway Solutions for the Internet of Things. http://intelintelligentsystemsalliance.com/solutions-directory
BACKUP
# Intel® Gateway Solutions for the Internet of Things Development

<table>
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<tr>
<th>Approved Countries for shipment: US, Canada, EU, PRC</th>
<th>DK 50 Series</th>
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<tr>
<td><strong>Target Markets</strong></td>
<td>Developers, Enthusiasts</td>
<td>Industrial, Energy</td>
<td>Transportation</td>
<td>Industrial, Energy, and Transportation</td>
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<td><strong>SoC</strong></td>
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<td>Intel® Quark™ SoC X1020D</td>
<td>Intel Quark SoC X1020D</td>
<td>Intel® Atom™ Processor E3826</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>Non-production, 6 Month SW License includes, Wind River* Linux* (Host), Wind River Intelligent Device Platform XT, Wind River Workbench, McAfee* Embedded Control</td>
<td>Wind River Linux (Host), Wind River Intelligent Device Platform XT, Wind River Workbench, McAfee Embedded Control</td>
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</tr>
<tr>
<td><strong>Manageability and Provisioning</strong></td>
<td>OMA DM, TR-069, Web-based configuration interfaces</td>
<td>BlueTooth*, Serial, USB, VPN, Wi-Fi Access Point, MQTT, ZigBee†</td>
<td>BlueTooth*, Serial, USB, VPN, Wi-Fi Access Point, MQTT, ZigBee†</td>
<td>Cellular 2G/3G/4G, BlueTooth*, Serial, USB, VPN, Wi-Fi Access Point, MQTT, ZigBee†</td>
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<td><strong>Communications and Connectivity</strong></td>
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<td><strong>Runtime Environments</strong></td>
<td>Java, OSG*</td>
<td>Lua, Java, and OSG</td>
<td>Lua, Java, and OSG</td>
<td>Lua, Java, and OSG</td>
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<tr>
<td><strong>I/O</strong></td>
<td>Ethernet 10/100, USB 2.0 host &amp; device, RS-232, full PCIe mini card slot, UART 5V/3.3V, SPI for Arduino shield, I2C, 14 digital I/O pins, 12-bit 8 channel ADC</td>
<td>2x Ethernet 10/100, USB 2.0 host &amp; device, RS-232, RS-485, ZigBee†, Wi-Fi/Bluetooth mini PCIe Module, SPI (internal), 12-bit 8 channel ADC</td>
<td>2x Ethernet 10/100, USB 2.0 host &amp; device, RS-232, Audio line in/out, CAN*, WiFi/Bluetooth mini PCIe Module, 3 axis accelerometer (internal), 12-bit 6 channel ADC</td>
<td>2x Ethernet 10/100/1000, 2x USB 2.0, 1x USB 3.0, RS-232/422/485, Line in/out, Wi-Fi/Bluetooth mini PCIe Module, Cellular WAN mini PCIe module, Cellular WAN mini PCIe Module, WIFI/Bluetooth mini PCIe Module, HDMI</td>
</tr>
<tr>
<td><strong>Memory and Storage</strong></td>
<td>512KB SRAM; 256MB DDR3, onboard microSD card</td>
<td>512KB SRAM; 1 GB ECC DDR3, onboard microSD card</td>
<td>512KB SRAM; 512MB ECC DDR3, onboard microSD card</td>
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†Enabled by third party hardware on the DK100 Series only.
### Intel® Quark™ SoC X1000 Applications Marketing Seminar

#### 2014 ODM Branded Moon Island Gateway Solutions for the Internet of Things

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<tr>
<th>CPU</th>
<th>Intel® Quark™ SoC X1000</th>
<th>Intel Quark SoC X1000</th>
<th>Intel® Quark™ SoC X1020</th>
<th>Intel® Quark™ SoC X1021</th>
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<td>Segments</td>
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<td>Ports</td>
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<td>USB 2.0, RS-232 COM,</td>
<td>USB 2.0, COM RS-232, CAN,</td>
<td>USB 2.0, Serial RS-232,</td>
<td>USB 2.0, COM, Audio</td>
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<td>RS-485, External Antennas</td>
<td>Audio, HDMI</td>
<td>485, Analog, I/O Digital I/O</td>
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<td></td>
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<td>2x Ethernet 10/100</td>
<td>2x Ethernet 10/100</td>
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<td>WiFi 802.11 a/b/g/n +</td>
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<td>WiFi 802.11 a/b/g/n +</td>
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<td>2G/3G Telit mPCIe*</td>
<td>ReliaCELL* Cellular &amp; GPS</td>
<td>ReliaCELL Cellular &amp; GPS</td>
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<td>mPCIe*</td>
<td>ZigBee†</td>
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<td>ZigBee†</td>
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<td>Expansion</td>
<td>1 x Full Size mPCIe</td>
<td>1 x Full Size mPCIe</td>
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<td>1 x Full Size mPCIe</td>
<td>1 x Full Size mPCIe</td>
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<td>1 x Half Size mPCIe</td>
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<td>1 x Half Size mPCIe</td>
<td>1 x Half Size mPCIe</td>
<td>1 x Half Size mPCIe</td>
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<td>Memory and Storage</td>
<td>1GB non ECC DDR3</td>
<td>512MB DDR3L (support up to 1GB)</td>
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<td>MicroSD Slot</td>
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<td>-40°C ~ 85°C</td>
<td>-10°C ~ 70°C</td>
<td>0°C ~ 55°C</td>
</tr>
</tbody>
</table>

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†Enabled by third party hardware.
Use Case: Intel® Gateway Solutions for the Internet of Things Industrial HVAC

Securely* connect to HVAC units and send data to the cloud

Aggregate, Analyze, Manage Data

Cloud Services Creation and Deployment

Performance Management (Owner)
- Energy performance benchmarking
- Utility grade demand response
- Sustainability and regulatory reporting

Asset Management (Service)
- 24/7/365 anywhere access
- Remote diagnostics and monitoring
- Online integrated service and parts locator

Accelerating Business Transformation

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