Freescale Helps Ease Interoperability Challenges for the Internet of Things

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Freescale – A Leader in Embedded Solutions:

We Touch Your Life Every Day

We Have a Broad Portfolio

We Have a Strong Global Presence

We are Enabling the Next Growth Wave
Infrastructure of the INTERNET OF THINGS

Edge Nodes | PAN/LAN Connectivity | Gateway | WAN Connectivity | Cloud

**Xtrinsic Sensing**
*Intelligent Contextual Sensing.*

The right combination of intelligent integration, logic and customizable software on the platform to deliver smarter, more differentiated applications.

**Kinetis ARM Microcontrollers**
*Design Potential. Realized.*

Industry’s most scalable ultra-low-power, mixed-signal MCU solutions based on the ARM® Cortex™-M and Cortex™-M0+ architectures.

**i.MX Applications Processors**
*ARM Your Interface to the World.*

Industry’s most versatile solutions for multimedia and display applications, with multicore scalability and market-leading power, performance & integration.

**QorIQ Processors Built on Layerscape Architecture**
*ARM Accelerating the Network’s IQ.*

Industry’s first software-aware, core-agnostic networking system architecture for the smarter, more capable networks of tomorrow – end to end.
smart cars
...smart home

- Home Energy Activated
- Home Cooling System Schedule

Sending... “Delay AC activation”
Receiving... “Returning 30 minutes late”
Why IP?

IPv6 - A unified Convergence Layer for the home

Application 0

Application Protocol

802.15.4

Application n

Application Protocol

802.11

Bluetooth 4.x
7 companies founded the Thread Group

Not another standards body

A market education group offering product certification

Promoting Thread’s use in connected products for the home

Thread will offer rigorous product certification to ensure security and interoperability

Board of Directors

President: Chris Boross - Nest Labs
VP of Marketing: Sujata Neidig - Freescale
VP of Technology: Skip Ashton - Silicon Labs
Secretary: Bill Curtis - ARM
Treasurer: Kevin Kraus - Yale Security
Director: Landon Borders - Big Ass Fans
Director: Benny Getz - Samsung Electronics
**What it delivers**

- IPv6 based
- Lightweight and low latency
- Not a whole new standard
- Collection of existing IEEE and IETF standards
- Runs on existing 802.15.4 based products
- 250+ devices on a PAN
- Direct Addressability of devices
- Flexible network with full point to point connectivity of all devices
- No single point of failure
- Enable low cost bridging to other IP networks
- Simple security and commissioning
- Low Power support for sleeping devices

### Standard

<table>
<thead>
<tr>
<th>Application Layer</th>
<th>Standard</th>
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<tbody>
<tr>
<td><strong>UDP + DTLS</strong></td>
<td>RFC 768, RFC 6347, RFC 4279, RFC 4492v RFC 3315, 5007</td>
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<tr>
<td><strong>Distance Vector Routing</strong></td>
<td>RFC 1058, RFC 2080</td>
</tr>
<tr>
<td><strong>6LowPAN (IPv6)</strong></td>
<td>RFC 4944, RFC 4862, RFC 6775</td>
</tr>
<tr>
<td><strong>IEEE 802.15.4 MAC (including MAC security)</strong></td>
<td>IEEE 802.15.4 (2006)</td>
</tr>
<tr>
<td><strong>IEEE 802.15.4 PHY</strong></td>
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Thread Target applications

Thread is designed for all sorts of products in the home

- Appliances
- Access control
- Climate control
- Energy management
- Lighting
- Safety
- Security

Devices working together to form a cohesive mesh network
**THREAD** Freescale Hardware offering

- **Freescale Kinetis KW2x - Tower**
  - Mesh Network Router / End Device
  - Thread IEEE 802.15.4 compliant
  - Tower Board and Freedom Board coming up soon
  - Runs MQX for Kinetis SDK

- **Freescale i.MX6 IoT Gateway**
  - Cloud gateway / Border Router
  - Provides IP data routing and infrastructure integration
  - Runs Linux operating system

- **Proximetry Cloud Services**
  - Cloud dashboard and gateway agent
  - End-to-end addressing of IP end nodes
  - Control and monitor Thread network devices

- **Freescale Kinetis KL46 + MCR20A Transceiver**
  - Mesh Network Router / End Device
  - Thread and IEEE 802.15.4 compliant
  - Freedom Board format
  - Runs MQX for Kinetis SDK
THREAD Freescale Launch Timeline

Thread Beta #1
KW2x
Mar 2015

Thread Beta #2
KW2x, MCR20A
K64F, KL46
May 2015

Thread Beta #3
KW2x, MCR20A
K64F, KL46
Jun 2015

Thread G.A
KW2x, MCR20A
K64F, KL46
Aug 2015

4th Interop
End February 2015
Thread Interoperability Event #4

5th Interop
End April 2015
Thread Interoperability Event #5

6th Interop
End May 2015
Thread Interoperability Event #6

Contained Thread Network

Border Router Functionality

Complete Functionality

Thread Certified Products