Intro to Google Thread

Scott Richardson
EECS 700
Lightning Talk
*Adapted From Thread Group's Technical Documents
What is Google Thread?

Problem: A new era of Connected Products

Why?: Existing wireless mesh protocol didn’t meet requirements.

Solution? A new wireless home network that is not a completely new standard
Founders

A Working Group That includes:

Launched in July 2014
How Does it Fit into IoT?

Smart Homes

Smart household devices to communicate on a network

Designed specifically for Connected home applications where IP-based networking is desired
Thread Connected home requirements

HVAC
- Gateway
- Lighting
- Appliances
- Smart Meter
- Garage door opener
- HVAC equipment
- Smart Plugs
- Fans

Energy Saving
- Thermostat
- Light switches
- Smoke Detectors
- CO detectors
- In home display
- Shade or blinds control
- Door bell
- Glass break sensors
- Robots/cleaners

Security
- Door sensors
- Window sensors
- Motion sensors
- Door locks
- Radiator valves
- Body sensors (health care)

Sensors

Lighting

Appliances

Normally Powered

Powered or battery

Normally Battery

Consideration for devices that rely on energy harvesting is also a requirement
Thread: A Wireless Mesh Networking Protocol

Features

Simple network installation
Secure
Small and Large networks
Range
Low Power
Network Features

- Runs on existing 802.15.4 protocol (MAC Layer)
- Uses 6LoWPAN (IPv6 based addressing)
- 250kbps (low latency)
- Enables Cloud connectivity
- Direct IP addressability of devices
- Secure
Competing Protocols

ZigBee
Z-Wave
WeMo
## Comparison

<table>
<thead>
<tr>
<th></th>
<th>Z-Wave</th>
<th>ZigBee</th>
<th>WeMo</th>
<th>Thread</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating range</strong></td>
<td>100 feet</td>
<td>35 feet</td>
<td>100 feet</td>
<td>100 feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(theoretical)</td>
<td></td>
</tr>
<tr>
<td><strong>Max no. devices</strong></td>
<td>232</td>
<td>65,000</td>
<td>Router-dependent</td>
<td>250-300</td>
</tr>
<tr>
<td><strong>Data rate</strong></td>
<td>9.6-100 kbps</td>
<td>40-250 kbps</td>
<td>Router-dependent</td>
<td>250 kbps</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>908/915 MHz (U.S.)</td>
<td>915 MHz/2.4 GHz</td>
<td>2.4 GHz</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td><strong>Network type</strong></td>
<td>Mesh</td>
<td>Mesh</td>
<td>Star</td>
<td>Mesh</td>
</tr>
<tr>
<td><strong>Needs hub?</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Further Reading

Thread Home Page
Thread intro
Thread Technical Overview
Thread Stack Fundamentals
Thank You!