Thread Use Case

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What is Thread?
A Foundation for Matter
Thread + Matter

Connectivity Standards Alliance
11,456 followers
3w

#Matter Milestone - Test Event #7 is the largest in CSA history with 134 devices and 187 participants representing over 53 companies. Join hundreds of members who #buildwithmatter.

Half of Matter devices implement Thread
Not Just Matter

A multi-service network

Host *multiple applications* using a *common network infrastructure*
## IEEE 802.15.4 Radio (same as Zigbee)

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<tbody>
<tr>
<td><strong>PHY</strong></td>
<td>Frequency</td>
<td>2.4 GHz ISM</td>
</tr>
<tr>
<td></td>
<td>Modulation</td>
<td>O-QPSK</td>
</tr>
<tr>
<td></td>
<td>Data Rate</td>
<td>250 kbps</td>
</tr>
<tr>
<td></td>
<td>Frame MTU</td>
<td>127 bytes</td>
</tr>
<tr>
<td><strong>MAC</strong></td>
<td>Media Access</td>
<td>CSMA-CA</td>
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<tr>
<td></td>
<td>Security</td>
<td>AES-128</td>
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<tr>
<td><strong>ADP</strong></td>
<td>IPv6 Header Compression</td>
<td>RFC 6282</td>
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<td></td>
<td>Fragmentation</td>
<td>RFC 4944</td>
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<tr>
<td></td>
<td>Addressing</td>
<td>RFC 4944</td>
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Dynamic Mesh Topology
Border Routers
Shipping Thread Border Routers
Dynamic Partitioning
Dynamic Merging
Network Architecture
Home Network

Single IP subnet

Single broadcast domain

All devices in home are within a single IP hop
Home Network with Thread

- Separate IP subnets
- Separate broadcast domains
- Multiple IP hops between Thread and Wi-Fi
IPv6 Reachability
**IPv6 Reachability**

To Wi-Fi devices

Config Wi-Fi devices with ULAs
Send Router Advertisements on Wi-Fi Prefix Information Option (PIO) with Wi-Fi ULA Prefix (based on Ext PANID)

Config Thread devices with route to Wi-Fi
Publish Thread Network Data on Thread External Route with Wi-Fi ULA Prefix (based on Ext PANID)
IPv6 Reachability
To Thread devices

Config Thread devices with ULAs
Publish Thread Network Data on Thread
On-Mesh Prefix with
Thread Network ULA Prefix

Config Wi-Fi devices with route to Thread
Send Router Advertisements on Wi-Fi
Route Information Option (RIO) with
Thread Network ULA Prefix
DNS-Based Service Discovery
Multicast DNS (mDNS)

mDNS widely used for discovering services

Multicast DNS Query sent to link-local multicast
Does not extend into Thread network

Increasing performance gap between unicast and multicast

Multicast in mesh networks very expensive
Service Registration Protocol (SRP)

Thread device publishing services

SRP Update (DNS Update)
Zone
default.service.arpa
Updates
Service Discovery Instruction (PTR)
Service Description Instruction (SRV, TXT)
Host Description Instruction (AAAA, KEY)
Additional Records
Update Lease
Lease
Key Lease
SIG(0)

SRP Update Response (DNS Update Response)
Error Code
Advertising Proxy

Border Router implements Advertising Proxy to make services discoverable on Wi-Fi.

Publish DNS-SD records from SRP on Wi-Fi using mDNS.
Discovering Services
Thread device discovering services on Thread

Border Router is DNS authoritative server for default.service.arpa
Thread device sends unicast DNS queries to BR
Border Router sends unicast DNS response
Discovery Proxy
Thread device discovering services on Wi-Fi

Border Router implements Discovery Proxy

Thread device sends unicast DNS queries to BR

BR sends mDNS Query and receives Responses

Border Router sends unicast DNS response
Thank you

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