THREAD

Learn How Thread Delivers Value to You and Your Customers

May 2017

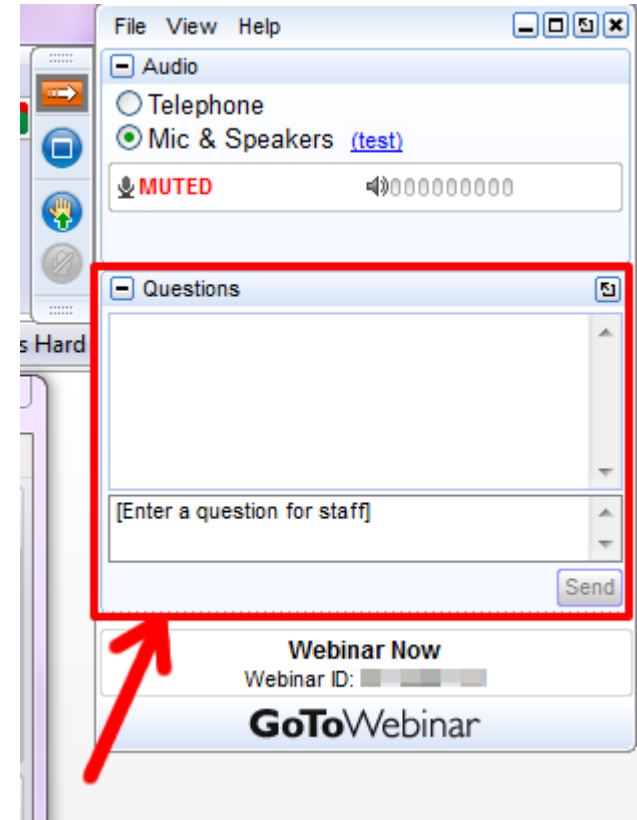# 𝐓HREAD GROUP | **Go To Webinar Overview**

You will be defaulted to mute by organizer

Audio pane: Use the Audio pane to switch between Telephone and Mic & Speakers

Questions pane: Post your questions for panelists

Questions will be read and addressed after the presentation

Recording of this webinar will be made available on the Thread Group website

ᎢHREAD GROUP | **Today's Speakers**

Grant Erickson
President, Thread Group
Principal Software Engineer, Nest

Grant Erickson is a principal engineer at Nest, where he oversees the technical development of software designed to support Bluetooth Low Energy, Thread, Wi-Fi, and Nest Weave.

Grant was also an early contributor to the formation of the Thread Group and Thread networking protocol. He is currently a member of the Thread Group Board of Directors.

Sujata Neidig
Vice President of Marketing, Thread Group
Senior Global Marketing Manager, NXP

Sujata Neidig has over 23 years of experience in the semiconductor industry and has served in a variety of roles ranging from product engineering to marketing and business development.

She is currently the MCU Global Marketing Manager responsible for NXP's microcontrollers and connectivity roadmap and portfolio - driving leadership and growth in multiple market segments. Prior to this role, Sujata worked in business development and product marketing for various groups within NXP. She earned a Bachelor of Science in Electrical Engineering from the University of Texas at Austin.

ℱHREAD GROUP | Delivering Value to You & Your Customers

Why Thread was created

Who is Thread Group

What benefits Thread brings to developing IoT solutions

How Thread fits with other wireless connectivity technologies

How to get started now

Why Thread?

↑HREAD GROUP | **Problem Statement**

How do we **securely** and **scalably** connect an ecosystem of **low power** products to each other, to cloud services, and to consumers via their mobile devices supporting applications—including mission-critical ones—such as?
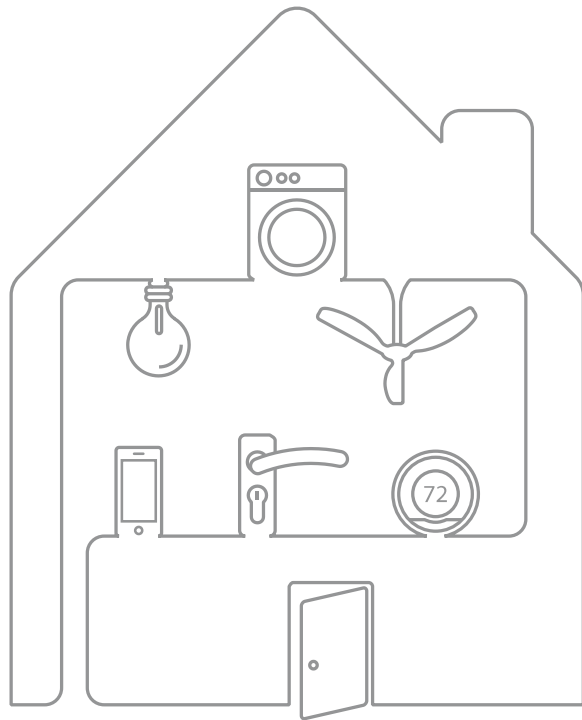
- Appliances

- Access control

- Climate control

- Energy management

- Lighting

- Safety

- Security
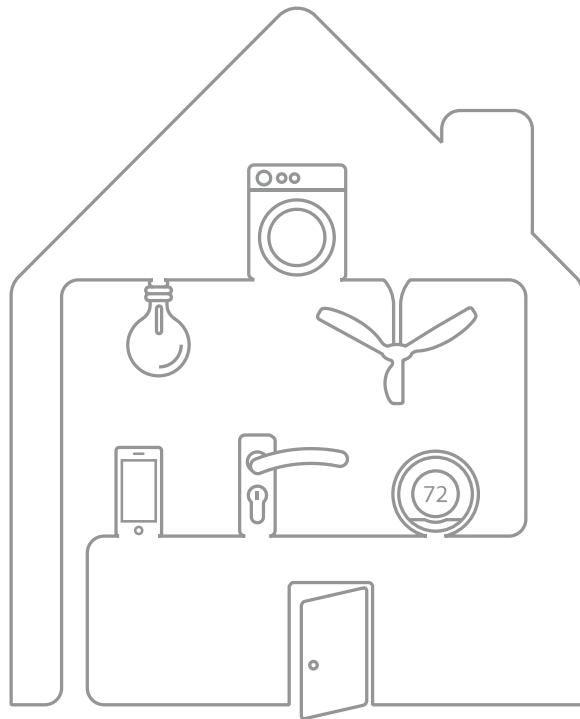
THREAD GROUP | The Search

We wanted to use an existing wireless mesh protocol

- None fit our requirements well enough

- None were suitable for homes and consumer electronic products

Requirements:

New wireless home network

✔   Low power

⌖THREAD GROUP | **Requirements**

✔	No single point of failure
✔	Self-healing
✔	Interference robustness
✔	Self-extending
✔	Reliable enough for critical infrastructure

Requirements:
New wireless home network

✔	Low power
✔	Resilient (mesh)
✔	IP-based
✔	Open protocol
✔	Secure and user friendly
✔	Fast time to market
✔	Existing radio silicon

THREAD GROUP | Establishing Thread

We found that many companies shared the same concerns

- So we created a new wireless mesh network technology

- Built on **existing standards** using established **Internet** protocols

We established Thread to be a key foundation for the Internet of Things

Who Is Thread?

THREAD GROUP | Who Is Thread?

Formally launched in July 2014, the Thread Group currently has more than 200 member companies

The Thread Group is:

- A technology alliance, not just another standards defining organization (SDO)

- A nonprofit market education group promoting Thread's use in connected products

- Ensuring a great user experience through rigorous, meaningful product certification

Structured as a Delaware 501 (c) (6) Non-Profit Corporation for the mutual benefit of its members

- Independent, vendor-neutral and open to all — any entity can join

- Organizational membership only — one membership, one vote

ᚦHREAD GROUP | **Board of Directors and Team**

President	**Grant Erickson** – Alphabet / Google / Nest
VP of Marketing	**Sujata Neidig** - NXP
VP of Technology	**Skip Ashton** – Silicon Laboratories
Secretary	**Bill Curtis** - ARM
Treasurer	**Kevin Kraus** - Yale
Director	**Ben Flannery** – Haiku Home
Director	**Jean-Michel Orsat** - Somfy
Director	**Greg Hill**- Johnson Controls
Director	**Rolf De Vegt** - Qualcomm
Director	**Arnulf Rupp** - OSRAM
Director	**Cam Williams** – Schneider Electric
Executive Director	**Deepak Kamlani** - Inventures
Director of Certification	**Tom Sciorilli** – Thread Group

THREAD GROUP | Structure

```
┌─────────────────────────────────────────────────────────┐
│                    Board of Directors                     │
└─────────────────────────────────────────────────────────┘

┌─────────────────────────────────┐
│  Management Organization         │
│  (Inventures)                    │
└─────────────────────────────────┘
```

Certification	Marketing	Use Case	Technical	Executive
Working Group	Working Group	Working Group	Working Group	Working Group

Available to Contributors   Available to Sponsors
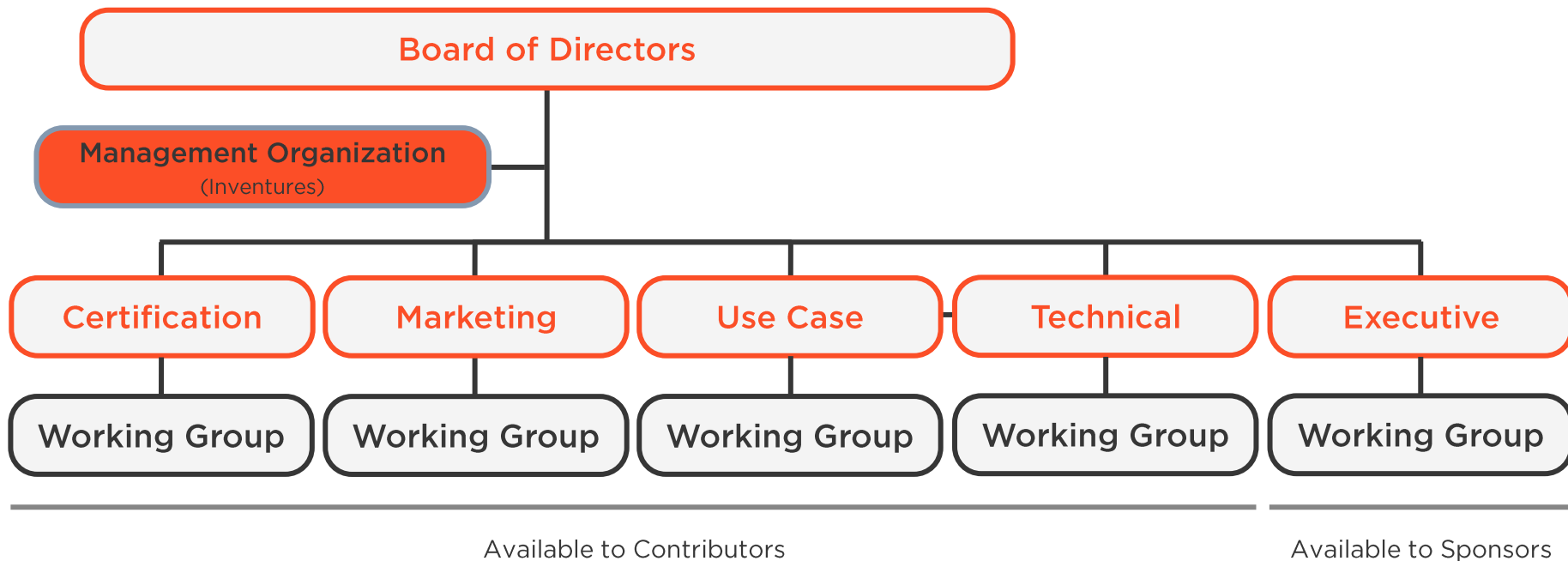
⊕THREAD GROUP | Intellectual Property

Copyrights and Trademarks

Licensed to participants royalty free

Other Intellectual Property Policy

Policy is designed to maximize the adoption of the Thread technology and accelerate market acceptance

Policy for Thread Group membership balances interests of all stakeholders

Applies to all Thread members

Commitment to grant a RAND-RF (royalty free) license to members for patents essential to the Thread specification

THREAD GROUP | Membership Tiers

Membership Benefits	Academic	Affiliate	Contributor	Sponsor
Receive member communications	✔	✔	✔	✔
Participation in general or annual meetings	✔	✔	✔	✔
Access to members only website	✔	✔	✔	✔
Use of Alliance Member Logo	✔	✔	✔	✔
Participation in press articles & interviews	✔	✔	✔	✔
Access Final Deliverables	✔	✔	✔	✔
Access Draft Deliverables	✔	✔	✔	✔
Chair Committees and/or Work Groups			✔	✔
Certify Compliant Products and Utilize Certification Logo			✔	✔
Participate and Vote in Work Groups			✔	✔
Participation and Vote in Committees			✔	✔
Approve Operating Budget				✔
Approve Final Deliverables				✔
Initiate Work Groups or Committees				✔
Automatic Seat on Board of Directors				✔
Annual Fee	**$0K**	**$2.5K**	**$15K**	**$100K**

ϙHREAD | Membership Benefits

Access to the technology	Reduce time for development and implementation using a proven solution
Access to the IP	Gain IP rights for the Thread technology with no royalty payments
Access to Thread Certification Program	Guarantee network interoperability with other Thread devices and broaden your ecosystem
Use of the Thread Test Harness and Commissioning App	Save time and resource investment by completing in-house testing for spec conformance and network interoperability
Participation in Marketing and PR campaigns	Leverage Thread's marketing, social media and PR tools to extend marketing efforts
Participation in Committees	Provide a voice to help influence the direction of Thread
Networking with an ecosystem of companies	Collaborate with other members to optimize investment

ᏔHREAD | **Liaisons**

	Organization	Liaison Type
	CABA	Marketing
	EEBus	App Layer
	Fairhair Alliance	Standards
	OCF	App Layer
	zigbee alliance	App Layer

Benefits of Thread

ℱHREAD | Solution for IoT

AVAILABLE NOW

Spec is available publicly

Certification program released to members with fast-ramp tools

Four certified stacks to choose from

Thread membership gives rights to use the IP

SECURE

Link layer security

All network traffic is encrypted

Only authenticated nodes can join the network

User-friendly commissioning

SCALABLE

Large number of nodes

Low latency

Border Router to expand to the internet and other networks such as Ethernet, Wi-Fi, and Cellular Commissioning multiple devices

15 channels allowing separation of neighboring networks

INTERNET PROTOCOL

Device-to-device, device-to-mobile, device-to-cloud

Many application choices

Multiple ecosystems

No hub needed

End-to-end security

Eases of development

Understood & available network management tools

Standards based

RELIABLE

True mesh network

No single point of failure

Self-healing

Better end user experience

Lower support structure required

Thread is more than a connectivity technology, it's a flexible and future-proof **IoT network technology**

ꝉHREAD | Solution for IoT

AVAILABLE NOW

Spec is available publicly

Certification program released to members with fast-ramp tools

Four certified stacks to choose from

Thread membership gives rights to use the IP

SECURE

Link layer security

All network traffic is encrypted

Only authenticated nodes can join the network

User-friendly commissioning

SCALABLE

Large number of nodes

Low latency

Border Router to expand to the internet and other networks such as Ethernet, Wi-Fi, and Cellular Commissioning multiple devices

15 channels allowing separation of neighboring networks

INTERNET PROTOCOL

Device-to-device, device-to-mobile, device-to-cloud

Many application choices

Multiple ecosystems

No hub needed

End-to-end security

Eases of development

Understood & available network management tools

Standards based

RELIABLE

True mesh network

No single point of failure

Self-healing

Better end user experience

Lower support structure required

Thread is more than a connectivity technology, it's a flexible and future-proof IoT network technology

↑HREAD GROUP | Available Now

We set the bar high

True **multi-vendor interoperability** between ≥ 3 stacks, not just a golden node

We held 13 discrete in-depth interop sessions to validate 1.0 and 1.1

We opened certification and announced 4 certified stacks

We provide fast ramp tools

ARM   NXP   openthread
                released by Nest   SILICON LABS

𝝘HREAD GROUP | Certification Fast Ramp Tools

Thread Commissioning App

- Speeds prototyping / implementation of the Thread device commissioning process for end users.

- First beta release of compiled app now available via the Google Play Store; iOS version to follow shortly.

Thread Test Harness

- Inexpensive test bed, plus software replicates the test environment used for certification.

- Provides debug & pre-validation of Thread implementations internally, vs. lab time at 3rd party test facility.
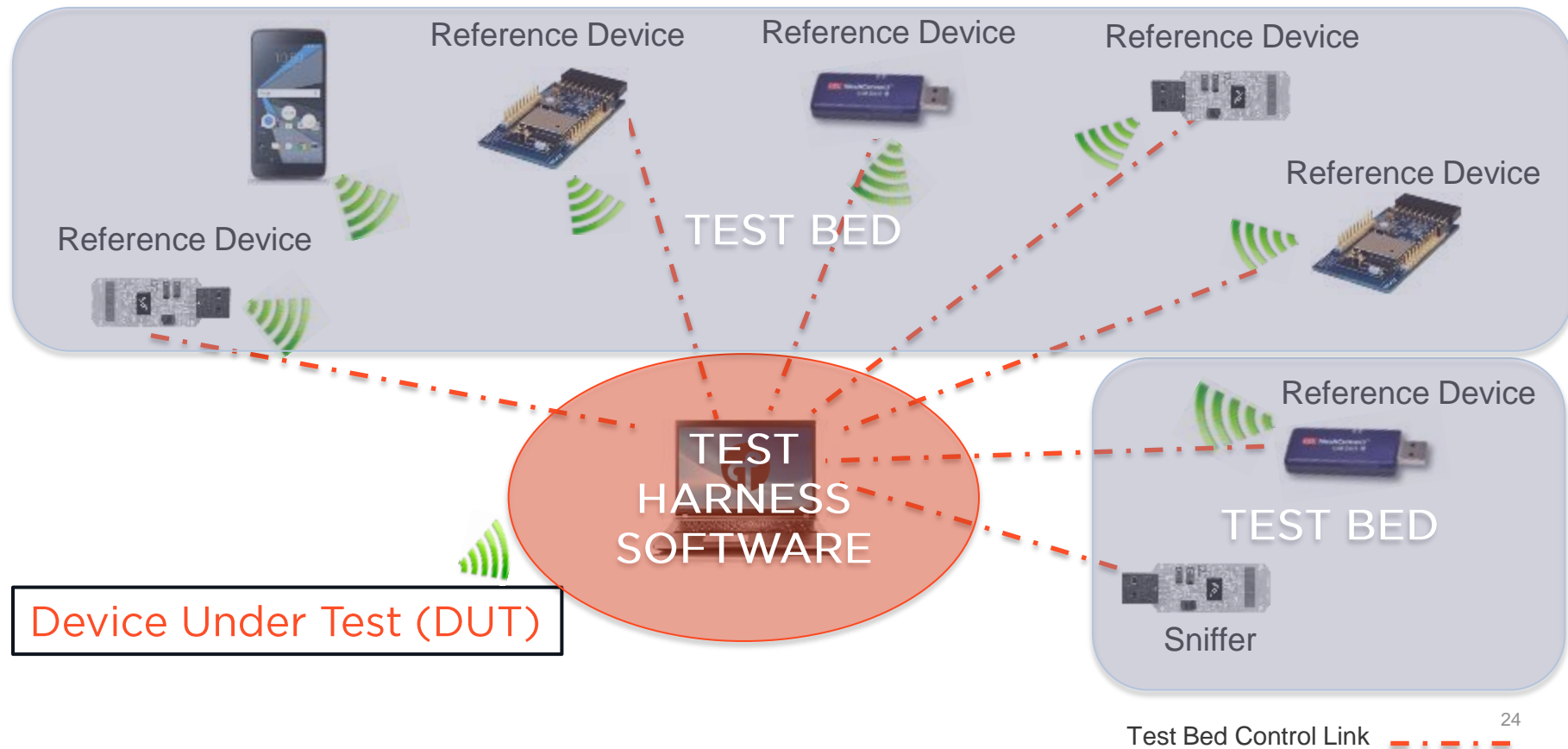
Thread Test Harness Extensions

- Automates Thread test execution for devices-under-test (DUTs) and integrates Thread testing into an existing automated regression environment.

- Functionality can be extended to control the testing of other technologies to create a comprehensive regression environment.

Thread Wireshark

- The dissectors enable engineers, developers, and system integrators to see the contents of network packets, bit-by-bit and field-by-field, at the IPv6, Thread, and 802.15.4 layers.

⌀THREAD GROUP | Example Thread Test Environment Setup

Reference Device

Reference Device

Reference Device

Reference Device

Reference Device

TEST BED

TEST HARNESS SOFTWARE

Reference Device

TEST BED

Device Under Test (DUT)

Sniffer

Test Bed Control Link

ꟼHREAD GROUP | Solution for IoT

AVAILABLE NOW	SECURE	SCALABLE	INTERNET PROTOCOL	RELIABLE
Spec is available publicly	Link layer security	Large number of nodes	Device-to-device, device-to-mobile, device-to-cloud	True mesh network
Certification program released to members with fast-ramp tools	All network traffic is encrypted	Low latency	Many application choices	No single point of failure
Four certified stacks to choose from	Only authenticated nodes can join the network	Border Router to expand to the internet and other networks such as Ethernet, Wi-Fi, and Cellular	Multiple ecosystems	Self-healing
Thread membership gives rights to use the IP	User-friendly commissioning	Commissioning multiple devices	No hub needed	Better end user experience
		15 channels allowing separation of neighboring networks	End-to-end security	Lower support structure required
			Eases of development	
			Understood & available network management tools	
			Standards based	

Thread is more than a connectivity technology, it's a flexible and future-proof IoT network technology

⌀HREAD GROUP | Security and Commissioning

○	End Device
⬟	Thread Leader
⬟	Thread Router
◼	Border Router
—	Thread Link
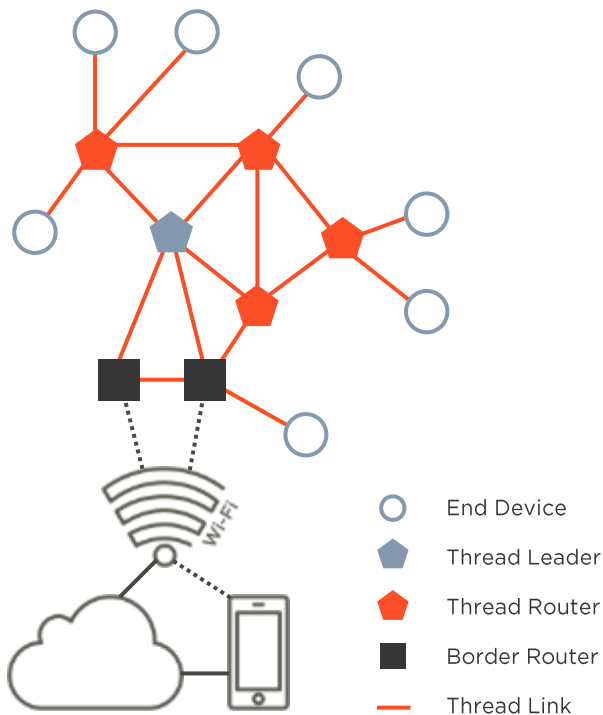
- Simple Commissioning

  - User authorizes devices onto the network using smart phone or web

  - Can be done on network if there is a device with a graphical interface

- DTLS Security session established between new device and commissioning device to authenticate and provide credentials

- Once commissioning session is done, device attaches to network

- MAC security used for all messages

- Application level security is based on end-device requirements and application layer being used

ϙHREAD GROUP | Solution for IoT

AVAILABLE NOW
Spec is available publicly

Certification program released to members with fast-ramp tools

Four certified stacks to choose from

Thread membership gives rights to use the IP

SECURE
Link layer security

All network traffic is encrypted

Only authenticated nodes can join the network

User-friendly commissioning

SCALABLE
Large number of nodes

Low latency

Border Router to expand to the internet and other networks such as Ethernet, Wi-Fi, and Cellular Commissioning multiple devices

15 channels allowing separation of neighboring networks

INTERNET PROTOCOL
Device-to-device, device-to-mobile, device-to-cloud

Many application choices

Multiple ecosystems

No hub needed

End-to-end security

Eases of development

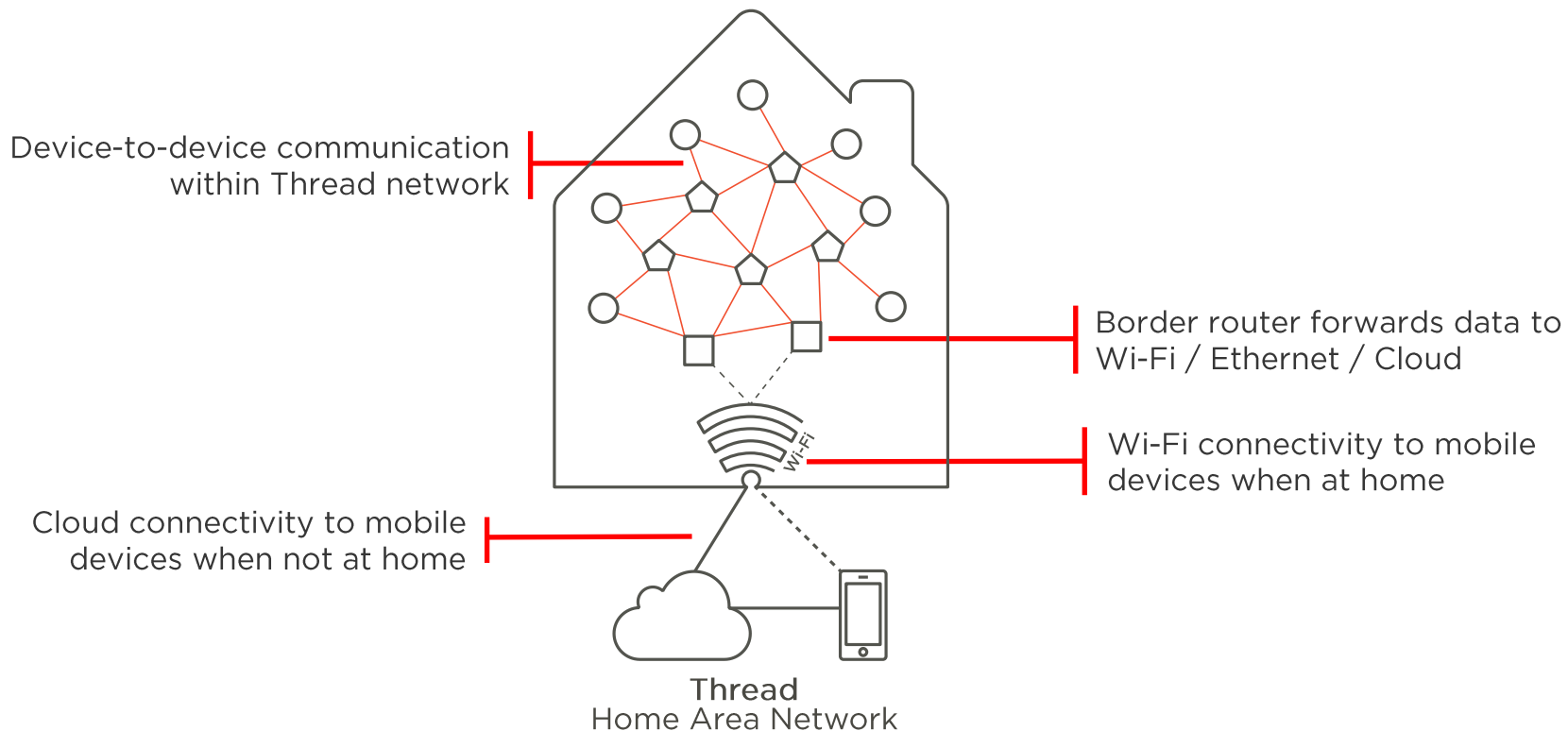Understood & available network management tools

Standards based

RELIABLE
True mesh network

No single point of failure

Self-healing

Better end user experience

Lower support structure required

Thread is more than a connectivity technology, it's a flexible and future-proof **IoT network technology**

ꔹHREAD GROUP | Thread Home Area Network

Device-to-device communication within Thread network

Border router forwards data to Wi-Fi / Ethernet / Cloud

Wi-Fi connectivity to mobile devices when at home

Cloud connectivity to mobile devices when not at home

Wi-Fi

Thread
Home Area Network

ᕗHREAD GROUP | **Network Topology Roles**

Border Router

Forwards data to and from cloud/other networks

Provides optional Wi-Fi connectivity

Many +

Thread Leader

Manages network parameters

Coordinates commissioners

Makes network decisions

One +

Thread Router

Routes traffic among devices

Form the mesh topology

Eligible to become the Leader

Up to 32 +
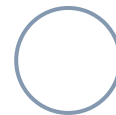
End Device

Designed for low power operation

May be powered or sleepy

May be router-eligible if powered

Up to 511 per Router

Hundreds of Devices per Network

ℱHREAD GROUP | Solution for IoT

AVAILABLE NOW	SECURE	SCALABLE	INTERNET PROTOCOL	RELIABLE
Spec is available publicly	Link layer security	Large number of nodes	Device-to-device, device-to-mobile, device-to-cloud	True mesh network
Certification program released to members with fast-ramp tools	All network traffic is encrypted	Low latency	Many application choices	No single point of failure
Four certified stacks to choose from	Only authenticated nodes can join the network	Border Router to expand to the internet and other networks such as Ethernet, Wi-Fi, and Cellular Commissioning multiple devices	Multiple ecosystems	Self-healing
Thread membership gives rights to use the IP	User-friendly commissioning	15 channels allowing separation of neighboring networks	No hub needed	Better end user experience
			End-to-end security	Lower support structure required
			Eases of development	
			Understood & available network management tools	
			Standards based	

Thread is more than a connectivity technology, it's a flexible and future-proof IoT network technology

ꝰHREAD GROUP | Internet Protocols Thread Uses

The Internet: Today, mostly "large" devices

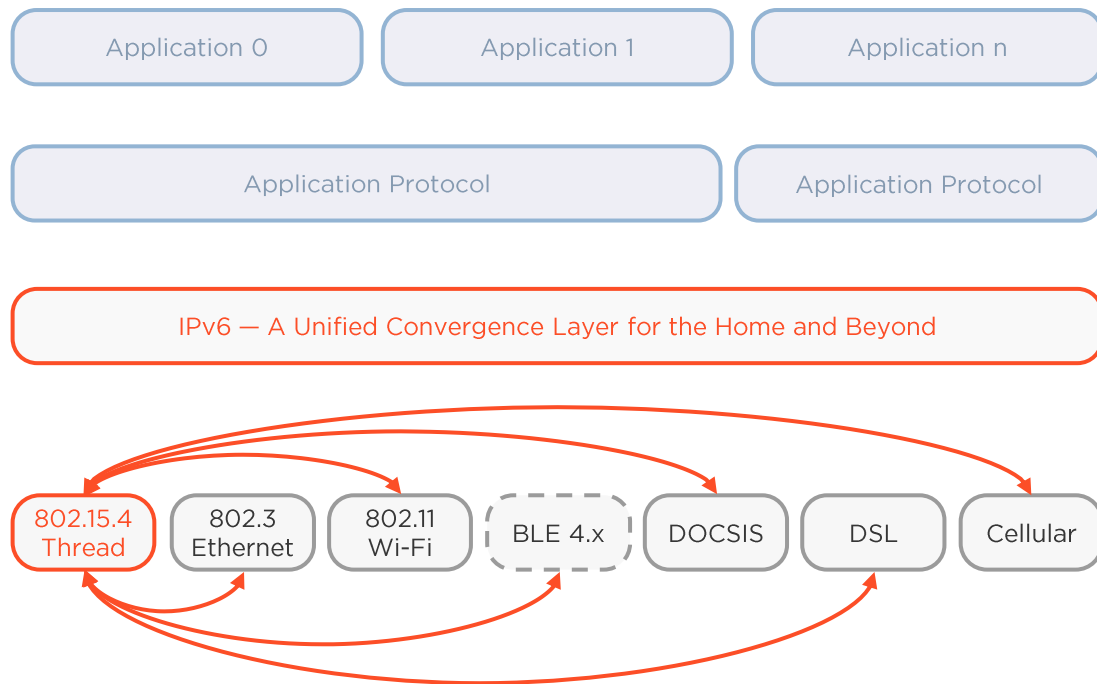|	Large devices Mains powered Fast networks
Applications	Internet / Web applications
Web Transfer	HTTP
Transport	TCP
Security	TLS
Addressing	IPv6 / IPv4

ᛐHREAD GROUP | Internet Protocols Thread Uses

The Internet: Now available in "small!"

	Large devices Mains powered Fast networks	Small devices Battery powered Constrained networks
Applications	Internet / Web applications can work with large or small devices	
Web Transfer	HTTP	CoAP
Transport	TCP	UDP
Security	TLS	DTLS
Addressing	IPv6 / IPv4	6LoWPAN

THREAD GROUP | Thread is IP

| Application 0 | Application 1 | Application n |

| Application Protocol | Application Protocol |

| IPv6 — A Unified Convergence Layer for the Home and Beyond |

| 802.15.4 Thread | 802.3 Ethernet | 802.11 Wi-Fi | BLE 4.x | DOCSIS | DSL | Cellular |

Unified convergence layer across all networks in the home and beyond

- Reuse software stacks

Enables direct device-to-device, device-to-mobile, and device-to-cloud, and one-to-many communication

- Nodes can communicate directly with each other and with multiple apps or backend services

Support for many application layers

- Any low bandwidth application layer that can run over IPv6 can run over Thread

THREAD GROUP | Many Wireless IoT Standards

Category 1: Connectivity layer

- Provide wireless connectivity

- Examples: Thread, Wi-Fi/HaLow, ZigBee PRO

Category 2: Application layer

- Provides interoperability with other devices or the cloud. Some can be run over multiple connectivity methods, or at different layers.

- Examples: AllSeen, IPSO, OCF (IoTivity), IIC, zigbee dotdot, many vertical-industry alliances

Category 3: Full-stack technologies – connectivity layer + application layer

- Examples: Bluetooth, zigbee 3.0, Z-Wave, ULE

↟THREAD GROUP | Application Layer Diversity

Thread is an IP **network** & **transport** layer specification

- Application Layer – A protocol running over an IP network layer

- Network layers – Ethernet, WiFi, cellular ... and Thread

- Application layers can use multiple IP networks – i.e. Thread and Wi-Fi

- Thread can support multiple application layers

- Thread **does not** favor one application layer over another

- App layers typically interoperate via services through public interfaces
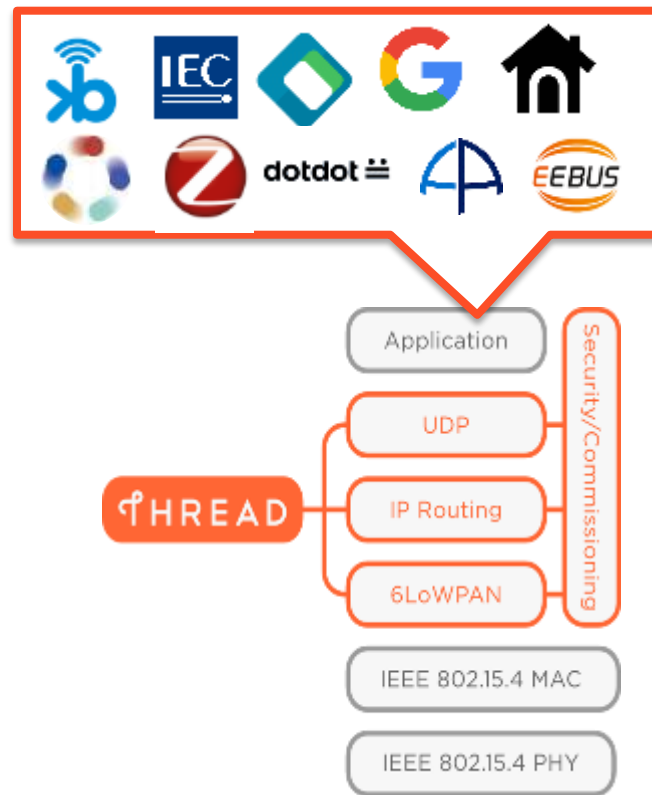
ᎢHREAD GROUP | Defining the IoT Product

What is the environment?

- Home, Commercial, Professional, Personal?

- Number of devices to support?

Is it standalone or part of an ecosystem?

- A proprietary ecosystem?

- Established industry ecosystem or ecosystems?

- Is it a single product or a system?

What is this product connecting to?

With Thread and IP you are not forced to choose a single link technology to the exclusion of all others.

Network Links
Choose One

- ◉ Thread
- ○ WiFi
- ○ Ethernet
- ○ Bluetooth
- ○ Cellular
- ○ DOCSIS
- ○ DSL

Choose the right link technologies for your product and customer

Choose the right application layers appropriate for the:

Resources of your product

Ecosystems your customers want to access

Network Links
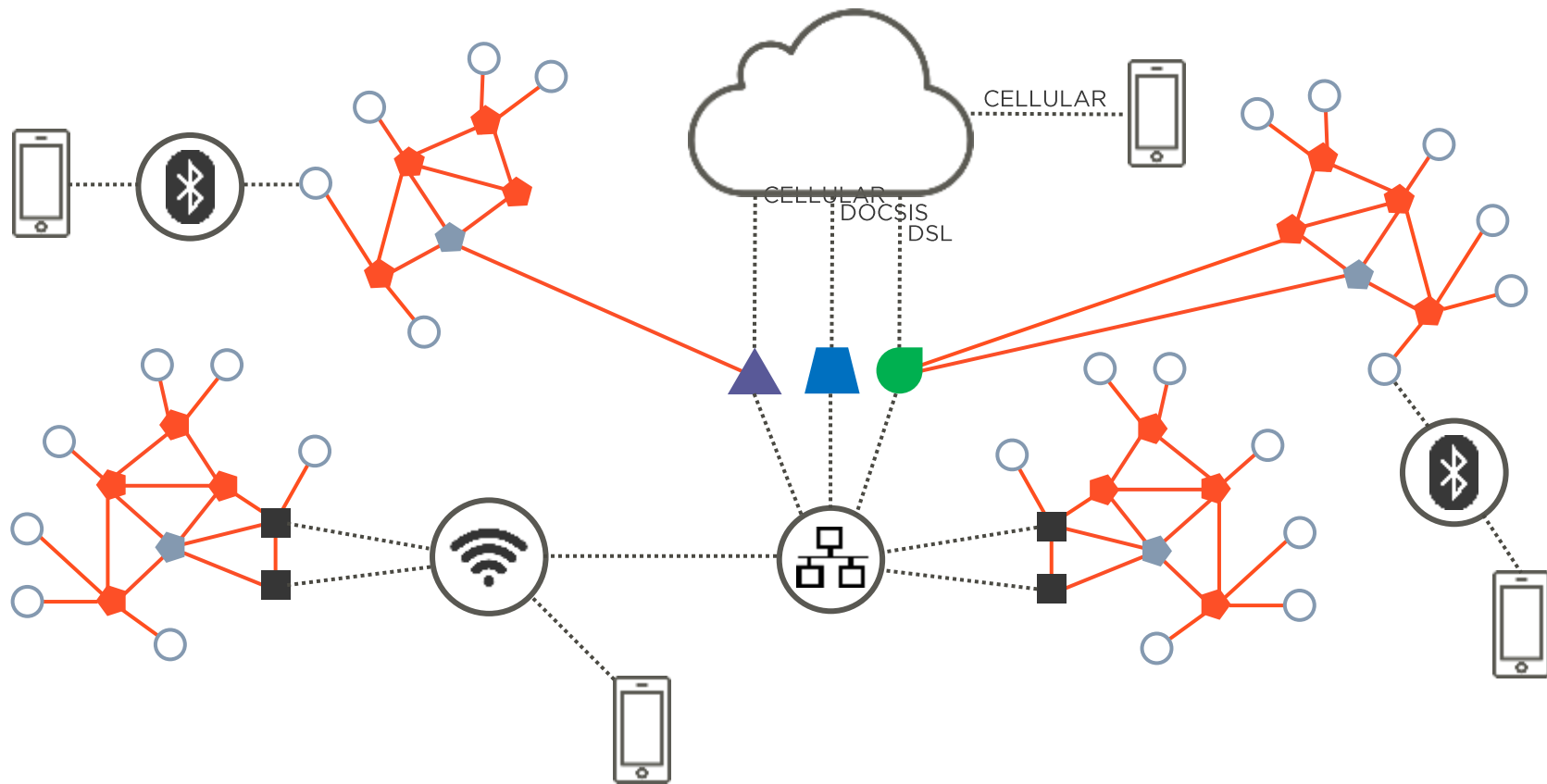Choose Any

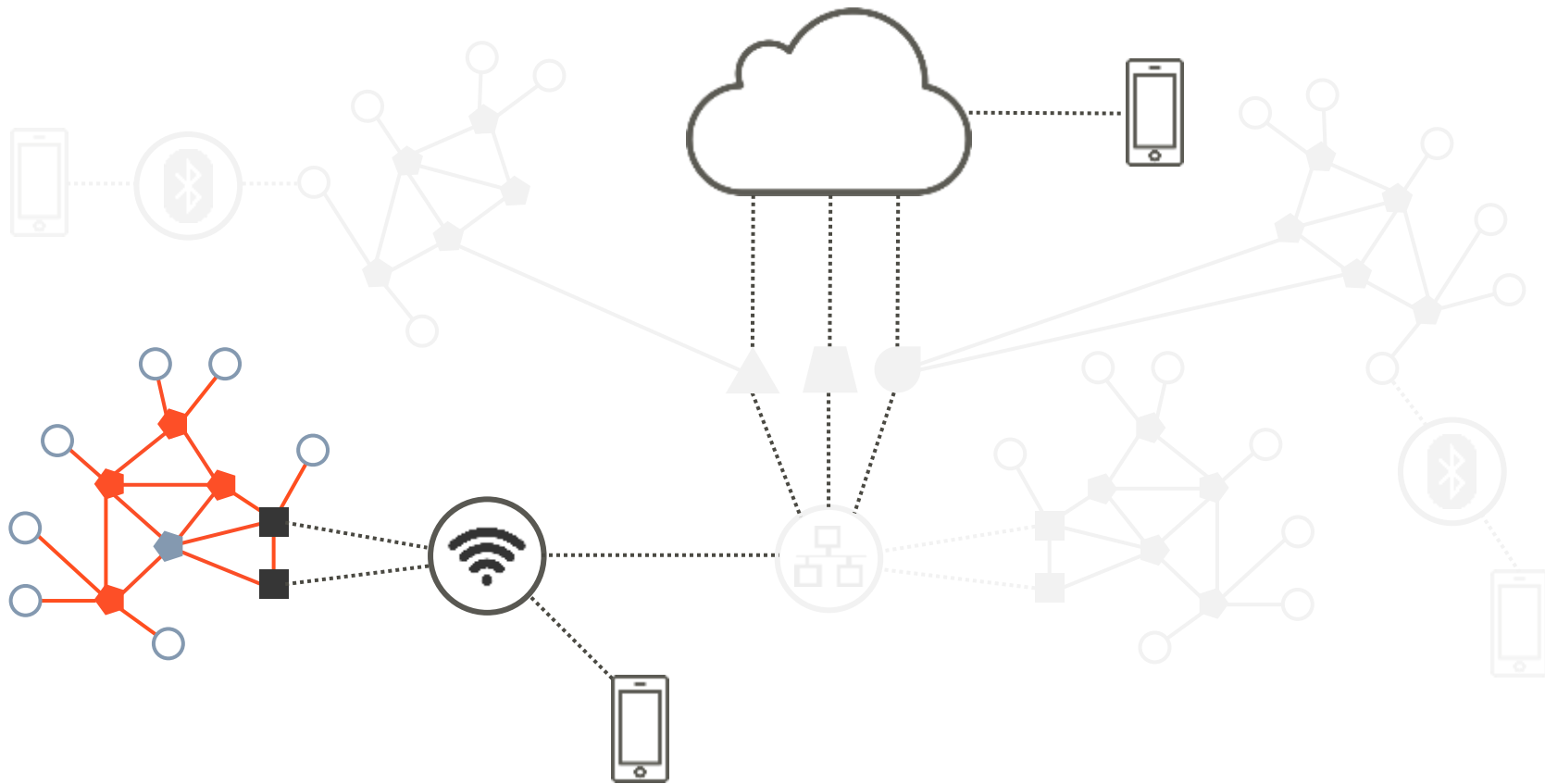☑ Thread
☑ WiFi
☐ Ethernet
☐ Bluetooth
☑ Cellular
☐ DOCSIS
☐ DSL

THREAD GROUP | **Thread + One**

CELLULAR

CELLULAR
DOCSIS
DSL

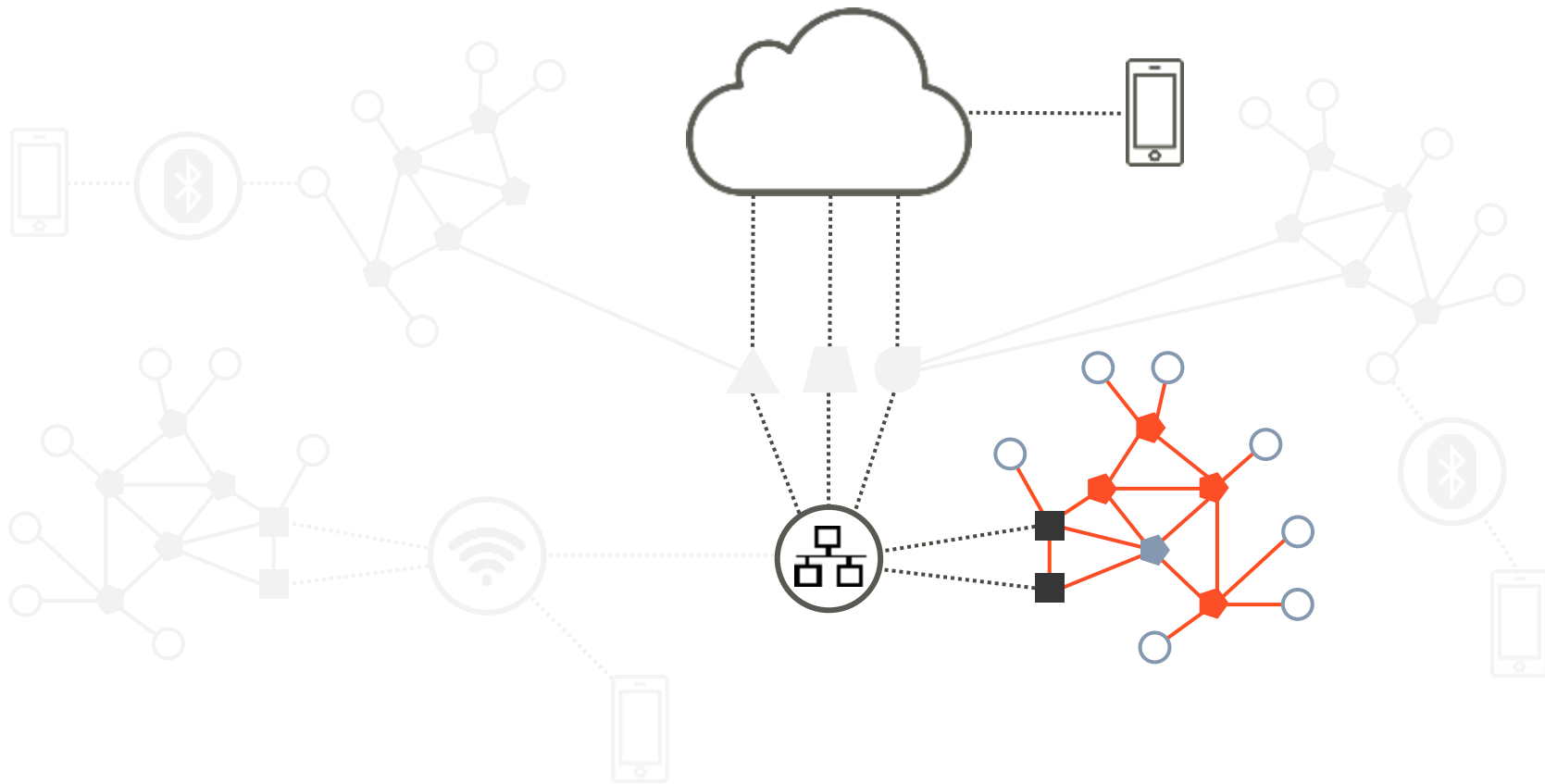ФHREAD GROUP | Thread + WiFi

THREAD GROUP | Thread + Ethernet

THREAD GROUP | Thread + Internet & Telecommunications

CELLULAR

CELLULAR
DOCSIS
DSL
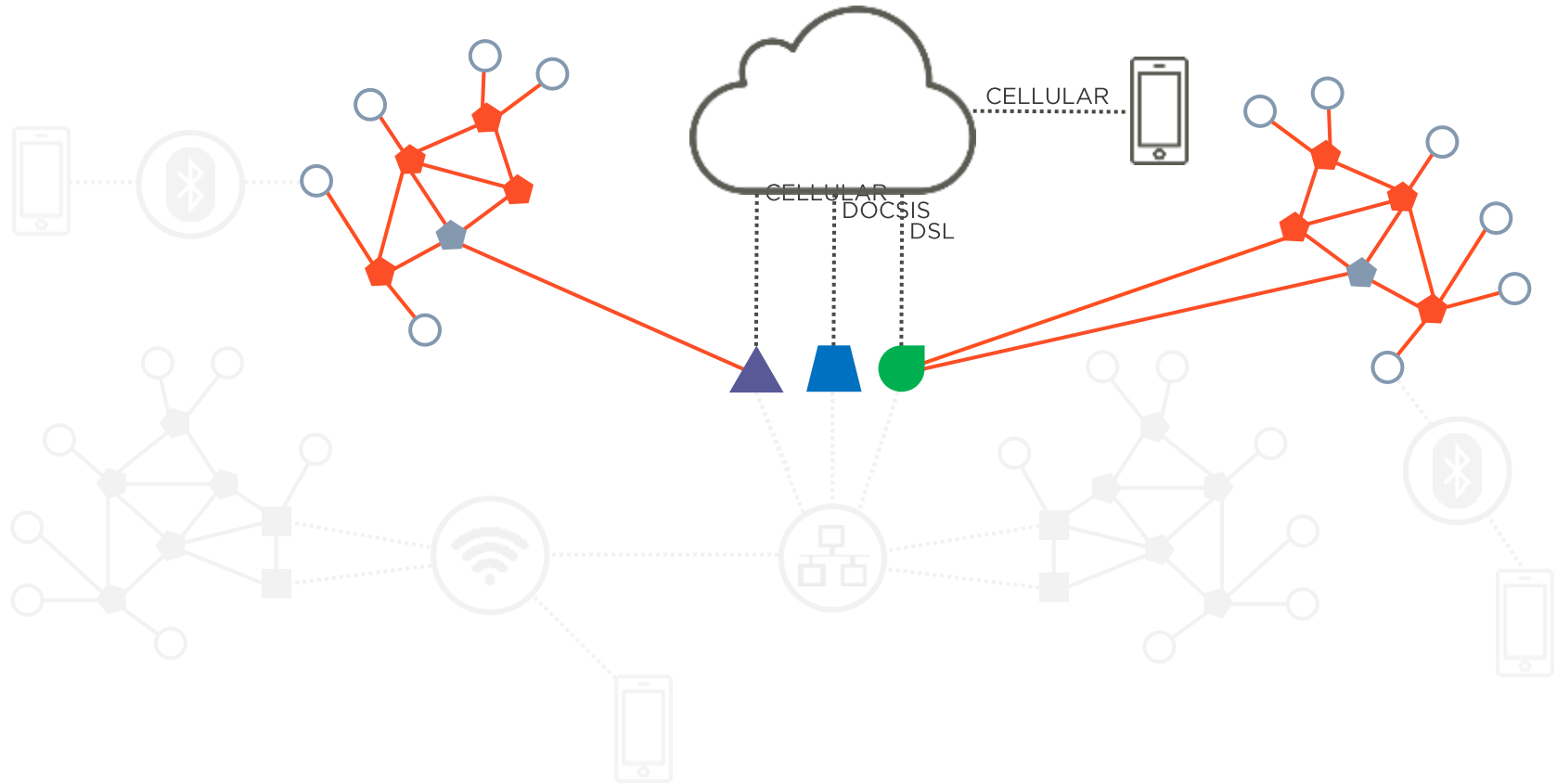
THREAD GROUP | **Thread + Bluetooth**
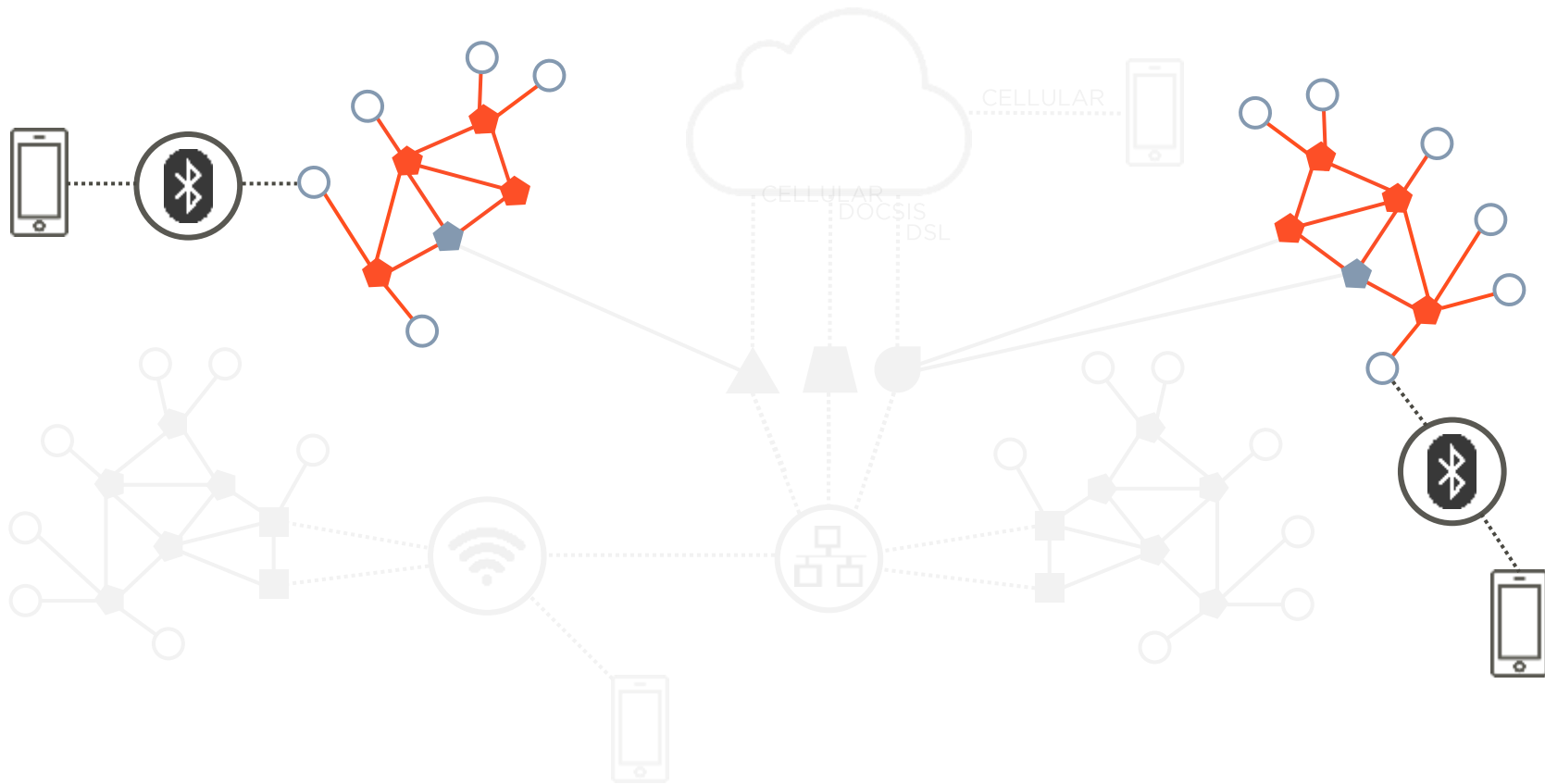
ᚦHREAD GROUP | Which ONES do you choose?

	Wi-Fi 802.11 a/ac/b/g/n	Wi-Fi 802.11 ah (HaLow)	BLE 4.x+	BLE Mesh v1	ZigBee 3.0	Z-Wave Plus	ULE	Thread
Range	Medium	Long	Short	Short	Short	Short	Short	Short
Topology	**Star**	**Star**	**Star**	**Flood**	Mesh	**Mesh**	**Star**	Mesh
Bandwidth	High Mb/s	Medium Kb/s	**Low Kb/s**	**Low Kb/s**	Medium Kb/s	**Low Kb/s**	**Low Kb/s**	Medium Kb/s
Band(s)	2.4 GHz 5.0 GHz	Sub-GHz	2.4 GHz	2.4 GHz	Sub-GHz 2.4 GHz	Sub-GHz	1.9 GHz	2.4 GHz
Frequency Hopping	No	No	Yes	Yes	No	No	Yes	No
Power Requirements	**High**	Low	Low	Low	Low	Low	Low	Low
Open Standard	✔	✔	✔	✔	✔	✘	✔	✔
Support for IPv6	✔	✔	**Targeted at 4.1+**	✘	✘	✘	**Planned**	✔
Application Layer	Multiple Concurrent	Multiple Concurrent	Native Singular	Native Singular	Native Singular	Native Singular	Multiple Concurrent	Multiple Concurrent
Use Cases	A/V equipment, mains-powered devices	Connected home products, mains- and battery-powered devices, A/V	One-to-one connections for portable devices or automotive speaker systems	Data, IoT devices built for the home.	Mission critical devices, such as security, on their own network	Security	Telephony, Physical Security, Home Automation (based on DECT)	Mission critical IoT devices built for the home and beyond
Benefits	Used almost universally in commercial and residential spaces	A more power-conservative, longer-range, sub-gig version of Wi-Fi	A power-conservative, user-friendly solution for control of devices tethered to your phone	A mesh version of BLE designed for collections of products	A purpose-built, device-to-device connectivity solution	A secure and closed device-to-device solution for connected products	Long-range, secure, low-latency, audio-capable	IP-addressable, low-bandwidth, secure mesh network designed to support today's connected devices
Silicon Availability	Broad	**None**	Broad	Broad	Broad	**Single**	Broad	Broad

THREAD GROUP | Solution for IoT

AVAILABLE NOW

Spec is available publicly

Certification program released to members with fast-ramp tools

Four certified stacks to choose from

Thread membership gives rights to use the IP

SECURE

Link layer security

All network traffic is encrypted

Only authenticated nodes can join the network

User-friendly commissioning

SCALABLE

Large number of nodes

Low latency

Border Router to expand to the internet and other networks such as Ethernet, Wi-Fi, and Cellular Commissioning multiple devices

15 channels allowing separation of neighboring networks

INTERNET PROTOCOL

Device-to-device, device-to-mobile, device-to-cloud

Many application choices

Multiple ecosystems

No hub needed

End-to-end security

Eases of development

Understood & available network management tools

Standards based

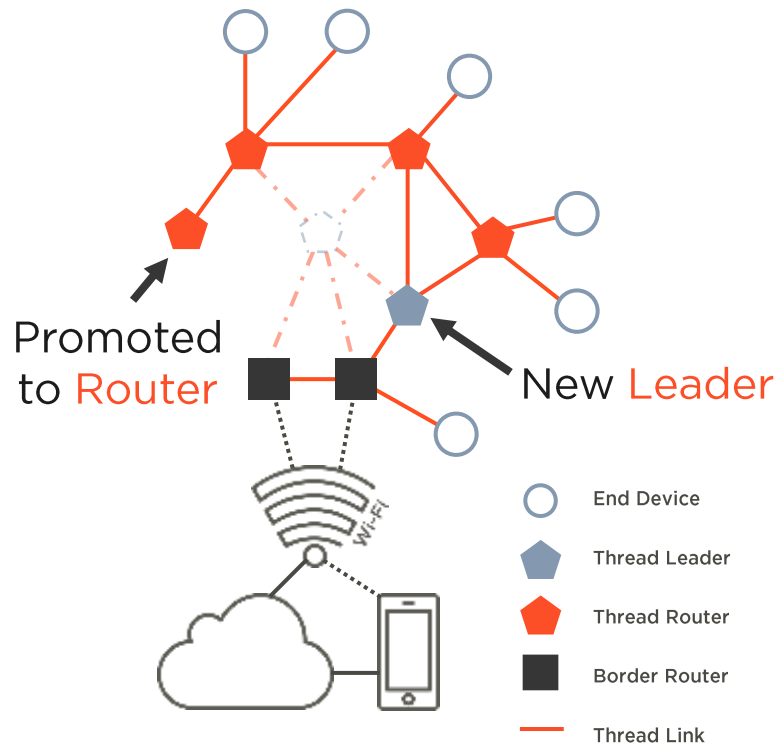## RELIABLE

True mesh network

No single point of failure

Self-healing
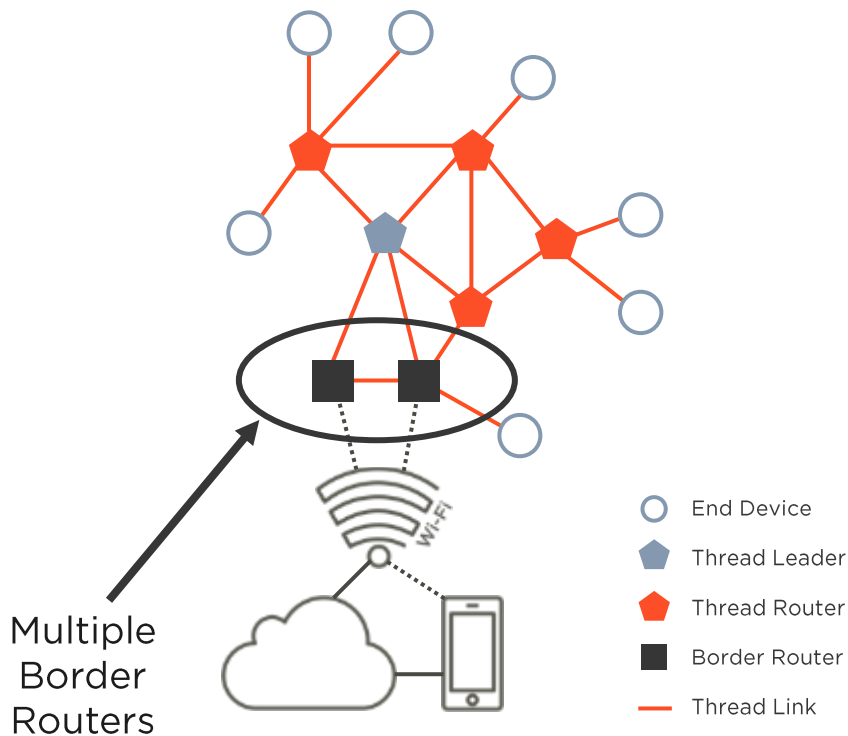
Better end user experience

Lower support structure required

Thread is more than a connectivity technology, it's a flexible and future-proof IoT network technology

ᎦHREAD GROUP | Robust: No Single Point of Failure

Promoted
to Router

New Leader

- End Device
- Thread Leader
- Thread Router
- Border Router
- Thread Link

- Dynamic Leaders

  - If Leader fails, another Router will become Leader

- Router Promotion

  - Leader can promote Router Eligible devices to Routers to improve connectivity if required

𝕮THREAD GROUP | Robust: No Single Point of Failure

Multiple Border Routers

Legend:
- End Device
- Thread Leader
- Thread Router
- Border Router
- Thread Link

- Multiple Border Routers can be used for off network access

  - Devices operate without Border Router

- What can be a Border Router?

  - Anything with an 802.15.4 radio and another physical layer

    - Home Wi-Fi router

    - Set top box

    - Smart Thermostat (802.15.4 and Wi-Fi)

Getting Started Now

THREAD DEVELOPMENT ECOSYSTEM

Ready to get started? Many members offer a variety of products & services to help you built your Thread solutions.
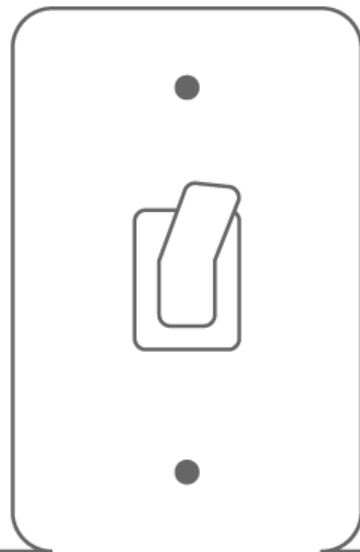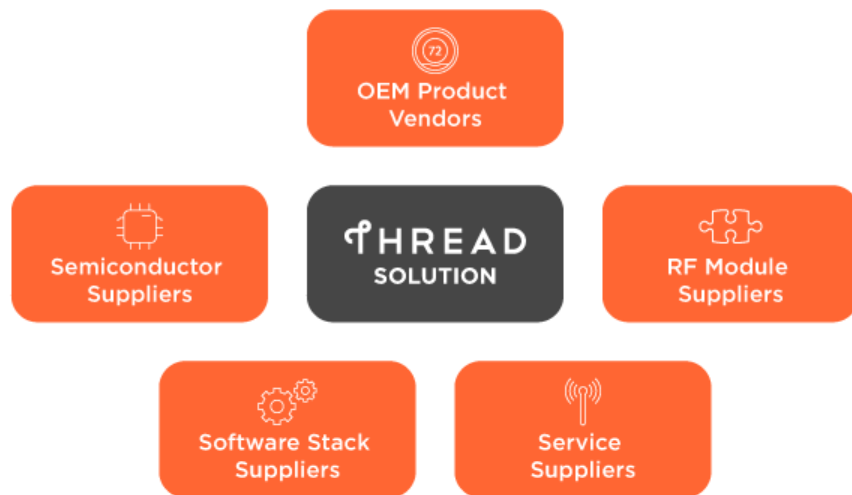
THREAD CERTIFIED PRODUCTS

The following Thread Group Certified Products and Components are available.

ARM mbed OS (NXP FRDM-K64F + Atmel ATZB-RF-233)

ARM mbed OS is an open source embedded operating system designed specifically to facilitate the creation and deployment of commercial, standards-based IoT solutions at scale. mbed OS features full support for Thread to simplify development of secure IoT applications in the home and to ease Thread product certification. Product Link

NXP Kinetis Thread Stack (KW2xD)

NXP's Kinetis Thread Stack is a complete, robust and scalable certified stack, architected and tested to meet the most demanding product requirements including very low power end nodes, large Thread networks and gateway solutions. The stack is available across multiple NXP microcontrollers and easily connects to host processors to create Thread Border Router solutions. Product Link

NXP Kinetis Thread Stack (KW41Z/21Z)

NXP's Kinetis Thread Stack is a complete, robust and scalable certified stack, architected and tested to meet the most demanding product requirements including very low power end nodes, large Thread networks and gateway solutions. The stack is available across multiple NXP microcontrollers and easily connects to host processors to create Thread Border Router solutions. Product Link

OpenThread (TI CC2538)

OpenThread, released by Nest and supported by Google, is an open-source implementation of the Thread networking protocol. It is a highly portable library that is OS and platform agnostic with a radio abstraction layer that is supported on multiple platforms. Product link

Silicon Labs Thread stack (EM35x)

The Silicon Labs Thread stack is a robust implementation of the Thread 1.1 protocols suitable for field deployment and certified on the EM35x platform. Product link

↑HREAD GROUP | Development Partners

RF Module Suppliers

- FCC and Thread Certified RF hardware modules to plug into your design

- A number of vendors also offer certified turnkey hardware solutions to complement your design (e.g., border routers)

- Some also offer software and/or design services

CEL

CENTERO

DIGI™

Linx TECHNOLOGIES

MMB Networks

muRata INNOVATOR IN ELECTRONICS

RIGADO

altiux®

7layers testing for a smarter world

ubilogix

runtime.io

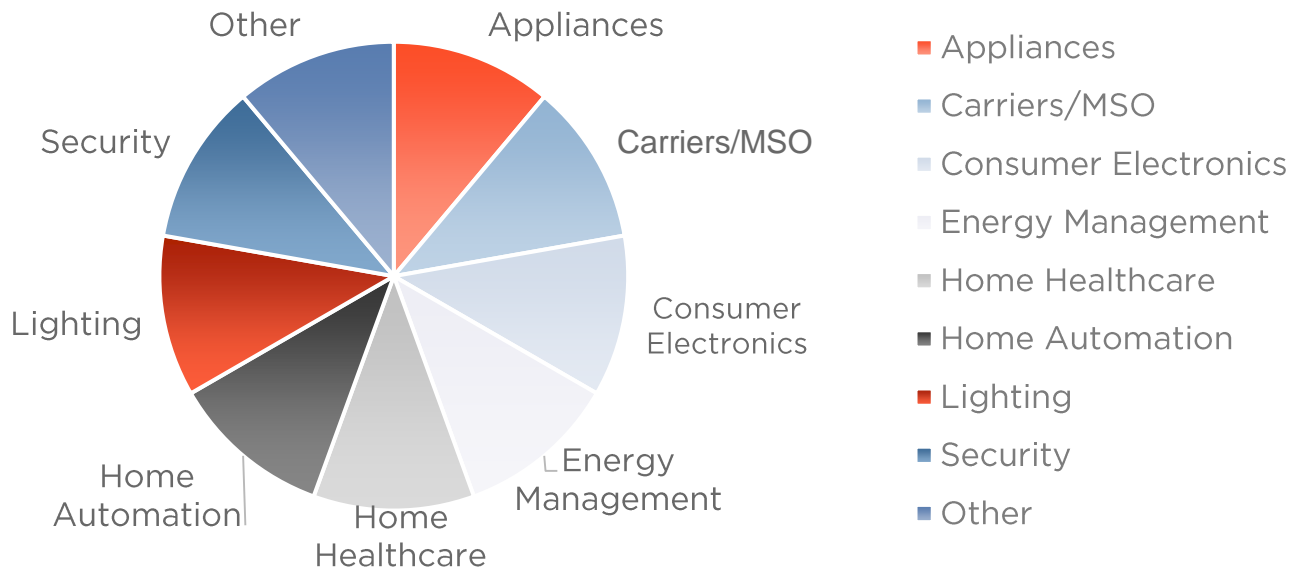**TÜVRheinland®** Precisely Right.

SGS

Service Suppliers

- Software stack providers or developers

- Software system integrators - integration of all networking and application layer technologies

- Manufacturing

- Hardware design

- Network testing

ꓭHREAD GROUP | OEM Product Vendors

- Thread Group OEM product vendors represent many different markets and applications

- Create a unique ecosystem or join an existing ecosystem by working with other OEMs

Legend:
- Appliances
- Carriers/MSO
- Consumer Electronics
- Energy Management
- Home Healthcare
- Home Automation
- Lighting
- Security
- Other

ꟻHREAD GROUP | Connect with Thread Members

Navigate the Thread Ecosystem through the Member page on threadgroup.org

OUR MEMBERS

Industry :   [All   ▾]
Segment :   [All   ▾]
Region :   [All   ▾]
Membership Level : [All   ▾]

            [Search]   [Clear All]

↑THREAD GROUP | **Thread Resources**

Thread White Papers

Thread Spec

Thread Videos

Thread FAQs

WHITE PAPERS

Thread Overview [pdf]

6LoWPAN [pdf]

Security & Commissioning [pdf]

JUMP TO ALL WHITE PAPERS

SPECIFICATION

Download the Spec

FAQ / DEVELOPERS

> What Is Thread And What Does It Do?

> What Kind Of Devices Will Use Thread?

> Will Devices That Use Thread Work With Other Wireless Solutions Such As Zigbee, Bluetooth, Wi-Fi And Z-Wave?

> Is Thread Available Now?

> When Will Thread Certified Devices Be Available?

> What Aspects Of The Wireless Network Does Thread Cover And Not Cover?

> What Does Thread Do Differently In Regards To Security And Commissioning?

End Devices
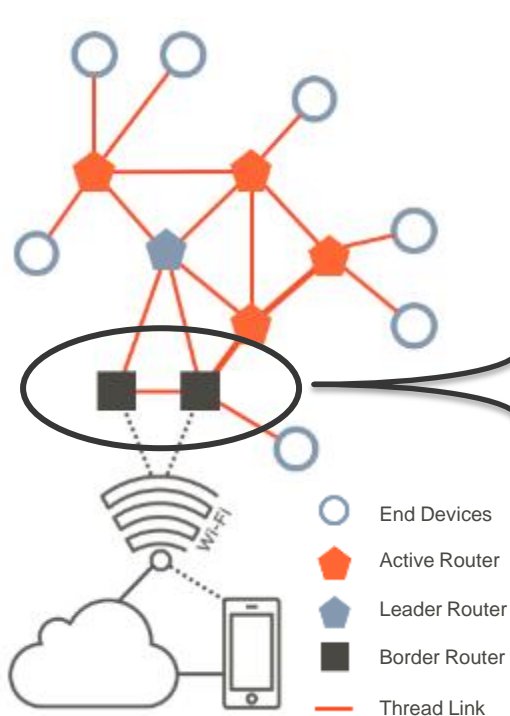Active Router
Leader Router
Border Router
Thread Link

The Border Router:
- A key role of a Thread network that routes traffic from the Thread mesh network to the internet

How to implement a Border Router:
- Create your own product that contains border router functionality (e.g. thermostat, dishwasher, etc.)
- Create a stand-alone border router as an accessory to your product that you can build yourself or work with a Thread member (white label)
- Rely on a border router already in the market, created by another vendor (standalone device, gateway, cable modem, etc.)

The path you pick depends on your product release timeframe and resources available

Altiux	Thread stack using OCF & OMA lightweight M2M on a LED light, gateway and sensor
Dialog	DA1510x product family
Haiku (Big Ass Solutions)	L-series ceiling fan / wall controller
Legrand	Wireless light switches using OCF on Thread
NXP	Thread Modular IoT Gateway & end-node modules controlled by Amazon Tap
Nortek	Garage door controller and door tilt sensor using dotdot on Thread
OSRAM	LED light tube with dotdot on Thread, announcement of a Thread Gateway
Resolution Products	Helix security gateway & door/window sensor with dotdot on Thread
Rigado	Thread border router
Samsung	Thread gateway using OCF on Thread
Schneider	Wiser light switch using dotdot on Thread
Silicon Labs	Smart outlet and proximity sensor – using dotdot on Thread
Texas Instruments	Thread software stack and development kit
Tridonic	Thread module and border router
Yale	Assure door lock using dotdot on Thread

ꟼHREAD GROUP | **Call to Action**

Join Thread Group →

- See how peers in your industry are building their roadmaps around Thread
- Get early visibility to what our members are developing
- Learn about the technology and new features and markets we're addressing
- Participate in and learn from others in our working groups
- Attend member meetings to network with others in your industry, see demos of Thread products in development and engage face-to-face in working group meetings
- Get access to certification and certification tools so you can bring a Thread product to market
- Participate in Thread demonstrations and events to aid in your development efforts
- Be part of Thread marketing outreach efforts to increase awareness of your brand

ᏆHREAD GROUP | Thank You!

Sign up for our newsletter to get quarterly updates

For more information, please connect with us:

- help@threadgroup.org

- www.threadgroup.org

- linkedin.com/company/thread-group

- @TheThreadGroup

- Be sure to check out Thread Group's Blog!

ᏆHREAD MEMBER

For more information about Thread Group,
please visit threadgroup.org or email help@threadgroup.org

THREAD GROUP