

Tech Talks LIVE Schedule – Presentation will begin shortly

tech  lks

Wireless Connectivity Tech Talks



6月23日 · 星期三

瞭解 OpenThread 設計資源和示例
[Get to Know OpenThread Resources and Examples](#)

Recording and slides will be posted to:
www.silabs.com/training

We will begin in

3:00



Speaker



林仕文 (Steven Lin)

資深應用工程師 Sr. FAE, Taiwan



WELCOME

Get to Know OpenThread
Resources and Examples

林仕文 (Steven Lin)



The Leader in IoT Wireless Connectivity



60%

Revenue Based
on IoT

Bluetooth® Multiprotocol

Proprietary THREAD WiFi

WiSUN zigbee ZWAVE

Breadth and Depth of Wireless IoT Protocols



#1

Share in Mesh



1st

To Market with Multiprotocol,
BLE Mesh, BLE 5.1

matter

Proven IoT Expertise

ember

2012

Software ZigBee SoC

ENERGY
micro

2013

Low-power 32-bit MCUs

bluegiga

2015

BT Smart Modules

telegesis

2015

ZigBee/Thread Modules

Micrium®

2016

Software RTOS

ZENTRI

2017

Cloud Connected Wi-Fi

ZWAVE

2018

Smart Home Protocol

REDPINE
SIGNALS

2020

Ultra Low Power Wi-Fi

Thread – The pipeline to the next big thing

Background and Concepts



Thread Background

THREAD
GROUP

Products to communicate with **each other**,
cloud services and the **customer**.

■ Requirements:

- Secure
- Scalable
- Resilient
- Low Power
- IP-Based

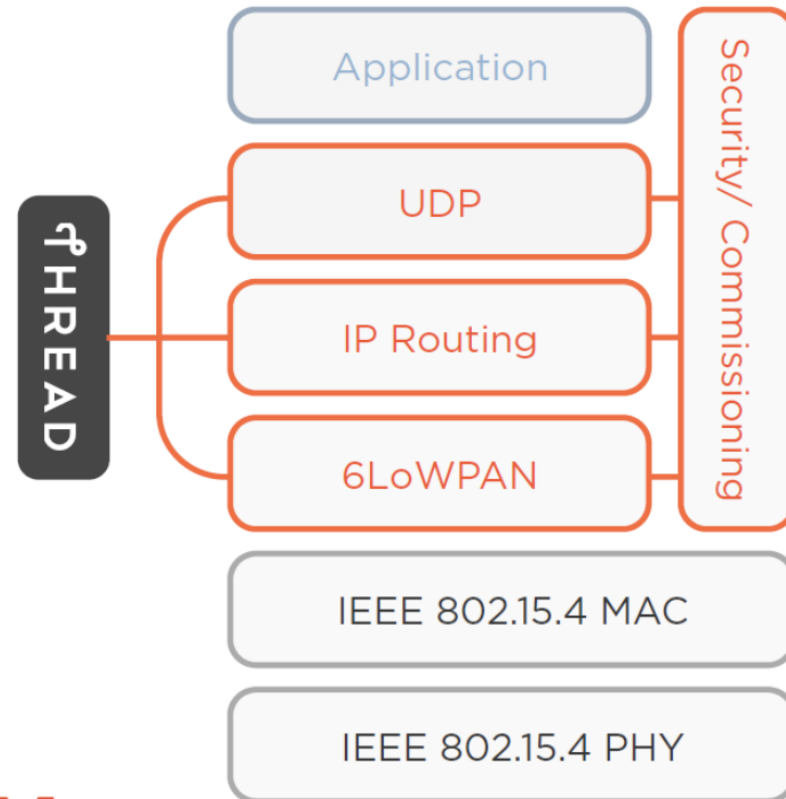


Thread Overview

Build on Existing Technologies

- Same PHY as Zigbee (802.15.4)
 - Fast time to market
- IETF Link layer standards (6LoWPAN)
- Security / Simplicity
- Efficiency
- Thread Specification (1.2)

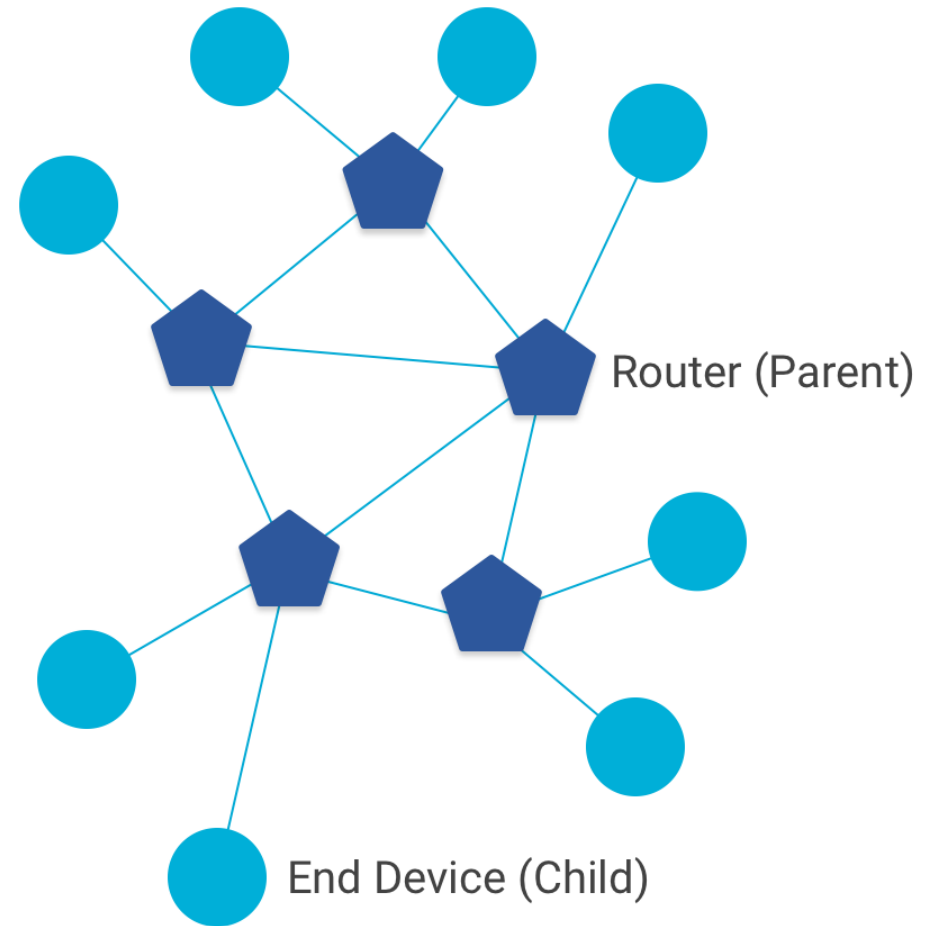
Thread can support many popular application layer protocols



Thread Network Overview

Scalable Mesh Network

- Up to **32 routers** per network
- Up to **511 end devices** per router
- **Parent-Child** relationship



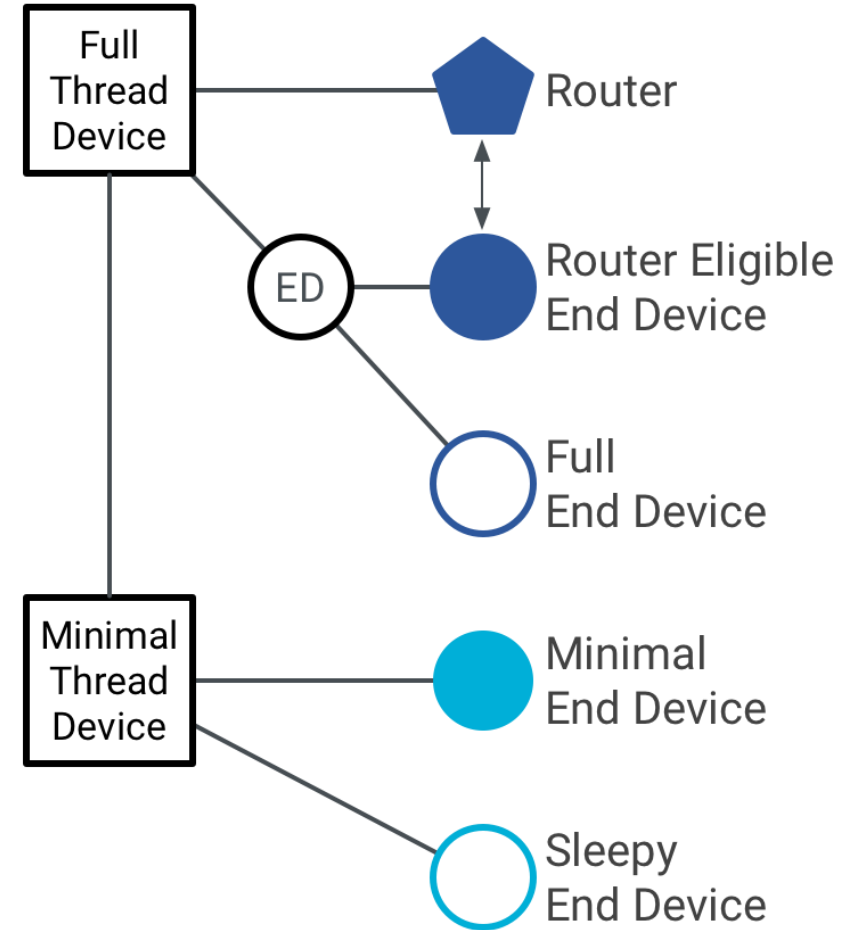
Thread Network Overview

Full Thread Device

- Radio on at all times
- Router multicast address
- 3 main types: **Router, REED, FED**

Minimal Thread Device

- All messages to the parent
- No Router multicast address
- 2 main types: **MED, SED**



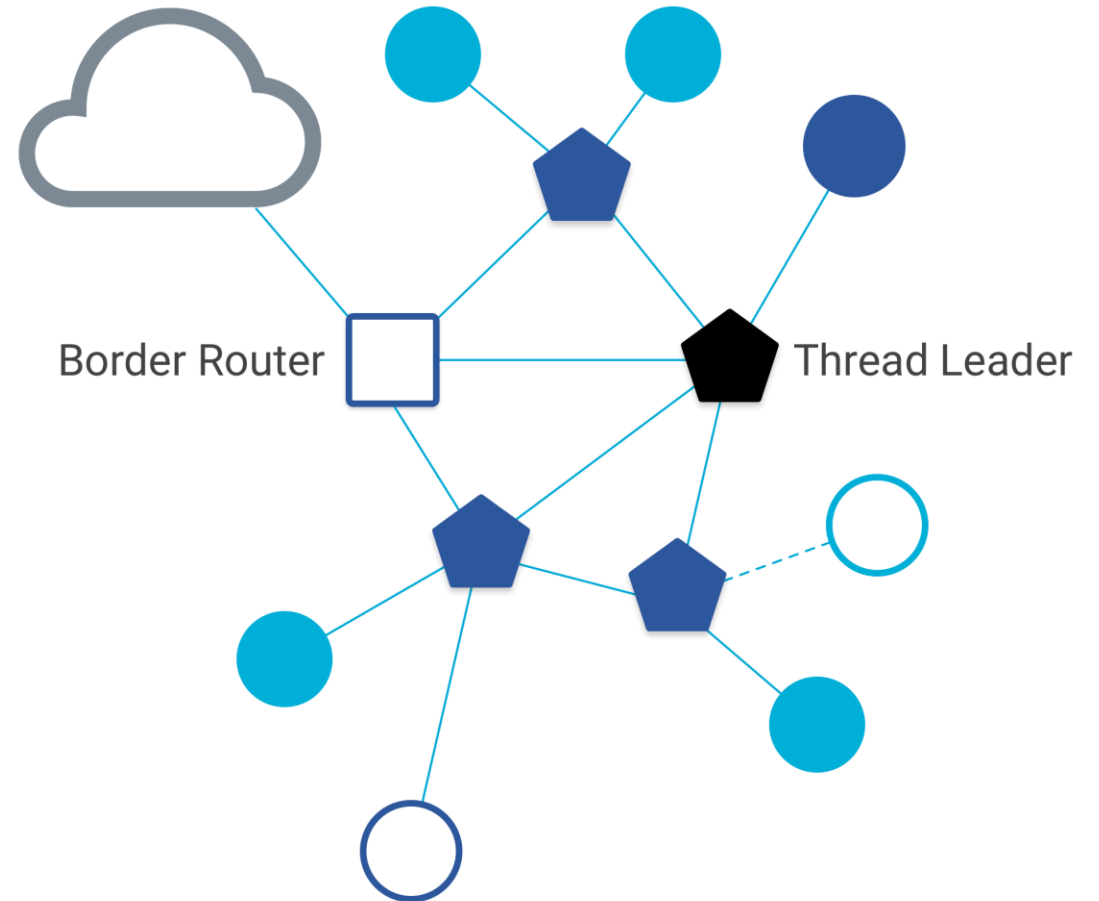
Other device roles

Border Router

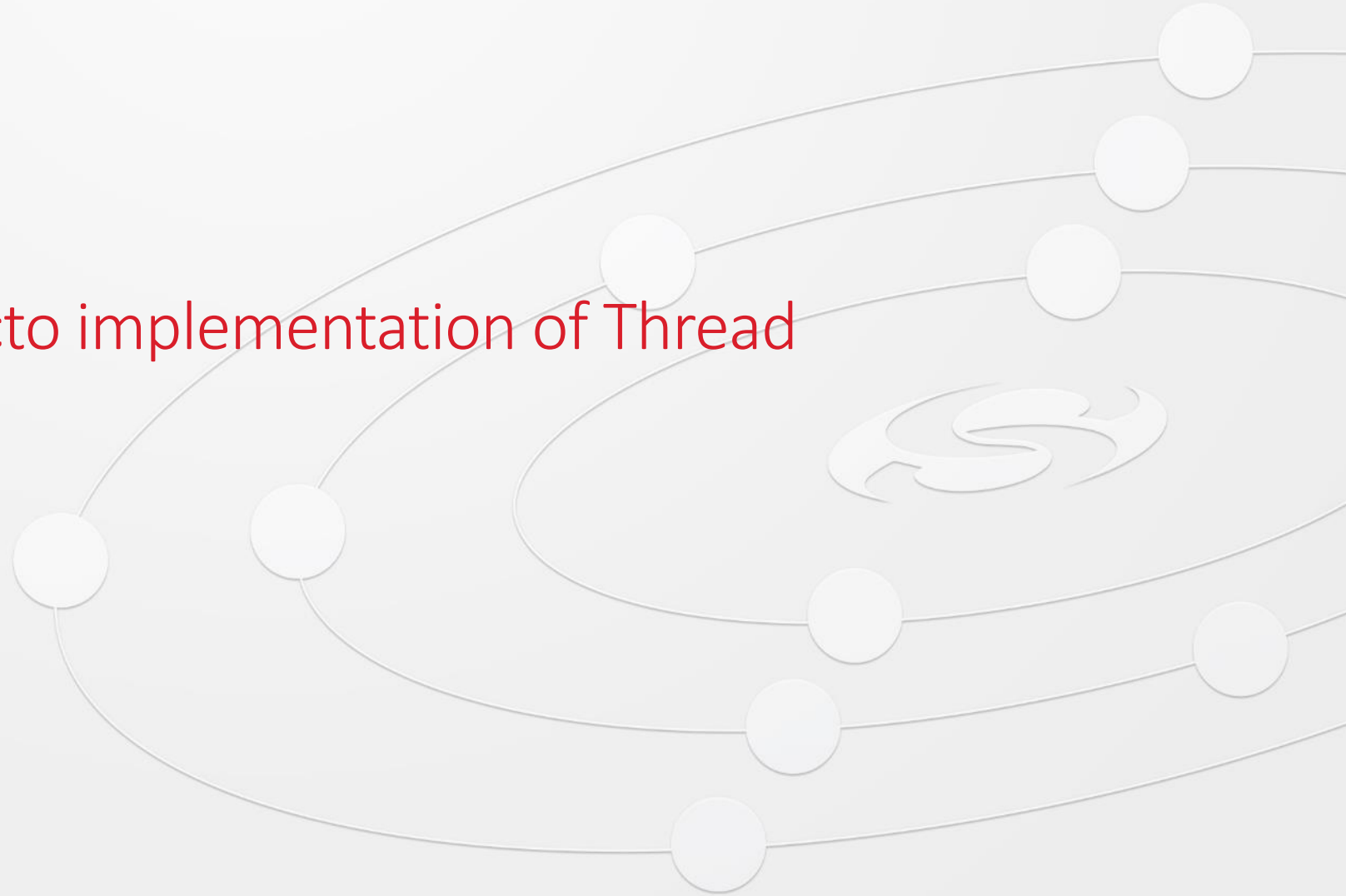
- Bridge between Thread – non-Thread
- Configure external connectivity

Thread Leader

- Manage routers.
- Self elected dynamically.
- Aggregates and distributes network configuration.



OpenThread – The de facto implementation of Thread



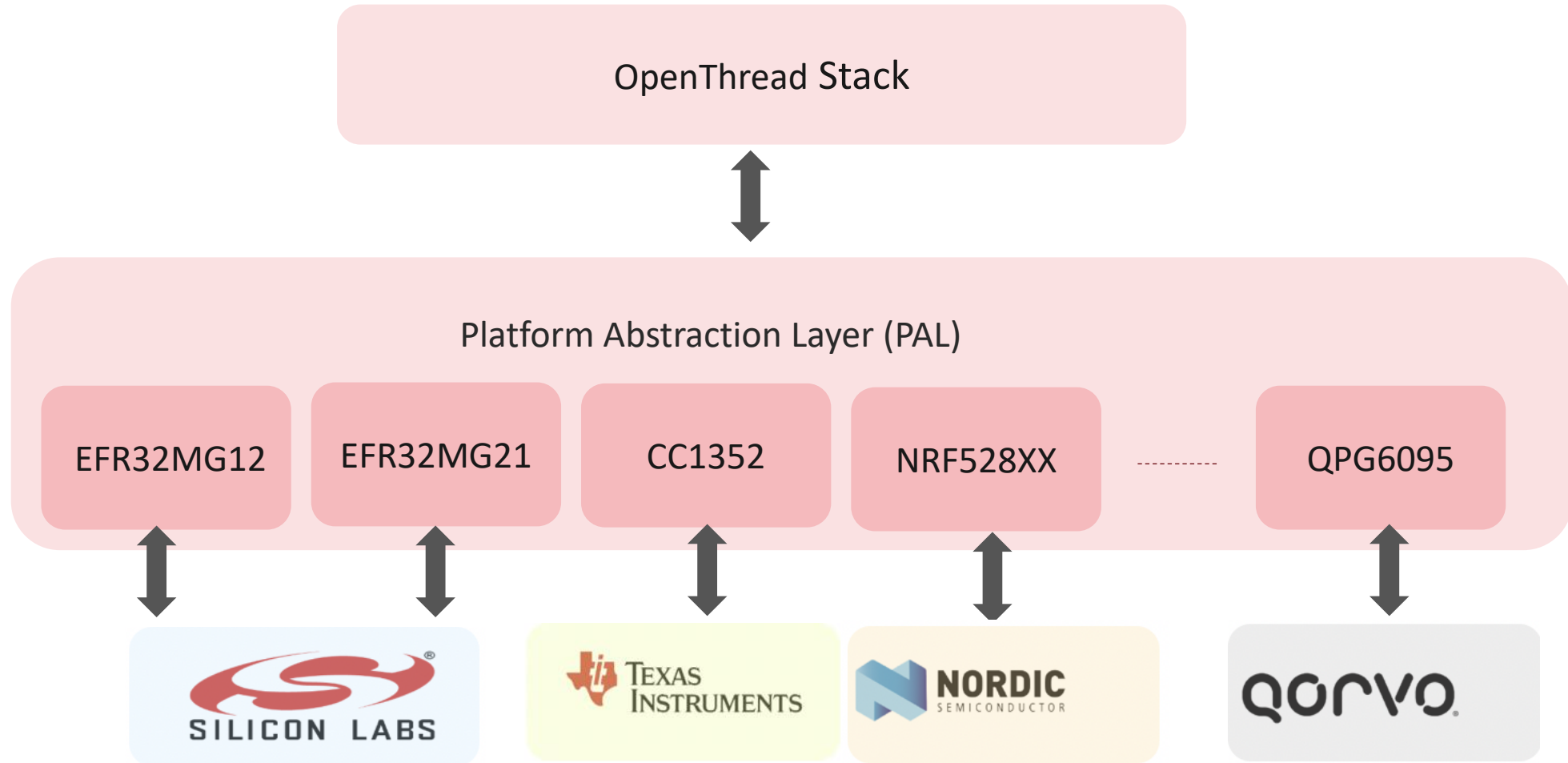
OpenThread

- Open Source, C++ implementation of Thread
- OS and Platform agnostic
- Thread-Certified
- Supported on multiple platforms from different vendors

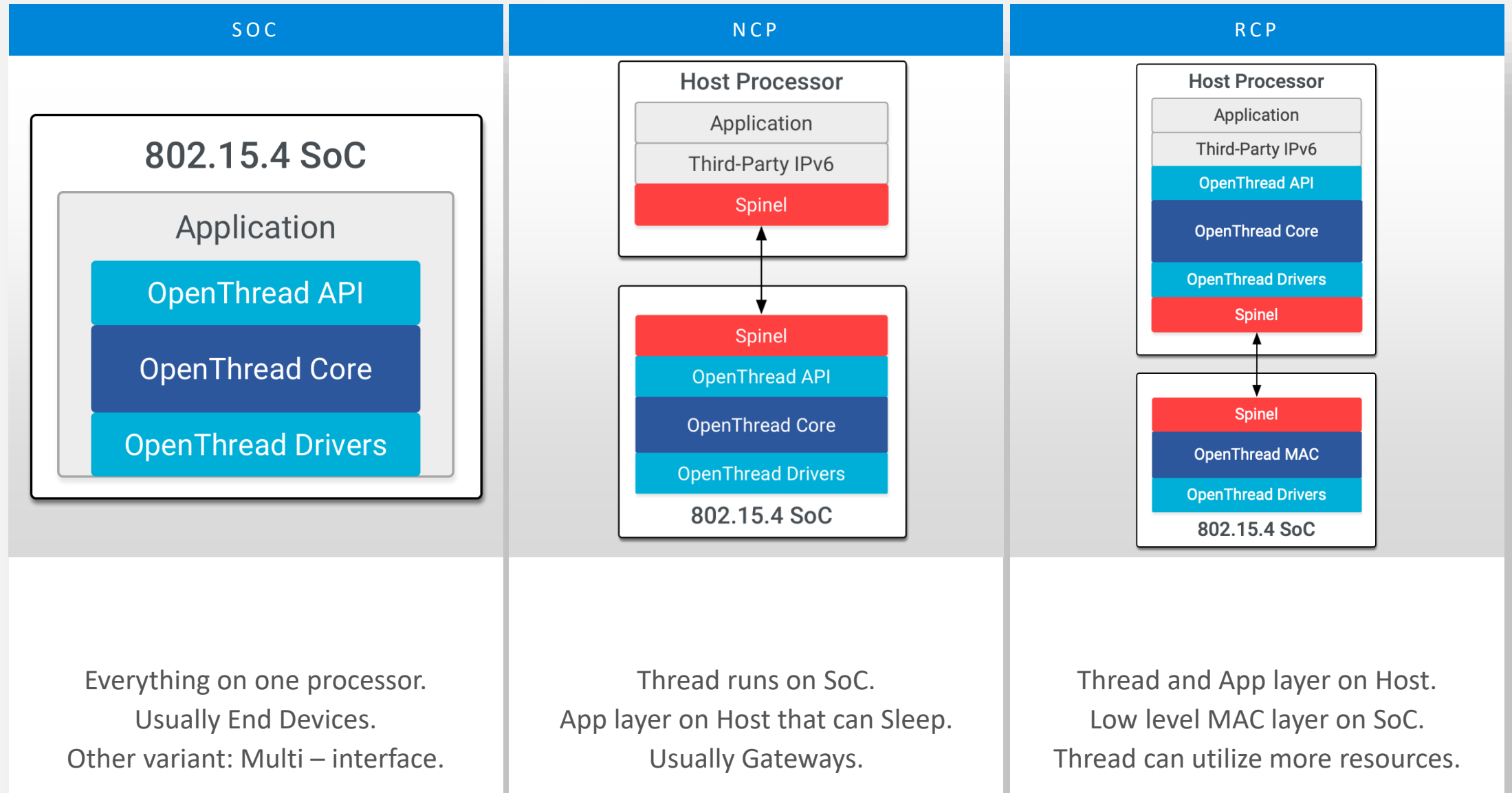
OPENTHREAD
released by Google



OpenThread Architecture



OpenThread Architecture



Get started with Simplicity Studio 5

- Simplicity Studio 5 : <https://www.silabs.com/developers/simplicity-studio>
- Simplicity Studio Tips and Tricks : <https://docs.silabs.com/simplicity-studio-5-users-guide/1.0/additional-information/tips-and-tricks/>

Simplicity Studio 5 installation and sdks update



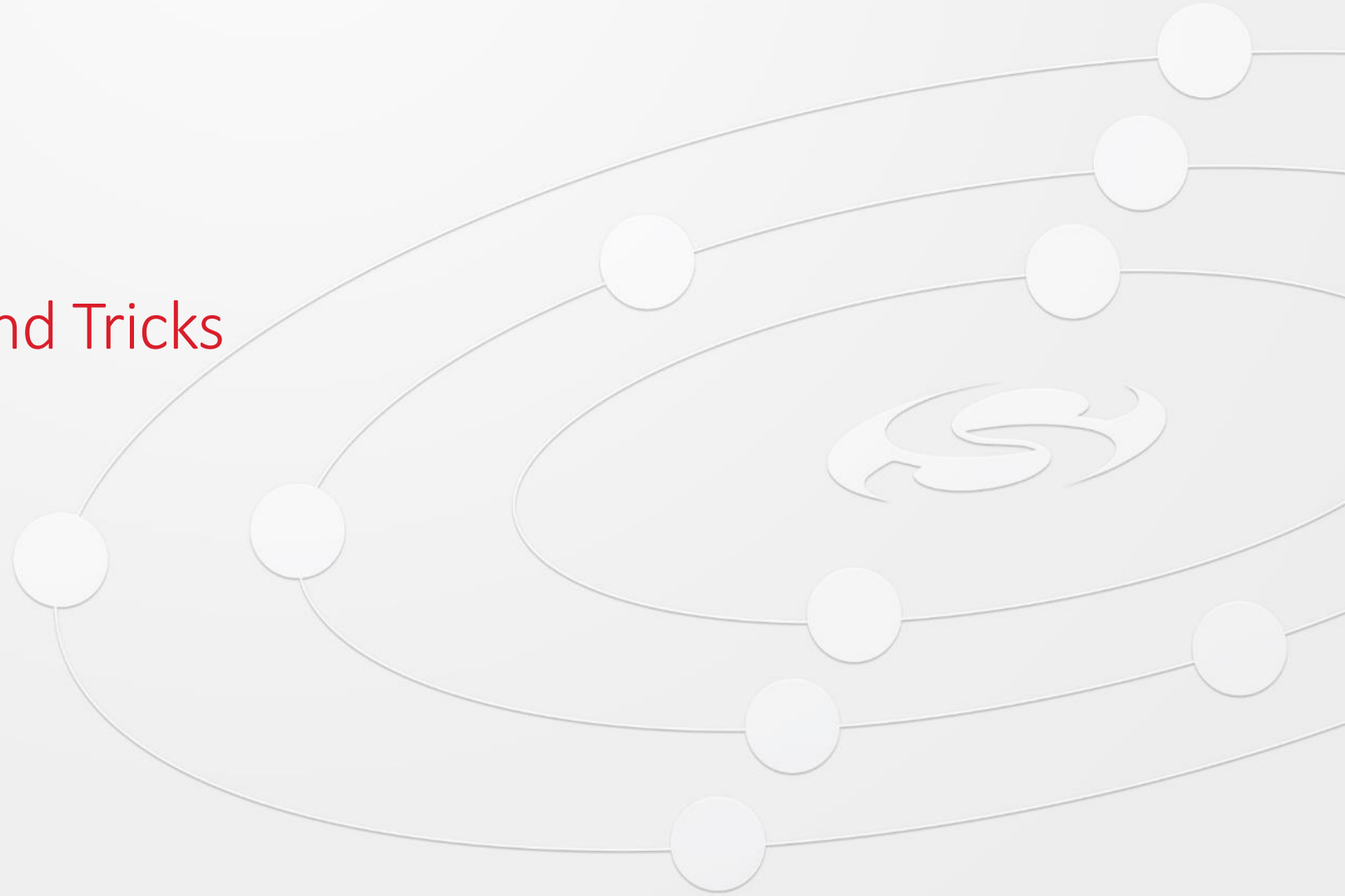


Feedback

Simplicity Studio is the core development environment designed to support the Silicon Labs IoT portfolio of SoCs and modules. It provides access to target device-specific web and SDK resources in the Launcher; software and hardware configuration tools; an integrated development environment (IDE) featuring industry-standard code editors, compilers and debuggers; and advanced, value-add tools for network analysis and code-correlated energy profiling.

Simplicity Studio is designed to simplify developer workflow as it intelligently recognizes all evaluation and development kits released by Silicon Labs and then makes

Simplicity Studio 5 Tips and Tricks



You are viewing documentation for version: 1.0 (latest) | [Revision History](#)

Tips and Tricks

Many of these tips rely on changes in Preferences. This can be accessed through the **Window > Preferences** selection, or the **Preferences** button on the toolbar.

Useful Windows 10 Paths

- Default Install Path: C:\SiliconLabs\SimplicityStudio
- Downloaded location for kit resources: ~\SimplicityStudio\v5\offline\hwtools\boards\
<BRD part number>
- Command line or direct GUI access to Simplicity Commander: ~\SimplicityStudio\v5\developer\adapter_packs\commander
- Bluetooth Mesh SDK location: ~\SimplicityStudio\v5\developer\sdk\blemesh
- Protocol SDK locations for Bluetooth, Flex, Zigbee, and Z-Wave: ~\SimplicityStudio\v5\developer\sdk\gecko_sdk_suite\
<GSDK version>\protocol

Useful MacOS Paths

Get started with OpenThread

- Silicon Labs OpenThread training : <https://www.silabs.com/support/training/introduction-openthread>
- Thread Groups : <https://www.threadgroup.org/>
- OpenThread Project : <https://openthread.io/>
- GitHub OpenThread : <https://github.com/openthread>
- Stack Overflow OpenThread : <https://stackoverflow.com/questions/tagged/openthread>
- Google Groups OpenThread : <https://groups.google.com/g/openthread-users>

QSG170 : Silicon Labs OpenThread Quick-Start Guide



EFR32MG12 2.4 GHz 19 dBm RB, WSTK Mainboard (ID: 000440030464)

OVERVIEW EXAMPLE PROJECTS & DEMOS DOCUMENTATION COMPATIBLE TOOLS

Create New Project

General Information

Connected Via: **J-Link Silicon Labs**
[Configure](#)

Debug Mode: **Onboard Device (MCU)** [Change](#)

Adapter FW: **1v4p6b1171** **Latest**

Preferred SDK:
Gecko SDK Suite v3.1.2 [Manage SDKs](#)

Recommended Quick Start Guides

- [AN1254: Transitioning from the v2.x to the v3.x Proprietary Flex SDK](#)
- [AN1255: Transitioning from the v2.x to the v3.x Bluetooth SDK](#)
- [QSG168: Proprietary Flex SDK v3.x Quick Start Guide](#)
- [QSG169: Bluetooth SDK v3.x Quick Start Guide](#)

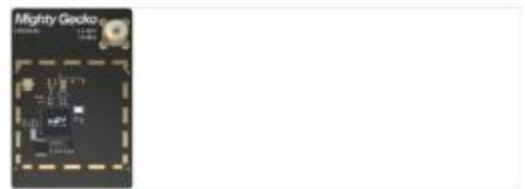
All Quick Start Guides

Board



Wireless Starter Kit Mainboard (BRD4001A Rev A01)

Board



EFR32MG12 2.4 GHz 19 dBm Radio Board (BRD4161A Rev A02)

Target Part



EFR32MG12P432F1024GL125

- EFR32MG12 2.4 GHz 19 dBm RB (ID:440030464)
 - EFR32MG12 2.4 GHz 19 dBm Radio Board (BRD4161A Rev A01)
 - Wireless Starter Kit Mainboard (BRD4001A Rev A01)
- EFR32MG13 2.4 GHz 19 dBm RB (ID:440098240)

- My Products
- Enter product name
- My Products 1
 - EFR32MG12 2.4 GHz 19 dBm Radio Board (BRD4161A Rev A01)
 - EFR32MG13 2.4 GHz 19 dBm Radio Board (BRD4168A Rev A01)
 - Thunderboard Sense 2 (SLTB004A)

Debug Adapters: 2

- > EFR32MG12 2.4 GHz 19 dBm RB (ID:440030464)
- > EFR32MG13 2.4 GHz 19 dBm RB (ID:440098240)

Ra... Ev... Co... Dat...

Matter – The makeup of the IoT Smart Home

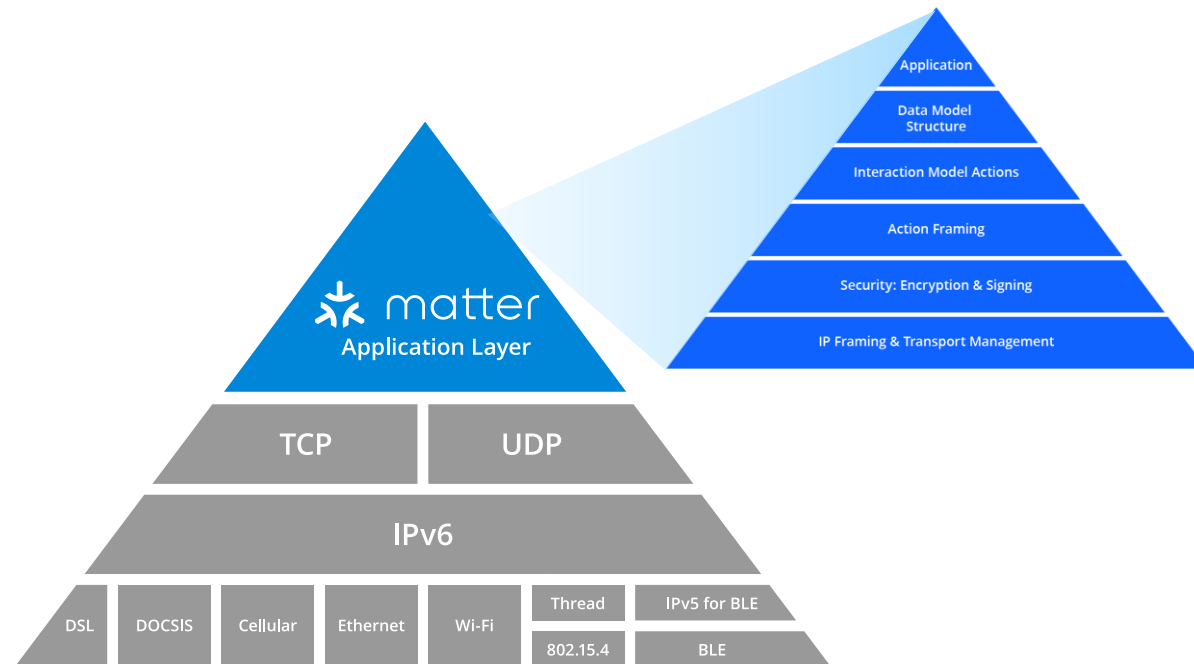


Matter Overview



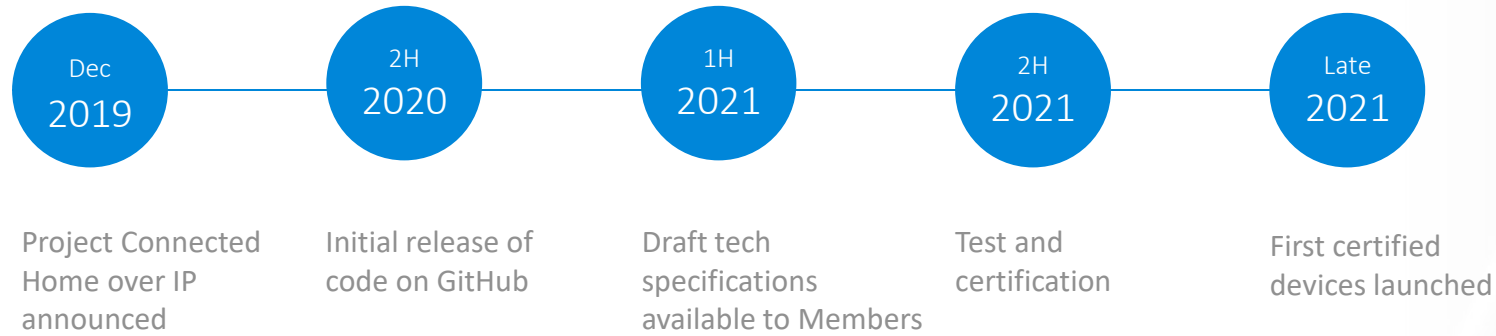
- Project CHIP rebranded to Matter on **May 11, 2021**
- New application layer based on market-tested technologies leveraging multiple network protocols like Wi-Fi, Thread, and Bluetooth
- Improves end user experience by simplifying interoperability between ecosystems & protocols
- Backed by 140+ member companies working to reduce complexities for IoT product developers across smart home & commercial markets

Matter Connectivity Standard

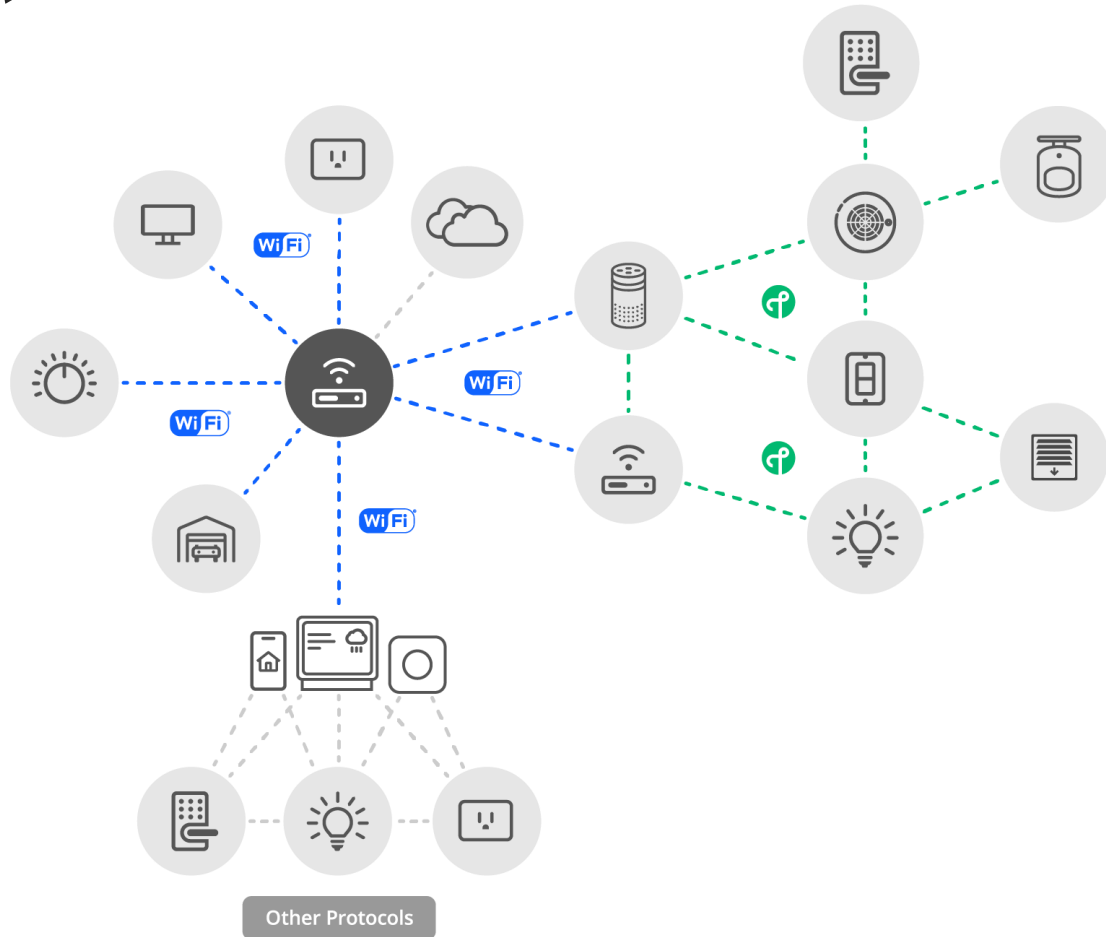


- Development led by key ecosystem vendors
 - Apple
 - Google
 - Amazon
 - And more...
- Common application layer + data model
 - Interoperability, simplified setup & control
- IP-based
 - Convergence layer across all compatible networks
- Secure
 - AES-128-CCM encryption with 128-bit AES-CBC
- Open-source development approach
 - Based on market-proven technologies
- Common protocol across device and mobile
 - Extendible to cloud
- Common data model
 - Core operational functions, multiple device types
- Low overhead
 - MCU-class compute, <128KB RAM, <1MB Flash

Matter Target Milestones and Timeline



Network Topology



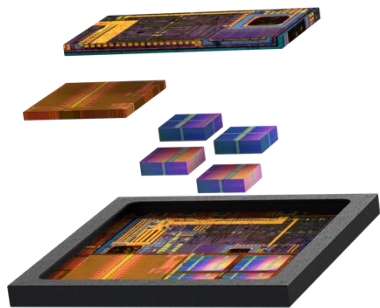
- Devices are commissioned onto a Matter network via Bluetooth
- Matter devices connect to the network over Wi-Fi or Thread
- Thread devices connect to other IP networks through Border Routers
- Bridges can link to other protocols like Zigbee and Z-Wave

Silicon Labs Matter Solution

THREAD

Bluetooth®

WiFi®

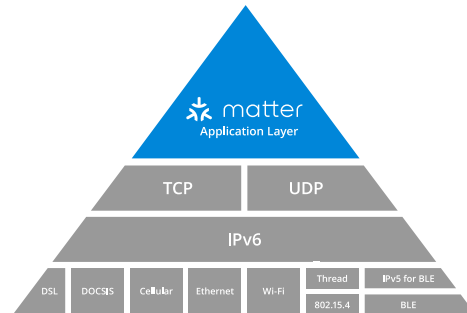


HARDWARE

Field Proven SoCs & Modules
Thread, Bluetooth & Wi-Fi
Certified Thread PHYs



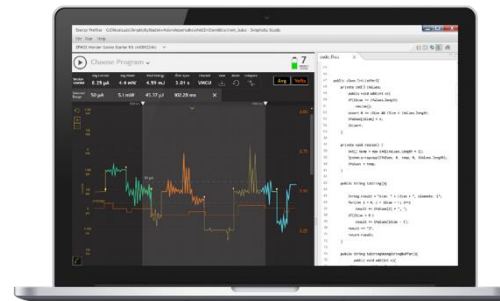
matter



SOFTWARE

One-stop-shop for all software
Full featured Matter solution
Built on top of IP stacks

14
Simplicity
Silicon
Studio 5



TOOLS

Reference Applications
Command Line Interface support
LCD to display QR code

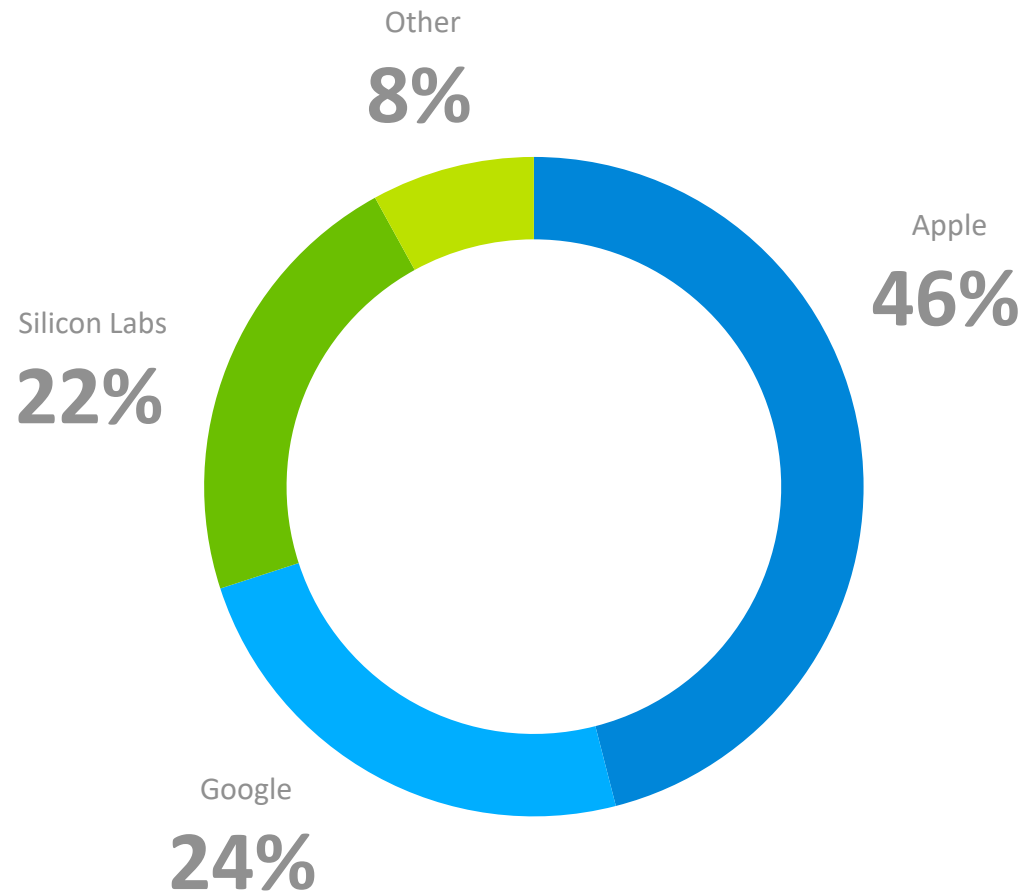


CERTIFICATION

+50,000 Wi-Fi & 802.15.4 end products deployed
Support for end-product certification
Matter certification at end of 2021

Silicon Labs Proven Mesh Networking Expertise

Matter Contributors by Lines of Code Submitted
as of 03-15-2021



Silicon Labs is the 3rd largest contributor to Matter GitHub

- [ZCL parser](#) (ZAP tool)
 - Replaces Application Builder
 - Standalone, no longer tied to Studio
- Ported Zigbee application framework
 - [Framework link](#)
- [Light](#), [lock](#), and [window covering](#) controller examples
 - MG12 and MG21 support

SoC Selection Guidelines for Matter/OpenThread Ecosystems

Use Case	Software Mode	OTA Image Storage	EFR32MG1	EFR32MG13	EFR32MG12	EFR32MG21
			256kB Flash	512kB Flash	1MB Flash	768kB/1MB Flash
			32kB RAM	64kB RAM	256kB RAM	96kB RAM
Gateways	Single Protocol RCP Mode ¹	External Flash	✓	✓	✓	✓
Devices	Dynamic Multi-Protocol w/ BLE SoC Mode	External Flash			✓	✓
		Internal Flash				

EFR32MG12 and EFR32MG21 are the recommended devices for SoCs due to the large Flash requirements
Module support will be included through the GSDK

¹NCP mode is not supported by OpenThread Border Router moving forward

Consult Silicon Labs wireless support team or FAEs before making final architecture decisions.

Get started with Matter

- Silicon Labs Matter : <https://www.silabs.com/wireless/matter>
- CSA (Connectivity Standards Alliance, formerly Zigbee Alliance) : <https://csa-iot.org/>
- GitHub Matter (formerly Project CHIP) : <https://github.com/project-chip/connectedhomeip>

Matter/OpenThread demo with Google Nest Hub Max







智慧家庭



智慧城市



工業物聯網



通用物聯網



works with
BY SILICON LABS
VIRTUAL CONFERENCE

2021年9月14至15日
(美國中部時間, CDT)

Works With 2021
全球IoT開發者大會



workswith.silabs.com



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Community





THANK YOU

Recording and slides will be posted to:
www.silabs.com/training

