Tech Talks LIVE Schedule – Presentation will begin shortly

Tuesday, December 7	**Learn more about Matter Development for the Holidays**
Tuesday, December 21	Secure IoT Products with Custom Part Manufacturing Services (CPMS)

Respond to the poll to enter to win a Thunderboard Sense 2

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

We will begin in: 0:00

WELCOME

Learn More About Matter Development for the Holidays

Brian Rodrigues

The Leader in Short Range IoT Wireless Connectivity

100% — Revenue Based on IoT

Breadth and Depth of Wireless IoT Protocols
- Bluetooth
- Multiprotocol
- Proprietary — 100s of Technologies
- THREAD
- Wi-Fi
- Wi-SUN
- zigbee
- Z-WAVE

#1 — Share in Mesh

1st — To Market with Multiprotocol, BLE Mesh, BLE 5.1

Innovation — Performance, Power, CoEx, Xpress, Modules

ember	ENERGY micro	bluegiga	telegesis	Micrium	ZENTRI	Z-WAVE	REDPINE SIGNALS
2012	2013	2015	2015	2016	2017	2018	2020
Software ZigBee SoC	Low-power 32-bit MCUs	BT Smart Modules	ZigBee/Thread Modules	Software RTOS	Cloud Connected Wi-Fi	Smart Home Protocol	Ultra Low Power Wi-Fi

Matter Overview

- **Project CHIP rebranded to Matter on March 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**

SILICON LABS

Matter Target Applications

Lighting, Electrical

HVAC Controls

Safety & Security

Access Control

TVs

Blinds/Shades

Access Points, Bridges

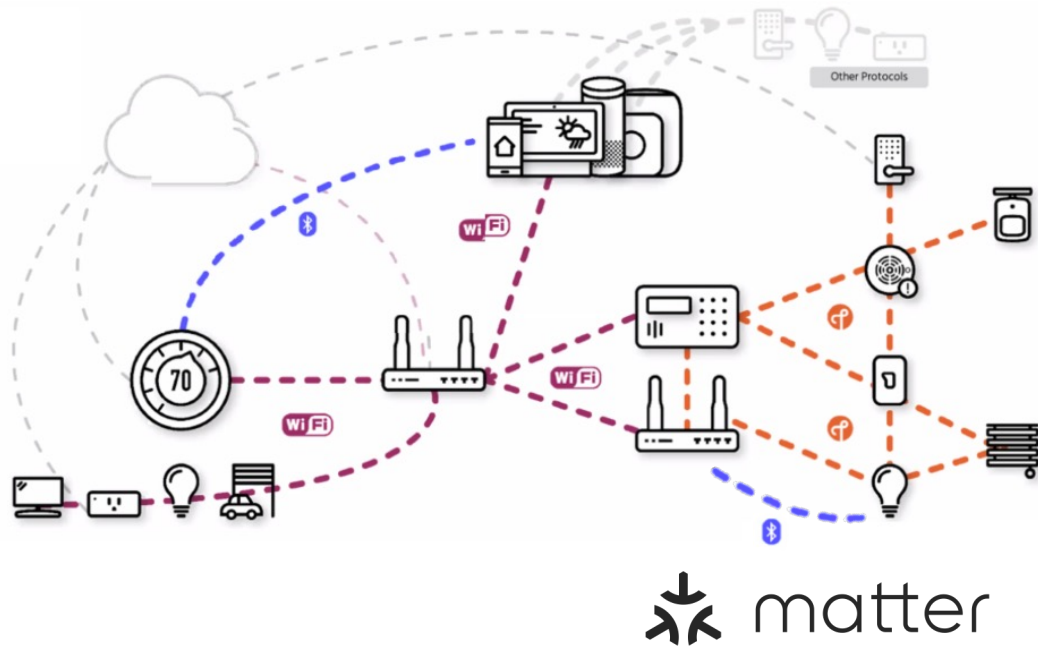Scoping exercises for additional device types and use cases underway and continual.

SILICON LABS

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**

Matter Connectivity Standard Stack

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

*Source code is provided under an Apache v2 license to align with an open and transparent process

SILICON LABS

Protocol & Device Security

Comprehensive

Layered approach

Strong

Well-tested standard cryptographic algorithms such as ECC NIST P256 & AES-CCM-128
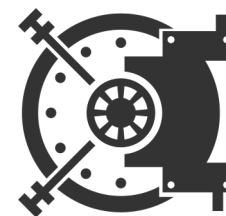
Easy

Improve ease of use ot decrease it

Resilient

Protect, Detect and Recover

Agile

With Crypto-flexibility in mind to address new developments and threats.

Secure Element Subsystem

Security isolation in hardware

True Random Number Generator

Generate keys for proper cryptography

Secure Boot with RTSL

Only boot authenticated firmware

Crypto Engine

Up to 512-bit ciphers and elliptic curves

Secure Debug

Allow enhanced FAs

Secure Key Management

Isolate encrypted keys from application code
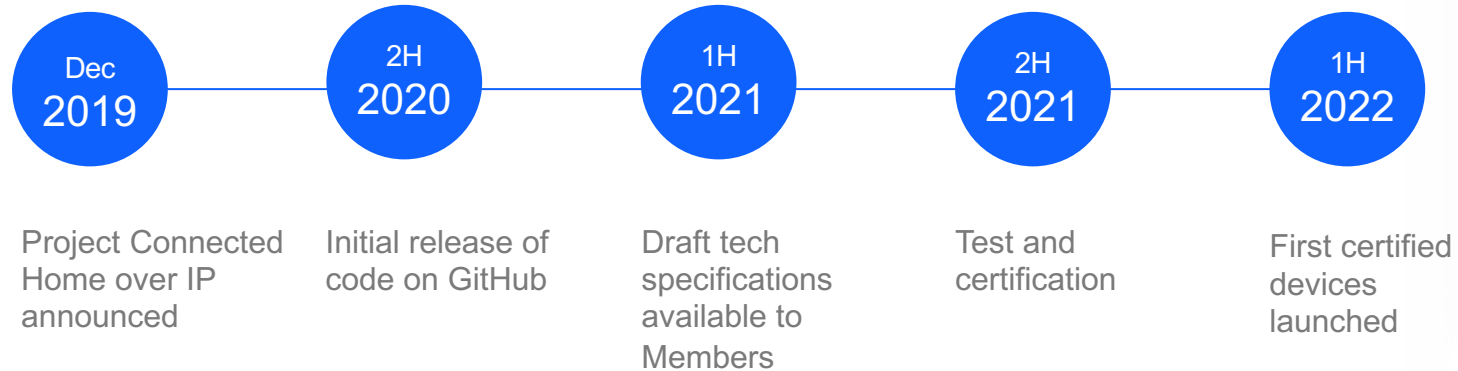
Secure Attestation

Ensure integrity and authenticity

Anti-tamper

Detect tamper and protect keys/data

DPA Countermeasures

Resist side channel attacks

SILICON LABS

Matter Target Milestones and Timeline

Dec 2019
Project Connected Home over IP announced

2H 2020
Initial release of code on GitHub

1H 2021
Draft tech specifications available to Members

2H 2021
Test and certification

1H 2022
First certified devices launched

SILICON LABS

Getting Started with Matter

Magnetism and Proximity
Hall effect Sensor
Silicon Labs Si7210

Computation and Communication
ARM Cortex-M4 multi-protocol radio SoC
Silicon Labs Wireless Gecko EFR32MG12
1MB Flash, 256 KB RAM

Air Quality
Air pollution, air quality and breath analysis
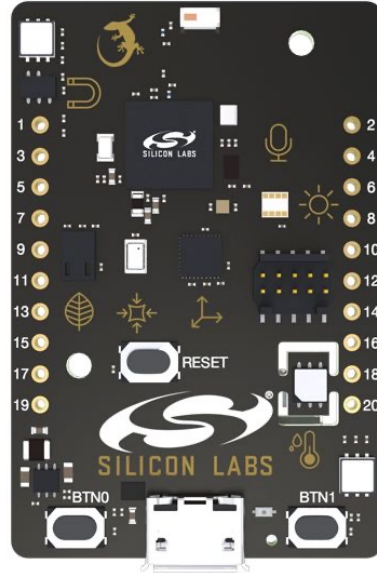Cambridge CMOS CCS811

Pressure
Absolute Barometric Pressure Sensor
Bosch BMP280

Motion Tracking
6-axis gyroscope + accelerometer
TDK InvenSense ICM-20648

USB Program and Debugger
Segger J-Link and bed MSD
Silicon Labs EFM32GG

Audio Sensing
I2S Digital microphone
TDK InvenSense ICS-43434

UV and Light
UV index, ambient light and proximity sensing

Environment Sensors
Precision temperature and relative humidity
Silicon Labs Si7021

User Input and Feedback
2 push buttons and 4 high-power RGB LEDs

Large Memory
8 Megabit low power flash memory
Macronix MX25R8035F

Data Acquisition and Analytics
Open-Source iOS/Android apps & cloud demos
Github.com/siliconlabs

- **Thunderboard Sense 2**
  - Adds EFR32xG12 SoC with 256kB RAM & 1M Flash
  - Supports Thread and Bluetooth
  - Great platform for Matter development
  - Build in sensors
    - ‣ 6-axis inertia
    - ‣ Relative temperature and humidity
    - ‣ Air Quality & pressure
    - ‣ Light level
  - Digital PDM microphone
  - Magnetic Hall effect sensor
  - RGB LEDs & buttons
  - USB for programming
  - Reference smart phone application with cloud integration
- **EFR Connect phone application available on IOS and Android for development purposes**
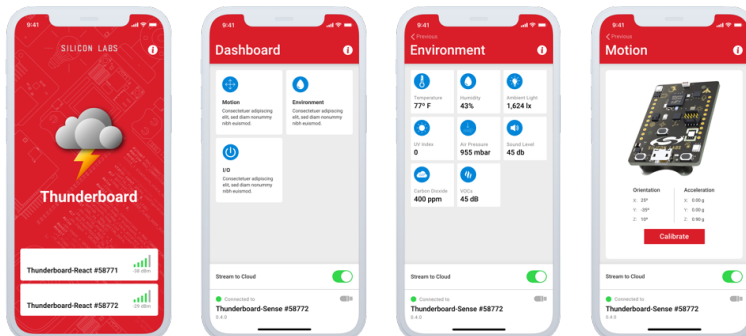
Matter Solution Available on GitHub
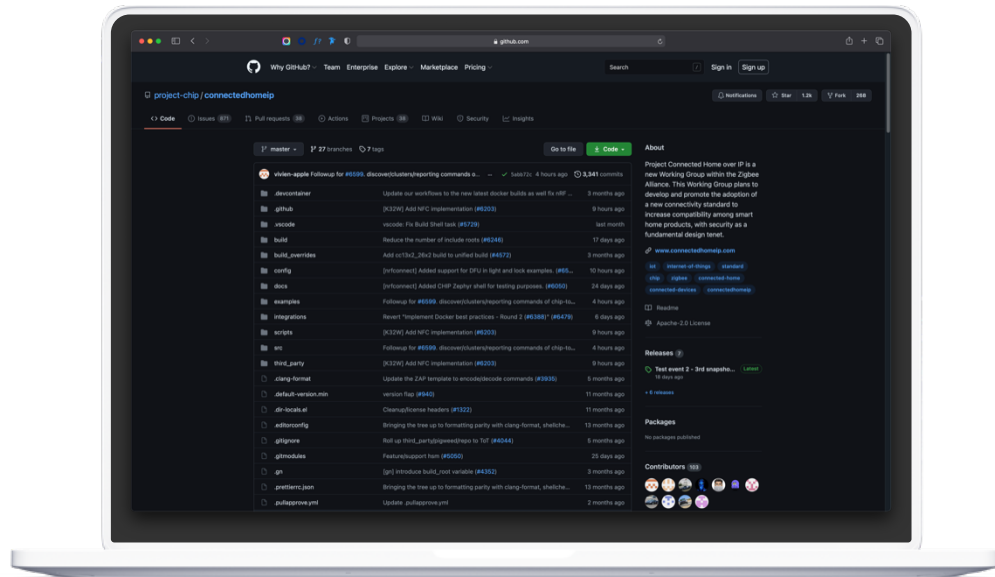
- Clone Matter repo from GitHub
  - github.com/project-chip/connectedhomeip
  - Tested on macOS 10.15, Ubuntu 20.04 LTS
- Install Tools
  - Simplicity Commander
  - ARM GCC Toolchain
- Follow the developer guide on silabs.com to get started
  - silabs.com/wireless/matter#start
  - MG12 part support for all devices
- More guidance available on community.silabs.com

SILICON LABS

Building Border Router Example Application

- **Description**
  - Step by step guide to build a Thread boarder router to connect a Thread network to other IP-based networks, such as Wi-Fi or Ethernet

- **Requirements**
  - Raspberry Pi 4 or newer
  - OpenThread Platform (such as Silicon Labs products) for network connectivity
  - MicroSD card and MicroSD card reader

- **Other Details**
  - Link: https://openthread.io/guides/border-router/raspberry-pi
  - Link: https://openthread.io/codelabs/silabs-openthread-hardware#6

SILICON LABS

Building Light Bulb Example Application

- **Description:**
  - The lighting example provides a baseline demonstration of a light control device
  - Built using Matter and the Silicon Labs Gecko SDK
  - It can be controlled by a Matter device controller over OpenThread network
- **Features**
  - Commissioned over Bluetooth Low Energy
  - Matter controller and device exchange security information with the Rendezvous Protocol
  - Has On/Off functionality and remote control
- **Other Details**
  - As the most basic device type, the lighting example is intended to serve as a template for other devices

SILICON LABS

Door Lock Example Application

- **Description:**
  - The lock example provides a baseline demonstration of a smart door lock, for access control to a residence

- **Features**
  - Deadbolt status and control represented by LED lights
  - States includes deadbolt closed, deadbolt open, and deadbolt in motion

- **Other Details**
  - Includes step-by-step walkthrough on building the device, flashing the application, and logging output and running the complete example

Window Covering Example Application

- **Description:**
  - The window example provides a baseline demonstration of a window covering
  - Can be used for either vertical or horizontal examples
  - WSTK LED's are used to indicate the status of the shade covering
 - Push buttons offer input options
- **Features**
  - Includes an automatic fully open and fully closed control
  - Includes partial coverings by increments of 10%
  - Can cycle between different window covering types
- **Other Details**
  - Features included in the lightbulb and lock examples
  - Example includes a factory reset option for the device

Matter Development – Lighting Application
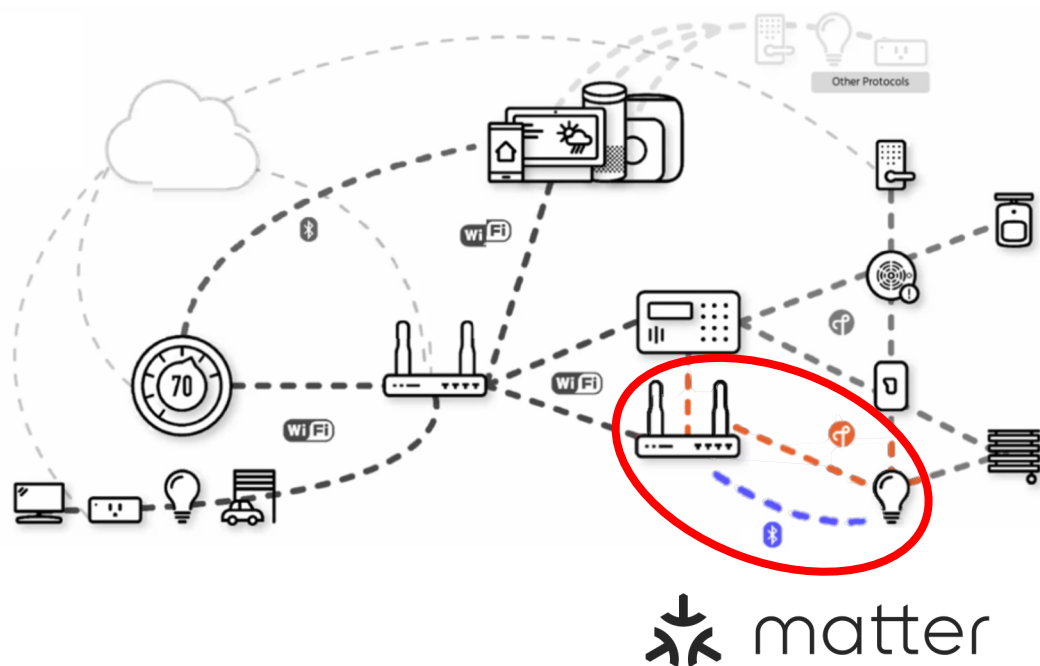
Segment of a 1h Matter tutorial demonstrating:

- **Building of Matter Controller tool**
  - That uses Bluetooth Low Energy to commission nodes on a Thread network
  - Runs on a Border Router
- **Building of Matter Lighting sample application**
  - Built on Thunderboard Sense 2
- **Commissioning of Lighting App**
- **Driving of Thunderboard LED using Matter controller**

Matter Development – Where to start
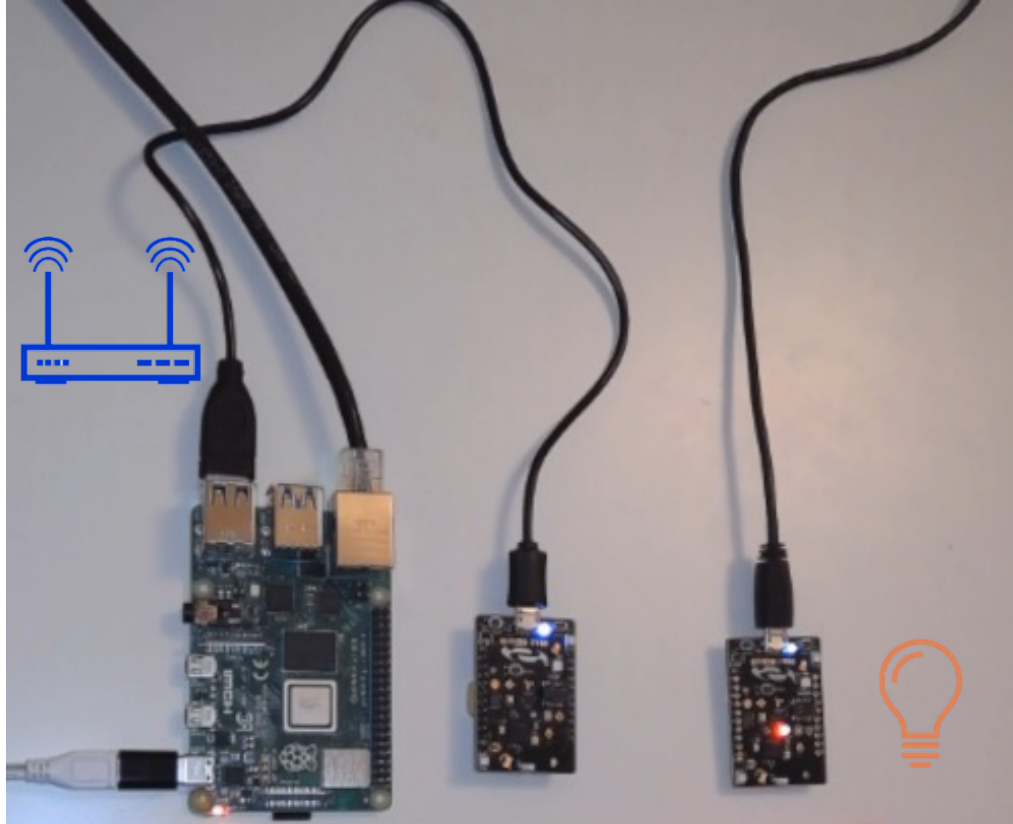
Available from Community :

Setting up a Matter Operational System

Directly on Github pages :

Github.io - OpenThread and Matter

Full video link will be made available on both places above

SILICON LABS

Matter Development – Hands on video

SILICON LABS

Commissioning and Driving the L... × | OpenThread Border Router ×
brian-silabs.github.io/SE_FAE_team/OpenThread/Applications/CHIP_compile_lighting_example/commision_and_test.html
Applications | Programming udp... | Internet of things C... | Any way to get mis... | Utiliser la reconnais... | Sambuca — Wikipé... | Autres favoris | Liste de lecture

South European FAE team

Search docs...

OPENTHREAD SUBGHZ

⊞ Applications

OPENTHREAD

⊟ Applications
- ⊞ 1- OpenThread Border Router setup for Matter Development
- ⊞ 2- Matter Dev Environment Setup
- ⊟ 3- Matter Building and Running Lighting App Example
  - 1. What you need
  - 2. Building the Lighting App example:
  - ⊟ 3. Commissioning and Driving the Lighting App
    - Debug device using RTT Viewer
    - Commissioning the node using Python Controller
    - Operating the lighting device using Python Controller
    - Troubleshoot
- ⊞ 4- Matter Python Controller Build and Common usage
- ⊞ 5- CHIP Customize Cluster Support (Obsolete)
- ⊞ 6- Adding BLE OTA to a CHIP example (Obsolete)

⊞ Miscellaneous

ZIGBEE

⊞ Applications

ZIGBEE GREEN POWER

⊞ Applications

Commissioning and Driving the Lighting App

Before continuing, ensure that you did build the Python Cotroller following this guide's prerequisites

Debug device using RTT Viewer

Connect an RTT Viewer on the Thunderbaord Sense that is flashed with the Lighting App example
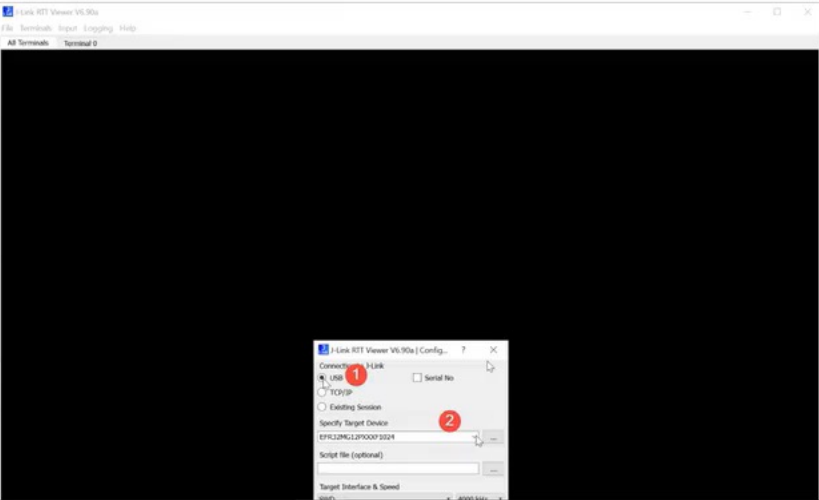
Depending on your Operating System, you will either use the GUI or commandline. Either way you need to have the JLlink Software Suite as in the preriquisites of the Matter Development Setup guide

- Using the shell bin **(For all users except WSL)**

  Log output can be viewed using the JLinkExe tool in combination with JLinkRTTClient as follows:

  i. Run the JLinkExe tool with arguments to autoconnect to the WSTK board:

  ```bash
  JLinkExe -device EFR32MG12P432F1024GL125 -speed 4000 -if SWD -autoconnect 1
  ```

  ii. In a second terminal, run the JLinkRTTClient to view logs:

  ```bash
  JLinkRTTClient
  ```

  For the user conting via `ssh`, simply open a second ssh terminal to execute RTTClient

- Using the GUI **(Most likely for Windoes users)**

  Connect to your plugged Thunderboard :

Sélection brian@DESKTOP-3ACCJ2F: ~/matter_dev/connectedhomeip
brian@DESKTOP-3ACCJ2F:~/matter_dev/connectedhomeip$ wget https://www.dropbox.com/s/qqh45vmflw3w8le/bootloader-storage-internal-single-combined-BRD4166A.s37
--2021-12-02 20:47:29-- https://www.dropbox.com/s/qqh45vmflw3w8le/bootloader-storage-internal-single-combined-BRD4166A.s37
Resolving www.dropbox.com (www.dropbox.com)... 162.125.69.18, 2620:100:6025:18::a27d:4512
Connecting to www.dropbox.com (www.dropbox.com)|162.125.69.18|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/qqh45vmflw3w8le/bootloader-storage-internal-single-combined-BRD4166A.s37 [following]
--2021-12-02 20:47:29-- https://www.dropbox.com/s/raw/qqh45vmflw3w8le/bootloader-storage-internal-single-combined-BRD4166A.s37
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://uc279844c259e4440ca03f82b9de.dl.dropboxusercontent.com/cd/0/inline/BbGXgV-MMijuBsXXr27s8BuQEHDgS_K-m_i2wp1_ZwAh30tHIGCgWXSZn7EbvATTdhddM226f7HkaAy_0Xux27Fhlyg66fXMSzocn5A2rR0wVOzSvoGJHx205T4ajANcKXpuLaQs-n64KqJCEuQtTPDz/file# [following]
--2021-12-02 20:47:29-- https://uc279844c259e4440ca03f82b9de.dl.dropboxusercontent.com/cd/0/inline/BbGXgV-MMijuBsXXr27s8BuQEHDgS_K-m_i2wp1_ZwAh30tHIGCgWXSZn7EbvATTdhddM226f7HkaAy_0Xux27Fhlyg66fXMSzocn5A2rR0wVOzSvoGJHx205T4ajANcKXpuLaQs-n64KqJCEuQtTPDz/file
Resolving uc279844c259e4440ca03f82b9de.dl.dropboxusercontent.com (uc279844c259e4440ca03f82b9de.dl.dropboxusercontent.com)... 162.125.69.15, 2620:100:6025:15::a27d:450f
Connecting to uc279844c259e4440ca03f82b9de.dl.dropboxusercontent.com (uc279844c259e4440ca03f82b9de.dl.dropboxusercontent.com)|162.125.69.15|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 40070 (39K) [text/plain]
Saving to: 'bootloader-storage-internal-single-combined-BRD4166A.s37.1'

bootloader-storage-internal-single-combine 100%[===>] 39.13K --.-KB/s   in 0.1s

2021-12-02 20:47:30 (347 KB/s) - 'bootloader-storage-internal-single-combined-BRD4166A.s37.1' saved [40070/40070]

brian@DESKTOP-3ACCJ2F:~/matter_dev/connectedhomeip$ mkdir -p /mnt/c/Temp/matter_binaries
brian@DESKTOP-3ACCJ2F:~/matter_dev/connectedhomeip$ cp ./bootloader-storage-internal-single-combined-BRD4166A.s37 /mnt/c/Temp/matter_binaries
brian@DESKTOP-3ACCJ2F:~/matter_dev/connectedhomeip$ cp ./out/lighting-app/BRD4166A/chip-efr32-lighting-example.s37 /mnt/c/Temp/matter_binaries^C
brian@DESKTOP-3ACCJ2F:~/matter_dev/connectedhomeip$ ^C
brian@DESKTOP-3ACCJ2F:~/matter_dev/connectedhomeip$ cp ./out/lighting-app/BRD4166A/chip-efr32-lighting-example.s37 /mnt/c/Temp/matter_binaries
brian@DESKTOP-3ACCJ2F:~/matter_dev/connectedhomeip$

Wrap Up: Resources

- What has been covered today :
  - Matter overview
  - Matter Sample Applications review
  - Technical Demonstration

- Clone Matter repo from GitHub
  - github.com/project-chip/connectedhomeip

- Full demonstration available here :
  https://www.brainshark.com/1/player/siliconlabs?pi=zHTzFvZa7zPWXYz0&r3f1=&fb=0

- Available from Community :
  Setting up a Matter Operational System

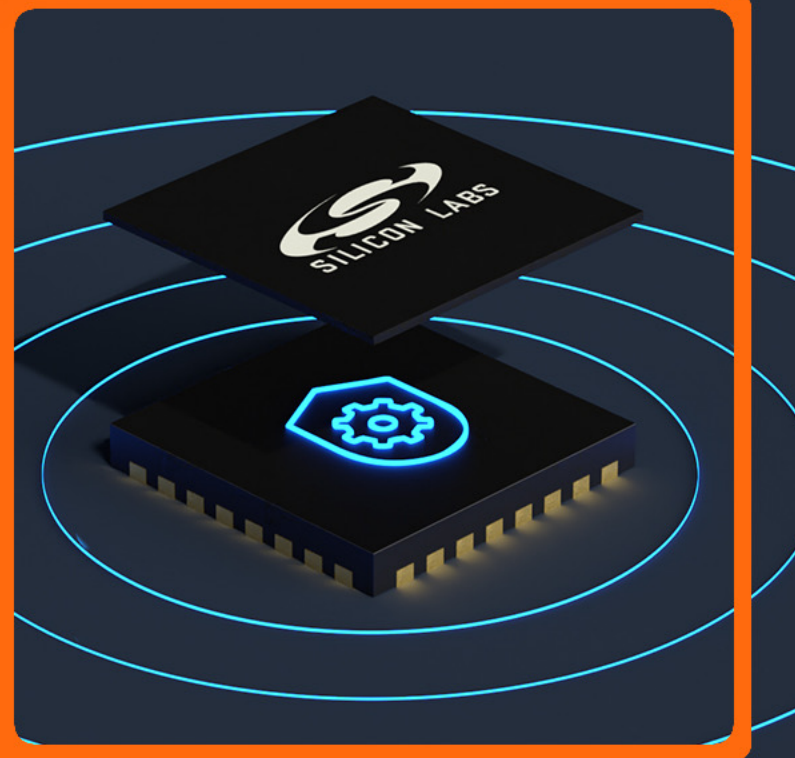- Directly on Github pages :
  Github.io - OpenThread and Matter

SILICON LABS

Join our next Tech Talk

tech t▶lks
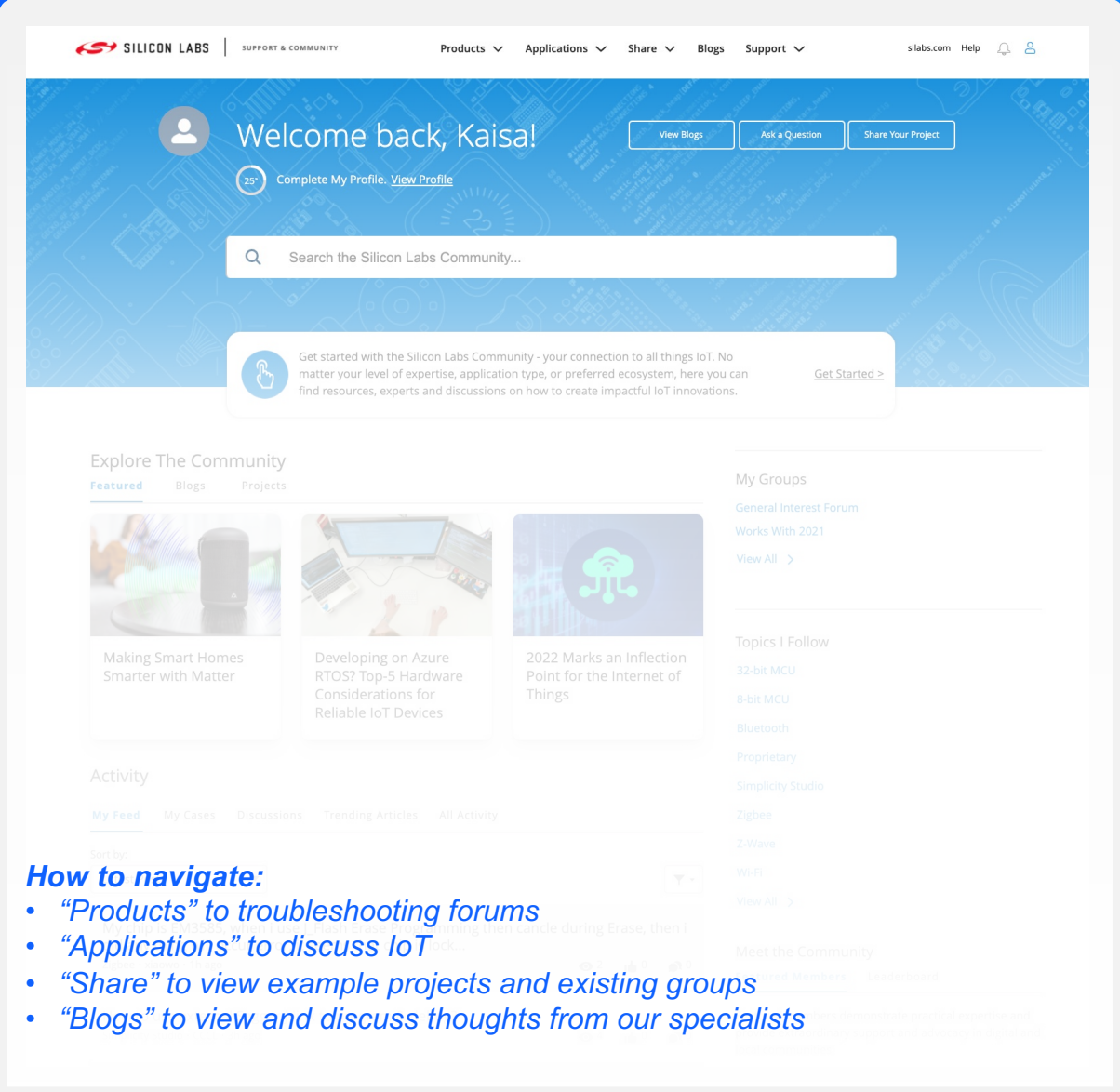
WEBINAR

Secure IoT Products with Custom Part Manufacturing Services (CPMS)

DECEMBER 21 | 10AM CST

SILICON LABS

SILICON LABS

Continue discussion in our community!

How to navigate:
- *"Products" to troubleshooting forums*
- *"Applications" to discuss IoT*
- *"Share" to view example projects and existing groups*
- *"Blogs" to view and discuss thoughts from our specialists*

Q&A

THANK YOU