



Sensors
Converge

Matter over Wi-Fi Training Session

June 20–22, 2023 | Santa Clara, CA

#SensorsConverge

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What is Matter?

- Matter is a unifying, IP-based connectivity protocol built on proven technologies, helping connect to and build reliable, secure IoT ecosystems.
- Simplicity, Interoperability, Reliability and Security



<https://csa-iot.org/members/>

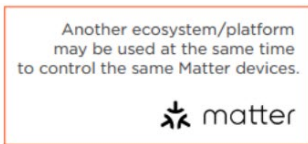
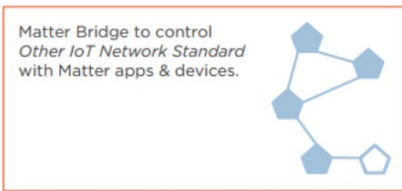
Matter Smart Home Fabric example



Ikea Dirigera



Philips Hue



Today 90+% of Smart Speakers are Wi-Fi only

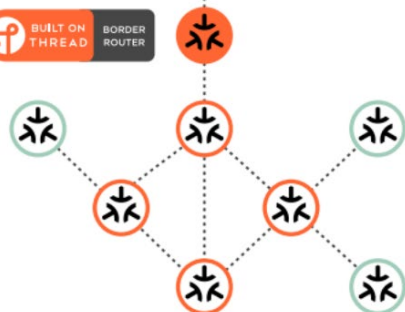


Samsung SmartThings Hub



Apple TV 4K

Border Router can be built into many devices such as access points, smart speakers, etc.



Matter Devices of different types & brands, sharing the same Thread mesh network.

- Matter Device
- Thread Border Router
- Thread Mesh Extender
- Thread Battery Operated Device
- Matter Bridge
- Non-IP Device
- IP Connection



Echo Dot (Wi-Fi)

Matter Concepts and Terminology

- **Node:** An addressable entity which supports the Matter protocol stack and has its own Operational Node ID and Node Operational credentials.
- **Fabric:** A logical collection of communicating Nodes, sharing a common root of trust, and a common distributed configuration state.
- **Commissioning:** Sequence of operations to bring a Node into a Fabric by assigning an Operational Node ID and Node Operational credentials.
- **Cluster:** A specification defining one or more attributes, commands and dependencies, that supports an independent utility or application function. The term may also be used for an implementation or instance of such a specification on an endpoint.

Matter Concepts and Terminology (Contd.)

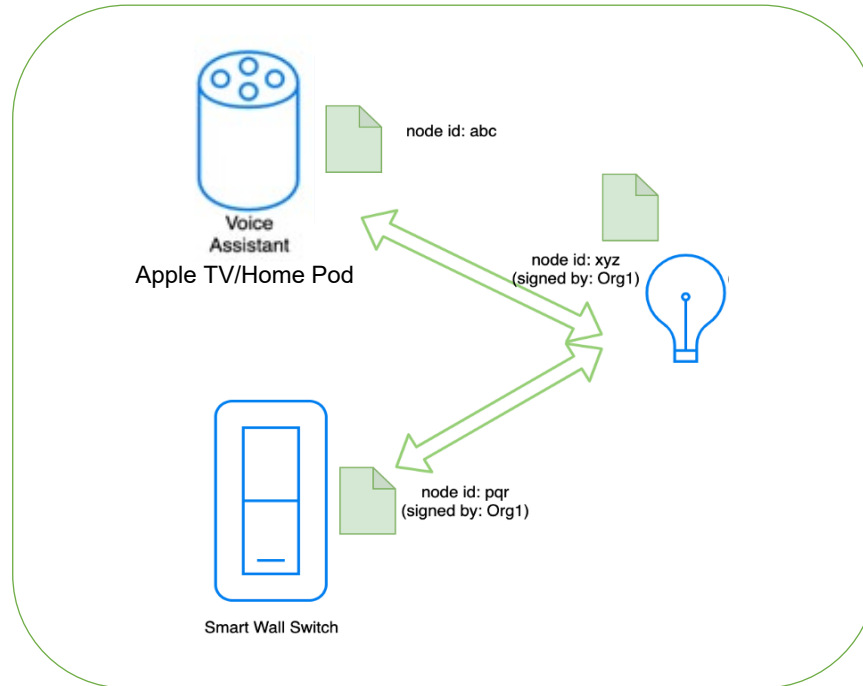
- Matter Onboarding Payload: It allows onboarding a device into a Matter network
 - Payload Contents:
 - Version, Vendor & Product ID, Discriminator ID, Custom Flow, Discovery Capabilities Bitmask, Discriminator Value and Passcode.
 - Payload Representation:
 - QR Code
 - Manual Entry
 - NFC Tag (v1.x)



Matter Concepts and Terminology

- Matter Ecosystem

Fabric 1



Matter Concepts and Terminology

- Multi-Admin Control:

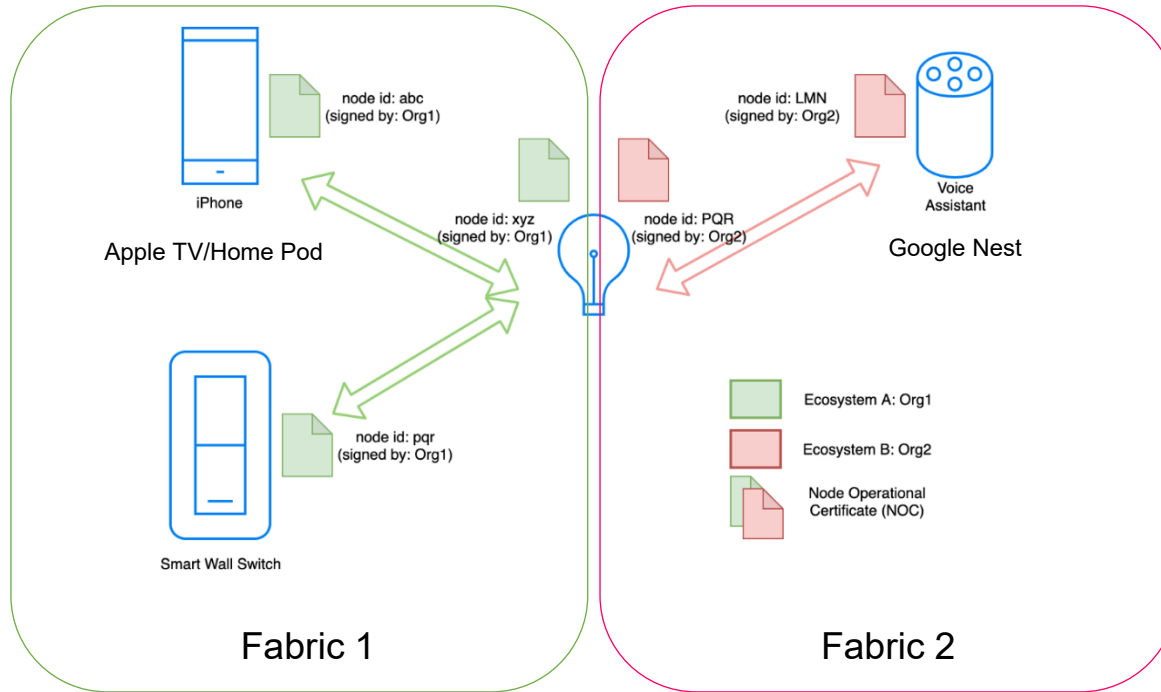


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Architecture Overview of Matter

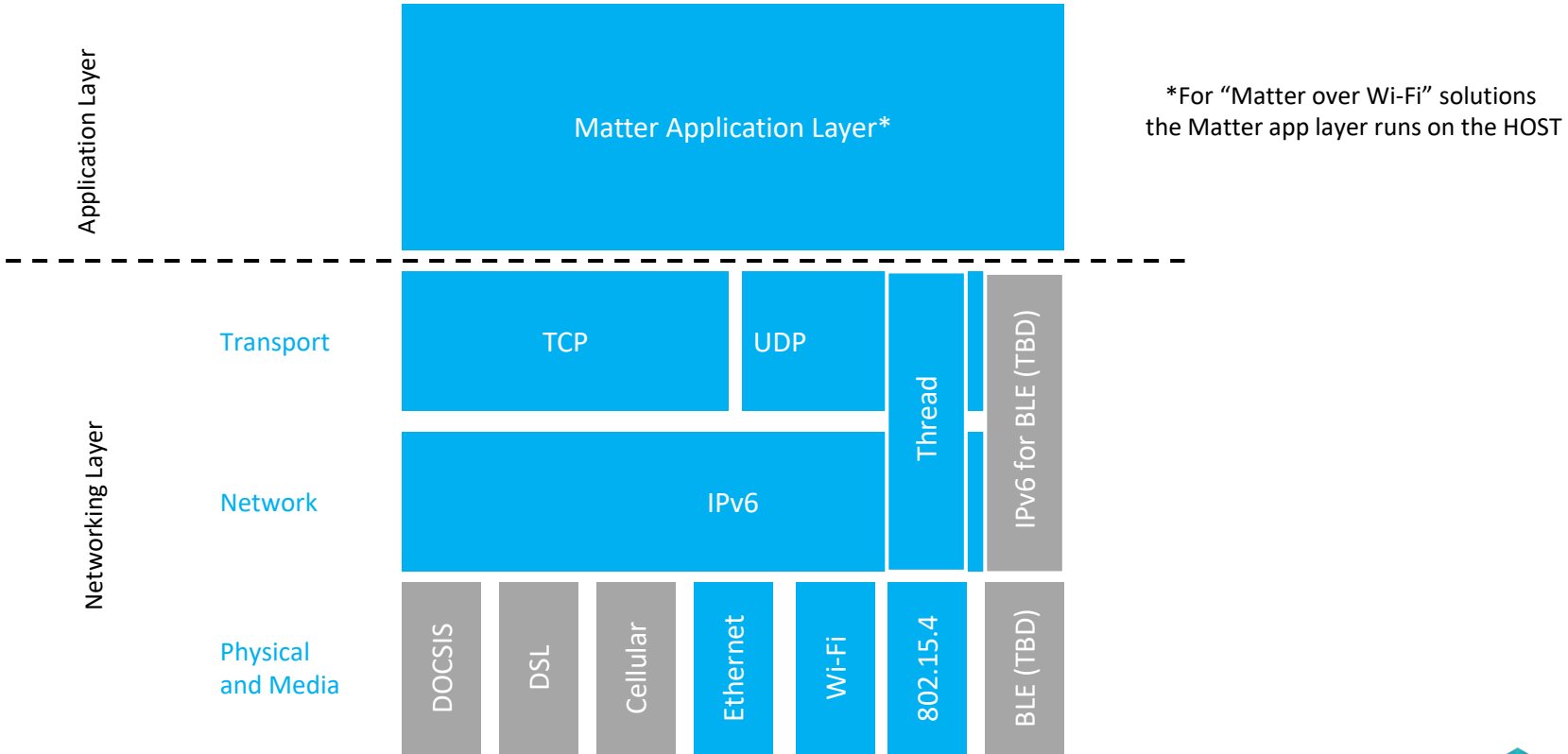
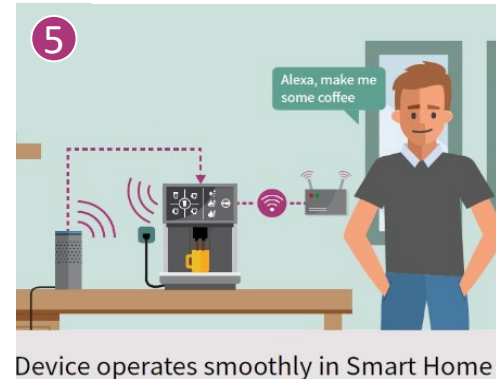
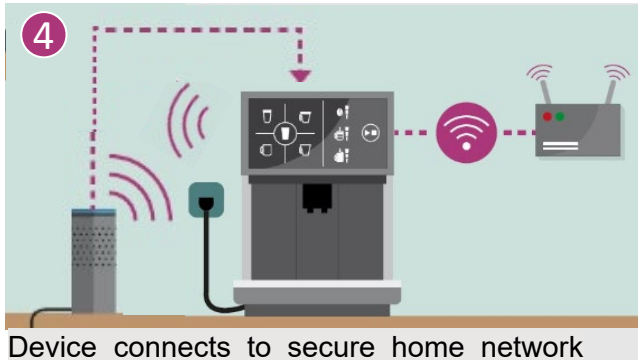
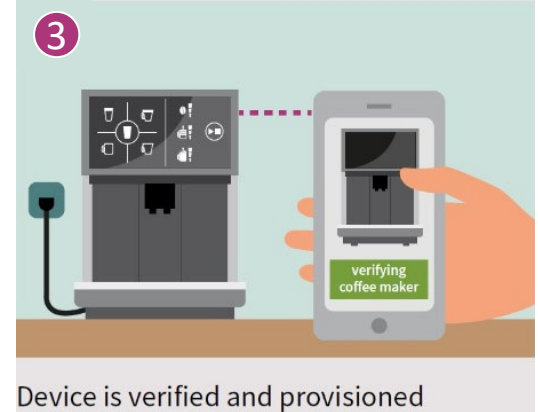
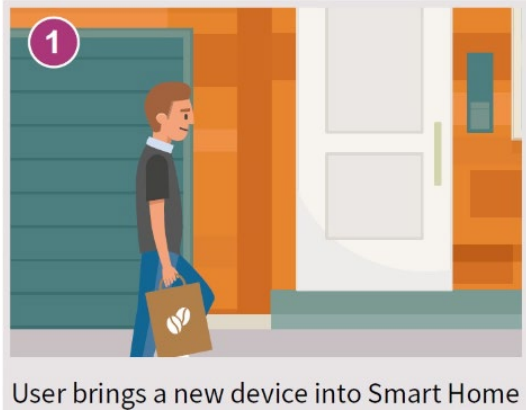


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Matter – the expected user experience



Matter commissioning – user view

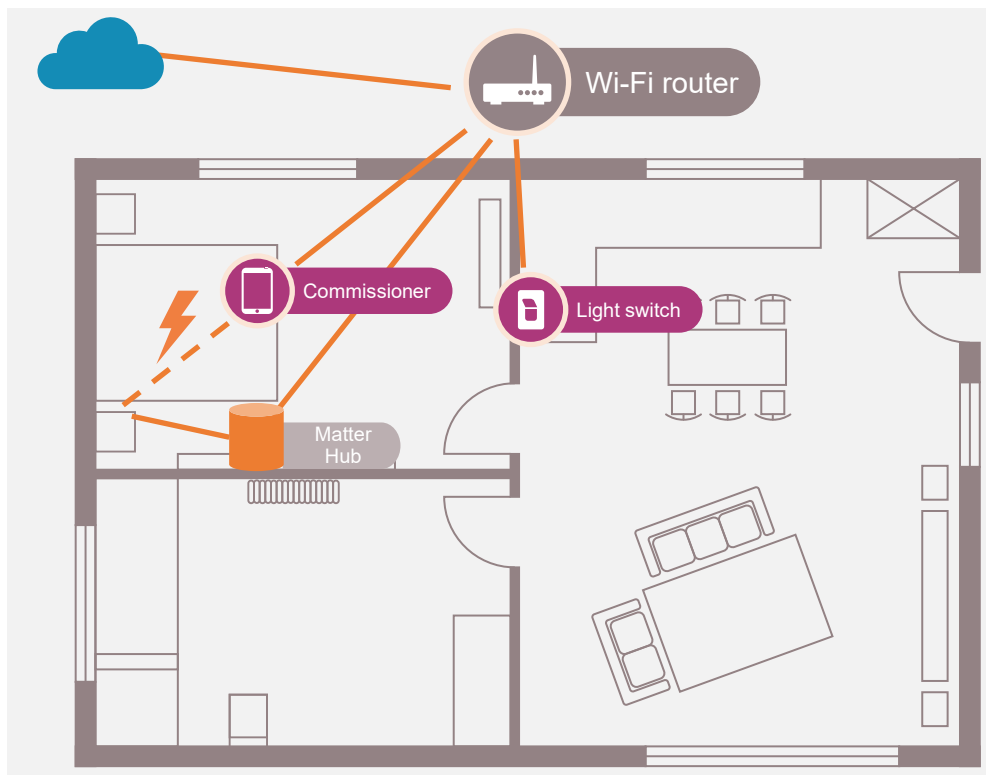


Factory



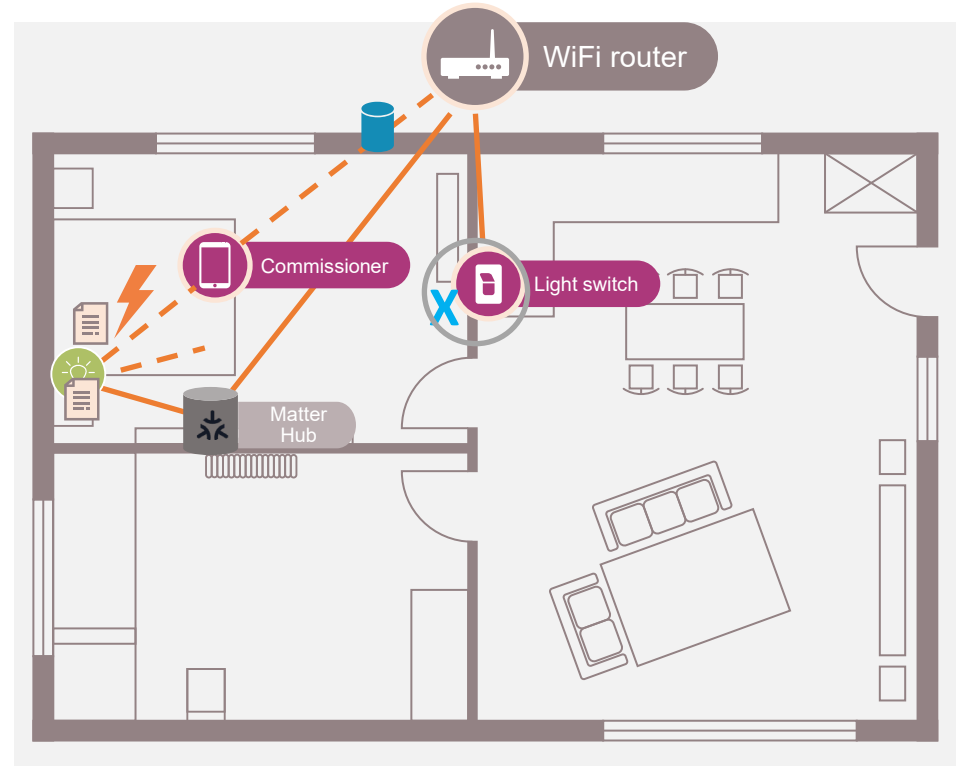
Store

1. Device is manufactured and shipped
2. User brings device to smart home
3. User intros device to commissioner (Tablet, phone, smart speaker, etc.)
4. User initiates commissioning
5. Device is commissioned
6. Device operates smoothly in smart home

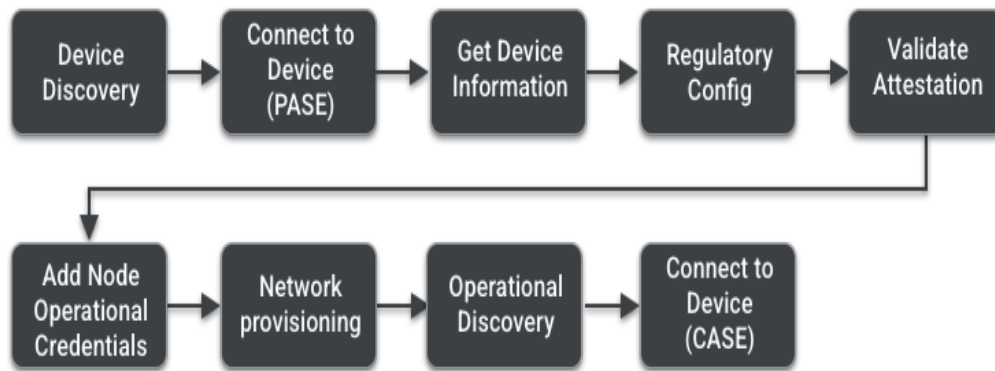
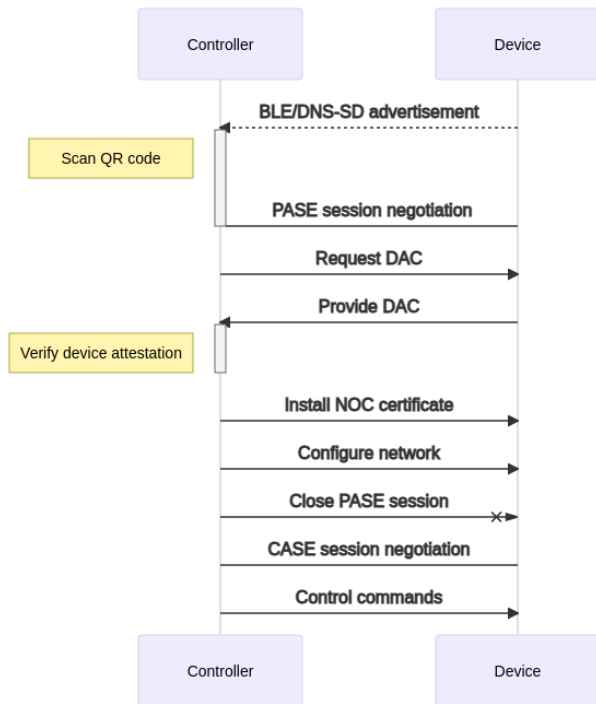


Matter Raises the Bar for IoT security, privacy & ease-of-use

1. Easy, secured, and flexible device commissioning
2. Validation that each device is authentic and certified
3. Up-to-date info via Distributed Compliance Ledger
4. Strong device identity so only your devices can join your smart home
5. Secured unicast communications
6. Secured group communications
7. Multiple administrators and controllers, maximizing choice
8. Verified access controls to prevent unauthorized actions
9. Secured, standard software updates
10. Verification of software integrity



Matter Device Pairing Flow



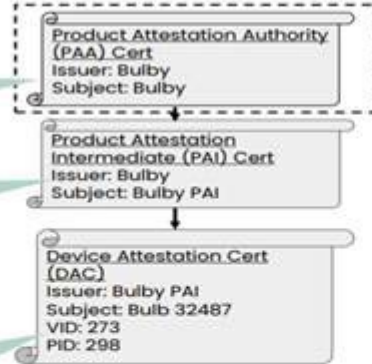
- DNS-SD- Domain Name System- Service Discovery
- PASE- Passcode Authenticated Session Establishment
- DAC- Device Attestation Certificate
- NOC- Node Operational Certificate
- CASE- Certificate Authenticated Session Establishment

Matter PKI – Customer Pain Points lead to Integrated Solution Opportunity

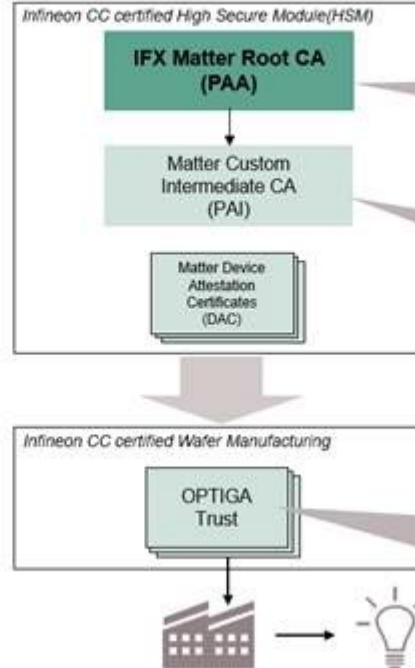
Customer Pain Points

- Root CA signing the PAI and DAC on the device.
Have to be Matter Certified!
- Each OEM device group requires its own ID. Meaning an own configuration per group resulting in an own SKU
- These secret keys shall only be provisioned and known to a 100% trustworthy secure environment.
Very difficult to find a 100% trustworthy EMS/ODM

Matter required PKI



Infineon implements Matter PKI on behalf of the customer

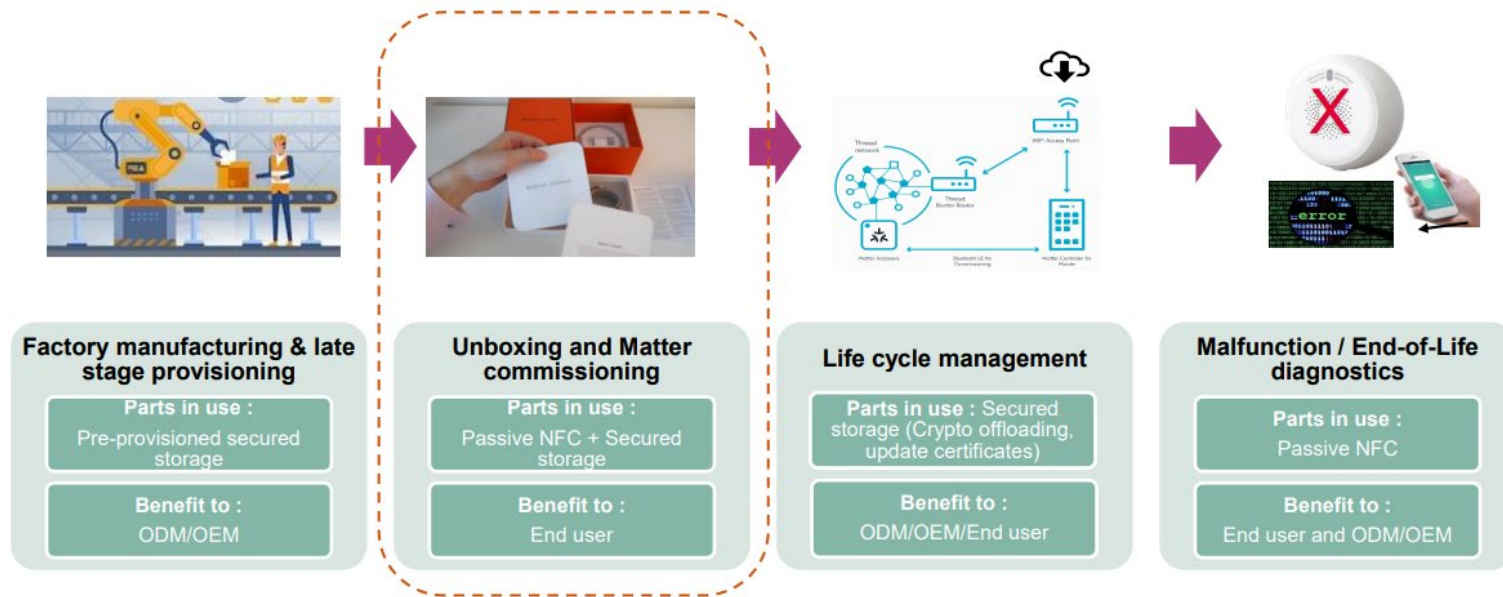


IFX Resolution

- IFX provides and operates this Root CA for his customers. Also run the Matter compliance
- IFX provides OTA Certificate Management. Resulting in less effort in SKU management for the customer
- IFX provisions this key at earliest point possible – during production of the chip – in CC certified environment trusted by the major payment networks and 120 government worldwide

All Matter products require a solution

Matter Commissioning – Part of Edge SE ‘Cradle to Grave’ Flow



All SEs will come with its own **Cloud Provisioning Service** offered by IFX, thereby making it a full package for OEMs (Chip + Services).

Matter Certification Process – 1/2

Become a Member

01

Read [Connectivity Standards Alliance Policies and Governing Documents](#) and [become a member](#).

Request a
Manufacturer ID /
Vendor ID

02

[Contact the Alliance Certification Team](#) to reserve your Manufacturer ID or Vendor ID.

Select a Compliant
Platform or Network
Transport

03

For Zigbee and Smart Energy end products, we have established access to Compliant Platforms from multiple silicon vendors. Select one from the list of certified [Compliant Platforms](#).

For Matter end products, you have the choice of various network transport options, including Wi-Fi, Thread, and Ethernet. Note that you will need to obtain certification for your network transport from the relevant standards organization before you certify your Matter device with the Alliance.

Choose a Testing
Provider

04

Select from Connectivity Standards Alliance authorized [Test Providers](#) at locations all around the world.

<https://csa-iot.org/certification/testing-providers/>

Matter Certification Process – 2/2



Infineon has taken P6+43012 through the Matter pre-certification test process

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Matter Spec: What applications are covered today? What's planned next?

Application	V1.0 (R)	V1.1 (P)	V1.x (P)
Lighting Devices (bulbs, switches, etc.)	<input checked="" type="checkbox"/>		
Smart Speaker	<input checked="" type="checkbox"/>		
Smart Lock	<input checked="" type="checkbox"/>		
Smart Thermostat	<input checked="" type="checkbox"/>		
Security Sensors (motion, occupancy, etc.)	<input checked="" type="checkbox"/>		
TV	<input checked="" type="checkbox"/>		
Smart Appliance (Washing, Fridge, AC)		<input checked="" type="checkbox"/> →	<input checked="" type="checkbox"/>
Smart Appliance (HVAC, Dish, Dryer,....)		<input checked="" type="checkbox"/> →	<input checked="" type="checkbox"/>
Robot Vacuums		<input checked="" type="checkbox"/> →	<input checked="" type="checkbox"/>
IP Cameras/Video Doorbells		<input checked="" type="checkbox"/> →	<input checked="" type="checkbox"/>
Easy Wi-Fi onboarding, Sleepy Devices		<input checked="" type="checkbox"/>	
Bug fixes		<input checked="" type="checkbox"/>	
Air Quality Detectors, Garage Door			<input checked="" type="checkbox"/>

Broad Secure Connected Portfolio Delivers Matter Compliance for Your Application

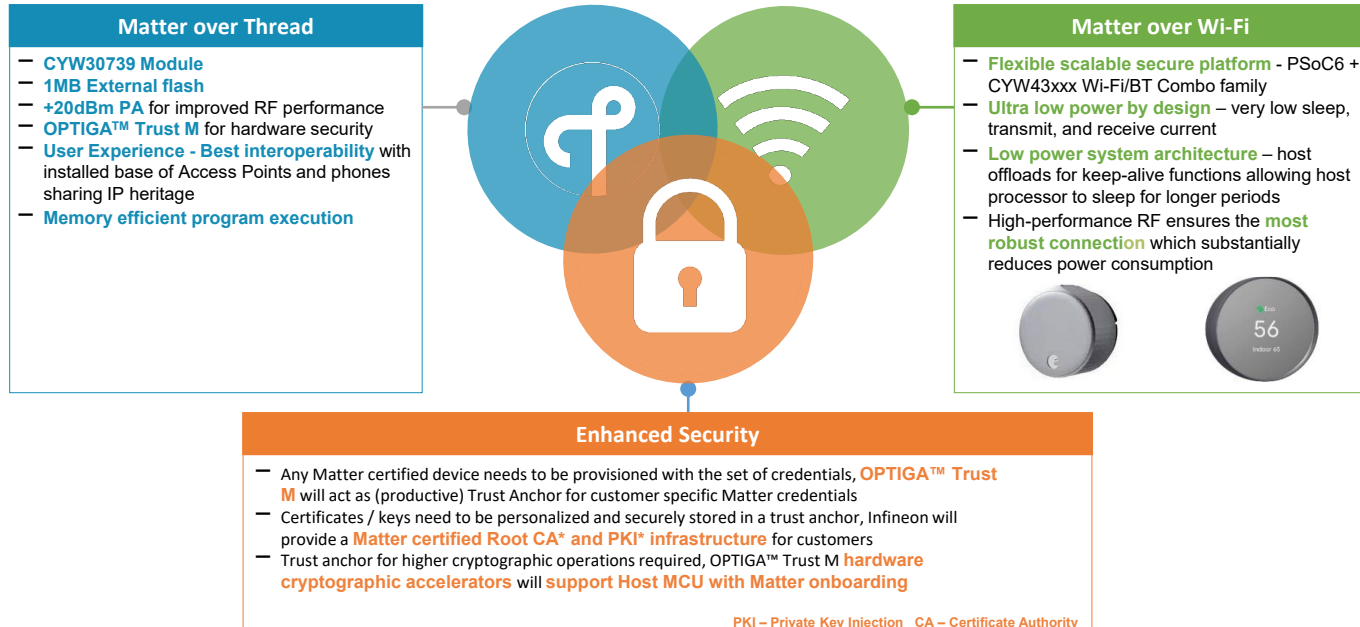




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Matter Roadmap Summary

Wi-Fi MCU		802.15.4/BLE SoC
<p>MCU</p>  <div style="display: flex; justify-content: space-around;"> <div style="background-color: #0070c0; color: white; padding: 5px; text-align: center;"> <p>PSoC™ 64</p> <p>150 MHz Cortex-M4 /100 MHz M0+, Security 2MB Flash/1MB RAM</p> <p><small>* H1/23</small></p> </div> <div style="background-color: #0070c0; color: white; padding: 5px; text-align: center;"> <p>PSoC™ 62</p> <p>150 MHz Cortex-M4 /100 MHz M0+, Security 2MB Flash/1MB RAM</p> <p><small>Now</small></p> </div> </div> <div style="background-color: #ffcc00; padding: 10px; text-align: center; margin-top: 10px;"> <p>PSoC™ 6</p> <p>MCUs for the broad base of IoT and consumer applications, bringing best in class low power, connectivity, and security</p> </div>	<p>Wi-Fi Combo</p> <div style="background-color: #ffcc00; padding: 10px; text-align: center; margin-bottom: 10px;"> <p>Wi-Fi Combo (11n and 11ac)</p> <p>Complete portfolio with low power keep alive across 11n and 11ac, offer ac friendly ultra low power series optimized for battery powered connected home solution</p> </div> <p><small>For Wi-Fi the SW API hooks into Matter stack in MCU</small></p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="background-color: #e67e22; color: white; padding: 5px; text-align: center;"> <p>CYW43439</p> <p>SB 1x1 11n HT40 SDIO, BT5.0, UART/SDIO</p> <p><small>Now</small></p> </div> <div style="background-color: #e67e22; color: white; padding: 5px; text-align: center;"> <p>CYW43012</p> <p>ULP DB 1x1 11n HT20 11ac Friendly SDIO/SPI, BT5.0</p> <p><small>Now</small></p> </div> <div style="background-color: #e67e22; color: white; padding: 5px; text-align: center;"> <p>CYW4373</p> <p>DB 1x1 11ac HT80 SDIO/PCIe BT5.2, UART/USB</p> <p><small>Now</small></p> </div> </div> <div style="background-color: #e67e22; color: white; padding: 5px; text-align: center; margin-top: 10px;"> <p>CYW54590</p> <p>DB 2x2 11ac HT80 SDIO/PCIe BT5.1, UART</p> <p><small>* H2/23</small></p> </div>	<p>802.15.4/BLE SoC</p> <div style="background-color: #ffcc00; padding: 10px; text-align: center; margin-bottom: 10px;"> <p>Bluetooth LE and Thread</p> <p>High-Performance, Low Power Multi-Protocol MCU with integrated Security for Embedded and Hosted applications BLE 5.x and Thread stack supporting Matter</p> </div>  <div style="background-color: #27ae60; color: white; padding: 10px; text-align: center; margin-top: 10px;"> <p>30739 Module</p> <p>BLE5.1/Thread/ Matter CM4 SoC 1M Flash/512K, 5dBm Tx</p> <p><small>* H2/23</small></p> </div>

Matter stack
MCU
Wi-Fi combo
Thread/Matter BLE combo
Availability

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Building Matter

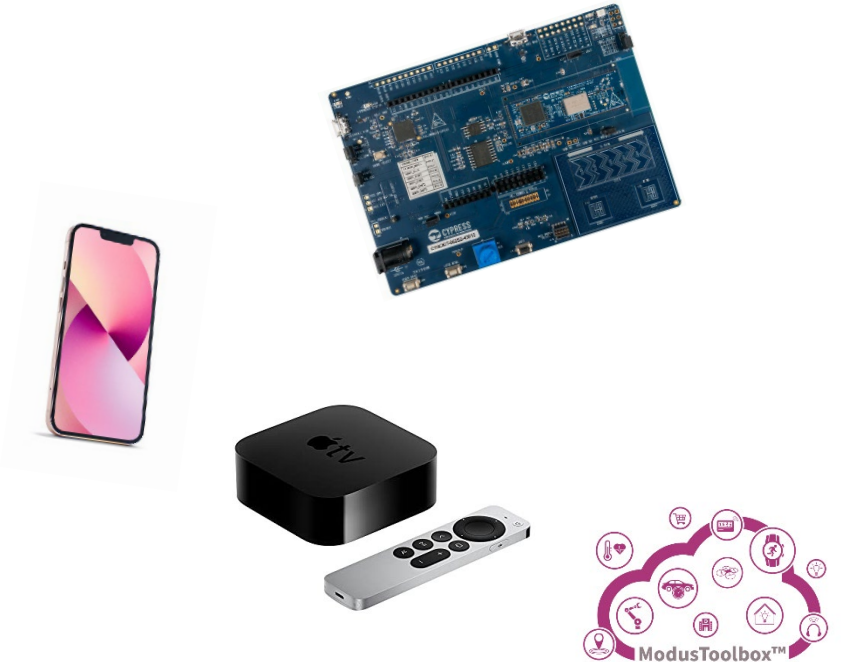
1. Matter over Wi-Fi

Platforms:

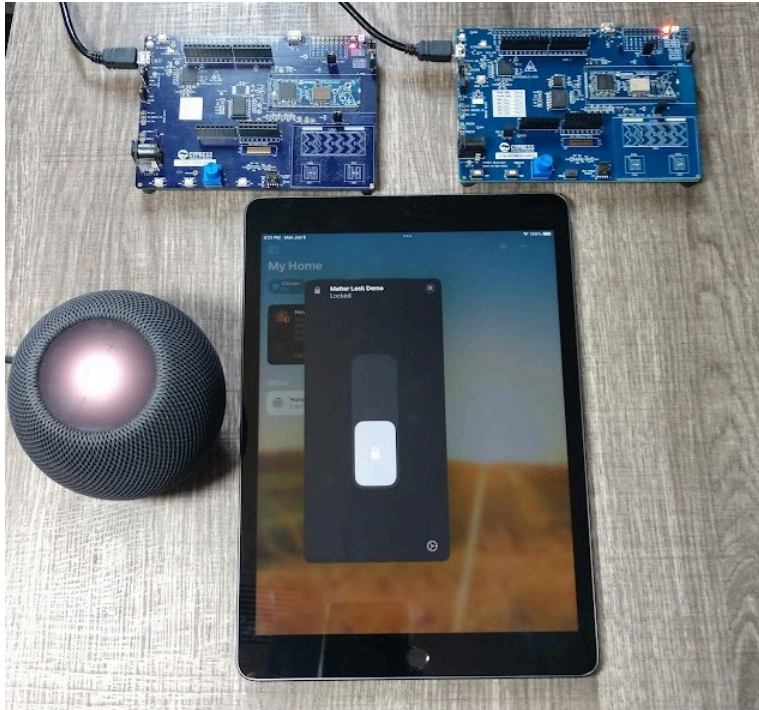
- Raspberry Pi (core developmental)
- Smart Home Hubs:
 - Apple TV, HomePod mini
 - Smart Things Hub
 - Google Nest Hubs
 - Amazon Eco
- CHIP GitHub Repo (V1.0-branch <https://github.com/project-chip/connectedhomeip>)
- ModusToolBox™

Prerequisites (Hardware & Software Tools)

- 2x CY8CKIT-062S2-43012 Wi-Fi BT Pioneer Kit
- 1x iPhone/iPad with iOS 16.2 or +
- 1x Apple TV 4K/Apple HomePod mini
- 1x WLAN Access Point with Network connection
- ModusToolBox™ ver. 3.0+



Matter Demo Hardware Setup



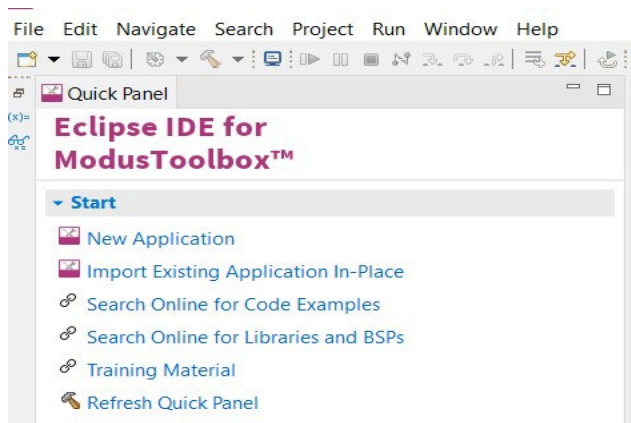
- Lock App on PSoC™ 6 CY8CKIT 43012 Wi-Fi BT Pioneer Kit #1
- Light App on PSoC™ 6 CY8CKIT 43012 Wi-Fi BT Pioneer Kit #2
- Homepod Mini
- iPad

Kits Functionalities

Kit	Baud Rate	Factory Reset Mechanism	Action Button	Indication
CY8CKIT 062S2 43012	115200	Button Press (User Button 2)	User Button 1	LED 9
CYSBSYSKIT-DEV-01	115200	NA	NA	LED 4 Blue Power
XENSIV™ BGT60TR13C	NA	NA	NA	LED D1 Red/Green

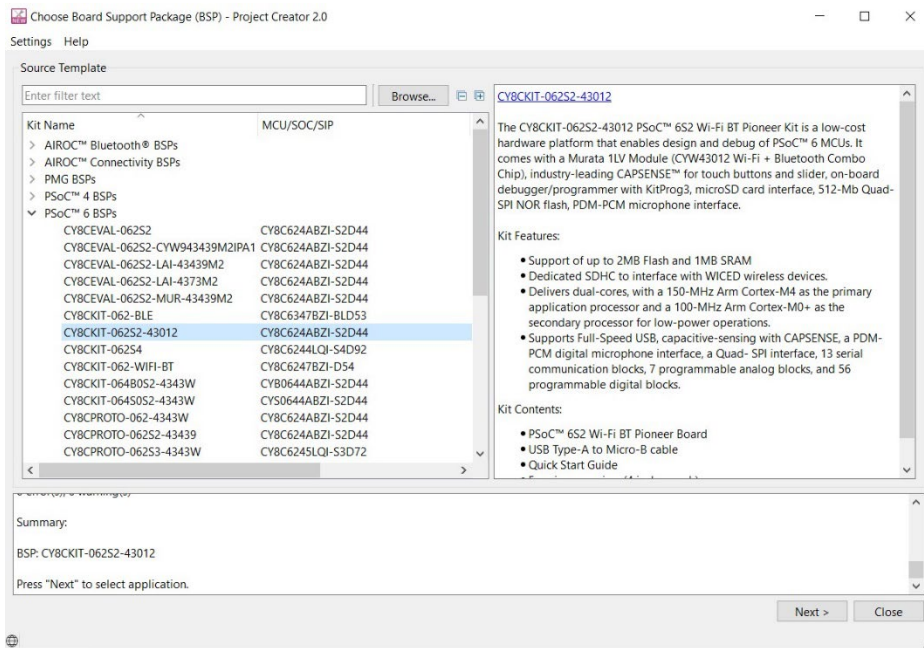
Getting Started with Matter on MTB

- Install & Open MTB 3.0
- Make sure you are familiar with workspace creation and related operations
- Create a folder in workspace
- Click New Application in the Start group of the Quick Panel



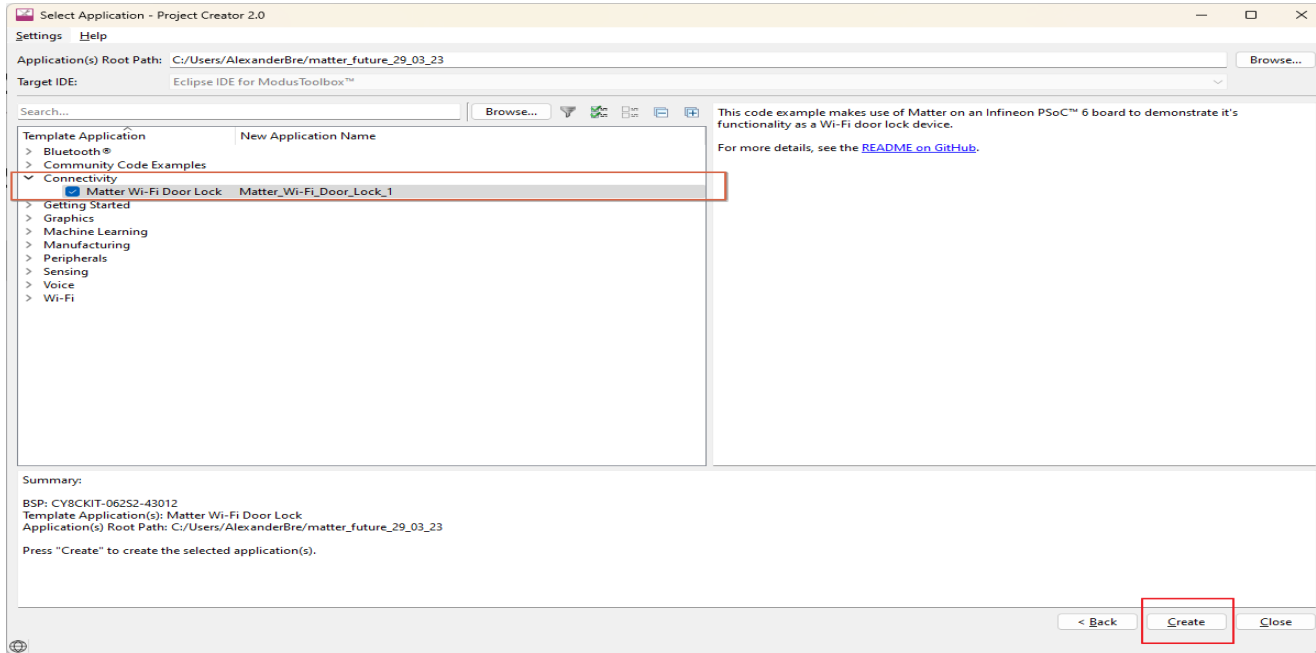
Getting Started with Matter on MTB

- Select the BSP as [CY8CKIT-062S2-43012](#) which will be used in this sample Lock application and click Next



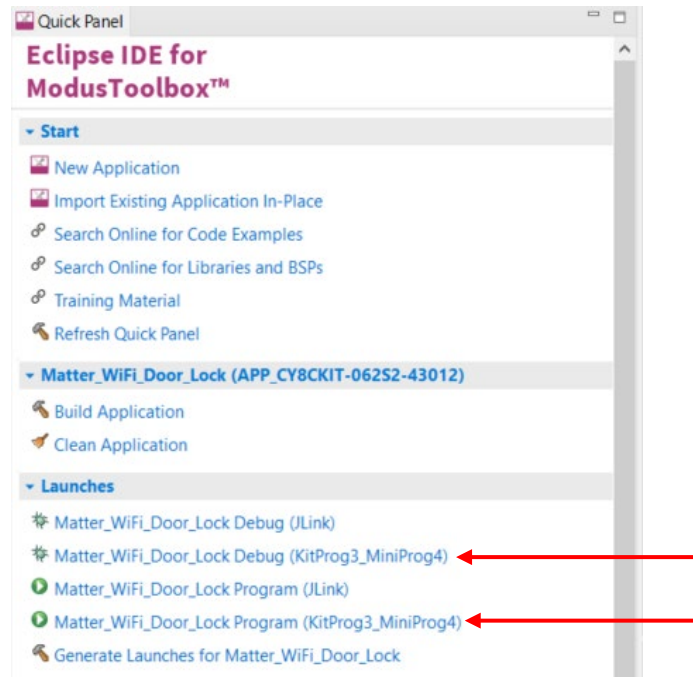
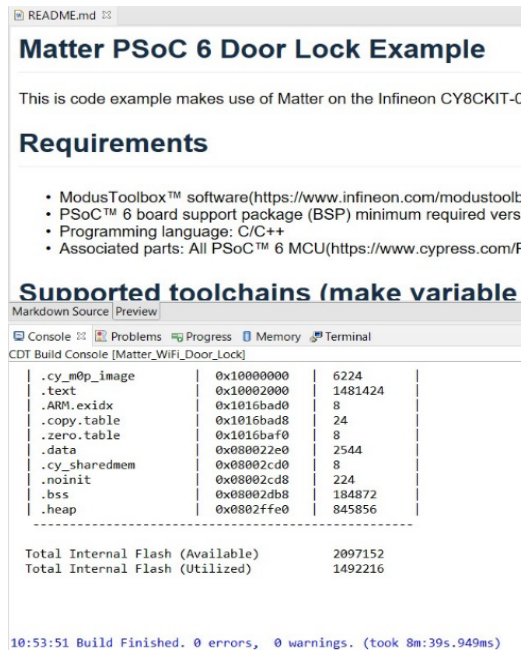
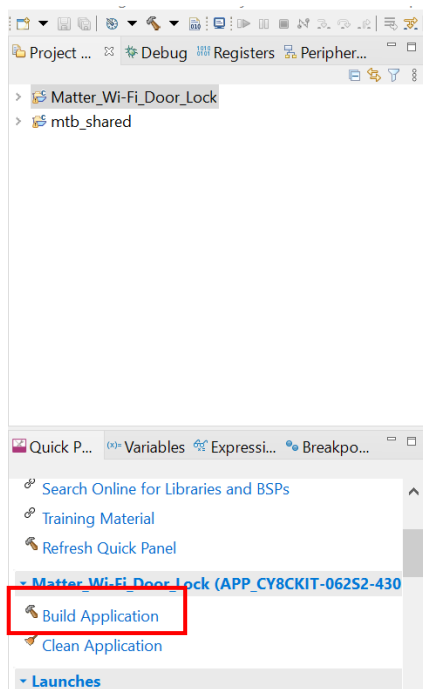
Getting Started with Matter on MTB

- Under Connectivity, select Matter Wi-Fi Door Lock as the sample application and click Create




Getting Started with Matter on MTB

- Build and flash the example application onto the Kit



Matter over Wi-Fi Smart Lock Cluster Resource Usage – A breakdown

Description	Flash Usage (KB)
Matter SDK	400
MTB shared	1,004
Total Flash	1,404



Description	Flash Usage (KB)
WHD (43012)	485
LWIP	168
BT Stack	90
mBed TLS	96
MTB HAL	26
WCM	8
WPA3	12
PDL	36
FreeRTOS	11
Miscellaneous	72
MTB Shared	1004

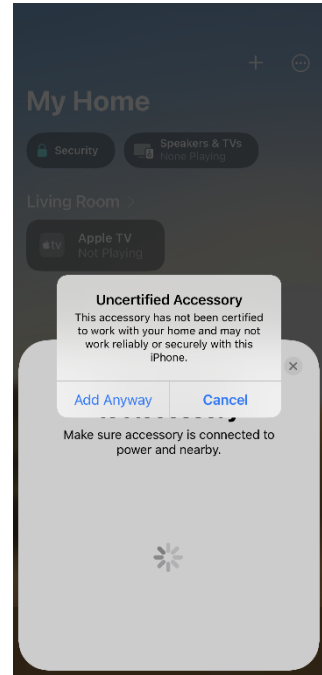
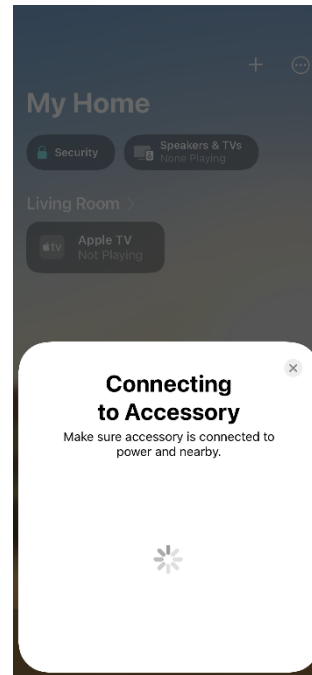
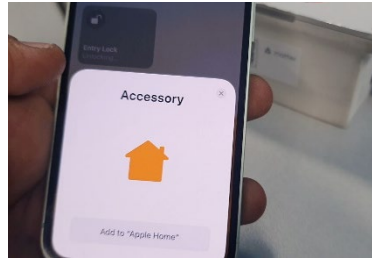
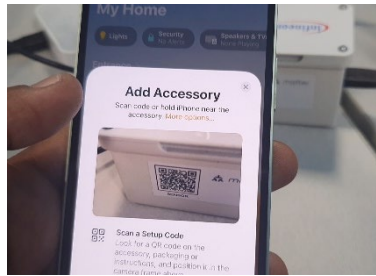
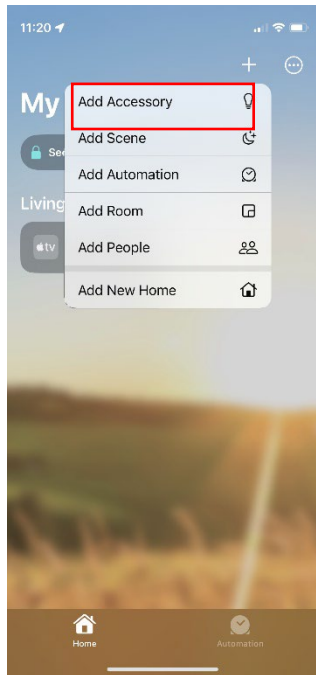
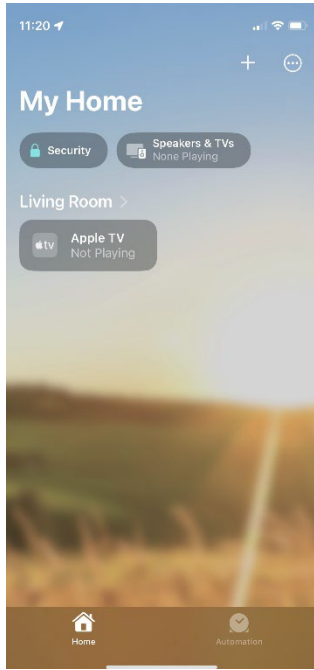
Matter over Wi-Fi can only be supported on PSoC6 2M Flash variant

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Adding a Matter Accessory to Apple Homepod Mini Matter Controller

- Adding accessories using QR scan



Adding a Matter Accessory to Apple Homepod MiniMatter Controller

- Selecting location & naming for accessories

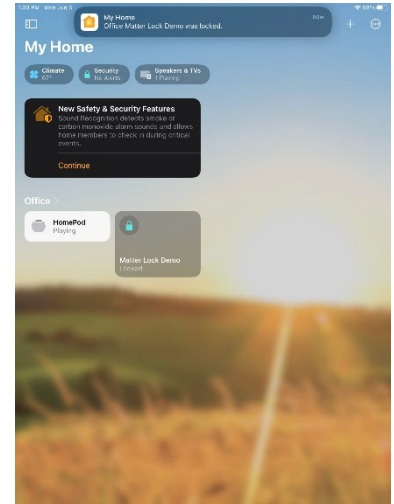
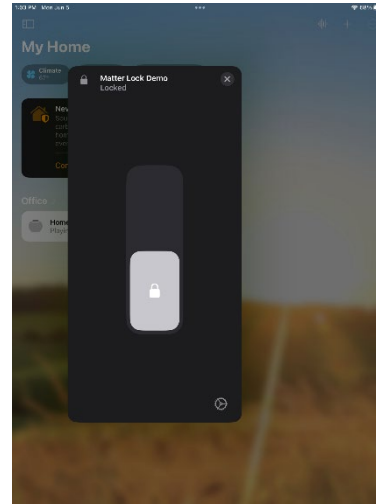
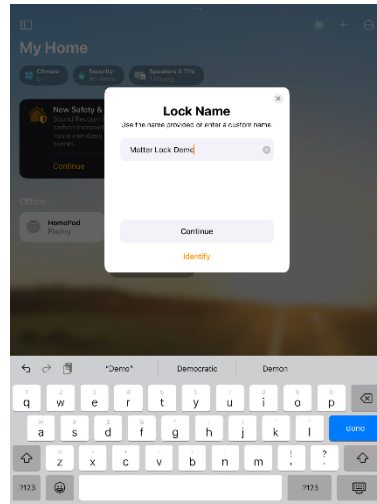
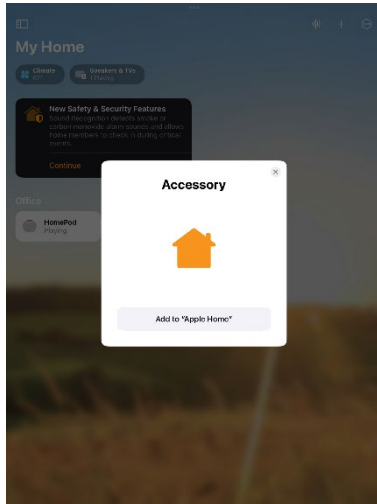


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Resources

Matter lock Example Code GitHub Repo:

<https://gitlab.intra.infineon.com/wpp/ce/mtb/mtb-example-psoc6-matter-door-lock>

Chip Repo:

<https://github.com/project-chip/connectedhomeip/>

Boards:

<https://www.infineon.com/cms/en/product/evaluation-boards/cy8ckit-062s2-43012/>

<https://www.infineon.com/cms/media/pss-3dmodels/xensiv-connected-sensor-kit/>

Download Matter 1.0 Spec : [here](#)

Additional details :

<https://www.infineon.com/cms/en/product/promopages/matter-over-thread-30739-802.15.4/>

Call to Action

1

[Learn More](#)
Webinars on
Matter

2

Demo Environment
Order development
kits:
[PSoC™ 6 Pioneer Kit
Sensor Kit](#)

[XENSIV™ connected
sensor kit](#)

3

[Download Matter Lock Ex.](#)

4

Drive discovery
into customers
looking to use
Matter

For more information go to www.infineon.com/matter