How to go to market with Matter

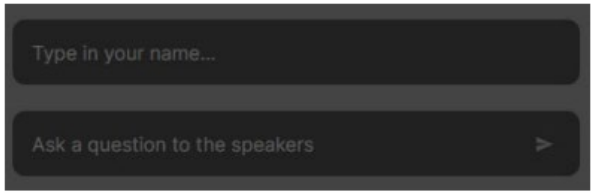
Nordic Tech Webinar

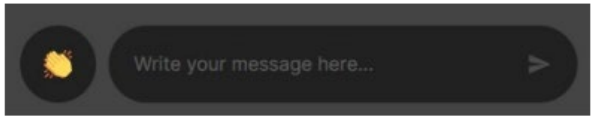
Łukasz Duda / Senior Firmware Engineer
Krzysztof Loska / Technical Product Manager

March 2023

Practicalities

- Duration: 60 minutes, 10 min Q&A
- Questions are encouraged!
  - Please type questions on the top of the right sidebar
  - All questions are anonymous
  - Try to keep them relevant to the topic
  - We will answer them towards the end
- The chat on the bottom of the right sidebar is not anonymous, and it should not be used for questions.
- Go to DevZone if you have more questions
- A recording of the webinar will be available together with the presentation at https://webinars.nordicsemi.com/on-demand





{ DevZone

Today's host

Finn Boetius

Product Marketing Engineer

NORDIC SEMICONDUCTOR

Today's Speakers

Łukasz Duda

Senior Firmware Engineer

R&D

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Krzysztof Loska

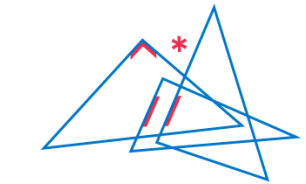
Technical Product Manager

Short-range wireless

NORDIC SEMICONDUCTOR

Previous Nordic Matter webinars

- Introduction to Matter
  - Krzysztof Loska
- Developing Matter 1.0 products with nRF Connect SDK
  - Kamil Kasperczyk & Marcin Kajor



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Agenda

- Testing with Matter ecosystems
- Device Firmware Update
- Matter Device Attestation
- Distributed Compliance Ledger
- Factory Provisioning
- Product certification
- Product packaging and branding
- Q&A session

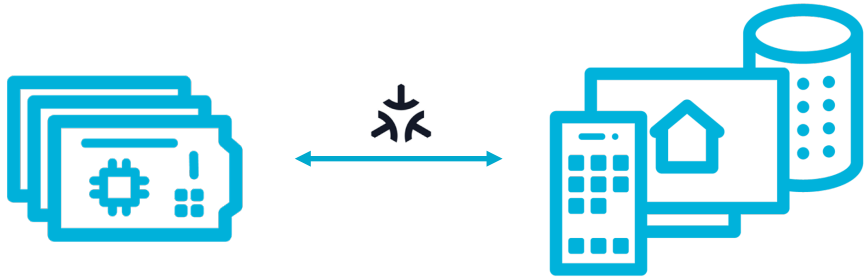
Testing your Matter product

..with leading ecosystems

Matter is officially supported right now!

- The major ecosystem providers already support Matter 1.0.
  - Google Home
  - Apple Home
  - Samsung SmartThings
  - Amazon Alexa

- Check the blogpost on DevZone about working with leading Matter ecosystems.



Device Firmware Update

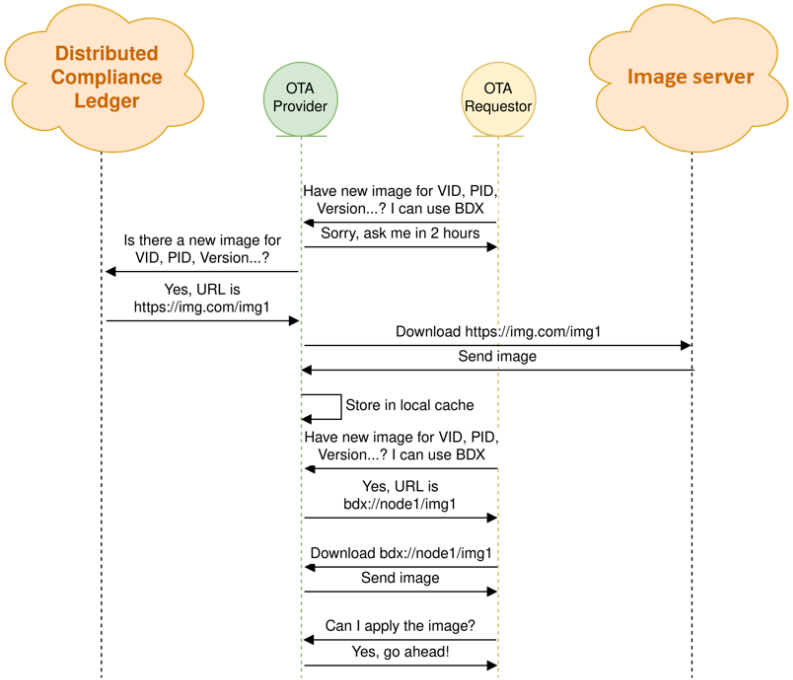
How to update firmware in the field?

Device Firmware Update (DFU)

- Each Matter compliant device MUST support device firmware update.
- The DFU process MUST meet Matter's security requirements e.g., validating authenticity and integrity of the new firmware prior to its installation.
- nRF Connect SDK comes with few DFU options:
  - DFU over Matter (using IPv6)
  - DFU over Bluetooth LE (using SMP)
  - DFU over serial bus (e.g., using UART)
  - Using proprietary mechanism e.g., IP based communication with a cloud
- All Matter samples in nRF Connect SDK use immutable bootloader called MCUBoot.
- For nRF52840 and nRF5340 a new firmware is downloaded and stored in the external flash memory.

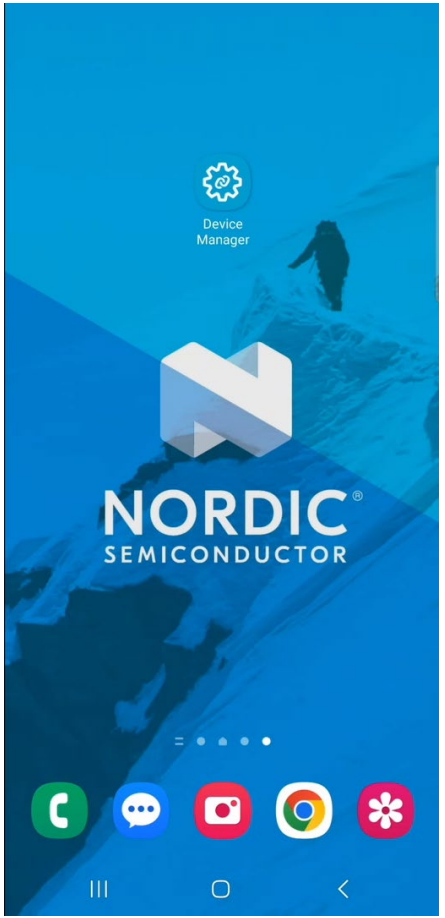
DFU over Matter (IPv6)

- The DFU process involves few actors:
  - **OTA Requestor** – Matter device (typically Matter accessory) that wants to have its firmware updated.
  - **OTA Provider** – Matter device (typically Smart Home hub) that provides the image for the DFU process to OTA Requestor.
  - **DCL and Image server** – which provide information about the new firmware.
- nRF Connect SDK comes with OTA Provider CLI tool for testing.
- Build system automatically creates the binary file to be used in DFU process.



DFU over Bluetooth LE (SMP)

- DFU is performed over Bluetooth LE using GATT and SMP.
- Firmware can be updated using:
  - Smartphone and nRF Connect Device Manager,
  - PC and tool called mcumgr
- Support for DFU over Bluetooth LE can be enabled via *CONFIG_CHIP_DFU_OVER_BT_SMP* build flag.
- nRF Connect Device Manager is open-sourced for both Android and iOS.
- Build system automatically creates the package with the firmware used in DFU process called **dfu_application.zip**.



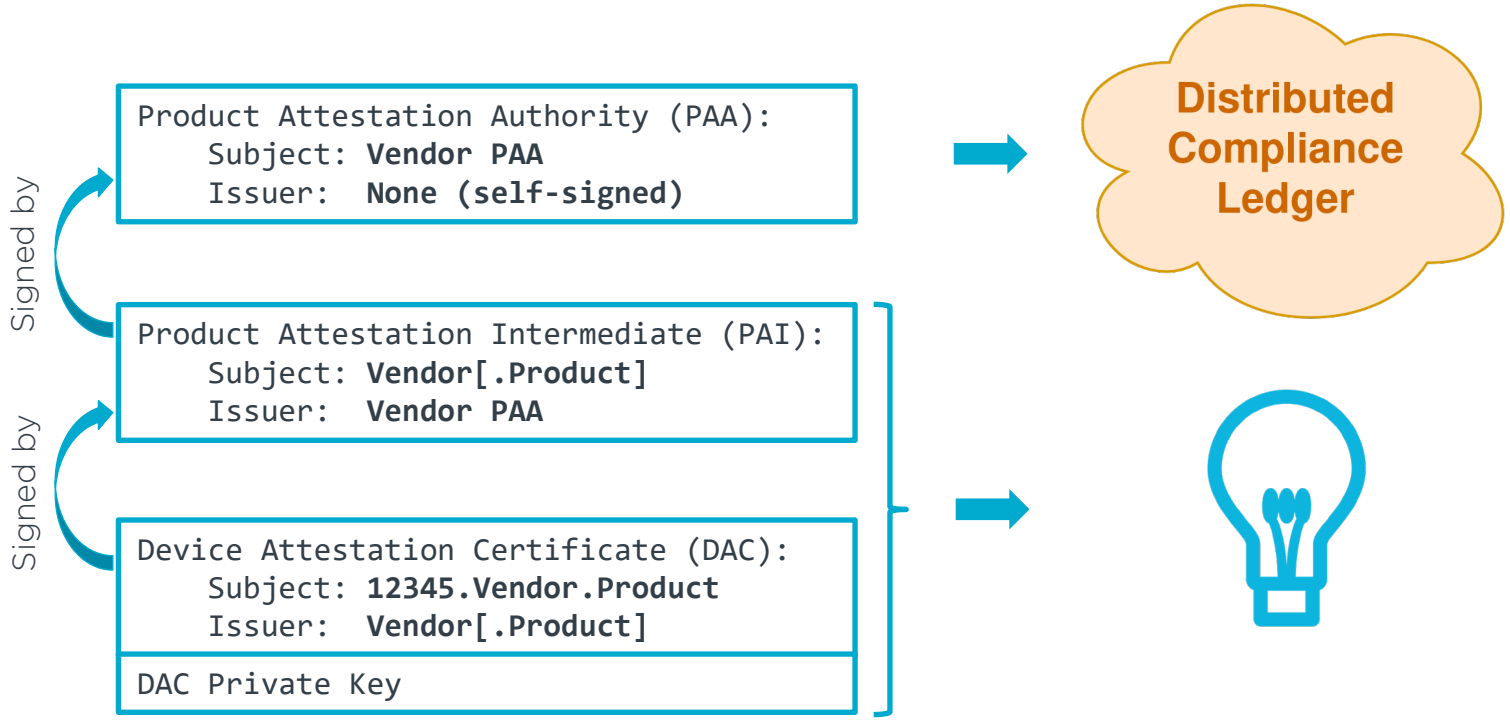
Matter Device Attestation

How to protect against counterfeits?

Device Attestation in Matter

- Matter Device Attestation procedure is designed to detect and protect against counterfeits as well as verify the Matter compliance status.
- Each certified Matter device includes a Device Attestation Certificate (DAC) and other values that enable the device to be authenticated and verified during the commissioning process.

Device Attestation – Public Key Infrastructure (PKI)



Device Attestation – How to get the DAC?

Option 1: Work with an established PKI provider that is a CSA member.

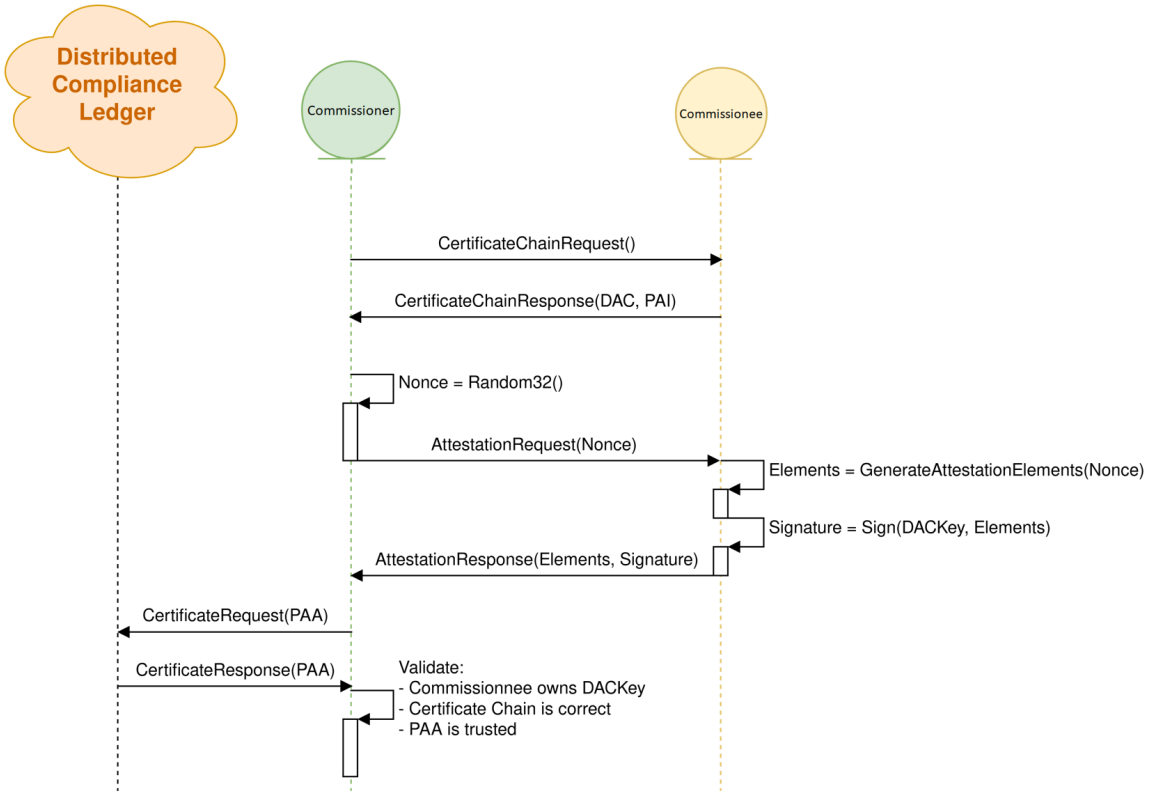
- PKI provider usually provides:
  - Encrypted file with pre-generated DACs with accompanying private keys and PAI certificate.
  - Online service to generate certificates on demand.
  - HSM with PAI to generate certificates on demand.

Option 2: Using own PKI (new, existing or expanded one).

- Product manufacturer may create and maintain its own Vendor-scoped PAA and PAIs.

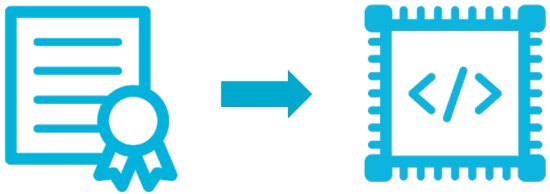
For more details, check the PKI Certificate Policy in the Matter Resource Kit.

Device Attestation - verification



Device Attestation – Certification Declaration

- Certification Declaration (CD) is a cryptographic document created by the CSA for each product identified by Vendor ID, Product ID and Software Version. It confirms that a product was certified.
- CD is a part of the firmware
  - CD might be configured using CHIP_DEVICE_CONFIG_CERTIFICATION_DECLARATION define in your *chip_project_config.h* of the application.
- CD is placed in a memory area that is allowed be modified after certification.

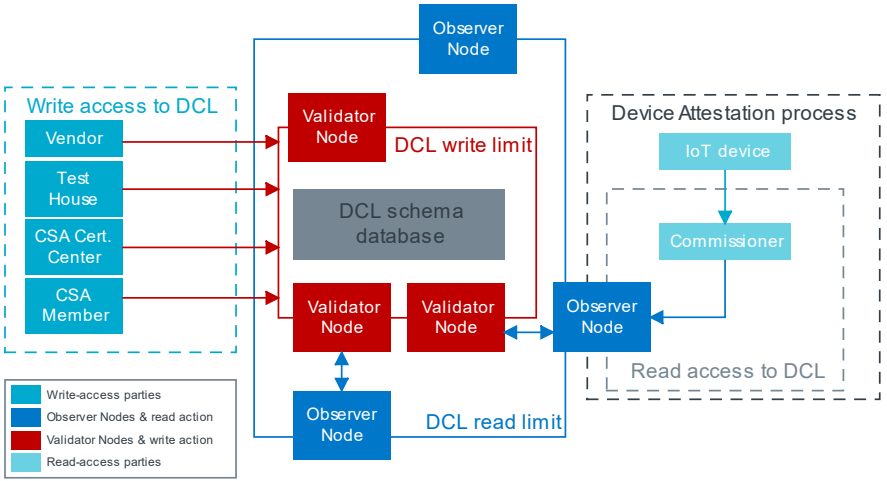


Distributed Compliance Ledger

CSA's decentralized store of information

Distributed Compliance Ledger (DCL)

- DCL is a distributed database based on blockchain technology maintained by CSA and CSA Members.
- Read access to the DCL is public. Matter-based ecosystems may retrieve information from DCL to read:
  - Vendor and Device Model information
  - Device Firmware information
  - Certification status of the device
  - Product Attestation Authorities certificates
- DCL records can be viewed from the Web UI: https://webui.dcl.csa-iot.org/

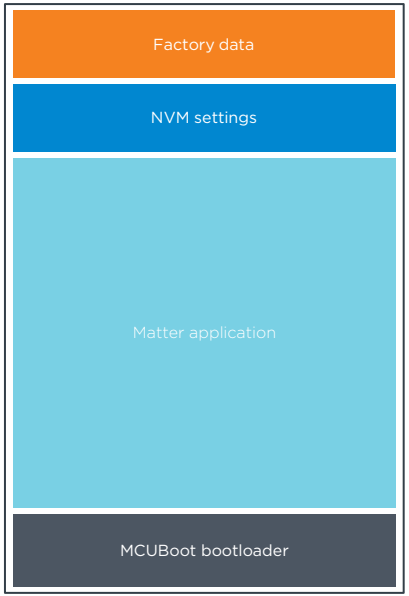


Factory provisioning

Programming device specific information

Factory provisioning and factory data

- Factory data is a set of device parameters written to the non-volatile memory during the manufacturing process.
- Parameter set includes information about:
  - Device certificates and cryptographic keys
  - Device identifiers
  - Hardware information
- nRF Connect SDK provides tools for managing factory data:
  - Support for generating and flashing factory data
  - Data encoded using CBOR format
  - Dedicated partition in memory (4k of flash)
  - Data protected from modifications by hardware protection driver



nRF52840 or nRF5340
application core

And finally do remember to..

- Generate your own private keys for MCUBoot – by default all examples in nRF Connect SDK use development keys.
  - You can find step-by-step instruction in the nRF Connect SDK documentation.
- Enable readback protection using hardware access port control mechanism called AP-Protect.
  - Check how to configure AP-Protect in nRF Connect SDK documentation.
- Disable debug serial ports so that logs and shell console are not accessible.
- Make sure that the NVM Settings partition is sufficiently large for your use-case (by default, set to 16k).

Product Certification

How to certify a Matter device?

Required certifications and qualifications

Matter over Thread device

- Matter certification
- Dependent certifications:
  - Bluetooth LE qualification
  - Thread certification

Matter over Wi-Fi device

- Matter certification
- Dependent certifications:
  - Bluetooth LE qualification
  - Wi-Fi certification

Dual Matter device or
Thread Border router +
Matter Controller

- Matter certification
- Dependent certifications:
  - Bluetooth LE qualification
  - Thread certification
  - Wi-Fi certification

Bluetooth SIG membership

Benefits	Adopter	Associate
Use of Bluetooth® technology in products*	✔	✔
Use of Bluetooth word mark and logo in marketing and on products*	✔	✔
Access to draft specifications	v0.9	v0.5, v0.7, v0.9
Access to Profile Tuning Suite (PTS)	✔	✔
Fees and Discounts		
Declaration Fee	$9,600 USD	$4,800 USD
Annual Membership Fee		
For companies whose annual revenue is < $100M USD	$0	$9,000
For companies whose annual revenue is > $100M USD	$0	$42,000

- Fees as of March 2023
- More details regarding Bluetooth SIG membership

Bluetooth qualification

- The Bluetooth Qualification Process promotes global product interoperability
- Qualification helps member companies ensure their Bluetooth products **comply with the Bluetooth Patent & Copyright License Agreement and the Bluetooth Trademark License Agreement** (collectively, the Bluetooth License Agreement) and Bluetooth specifications
- **All Bluetooth® Products Must Be Qualified** – it is not enough to just reference the qualification from your supplier; you must complete the qualification of your product for yourself

- More details regarding Bluetooth Qualification

Bluetooth qualification paths

Qualification Process with No Required Testing

- Using previously qualified Bluetooth® Subsystem in your product **with no changes** or additions to the Bluetooth design
- "white-labeling"
- Creating combinations involving only previously qualified Bluetooth End Products or Subsystems and you make **no design changes**

Qualification Process with Required Testing

- Creating a new design or combination that does not involve only previously qualified Bluetooth® End Products or Subsystems
- **Altering a previously qualified Bluetooth design** by changing the core configuration/functionality
- Qualifying a design that uses a previously qualified Bluetooth Component product type

The easy path to obtain Bluetooth qualification

Qualification Process with No Required Testing

- Using previously qualified Bluetooth® Subsystem in your product with no changes or additions to the Bluetooth design
- “white-labeling“
- Creating combinations involving only previously qualified Bluetooth End Products or Subsystems and you make no design changes

- Every release of nRF Connect SDK provides:
  - Qualified Bluetooth LE Controller Subsystem (the SoftDevice Controller)
  - Qualified Bluetooth LE Host Subsystem (Zephyr RTOS Bluetooth LE Host)
- If using them, your Matter product can reference Bluetooth LE QDIDs obtained by Nordic to apply for Bluetooth LE qualification without testing

Thread Group membership

MEMBERSHIP BENEFITS	ACADEMIC	AFFILIATE*	IMPLEMENTER	CONTRIBUTOR	SPONSOR
Access Draft Specification / Documents	✓	✓	✓	✓	✓
Access Final Specification / Documents	✓	✓	✓	✓	✓
Participation in General or Annual Meetings			✓	✓	✓
Access to IP - Gain Intellectual Property Rights (IPR) for Thread Technology, Typically with No Royalty Payments			✓	✓	✓
Certify by Inheritance Compliant Components and Products and Utilize Alliance Certification Logo			✓	✓	✓
Certify at ATL Compliant Components and Products and Utilize Alliance Certification Logo				✓	✓
Participate and Vote in Work Groups and Committees				✓	✓
Chair Work Groups and Committees				✓	✓
Annual Fee	$-	$750	$7,500	$15,000	$65,000
One-time Initiation Fee					$35,000

- Fees as of March 2023
- More details regarding Thread Group membership benefits

Thread certification

- Formal validation of:
  - The product's conformance to the Thread specification
  - The product's interoperability with leading Thread reference implementations
- Acquire a product **license for intellectual property rights (IPR)** to Thread technology
- Acquire **license to use the Thread Group certification logo** with the product

- More details regarding Thread Certification

Thread certification paths

Certification by Inheritance

- **Derivative Products:** variations of a certified product, non-Thread functional changes etc.
- **Modules:** use of a Thread Certified Component within a module
- **End Products:** use of a Thread Certified Component within an end product
  - The most complex scenario
  - May require extensive supporting technical information

Certification at an Authorized Test Lab (ATL)

- Use of an uncertified Thread stack
- Altering a Thread Certified Component

The easy path to obtain Thread certification

Certification by Inheritance

- **Derivative Products:** variations of a certified product, non-Thread functional changes etc.
- **Modules:** use of a Thread Certified Component within a module
- **End Products:** use of a Thread Certified Component within an end product
  - The most complex scenario
  - May require extensive supporting technical information

- Every release of nRF Connect SDK provides pre-built Open Thread libraries certified as a **Thread Certified Component**
- If using them, your Matter product can reference Thread CIDs obtained by Nordic to apply for Thread Certification by Inheritance without testing

- More details regarding Nordic's Thread Certified Components

Thread certification fees (per product)

- ATL Certification - $2500 (does not include payment for testing services to an ATL)
- Inheritance Certification:
  - Contributor member - $1000
  - Implementer member - $1500
- Recertifications (maintenance) - $0
- Fees as of March 2023

Wi-Fi Alliance membership

Contributor

For companies who want to drive the direction of the Wi-Fi industry and develop many Wi-Fi CERTIFIED™ products and use the Wi-Fi CERTIFIED brand

US$20,000/year (2023)
US$25,000/year (2024)
pro-rated by quarter for new members

- Develop, test, and certify products
- Use the Wi-Fi CERTIFIED logo and brands
- Participate and vote in Marketing, Technical, and Regulatory task groups
- Monitor developing programs
- Extend benefits to affiliated companies

Implementer

For companies who want to implement certified solutions in products and use the Wi-Fi CERTIFIED brand

US$5,150/year (2023)
US$6,000/year (2024)

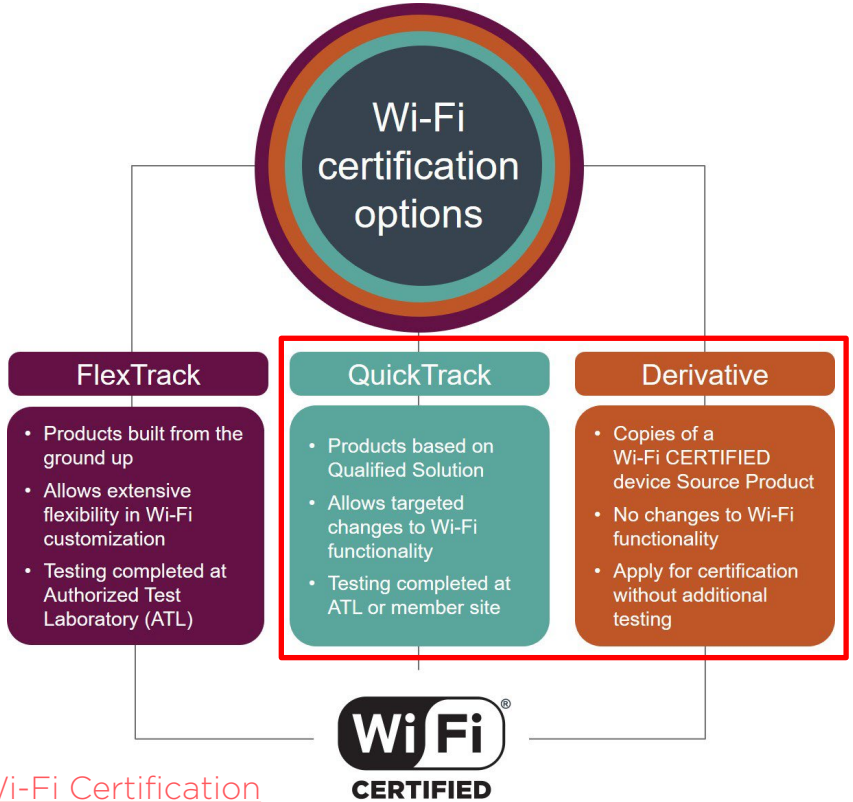
- Implement unmodified Wi-Fi modules which have been certified by another member
- Use the Wi-Fi CERTIFIED logo and brands
- Access final documents

- More details regarding Wi-Fi Alliance membership

Wi-Fi certification

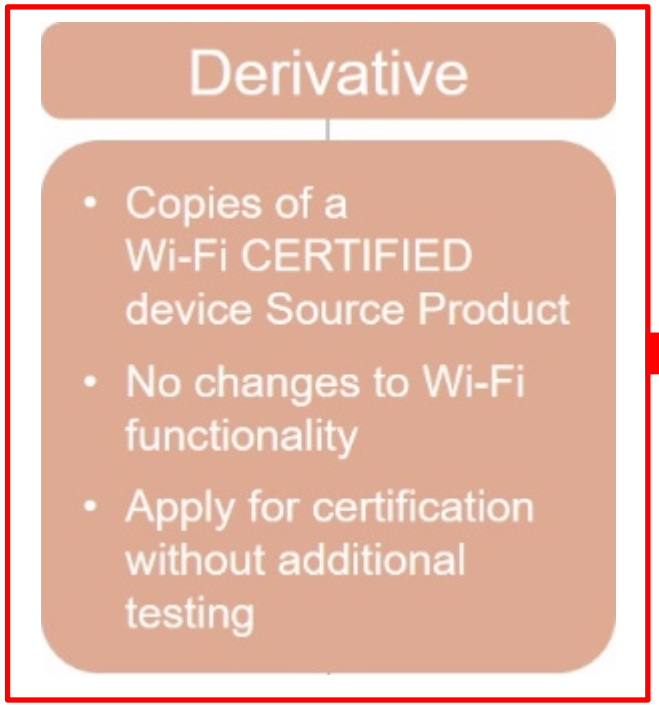
- Certification means that a product has been tested in a variety of ways to validate interoperability with other Wi-Fi CERTIFIED equipment operating in the same frequency band
- A company must be a member of Wi-Fi Alliance® and achieve certification to use the Wi-Fi CERTIFIED logo and Wi-Fi CERTIFIED certification marks

Wi-Fi certification paths



- More details regarding Wi-Fi Certification

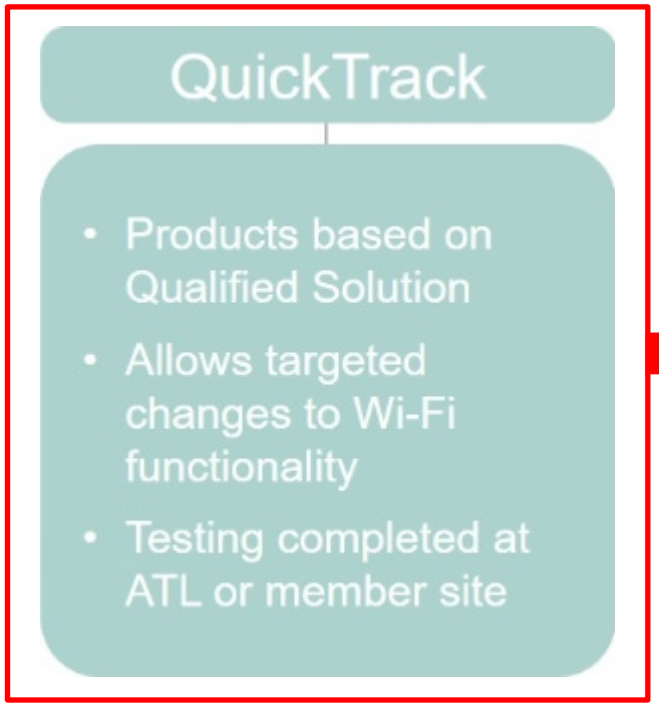
The easy path to obtain Wi-Fi cert. (module)



- Derivative certification is applicable for End Products based on third-party Wi-Fi CERTIFIED modules containing an nRF70 Series IC without any modification
- A range of module suppliers offer qualified and certified modules/modems based on Nordic Semiconductor technology

- More details regarding 3rd party modules/modems based on Nordic technology

The easy path to obtain Wi-Fi certification (IC)



- Soon nRF Connect SDK will provide **Qualified Solutions** and **Qualified Solution Variants** for all nRF70 Series platforms
- If using them, your Matter product can reference Wi-Fi CIDs obtained by Nordic to apply for Wi-Fi certification of an End Product through the QuickTrack path
- QuickTrack path allows targeted modifications to Wi-Fi components and functionality. A subset of tests is required

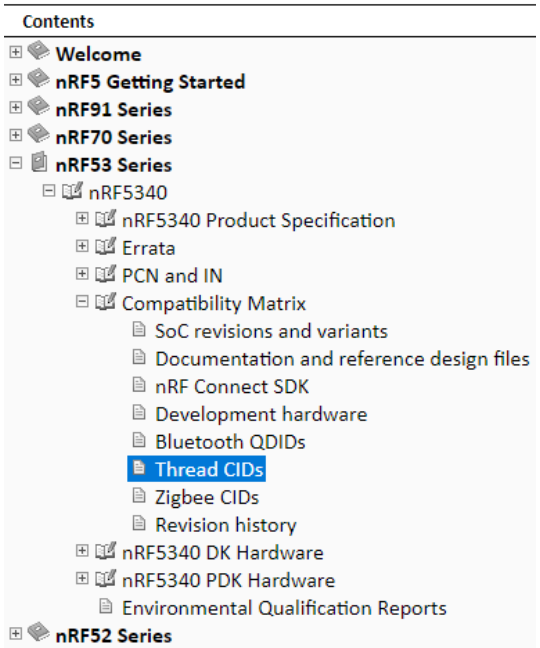
- Nordic's White Paper "Wi-Fi Alliance Certification - nRF70 Series"

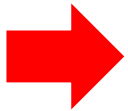
Wi-Fi certification fees

Certification license fees	**Contributor / Affiliate / Small Business Introductory Participant**	**Implementer / Small Business Introductory Implementer**
Certify a new product at an ATL using the FlexTrack certification path	One-time, per product $5,000 license fee + ATL testing fees (**consult with an ATL for specifics**); volume discount available for 25+ certifications in calendar year	
Certify a new product using the QuickTrack certification path	One-time, per product $7,500 program license fee + ATL testing fees, if applicable	
Certify a derivative product (based on your own company's Wi-Fi CERTIFIED product)	$600 certification fee per derivative product; after 16 certified products from the same source, $100 per product	
Certify a derivative product by integrating an unmodified, certified Wi-Fi module or system into your product	$600 certification fee per derivative product; after 16 certified products from the same source, $100 per product	$4,000 certification fee per derivative product

Where to find qual./cert. IDs?

- Nordic's Infocenter portal provides references to all applicable qualification and certification IDs obtained by Nordic for all applicable SoCs and nRF Connect SDK releases





Thread CIDs

The Thread® Certification IDs (CID) for the nRF5340 SoC used with nRF Connect SDK are listed here. The CIDs apply to all package variants of the SoC.

nRF Connect SDK	CID			Thread specification
	Master	FTD optimized[1]	MTD optimized[1]	
1.5.0	Not planned	#11A079	#11A080	1.1
1.5.1				
1.6.0		#11A097	#11A096	
1.6.1				
1.7.0		Not planned	Not planned	-
1.7.1				
1.8.0		#11A126	#11A125	1.1
1.9.0		#11A134	#11A135	
1.9.1		Not planned	Not planned	-
1.9.2				
2.0.0				1.2
2.0.1		#12A007	#12A008	
2.0.2		#13A010	#13A011	1.3
2.1.0		#13A019	#13A020	
2.1.1				
2.1.2				
2.1.3				
2.2.0		#13A053	#13A052	

Table 1. nRF5340 nRF Connect SDK Thread CIDs

Connectivity Standards Alliance membership

Benefit	Promoter	Participant	Adopter	Associate
Develop, test, and certify products	✓	✓	✓	White label or rebrand a Certified Product via the Certification Transfer Program
Develop, test, and certify products that can be transferred to a 3rd party via the Certification Transfer Program	✓	✓		
Implement a Certified Product via the Cert Transfer Program	✓	✓	✓	
Participate in the development of market messaging and marketing communication	✓	✓		
Participate in Alliance marketing communications	✓	✓	✓	
Participate, vote, and chair Alliance Working Group teams	✓	✓		
Participate in the development of Market Requirements and Use Cases, Specifications and Test Materials	✓	✓		
Annual Fee	$105,000	$20,000	$7,000	$0

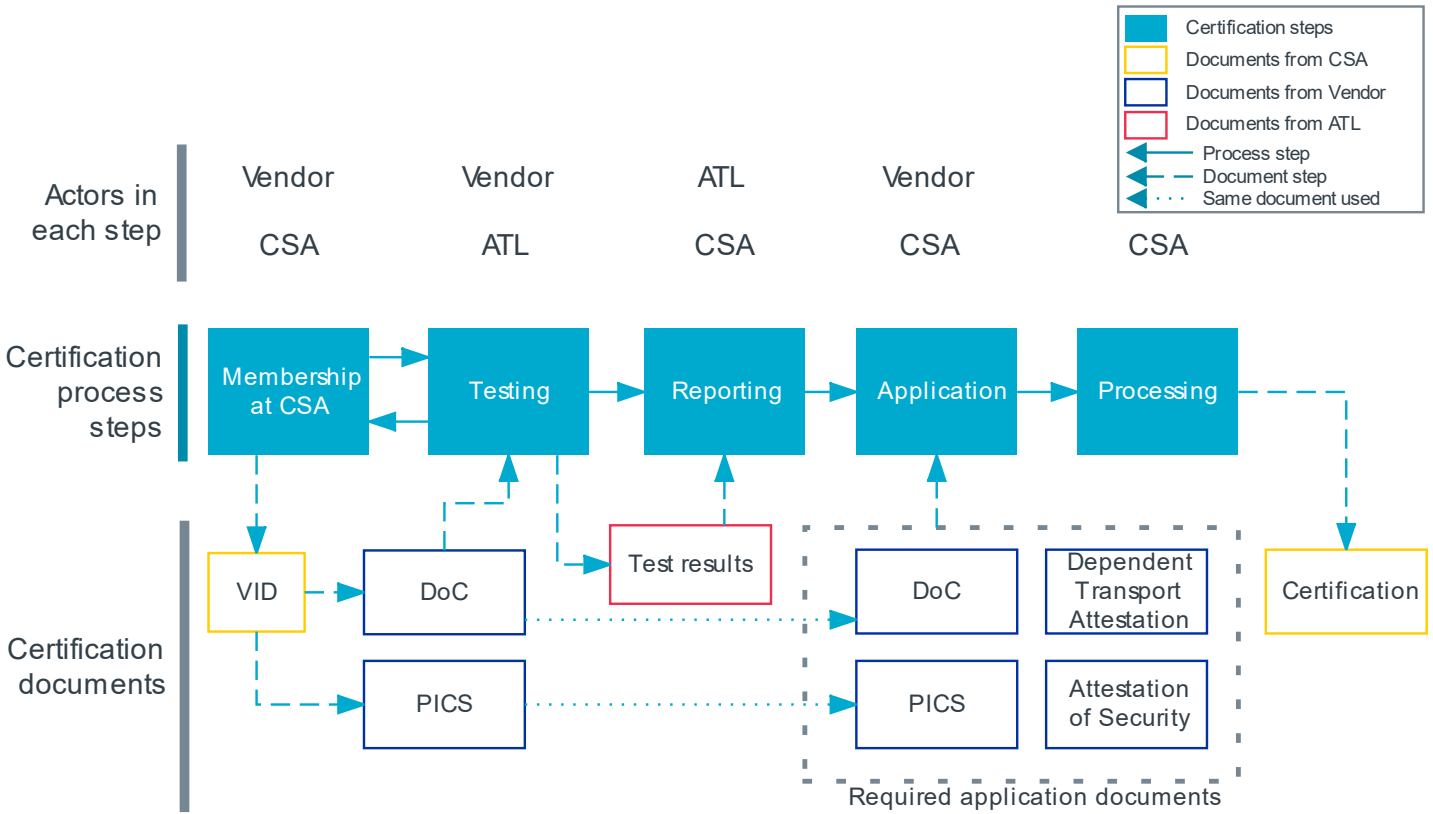
- Fees as of March 2023
- More details regarding Connectivity Standards Alliance membership benefits

Matter certification

- Matter certification denotes compliance to the specification and validate interoperability
- In addition, certification allows the **use of Certified Product logos** and listing of the product on the Alliance website for verification
- Matter product certification **cannot be inherited** from a semiconductor vendor
- First Matter certification of a product **always includes testing** at an Authorized Test Laboratory (ATL)

- More details regarding Matter Certification

Matter certification process overview



Matter certification process variants

- The standard Matter certification process has several variants that you can use if you have already obtained the certification, or you want to certify several products of the same family:
  - Rapid Recertification program
  - Product Family certification
  - Certification by Similarity
- More details regarding Matter certification process variants

Matter certification made easier

- What does Nordic do to facilitate your Matter certification?
  - Exhaustive verification of Nordic's Matter solution for every nRF Connect SDK release – we guarantee that every release of nRF Connect SDK passes all applicable core Matter certification tests
  - Comprehensive documentation regarding Matter certification as part of the nRF Connect SDK documentation
  - Certification document templates from Nordic Semiconductor (to request and obtain such documents, open a private ticket on DevZone portal):
    - Matter Attestation of Security
    - Thread certification by inheritance application

Matter certification fees (per product)

	Promoter	Participant	Adopter	Associate
Certify a product	$2,000	$2,000	$3,000	N/A
Certify own derivative product	$1,500	$1,500	$2,500	N/A
Implement a Certified Product via the Certification Transfer Program	$1,500	$1,500	$2,500	$2,500 + $500 per year

- Fees as of March 2023
- Fees do not include payment for testing services to an Authorized Test Laboratory (ATL)

Product packaging and branding

Badges and setup codes

Smart home device badges

- Compatibility badges are a quick and easy way for consumers to gain confidence that the devices they're buying will work with each other

- Matter Brand and Setup Guidelines

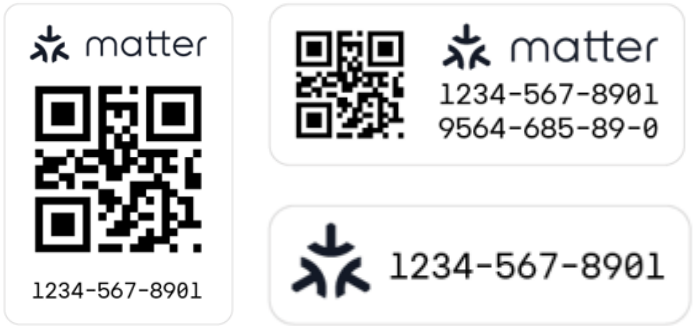
- The Bluetooth Brand Guide

- Thread Brand Guidelines

- Wi-Fi Brand Style Guideline

Matter setup codes

- Matter makes smart home device setup easy by standardizing the setup process with a consistent set of steps
- Matter devices use Bluetooth Low Energy and numeric, QR, or NFC setup codes to make this process consistent, easy, and secure



- More details regarding Matter Brand and Setup Guidelines

NORDIC SEMICONDUCTOR

- IoT made easy -

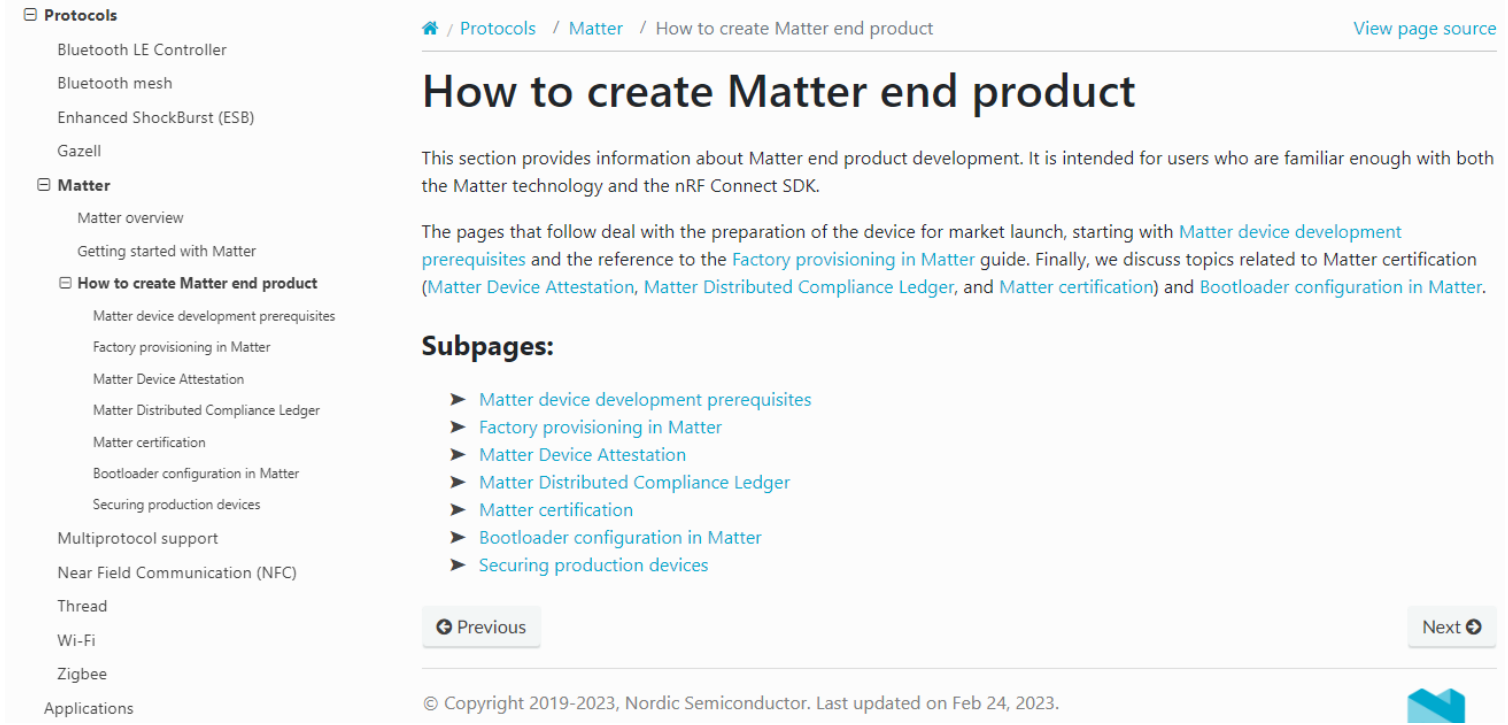
Bluetooth LTE-M NB-IoT GPS

ANT+ THREAD zigbee NFC

Summary

Additional resources

nRF Connect SDK user guides for Matter



- nRF Connect SDK documentation: Matter user guides

Matter Resource Kit

Matter Resource Kit

Marketing Resources and Assets

Press Release »

Messaging

- Matter Member Messaging
- CSA & Matter + Technical Introduction

Brand and Setup Guidelines

- Trademark & Logo Usage Guidelines
- Matter Brand Guidelines
- Matter Setup Code
- Matter Logo
- Matter Badges

Other Resources

- Matter Marketing Assets & Collateral

Technology and Developer Resources & Assets

Specification

- Matter 1.0 Core Specification
- Matter 1.0 Application Cluster Specification
- Matter 1.0 Device Type Library Specification
- Matter 1.0 Core Test Plan
- Matter 1.0 Application Cluster Test Plan

Distributed Compliance Ledger (DCL)

- DCL Source Code
- DCL Web UI
- DCL Policies, Procedures and Governance
- DCL Whitepaper

Open Source SDK »

Product Attestation

- PKI Certificate Policy
- Getting a Device Attestation Certificate for your Product
- Matter Product Attestation Authority Approval Process
- Product Attestation Authority - Self-attestation form and contact information
- Certification Practice Statement Template
- Certificate Declaration Overview

Testing and Certification

Testing

- Test Tool User Guide
- Authorized Test Lab Contact Information

Certification

- Certification Policy
- Matter Rapid Recert Policy
- Declaration of Conformity (DoC)
- Certification Process Presentation
- Recording of Certification Process
- Matter Certification Attestation Forms

Questions?

Should you not find what you need here, please reach out to one of these Alliance teams with any questions:

- Testing & Certification: certification@csa-iot.org
- Marketing: marketing@csa-iot.org
- General Help Desk: help@csa-iot.org

- CSA member portal: Matter Resource Kit

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Q&A