



# Exciting new features in nRF Connect SDK

Learn about the next generation SDK v1.5.0 for  
Nordic wireless solutions

*Webinar*

*Nordic Semiconductor*

*March 2020*

*Duration: 60 min*

# Today's hosts

Bjørn Kvaale



Product Marketing Engineer



Krzysztof Loska



Technical Product Manager  
Short-range wireless



Joakim Tønnesen

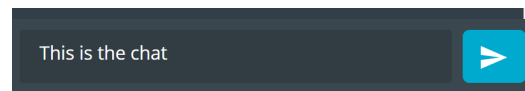
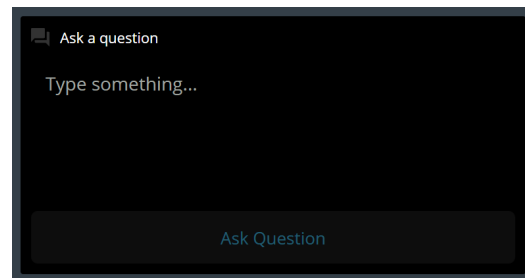


Technical Product Manager  
Cellular IoT



# Practicalities

- Duration: 45 min presentation, 15 min Q&A
- Questions are encouraged!
  - Please type questions in 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 is not anonymous, and 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 [webinars.nordicsemi.com](http://webinars.nordicsemi.com)



# Content

- Intro to the nRF Connect SDK and basic terminology (15 min, Bjørn)
- Short-range updates in nRF Connect SDK v1.4 (15 min, Krzysztof)
- Cellular IoT updates in nRF Connect SDK v1.4 (15 min, Joakim)
- Q&A (15 min)

# nRF Connect

- nRF Connect is our umbrella of tools to help developers build and debug their applications quickly
- Consist of
  - nRF Connect SDK
  - nRF Connect for Desktop
  - nRF Connect for Cloud
  - Mobile applications

# nRF Connect SDK intro

and basic terminology

# nRF Connect SDK



- All in one place
- One code base and toolchain for nRF91, nRF53 and nRF52 Series
- Optional for nRF52 Series (  $\geq$  v1.3.0 tag)
- Includes Bluetooth Low Energy, Bluetooth mesh, Thread/Zigbee and LTE-M/NB-IoT/GPS
- nRF Connect SDK v1.4.1 introduces Bluetooth v5.2 qualified Host and Controller



# nRF52 Series SDK Support

- nRF5 SDK
  - Good if you do not require an RTOS
  - If you are used to this SDK and do not require newer features after Bluetooth 5.0, Bluetooth mesh 1.0.1, Thread 1.1 or Zigbee 3.0 (R22)
- nRF Connect SDK support optional
  - Will support newer features after Bluetooth 5.0, Bluetooth mesh 1.0.1, Thread 1.1 or Zigbee 3.0 (R22)
  - Optional for the nRF52 Series
- See [documentation](#) or [webinar](#) for more info

## nRF52 Series Supported SDKs

nRF5 SDK

nRF5 SDK for Bluetooth mesh

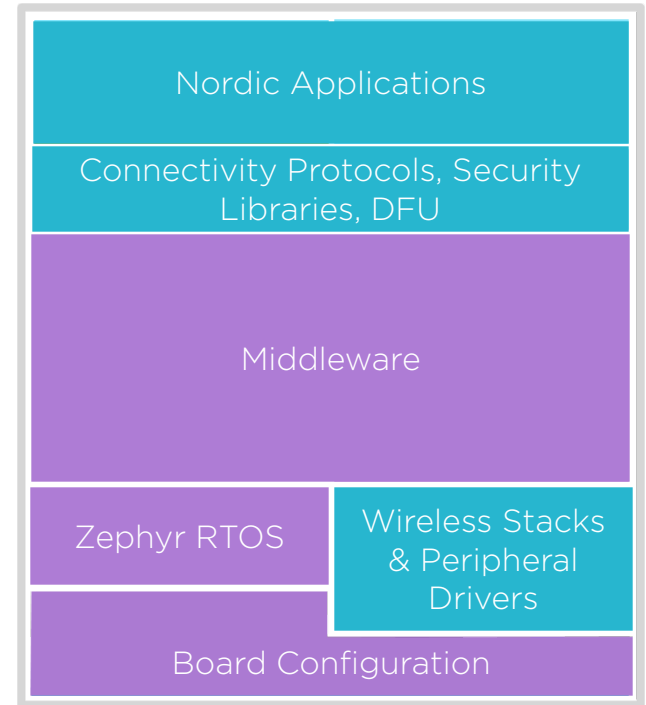
nRF5 SDK for Thread/Zigbee

nRF Connect SDK



# Code Base

- Contains app code, connectivity protocols, wireless stacks and peripheral drivers
- Code is organized in 4 main repositories (Nordic and Open Source (OS) code):
  - nRF - Application & Connectivity Protocols
  - nrfxlib - Peripheral Drivers and Stacks
  - Zephyr - RTOS & Board configuration (OS)
  - MCUBoot - Secure Bootloader (OS)



# nRF Connect SDK Basic Terminology

- Git
  - An open source distributed version-control system for managing source code changes
- West
  - Command line tool for multi-repository management and building and flashing examples
- Repository
  - A version-controlled project folder e.g. nrf, zephyr
  - Every code commit creates a repository “version” with unique SHA identifier

# nRF Connect SDK Basic Terminology

- Tag
  - Points to a specific commit SHA identifier, immutable
  - A human readable version reference
  - Nordic product development support is available
- Master branch
  - Points to the most recent commit SHA, mutable
  - Start testing newest features earlier

# Supported for Development and Production

Features “supported for **Development**” may be used for development, but not recommended for volume production.

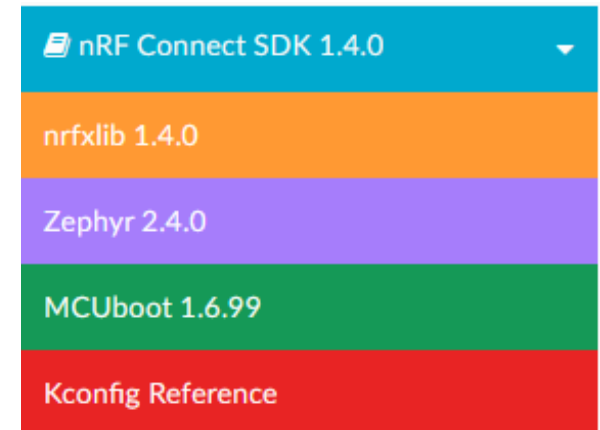
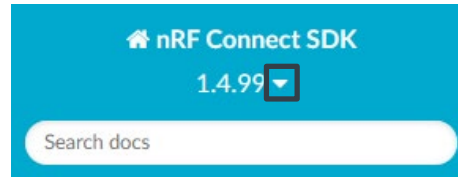
- Technical support is available
- Reported bugs may not be resolved until supported for Production
- Implementation may be partial
- APIs may change going to production
- Incomplete verification
  
- Suitable for prototype / evaluation

Features “supported for **Production**” will be maintained and are suitable for product development.

- Technical support is available
- Reported critical bugs will be resolved in both Master and latest Tag version of nRF Connect SDK.
- Complete implementations
- Verified for product development
  
- Suitable for integration in end-products

# nRF Connect SDK documentation

- [Documentation link](#)
- Click on arrow in top left to choose documentation tag
  - 1.4.99 refers to master branch
  - Latest tag is 1.5.0
- Click on arrow in bottom left to switch to nrfxlib, Zephyr or MCUboot doc



# Manage Source Code and Configurations

**West**  
Multi-repository  
management tool

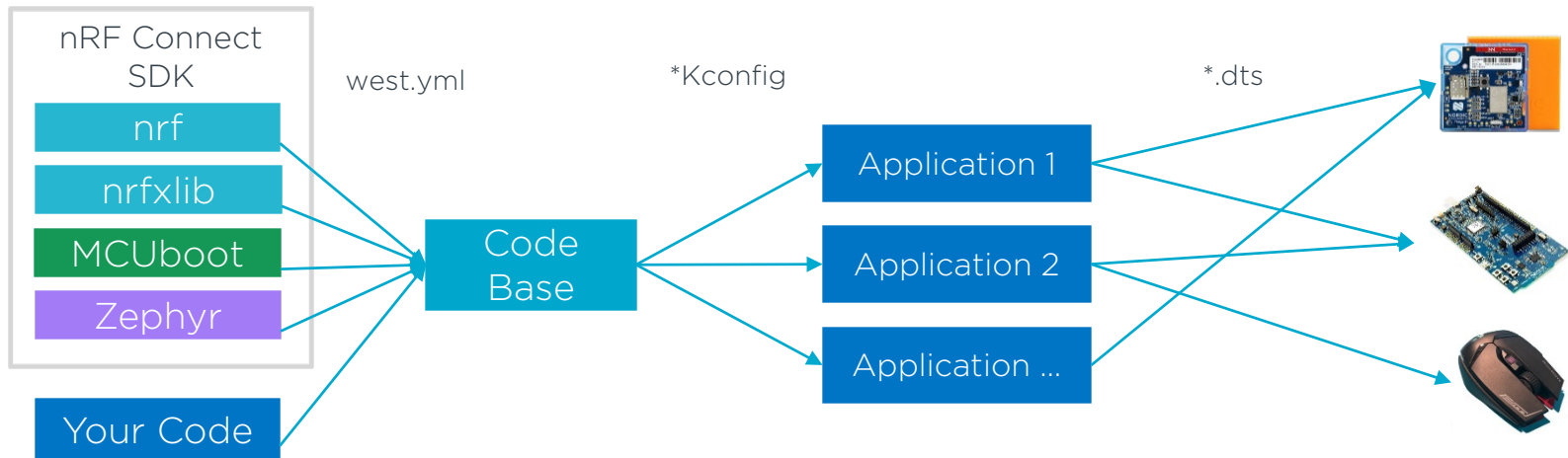
**Kconfig**  
Source module / feature  
configuration for compile

**Device Tree**  
Target Board / Device  
description

Clone / update

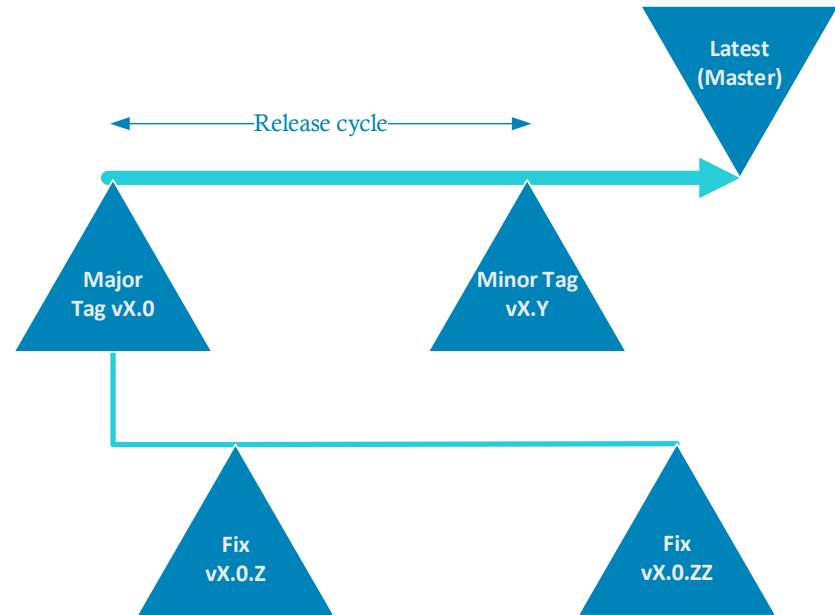
Configure features

Configure target



# Release Cycles

- Regular releases (e.g. quarterly)
- Publicly hosted on [GitHub](#)
- Fixes released as needed
  - Long term supported releases can have fixes applied and delivered after new releases
- Latest development version available
- Version control management with Git:
  - manage new version and fix adoption
  - tool supported merging



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## nRF52 Series Supported SDKs

nRF5 SDK

nRF5 SDK for Bluetooth mesh

nRF5 SDK for Thread/Zigbee

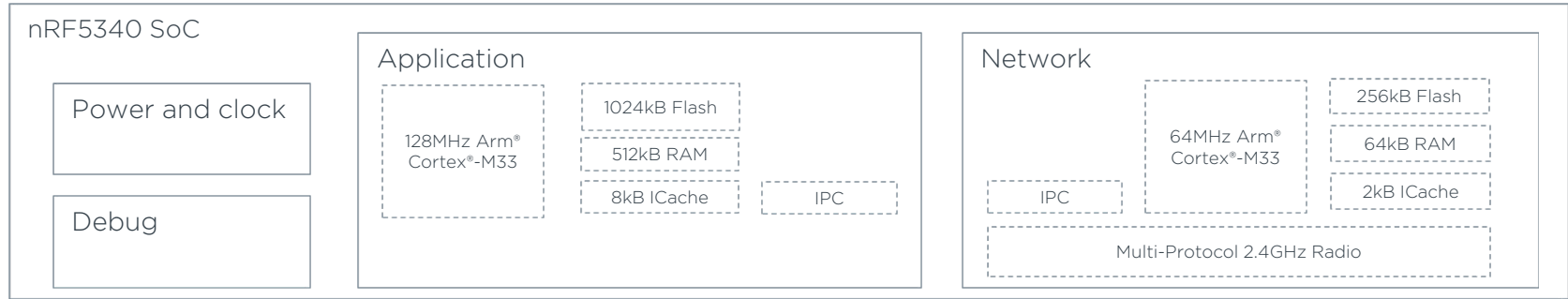
nRF Connect SDK



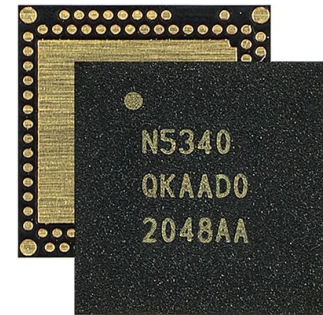
# Short-range updates

nRF Connect SDK v1.5

# nRF5340 – volume production

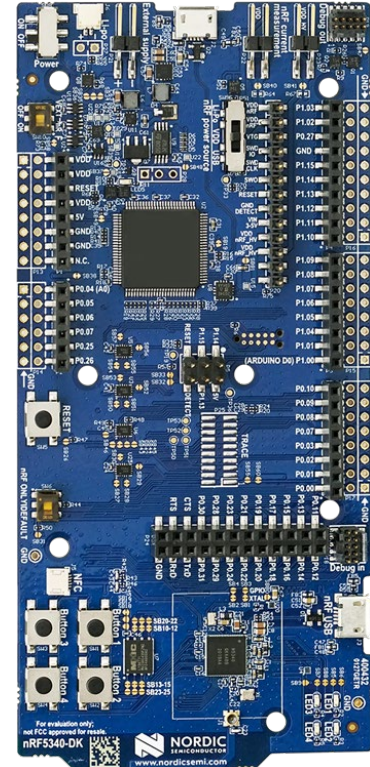


- The nRF5340 is the world's first wireless SoC with two Arm® Cortex®-M33 processors
- The ideal choice for LE Audio, professional lighting, advanced wearables, and other complex IoT applications
- nRF53 Series devices are now supported for production



# nRF5340 DK

- NCS v1.5.0 introduces support for nRF5340 DK
  - The nRF5340 PDK has been deprecated with the introduction of the production-level nRF5340 DK. nRF Connect SDK v1.4 was the last release supporting the nRF5340 PDK
  - To determine if you have a PDK or DK, check the version number on the sticker on your kit. If the version is 0.11.0 or higher, the kit is an nRF5340 DK



# nRF5340 – status of connectivity protocols

Protocol	Status in NCS 1.5.0
Bluetooth LE	For development
Bluetooth mesh	For development
Thread	For production
Thread + Bluetooth LE	For development
Zigbee	For development
Zigbee + Bluetooth LE	For development

# Bluetooth mesh

- Feature complete Bluetooth mesh implementation, released for development. Added support for:
  - Light xyL models
  - Light HSL models
  - Scheduler models
  - nRF52833 DK in *the Bluetooth: Mesh light* and *Bluetooth: Mesh light switch* samples
- Qualification is planned for the v1.5.0 tag



## Minimal build for samples

- Added minimal configuration (prj\_minimal.conf) to the *Bluetooth: Peripheral UART* sample, thus enabling support for building for nRF52810 and nRF52811 devices
- Optimized ROM and RAM used by Thread samples
- Added memory footprint optimization guide in Application development section for Bluetooth LE and Thread networking protocol



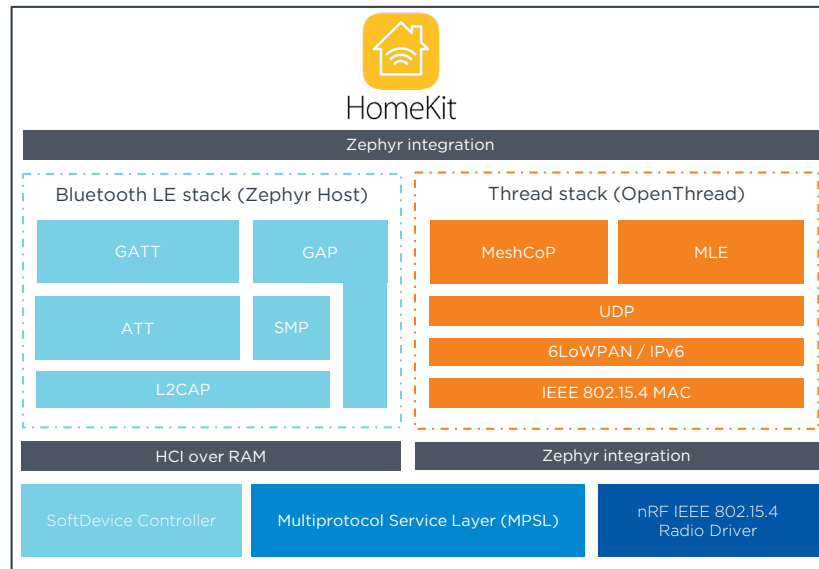
# nRF5 SDK for HomeKit

- nRF5 SDK for HomeKit is now **deprecated** and will not be upgraded to HomeKit Accessory Development Kit v5 (ADK v5) or any future version of the ADK
- It is not possible to obtain a HomeKit certification for a new product using the nRF5 SDK for HomeKit, as it is based on the deprecated ADK v4



# Apple HomeKit in nRF Connect SDK

- Apple's HomeKit Accessory Development Kit v5.1 have been integrated into the nRF Connect SDK and is distributed as a private GitHub repository
  - Supports both HomeKit over Thread and HomeKit over Bluetooth Low Energy
  - MFi licensees can get access to the HomeKit repository by contacting us via Nordic DevZone private ticket
  - Support for development

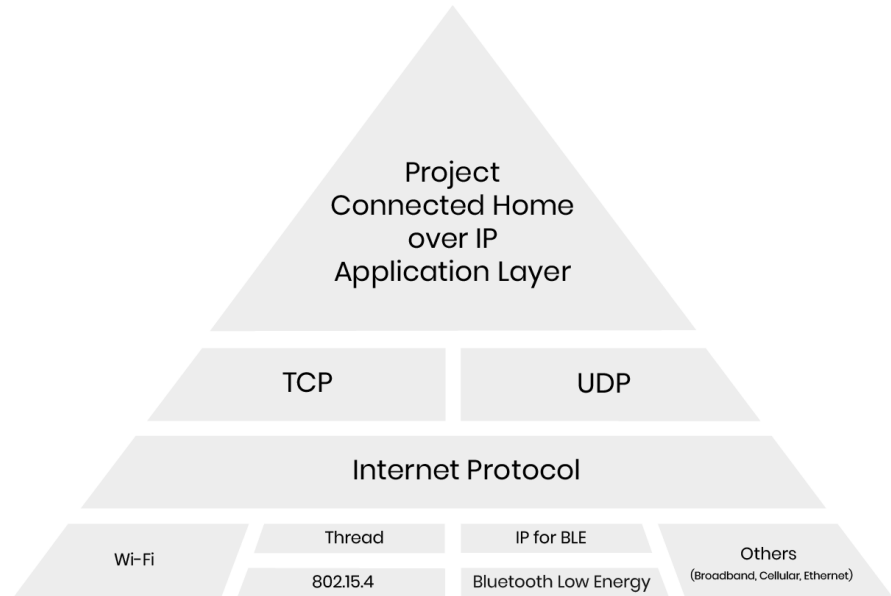


nRF52840 or nRF5340



# Project Connected Home over IP

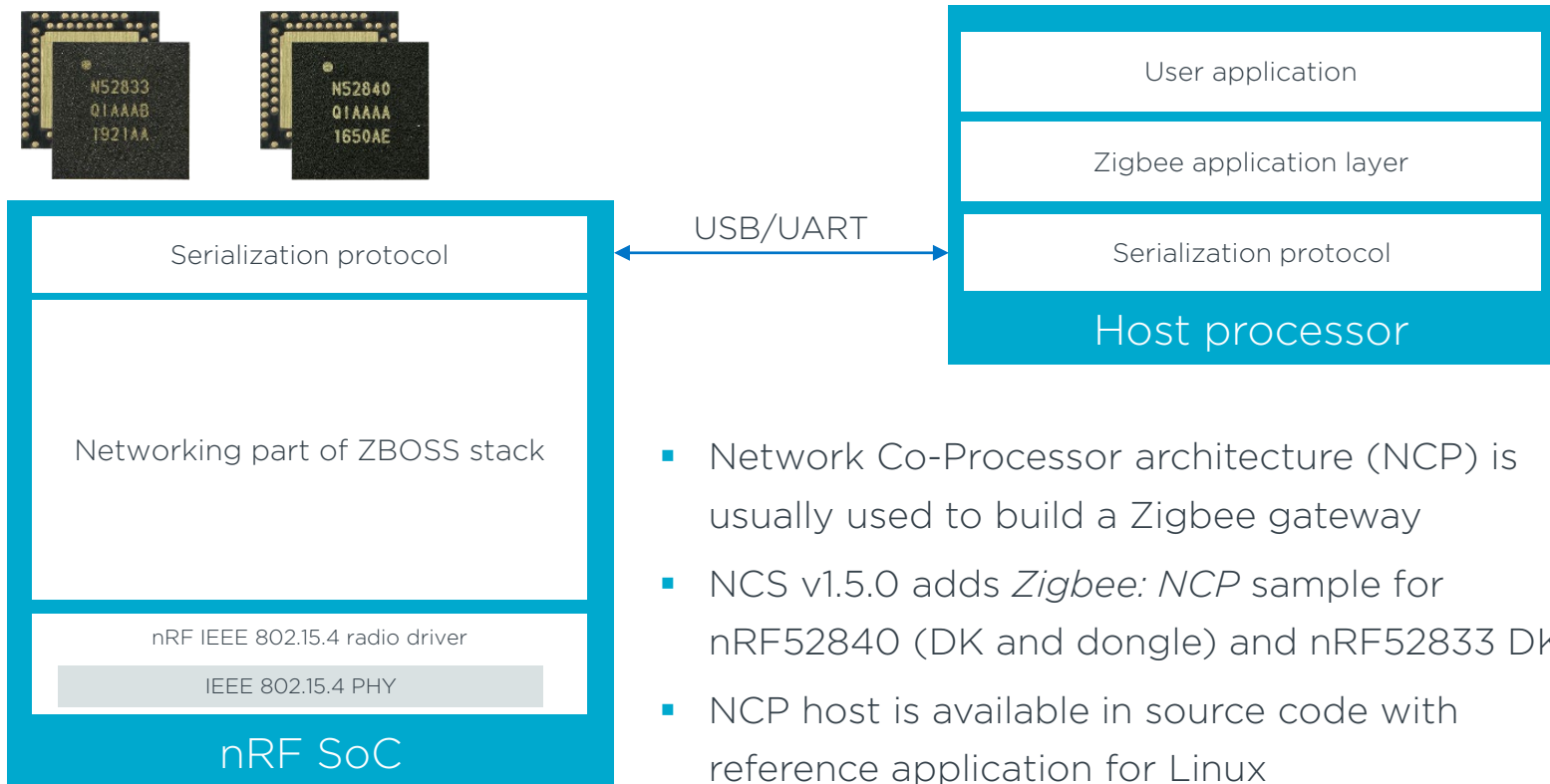
- Amazon, Apple, Google, Samsung and others joined together within the Zigbee Alliance to create a new application layer and unify smart home
- Version 1.0 targets WiFi and Thread as main connectivity protocols. Bluetooth LE will be used to onboard new devices



# Project Connected Home over IP - status

- The Project is still at an early stage and is under development
- NCS v1.5.0 integrates the current state of Project Connected Home over IP repository
  - Project Connected Home over IP protocol user guide
  - Project CHIP door lock sample
  - Project CHIP light switch sample
  - Project CHIP light bulb sample
- An official support for the Project is available now through Nordic's DevZone

# Zigbee NCP – better support for gateways



- Network Co-Processor architecture (NCP) is usually used to build a Zigbee gateway
- NCS v1.5.0 adds *Zigbee: NCP* sample for nRF52840 (DK and dongle) and nRF52833 DK
- NCP host is available in source code with reference application for Linux

# Edge Impulse

- nRF Connect SDK v1.5.0 introduces support for Edge Impulse machine learning models
  - Edge Impulse is a development platform that can be used to enable embedded machine learning on Nordic's SoCs
  - Before integrating the Edge Impulse machine learning model to an nRF Connect SDK application, the machine learning model must be prepared and deployed. This model is prepared using the *Edge Impulse studio* external web tool
  - *Edge Impulse: Data forwarder* sample demonstrates the usage of Edge Impulse's data forwarder to provide sensor data to *Edge Impulse studio*
  - *Edge Impulse wrapper* is used for integrating the Edge Impulse machine learning model into an nRF Connect SDK applications. The usage of the wrapper is demonstrated by the *Edge Impulse: Wrapper* sample



# Platform Security Architecture (PSA)

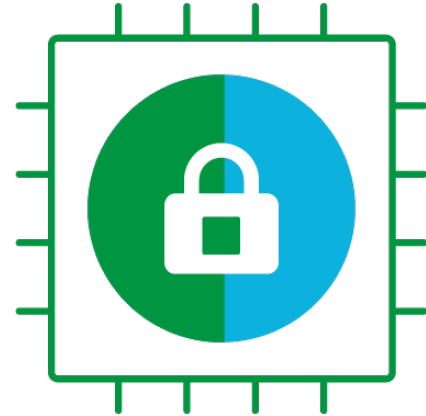


**psacertified**<sup>™</sup>  
level two

- The Platform Security Architecture (PSA) is an initiative from Arm that aims to address some of the shortcomings with IoT security. Built on industry best practices, it outlines common standards for security
- The Platform Security Architecture (PSA) is made up of four key stages:
  1. analyze - analyze the threats that have the potential to compromise a device and generate a set of security requirements
  2. architect - specifications to design-in the necessary security requirements for a product
  3. implement - the implement stage offers an open source firmware reference implementation
  4. certify - known as PSA Certified, is an independent evaluation and certification scheme, developed by Arm and its security partners

# Trusted Firmware-M (TF-M)

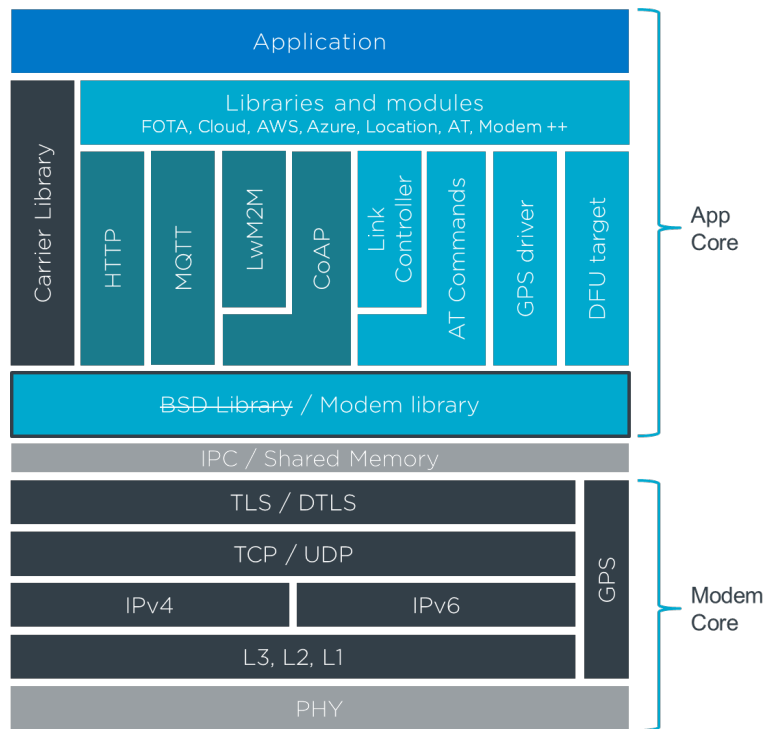
- Trusted Firmware-M (TF-M) is the reference implementation of Platform Security Architecture (PSA). It provides a highly configurable set of software components to create a Trusted Execution Environment
- nRF Connect SDK v1.5.0 adds basic, for development support for Trusted Firmware-M (TF-M) for nRF5340 and nRF9160
- More complete support is coming



# Cellular IoT updates

nRF Connect SDK v1.5.0

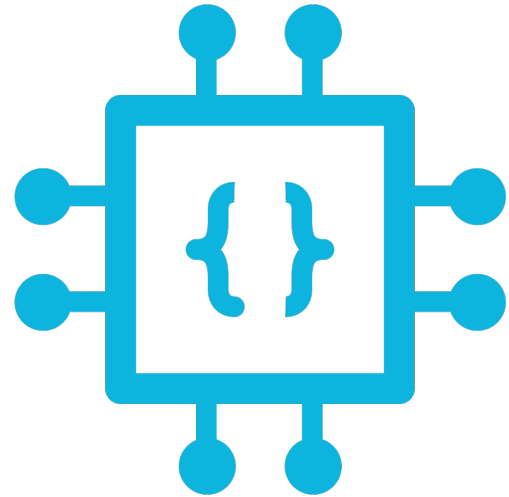
# Overview





# Modem library v1.0.0

- Renamed from BSD library to Modem library.
- Dynamic memory configuration
- Memory optimization
- Memory diagnostics



# Device management

- Carrier LwM2M library v0.10.2
  - Certified for AT&T and Verizon.
- Full modem FOTA
  - 2 MB external flash.
  - Example showing update through HTTP.
- Full modem DFU
  - Serial (UART) update using the SMP protocol.
  - Using MCU manager (mcumgr) management protocol.



# Asset Tracker v2

- Ultra-low power by design
- Offline first
- Timestamping
- Batching of data
- Configurable at run-time



# Supported Modem firmware

- [mfw\\_nrf9160 v1.2.3](#)
- [mfw\\_nrf9160 v1.1.4](#)
- [Compatibility matrix](#)
- [nRF9160 Certification web page](#)



Q&A