Exciting new features in nRF Connect SDK v2.3.0

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Today's hosts

Tiago Monte
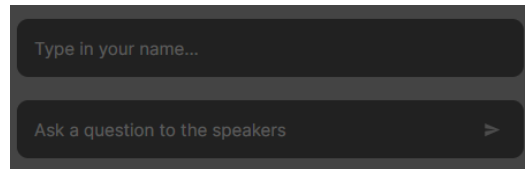

Developer Marketing Manager
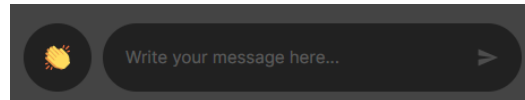
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Practicalities

- Duration: 50 min presentation, 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 toward 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 webinars.nordicsemi.com/on-demand

Agenda

- Intro to the nRF Connect SDK

- Development tools updates (including demo)

- Bluetooth updates

- Wi-Fi updates (including demo)

- Matter updates (including demo)

- Cellular IoT updates

- Q&A

Excite and Support Developers

Webinars	DevZone	GitHub	DevAcademy

Technology intros and trainings

Tech support center & online community

121 Repos, C/C++ Python, Javascript

Interactive Online Learning Platform

nordicsemi.com/webinars

devzone.nordicsemi.com

github.com/nordicsemiconductor

academy.nordicsemi.com

nRF Connect SDK intro

nRF Connect SDK

- One code base and toolchain for nRF91, nRF70, nRF53, nRF52 and nRF21 Series
  - Optional for nRF52 Series (>= v1.3.0)
- Includes ANT, Bluetooth Low Energy, Wi-Fi, LTE-M, NB-IoT, GNSS, Bluetooth mesh, Thread, Zigbee, Matter, ESB, Gazell, NFC
- Bluetooth v5.3 qualified Host and Controller stack since v2.0.0
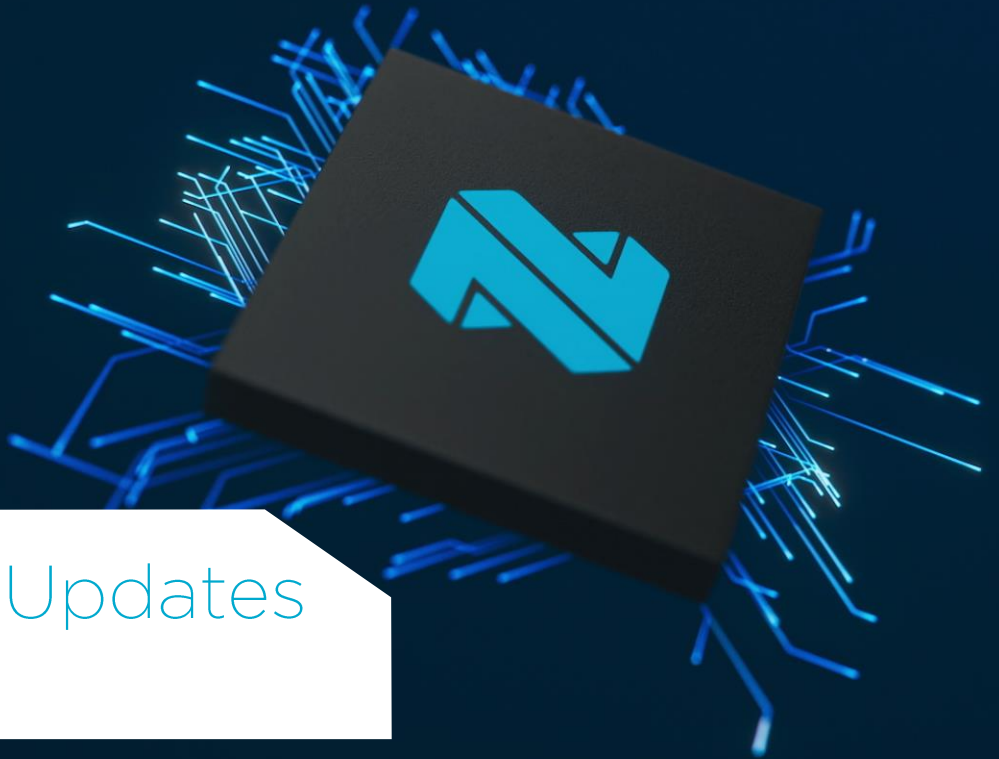
Development Tools Updates

nRF Util v7.4.1

- Added a built-in `self-upgrade` command to upgrade the nrfutil core functionality to the latest version

- New command added `nrfutil trace`
  - Analyze/monitor an nRF9160 modem traces
  - Analyze traffic with Wireshark
  - Analyze static power consumption using Online Power Profiler
  - Ideal for scripting & test automation
  - Documentation

nRF Connect for Desktop new application
## Serial Terminal

- Serial Terminal
  - Built to be used with other applications in nRF Connect Desktop
  - Allows sharing COM Ports between applications

- Line or Char (Shell) mode
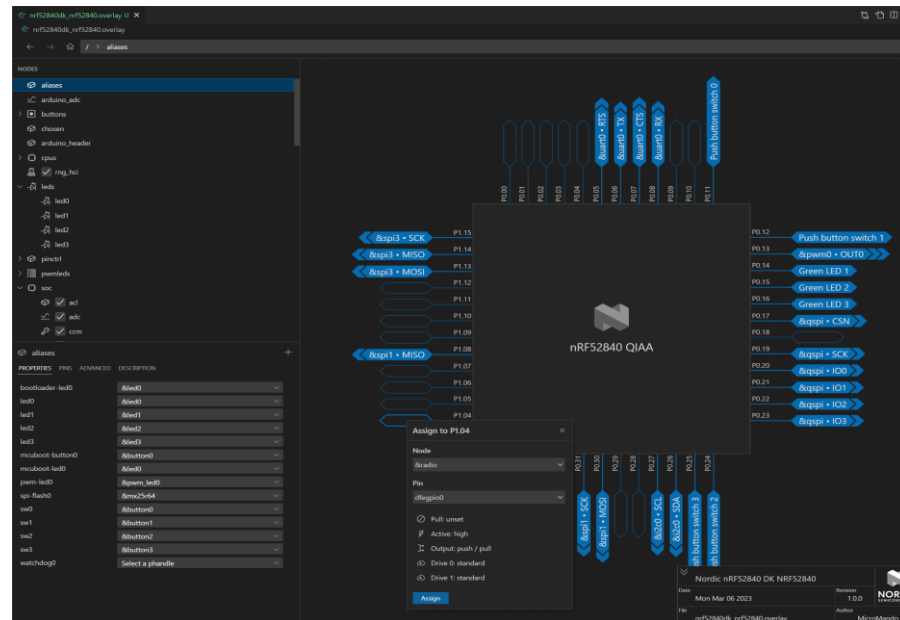
- Auto re-connect after device reset
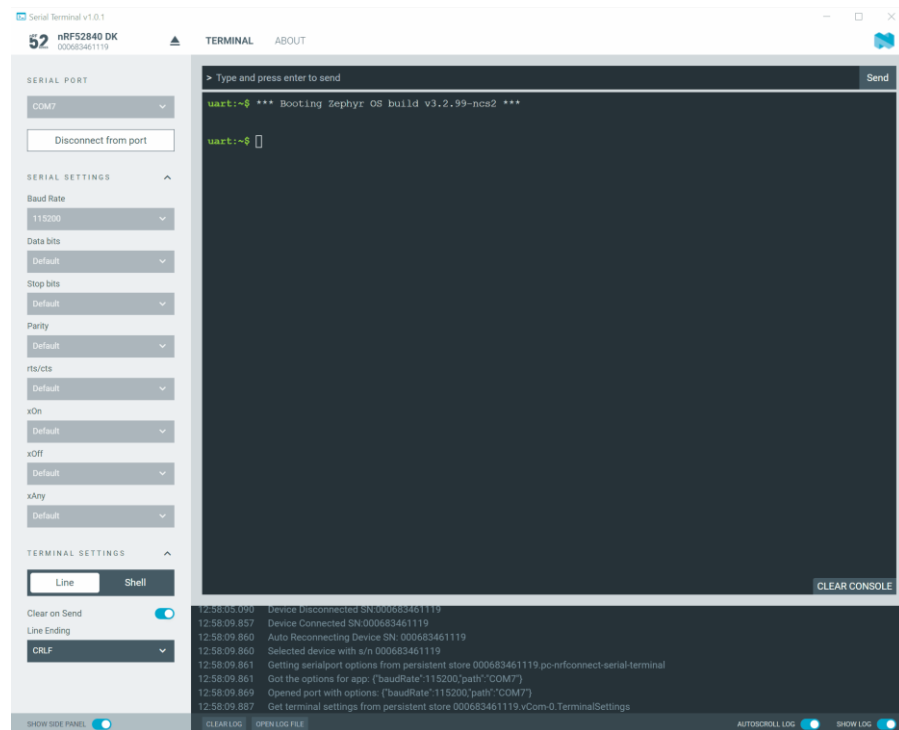
nRF Connect for VS Code Beta releases

- We are introducing beta releases using the Pre-Release feature in VS Code

- Allows single-click switching between production and beta (pre-release)
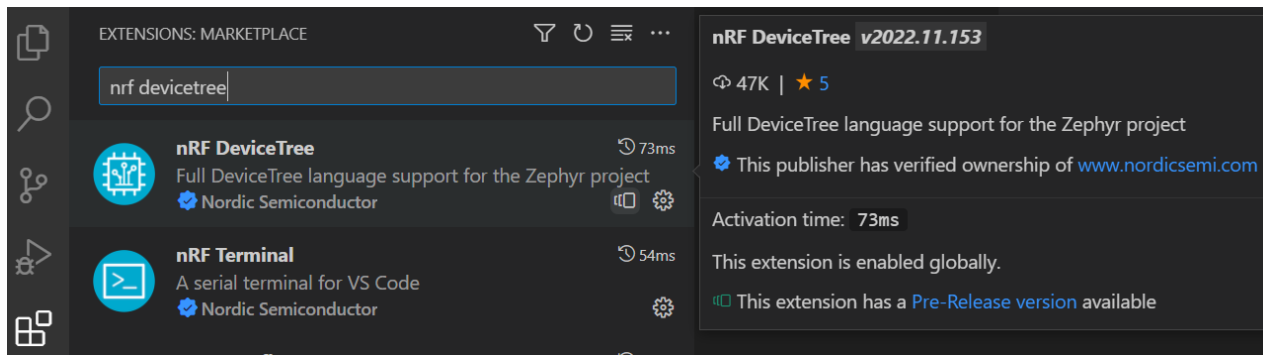
VS Code Devicetree Visual Editor Pre-release

- GUI resembling HW CAD

- Abstracts the user from devicetree details

- No special files under the hood
  - Uses .dts and .overlay files

- DeviceTree files are updated on the fly as the user interacts with the visual editor and vice-versa

- Pre-release is available in Extensions from within VScode

Bluetooth Updates

nRF Connect SDK v2.3.0

Bluetooth updates

- Added support for:

  - Bluetooth LE: Periodic Advertising Sync Transfer (PAST)

    › Allows synchronization data to be transferred over an ACL connection, giving power saving benefits for energy constrained devices

    › Key feature for Auracast™ Assistant (e.g. mobile phone, hearing aid remote) to transfer synchronization of selected broadcast to the Auracast receiver (e.g. earbuds, hearing aid)

- Added experimental support for:

  - Bluetooth LE: Periodic Advertisement with Responses (PAwR) – Advertiser

    › New feature introduced in Bluetooth 5.4 specification, enabling the bidirectional exchange of application data using connectionless communication. Learn more on our Bluetooth 5.4 DevZone blogpost.

    › The SoftDevice Controller continues to be Bluetooth v5.3 qualified.

  - Bluetooth LE Audio: Public Broadcast Announcement (PBA) and bidirectional streams to and from two headsets

Periodic Advertising Sync Transfer (PAST)

Without PAST both devices need to go through periodic advertising synchronization process which requires **time** and **energy**

Periodic advertising synchronization
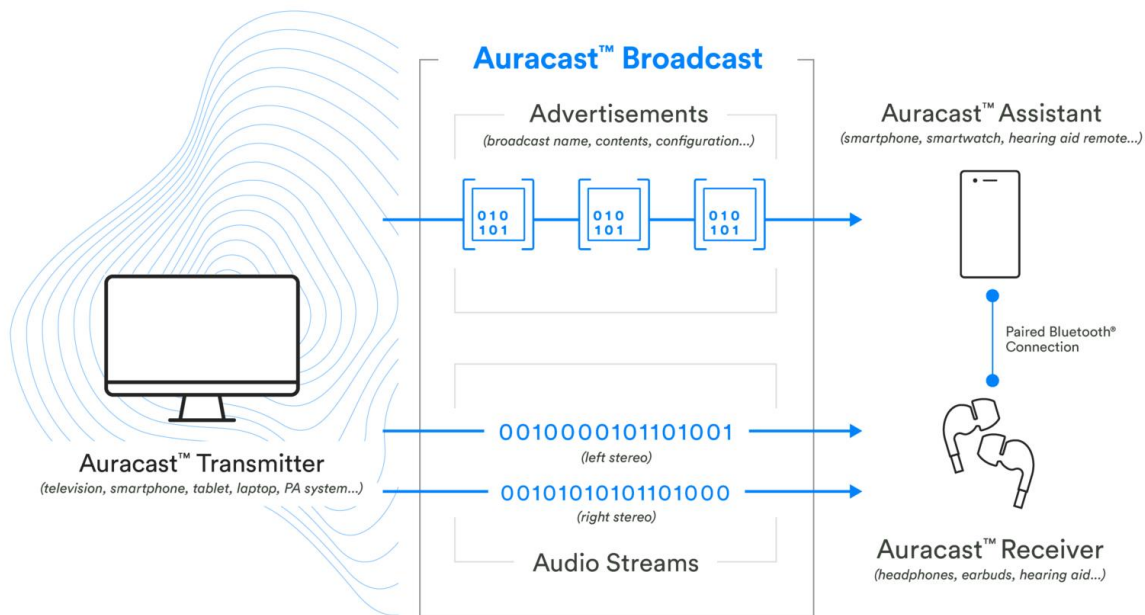
Periodic advertising transmitter

Periodic advertising synchronization
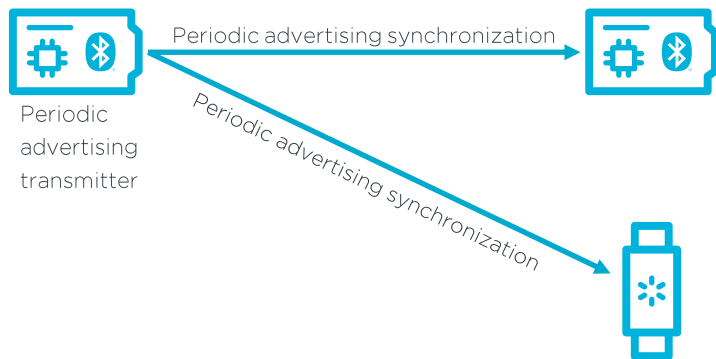
With PAST the periodic advertising synchronization information can be sent over Bluetooth LE, saving time and energy

Periodic advertising synchronization

Periodic advertising transmitter

Periodic advertising synchronization information
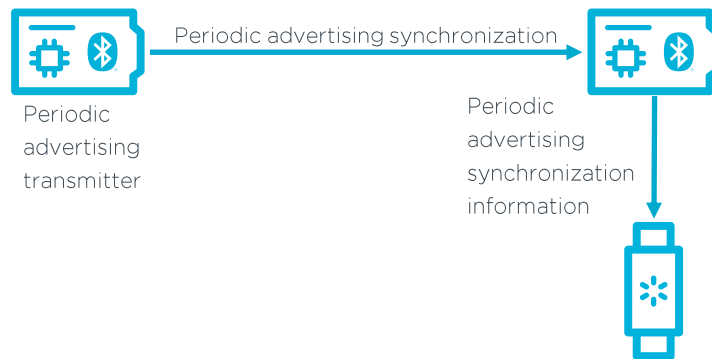
Auracast™ Broadcast

# Periodic Advertisement with Responses

- Benefits
  - Bidirectional connectionless communication
  - Large scale (>7000+ per Acces Point)
  - Ultra low power on the device side
- Use cases
  - ESL (electronic shelf labels)
    - Bluetooth 5.4 also introduces an ESL profile
  - Sensor networks
  - Smart locks for hotels
  - Restaurant paging systems
  - Classroom response system
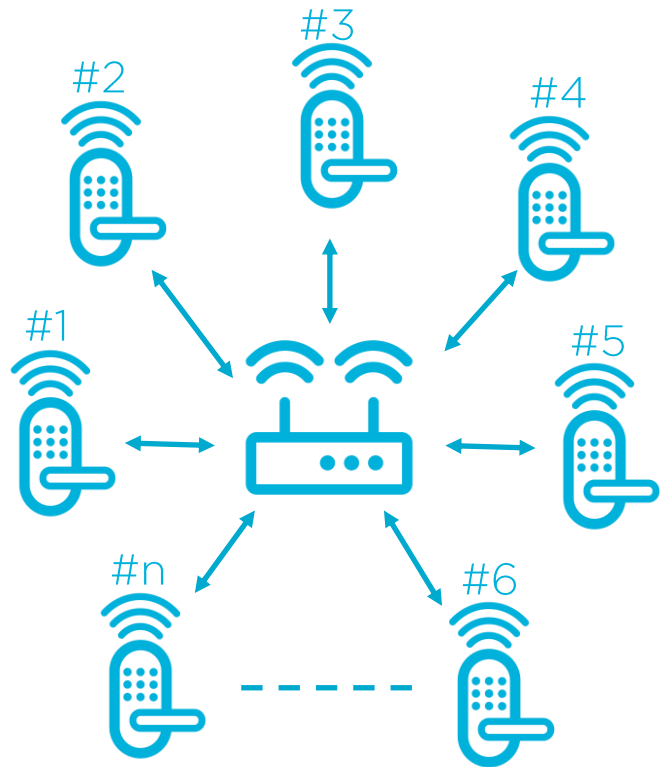
Periodic Advertisement with Responses

- Data is sent within PAwR events

- PAwR event has subevents

- Observers can synchronize to one or multiple subevents

- Synchronized observers only scan for a small and precise period of time

- Dedicated slots for responses from each observer

- The response scheme is handled at the application level

- Possible to establish ACL connection
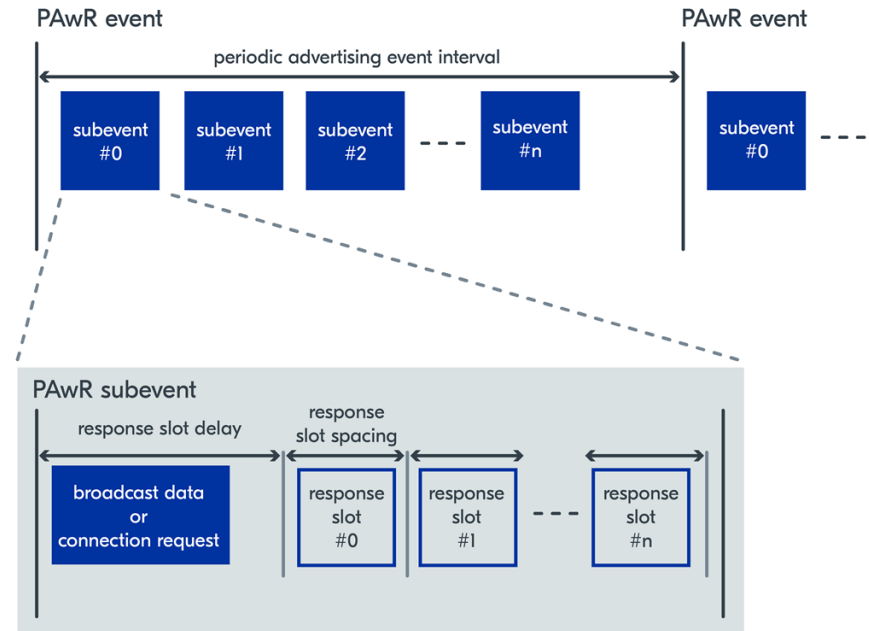
Wi-Fi Updates

nRF Connect SDK v2.3.0

Full support in nRF Connect SDK

- Support for nRF7002 in nRF Connect SDK

- Wi-Fi samples update:
  - Provisioning service (improved)
    - › Wi-Fi provisioning Bluetooth GATT service available as library
    - › Can be easily added to any Wi-Fi application
  - Bluetooth LE coexistence (new)
    - › Demonstrates coexistence between Wi-Fi and Bluetooth radios
  - MQTT (new)
    - › Demonstrates connecting to an MQTT broker to publish/subscribe
    - › Supports either cellular IoT or Wi-Fi, depending on the build target
    - › A good example of the powerful nRF Connect SDK modularity, where a single piece of application code can leverage different wireless connectivity mechanisms according to the underlying hardware

Sign up for our Wi-Fi newsletter!

Watch the Introduction to low-power Wi-Fi webinar on demand

Matter Updates
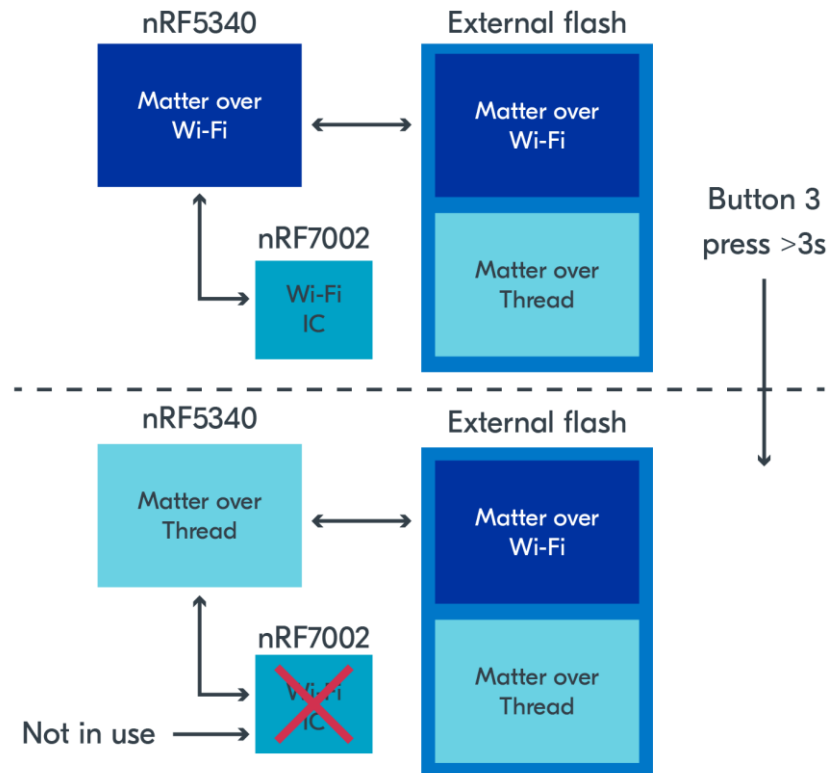
nRF Connect SDK v2.3.0

Testing with Matter ecosystems

- **DevZone blogpost** - Matter: Testing the nRF Connect platform with Apple, Google and Samsung ecosystems (link)

- Demonstrates how to test nRF Connect SDK Matter samples and applications (Thread and Wi-Fi) with Apple, Google, and Samsung SmartThings hubs

- Presents multi fabric feature and guides how to share Matter devices between ecosystems

Switching between Wi-Fi and Thread

- Improved <u>door lock</u> sample that supports switching between Matter over Wi-Fi and Matter over Thread

- LED2 shows the state of the lock
  - ON – door lock (bolt extended)
  - OFF – door unlocked (bolt retracted)
  - Flashing – moving between positions

- Button 3 triggers image swap

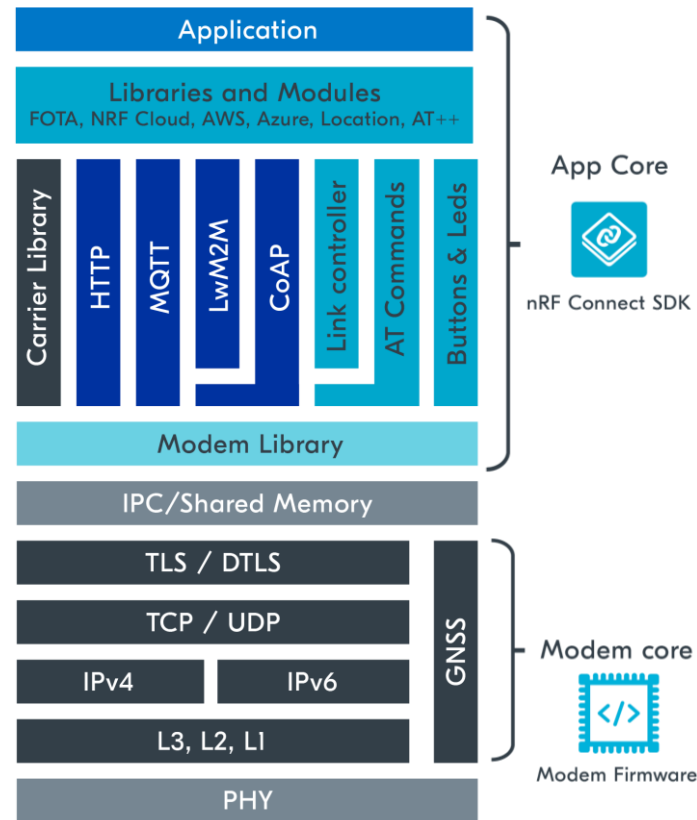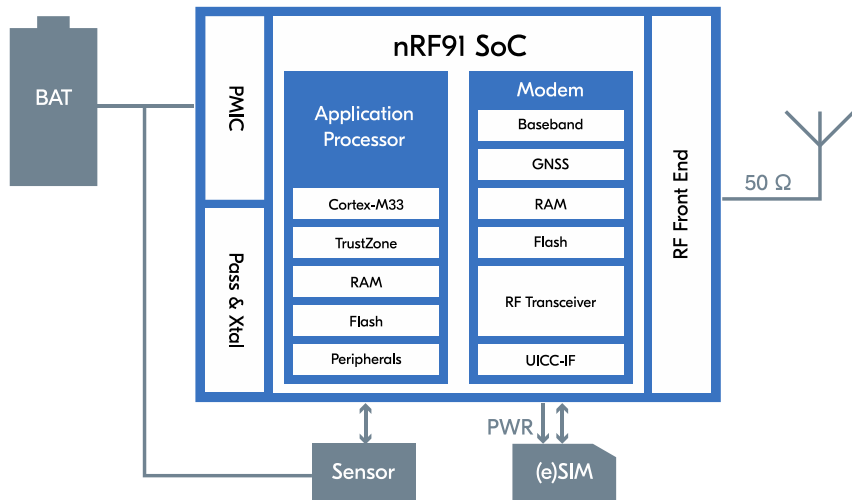- MCUboot retrieves Matter over Thread image from external flash

Cellular IoT Updates

nRF Connect SDK v2.3.0

nRF Connect SDK Overview – cellular IoT

Wi-Fi and LTE Location

- Neighbor cell measurements and Wi-Fi scan results are combined into a single cloud request
  - Increasing the probability of accuracy and reliable results

- This is supported in the Location library

- Demonstrated in Asset Tracker v2, Modem Shell, LwM2M client samples

Wi-Fi support for nRF9160 DK + nRF7002 EK configuration
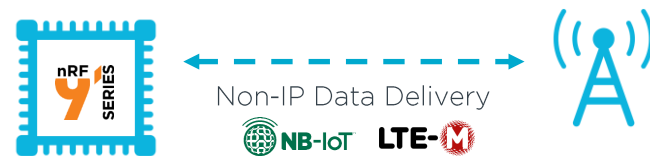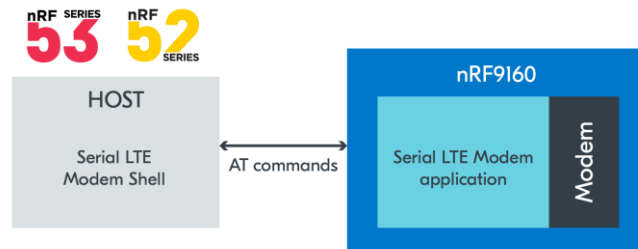
Modem trace store in FLASH

- Store modem trace in external Flash for later retrieval when issue appears
  - Much easier to follow up misbehaving field devices

- Modem Trace Module now supports backends that store the trace for later retrieval

- nRF9160 Modem Shell sample demonstrates how to store and upload modem trace to Memfault

Memfault

nRF9 SERIES

External Flash

SLM client and NIDD

"Traditional" cellular approach
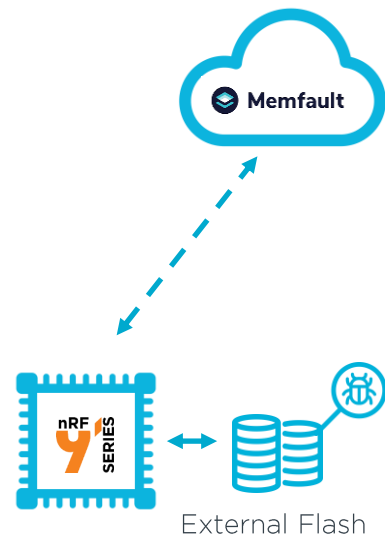
- Exposed AT command interface of the [Serial LTE Modem application](#) for external devices over the serial interface

  - Added in Modem SLM library

  - Demonstrated in [Serial LTE Modem Shell](#) sample

  - Added NIDD sample to demonstrate Non-IP Data Delivery (experimental)

    › Requires network to have support (limited)

nRF SERIES 53 nRF 52 SERIES

HOST

Serial LTE Modem Shell

AT commands

nRF9160

Serial LTE Modem application

Modem

nRF 9 SERIES

Non-IP Data Delivery

NB-IoT LTE-M

Supported Modem Firmware

- [mfw_nrf9160 v1.3.4](#)

- [Compatibility matrix](#)

- [nRF9160 Certification web page](#)

nRF9160 modem firmware version	nRF Connect SDK
1.3.2	1.8.0 1.9.0 1.9.1 2.0.0 2.1.0
1.3.3	2.1.0 2.1.1 2.1.2 2.1.3 2.2.0
1.3.4	2.1.0 2.2.0 2.3.0

Table 1. nRF9160 modem firmware and nRF Connect SDK versions

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Q&A