Accelerate Cellular Product Development

Leveraging nRF91 Series, nRF Connect and Cloud services

August 2023

Nordic Semiconductor

Today's speakers

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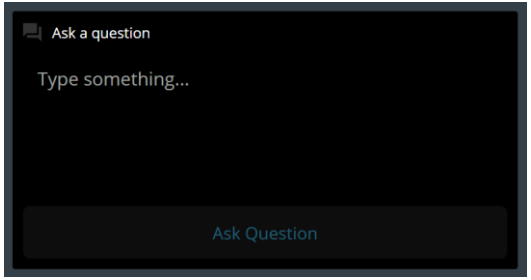
Technical Marketing Manager

Cellular IoT

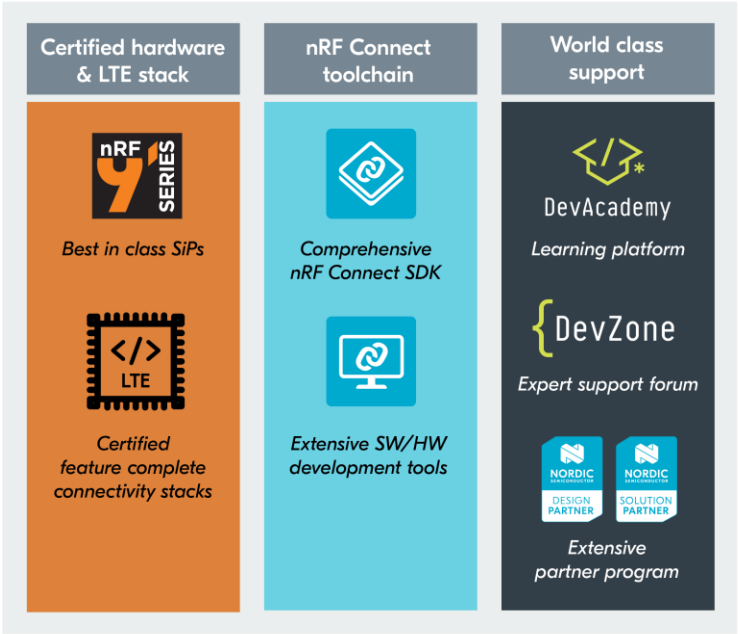
Practicalities

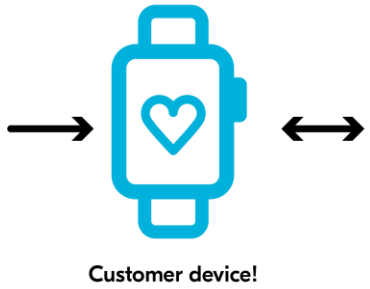
- Duration: about 30 minutes
- Questions are encouraged!
  - Please type questions in the top of the right sidebar
  - All questions are anonymous
  - Try to keep them relevant to the topic
  - We will answer towards the end
- The chat is not anonymous, and do not use for questions
- Go to DevZone if you have more questions
- A recording of the webinar will be available together with the presentation at webinars.nordicsemi.com

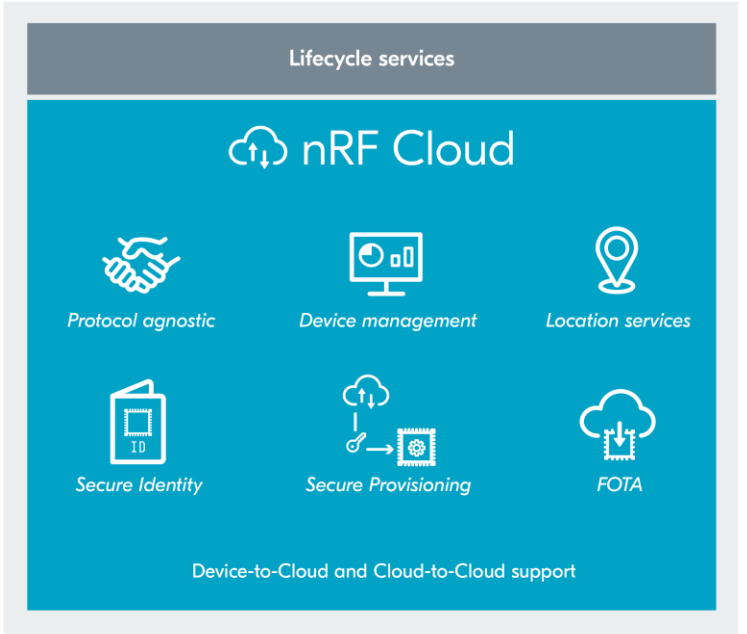


{ DevZone

Fast time to market with our offering!

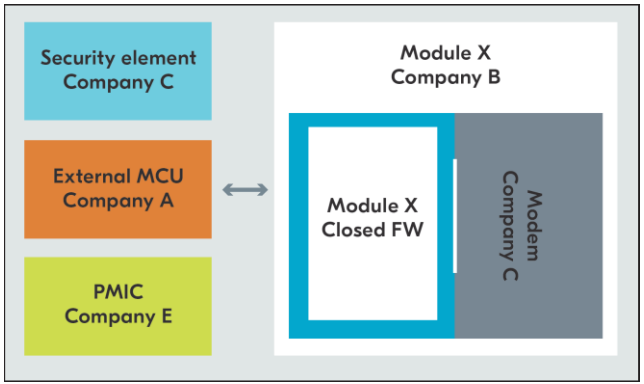




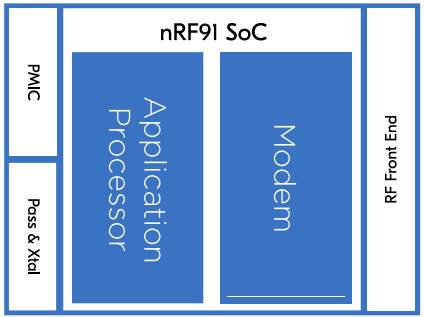


Lowers total cost and simplify supply chain

Others
Fragmented ownership



Nordic Semiconductor
Full solution ownership



Completely integrated

- 5 years out in the market
- Lower complexity
- Lower power
- Smaller size
- Total lower cost
- Simple supply chain
- Support and maintained
- Globally certified

Designs with nRF9160

Sunfish
Smart Buoy
nRF9160

7 Sense
Irrigation Sensor
nRF9160

Rulo
EdgeTrak 4S
nRF9160

ENUA
EV Charger
nRF9160+nRF52840

Lilbit
Pet Tracker
nRF9160+nRF52811

Grandcentrix
Modbus Cloud Connect
nRF9160

Cellular Tracking Tech.
Flicker GPS tracker
nRF9160

Connected Sensors
Water Monkey
RF9160

TYMIQ
IoT Gatewayn
RF9160

Ashridge Engineering
CharloT
nRF9160

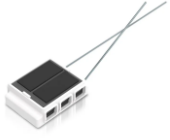
adhoc
smart waste solution
nRF9160

Flaik
SnowSports tag
nRF9160

leova
SMART climate sensor
nRF9160

Dayton
Smart Wearable
nRF9160+nRF52832

MOKO Smart
Smart Plug
nRF9160+nRF52833



Druid Technology
DEBUT ULTRA 5G
nRF9160+nRF52840

Littlebird CareTracker
nRF9160+nRF52840

Saluswear
Elderly wearable
nRF9160

Digital Matter
IoT data logger
nRF9160

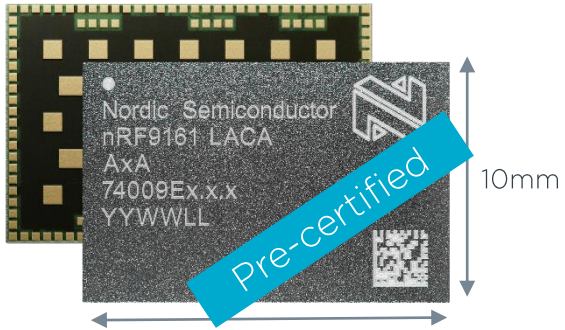
Sodaq, Podgroup
Smart label
nRF9160

AND MANY MORE...

nRF9161 System in Package (SiP)

- Arm® Cortex® M33 Application processor for the user application
  - 1 MB Flash, 256 kB RAM, Arm TrustZone®, CryptoCell 310
  - Minimal firmware migration effort from nrf9160
- Multiband LTE-M/NB-IoT (3GPP Rel 14) with GNSS and DECT NR+ Modem
  - New band B85 for cellular
- Small form factor – incl. PMIC, RF FEM, passives and crystals
  - 3.0V – 5.5V operation, -40°C to 85°C
- Ultra Low Power – Avg. 18µA @ 81.92s eDRX
  - PSM floor current: 2,7µA

LTE-M NB-IoT GNSS nr+



nRF9161 SiP

Development hardware

- nRF9161 DK for firmware development
- Thingy:91 X for prototyping
  - SSID-based Wi-Fi location nRF7002, nRF5340, nPM1300 & nPM6000

nRF9161 DK

Thingy:91 X

nRF9131 mini SIP

Smaller, lower-integration-level module

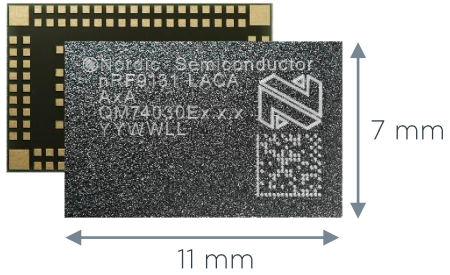
- 50% size, and 25% height reduction from nRF9161 SiP
- Feature and software compatible with nRF9161 SiP
- Good fit for NR+, and high volume (>500 kpcs/y) cellular products

Full reference design and BOM

- Ensure good performance for both supported technologies
- Limit cellular certification scope
- Reduce risk, cost, and schedule vs. traditional cellular chipset design

Development hardware

- nRF9131 EK available for PoC and pilot testing
- nRF9161 DK for more comprehensive firmware development

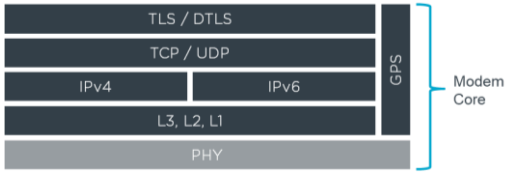


nRF9131 mini-SiP

Certified Modem Firmware Stacks

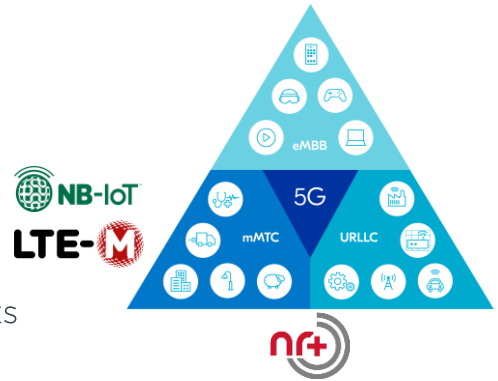
LTE Firmware stack (LTE-M/NB-IoT 3GPP rel.14 + GNSS)

- Power Saving mode for roaming devices
- Improved TTFF performance w/ offline GPS satellite acquisition
- SoftSIM support
- Globally certified w/ all the big carriers



DECT-NR+ Firmware Stack

- License-exempt, highly scalable, decentralized massive mesh networks
- NR+ global 1.9GHz bands supported
- Wirepas provides the NR+ firmware and SDK



World's first non-cellular 5G standard for mMTC and URLLC use cases

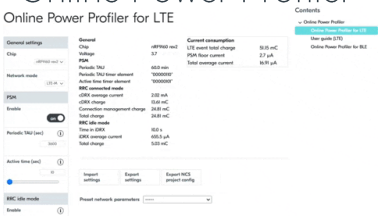
nRF Connect for Evaluation

- Flexible evaluation
  - Tools to evaluate Power consumption, Modem performance, and cloud services (Via AT commands or precompiled samples)
  - Online Power Profiler tool to estimate power consumption

- nRF Connect for Desktop
  - Power Profiler: Measure power consumption
    - requires a Power Profiler kit II
  - Cellular Monitor: Analyze modem traces, evaluate communication, and network testing

- Devzone for technical support

Online Power Profiler

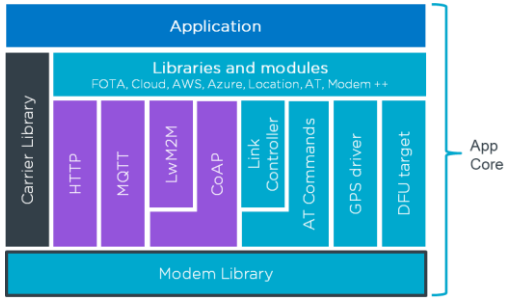


Cellular Monitor

DevZone

nRF Connect for Development

- nRF Connect SDK
  - Unified code base for Nordic hardware
  - Zephyr RTOS, protocol stacks, drivers, etc.
  - Reference apps and samples



- nRF Connect for VS Code IDE
  - Incl. everything expected from a modern IDE
  - Visual and command line support
  - DeviceTree Visual Editor, Custom board wizard

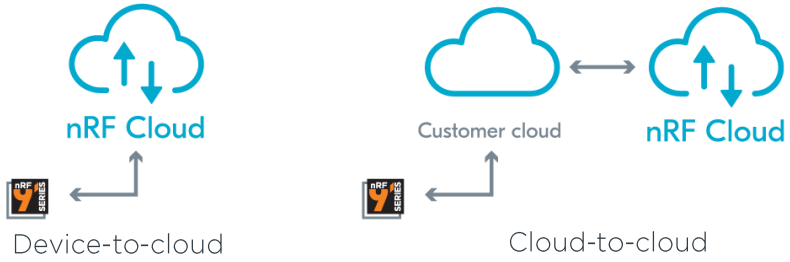
- DevAcademy interactive learning platform, smooth transition from evaluation to development

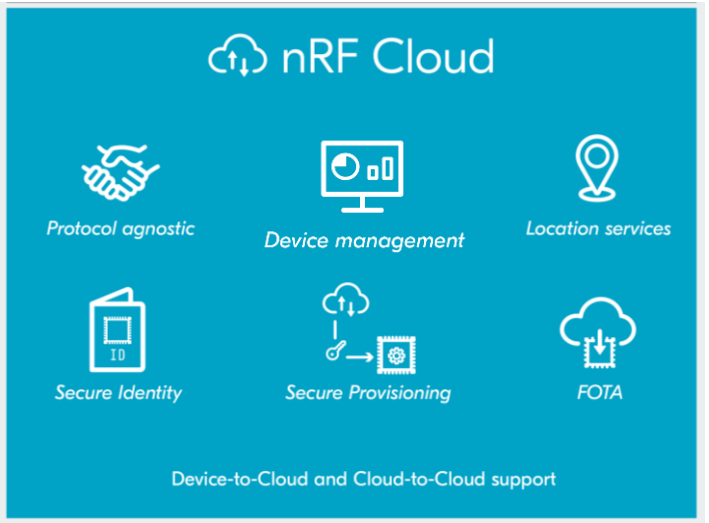
DevAcademy

nRF Cloud

IoT Services platform

- Built for low-power Nordic devices
  - Device-to-cloud and cloud-to-cloud
- Agnostic connectivity transport
  - (NEW!) CoAP, MQTT, REST
- Standalone services for flexible adoption
- Device management services
  - Firmware over the air, Message storage, Device alerts/logs





nRF Cloud Location services

Nordic offers complete selection of location services

Assisted GNSS

Reduce time-to-first-fix from minutes down to seconds.

1 - 6 Years

Exact position

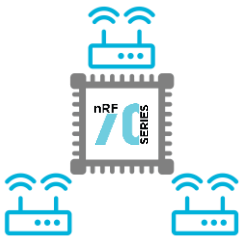
Predictive GNSS

Same as assisted GNSS but data is valid up to two weeks.

1 - 6 Years

Exact position

SSID Wi-Fi

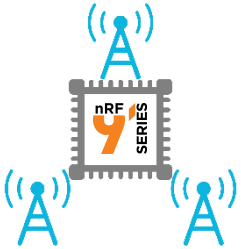


Scan nearby Wi-Fi access points to determine location.

7 - 13 Years

House/city block

Multi-cell



Scan nearby cell towers to determine location.

10 - 14 Years

Neighborhood

Single-cell

Use serving cell-tower to determine crude location.

15 Years

City/region

Device battery life

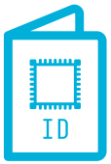
Location accuracy

nRF Cloud Security Services

All cloud-connected devices need credentials to connect to the cloud securely.

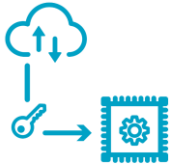
Securely provisioning devices can be complex and costly.

Secure Identity



Provides a secure and unique identity for devices with Nordic root-of-trust

Secure Provisioning



Configure the device remotely with the required credentials and custom configurations

IMEI Management

Allocate and report IMEIs w/o their own TAC ranges for provisioning devices with specific MNOs

nRF Cloud Secure Identity

Foundation for the nRF Cloud Security Services

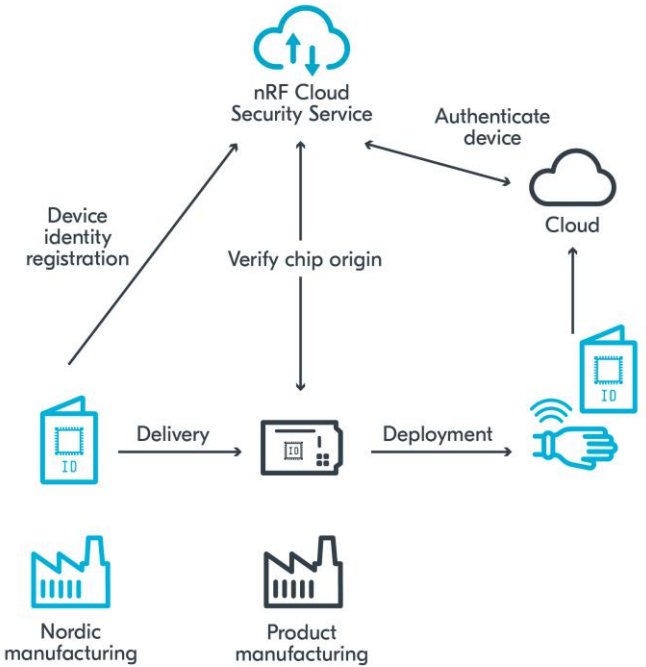
- Verify legitimacy of chip
- Protect product IP
- Authenticate devices

Establishing Root-of-Trust

- Identity generation on-device in Nordic manufacturing
  - Unique device ID and private/public key pair
- ID and public key uploaded to nRF Cloud

Hardware Verification & Authentication

- Attestation token verified against nRF Cloud
  - Authenticating can also be done after production



nRF Cloud Secure Provisioning

Simplify provisioning process

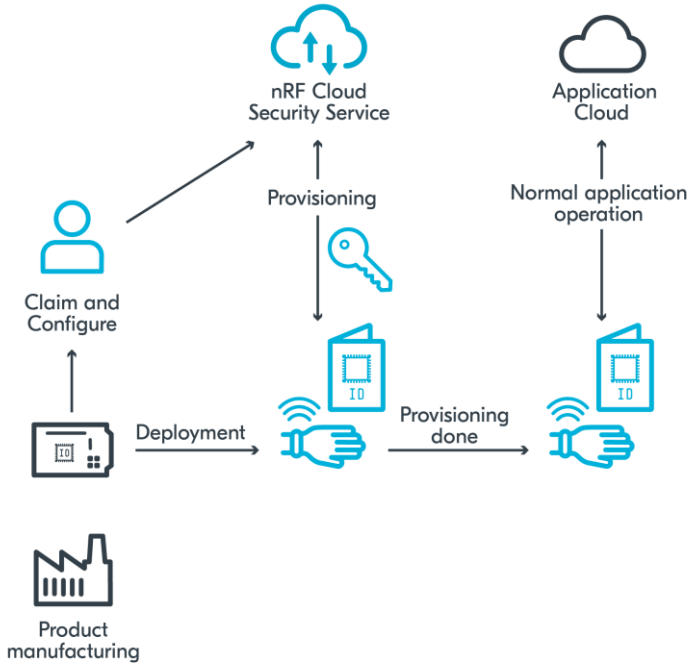
- Configure device behavior on deployment
- Flexible and scalable
- Enables zero touch provisioning

Customer claims device

- Bind device w/ Secure Identity service
- Set tags, define provision rules

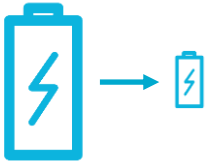
Device securely provisioned

- Device uses received credentials and rules
- Securely connected to endpoint



nRF91 Series – Ease of use

Lowest Power



Designed for low power IoT

Efficient HW, FW, protocols and optimized cloud services

Verify with Power Profiler Kit II

Security Lifecycle

nRF Cloud Security Services from blank to securely connected device

Secure boot, authenticated FOTA, secure key/data storage

Reduced cost of ownership

Single integrated hardware for global deployment

Tools and SDK for faster time to market

Fast time to market with our offering!