Getting Started with AVSystem Coiote and nRF Cloud Location Services using LwM2M

World-class device management and location services

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Today's hosts

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Practicalities

- Duration: 50-60 mins

- 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 questions towards the end

- The chat is not anonymous, and should **not** be used for questions

- If you have more questions:
  - Go to DevZone for Nordic related questions

- iot@avsystem.com or https://discord.avsystem.com/

- A recording of the webinar will be available together with the presentation at webinars.nordicsemi.com

Ask a question

Type something...

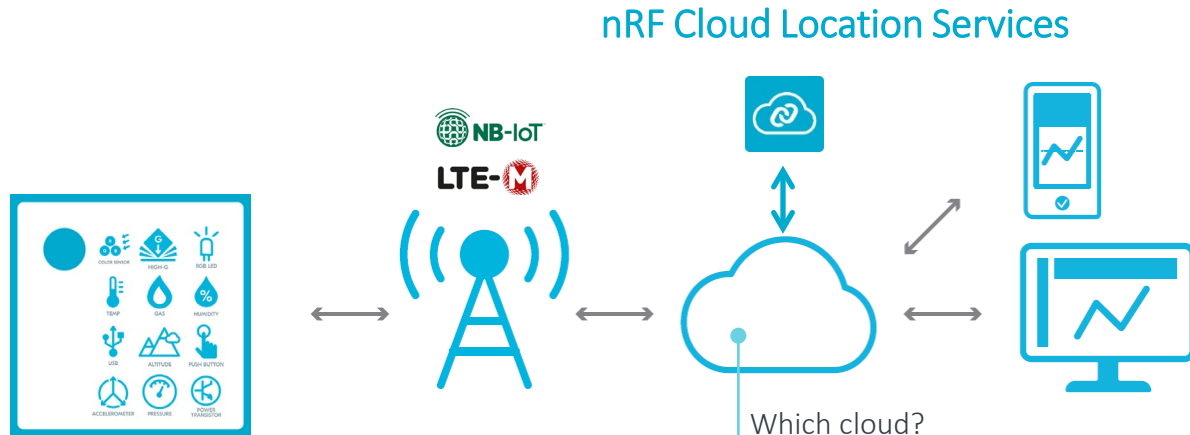Ask Question

This is the chat
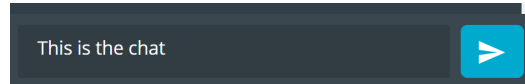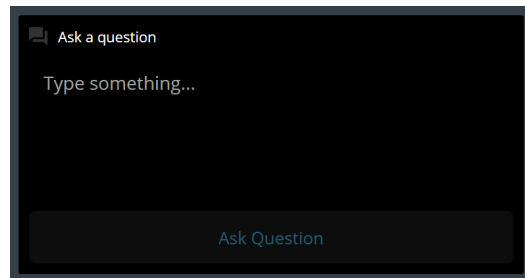
{ DevZone

Abstract

- LwM2M for device-to-cloud connectivity

- Introduction to AVSystem

- Nordic and AVSystem benefits

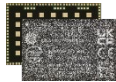- Getting Started: Connecting nRF9160 DK to AVSystem Coiote

- Q&A

Introduction

LwM2M for device-to-cloud connectivity

Connecting your cellular device to the cloud

nRF Cloud Location Services
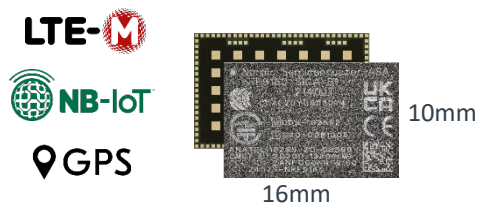

Your cellular IoT device with nRF9160

Which cloud?

How to send data? Which protocol to use (TCP, UDP, etc)?

How to support FOTA – Fleet management?

How to get location services from nRF Cloud?

Best Practices White Paper, more info

nRF9160 SiP

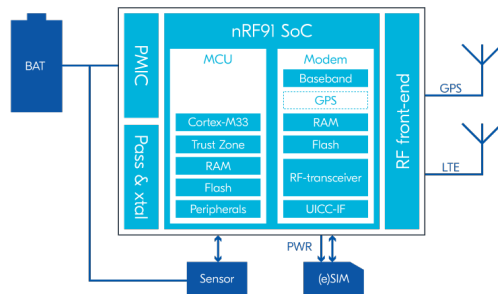**Ultra Low power** & Small SiP

Pre-certified SiP

LTE-M, NB-IoT with GNSS

Multiband for global coverage

Advanced SiP technology

Enabling single chip solutions
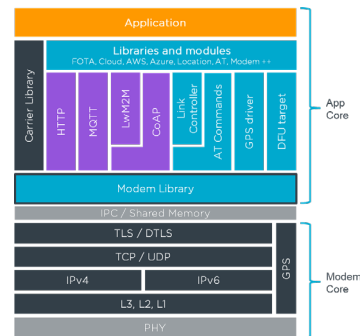

High level of integration

Nordic Dual Core SoC chipset:

app core: ARM Cortex M33 MCU

modem core: LTE-M, NB-IoT with GNSS

Includes PMIC, RF FEM, passives and crystals

nRF Connect SDK

Easy to use and flexible

Modern and flexible nRF Connect SDK, supporting all clouds, with examples and tools

Seamless integration between App Core and Modem thanks to Modem Library

nRF Cloud Location Services

- Location Services offered as part of nRF Cloud
- Nordic has unique offering to help customers who need enhanced location solutions:
  - A-GPS, P-GPS, single-cell (SCELL), multi-cell (MCELL), Wi-Fi
  - Seamless integration for nRF9160
- Improve performances / power consumption
- Customers can use it in two ways:
  - Device-to-Cloud
  - Cloud-to-Cloud
- More info: www.nordicsemi.com/cloudservices
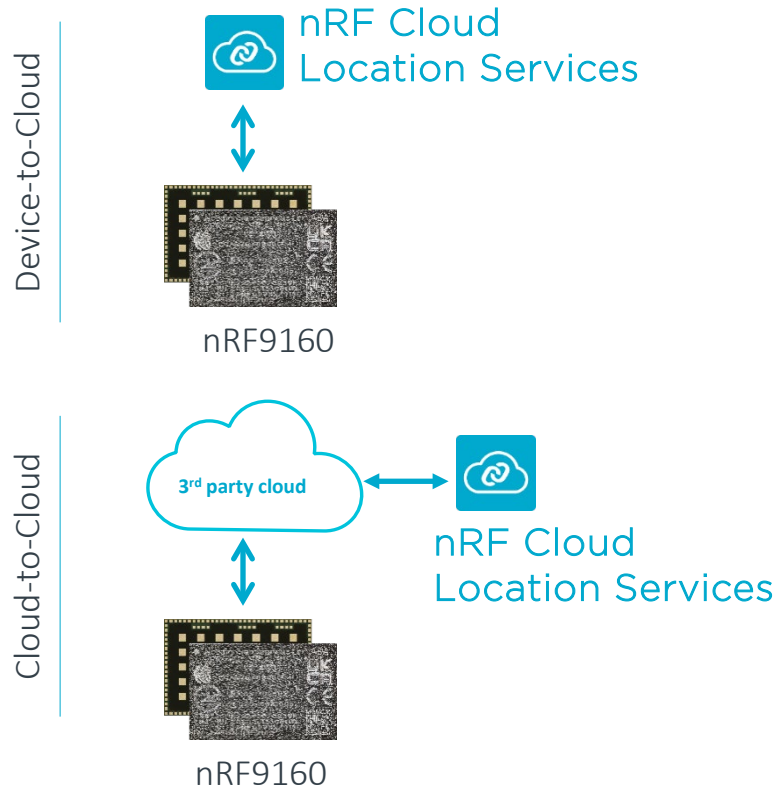
Introduction to AVSystem

Shaping the World of Connected Devices

AVSystem is a software provider specializing in solutions and services for device connectivity. **Leaders in IoT device management** and experts in affordable, secure, and energy-efficient large scale solutions.
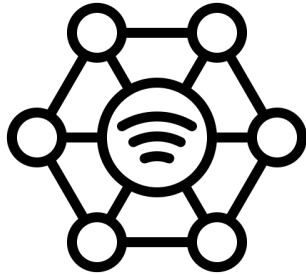
AVSystem in numbers:

- ❏ **80 million managed devices**
- ❏ 60 countries
- ❏ **170+ customers worldwide**
- ❏ 16+ years of experience
- ❏ **200+ software engineers**
- ❏ 100% software development done in-house

Attentive coexistence of human, environment and technology.

IoT Products Portfolio

LwM2M Client

SDK - Anjay
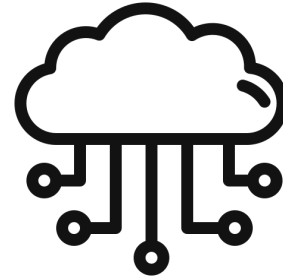
Coiote IoT Device Management

Anjay & Coiote: value for customers

As a user, I **want** to focus on building my application.

I **don't want** to spend time implementing:

- Device provisioning mechanisms,

- OTA updates,

- Reliable device-to-cloud communication.

- …

I want to save device battery; thus I'd like to avoid:

- Opening many connections to different cloud endpoints,

- Sending excessive amounts of data

Your IoT business case

Data collection — OTA — Device monitoring — Interoperability — Connectivity — Device provisioning — Remote diagnostics — Protocol stacks — Communication security — Reliable communication — Security updates — Lock, wipe, recover
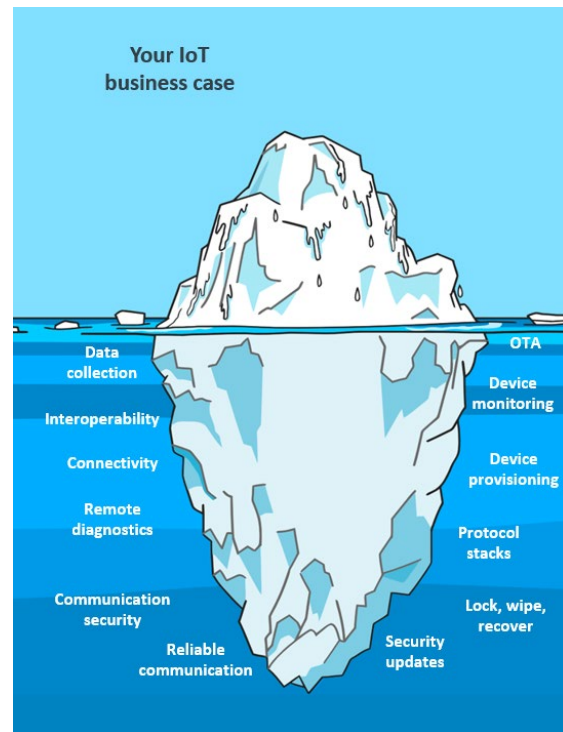
Lightweight M2M (LwM2M): our cornerstone

Lower operational expenses
Low resources consumption

Reduced time-to-market
Well-defined data model

Security by design
(D)TLS, OSCORE included

Standard-based design
Device management
OTA updates
Data collection

Sustainable solution
Longer battery lifetime
Less waste

Single-pane of glass
Agnostic transport layer

LwM2M: a deeper technical dive

Non-LwM2M based app	LwM2M based app
	LwM2M

MQTT/HTTP	CoAP	
TLS	DTLS	Non-IP Cellular IoT LoRaWAN SMS
TCP	UDP	
IP		
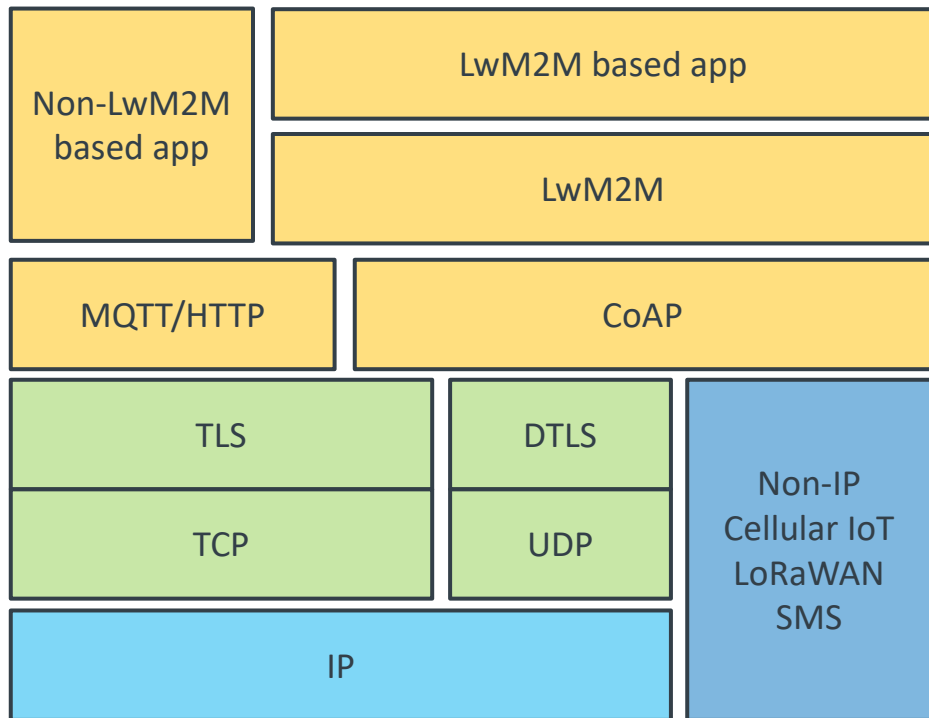
- Key features:
  - Well-defined data model
  - Device management & data collection
  - Security by design
  - Efficient communication & power consumption
  - Device provisioning by design
  - Bindings to non-IP networks

See crash course for more info

Where do we sit in the IoT ecosystem?

Alliances

M(V)NOs

AI

LoRa

802.15.4

Blockchain

Emerging technologies

Bluetooth LE

5G

Hardware Security

IoT SAFE

TinyML

Edge computing

Telematics

Current technologies

Utilities

Agriculture

OEMs

Industry

mHealth

Assets Tracking

Environment

NB-IoT

LTE-M

MCU containers
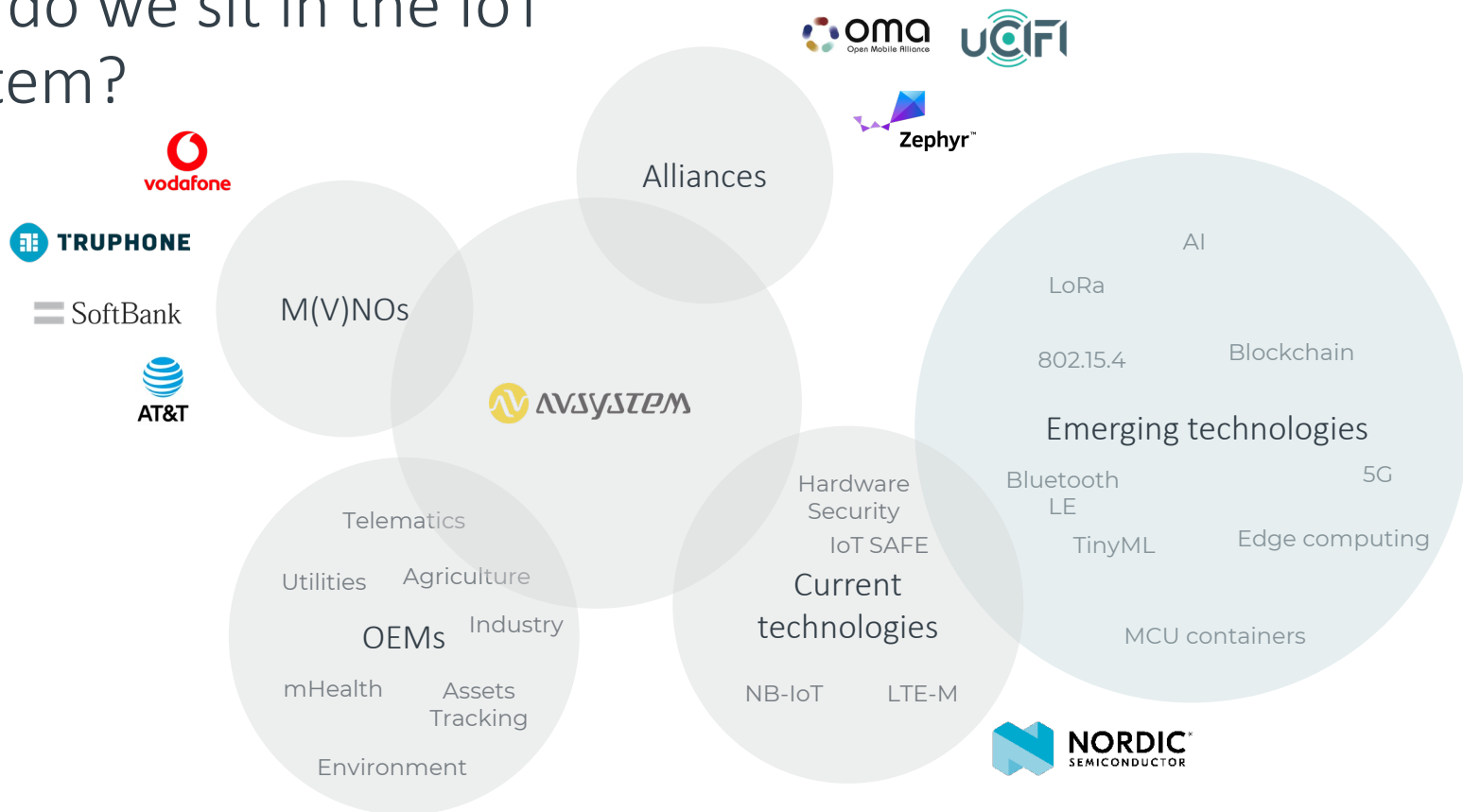
Enabler for rapid IoT success

Re-design

New requirements

Prototype

Manufacturing

Production

Maintenance

NORDIC SEMICONDUCTOR

Security

Ramp-up

Scale

Customers

- Pre-integrated Anjay LwM2M SDK
- Free version of Coiote platform
- Bridge to nRF Cloud, AWS, Azure

- Device provisioning mechanisms
- Support for EST (3rd party CA)
- IoT SAFE
- Ecosystem of partners

- Scalable deployment model
- Pre-integrated firmware update
- Optimized for LPWAN networks

- Co-marketing opportunities
- 24/7 support
- SLA
- Customer success

AVSYSTEM

Nordic and AVSystem Benefits

Nordic & AVSystem = Value for customers

nRF Cloud
Location Services

Customer cloud
(AWS, Azure, etc)

LwM2M Server
Coiote IoT DM

LwM2M used for:
- Data
- Device Management (FOTA, etc)
- nRF Cloud Locations Services

| LwM2M client |
| :---: |
| CoAP |
| UDP |
| LTE-M   NB-IoT |
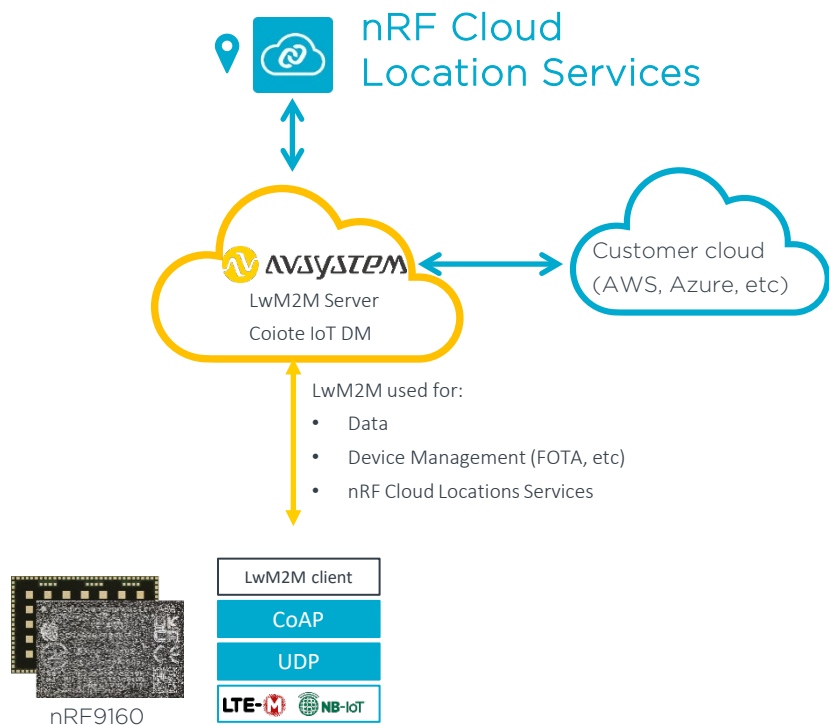
nRF9160

- AVSystem offers LwM2M solutions and it is Nordic Solution Partner
- Full LwM2M integration of nRF9160 with AVSystem Coiote IoT for Data, DM, Location Services
- Open Source LwM2M Clients:
  - Zephyr LwM2M stack (included in nRF Connect SDK, with Coiote IoT support)
  - AVSystem Anjay LwM2M Client (ported to nRF9160)

- Out of the box integration with nRF Cloud Location Services

- Free Development up to 10 devices
  - Self-service website sign-up registration

- Getting started guides, examples
  - See partner page for links and to get in touch

Getting Started: Connecting nRF9160 DK to AVSystem Coiote

Step by step using LwM2M Client in nRF Connect SDK

Demo: Preparing the cloud accounts

Coiote IoT DM

nRF Cloud
Location Services
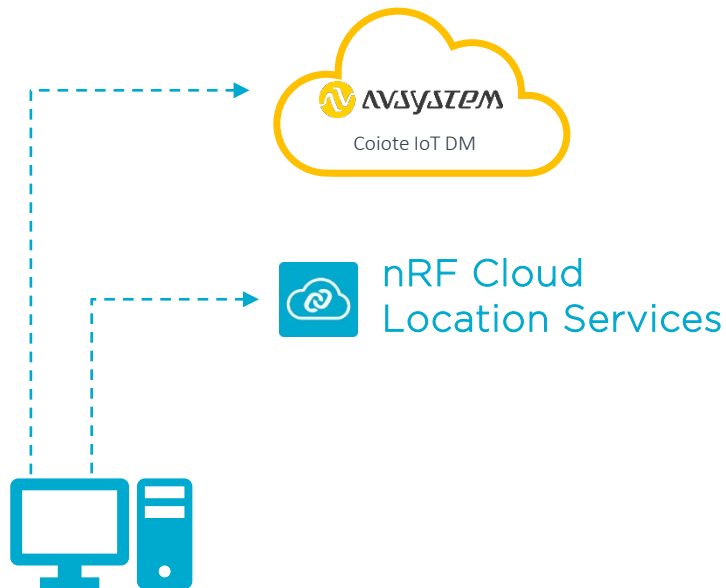
- Setting up developer account at AVSystem

- Setting up developer account at nRF Cloud

- Enable nRF Cloud Location system integration in AVSystem

Demo: Cell based location via LwM2M

Multivendor 3rd party
Cell Tower Database

nRF Cloud
Location Services

Cloud to Cloud

B) Estimated location

AVSYSTEM
Coiote IoT DM

LwM2M

A) Cell information
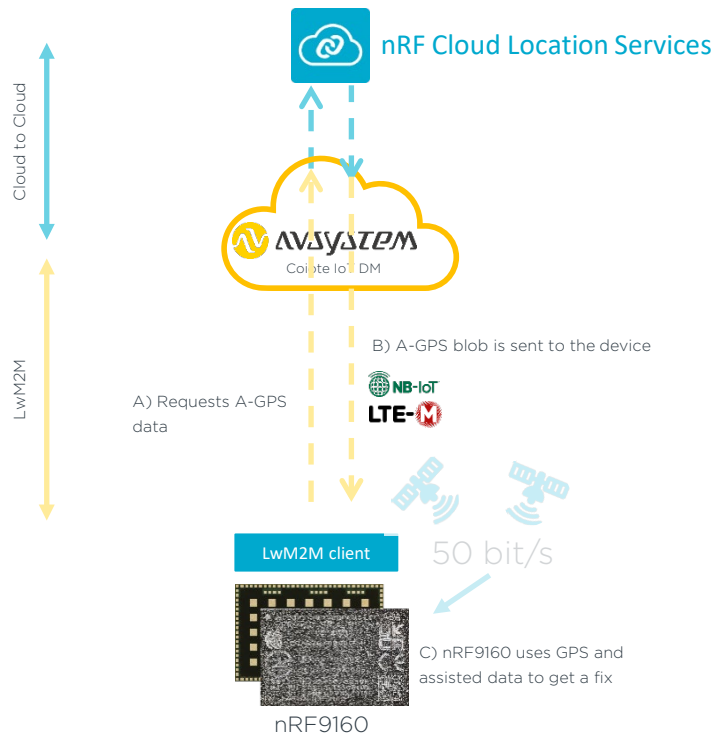
NB-IoT
LTE-M

LwM2M client
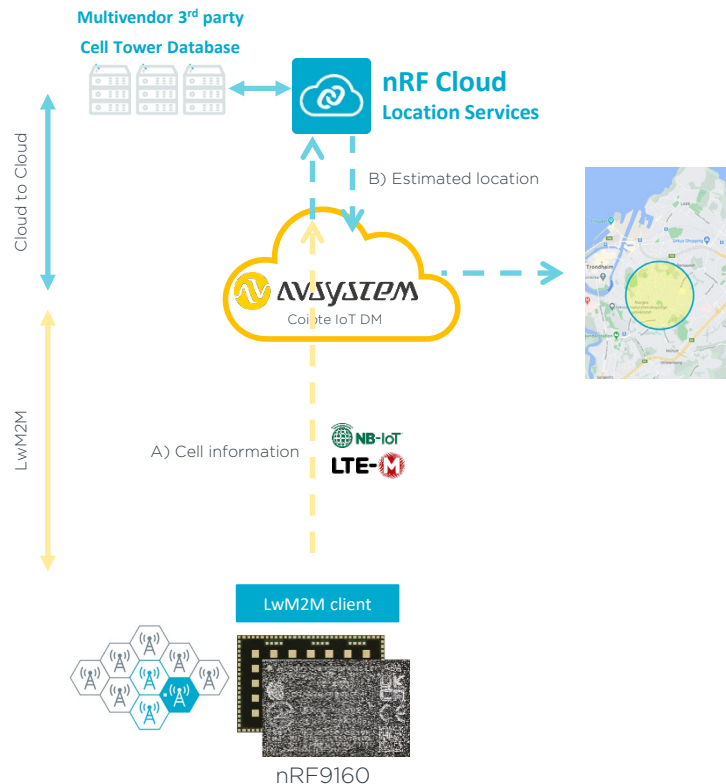
nRF9160

S-CELL and M-CELL uses cell info to get an estimated location

- Both indoor & outdoor

- Single Cell (accuracy up to 1000 meters)

- Multi Cell (accuracy up to 300 meters)

- Low Power (zero TTFF)

Demo: Flashing nRF9160DK with LwM2M Client from nRF Connect SDK (overlay-assist-cell.conf) & getting estimated location in AVSystem dashboard

Demo: A-GPS via LwM2M

Cloud to Cloud

LwM2M

nRF Cloud Location Services

AVSYSTEM
Coiote IoT DM

B) A-GPS blob is sent to the device

A) Requests A-GPS data

NB-IoT
LTE-M

LwM2M client

50 bit/s

C) nRF9160 uses GPS and assisted data to get a fix

nRF9160

Assisted GPS

- Download assistance data over cellular IoT (e.g. ephemeris, almanac)

- Faster Time to First Fix (TTFF)

- lower power than standard GPS

- Still uses GPS to get a fix

Demo: Flashing nRF9160DK with LwM2M Client from nRF Connect SDK (overlay-assist-agps.conf) and getting assisted data to nRF9160; finally computing GPS fix locally on nRF9160

Buy an nRF9160 DK and follow the steps here:
www.nordicsemi.com/avsystem

Register for upcoming Nordic Tech Webinars

www.nordicsemi.com/webinars

Q&A

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