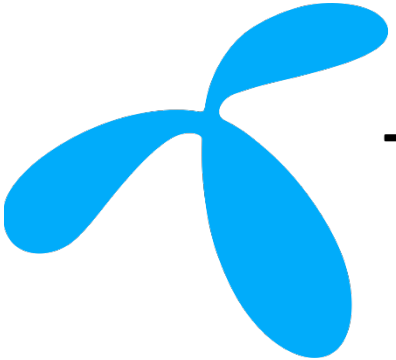
NORDIC®
SEMICONDUCTOR



telenor

Introduction to nRF9160 and Telenor Start IoT

Cellular IoT made easy

Jon Petter Andersen

Mette Kristine Kanestrøm

Joakim Andre Tønnesen

Today's hosts

Jon Petter Andersen

Partner Manager
Managed IOT Cloud &
IOT Ecosystem

telenor

Mette Kristine Kanestrøm

Head of Managed IoT
Platform

telenor

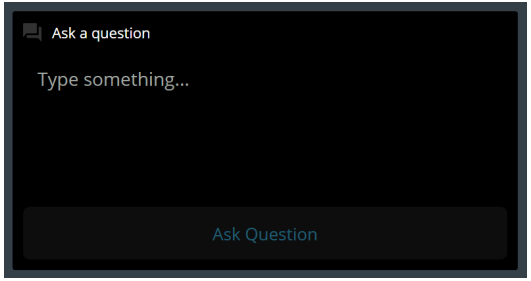
Joakim Andre Tønnesen

Technical Product
Manager

NORDIC SEMICONDUCTOR

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
  - Go to Telenor Start IoT website



{ DevZone

Agenda

- Nordic Semiconductor and nRF9160
- Telenor and IoT
- Managed Connectivity
- Managed IoT Cloud
- Use-cases
- Start IoT

Nordic Semiconductor

Key Facts:

- Founded in 1982, HQ in Norway
- ~1000 employees
- R&D in Norway, Finland and Poland
- Publicly Listed OBX: NOD
- Market Cap 3800 MUSD (Q1 2021)
- Key parters: TSMC, QORVO, AMKOR, ASE

- Fabless Semiconductor Company
- Market Leader in Bluetooth Low Energy
  - >40% market share
  - > 700M ICs shipped per year
  - 1000s of customers in volume production
  - 95,000 development kits shipped in 2020 (12% cellular)
- Short-range Ultra low power wireless SoCs
  - *Bluetooth®* Low Energy/ Zigbee / Thread / ANT
- Cellular IoT: LTE M, NB IoT Chipset & SiP
  - *LTE design team in Finland (200+ engineers)*

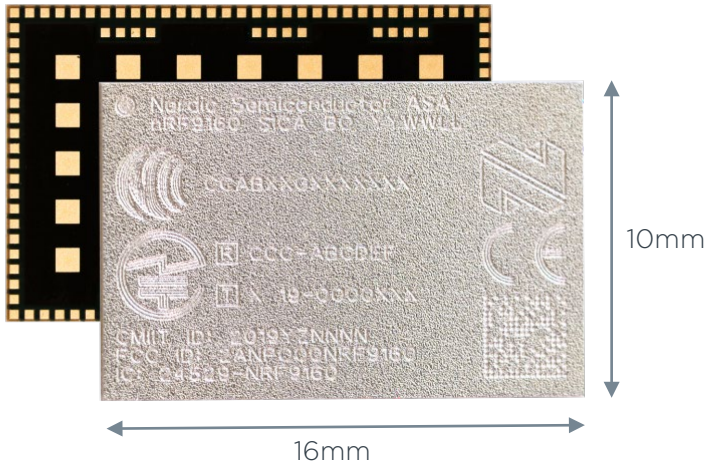
Nordic Cellular Expertise

2000+ Engineering years in Cellular

- In-house unique expertise in Cellular
- 100+ World-renowned experts joined Nordic 5 years ago in Finland. Now 200+ eng. in Finland working on cellular.
- Long experience in cellular:
  2000+ Engineering years in Cellular
- Complemented by Nordic's low power DNA
- Full ownership – Chipset + firmware + SiP

nRF9160 – voids cellular modules

- Based on **Nordic Dual Core SoC**:
  - multiband **LTE-M/NB-IoT** modem with **GPS**
  - **Arm® Cortex® M33 MCU** for the application
- **Small** form factor (includes PMIC, RF FEM, passives and crystals)
- **Ultra Low Power** – 18uA @ 81.92s eDRX
- Multiband support for global coverage
- **Pre-certified** System-in-Package (SiP)



nRF9160 SiP

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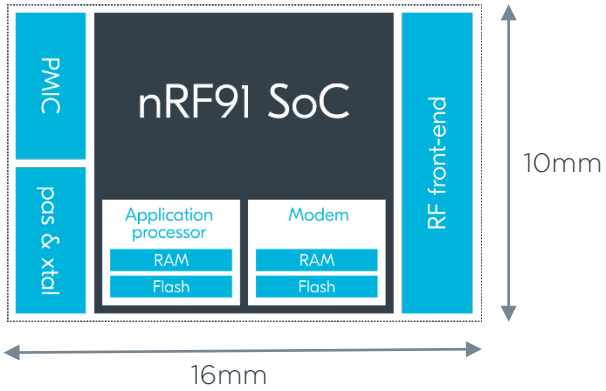
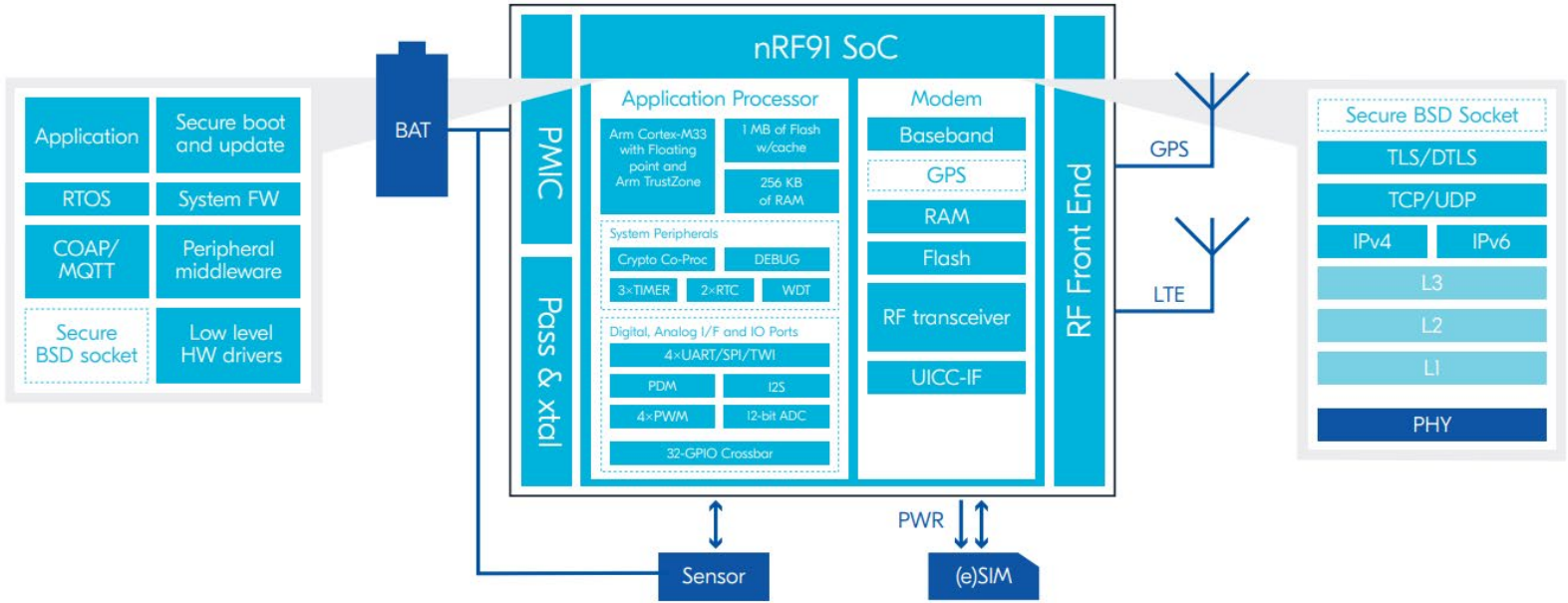


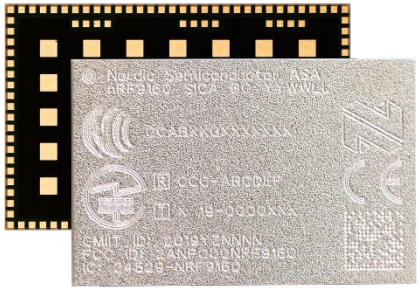
nRF9160 SiP

Building applications



Complete low power cellular IoT solution

nRF9160



Dedicated application processor and memory

Multimode LTE-M / NB-IoT modem with integrated RFFE

GPS

Ultra Low Power

nRF Connect

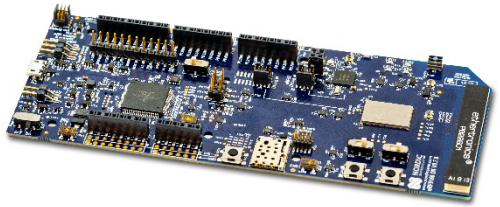
nRF Connect SDK

nRF Connect for Desktop

nRF Connect for Cloud

nRF Connect for Mobile

nRF9160 DK



Standalone development kit for the nRF9160 SiP

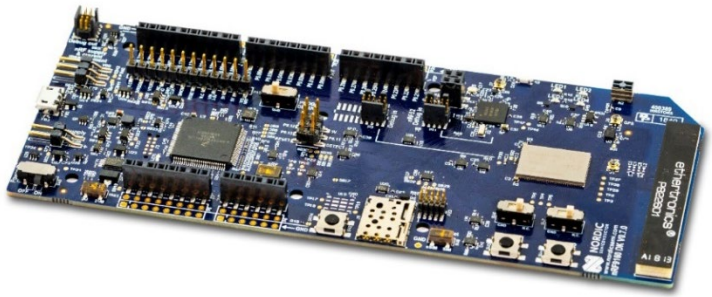
Nano SIM or soldered eSIM

nRF52840 board controller with Bluetooth LE

LTE, GPS, and 2.4 GHz antennas

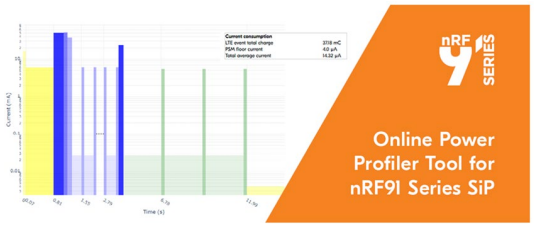
Nordic cellular IoT Kit Overview

- Nordic Thingy:91
  - Battery Powered and size optimized
  - Modem and application programming over USB

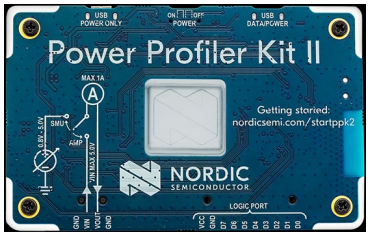


- nRF9160 Development Kit
  - Mains powered and expansion headers
  - Include on-board debugger w/ USB connection

Tools for optimizing power

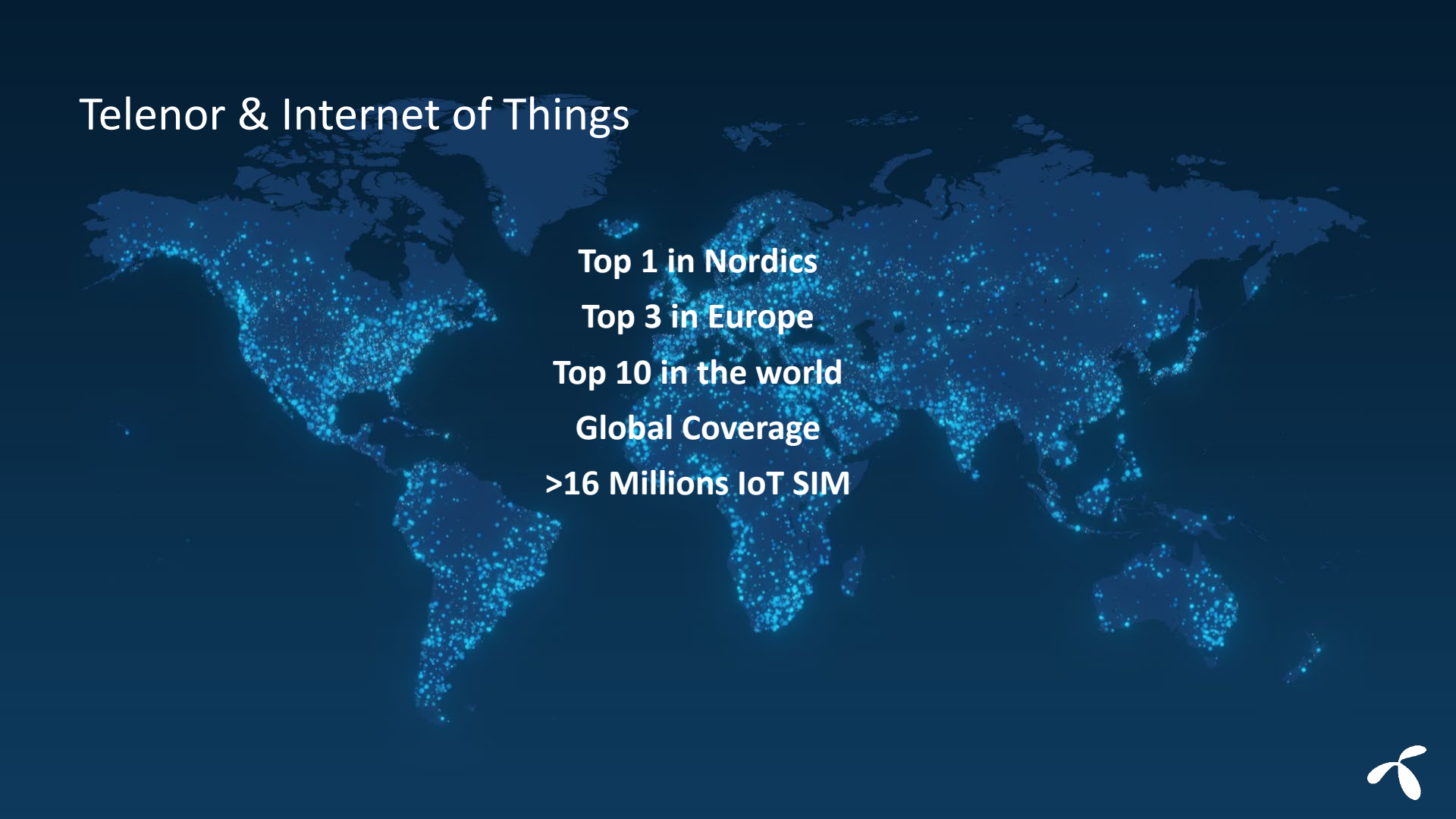


- Online Power profiler
  - Configure network parameters and use-case
  - Get estimated power profile
  - Available on Nordic DevZone



- Power Profiler Kit II
  - Real life measurements
  - Measure and optimize any design

Telenor & Internet of Things



Top 1 in Nordics

Top 3 in Europe

Top 10 in the world

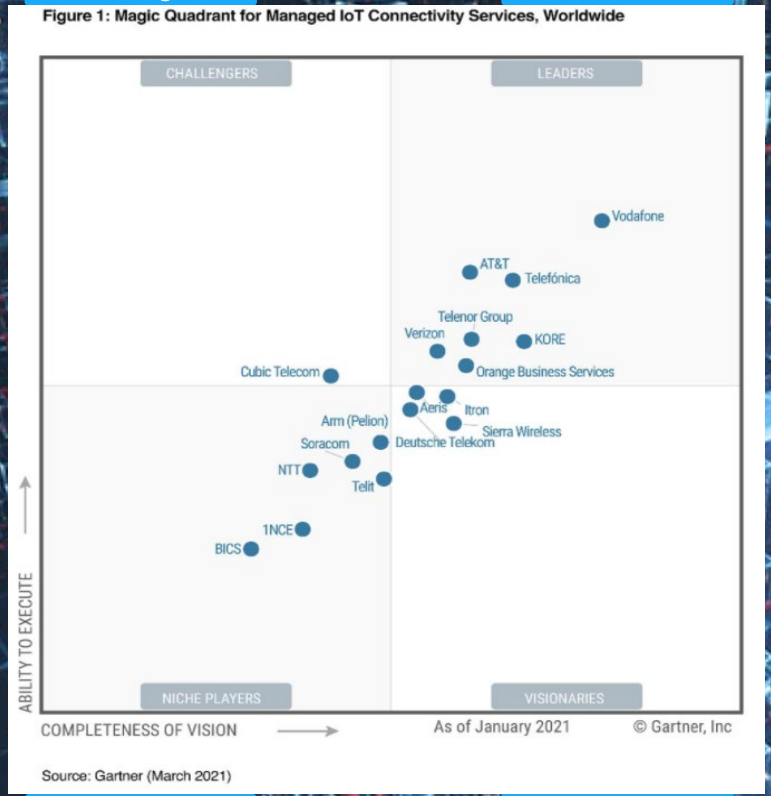
Global Coverage

>16 Millions IoT SIM

Telenor is recognized as a leader in Gartners Magic Quadrant for «Managed IoT connectivity»

Challengers

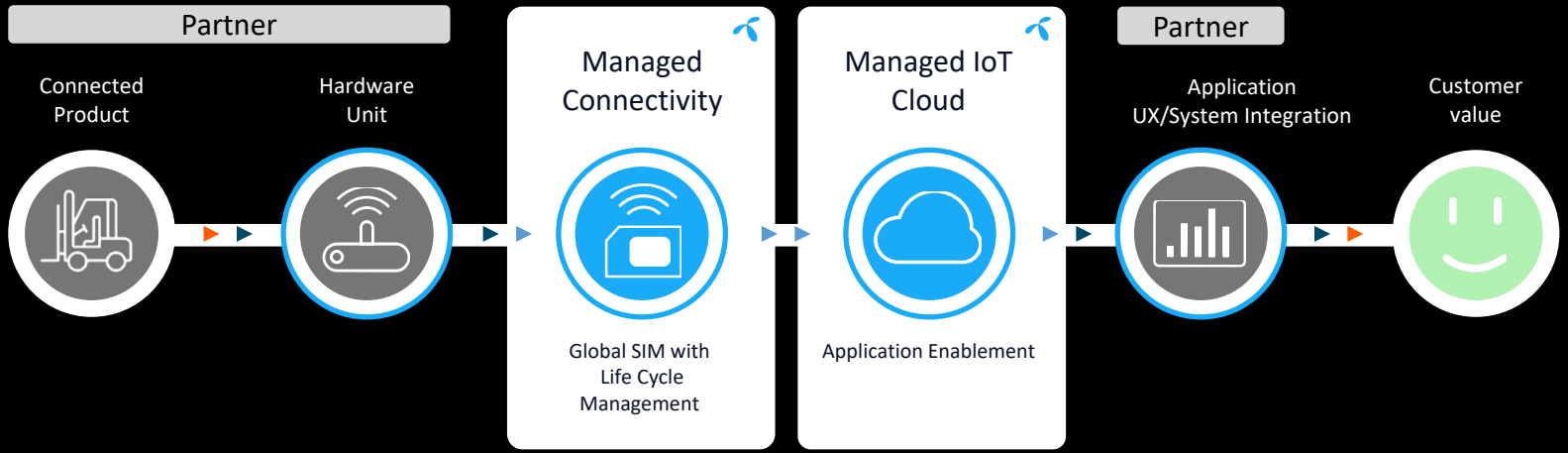
Leaders



Niche

Visionary

Telenors role in an end-to-end solution



Our strategy is to grow together with our customers and partners locally as well as globally in delivering Premium Connectivity and IoT solutions.

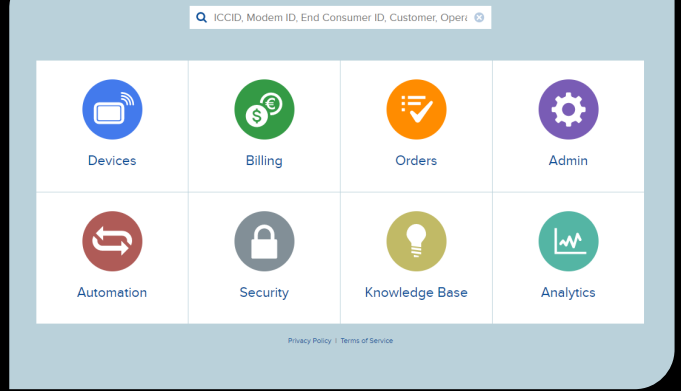
Managed Connectivity

Global SIM with Life Cycle Management

Telenor IOT

- ✓ 4G, 5G, LTE-M & NB-IOT
- ✓ Global roaming
- ✓ Embedded, nano, micro and std SIM
- ✓ SMB & Telenor Premium Enterprise connectivity platform.
- ✓ eUICC simcards

+

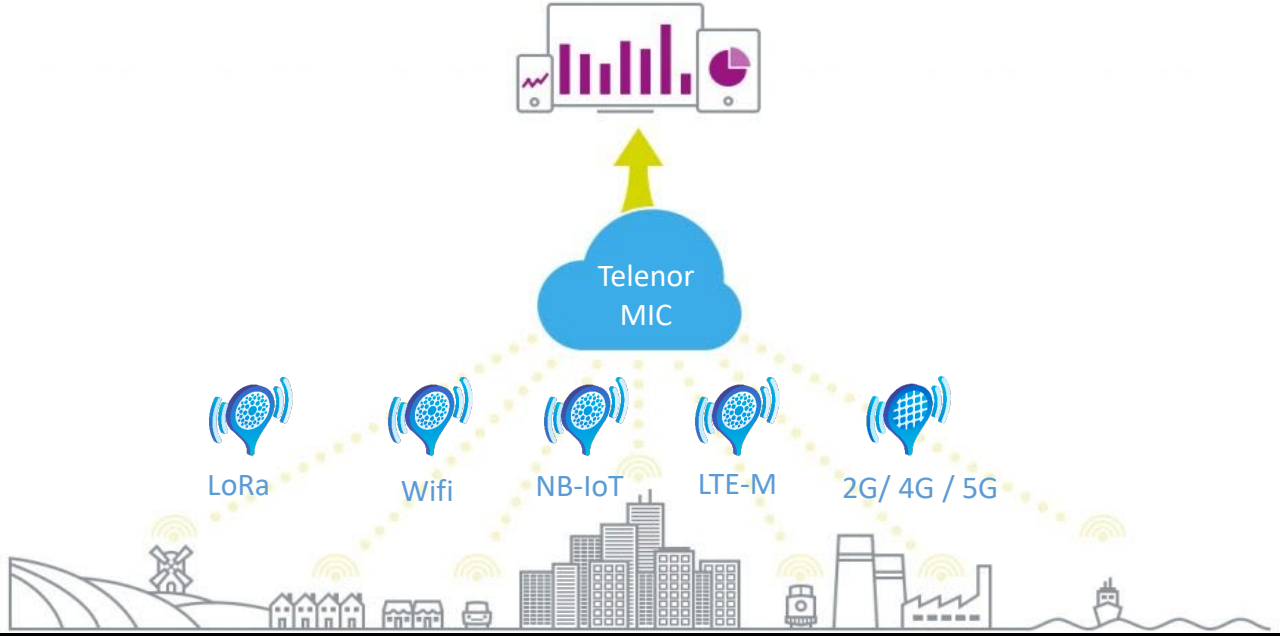


Telenor Managed IoT Cloud

Easy acces to your data and connected devices.

Telenor Managed IoT Cloud (MIC)

End-to-end solution that works with any type of connectivity technology



Telenor Managed IoT Cloud (MIC) is ready to be switched on today

App Board: Built-in configurable dashboard for prototyping

aws partner network
Advanced Technology Partner

Functionality presented in API:s for apps and integration

Managed IoT Cloud

Functionality and innovation delivered through architecture, development, integration and test using ~20 AWS services

IAM, Amazon EC2, Amazon CloudWatch, AWS KMS, Amazon API Gateway*, Amazon Cognito, AWS IoT, AWS CloudFormation, Amazon Kinesis, Amazon SES

Amazon VPC, AWS X-Ray, Elastic Load Balancing, AWS Lambda, Amazon SNS, Amazon DynamoDB, Amazon S3, Amazon CloudFront, Amazon ES, AWS CloudTrail

Device Management

Manages things, certificate and firmware

Communication Management

Authenticates Things and secure communication

Information Management

Stores and processes captured data

Telenor Managed IoT Cloud (MIC) is built to manage large scale local and global IoT deployments

powered by aws

SECURE

- ✓ Complete customer data separation
- ✓ Secure connection from device to cloud by mobile network secure connect/encryption (TLS) and mutual certificate for authentication
- ✓ Data security in transit and in cloud

RELIABLE

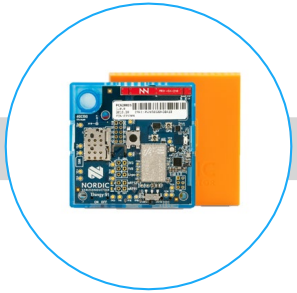
- ✓ 3 data centers per region for redundancy (AWS)
- ✓ Supported by Telenors Operations Center 24/7
- ✓ Advanced functions for monitoring, backup and restore
- ✓ AWS platform no 1 in availability [1]

SCALABLE

- ✓ Leverange AWS global infrastructure
- ✓ Proven for scale with largest cloud provicer med den største skyleverandøren
- ✓ Auto-scaling “serverless” technology
- ✓ Scalable with business model

[1] CloudHarmony, Gartner

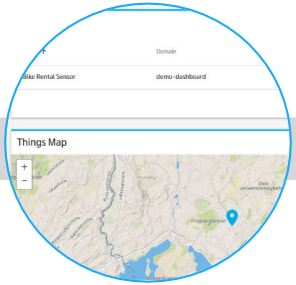
Add hardware and start exploring instantly



Any hardware
Protocol requirements:
MQTT/TLS
CoAP/APN

Telenor SIM
Ready for delivery

MIC Instance & App Board
Instant access
No development required

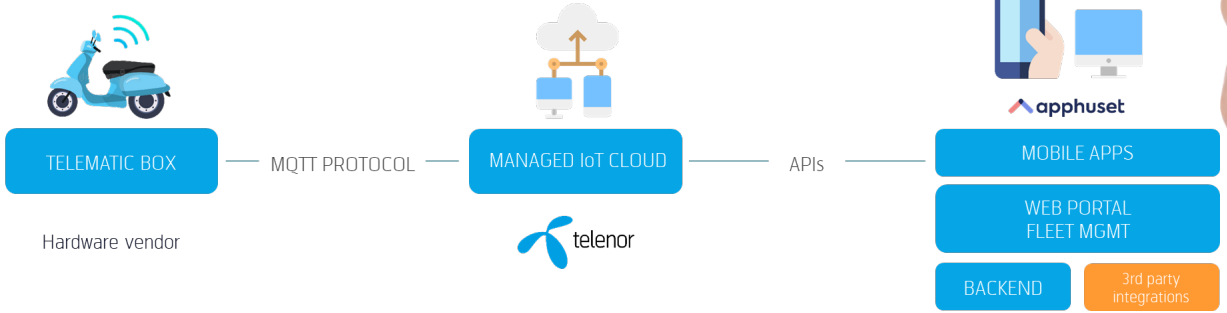


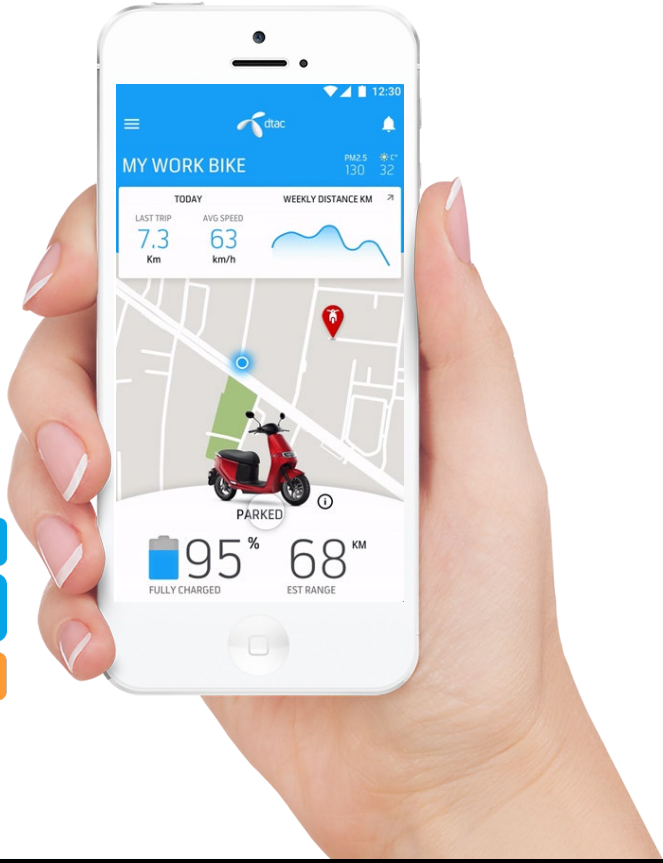
Application
2-6 months
development

QUICK ONBOARDING

Connected scooters

A IoT-eco system for electrical scooters to improve air quality and to give a safer, cleaner and cheaper transport system in Thailand.





Nordic Thingy:91 - Get Started

This tutorial will get you started with your Nordic Thingy:91 and send sensor data in a CoAP packet over the LTE-M (Cat M1) or NB-IoT (NB1) network.

Start IoT fromTelenor

A quick and easy start to IoT!

With Start IoT you get

- 5 Start IoT SIM-kort for free
- 5 month free access to Managed IoT Cloud Platform
- Possibilities to buy for prototyping
- Access to tutorials

startiot.telenor.com

The Thingy:91 + Telenor SIM card bundle is available for purchase in Norway.

If outside of Norway, it is possible to buy both separately from Start IoT and nordicsemi.com

Q&A

Register for upcoming Nordic Tech Webinars

www.nordicsemi.com/webinars