Expand cellular IoT coverage with iBasis IoT connectivity

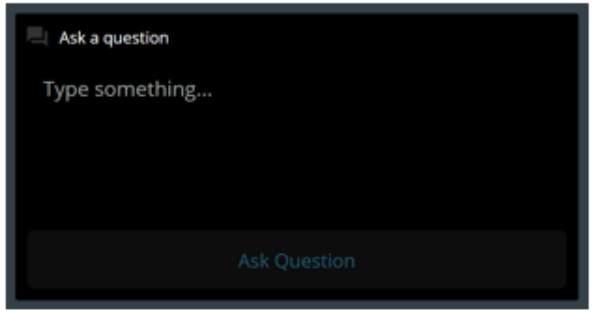
A part of Mobile World Congress experience

iBASIS
POWERED BY TOFANE

NORDIC®
SEMICONDUCTOR

PRACTICALITIES

- Duration: ~45 mins + ~ 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 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

Welcome & Agenda

- Practicalities
- Introduction to the Speakers
- nRF9160 SiP
- iBASIS Global Connectivity with eSIM
- LPWA Network Coverage with PSM/eDRX
- Dev Kit Connectivity Experience
- Moving from Development to Production
- nRF9160 and Thingy:91 with iBASIS eSIM
- Q&A and Closing
  - Help and technical support
  - Program for Mobile World Congress 2021.

SPEAKER

Bjørn Kvaale

Product Marketing Engineer
Nordic Semiconductor

SPEAKER

Freek Smouter

Senior Product Manager iBASIS

SPEAKER

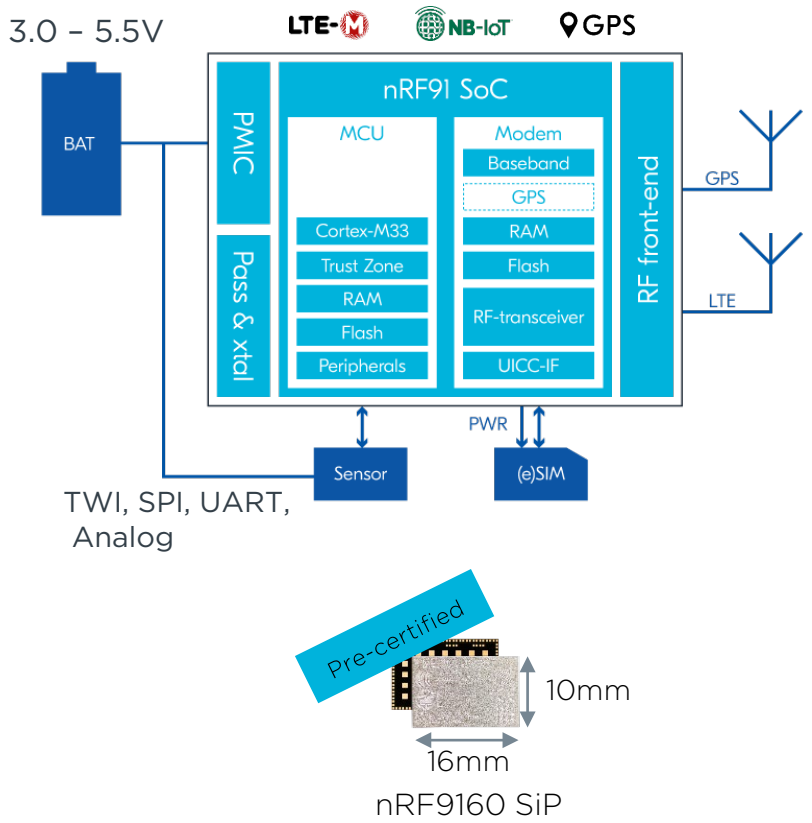
Paul Tommassen

Principal Architect, Innovation Technology, iBASIS

nRF9160 SiP

nRF9160 SiP– Voids Cellular Modules

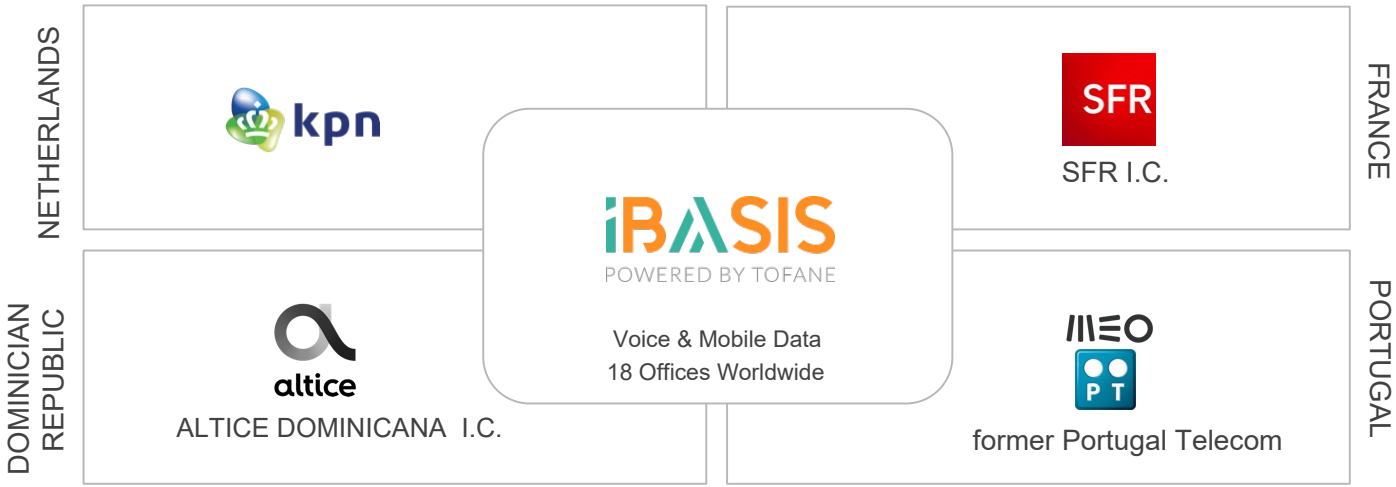
- Based on Nordic Dual Core SoC:
  - Arm® Cortex® M33 MCU for the user application
    - 1 MB Flash, 256 kB RAM, TrustZone®, CryptoCell 310
    - 3.0 V – 5.5 V operation, -40°C to 85°C
  - Multiband LTE-M/NB-IoT modem with **GPS**
  - **Small** form factor - includes PMIC, RF FEM, passives and crystals
  - **Ultra Low Power** – Avg. 18 µA @81.92s eDRX
    - PSM floor current: 2,7 µA
  - Extensive open-source nRF Connect SDK
  - nRF91 Development kits and prototype platform
    - Open reference design files available (Altium)



iBASIS
Global Connectivity with eSIM

WHO IS iBASIS? ONE OF THE WORLD'S LARGEST INTERNATIONAL CARRIERS

- Founded in 1996
- $1+ Billion in Revenues
- Global IPX for Mobile Operators
- Reaching over 700 LTE Destinations
- 1,000+ customers
- 300 direct MNO interconnects
- Global sales force
- Global support
- 18 regional offices



CONSOLIDATION OF THE INTERNATIONAL CARRIER BUSINESS OF MAJOR OPERATORS

3 Core Businesses: Voice Mobile IoT

How can I focus on product development and customer acquisition, and not on multiple connectivity providers?

How do I prevent getting locked into a single telecom provider?

How do I control the customer experience ?

DEPLOYING GLOBAL DEVICES WITH SINGLE SKU USING eSIM

A single eSIM can be installed in all devices regardless of deployed location

The device can be programmed remotely with operator credentials when it is turned on

As the need arises, the device can be re-programmed remotely with a different set of operator credentials

This is an 'Open', unlocked eSIM

Standardized by the GSM Association

iBASIS' position in the mobile ecosystem – 3rd largest IP Exchange (IPX) – the operators are our customers

Exclusively eSIM – based on GSMA standards – not proprietary multi-IMSI or roaming only

Global access via multiple operators for reliable connectivity – even for coverage gaps in a single country

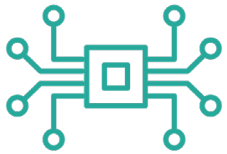
WHAT iBASIS PROVIDES ENTERPRISES FOR THEIR IoT SOLUTIONS

Global CellularIoT Connectivity with Regional Break Outs

MNO Partnerships with strict adherence to MNO Regulations

eSIM Technology

Security Including a Global Private Secure Network



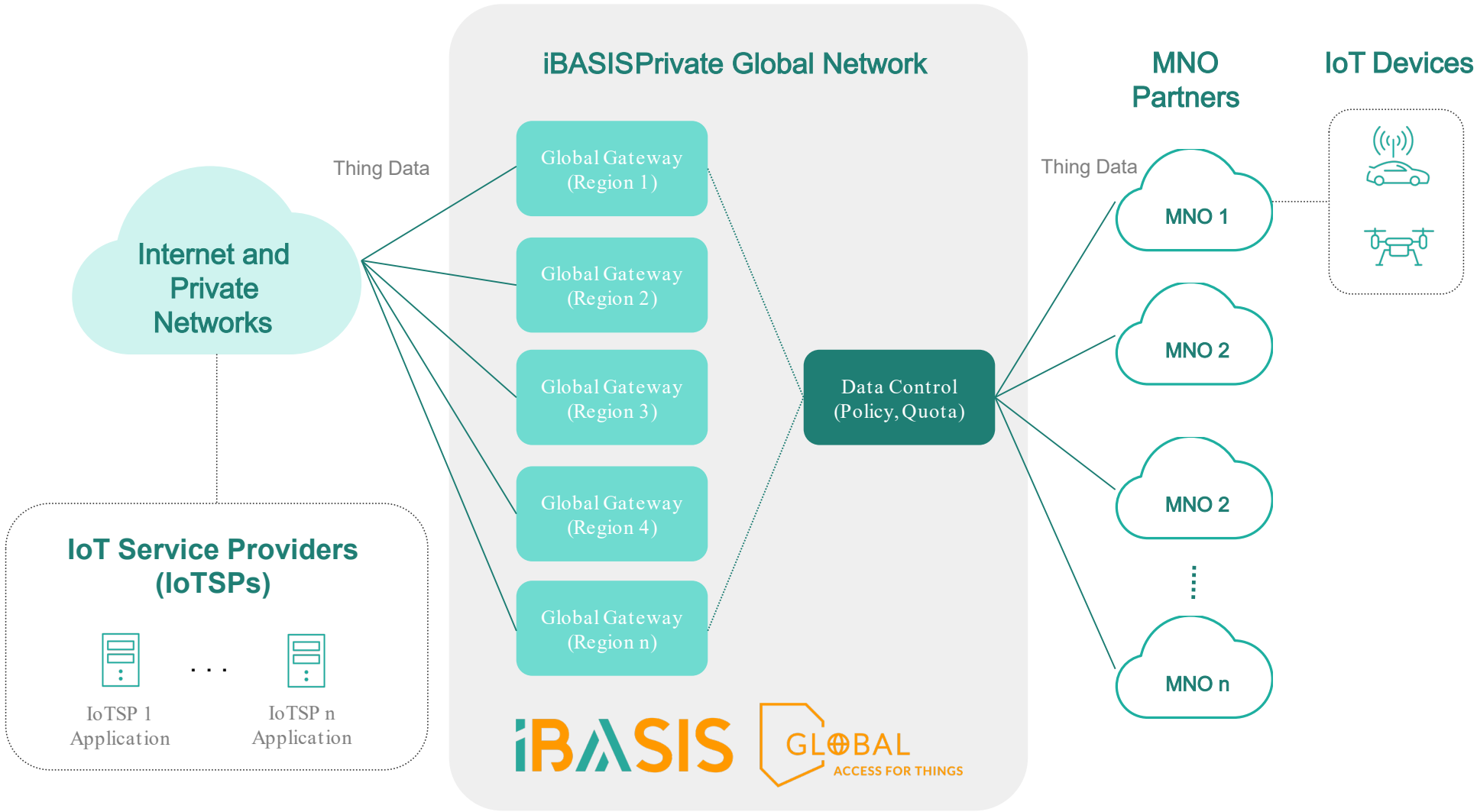
RESTful API

Sophisticated Rules Engine for Network Selection

Single IoT Management Platform

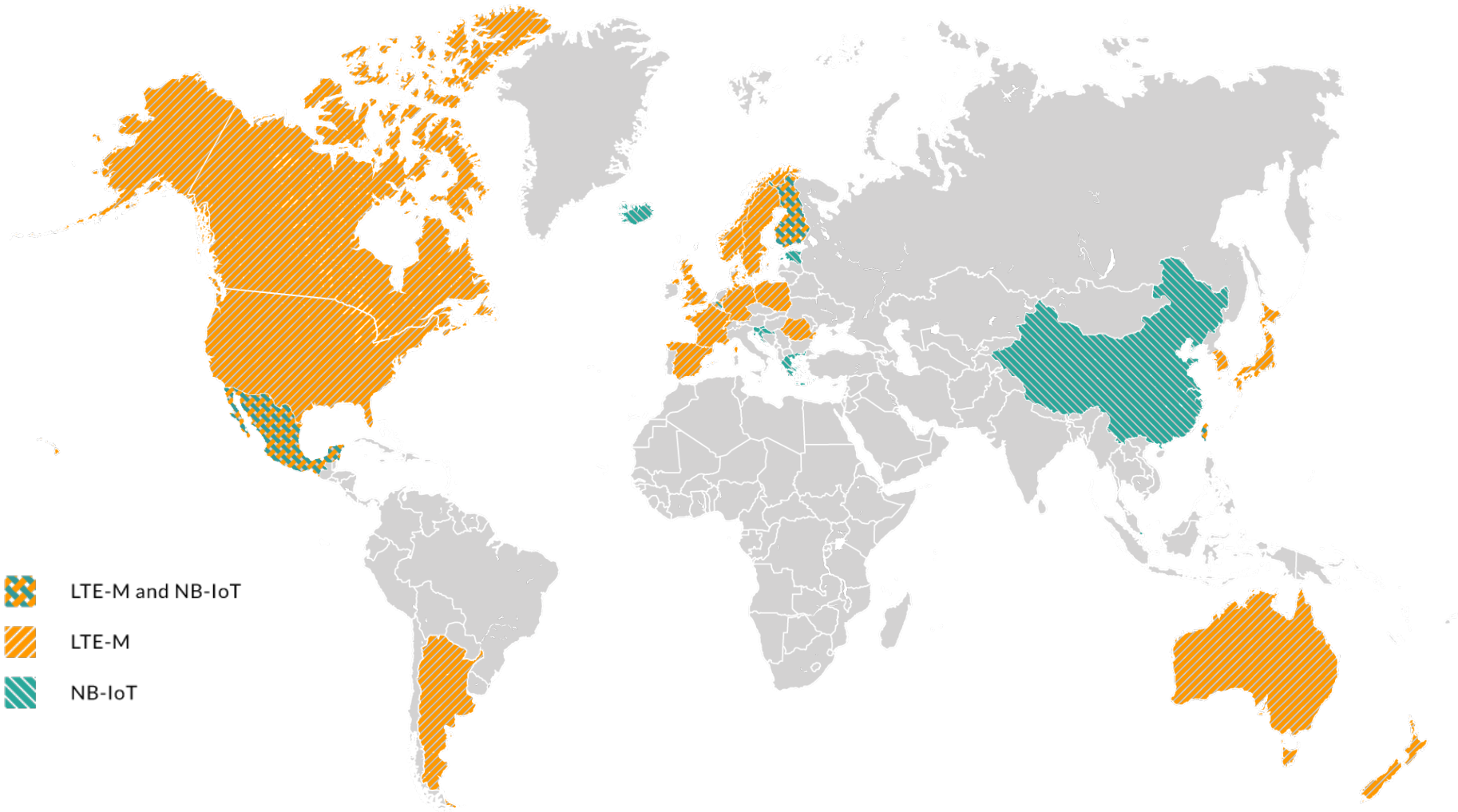
Single Bill and 24/7/365 Support

FUTUREPROOF OPEN GLOBAL CONNECTIVITY

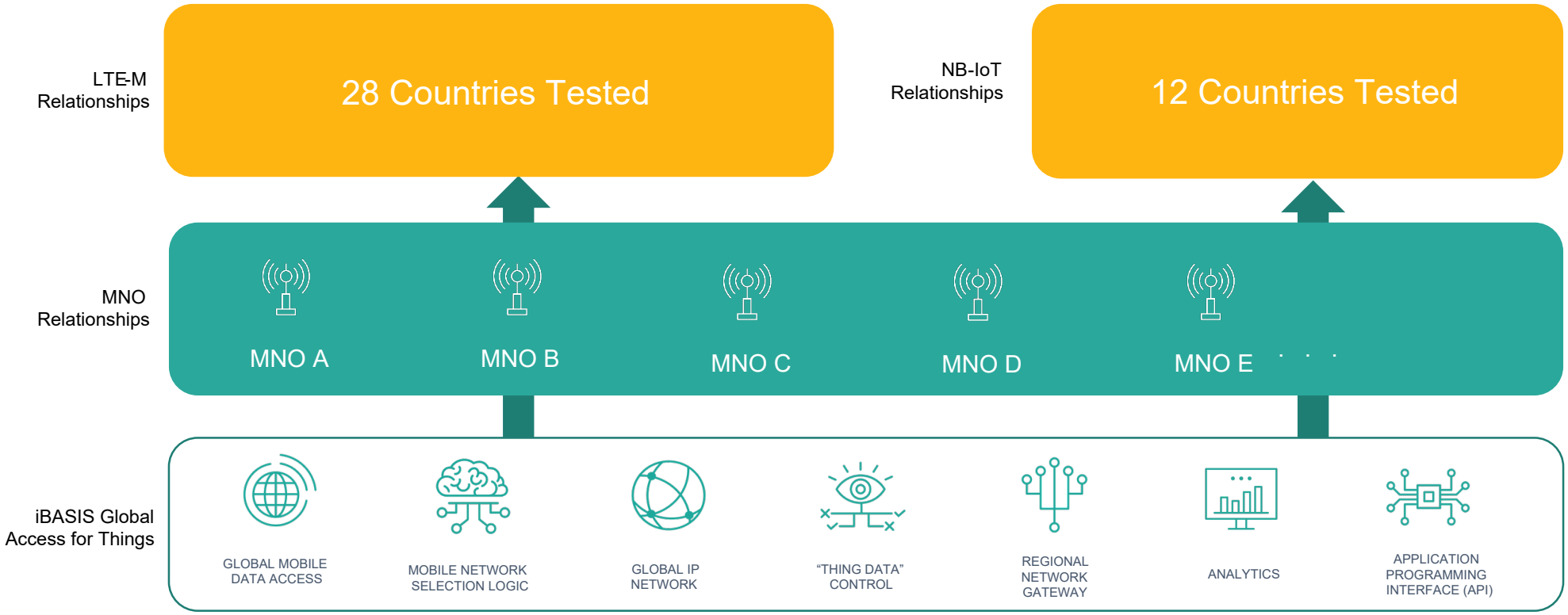


LPWA Network Coverage with PSM/eDRX

LTE-M AND NB-IoT COVERAGE



iBASISMOBILE OPERATOR RELATIONSHIPS PROVIDE CHOICE



iBASIS

iBASIS eSIM national coverage update

NORDIC SEMICONDUCTOR

iBASIS uses in country probes to test networks

iBASIS GLOBAL

iBASIS NETWORK COVERAGE DETAILS:

Country	Test Location	Band		LTE-M Result	Feature Supported LTE-M	NB IoT Result	Feature Supported NB IoT
		LTE-M	NB-IoT				
Argentina	Buenos Aires	4		Available**	N/A	N/A	N/A
Australia	Sydney	28		Available	PSM+eDRX	N/A	N/A
Austria	Vienna	3		Available	PSM	N/A	N/A
Belgium	Brussels	20	20	Available	PSM+eDRX	Available	PSM+eDRX
Canada	Montreal	12		Available	PSM	N/A	N/A
	Toronto			Available	N/A	N/A	N/A
				Available	N/A	N/A	N/A
China	Beijing		8	N/A	N/A	Available**	N/A
Croatia	Zagreb		20	N/A	N/A	Available	PSM+eDRX
Denmark	Copenhagen	20		Available	PSM	N/A	N/A
				Available	PSM	N/A	N/A
Estonia	Tallinn		20	N/A	N/A	Available	PSM
Finland	Helsinki	3	20	Available	PSM+eDRX	Available	PSM+eDRX
France	Paris	20		Available	PSM	N/A	N/A
Germany	Munich, Nuremberg	3		Available	PSM	N/A	N/A
Greece	Athens		20	N/A	N/A	Available**	N/A
Iceland	Reijkjavik		28	N/A	N/A	Available	PSM
Japan	Osaka	8		Available	PSM+eDRX	N/A	N/A
Latvia	Riga		20	Available	PSM	N/A	N/A
Liechtenstein	Vaduz	3		Available	PSM+eDRX	N/A	N/A
Luxembourg	Luxembourg	20		Available	PSM+eDRX	N/A	N/A
Mexico	Mexico City	4		Available	N/A	N/A	N/A
		4,5	5	Available	PSM+eDRX	Available	PSM+eDRX
Netherlands	The Hague	20		Available	PSM+eDRX	N/A	N/A
New Zealand	Auckland	28		Available	PSM	N/A	N/A
Norway	Oslo, Trondheim	20		Available	PSM	N/A	N/A
Poland	Warsaw	20		Available**	N/A	N/A	N/A
Portugal	Lisbon	20		Available**	N/A	N/A	N/A
Romania	Bucharest	3		Available**	N/A	N/A	N/A
Singapore	Singapore	3	8	Available	PSM+eDRX	Available	PSM+eDRX
Slovenia	Ljubljana		3	N/A	N/A	Available	PSM
South Korea	Seoul	3		Available	PSM	N/A	N/A
Spain	Madrid	20, 3	20	Available	PSM+eDRX	Available	PSM+eDRX
Sweden	Stockholm	20		Available	PSM	N/A	N/A
				Available	N/A	N/A	N/A
Switzerland	Bern	20		Available	PSM+eDRX	N/A	N/A
Taiwan	Taipei	3	8	Available	PSM+eDRX	Available	PSM+eDRX
UK	London	20		Available**	N/A	N/A	N/A
USA	Dallas, Los Angeles, Washington, Seattle, San Francisco, San Diego, Phoenix, Miami, Houston, Detroit, Hawaii	2		Available	PSM+eDRX	N/A	N/A
	Los Angeles, San Diego, New York	12		Available	N/A	N/A	N/A

"Limited Coverage; N/A= not yet available

NOTE: Data in the above table applies to the default bootstrap profile only.

{ DevZone

Do all networks support PSM/eDRX in the same way?

TESTING SUPPORT FOR LTE-M/NB-IoT WITH PSM AND eDRX

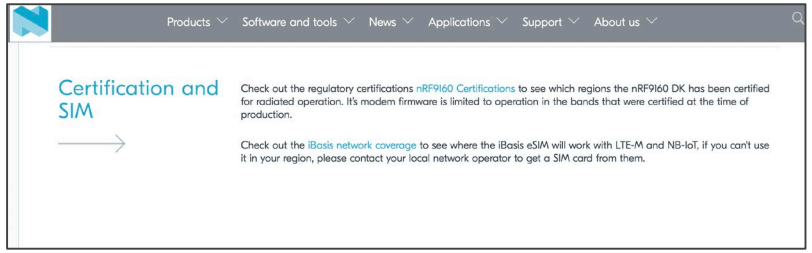
iBASIS has probes deployed in many countries where connectivity is confirmed to many operators

Probes are capable of testing LPWA networks over LTE-M and NB-IoT technologies with configurable

- Timer T3412: Sleep timer
- Timer T3324: Activity timer
- eDRX Cycle

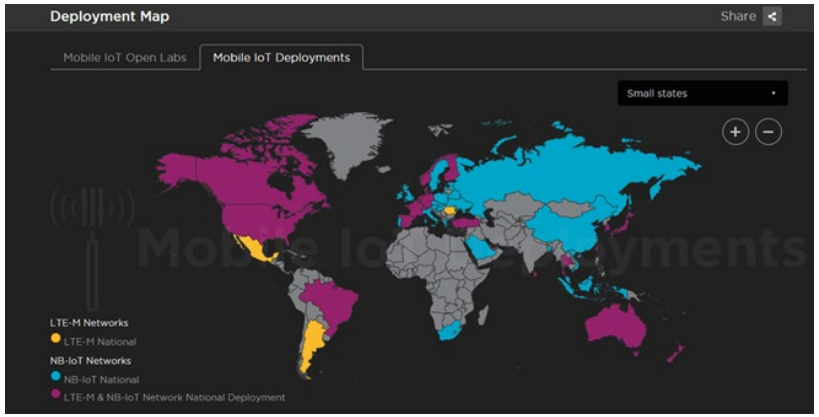
Coverage list is available via Nordic or iBASIS site

https://www.nordicsemi.com/Software-and-tools/Development-Kits/nRF9160-DK/GetStarted#infotabs



PSM and eDRX also tested using Thingy:91 and nRF9160 Development Kit (DK)

WHAT DOES iBASIS TO VALIDATE AND OPERATIONALIZE LPWA (NB-IoT AND LTE-M) NETWORK COVERAGE



iBASIS follows relevant websites and announcements to detect which Mobile Network Operators (MNOs) launch NB-IoT/LTE-M

iBASIS tries to partner with the MNOs in the relevant countries

- Either by getting access to the profile of the MNO
- Or to get an agreement to roam on the MNOs network with one of the profiles iBASIS already has

iBASIS brings in a device to test the access

In roaming cases iBASIS checks signaling messages to validate the Radio Access Type that is used

iBASIS has a tool to be able to test LTE-M/NB-IoT access remotely

Coverage availability may change over time

The Nordic Dev Kit Experience with iBASISeSIM

HOW ARE NETWORKS SELECTED USING MY NORDIC DEV KIT?

Modem selects strongest signal

MNO 1

MNO 2

MNO n

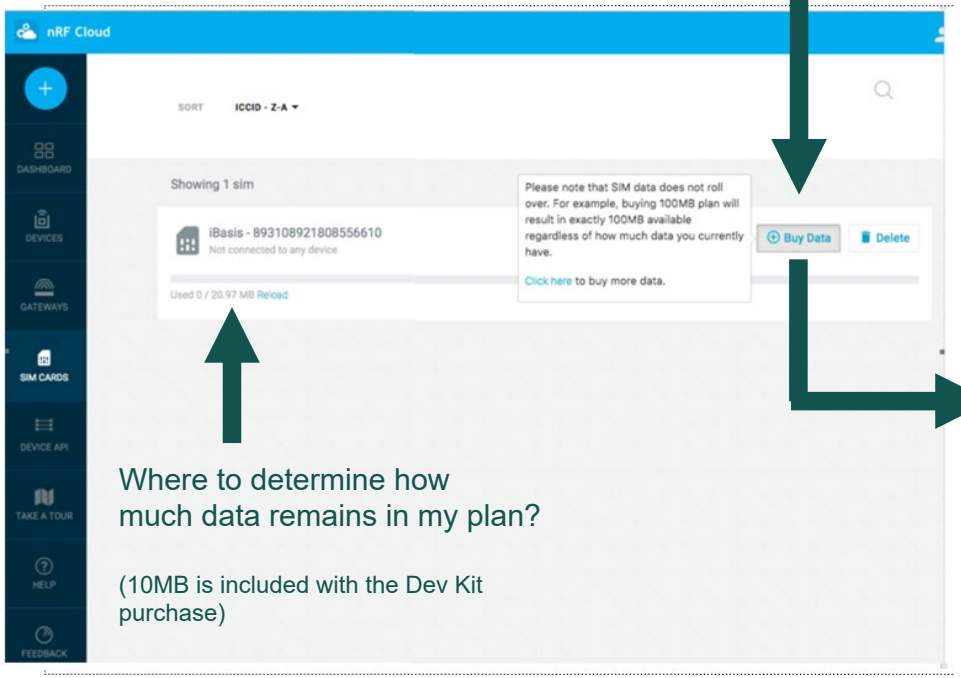
iBASIS performs admission control (accept or reject

iBASIS GLOBAL ACCESS FOR THINGS

Only the iBASIS global roaming profile is used with the Dev Kits
Additional profiles are made available to production customers via rules engine or API

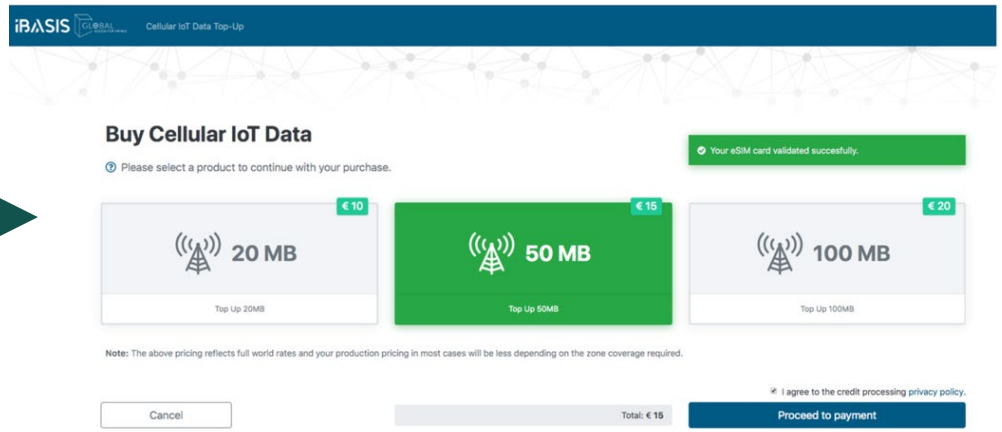
THE NORDIC DEVELOPMENT ENVIRONMENT INTEGRATED WITH iBASIS

How do I purchase more data via a credit card top-up?



Where to determine how much data remains in my plan?

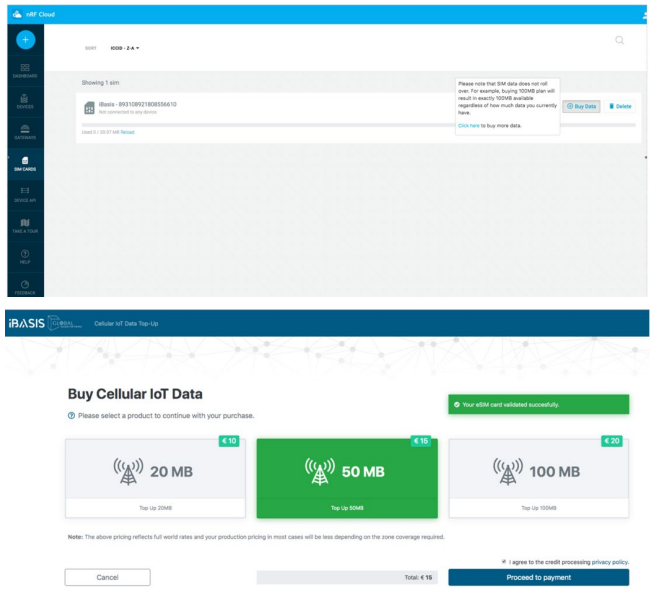
(10MB is included with the Dev Kit purchase)



THE NORDIC DEVELOPER EXPERIENCE AND THE NEXT PHASES OF DEVELOPMENT/DEPLOYMENT

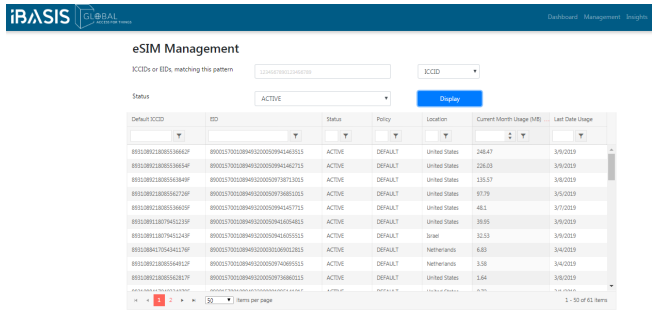
Nordic Development Environment

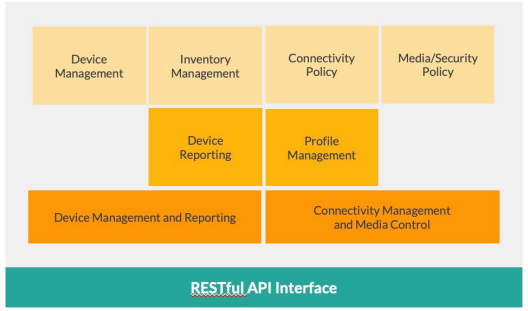
Viewing my eSIM enabled device usage and top-up link on the nRFCloud SIM Cards screen



Prototyping and Production Connectivity Environment

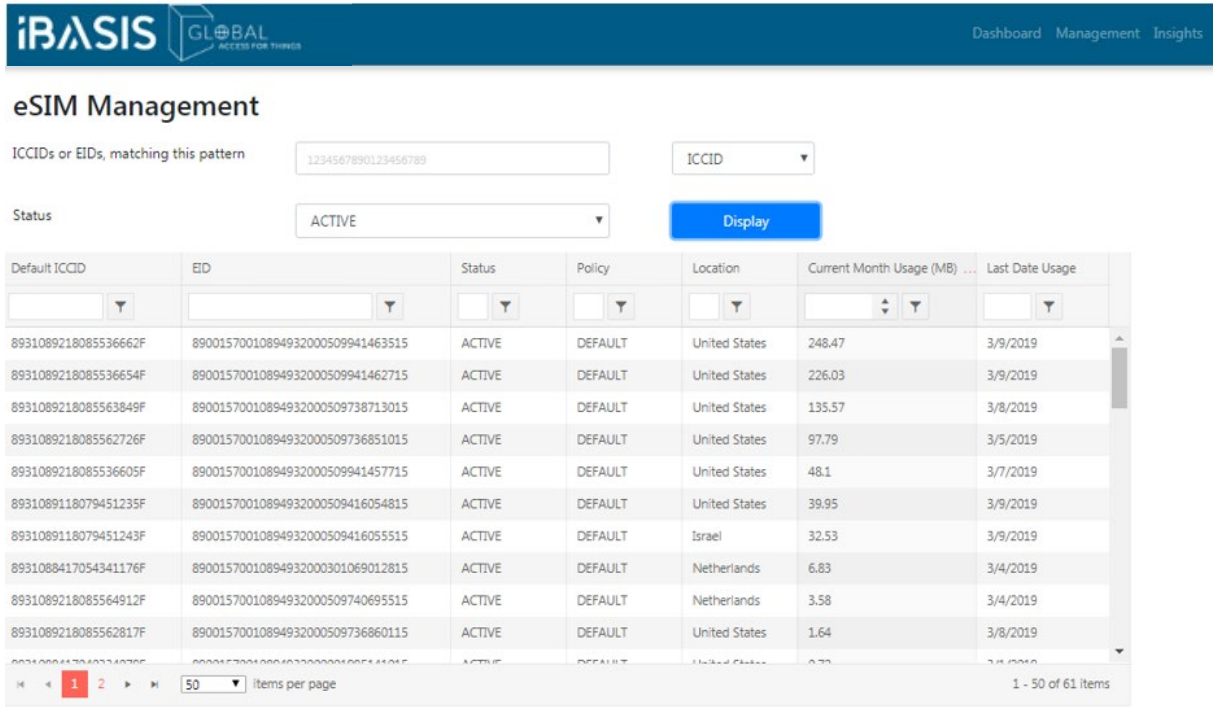
Viewing my eSIM enabled devices in *Global Access for Things* eSIM management with production billing



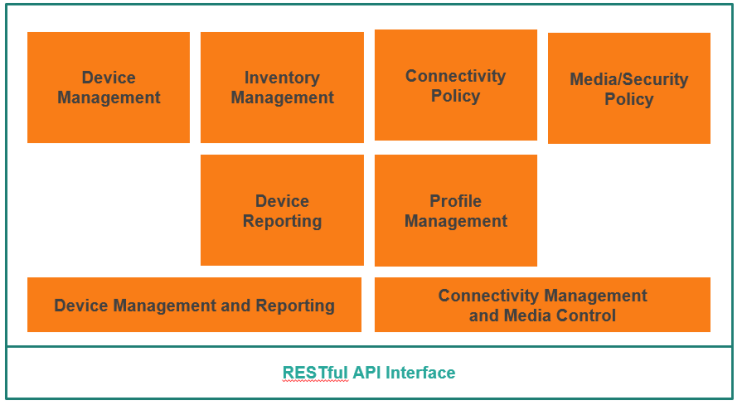


THE iBASIS PRODUCTION CONNECTIVITY ENVIRONMENT

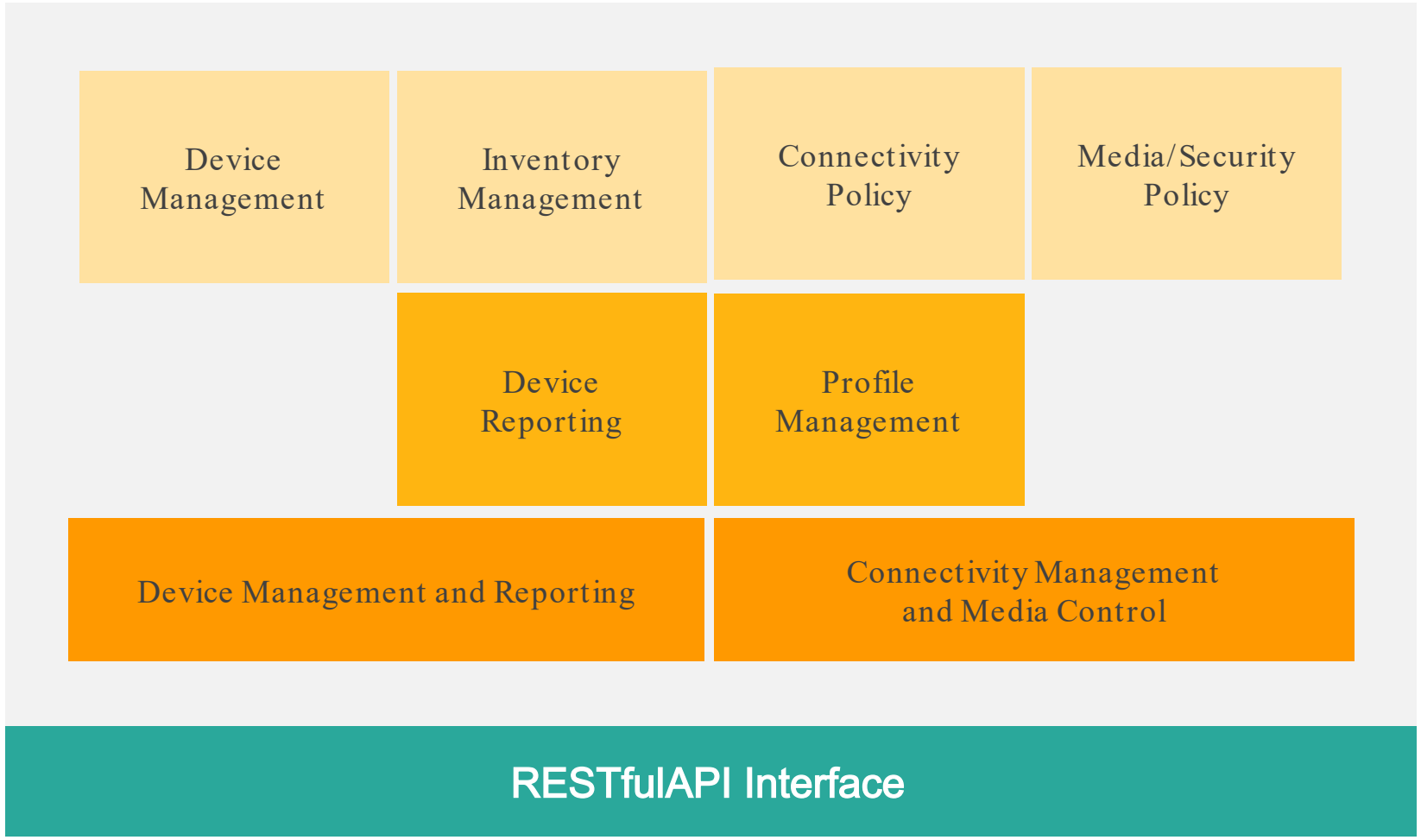
Prototyping and Production Connectivity Environment



Viewing my eSIM enabled devices in *Global Access for Things* eSIM management with production billing



INTEGRATING CONNECTIVITY USING AN API

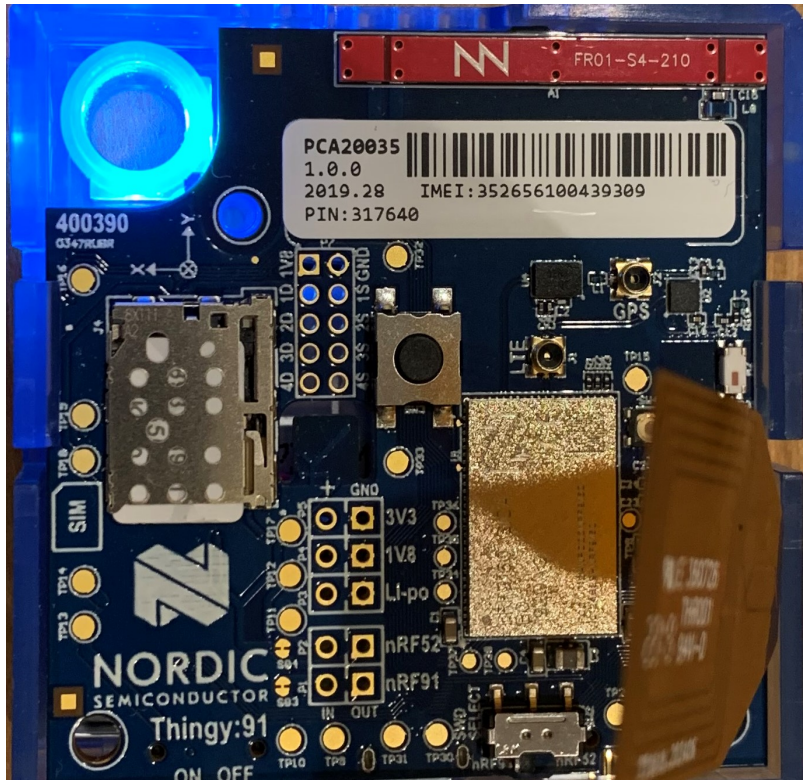


nRF9160 and Thingy:91 with iBASIS eSIM

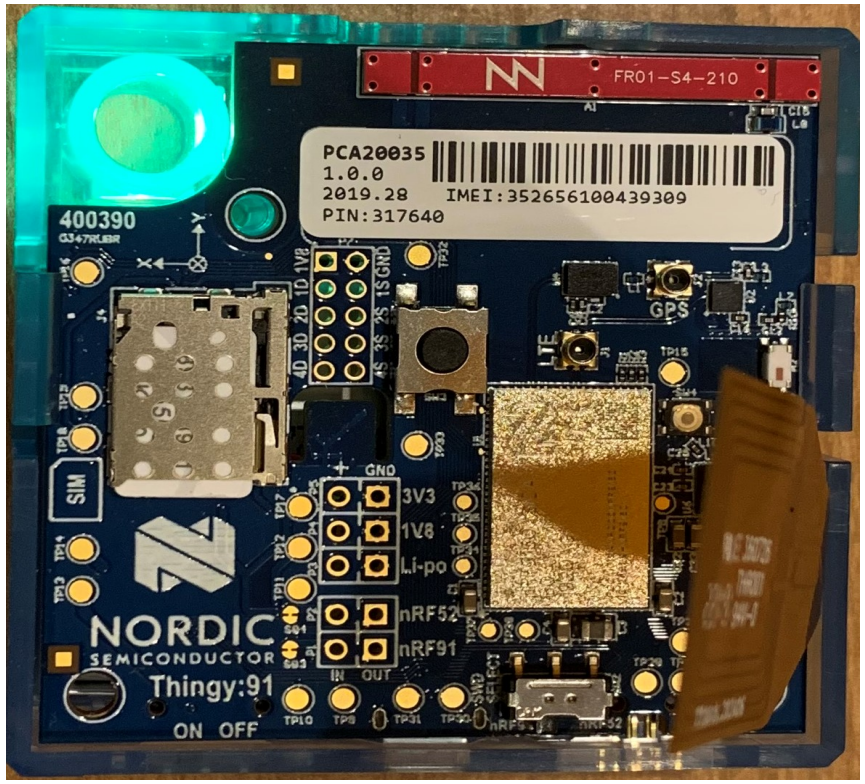
What should I do if I am having trouble connecting?

IS MY THINGY:91 CONNECTED? CHECK THE VISUAL

CONNECTING



CONNECTED



Data failure

- Typically happens due to network unavailability
- Could be due to network blocking the access
- No support for LTE-M or NB-IoT in that region.

Card activation issues

Resolved via support ticket.

APN issues

- Incorrect APN configuration on the board
- Correct APN may be required to be configured manually in some cases.

Access to SUPL server for AGPS

- DNS Network resolution issues to SUPL servers
- Network blocking access to those SUPL servers.
- PSM not enabled.

BEST PRACTICES WHEN TROUBLESHOOTING CONNECTIVITY, CONTINUED…

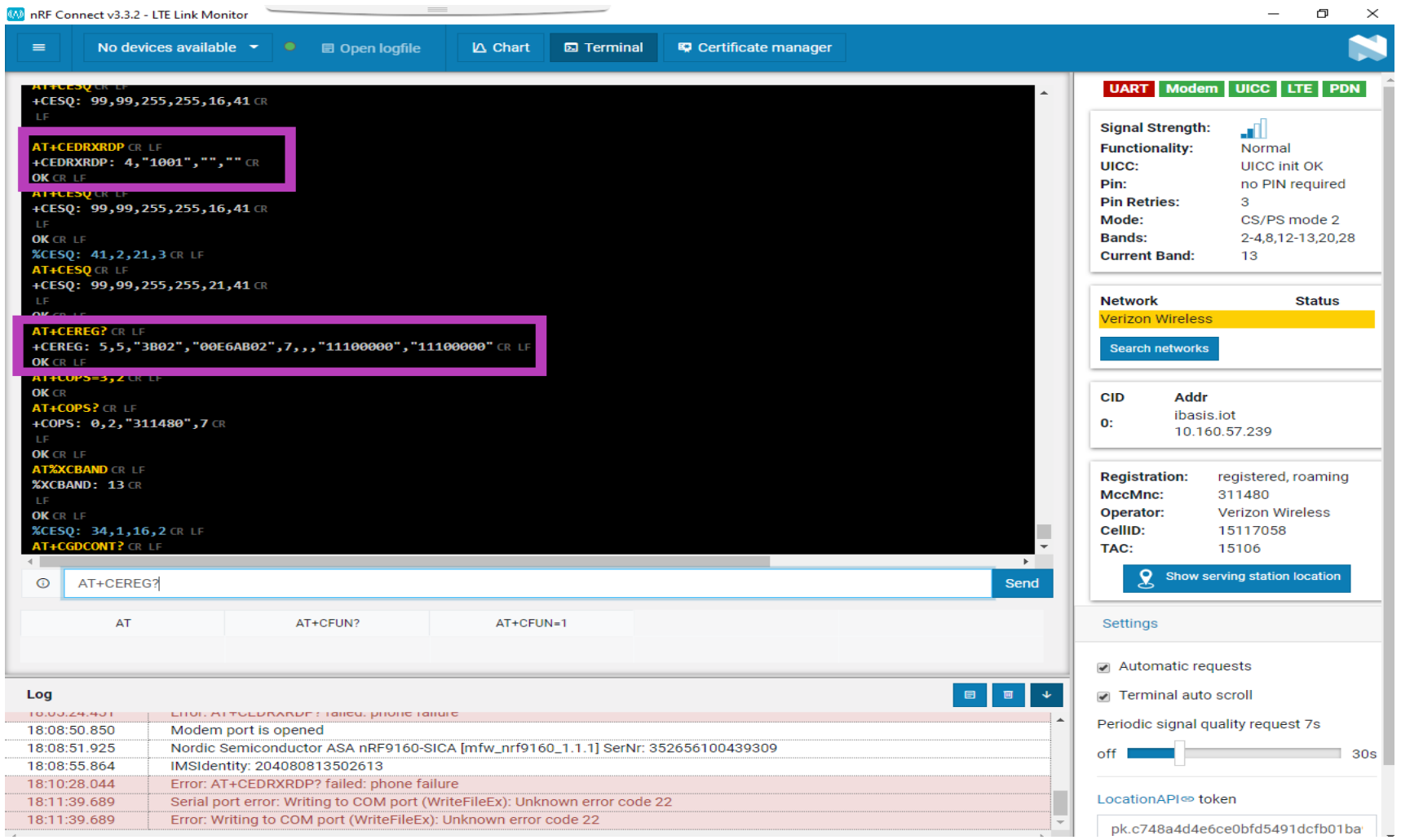
Check for coverage list for networks supported byiBASISeSIMs

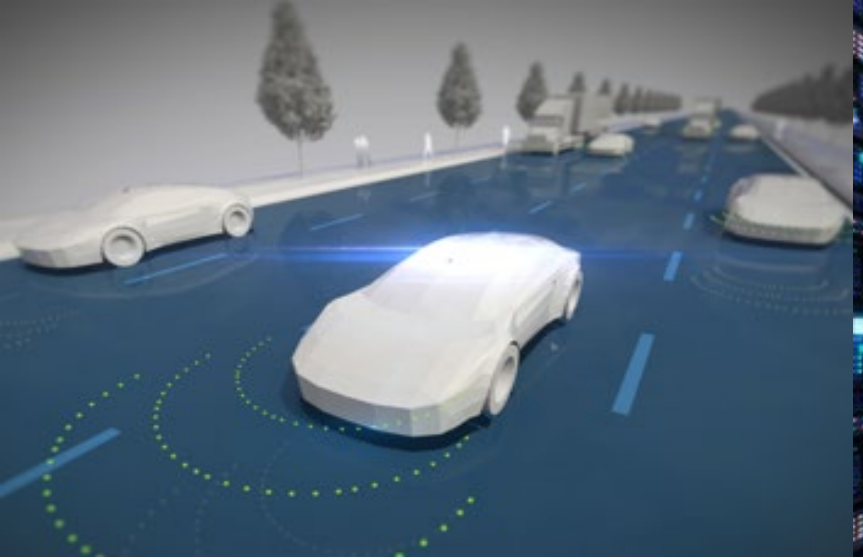
- List includes LTE-M and NB-IoT coverage by country and MNO
- Check to make sure if firmware supports LTE-M and NB-IoT
- Check the current setting by executing AT%XSYSTEMMODE?
  - 1,0,x,x is LTE-M and 0,1,x,x is NB-IoT

Reach out toiBASISat support@iBASIS.netor via the Nordic FAQ prompt.

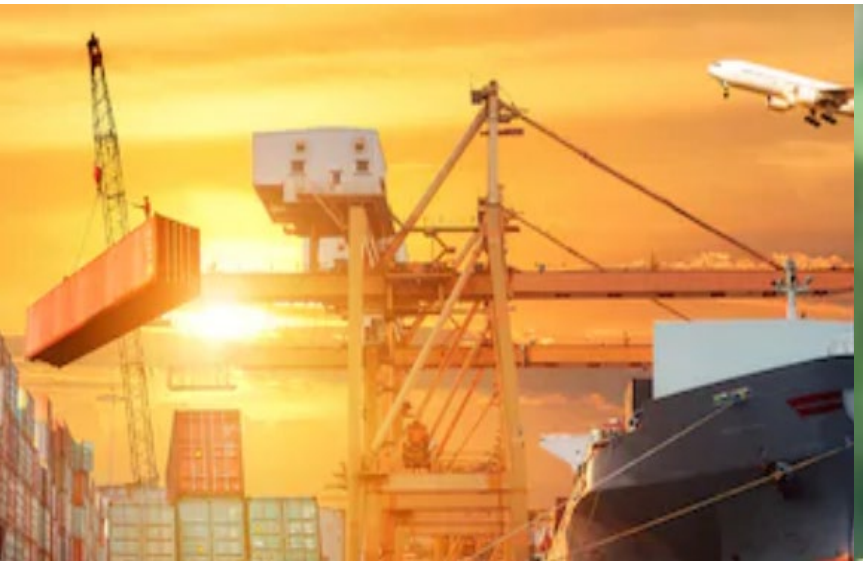
Ask Nordic-related questions on theNordicDevZone

SNAPSHOT OF PSM&EDRX REGISTRATION WITH LTEM





YOU MAKE SMART THINGS
WE CONNECT THEM



Q&A

Program for Mobile World Congress 2021

Date	Topic
June 28, 10:00 CEST	How to power optimize with the latest features in the nRF9160 SiP
June 29, 09:00 CEST June 29, 18:00 CEST	Expand cellular IoT coverage with Ibasis IoT connectivity
June 30, 10:00 CEST	How cloud helps your IoT devices to get location data
July 1, 09:00 CEST July 1, 20:00 CEST	Exciting new features in nRF Connect SDK v1.6

All webinars are available on demand at webinars.nordicsemi.com

Get on it

#1 Sign up for more webinars at **webinars.nordicsemi.com**

#2 Get tech support and join our community at **devzone.nordicsemi.com**

#3 Find out more about our products and services at **nordicsemi.com**

NORDIC®
SEMICONDUCTOR