

# ANT WIRELESS SYMPOSIUM 2019

SEPT 24-26  
CANMORE, CANADA

## Nordic Workshop

Introduction to nrf91 Series

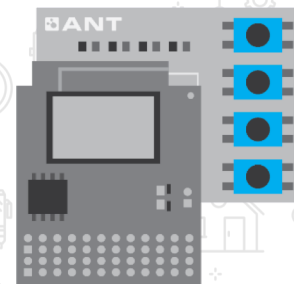
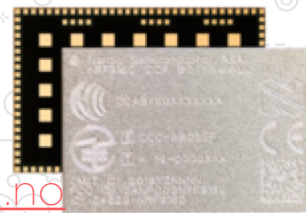
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# Workshop Agenda

1. Workshop Objective
2. Introduction to nRF91 Series
3. Workshop Network - Topology, Elements and nrfCloud
4. Some IoT Basics - REST and MQTT
5. Break
6. Web Application Workshop
  - **Web Application Architecture**
  - **nrfCloud Device API**
  - **Index.html Structure and Overview**
  - **Shadow Data Structure**
  - **Static Demo**
7. Thingy:91 setup and use of nrfcloud Device API

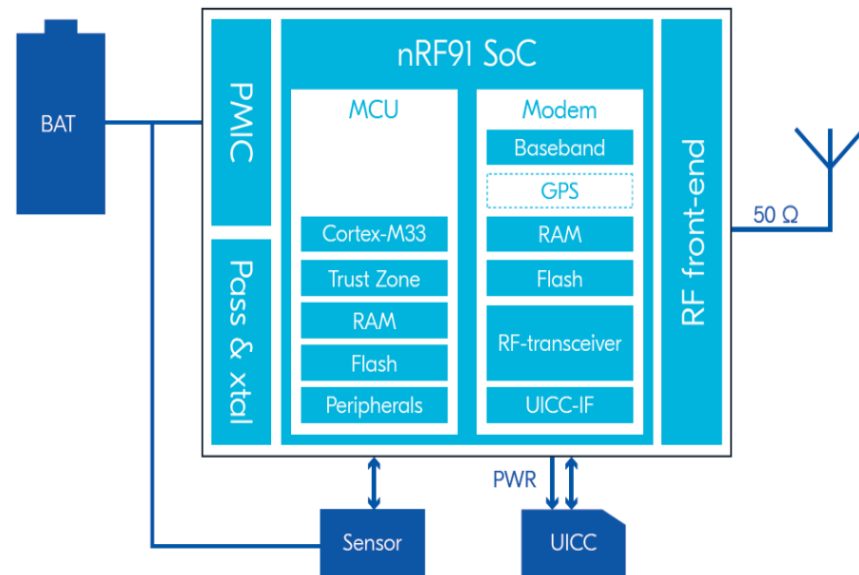
# Workshop Objective

## Develop a Web Application for a cloud connected ANT Blaze Network

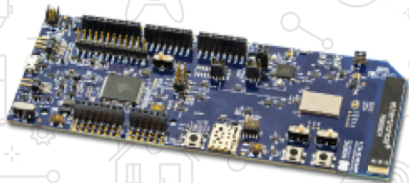
- Each participant will write a web application to control your ANT Blaze Node
- ANT network, LTE Gateway and nrfcloud IoT account already set up and ready
  - Details on next slides
- Web application has been 90% completed
- Written in React.JS – basic Javascript knowledge a benefit but not required

# nRF9160 SoC

- Worldwide operation LTE-M and NB-IoT from 700 MHz to 2.2GHz
- Single pin 50  $\Omega$  antenna interface
- Integrated Application Processor (MCU)
- Supports SIM or eSIM
- DRX, eDRX, PSM power saving modes
- nRF52 style peripherals
- Cortex M33 core with trustzone
- GPS



# nRF9160- DK



- nRF9160 for LTE or NB-IoT
- nRF52840 for BLE/ANT and board controller
- Segger Programming Support
- Arduino rev 3 shield compatible
- GPIO/SPI/UART available via connectors
- LED and switches for prototyping
- Antennas for LTE/NB-IoT and GPS
- 4FF SIM slot and soldered eSIM interface

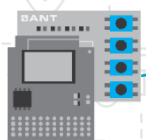
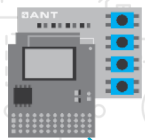
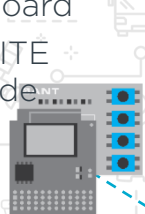
# Thingy:91



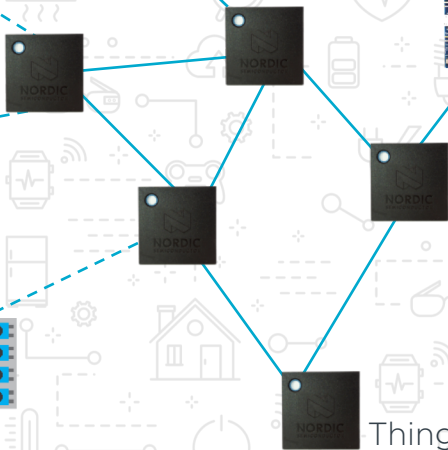
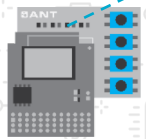
- Integrated nRF9160 and nRF52840
- Architecture compatible with nRF91 DK
- Includes many sensors and I/O
- 1440 mAh LiPO rechargeable battery
- RGB LEDs, high current outputs, audio
- Temperature, air pressure ... sensor
- Built-in 3 axis accelerometer

# Workshop Network Topology

I/O Board  
IGNITE  
Node



I/O Board  
IGNITE  
Node

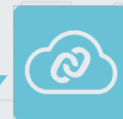


BLAZE to  
MQTT



MQTT

nrfCloud



REST/MQTT



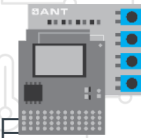
# Network Elements



- ANT BLAZE
  - Mesh networking stack
  - Backbone consisting of mains powered nodes provides coverage of an extended area



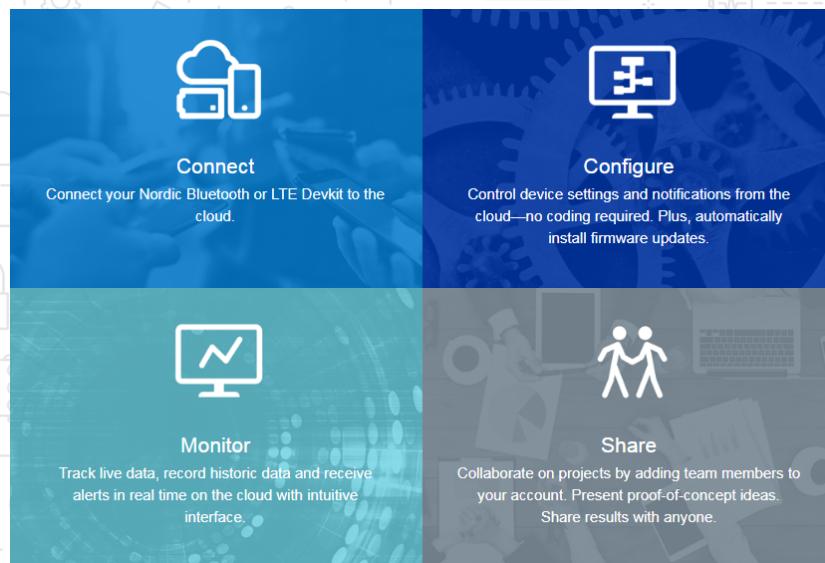
- BLAZE to MQTT/IP Gateway
  - Converts BLAZE protocol to IP
  - LTE Connection to Cloud



- ANT IGNITE
  - Short range polling-based networking stack
  - Coin cell battery operated sensor nodes
  - Sensors connect to hub with highest RSSI
  - Sensors periodically evaluate RSSI of nearby hubs and switch if a stronger hub is detected

# nRFCloud

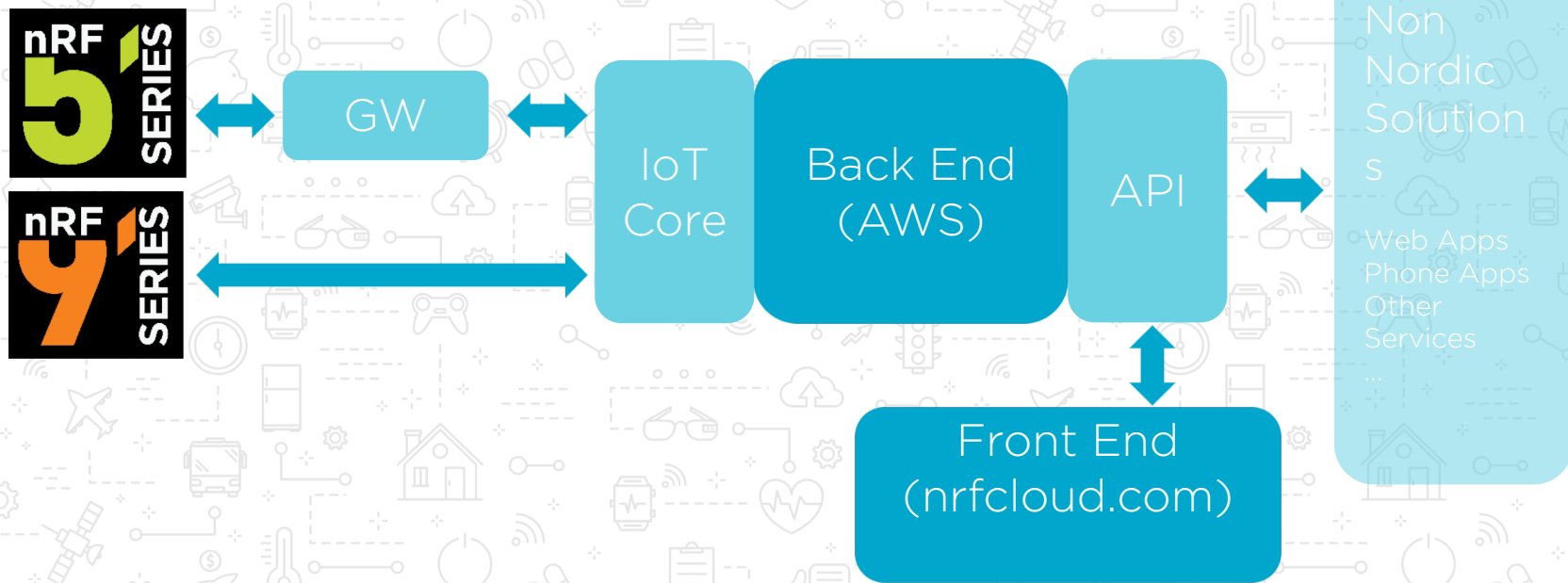
connect, monitor and configure IoT devices



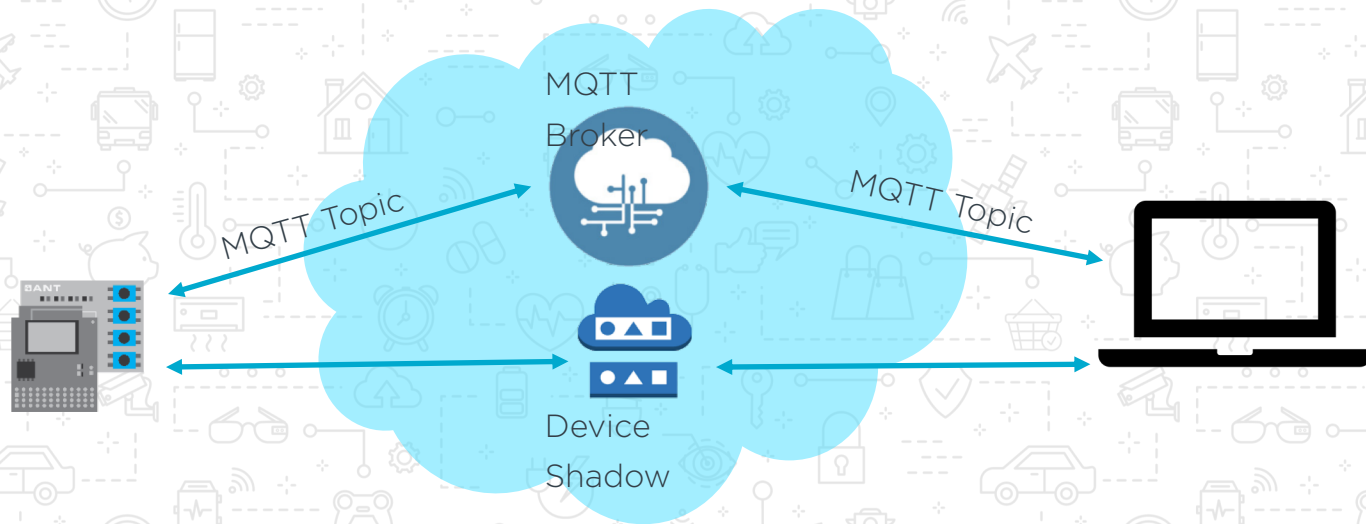
- A IoT developer tool for Nordic BLE and Cellular IoT SOCs
- BLE gateways available for iOS, Android and PC
- Native support for all Nordic SDK/NCS examples and Thingy:52 and Thingy:91
- Supports design and interaction with custom IoT devices
- Includes multiple cloud services
  - Connectivity/Security
  - Storage
  - Device Monitoring and Alerting
  - DevOps/Configure
  - Device API



# nRFCloud Elements



# Cloud Data Architecture



- MQTT Broker

- Publish/Subscribe for real-time messaging

- Device Shadow

- JSON document in cloud to store current state of device

# Web Application Workshop Thingy:91 Setup