



 **lumenradio**

Connectivity for a Better Tomorrow

Agenda

- **“Round table”**
- **Introducing LumenRadio**
 - **Our History / The Company**
 - **Our Technology**
 - **W - Modbus**
- **Q&A**
- **Possible next steps**

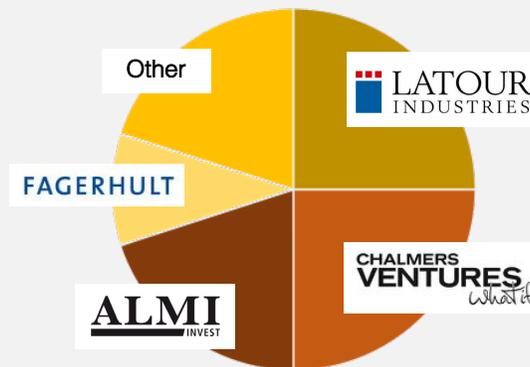
Company Facts

60
employees

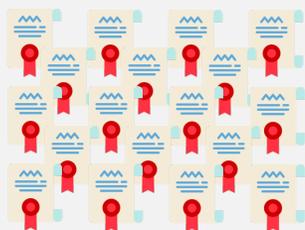


4

major
owners



18
patents



4

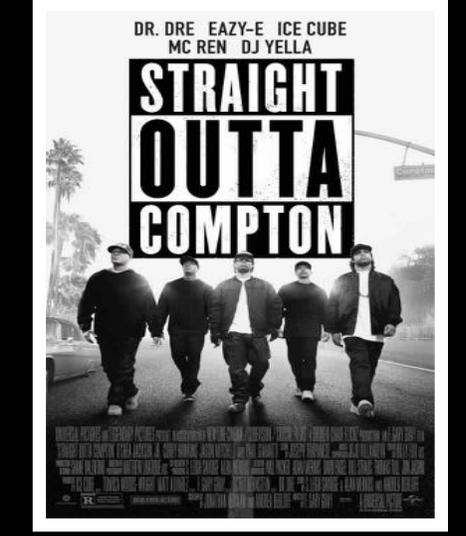
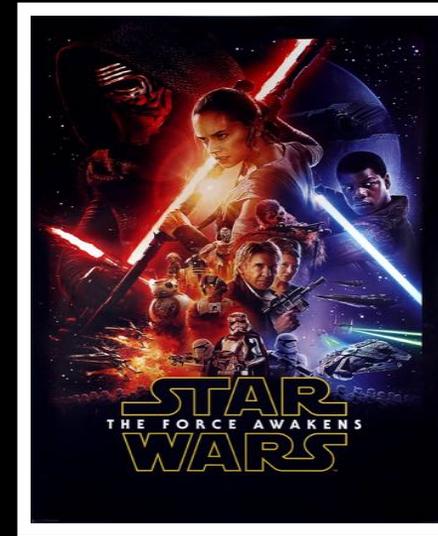
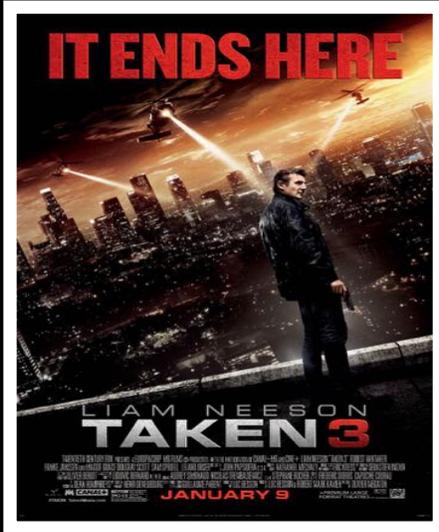
locations



OUR HISTORY



COACHELLA
COACHELLA VALLEY MUSIC AND ARTS FESTIVAL





DESCRIPTIONS

2005



2013

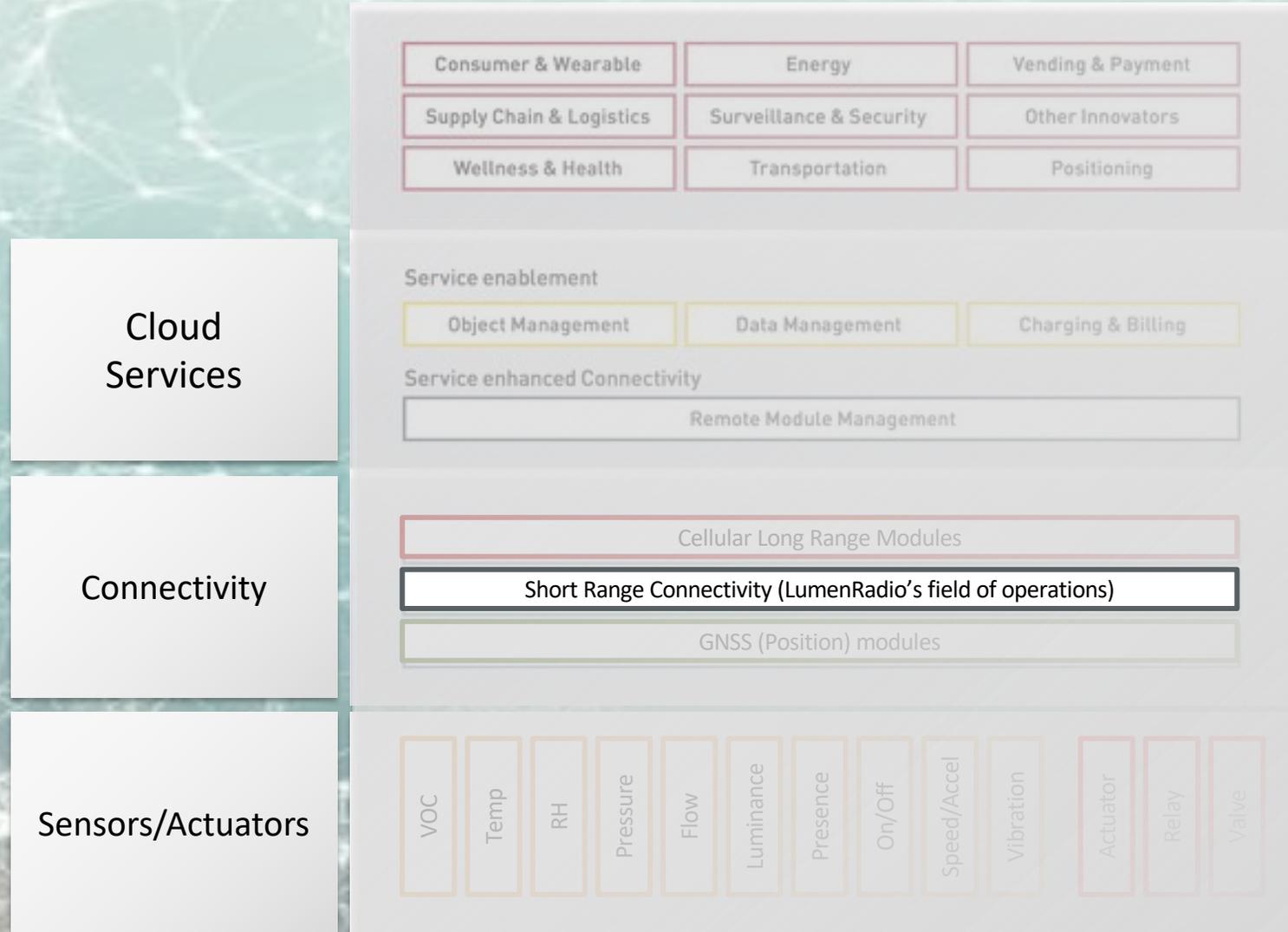


Change Happens!

THE INTERNET OF THINGS

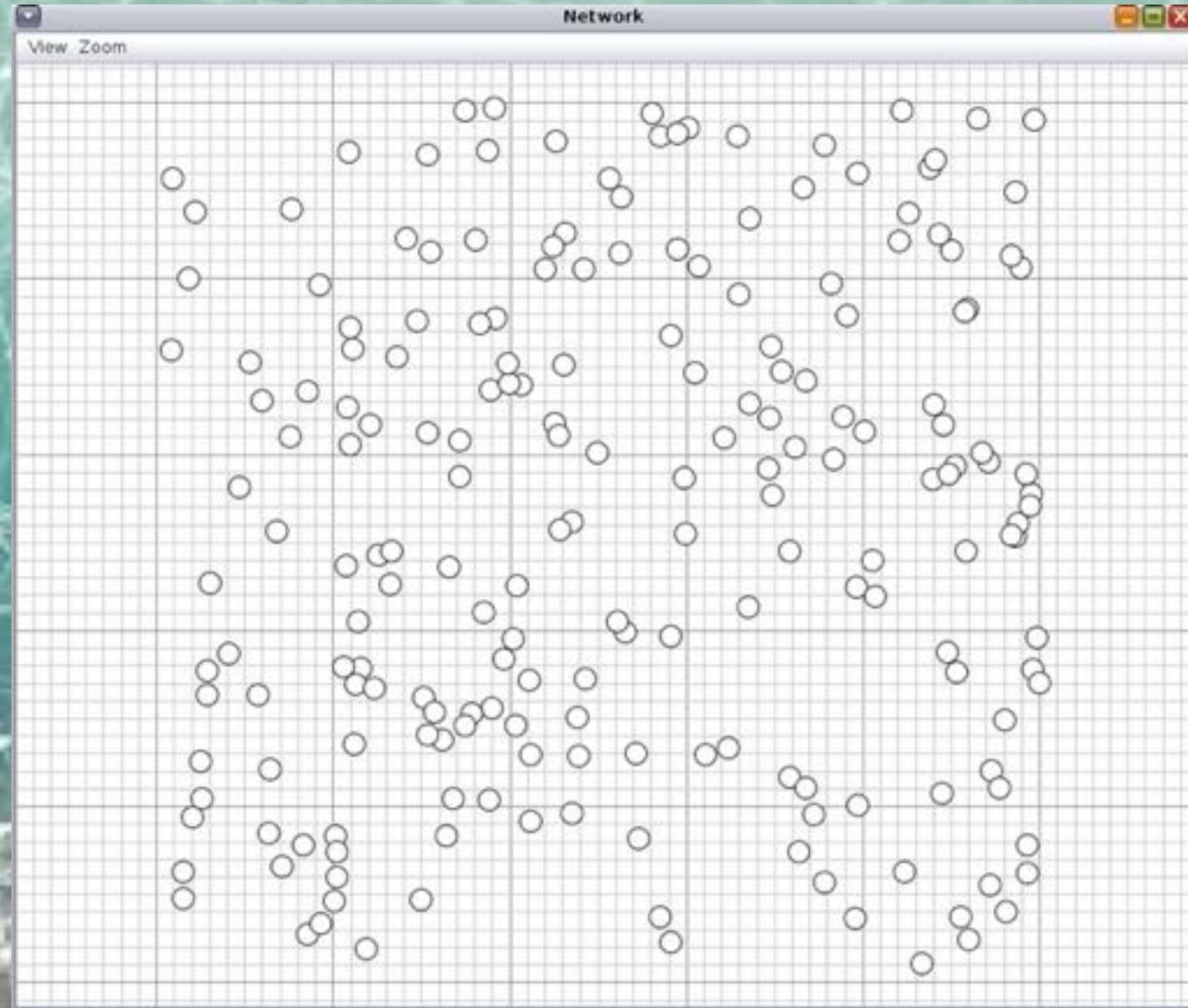


The IoT application Eco System



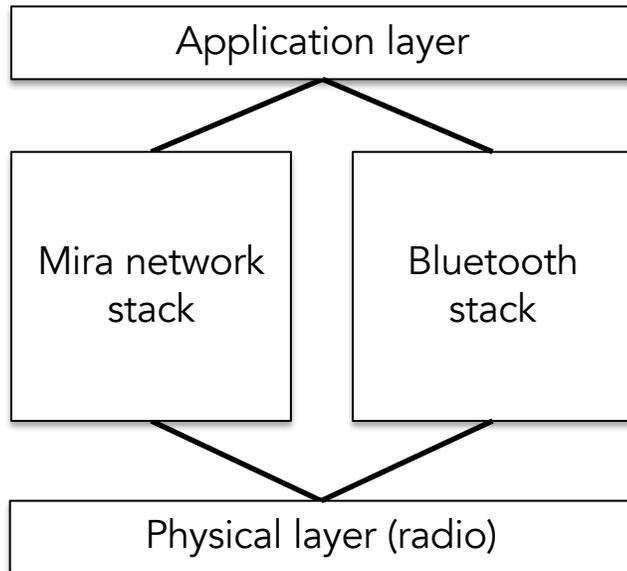
OUR TECHNOLOGY

A LumenRadio meshed network in practice...





Bluetooth concurrent



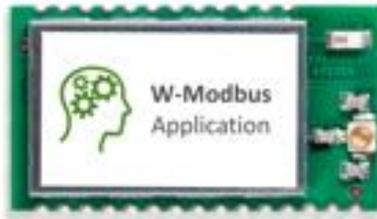
- ❑ Mira network stack sharing timeslots with Nordics BLE SoftDevice s140 or s132.
- ❑ Use Nordics devZone for BLE support

W - MODBUS

W-Modbus Offering

Offering of W-Modbus

Radio Module



- Modbus RTU
- Easy and fast to integrate on PCB
- Replacing Modbus cable to product
- RS485
- 3,6 V power
- Long range
- Battery operation possible in future

End user product



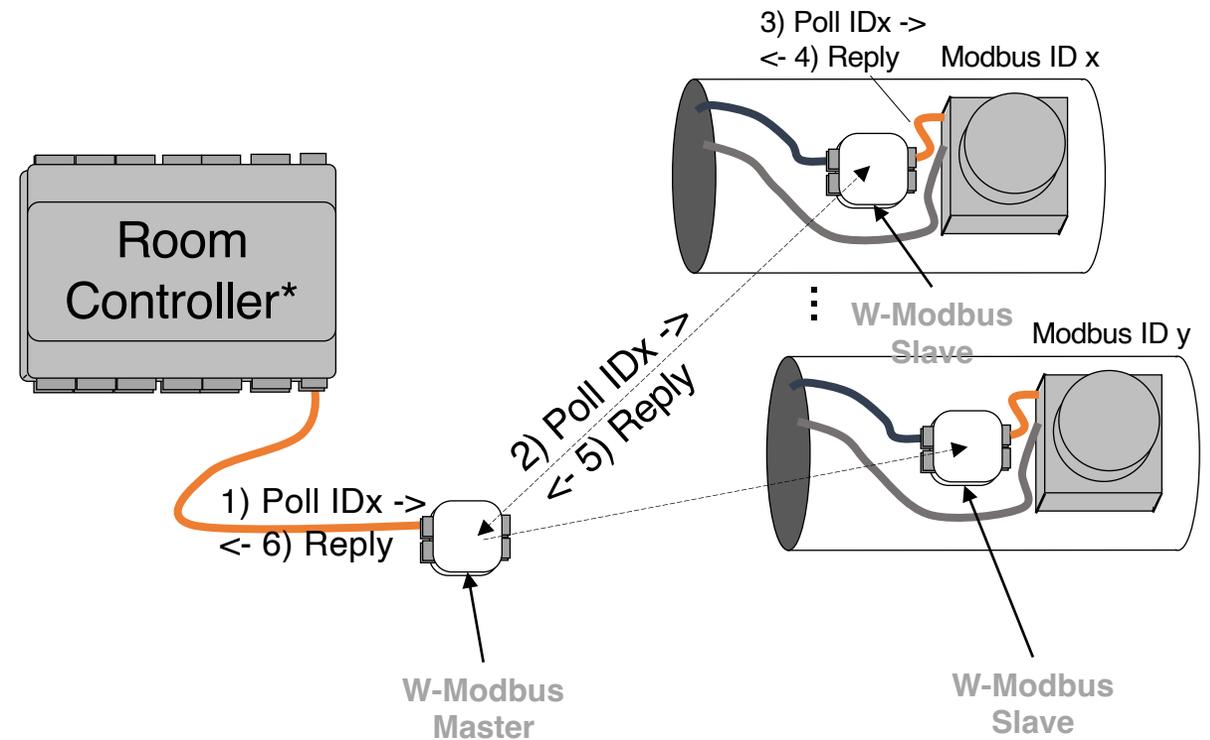
- Modbus RTU
- Short time to market
- Fast and easy to install
- 24 VDC power
- VAC
- Long range
- Possibility to white label
- Modbus RS485

Fast & Simple Installation Process

Installation process

- 1 Power and connect W-Modbus Master to master device (controller). Set baud rate, parity and stop bit which will be transferred to the full network
- 2 Power and connect W-Modbus slaves to slave devices
- 3 Wait ~1-2 minutes to W-Modbus slaves have joined network
- 4 Set W-Modbus master to secure mode for secure network

Overview



Fast & Simple Installation Process

Installation process

Overview

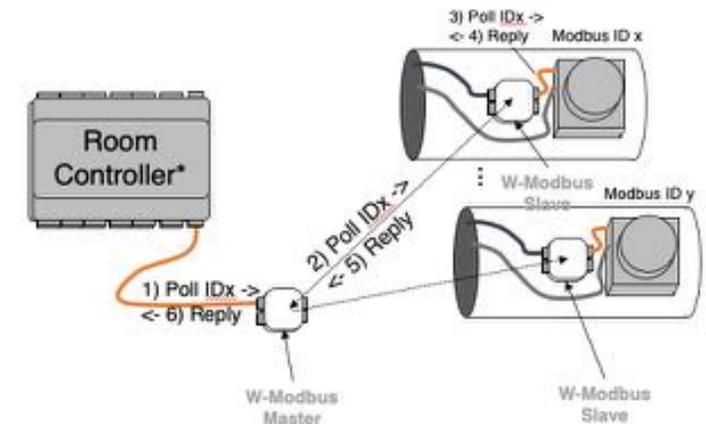
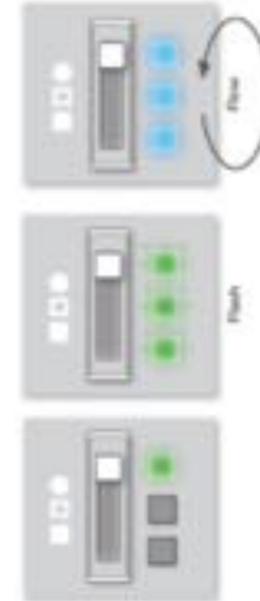
COMMISSIONING

- 1** All uncommissioned W-Modbus Nodes will, at power up, start scanning for a W-Modbus Gateway. The LEDs will turn blue color and flow from top to bottom during this process. To initiate the W-Modbus Gateway node scan, position the 3 pole switch in the middle position on the Gateway. During the Gateway scan process the 3 LEDs will flow from top to bottom in green color.
- 2** Wait for all W-Modbus Nodes to find and connect to the Gateway, the LEDs on the Nodes will start to flash in green color. This process can take up to 5 minutes.
- 3** When connected, set the switch on the W-Modbus Gateway to the bottom position. This will restart the W-Modbus network in secure mode. This is indicated by the top LED, yellow for W-Modbus Gateways and green for W-Modbus Nodes. In this mode the status of wireless signal strength and Modbus RTU cable connection status will be indicated by the LEDs as shown under System status.

W-MODBUS GATEWAY



W-MODBUS NODE

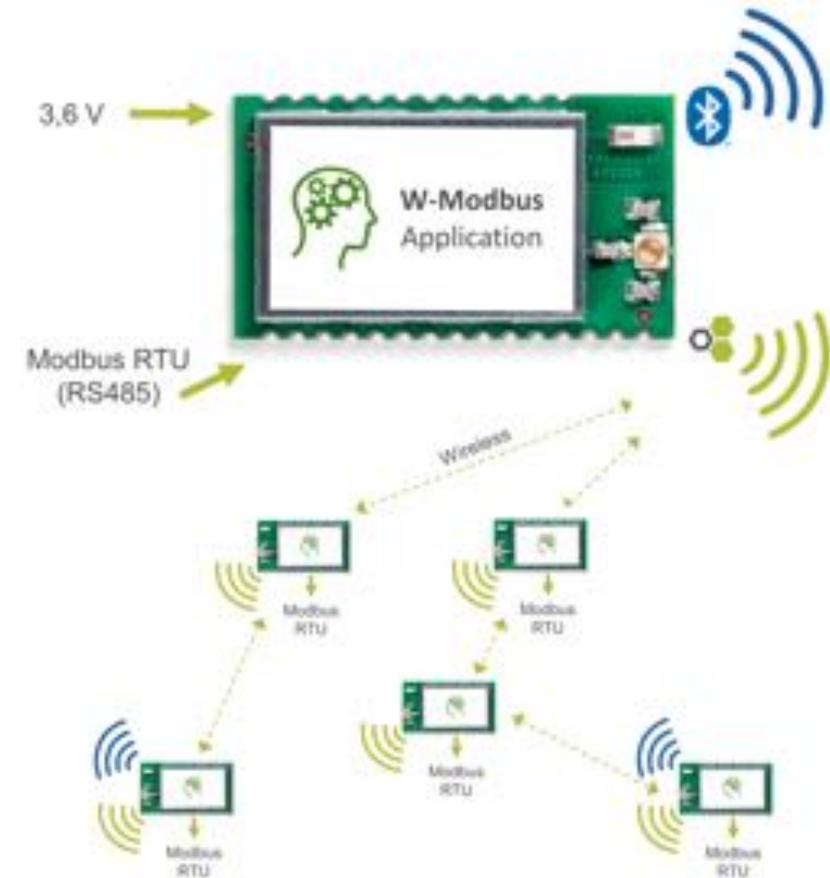


W-Modbus should act as a cable replacement and be simple to install

What is included in first version

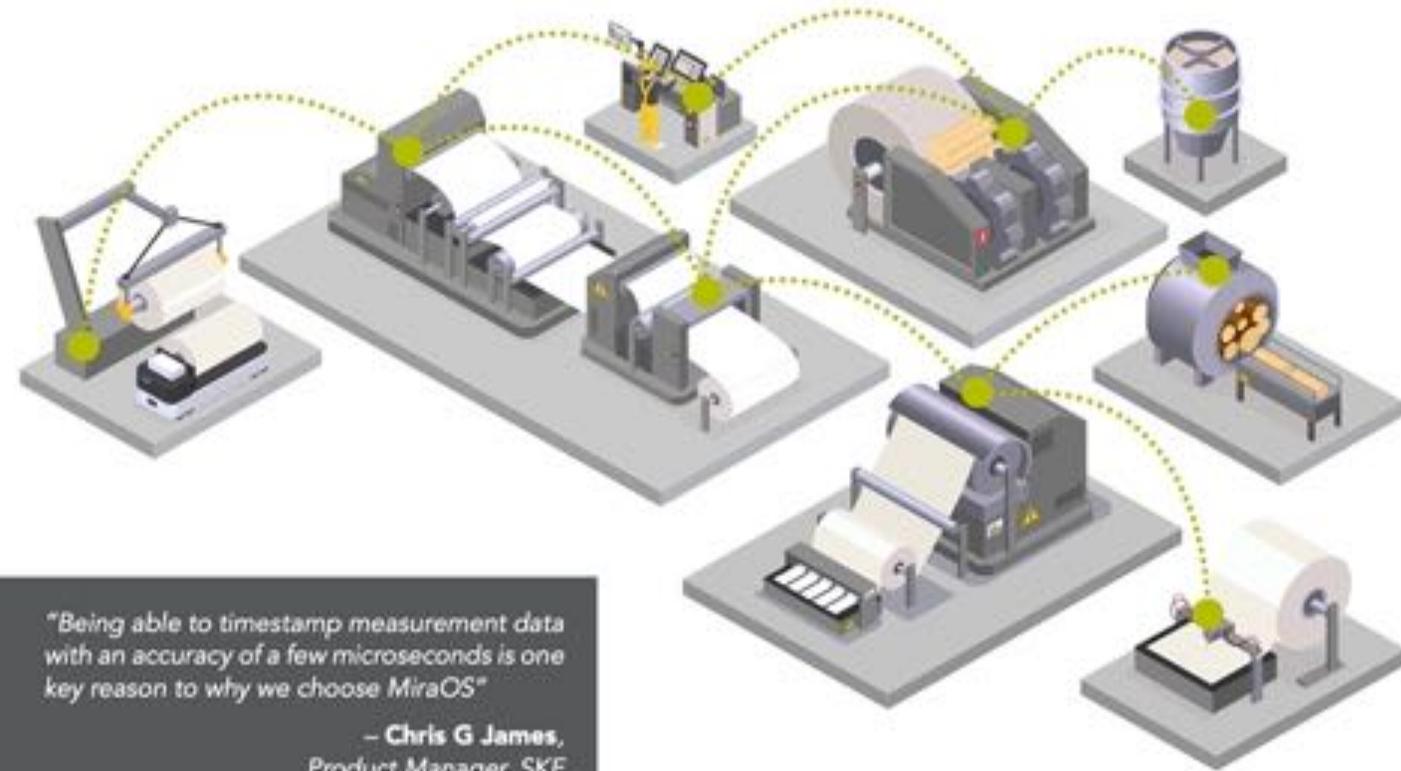
- Configurable baud-rate, parity and stop-bits
 - Baud-rate: 9600, 19200, 38400, 76800
 - Stop-bit: 1, 2
 - Parity: none, even
- Slave devices 100
- Range for 1 hop line of sight 1000m, in a normal indoor environment approximately 210m
- 8 hops in the network
- Easy commissioning
 - Secure
 - Fast
 - Understandable
- Firmware update over the air possibility
- Latency for 3 hops ~60ms, for larger networks time-out of Modbus master normally needs to be configured

Overview



USE CASE

Customer Case: SKF - Enlight Collect IMx-1



"Being able to timestamp measurement data with an accuracy of a few microseconds is one key reason to why we choose MiraOS"

– Chris G James,
Product Manager, SKF

SKF

THE SKF ENLIGHT COLLECT IMx-1 SYSTEM
Automated machine monitoring for reliable rotation in heavy industries



Why MiraOS ?

- Reliable, robust wireless communication
- Fast commissioning, flexible to changes
- Precise time stamping of vibration data
- Ultra-low battery power consumption



Customer Case: Swegon

LumenRadio's wireless connectivity powers "New Wise", a demand-controlled HVAC system by Swegon, a leading manufacturer in energy efficient ventilation & indoor climate systems.

Indoor air-quality sensor

Occupancy sensor

Temperature sensor/adjuster

Controller unit

Air diffuser

Window control sensor

80% reduced installation costs (compared to wired installation)

35% expected savings in support, RMA & TCO

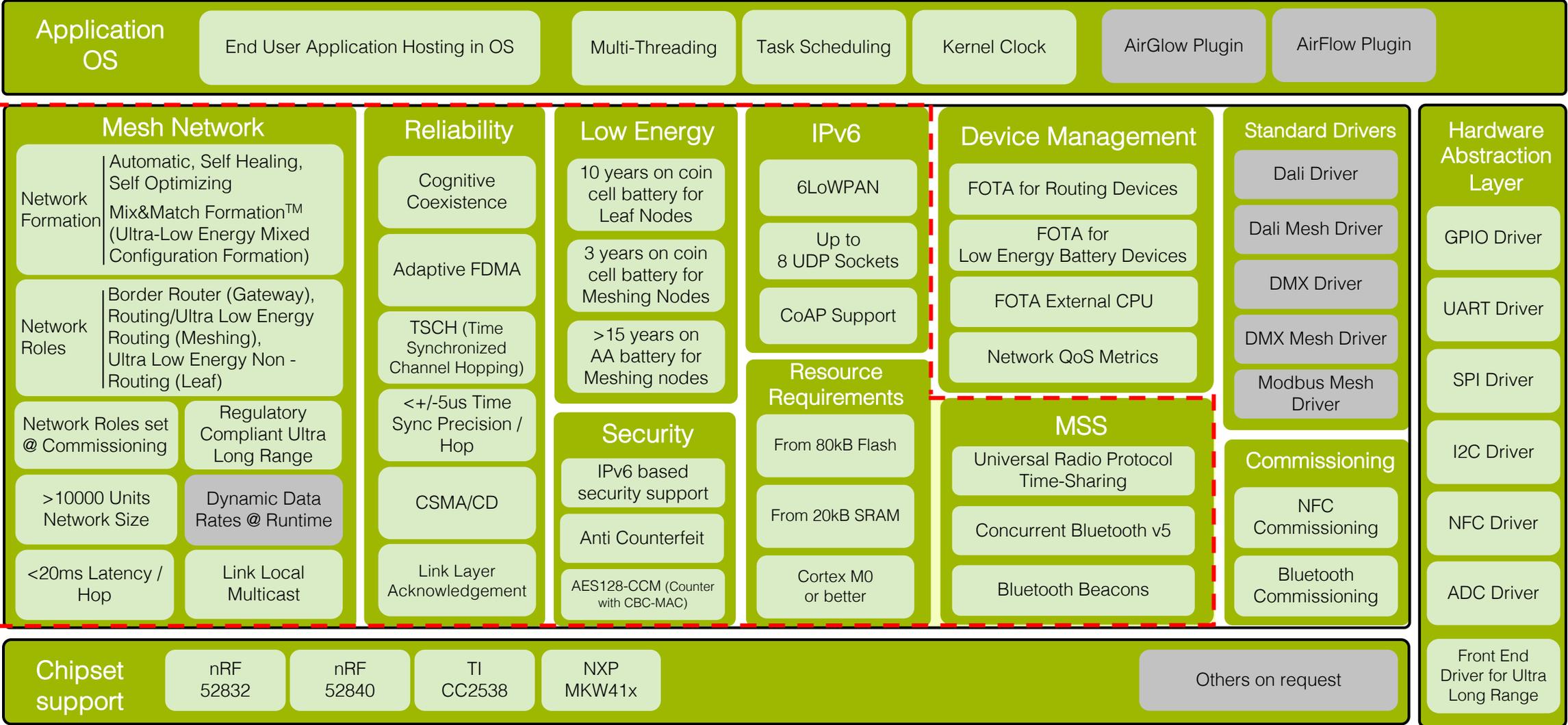
Enables new, revenue-generating services

Why LumenRadio?

- ✓ Reliable, robust wireless communication
- ✓ Fast commissioning, flexible to changes
- ✓ OTA FW Updates, ultra-low battery power consumption
- ✓ Long-term partner: consulting from design to maintenance

MiraOS v2.4 Building Blocks

MiraMesh



Q&A

Q&A



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