

Next Generation Wireless Design

Brad Thomas, 24 July 2017

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Why Wireless?

- Simplified installation
- Less trades required
- Less interruption to facility during installation
- Instruments can be pre-configured and tested prior to site delivery, further simplifying installation

Wireless, Why Not Wi-Fi?

- Crowding on Wi-Fi bands
- Possible security issues/accessible from consumer devices
- More passwords or access lists to manage
- Poor indoor range

What other options are available?

- Industrial, Scientific and Medical (ISM) Bands
- LoRaWAN (Low Power Wide Area Network)
- Sigfox
- Zigbee, Xbee

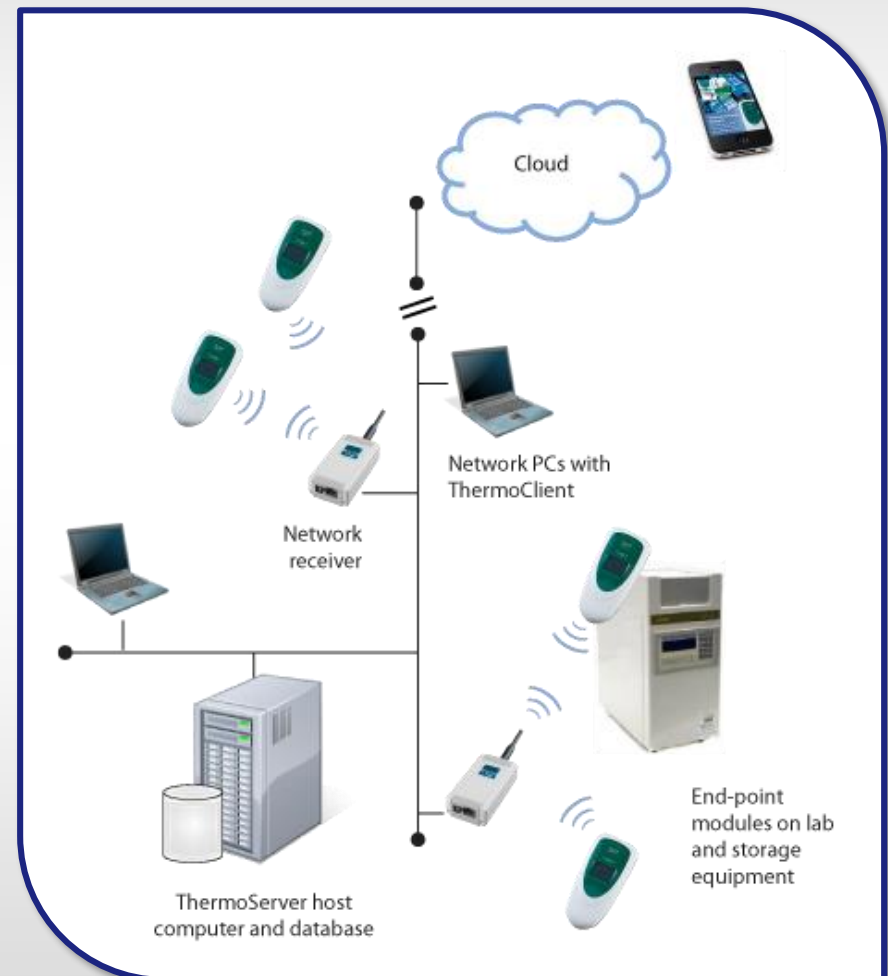
We will focus on **ISM** and LoRaWAN in the following slides

Industrial, Scientific and Medical (ISM) Bands

- Lower frequency than Wi-Fi, leading to inherently better range indoors
- Less prone to interference (not as many networks, etc)
- Generally can't be accessed by consumer devices, leading to less security issues

Example System

- Local ISM network of modules, repeaters and receivers
- Local data storage and access via corporate network
- Cloud backup and alert systems
- Access data via network computers or via smartphone app

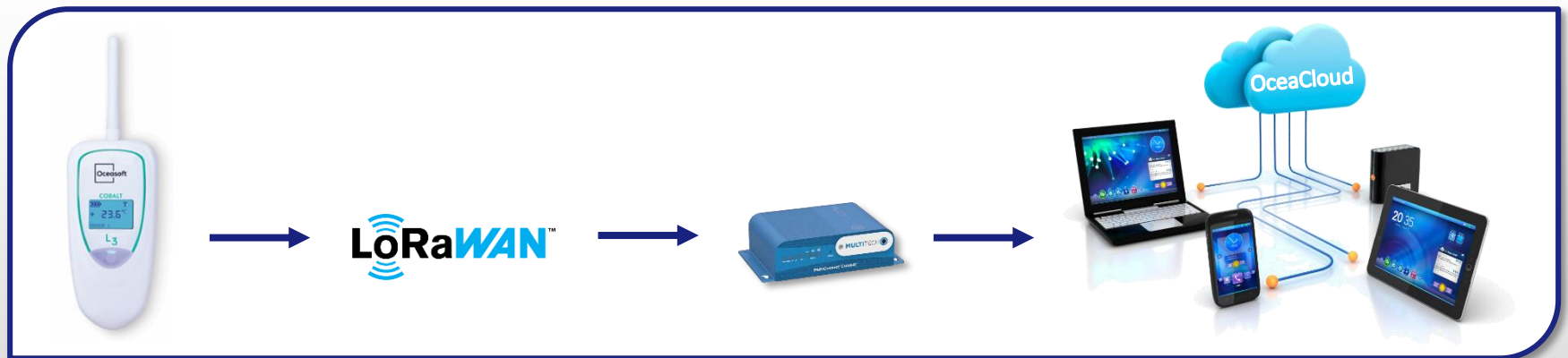


LoRa WAN – A Low Power Wide Area Network

- Lower frequency than Wi-Fi, leading to inherently better range indoors
- Specifically designed to conserve power and deliver maximum range
- Less prone to interference (LoRa WAN protocol designed with this in mind)
- One Gateway device can be used to cover a large area/multiple buildings
- Data can be sent straight to the cloud, reducing the amount of hardware needed on site
- [Demonstration Video](#)

LoRa WAN – System Options and Features

- Data stored on the Cloud (no need for on-site server) and accessed via any smartphone, tablet or PC (web browser)
- Data stored on a local server and accessed over local network via any smartphone, tablet or PC (web browser)
- LoRa Gateway can push data to the Cloud without other hardware (via cellular network)



LoRa WAN – Reliability and Flexibility Features

- End-Modules:
 - have inbuilt data storage
 - can act as a hub for nearby Bluetooth temperature loggers, meaning inexpensive sensors can be added to expand the monitoring system
 - can be battery or USB powered (batteries act as backup if USB powered)
- Additional Gateways and modems can be added to the system to provide hardware redundancy
- Logging and transmission intervals are configurable, alarms are transmitted instantly regardless of configured values

System Upgrade Example 1

Scenario: A room with one fridge/freezer being monitored with two probes is to have another 2 fridges installed

- Wired Solution:
- New cables and wall points
- New input device
- New pre-calibrated sensors
- Configure new sensors
- On-site adjustment
- Significant changes to Validation Documentation

- Wireless Solution:
- New pre-calibrated Bluetooth sensors (no new LoRa module required)
- Pair new sensors
- Configure devices in software
- Minor changes to validation documentation

System Upgrade Example 2

A facility with an existing monitoring system (wired or wireless) wants to add further monitoring points in another building with no network access.

- Wired Solution:
- New cables and wall points
- New input devices
- New pre-calibrated sensors
- Configure new sensors
- On-site adjustment
- New server hardware, or new building to building wireless link

- Wireless Solution:
- New LoRa modules
- New pre-calibrated sensors
- Configure new sensors
- (Worst case) New Gateway



ANY QUESTIONS?