
NS
18
NIAGARA
SUMMIT
CONNECTING
THE WORLD

Wireless Technologies

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Switzerland

Internet of Simple Things

The IoT Cycle – From data acquisition,
through the LPWAN networks, to Niagara

Io(S)T – Internet of Simple Things

“Things” can be interconnected and communicate through Internet by means of a Technology that, as such, is known as IoT.

Such a Technology may be applied in several fields like Building Automation, Smart Cities, Industry, Retail to the Consumer Market....

What are the basic components to build up an IoT application?

Io(S)T – The pillars

- **Electronic devices:** as physical interface to the Things for the first data exchange (i.e. environmental parameters, statuses, localisation and so on). We can define this as the “field technology for data acquisition”.
- **Connectivity:** the technological Infrastructure to transfer the acquired data (LPWAN Sigfox).
- **Framework:** to collect the data and make possible: visualisation, history, data sharing with multiple users (Tridium Niagara Framework).
- **Specific applications:** to analyse big amount of data and extract the information related to the business they are related to (Niagara Analytics).

Io(S)T - Electronic Front End

Low Radio Frequency sensors with a Low Energy footprint

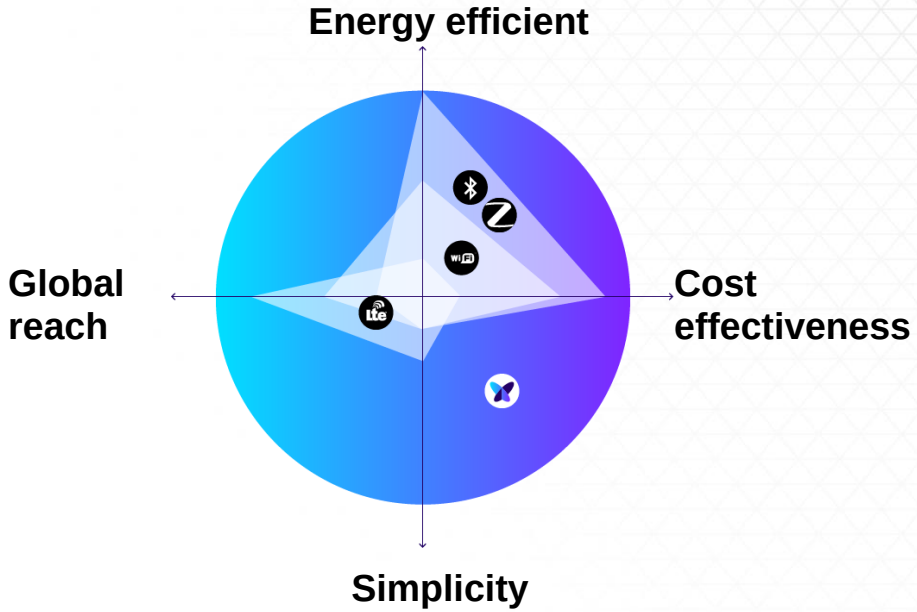
- SSI designs and produces a wide range of wireless sensors and actuators
- Factory calibration SoC (System On Chip)
- 433MHz ISM band (Narrow Band Long Range Operation) Europe
- 868 MHz, +14 dBm Sigfox Europe
- 902 MHz, +22 dBm North America, Brazil
- Native Connectivity with Sigfox Network
- Powered by std alcaline batteries (option)
- Real integration inside N4 (SSI-DR-SIGFOX – SSI driver for Sigfox)
- Design customisation
- High quality production standards (EU product)

Io(S)T - Connectivity

sigfox
Make Things Come Alive

The Global Communication Service Provider

- Established in 2009 in Paris – France
- Fast development of the network in Europe and Worldwide
- LPWAN-UNB Sigfox working on 868 MHz (EU)
- Seamless integration at International level
- Global reach
- Small messages from field devices
- Easy to use and deploy

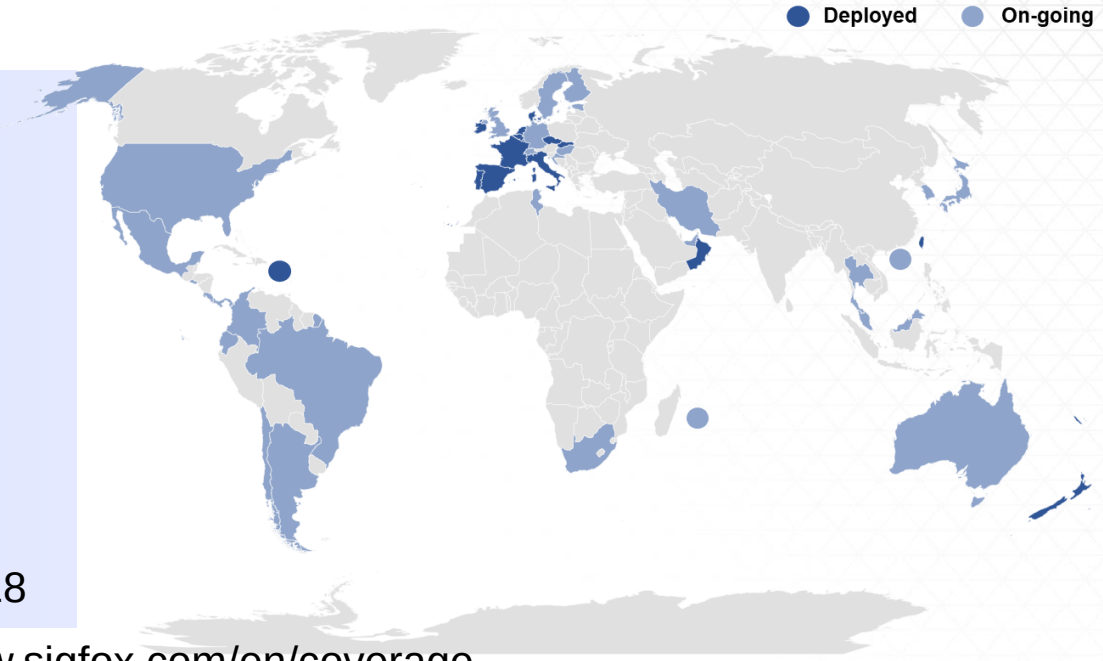


Io(S)T – Global Coverage

sigfox
Make Things Come Alive

NETWORK

- 2.3 mln sq km covered
- 589 mln people
- 50 countries confirmed
- 38 countries fully covered
- More than 60 countries to be covered within the end of 2018



https://www.sigfox.com/en/coverage

Io(S)T – Radio Zones

- RC1: Europe, MEA

  868 MHz, +14 dBm

- RC2: North America, Brazil

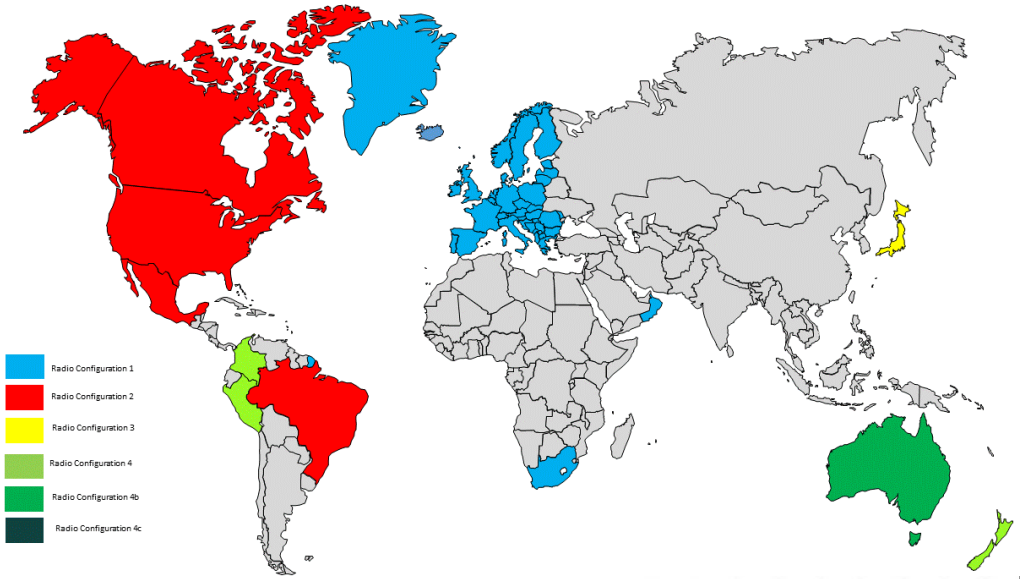
  902 MHz, +22 dBm

- RC3/5: Japan, Korea

  920 MHz, +14 dBm, LBT

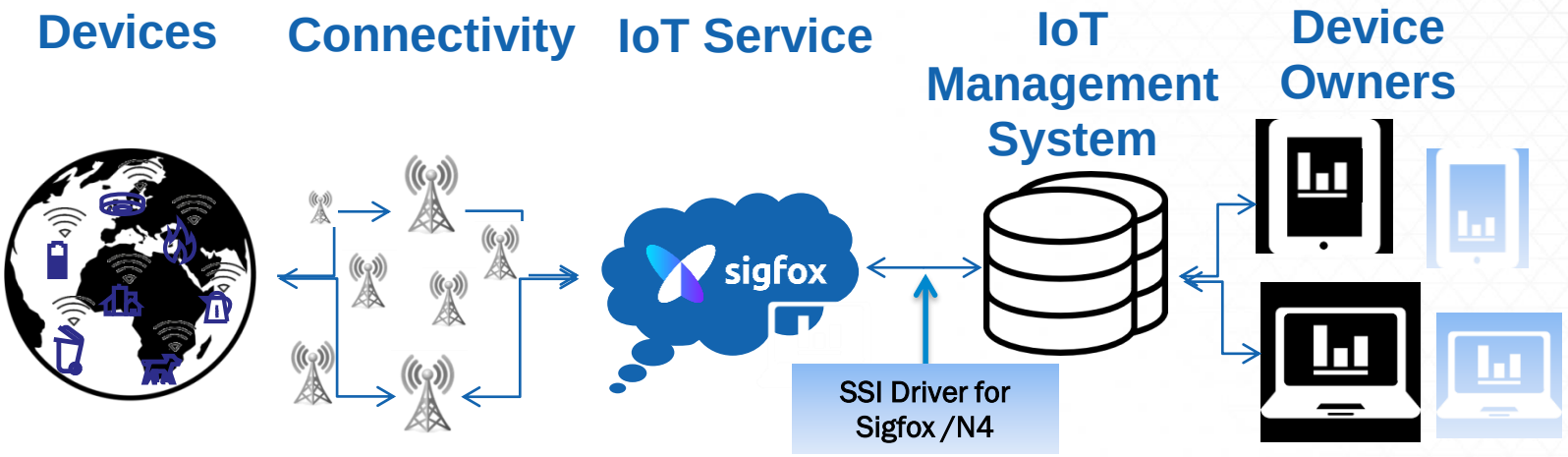
- RC4: South America

  920 MHz, +22 dBm



Io(S)T – Data flow

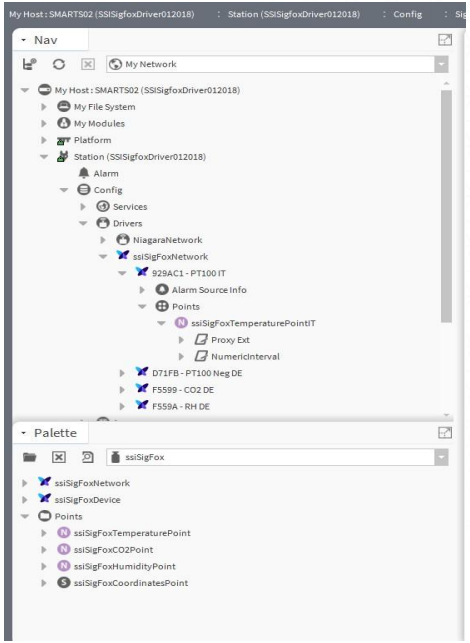
sigfox
Make Things Come Alive



Io(S)T - Data integration inside N4

SSI-DR-SIGFOX - Main features

- Made by SSI
- Available for server (WS) and local applications (WB or Jace8000)
- Autodiscover of the registered Sigfox devices
- License limited by active devices
- Points generated according to Tridium standards
- Installation manual



THANK YOU

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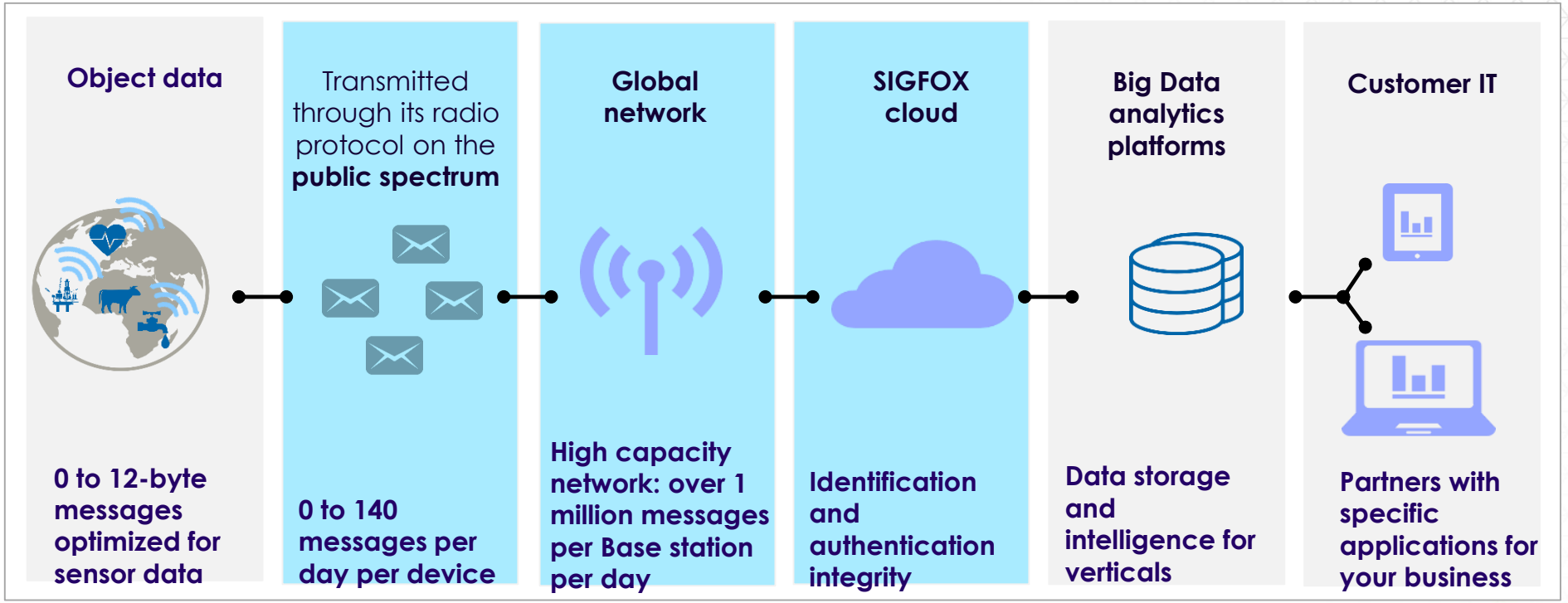
Appendix

Sigfox System Architecture

Source: Sigfox



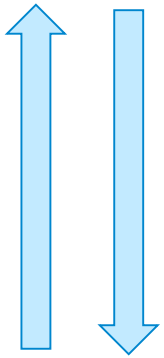
Sigfox System Architecture

Payload size examples

- ❑ 6 bytes: GPS coordinates
- ❑ 2 bytes: temperature reporting
- ❑ 1 byte: speed reporting
- ❑ 1 byte: object state reporting
- ❑ 0 byte: heartbeat (demonstrate when an object is alive)

UPLINK
12-Byte payload

- Sensor data
- Event status
- GPS fix
- Application data



DOWNLINK
8-Byte payload

- Action / actuator trigger
- Device management
- Application parameter setting

1 % duty cycle for Objects (ISM limitation)

- Up to 6 messages of 12 bytes /hour
- Up to 10 messages of 1 byte / hour

10 % duty cycle for Base Stations

- 4 **guaranteed** downlink msg/day
- More downlink possible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Wireless Technologies

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Ged Tyrrell

Wireless Standards Overview


LoRa™


ZigBee®


sigfox


Wi Fi


enocean®


LoWPAN


Z WAVE


THREAD

Tyrrell Smart Home / eBMS/Micro

Smart Home Devices

Wireless Smart Hub

Wireless Thermostat

Wireless Smart Relay

Wireless Smart Switch

Wireless Smart Meter

Smart Plugs

Wireless Smart Plug UK

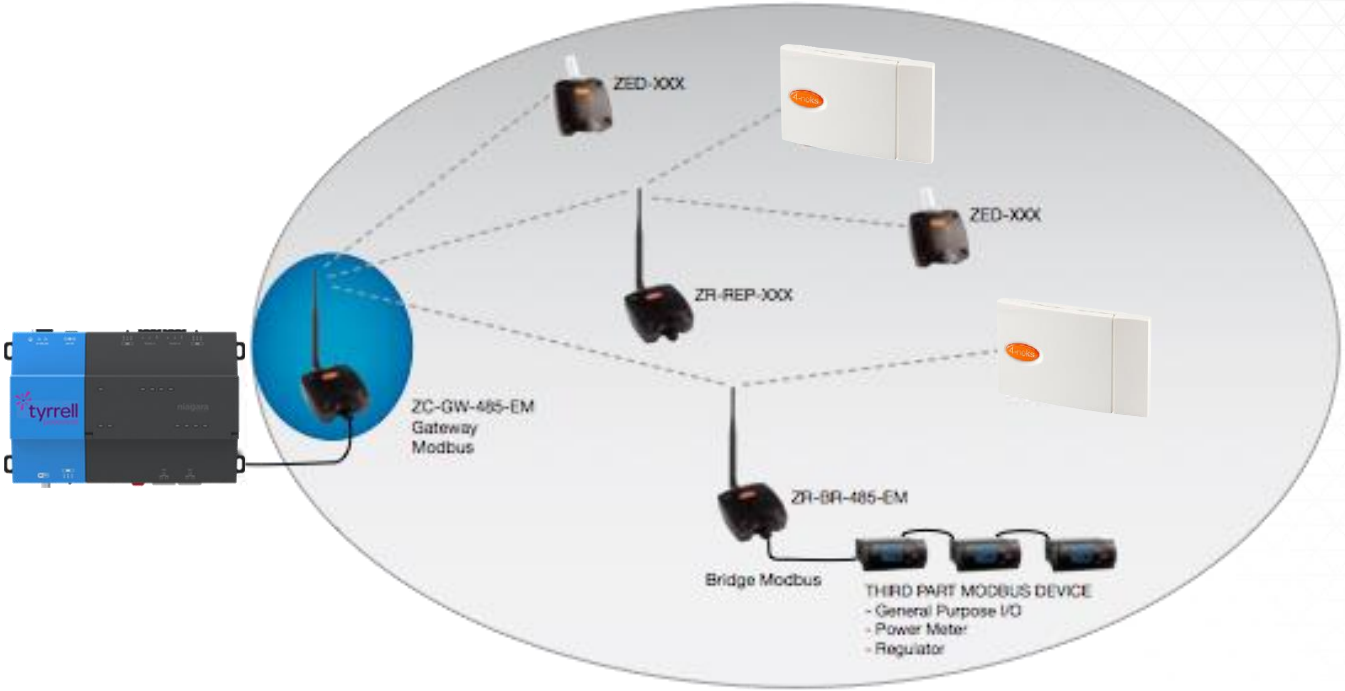
Wireless Smart Plug EU

Wireless Smart Plug IT

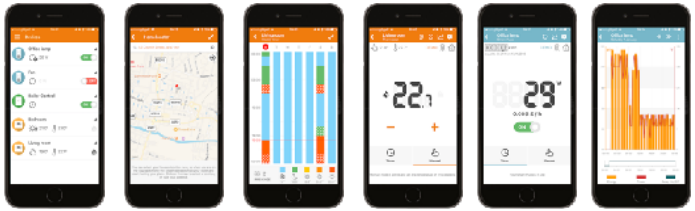
Wireless Smart Plug US

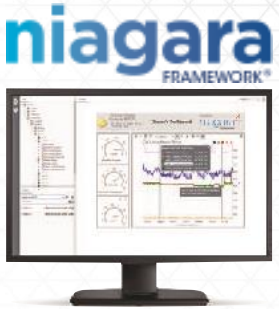
Wireless Smart Plug FR

Mesh Networking



Zigbee 1.2





Cloud based analytics

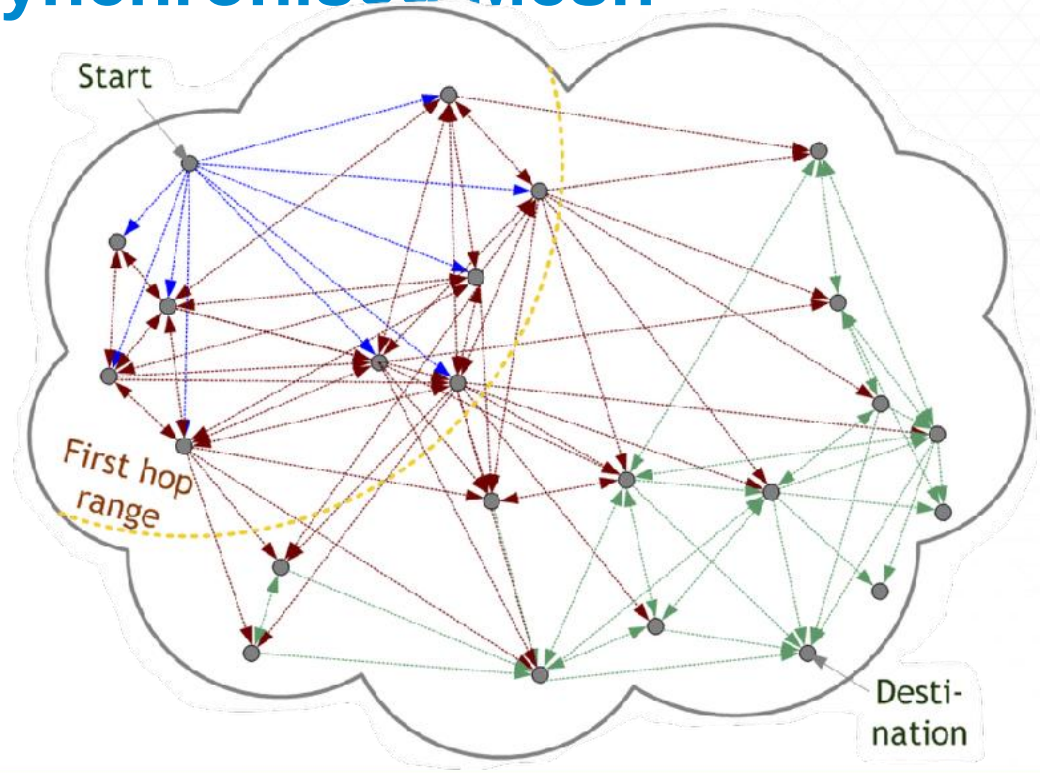
Wireless DALI

TCP-IP Gateway

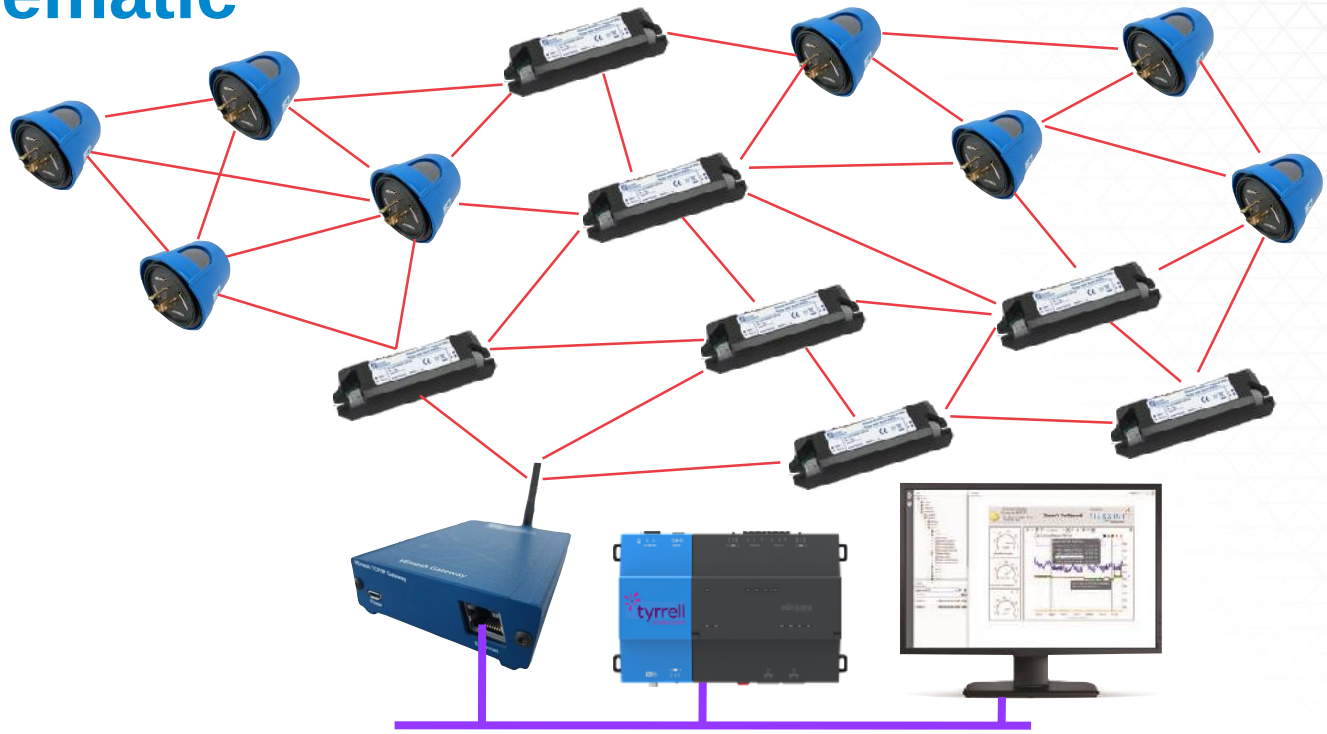
Bridge Node

NEMA Node

Secure Synchronised Mesh



Schematic



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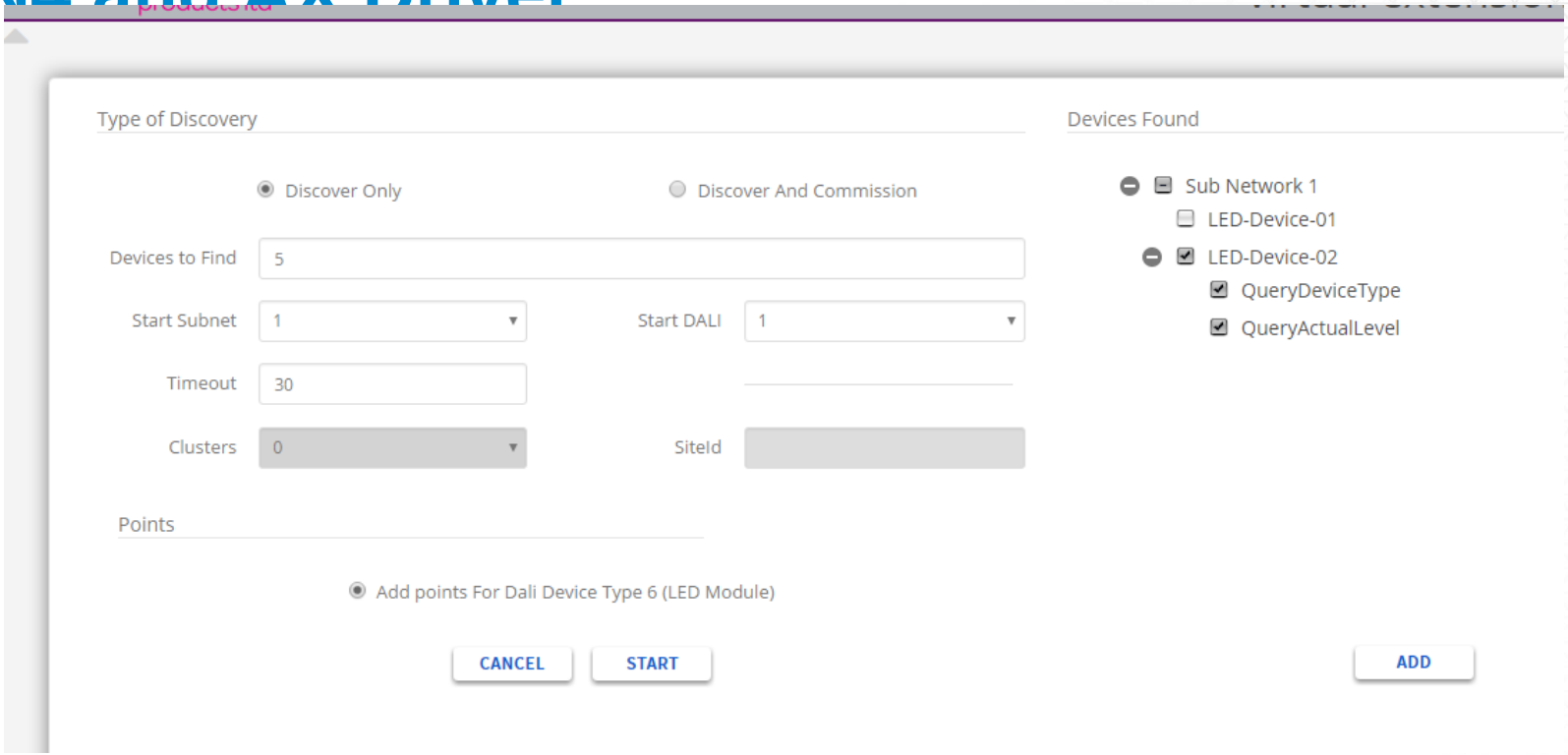
N4 and AX Driver



N4 and AX Driver

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virtual extension controls

Network / Sub Networks

Name:	E2DGateway1
Network Id:	0
Ip Address:	127.0.0.1:10001
Hop Number:	1
Serial Number:	3916.0002
Version:	5.0
Published Ip:	0.0.0.0
Status:	{ok}
Health:	Ok [06-Feb-17 12:25 PM GMT]
Last Command:	

PING

SET HOP 1

SET HOP 10

SET HOP 20

SET HOP 32

ALL OFF

ALL MAX

ALL MIN

LOCK COMMISSIONING

SET SERVER ADDRESS

LoRa LPWAN

LoRa® Alliance

Wide Area Networks for IoT

- Agreed Communication Standards
- Low Powered Wide Area Network
- Long Range Wireless Network
- Low cost Transceivers

LoRa® Alliance

Wide Area Networks for IoT

- Class A
- Class B
- Class C

The LoRa Alliance

The fastest growing global technology alliance

500+
Members

Why Major Telecoms Choose LoRaWAN?

1. Low power connectivity unlocking new use cases & business models
2. Low Cost of gateway roll-out for B2B & B2C
3. Scalable Capacity Model of Network
4. Supports key IoT use cases with bidirectionality and native security management
5. Supports of Sensor Firmware update over the Air

Actility
Connecting with intelligence

LoRa Devices

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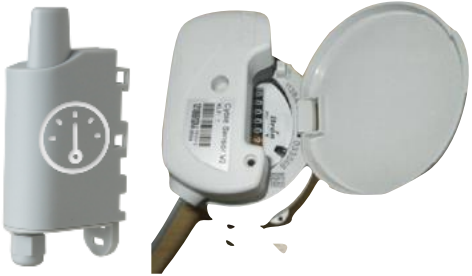
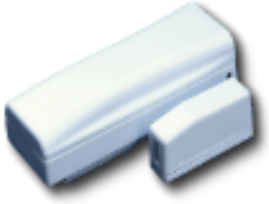


Water / Gas Metering

Temperature Motoring

Condition Motoring

Electricity Motoring



Door/window /count Sensor

Smoke detectors

Flood detection

Feedback button

Waste management

LoRa Devices

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LoRa Devices

LoRa Based Lighting for Niagara

Introduction

- Remote Control
- Light Level Feedback & Control
- Energy kWH Information
- Time Scheduling
- Remote Fault Diagnosis
- Energy Based Dimming
- 30km Range
- Hard Switching Relays
- DALI or 0-10v Control

Controllers

NEMA Controller

- Modern 7-Pin NEMA Connection
- Retrofit for PhotoCell
- DALI or 0-10v DC on Pins 4&5
- Built in Light Level Sensor

Hard Wired Controller

- Bracket mounting to any street light
- Hard-wired connection to lantern
- DALI or 0-10v DC on cables
- Built in Light Level Sensor

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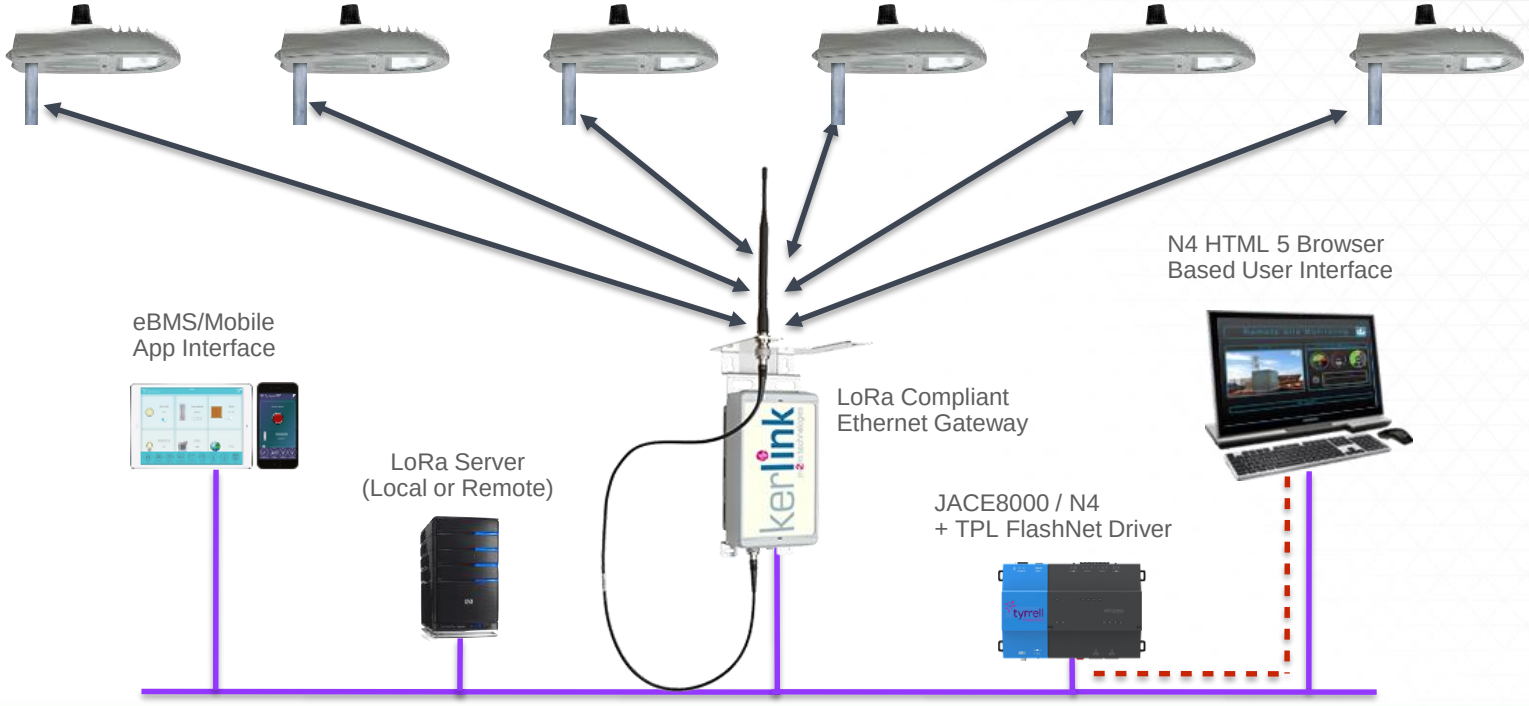
4

System Schematic

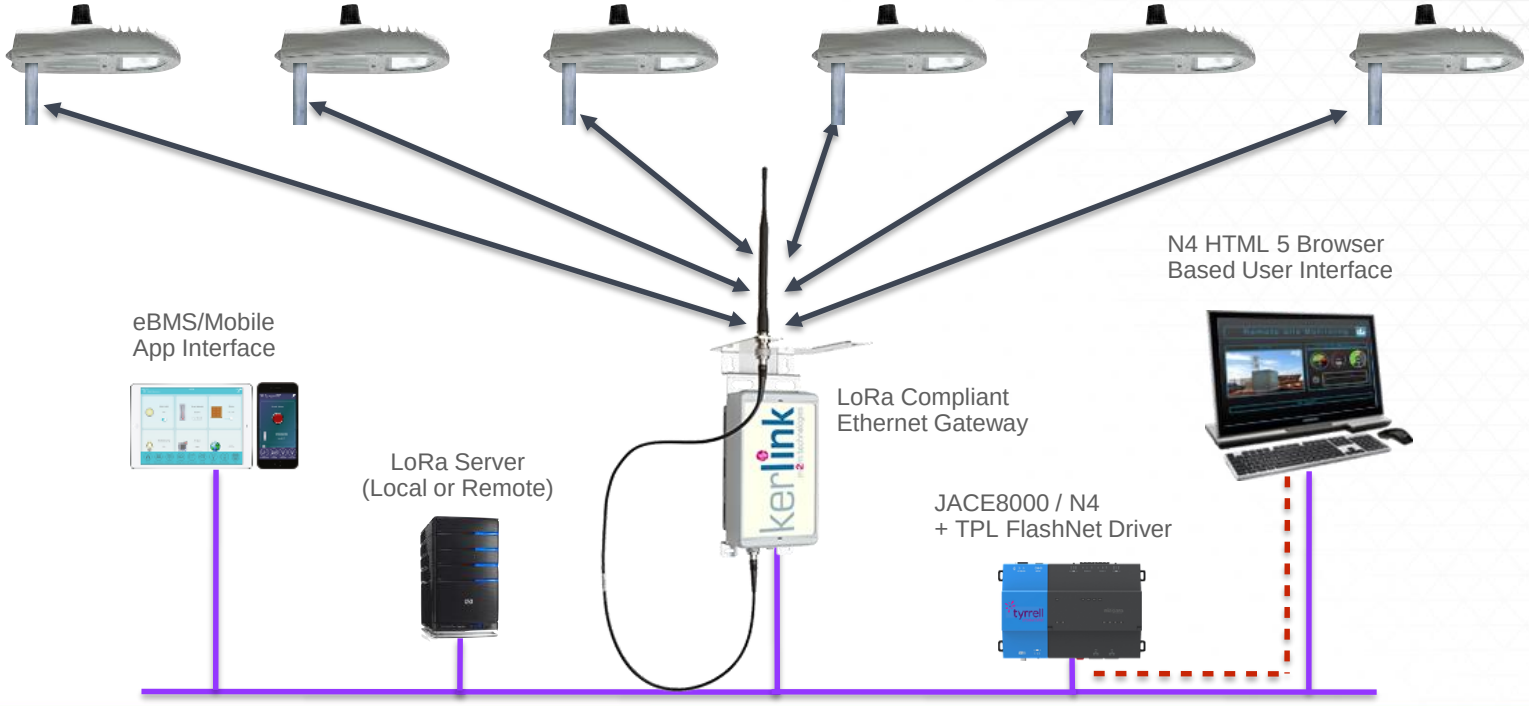
Street Lighting with NEMA Controller



Actility Partnership

System Schematic

Street Lighting with NEMA Controller



Niagara Integration to All of LoRa

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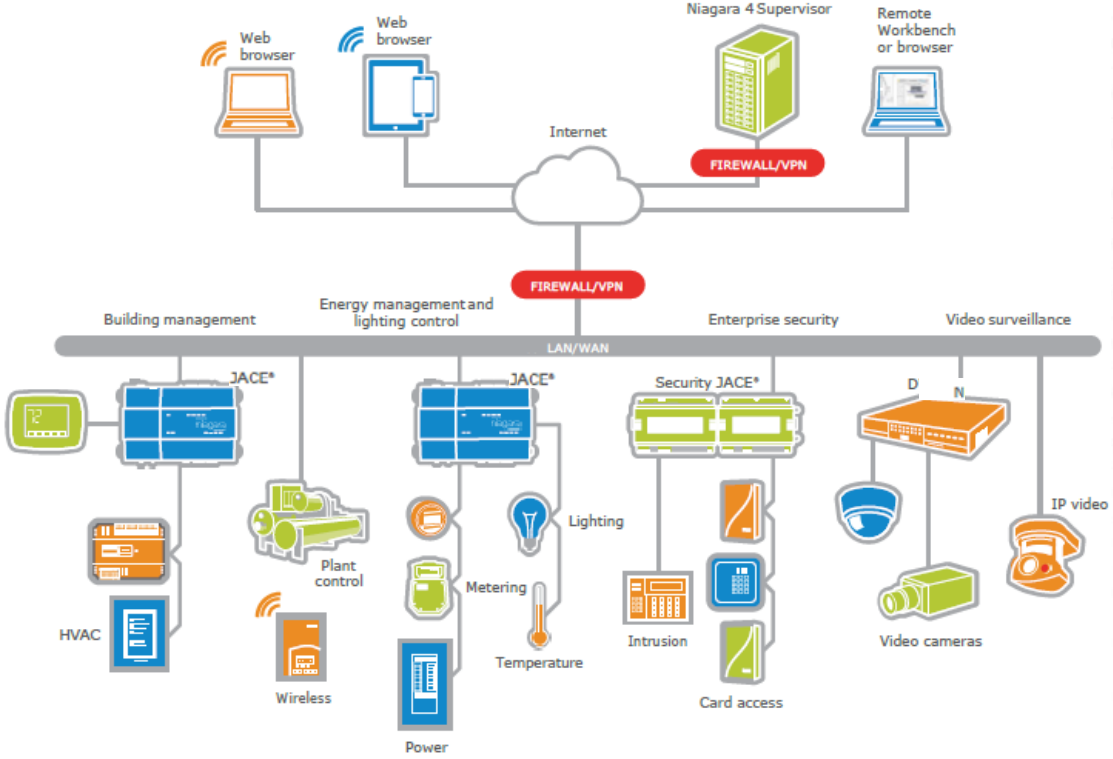
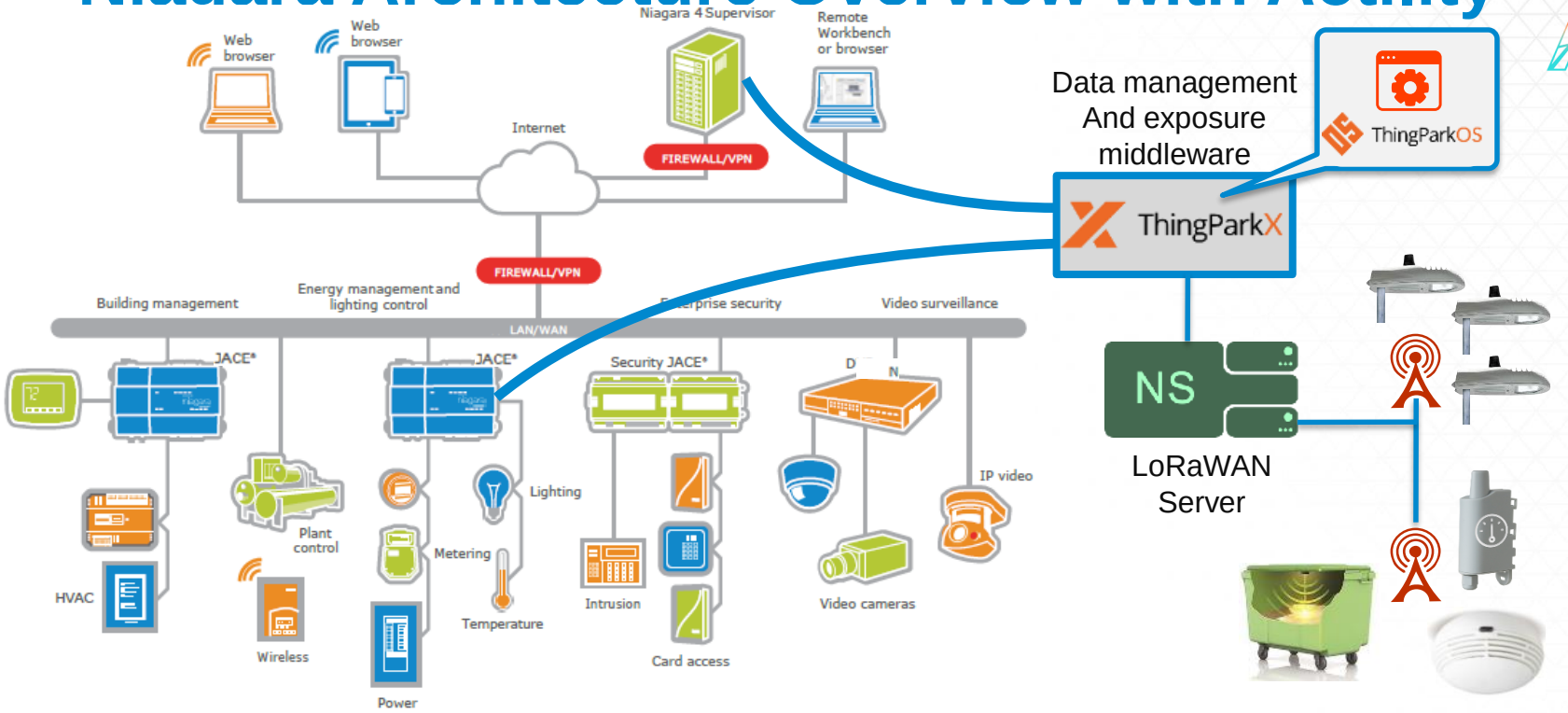
Typical Niagara Architecture Overview



Niagara Architecture Overview with Actility



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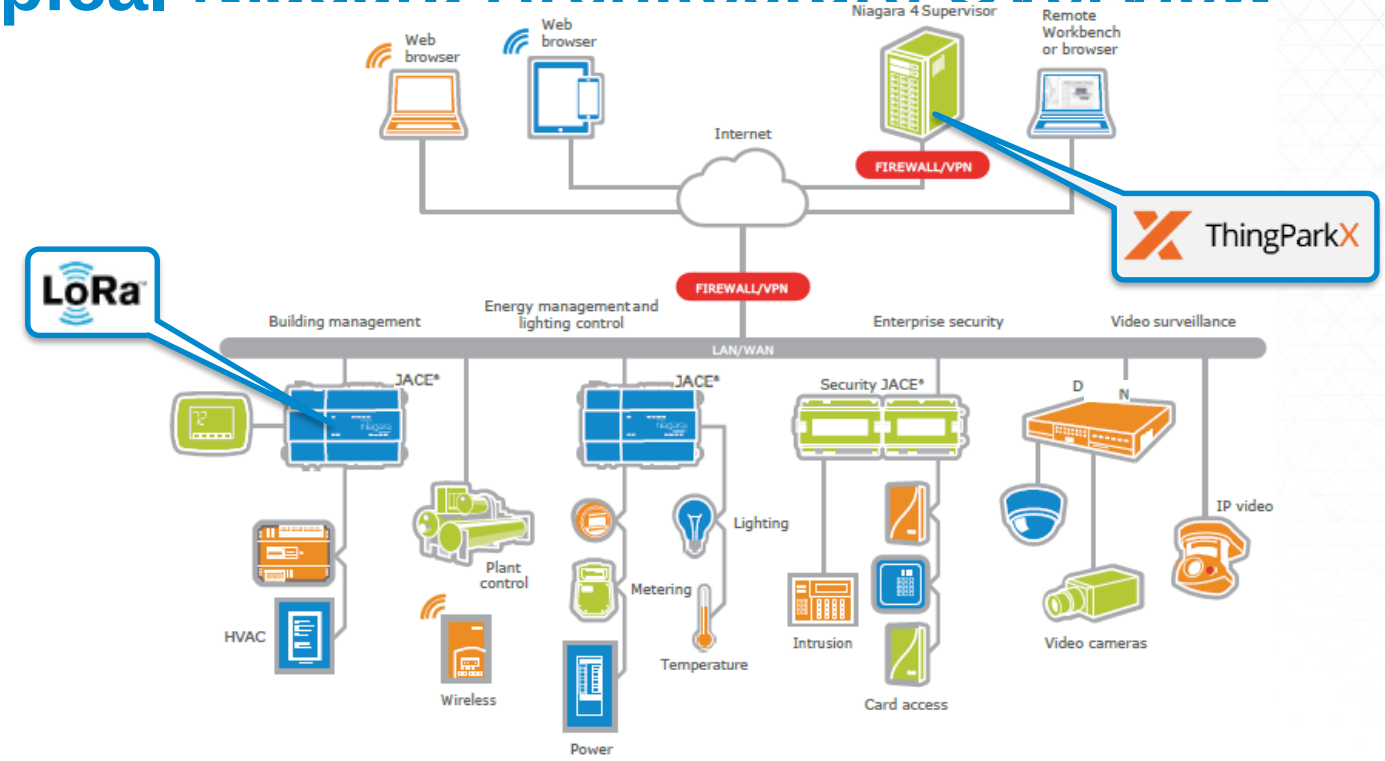

Summary

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