Proximus Enco

Enable

- fast development
- consumption
- and monetization
- of digital solutions

with EPHEC

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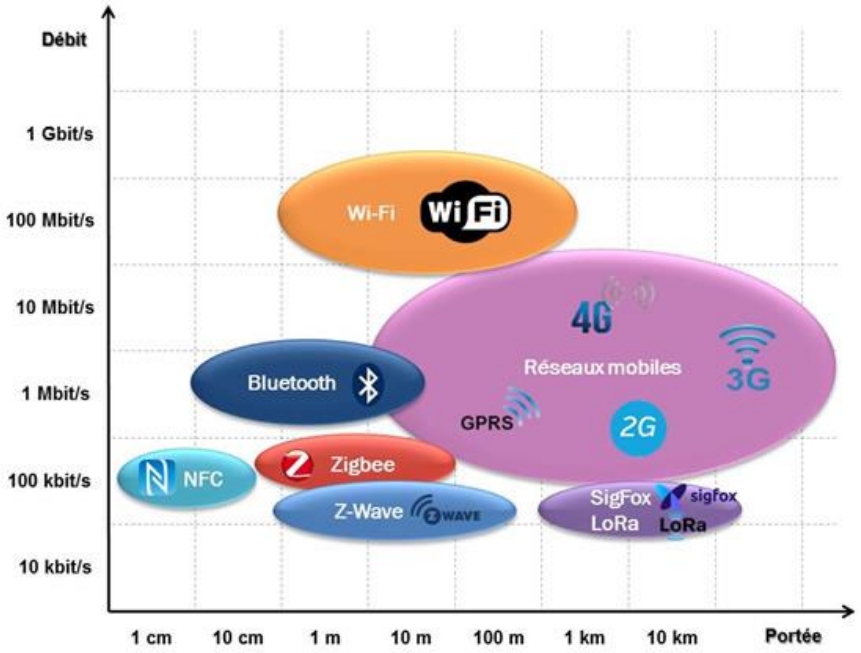
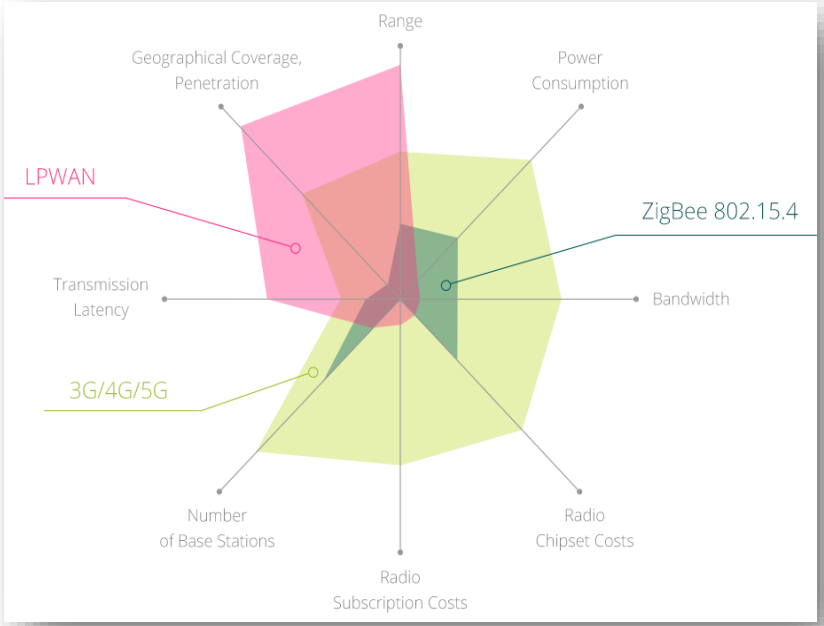
proximus

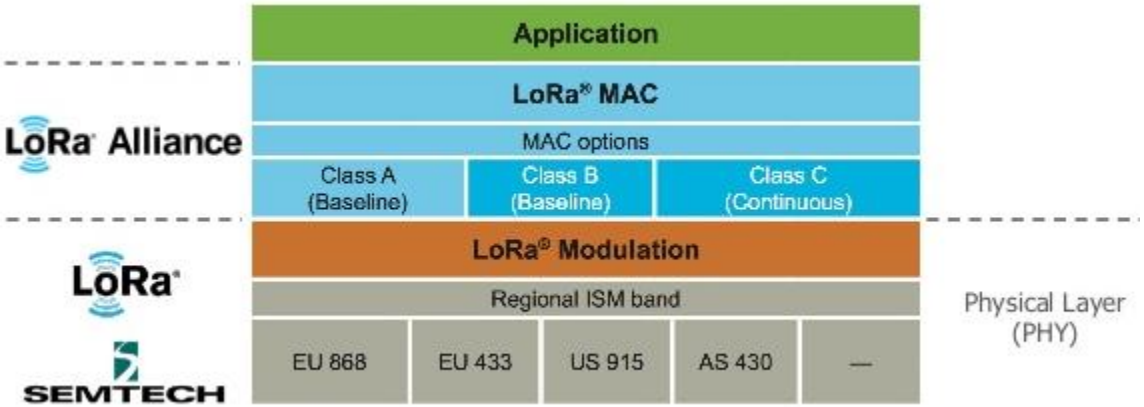
A Bit Of LoRaWAN Theory

Finding the right connectivity for your use cases



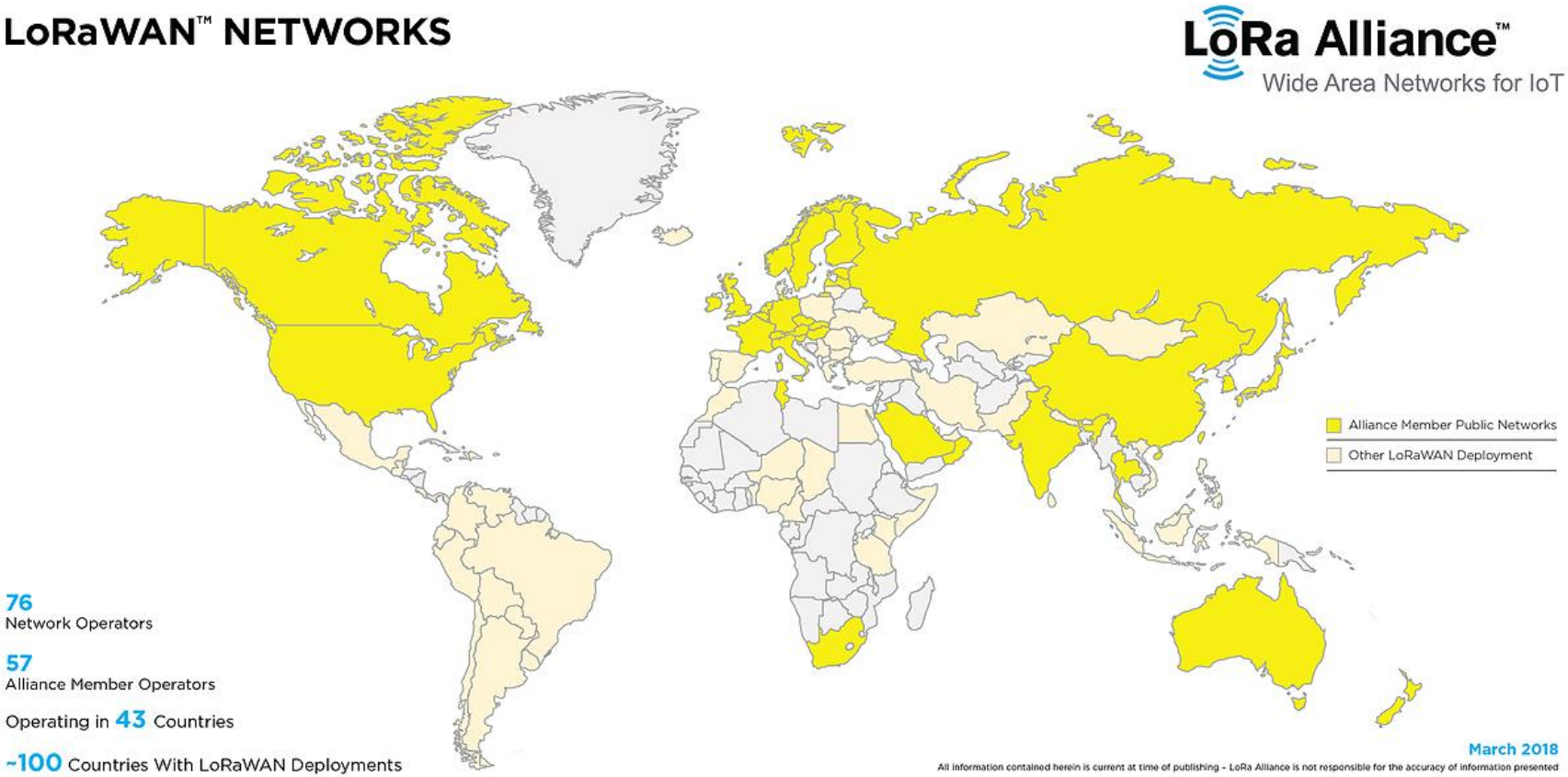


LoRa? LoRaWAN?

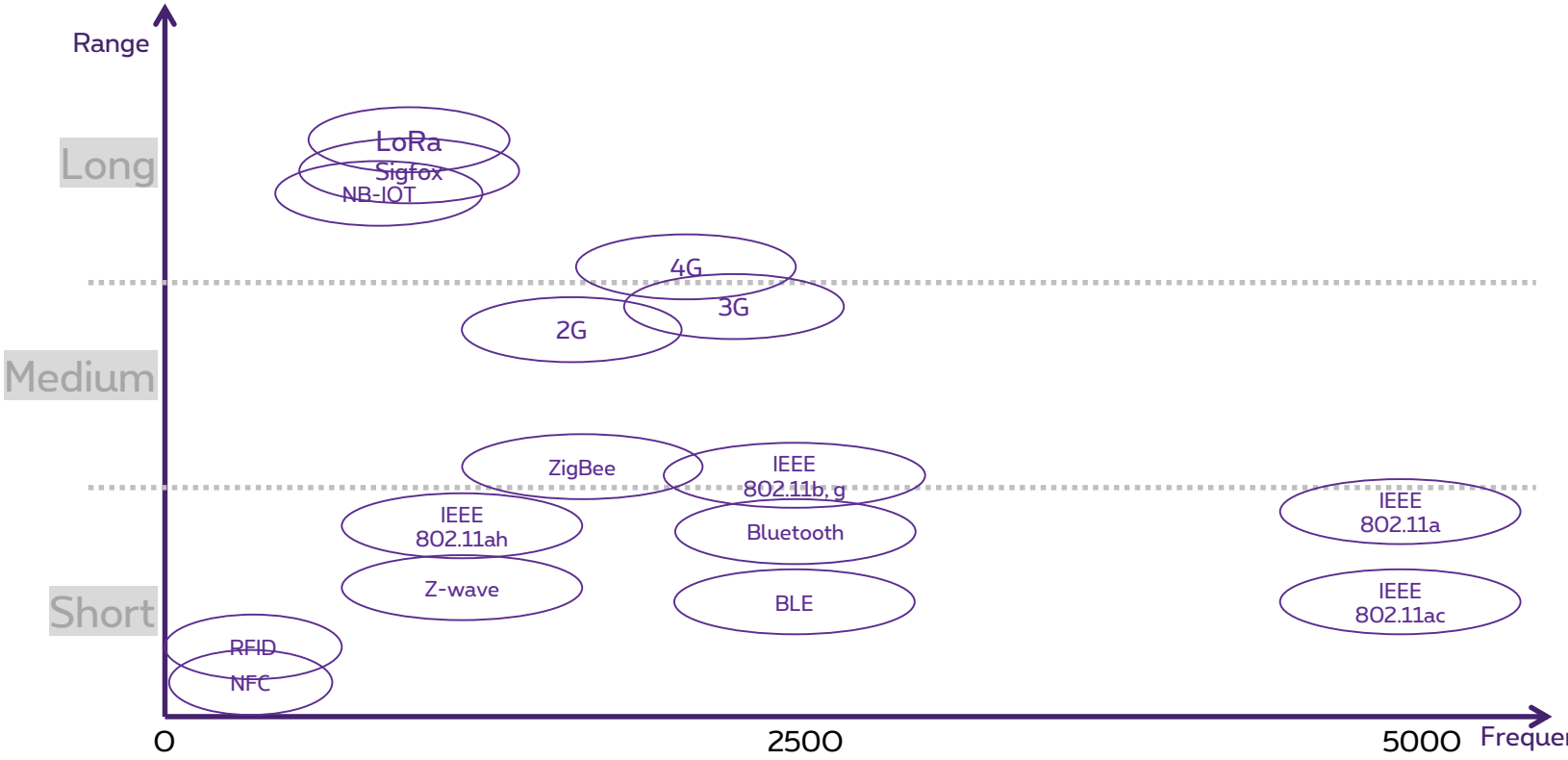


- LPWAN: Low Power, Wide Area Wireless Network
- Initially developed by Cycleo (FR) then acquired by Semtech (US)
- LoRa: a radio modulation technique (PHY layer)
- LoRaWAN: a network protocol (RF/PHY, MAC and Application layers)

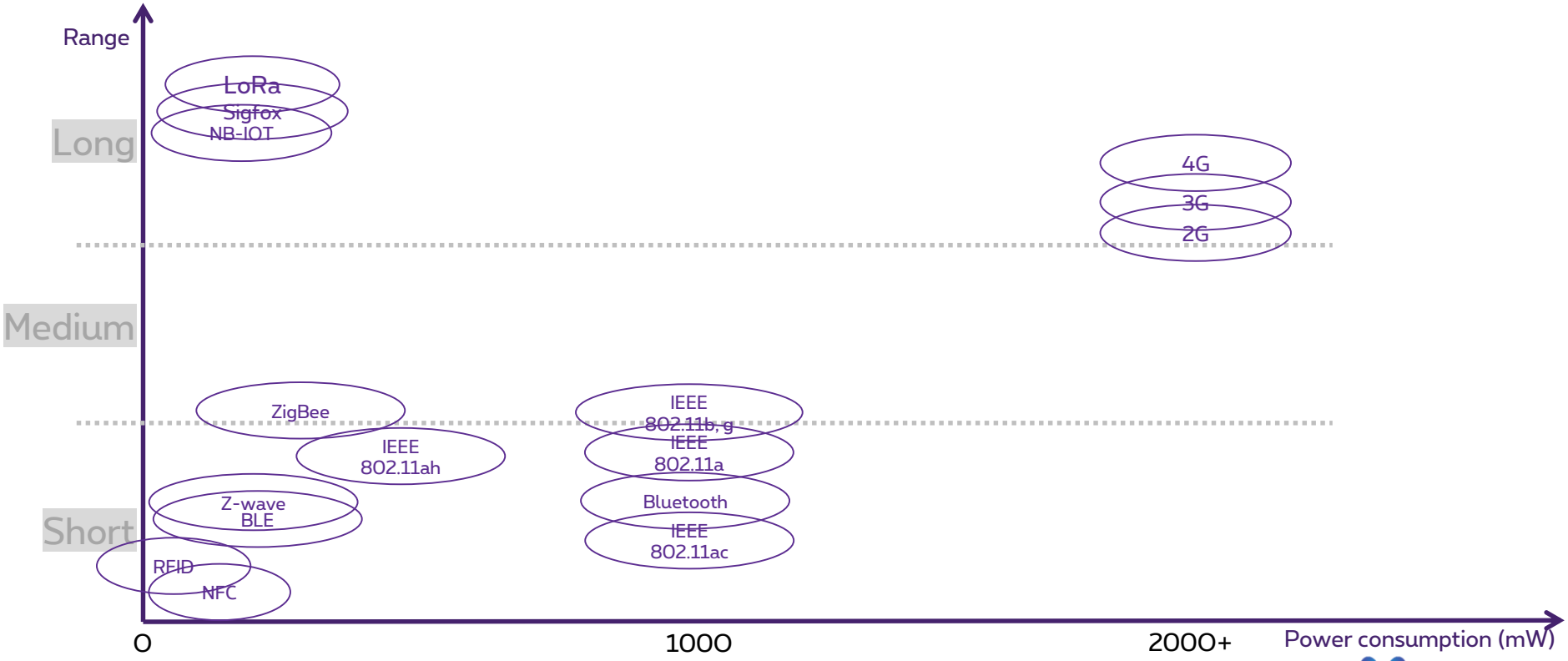
LoRaWAN coverage



Connectivity



Connectivity



LoRa Spread spectrum

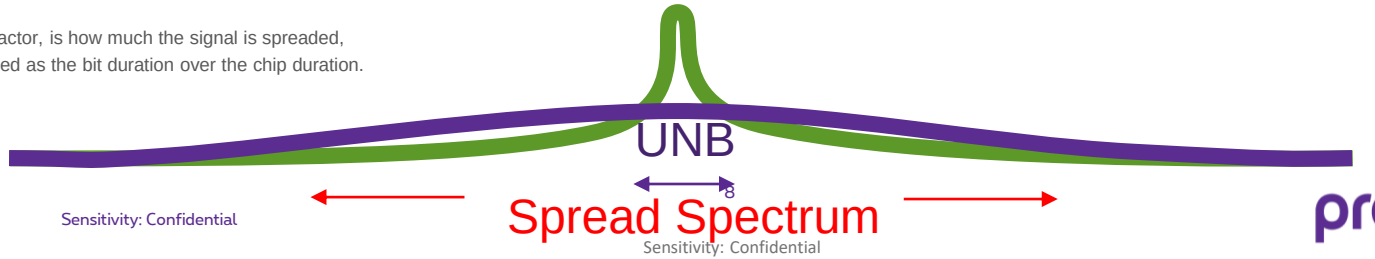
Originally used for military communication, spread spectrum transceivers transmit a known pattern of bits for each information bit.

« 0 » → « 0100101110100111010101111011111011 »

« 1 »→ « 1001101101101010111110110111011 1 »

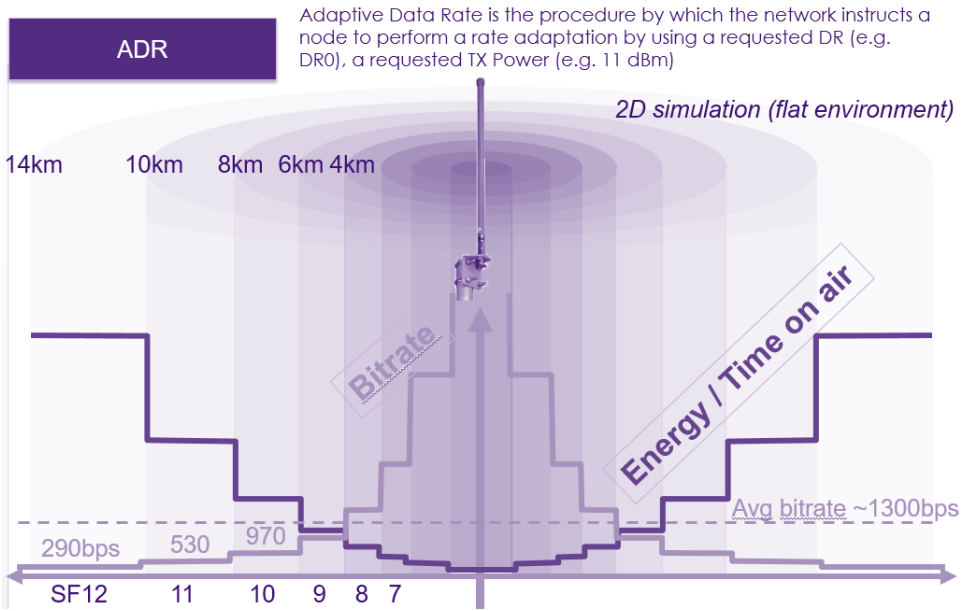
- Radio Frequency (RF) spectrum is « spread » accordingly
- Symmetrical bidirectional communication
- Information is recovered with negative SNR (-22dB in noise) !
- Very robust to interference & jamming

The spreading factor, is how much the signal is spreaded, and it is calculated as the bit duration over the chip duration.



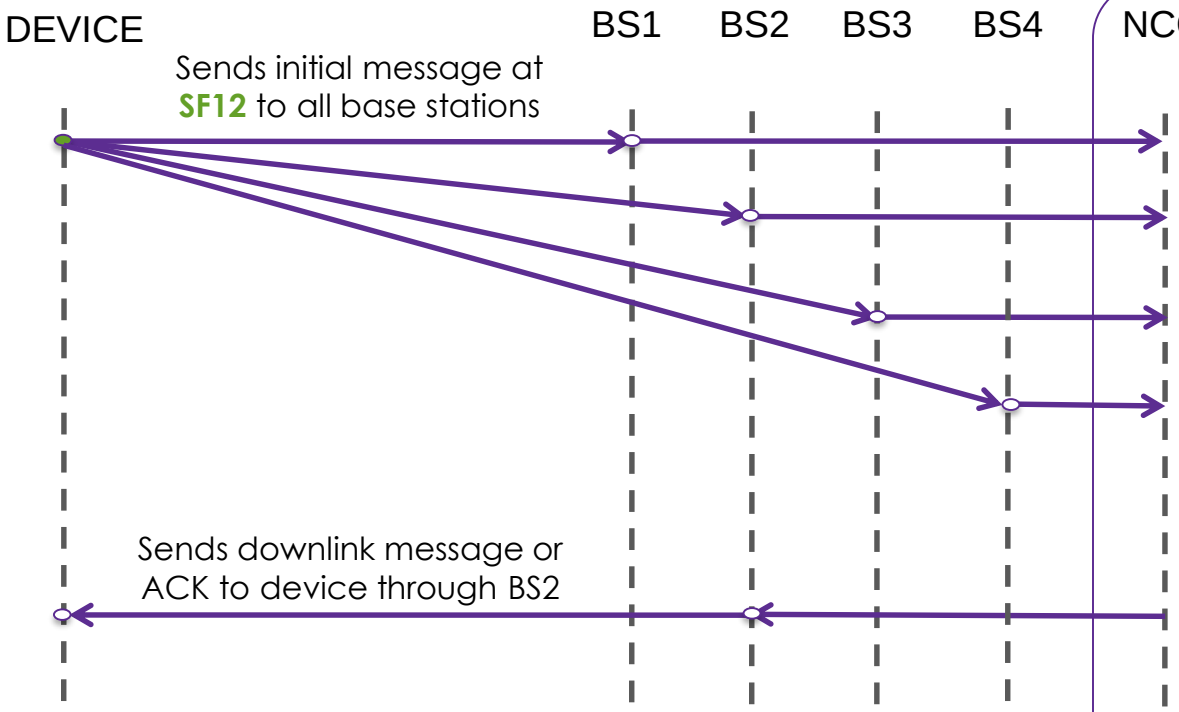
Adaptive Data Rate

- The LoRa data rate can vary (ADR – **Adaptive Data Rate**) from 250bps to 11kbps.
- **Maximum** application **payload size** is 250 bytes.



50 bytes SF 12 : +- 2 sec
50 bytes SF 7 : 70 ms

Device to base stations dialogue



NCC

Creates and updates local table for BS <-> SNR information

BS	SNR
1	-10
2	-4
3	-18
4	-6

Defines BS2 as best base station for this sensor

Then, the devices stays in contact with 3 BS, allowing geolocation by triangulation

Device classes

LoRa devices are catalogued in 3 classes

Class name	Intended usage
A (« all »)	**Battery powered sensors**, or actuators with no latency constraint Most energy efficient communication class. Must be supported by all devices
B (« beacon »)	**Battery powered actuators** Energy efficient communication class for latency controlled downlink. Based on slotted communication synchronized with a network beacon.
C (« continuous »)	**Mains powered actuators** Devices which can afford to listen continuously. No latency for downlink communication.

→ Receive window only after sending

→ Periodic receive slots – time synchro with gateway

→ Continuous open windows for receiving (except transmit time)

Where is the value in IoT? ....

1. Things

- M2M
- LoRa

2. Connectivity

3. Creating new services

- IoT platforms & partners
- Integration in Back-End

4. Exposing assets

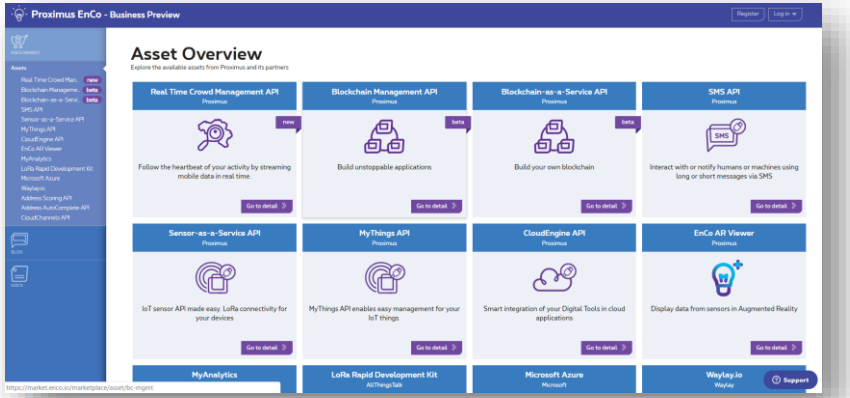
5. Expert advise

- Design thinking

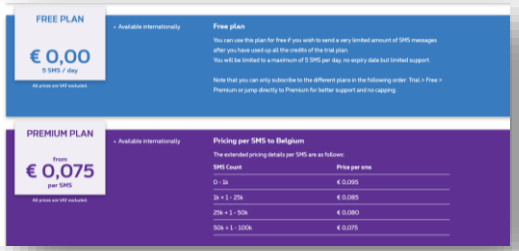
Your toolbox for the next days

An API digital marketplace @ Proximus – enco.io

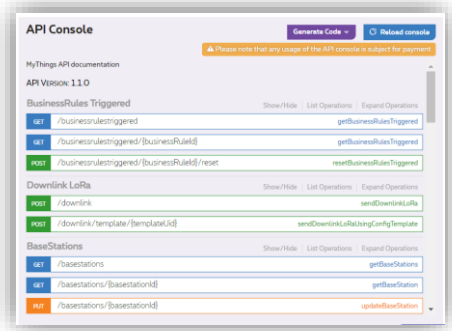
Serving software vendors & integrators, customers, start-ups…



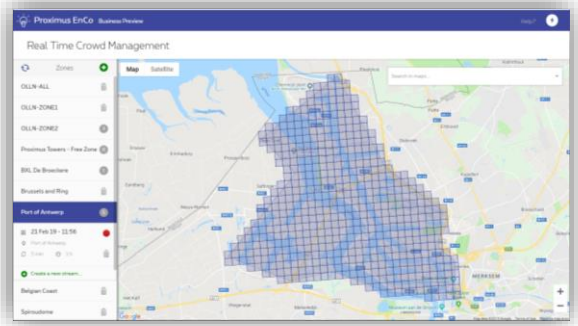
OFFERING CATALOGUE



PAYG, WITH TRY BEFORE BUY



API SWAGGERS & DOCUMENTATION



ASSET SPECIFIC MICROSITES

On a mission to expose Proximus & 3rd party API

Telecommunications

SMS

® : *Fixed – Mobile Unification*
Voice, WebRTC

IoT

LoRaWAN,

® : *M2M, NBIOT*

Data, Analytics

Realtime crowd Management
Location Insights, Directory Services (1307)

® : *Mobility (parking, route planning, …)*

Media, TV

® : *Digital Signage*

Integration

Blockchain as a Service
Blockchain Management
CloudEngine

® : *roadmap statements*

What will you use ?

Arduino-based LoRaWAN development kit

Sensor-as-a-Service API
Proximus

IoT sensor API made easy. LoRa connectivity for your devices

Go to detail

Proximus LoRaWAN connectivity (subscription)

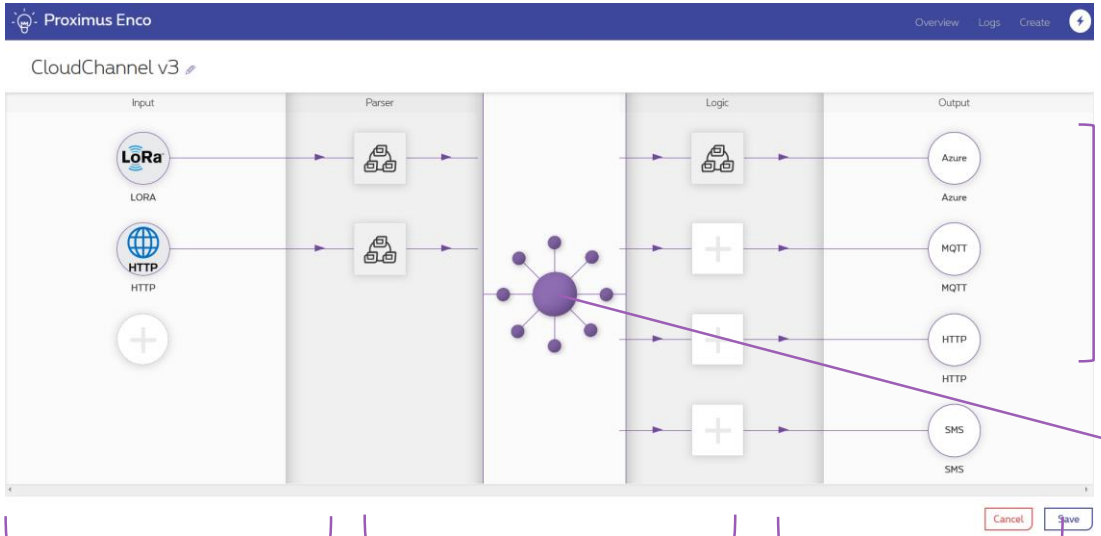
CloudEngine API
Proximus

Smart integration of your Digital Tools in cloud applications

Go to detail

Inject your LoRa sensor data in your applications

Ease system and data integration with CloudEngine



Connect your data sources and systems

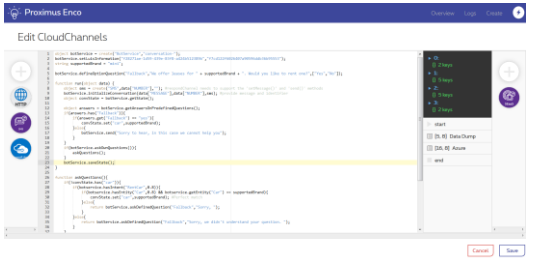
Define logic, transform, normalize, script

Route, integrate your flows

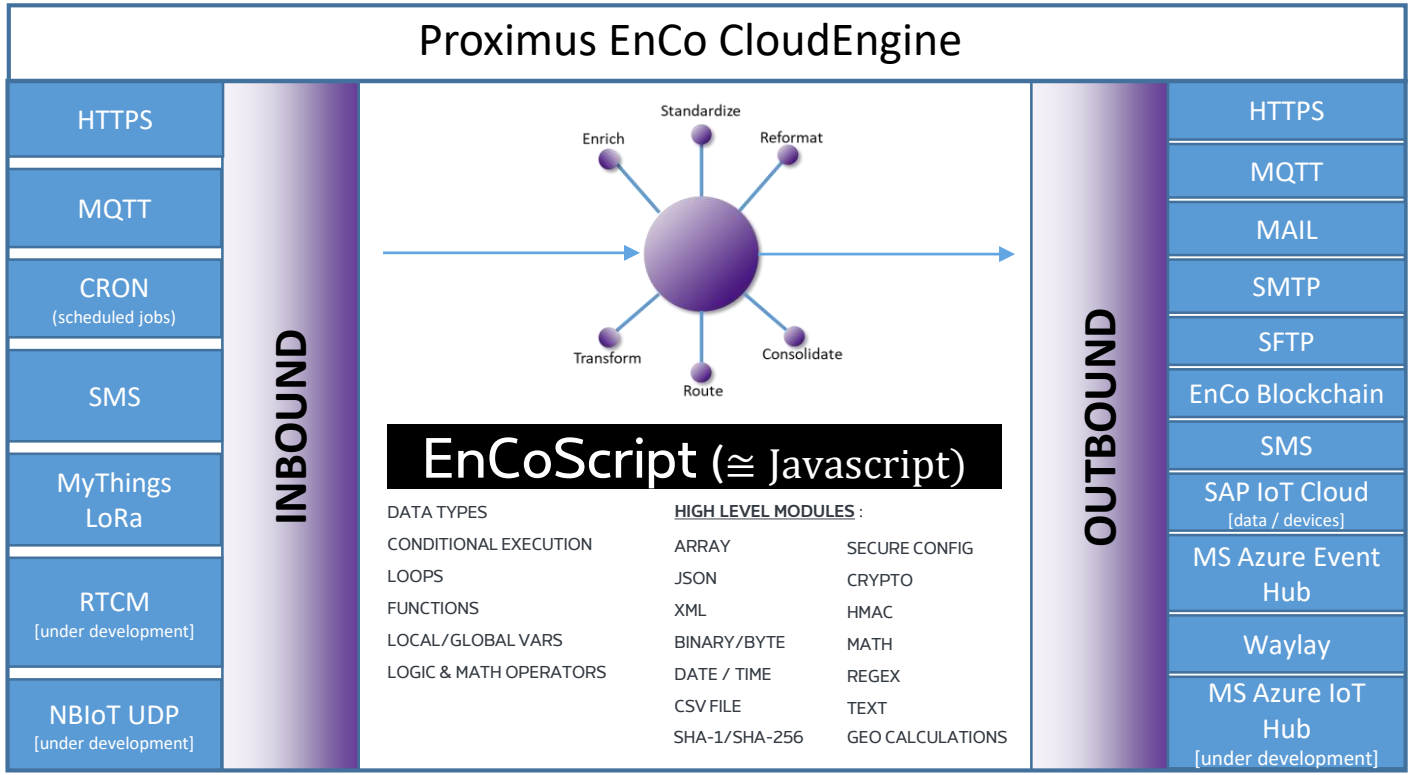
Pre-defined
(Microsoft Azure, IBM, SAP Hana...)

and custom connectors
(HTTP, MQTT)

Scripting in the cloud, modules
(Bots, Crypto, KV, Math, Geo, XML, etc)



CloudEngine Capabilities



Help & Support

http://bit.ly/2IGUWP4

Proximus EnCo

docs.enco.io

AllThingsTalk

docs.allthingstalk.com/examples/kits/lorawan-rdk/

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Thank you

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