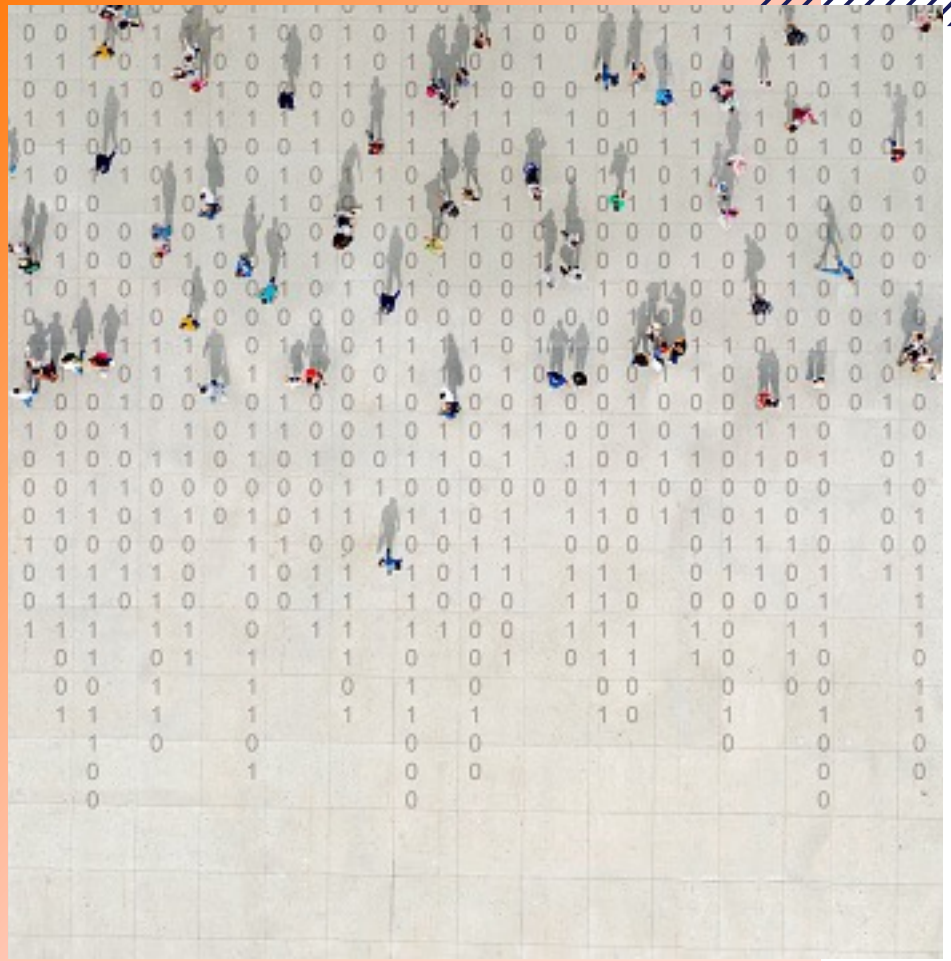
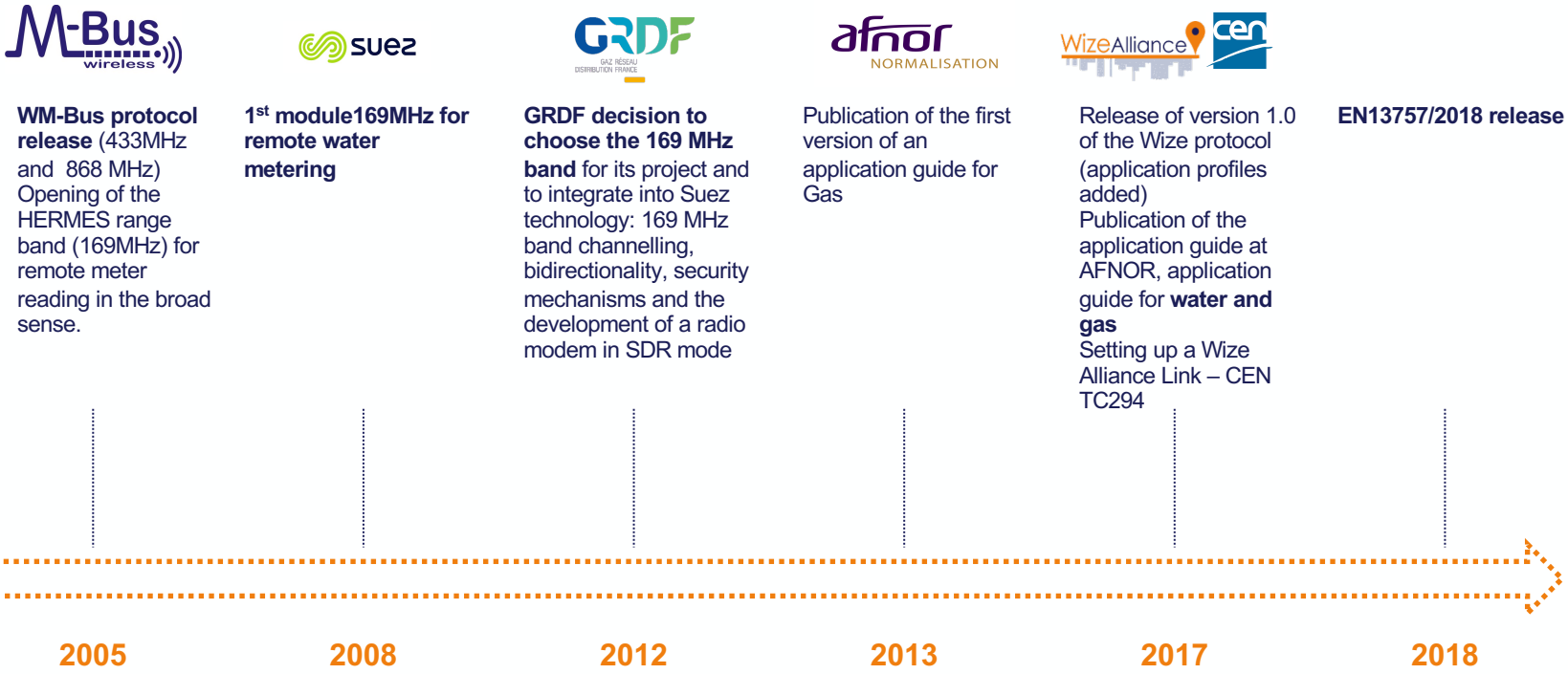


MARCH 2021

Wize technical presentation

WizeAlliance

A story marked by a strong desire to comply with standards



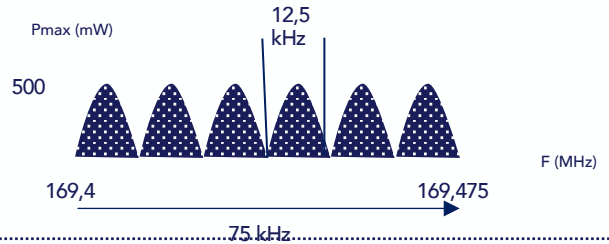
A radio technology on the ISM 169MHz frequency

- **Open and royalty-free frequency** since 2003 (e. g. Hermès band reserved for pagers)
- **Open** to the whole of **Europe.**
- Radio spectrum **few used** since it opened**.**
- Decision 2013/752/EU of 11 December 2013 amending Decision 2006/771/EC on the harmonization of the use of radio spectrum in the ISM bands

Band N°	Frequency band	Category of short-range devices	Transmit power limit/field strength limit/power density limit	Additional parameters (channelling and/or channel access and occupation rules)
37b	169,4+169,475 MHz	Metering devices	500 mW e.r.p.	Channel spacing: max 50 kHz Duty cycle limit: 10,0%

Main features of Wize technology

Radio spectrum **divided into 6 channels (5 Up et 1 Down)**



Bidirectional connection

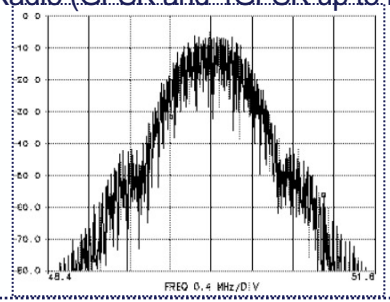
256 bytes

256 bytes

Speaking time

Duty Cycle: 10%
6 min / hour

Scalable Modulations in Software Design Radio (GFSK and 4GFSK up to now)



Speed

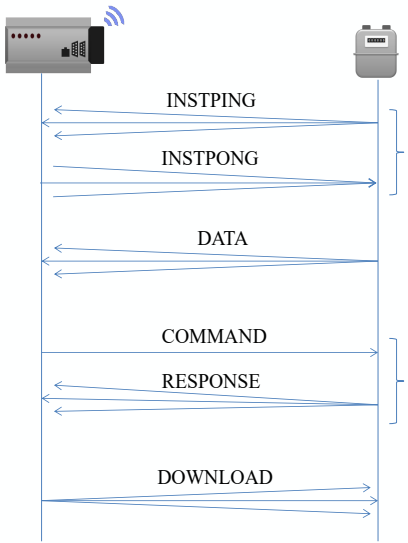
Between 2400 and 6400 bits/s

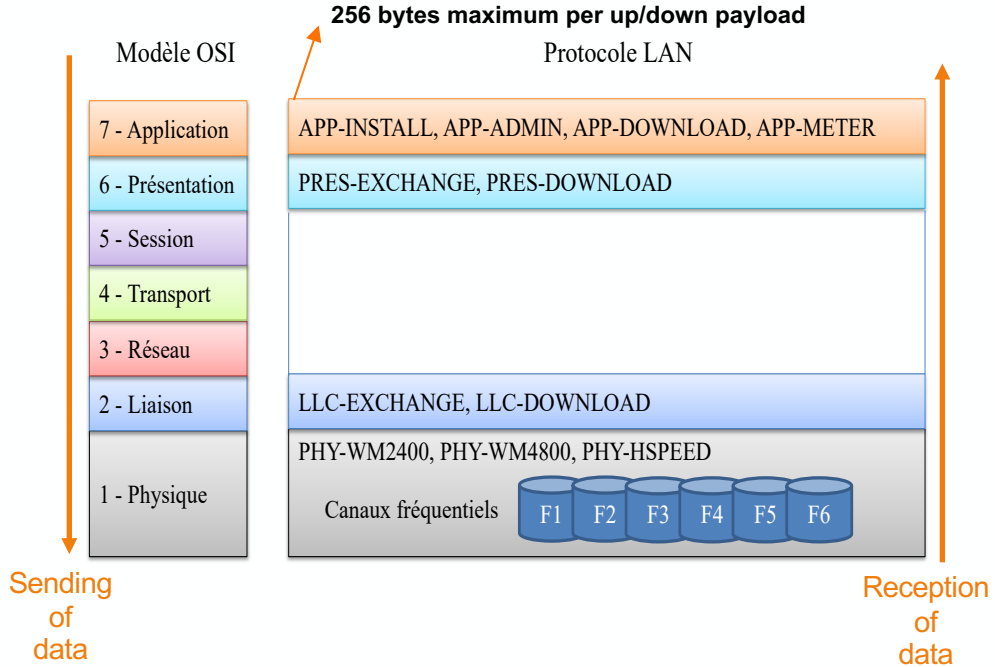
Cryptage

AES 128 bits (evolving 256 bits)

A simple and efficient radio protocol

- The possibility of reusing a 7-layer application profile already proposed by one of the Alliance members, or the possibility of defining a proprietary application layer.

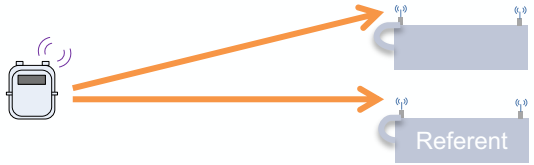




The mechanisms used to send orders to a device

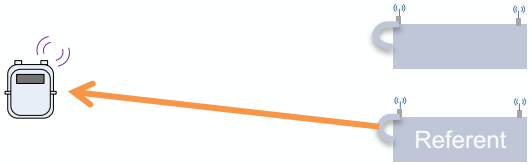
- The APP - ADMIN transmission mode, which is a unicast mode in "piggy-back"

1



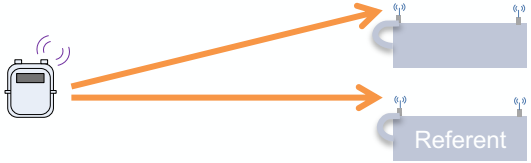
Initialization by a transmission
APP – DATA.
At the end of APP – DATA,
the device goes into listening mode.

2



Upon receipt of APP-DATA,
the referent gateway sends the command
transmitted from the IS

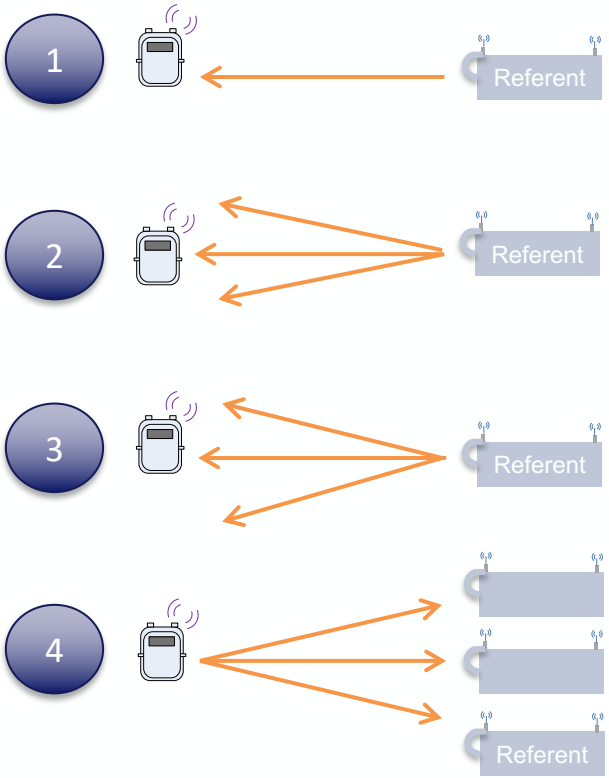
3



The device sends an acknowledgement of
receipt / execution of the order, immediate or
delayed.

Mechanisms used to download a device

- The APP - DOWNLOAD transmission mode, which is a broadcast mode following an appointment



At the IS's initiative, the referent gateway sets up an appointment with the device, via the APP - ADMIN mode.

At the scheduled appointment time, the referring gateway sends the software to be downloaded by the device, in blocks of 256 bytes.

The referent (or diffusion) gateway sends the software again, for cases of partial or total non-receipt. 4 repetitions are performed.

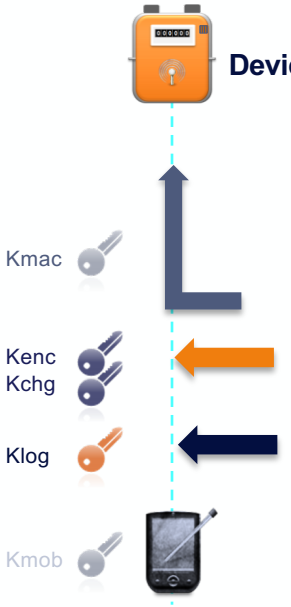
The device sends an immediate or delayed acknowledgement of receipt / execution of all transmitted files (APP-ADMIN mode).

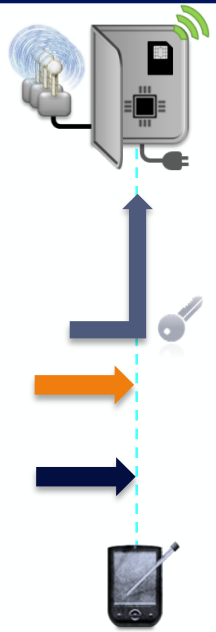
A technology secured by design

- IOT opens new areas of vulnerability

Objects integrate embedded software

The use of radio makes it possible to listen, usurp and replay communications.





An authentication key is embedded in the device and the gateway

Frames are encrypted by a key (128-bit AES) embedded in the device. (several rotating keys in fact). A rotating number on each frame makes it impossible to replay by listening.

In the case of downloading software, a specific key is transmitted to the device to protect the exchanges.

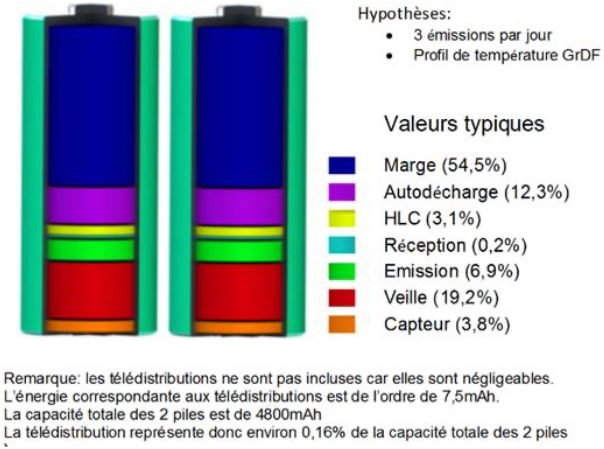
The devices carry a specific key or an authentication certificate for exchanges with mobile tools that may be used for local programming. This key and certificate are also embedded in the mobile tool.

The material aspects of an object connected in 169 Mhz

- A function of the use case to be processed.

- Several component manufacturers offer 169 MHz **chipset**, ultra-low power, for prices between 1.5€ and 3€ per 1000 parts.
- Radiocrafts proposes by the end of the year a **module** that includes a Texas Instrument chipset and the Wize protocol layer.
- The typical consumption of these components is **10 to 30 mA** in emission.

Example: Gazpar consumption profile.

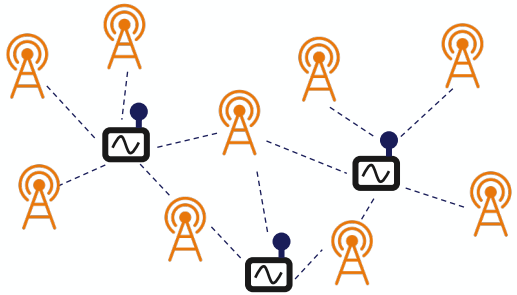


Remarque: les télédistributions ne sont pas incluses car elles sont négligeables.
L'énergie correspondante aux télédistributions est de l'ordre de 7,5mAh.
La capacité totale des 2 piles est de 4800mAh
La télédistribution représente donc environ 0,16% de la capacité totale des 2 piles

- The energy dimensioning of a sensor: a compromise between functionality, cost and lifetime.
- For a stand-alone sensor: The measuring step and transmission frequency, combined with the characteristics of the batteries used and the operating temperature profiles, determine the size of the battery required for the use case.
- If the equipment is supplied with energy, then the functional **achievable on a radio infrastructure is limited to the available bandwidth**... and the criticality of the function to be performed.

Wize is an operable or operated technology*

- Two 169 MHz networks are currently operated in France, by GRDF and Suez.



2019 → 2021

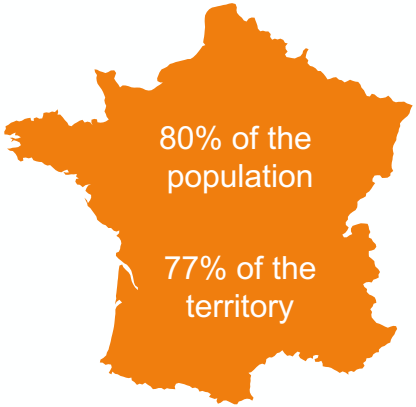
5 000 Antennas

15 000 Antennas

Unit coverage

3 km to 8 Km range

National Coverage



A network deployment operated on a European scale

- And the opportunity to deploy private networks all over the world.

Wize technology adapts to various usage models

Private network

Gateways =
Customer's property
+
Own operation

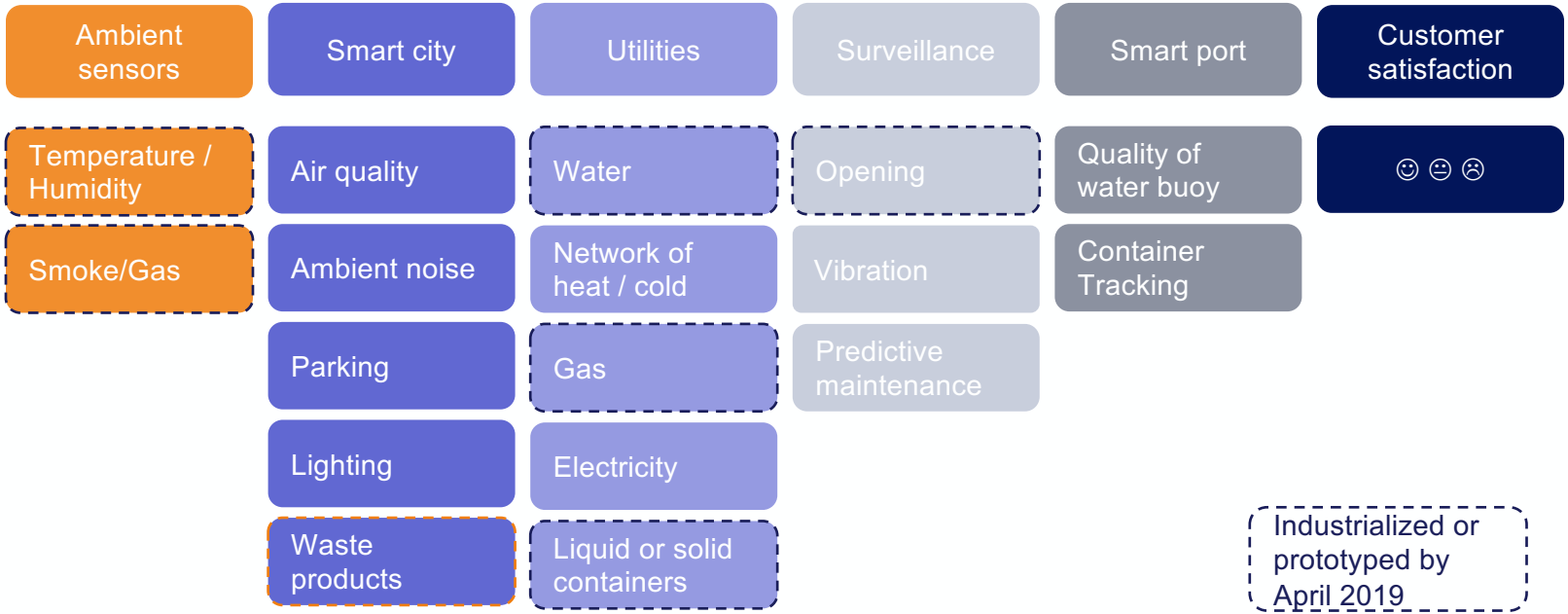
Hybrid network

Gateways =
Customer's property
+
Operation operated
by GrDF and/or Suez

Operated network

Gateways =
operator's property
+
Operation operated
by GrDF and/or Suez

Wize is a technology well adapted to telemetry and geolocation applications for "buried" industrial objects



THANKS

www.wize-alliance.com