Low Power Wide Area Network, New Smart Grid Networks

LPWANs NETWORKS

low cost

long range

low power

secure

SIGFOX

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nxtview
working with energy

IOT = SMARTGRID

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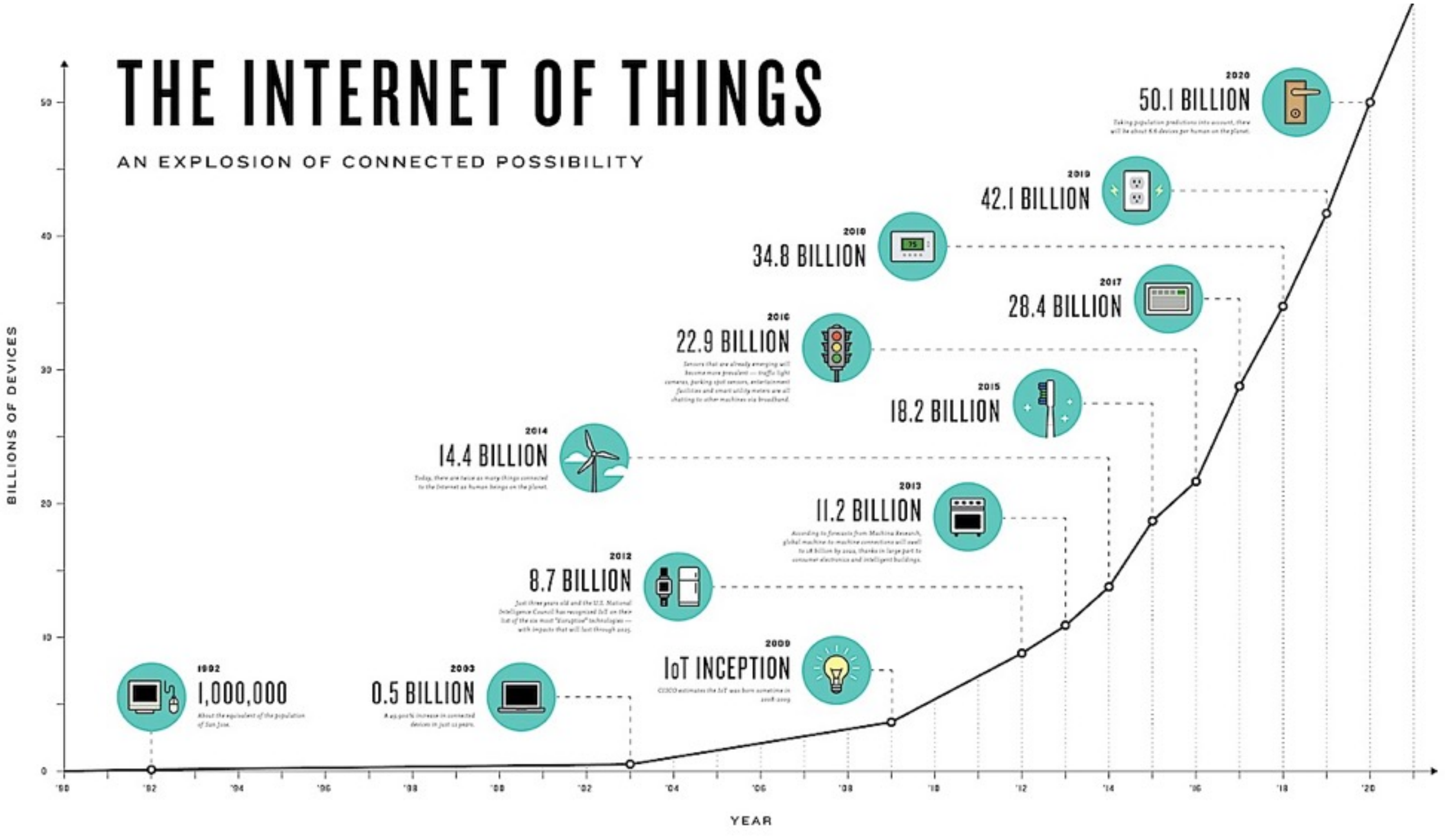

IOT COMUNICATION TECHNOLOGIES

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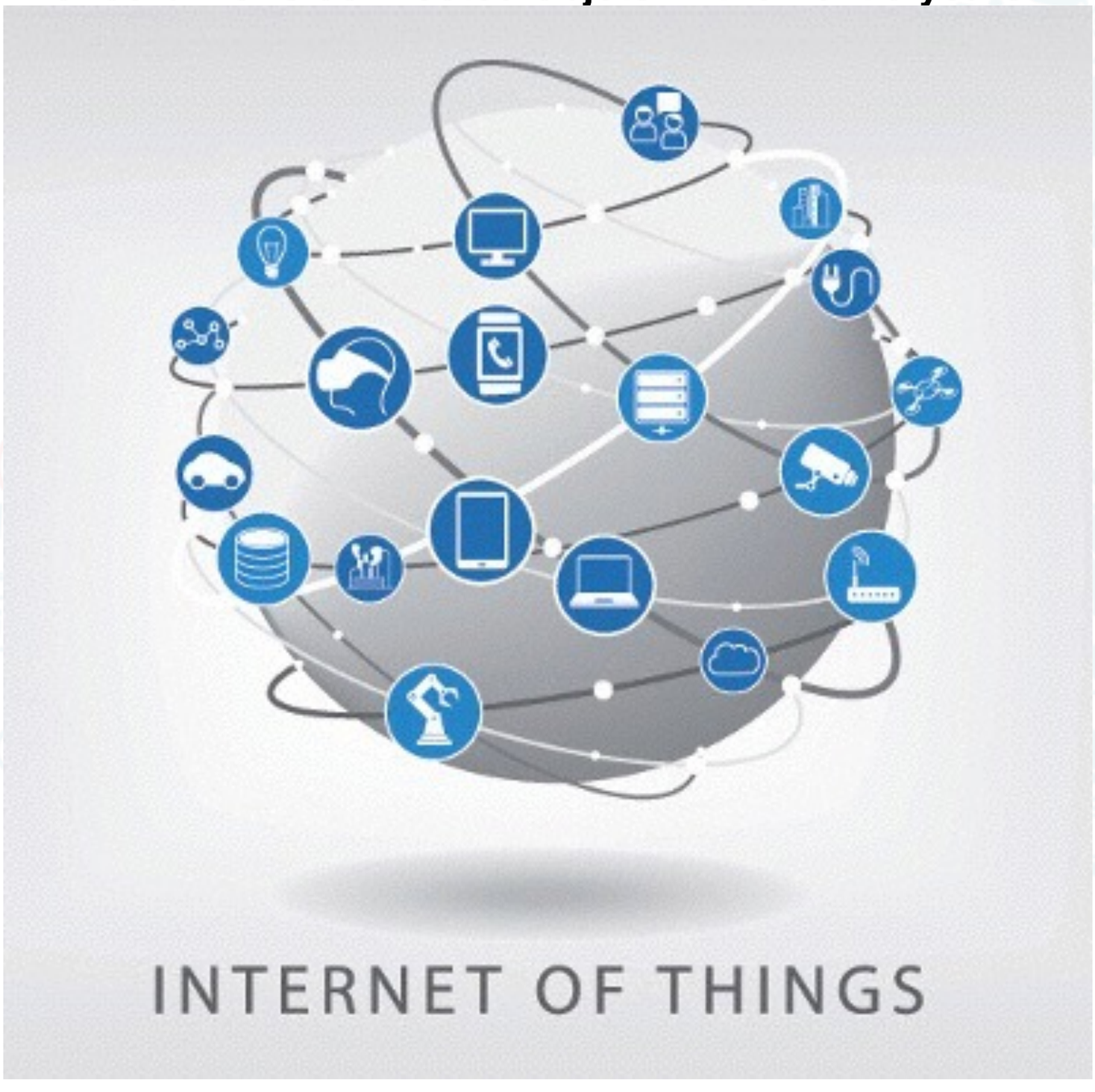
25 -50 billions connected objets in the next 5 years



10%
2G/3G/4G

grows of 60 millions celular in USA

250 millions IOT Cellulars WorldWide

50%
Wire & Others RF

40%
?????

GAP of millions

RANGE / POWER / BANDWITH/ LATENCY / COST

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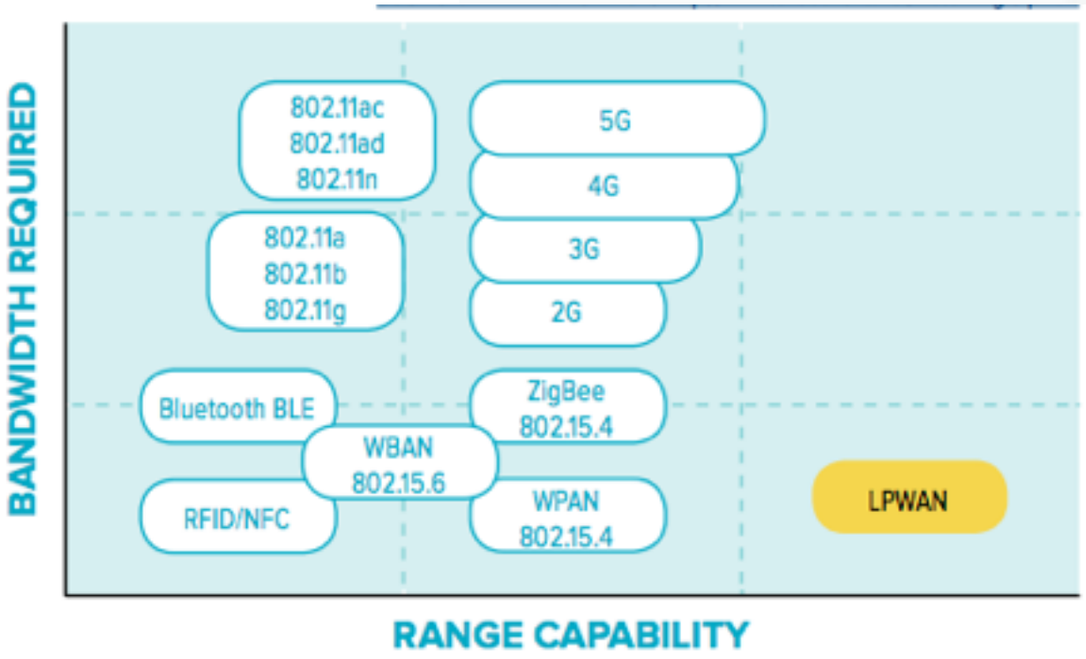
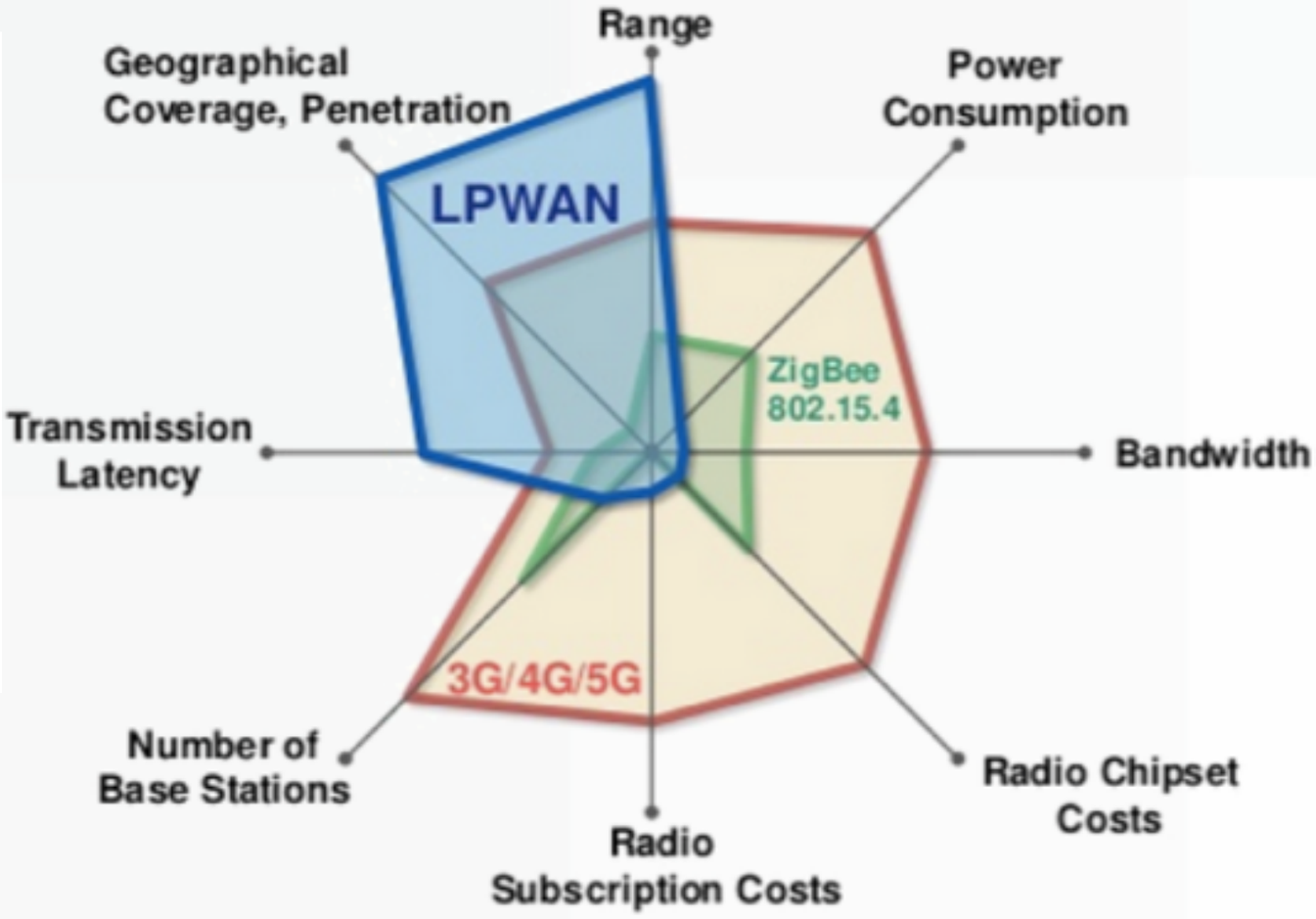
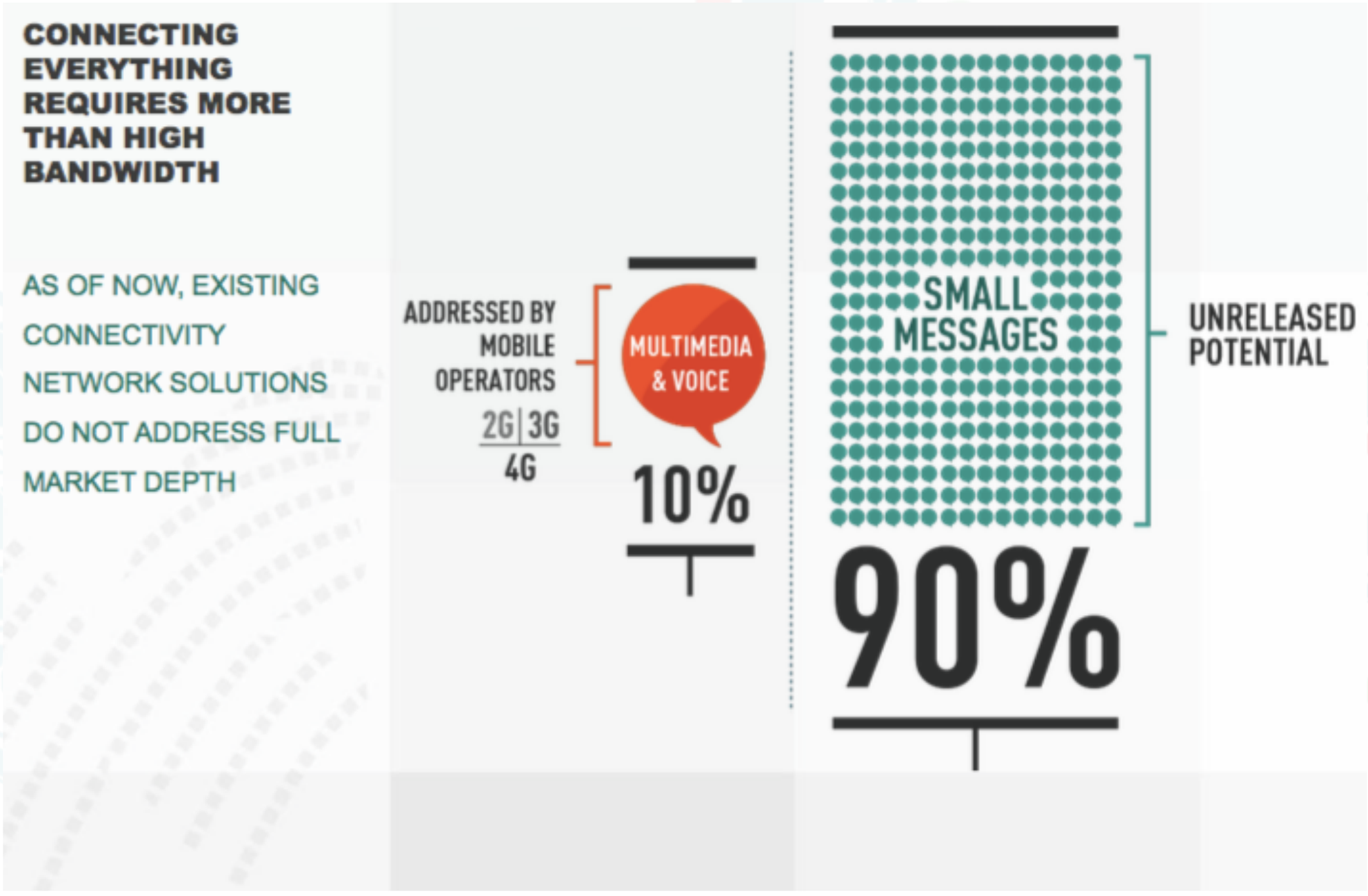
SIGFOX (LPWAN) COMPARED



Long range, low bandwidth, low power



UNB ULTRA NARROW BAND



TO ACHIEVE LONG RANGE OR DEEP INDOOR IN WIRELESS COMMUNICATIONS, YOU NEED A LARGE LINK BUDGET

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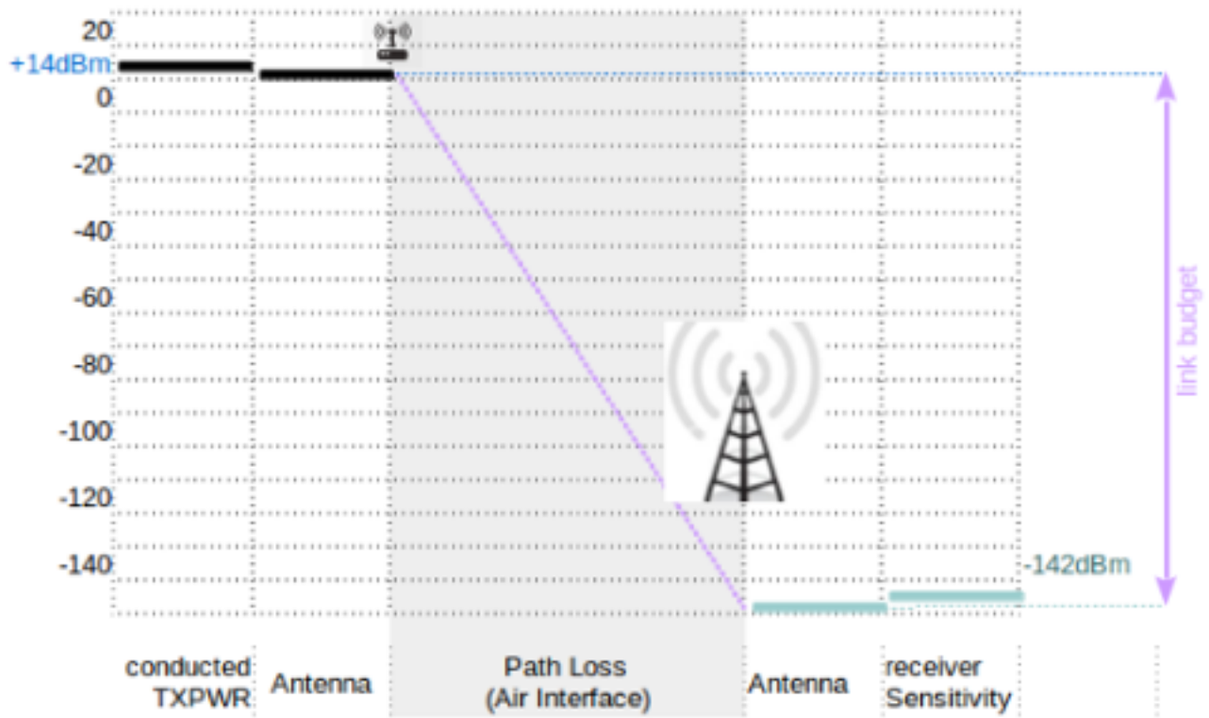
The slower the modulation rate, the higher the receiver sensitivity can be.

Shannon-Hartley theorem: By slowing the modulation rate by half, you are putting twice as much energy into each symbol; thus, you are increasing the link budget



SIGFOX : -156dBm Link Budget

binary phase-shift keying (BPSK)

-130 dBm can detect signals 10,000 times weaker than technologies with -90 dBm

Receiver sensitivities of more than -130 dBm are common in LPWAN technologies, compared to -90 to -110 dBm seen in many traditional wireless technologies.

LPWAN DRIVERS

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PHILOSOPHY OF SIGFOX NETWORK

THE TECHNOLOGY TO MEET THE IOT STRATEGY:

- LOWEST TCO
- OUT OF THE BOX CONNECTIVITY
- LOWEST ENERGY
- GLOBAL REACH

FARTHEST SATELLITE FROM EARTH USES UNB BPSK

Lowest Energy

Lowest TCO

Global reach

Out of the box connectivity

Small messages
14 bytes of header + 12 bytes max of payload

Use existing chipsets

No pairing
Public network

Bidir is device initiated
Sleep time maximized

Unlicensed spectrum
ISM band: ETSI – 868Mhz / FCC – 902Mhz

No synchronization with base stations
Sleep time maximized – Simple processing

Strong resistance to interference

Low radiated power
25mW @ 100bps ETSI
150mW @ 600bps FCC

Long range to reduce number of base stations
Large link budget = 160dB

High capacity network for scalability

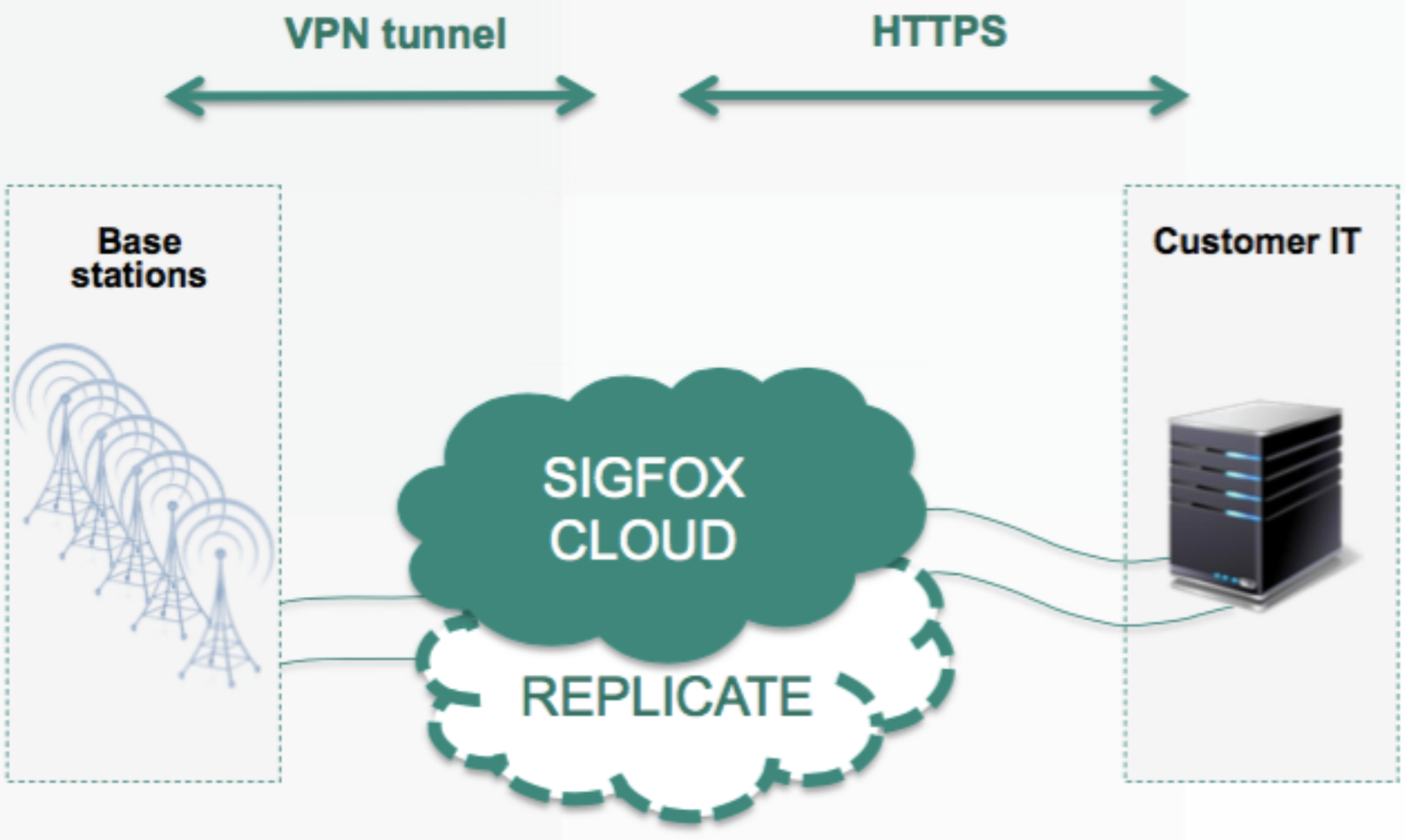
Ultra Narrow Band BPSK is the way to go

Architecture Security

ARCHITECTURE SECURITY

SECURITY GUARANTEED FROM END TO END

CLOUD REDUNDANCY FOR SLA OF 99.99%



SIGFOX

RADIO SECURITY

IDENTIFICATION AND AUTHENTICATION

Each device contains a unique ID and secure key

- **Identification is done with the ID**
- **Authentication is done with an AES encrypted signature sent in the header**

IDENTIFICATION

AUTHENTICATION

RESISTANCE TO SPOOFING

RESISTANCE TO SPOOFING AND JAMMERS

Each message contains a sequence number

SIGFOX cloud detects differences in the sequence number

RESISTANCE TO JAMMING

No synchronization is required to send messages on the SIGFOX network

So jamming the device receiver will not affect the delivery of the uplink message

LPWAN Vs Others

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	SIGFOX UNB	COMPETITION GSM/Cellular	COMPETITION Proprietary ISM Technology
DENSITY of ANTENNAS TO COVER A CITY (1M inhabitants)	3	60	200
DENSITY of ANTENNAS TO COVER a 1000 km² RURAL AREA	1 to 3 per 1000 km²	10 to 20 per 1000km²	200 to 500 per 1000km²
DENSITY of OBJETCTS / BASE STATION	High +	Low	Medium
SENSITIVITY	High +	Low	High
POWER CONSUMPTION (in µW)	50µW mono / 100µW bidir	5000 µW	150 to 700 µW
RADIATED POWER / EM POLLUTION	Very Low	Medium to high	Low
TYPICAL STAND-BY TIME (in years) for 2.5 Ah battery	20	0,2	2 to 10
SECURITY LEVEL	High	High +	High
SIGNAL PENETRATION into buildings	High	Medium	Medium +
VERSATILITY	Worldwide	Subject to license	Subject to local spectrum allocation
MODEM COST ESTIMATION (with silicon integration)	Below 1$	10$	Between 5 and 10 $
TYPICAL COMMUNICATIONS COST (yearly subscription + traffic per device)	< 3$	30$	No operator available

COSTS OPTIMIZED FOR DEVICE LIFE CYCLE

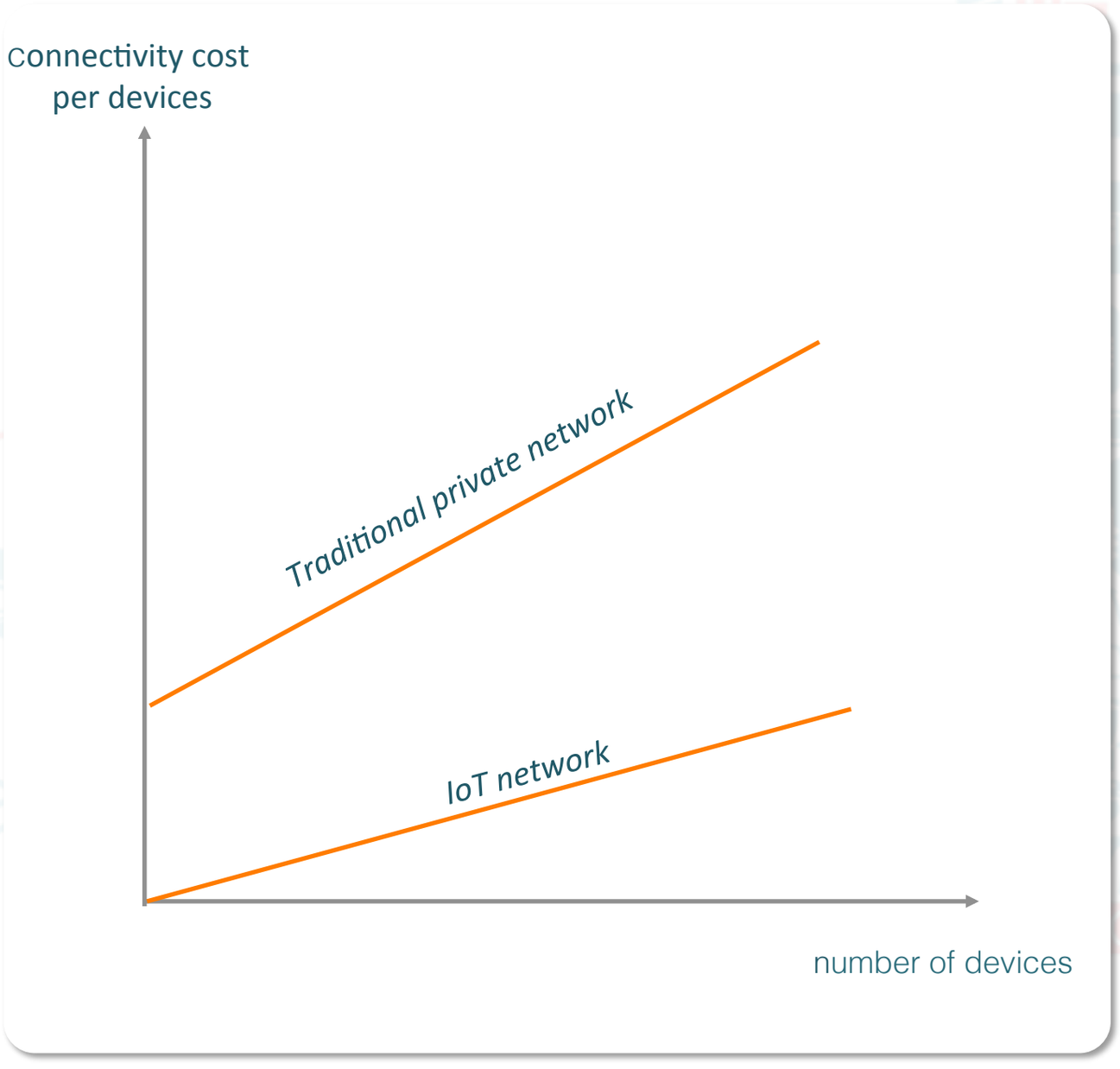
CAPEX

- Simple, open, royalty free and hardware agnostic technology
- No SIM card
- Low integration cost: standard-based web APIs
- No private network roll-out

OPEX

- Low subscription cost
- Limited device maintenance
- Scalability of SIGFOX solution
- No network maintenance

SMARTGRIG POSSIBLE



Avoid network CAPEX

Avoid network and meter maintenance

SEAMLESSLY CONNECT YOUR ASSETS TO YOUR MDM

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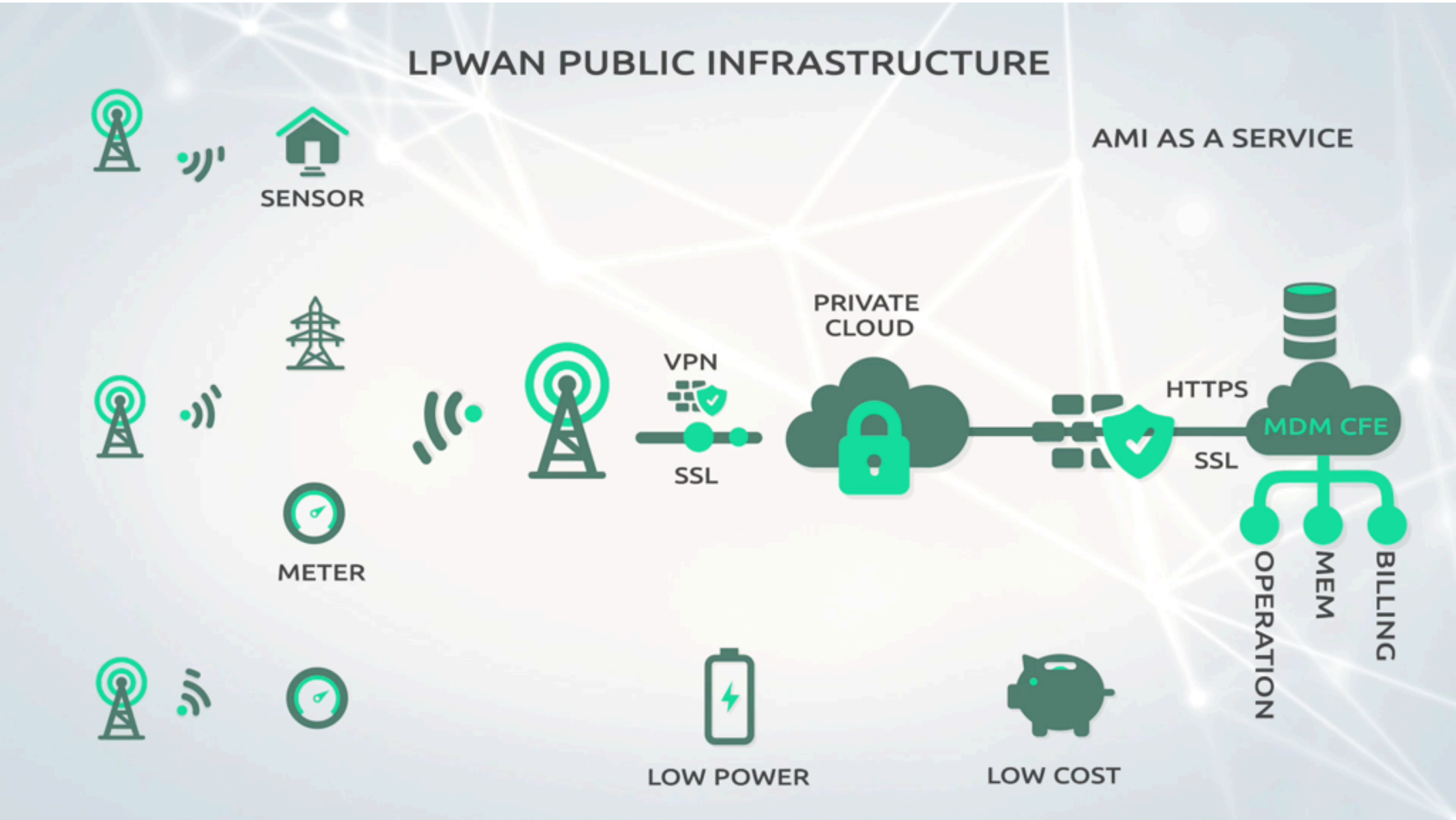

SIGFOX DEPLOYMENT

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SIGFOX GLOBAL EXPANSION

aerea FIBER.WIRELESS.BROADBAND.INTERNET.

cellnex driving telecom connectivity

arqiva

NARROW NET LINKING THINGS

EI TOWERS

SIGFOX One network A billion dreams

IOTADENMARK

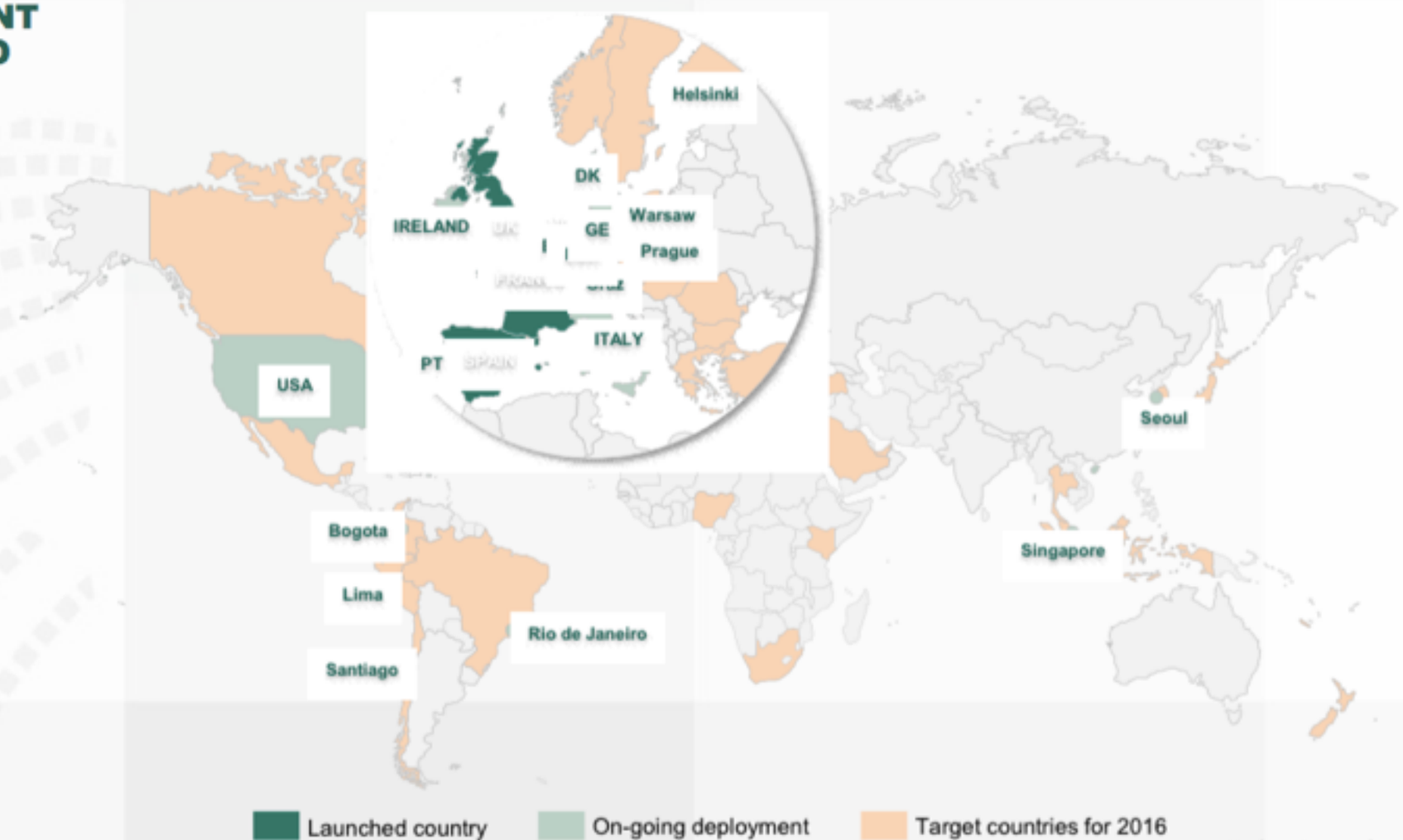
rms.lu

ENGIE

VIZOR TECHNOLOGY

INHABITANT COVERED:

- **160 MILLION TODAY WITH 3,000 BS**
- **220 MILLION WITH FULL DEPLOYMENT OF EXISTING SNO WITH 5,000 BS**



ECOSYSTEM

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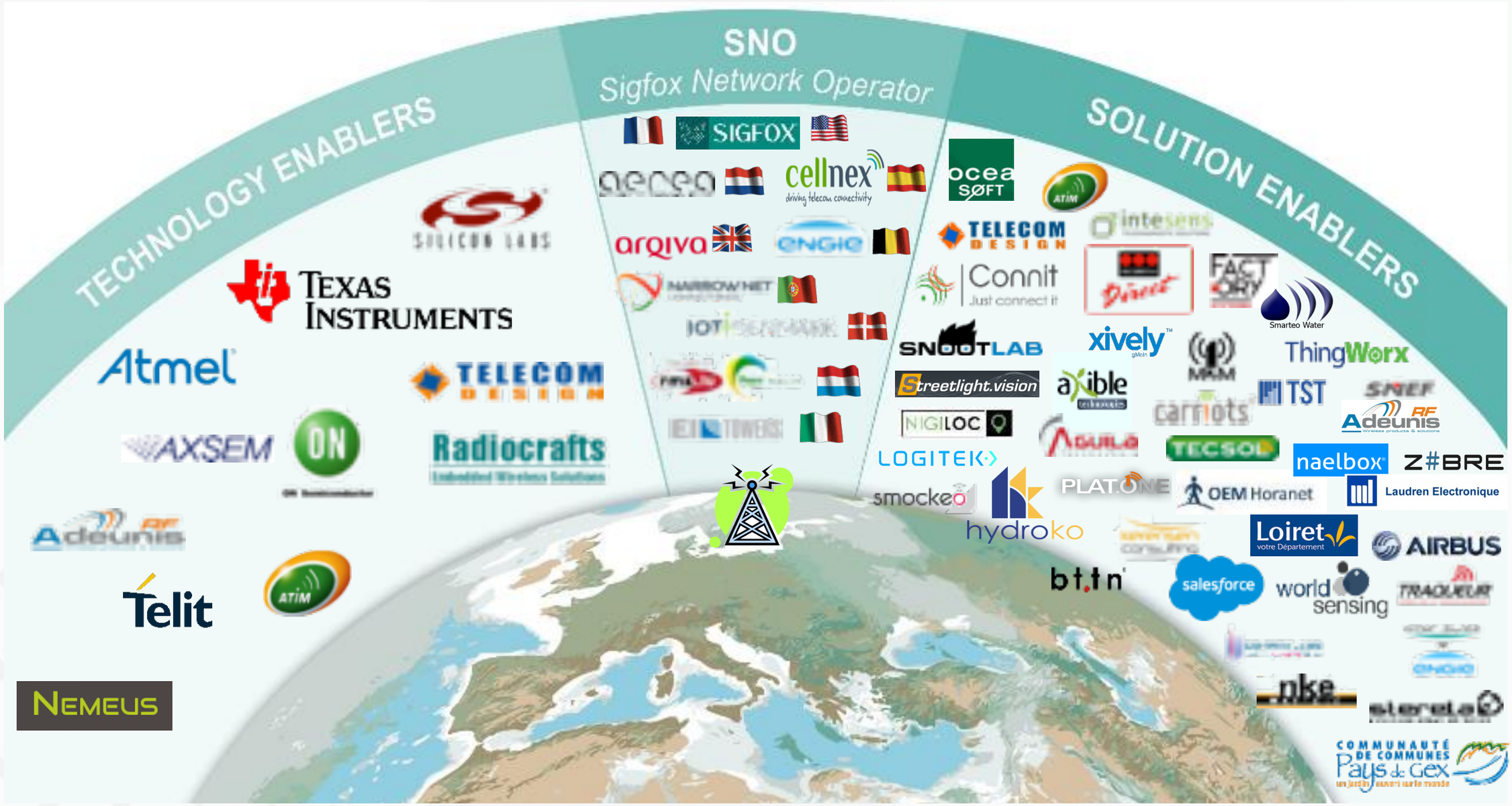
SIGFOX

FAST GROWING ECOSYSTEM



SIGFOX now has 100+ SIGFOX Ready™ solutions

integrate

connect

SILICON LABS
ON Semiconductor
AXSEM
Atmel
Texas Instruments
Telit
Adeunis RF
Radiocrafts Embedded Wireless Solutions
ATIM
NEMEUS
TELECOM DESIGN

SIGFOX ready chipset and modules

kamstrup
maddalena
Itron
elster
ARAD GROUP Integrated Metering Technologies
DIEHL Metering
GLEN CANYON

Meters manufacturers

APLICATIVOS IMPLEMENTADOS

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SIGFOX

SMART WATER METERING

UTILITY

Customer | Communauté de Communes Pays de Gex | sogedo

&

Object / Integrator | Connit

The Challenge

- Pays de Gex County Council (France) encompasses 27 towns & 80,000 inhabitants
- Requested communicating meters
- Consumption monitoring & alarm in case of outage and pipeline failure

The connected Solution

- 30,000 water counters to replace legacy

The customer Benefits

- **New end-user services**
- **Compliant to Warsmann law on overconsumption alerts**
- **Improved invoicing & investments**
- **Productivity gain (leak detection)**

Why SIGFOX inside ?

- **Operated network: no mesh infrastructure costs**
- **Better indoor penetration**
- **12 years life duration**

CONTACT

IotNet Mexico

nxtview working with energy

@IotNetMX
@Nxtview

CONTACTO@IOTNET.MX

CONTACTO@NXTVIEW.COM

SIGFOX
One network A billion dreams

IotNet Mexico

www.nxtview.com

www.iotnet.mx