WELCOME TO LoRaWAN® LIVE

BUSINESS TRACK 2.00PM – 6.00PM

BERLIN, JUNE 13, 2019

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LoRaWAN®

Creating Valuable IoT Connections

Charles Paumelle

Marketing Committee Co-Chair & Co-Founder Microchip

LoRaWAN®

Creating Valuable IoT Connections

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UTILITIES PANEL DISCUSSION

Moderator: Rémi Demerlé, Semtech

Maurice Zembra, Vertical M2M

Olcay Taysi, NetOp Technology

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Massimo Marini, Proesys

1. Building more efficient smartwater solutions with LoRaWAN®

Maurice Zembra, CEO, VERTICAL M2M
mzembra@vertical-m2m.com

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Creating Valuable IoT Connections

150 LoRaWAN® devices available with “CommonSense” platform

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CommonSense IoT Platform (CLOUD or ON-PREMISE)

150+ LoRaWAN®

READY DEVICES CommonSense IoT Platform

Managing water life cycle, a truly challenging but promising market

- Water is a worldwide critical resource as well as a sustainable development challenge :
  - Utilities are losing **up to 30%** of their water supply through leakages
  - The revenue of global NRW (Non-Revenue Water) management solutions market mostly due to water leaks will grow from $850.5 million in 2018 to $1,594.3 million by 2025 according to a Research & Markets study dated Oct. 2018
- Water treatment plant management efficiency is key for quality cost-effective production of drinking water
- Water metering services allow to avoid over-consumption

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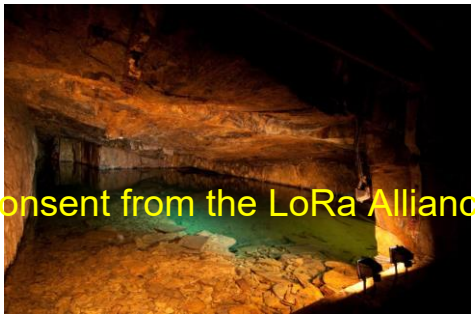
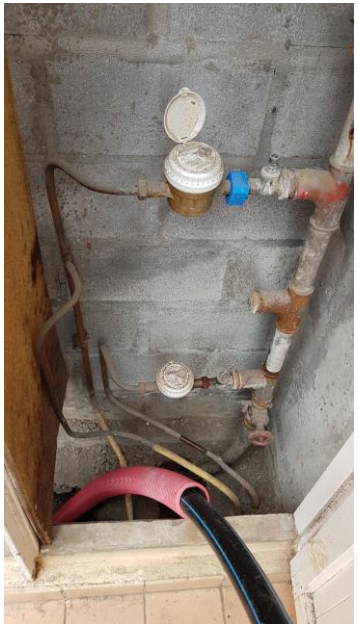
LoRaWAN® solves several key issues for Smart water applications

- Why LoRaWAN® is relevant for smartwater applications?

  - A complete **ecosystem** with a wide range of smartwater IoT devices:
    - Meters
    - Valves
    - Sensors (flowmeters, dry contacts, …)…
  - **True deep indoor** capabilities
  - Low consumption devices complying with long-lasting requirements of water industry
  - Ability to combine **private and public deployments**, depending on business models, constraints and markets





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Smart water applications for REUNION telereleve

REUNION Telereleve is both an engineering company specialized in water infrastructures and a LoRaWAN® service provider

Challenge: Need to aggregate different sensors, actuators and meters

Target markets: property managers with hundreds of buildings to manage and cities

Solution:

- Private network and device management => full infrastructure managed by VERTICAL M2M
- Maddalena smart water metering
- Strega electrovalve
- Adeunis MODBUS
- Adeunis Dry contact

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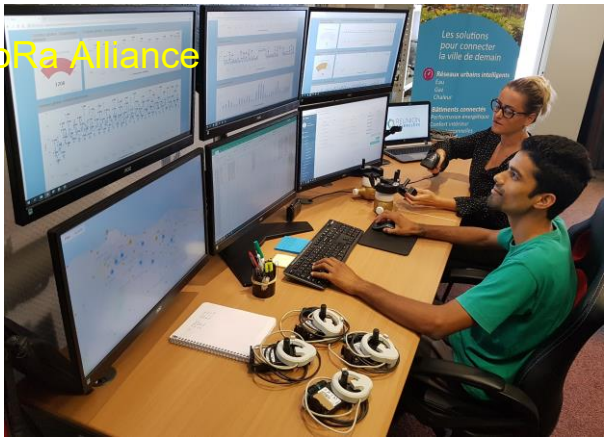


LoRaWAN Benefits:

- Advanced value added services (water leak detection in buildings)
- Front-end / web application for customers
- LoRaWAN benefits : deep indoor, private network

Next steps : aggregate more devices, grow predictive services in water management

- **Potential market : > 15 000 meters and sensors within 3 years**

Unlocking smart water usages for BRL

CommonSense IoT Platform

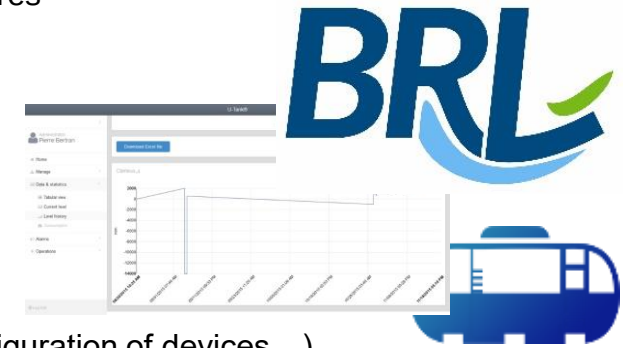
BRL exploitation (France): Engineering company specialized in water infrastructures

Challenge: Aggregate different sensors and meters

Target markets: agriculture, industrial customers and residential customers

Solution:

- Device management through various public networks
- Advanced value added services (KPIs for water management, full remote configuration of devices…)
  - Water meters
  - Adeunis analog
  - Adeunis Pulse
  - Adeunis dry contact



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LoRaWAN® benefits: deep indoor, use of publics operator networks in France

- Next steps: implement more remote IoT services to improve operations and lower costs
- Potential market: > 5,000 sensors and meters within 3 years

cuma

SAINT - EMILION

2. Monitoring and analyzing solutions with LoRaWAN® for power utilities

Olcay Taysi from **NetOP Technology**
olcay.taysi@netop.io

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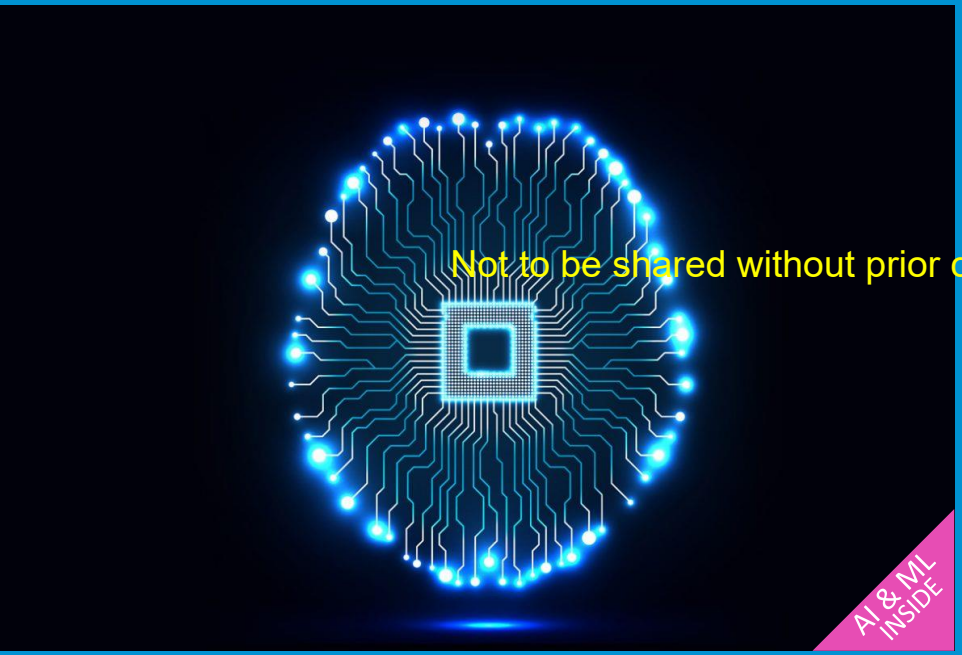
Creating Valuable IoT Connections

Low Voltage Electricity Distribution Networks Monitoring & Analyzing System

NetOP TECHNOLOGY



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CHALLENGE

Most of the electricity distribution companies know nothing after the substation.

All of them monitoring the electricity distribution grid with SCADA systems until the substation but nobody knows that valuable data that will contribute to the decision-making mechanism is hidden in substations.

NetOP brings this hidden treasure to light and blend it with AI.

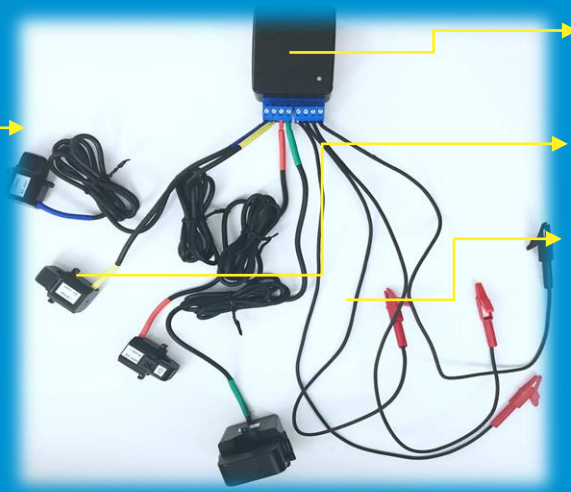
NetOP TECHNOLOGY

Power Distribution Substation
One of the arteries feeding the city
If really monitored and analyzed
it's easy to reach tons of results

Electricity Distribution Company
Municipality
City Council
Police Department
Fire Department
Government
need BIG DATA to make decisions

Values Monitoring

- Zero I Current
- Voltage (PH1 PH2 PH3)
- Current (PH1 PH2 PH3)
- Frequency (PH1 PH2 PH3)
- Power Factor (PH1 PH2 PH3)
- Power (PH1 PH2 PH3)
- Voltampere (PH1 PH2 PH3)
- Total Harmonic Distortion I
- Total Harmonic Distortion U
- Harmonic 3 (PH1 PH2 PH3)
- Harmonic 5 (PH1 PH2 PH3)
- Harmonic 7 (PH1 PH2 PH3)
- Harmonic 9 (PH1 PH2 PH3)
- Harmonic 11 (PH1 PH2 PH3)
- **and 40 different more…**



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LoRaWAN®

Easy to deploy
Easy to use
Easy to install
Affordable cost
Independent
Network
Secure
Scalable
Sustainable

NetOP Octopus V1
Substation Electricity Monitoring Analyzer

- 3-phase electricity monitoring sensor for low voltage substation feeders
- NetOP Octopus can monitor substations feeder by feeder / phase by phase and collect data in real time
- Generated big data analyzed by AI algorithms
- Alerts & Reports generated instantaneously and forwarded to relevant units
- Embedded LoRaWAN® connectivity inside

USE CASE: Detection of Abnormal Power Usage

NetOP TECHNOLOGY

With the help of smart sensors developed by NetOP, the city's electricity consumption is monitored from substations and recording "electricity consumers" that signed the electricity grid with a unique signature.
The big data generated is analyzed by AI-powered algorithms and it gives a possibility to reach back-to-date, real-time and predictive decisions.
All units that work for a better city can benefit dozens by using this data. It can prevent frauds, leakages, manipulations, accidents, breakdowns, even crime.

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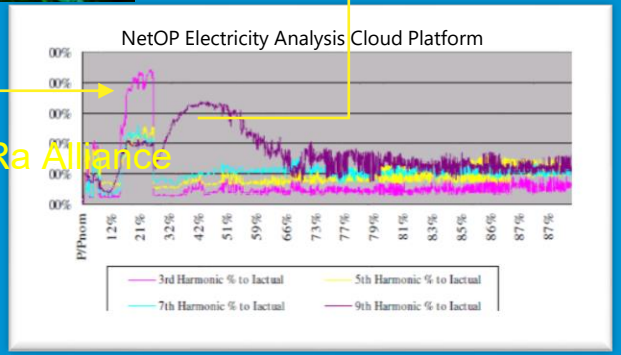
Indoor Cannabis Farming

This kind of bulbs effects Power Harmonics and signs the power grid with the unique signature (Harmonic 3 effected)



AI powered algorithms analyzing harmonics data and detect an abnormal situation on 3rd Harmonic

With NetOp, Incredible digital transformation from “knows nothing to predictive”

3. Critical Monitoring of energy transport infrastructure

Massimo Marini, CTO from **PROESYS**
m.marini@proesystech.com

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ENERGY TRANSPORT USE CASE: Structural integrity of HV Pylons

Customer requirements:

- diagnostics of excessive stress on the structure
- Structure collapse due to fatigue or landslide or severe weather
- physical attack / sabotage detection / copper theft

LoRa technology and the use of a private LoRaWAN® network are ideal solutions to monitor the **health of critical infrastructure and HV pylons, installed in remote areas with no public network coverage**

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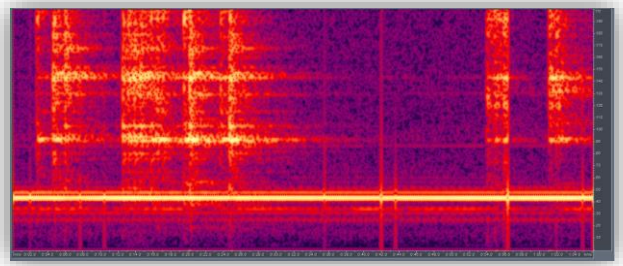
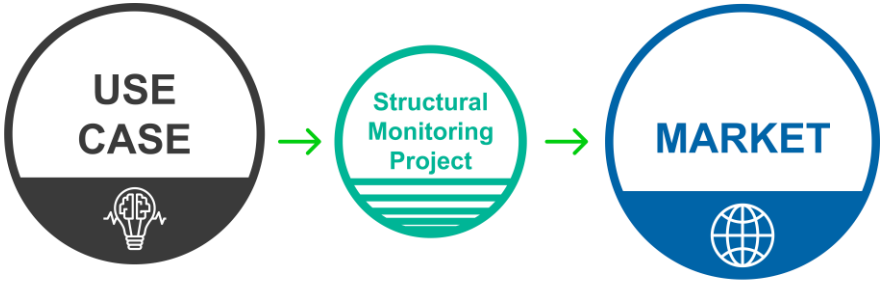
ProEsys developed a custom sensor performing real-time **Inclination, Vibration and Spectral analysis** :

discriminating the periodic oscillations of the tower from intentional tampering with mechanic tools.



Critical Infrastructure Monitoring using LoRaWAN®

ENERGY TRANSPORT USE CASE: Structural integrity of HV Pylons



- Custom sensors
- Rugged gateways for hostile environments
- Network server infrastructure

Any **anomaly triggers an alarm sent in real-time** over the LoRaWAN® network together with the exact position of the HV pylon.

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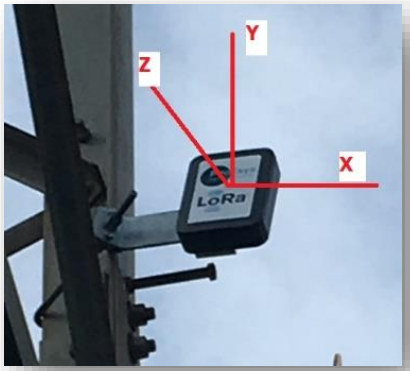
What we wanted to monitor:

- Integrity and verticality of HV pylons
- Protection against attacks and sabotage
- Prevention against copper theft
- Temperature of pylon
- Other specific applications



Advantages of LoRaWAN® Technology for Customers

Long Range: suitable for nationwide coverage of rural and mountain areas not covered by GSM, LTE and NB-IoT.

Low Power: sensors live up to 10 years on battery → reduced maintenance for hard-to-reach sites.

Ideal for **private and closed network** solutions with no internet access → required by critical infrastructure owners.

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All network elements under **full control of network owner**: sensors, gateways, network server, application server → a must for critical infrastructure owners, some require source code of all equipment.

High level of cyber security in the entire signal chain.

Remote parameter changes on sensors, up to entire firmware upgrade.

Standard protocol ensuring compatibility with different vendors of sensors and gateways.

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@LoRaAlliance

linkedin.com/company/loraalliance/

marcom@lora-alliance.com

lora-alliance.org

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LoRaWAN® Deployment Challenges In Emerging Markets

Anas Ouali (aouali@3s.com.tn)
Business Development Manager - 3S Tunisia

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AGENDA

- 3S Group Introduction
- Global IoT Strategy
- African Market Landscape
- Challenges

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- Turn Challenges Into Opportunities
- Relevant Use Cases
- Next?

3S GROUP INTRODUCTION

- Established in 1988
- IT Integration
- Internet Service Provider
- Software Development
- IT Training
- Multi-Channel Contact Center

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- Electronics Industry
- LED Lighting
- Photovoltaic Systems Integration
- Real Estate
- Bioplastics
- Bio Fruit Processing
- Shipyard/Boating
- …

GLOBAL IOT STRATEGY

IoTAfrica
Nationwide Network

Dedicated IoT
Platform

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Industrial Endpoint
Development

Local Startup Ecosystem
& Internship Programs

LoRa Alliance™
Member since 2016

AFRICAN MARKET LANDSCAPE & CHALLENGES

Source: LoRa Alliance (www.lora-alliance.org)

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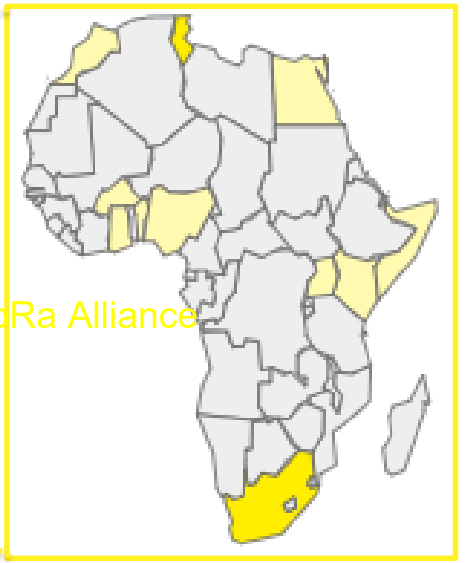

Objective > Increase Network Coverage & Deployments

CHALLENGES

Taxes

Regulation

Awareness

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Education

Infrastructure

TURN CHALLENGES INTO OPPORTUNITIES

- Highest-Growing Markets
- Large Investments
- Mobile/Internet Penetration

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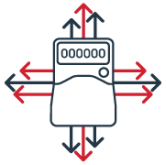
- Adapt Pricing Models/Market
- Do Not Miss Targets/Priorities
- Enable Local Services Development
- Invest In Education

RELEVANT USE CASES



Smart Metering

Cattle Tracking

Irrigation

Flood Prevention

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Forest/Land Fire Prevention

Air Quality

Pollution Prevention

NEXT?

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- Move Towards Africa
- Raise Awareness
- Educate
- Help Regulators
- Develop Solutions
- LoRaWAN® Certification Program

THANKS FOR YOUR ATTENTION

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Anas Ouali
aouali@3s.com.tn
+216 98 33 52 71

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LOGISTICS PANEL DISCUSSION

Moderator: Pierre Gelpi, Semtech

Gustavo Travassos, Maxtrack

Domenico Carapezza, Axino Solutions

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Alex Raimondi, Miromico

Massive Car Tracking Using LoRaWAN®

Maxtrack

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ABOUT MAXTRACK

- Leading GPS tracker manufacturer in Latin America for more than 10 years
- More than 3 million devices sold in Brazil over the last 20 years
- Design house in Beijing, logistics hub in Hong Kong, factory and R&D in Brazil
- Supplier of largest insurance companies and tracking companies in Brazil
- Leading data analytics platform for real time driver behavior analysis and theft, crash, fraud and fail detection

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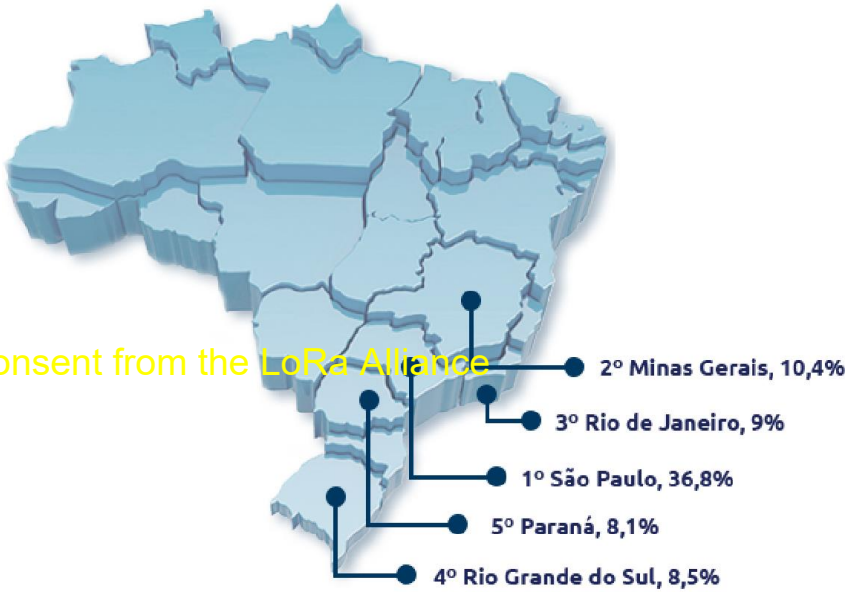
ABOUT BRAZILIAN FLEET

- In Brazil we have around 65,8 million cars and motorcycles, 5 million small trucks and 2 million trucks

- More than 70% of the fleet is within 5 states, concentrated in the metropolitan areas of these 5 state capitals



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ABOUT GSM AND LoRaWAN® NETWORKS IN BRAZIL

- GSM 2G covers about 93% of the population, corresponding to almost 4 thousand cities
- Phase out of GSM 2G has already started, with connections degrading more and more every month, but CAT-M1 or NB-IOT coverages are still not available. 3G is announced to be approaching end of life as well
- Cost of GSM 2G data is around US$ 1/month for M2M sim cards with 10MB plans and cost of 4G LTE is about US$ 7,50/month for the cheapest data plans, so there is a huge gap between these options, not to mention hardware cost impact
- American Tower has started its LoRaWAN® network last year and it covers about 35% of the population presently, with plans to reach 85% of the population by 2020

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ABOUT INSURANCE AND GPS TRACKING IN BRAZIL

- Every year, about 650K vehicles are stolen in Brazil (nearly 1% of the fleet), with some areas showing almost 3% rate, like Rio de Janeiro metropolitan area
- About 20% of the fleet have insurance, which is not mandatory in Brazil. Insurance companies have several restriction rules for covering professional drivers like Uber's or to cover old cars. GPS tracking is applied to only 5% of all insured cars, mainly to help recovering stolen cars above a certain value
- Another 4% of Brazilian fleet have some kind of loss protection or tracking service, but not a formal insurance, neither with any kind of roadside assistance
- Average cost of insurance in Brazil is about US$ 800/yearly, while non formal protection costs about US$ 250/yearly and GPS tracking services about US$ 180/yearly
- 76% of the fleet in Brazil (more than 50 million vehicles) have no insurance, protection or roadside assistance at all

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MAXTRACK'S STRATEGY TO INTRODUCE LORAWAN

- Show LoRaWAN® as a way to mitigate risk of 2G shut down
- Workaround CTO's dilemma between LPWAN technologies giving them options
- Use GSM/LoRa enabled vehicles to work as repeaters to provide connectivity outside of network coverage footprint.
- Create a LoRa peer-to-peer layer to allow a local network between devices
- Create an emergency beacon channel to help recovery teams to find stolen vehicles
- Enhance LoRaWAN-only devices with context awareness (via neural network) to minimize raw data transfers and so compensate for a smaller bandwidth than GSM
- Highlight LoRaWAN not as cheaper than GSM technology, but as a rich companion technology instead (customers are paying a premium for devices with GSM and LoRaWAN)

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ROADMAP

- Scale Maxtrack's LoRaWAN® solution (devices + device management + data analytics platform) as a solution to be deployed for all cars with insurance/roadside assistance in Brazil - already ongoing with biggest roadside assistance company in Brazil and second biggest insurance company
- Ramp GoS2, a company to offer some very cheap tracking and roadside assistance package to those 76% of the fleet which have no insurance or protection at all (about 50 million vehicles) in a very disruptive commercial model
- Create with biggest risk management company in Brazil a platform for having trucks working as multi-channel LoRaWAN gateways capable of "scanning" all goods being transported
- Create retail smart hubs to work as "last mile" LoRaWAN gateways, to guarantee coverage at critical points and to allow firmware updates and low cost indoor/outdoor location to all LoRaWAN only (no GSM) devices

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Thank you!

Gustavo Horta Travassos

Maxtrack/Denox

ght@maxtrack.com.br

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Improve Quality in Fresh Food Retailing with LoRaWAN® Technology

Domenico Carapezza, Axino Solutions GmbH

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Axino Solutions – www.axino-group.com

- Former Business Unit of Swiss technology company ascom
- Management Buy-Out Jan 2016
  New company named Axino Solutions
- IT Solutions and Consulting
  - Service Management
  - Telecommunication
  - Internet of Things
- IT-Solutions based on own products and of leading partners like:

bmc Partner · IBM Business Partner · SAP · ORACLE

- 100 employees
- Locations in Aachen/DE and Solothurn/CH

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Quality in fresh food retailing

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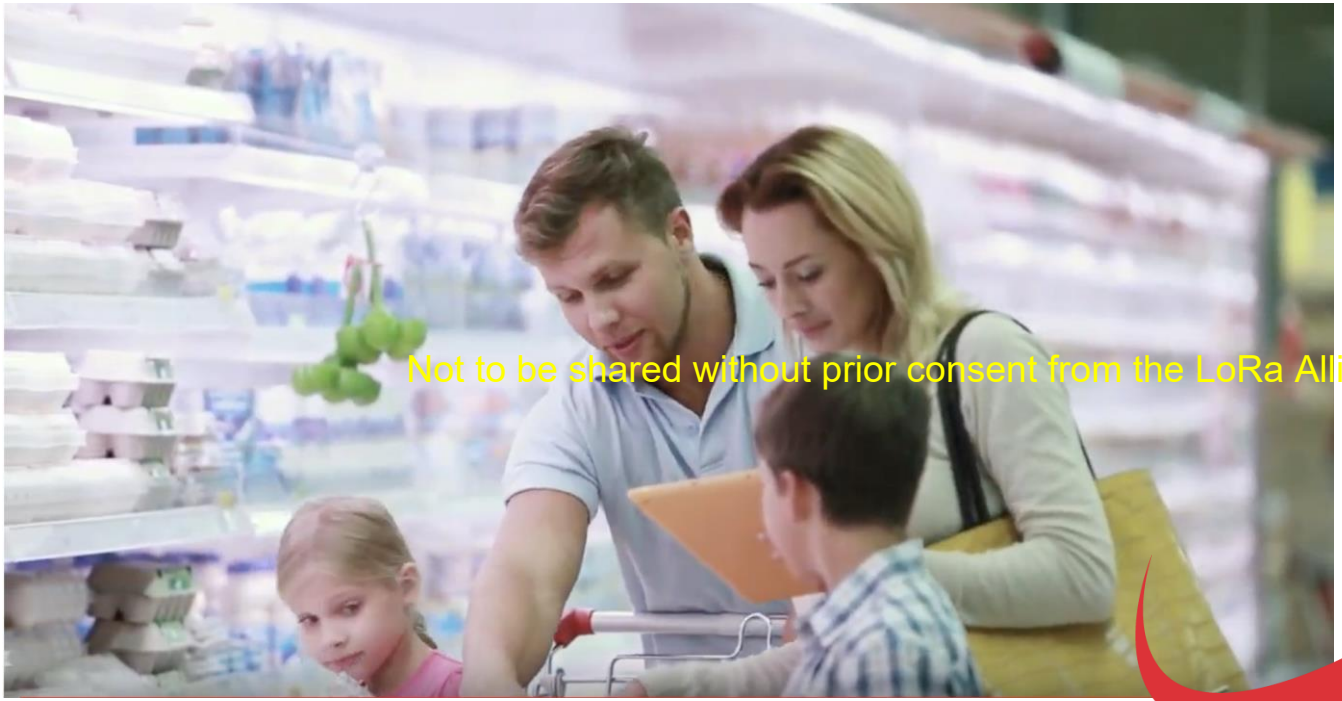
It’s all fresh?!



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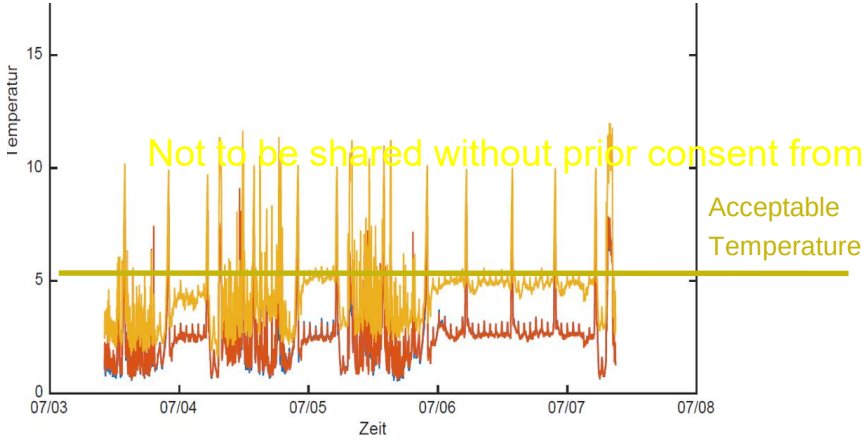
Enabling Food Quality Inside

Air temperature inside cooler



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- The temperature inside: fridge shows large fluctuations & peaks.
- This is due to: thawing cycles, temperature thermostat, customer interaction, employee interactions and environmental change.
- How can I make sure the food is cold enough at any given time?

LoRaWAN® Sensor Module

Essentially maintenance free

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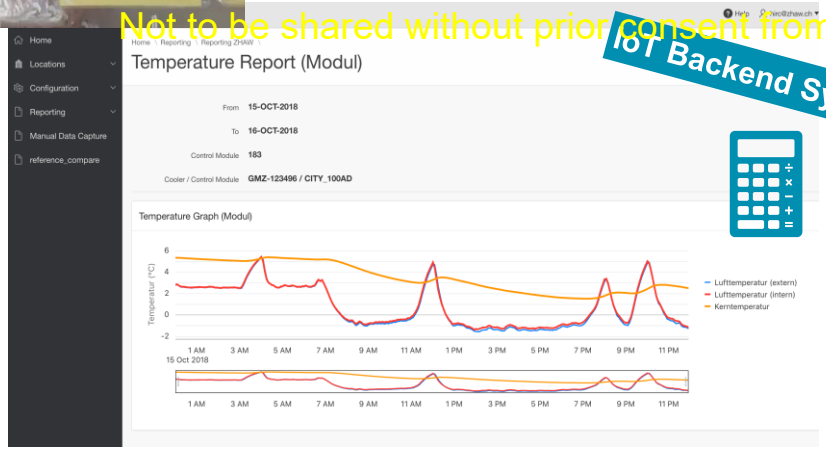
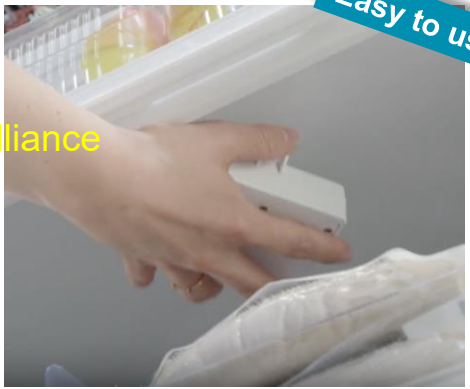
IoT Backend System



Easy to use



Benefits

Corporate Quality Assurance	Store Managers
Complete view in real-time	Complete view in real-time
Simplified control (internal / external)	Cost-effective installation
Traceability of QA measures	Reliable Alarming
Improved Quality	Simplified and improved documentation
Lower operating costs	Lower operating costs
Fast ROI (12-18 months)	

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Recognition

Finalist of the Aachen Innovation Prize 2018

Winner of the IoT/WT Innovation World Cup 2019
in the Category Transport, Lifestyle and Retail
Mobile World Congress 2019 in Barcelona

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@LoRaAlliance

linkedin.com/company/loraalliance/

marcom@lora-alliance.com

lora-alliance.org

LoRa Alliance™

Smartbutton Reader: The LoRaWAN® Smart Button Reader

Alex Raimondi, Miromico

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BRAVE NEW WORLD

THE POST IN TRANSITION

DIE POST

Digital Postal Services on demand at your Domicile

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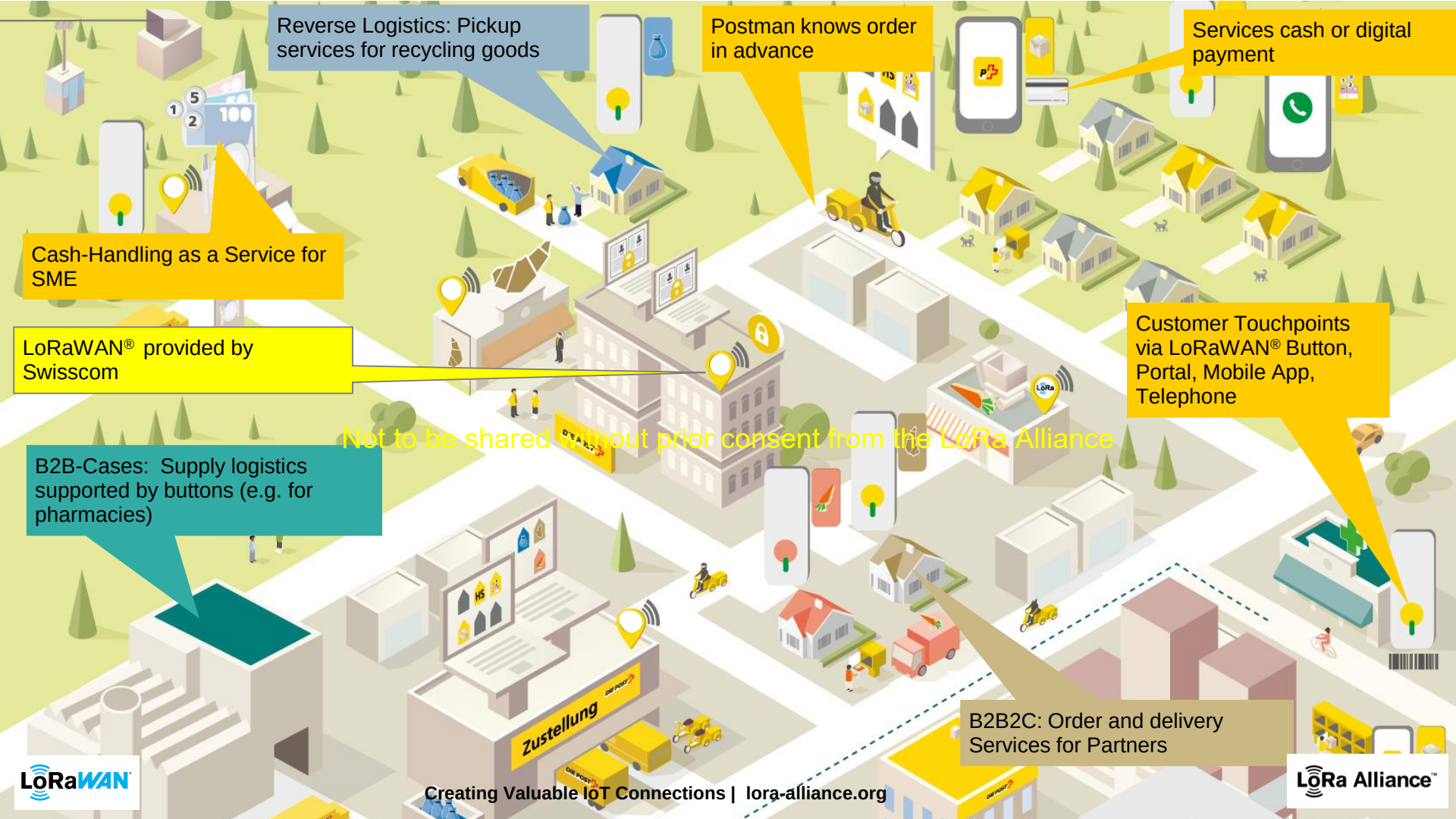
Reverse Logistics: Pickup services for recycling goods
Postman knows order in advance
Services cash or digital payment
Cash-Handling as a Service for SME
LoRaWAN® provided by Swisscom
Customer Touchpoints via LoRaWAN® Button, Portal, Mobile App, Telephone
B2B-Cases: Supply logistics supported by buttons (e.g. for pharmacies)
B2B2C: Order and delivery Services for Partners
Zustellung
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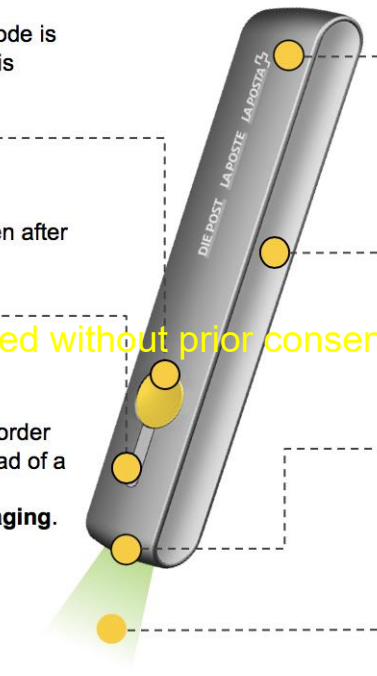
POST Home Button (PHB)
The innovative functions explained

Button:
With a click on the trigger button, the scan of an OID Code is carried out and the order is triggered. The amount due is automatically deducted from the once-off payment.

Status Display
If the scan was successful, the status bar lights up green after a short time.

Order Card
The customer can order products with the code on the order card. It is physically sent to the customer by post. Instead of a "card", any printable format can be used, including **catalogues**, **flyers** or an **imprint** directly **on the packaging**.



Antenne und Funkmodul
The button sends and receives data via a LoRa radio module. The LoRaWAN® has a network coverage of 95% of the Swiss population, is designed for the transmission of very small amounts of data and requires extremely little energy.

Battery
The integrated battery has a service life of up to 10 years on average usage. If the battery tapers towards the end, the button triggers the replacement by itself.

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OID Reader
The OID-Scanner is located in the head of the Home button. It is activated by pressing the button and can reliably read the OID Codes within milliseconds.

Scan area with OID-Code
The so-called OID Code (Optical Identification Code) contains product and service information. The code is read at the push of a button and transmitted to the post office by LoRaWAN® .

APPLICATION

1. Hold read head on scan area and click
2. Transmission via LoRaWAN®
3. Notification by e-mail / SMS to the stored e-mail address / mobile no.

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OTHER FIELDS OF APPLICATION

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DIE POST

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BAYER

LoRaWAN

LoRa Alliance

Menü-Bestellkarte

Bestellen Sie Ihre präferierten Schweizer Klassiker auf Knopfdruck

MENU CASA

Fleischvogel
252

CHF 14.80

mit Kartoffelstock und Karotten Rindfleisch, Schweinefleisch

Hacktätschli
253

CHF 12.80

An brauner Sauce mit Kartoffelstock und grünen Bohnen

Aelpler Magronen
250

CHF 12.80

Teigwaren, Kartoffeln, Käse, Röstzwiebeln und Apfelmus

Schweinsbratwurst an Zwiebelsauce
253

CHF 12.80

An brauner Sauce mit Kartoffelstock und grünen Bohnen

Brauchen Sie Hilfe?

Bei einer Fehlbestellung kontaktieren Sie uns bitte umgehend:
058 475 90 90 (Mo – Fr 8.00-16.00 Uhr)

Bestellen Sie Montag-Freitag bis spätestens 12.00 Uhr und wir liefern am nächsten Tag.
Preise verstehen sich ohne MwSt.
Bei Bestellungen unter CHF 50 wird eine Versandgebühr von CHF 8.50 verrechnet.

Bischofszell Nahrungsmittel AG, Industriestrasse 1, 9220 Bischofszell | www.menu-casa.ch | V01.00

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«SILVER ECONOMY» - A LARGE GROWTH MARKET

CARE COSTS TODAY: 7.2 MRD. / CARE COSTS TODAY 2030: 10.5 MRD. CHF

Trends

- **83% the senior citizens** do not want to stay in a retirement home, but at home
- **+34% empty beds** in retirement and nursing homes (2012 bis 2016)
- **New** housing forms and offers are in demand

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Social contacts

Essential factor for health and well-being

Support costs

(Spitex services)

2.45 Mrd. CHF 2017 (587.- per recipient), +5.8% for the previous year

Other markets

- Services at home (e.g. for DINKS)
- concierge
- secondary dwelling
- Hotel
- …

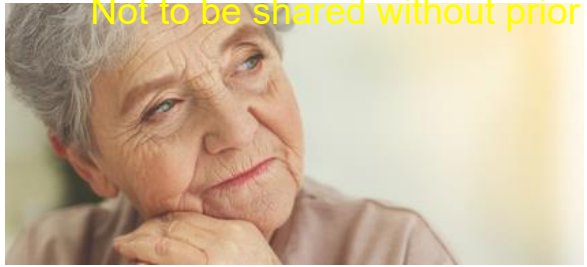
THE MARKET / OUR FOCUS

The market is changing rapidly due to various influences. This can be cost pressure (e.g. in the health sector) or new digital possibilities which allow services to be provided more efficiently. Customers are demanding more and more services, so-called "on-demand" services.

New business opportunities and potentials are opening up in this digital transformation.

Our focus:

Services for Silver Agers
(Living in old age)



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Mediation of services:
physically & digital

Further

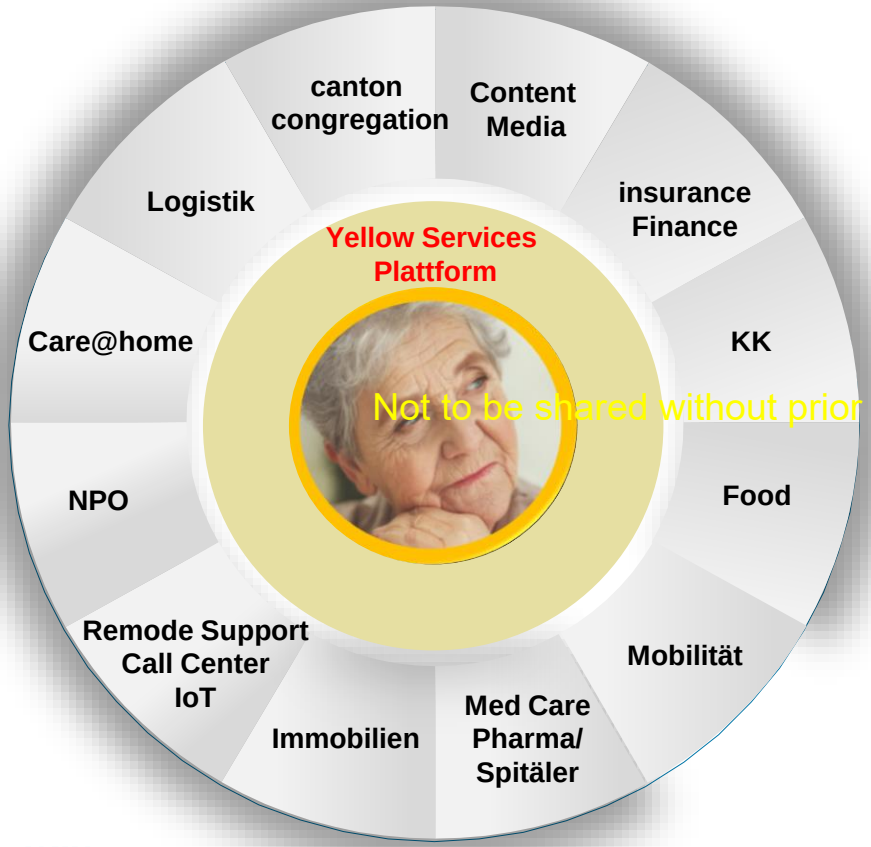
Markets
(Phase 2)

Services at home

Hotel and second apartments

etc…

«ÖKO-SYSTEM SILVER ECONOMY, WE CLARIFY»



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What are the needs?

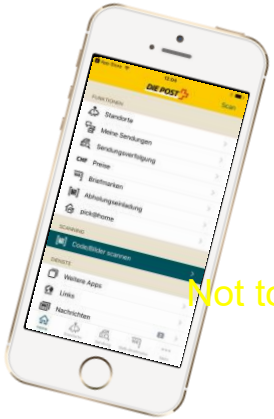
Possible offers?

Who are our partners?

=

Business Case Yellow Services Platform

HYBRID CODE



1 **Post CH App**
QR-Code Reader

Simple with system
QR-Code & OID-Code are united at Swiss Post

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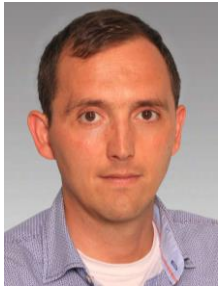
DIE POST **Post Home Button**

2 **LoRaWAN SmartButton**

The topic of cross-media is more present today than ever, because the physical and digital worlds are increasingly merging...

CONTACT



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Andreas Hosang
andreas.hosang@post.ch

Post CH AG
Project Manager PHB
PostNetz
Wankdorfallee 4
CH-3030 Bern

Thomas Koch
Thomas.koch@post.ch

Post CH AG
Enterpise Architect IOT
I421
Wankdorfallee 4
CH-3030 Bern

Alex Raimondi
Alex.raimondi@miromico.ch

Miromico AG
Director Embedded Systems
Gallusstrasse 4
CH-8006 Zürich

LOGISTICS PANEL DISCUSSION

Moderator: Pierre Gelpi, Semtech

Gustavo Travassos, Maxtrack

Domenico Carapezza, Axino Solutions

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Alex Raimondi, Miromico

WELCOME TO LoRaWAN® LIVE

BUSINESS TRACK 2.00PM – 6.00PM

BERLIN, JUNE 13, 2019

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LoRaWAN®

Creating Valuable IoT Connections

Benefits of Private LoRaWAN® Networks

Derek Wallace, Director of Product Management, MultiTech
LoRa Alliance North America Regional Vice Chair

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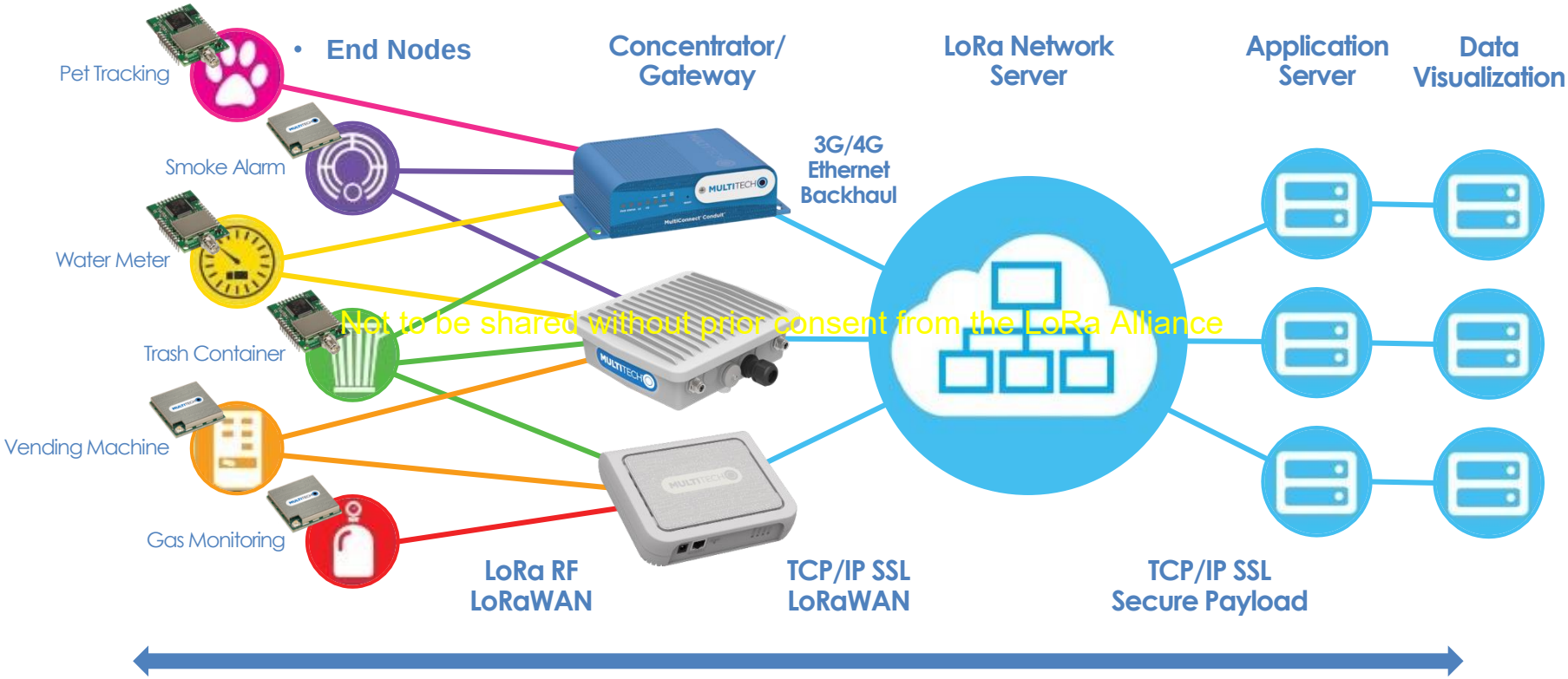
LoRaWAN®

Creating Valuable IoT Connections

Traditional LoRaWAN® – NS, JS, & AS in Cloud



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What is Driving Enterprise Networks

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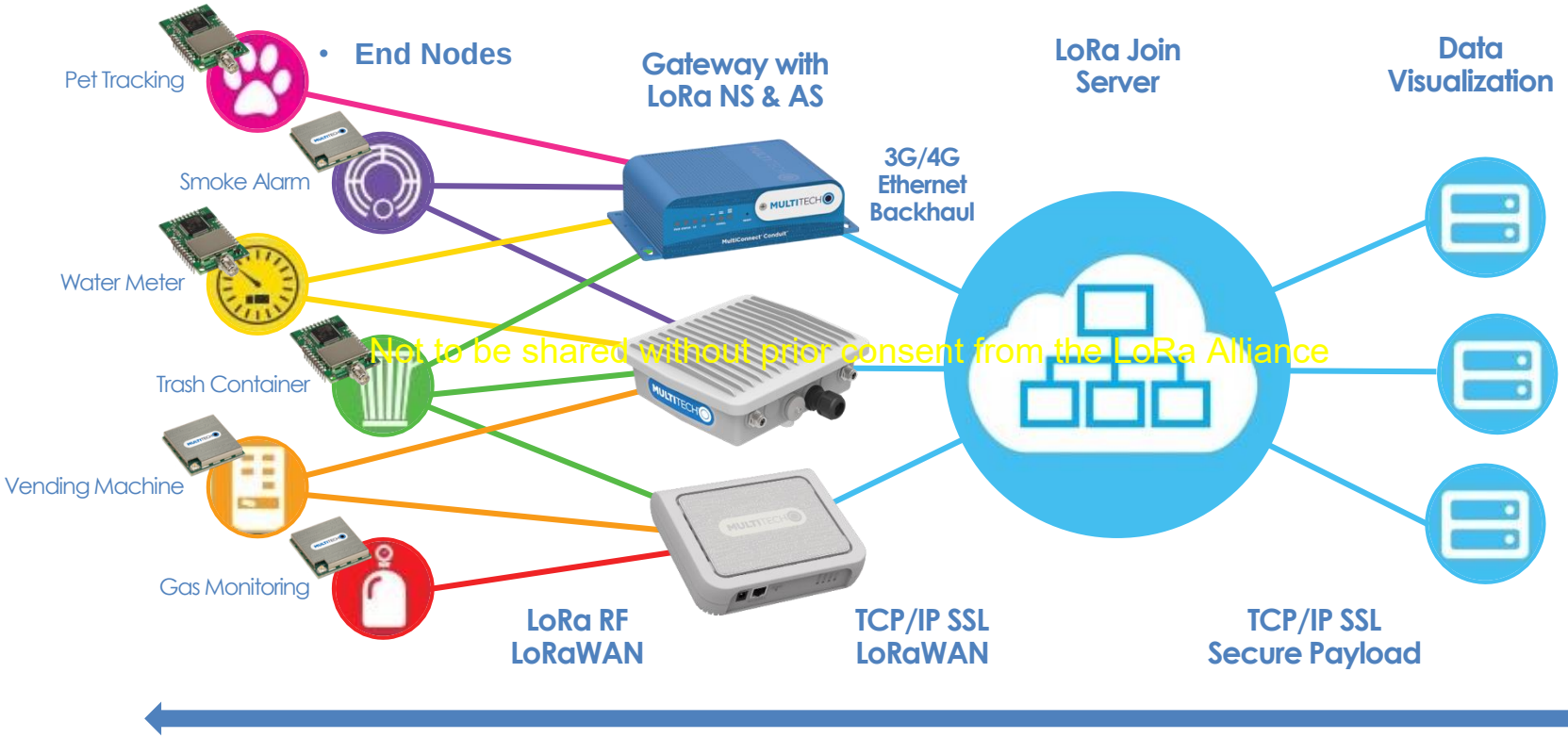
Lens LoRaWAN®- only Join Server in Cloud



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NETWORK TYPES

Public

Subscription Based

Just like a cell phone

Well-established network providers

Better for:

- Low CapEX
- Mobility
- Speed of deployment
- QoS/SLA-based Network Management

Enterprise (private)

Owner Operated

Mission-Critical System

Well established companies

Better for:

- Low OpEx
- Control of data on own network
- Leveraging edge intelligence
- Reduced backhaul costs

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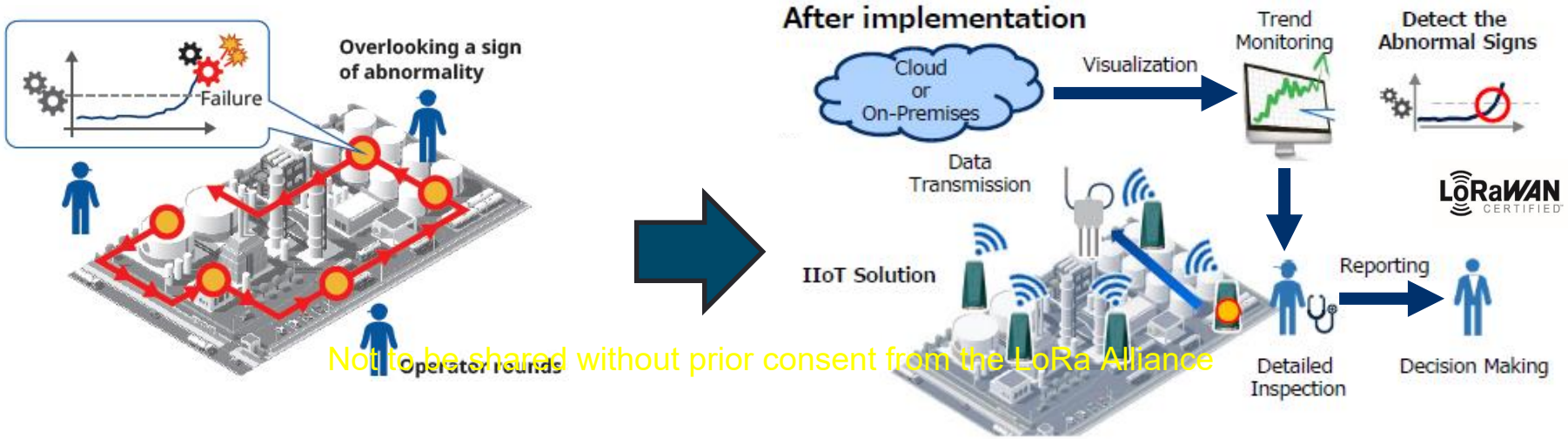
Higher Ongoing Opex Costs

Higher Upfront Capital Expense

Case Study: Yokogawa Sushi Sensor – Efficient Field Work



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Before

Outsourced vibration measurement for 200 items
$20 * 12 * 200 = **$48,000 / yr**

Inspection results were <u>not digitalized</u>.

→ Customer could not utilize the data.

After

No recurring fees

- Realtime equipment status check
- Automatic warnings to technicians.

→ Enables digital transformation.

LoRaWAN® Digital Pest Management Use Case

Overview

Industry: Digital Pest Management

Description: Operates as a life science company through four divisions including Pharmaceuticals, Consumer Health, Crop Science, and Animal Health segments

Business Issue, Solution, and Business Value

Business Issue

- Build a better mouse trap" and create a rapid-response system that enables companies to spot, thwart—and eventually predict—rodent incursions before they grow out of control. Wanted local decision-making and networks to reduce backhaul costs, control data flow over network and mitigate against internet loss.

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Solution

- MultiTech® partnered with the customer and added sensors to the rodent trap, paired with a LoRaWAN radio to transmit capture data to a central gateway, which relays the real-time data to a cloud platform.

MultiConnect® Conduit®

MultiConnect xDot®

Business Value

- This system **reduced** the time needed to manually inspect traps by an average of **60%** while enabling improved food safety and compliance monitoring and reporting

LoRaWAN® Private Network Benefits

- Custom application deployment
  - Load and manage your application on gateways
- Reduced cost and greater control of data packets
  - Only Join Request packets sent to the cloud
  - Your custom application decides what data is sent to the cloud for visualization
  - Network Availability
- Realization of edge intelligence and event processing capability
- No geographic restrictions
- Your own private LoRaWAN® network

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About MultiTech

MultiTech Industrial IoT Assets

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ISO 9001 Quality Management
FM31060

ISO 13485 Medical Devices Quality Management
FM 586973

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LoRaWAN®

Creating Valuable IoT Connections

LoRaWAN® is here to scale!

Wienke Giezeman
CEO The Things Industries

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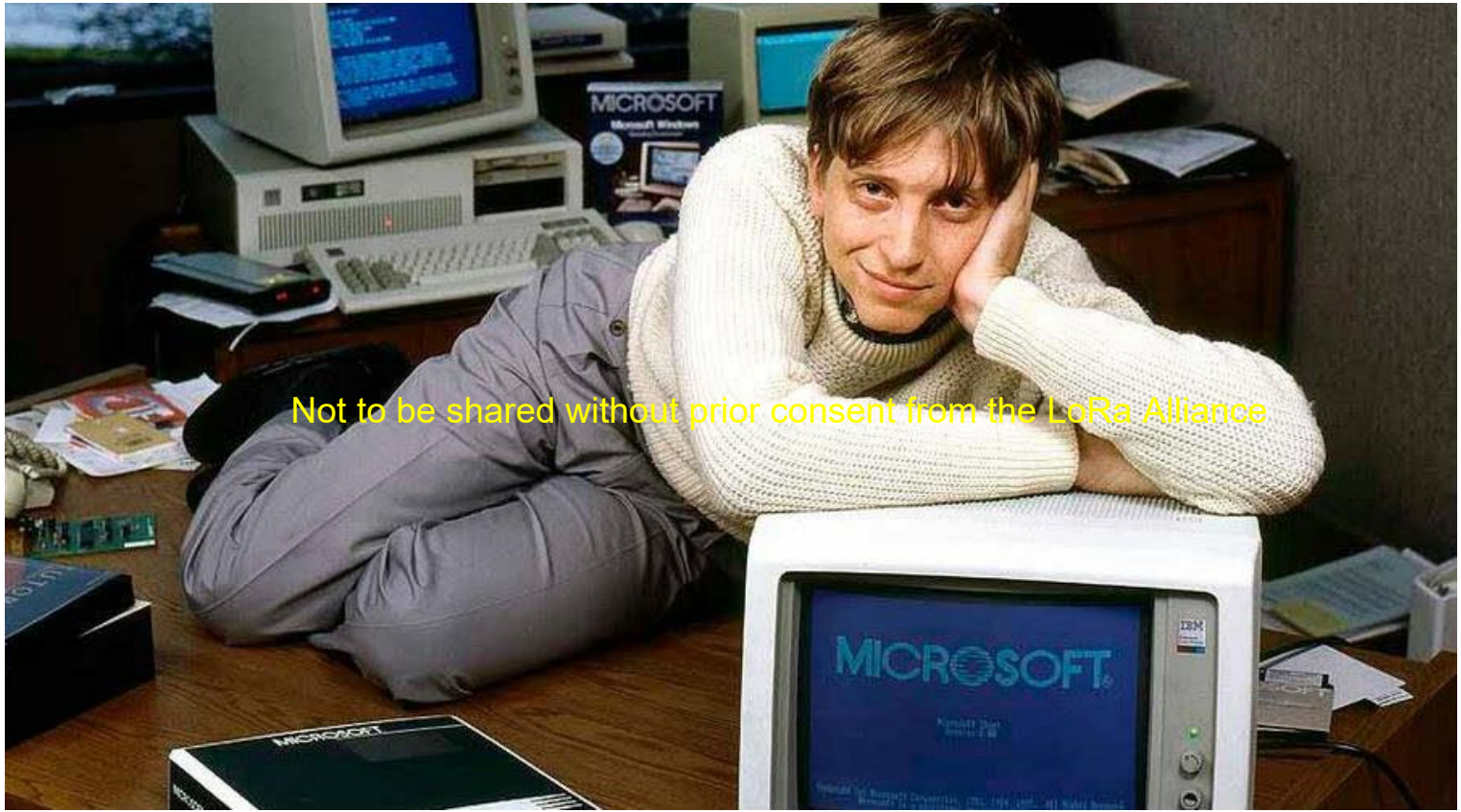
LoRaWAN®

Creating Valuable IoT Connections

Pushing the IoT dream



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What is the big IoT dream?

1. Ubiquitous connectivity – Connectivity like water from the tap
2. Devices can easily join the network like Wi-Fi

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The Good News

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The LoRa Alliance™ has thought this all through!

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The design has already been done!

- Ubiquitous connectivity – Networks are interoperable!
- Devices can join any network – We have a Join Server!

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And it is scalable because…

- Open standard
- Open spectrum

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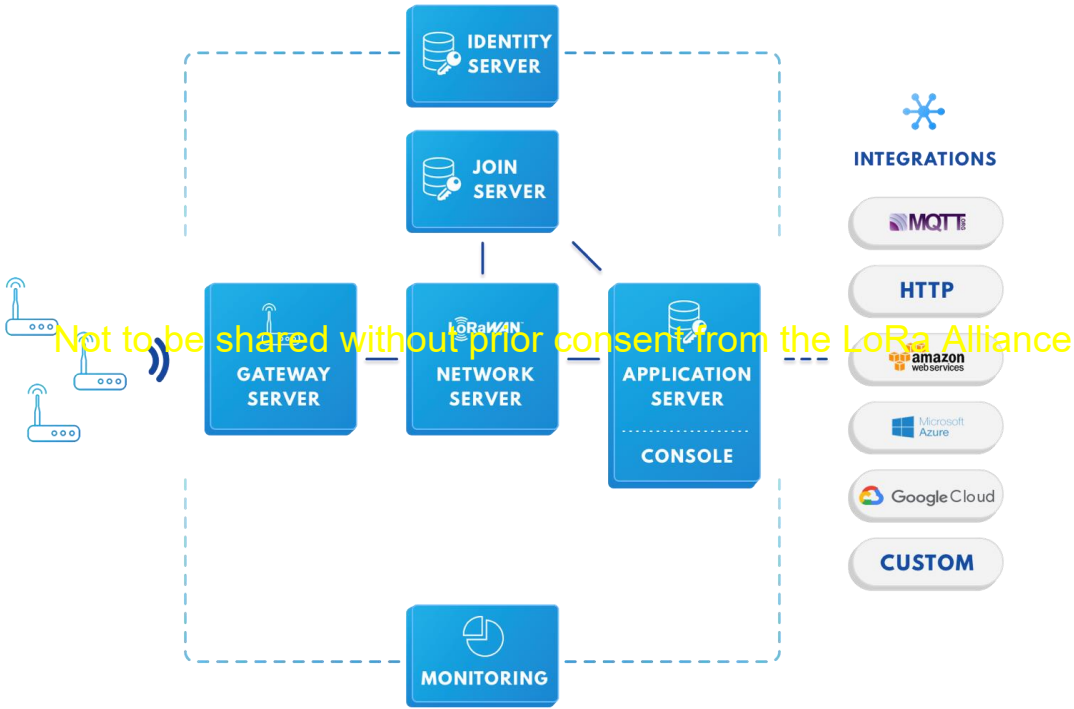
- **Separation of concerns**

The Architecture



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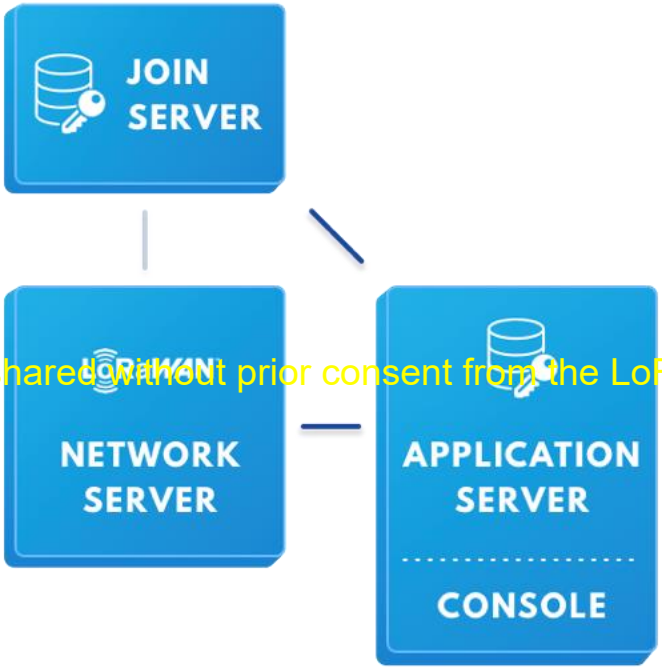
Agnostic Secure Hardware Solutions

Agnostic Join Server Implementation



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Conclusion

The members of the LoRa Alliance™ are pushing the IoT dream every day. Pushing global ubiquitious connectivity where devices can join anytime and anywhere.

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LoRaWAN®

Creating Valuable IoT Connections

SMART BUILDING & SMART CITY PANEL DISCUSSION

Moderator: Byron Bemiller, Semtech

Jean Baptiste Raphanaud, LHIRR for Accorinvest
Hany Zekry, Digimondo
Tim Giesendorf, Digitalstadt Darmstadt GmbH
Yannik Kopp, LORIOT.io AG
Hans Scholten, Cap Gemini
Becky Oh, PNI Sensor

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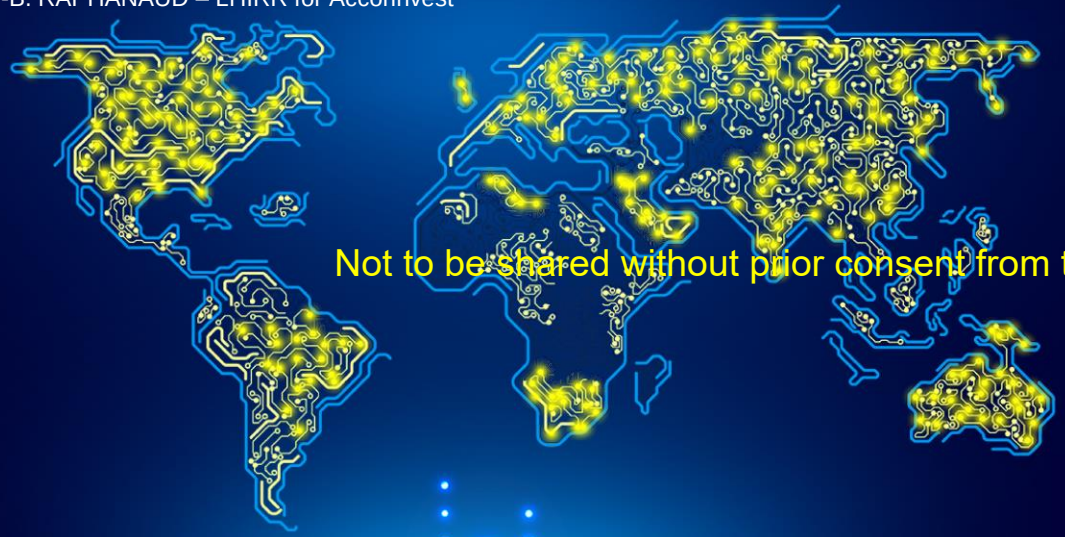
ACCORINVEST – CARBON ACTION PLAN

How Accorinvest Transforms its Building Asset Management Strategy Thanks to LoRaWAN® Private Networks

J-B. RAPHANAUD – LHIRR for Accorinvest



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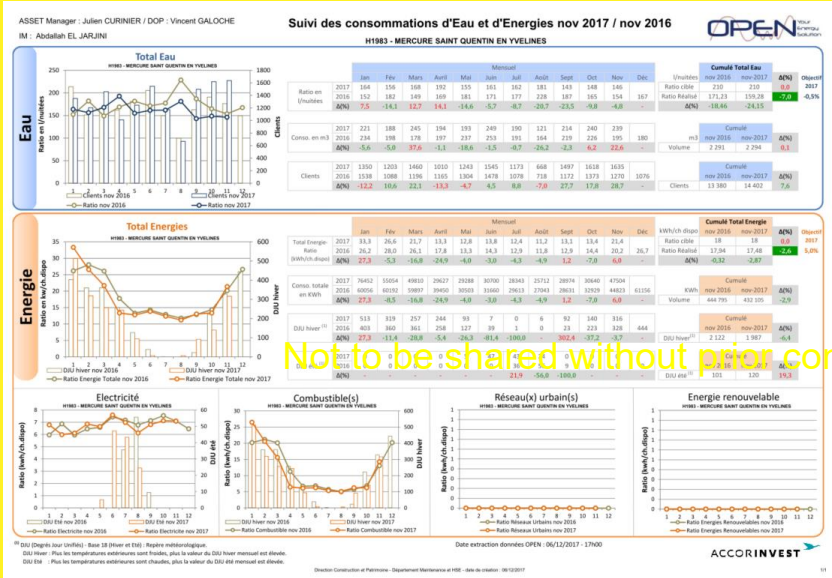
LoRaWAN®

Creating Valuable IoT Connections

Our story



Until 2016, a tool for:
Manual data collection
Monthly report for Technical Engineer
2 reviews/year

CAP
CARBON ACTION PLAN

From 2017:
A new way of management for Water, Energy and Critical Processes

Connected to daily hotel activity, involving GM, TE, HoD.

Bringing new skills to hotels for building systems management.

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Our IoT solution: figures

CARBON ACTION PLAN

70

70 hotels in 2018 (BE, DE, ES, FR, GB, NL)
+ 55 in 2019 (+ BR, IT, PL, PT)
Target: 850+ hotels in 26 countries by 2021.

126

126 references in our connected devices catalogue from 9 european suppliers.

11

11 video tutorials, 1 web&mobile application for provisioning,
1 helpdesk available by phone and e-mail.

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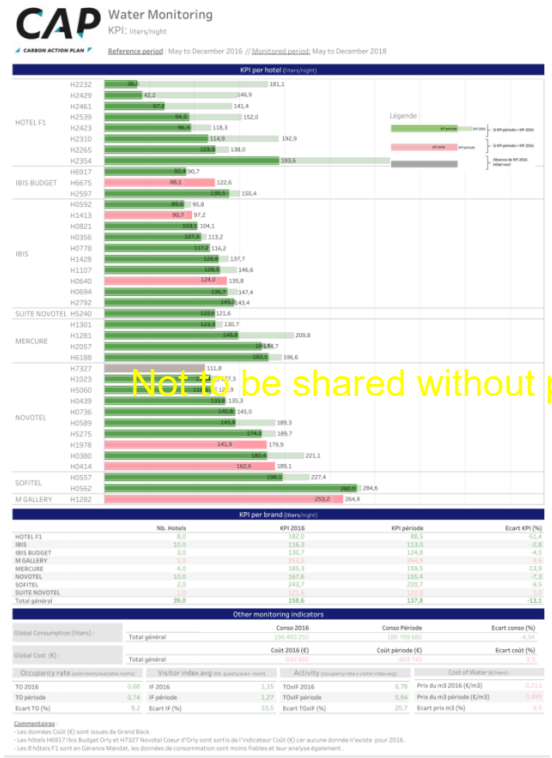
1

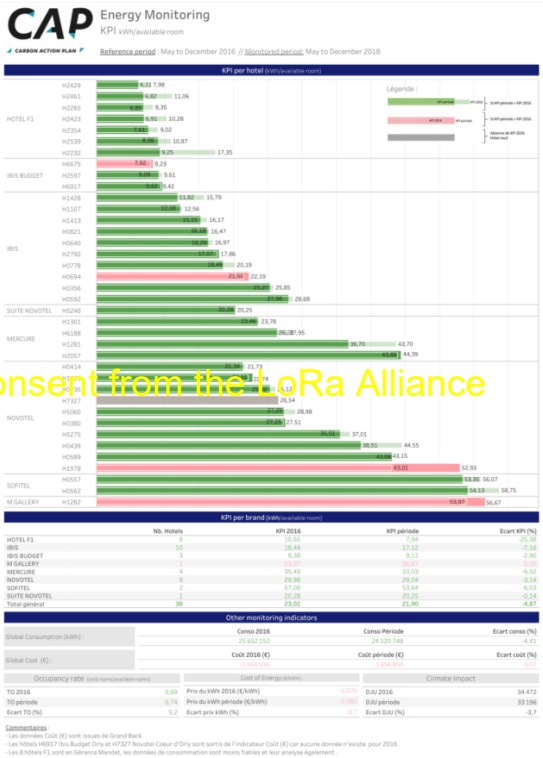
1 flexible, cutting-edge, accorinvest-owned infrastructure and software environment for connected buildings.

5286

5286 data streams including 2956 streams from LoRaWAN devices and 2330 streams from web and internal services.

A key-feature: getting results





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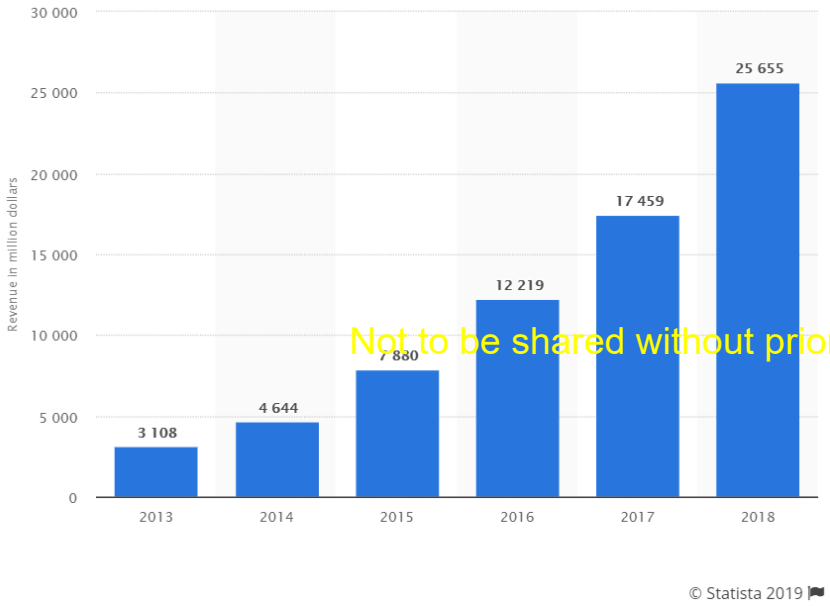
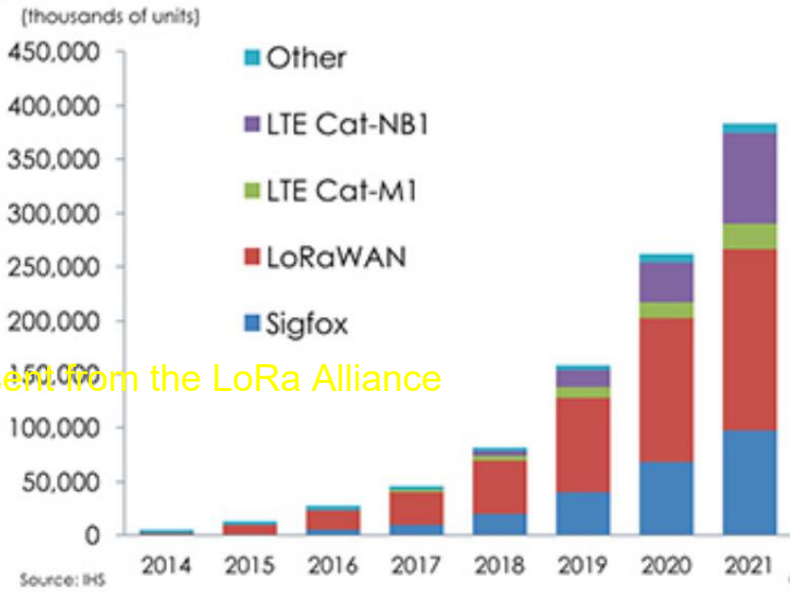
Building an IoT solution, our five rules

Rule #1: Never fall asleep – A market review every 6 months





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AMAZON WEB SERVICES REVENUE GROWTH

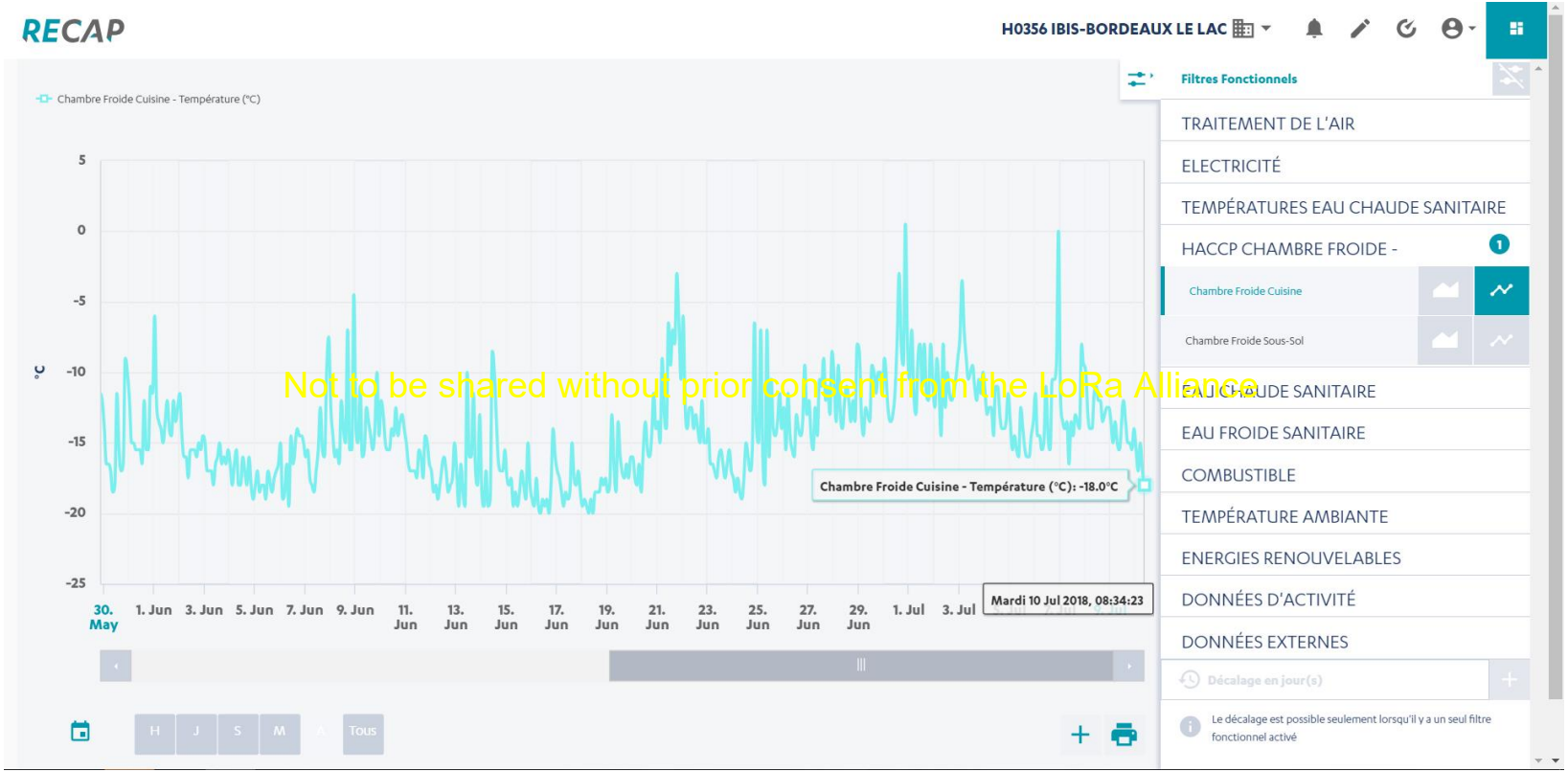
In Millions Dollars - Source: Statista

PUBLIC IOT NETWORKS GROWTH

In Thousands of Units - Source: IHS

Building an IoT solution, our five rules

Rule #2: Stay focused on your core-business – Do not listen tech-gurus



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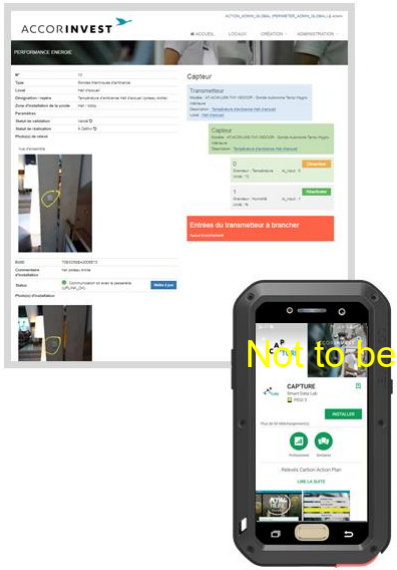
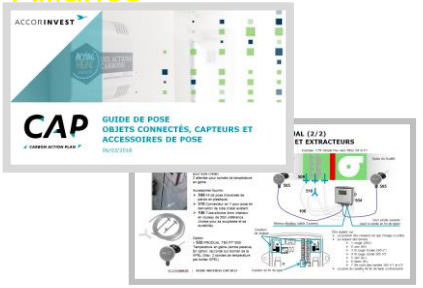
Rule #3: Get out of your office, use the tools you designed



Tutorials

Hardcopy of support documents



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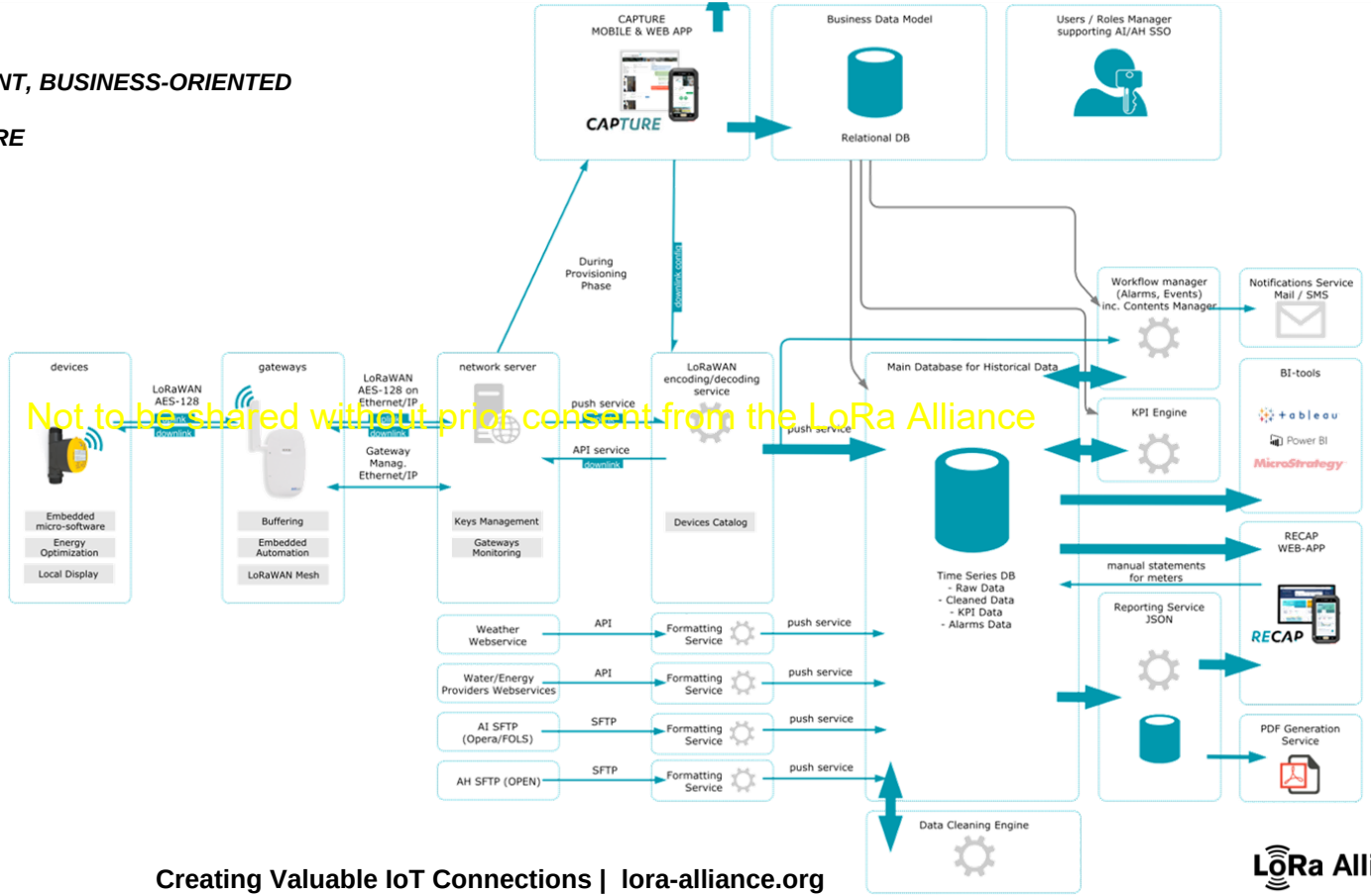
Rule #4: Popularize

A FLEXIBLE, TRANSPARENT, BUSINESS-ORIENTED

SOFTWARE ARCHITECTURE

FOR ACCORINVEST



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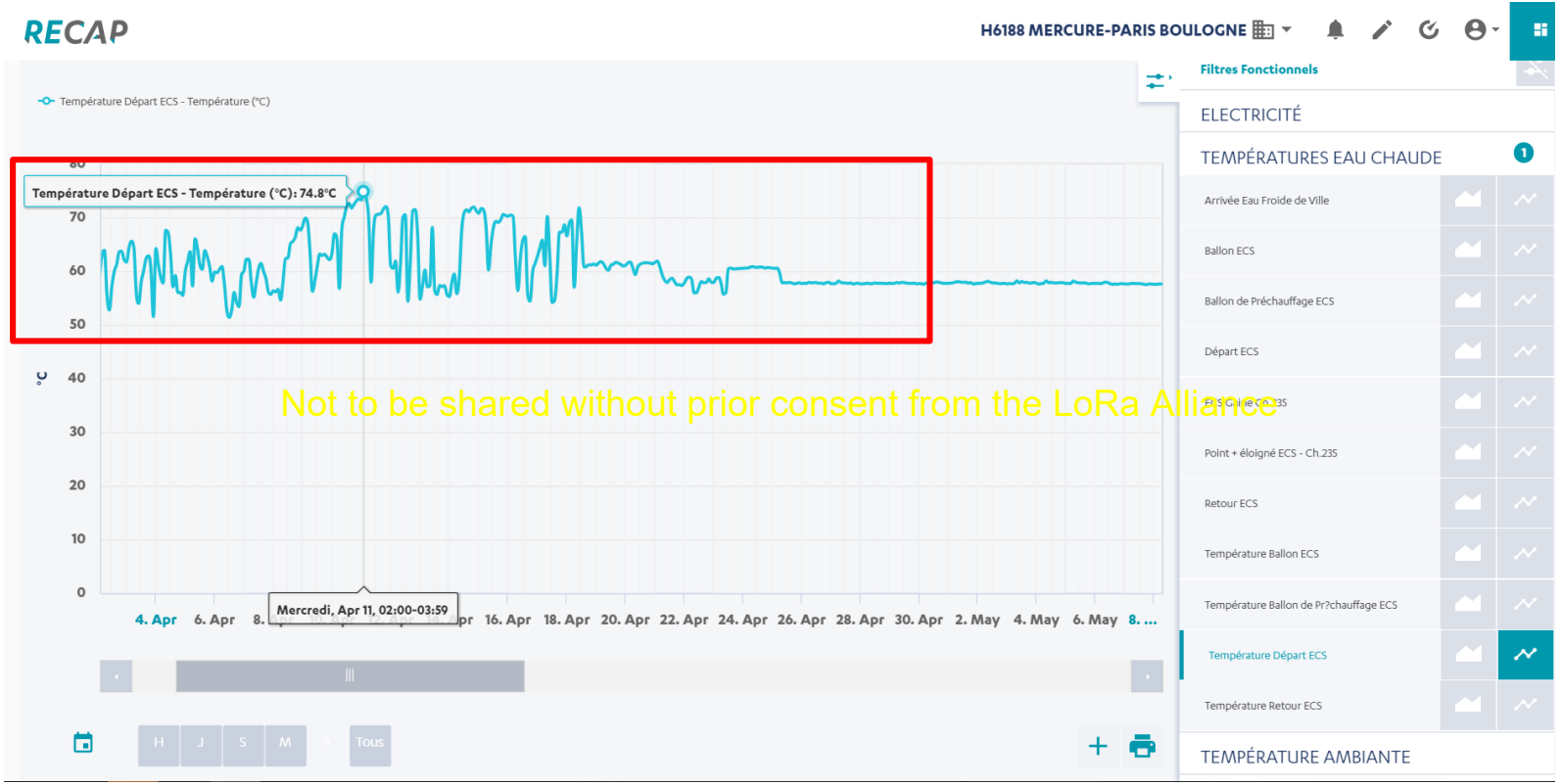
Rule #4: Feed your roadmap with feedback



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IoT is not IT.

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Why LoRaWAN® with a private network? 1/4

RADIO PERFORMANCE

LORA MODULATION IS VERY POW…

YOU KNOW IT.

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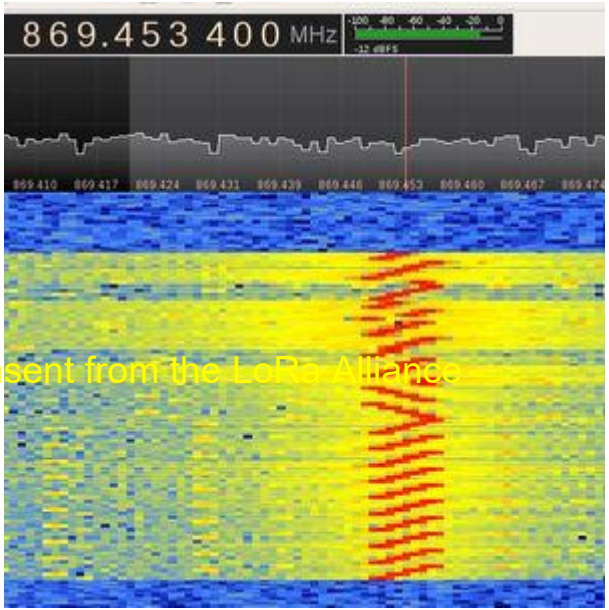
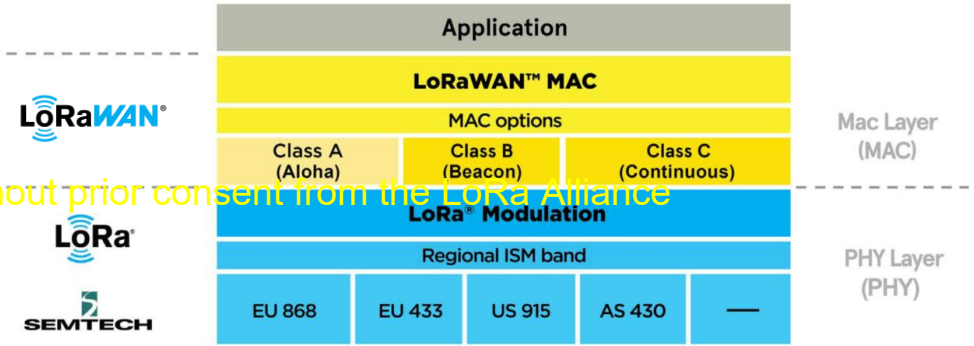


Source: revspace.nl

Why LoRaWAN® with a private network? 2/4

A SMART PROTOCOL

LoRaWAN® ADAPTATIVE DATA RATE (ADR) BRINGS FLEXIBILITY IN USE-CASES DESIGN FOR BUILDINGS.



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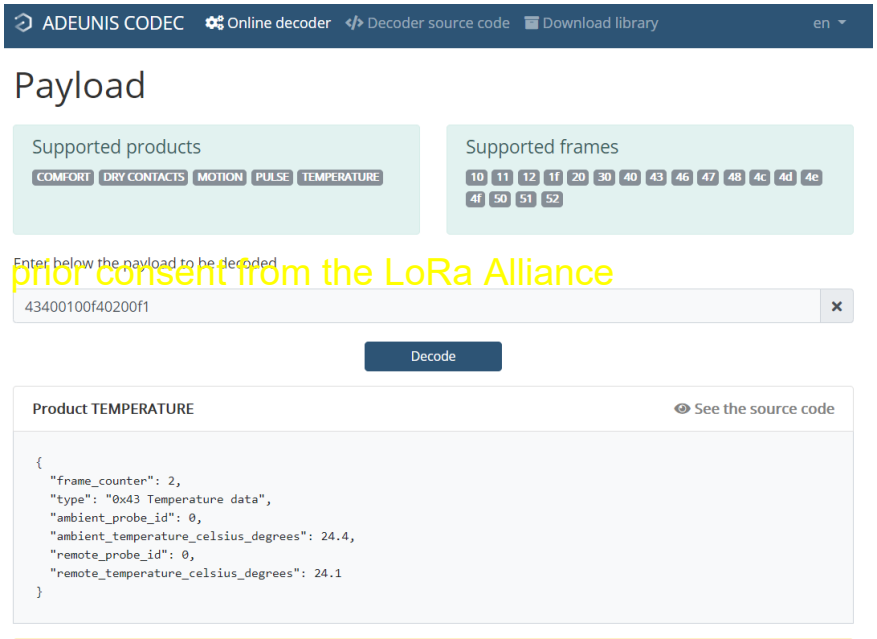
Why LoRaWAN® with a private network? 3/4

OPENNESS AND SIMPLICITY



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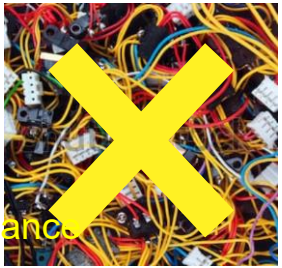
Why LoRaWAN® with a private network? 4/4

COMPETITIVE DIRECT AND INDIRECT COSTS



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LIGHT NETWORK, LIGHT FEES

DEVICE MAKERS COMPETITION

REDUCED INTEGRATION COSTS

Private LoRaWAN® networks:

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4x4 connectivity for buildings

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LoRaWAN®

Creating Valuable IoT Connections

HOW LoRaWAN® MAKES SCHOOLS SMARTER AND SHAFT CONTROL SAFER

Hany Zekry, Digimondo

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LoRaWAN®

Creating Valuable IoT Connections

About DIGIMONDO

DIGIMONDO

- Based in Hamburg
- Provider for IoT software solutions
- Simplify digital transformation, automation, visualization and IoT

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DIGIMONDO’s goals

DIGIMONDO

- Make IoT and building automation for public buildings as simple as possible
- Use IoT for local municipality and ensure a safe work environment

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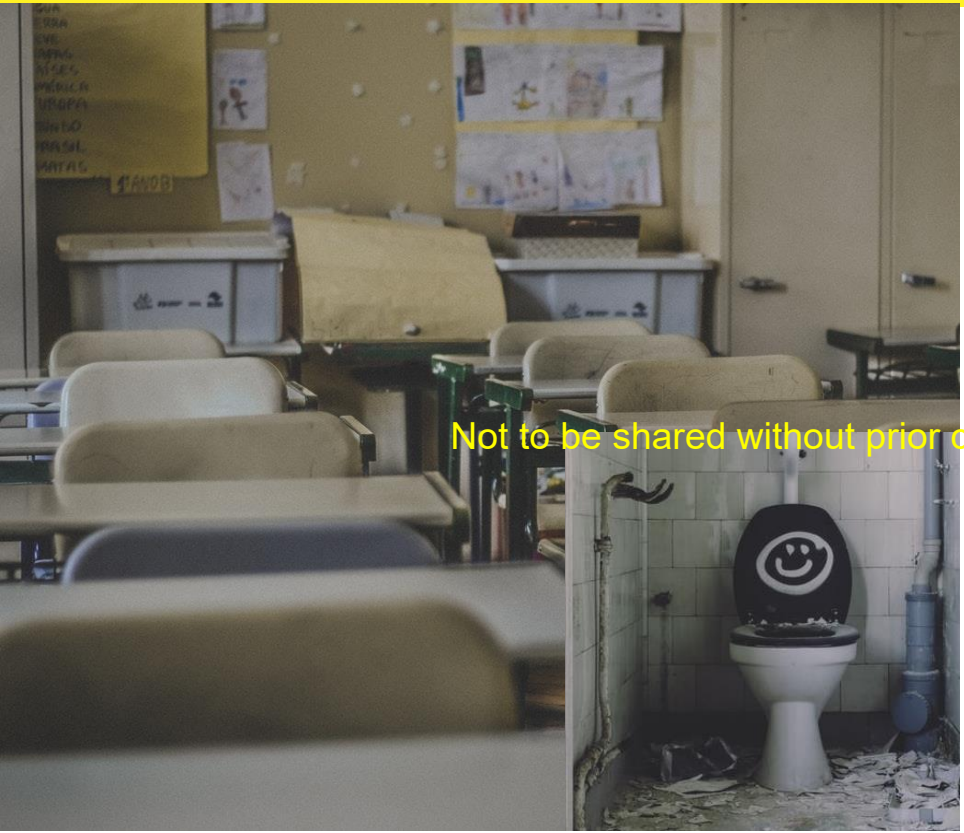
How DIGIMONDO uses LoRaWAN® to make schools smarter



- Janitor Peter has many tasks at school
- The school ground is extensive and utilized by many people
- Last year, the toilets were vandalized at night
- Bad air quality makes children perform worse in schools

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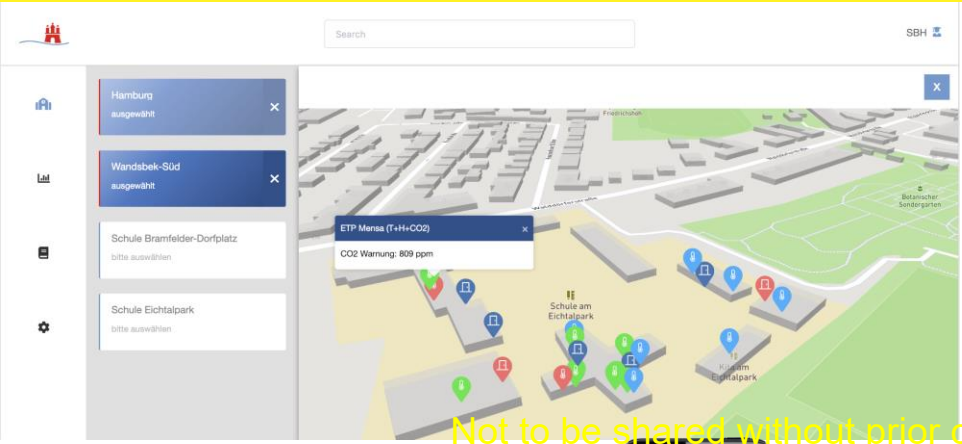
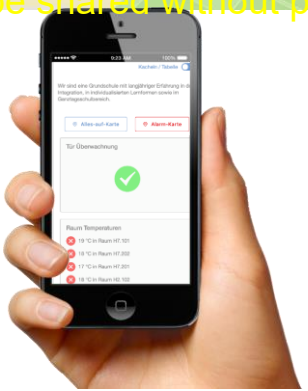
The solution: MONITORING WITH REDUCED PERSONNEL EXPENSES





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- ✓ Wireless monitoring of schools with LoRaWAN®
- ✓ Integrated 3D app to show alarms about CO^2 or open doors in real time
- ✓ Battery operated
- ✓ Easy installation
- ✓ Next step: LoRaWAN® network for locking system in sports facilities in Hamburg

How public building companies and schools benefit from LoRaWAN®

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- Facility management companies bear the risk of liability for public buildings
  → **LoRaWAN® prevents risks and warns before potential damage**
- Instead of 30.000 transponder cards (25 € each) for all sports facilities in Hamburg, companies only need one locking system
  → **LoRaWAN reduces costs and staff**
- Schools become bigger and more difficult to maintain
  → **LoRaWAN establishes a better learning atmosphere, reduces costs and staff**

How DIGIMONDO uses LoRaWAN® to ensure shaft control

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- Andreas, father of 2 children, works at a local municipality
- Every week, he has to climb down shafts
- Shaft control is necessary and unpredictable for the workers
- Opening is narrow and slippery
- Just recently, a colleague fell and was badly injured

The solution: NO MORE UNNECESSARY CHECK-UPS!

- ✓ Wireless monitoring of schools with LoRaWAN®
- ✓ Integrated 3D app to show alarms in real time
- ✓ Battery operated
- ✓ Easy installation

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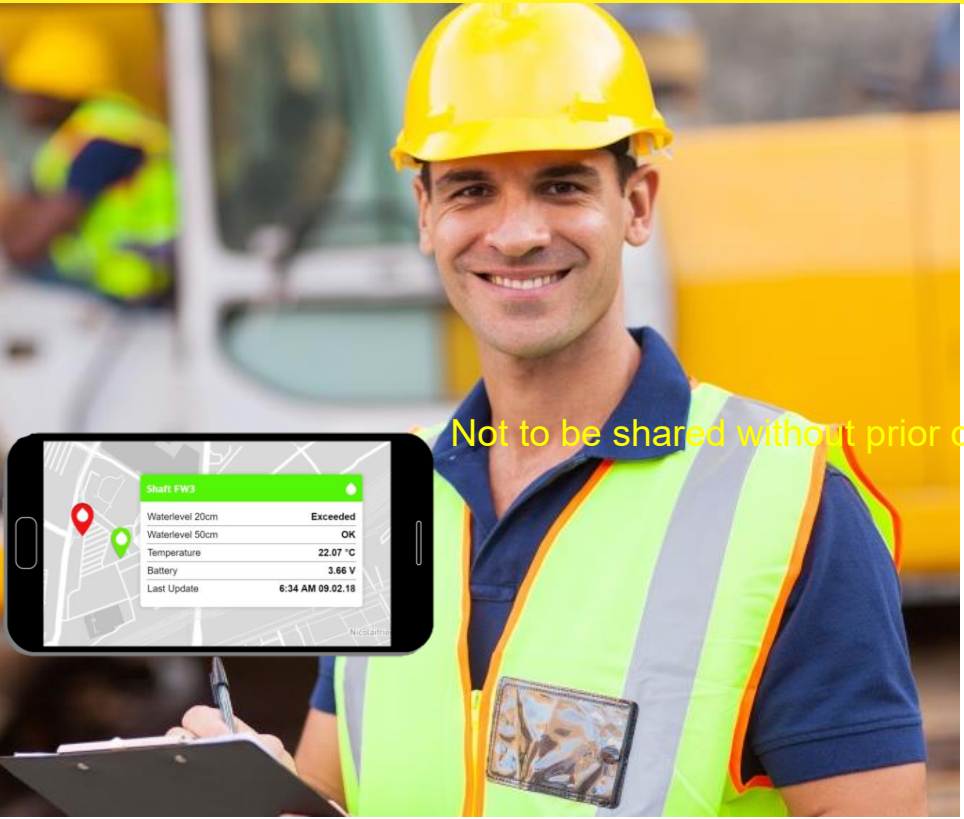
How local municipalities benefit from LoRaWAN®



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- Damages on pipes are difficult to detect and cost-intensive
  → **LoRaWAN® simplifies monitoring, gives warning before the damage and reduces costs**
- Workers at local municipalities need to conduct shaft inspections regularly
  → **LoRaWAN reduces personnel costs and worktime**

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linkedin.com/company/loraalliance/

marcom@lora-alliance.com

lora-alliance.org

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Creating Valuable IoT Connections

LoRaWAN® as a SmartCity enabler

The Digitalstadt Darmstadt case study

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BITKOM Contest „Digitale Stadt“

- In November 2016 BITKOM (Germany’s Telco and IT industry association) initiated the contest „Digitale Stadt“
- The Goal: The model city of the future sponsored by BITKOM companies
- The Prize: Two-digit million amount worth of goods and consulting services
- All cities with a population of up to 150.000 inhabitants could participate
- Darmstadt emerged successful from this contest

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A SPECIAL ECOSYSTEM FOR THE DIGITAL MODEL CITY

LOCAL ECONOMY

+ >150 ADD. COMPANIES

YOUNG CITY
20-35 YO. CITIZENS

COMPANIES

LOCATION

DIGITAL HESSEN STRATEGY

SUSTAINABILITY
100% climate neutral

CITY

ECONOMY

STARTUPS

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INTERNATIONALITY

CULTURE

CITIZENSHIP

SCIENCE

STRATEGIC FEDERAL PROJECTS

UNIVERSITIES

INDUSTRY 4.0

INTER-DISCIPLINARITY

STEM-ORIENTED

Darmstadt bleibt weltoffen.

WILLKOMMENSKULTUR

EUROPEAN ORGANISATIONS

RESEARCH INSTITUTES DIGITIZATION

CYBER SECURITY

VISUAL COMPUTING

ELECTROMOBILITY

PROJECT OVERVIEW

Highly innovative, high-visibility projects

Administration:
- Community service account
- On-line application management
- Introducing „E-Akte“
- GovBot (Chatbot)

Commerce:
- Location-based Services / Marketing
- Online trading platform with Same-Day Delivery
- Connection / Expansion via Ebay on-line trading platform
- City Logistics

Society:
- Digital City Lab
- District App / Digital Neighborhood Support
- Data visualization
- Expansion of citizen participation platform
- Live Streaming of City Council meetings and other city events

Health:
- Digital patient records
- Data cross-link between hospitals and healthcare providers
- On-line Check-In to Klinikum Darmstadt
- Chatrooms for target group-specific on-line consultation and help

Mobility:
- Smart Traffic
- Multimodal Transport App
- Semi-autonomous tram testing
- Autonomous Minibuses
- Smart Parking
- Traffic light sensors

Education:
- Model Project „Digitale Schule 2020“
- „Haus der Digitalen Medienbildung“ education portal
- Digital education map

Environment:
- Smart Waste
- Smart Zoo Vivarium
- Mobility portal – city carpool
- Environmental sensor network

Safety / disaster control:
- Drones and cameras for situation control
- Digital mobile mission data collection for emergency services
- Digital control center setup

Energy:
- Smart Lighting / Intelligent Street Lighting
- Area concepts for building stock / local power generation (Mieterstrom 2.0)
- Smart Grid / Smart Meter expansion

IT Infrastructure:
- **Setting up LoRaWAN as basis for IoT Applications**
- Test field 5G
- Expanding Darmstadt Wi-Fi

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Cyber Security:
- Encryption between city administration and local economy
- Intelligent virus detection through artificial intelligence (Working title)
- High security data platform

Data platform:
- Creation of an overarching data platform
- Core aspects of Internet of Things, E-Administration, Open Data
- Connection / Interface between different companies’ IT systems

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DIGITALSTADT DARMSTADT

Teilweise © Flaticon

PROJECT OVERVIEW

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DIGITALSTADT DARMSTADT

Teilweise © Flaticon

LoRaWAN® as SmartCity foundation

- 7 out of 10 projects include IoT & LoRaWAN®
- Network coverage in the city area, regionwide roll-out in planning
- High importance on data security, scalability and reliability
- Partnership with **LORIOT** for on-premises network server operation and consulting in the Smart Cities field

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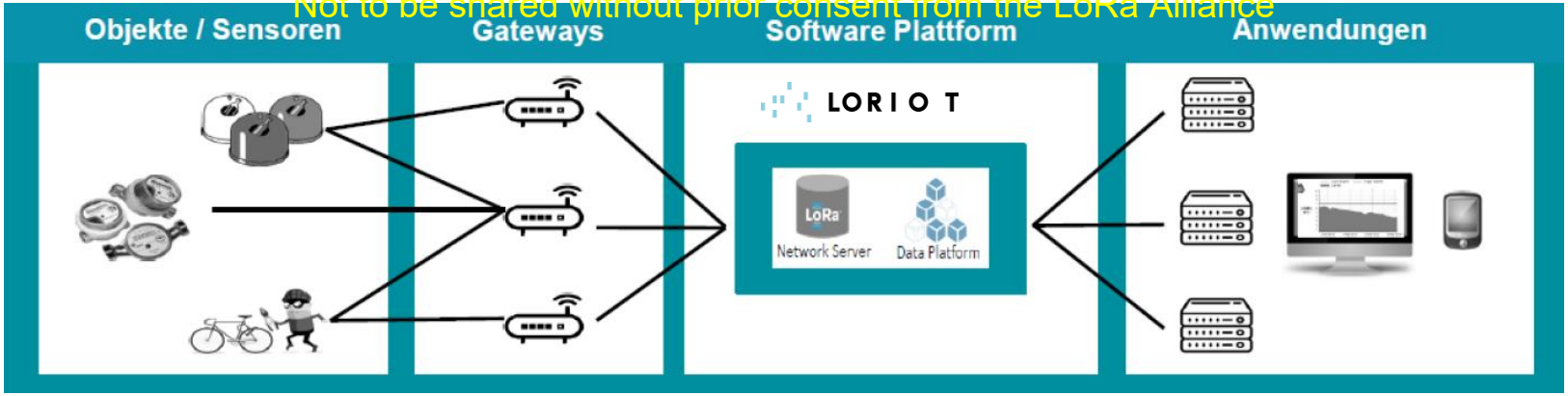

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Smart Waste

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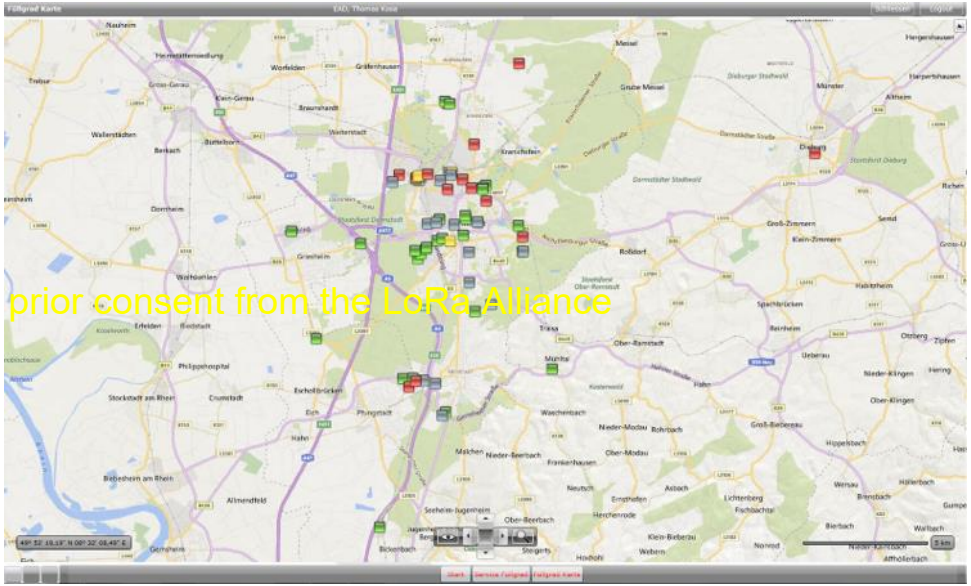
Smart Waste



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IoT and LoRaWAN® Education

- Two times a month the Digitalstadt Darmstadt visits schools and universities to do workshops about IoT and LoRaWAN®
- Participants come up with their own use cases or work on existing projects
- The age range of the participants is between 12 and 20

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Tim Giesendorf, IoT Solution Architect
Digitalstadt Darmstadt GmbH

Yannik Kopp, Head of Business Development
LORIOT.io AG

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linkedin.com/company/loraalliance/

marcom@lora-alliance.com

lora-alliance.org

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Real-time occupancy information in 400 offices for 200.000 users

H.W. Scholten Capgemini

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Capgemini

Capgemini's Corporate Real Estate Services (CRES) wanted to monitor 1.6 million sqm of office space and measure the usage (400 offices, 200000 employees, 60 countries, 10000 meeting rooms)

Space Optimization

- Reducing no-shows in meeting rooms (used to be 30%)
- Show availability of meeting rooms and desk in real-time

Comfort

- Measure CO2, noise, light, humidity and temperature
- Real time dashboard for users showing area specifics

SQM Rightsizing

- Increase space utilization from 65% to 75% by reducing SQM at contract renewals

Sustainability

- Less SQM results in less Carbon footprint
- Less travel (plane/car) by investing in communication equipment

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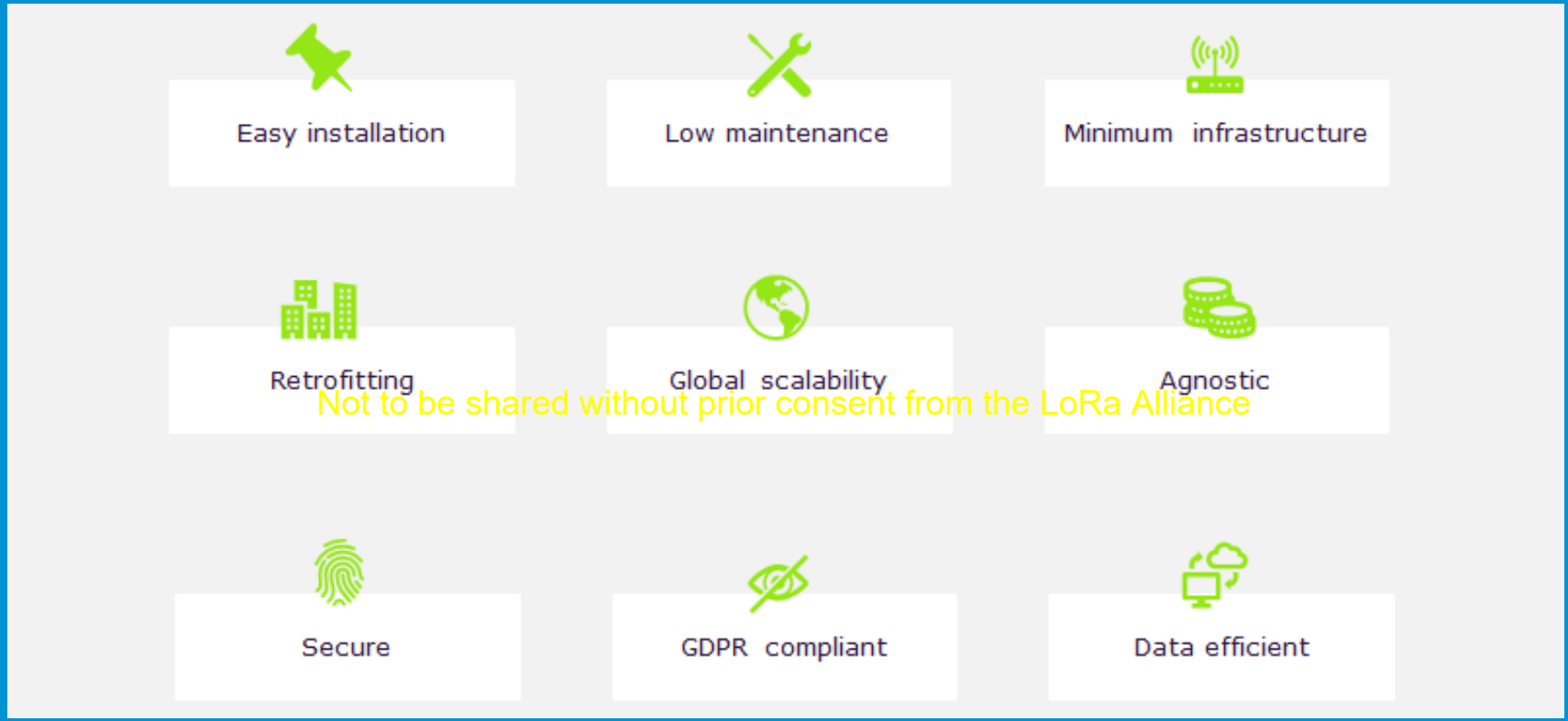
Why we have chosen LoRaWAN®?



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Capgemini Smartoffice solution

Sensors	Gateway	Infrastructure	App and/or Dashboard
		XIOT Microsoft Azure	
IR motion detection sensor. Wireless, battery powered (>7 yrs lifecycle)	LoRaWAN gateway	The X-IoT solution connects the devices. The data is processed by Azure cloud	Customized IoS/Android App can be developed based on needs
Connect any sensor ➢ Easy installation ➢ Low maintenance ➢ Scalable sensor solution	**Low Power Tech** Less infrastructure required 15000 m^2 per gateway	**IOT Middleware** Infrastructure & back-end Managing Sensor Network Solution	**End-user mobile application** **Manager mobile application** **Dashboard for building owners**

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Smartoffice User App

Sensors | Gateway | Infrastructure | **App / Dashboard**

- Meetings
  - Find and book meeting rooms on-the-fly
- Report anomalies
  - Broken furniture
  - Missing remote control
- Find office location facilities
  - Restaurant information
  - Public transport
  - Events

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An app for end user functionalities

Capgemini Business Case

Install IoT devices in:
- **400 offices**
- **10.000 meeting rooms**
- **150.000 desks**

for 200.000 users

Invest in:
- **Mobile Apps**
- **Desktop Apps**
- **BI & Analytics**

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Total investment:
- **6 M€ Capex (One-time)**
- **5 K€ Opex (Yearly)**
- **Less than 4€ per SQM**

Savings:
- **10% of CRES Budget**
- **More than 20M€ yearly**

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Creating Valuable IoT Connections

Fine-Tuning Your LoRaWAN® Deployments

Becky Oh, President and CEO PNI Sensor

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Creating Valuable IoT Connections

Who we are

- PNI is the world's foremost expert in precision location, motion tracking, and fusion of sensor systems into real-world applications
- Founded in 1987 out of Stanford University with the invention of Magneto-Inductive sensor technology
- PNI's products and technologies are used by leading, global companies in applications where a high degree of accuracy, continuous reliability, and low power consumption are required

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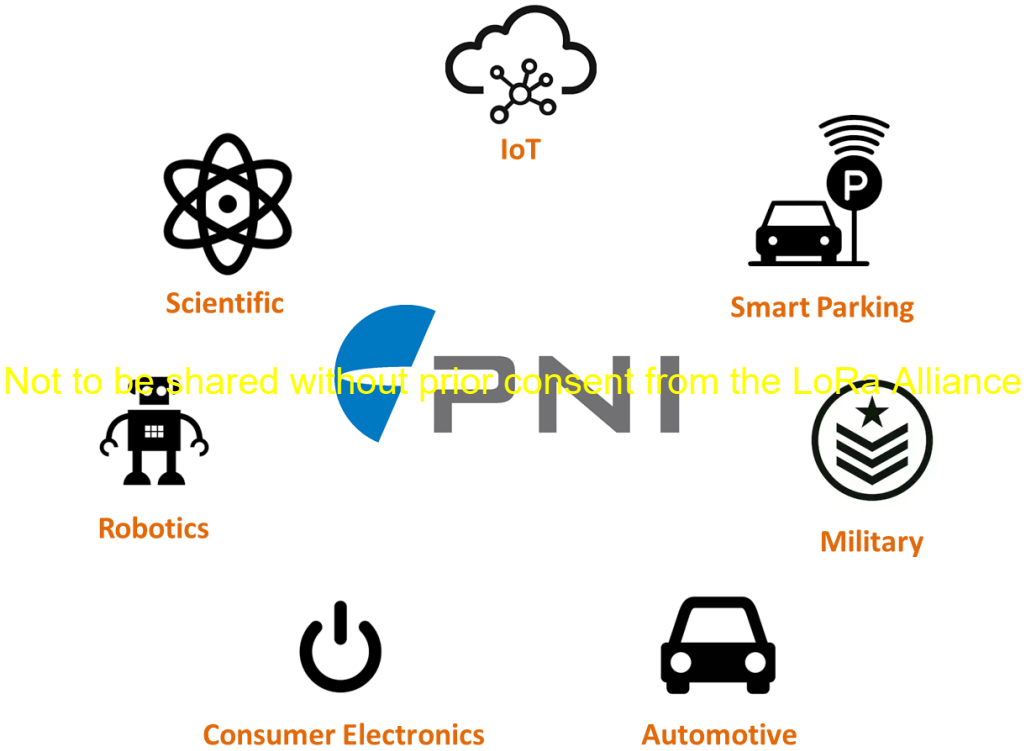
- Products include:
  - High-performance geomagnetic sensors
  - Location and motion coprocessors
  - Military-grade sensor modules
  - Sensor fusion algorithms
  - Complete sensor systems

Applications



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What you will learn

- How to effectively trouble-shoot nodes and network deployments
- Benefits of using the proper device to test network signal strength
- How to effectively solve difficult corner cases
- Best practices from successful LoRaWAN® Smart Parking deployments

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Best case scenario

- LoRaWAN® network successfully deployed
- End nodes are functioning according to spec and communicating to the LoRaWAN
- Proof of concept is live
- Customer is happy

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But sometimes…

- Data stops flowing
- Nodes are not functioning
- Network is inoperable
- IoT project fails

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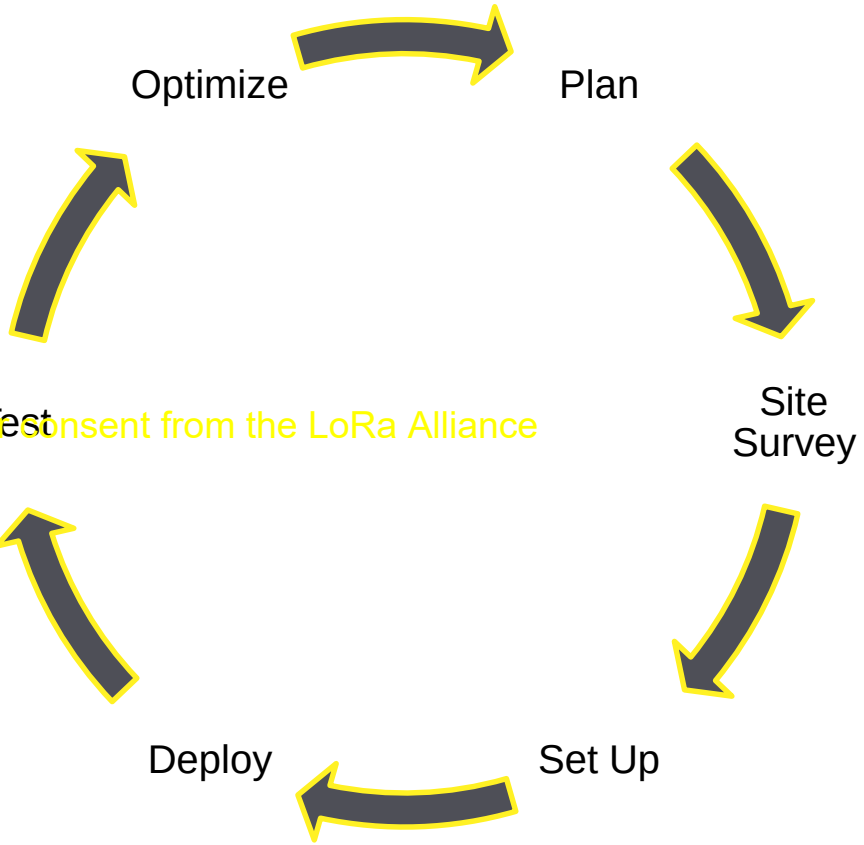
Best practices for LoRaWAN® deployments

- Perform a site survey *prior* to installation
- Test for RSSI with the actual end device vs. a generic testing tool
- Test for the device manufacturer's recommended RSSI values
- Troubleshoot issues and make improvements



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Use Case – Smart Parking

Vehicle Detection Sensor

Gateway

LoRaWAN® Network Service

Applications

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Use Case: City of Montréal

- **Need**: Monitor on-street parking spaces in business district to reduce traffic congestion and manage enforcement
- **Situation**: Smart parking managed on a public LoRaWAN®
- **Challenge**: Sensor must function reliably in harsh weather; installation sites are in deep “urban canyons”

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Use Case: City of Montréal

- **Solution**:
  - Tested parking sensors for -90dBm in spaces without car present
  - Recommended adding more gateways to optimize network performance
  - Deployed gateways in a higher location based on RSSI results
  - Parking sensors buried in-ground
  - Sensors reliably filter interference from passing traffic

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Use Case: Nvidia Corporate Headquarters

- **Need**: Monitor space availability in parking garage of new, state of the art corporate campus in Silicon Valley
- **Situation**: Nvidia uses a private, on-premise LoRaWAN®
- **Challenge**: Garage has multiple stories; contains rebar-reinforced concrete obstructions; signal “dead zone” in center of garage

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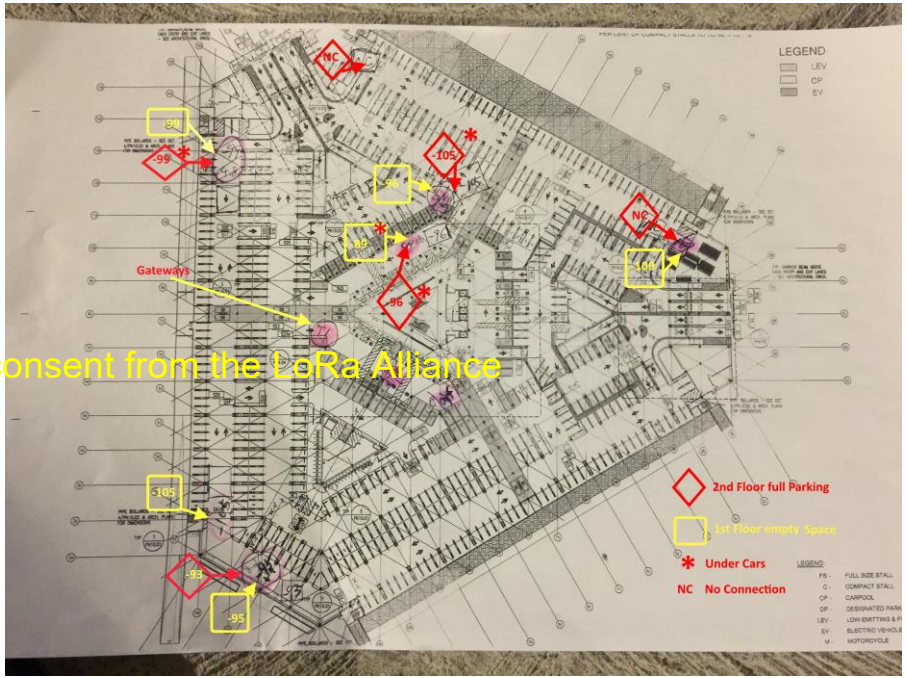
Use Case: Nvidia Corporate Headquarters

- **Solution**:
  - Tested parking sensors for -90dBm in spaces without car present
  - Added two gateways per level to account for the unique layout/shape of garage
  - Used more powerful gateway antennas
  - Installed surface-mount sensors in each parking space



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Use Case: City of El Monte, California

- **Need**: Monitor space availability in city-managed parking lot and direct drivers where to park
- **Situation**: City uses a public LoRaWAN®
- **Challenge**: Large parking lot with an alley; integration with digital sign

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Case Study: City of El Monte, California

- **Solution**:
  - Tested parking sensors for -90dBm in spaces without car present
  - Mounted gateway high on light pole in center of lot to reach edge devices
  - Used more powerful gateway antenna
  - Installed in-ground sensors in each parking space
  - Integrated with digital sign to guide drivers to rows with available parking

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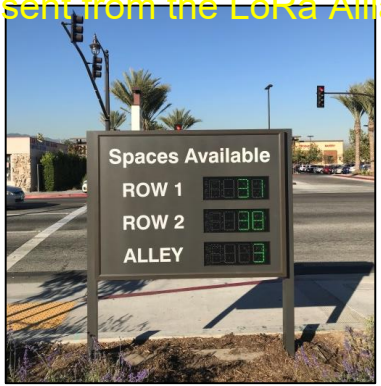

Factors to consider

- Density of gateways for ***RELIABLE*** network performance
- Placement of gateways
- Nearby buildings and obstructions
- Antenna size
- Device performance characteristics

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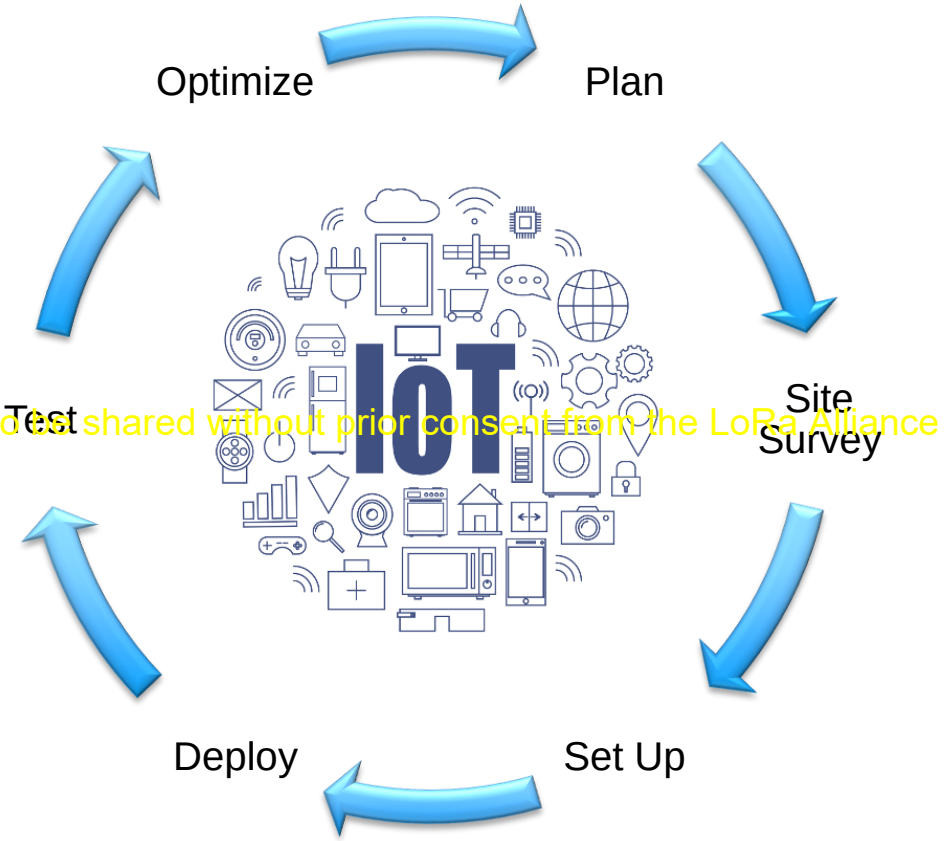
Best practices for LoRaWAN® deployments



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Prepare for success!

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marcom@lora-alliance.com

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SMART BUILDING & SMART CITY PANEL DISCUSSION

Moderator: Byron Bemiller, Semtech

Jean Baptiste Raphanaud, LHIRR for Accorinvest
Hany Zekry, Digimondo
Tim Giesendorf, Digitalstadt Darmstadt GmbH
Yannik Kopp, LORIOT.io AG
Hans Scholten, Cap Gemini
Becky Oh, PNI Sensor

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LoRaWAN® Deployment at Schneider Electric

Maxime Loidreau
IoT Sensors Program Manager – 13th of June 2019

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Agenda – LoRaWAN® Deployment at Schneider Electric

- Connect the unconnected assets…
  - About us, Our Assets
  - Our Challenges
- Implementation at Schneider Electric

  => Enabling seamless integration in Schneider Electric world
- Business is starting:
  - “Easy Smart Panel” offer launched in march 2019
  - Looking forward to scale up together with the ecosystem

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About us…

Schneider Electric, leading the digital transformation of Energy Management and Automation

€24.7 billion
FY 2017 revenues

~5%
of FY revenues devoted to R&D

142,000+
people in 100+ countries

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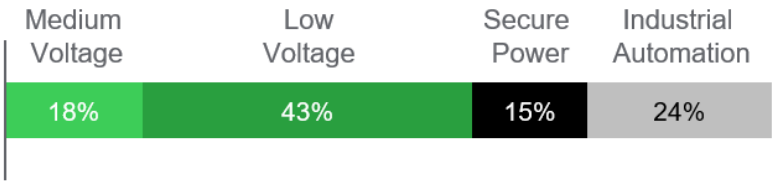
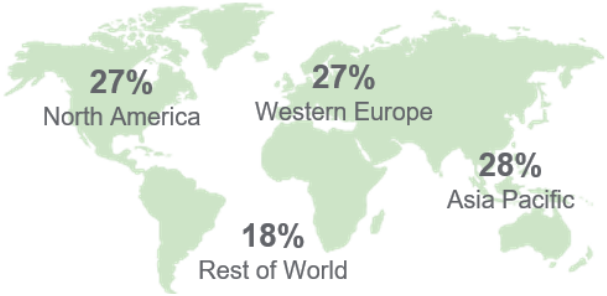
Our Products & Solutions
– FY 2017 revenues



Balanced geographies – FY 2017 revenues



Our Challenge: Connect the unconnected assets…

Many of our assets are difficult to connect…

- Our assets…

…have no access to IT networks … are installed early in the building phase

…are placed in location like basement or technical cabinet

”Deep indoor”

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…stay for 20 years in the field

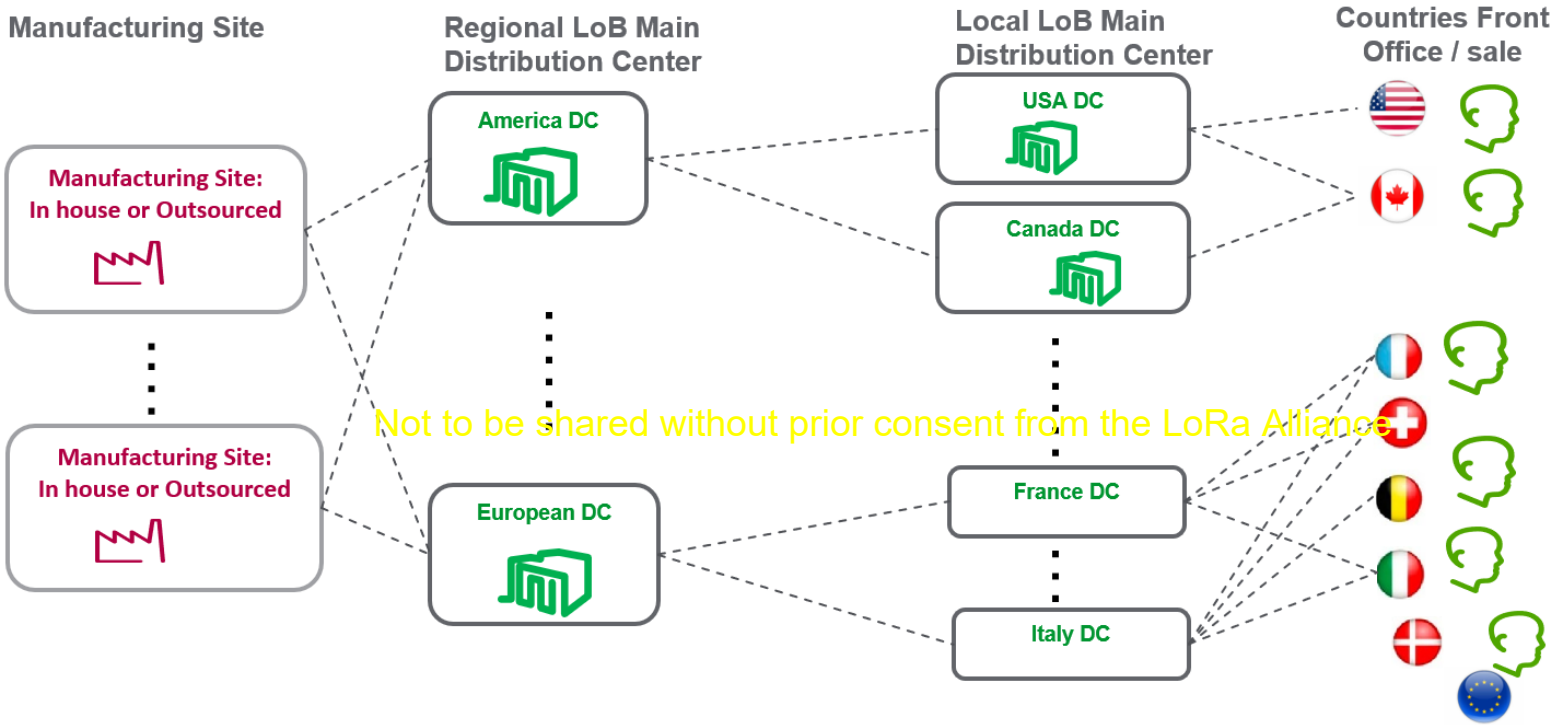
”Low TCO of connectivity is mandatory”

…are sold via a chain of intermediaries

”Remove complexity”

LoRaWAN® offers a solution to meet this requirements…

Challenge over the whole chain: Manufacturing - Supply chain - Chanel



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=> Mandatory to know target Network at manufacturing time to ensure Secure manufacturing

Our Challenge over the whole chain

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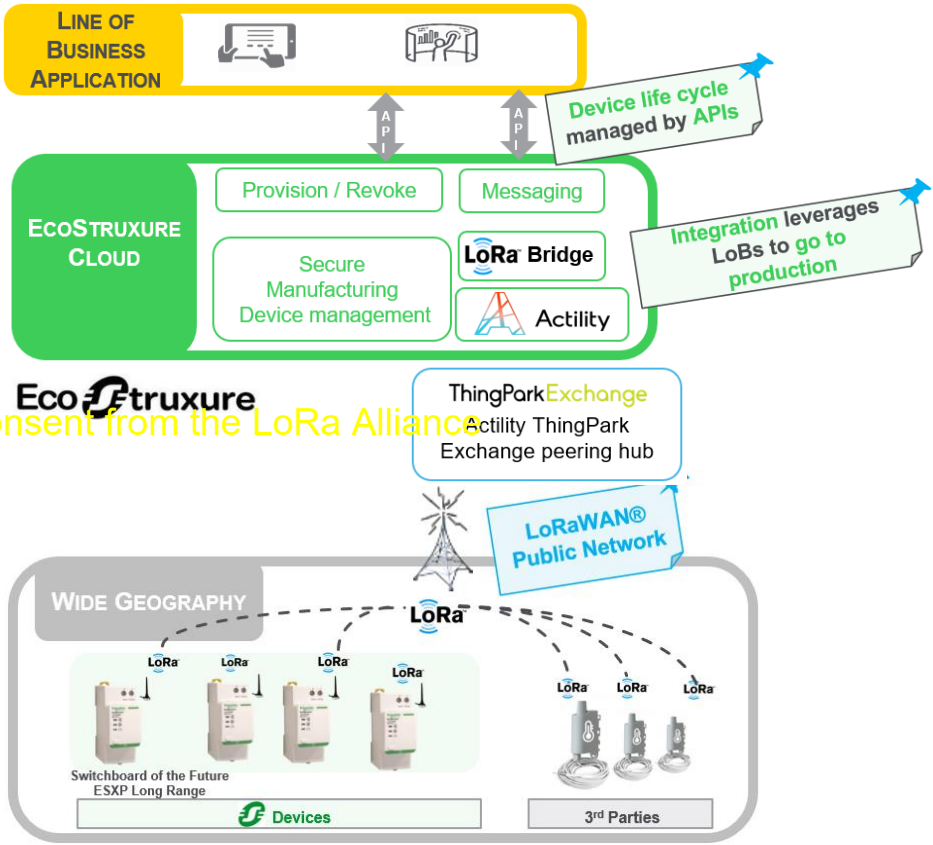
Need to remove the complexity from the field:

- ⇒ Unified Enrolment process
- ⇒ Seamless Integration
- ⇒ Cybersecurity by design / Secure Manufacturing

integration Mandatory to leverage Business

- Challenges: **Security** and **ease of use**
  - End to End Cybersecurity
  - Unified enrollment process for diversity of our Offers and for various geography
  - Unified access to Public and Private Network worldwide



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Schneider Electric launching “Easy Smart Panel”

Smart electrical panels for simple and efficient maintenance

Commercially launched since March 2019 in France, Switzerland, Belgium

Looking forward to launch in *Italy, Russia, Netherland Sweden, United Kingdom…*

Heat Damage Prevention

- *FireTag*: wireless sensor to generate alert by detecting overheating cables through gas emissions

Mobile platform for maintenance

- *EcoStruxure™ Facility Expert*: cloud-based application for managing maintenance plans, real-time notification of alert and simple energy monitoring

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Wireless Energy measurement & Voltage loss Alarm

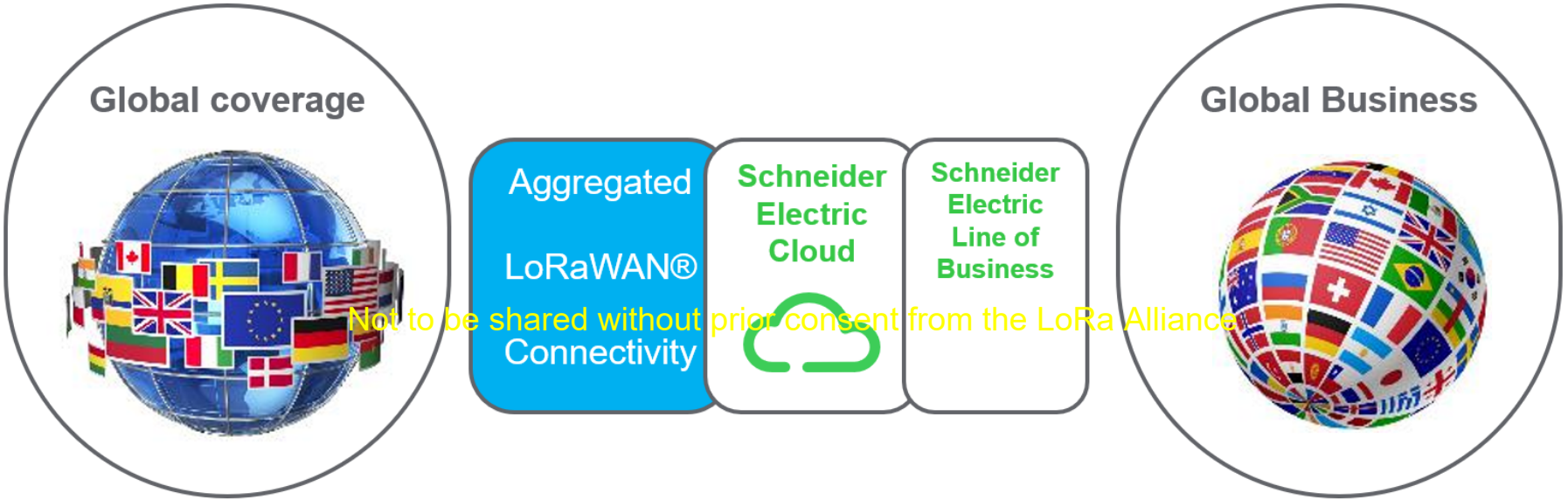
- *PowerTag:* wireless energy sensors continuously measure power and generate alert notification for voltage loss.

Presented at the Booth

Wireless Gateway Connection

- *Gateway Long range:* gateway enables wireless communication for alert on mobile platform

Looking forward to scale up together…



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Easy global connectivity over LoRaWAN® ecosystem is mandatory to reach maturity phase

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LoRaWAN®

Creating Valuable IoT Connections

How LoRaWAN® transforms business

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Andrea Krämer
Managing Director Minol Sales, Marketing & Product Management

OUR BUSINESS

- We are the digitisation partner for the housing & real estate industry
- We offer services for energy consumption & performance
- Our core: smart services for measuring, monitoring, consumption and billing for heating & water
- Additional services & solutions for smoke detectors, energy performance certificates & legionella check

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LoRaWAN®: THE REASON WHY

Remote read out of consumption data:

- Future-proof in alignment with European Energy Directive (EED)
- High data availability & data quality
- Automation of processes
  - saves tenant‘s time
  - allows service improvements & less cars on the road

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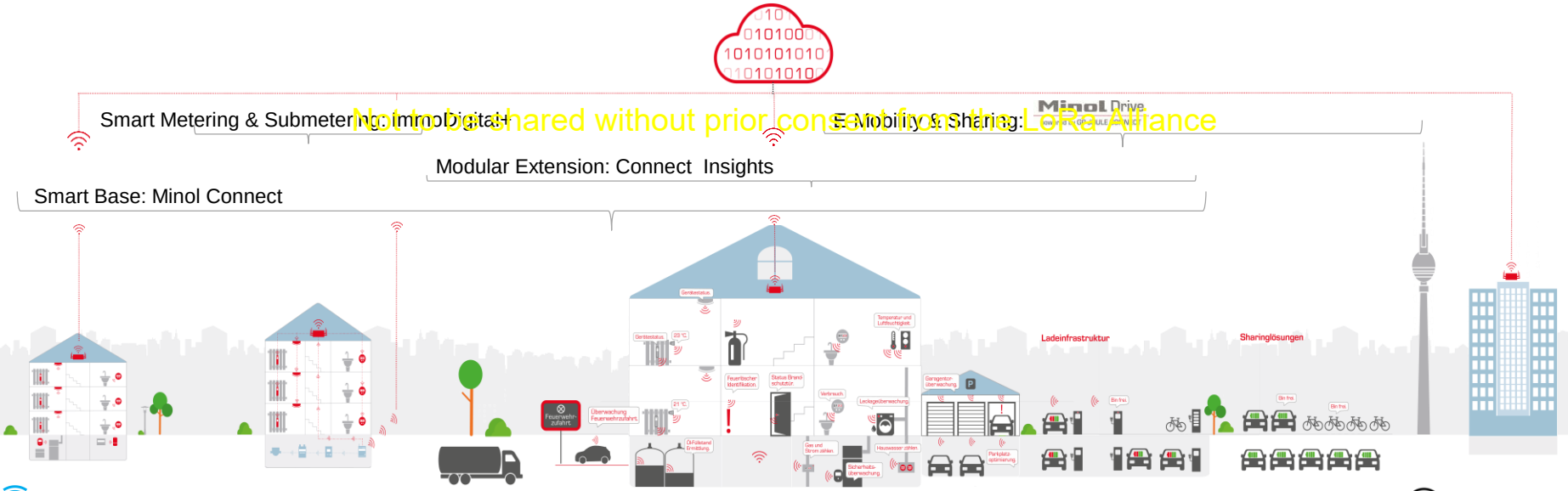
The future is connected:

- Standardised, open, secure, reliable & scalable
- Deep indoor coverage, no need for repeaters
- Battery based end devices, long-lasting

YESTERDAY & TODAY

- **Yesterday | Technology Island:** getting data via visits on site & walk-by radio technology

- **Today | Ecosystem**
  - Reliable, powerful infrastructure based on LoRaWAN® serving our traditional business (AMR)
  - IoT infrastructure enabling additional services integrating best of breed 3rd party devices



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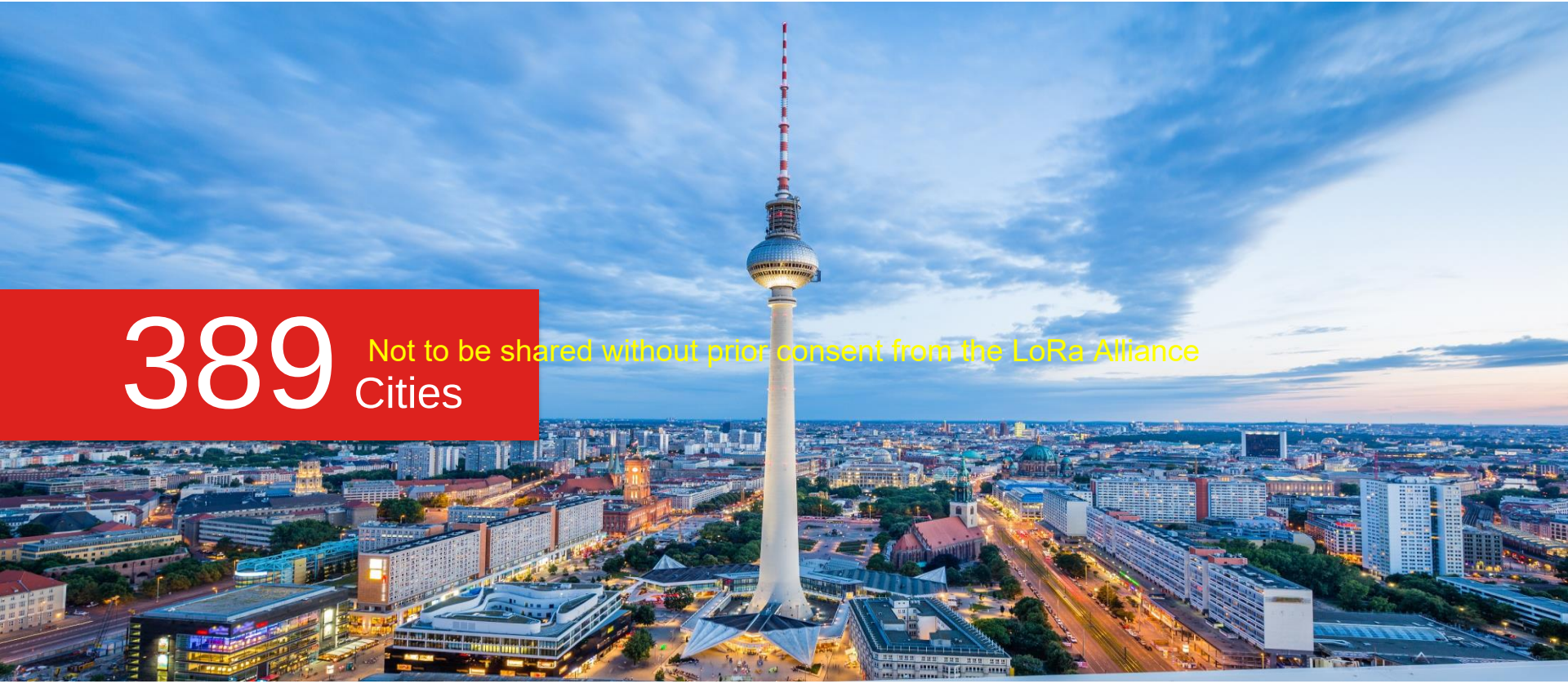

389 Cities

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STATUS QUO: CONNECTED

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2.412 Real Estates

FOR OUR PLANET: LESS EMISSIONS

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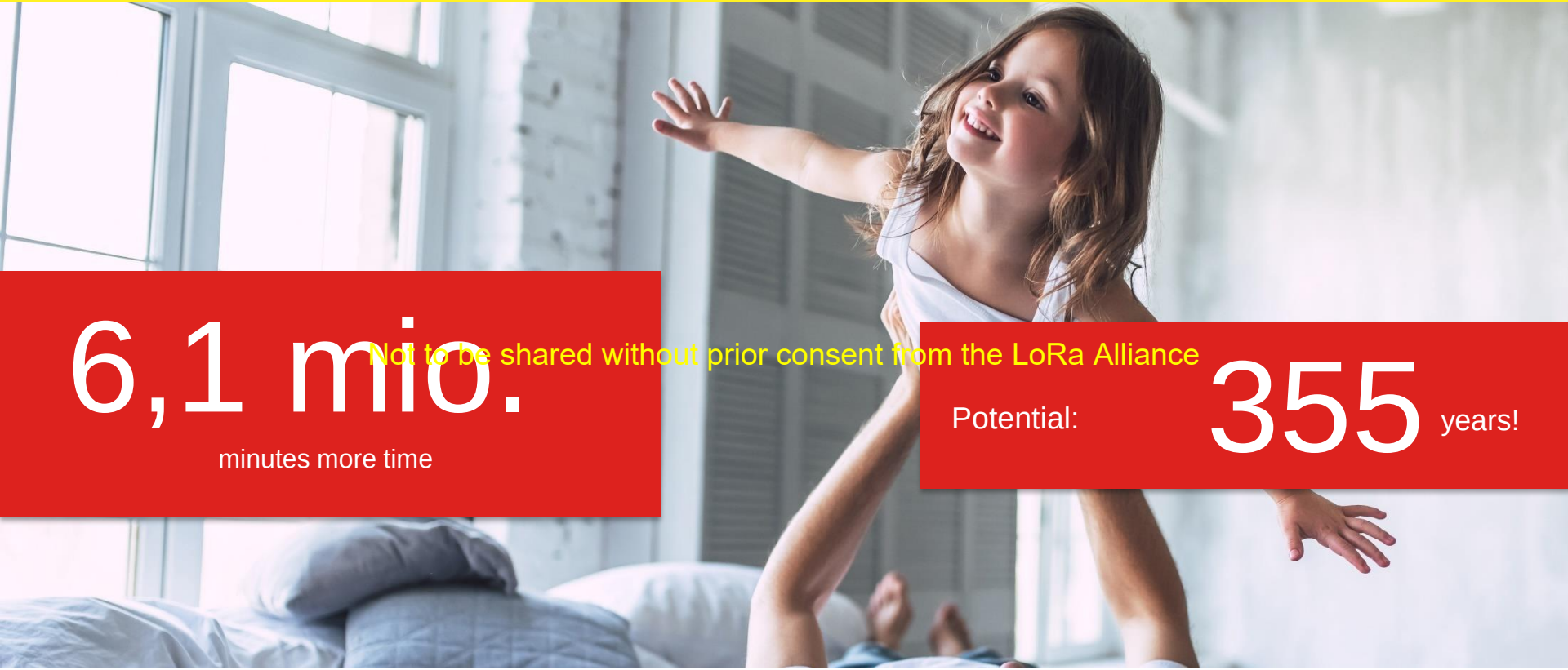
43.868 Kg CO_2

same amount that an e-car would need to surround the world 8 times

Potential: **1.205** tons less CO_2

FOR OUR CUSTOMERS: MORE TIME



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minutes more time

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Potential: 355 years!

Join us as an Ecosystem Partner and visit us @Marketplace

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Thank you for attending LoRaWAN® Live.

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Please join us in the Marketplace for the Networking Drinks sponsored by Semtech