Webinar:

How to deploy your Indoor Air Quality Management solution using a LoRaWAN® connected Starter Kit

Date: 3 June 2021, 5pm CET.

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Introduction

- Sylvain Pillons

Webinar Introduction

Today's speakers:

Shmuel Solomon
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Webinar Meeting Agenda

- Webinar Introduction – **Sylvain Pillons**
- The Indoor Air Quality Solution – **Sylvain Pillons**
- ELSYS - **Olivia Ählström**
- WMW - **Bert Vanaken**
- Actility – **Shmuel Solomon**
- Live Demo - **Bert Vanaken**
- Summary and Q&A

Indoor Air Quality Solution

- Sylvain Pillons

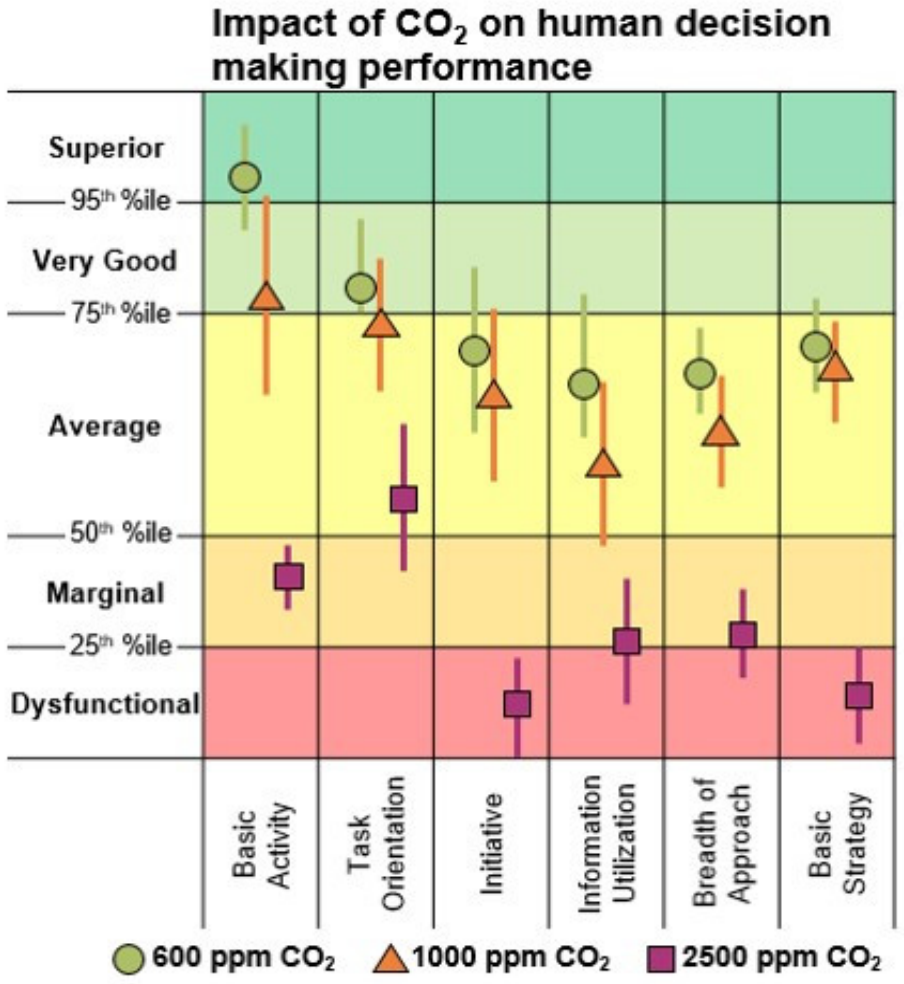
The importance of IAQ

- We spend **90%** our our time indoors
- IAQ has a measurable impact on **cognitive performance**
- **Poor IAQ is harmful**, particularly to those suffering chronic respiratory and/or cardiovascular diseases

CO2 – Impact on cognitive performance

- **CO2 concentration is a key indicator of air quality.** The higher the CO2 value in a building, the less comfortable it becomes for the people inside. In poorly ventilated rooms, the **CO2 concentration increases rapidly.**
- Current statistics, such as from the U.S. Environmental Protection Agency (EPA), show that **people spend almost 90% of their time indoors**. Indoor concentrations are often 2× to 5× higher than typical outdoor concentrations.

Optimization of air quality in rooms is essential for more healthy and productive indoor living and working conditions.



In a space of about 4m2 occupied by only one person, the CO2 value rises from 500ppm to more than 1,000ppm in just 45 minutes. This can cause headaches, drowsiness, and poor concentration, often resulting in reduced productivity.

From 2,000ppm onward, even the cognitive abilities of humans are influenced, and there is a significant risk to health at higher levels.

BE Royal Decree of 2 May 2019 well-being code at work :
The employer must take the necessary technical and/or organizational measures to ensure that the concentration of CO2 in the workplace is generally less than 900 ppm.

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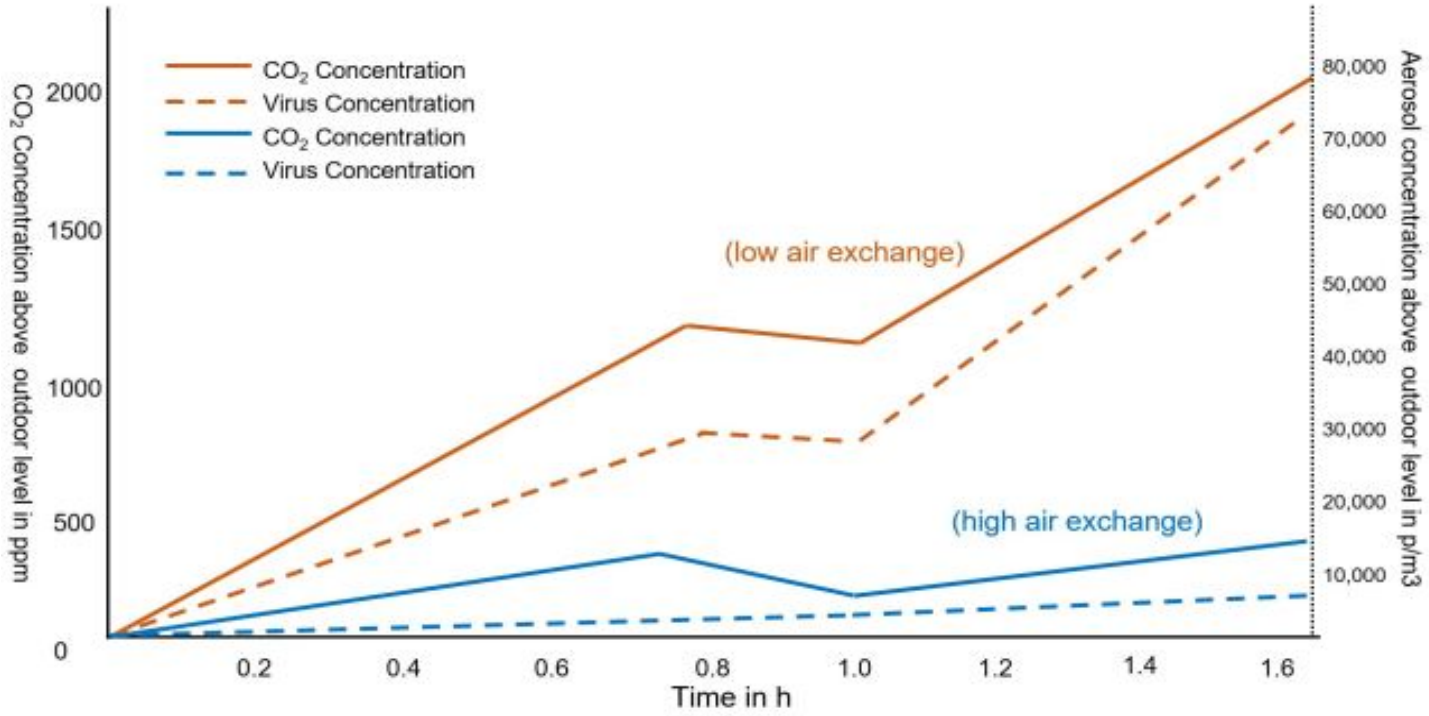
Ventilation performance – Impacting Risks COVID-19

- High amount of CO2 in the air, means also a **high number of aerosols**. A high concentration of aerosols increases the **risk of infection** for everyone else in the room.
- When a person infected with the **coronavirus** coughs, speaks, or sneezes, a spray consisting of droplets and aerosols is generated, which **penetrates air in the room and then spreads.**
- Non-ventilated indoor spaces can increase the likelihood of **aerosol transmission of Covid-19.** Insufficient ventilation may lead to a long-range airborne transmission of the **virus and opportunistic infection**.



Indoor climate plays a key role in health protection, as pathogens remain in rooms for hours at typical air exchange rates in residential and office buildings. Air renewal take considerable time. As such, an increase in the fresh air supply is recommended.

CO2 levels in rooms and enclosed spaces may be used as a proxy for COVID-19 transmission risk

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Air quality in Covid 19 times – a business opportunity


rtbf

Info | Sport | Culture | Auvio | TV

INFO

Rechercher sur le sit

À la une | Fil Info | Coronavirus | Belgique | Régions | Monde | Économie | Société | Médias

Belgique

Pour rouvrir, restaurants et salles de sport devront mesurer le taux de Co2, mais ils ne savent toujours pas comment

La mesure de la concentration de Co2 devra être visible dans l'établissement. © Tous droits réservés

Jean-François Noulet, avec T.D Quash et M. Sirlereau

Publié le lundi 17 mai 2021 à 14h27

Belgium TV web article:

« To reopen, restaurants and gyms will have to measure Co2 levels, but they still don't know how"

Also a topic in Dubai:


Poorly ventilated indoor spaces can cause respiratory infections

Experts explain how to disease-proof your home as summer drives people inside

DUBAI

BY SUCHITRA BAJPAI CHAUDHARY
Chief Reporter

As the summer heat keeps more people indoors, experts warned against respiratory infections caused by poorly ventilated indoor spaces.

Dr Ali Anwar Mohammad, specialist pulmonologist at Prime Healthcare Group, said, "AC vents have things like mould, mites, dust pollen, fungus, virus and bacteria, which thrive in damp, dark and humid places. Regular cleaning keeps the vents free of these or-

WHAT YOU CAN DO

- **Keep it clean:** Regularly vacuum carpets, rugs, cleaning beddings, drapes, rugs, pillows. Clear clutter because it traps and holds dust.
- **Keep the greenery outdoors:** Plants are pretty indoors, but can also foster mold. Even plants that improve indoor air quality can trigger allergies.
- **Get an air-purifier/dehumidifier:** To be placed in the most commonly used areas of the house, these devices can capture some of the pollutants.
- **Let the fresh air in:** Even in cold months, open windows, use exhaust fans to remove fumes from kitchen and ensure a higher ventilation rate.
- **Get a virus attenuator:** It costs less than a smartphone and reduces VOC (volatile organic compounds) dramatically taking care of allergens and irritants making the environment healthier.

SCAN ME

How to clean your home correctly

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Air Quality Monitoring Use Case #1

Customer

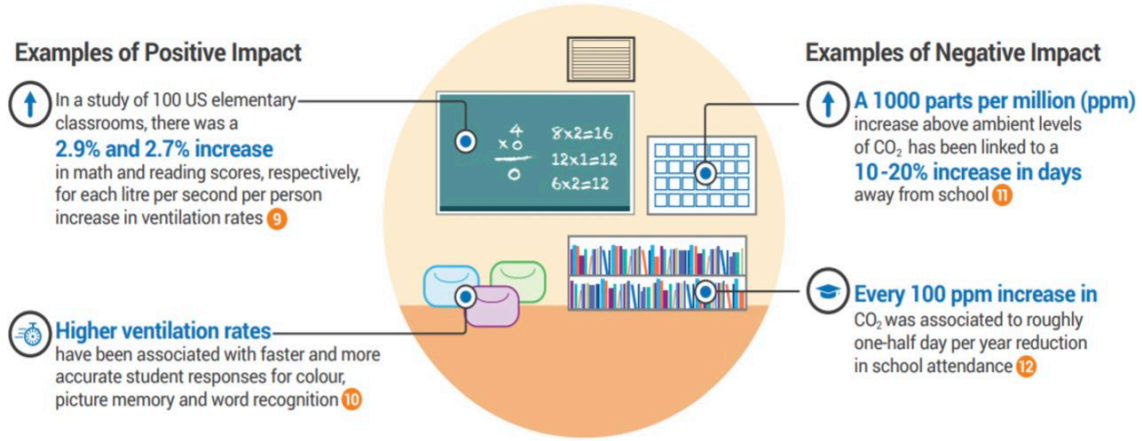
- School complex - Qatar.

End customer needs

- Staff room.
- 1 meter from ground, away from HVAC and air vents.

Solution & results

- Clear indicators have been identified.
- Real Time actions have been proposed for improvements.



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Air Quality Monitoring Use Case #1

Temperature

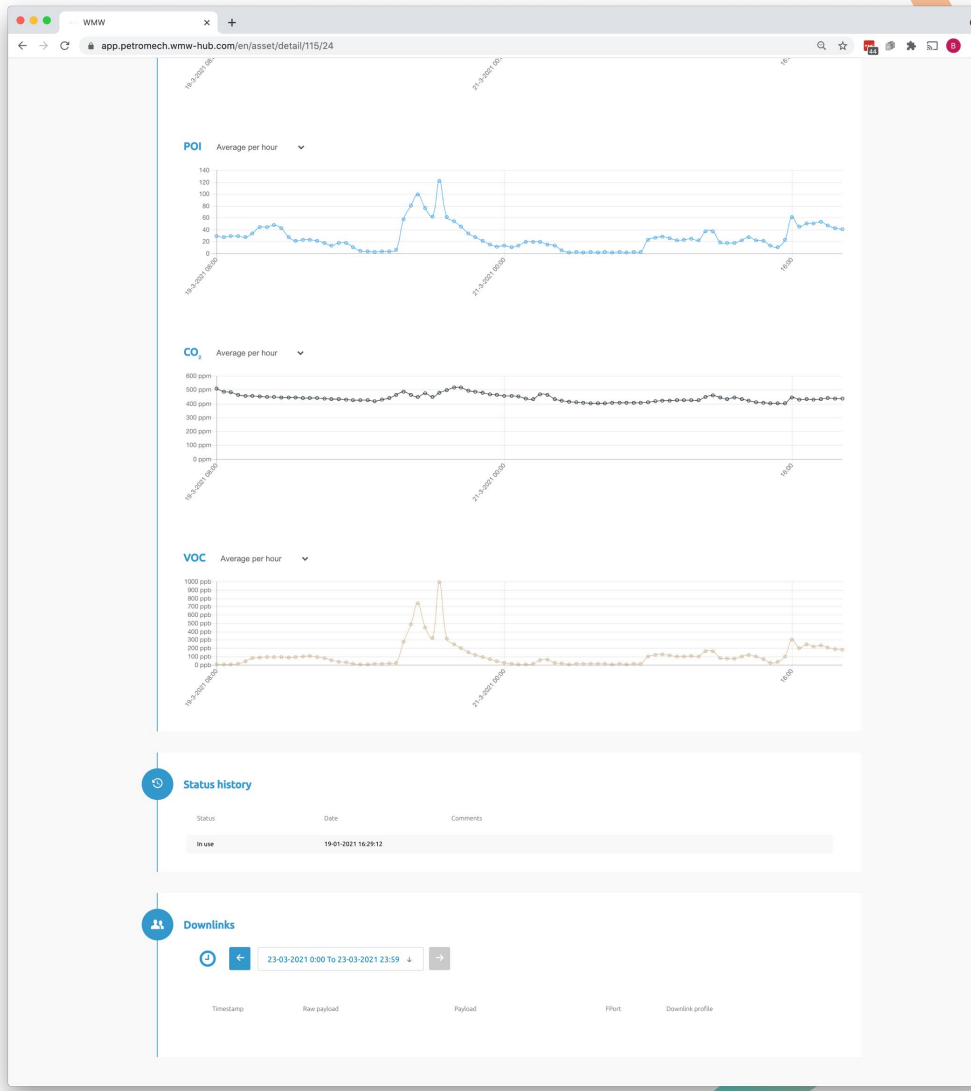
- Temperature values in general should be maintained between 23 to 27-degree Celsius. High or low temperatures can cause discomfort to the residents of the building.

Humidity

- Humidity levels should be between 40 to 60, high humidity can affect the residents and buildings both in a direct and an indirect way:
  - Direct effects: Sweating / Increased respiration / Altered blood circulation
  - Indirect effects: Bacteria and viruses take hold in humid conditions / Allergens kick into high gear / Asthma sufferers beware- Increases / Humidity Increases Airborne Chemical Contaminants / Increased rate of development of mold in the building

CO2

- CO2 values are at exceedingly high levels with peals reaching around 900 ppm even with a negligible presence of people inside the building and is likely to increase quite a lot when the schools are running normally.



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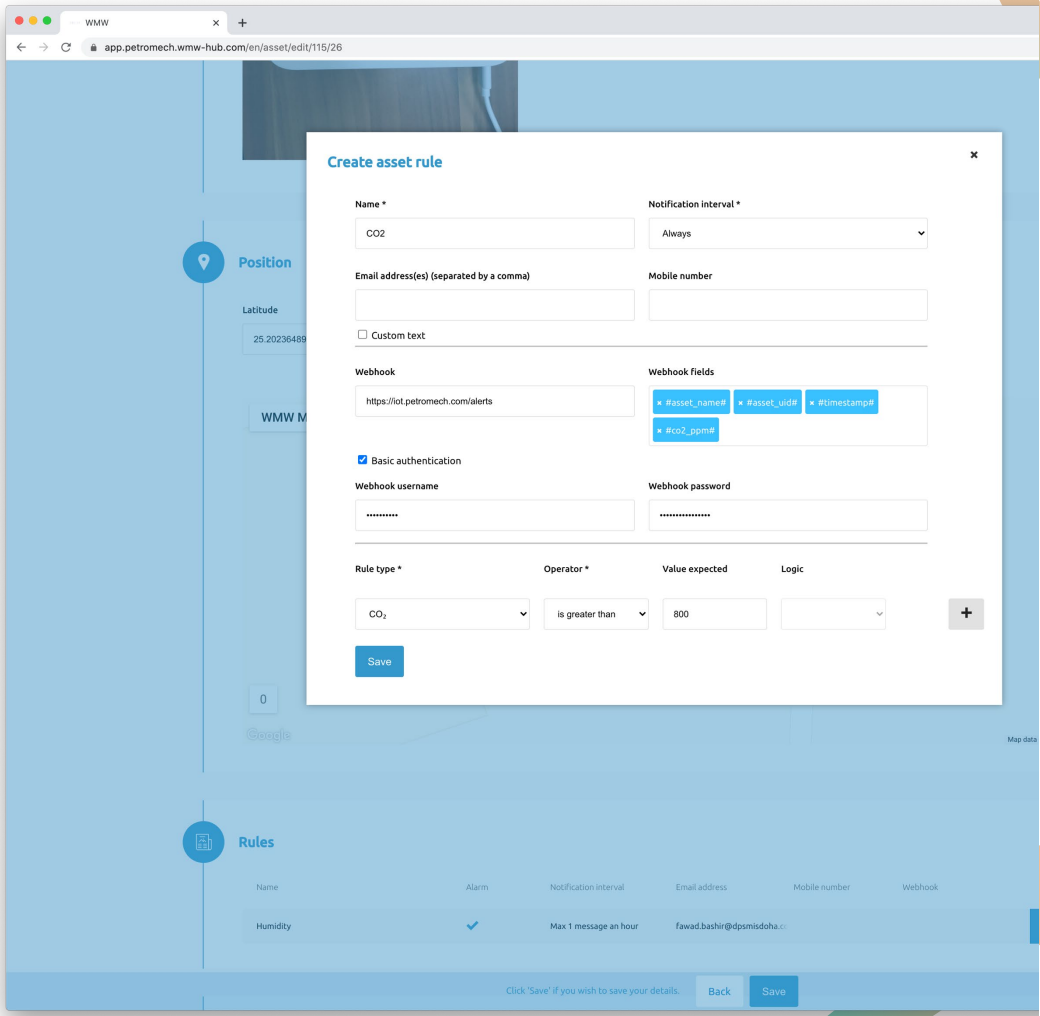
Air Quality Monitoring Use Case #1

Remedies

- Temperature:
  - Open/close windows/doors
  - Manually control the thermostat
  - Control using BMS setpoints values in case of large commercial and residential buildings
  - Automate by implementing the artificial intelligence based smart buildings solution which will override the existing BMS and control the full system automatically keeping the indoor climate as a priority and energy saving the second, consequently providing an automatic and optimized HVAC system.

- CO2:
  - Open/close windows/doors
  - Manually control the fresh air equipment in the building
  - Control using BMS setpoints of fresh air equipment/fresh air dampers/fans in case of large buildings with BMS facility available.
  - Automate by implementing the artificial intelligence based smart buildings solution which will override the existing BMS and control the full system automatically keeping the indoor climate as a priority and energy saving the second, consequently providing an automatic and optimized HVAC system.



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Air Quality Monitoring Use Case #2

Customer

- Global sports event organization with athletes from all over the world.

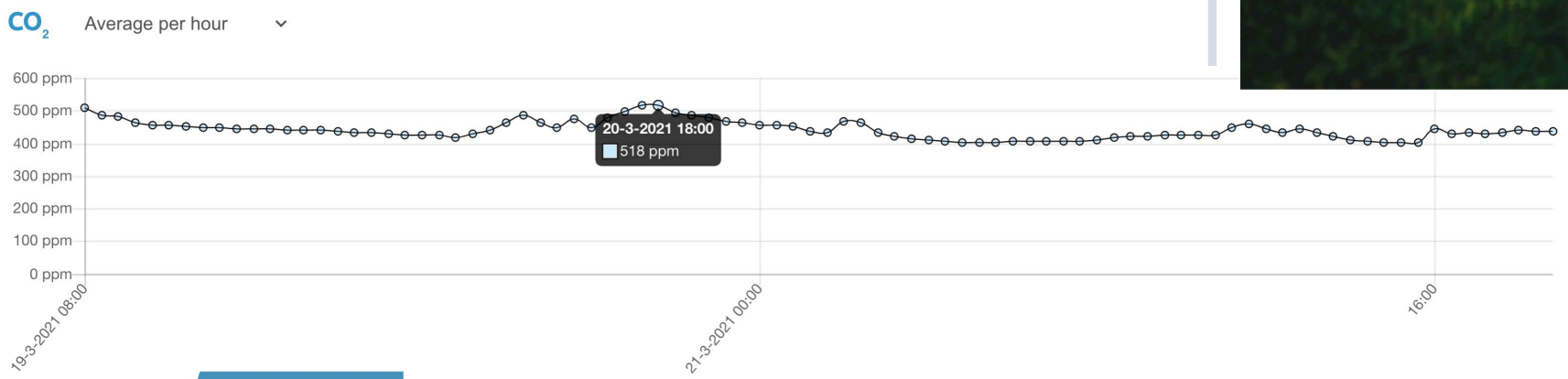
End customer needs

- On the sports grounds, but also in the visitor area, it was important to monitor the air quality. Keeping athletes in top condition is equally as important as minimizing the risks for all spectators.

The Solution and Results

- Various devices measuring multiple values. CO2 being the driver.
- An in country centralized platform for data integrity
- A Telco operator and a System Integrator

delivered a solution that can report and warn on the values in real time.



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Air Quality Monitoring Use Case #2

Customer

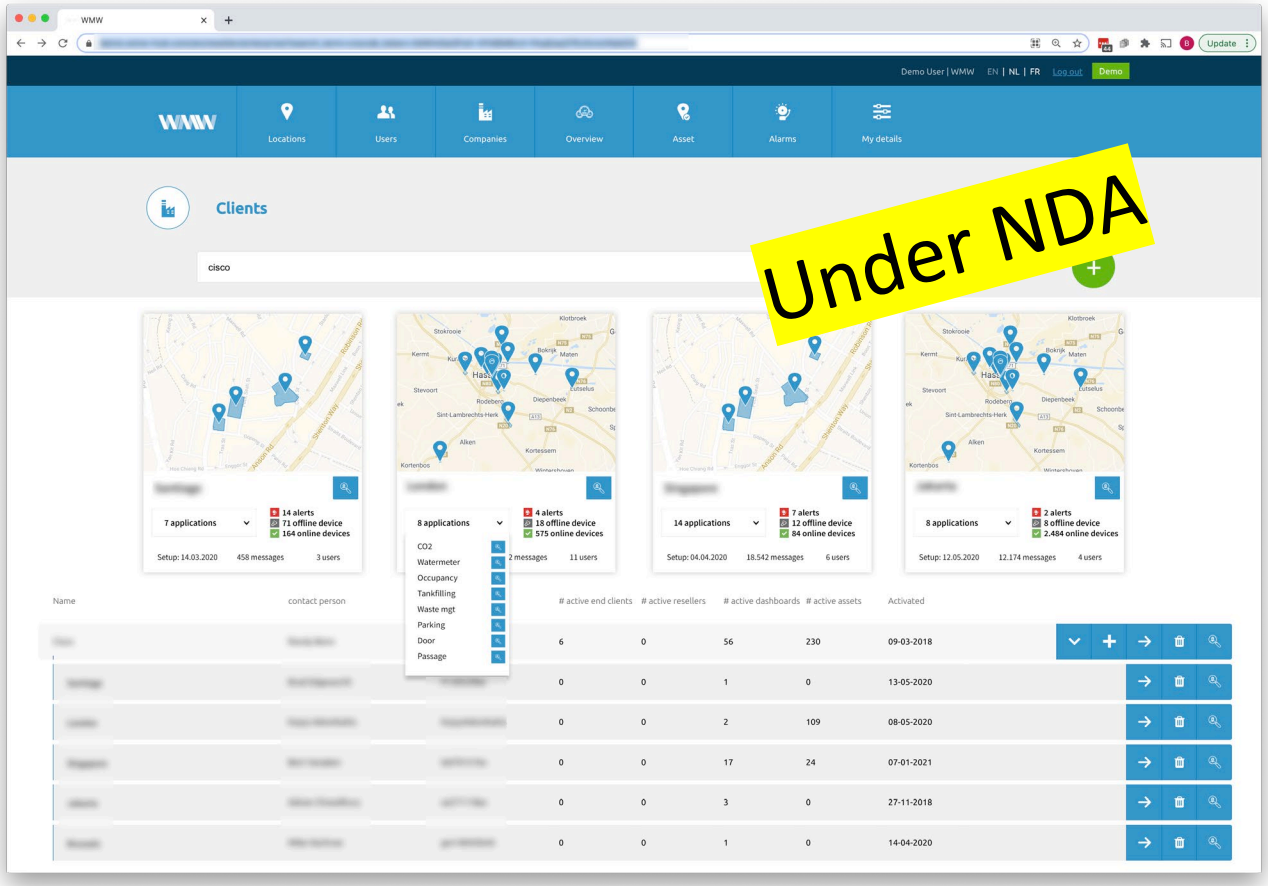
- +100 Government official buildings.

End customer needs

- Detect and report before it can harm.
- Getting employees back to work in a safe manner.

The Solution and Results

- + 30 applications and + 60 different sorts of devices.
- CO2, desk monitoring and room occupancy as crucial parts.
- A secured centralized platform for data integrity
- LoRaWAN devices capable of covering all frequency plans.



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Workspace Management Monitoring CO2 Levels - Use Case #3

Customer

- A construction company based in the Netherlands.

End customer needs

- Occupation and Space – understand usage in real time.
  - Detect the presence of individuals e.g. behind desks or in restrooms.
  - Measure present and planned occupancy of any room.
  - Understand repartition of people - differentiate between adults and children.
  - **Analyze number of 'pass through' a certain door.**
  - **Analysis of affluence over time – in waiting rooms.**
- Peoples well being – improve occupant's experience.
  - Measure and automatically adjust factors such as Temperature, Humidity, Light, **CO2 levels**
  - Perform analysis on configurable periods.
- Improve operational excellence and reduce costs.

The Solution and Results

- ThingPark Enterprise SaaS Solution :
  - **17,000 sensors** have already been deployed in smart buildings.
  - Production of automatic analysis reports with occupation data.
  - Set alarms thresholds and raise an alarm event when occupancy or monitored environmental factor have reached a certain level.
  - Enable the combination of **several environmental data KPIs and automatic actions**.

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Solution Target Market

Education

Schools and Universities

Public Buildings

Airports ***Hospitals***

Governmental - Public Services

Smart Buildings

Offices ***Logistics***

Co-Working

Services

Hotels and Restaurants

Shopping centers

Theaters & Cinemas

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Indoor Air Quality Monitoring Solution

Increase well being and reduce the spread of COVID-19

A solution focused on creating a safer and healthier indoor environments, protecting pupils, students, workers and meeting air quality regulations levels through means of controlling and monitoring CO2 levels and people's presence.

Anti COVID-19

Safer Indoor Environment

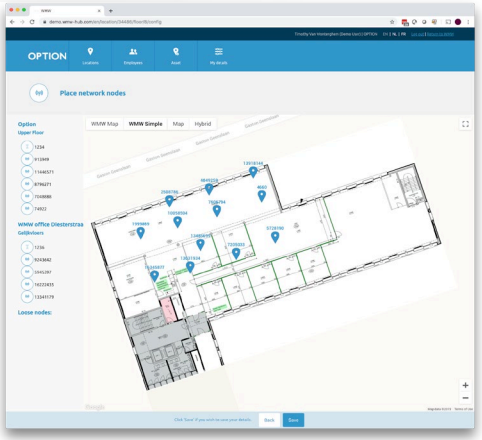
Presence Detection

Environmental monitoring

What's included?

Elsys ERS CO2 Indoor Environment Sensor,
Parametric PCR2 Indoor People Counting Sensors

WMW IoT Business Application



ThingPark Connectivity and a LoRaWAN Gateway

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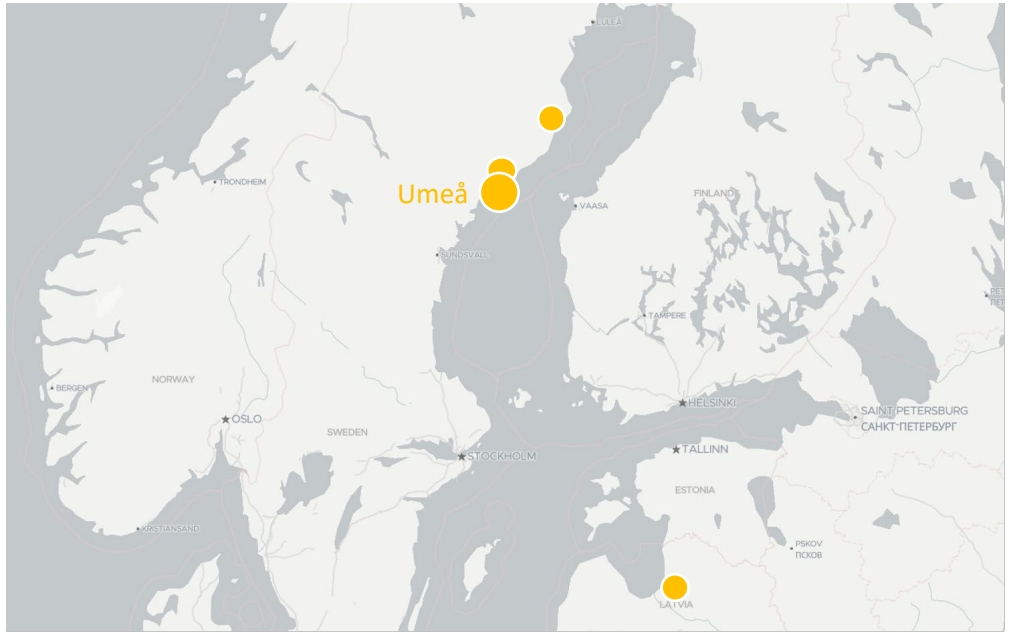
Olivia Ählström

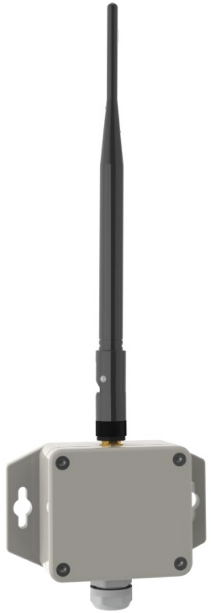
Leading provider of LoRAWAN® sensors

- Founded 2005 as a Spin-off from Umeå University
- Located in Umeå, Sweden
- Production in Sweden and Latvia
- LoRa sensors since 2015
- > 200k sensors, 1000 customers, 45 countries



Product Range

LoRaWAN®



ELT Series

3 devices in the series

Long-range sensors

Measure analog or digital signals

IP67 classified, designed to be outside or in extreme environments

Add accessories and external sensors to create a unique solution

Agriculture, industries, water flow measuring, distance measuring, and much more

ERS Series

7 devices

Ideal for smart buildings and smart workplaces

Multiple options to build a perfect solution

Install one specific product or let them work together to have full control

EMS Series

4 devices

Our most minimalistic and subtle sensor yet

Perfect size for mounting on limited surface areas

Multiple options to meet your needs

ERS CO_2

- CO2 Levels
- Temperature
- Humidity
- Light
- Motion

Battery powered

Configure using NFC or downlink

ABC Algorithm - Automatic Baseline Correction

A self-calibration function for achieving **maintenance-free** gas sensors.

A life expectancy of at least 15 years

Constantly keeps track of the sensors's lowest reading

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ERS CO_2

Traffic light

In the latest version of the ERS CO2, there is a traffic light feature to let you know when a certain threshold of CO2 levels (or any other value) has been reached. The threshold value is configurable. Choose color, frequency and light intensity.

Configurable

All sensor settings can be configured via a smartphone application with NFC (Near Field Communication) or over the air via the network server and downlink data to the sensor.

Life time

ELSYS sensors have excellent battery life. For the ERS CO2, it can last up to 10 years. When the battery runs out, replace it with a new one.

Uncomplicated

ERS CO2 is simple to install and maintenance-free*. Calibration is only needed in particular locations.

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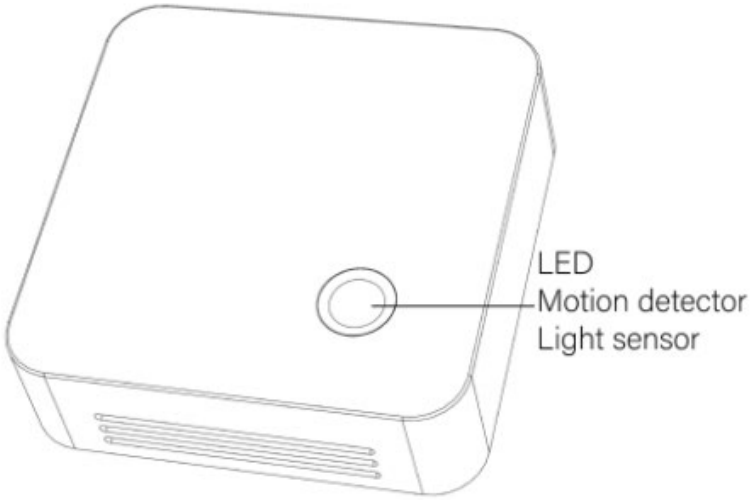
ERS CO_2



Radio

LoRa® SF7-SF12
LoRa® 1.0.3 Class A/C (configurable)

US902 – 928	KR920 – 923
EU863 – 870	RU864
AS923	IN865
AU915 – 928	

Operating conditions

Temperature: 0°C to 50°C
Humidity: 0 to 85% RH (non-condensing)

Case

Enclosure: Plastic PC/ABS
Dimensions: 86 x 86 x 27 mm

Power supply

2 x 3.6V AA Lithium Batteries

< 10 years (Depending on configurations and environment)

Certification

Possesses the certifications RoHS, RED/CE, and comply with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s).

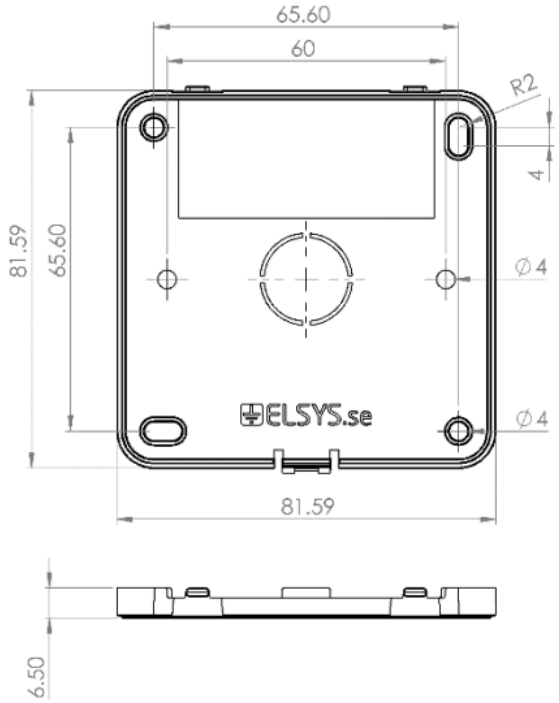
Embedded sensors

CO2
Temperature
Humidity
Light
Motion

CO_2 Sensor

Range: 0 – 2000 ppm
Accuracy: ± 50 ppm
Range extended: 0 – 10000 ppm

Accuracy is met at 10 – 40°C, 0 – 60%RH, after minimum three (3) performed Automatic Baseline. Corrections.



Use cases

Facility managements

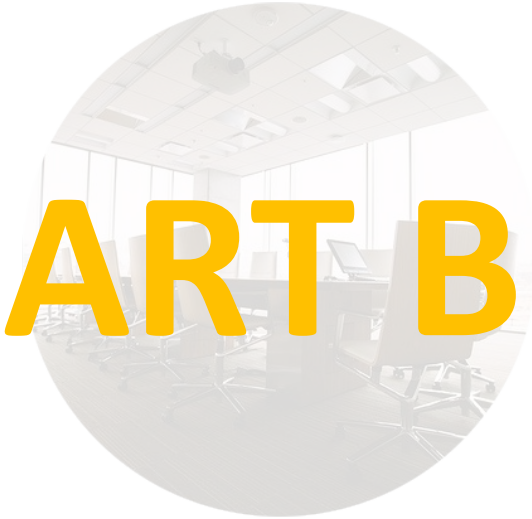
Meeting rooms
Conference rooms

Public places
Airports
Cafés
Schools

Offices
Break rooms

Use cases

Schools
Universities



Meeting rooms
Conference rooms

Public places
Airports
Cafés

Offices
Break rooms

SMART BUILDINGS

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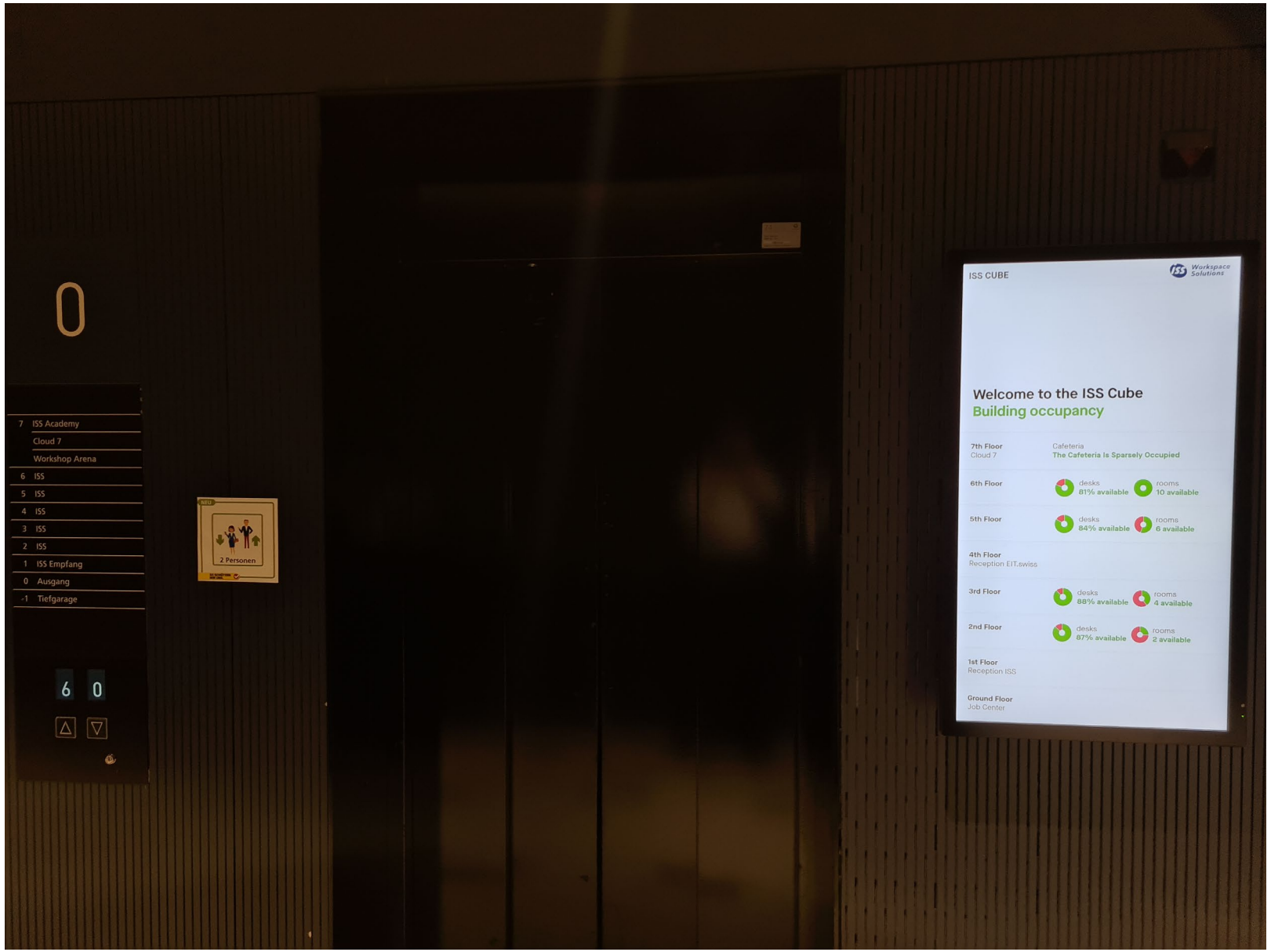
Use case

akenza.io

ISS



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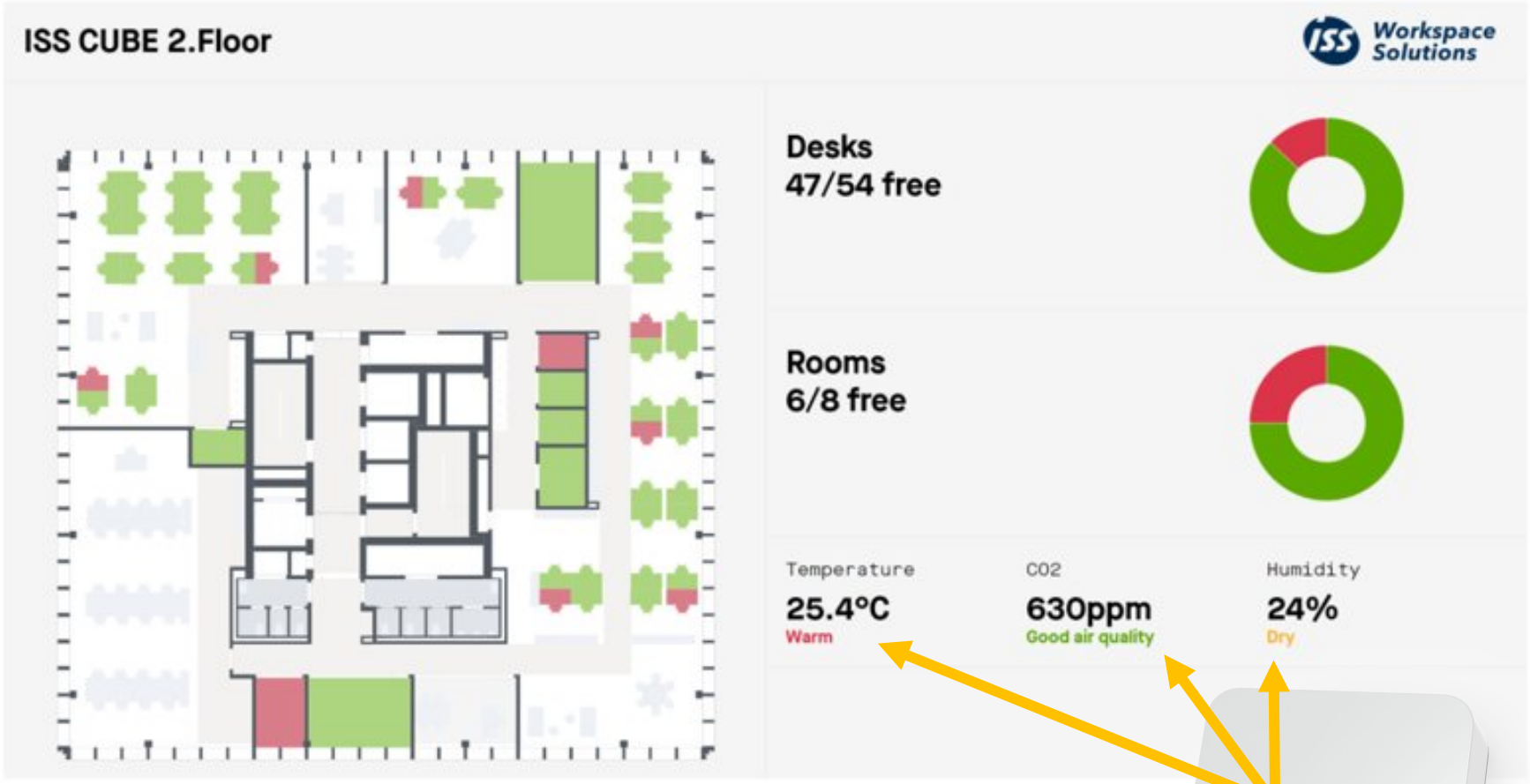
Use case



ERS CO_2 on each floor to measure indoor air climate

290 Desk sensors

40 Room sensors

Data available in **real-time** on dedicated signage screens

WMW

- Bert Vanaken

What?

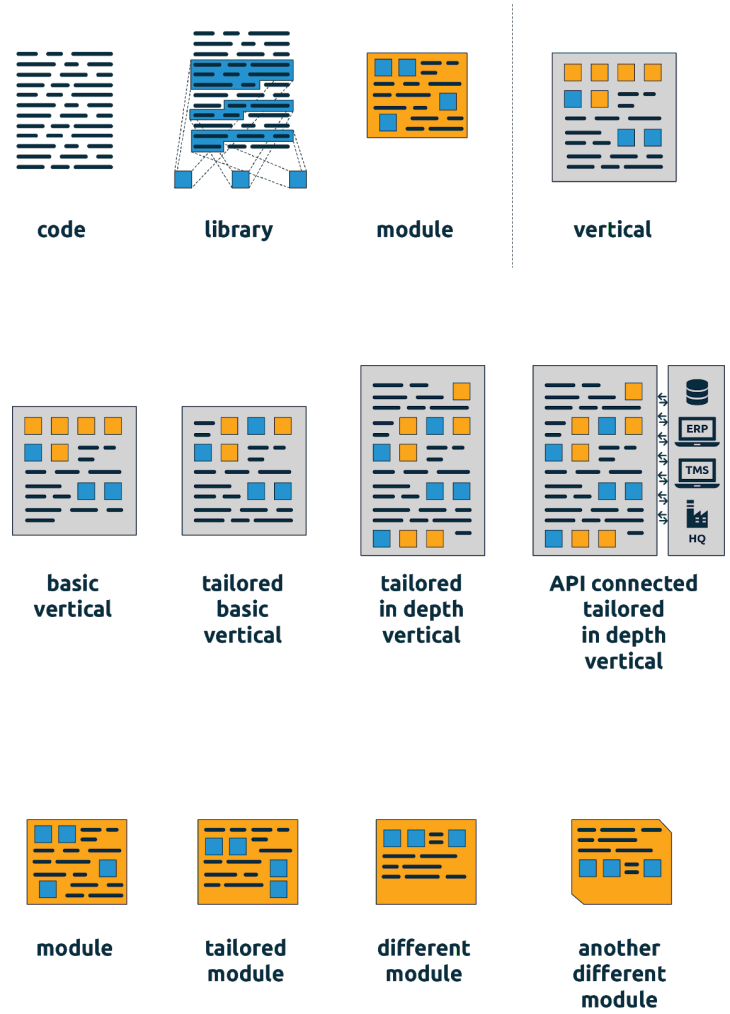
WMW is:

- ✓ A **technology** to build platforms and applications.
- ✓ Sold **worldwide** by System Integrators and Telco Operators
- ✓ An IoT business **accelerator**
- ✓ **Agnostic** to devices, connectivity and even hosting
- ✓ In vertical markets like smart city, agriculture, healthcare, logistics, smart building, construction & mining, smart industry

Mission

An emerging IoT market is still defining itself and only X% of the IoT use cases have been properly identified. WMW does not want to sell a product but allow the market to ask for a solution.

With virtually the most flexible "framework" in the market we allow fast adoption of use cases and aim to grow to the most versatile asset management platform on a global scale.



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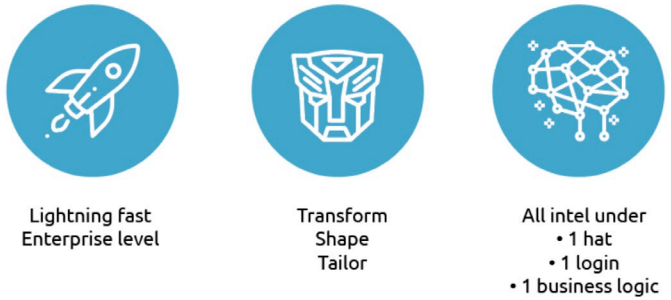
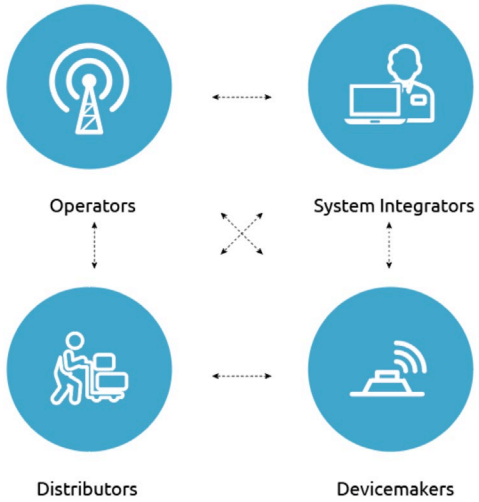
Why & Where?

USPs:

- ✓ Extremely fast development
- ✓ Extremely flexible tailoring
- ✓ All IoT in 1 UI/UX/Logic





Customers:

With a full multi-tenant environment, including account creation, level 1 support systems, billing preparation, … we support 4 groups of partners with:

- ✓ Readymade applications
- ✓ Application suites
- ✓ Tailored dedicated single apps
- ✓ Full platforms
- ✓ Customized

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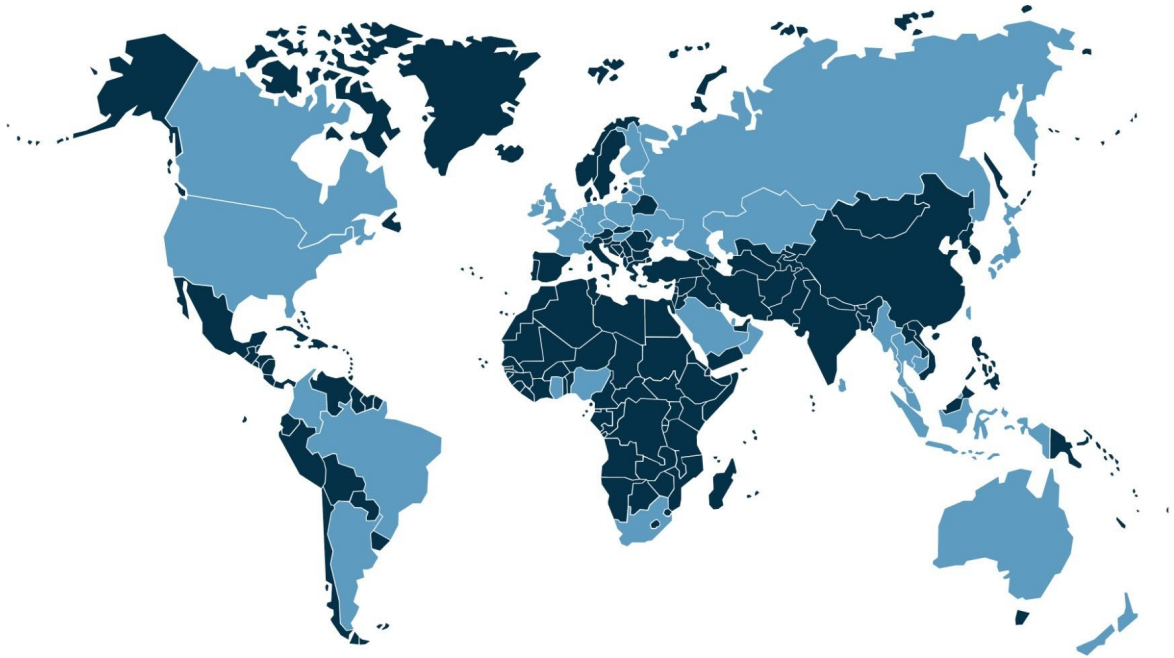
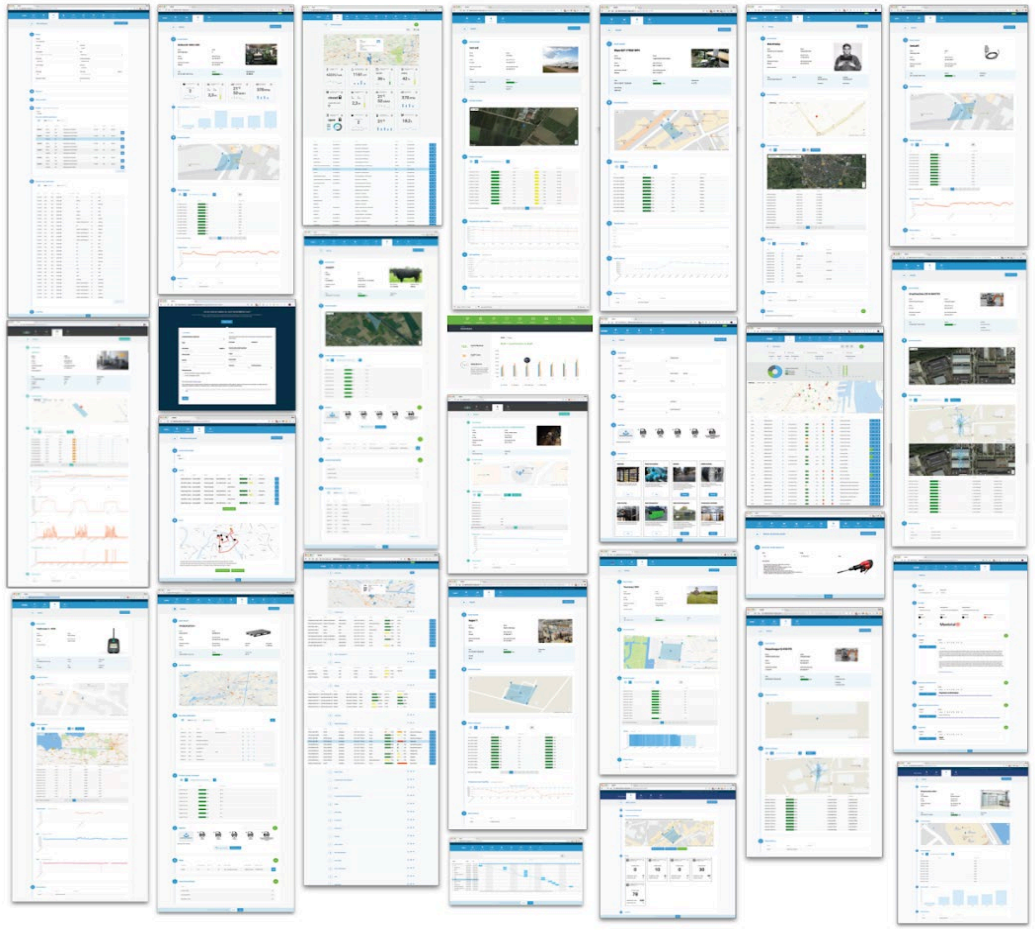
Market?

Demographics:

- ✓ +115 apps
- ✓ +250 devices (and growing)
- ✓ 5 continents





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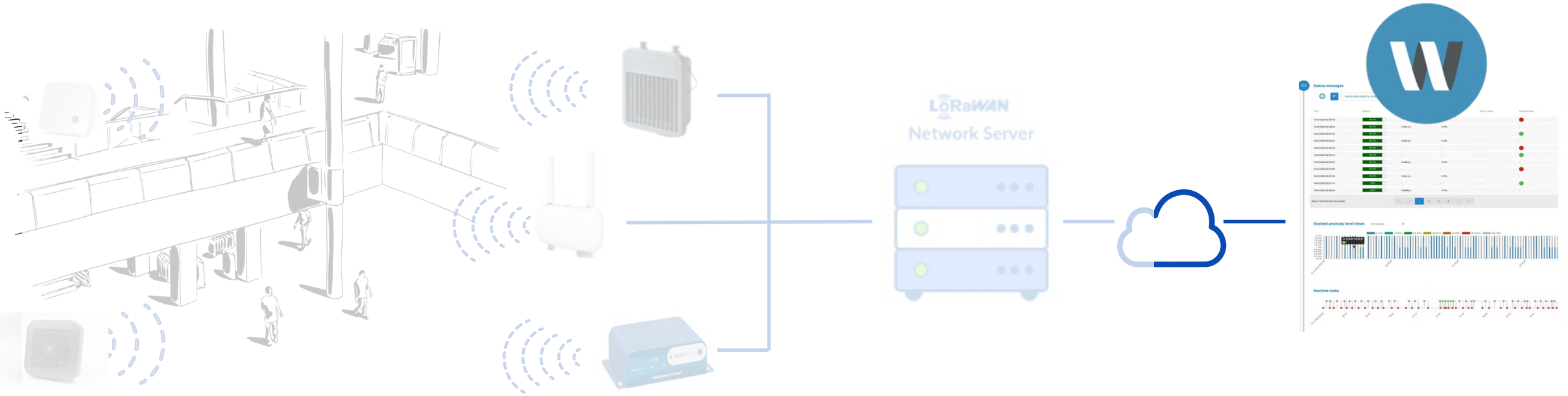
Transform Indoor Data Into Useful Information - How Does It Work?



CO2, People Flow Sensors → ThingPark Private Gateways → ThingPark Network Server (SaaS, OCP) → **WMW Application for Insights and Management**

Low Power communication enabling 10 years battery life

Robust Radio technology Immune to interferences from Cellular, Wi-Fi…

Operation & Management of a highly scalable Network via a simple user interface

Data Mediation Layer for seamless integration of the LoRaWAN Network to the Application

Native End-to-End encryption and authentication of communications

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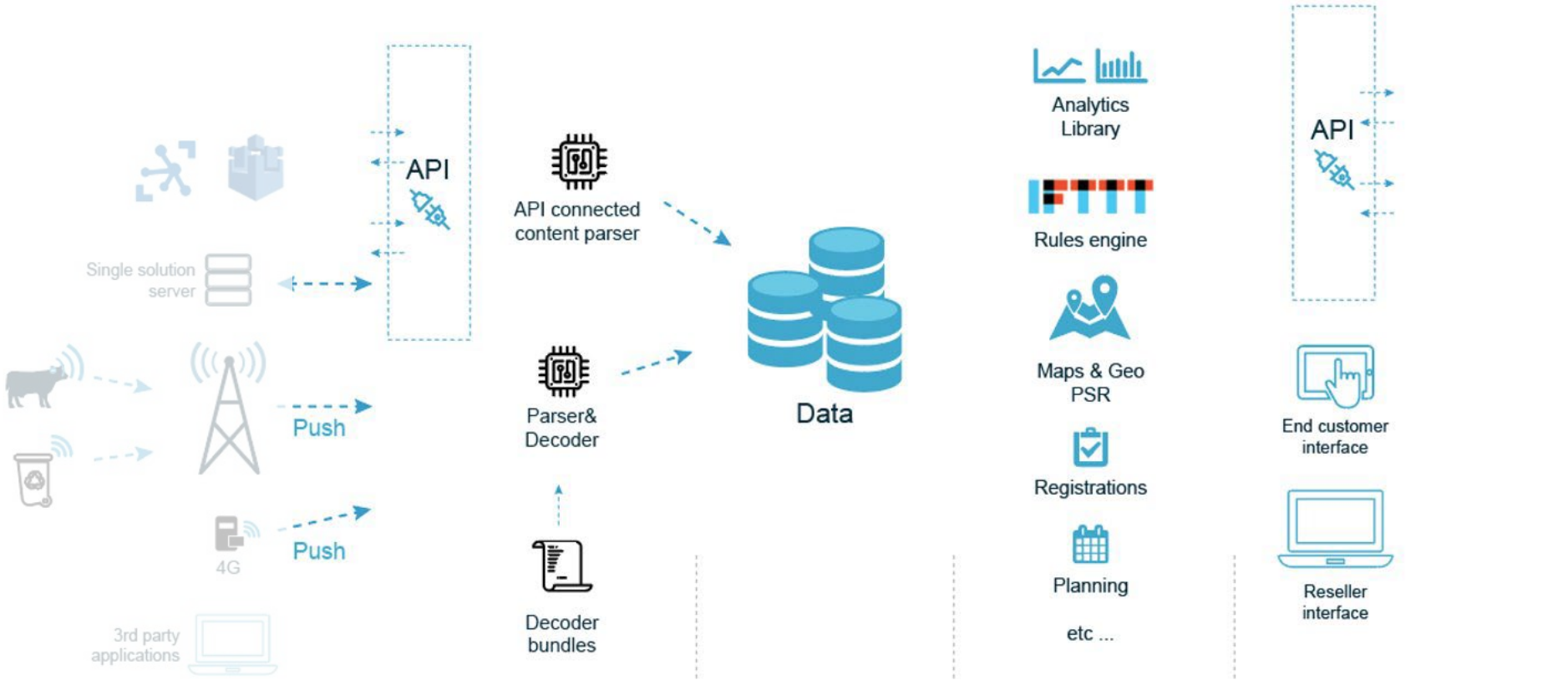
WMW, part of an end2end solution



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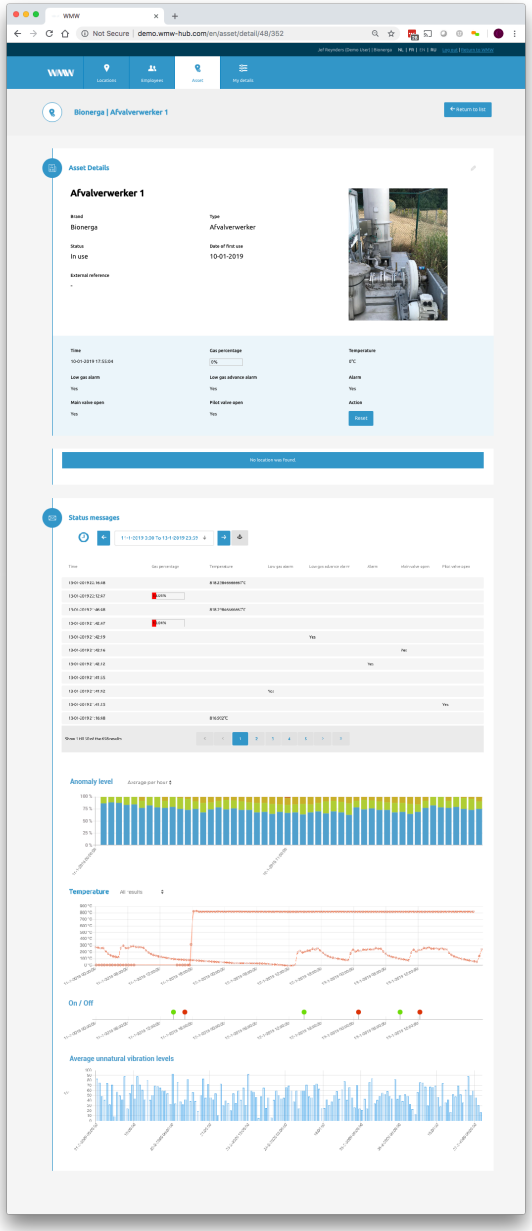

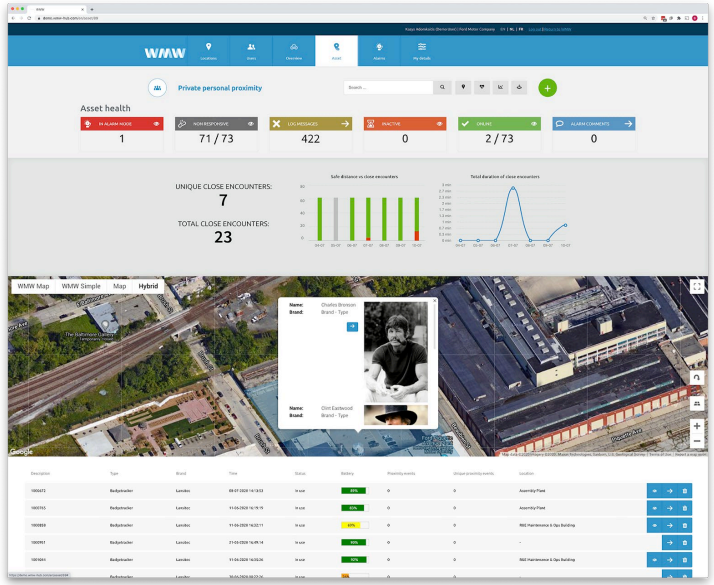

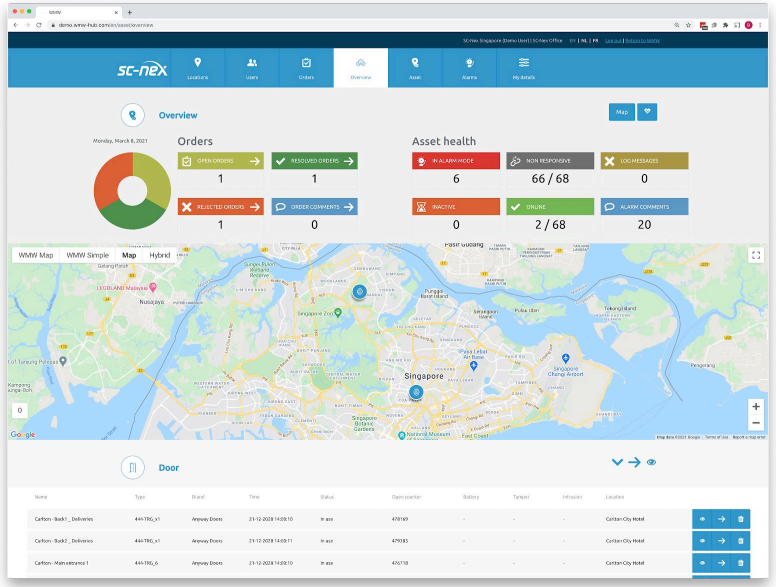

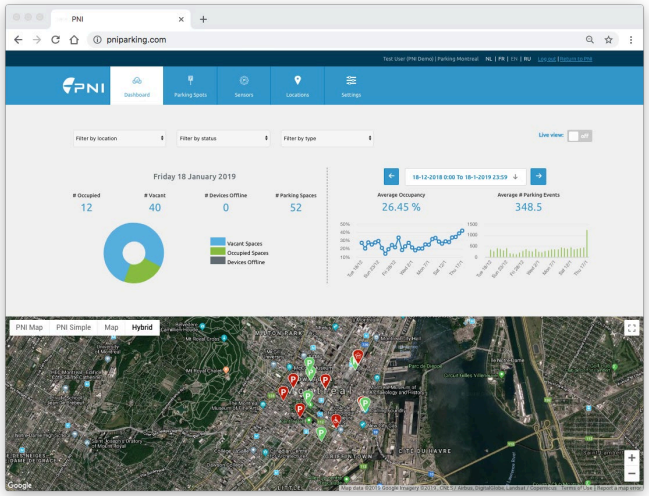

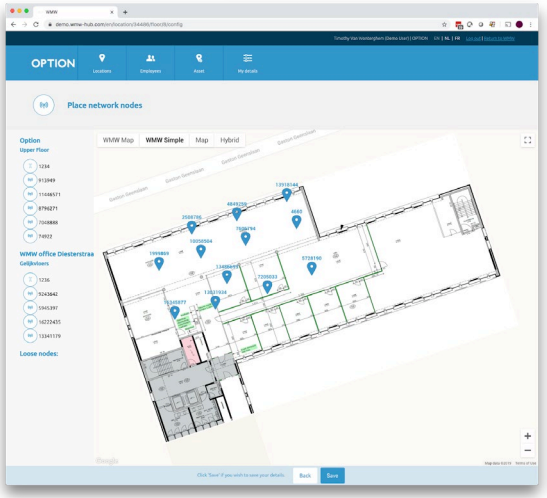

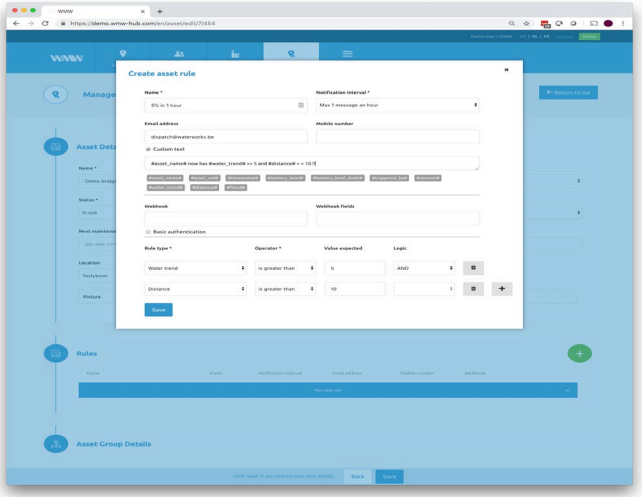

ERS CO_2 & WMW

ERS CO_2 - Capability

Be alerted in real time when a threshold is exceeded/subsceeded so that you can take action as quickly as possible.

Customize the sample rate and transmit frequency of the measurements.

Simple to install, just mount it on the wall and if needed, change the settings with a smartphone or via downlink.

Secure by design – ERS CO2 sends only encrypted data.

Autonomous – ERS CO2 works for several years without recharging.

WMW Best Compliance

- ✓ **Dashboard & detail page of some and all your assets**
- ✓ **Ruling system** with notification engine
- ✓ **Ruling system** with **notification engine**
- ✓ **Predefined application to start with. Device onboard = adding the ID and giving it a name.**
- ✓ **Security of data in transit, - in rest, description, …**
- ✓ Platform architecture can scale from a single instance to a full duplicated load balanced multi-VM or multi-node environment in minutes.
- ✓ Ability to manage the device and its settings by downlink commands (for example for data transmission frequency)

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Actility

Shmuel Solomon

Actility

In Short

- ✓ Actility is a **world leader** in LPWAN **industrial-grade connectivity solutions** for the IoT.
- ✓ Also provides revolutionary **ultra-low TCO geolocation technologies** through its subsidiary **Abeeway.**
- ✓ Headquarters **– Paris, France / Worldwide regional offices.**
- ✓ Founded – **2010.**
- ✓ Employees – 130. **60% R&D and Product Managers.**
- ✓ Founder, CTO & CEO - **Olivier Hersent**.
- ✓ Actility is **ISO 9001 certified.**

Mission

✓ Actility believes in a more efficient and sustainable world through **ubiquitous digital-twin technology.** We want to spark this transition and become the **leading global mediation** platform between cloud apps & physical world by 2023.

✓ Actility's ambition is to **put IoT at the service** of cities, citizens, industries, and communities, enabling them **to form a connected ecosystem**.

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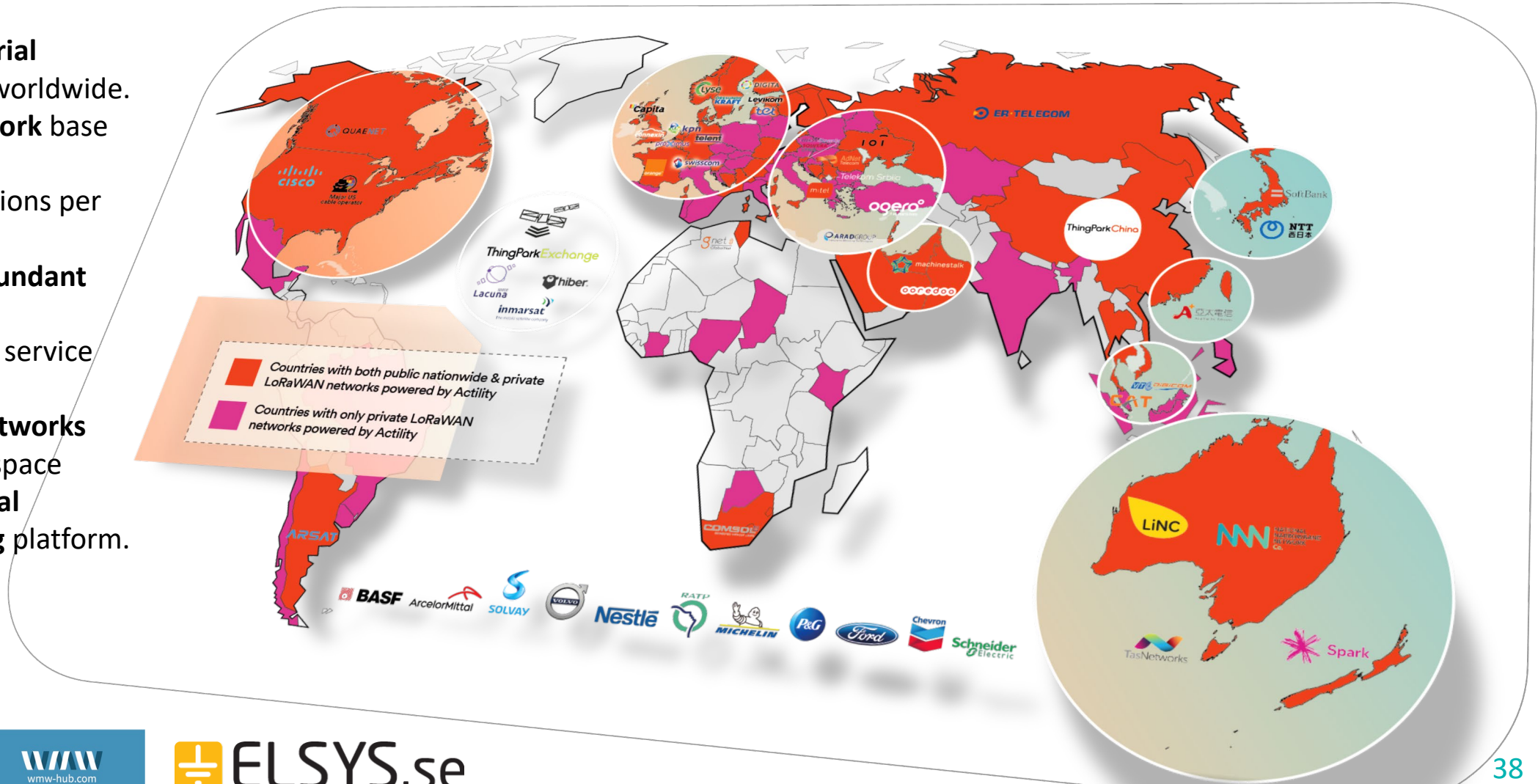
Actility Global Footprint

We deploy IoT networks across campuses, regions and whole countries, everywhere.

- ✓ **Thousand + of industrial enterprise** networks worldwide.
- ✓ Over **35K public network** base stations worldwide.
- ✓ **20 billion** IoT transactions per year.
- ✓ **24/7 regional georedundant datacenters.**
- ✓ **50+ large-scale Tier-1** service providers.
- ✓ **20 interconnected networks** across countries and space through an **operational Activation & Roaming** platform.



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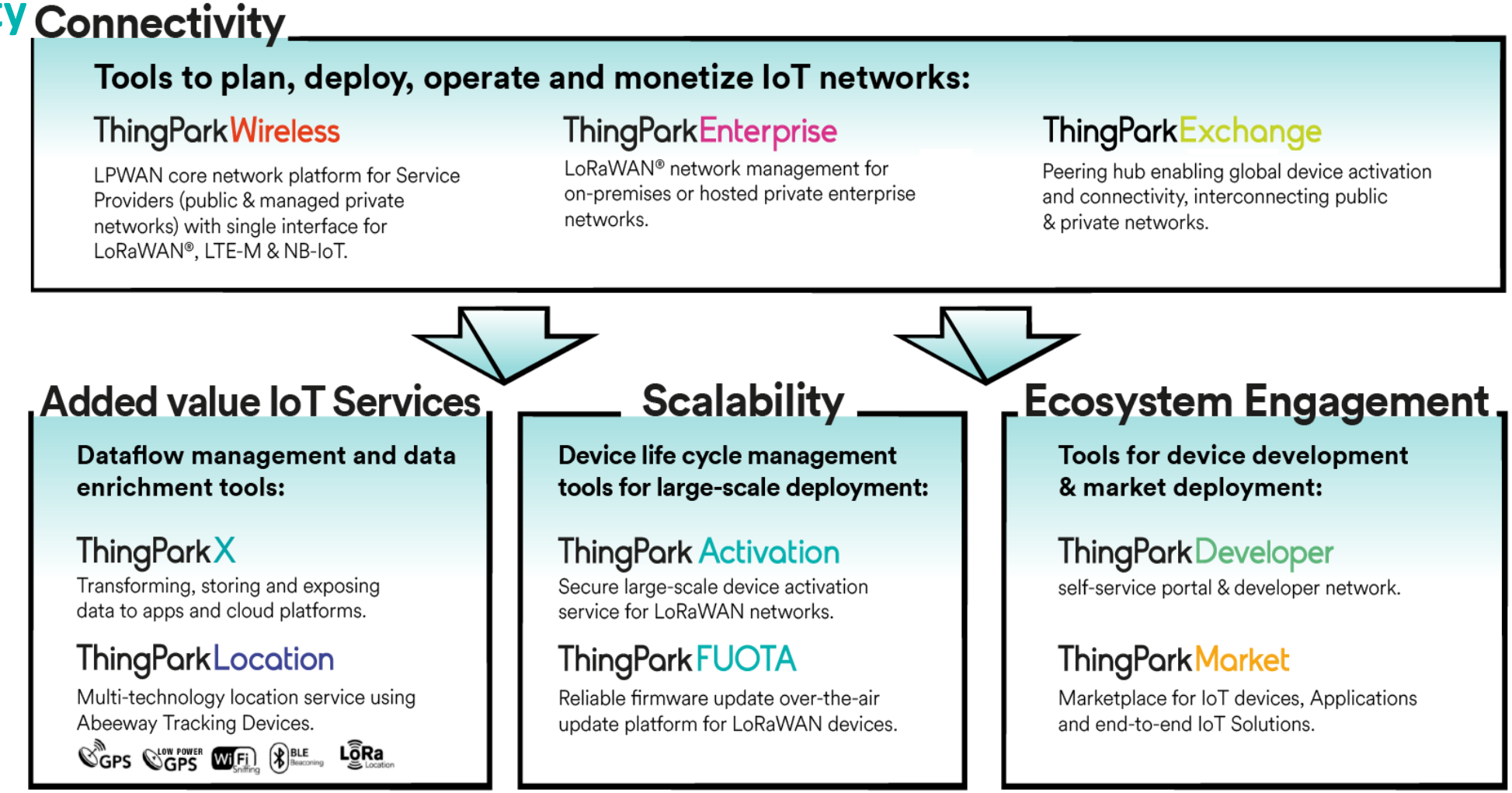
ThingPark Product Suite

We accelerate the creation of IoT solutions, bringing a profound digital transformation of industries and society

- ✓ **ThingPark™** is our **multi-radio IoT connectivity** platform allowing to deploy LPWAN worldwide, integrating LoRaWAN®, but also low-power cellular (LTE-M, NB-IoT).
- ✓ **ThingPark™ Suite** is a comprehensive portfolio of **products and value-added services.**



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LoRaWAN – A Leading Choice For IAQ Solution

Why LoRaWAN is the best wireless tech? because it is easy to deploy (long range indoor), provide a reliable connection (macro diversity) and network investment can be amortized over various verticals.

Coverage
- ✓ **5-15 km range**
- ✓ Deep indoor
- ✓ Star network
- ✓ **Bidirectional communication**

Cost
- ✓ **Low deployment costs**
- ✓ License-free spectrum (ISM band)
- ✓ **Minimal infrastructure**
- ✓ Low power consumption
- ✓ 10+ years battery life

Eco-System
- ✓ **Availability of end-products to ensure ROI of network deployment**
- ✓ Strong ecosystem to ensure quality and longevity of the solution
- ✓ **Actility is at the hearth of the LoRa Alliance**

Security
- ✓ **Secured communication protocol**
- ✓ Two layers of security: one for the network and one for the application
- ✓ AES encryption is used with key exchanges

Usage
- ✓ Public & private networks
- ✓ Network scalability
- ✓ **Easy to install, simple to operate and do not rely on wires**

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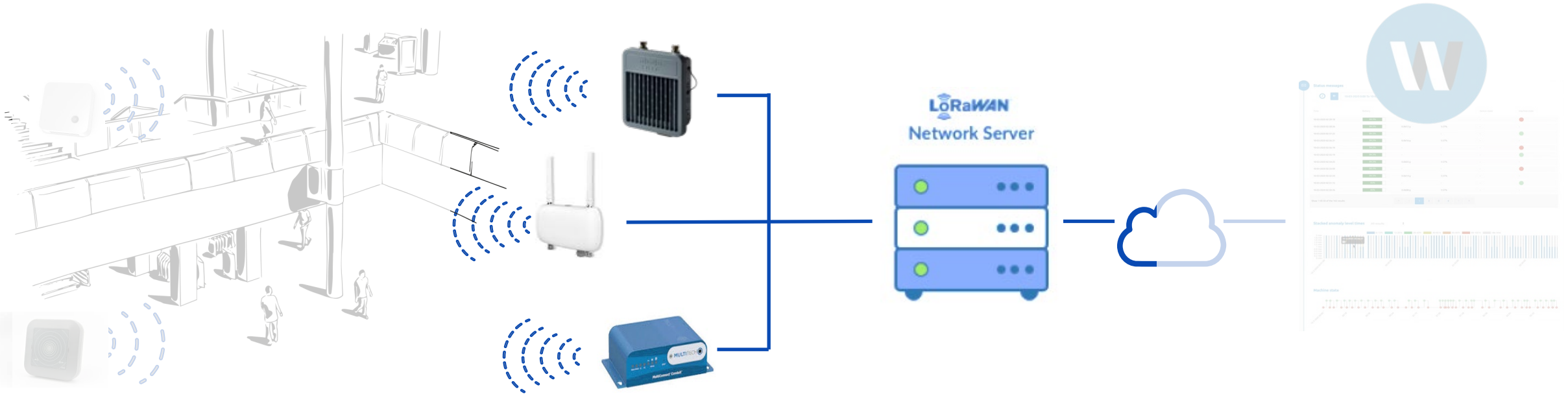
Transform Indoor Data Into Useful Information - How Does It Work?



CO2, People Flow Sensors → ThingPark Private Gateways → ThingPark Network Server (SaaS, OCP) → WMW Application for Insights and Management

Low Power communication enabling 10 years battery life	Robust Radio technology Immune to interferences from Cellular, Wi-Fi…	Operation & Management of a highly scalable Network via a simple user interface	Data Mediation Layer for seamless integration of the LoRaWAN Network to the Application

Native End-to-End encryption and authentication of communications

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ThingPark Enterprise - Actility Air Quality Monitoring Solution Backend Dashboard

DEVICE INFORMATION

Name: Elsys ERS CO2

Manufacturer: Elsys

Model: ERS/ELT/EMS sensors - 1.0.3 revA - class C

DEVICE STATUS

Connection: ACTIVE CLASS C

Power Source: Battery 100%

Last Uplink: Today - 14:29:15

Last Downlink: Today - 11:59:16

Average Packets: 285.0 packet(s)/day

LAST 10 PACKETS

	UL/DL	FCNT	Timestamp	Content	LoRaWAN™ Port	RSSI	SNR	ESP	SF	BEST LRR ID
^	↗	851	Today - 14:29:15	DATA	5	-57 dBm	7.25 dB	-57.75 dBm	SF7	10-00-0A-4A

Model Identifier: elsys:ers:1
Protocol Identifier: elsys:generic:1
Driver Identifier: actility:elsys-generic:0

Decoded Payload: RAW PREVIEW

```
{
  "motion": 0,
  "light": 39,
  "co2": 507,
  "vdd": 3650,
  "temperature": 19.6,
  "humidity": 26
}
```

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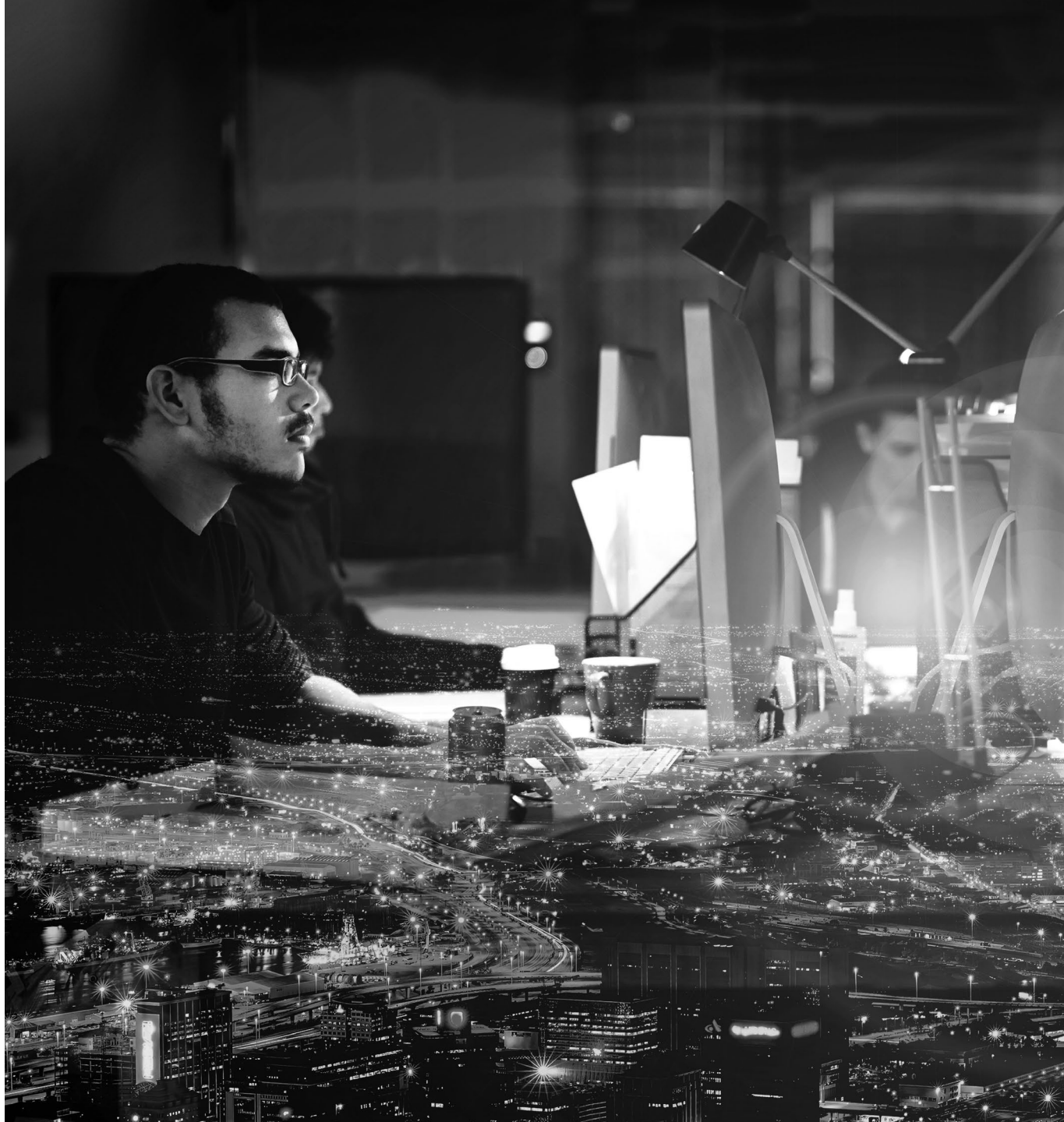
Live Demo

- Bert Vanaken

Summary

- Olivia Ählström
- Bert Vanaken
- Shmuel Solomon



Thank You!

Continue the discussion and contact WMW, ELSYS and Actility

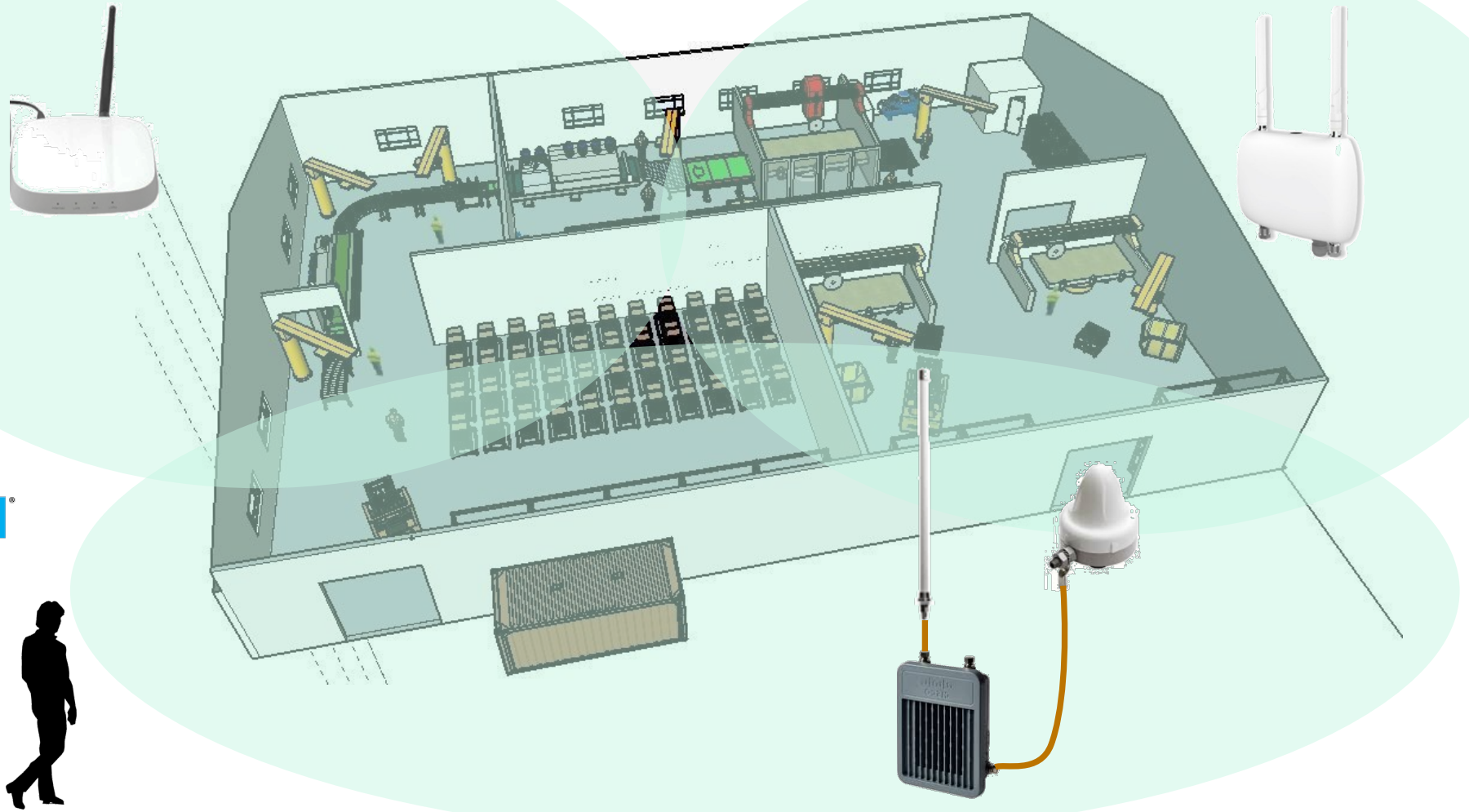
Technical and commercial experts directly at:

Olivia Ählström - olivia@elsys.se

Bert Vanaken - bert@wmw-hub.com

Shmuel Solomon - shmuel.solomon@actility.com

LoRaWAN™ macro-diversity provides robust connectivity Indoor, outdoor and in motion



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