

Actility Webinar

LoRaWAN® for Private and Enterprise Networks

Oct 26, 2023

16:00 CET, Paris (10AM ET, New York)

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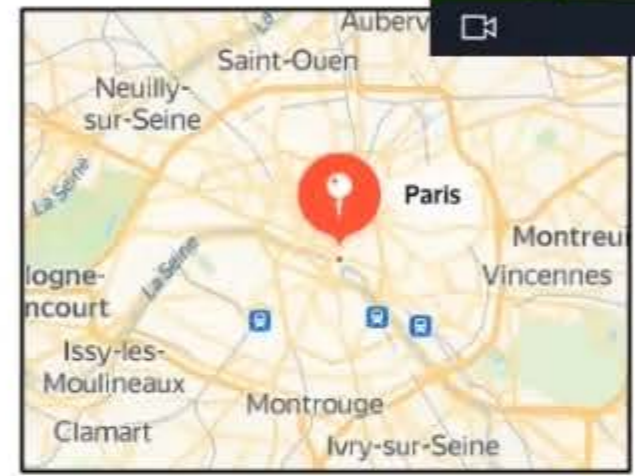


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Public Networks



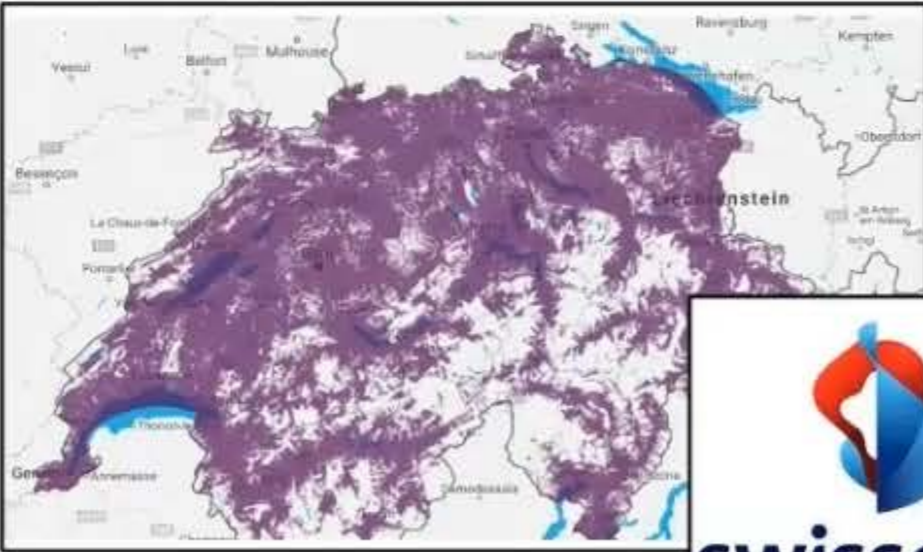
City-wide



Country-wide



170+ public LoRaWAN networks globally



Planet-wide

Community Networks



ThingPark Community

ThingPark Community

Connecting the LoRaWAN® ecosystem

Connect the dots of the LoRaWAN® ecosystem and unleash the potential of Industrial IOT with the latest ThingPark technology.

Join ThingPark Community

helium

LORIO Tee Community

Register your account

Worldwide, publicly accessible, low-latency LoRaWAN® network servers

THE THINGS NETWORK

Private/Enterprise Networks



Volvo manufacturing site in USA and France



Domitys senior residences in Mauritius



Pittsburgh Airport



Eskisehir Industrial Zone





Variety of Network Types – How Come?

Public networks

Private networks

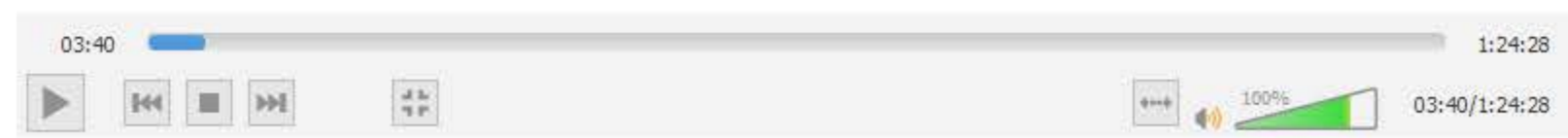
Community networks



Low cost

Using unlicensed band

Easy to use



Use Own Private Network or Public/Community Ones



Ask yourself:

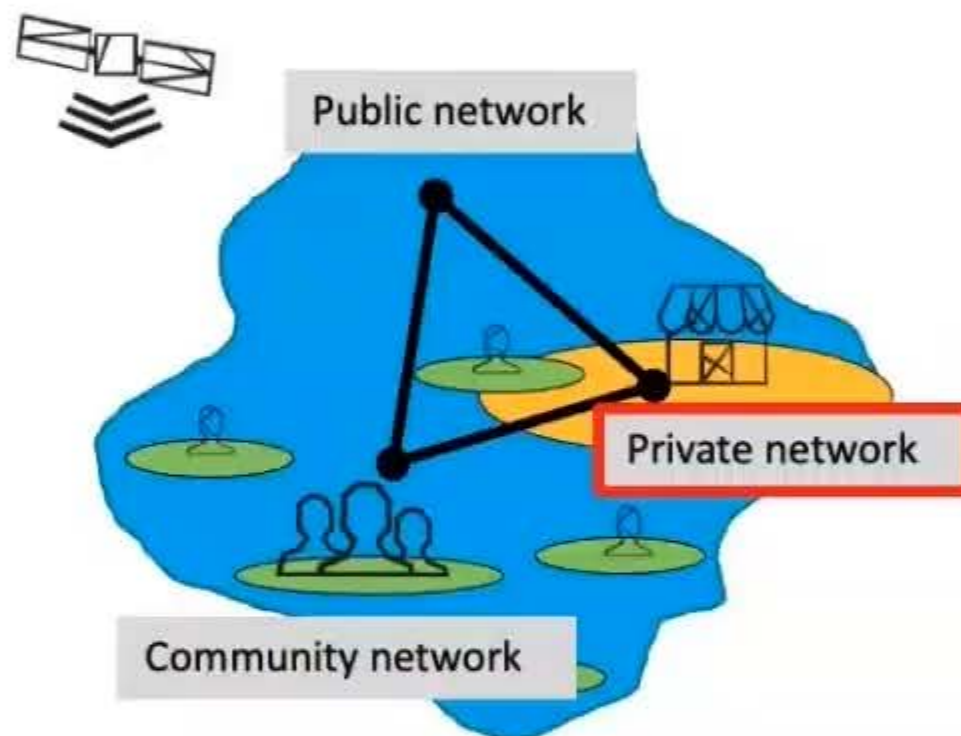
- Is there a public/community network where I need it? (*)
- Does it provide the level of coverage I need (e.g., deep indoor)? (*)
- Is it cost-effective?

(*) Talk to your local public operator for on-demand coverage

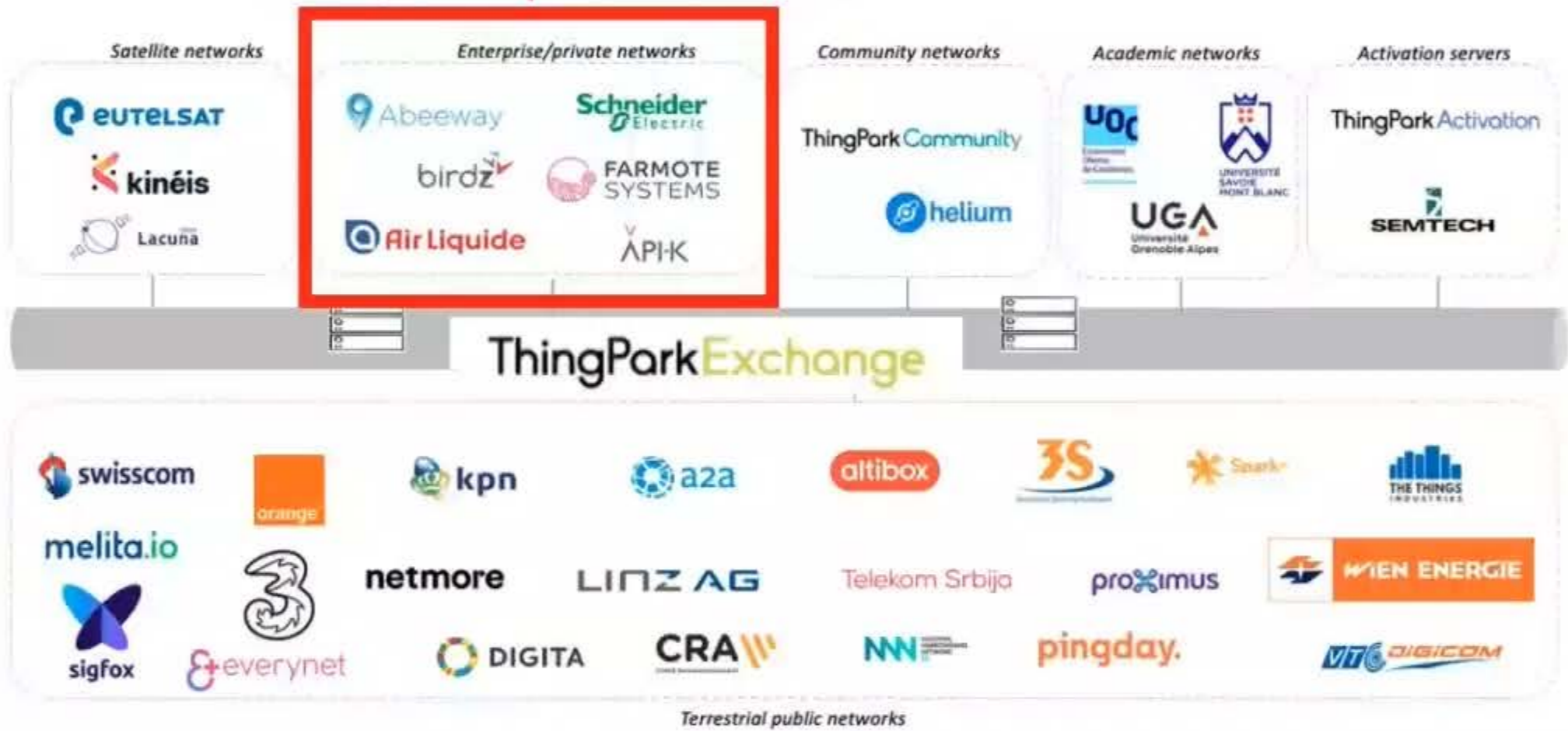
Note: “Network” may also be bundled with the solutions being deployed.



Not Necessarily an Either-Or Question!



Private/enterprise networks



Network collaboration via roaming

LoRaWAN backbone powered by ThingPark Exchange roaming hub

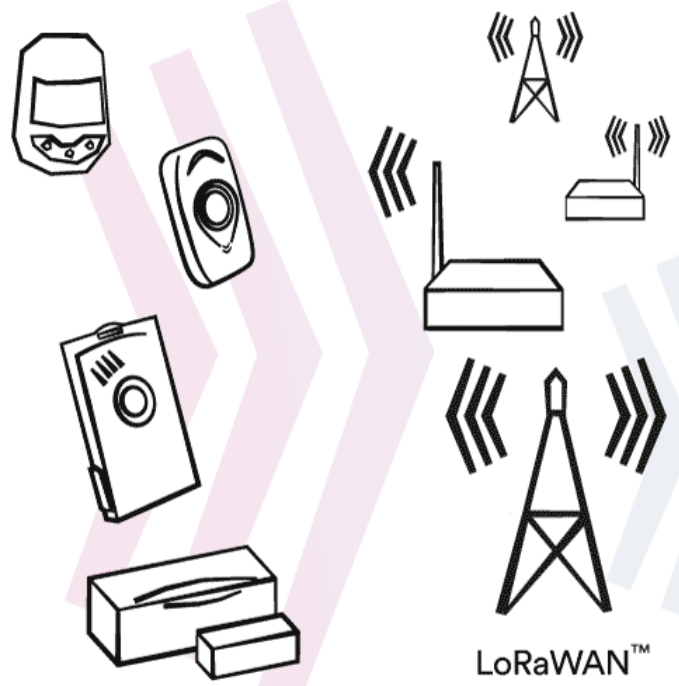


ThingPark Enterprise Overview


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Solution Overview

← LPWAN Network →



LoRaWAN™ Devices and Base Stations



ThingPark Enterprise

- ✓ Geolocation
- ✓ Roaming
- ✓ Reliable multicast & FUOTA
- ✓ High Availability


Device payload drivers & Cloud connectors

Network Server

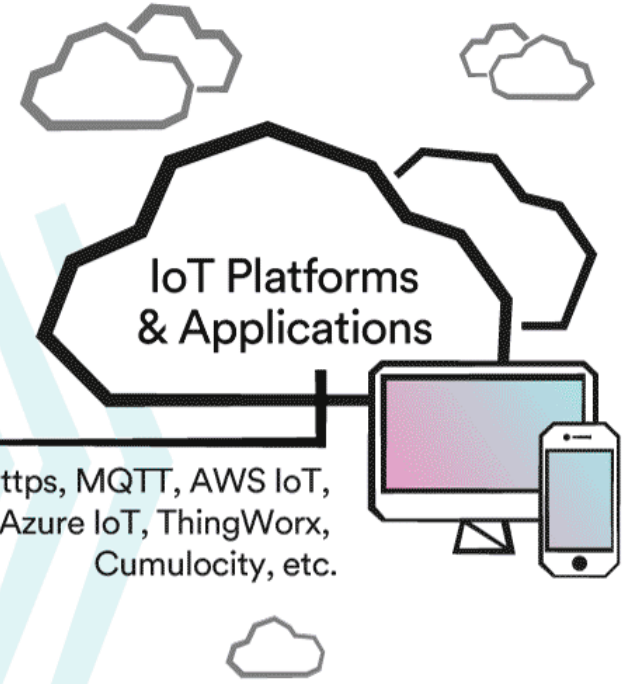
Join Server

Device & Base Station Management

Connectivity Management Platform for dedicated LoRaWAN™ Networks



SaaS, Private Cloud or On premise deployment



Business Applications and Cloud Connectors

ThingParkEnterprise is ...



- The most **scalable** LPWAN platform, supporting up to:
 - **SaaS:** 1500 packets/sec, 12 million devices, 50K gateways
 - **Self-hosted:** 100 packets/sec, 500K devices, 2000 gateways

Useful Resource:
ThingPark Enterprise load & stress reports
for [SaaS](#) and [self-hosted](#) deployments



- A **secure** solution meeting the most stringent security requirements:
 - Communication over all external interfaces is secured by TLS and/or IPsec
 - Multi-factor authentication and federated authentication
 - Built-in DoS and replay attack mitigation techniques
 - E2E secure key handling + secure storage in Hardware Security Module (powered by ThingPark Activation)
 - Security audits for each ThingPark Enterprise release, reports published to customers



- **High Availability:** Resilient and fault-tolerant by design
 - No touch failover/failback
 - Built-in message queues (Kafka) to prevent data loss
 - 24/7 level-3 support + optional level 1 & 2 support services

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ThingParkEnterprise Deployment Models

SaaS

Self-hosted

Advantages

- Fast deployment
- Low OPEX
- Seamless evolution and scalability

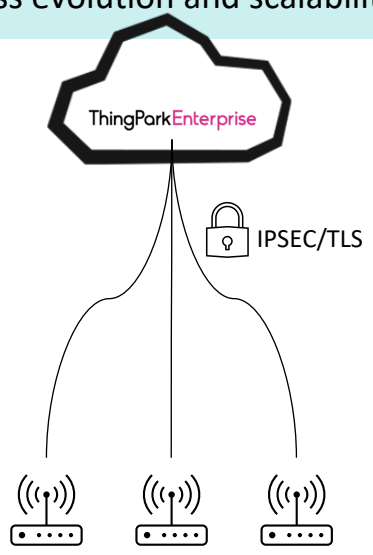
- Infrastructure as a Service (kubernetes supported)
- Ready to install on AWS, Azure, etc.

Full control on data and infrastructure

Activity Datacenters

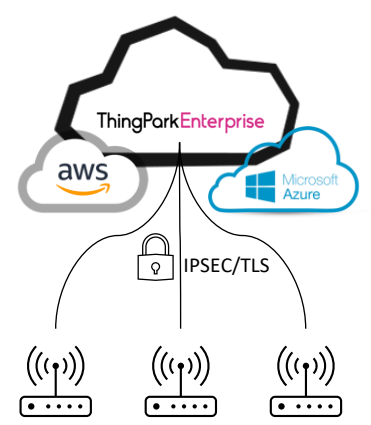
Cloud Provider

Customer Premises



Private Cloud

On Customer Premise (OCP)



High Availability 

Standard

Optional

Optional

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FLEXIBLE

Connect Any Gateway To ThingParkEnterprise

Video tutorial:
[LRR vs. Basics Station comparison](#)

- ThingPark Enterprise supports two LoRaWAN packet forwarders:
 - ThingPark's Long Range Relay (LRR) – continuously maintained with a clear roadmap
 - Basics Station: open source with very limited maintenance and no roadmap (only one release delivered in the last 3 years)
- Multi-vendor hardware-agnostic solution
- Compatible with both Linux and FreeRTOS operating systems



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FLEXIBLE

Multi-tenancy & User Permissions

Video tutorial:

[TPE partitioning using administrative domains](#)

Administrative Domains

The same TPE subscription may be partitioned to serve multiple tenants, allowing full segregation of the user permissions.

CREATING A DOMAIN

Use domains to restrict user access to a subset of resources, by associating resources (base stations, devices or multicast groups) with one or several domains and setting domain restrictions for individual user accounts.

Group ⁱ

Geography ▼

[Create a group](#)

Name ⁱ

EMEA/France ✓

Activation ⁱ

ON

Description ⁱ

This domain segregates user permissions based on geographical location, gathering resources located in France, under the world region EMEA. ✓

Create another

Name	State	
Geography		
Domains are segregated by their geographical location		
EMEA/France/Paris	Active	
EMEA/Germany	Active	
EMEA/United-Kingdom	Active	
USA/East-Coast	Active	
USA/West-Coast	Active	
Use-case		
Domains are segregated according to the vertical use-case		
Asset Tracking	Active	
Smart Building	Active	

Domain Groups

A Domain Group defines a segregation scope. Several groups can be defined, e.g., Geography, use case, end-customers ID etc.

User Restriction

Associate end users with Domain Restrictions to restrict their access to resources (devices, base stations and multicast groups).

PERMISSIONS

Domain Restrictions ⁱ

EMEA

Roles ⁱ

- Administrator
Create, edit, delete users, domains, base stations, devices, mult
- Devices, multicast groups and connections manager
Create, edit, delete devices, multicast groups and connections.
- Base stations manager
Create, edit, delete base stations.
- Viewer
View base stations, devices, multicast groups and connections.

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Packaged Connectors To Popular IoT Cloud Platforms

CREATING A CONNECTION

 HTTP	 MQTT	 Azure IoT Hub	 Azure IoT Central
 Azure Event Hubs	 AWS IoT Core	 AWS IoT Greengrass	 Google IoT Core
 WMW	 Advantech	 Kafka	 CUMULOCITY
 ThingsBoard	 DATA CAKE	 Qubitro	 CommonSense
 Tago	 Gear Studio	 HERE Asset Tracking	 Microsoft Teams
 Ginjer	 Opinum	 Cayenne	 AMQP
 ThingWorx	 SAP	 IBM Watson IoT	 Yandex

Additional On-Premise Connectors

 Modbus
 OPC UA SERVER



Device Drivers – Deliver Actionable Data

Video tutorial:
[Payload decoding in ThingPark](#)

- Built-in payload drivers for more than **500 models** from over **128 device manufacturers** (full list available [here](#))
- Additionally, you may bring your own **Custom Drivers**

Fully integrated in ThingPark Product Stack

The screenshot displays the 'LAST 10 PACKETS' table with columns: UL/DL, FCNT, Timestamp, Content, LoRaWAN™ Port, RSSI, SNR, ESP, SF, and BEST LRR ID. The second packet is highlighted with a green arrow and contains a 'DATA' button.

Below the table, the 'Decoded Payload' section shows a tree view of the payload data:

```

Model Identifier: advantec:wise-2410:1
Protocol Identifier: advantec:wise:1
Driver Identifier: actility:advantec:wise:0

Decoded Payload:
  TotalLength: 88
  Device:
    Events: 0
    PowerSrc: 1
    BatteryVolt: 0
    Time: 1553227296
    SequenceNumber: 53
  TempHum:
    Status: 0
    SenVal: 26375
    Event: 1
    Range: 0
  Accelerometer:
    X-Axis:
      SenEvent: 1
      Peak-to-Peak Displacement: 4
      0AVelocity: 19
      RMSng: 19
      CrestFactor: 474
      Skewness: 38
      Peakmg: 27
      Kurtosis: 22
      Deviation: 2
    LogIndex: 0
    Z-Axis: Object {"SenEvent":1,"Peak-to-Peak Displacement":7,"0AVelocity":
    Time: 1553227295
  
```

On the right, a JSON representation of the decoded payload is shown:

```

{
  "deviceEUI": "20635f016100022c",
  "time": "2021-01-18T11:47:41.730Z",
  "customerId": "100133879",
  "modelCfg": "1:TWA_100133879.14389.AS",
  "dxProfileId": "community-api",
  "coordinates": [
    2.333739816,
    48.8748846,
    90
  ],
  "age": 56,
  "validityState": "NEW",
  "horizontalAccuracy": 66,
  "processedFeed": {
    "SF": 8,
    "deviceProfileId": "ABEEWAY/MICRO",
    "payloadEncoded": "032861780907a434d98fbf3dda2c8675e6e4694cdc8675e6e47d4c20cf4d55b5708c2",
    "sequenceNumber": 3003,
    "receptionTime": "2021-01-18T11:47:41.730Z",
    "dynamicMotionState": "STATIC",
    "temperatureMeasure": 16.705883,
    "processedPacket": {
      "SNR": 15,
      "RSSI": -50,
      "baseStationId": "00000694",
      "antennaCoordinates": [
        2.334984,
        48.874218
      ]
    }
  },
  "port": 18,
  "rawPosition": {
    "rawPositionType": "RawPositionByWifiSolver",
    "coordinates": [
      2.333739816,
      48.8748846,
      90
    ],
    "age": 56,
    "bssidCount": 4,
    "wifiBssids": [
      {
        "bssid": "A4:34:D9:8F:BF:3D",
        "rssi": -46
      }
    ]
  }
}
  
```

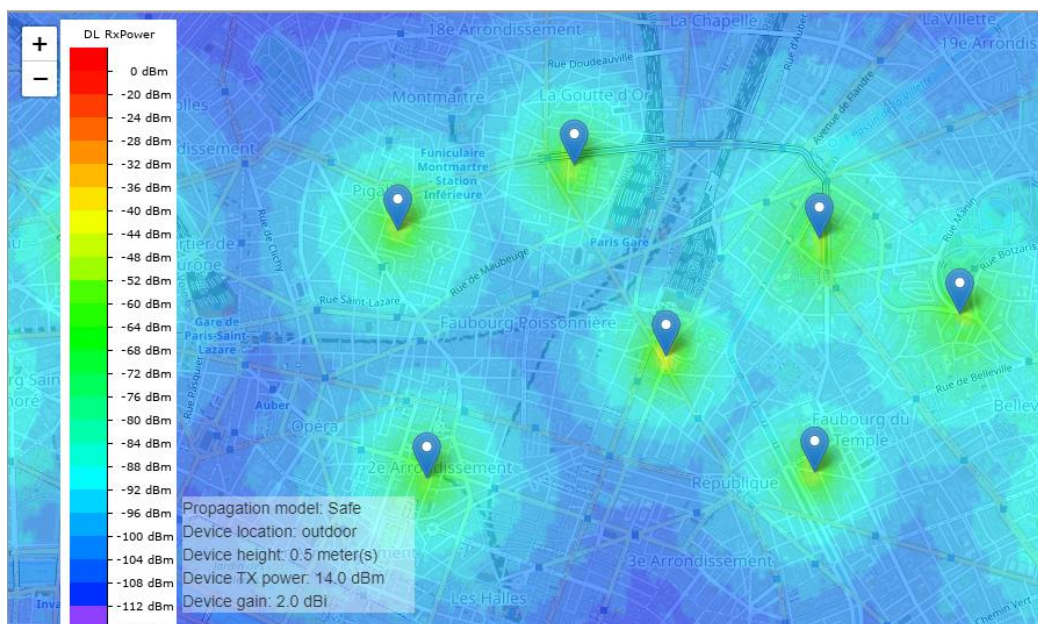
The screenshot shows the 'DRIVER INFORMATION' form in the ThingPark interface. It includes fields for Driver Name, Driver ID (set to 'custom::1'), Protocol ID, Specification URL, Provider Logo URL, Manufacturer Logo URL, and Description. There are 'CANCEL' and 'CREATE' buttons at the top right.

Off-the-shelf Network Tools (1/2)



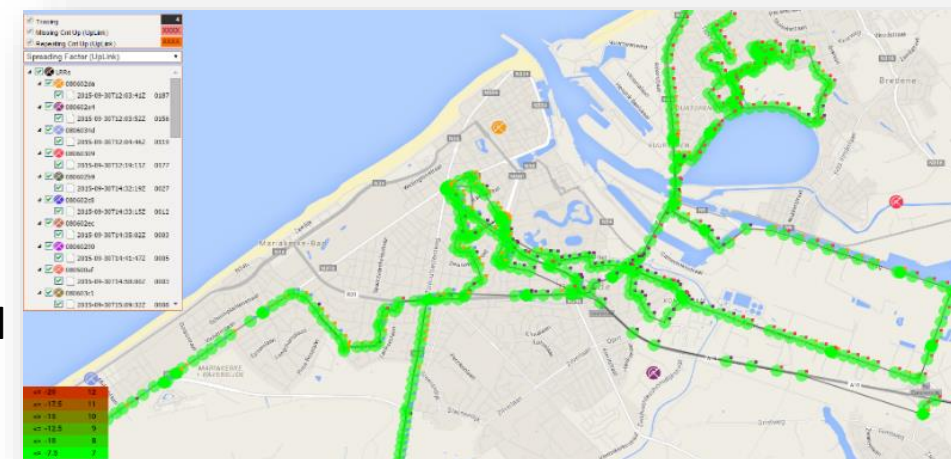
Network Coverage

LoRaWAN coverage prediction tool for outdoor gateways



Network Survey

LoRaWAN coverage test analysis tool (drive/walk tests)



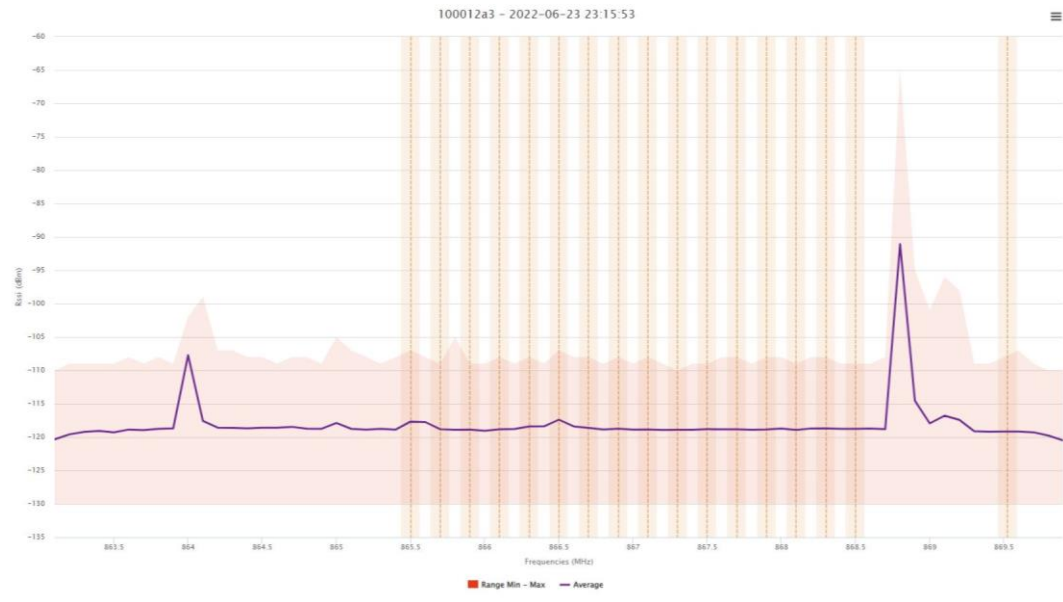
Off-the-shelf Network Tools (2/2)

LOW TOUCH



Spectrum Analysis

Base Station Radio Frequency scan analysis



Wireless Logger

Log of all UL & DL messages incl. MAC messages & payload decoding ("Wireshark" for LoRaWAN)

WIRELESS-LOGGER Last Update: 2023-10-16 15:43:51

Dashboard [100001138]

DevAddr Filtering: Clear DevEUI Filtering: Clear LRR Id Filtering: Clear LRC Id Filtering: Clear AS ID Filtering: Clear

From: To: Packet Type: Uplink (MAC + Data), Downlink UI Clear

Decoder: Automatic

Auto Reload: no Expand All: Refresh Export size: 100 Export Map

		UTC Timestamp	Local Timestamp	DevAddr	DevEUI	FPort	FCnt	NFCnt	AFCnt	RSSI	SNR	ESP	SF/DR
<input type="checkbox"/>	mac data	2023-10-16 12:09:49.568	2023-10-16 14:09:49.568	04000484	7083D5E75E001153	125	7420			-83.0	5.5	-84.078	SF12
<input type="checkbox"/>	mac data	2023-10-16 11:31:56.501	2023-10-16 13:31:56.501	04000484	7083D5E75E001153	125	7417			-83.0	5.25	-84.134	SF12
<input type="checkbox"/>	mac data	2023-10-16 09:32:29.701	2023-10-16 11:32:29.701	0400080B	20635F028100017A	18	299614			-92.0	10.0	-92.413	SF7
<input type="checkbox"/>	mac data	2023-10-16 09:19:58.784	2023-10-16 11:19:58.784	0400080B	20635F028100017A	18	299589			-78.0	9.5	-78.461	SF7

Mtype: UnconfirmedDataUp
Flags: ADR : 1, ADRAckReq : 0, ACK : 0

Mac (hex): 0307

MAC.Command.LinkADRAns
MAC.LinkADRAns.Status : 0x07
MAC.LinkADRAns.Status.ChannelMaskAck : 1
MAC.LinkADRAns.Status.DataRateAck : 1
MAC.LinkADRAns.Status.PowerAck : 1

Data (hex): 034864900700 [not encrypted]

Driver metadata: model: abeeway:micro-tracker2, application: abeeway:asset-tracker2

Decoded data using driverId: abeeway:asset-tracker3

```
{
  "messageType": "POSITION_MESSAGE",
  "age": 0,
  "trackingMode": "PERMANENT_TRACKING",
  "batteryLevel": 100,
  "batteryStatus": "OPERATING",
  "ackToken": 0,
  "rawPositionType": "BLE_BEACON_SCAN",
  "periodicPosition": false,
  "temperatureMeasure": 28.8,
  "sosFlag": 0,
  "appState": 1,
  "dynamicChirpsState": "STATIC",
  "onDemand": false,
  "payload": "034864900700",
  "deviceConfiguration": {
    "mode": "PERMANENT_TRACKING"
  },
  "bleSsid": []
}
```

Data size (bytes): 6
AirTime (s): 0.056576

Decoded MAC commands

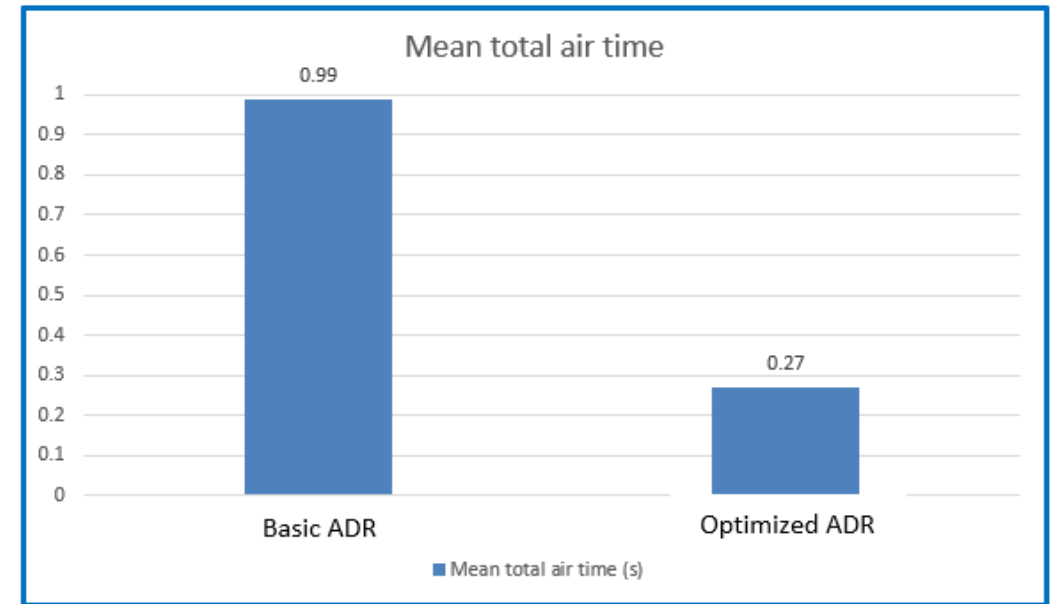
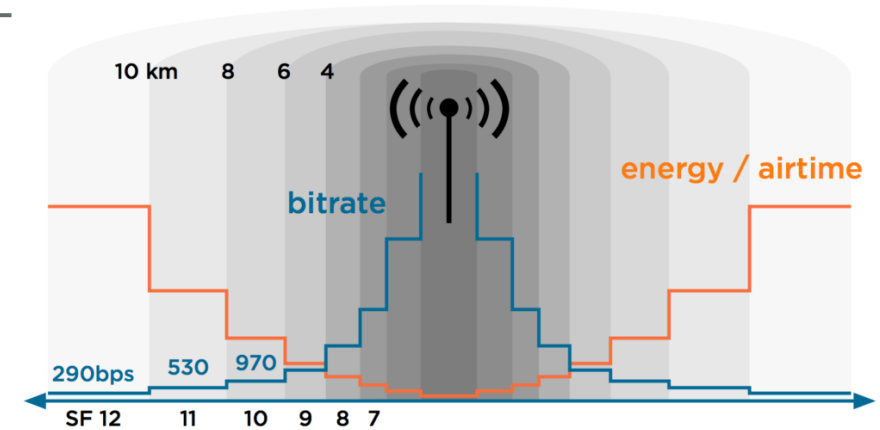
Decoded payloads

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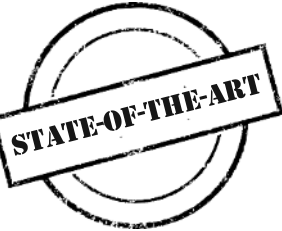
ThingParkEnterprise Offers The Best MAC Efficiency (1/2)

ThingPark's Adaptive Data Rate mechanism:

- **Dynamically adapts the device's Tx parameters** (TxPower, number of transmissions, data rate) according to the quality of the device-BS radio link
- **Minimizes the device's battery consumption** while fulfilling the target quality metrics
- **Adjust its reactivity** to avoid too volatile decisions or slow response to abrupt RF changes



Field tests show significant reduction (-72%) of average total air-time per uplink frame counter.



ThingParkEnterprise Offers The Best MAC Efficiency (2/2)

Field tests conducted by a Singaporean industrial IoT system integrator

Number of Nodes = 2
 Message Length = 51
 Confirmed Message
 Modem number of attempts = 1
 Application retries until no error
 Activity SaaS

ThingPark LNS

Message Duration

Attempts	2	3	4	5	6	7	8	9	10	12	Grand Total
1	96.24%	0.92%	0.06%	0.92%	0.09%	0.03%	0.03%	0.00%	0.03%	0.00%	98.32%
2	0.00%	0.00%	0.06%	0.06%	1.20%	0.03%	0.00%	0.00%	0.00%	0.03%	1.39%
3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.13%	0.00%	0.28%
Grand Total	96.24%	0.92%	0.13%	0.98%	1.30%	0.06%	0.03%	0.16%	0.16%	0.03%	100.00%

96.24% of the message is successfully sent out within 1 attempt with message interval of 2 seconds.

%Message Received by Activity TPE

Hour	Received
13	100.00%
14	100.00%
Grand Total	100.00%

Server receives 100% of the messages.

Number of Nodes = 2
 Confirmed Message
 Modem Retry = 1

Open Source LNS

Delay vs ACK (Node)

Delay	RXWIN1	RXWIN2	NOACK
2	67.50%	0.90%	31.60%
4	70.40%	0.50%	29.10%
6	70.80%	0.20%	29.00%
8	64.90%	0.30%	34.80%
10	67.20%	0.20%	32.60%
12	65.90%	0.50%	33.60%
14	65.50%	0.20%	34.30%
16	68.20%	0.40%	31.40%
18	65.70%	0.70%	33.60%
20	64.50%	0.30%	35.20%
Grand Total	67.06%	0.42%	32.52%

Node receives 67.6% acknowledgement.

Message rate = 1 Message per 5.0 seconds

Delay	5	4
2	96.10%	3.70%
4	98.30%	1.60%
6	96.30%	3.50%
8	96.70%	3.30%
10	97.00%	2.90%
12	96.10%	3.80%
14	96.80%	3.10%
16	97.00%	2.90%
18	96.80%	3.20%
20	97.80%	2.20%
Grand Total	96.89%	3.02%

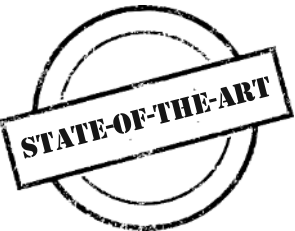
% ACK Received (Node)

Hour	RXWIN1	RXWIN2	NOACK
0	64.53%	0.28%	35.20%
1	71.98%	0.29%	27.73%
2	61.42%	0.59%	37.98%
3	61.23%	0.31%	38.46%
4	70.87%	0.65%	28.48%
5	69.26%	0.00%	30.74%
6	67.59%	0.93%	31.48%
7	60.00%	0.74%	39.26%
8	56.06%	0.00%	43.94%
9	74.63%	0.98%	24.39%
10	68.09%	0.53%	31.37%
11	67.35%	0.96%	31.69%
12	71.74%	0.62%	27.64%
13	70.19%	0.17%	29.64%
14	66.93%	0.32%	32.74%
15	67.21%	0.32%	32.47%
16	64.52%	0.00%	35.48%
17	67.25%	0.39%	32.36%
18	65.19%	0.21%	34.60%
19	68.22%	0.22%	31.56%
20	67.63%	0.24%	32.13%
21	65.93%	0.49%	33.58%
22	63.59%	0.53%	35.88%
23	65.68%	0.54%	33.78%
Grand Tot	67.06%	0.42%	32.52%

% Message Received (Server)

Hour	Received	Not Received
0	93.85%	6.15%
1	90.27%	9.73%
2	90.21%	9.79%
3	87.08%	12.92%
4	89.97%	10.03%
5	88.67%	11.33%
6	87.50%	12.50%
7	87.41%	12.59%
8	87.88%	12.12%
9	91.71%	8.29%
10	91.27%	8.73%
11	90.67%	9.33%
12	89.29%	10.71%
13	89.27%	10.73%
14	91.49%	8.51%
15	88.96%	11.04%
16	87.63%	12.37%
17	92.44%	7.56%
18	89.87%	10.13%
19	91.33%	8.67%
20	93.05%	6.95%
21	89.46%	10.54%
22	92.35%	7.65%
23	92.76%	7.24%
Grand Tot	90.34%	9.66%

Server receives 90.34% of the messages.



LoRaWAN Relays

- LoRaWAN Relays are battery-powered, can be installed anywhere (do not require electricity or internet connectivity), and work as a 'repeater'.
- They are typically used to extend the coverage in hard-to-reach areas, like basements for water meters or underground for manhole sensors.
- Infrastructure costs can be reduced significantly by installing battery-powered relay devices instead of indoor gateways.

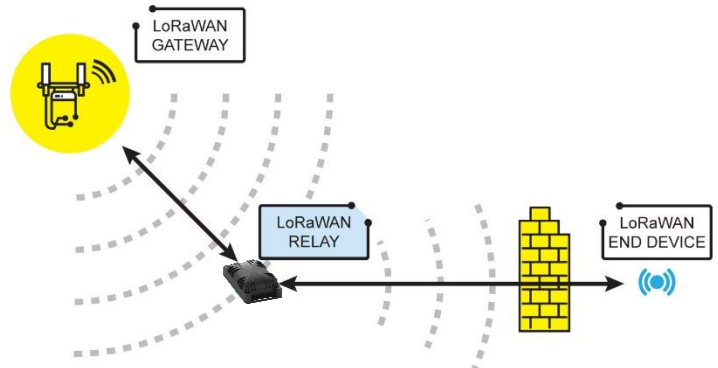
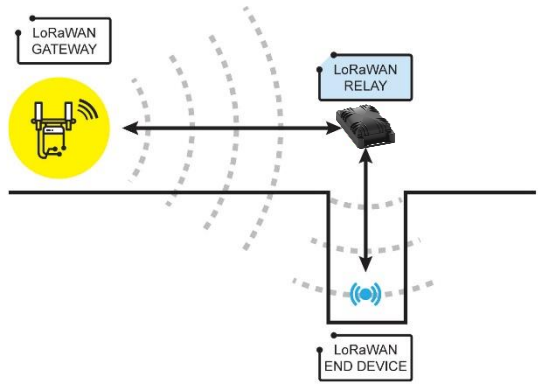
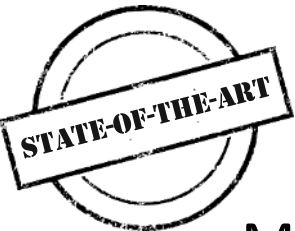


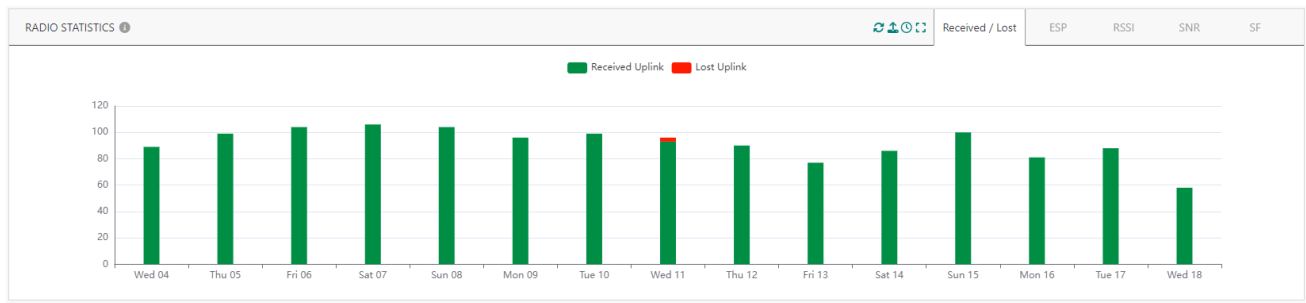
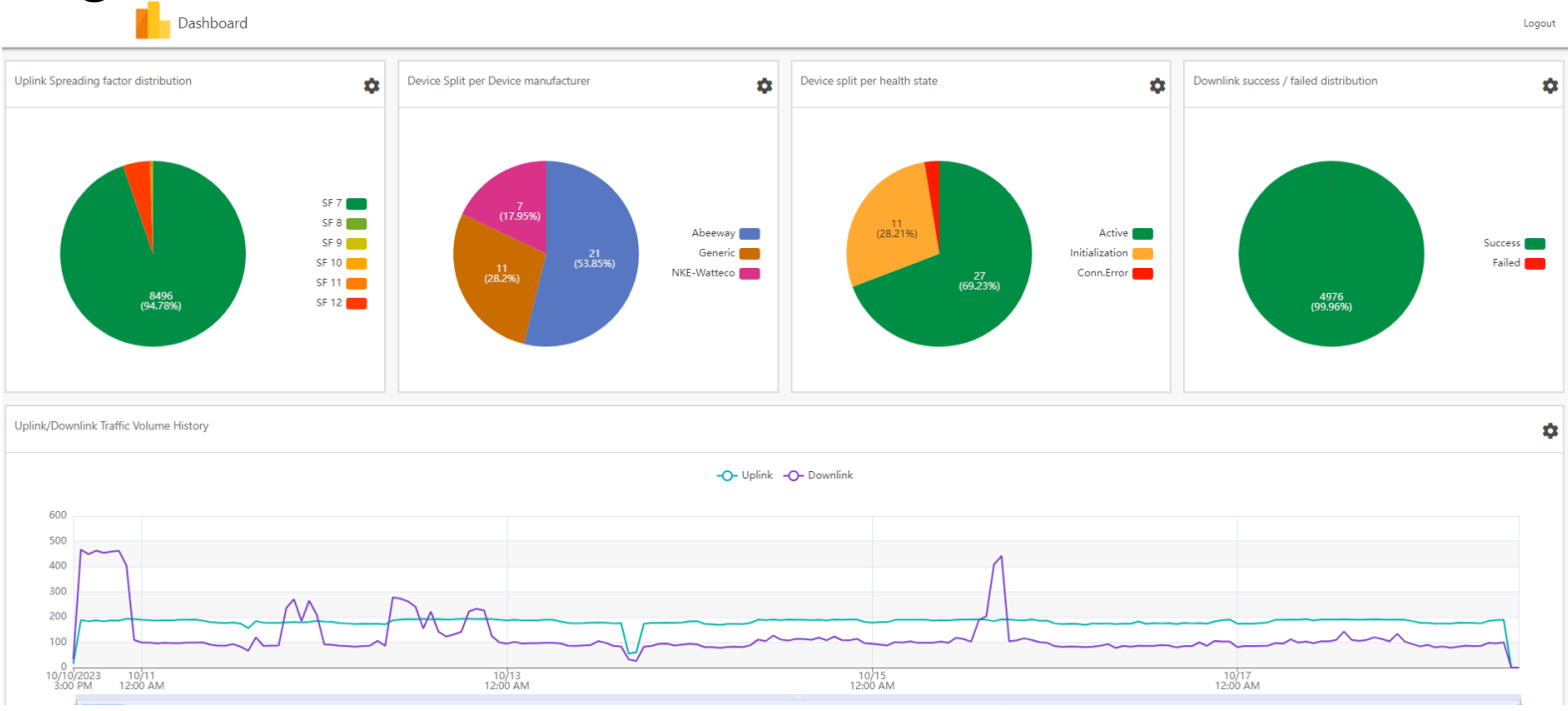
Image source: <https://lora-alliance.org>



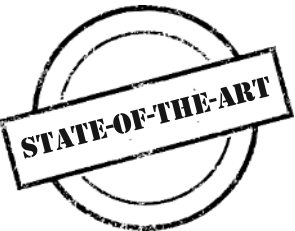


State-of-the-art Operations & Maintenance (1/2)

Monitoring dashboards



Activity



State-of-the-art Operations & Maintenance (2/2)

- Simplified supervision through a rich set of device and gateway alarms

The dashboard displays two main sections: BASE STATION ALARMS and DEVICE ALARMS. Each section includes a donut chart showing the total number of alarms and a breakdown by severity level.

Severity	Count
Critical	50
Major	31
Minor	0
Warning	17
Indeterminate	0

Severity	Count
Critical	2
Major	6
Minor	0
Warning	8
Indeterminate	0

State	Alarm Name	Base Station Name	LRR-ID	Creation Date	Last Update	Domains	Acked
MAJOR	Unusually high CPU usage level	Paris CI Lab - LAB81 Multitech Refresh V1.5	10-00-14-92	2023-09-28 08:43:35	Today 15:20:08		
MAJOR	Time synchronization lost	Paris CI Lab - LAB21 Kerlink iFemto Evo	10-00-00-CE	2023-10-06 15:23:39	Today 15:17:35		
MAJOR 265	Wrong MIC detected in Join request	LAB75 MTCDTIP2-Korian	10-00-0D-3D	2023-09-30 22:50:27	Today 15:17:07		

Gateway alarm examples

Alarm name

- Base station connection status
- Unusually low uplink traffic level
- Unusually high level of invalid uplink physical CRC
- Downlink frame rate exceeds the RF cell capacity
- Unusually high CPU usage level
- Unusually high RAM usage level
- Unusually high file system usage level
- Time synchronization lost

Device alarm examples

Alarm name

- Battery level threshold
- Traffic exceeds the downlink regulator settings
- Traffic exceeds the uplink regulator settings
- No uplink activity
- Node uses higher data rate than expected
- Node uses lower data rate than expected
- Join request replay detected (DevNonce replay)
- Wrong MIC detected in Join request

Activity

FUTURE PROOF

ThingParkEnterprise Value Added Services

Video tutorial:
[ThingPark Activation](#)



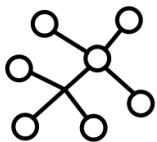
Geolocation

Native support for network-based Geolocation leveraging LoRaWAN TDOA/RSSI



FUOTA

Support of Firmware Update Over The Air (FUOTA) for LoRaWAN devices, using multicast feature



Roaming

Passive Roaming, compliant with the latest official LoRaWAN specification and pre-integrated to ThingPark Exchange



Activation (JS)

Secure end-to-end Activation through a standalone Join Server with HSM

In A Nutshell...

Useful Resource:
[Key features of ThingPark Enterprise](#)

ThingPark Enterprise offers a carrier-grade platform to satisfy IoT deployment requirements for enterprises



Low touch



Flexible

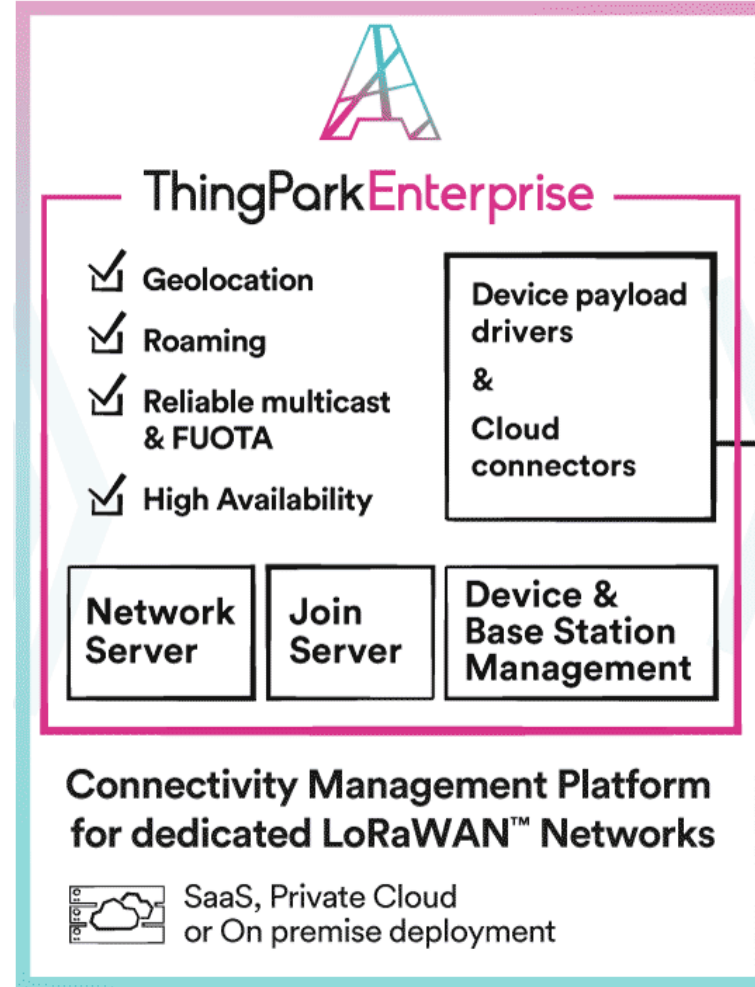


Easy Integration



Future-Proof

Activity



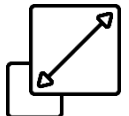
Reliable



Secure



Scalable



State-of-the-art



They Trust ThingPark (among many others...)



Actility

And ThingPark Enterprise All-in-One?

Useful Resource:

[ThingPark Enterprise All-in-One product page](#)

What?

- A LoRaWAN gateway with embedded ThingPark network server + basic UI + Node-Red
- Supports up to four remote gateways besides the local gateway
- Up to 500 devices

Where it fits? PoC and small-scale deployments with 100% data locality constraints



Small warehouse (< 500 m²)



Small enterprise



Restaurant

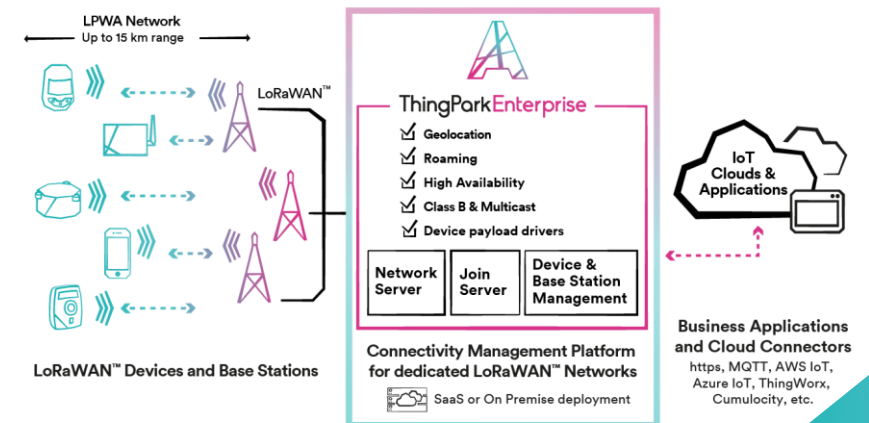
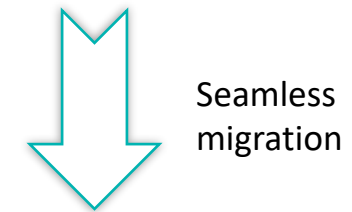
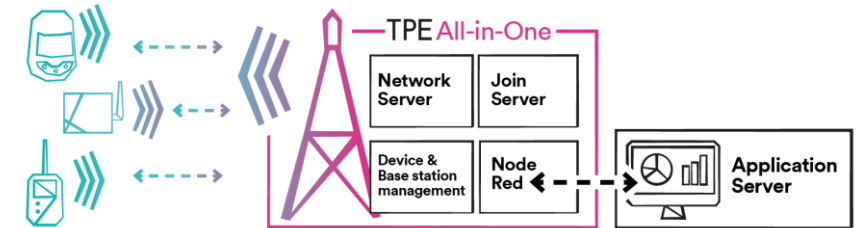


Small isolated sites with outdoor use-cases (potentially using satellite backhaul)



Seamless Migration Path Towards TPE Full-Edition

- In LoRaWAN, end-devices exchange MAC sessions with the network server; each session has its security context
- Seamless migration of an end-device from one platform to another means **secure** transfer of the device's session context between platforms without having to physically reset the device (**no service disruption**)
 1. Generate a migration key from the UI of your full-edition TPE subscription.
 2. With this migration key, export archive from TPE-All-in-One UI.
 3. Import this archive to your ThingPark Enterprise (full-edition) subscription.



Logicalis

The Architects

of Change



Logicalis Vision



Logicalis is a leading and globally operating IT service provider that implements digitalization projects successfully (digitalization, infrastructure, security, etc.) while significantly reducing IT complexity.



We support our customers in achieving their business goals quickly through the efficient and sustainable use of technology.

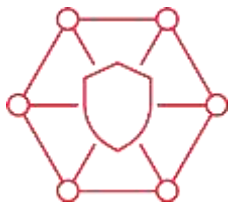


Thanks to our global presence and comprehensive expertise, we support our clients from strategy to integration and support, thus achieving long-term competitive advantages.



Thanks to our long-standing customer relationships based on trust, we are a reliable partner who focuses on growth and sustainable increase of corporate values.

Working with the line of business and IT to create tangible and transformative digital outcomes



Hybrid IT

- ▶ Cloud solutions
- ▶ Data centres
- ▶ Security



Digital Workplace

- ▶ Communication and collaboration
- ▶ Mobility
- ▶ ITSM



Digital Ready Infrastructure

- ▶ Networking
- ▶ Software-defined everything (SDx, SDDC)
- ▶ Internet of things



Advisory and Managed Services

- ▶ Advisory services
- ▶ Data and information insights
- ▶ Managed services

Our Core Values



Integrity

We aim for an environment of honesty, transparency, fairness and high moral standards.



Innovation

We embrace change and creativity to deliver the best practical outcomes.



Excellence

We strive to exceed expectations and be the best that we can be, maintaining the highest level of quality.



Partnership

We build strong relationships and alliances in order to achieve success for the long term.

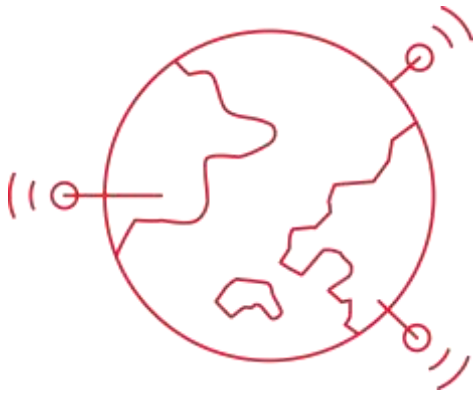


Empowerment

We encourage initiative and provide opportunity for our people.



There is a changing
paradigm in
our industry



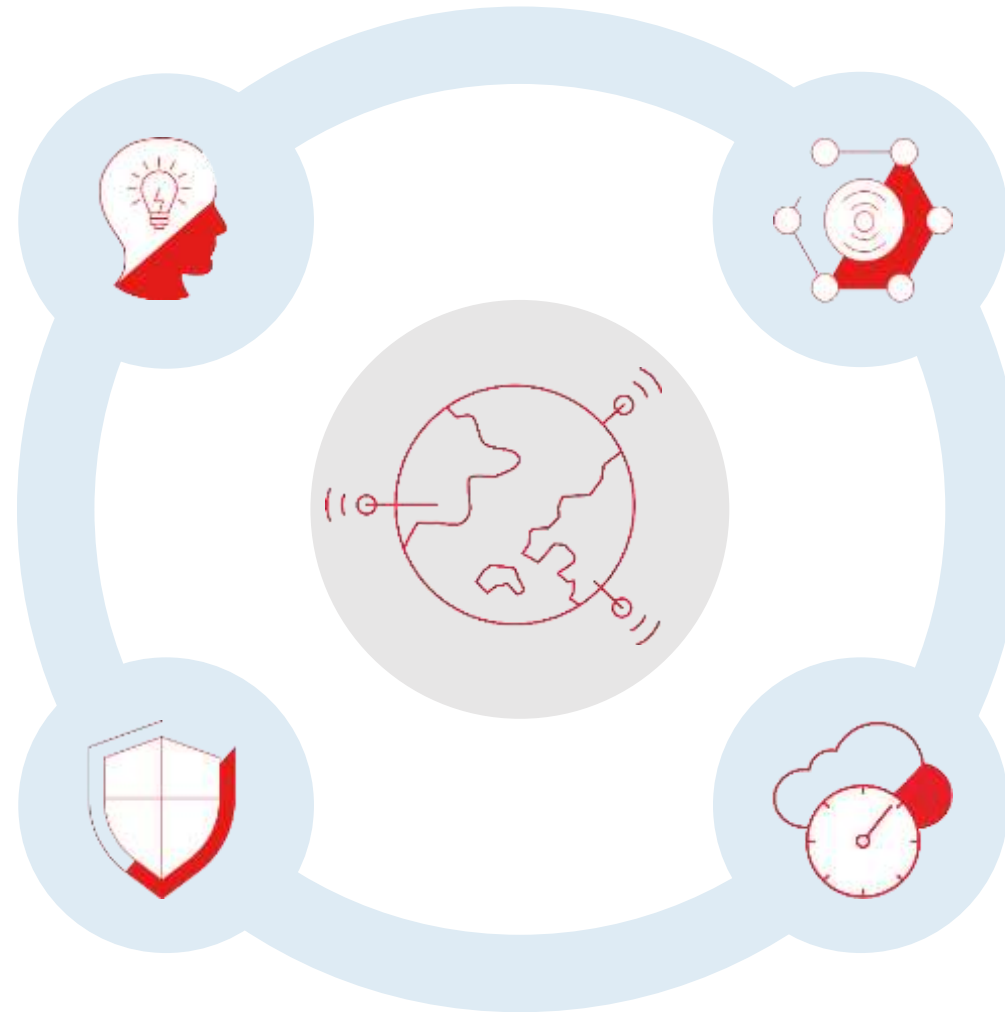
Market Overview

Internet of Things

IoT changes everyday life and creates new business models - facility automation, predictive maintenance and smart cities are just a few examples. Those who take the lead have the opportunity to gain decisive competitive advantages for themselves and their customers.

Security

The increasing number of cyber attacks, which are becoming more and more targeted, require companies to have a well thought-out security strategy. With more and more networked devices, increasing compliance requirements and the use of cloud services, IT security is moving into the focus of company managers.



Big Data and Analytics

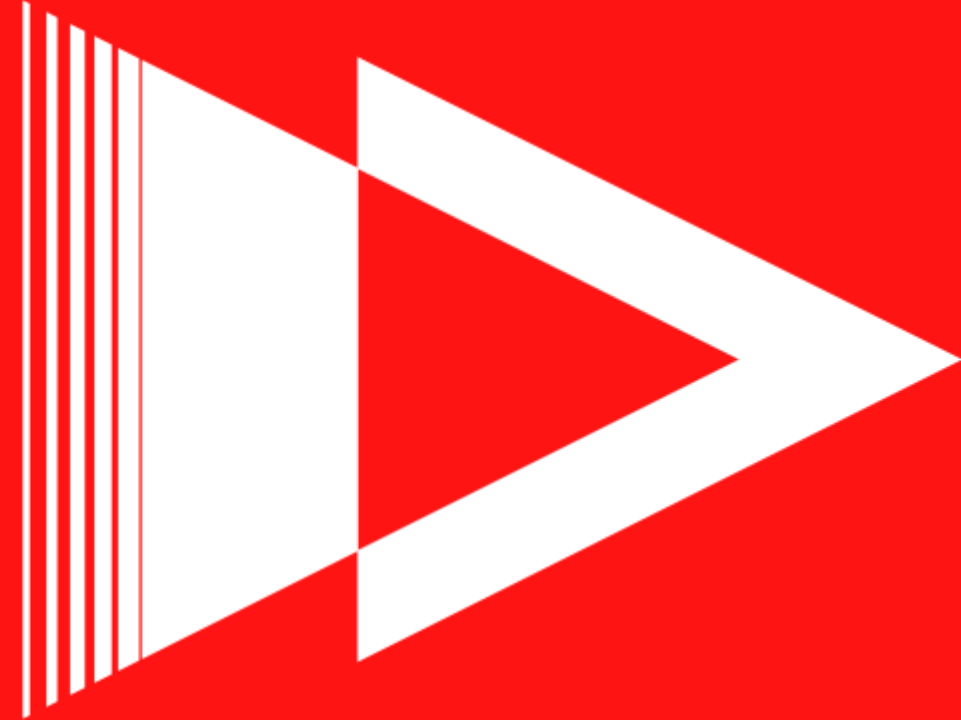
Due to the rapid growth of data worldwide, companies are recognizing the value they can add to their own business model. From human resources and marketing to logistics and risk analysis, decisions are increasingly driven by data.

Cloud First

Cloud computing is at the core of digital transformation as IT solutions are delivered with more scalability, performance, efficiency, speed and agility. The cloud is also driving innovation, including analytics, machine learning and IoT.

Supporting digital
transformation journeys

LoRaWan Overview



LoRa World-Wide utilization

100

Network Operators

68

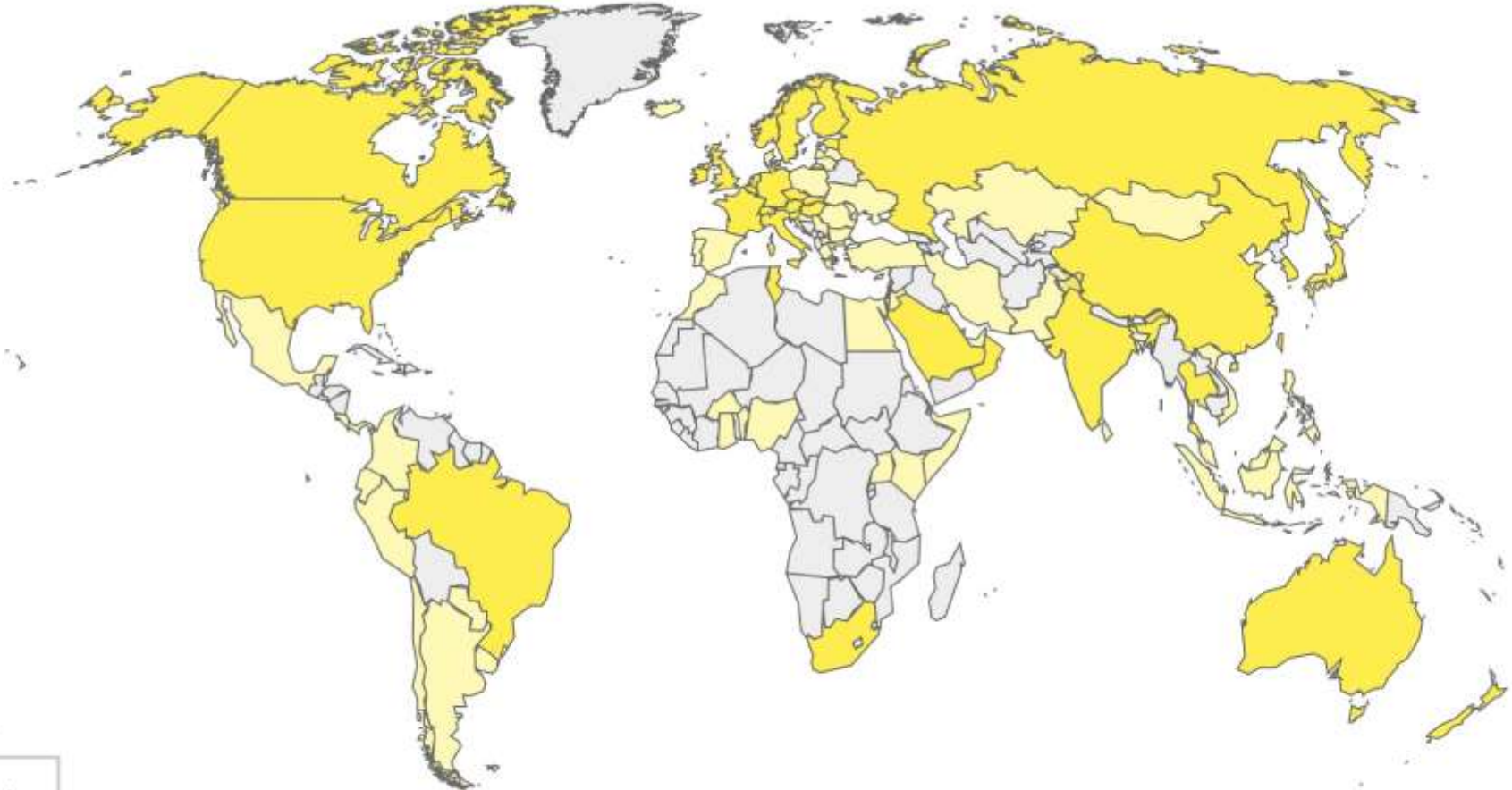
Alliance Member Operators

51

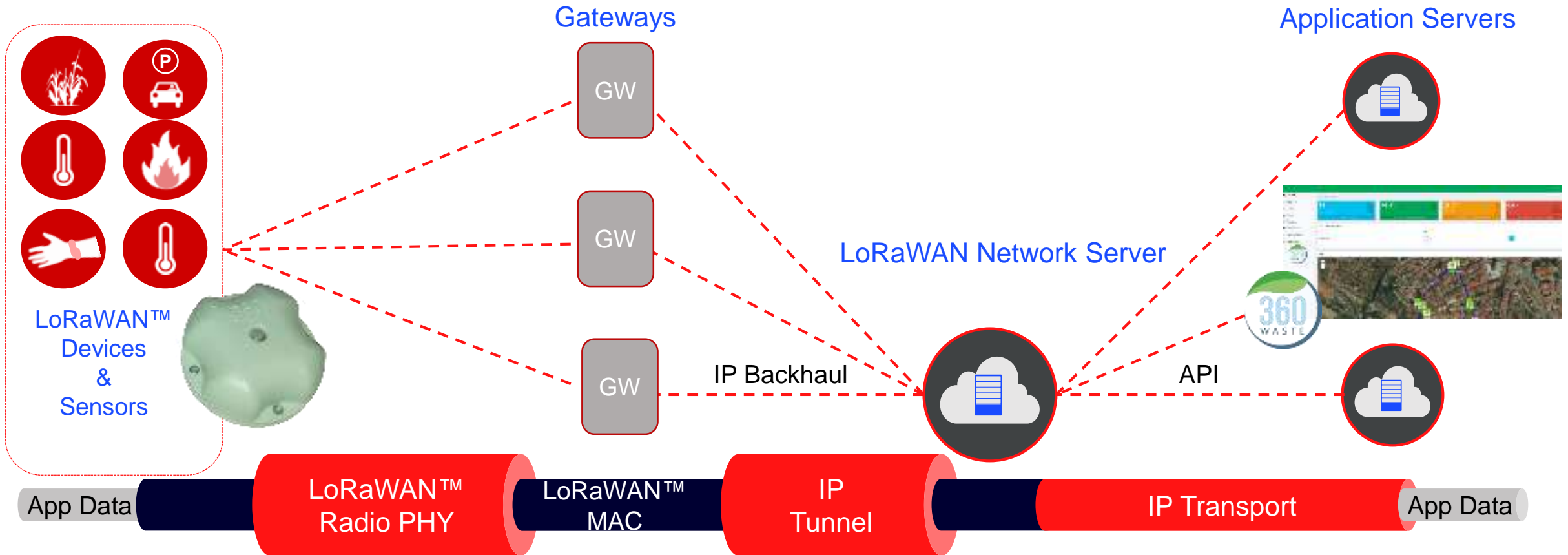
Countries operating in

100

Countries with LoRaWAN Deployments

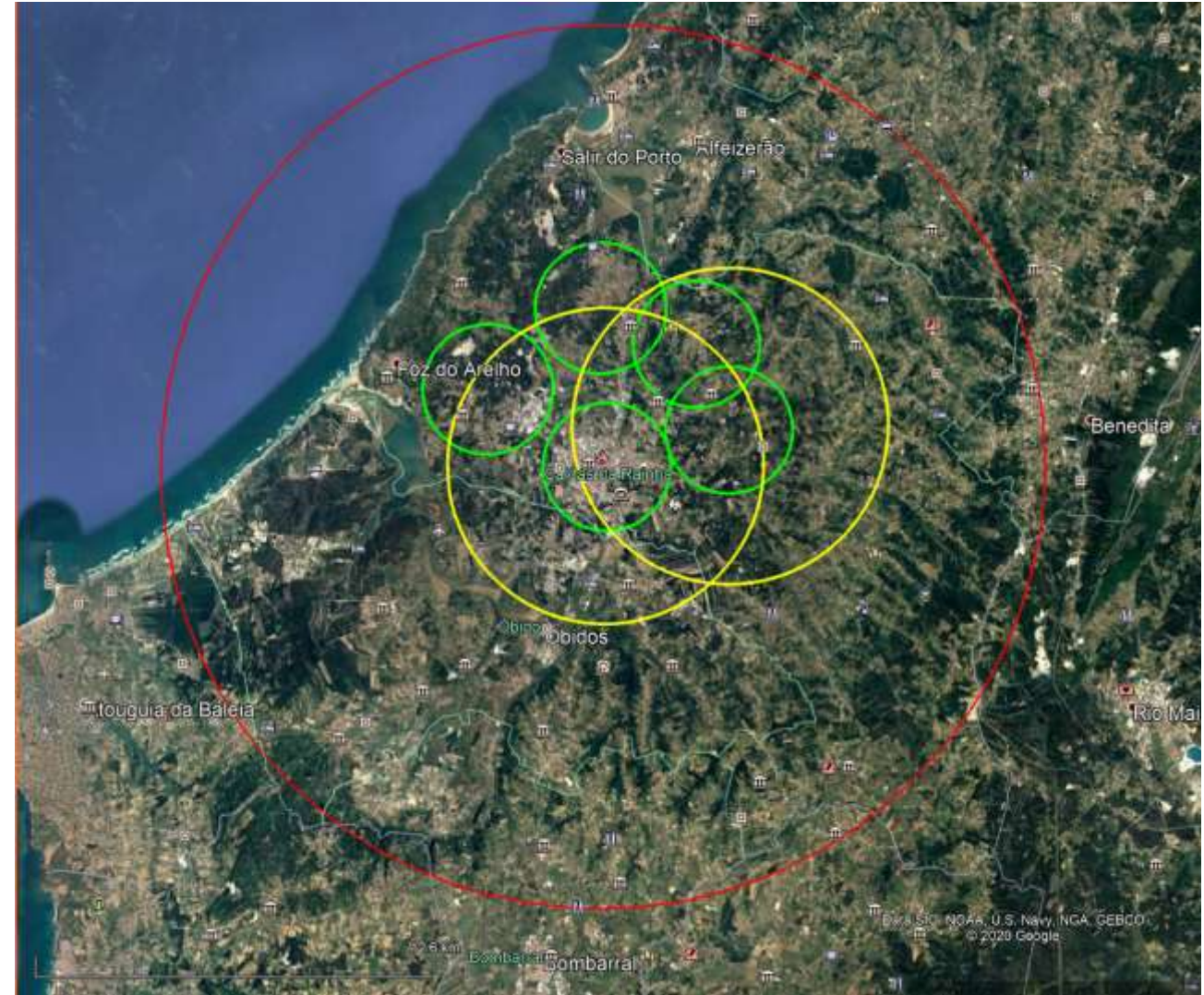


LoRa End-To-End Architecture



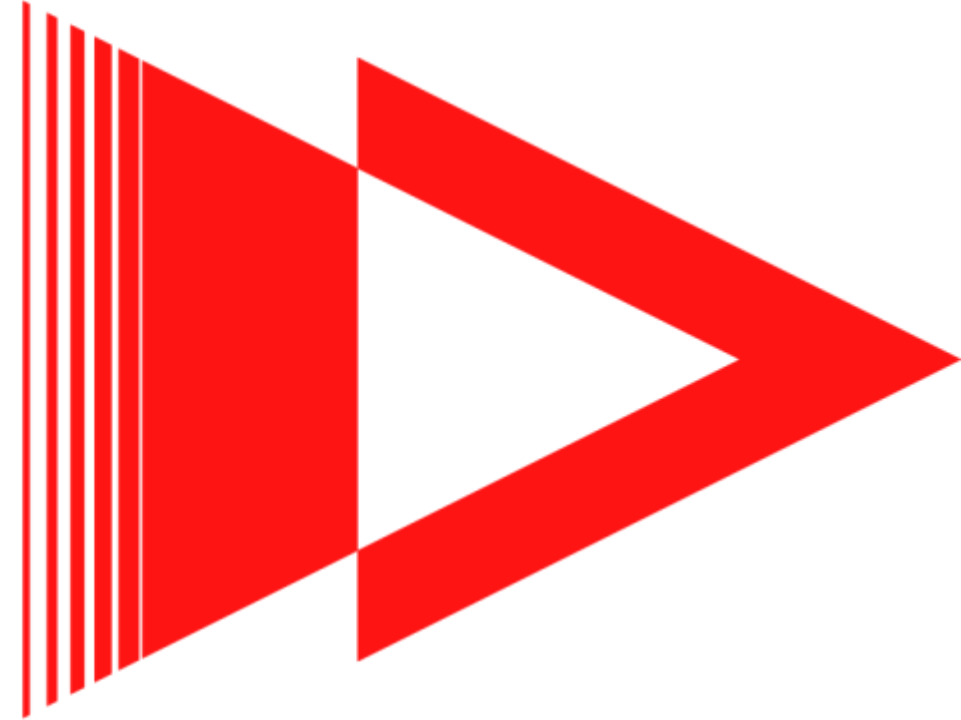
LoRaWAN Deployment

- ▶ Caldas de Rainha county deployment
- ▶ 250 km² covered by 5 gateways
- ▶ Coverage in buildings and basements
- ▶ Coverage to 2-3 metres under road surface
- ▶ Secure connectivity
- ▶ Central management



[Caldas da Rainha video](#)

LoRaWan Use Cases



LoRaWAN Use Cases



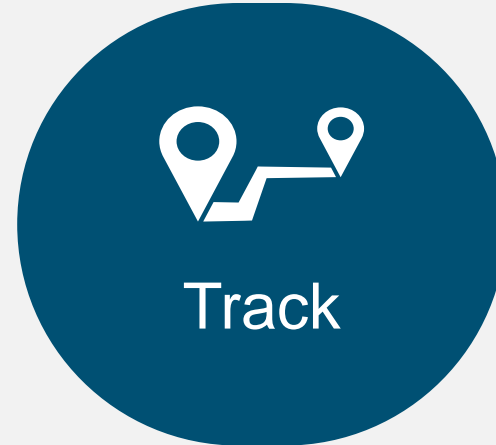
Measure
Data

Gather Device Data



Report
Events

Report a State



Track

Provide Asset Location
with or without GPS

Enable Innovations

Generate New Revenues

Decrease Operating Costs

Improve Customers Satisfaction

Increase Productivity and Operations

Preserve existing Assets



Gas and Water Meters



Temperatures



Customer Satisfaction Survey



Prevent Copper Spool Thefts



Track "Live Stock"



GPS Tracking

Use geolocation to protect and monitor assets



Optimize Waste Collection



Connected Mouse Trap



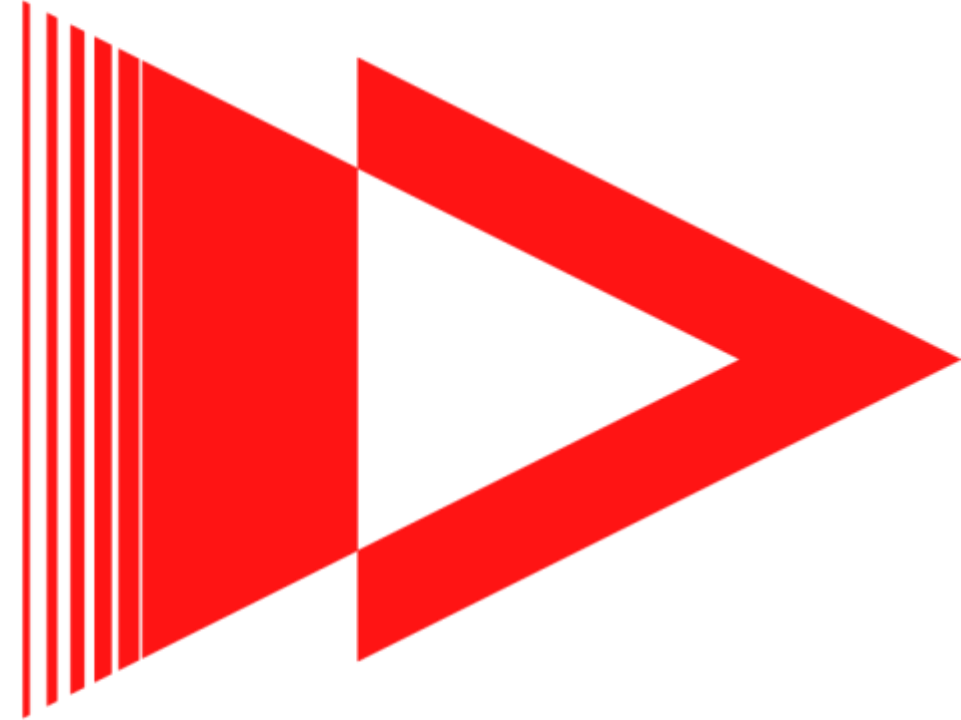
Report Events



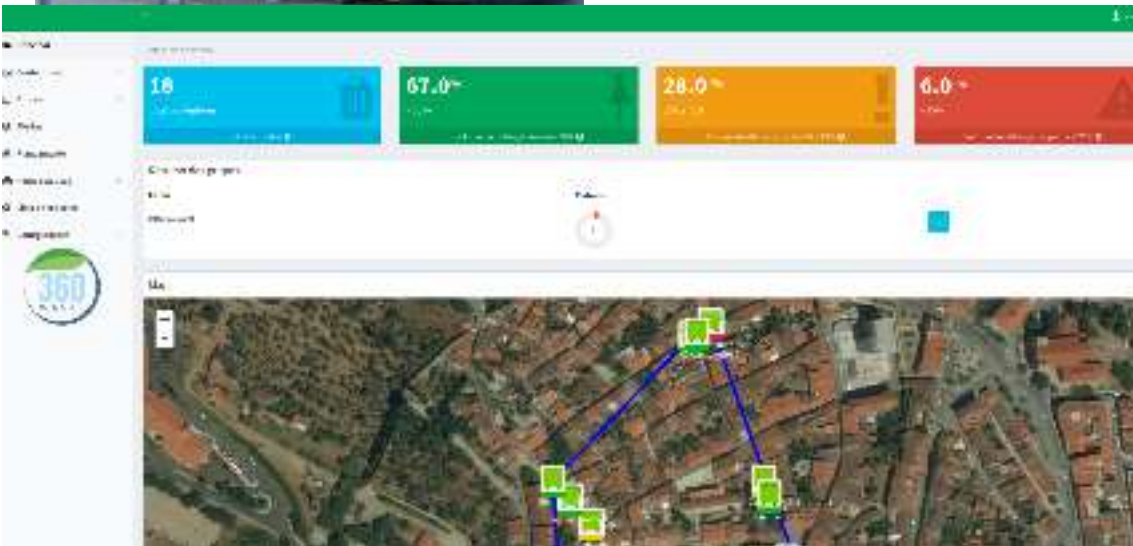
Physical Security

Optimize routes and reduce busy time to improve business efficiency

LoRaWan - Examples



Waste Management Use Case



Waste Management Operations

Use Cases and Benefits

- Real-time location and monitoring of containers
- Optimization of waste vehicle operations to empty waste containers that are reaching 100% full state

Waste Management Domain

- Fill Level
- Bin Location
- Temperature
- Battery Status (when available)



Waste Management Use Case

Waste Management (360waste.pt)

Use Cases and Benefits

- Waste (level) sensor allowing management and operations
- Waste infrastructure log, management and record
- Waste handling resources management – trucks & maintenance



Waste Management Use Case



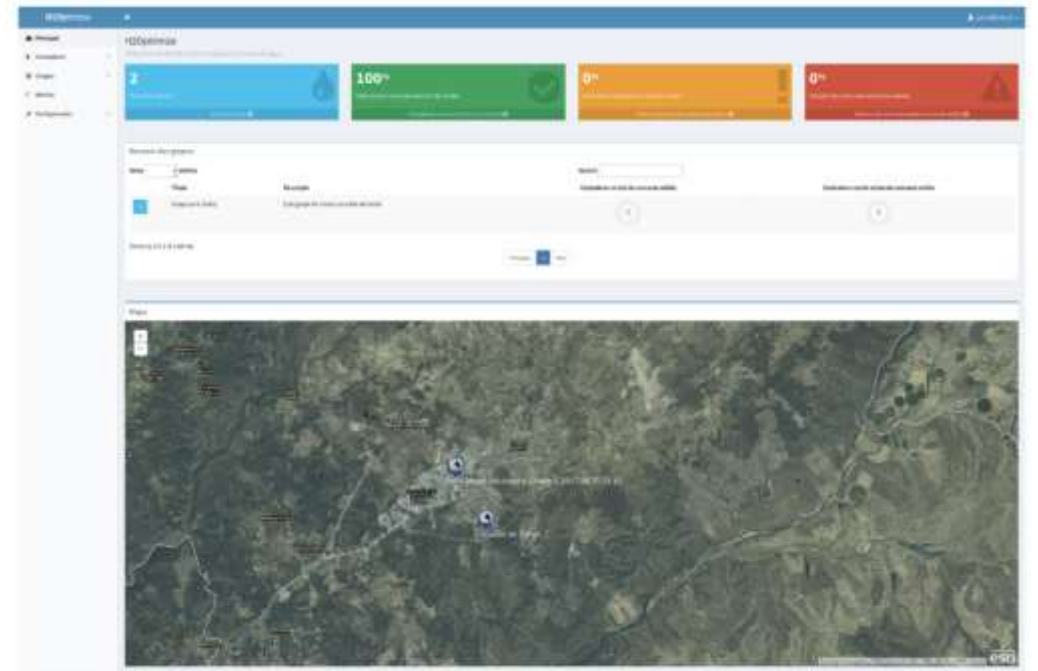
Water Management



Water Management

Use Cases and Benefits

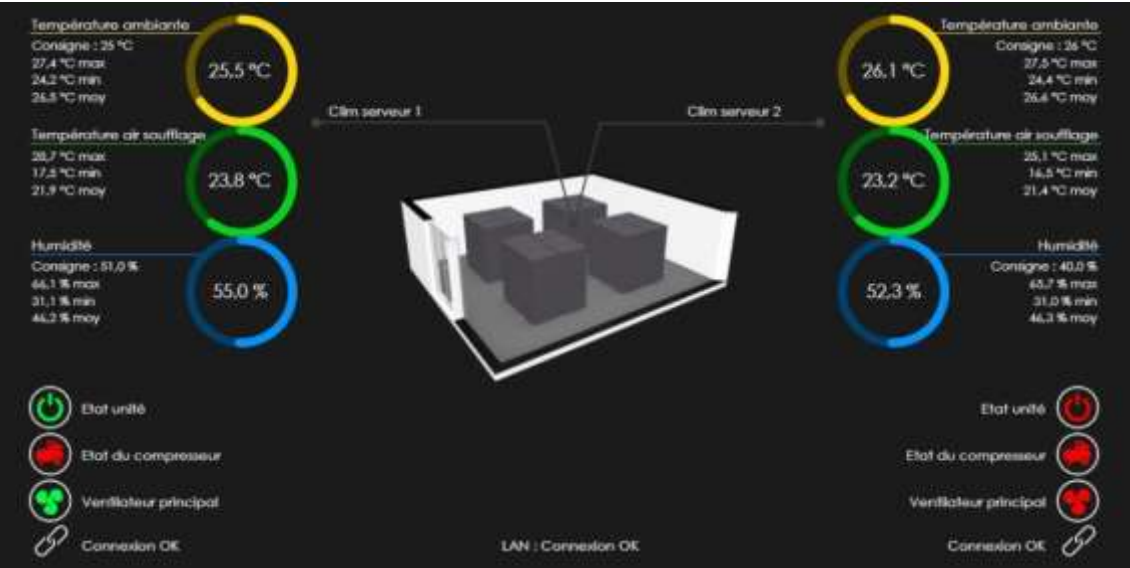
- Water (metering) sensor allowing management and operations
- Water infrastructure log, management and record
- Leak detection and Alarm – Trigger notifications



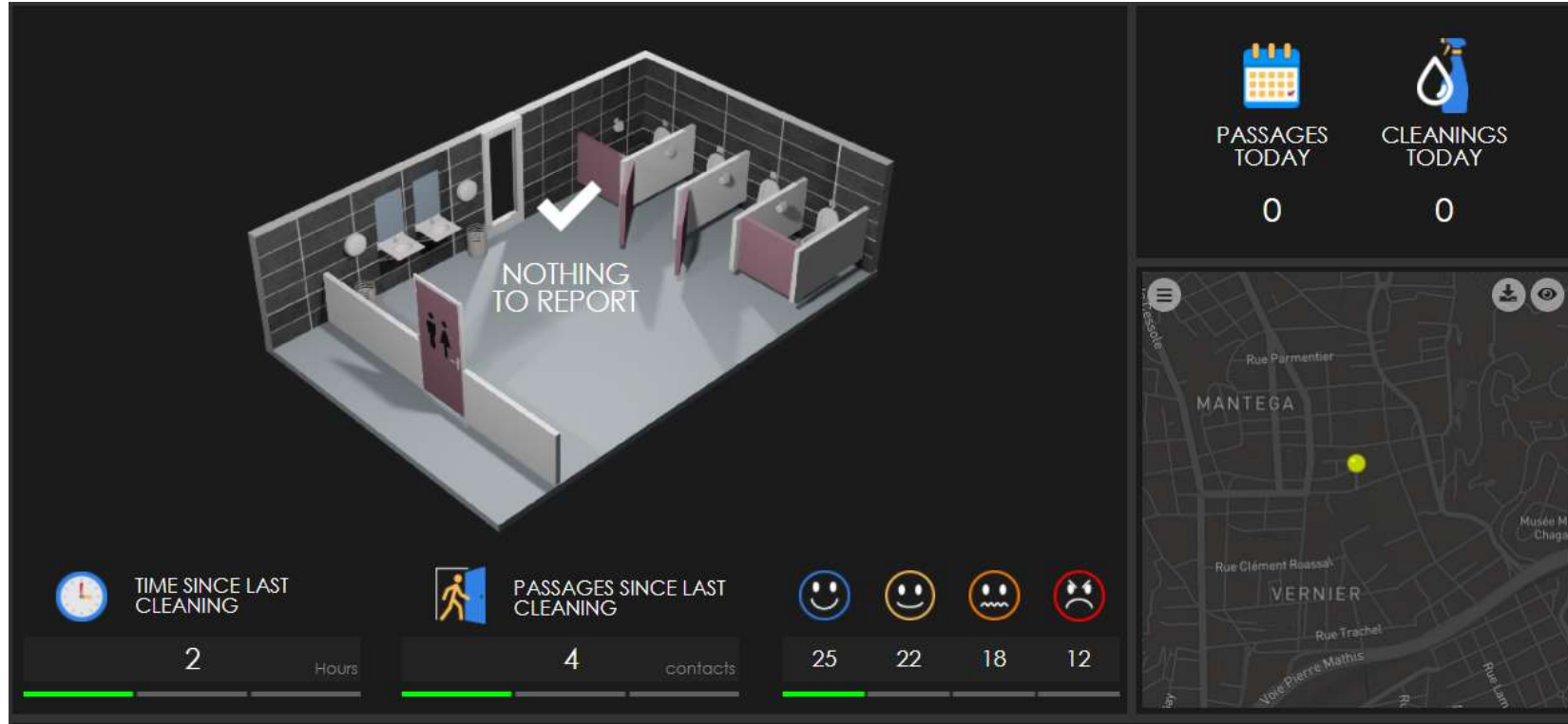
H2Optimax – Water counters // Leak Detection



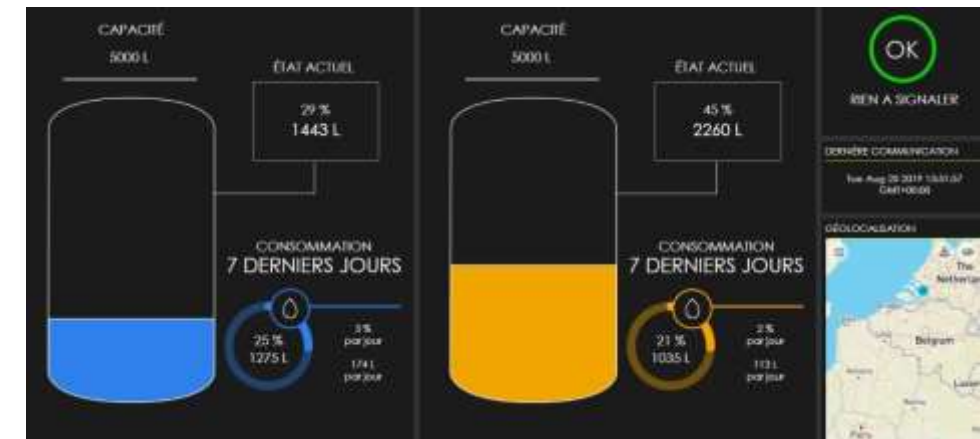
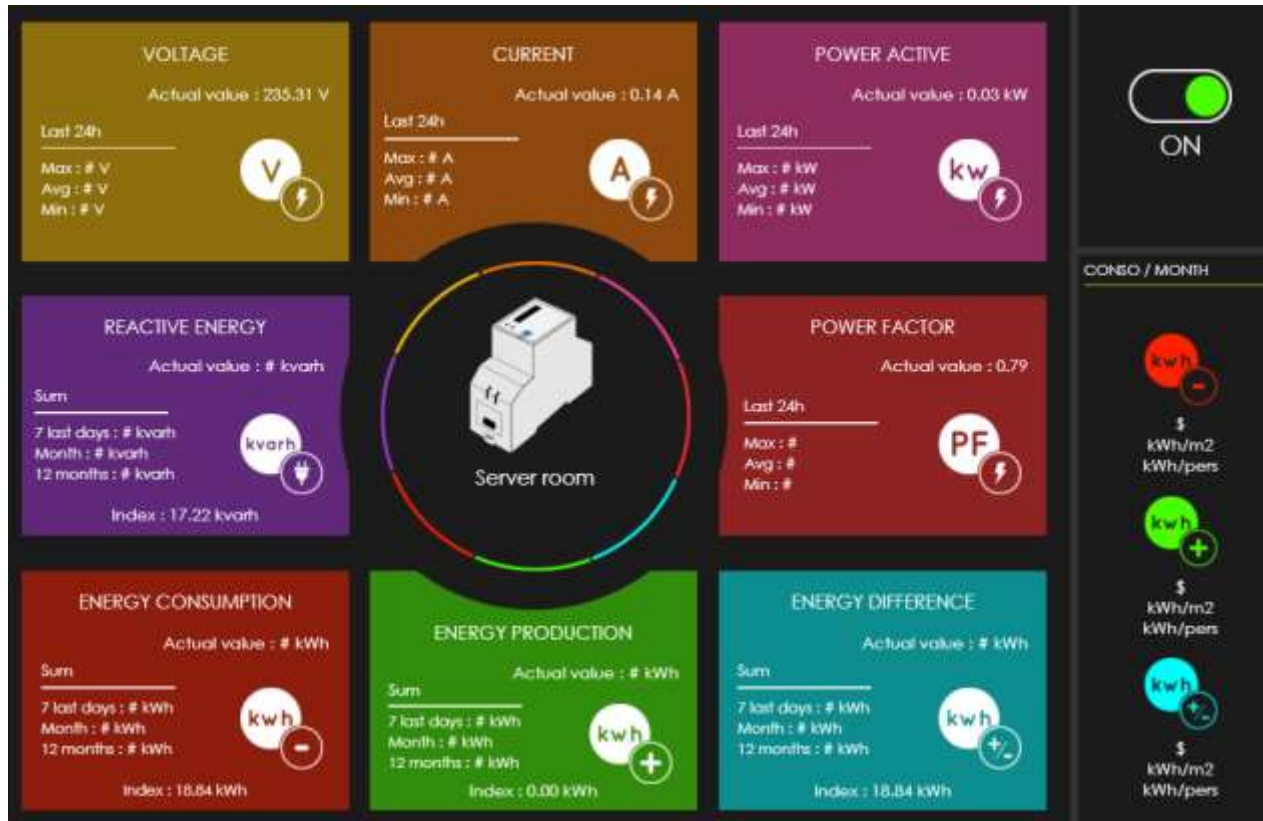
SmartBuilding – Temperature // Open Door // Water Leak



SmartBuilding – Fire Detection // People Counting // Presence // Satisfaction



SmartEnergy // Thank Level



SmartConstruction // Smart Office – Tracking Solutions // Alarm Button



Obrigado



TRACKING OF PEOPLE IN THE BLASTING AREA

Safety in the evacuation process

Problematic

+29%

Accidents in mines are caused by BLASTINGS AND LANDSLIDES

Solution

Our People Tracking solution will significantly improve worker safety by monitoring and alerting personnel entering the blasting area, **reducing the risk of accidents.**

In addition, this system allows **real-time monitoring of personnel**, generating alerts before entering rigid zones and making informed decisions by having historical information on the movement of workers, contractors and visitors.





OUR TRACKING SOLUTION

-  Increased security
-  Reduction of accidents
-  Regulatory compliance
-  Increased efficiency and control
-  Informed decisions
-  Real-time monitoring



Features

Lora Wan



Secure bi-directional connections through end-to-end encryption.



Low power consumption
(battery life up to 10 years)



Long communication range (10 - 30 km).



Infinite connection of sensors and equipment to public or private networks (up to 1 million network nodes).



Low data rates.



Low transmission frequency, mobility and location services.



Interoperability of various LoRaWAN networks worldwide.



BASIC COMPONENTS

INFRASTRUCTURE LoRaWAN Gateway Network

- Large coverage per Antenna (10-30 Km typical)
- Cost effective per area covered, ideal for open pit mining
- Reduced bandwidth for greater tag battery savings
- Redundancy by design, all cells listen at the same time
- Network Server resolves duplicity of packets sent by cells
- High security standards with AES 128 encryption



INFRASTRUCTURE

BASIC COMPONENTS

LNS THINGPARK SAAS

- Service 100% managed by Activity
- Virtually unlimited scaling possibilities
- Decoding of many devices in a very easy way thanks to the repository available.
- Compatibility with many Gateway manufacturers available in the market.
- Possibility of working in SAAS or OnPremise depending on the need.



INFRASTRUCTURE

COMPONENTES BÁSICOS

DEVICES Tags Beacon and Accessory

- Fully sealed equipment with IP67 degree of protection.
- Manufactured from high impact resistant polymer
- Electronic components with industrial specifications that allow work in an extended range of temperature (certification for temperature and humidity).
- Reduced size and weight, facilitating transport, storage and daily use is not uncomfortable.
- Low power consumption guarantees long life of the rechargeable battery.
- Cost effective equipment that allows massive utilization in each mining company.

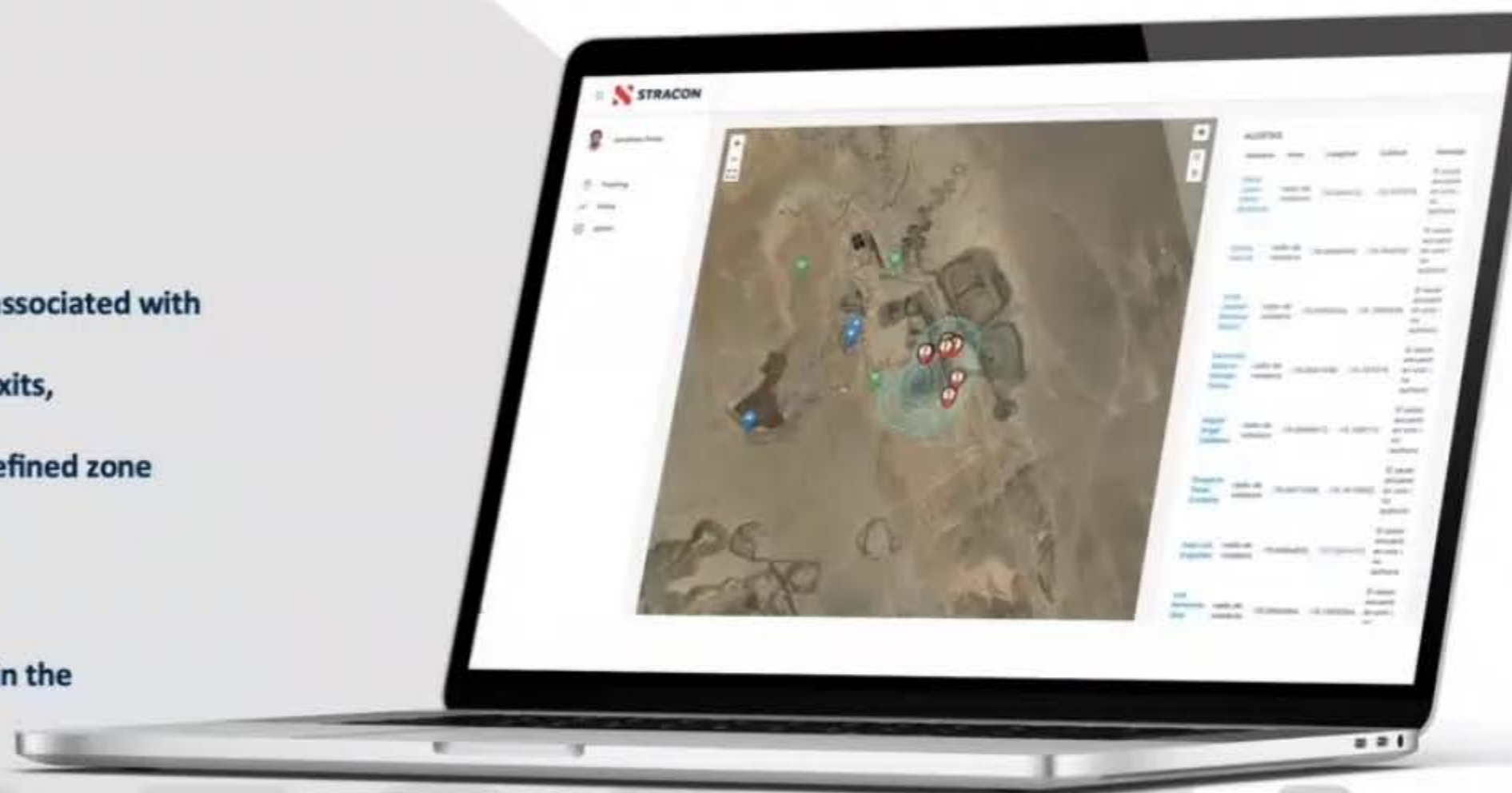




ACTIVE COMPONENTS

PLATFORM ST-Track Software

- Geographic Information System (GIS)
- Mine map display
- Real-time display on the map of tracker devices that are associated with each person.
- Definition of points of interest (POIs) such as entrances, exits, communication towers.
- Definition of Zones of Interest to count people for each defined zone and totalize.
- Association of devices per person.
- Definition of authorizations by Zone.
- Alarms for entry into unauthorized areas.
- Real-time counting by defined Zone and totalization within the coverage area.



HOMOLOGATION

Our product complies with all regulations and requirements and is approved by the MTC.





Private Networks for Any Horizontal IoT Use Case: **Versatility as Driver of Success.**



CyRIC IoT

Michalis Stylianou

Commercial & Business Development
Manager

LoRaWAN® for Private and
Enterprise Networks

Actility Webminar 2023

CyRIC IoT - Commercial.

- End-to-end IoT Solution Provider & Distributor
- More than 8 years of experience
- Addressing mainly the markets of Cyprus & Greece
- Extensive market-horizontal solutions portfolio



CyRIC IoT – R&D.

- Commercial Arm of CyRIC – Cyprus Research & Innovation Center Ltd
- One of the most successful private R&D centers in Eastern Mediterranean
- R&D departments in Software Development, Machine Learning, Electronics & Communications, Mechanical Engineering & Prototyping
- Design & development of innovative IoT technology products for several industries

**Why
Horizontal?**





- Small Target Markets [Cyprus & Greece total 11,000,000 population]
- IoT Pre-Mature Markets

**A need evolved
to an advantage.**

Our Solutions.



LoRaWAN Networks
Deployment & Operation



Smart Parking



Automatic Water Metering



Waste Collection
Management



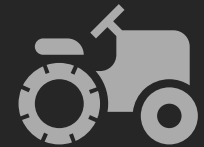
Traffic Monitoring



Smart Buildings



Environment & Air Quality
Monitoring



Smart Agriculture

Partnering with Actility.

- We needed a carrier-grade LNS to operate our Public LoRaWAN Network in Cyprus
- Excellent suite of tools – a trusted partner
- Provides flexible pricing models (per gateway, per sensor)

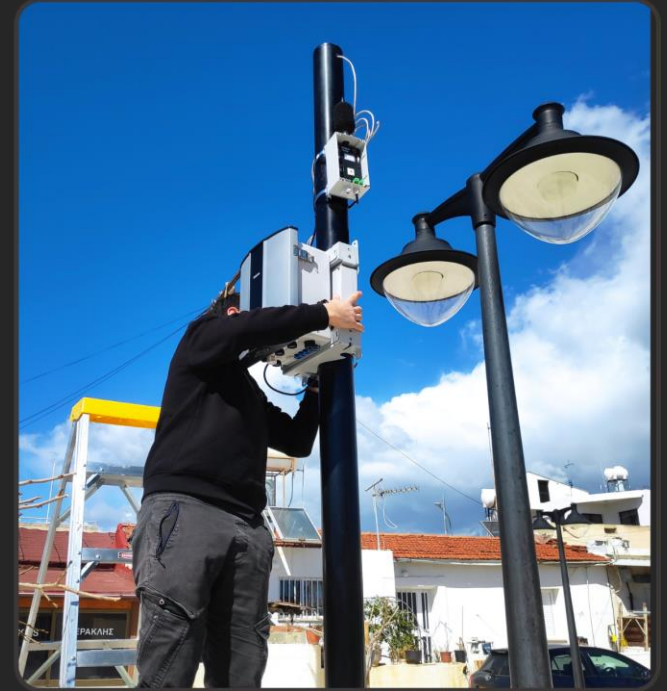


Use Case: **Cold Chain Monitoring.**



- Temperature and humidity monitoring in cold storage rooms, refrigerators, packages etc.
- Measurement logging, event based alerts
- Reduction of inventory loss & operational costs / up-to-date for health inspections

Use Case: **Air Quality Monitoring.**



Use Case: **Forest Management.**



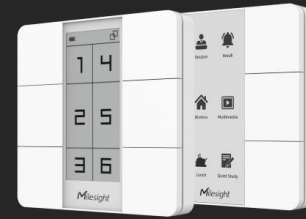
Use Case: **Smart Buildings.**



Indoor Air Quality



Electrical Loads Control



Lighting Control



Electrical Devices Control
and Electricity
Measurement



Modular Multi-Protocol
BMS Controller



Heating & Cooling Control



Leakage Detection



Liquids Level Monitoring

Thank you.



CyRIC IoT

Michalis Stylianou

Commercial & Business Development
Manager

**LoRaWAN® for Private and
Enterprise Networks**

Actility Webinar 2023

A large, stylized 'X' logo is positioned on the left side of the slide. The 'X' is formed by two overlapping shapes: a teal-colored shape on the left and a greenish-teal shape on the right. The background of the slide is a gradient from orange to red.

Airbus Helicopters

Actility



Airbus Helicopters – some facts & figures

- Headquarters Donauwörth > 5'000 employees
- Total workforce 20'556 worldwide
- 7,048 M€ revenues
- Largest product range
- 12'228 helicopters in service in 152 countries
- New 6.000 square meter production facility

Mastering the entire helicopter value chain

- Pioneer in the aerospace industry
- Leader designing, manufacturing, delivering aerospace products, services and solutions worldwide



Conception and development



Industry and production



Support and services

- Manufacturing excellence with a meticulous supply chain and innovative technology
- Global concern: reducing CO2 emissions to reach the industry's net zero target by 2050


Airbus Helicopters - Actility

ThingParkEnterprise

- Private LoRaWAN infrastructure
- On-premises
- High security standards
- Three other sites by the end of the year



Temperature & Humidity monitoring

- 200 sensors in 20 buildings
 - One data point costs around 2000€
 - Sensors will be obsolete soon
 - Keep the system = 400K€
 - Replace with LoRaWan => save 200K€ /50% 
- => Lorawan infrastructure allows for further use cases

Abeeway tracking use cases

- 6000 production orders daily
- Employees can identify very quickly the position in the warehouse
- Search time reduced by 5300h/year

FOD –Foreign object damage

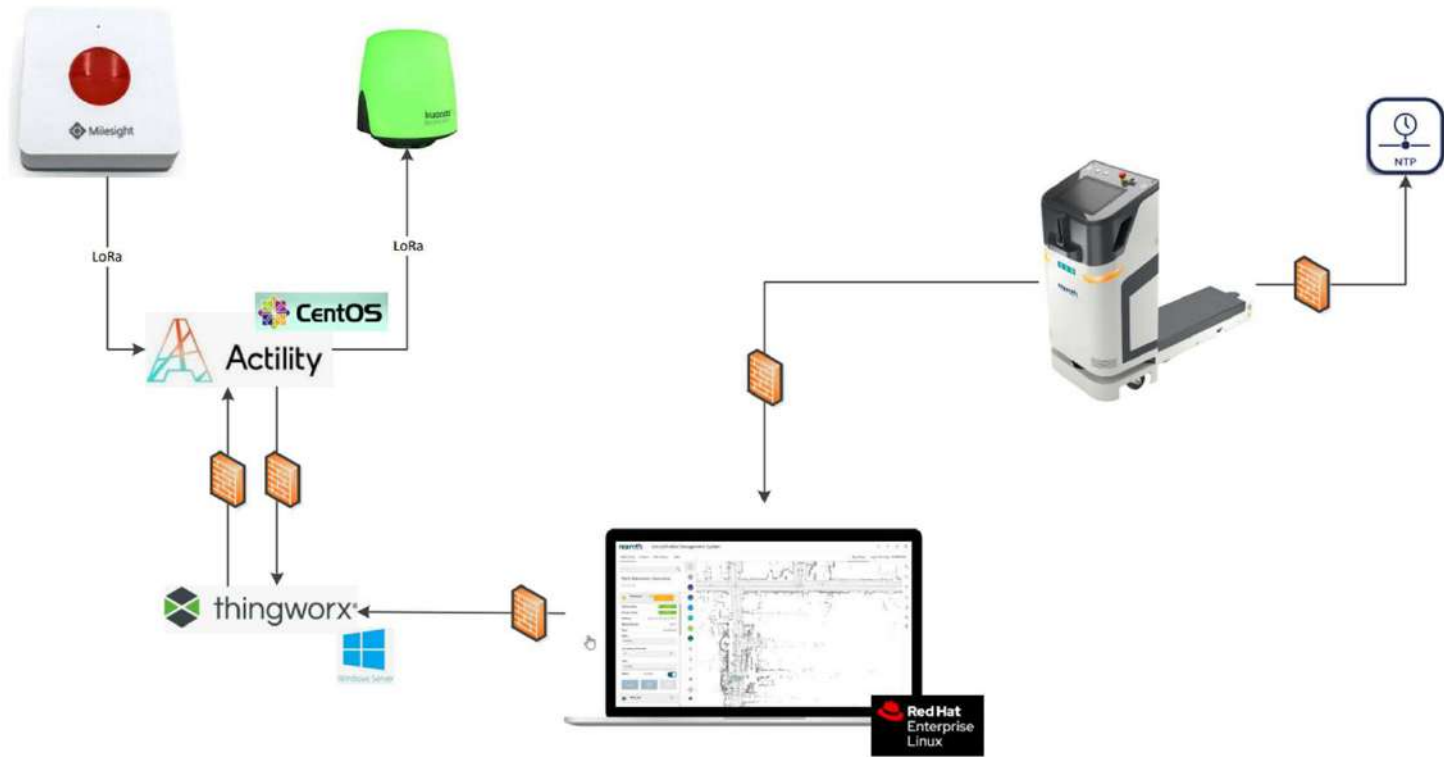
- Trackers are placed inside the helicopters
- If a tracker was forgotten in a helicopter an alarm will be sent

Lorawan Smart Buttons



Activity

Lorawan Smart Buttons – Network architecture



Activity

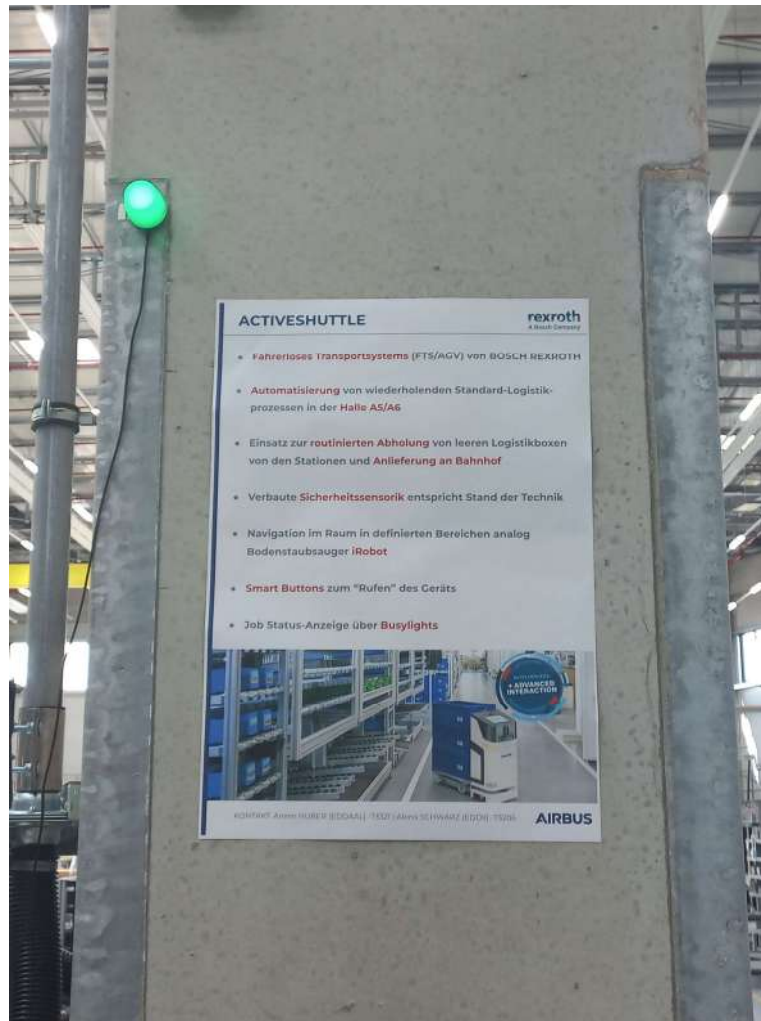
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Lorawan Smart Buttons



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Lorawan Smart Buttons



Actility

Lorawan Smart Buttons - Video



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