



### SMART CITY

LORIOT AG is a global IoT company providing a secure, reliable and scalable solution to operate long-range IoT networks through a global infrastructure enabling IoT vertical solutions for every

sector and industry worldwide.

# The Company – Facts and Figures

- First LoRa Community Forum (2015)
- Founded in December 2015
- Headquarters in Zurich, Switzerland
- Offices in Valencia (ESP) and Budapest (HU)
- Professional services launched in 2016
- Whybrid solution LoRaWAN® + mioty® coming soon

  Whybrid solution LoRAWAN®
- Running a global public infrastructure
- ✓ International team of 30+ Employees
- Awarded with over 20 awards











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### Our Vision & Mission

Vision

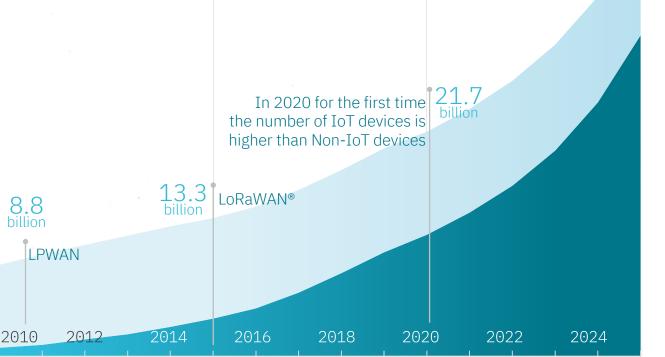
41.2 billion

The Internet of Things is disrupting every industry sector and processing all the captured data can lead to new even more evolutionary and transformative opportunities.

We envision a future where the IoT is accessible to everyone and transforms society and people's lives for the better, improving not just processes and services but also the health of our planet and all inhabitants.

### Mission

Our mission is to enable the Internet of Things in every corner of the globe (and even space!) and enabling our users to easily set up, operate and scale distributed, resilient and secure radio networks. By connecting a large variety of gateways and sensor devices and gathering valuable data, they can deploy IoT solutions to solve problems of all sizes.







## Global Presence

- Operating in 150+ Countries
- 20'000+ Users
- 18 Geographically distributed Public Servers
- Thousands of Industrial-grade connected gateways by users
- Global Private Network Servers Deployments
- 7 Nation-wide Deployments





### **International Awards**

Global tech experts from different sectors recognised and rewarded the innovative potential of our solution.





#### Market Leaders

Several independent Organizations and Market Research Institutes positioned LORIOT as one of the top Low Power Technologies (LPWAN) Global Market Players.



























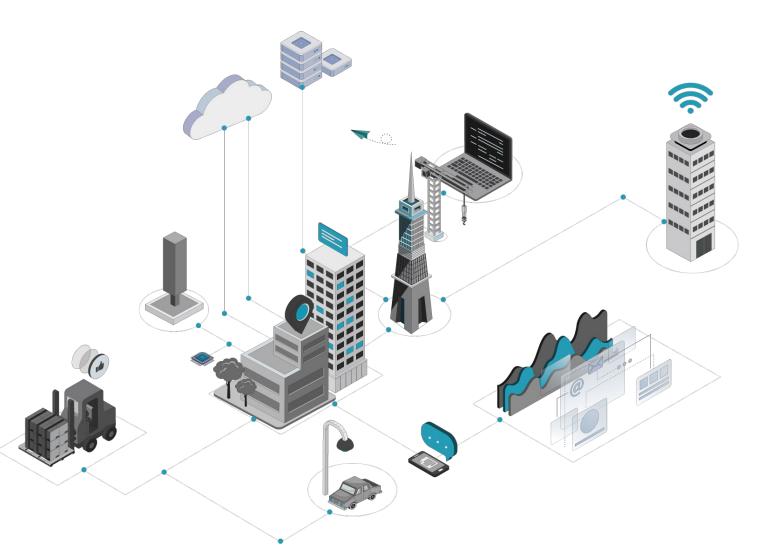


# The IoT is everywhere

1. The Internet of Things is disrupting every industry sector.

2. It's pervasive and impacts on our behaviors, habits and lifestyle.

3. IoT also generate a huge positive impact on the environment.



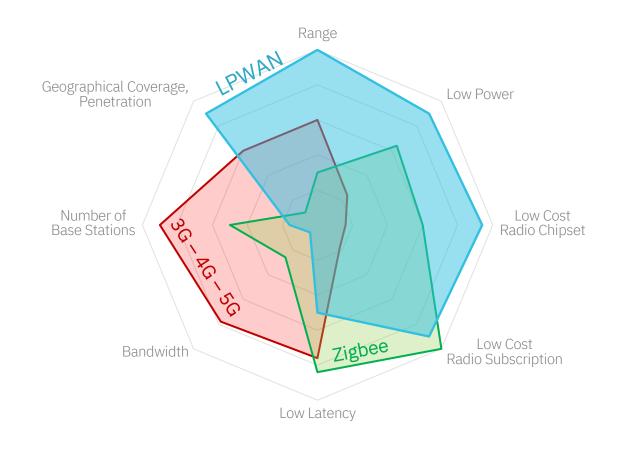


# Transmission Technologies

Each technology is suited to different use cases according to the objectives, the different environmental characteristics and the limitations related to the design choices.

The most important parameters to consider are:

- Range short range vs long range
- Power Consumption battery powered vs grid powered
- Cost devices, connectivity, deployment, maintenance
- Capacity few nodes vs numerous nodes
- Security critical security vs loose security
- Data Size/Bandwidth large packets vs small packets
- Latency time critical vs not time critical
- Complexity deployment issues, topology required, redundancy, etc.





#### About LoRaWAN®

Long Range Wide Area Network is a wireless spread spectrum modulation technology.

This open technology standardized by LoRa Alliance is designed for low power wide area network needs for IoT, operates in an unlicensed spectrum, guarantees global interoperability and ensures high scalability.



Sensors can be located indoor, outdoors and underground and still communicate directly to the gateway within a range of up to 50 km in open areas and up to 10 km in urban environments. There is no need for complex coverage analysis.



The network security ensures authenticity of the node in the network. the application layer of security ensures the network operator does not have access to the end user's application data. AES-128 encryption is built in.



#### **LOW POWER**

Low bit rates and asynchronous communications ensure low energy consumptions.

Sensors are designed to send small data bits when ready whether event-driven or scheduled. Battery life can reach up to 10 years.



## EASE OF INSTALLATION

One or few gateways allow to cover a very wide area. Low cost, long-lasting battery-operated sensors can be installed with no need for power source wiring and low maintenance operations.



### HIGH NETWORK CAPACITY

The adaptive data rate and a multichannel multi-modem transceiver in the gateway allow simultaneous messages on multiple channels and enable a LoRaWAN® network to have a very high capacity and make the network scalable.



#### LOW COST

LoRa gateways are stateless and do not have to establish a session to communicate with the sensors. As a result, gateways and sensors cost less. In addition, long range and battery life ensure low deployment and maintenance costs



#### OPEN STANDARD, UNLICENSED BAND

The LoRaWAN® specification is supported and maintained by the LoRa Alliance allowing seamless and easy scalability. LoRa technology operates in the unlicensed ISM band, thus allowing public and private deploying.



## GROWING ECOSYSTEM

All the players, large companies as well as startups and network operators, covering every part of the IoT value chain, from all over the world are aggregated in the LoRa Alliance.

Interoperability and compliance to the standard are guaranteed.



### Best LoRaWAN® Verticals



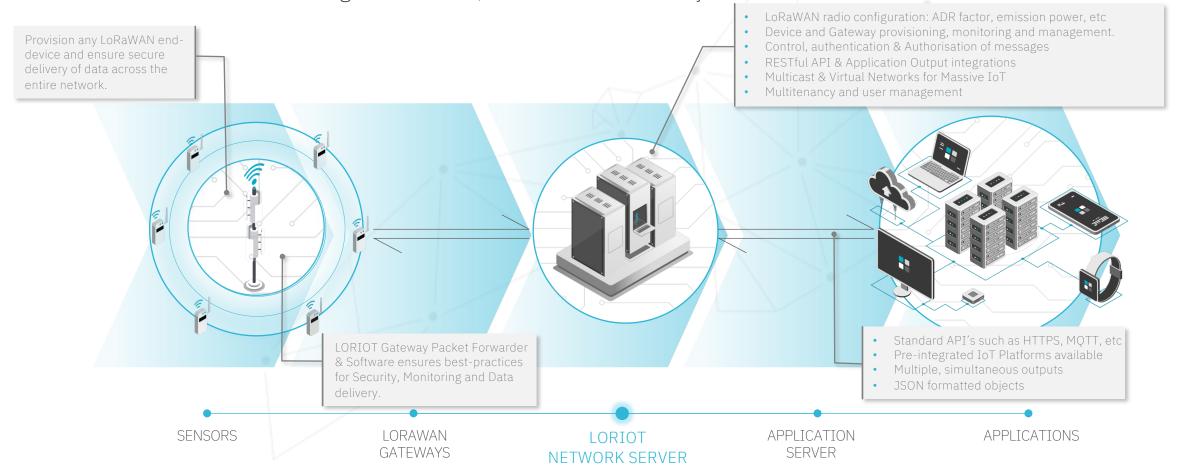




### LORIOT Network Server – The Architecture

LORIOT provides a secure, reliable and scalable LoRaWAN ® Network Servers to operate long range IoT networks throughout the world.

Our solution is the critical link between connected objects and IoT applications and makes the communication among them secure, reliable and ultimately scalable.



# LORIOT Network Server – Global infrastructure, valuable benefits.

We are running one of the largest LoRaWAN® server infrastructures worldwide to ensure low-latency, flexibility and legal compliance worldwide.

Our Public & Private Network Servers are deployed, maintained and supported globally.



#### LORIOT Network Server – Advanced features



Our solution is one of the most advanced and feature-rich in the market.



SECURE UPLINK AND DOWNLINK



**GATEWAY SSH TUNNEL** 



BEST-IN-CLASS LORIOT GATEWAY SOFTWARE



MULTIPLE SIMULTANEOUS APPLICATION OUTPUTS



EXTENSIVE DATA LOG AND VERBOSITY



VAST RANGE OF THIRD-PARTY & STANDARD OUTPUT INTEGRATIONS



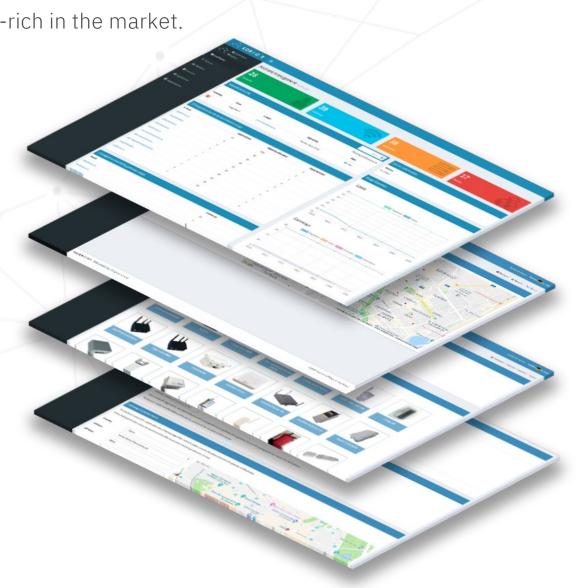
ADVANCED MULTITENANCY & ROLES



NEXT GENERATION MULTICAST

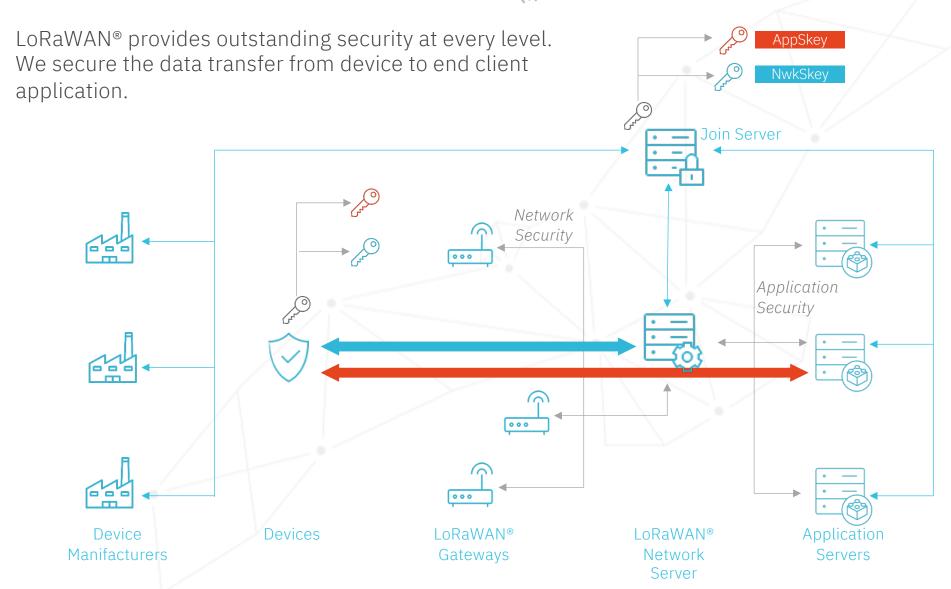


NETWORK PLANNING & MAPPING TOOLS





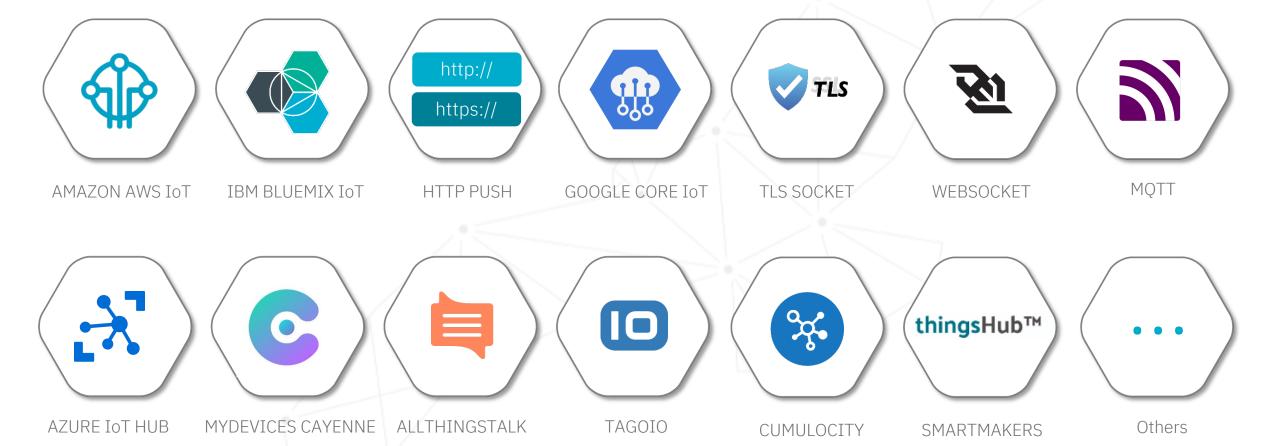
# LORIOT LoRaWAN® Security





# Integrated Output Formats







# Custom Binaries



In enterprise-grade LoRaWAN® networks, a typical requirement is guaranteed data delivery from the gateways to the network server. Even historical data from sensors can be useful to have full reliability and to get successful results, and therefore many PoCs fail.

The LORIOT Gateway Software guarantees reliable delivery of data:

- Confirms data delivery to the application layer
- Monitors the gateway performance & Status Alerting
- Identifies data that are delivered late (re-transmitted)

This means a higher quality of services (QoS) to the end-application without missing data points.

#### Other major advantages are:

- JSON Based protocol over TCP
- Enhanced Security, TLS 1.2 & PKI
- Unified Remote Management
- Spectrum Scanning
- Life-cycle Management

- Gateway Performance & Radio Monitoring
- SNMP, Email & Webhook Status Notifications
- Remote Console Access via SHH
- Secure Provisioning
- Automatic Binary Updates



# Advanced Multitenancy



LoRaWAN® Networks make it possible to deploy many use-cases utilsing a single server. Typically, each use-case, area or solution is managed by different teams with the same division or, sometimes, different companies.

Our Network Server allows our customer to build an IoT platform shared or private among different entities.

Advanced Multitenancy enables the support of multiple organisations on the same platform and streamlines the management of users and resources within an organisation with roles & permissions.

Organisations are isolated, secure environments and private to other Organisations on the server and can be monitored, managed and allowed to operate independently.

The main benefits are:





Workspace





Team Hierarchy



### Next Generation Multicast



Our solution have been built to enable our customers to easily setup and operate large long-range LoRaWAN® networks with ease and reducing potential issue when scaling up their solution.

Next Generation Multicast is an advanced feature fully compliant to the LoRa Alliance LoRaWAN® Specification and includes additional features like Virtual Networks.

It allows the Application Server to define in advance the time of a multicast downlink message transmission to devices in 'Class-C' mode and selecting specific groups of gateways to delivery the message. This prevents gateways interferences and ensuring greater reliability in areas with high gateway density.

This feature is ideal for solutions that require remote control of large number of devices, thousands or ten thousand, at the same time with a single downlink command.



Programmed Multicast



Higher Efficiency



Virtual Networks



Ideal for High Density



# 2.4 GHz band – the ultra-long range communication

LoRa® 2.4GHz offers ultra-long range communication in the 2.4GHz band with lowest power and highest reliability connectivity. Due to the configurable bandwidth and lower data rates, LoRa outperforms other technologies in the 2.4 GHz band in terms of communication range.



LONG RANGE RADIO IN THE WORLDWIDE ISM 2.4GHZ BAND



**MULTI RADIO** 



OPEN SOURCE PROPRIETARY PROTOCOL STACK



RANGING ENGINE FOR PROXIMITY DETECTION



LOW SYSTEM COST



LOW POWER

#### Key Benefits for new use cases

- LoRa® capabilities at 2.4GHz address IoT markets where single SKU, worldwide interoperability, high data rate, and no duty cycle limitations are required
- Indoor/outdoor connectivity and low power proximity detection with low bill of materials
- Fully documented pre-certified for FCC and ETSI gateway reference design reduces development time
- Enabling maritime and logistics use cases

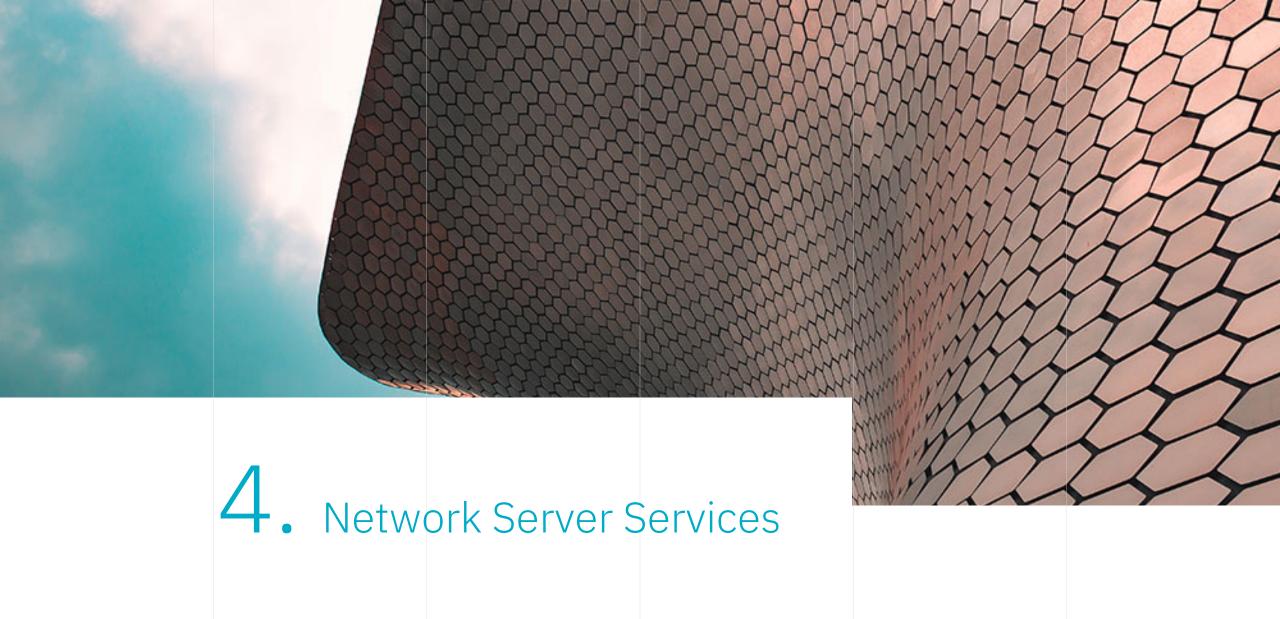
# Roaming Hub

Our Roaming Hub allows our customers to extend the LoRaWAN® coverage offered by their own infrastructure leveraging other private and public networks.

- 1. Our global public infrastructure
  - 18 geographically distributed Network Servers
- 2. Other LORIOT's customers private network
  - Extensive networks included 7 nationwide rollouts.
- 3. Other operators' clients' networks
  - Interoperability test successfully completed with the main operators in the market.

The same way, connecting the infrastructure to the Roaming Hub and making it available for roaming, allows to use it to its full potential and activate a new revenue line, through roaming agreements.

Roaming is completely secure and you do not lose ownership of the data generated by the lorawan sensors in the field



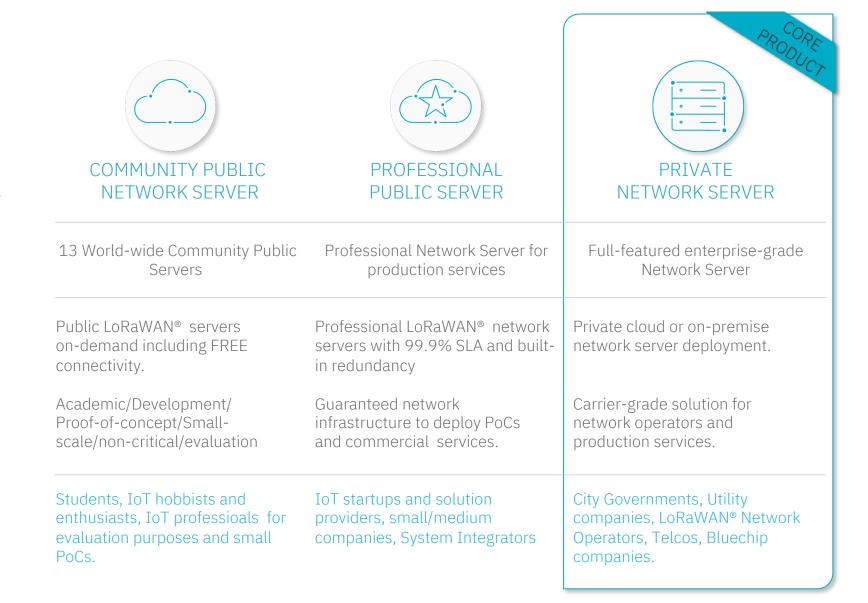


# Flexible Model for every Market segment

A Flexible business model addressing every market segment;

- Academic & Hobbyists
- Innovative Start-ups
- Vertical solution providers
- System Integrators
- Multination Corporations
- Telecoms operators
- Utility Companies
- o City & Regional Government

We can support LoRaWAN® Networks across all types of stakeholder!





# Main Features



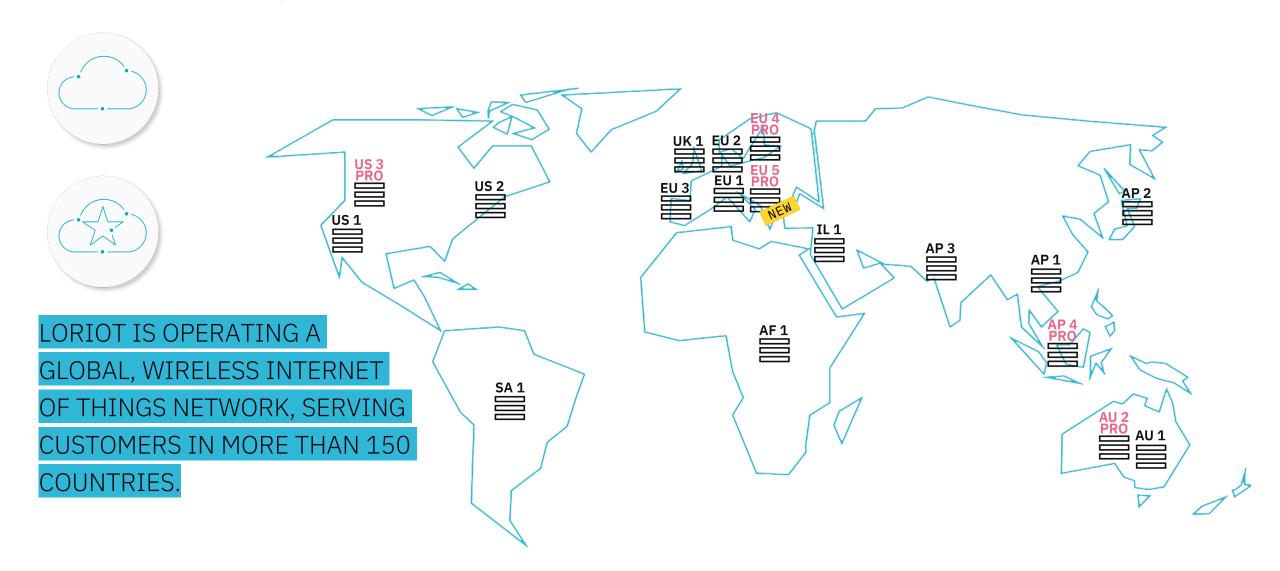


PROFESSIONAL PUBLIC	PRIVATE
NETWORK SERVER	NETWORK SERVI

	NETWORK SERVER	NETWORK SERVER	NETWORK SERVER
<ul><li>STANDARD FEATURES</li></ul>			
Unlimited User Accounts	×	<b>V</b>	<b>✓</b>
Unlimited Applications	×	V	<b>∨</b>
Unlimited Gateways	×	V	V
Unlimited Messages	<b>V</b>	V	<b>∨</b>
Multitenancy	×	V	V
Included Devices	30 devices FREE	<b>V</b>	Unlimited
Included Gateways	Unlimited	<b>V</b>	Unlimited
Service Level Agreement	×	99,9%	<b>∨</b>
Cloud Deployment	Worldwide - 13 Regional Servers	Worldwide - 5 Regional Servers	Available Worldwide
On-Premise Deployment	-	×	<b>∨</b>
LoRaWAN® Network Operator	×	×	<b>∨</b>
White Label + Custom Domain	-	-	<b>∨</b>
Technical Support	Basic	<b>V</b>	<b>∨</b>
Test Server	-	-	V
Pricing	FREE	4 connectivity packages	Contact us



# The Largest LoRaWAN® Public Infrastructure





#### Professional Public Server



Professional LoRaWAN® network server with a 99.9% SLA, built-in redundancy with new user & admin features to manage and scale an enterprise LoRaWAN® Network.

- Full-featured LoRaWAN® network server
- o 99.9% SLA up-time guarantee
- Unlimited number of gateway connectivity
- Organization multi-tenant team environment
- Low latency regional server
- o 4 plans from 250 up to 2500 devices



#### START

Basic plan ideal for small deployments and Proofs of Concept (PoCs).

- ✓ 99.9% SLA
- ✓ Unlimited Gateways
- ✓ Multitenancy
- ✓ 250 devices

#### BUILD

Enter the market with a professional and reliable solution.

- ✓ 99.9% SLA
- ✓ Unlimited Gateways
- ✓ Multitenancy
- ✓ 500 devices

#### GROW

Expand your device network without losing out on performance.

- ✓ 99.9% SLA
- ✓ Unlimited Gateways
- ✓ Multitenancy
- √ 1.000 devices

#### SCALE

Scale your network and take your IoT solution to the next level.

- ✓ 99.9% SLA
- ✓ Unlimited Gateways
- ✓ Multitenancy
- **✓** 2.500 devices



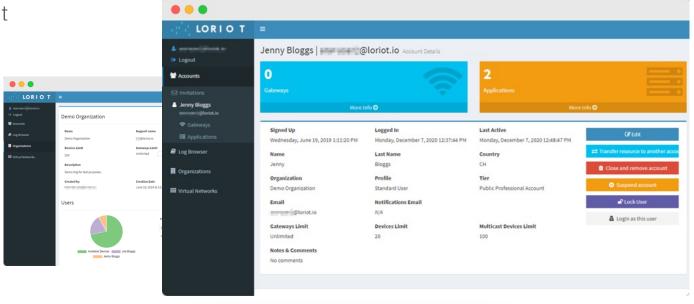
# Professional Public Server – Main Advantages



The LORIOT Professional Public Servers have been designed and engineered for the needs of professional users to scale from small networks to large operations.

Teamwork, Security, Performance, Reliability, Flexibility and Growth.

- 99.9% Service Level Agreement
- Run Professional Services
- Independently Managed
- Technical Support
- ✓ Value for Money
- Quick & Simple to Start
- Global Server Availability
- No major investment (CAPEX)
- Pricing Scales with the Network





#### Private Network Server - Models



A Private Network Server is the premier deployment model to ensure the highest security standards, control, flexibility and scalability for your LoRaWAN® services.

The LORIOT Private Server is available in three models which can be customized and are designed to meet the scaling, redundancy and pricing requirements of the many diverse use-cases and business models across the Internet of Things.

	MONOLITHIC STARTER	ENTERPRISE ADVANCED	FULL FAIL SAFE ENTERPRISE
	<ul><li>No redundancy</li><li>Single server deployment</li></ul>	<ul><li>No single point of failure</li><li>Storage and computing redundancy</li></ul>	<ul> <li>No single point of failure</li> <li>Storage and computing redundancy</li> <li>Application distributed across several network layers</li> </ul>
Service Level Agreement*	99.50%	99,95%	99.99 %
Includes Installation		<b>V</b>	<b>√</b>
Software License		<b>V</b>	<b>√</b>
Server Redundancy	-	✓	<b>√</b>
Single Point of Contact Person		-	<b>✓</b>

#### **FLEXIBLE HOSTING**



LORIOT Hosted Private Cloud is a managed network server as a service. The network operator can fully focus on building the network without worrying about hosting and maintenance. LORIOT can host the server in any country worldwide for low latency access.



Self-Hosted Private Cloud the LORIOT network server is installed within the client's private cloud environment via temporary remote access. This deployment ensures full control over the hosting environment and operator access.



On-Premise Bare Metal Server the LORIOT Network Server is installed on a bare metal server either with temporary remote access or physical access. This model is especially suited for on-site networks with limited or restricted WAN connectivity.

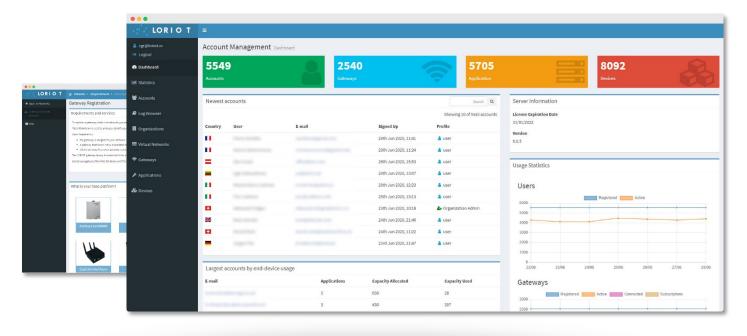


#### Private Network Server – Software as a Service



The LORIOT Private Network Servers is the perfect solution for carrier-grade network infrastructure. It enables the operation and management of large-scale IoT networks while providing proven reliability and scaling. Secure connectivity for thousands of gateways, millions of devices and the routing of critical data!

.



- Server Operator Admin Control
- Ownership of Data Path
- Advanced Network Management
- Centralized Network Server
- Scalable Solution with No Limits
- Connectivity for all LoRaWAN ® Deployments
- Ø Become a LoRaWAN® Operator &
- ✓ Custom Pricing for your Business Model



### Private Network Server – Software as a Service



We install a dedicated LORIOT Network Server for your organisation.

We manage monitoring, maintenance and updates of the server

You have complete control of utilisation, privacy and access

The server is hosted in your country to guarantee compliance with local regulation and data protection.

- Unlimited number of Gateways
- Unlimited number of Devices
- Server Operator Admin Access
- ✓ Top Level Security & Privacy
- Enhanced Radio Information
- Server Browser Event Logs

- O LORIOT Software Warranty
- Single Point of Contact
- Premium Technical Support
- SLA & Technical Support Included
- Billing System
- Hosted & Maintained by LORIOT



#### Private Network Server – Software License



We install our solution on your on-premises or private cloud server.

You manage and monitor the server and we schedule the updates.

You are completely in control, independent, and data remains within organisation.

- Small to Large Use-cases & Network Operator
- Unlimited number of Gateways
- Unlimited number of Devices
- Advanced Multitenancy
- Advanced Security
- Enhanced Radio Information
- **⊘** LORIOT Software Warranty

- Single Point of Contact & Premium Support
- Technical Support Included
- Billing System
- Customizable
- White-label
- Hosted by your Company
- Full Data Compliance



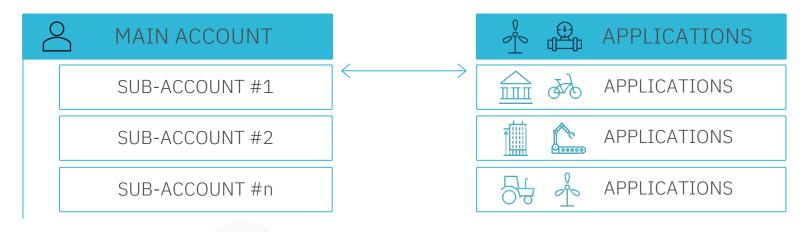
## Become a Network Operator



Our system allows the Main Account to create an infinite number of Sub-Accounts within the same network to rent it and bills other companies for using it. All the accounts share the same infrastructure but each one can manage its own applications independently.

ONE NETWORK
MULTIPLE ACCOUNTS
MULTIPLE APPLICATIONS



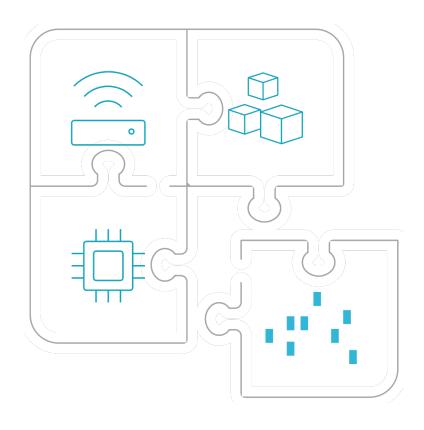


#### ADVANTAGES:

- No need of additional hardware
- Increase your revenues
- Reduce your costs by scaling your network
- Use our multiple billing solution for your clients
- We can customize our platform with your logo



# End-to-end Vertical Solutions for your business



Due to our unique positioning in the LoRaWAN® Ecosystem as both software provider and network operator, and having built a large partnership network with hardware manufacturers as well as IoT solution providers, we are able to offer, not only one of the most powerful, complete and secure solutions in the market, but also tailor-made plug-and-play solutions for a large variety of use cases.



# Additional Expert Services



## ONLINE WORKSHOPS

The LORIOT Workshops draw on the expertise and experience of our team to provide education led insights to LoRaWAN® network building and operation. Leverage our in-house expertise for a shortcut to maximising the success of your project, and avoid the common pitfalls.

With 4 curriculums available to best suit the different deployment stages or, on request, the possibility to tailor the topics to specific use-case and requirements.

- LoRaWAN Basics, Utilising the Network Server & Best Deployment Practices
- LORIOT LNS Software Walkthrough, Utilisation & Best Practices
- LoRa/LoRaWAN Technical 101, Solution Integration & Network Planning
- o IoT Business Models, Use-cases and Go-to-market Strategy



## **CONSULTANCY SERVICE**

LORIOT's IoT and technology professionals are industry leaders in guiding organizations through the end-to-end steps of enterprise IoT transformation and LoRaWAN® network deployment.

Ensure the highest ROI on your LoRaWAN® network by investing in an experience-led strategy, design, implementation, and optimization of the systems that empower your people to new levels of performance.

IoT requires expertise across a wide range of information technology fields and you can leverage our knowledge with consultancy services in the following areas:

- Project Management
- Radio & Network Building
- Technical Management
- Azure Cloud Consultancy
- Management Consultant



# Some of our Valuable Customers



















































# In love with Smart Cities





































# Nationwide Rollout & Smart City Platform

# **USE CASE**

## **PARTNERS**

#### CZECH REPUBLIC & SLOVAKIA NATIONWIDE ROLLOUT

Large Nationwide LoRaWAN® Network covering Czech Republic and Slovakia.

- Vertical IoT solution providers buy LoRaWAN® connectivity.
- End customers buy IoT application offered together with many different partners.



#### DARMSTADT DIGITAL CITY

The Smart City Platform goals are twofold:

- Delivering IoT services to the citizens (e.g. traffic management, public green maintenance, noise and pollution monitoring, etc).
- Enabling private and utilities companies to hire and access the platform to deliver additional services and improve their processes.

Scalability and security play a huge role for a Smart City.







# Smart Industry, Metering & Utilities

# **USE CASE**

## **PARTNERS**

#### PRIVATE LORAWAN SITE NETWORKS

Private LoRaWAN Network available across Shell production sites worldwide - smart industry solutions can be leveraged:

- o Centralized network servers for multiple sites & solutions
- o Multiple network server installations for global coverage
- o Metering, monitoring, corrosion detection
- o H&S equipment monitoring, lone worker, worker location
- Site Security, geofencing & site-security



#### **INDUSTRY 4.0**

The WIKA Group manufactures around 800 pressure and temperature measurement products in thousands of variants. The measuring ranges extend between vacuum and 15,000 bar. WIKA products can measure and display temperatures in the spectrum between minus 250 and plus 1800 degrees Celsius. Equipped with LoRaWAN connectivity, they enable countless industrial use cases.





# Proptech & Facility Management

# **USE CASE**

## **PARTNERS**

#### **BUILDING MONITORING & FACILITY MANAGEMENT**

Managing buildings efficiently leads to usage optimization, cost reduction and maximum real estate investment returns.

The main goals are:

- o Room/desk Occupancy & Usage
- Room Comfort & Energy consumptions monitoring
- Door/window Monitoring
- Management/Cleaning Optimization



#### FIREDOOR MONITORING

Reliability is essential when it comes to disaster prevention and management solutions.

Monitoring the firecut doors can be critical to prevent fire to spread along the buildings.

LoRaWAN® technology makes easy monitoring a large number of doors with very little setup and maintenance costs.





# Asset Tracking and Cold Chain Monitoring

# **USE CASE**

## **PARTNERS**

#### COLD CHAIN AND REFRIGERATION MONITORING

This solution can automatically monitor and document the temperature in refrigerators, server rooms, medicine stores and freezers. Ideal for hotels, restaurants, butcher shops, pharmacies and wherever valuable inventory is in use, which needs to be monitored and their temperature history logged. The users are alerted in the event of a possible failure of the refrigeration system and can react accordingly.



#### SUPPLY CHAIN LOW-POWER TRACKING SOLUTION

Trailer visibility is crucial for optimizing asset utilization, successful and cost-effective operations plus unlocking financial opportunities.

The solution provides nationwide location of the trailers based on movement behaviour, reports events such as dispatch or arrival to and from locations and alerts fleet managers on lack of movements or exit from pre-defined areas (geo-fence alerts).





# Agritech & Smart Farming

# **USE CASE**

## **PARTNERS**

#### **SMART AGRICULTURE**

In crop production, small changes in soil conditions can have significant impacts on production.

Measuring and Analysing the main soil parameters allows:

- o reduction in waste of energy and water
- o increase in facilities management productivity
- o facilities management services optimization
- higher-quality final product



#### HERDS TRACKING & MONITORING

Livestock theft is a major problem, particularly in South America and Africa.

Chipsafer is a platform that can track and detect anomalies in livestock behaviour at any time and place with the aim of improving the safety and security of livestock herds, while reducing ranchers environmental impact and providing traceability across the bovine lifecycle.





# LORIOT is the perfect partner for your LoRaWAN® Solution



PROBABLY THE
MOST ADVANCED
SOLUTION IN THE
MARKET



RELIABLE
PARTNER
FOR YOUR
NETWORK



SCALABLE WITH YOUR

BUSINESS





SWISS QUALITY,
RELIABLE, SECURE
AND TECHNICALLY
ADVANCED



# LORIO T Want to know more? Reach out to our tear

Reach out to our team today!



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