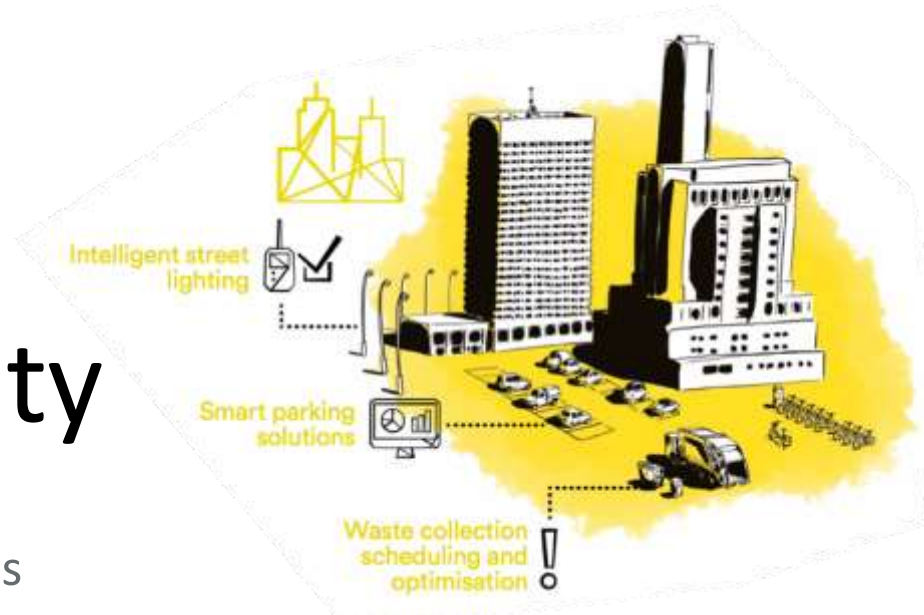


# NW TECS Smart City

LoRaWAN Use cases





# About

NW TECS

Actility

# At a glance

## Company founded

2008



## Headquarters

Paris  
France



## Technology leadership

Co-inventor of LoRaWAN  
Funding member  
of LoRa Alliance



## PROFILE



110

Employees – 60 % of R&D strong customer support  
Worldwide presence



100 M€+

funding raised  
Investor List:  
Orange, Cisco, KPN,  
Swisscom, Bosch, Foxconn



>200k Abeway  
trackers

shipped in last 18 months



>39.000+

LoRaWAN gateways connected on Activity-supplied networks

>3 billions messages

Per year transit on Activity-supplied networks

## PRODUCT & SERVICES PORTFOLIO

### Deploy



- ✓ LoRaWAN network server
- ✓ Professional Services & radio planning
- ✓ Carrier-grade OSS/BSS for gateway & device management
- ✓ Join servers for easy device activation

### Scale



- ✓ Key Management System for enhanced security & large scale device activation
- ✓ Firmware-over-the-air update for devices
- ✓ Ecosystem marketplaces and Partner programs

### Enrich



- ✓ Geolocation services using combinations of technologies : LoRa network location or AGPS
- ✓ Access to Roaming hub for easy device roaming
- ✓ Fully integrated end-to-end solutions marketplace to accelerate go-to-market

## MARKETS

### Public operators



55 + large scale operators

Activity  
NWTECS  
NWTECS

### Enterprise networks



180+ Enterprise Networks

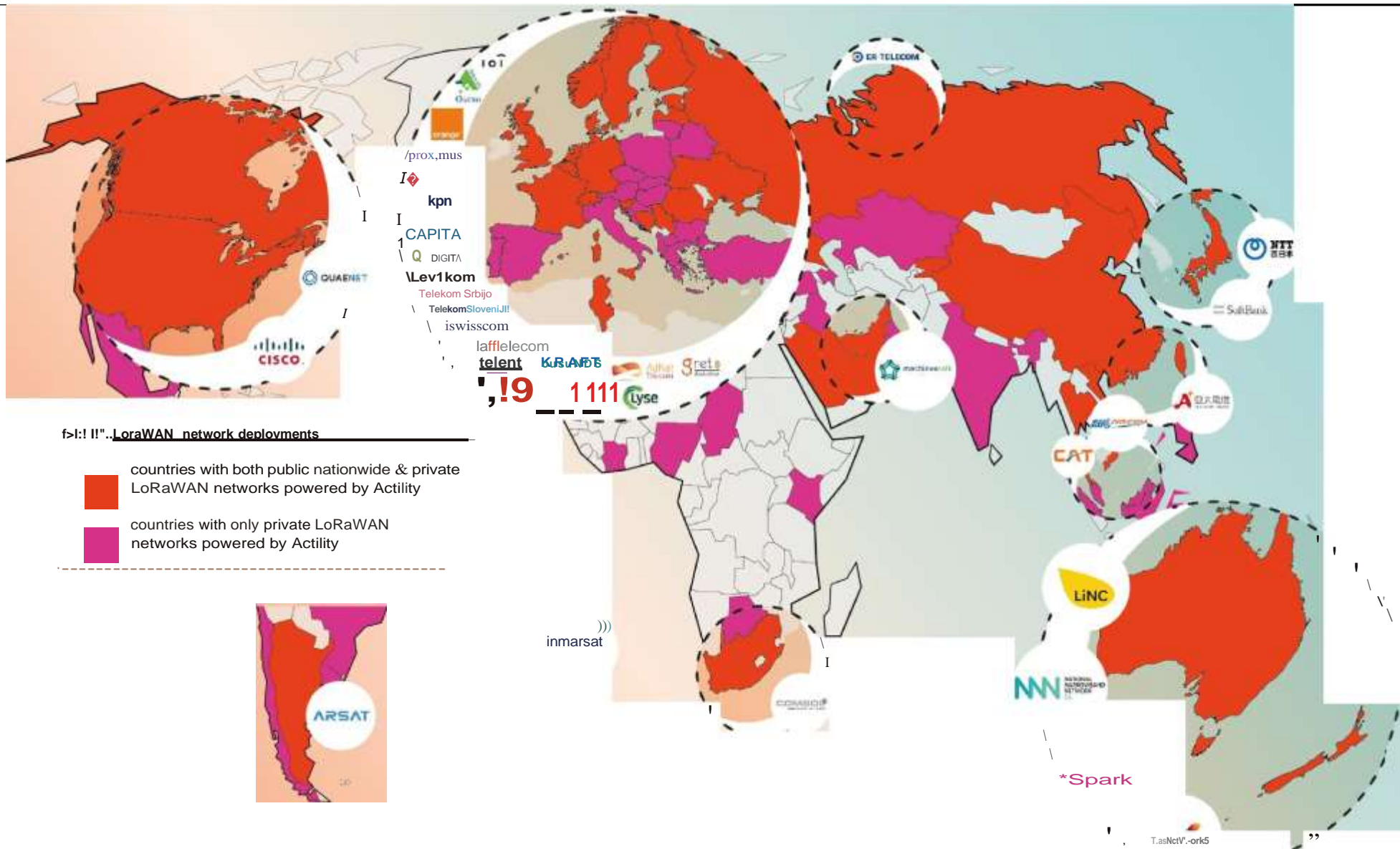
### Channel Partners

100 % Indirect GTM  
strategy

### Solution Partners



Partner Program for Eco-systems from validation to distribution



**LoRaWAN network deployments**

- countries with both public nationwide & private LoRaWAN networks powered by Actility
- countries with only private LoRaWAN networks powered by Actility





# ThingPark Portfolio

NW TECS

Actility

# ThingPark – Strategic Principles

---

## Mass scalability

The ThingPark platform is designed for mass scalability, explaining why These unique capabilities explain why over 90% of public network operators, the largest LPWAN smart water & gas projects (>3M meters), as well as the largest LPWAN enabled smart-city in the world, Shanghai (>100000 devices per quarter), all selected ThingPark

## Provide a whole solution

Provide 100% of the components of a LPWAN ecosystem, from roaming hubs to activation servers, Hardware security systems, firmware update platforms, or multi-technology geolocation

## Be technology agnostic

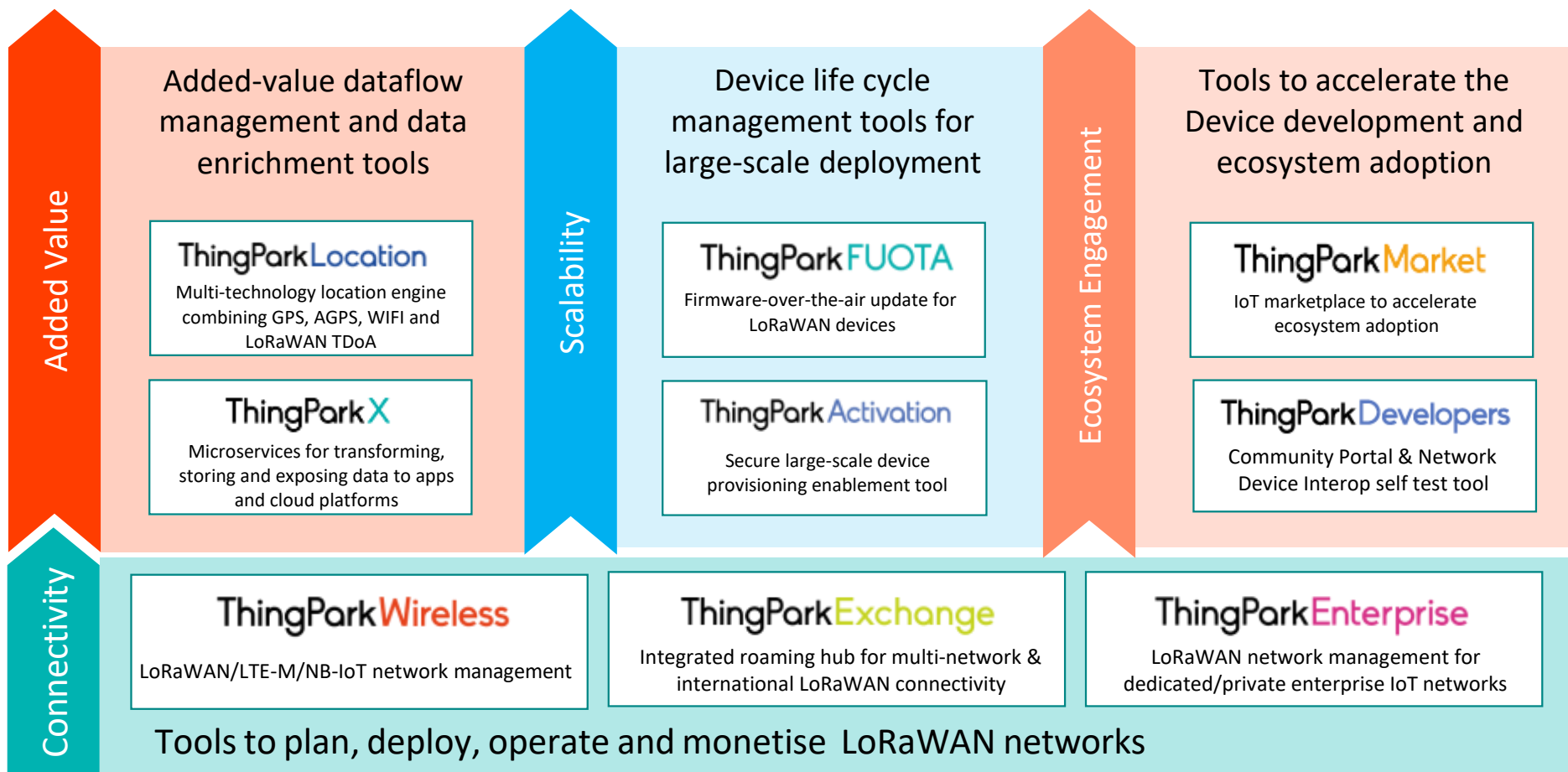
We fully embrace LPWAN, not just LoRaWAN. You can select LoRaWAN, LTE-m or NB-IoT as best suited for your use case, and you can become a MVNO on any existing LPWAN cellular network worldwide

## Openness

Pre-integrated does not mean proprietary, we drive standards and leverage standard interfaces across modules whenever they exist. We have a successful track record for interoperability with many suppliers and partners



# A complete IoT solution stack



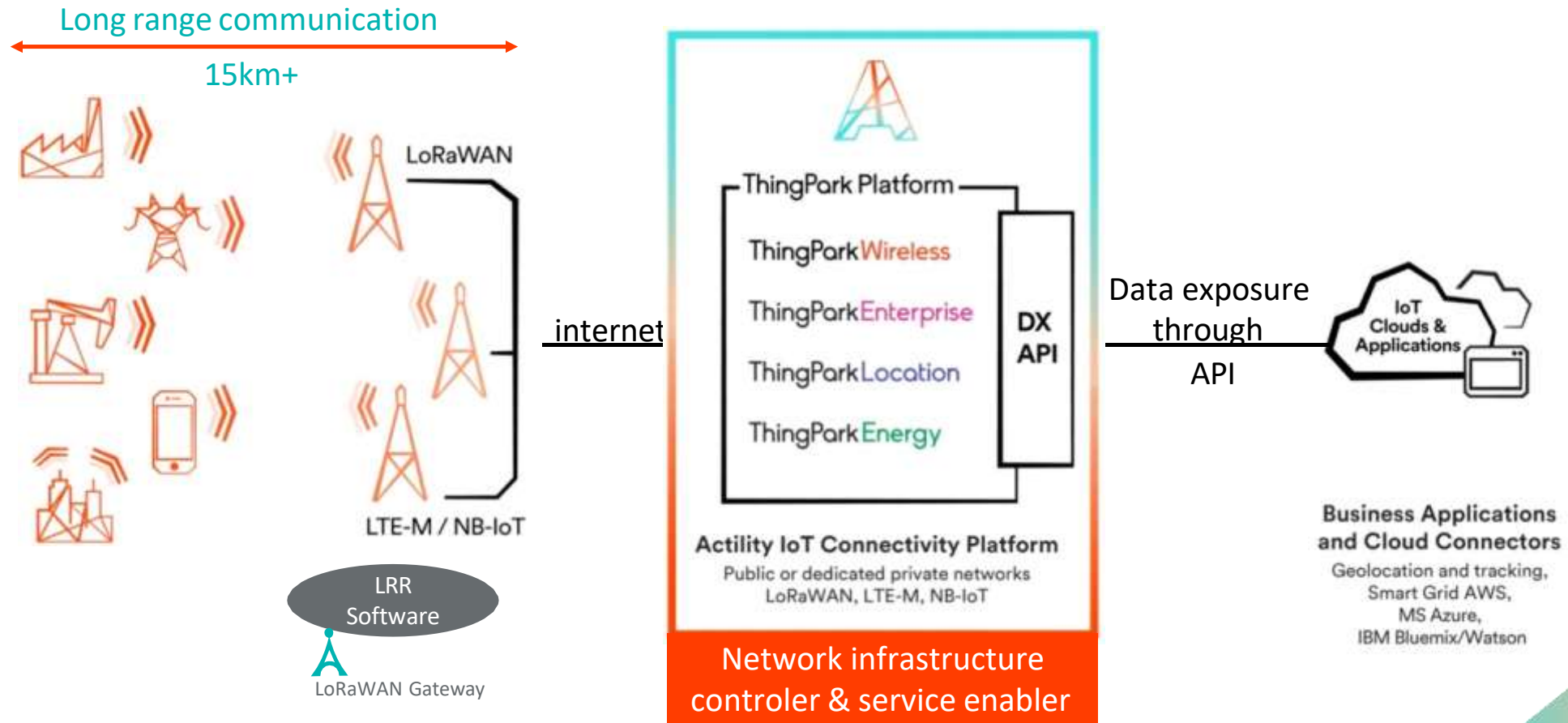
Actility

Copyright ©Actility - N W T E C S - Confidential

NW TECS



# LoRaWAN is the new communication standard for Industrial IoT







# Support Organization

NW TECS

Actility

# Actility CSO teams provides:



- ✓ Help to understand issues.  
✓ Assistance to obtain traces or understand a procedure.
- ✓ Problem analysis and issue qualification before R&D escalation.  
✓ RMA qualification.
- ✓ In case of incident, configuration or specific procedure will limit the effect of the problem.
- ✓ Follow-up bug resolution with R&D.  
✓ Patch or new release delivery.  
✓ Solution configuration.
- ✓ Optional subscription for better customer experience.

Actility

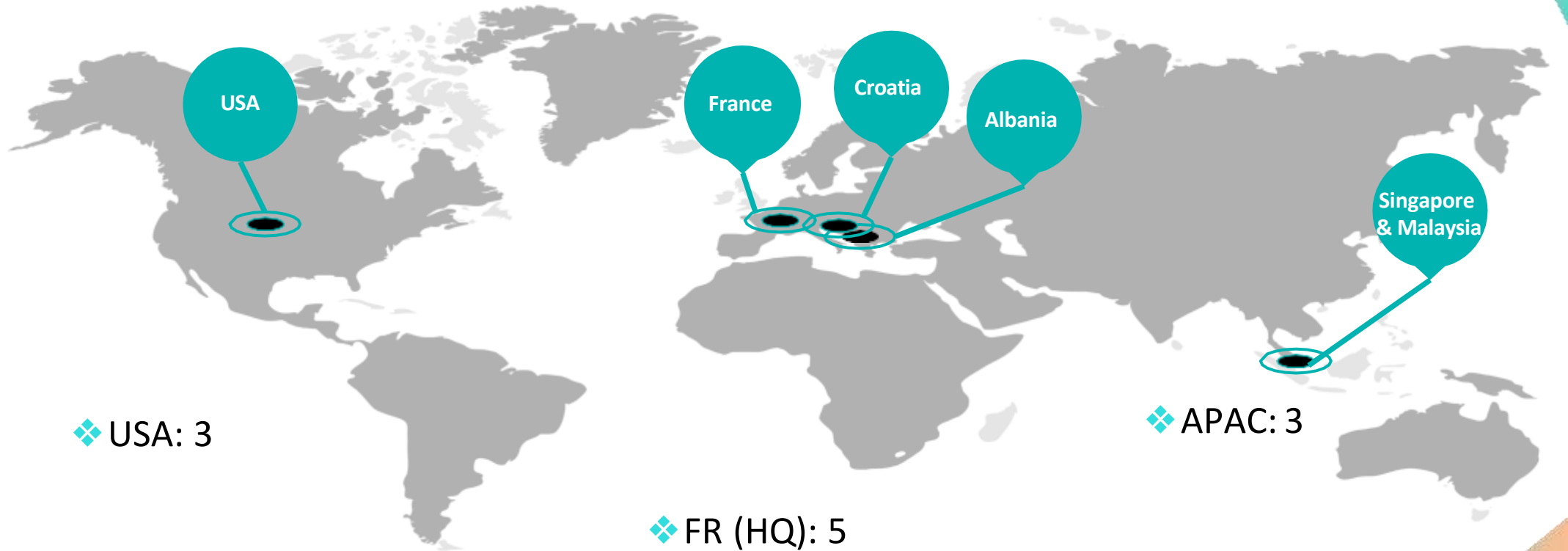
Copyright ©Actility - Confidential

NW TECS



# CSO Team

---



❖ USA: 3

❖ APAC: 3

❖ FR (HQ): 5

❖ Eastern EUR: 3

NW TECS

# City Operations

Helping cities to ensure efficient services to their citizens

NW TECS

Actility

Copyright ©Actility - N W T E C S - Confidential



# SMART WASTE MANAGEMENT



LoRaWAN™

Public or Private LoRaWAN coverage



LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.

## CHALLENGE



### How to optimize waste collection routes with connected dumpsters ?

Trash containers can often fill up too soon, and most of the time there is no real-time information on waste bins filling level. Waste is typically collected on fixed schedule, while the pick-up routes are not adapted to the actual level of waste in dumpsters, leading to inefficient waste management in a city, and unnecessary CO2 emissions and traffic complications.

## BENEFITS



**Easy-to-install and cost-efficient IoT solution** allowing cities to integrate even the simplest waste bins into an intelligent waste management system with smart LoRaWAN™ sensors



**Improved operational efficiency and route optimization:** sanitation specialists to work more efficiently and cut unnecessary costs up to 50% by optimizing refuse collection routes in real-time, avoiding overflows and planning ahead future routes. Cities can better analyze the citizen behavior patterns and install the bins at the best locations.



**Improved citizens's well-being:** private waste management services and municipalities can offer better comfort to citizens by collecting trash at the right time and avoid unnecessary CO2 emissions and traffic complications.



## DATA COLLECTION

**LoRaWAN-connected ultrasonic sensors** are placed in the bins and trash containers and notify whether the it's at full capacity or needs to be emptied.



## DATA PROCESSING



Integration with **Business Applications and Cloud Connectors**





# SMART PARKING



Public or Private LoRaWAN coverage



LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.

## CHALLENGE



**How to easily locate available parking spots using IoT?**

A city's parking management system is often under pressure of high and unstable demand from users. In order to offer an efficient parking service to its citizens, the city must fully exploit all available spaces, and therefore to connect them with IoT to monitor and optimize the occupancy of parking spaces in cities.

## BENEFITS



**Easy-to-install and cost-efficient IoT solution** using LoRa-enabled parking sensors deployed throughout urban areas with a fast infrastructure setup without transforming the entire city into a construction site.



**Improved city traffic:** Smart Parking IoT solution allows cities, parking operators and private companies to monitor and manage parking spaces, enhancing usage and traffic flow, and consequently generating incremental revenues.



**Enhanced citizens' well-being:** connected road signs and online applications can display information about available parking spots.



**Streamlined revenues:** parking providers can adapt their pricing strategies in line with real-world usage patterns.



DATA COLLECTION

**LoRaWAN-enabled parking sensors** capturing and reporting occupancy data in real-time



DATA PROCESSING

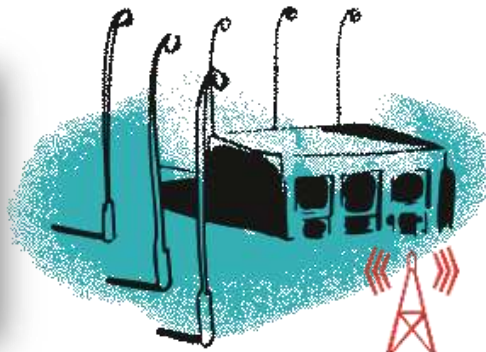


Integration with **Business Applications and Cloud Connectors**





# SMART STREET LIGHTING



LoRaWAN™

Public or Private LoRaWAN coverage



## DATA COLLECTION

LoRaWAN-enabled light intensity sensors or connected lamps to remotely control light intensity for energy savings



## LORAWAN NETWORK

Data transmission via long range, ultra low power LoRaWAN wireless network on public or/and private infrastructure, providing low cost connectivity & low TCO. ThingPark Platform: devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING

Integration with Business Applications and Cloud Connectors



## CHALLENGE



How to make streetlights control efficient and less costly ?

Currently, in most cities there is no real-time monitoring of streetlights condition, therefore manual inspection is required, and it's not possible to change and customize the lighting level depending on daylight intensity. That involves energy inefficiency and higher operating costs.

## BENEFITS



**Smart and cost-efficient IoT solution** using connected lamps, equipped with LoRaWAN™ sensors to determine in real time the traffic of vehicles and passers-by on an artery and adapt the lighting accordingly.



**Reduced energy and maintenance costs:** smart cities leverage connected lights to reduce their energy footprint and cut down on maintenance costs. Lighting operators can deploy workers only when necessary instead of carrying out routine maintenance checks, and to plan maintenance operations by detecting overheating, power supply shortage and broken bulbs.



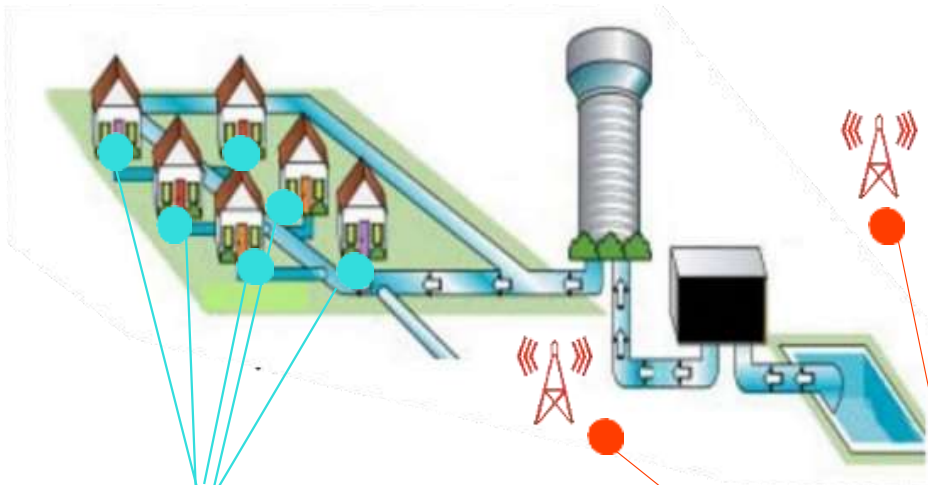
**Improved safety and sustainability:** monitoring and maintaining street lighting networks operational allows to make operations efficient without compromising the safety of streets for pedestrians and drivers.





Smart City

# AUTOMATED WATER METER READING



LoRaWAN

Public or Private LoRaWAN coverage



## DATA COLLECTION

Fully integrated **water meters** (positive displacement or ultrasonic technology) or already-installed with LoRaWAN pulse/TIC/optical external module



## LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING

Integration with **Business Applications and Cloud Connectors**



## CHALLENGE



**How to optimize the management and consumption of water resources in cities ?**

Most water metering solutions need manual reading by dispatched operators, preventing utilities and users to access real-time consumption and waste information. Intelligent IoT water readers allow to collect millions of data items daily to help local communities, manufacturers, third parties and retail customers reduce their energy bills and improve their services.

## BENEFITS



**Easy, cost-efficient & fast** to deploy IoT solution with very long-term benefits using connected meters with 10+ years battery life



**Meter-to-Cash services** enablement by visualizing real-time water consumption, and a more dynamic, adaptive, and interconnected utility distribution network, facilitating new use cases. **Pre-paid water management** can also be enabled by this solution.



**Reduced billing costs** by eliminating manual meter readings and reading errors, with **reduced consumer bills** by giving them access to real-time water usage data to identify potentials to enhance water efficiency and to identify fraud or leakage with atypical consumption

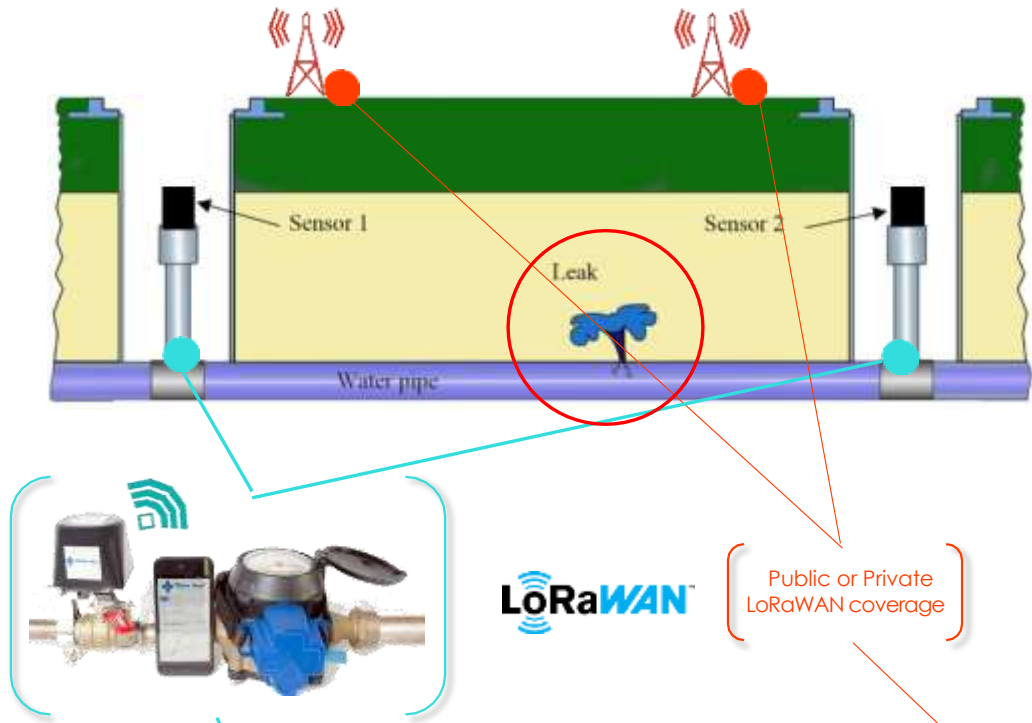


Significantly **improved customer relationships**, opportunities for greater engagement with customers by putting them in greater control of their usage and costs

NW TECS



# WATER LEAKAGE DETECTION



Public or Private LoRaWAN coverage

## CHALLENGE



**How to detect and eliminate water losses by monitoring water flow?**

Ageing or deficient water infrastructure generate numerous leaks, which is one of the biggest operational costs for utilities. Worldwide water loss (typically through leakages in the distribution network) can represent at least 20% or more than 1.3 million cubic meters of clean water. The challenge is to locate the leaks without spending too much human resources trying to visually locate the leaks.

## BENEFITS



**Easy, cost-efficient & fast** to deploy IoT solution with very long-term benefits using connected meters with 10+ years battery life. This precision avoid having to send a worker to inspect a large network a pipelines, thus dramatically reducing service costs



**Reduce non-revenue water losses and operational expenses** through quick detection of water leaks and instances of fraud, using connected sensors, and address leaks prior to them becoming costly main breaks.



**Improve water management** to ensure sustainable management of water resources and to enhance revenue collection.



**Reliable RF communication** link between sensing infrastructure and LoRaWAN-based network provides **excellent underground coverage**



## DATA COLLECTION

**Sensors /electronic meters synchronized with pressure and flow measurements.** The leak is detected if pressure drops between 2 specific meters.



## LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING

Integration with **Business Applications and Cloud Connectors**



# City Safety & Security

---

Protection of urban assets and people

NW TECS

Actility

Copyright ©Actility N W T E C S - Confidential



# MANHOLE MONITORING



LoRaWAN™

Public or Private LoRaWAN coverage



LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.

## CHALLENGE



### How to ensure safety and secure of city manholes ?

Degraded power lines are a major cause of exploding manholes and stray voltage. Security-related issues include theft, tampering and terrorism linked to manhole and other subsurface structures. And there is no real-time monitoring of manhole opening in the streets, requiring manual inspection. IoT brings an efficient solution.

## BENEFITS



**Easy-to-install and cost-efficient IoT solution** with LoRaWAN sensors transmitting information to a dashboard or the City Control center application, with LoRaWAN™ operating over long distances in harsh and deep indoor environments



**Improved safety and security:** with the manhole monitoring, automated incident detection allow a quicker response to threats. Street safety is improved by monitoring if unwanted manhole opening is done. . . LoRaWAN™-based system allows real-time monitoring and protection for both the cover's metal content and the valuable assets down below like fiber cables.



**Enhanced citizens' well-being:** city inhabitants take advantage from the efficient manhole anti-theft system



## DATA COLLECTION

**Battery-operated LoRaWAN-enabled sensors with accelerometers** are installed on manholes to detect manhole unauthorized openings and incidents.



## DATA PROCESSING



Integration with **Business Applications and Cloud Connectors**





# STREET SIGNAGE MONITORING



## CHALLENGE



### How to ensure safety and secure of street signage ?

Degraded street signs can cause serious issues for road users and pedestrians. Security-related issues include shocks, vandalism and degradation. And there is no real-time monitoring of street signage in the streets, remote areas and roads, requiring manual inspection. IoT brings an efficient IoT solution.

## BENEFITS



**Easy-to-install and cost-efficient IoT solution** with LoRaWAN sensors transmitting information to a dashboard or the City Control center application, with LoRaWAN™ operating over long distances in harsh and deep indoor environments



**Improved safety and security:** with the street signage monitoring, automated incident detection allow a quicker response to threats. Street safety is improved by monitoring if a shock or vandalism is happening to the street signs. LoRaWAN™-based system allows real-time monitoring with sensors on batteries lasting for years.



**Enhanced citizens' well-being:** city inhabitants, road user and pedestrians take advantage of a better monitoring of street signage



LoRaWAN™

Public or Private LoRaWAN coverage



LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



DATA PROCESSING

Integration with **Business Applications and Cloud Connectors**



**DATA COLLECTION**

Battery-operated LoRaWAN-enabled sensors with accelerometers are installed on street signs to detect shock and incidents.

**DX API**

Integration with **Business Applications and Cloud Connectors**





# STAFF, PATIENT AND ELDERLY PEOPLE SAFETY



## CHALLENGE



**How to insure staff, patient and elderly people safety in hospitals, healthcare facilities and retirement homes?**

In clinics, it can be difficult to keep medicated or confused patients safe, preventing them from getting lost or entering restricted areas. Staffing expenses are an ongoing burden for the healthcare industry. That is why many hospitals are trying to maximize resource utilization and reduce costs by eliminating manual, time-consuming workforce management processes.

## BENEFITS



**Easy-to-deploy and cost-effective solution** based on very low power **LoRaWAN** network requiring minimal investment, high-performance tracking devices. Ex: Abeeway trackers provide accurate geolocation and last for years, using an **indoor geolocation system based on BLE or WiFi allowing 2-5m precision.**



**Improved visibility:** solution allows to locate patients and staff as necessary and can be configured to send alerts if a patient leaves pre-defined areas. It helps to streamline human resource allocation, lower costs and respond quickly to changing demands.



**Enhanced safety and security:** it's possible to trigger a mobile emergency call whenever a threatening situation or a medical emergency occurs ("panic button"). Whether it is for health care or senior care, it ensures maximum safety and security for patients/residents and hospital staff and reduces threats and liability risks.



**LoRaWAN**

Public or Private LoRaWAN coverage



## DATA COLLECTION

**Wearable trackers** for elderly, patients and staff (security personnel, housekeeping, or nursing staff)



## LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on private infrastructure, providing **low cost connectivity & low TCO.** **Actility's ThingPark Platform** for devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING



Integration with **Business Applications and Cloud Connectors**





# FIRE HYDRANTS MONITORING



Public or Private LoRaWAN coverage



LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



DATA PROCESSING

Integration with **Business Applications and Cloud Connectors**



## CHALLENGE



**How to make sure the hundreds of fire hydrants in a city are working properly?**

Hydrants are inspected manually, but that is a slow and costly process whose results are often out of date. It's now possible to remotely monitor hydrants for malfunctions or vandalism. IoT-enabled hydrants with LoRaWAN connectivity help fire departments ensure the water supply for firemen.

## BENEFITS



**Easy, cost-effective and fast-to-deploy** solution for real-time remote water flow monitoring using battery-powered sensors that can be located in remote and difficult-to-access areas thanks to LoRaWAN.



LoRaWAN network offers **low energy consumption, reduced costs, and easy integration**. It allows regular updates with data transmission covering long distances



**Better service efficiency** with creation of maintenance work orders. Alerts are sent via LoRaWAN network when a hydrant is being opened, closed, tampered with or isn't working properly.



**Less costs for maintenance** as it's done remotely and do not require regular checks



DATA COLLECTION

**LoRaWAN level sensors** placed on supply tanks sending information periodically through gateways



# City Environment

Helping cities to control and improve their environment

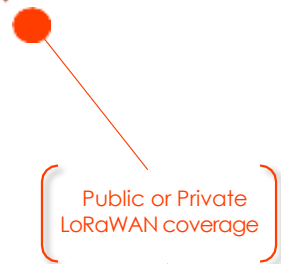
NW TECS

Actility

Copyright ©Actility - Confidential



# AIR QUALITY MONITORING



## DATA COLLECTION

LoRaWAN-connected air quality sensors measuring gases concentrations, temperature and humidity.

# NW TECS



## LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.

## CHALLENGE



### How to ensure efficient air quality monitoring in cities ?

Cities are the centers of consumption of energy, materials, thus having a high environmental impact from greenhouse gas production, waste, and emissions of pollutants. Air pollutants (CO<sub>2</sub>, PM, ozone, nitrogen dioxide) pose serious health and environment risks. To improve peoples lives, cities now use IoT for air quality monitoring.

## BENEFITS



**Easy-to-install and cost-efficient solution:** LoRaWAN™ allows monitoring even in remote areas with years of battery life for sensors, with a fast infrastructure setup. Compared to traditional methods battery-powered LoRaWAN sensors can provide more granular measurement points



**Improved safety:** by implementing a network of LoRaWAN™ sensors and gateways across urban regions, environmental indicators can be measured in real-time, detecting issues before they become crises.



**Efficiency and sustainability:** environmental IoT sensors help to track the evolution of the environment in the city remotely and in real-time, to forecast and take actions to reduce air pollution



**Enhanced citizens' health and well-being:** citizens can receive precise information about air pollution and act accordingly



## DATA PROCESSING

DX API



Integration with **Business Applications and Cloud Connectors**





# NOISE POLLUTION MONITORING



LoRaWAN™

Public or Private LoRaWAN coverage



## DATA COLLECTION

LoRaWAN-enabled low-cost acoustic sensors reporting noise level and nature



## LORAWAN NETWORK

Data transmission via long range, ultra low power LoRaWAN wireless network on public or/and private infrastructure, providing low cost connectivity & low TCO. ThingPark Platform: devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING



Integration with Business Applications and Cloud Connectors



## CHALLENGE



How to ensure efficient noise pollution monitoring in cities ?

Noise pollution has harmful effects on citizens health. The negative health effects of excess noise include disturbed sleep, hearing loss, cognitive disorders, and high blood pressure. Municipal noise ordinances aim to reduce noise pollution, but assessments of noise and monitoring are performed infrequently and are primarily complaint-driven.

## BENEFITS



**Easy-to-install and cost-effective IoT solution:** cities can build a city-wide monitoring system across public spaces. As soon as the volume exceeds a predefined level, sensors send an alert to the cloud platform to take action.



**Improved safety, efficiency and sustainability :** by implementing a network of LoRaWAN™ sensors and gateways across urban regions, environmental indicators can be measured in real-time and continuously, detecting issues before they become crises.



**Improved Quality of Life for citizens:** the data will help improve noise management and enforcement during public events by automatically alerting bylaw officers when noise thresholds are exceeded



# SMART IRRIGATION IN PUBLIC SPACES



Public or Private LoRaWAN coverage

## CHALLENGE



How to optimize water management for irrigation ?

Over **50% of irrigation water is wasted** due to evaporation or runoff, because most irrigation systems rely on simple timers. Large sized farms have complex irrigation systems and irrigation operations, often not efficient when moisture controls and valves openings are manual or time-scheduled instead of having a need-to-do basis. To ensure the irrigation is efficient and penetrates deep enough to cover all roots, moisture sensors can be set at three levels

## BENEFITS



**Easy, cost-efficient & fast** to deploy IoT solution with very long-term benefits using connected meters with 10+ years battery life and LoRaWAN connectivity allowing to cover large rural areas.



**Optimized irrigation control** based on multiple inputs including soil moisture, water flow, energy usage, and environmental factor, resulting in **streamlined farming operations and increased overall productivity**. LoRaWAN-sensors provide an accurate reading of soil water tension – an indication of how much water in the ground is available to plants.



**Reduced water consumption, optimized performance and profits** by improving crop yields, because irrigation operations are done on a **need-to-do basis** allowing to use water only when necessary and with the exact required amount, with controlled irrigation pumps



## DATA COLLECTION

LoRaWAN-enabled **soil moisture sensors** and connected **water pumps** and connected **valves** for efficient irrigation control



## LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING



Integration with **Business Applications and Cloud Connectors**





# PEST CONTROL



Public or Private LoRaWAN coverage



## DATA COLLECTION

LoRaWAN-connected mouse traps, also for rats and larger pests.



## LORAWAN NETWORK

Data transmission via long range, ultra low power LoRaWAN wireless network on public or/and private infrastructure, providing low cost connectivity & low TCO. ThingPark Platform: devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING

Integration with Business Applications and Cloud Connectors



## CHALLENGE



### How to reduce damage due to rodents in cities ?

Rodent reduction and pest control is a major challenge for cities. Pest control across cities will be a combination of IoT & Big data and city-wide sensor roll-out plans, and reduction of available food sources, An important part of effective pest control relies on residents' willingness to follow recommendations and community guidelines, but IoT can help.

## BENEFITS



**Easy, cost-efficient & fast** to deploy IoT solution with very long-term benefits using connected meters with 10+ years battery life and LoRaWAN connectivity allowing to cover large rural areas.



**Improved pest control efficiency:** the solution provides the ability to detect when trap has an occupant, no need for daily manual inspection, "the Rat Man" can be invisible. Historic data indicates prone entry or infestation points. Enhanced pests control becomes a simple process and very discrete as occupant removal can be scheduled, less occupants were found over time.

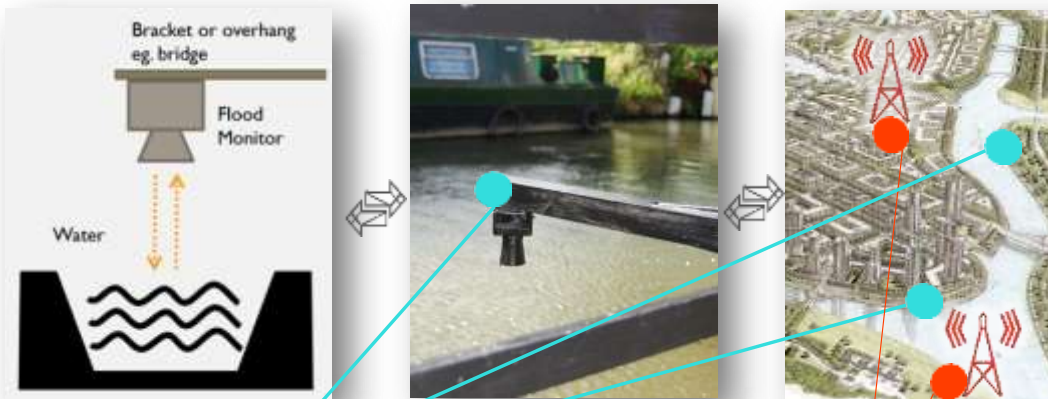


**Improved Quality of Life for citizens** health regulations are met more efficiently and citizens's expectations and well-being are respected





# FLOOD DETECTION AND MONITORING



LoRaWAN™

Public or Private LoRaWAN coverage



## DATA COLLECTION

Non-contact, ultrasonic **LoRaWAN water level sensors** (integrated or analogue sensor with 4-20mA / 0-10V LoRaWAN modem).



## LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING

Integration with **Business Applications and Cloud Connectors**



## CHALLENGE



**How to have a better control over the flood risk ?**

In many coastal towns and communities, rising water as a result of tides or rain can present a large threat, causing considerable disruption or damage to critical assets and infrastructure, so it is of great importance to have insight in the water level of rivers or canals to have early warnings in case of flooding. Determining how to precisely **predict flood events and efficiently minimize resulting losses** has become a high priority.

## BENEFITS



**Easy, cost-efficient & fast** to deploy IoT solution with very long-term benefits using connected meters with 10+ years battery life. Thanks to LoRaWAN wide-range capacities, each sensor **can be deployed in hard-to-reach remote positions** along the water's edge in marshland, rough terrain or in residential neighborhoods lacking urban infrastructure.



**Better decision making** during floods thanks to real-time insight from the sensors are monitored remotely. Thresholds can be set and alarms generated if risks are detected leaving enough time for corrective measures.

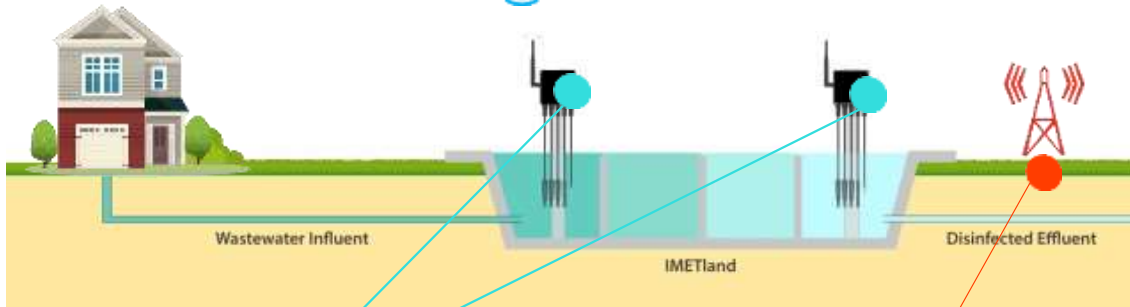


The ability to track data such as rainfall, ground saturation, and upstream water levels enables companies and utility services to receive **early flood warnings and take preventative action**.



Smart City

# WATER QUALITY MONITORING



## CHALLENGE



**How to detect changes in water quality and potential risk to public health in real time?**

Cities, municipalities and utility companies need to ensure real-time safety & healthy of rivers, swimming pools or lake waters using wireless Internet of Things (IoT) sensors for remotely measuring, monitoring and analyzing water, wastewater and groundwater systems.

## BENEFITS



**Easy, cost-effective and fast-to-deploy** solution for real-time water quality monitoring using battery-powered sensors that can be located in remote and difficult-to-access areas thanks to LoRaWAN. Can be used for potable water monitoring, chemical leakage detection in rivers, remote measurement of swimming pools and spas, and levels of seawater pollution,.



**Improved accuracy and efficiency of water control.** A continuous health monitoring of the water distribution system is enabled, with synchronized pressure, flow and quality measurements.



**Improved security and public health.** The solution can be used for chemical leakage or levels of seawater pollution, hydroponics and fishfarms monitoring.



Public or Private  
LoRaWAN  
coverage



## DATA COLLECTION

**LoRaWAN water quality sensors** to measure pH levels, dissolved oxygen (DO), oxidation-reduction potential (ORP), conductivity (salinity) and other



## LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



## DATA PROCESSING



Integration with **Business Applications and Cloud Connectors**



# NW TECS



# Transport & Mobility

---

Helping cities to optimize traffic control and fleet management applications

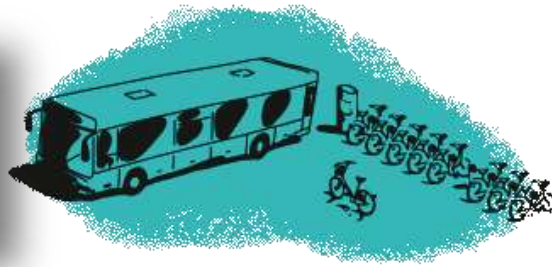
NW TECS

Copyright ©Actility - Confidential

Actility



# CITY VEHICLES FLEET TRACKING



LoRaWAN

Public or Private LoRaWAN coverage



DATA COLLECTION

LoRaWAN-enabled tracking devices

NW TECS



LORAWAN NETWORK

Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.



DX API



DATA PROCESSING

Integration with **Business Applications and Cloud Connectors**



## CHALLENGE



**How to optimize city vehicles management and reduce congestions?**

City operations require fleet tracking to optimize the usage of their vehicle fleet. Bike sharing providers require geolocation to pinpoint on smartphone application the location of the bicycles. But the use of cellular networks is not cost-efficient and often the coverage is not good enough in remote location or dense building areas.

## BENEFITS



**Easy, cost-efficient & fast** to deploy IoT solution with very long-term benefits using connected meters with 10+ years battery life and LoRaWAN connectivity allowing to cover large rural areas.



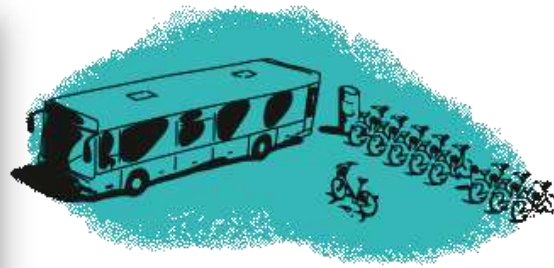
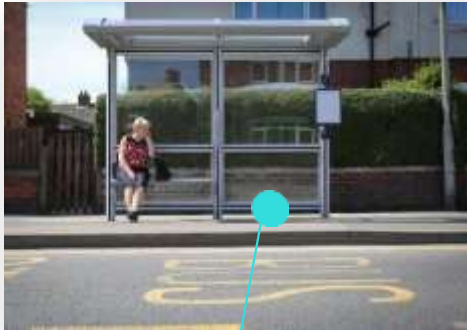
**Improved operational efficiency:** LoRaWAN-enabled fleet can be integrated into Smart City dashboard, allowing high level data management system about traffic. It can provide real-time information on bus arrivals, bus routes, detailed schedules, as well as service conditions and emergency communications.



**Enhanced services and well-being:** with IoT tracking the city enjoys less congestion, less pollution and higher levels of livability. Using road sensor and trackers on buses and bicycles, city officials can collect and aggregate data, drivers can be alerted of accidents and directed to routes that are less congested.



# BUS STOP DIGITAL DISPLAYS



Public or Private LoRaWAN coverage



Data transmission via **long range, ultra low power** LoRaWAN wireless network on public or/and private infrastructure, providing **low cost connectivity & low TCO**. **ThingPark Platform:** devices and gateways operations support system (OSS), data transfer and security.

## CHALLENGE



### How to optimize city vehicles management and reduce congestions?

Most of bus stops do not provide up-to-date information on bus schedules. But the use of cellular networks is not cost-efficient (SIM card-based solution is costly and energy-consuming), and often the coverage is not good enough in remote locations or dense building areas. LoRaWAN brings an efficient solution to those challenges.

## BENEFITS



**Easy, cost-efficient & fast** to deploy IoT solution with very long-term benefits using connected meters with 10+ years battery life and LoRaWAN connectivity allowing to cover large rural areas. The solution uses a digital display using e-paper technology with LoRaWAN gateways with Ethernet or cellular backhaul.



**Improved service:** real-time information on bus arrivals, bus routes, detailed schedules, as well as service conditions and emergency communications is provided to citizens.



**Additional features:** it measures external parameters and can be used to receive and/or transmit information in case of a blackout of traditional phone network. Powered completely using a small solar kit, it does not require a power supply through the electrical grid which means a significant reduction of the installation costs.



## DATA COLLECTION

LoRaWAN-connected digital displays

# NW TECS



## DATA PROCESSING



Integration with **Business Applications and Cloud Connectors**





# Real-life Actility implementations

NW TECS

Actility



## Veolia deploying over 3 million smart water sensors in France on Orange network

- Over 3 million LoRaWAN water sensors will be connected in the next 3 years in France to Orange LoRaWAN network
- Additional water sensors are scheduled for deployment in order to transition from pure metering to environmental services
- Unify all water sensors in a multiservice connectivity network to support digital transformation of water utilities



**Benefit:** enriched the quality of life, attract investment attractiveness citizens.



## Historical cities in Portugal deploys a set of Smart City applications using LoRaWAN



- Several cities in Portugal are modernizing the city's water management, waste collection, parking and traffic flow and pollution monitoring using smart LoRaWAN sensors.
  - Solution is based Actility Thingpark Enterprise On-Premise, Cisco gateways and EVOX sensors
  - Waste collection costs reduced by **67%**, the cost of protecting water quality and controlling leaks reduced by **33%**, and time to find a parking spot cut by **50%**
  - Aquagri
  - city of Oeiras
  - City of Caldas da Rainha
  - City of Portalegre
  - City of Pombal
  - City of Melgaço
- Paris Airport
  - Saudi Aramco Smart City project







## ThingPark China deployment in Shanghai

- Over 250,000 sensors connected and powering a wide range of Smart City applications
- Smoke detectors giving early warning of fires in office and residential blocks
- Acidity and oxygen sensors monitoring pollution and quality of water in rivers
- Parking space occupancy detectors
- Manhole cover opening detectors to detect and prevent unauthorised access



**Benefit:** Improved safety, security and city environment for residents

NW TECS

Copyright ©Actility - Confidential

ThingPark  
China







## Orange connects Vinci rest stops with ThingPark



- Parking lots fitted with sensors to help drivers find free spaces
- Real-time customer feedback to optimise operations
- Waste bin level sensors ensure efficient emptying



**Benefit:** more efficient operations and greater customer satisfaction

NW TECS

Copyright ©Actility - Confidential





## Daikin and NTT monitor air conditioning in Japan

- Enable pre-emptive maintenance based on wear and fluid monitoring
- Detailed visibility of component performance data and machine learning enable improved failure analysis and prevention
- Hundreds of sensors distributed across city rooftops enable real time air-quality forecasting



**Benefit:** reduced down-time and better air quality

NW TECS

Copyright ©Actility - Confidential





## NNNCo – Actility deal in Australia

- NNNCo signs 2d largest government area in Australia – Newcastle for smart city applications
- Gold Coast City wants to connect 150,000 water meters, 3000+ street light, 5000+ parking bays
- Ensuring distribution grid security using smart demand response with Ergon Energy



**Benefit:** more efficient and sustainable city services and robust electricity distribution grid

NW TECS

Copyright ©Actility - Confidential

NN NATIONAL  
NARROWBAND  
NETWORK  
Co.







# Noise Management Use Cases in the Netherlands



In the municipality of Amstelveen Sensor Team's Sound Sensors measure the sound level produced by a city hangout. The hangout is equipped with a professional audio system. The Sound Sensors are connected to a cloud platform that intervene when the sound level is too high.

NW TECS



To avoid festival noise nuisance municipalities make arrangements about the maximum sound levels. In Amstelveen, suburb of Amsterdam, 14 IoT Sound Sensors measure the sound levels and the sensor data is mapped in the cloud dashboard. Improve the lives of your communities with Sensor Team's Smart City solutions.

# Swisscom Air quality measurement in Zürich with Decentlab



## Air Quality station NO<sub>2</sub>, NO, CO



- 100+ sensors to be deployed in Zürich area
- New opportunities to conduct monitoring in locations and situations where traditional systems are not feasible solutions.
- Higher spatial resolution of measurements.
- Better understanding of local air quality concerns.
- Enriched engagement for air quality communities and stakeholders.

# Smart City IoT info

NW TECS

Actility



## Key challenges

---



Up to **30%** of cars driving in downtown traffic are looking for parking space



Street light accounts for **40%** municipality's utility bill



Urban waste generation will increase by **100%** by 2025 vs 2010



Cities occupy **2%** of the territories and produce **80%** of carbon emissions

# Smart city key applications for LoRaWAN



NW TECS

# Smart city key trends



## Mass urbanization

The world is rapidly urbanizing and by 2050, **2/3 of the population will live in cities**. The urban population has grown to **4 billion** and is expected to grow by **another 2.5 billion** by 2050.

## Environment

Today, cities are responsible for **60 to 80%** of the world energy & **greenhouse emissions**. With more & more inhabitants and infrastructure installations, cities must **reduce energy footprint** of the infrastructure, traffic

## Maintenance & Operations

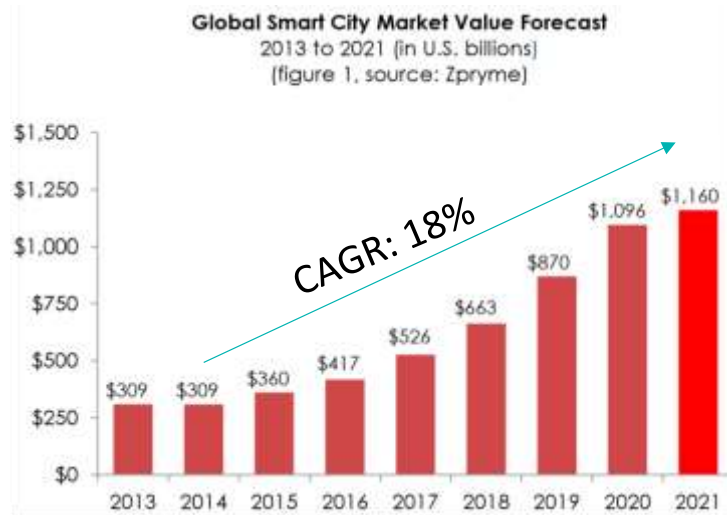
City infrastructures like traffic, waste, lights, sustain **increasing stress in terms of usage**. Cities target to optimize mobility & traffic flow and to better **manage maintenance & repairs**.

## Comfort, safety & security

With exponential increase of inhabitants, cities have to take in account the **comfort and security** of the citizens. Reducing air pollution or time spent to search for a parking space can increase people happiness and **satisfaction**.

Actility LoRaWAN based smart city solutions aim to enable cities to deploy a horizontal IoT platform solution to enable verticals (parking, light etc.) to reduce energy consumption, optimize operations & increase citizen comfort and satisfaction.

# Smart city market

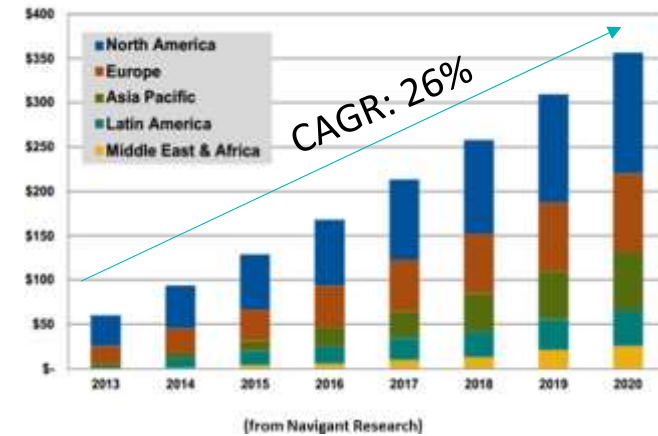


Actilil

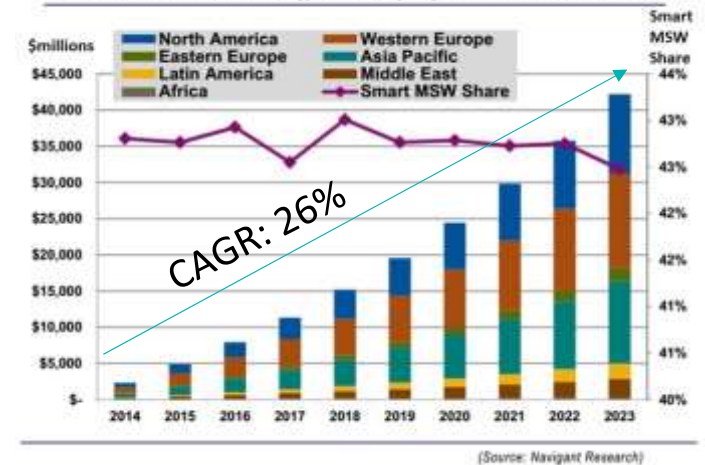
Source: Northeast Group

NW TECS  
Copyright ©Activity - Confidential

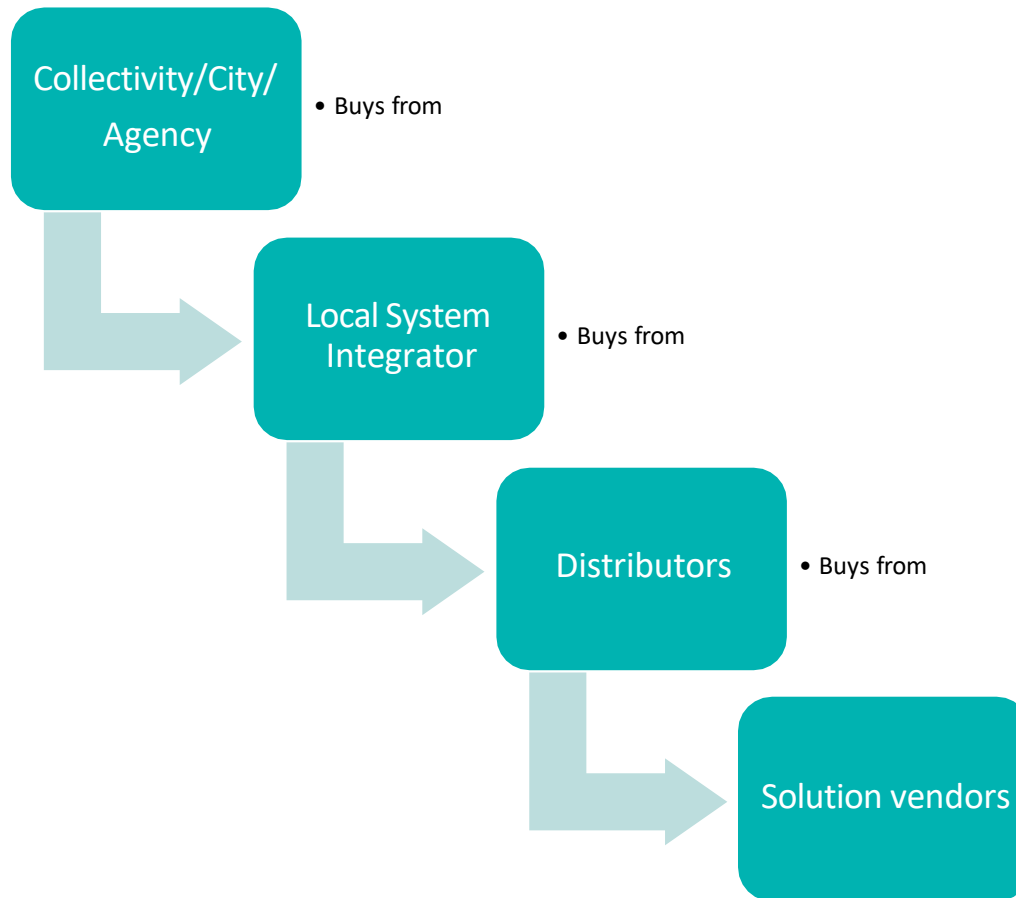
Smart Parking Systems Annual Revenue by Region, World Markets: 2013-2020



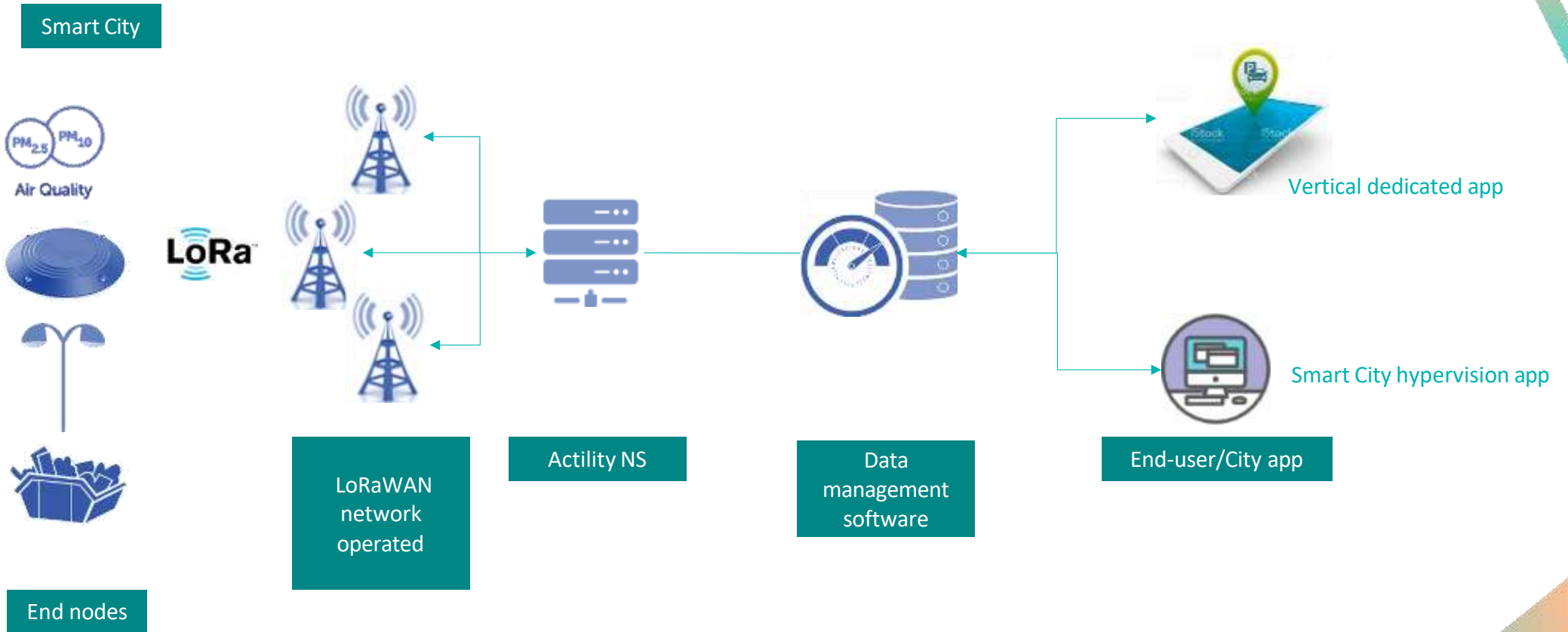
Cumulative Smart MSW Technology Revenue by Region, World Markets: 2014-2023



# Key Players in this market



# LoRaWAN smart city solution architecture



NW TECS



# LoRaWAN is a Game changer for Smart City Applications

---

- **Technical Benefits**

- ✓ **Low asset deployment cost:**

- ▶ The star network architecture with sensors communicating with a gateway from a range of up to 20 km. Multiple building can be covered with one gateway and no need for complex coverage analysis as required for mesh network solutions.
    - ▶ The ease of installation: Battery-operated sensors lasting up to 20 years depending on the application being used.

- ✓ **Secure** : AES-128 encryption is built-in.

- ✓ **Open Standard**: LoRaWAN specifications are publicly released by the LoRa Alliance.

- ✓ **Geolocation** with GPS-free technology not requiring additional power.

- **Business Benefits**

- ✓ **Available Today**

- ✓ **Low deployment and operational cost**

- ✓ **Open network** allowing cities to choose different service providers or to deploy their own network deploying multiple applications and leasing connectivity to third parties (Public or private companies).

- ✓ **Growing ecosystem**