

Smart water
management

SMART WATER



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Architecture for smart water management:

01



SERVICES

Display of information on maps, sending specific alerts, remote management of distant plants, smart actuators ...

02



BIG DATA ANALYTICS

Support on data management and use of connected services

03



DATA TRANSPORT

LoRaWAN technology enables the remote management of data recorded by sensors at great distances

04



SENSORS

Low energy consumption detectors and measuring devices

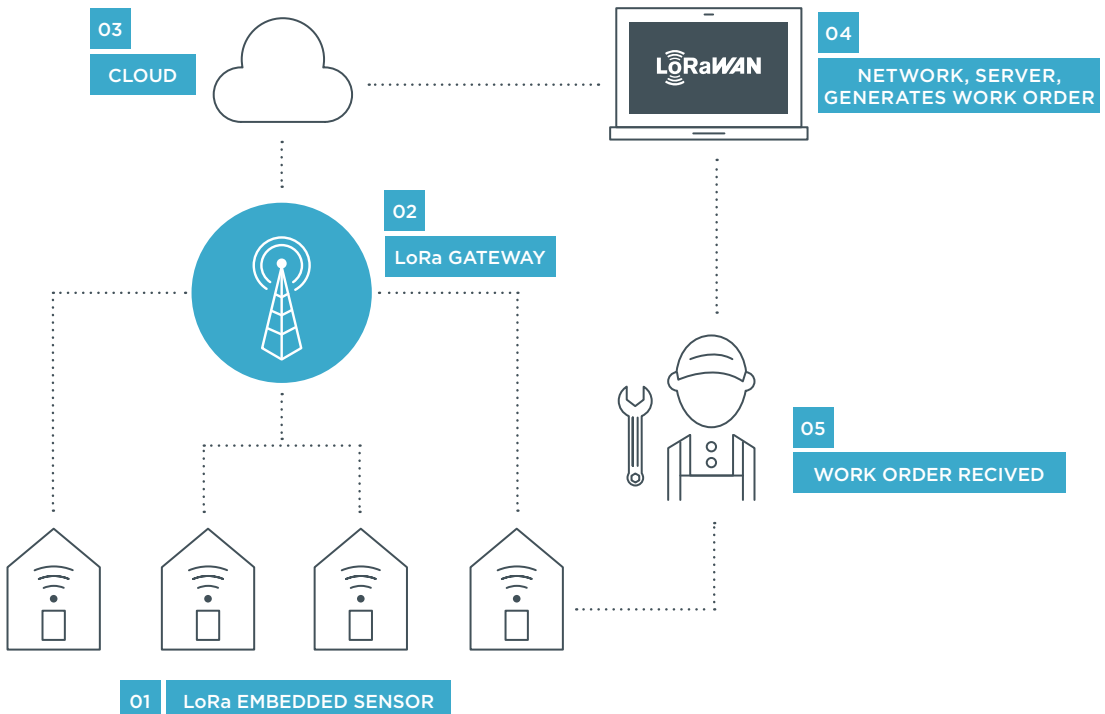
WATER, A PRIMARY RESOURCE

Water is, increasingly, an invaluable resource for the global economy: monitoring and controlling its use, preventing waste, are a priority for a sustainable planet.

The value of one litre of water in Italy has increased on average by 50% in the period 2007 to 2014, with cities seeing their water bills more than double in the same period. The increase in monetary value, combined with a recognition of its environmental value should encourage distribution companies to monitor leaks (on average 40% in Italy) and

consumption and network quality by developing a quick and efficient planning and maintenance system.

Infrastructure supported by **LoRaWAN** technology optimises the water distribution network through efficient monitoring, automated meter readings and an overall reduction in management costs.

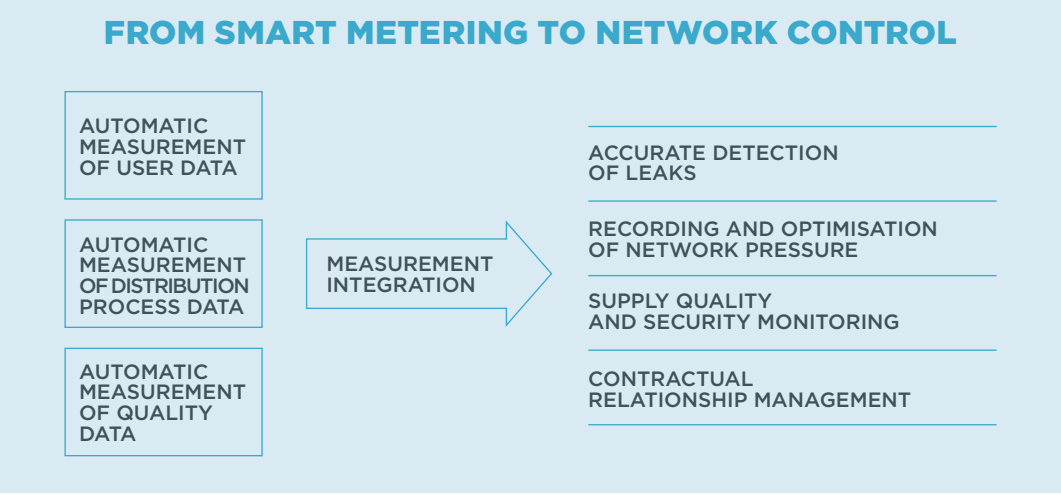




Network losses can be identified in two ways:

Direct detection: sensors installed on pipes transmit data, on pressure and load, to the LoRa infrastructure. In the event of irregularities, the system follows up with automatic alerts for verification.

Indirect detection: irregularities can be identified at post meters phase through automatic and continuous consumption readings and in-cloud analysis.



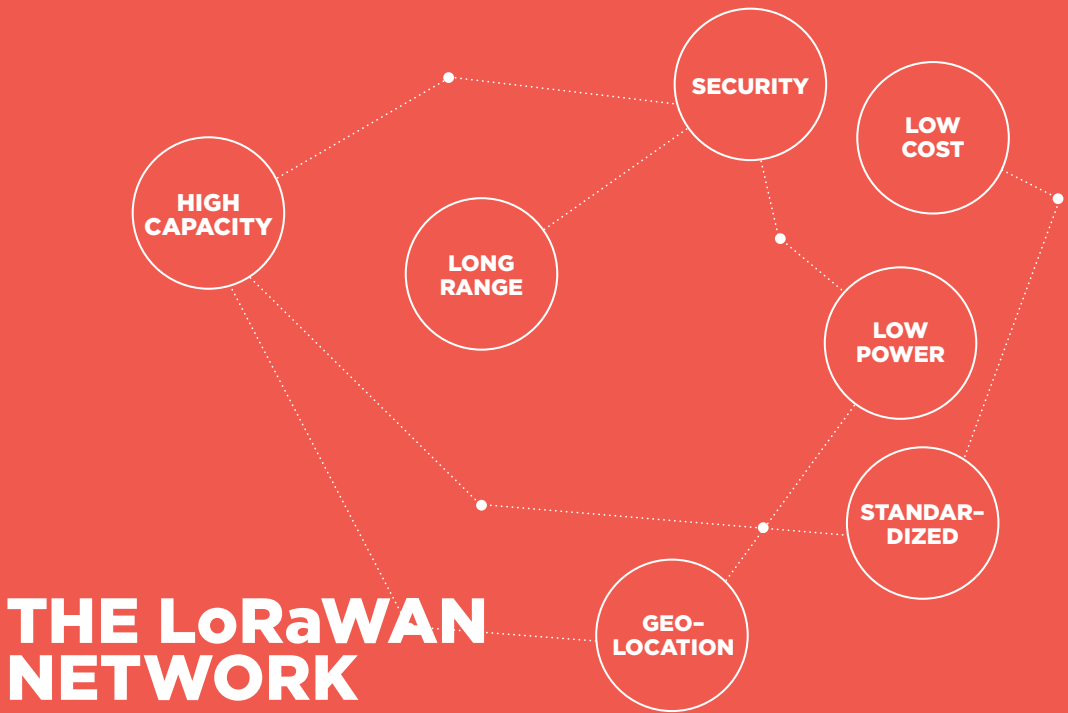
In Italy, droughts have reignited the discussion over the obsolete water infrastructure and reopened the debate on the type of investments needed. According to an ISTAT study, almost 40% of water is lost in the network, an increase of almost one percentage point year on year.



One figure is particularly alarming: the total daily loss of water in Italian water network would satisfy the water requirements of 10.4 million people for a whole year. A dispersion rate of 139 litres per person wasted every day as compared to an average daily consumption pro-capita of 245 litres.

Benefits

- reduction of water network maintenance costs
- rapid detection of any water leaks
- use of a technologically effective network based on LoRaWAN
- low energy consumption sensors



- **Long Range:** wide coverage, throughout the urban area, one gateway has a coverage range of more than 10 km in open field.
- **Low Power:** the sensor batteries can last for up to 10 years without requiring connection to the electricity grid.
- **High Capacity:** supports millions of messages for every monitoring station/sensor.
- **Geolocation:** enables the support of the geo-location service without GPS and without additional battery consumption.
- **Standardized:** the LoRaWAN network ensures interoperability between applications, IoT service providers, and telecommunications service providers.
- **Security:** the LoRa standard ensures privacy and data protection via a data encryption system (Embedded end-to-end AES-128 encryption).
- **Low Cost:** low cost solution, the infrastructure and nodes have low maintenance costs and are low in energy consumption.

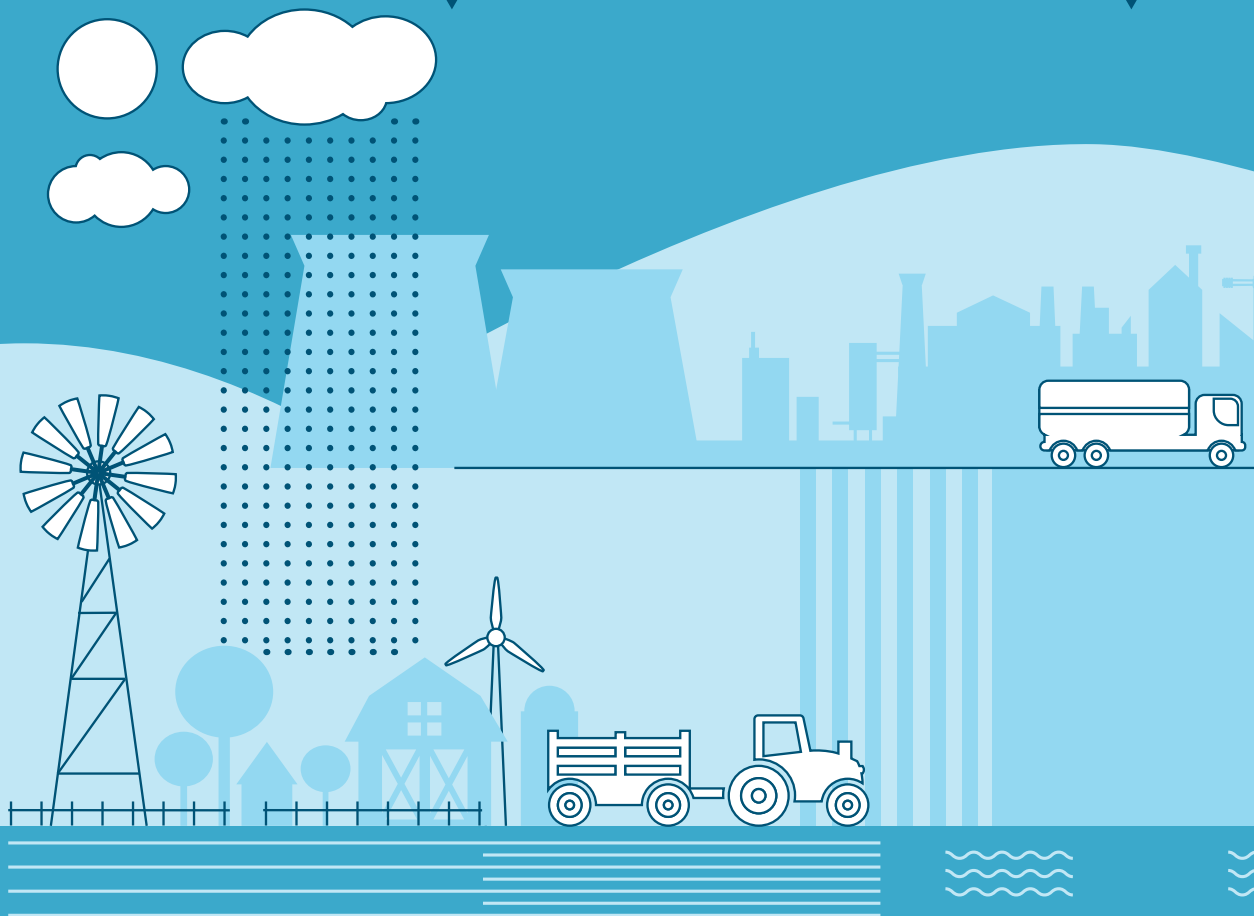
FIELDS OF APPLICATION

ENVIRONMENT

Monitoring of meteorological parameters

INDUSTRY 4.0

Monitoring and control of internal consumption and rainwater discharge



AGRICULTURE

Optimal irrigation of crops

WATER NETWORK

Leak detection and network pressure monitoring; smart metering; water quality monitoring

**Each service includes analysis of data collected within a BIG DATA system

PUBLIC ADMINISTRATION

Improved efficiency of irrigation in city parks; monitoring of underpass and manhole flooding; management of water systems in public buildings



PRIVATE CLIENTS

Consumption monitoring and division among residents



SURFACE WATER BODIES

Monitoring of river and lake water levels and quality



ENERGY PRODUCTION

Energy upgrade via a water ring main that uses renewable sources hydroelectric power plant management





OUR PROPOSAL

Water quality

Our multi-parameter probe can measure 5 different variables:

- temperature
- PH
- conductivity
- REDOX
- dissolved Oxygen
- specific ions
- level (in the case of a tank).

It is also possible to measure water cloudiness, using a special sensor.

Leak control

Monitor:

- pressure
- load
- capture of water hammer effect
- consumption at the meter.

The system also allows for pressure control with flow modulation, differentiated day and night programming, upstream support and loop closure.

Suitable in locations with very difficult environmental conditions, can operate in extreme environments with no electricity connections. Flood prevention by using rain overflow measurement and connection to a control centre via radio frequency.



Network monitoring: RTCP System - Real Time Critical Point

The solution is designed to control pressure automatically and immediately at the critical point, responding to changes in water demand.

The system consists of two functional units:

- a unit for the acquisition and transmission in real time of pressure measured at the critical point;
- a control unit that acts on the set point of the PRV (Pressure Reducing Valve) to change the inflow pressure at the PMZ (Pressure Management Zone) maintaining the desired pressure at the critical point.

The RTCP System does not require any software or remote server data: the regulation cycle is controlled locally by the Master Control System. The system can be managed by a simple browser on shared devices connected to the internet (PC/Tablet/Smartphone).

Thanks to a user interface, operators can monitor and control pressure values on the network, highlighting any anomalies. An advanced function reports every alert to the operators via SMS or email.



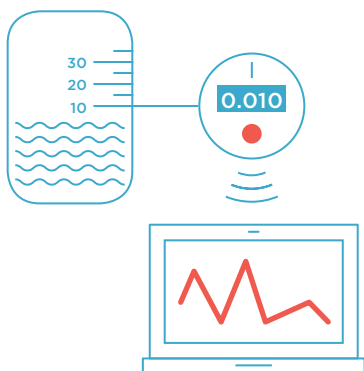
Thanks to advanced design, based on standards of communication and database, the RTCP System can be integrated within a SCADA supervision system, improving the efficiency of the PMZ in which the manager can analyse the status and efficiency using real data.



Remote meter management and automatic meter reading

The solution is designed for Automatic Meter Reading (AMR) and remote management of water meters by using the **LoRaWAN network** infrastructure.

The latest generation meters will integrate all the traditional meter measurement functions and transmit data via the new smart communication infrastructure.



Advantages:

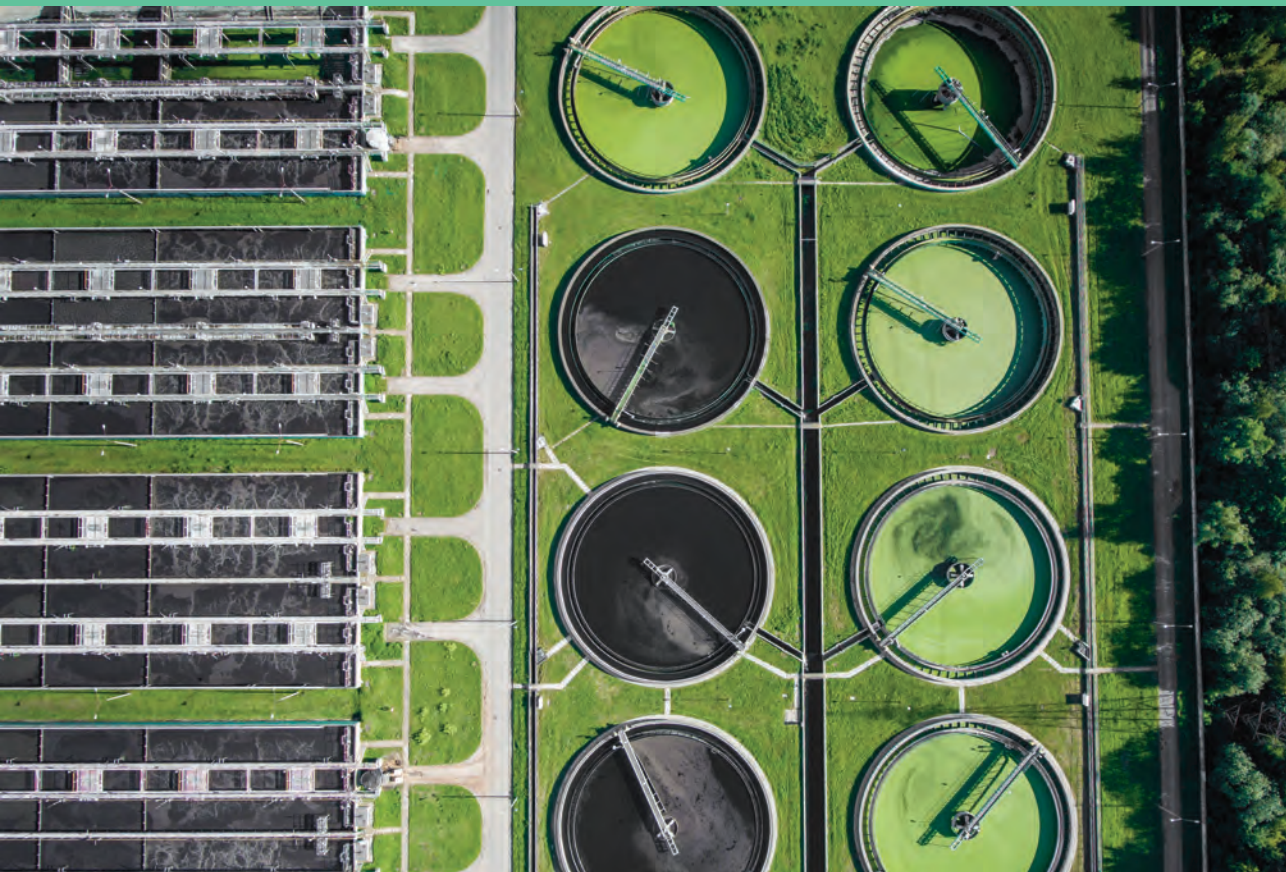
- fast and automatic reading of consumption
- utility-related monitoring and reports on consumption that can be integrated within management systems
- software functions to create and optimise a management district structure
- safeguard water resources and reduce the volume of unbilled water
- rapid leak detection and instructions provided to maintenance teams in order to improve network performance
- data from meters and load measuring devices provide a continuous remote view of the volumes of water in transit across sections of the network, reducing management costs (avoiding any manual measuring).

Monitoring and performance improvement of water treatment plants

Our solution enables the development or upgrade of water treatment plants, to ensure that they comply with regulations to reduce losses and avoid regulatory breaches.

Smart monitoring devices are deployed across the water network (pressure, load and analysis), at both inflow and outflow of the water treatment plant, with benefits across:

- improvement of treated water quality and water recoverable for other uses
- active monitoring of critical issues and leaks during water treatment
- software functions for monitoring water treatment cycles in plants, also useful for reporting and analysis
- improvement of plant maintenance
- improvement of plant performance
- reduction of management costs.



The UN resolution of 28 July 2010 states,
for the first time in history, that **access to water
is a universal and fundamental human right.**

« It's time to recognise access to drinking water
and health services as a fundamental human
right, defined as an equal right for all, without
discrimination, to access sufficient quantities of
drinking water for personal and domestic use - for
drink, wash, wash clothes, cook and clean - for the
purpose of improving health and quality of life. »



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