

IoT and LoRaWAN make conserving water more than a pipe dream for CILE



Client profile

The Compagnie Intercommunale Liégeoise des Eaux (known as CILE) sources and distributes drinking water to 24 municipalities in the province of Liège, Belgium. Their team of nearly 400 multidisciplinary agents is committed to preserving water and optimizing the management of water transport networks.

CILE prides itself in delivering safe drinking water to the residents of the municipalities in Liège, Belgium. Working with Cisco and CILE, we deployed a series of gateways to securely connect their sensors and water meters to the regional LoRaWAN network, providing them with real-time insights into the state of their water delivery network. This allows them to deliver a sustainable water supply now, and in the future.



We took advantage of NTT DATA's expertise in networks and IoT to further our goal of creating an integrated, smart city. We now have intelligent data, so we can make informed decisions to improve residents' lives and optimize water management."

William De Angelis
CIO, CILE

Business need

Smarter monitoring and control to boost sustainability

The residents of municipalities in the province of Liège in Belgium are used to turning on their taps and receiving safe drinking water. This is made possible by CILE, which pumps groundwater into water towers then distributes it to residents.

As part of their overall modernization journey, CILE was already participating in Liège's Smart City program, which combines technology with initiatives aimed at prioritizing sustainable development and improving residents' lives. One of the components of the smart city is its long-range wide area network (LoRaWAN). CILE had already started deploying sensors and had an intelligent network in place. Their next step was to use the data from those sensors to drive actionable insights.

Liège has felt the impact of the climate crisis in various ways, including catastrophic flooding in July 2021 that cost lives and damaged houses and infrastructure.

To optimize water usage and ensure a sustainable supply of water, CILE uses a range of systems which monitor water usage and generate alerts when sensors detect problems such as leaks and backflows (when the water pressure drops pulling water from other sources into the municipal system).

They wanted to meet four specific business goals by improving the LoRaWAN that connects their sensors:

1. Introduce smart metering to monitor water consumption, provide accurate billing and detect if water is being overconsumed when water restrictions are in place.
2. Strengthen the smart grid which manages the water pipelines that run to Germany and the Netherlands in collaboration with the Société Publique de Gestion de l'Eau (SPGE). This is necessary because large volumes of water can be exchanged between countries, and the bidirectional flow needs to be calculated to ensure just the right amount of water is pumped.
3. Create a small distribution array for each water tower and section to control the distribution of water in these sections. Sectorization would allow CILE to detect where water leaks are by comparing the volume of water at different points from the water tower to homes and along the pipeline.
4. Identify which pipelines to replace first. Aging pipelines lose water through leaks. CILE wanted to prioritize those needing to be replaced first.

A smarter network would help CILE to preserve water by limiting leaks, only pumping as much water as is needed while maintaining and replacing the piping system.

Solution

Secure gateways connect more than 250,000 sensors

Before NTT DATA became involved, Cisco conducted an assessment to determine how many network gateways were needed to cover the province and connect the more than 250,000 IoT devices located in the towers and pipe network. When NTT DATA joined the project, we worked with Cisco to deploy three gateways as a proof of concept to show how the sensors could connect to the gateways and relay information through the network.

We created a clear data structure that defined which data needed to be gathered and stored. It was also crucial to clearly define the conditions needed to trigger an alert. The integration of these elements into SAP allowed CILE to decrease the impact of alerts on the business, while providing valuable intelligence to the relevant teams.

Once the architecture was finalized, NTT DATA deployed 53 Cisco IXM Gateways in a secured OT network to gather information from the devices that provide information on water consumption, temperature, pressure in the pipes, backflows and leaks. We then integrated all the data streams while providing governance over all five project layers – sensors, networking, data, function and process. Bringing IoT devices, big data and AI together turns information into actionable insights that create value and enable savings in the long term.

NTT DATA manages the security for all the sensors as well as CILE's connection to LoRaWAN. The way the sensors are provisioned guarantees that they are secure, with end-to-end encryption between the devices and the monitoring systems.

Outcomes

Smart water monitoring ensures a sustainable future

The smart network connects IoT devices which produce data that allows CILE to improve water management by detecting problems in the pipelines and accurately and automatically monitoring water use. CILE can also now expand their business by offering new services.

Conserving water

Accurate information on the water in the system, water leaks and usage allows the company to pump only the water they need into the towers, instead of filling up the towers. Knowing what normal use looks like also allows CILE to see when water is being used when use is restricted, for example, when a customer fills a swimming pool.

More frequent and accurate billing

Knowing exactly how much water households, industries and large users are consuming enables CILE to automate billing and accurately invoice users according to the agreed schedule. Customers now know how much water they're using without resorting to estimates or manual checking.

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