AI-driven water consumption monitoring for commercial buildings

Gain new insights on the water consumption for better management

May 2023

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About Us

Shayp is a european tech company helping the commercial property management sector tap into new water consumption insights and become more sustainable thanks to a unique IoT & Cloud based SaaS water monitoring solution.

After 5 years of continuous R&D, with over 5000 sites equipped across 8 countries, we've developed the world's most advanced automated water efficiency reporting and anomaly detection capabilities that uses only water meter data.

10+ bn
Litres saved

€15M
Costs avoided

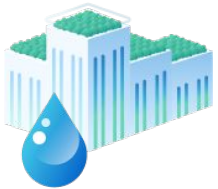
21.8%
Average savings

2000tn
CO2eq saved

50k+
Leaks detected

6000+
Buildings equipped

Leakages & anomalies are a daily challenge in commercial buildings



95%

of anomalies go
unnoticed or **unreported**
over long periods of time

>20%

of the total water usage
is avoidable with
targeted maintenance

High

Water damage is
the most frequent disaster
& insurance claim

... while ESG goals including water are a key objective

How much water does a leak represent?

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5 L/h

25 L/h

700 L/h

How it works?

AI enabled end-to-end water monitoring

BREEAM®

Earn up to 26 extra points

Connect the meters

Retrofit wireless
dataloggers on meters

or Connect the data

Smart meters
BMS, EMS

API

Let it do the work

Autonomous AI
24/7 all year

Gain insights

Easy reporting
& track savings

LEED GRESB The Green Key

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Examples of water meter situations in buildings

Exterior Manhole
under metal plates

Deep indoor

Basements

No electricity
No wifi
Remote
Extreme conditions
(humidity, temperature)

Collecting data on main meters and sub-meters

Cost effective and scalable remote water monitoring

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Data already collected?
We fetch the data

Honeywell

Itron

SIEMENS

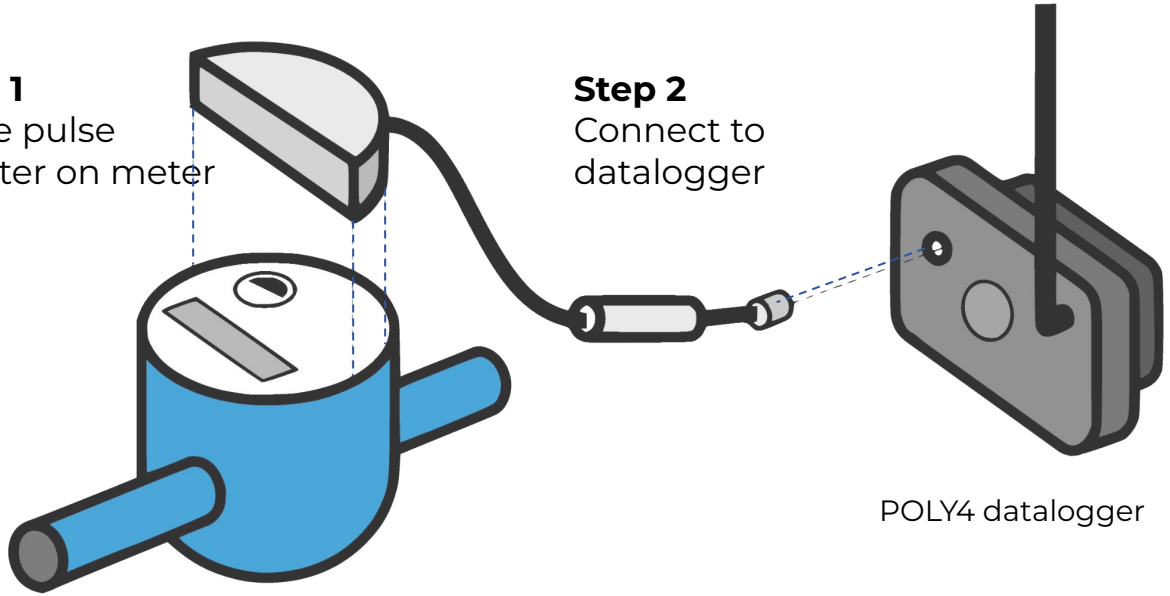
BACnet

OAUTH

Other...

Step 1
Place pulse emitter on meter

Step 2
Connect to datalogger



POLY4 datalogger

Pulse-ready meter

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Long life 12 years

Easy to install

HD High resolution

Deep indoor

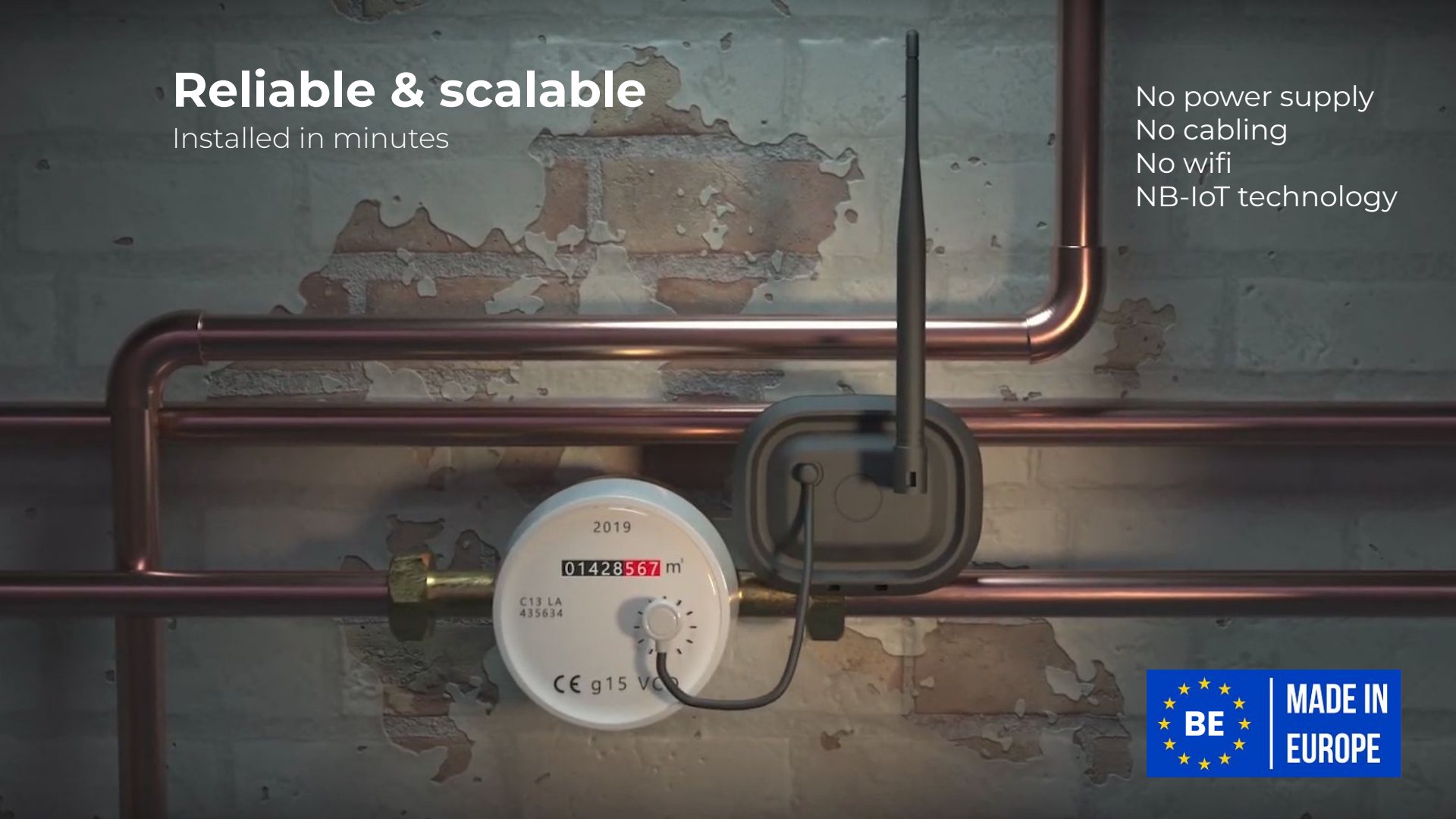
IP67

MADE IN EUROPE

Reliable & scalable

Installed in minutes

No power supply
No cabling
No wifi
NB-IoT technology



BE MADE IN EUROPE

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MIRAI

MIRAI : Machine Intelligence for smart and sustainable planning and operation of IoT and Edge

Certified B Corporation

MIRAI

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Industrial Demonstrator

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Macq

NOS Inovação

3E

ELiAR

Technology and Knowledge Provider

isep Instituto Superior de Engenharia do Porto

sirris

U.PORTO UNIVERSIDADE DO PORTO

BTH BLEKINGE INSTITUTE OF TECHNOLOGY

ENFORMA

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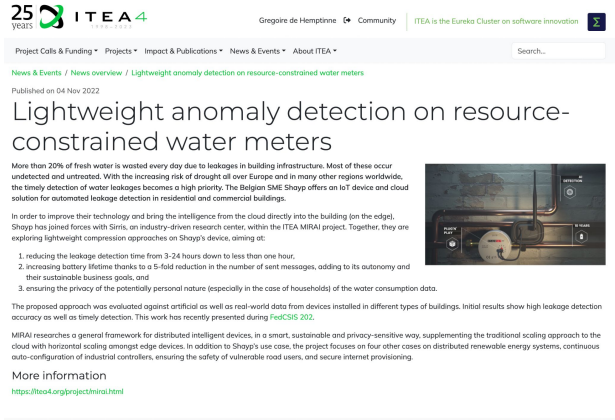
Main challenges of the research

- Increase speed of anomaly detection
- Increase battery life by sending fewer messages to the cloud to match lifetime of a water meter
- Keep data secure + provide data compression
- Bi-directional messages to update devices capability

Achievements

- Workshop on Edge computing & distributed AI @ DARE 2021
- Publication on compression-based anomaly detection
- Publication in ITEA4 newsletter the Shayp use-case:
  - Lightweight anomaly detection on resource-constrained water meters
- Participation to EFECS 2022
- Assessment of security posture



25 years ITEA 4

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News & Events / News overview / Lightweight anomaly detection on resource-constrained water meters

Published on 04 Nov 2022

Lightweight anomaly detection on resource-constrained water meters

More than 20% of fresh water is wasted every day due to leakages in building infrastructure. Most of these occur undetected and untreated. With the increasing risk of drought all over Europe and in many other regions worldwide, the timely detection of water leakages becomes a high priority. The Belgian SME Shayp offers an IoT device and cloud solution for automated leakage detection in residential and commercial buildings.

In order to improve their technology and bring the intelligence from the cloud directly into the building (on the edge), Shayp has joined forces with Sirris, an industry-driven research center, within the ITEA MIRAI project. Together, they are exploring lightweight compression approaches on Shayp's device, aiming at:

1. reducing the leakage detection time from 3-24 hours down to less than one hour,
2. increasing battery lifetime thanks to a 5-fold reduction in the number of sent messages, adding to its autonomy and their sustainable business goals, and
3. ensuring the privacy of the potentially personal nature (especially in the case of households) of the water consumption data.

The proposed approach was evaluated against artificial as well as real-world data from devices installed in different types of buildings. Initial results show high leakage detection accuracy as well as timely detection. This work has recently presented during FedCSIS 202.

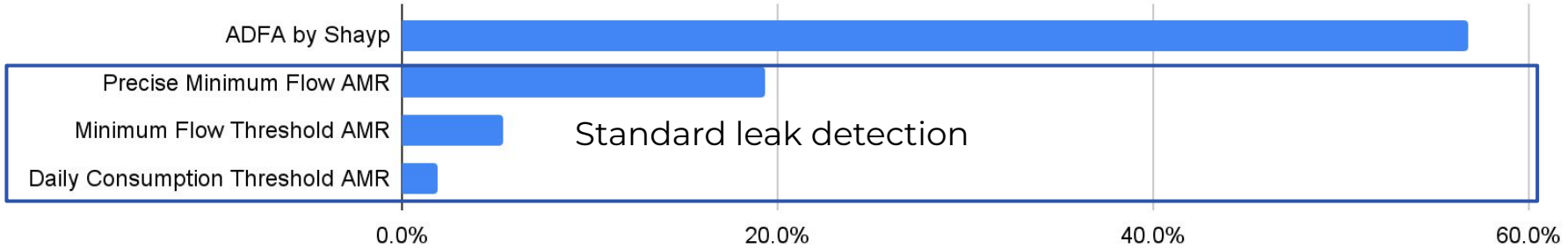
MIRAI researches a general framework for distributed intelligent devices, in a smart, sustainable and privacy-sensitive way, supplementing the traditional scaling approach to the cloud with horizontal scaling amongst edge devices. In addition to Shayp's use case, the project focuses on four other cases on distributed renewable energy systems, continuous auto-configuration of industrial controllers, ensuring the safety of vulnerable road users, and secure internet provisioning.

More information

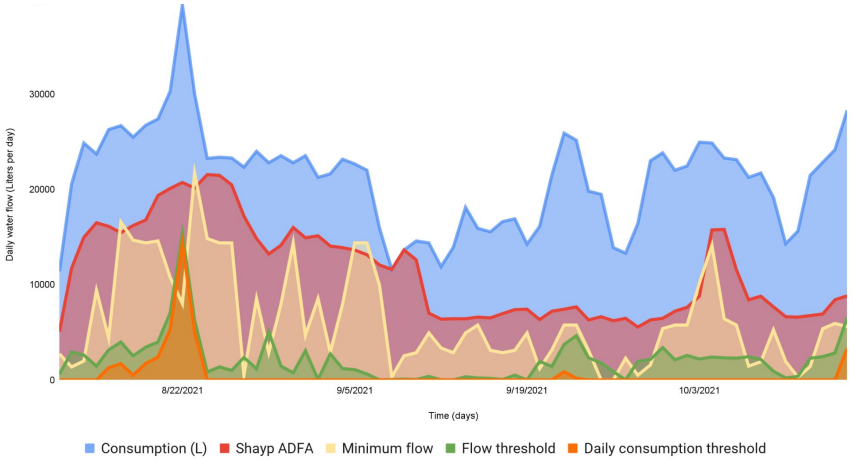
https://itea4.org/project/mirai.html

Results so far

ADFA detects up to 30 times more water loss with 98,7% accuracy



- Battery performance: Lab tests show
  - 40+ year through extrapolation
  - 34 year through testing
- Anomaly detection capability
  - Time to detect : 1 hour
  - Accuracy >99% true positives



Results and next challenges

- Evaluation of risk-aware messaging with respect to leakage detection and battery draining in real-world installation
- Adaptive, time-dependent and building-dependent risk thresholding
- Secure bidirectional communication

Learnings

- **Pros**
  - Get talent where it is
  - It can deliver concrete results
  - Aligns interest of technological partners & industrial partners
- **Cons**
  - Application & reporting require some involvement
  - Project management time should not be underestimated


10 billion
litres of water saved so far
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Shayp the future of water
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reach out to greg@shayp.com