

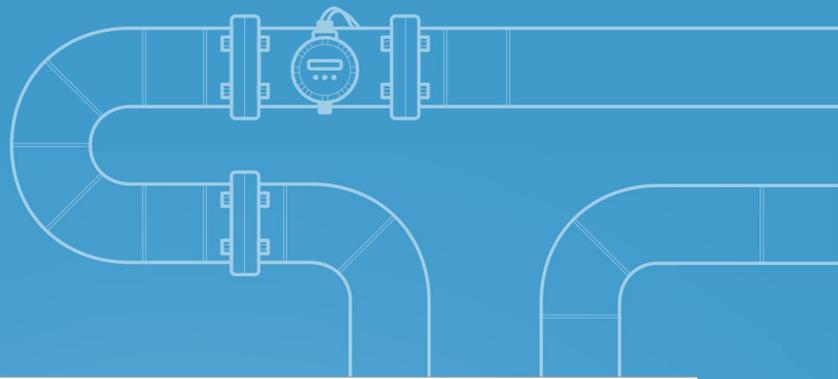


Future Processing

CASE STUDY

 **SmartFlow**





CONTENTS

1. CHALLENGES	2
2. THE SOLUTION	3
3. MPWIK WROCLAW	3
4. IMPLEMENTATION OF SMARTFLOW AT MPWIK WROCLAW IN NUMBERS	3
5. IMPLEMENTED DIAGNOSIS METHOD	6
6. EFFECTS OF THE COOPERATION	6

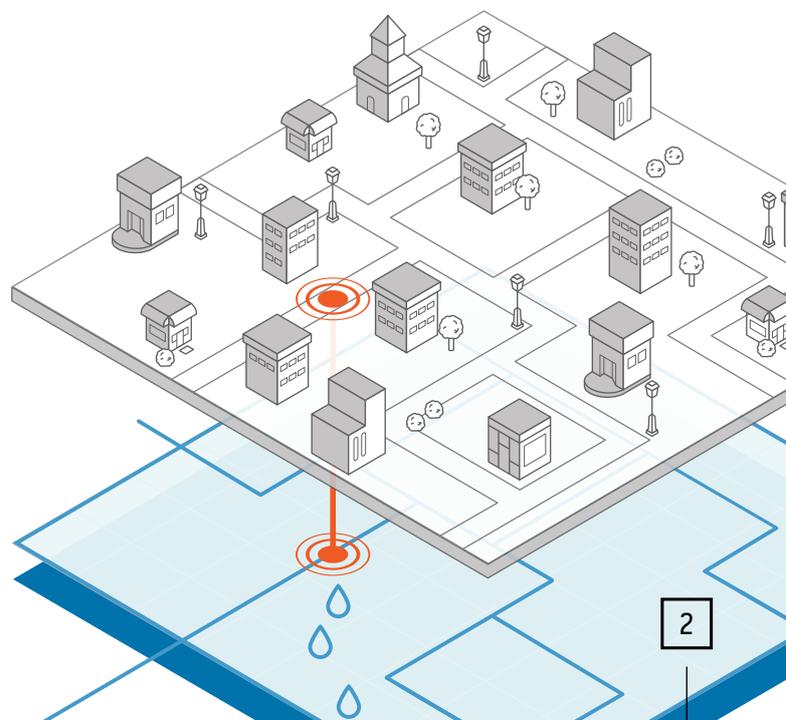
CHALLENGES

Did you know that Poland may soon become the desert of Europe? We have lakes, rivers, and access to sea, however, not all of this water is potable. Nowadays, Poland holds the last place in the continental clean water ranking, due to its scarcity of purifiable water. This may lead to hydrological drought.

Obsolete plumbing, irregularities in water supplies, hidden leaks, illegal water drawing – all of these result in cost increases.

In the last 14 years, the cost of water usage increased by 145% These costs are borne mostly by the water supply enterprises which then pass the costs onto consumers.

In cooperation with MPWiK Wrocław and Microsoft, we came up with a solution that can help waterworks enterprises manage their water resources in a more eco-friendly, effective, and economical way.



THE SOLUTION

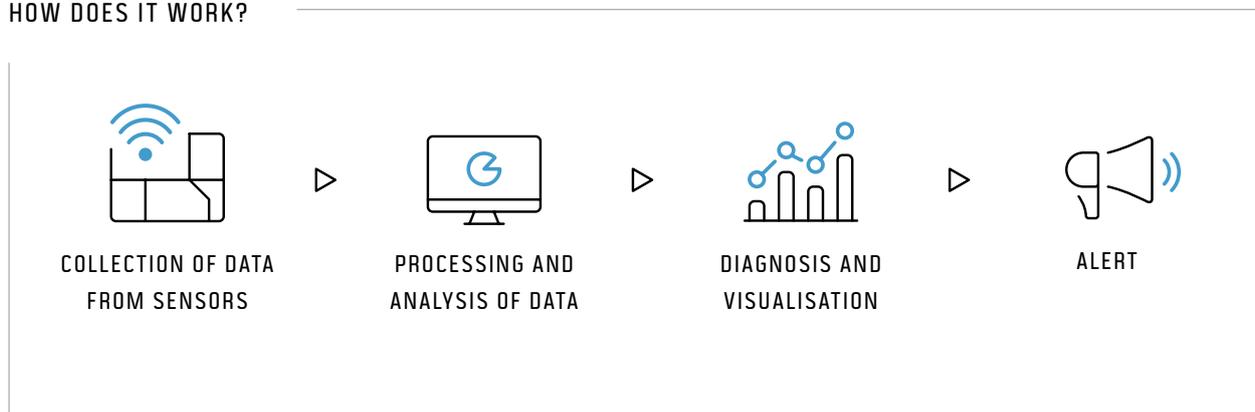
SmartFlow is a system used for monitoring waterworks infrastructure parameters. It is based on sensors built into the waterworks around the city.

The sensors collect and transmit real-time information about water distribution which is then analysed and processed by the system. In case of any anomalies, location of the fault is visualised on the map of the city, making it easier for the engineers to locate and repair the fault. The system effectively tackles the problem of hidden leakages which means that if failures occur, they are attended to quickly and no longer generate major losses.

SmartFlow is a unique system which:

- visualises the water supply network of the entire city, collecting data on water flow and analysing it according to the predefined norms of parameters, which are examined daily
- monitors the data gathered from measuring devices, which is later examined paying special attention to potential changes in the flow
- informs about anomalies that often occur in the water supply network (including the so-called hidden leakages)

HOW DOES IT WORK?



MPWiK WROCLAW

MPWiK Wrocław is the municipal water supplier for the Wrocław agglomeration. It is in the top 5 biggest water supply enterprises in Poland.

It is a perfect example of harmonious combination of centuries of tradition with dynamic development based on innovation and implementation of modern technologies. MPWiK conducts an ongoing monitoring of the carbon footprint and carries out projects that eliminate harmful influence of their enterprise on the environment.

The company, as a responsible entrepreneur, cooperates closely with universities and international research facilities in the field of environment protection. The nature of their business enables them to support the most talented graduates of technical, science and economics universities in their career paths.



MPWiK successfully implements its educational mission through multimedia **Centre of Environmental Education HYDROPOLIS**, which is solely devoted to water-related issues. Additionally, for a few years now it has been engaged in taking care of the cultural heritage and industrial architecture for the local community.

IMPLEMENTATION OF SMARTFLOW AT MPWiK WROCLAW

In 2014, Wroclaw noted a water loss of 24%. Thanks to the introduced modernisations and implementation of SmartFlow these losses decreased to 15%. As a result, the enterprise saved 500 million litres of water in 2016 alone.

IMPLEMENTATION OF SMARTFLOW AT MPWiK WROCLAW IN NUMBERS:

80%

OF WROCLAW'S AREA IS COVERED BY SMARTFLOW

70

FLOWMETERS

10 MINUTES

BETWEEN FLOWMETERS READINGS

1/24 H

THE DATA IS SENT ONCE A DAY

10 080

READINGS A DAY

9

PARAMETERS FOR ANALYSIS

- The pressure
- Counter status in either direction
- The velocity of the flow in either direction
- The speed of the flow in either direction
- The temperature
- The battery voltage
- The quality of water
- It can also monitor:
 - The quality of water
 - The work of pumping stations and hydrophones
 - Other crucial infrastructure points in detail

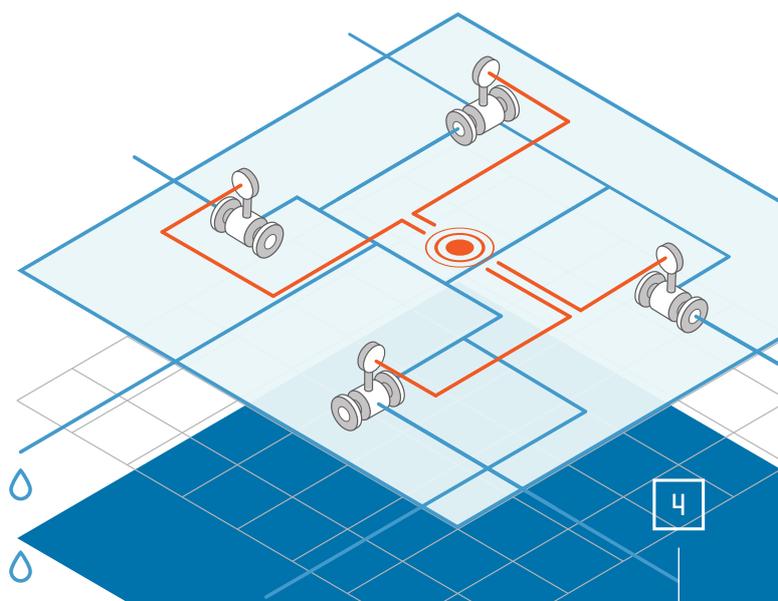
An eco-friendly approach and intelligent management of resources is the integral part of Wroclaw's city policy. For this reason, SmartFlow's trial run took place at MPWiK Wroclaw. Thanks to the cooperation of Future Processing, MPWiK Wroclaw and Microsoft, it was possible to work out tools suited to specific needs of Wroclaw and its citizens.

As part of the cooperation, during the implementation of SmartFlow at MPWiK Wroclaw, we worked closely on diagnosing the needs of the city. In order to meet them all, we organised a cycle of courses, during which experts from MPWiK Wroclaw shared their domain knowledge to let our modern technology specialists propose the best tools that would cater to the very specific needs of Wroclaw's waterworks and aid them in their daily work. Microsoft's experts supported us in the Azure platform which is the primary technology of SmartFlow – the most innovative water supply monitoring system in Poland.

SmartFlow was created in stages. At the beginning, we carried out an audit at MPWiK Wroclaw, analysing their IT systems, infrastructure with its specifics, and business processes. We found out that before the implementation

of SmartFlow, MPWiK Wroclaw's analysts had to manually record minimal night flow readings and carry out the analysis of data according to International Water Association's (IWA) methodology, without being able to compare them with historic data. Due to that fact, anomalies which could be symptoms of failures, were often missed.

After the analysis of information gathered, we prepared an offer for a trial run of SmartFlow and its implementation was suited to MPWiK's technical and business needs.



SMARTFLOW IN WROCLAW IS FOCUSED ON 4 MAIN ASPECTS

1. BALANCING OF DMA (DISTRICT METERED AREA) ZONES

Waterworks' area has been divided into zones which allow for much better grid monitoring and detection of anomalies. Flow meters are implemented at the entrance and exit of each of these zones. Water balance includes comparing of inflows and outflows of water (the actual usage) considering the sales of water in the zone. Thanks to that information, is the amounts of water lost in each zone are known.

As part of balancing of DMAs, we can distinguish the following indicators:

- **UARL** – Unavoidable Annual Real Losses
 - Indicator estimates the minimal losses that may occur depending on the conditions of the infrastructure. Achieving a lower level of losses is rarely possible.
 - The indicator is indispensable to determine the ILI indicator.
- **ILI** – Infrastructure Leakage Index
 - A universally used indicator, especially in the analysis of water supply's state.
 - The indicator is calculated from current losses (CARL) and unavoidable losses (UARL).
 - ILI is determined for each zone and the entire enterprise.

2. THE ANALYSIS OF MINIMAL NIGHT FLOWS IN A ZONE

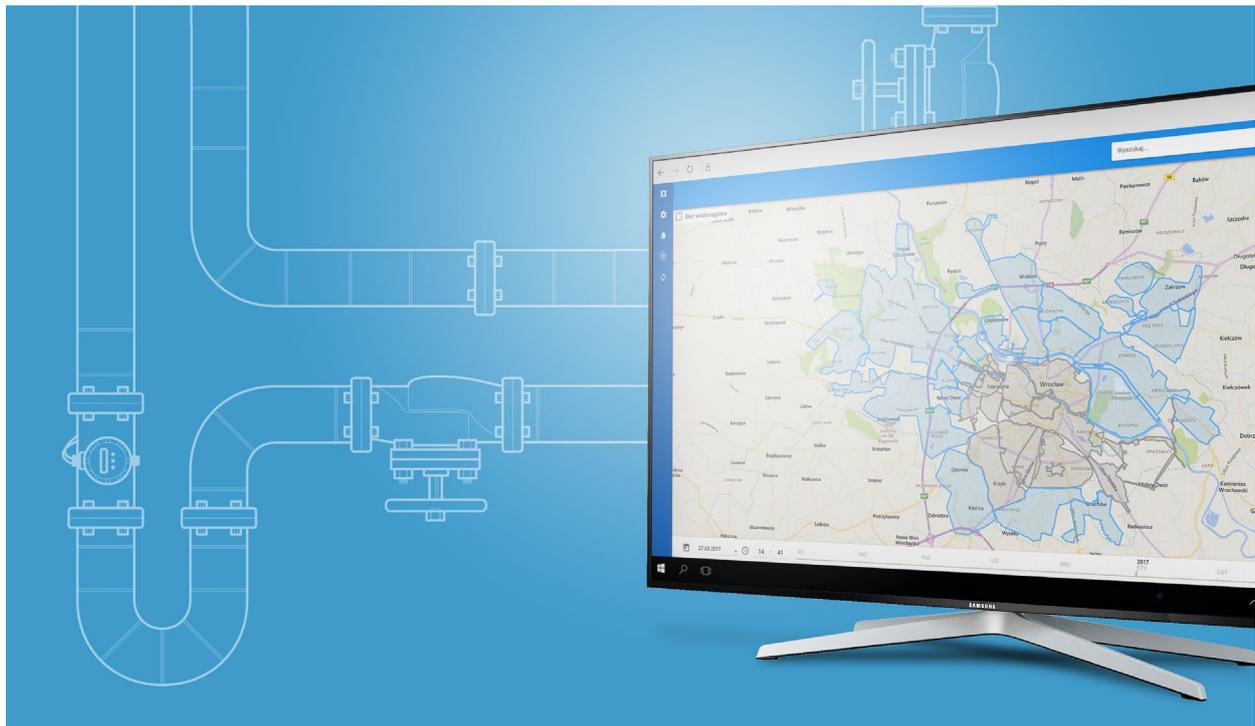
The implementation of SmartFlow at MPWiK Wrocław measures water flow between 1 and 5 AM. Based on that analysis, anomalies are the easiest to detect because at these hours water usage is at its lowest, so any increases are easily noticeable. SmartFlow analyses particular nights and selects the minimal value of the entire month.

3. MONITORING OF MEASUREMENT POINTS

SmartFlow also monitors each of the measurement points in Wrocław and measures the parameters like flow (volume, velocity and intensity), pressure and temperature.

4. VARIOUS WAYS OF DETECTING ANOMALIES

SmartFlow analyses weekly increases and decreases in water usage and verifies the minimal night flow with monthly reference. It is customised for each zone to differentiate the alert thresholds in each zone. SmartFlow also detects drops in pressure and informs about low change in batteries used in measuring devices, which is extremely important in monitoring of larger parts of the grid.



IMPLEMENTED DIAGNOSIS METHOD

Wrocław has been divided into **District Metered Areas (DMAs)**. These defined fragments of the network are equipped with remote measurement devices, which provide the system with data. DMAs are balanced using International Water Association's (IWA) methodology, based on the information coming from zonal flow meters and water meters.

IWA is an international association setting standards and good practices in sustainable water management. It provides a set of indicators which allow to assess the water supply system and occurring water losses.

EFFECTS OF THE COOPERATION

9%

reduction in water loss in Wrocław after modernisation and implementation of SmartFlow

72h

thanks to SmartFlow the **detection of anomalies shortened from 180 days to 3 days** and localising hidden leakages is much easier

500 mln

almost half a billion **litres of water were saved** in Wrocław in 2016 alone

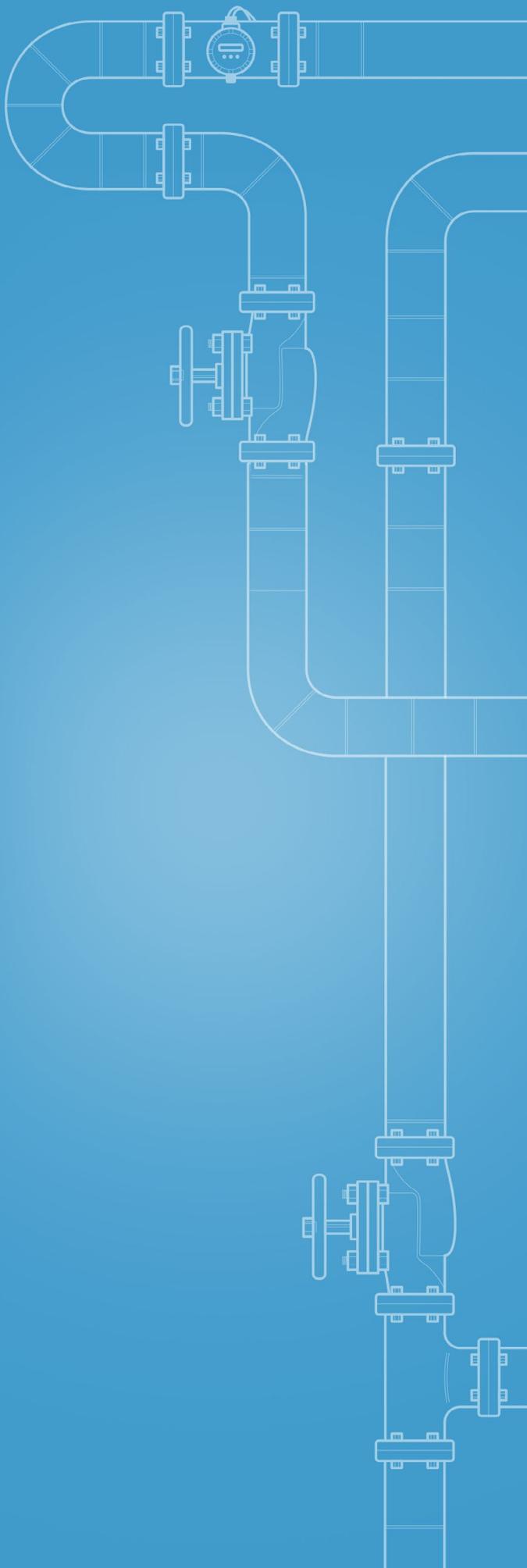
				
FASTER REACTION TIME TO DAMAGES	WATER SAVING	INTELLIGENT AND ECOLOGICAL MANAGEMENT OF WATER SUPPLIES	EASIER AND QUICKER ANALYSIS OF DATA	BETTER WATERWORKS MANAGEMENT

 *Application in easy and transparent way allows to monitor waterworks infrastructure parameters. Notification system, with use of customized warnings and alerts, indicates dispatchers the corresponding DMAs and flowmeters with found abnormalities. It gives waterworks service the ability to react quicker and more precisely to potential leakage or unauthorised consumption.*

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READ MORE ABOUT SMARTFLOW WWW.SMART-FLOW.EU ▶



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