A high-speed, close-up photograph of water splashing, creating a dynamic and textured blue background with many bubbles and droplets.

Bentley OpenFlows:

radically rethinking
the water industry

Bentley OpenFlows has the power to transform water utility companies into engines of water sustainability and efficiency—by surfacing actionable data that boosts performance and resilience.

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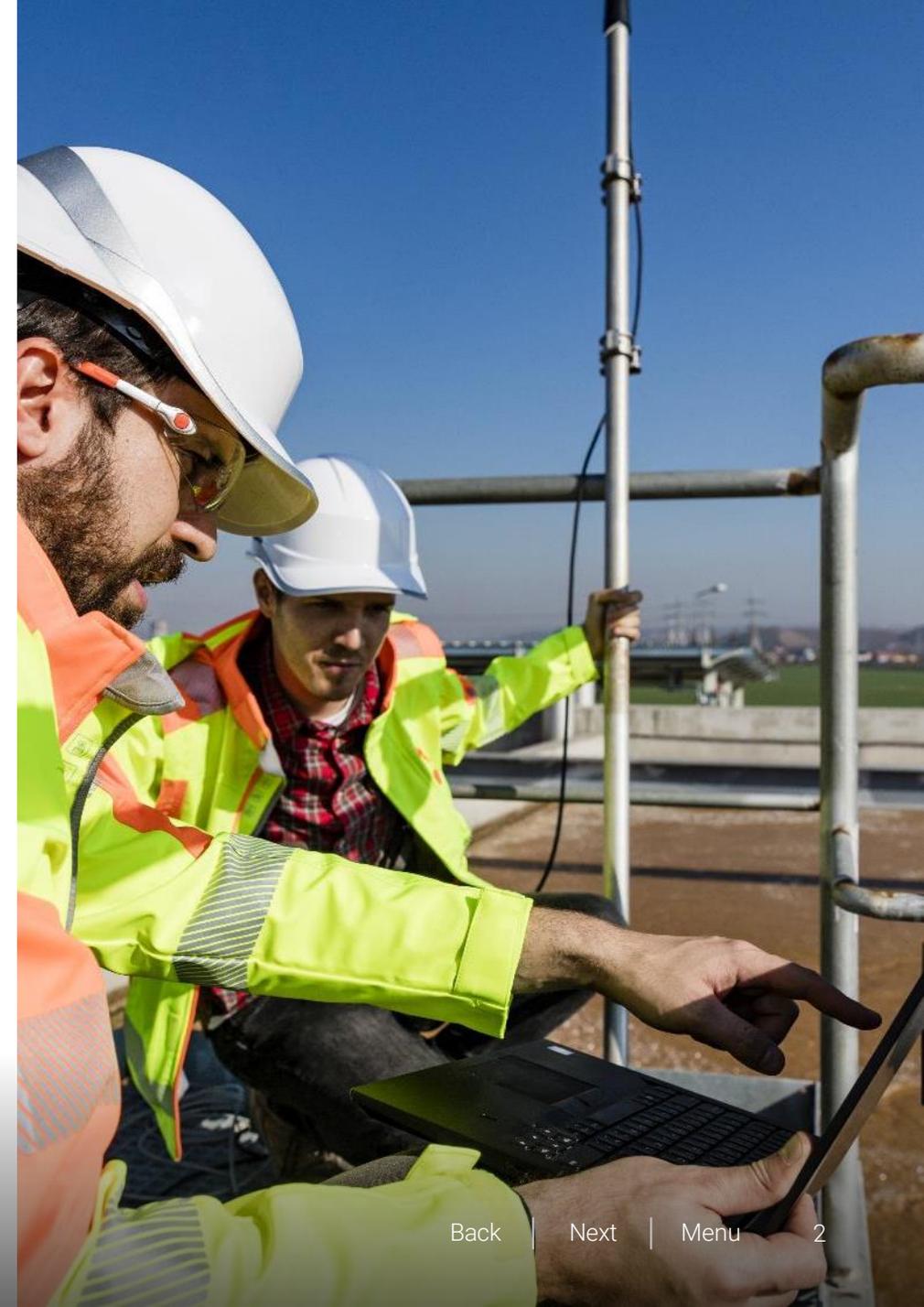
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Water: every drop matters

Water systems in cities and municipalities are urban lifelines. Utilities are responsible for delivering potable water to customers, collecting and treating wastewater, and managing the capture and impacts of stormwater runoff. Every day, they make critical decisions about their infrastructure to ensure the health and safety of the people they serve—as well as the environment around them.

It's not an easy task. Water utilities are responsible for a complicated system of buried infrastructure like pipes and valves along with treatment and storage facilities, pumps, and outfalls. Many components were put into place decades ago; some—particularly collection systems—are well over a century old. In addition to basic maintenance, these systems often need to be modernized, replaced, or expanded to meet growing population booms in urban areas—but without any interruption in service. As it is, most utilities simply aren't equipped to fix issues before something breaks. And that's not even counting the slow trickle of water loss from leaking pipes, which adds up to a global figure of 126 billion cubic meters per year—and a whopping one third of total water volume.¹

In recent years, many utilities have started using sensors for remote monitoring and maintenance. It's a fantastic first step. But to be effective in the long term, the vast amounts of data being collected need to be broken out of their silos—and used for predictive maintenance and what-if scenarios.



40%

World population affected by water scarcity²



1 in 4

People will live in a country affected by chronic or recurring freshwater shortages by 2050³



2M tons

Sewage and industrial / agricultural waste discharged into the world's water daily⁴

¹<https://waponline.com/ws/article/19/3/831/41417/Quantifying-the-global-non-revenue-water-problem>

²<https://www.worldvision.org/clean-water-news-stories/global-water-crisis-facts>

³<https://www.worldvision.org/clean-water-news-stories/global-water-crisis-facts>

⁴<http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/facts-and-figures/all-facts-wwdr3/fact-15-water-pollution/>

Bentley OpenFlows aggregates and analyzes your data

Bentley OpenFlows is a software suite that enables utilities and municipalities to plan, design, and operate water systems of any complexity. It combines real-time intelligence from sensor data with spatial analytics and numerical modeling capabilities, so you get visibility and insights that make it simpler to optimize real-world outcomes.

Here's how it works: OpenFlows includes a variety of packaged solutions that can be applied to your water, wastewater, and stormwater systems. Now you can see and analyze detailed information, so you can simulate and forecast water distribution, sanitary and combined sewer flows, assess and mitigate flood risks and more. And with OpenFlows, you can create and customize a digital twin—that is, a digital representation of physical assets, processes, and systems—so you can give your entire organization a single view of truth and place the best and most timely information into the hands of your decision makers.

- Modeling solutions for flood assessment
- Detailed data about urban water supply and distribution
- Wastewater treatment and conveyance support
- Sanitary sewer modeling and design
- Identification of anomalies and problem areas
- Advanced tools for stormwater solutions
- Analysis and design for retention areas
- A detailed look into hydraulic elements



The road to Net Zero

Utilities and municipalities are critical in solving the challenge of water stress, but they are also actively working toward a larger mandate of decarbonization and climate neutrality. OpenFlows actively supports the [U.N.'s water-related sustainable development goals](#).

For instance, OpenFlows enables remote monitoring and analysis of water systems, reducing the need for many on-site visits and associated fuel and labor costs. It also focuses on predictive maintenance, which extends the lifecycle of the infrastructure and, in turn, reduces the resources required to keep it running. OpenFlows can also help uncover areas of improvement—such as using less energy in water pumps or wastewater treatment and identifying areas of pipe friction that contribute to inefficient energy use in the distribution system.

Bentley OpenFlows connects all your water systems into a single view

Utilities that make effective and informed decisions are data-driven, with all system information monitored and connected. When you create a digital twin with OpenFlows, you'll be able to uncover critical information throughout your entire water system by seeing a full representation of all connected systems. Because digital twins can be used at different scales, you can monitor everything: pipes, pumps, valves, subsystems, treatment plants, and more.

For a water utility, a digital twin can be continuously updated with virtual operational data from supervisory control and data acquisition (SCADA) systems, sensors, meters, and other measured sources, creating a real-time model that can be used in operations.

Make better real-time decisions by connecting the interrelated assets that make up your water distribution, sewer collection, or stormwater network.

Eliminate the data silos that hamper progress and gain visibility across all your data sources.

Analyze system resiliency with a hydraulic/water quality model to simulate events like pipe failures, power outages, fires, and contamination.

Support risk-based strategic lifecycle management by using data from your existing work and asset management systems—even other enterprise systems.

Determine locations of potential leaks and reduce water loss with continuously updated measured operational data helps a utility determine the location of potential leaks as well as reduce water loss.

Analyze system properties that can't be directly measured with the ability to integrate hydraulic models with SCADA data—like pipeline breakages.

Examine many kinds of what-if scenarios to simulate and test how your systems could be improved.

OpenFlows solves the challenge of analyzing Big Data in the water industry

Most utilities are collecting data in unprecedented volumes but still struggle to use that data to support better decisions—often because it resides in disconnected IT solutions, spreadsheets, and paper records. OpenFlows enables you to collect all your data and turn it into actionable insight. The result is an intelligent, connected digital twin that supports planning, design, construction, and operations for smart water networks. These smart water networks are good for cities, good for people—and good for the environment.

Use case:

Leaks and reducing non-revenue water

Situation

Non-revenue water refers to water that has been “produced”—that is, treated—but is lost before it reaches the customer. It represents a huge loss not just in terms of cost, but also in environmental impact. Addressing non-revenue water has traditionally been a large challenge; with underground water distribution systems that can be vast, leaks—one of the primary sources of loss—are largely undetectable.

Solution

With OpenFlows, you can analyze system properties that cannot be directly measured. For instance, you can compare overall production against metering data to estimate how much water was lost, both in quantity and percentage. With automated evaluation of nightly minimum flows, you can also identify the location and quantity of non-revenue water—and you can do it for individual zones or the entire network.

Benefits



Conserve

water by pinpointing areas of waste.



Reduce

overall costs with the ability to account for where treated water goes.



Identify

areas of concern and prioritize areas that need to be fixed or upgraded.



Improve

energy efficiency by taking advantage of real-time analyses of each pump and tank, with alerts that tell you when performance and service require attention.



Use case:

Stormwater and wastewater

Situation

Many municipalities are still grappling with areas fitted with combined sewers, in which rainwater, domestic sewage and industrial wastewater collect into one pipe. Normally, all this water is shuttled to sewage treatment plants where it is processed and then returned to local water bodies. But when there is too much water—heavy rains, for instance—untreated water overflows and pollutes nearby streams, rivers, lakes, and oceans.

Solution

The OpenFlows suite of products includes a robust set of solutions for sewer and stormwater systems. Currently used by thousands of municipalities, utilities, and engineering firms around the world, OpenFlows makes it easier to design, analyze, and plan wastewater and stormwater collection systems based on real-time data and data modeling.

Benefits



See everything

in stormwater and wastewater systems, for a better understanding of both and how they interact.



Detect

system bottlenecks, improve capacity and limit flooding more easily with detailed data.



Model

a wide range of data, from rainfall and runoff to backwater effects for future infrastructure planning.

Use case:

Faster response times to water-related emergencies

Situation

To keep citizens safe, it's critical to respond to water-related emergencies quickly. While most utilities have emergency plans in place, they are often focused around ensuring response after a disaster has occurred—instead of being able to address those emergencies proactively. Furthermore, utilities are not always connected to other entities, such as fire departments, police departments, and medical response teams.

Solution

OpenFlows solutions surface a wide variety of data across all water systems—and can also be used to understand and mitigate flood risks in urban, river, and coastal areas. By integrating with other OpenFlows products, utilities can get a complete view of all systems from one location, run detailed what-if scenarios—and easily share that information with other agencies.

Benefits



Stay up to date

on current conditions with regular reporting and alerting—and respond to alerts in real-time.



Simulate

all hydrological and hydraulic processes that occur in river basins—including rainfall, infiltration, surface runoff, channel flow, and groundwater flow—and how these interact with engineered collection systems.



Connect

with other municipal departments and agencies to mobilize response teams proactively, armed with accurate and timely data.

Bentley and Microsoft: powering better water systems

Water management matters. And when you choose a water solution from Bentley and Microsoft for your utility or municipality, you're getting the full power of two companies that are dedicated to better business processes that serve the public good.

Bentley®

Four decades serving the water industry

A deep knowledge on how technology can streamline operations, reduce costs, improve water use, and conserve energy

Expertise on collecting electronic data and then using it to unlock data silos for full visibility into operations

Microsoft

The cloud building blocks to securely connect, monitor, authenticate, and aggregate data to see how you can improve your usage of natural resources

A flexible application model with a rich set of services, including SDKs, caching, messaging, and identity

The full weight of Microsoft security and privacy

A new global focus on sustainability

The U.K has committed to achieving net zero utility operations by 2030.⁵ The European Green Deal is dedicated to ensuring the EU will be climate neutral by 2050.⁶ And the U.S Environmental Protection Agency is actively promoting Net Zero Water, Net Zero Energy, and Net Zero Waste across all federal agencies and water utilities. Bentley and Microsoft are proud to support those efforts.

“Bentley Systems is an important Microsoft partner, helping government customers by delivering sustainable and flexible infrastructure solutions that solve critical business challenges. Together, we are committed to pushing the boundaries of digital transformation, to influence positive social change.”

Jeremy Goldberg

Worldwide Director of Critical Infrastructure,
Microsoft

5. <https://www.water.org.uk/routemap2030/>

6. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu_en

Take control of your water today

For more information, please visit:

Bentley:

www.bentley.com/en/goingdigital/water/going-digital-in-water-utilities

Microsoft:

www.microsoft.com/sustainability

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