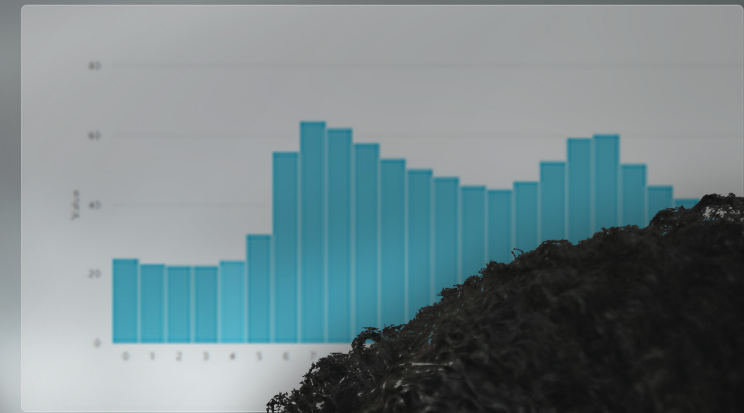




# Building a water data culture

How utilities can use operational analytics to turn data into decisions







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# Why data matters

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**“The fundamental objective in collecting, analyzing, and deploying data is to make better decisions.”**

McKinsey

“Data is the new oil.” You’ve no doubt heard this about the value of data. It’s easy to say that data is critical—but transforming data from stored bits and bytes into a vehicle for change and efficiency is the challenging part.

The water industry is a perfect example of this challenge. Water utilities, local councils, and supporting consulting companies have entered an era where vast amounts of data are produced from sensors that monitor water networks.

If accessed, configured, and analyzed in real time, this data helps water industry organizations create constantly evolving operational insights.

But data can do much more. It can foster greater integration between operations, engineering, and management teams. Pairing data with proactive system management and maintenance can uncover solutions for the complex challenges confronting the industry with a degree of execution and response previously beyond reach.





# Why does your water utility need a data culture?

Naturally, technology plays a key part in generating operational insights. It enables easy access to data and delivers advanced analytics for departmental needs. But a culture shift must occur if the tech is to be adopted and used regularly.

An established data culture, supported by effective change management, will help:

- A common data environment **enables the future of work** for disciplines of all types, whether it is engineers doing data analytics, or computer programmers automating an engineering workflow.
- Employees embrace the idea that all business decisions should be backed by data that's easily **sourced, managed, accessed, and communicated**.
- Workers **feel empowered to set technology standards** for their organizations that maximize the use of data for operations and capital planning.
- **People become catalysts for change** in their organizations by communicating the need for data management practices and adopting technology to support their needs.





**“Organizational culture can accelerate the application of analytics, amplify its power, and steer companies away from risky outcomes.”**

McKinsey





# The swell of data in the water industry

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Before diving into data culture, it's important to understand the data trends in the water industry. Data volume is accelerating; however, effective use is lagging.

Water utilities face pressure to operate efficiently and sustainably, while being responsible stewards of public and customer funds.

**“Digitalization and resilience now play two of the most profound roles in deciding the [water] sector’s direction, partly in response to the sector’s aging assets and the escalating worries about the effects of climate change.”**

Black & Veatch

A lack of interoperability between applications and the massive amount of collected information means that most of this data is barely glanced at—or worse, ignored altogether.





# Water industry data sources



Operational data  
(SCADA/historian)



Weather quality and climate  
change forecasts



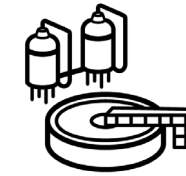
Geographic information  
system (GIS)



Field investigation  
reports



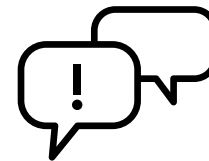
Hydraulic model  
simulation



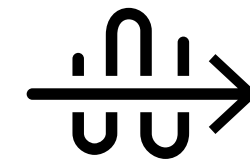
Water treatment,  
process simulation



Automated meter reading (AMR)  
and advanced metering  
infrastructure (AMI)



Customer data (complaints,  
usage, payments)



Standard operating  
procedures



# Technology barriers to data adoption

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Legacy data storage systems have stymied the water industry's desired data culture. The inefficient systems can't scale for growth of data and are not built to be transformed as business needs change.

For most utilities, the problem isn't a lack of data—it's unmanageable data, siloed data sets and teams, shortages of skills and tools, and the time to use tools effectively. Common barriers to data culture include:

- Siloed information that is incomplete, quickly outdated, and not shared across the organization.
- Standalone modeling and simulation tools that are not tied to operations or key performance indicators (KPIs).
- Generic analytics and business intelligence tools that are not designed for the water industry and require expensive customization to support water utilities.
- Digital transformation projects remain out of reach due to high cost and long timelines.
- Unreliable sensors and maintenance.







## Best practices for creating a water data culture

- 01 Encourage data-driven decision making
- 02 Improve accessibility to data
- 03 Influence internal culture with third-party resources
- 04 Invest in real-time data capture
- 05 Dedicate your data management to solving problems
- 06 Standardize with an operational data solution



## 01 | Encourage data-driven decision making

Employees need to understand the impact that data and its insights can have on their daily work—especially when that work demands rapid decision making. For example, operational analytics relies on data sets to prioritize resources and deploy accompanying action plans, such as critical infrastructure repairs.

Data collection acceleration is usually good for decision making—except when employees can't interpret the data quickly enough for decision making in the water utility environment. By the time live data sets and spreadsheets are manually combined and analyzed, the value of the data is greatly diminished.

**“In an effort to reduce operational costs and improve asset lifespans, water utilities are putting their data to work. But while smart water offers untold solutions, utilities are still working to understand how to gather, manage, and analyze this information in such a way that it can alleviate ongoing asset management challenges.”**

Water Online





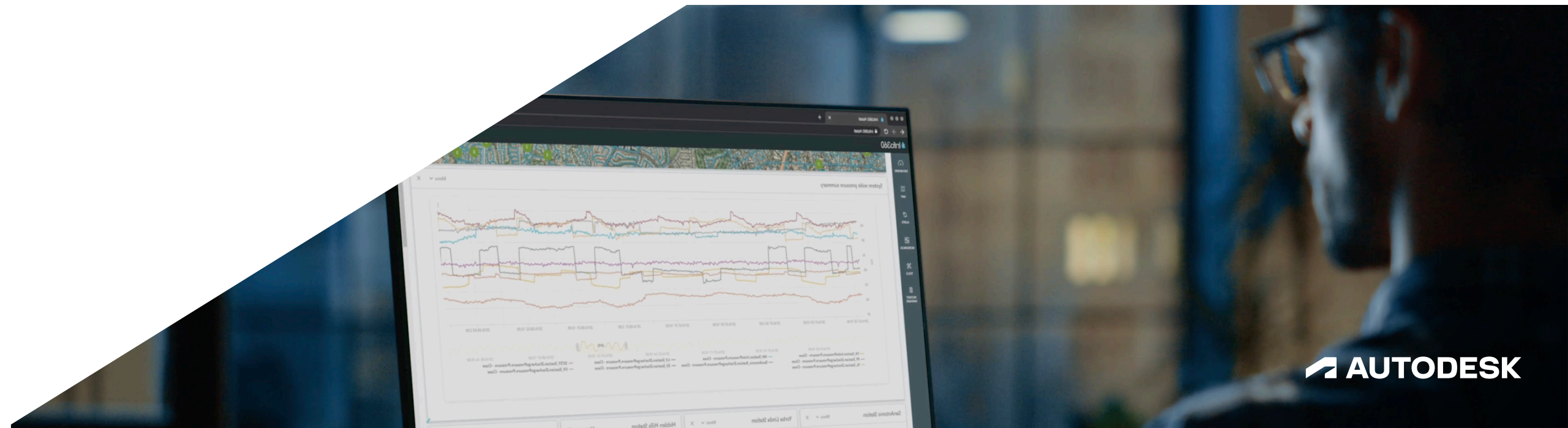
## 02 | Improve accessibility to data

Data must be shared if it is to be valuable and deliver insights. When data is made accessible and converted into actionable intelligence, utility employees gain access to highly useful tools such as advanced data analytics that use artificial intelligence. Data analytics systems include machine-learning-based pattern recognition, as well as simulation of a network using digital twins.

When water organizations share numerous data sets from multiple sources, there's high potential for integration between operations, response teams, planning, and management.

If employees across all departments can access live data, then many more staff will be monitoring water, sewerage, and drainage networks.

For example, intuitive dashboards can provide visibility on KPIs at a relatively low cost. In order to realize these benefits, utilities need a solid foundation of data collection, as well as broad institutional acceptance of new projects as they move beyond the pilot stage.





## CASE STUDY

# Bristol Water

Bristol Water has provided clean, fresh drinking water to its customers since 1846. Today, Bristol Water serves over 1 million people in the city of Bristol and surrounding areas in the west of England. As part of its business plan, Bristol Water undertook its largest-ever program of customer engagement by inviting customers to participate in the decisions made about the future of its water services.

The project team coupled data from periodic random water quality samples that were sent for analysis with the last five years of customer complaints about discolored water. They were then able to carry out a detailed analysis of their network dataset using Autodesk's InfoWorks WS Pro to target investments in the areas that would provide the greatest benefit to their customers.

Bristol Water's transparent, evidence-based approach to data analysis resulted in an increase in customer satisfaction and improved water quality. The use of water technology solutions underpinned decisions that affected not just the network, but ultimately the lives of customers and the community served by Bristol Water.

[Full case study >](#)



## 03 | Influence internal culture with third-party resources

If your utility lacks resources, internal expertise, and experience to gain a deeper understanding of its network, an external consulting company can collaborate with an internal engineering services team. This is a smart and efficient way to combine local knowledge with outsourced expertise.

Early successes with data insights help create data culture champions among employees. These on-the-ground successes will accelerate, leading to successful execution of the water organization's vision for a data culture.

An operational intelligence analytics software system will also help foster a data culture and deliver operational insights. These platforms allow for detailed analyses to be applied, saved, standardized, and reused across the organization. All departments can continually pursue innovation and integrate their latest data science and artificial intelligence techniques for system event management and leakage analysis.





## CASE STUDY

# Stantec and Wellington Water

Stantec is a global professional services company with 17 New Zealand offices, and a skilled water team assisting with issues such as equipment modernization and optimization. New Zealand Stantec mechanical engineers like James Curtis have been consulting on an overall pump modernization project with Wellington Water, which manages the drinking water, wastewater, and stormwater services near Wellington, New Zealand.

“Optimization is a common project for our clients,” Curtis explains. “When you optimize the pumps, you benefit from peak efficiency. And by achieving peak efficiency, you also achieve 100% of your asset life.” Given Wellington Water’s investment in pump infrastructure, realizing return on investment was critical. Curtis and his colleagues at Stantec trialed Info360 Insight from Autodesk to help Wellington Water develop a preventative asset maintenance program. With Info360 Insight, the utility could maximize its vast storehouse of raw SCADA data to better understand its operational performance.

The result: Wellington Water estimated they would experience 20% savings in electricity costs—plus lower maintenance costs and fewer field tests needed to assess pump condition.

[Full case study >](#)



## 04 | Invest in real-time data capture

Many newer technologies for water services will help organizations acquire masses of data. Smart, automated technologies—such as smart meters, SCADA system data, and automatic meter readers— provide water consumption metrics (authorized and unauthorized), variability in pressures across multiple zones, real-time asset performance, and much more.

As with all real-time data analytics, data streams have to be assessed for their quality, reliability, and suitability for the given metrics. Accordingly, all SCADA managers, data analysts, and engineers need to understand the availability of their data, frequency of data-dropouts, repeats, or other systematic anomalies.

Technology systems that monitor “sensor health”—that is, reliability and memory utilization of various sensors—can also measure data quality. The measurements ensure designers, operators, and maintainers of SCADA systems can be confident in the data they collect and provide for decision-making processes.

**In the 2022 Water Report from Black & Veatch, which surveyed water industry stakeholders, 68% of respondents said they were collecting “lots of data,” but only 27% believed they were maximizing that data effectively.**





## 05 | **Dedicate your data management to solving problems**

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**To optimize operations:** Once important KPIs have been identified and applied, the quality of the operational insights will be directly related to the data quality, which is paramount for actual insights. Streamline data access by combining sensor readings, lab results, network, and plant operational data. All the information your team needs should be securely sharable and accessible from anywhere, using a web browser.

**To optimize decision making:** With data-quality analysis in place and important KPIs created, the metrics about leakage, water balance and loss, pipe breaks, and storage that were previously calculated annually or quarterly can now be calculated on a sub-daily basis. This empowers water employees to see and act on near-real-time trends in key metrics, a capability that previously required time-consuming and labor-intensive efforts.

**To optimize solutions:** The timely availability of fresh data allows KPIs to be applied on a daily and potentially hourly basis, increasing opportunities for network analysis, event detection, and system performance analysis to detect problems faster and improve system maintenance. Employees will save time and effort while reducing the need for spreadsheet management, thanks to automated calculation and formatting tools typically built into data analytics platforms.

**“We identified a sensor that was down for six months, yet we’d been relying on it for pressure values to make decisions on our networks.”**

Large water council, Australia



## 06 | Standardize with an operational data solution

**Digital workspaces.** Employees can visualize, calculate, and inform colleagues about network performance based on the unique needs across the organization.

**Data modeling.** Instead of manual downloads and spreadsheets, employees can establish real-time direct connections with data, streamlining and standardizing their network performance calculations.

**Broad access to data analysis.** With a data platform, people in any role and with any skill set can plot data streams, or cross reference data against various locations—all in the context of their role within a workspace.

**Cloud access and sharing.** Cloud technology lets users combine sensor readings, lab results, and operational data with industry-specific metrics and KPIs displayed in personalized visualizations.

**Access to machine learning workflows.** Review the feasibility of applying Machine Learning (ML) technology for decision support intelligence for chemical use reduction, energy reduction, and ensuring water quality.





# Get from data to decisions, today

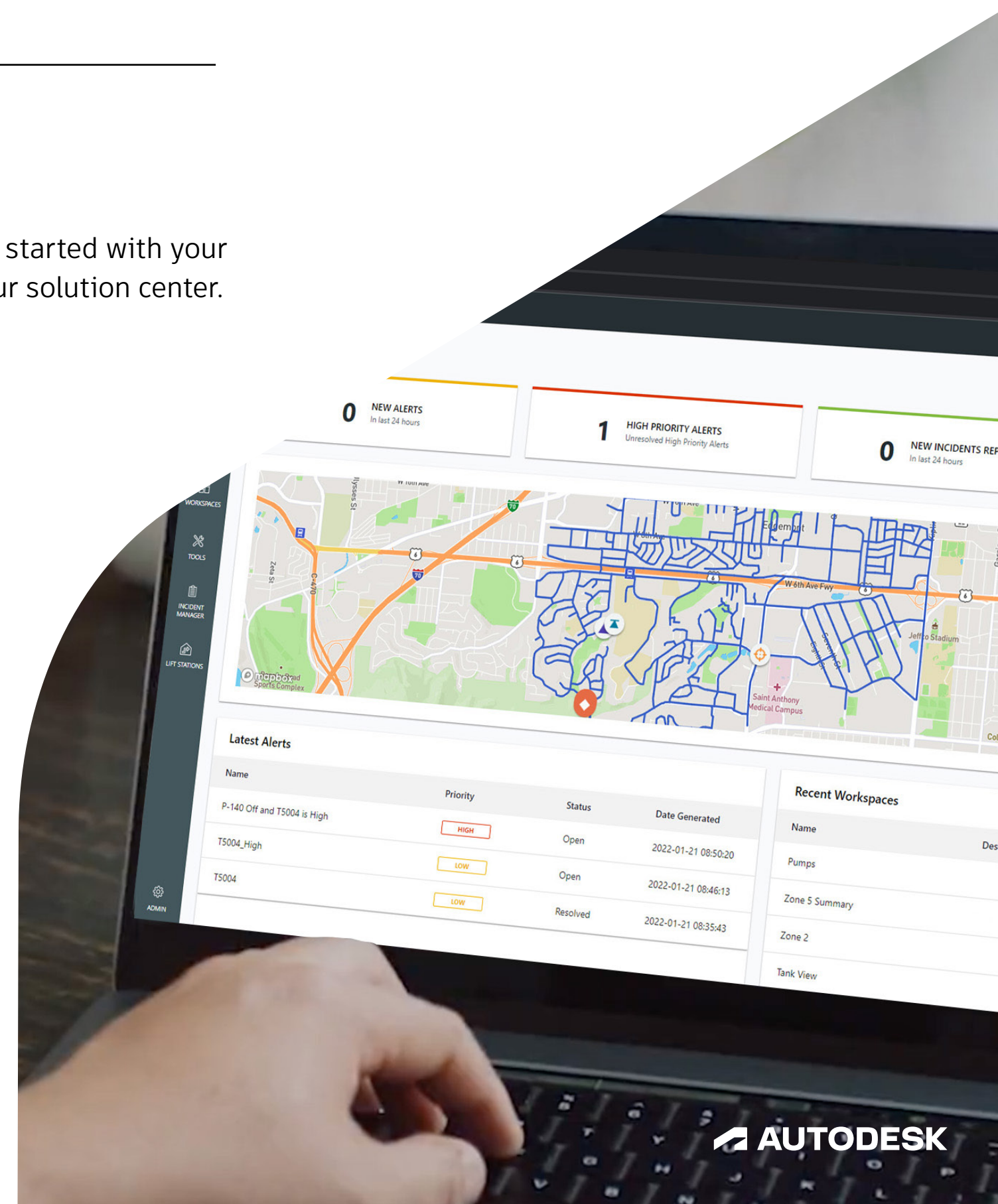
Operational analytics, artificial intelligence, and the application of machine-learning algorithms can now be part of every water utility's digital journey. With Info360 –the workflow cloud-based software system from Autodesk–water utility data can be a vital part of operational analytics from day one.

**Info360 Insight** is specifically tuned for the water industry's asset lifecycle, empowering water and wastewater utilities to understand operational performance with business intelligence, and quickly identify and resolve system incidents. Users can apply sophisticated analytics, modeling, and alerting tools to make operational information more accessible, reliable, and actionable.

## Ready to get started?

To learn more about getting started with your data transformation, visit our solution center.

[Learn more >](#)







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