Why Digital Twins Are Shaping the Water Utility Status Quo

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How to Participate Today

Open and close your control panel
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Note: Today’s presentation is being recorded and will be available shortly after today’s webcast
Smart Water Systems

Objectives and Challenges

Digital Twins for Water

Concepts and Applications

Solving Challenges

Changing the Status Quo with OpenFlows
“I want to have a **smart water** system to work with **big data** and the **IoT**”

What makes you smarter?
Every water utility has a clear mission…

To provide customers with:

- Safe
- Reliable
- Affordable

Water
Smart really means: Making Better **Decisions** for Better **Outcomes**

- **Smart Water Systems**
  - Objectives and Challenges

- **Digital Twins for Water**
  - Concepts and Applications

- **Solving Challenges**
  - Changing the Status Quo with OpenFlows
What is a Digital Twin?

A digital representation of physical assets, processes, or systems, as well as the information that allows us to understand and model its performance.

At Different Scales

Components | Subsystems | Entire Networks

Video courtesy of MCC CERI
Across Lifecycle Stages

Planning & Design  Construction  O&M

For Different People

Engineers  Operators  Stakeholders
Smart *really* means: Making Better Decisions for Better Outcomes
Real-World System  Real-World Outcome

Smart *really* means:
Making Better Decisions for Better Outcomes
Smart really means: Making Better Decisions for Better Outcomes
Real-World System → Sense Properties → DECIDE! → Take Action → Real-World Outcome

Understand the Current Situation → Consider Optional Actions

- Outcome
- Outcome
- Outcome

Creating and Maintaining Accurate Digital Twins

Applying Digital Twins to Solve Problems
Smart Water Systems

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Changing the Status Quo with OpenFlows

Interoperability across Enterprise Technologies

Hydraulic Model
GIS
SCADA
ERP/EAM
...

Connected Data Environment
Challenge: Data Overload

- Making sense of mountains of disparate data can be overwhelming
- Accessing ‘dark data’ is difficult

Challenge: System Complexity

- In the real-world, everything is connected…
  - Pipes, tanks, pumps, valves, controls, meters, SCADA, …
  - Weather, major events, demands, maintenance, …
- Engineers, operators, and others all need to make important decisions
Objective: Meet Standard Performance Levels

• Achieve minimum pressures
• Provide adequate water quality

Objective: Ensure Reliability

• Minimize the number and impact of disruptions
• Anticipate the impact of performing standard maintenance
• Determine which hydrants to open for effective flushing
Objective: Respond to Emergencies

- Pipe break
- Contamination
- Fire
- Unplanned outage

Digital Twins for Other Water Needs

- Master Planning
- Capital Planning
- Energy Management
- Non-Revenue Water Reduction
- ...
Smarter with Bentley Digital Twins

Enables water utilities to:
- Make better decisions on real-time events and emergencies
- Evaluate various what-if actions to best implement for faster & effective response
- Gain visibility into what is happening in between monitored locations for smarter decisions
- Automatically update and maintain dynamically calibrated models
- Plan and manage day-to-day operations
Real-time Business Intelligence Decision Support

Enables water utilities to:
- Make better decisions about real-time issues, then alert users (situational awareness)
- Monitor asset health (condition) and performance in real time
- Automatically create KPI reports and dashboards
- Instantly view Non-Revenue Water and perform water audits
- View and compare modeling results anywhere, anytime

Risk-Based Pipe Renewal & Capital Planning

Performed through:
- Automated Data Connections and Interoperability
- Objective, Data-Driven Predictive Learning and Failure Prediction
- Heuristic-based Risk Analysis and Scenarios
- Cross-Asset Planning
- Advanced Planning with Monetized Risk and Life-Cycle Cost Analysis
- Reach across departments with unified Reporting and PowerBI
One Digital Twin Model, Multiple Connected Applications

OpenFlows™
WaterOPS™

OpenFlows™
WaterSight™

OpenFlows™
WaterCAP™

The New Status Quo

• One Digital Twin Model, Multiple Connected Applications

Digital is all about data
Every digital activity has the following flow:

Collect Data

Store in Public Cloud

Apply Machine Learning or Advanced Analytical Methods

Create actionable insight

Support Decision Making leading to Value Creation
Thank You

For more information, please visit:
www.Bentley.com/OpenFlows