Smart Water Solutions for a Resilient Water Future

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Let’s talk about Smart Water

At Xylem, we’re leading the water industry’s migration to smart infrastructure...

Through strategic acquisitions and innovations centered on energy management and process optimization, Xylem has established itself as a leading provider of smart water solutions that address the industry’s most persistent challenges.

…and we’re committed to guiding water managers through this transition.

Xylem’s latest contribution to the global water dialogue is ‘The Smarter Water Manager - Smart Water Solutions for a Resilient Water Future’ – a tool to educate and support water managers in the transition to smart water.
Identify your challenges in your water and wastewater businesses
Learn about smart water solutions

A better understanding of Smart Water solutions gives **rapid rewards** from **Small, incremental changes**. The transition to smart water solutions does not necessarily involve complex systems.

<table>
<thead>
<tr>
<th>Intelligent equipment</th>
<th>Smart networks</th>
<th>Digital solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
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<td><strong>Definition</strong></td>
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<tr>
<td>Equipment, system and solution capable of self-optimization in-situ for enhanced performance – incl. Including pumps, mixers, treatment and sensors</td>
<td>Network collecting information across a number of equipment to provide exhaustive real-time status information of an overall system</td>
<td>Solution combining historical and current data with algorithmic decision support to provide data-driven forecast of the status of an overall system</td>
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<td><strong>Value for water managers:</strong></td>
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<tr>
<td>Reduces time and effort needed to monitor and maintain critical technologies</td>
<td>Enables remote and continuous monitoring of operations and real-time reactive management and maintenance</td>
<td>Enables preventive adjustments to operations and proactive management of the system based on data-driven decisions</td>
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</table>
... And define “Smart Water Migration”

**Intelligent Equipment**

**Smart Networks**

**Digital Solutions**

**Discover**
Qualitative and quantitative analysis with your expert partner

**Design**
Co-creation of solution in collaborative space

**Deliver**
Minimum viable product with basic necessities
Followed by Continuous delivery
### Discover Xylem smart water and wastewater solution map to solve your challenges

<table>
<thead>
<tr>
<th>Water manager daily challenges</th>
<th>Xylem’s solution</th>
</tr>
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<tbody>
<tr>
<td>Ecosystem monitoring</td>
<td>Remote sensor solutions to monitor and report on a variety of water resources parameters</td>
</tr>
<tr>
<td>Remote operations management</td>
<td>1-way and 2-way communications platforms to deliver real-time operations management</td>
</tr>
<tr>
<td>Preventative and predictive maintenance</td>
<td>Connected equipment and maintenance solutions to reduce downtime and failures of critical equipment</td>
</tr>
<tr>
<td>Treatment process optimization</td>
<td>Water quality sensors combined with advanced algorithms to optimize the treatment processes</td>
</tr>
<tr>
<td>Treated water and wastewater quality monitoring</td>
<td>Comprehensive real-time water monitoring and reporting solutions to support regulatory compliance</td>
</tr>
<tr>
<td>Advanced water and wastewater treatment</td>
<td>A broad range of reliable treatment solutions including disinfection, evaporation, filtration, and biological treatment</td>
</tr>
<tr>
<td>Wastewater and stormwater reuse</td>
<td>Integrated treatment to enable potable and non-potable reuse of wastewater and stormwater</td>
</tr>
<tr>
<td>Maximize equipment efficiency</td>
<td>Intelligent pumping and mixing equipment adapts to conditions for maximum reliability and operations efficiency</td>
</tr>
<tr>
<td>Stormwater management and flood relief</td>
<td>Comprehensive range of diversion solutions for all stormwater and wastewater flood events</td>
</tr>
<tr>
<td>Combined sewer overflow management</td>
<td>Intelligent equipment and real-time analytics to prepare for and prevent sewage and stormwater overflows</td>
</tr>
<tr>
<td>Reduce non-revenue water</td>
<td>In situ and algorithmic solutions to identify, monitor, and address real and apparent water losses</td>
</tr>
<tr>
<td>Water and wastewater network management</td>
<td>In situ and algorithmic solutions provide monitoring of network pressure, failures, and overall asset condition</td>
</tr>
<tr>
<td>Meter and billing management</td>
<td>Smart metering solutions to improve billing accuracy and enhance customer service</td>
</tr>
</tbody>
</table>

**EXAMPLE XYLEM BRANDS**

- Intelligent Equipment
- Smart Network
- Digital Solution
Partner with Xylem to implement smart water solution with the adapted return

Thames Water **smart network** reduces water consumption by 13% United Kingdom

**Smart network** saves $260 000 of water losses to Borough of Monaco, PA United States

**Digital solution** fulfills wastewater collection needs across 2500 pump stations, Netherlands

**Digital solution** at Milan municipality finds and fixes previously undetected leaks, Italy
Get our full Smart Water Manager paper today

Download it on:

http://info.xyleminc.com/Smart-Water-Solutions.html

or contact us at:

smartwater@xyleminc.com
Application of Advanced Analytics in NRW Management
Operational Efficiencies Achieved Through NRW Management

- Increased Availability of Water
- Reduced Treatment and Pumping Costs
- Social Factors
  - Reduced Risk of Water Contamination
  - Reduced Inconvenience from Unplanned Shut Downs
- Environmental Factors
  - Reduced Abstraction Volumes
- Improved Planning of Utility Resources
- Increased Revenue
No Single Solution

%NRW

0% 10% 20% 30% 40% 50% 60% 70%

Advanced Analytics

Advanced Leak Detection

Pressure Management

Pump Management

Leak Detection

Pipe Repair

Advanced Pressure Management

Systematic Pipe Replacement

Accurate Meters

Asset Management and Condition Assessment

Advanced Analytics

No Single Solution
Advanced Analytics

1. Real Time Network Monitoring and Alarms
2. High Resolution Data Recording
3. Machine Learning
4. Acoustic Leak Detection
5. Integrated Data Platforms
6. Pipe Risk Prioritisation
7. Pipe Condition Assessment
8. Revenue Meter Performance Assessment
Traditional Analytics
1. Real Time Network Monitoring and Alarms
1. Real Time Network Monitoring and Alarms

- **Tanjong Katong Complex (Stn 30)**
  - Type: Transient
  - Location: EASTERN
  - Date: 14 Feb 2017 - 23:59:30
  - Anomalies: Pressure
  - Status: Survey next day
  - Comments: [No Comments]

- **Ubi Ave1 (Stn 29)**
  - Type: Transient
  - Location: EASTERN
  - Date: 14 Feb 2017 - 23:41:44
  - Anomalies: Turbidity
  - Status: Survey next day
  - Comments: [No Comments]

- **Marine Parade Rd_VJC (Stn 48)**
  - Type: Transient
  - Location: EASTERN
  - Date: 14 Feb 2017 - 23:41:44
  - Anomalies: Turbidity
  - Status: Deploy crew immediately
  - Comments: [No Comments]

- **Fort Rd (Stn 39)**
  - Type: Transient
  - Location: EASTERN
  - Date: 14 Feb 2017 - 23:41:43
  - Anomalies: Pressure
  - Status: Deploy crew immediately
  - Comments: [No Comments]
2. High Resolution Data Recording
2. High Resolution Data Recording
3. Machine Learning
4. Acoustic Leak Detection
4. Acoustic Leak Detection
5. Integrated Data Platforms

**Data Sources**
- Acoustic logger
  - Background leakage
- Customer meters
  - Demand / usage
- Transient loggers
  - Water hammer / surges
- WQ Sensors
  - Detects water quality issues
- Flow meters
  - Inflow and outflow

**Business Functions**
- **Network Ops**
  - Supply management
  - Performance management
  - Water Quality
  - Burst detection
  - Water hammer / pressure monitoring
  - Demand management
- **Customer Demand**
  - Demand management
  - Meter management
  - Billing

**Other Enterprise Data**
- GIS
- Hydraulic model
- MDMS
- SCADA
- Billing
- Database

**Business Functions**
- **Maintenance**
  - Proactive works management
  - Leak detection
- **Network Ops**
- **Customer Demand**
- **Asset Management**
  - Preventative Maintenance
  - Renewal Planning
  - Condition Monitoring
  - Prioritisation
  - Network Management Strategy
  - Planning and Forecasting
  - Investment
6. Pipe Risk Prioritisation
7. Pipe Condition Assessment

Before condition assessment

After condition assessment

Pipe Risk
- Out of bounds
- Low Risk
- Med-Low Risk
- Medium Risk
- Med-High Risk
- High Risk
8. Revenue Meter Performance Assessment

Advanced Analytics
- Apparent Loss Anomalies
- Prioritization Capability
- Web-based interface

Data inputs
- Data inputs from historic and current meter and billing data

Machine Learning
- Rapid Algorithm Improvement
- Informed Decision Making

Utility Benefits
- Reduce Revenue Loss
- Increase Operational Efficiency
- Aid Meter Replacement Programs
- Aid Water Savings
- Happy Customers
Case Study 1 – NRW 50%
Case Study 2 – NRW 30%
Case Study 2 – NRW 30%
Case Study 3 – NRW 5%
Case Study 3 – NRW 5%

- Smart Water Grid System
  - Island-wide Sensor Deployment
  - Water Demand Prediction
  - Water Quality Monitoring & Analysis
  - Automated Metering Analytics
  - Sensor Health Management System
  - Hydraulic Modeling and Simulation
  - Water Quality Sub-zoning Tool
  - Load Dispatch
  - Water Main Break Detection and Localization
Summary

• There is no one solution for a NRW management strategy – different utilities face different challenges

• Use of advanced analytics can achieve major operational efficiencies through sustainable water loss management strategies.
Q and A