

# Committee on Water and Task Force on Innovation

# Using IIoT to Drive Business Insights

John Kuchmek – American Water  
Krishna Kumar – App Orchid



**WE KEEP LIFE FLOWING™**

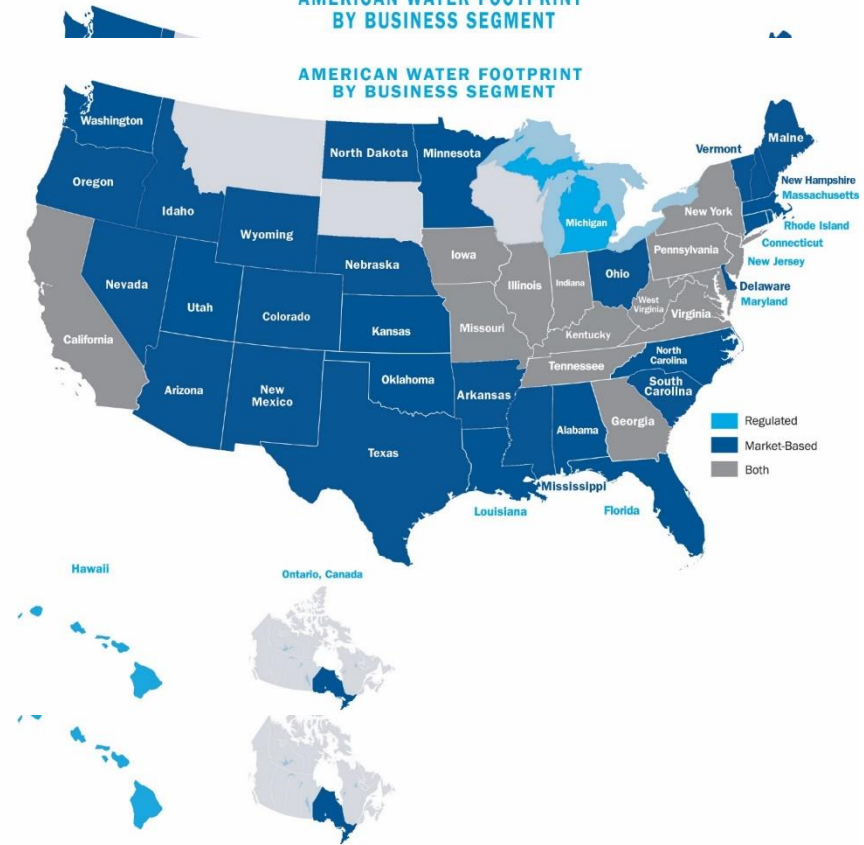
# WHO WE ARE

We are the largest and most geographically diverse publicly traded water and wastewater service provider in the United States.

- ★ We serve a broad national footprint and a strong local presence.
- ★ We provide services to approximately 15 million people in **46 states** and Ontario, Canada.
- ★ We employ **6,900** dedicated and active employees and support ongoing community support and corporate responsibility.
- ★ We treat and deliver more than **one billion** gallons of water daily.

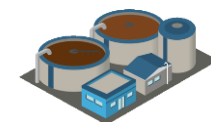
AMERICAN WATER FOOTPRINT  
BY BUSINESS SEGMENT

AMERICAN WATER FOOTPRINT  
BY BUSINESS SEGMENT



# Regulated Surface Water Plants



 x 72

Across 16 States

Different Networks



Different Historians



# Challenges

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- Maintain States Autonomy
- Work with different platforms
- Work with different networks
- Locale



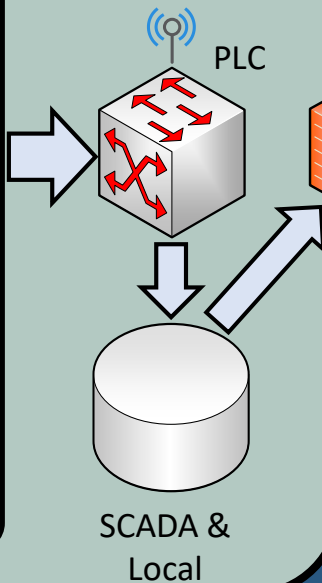
# Data at Rest

Local Plant

Cloud/On-Prem

On-Prem Data Center

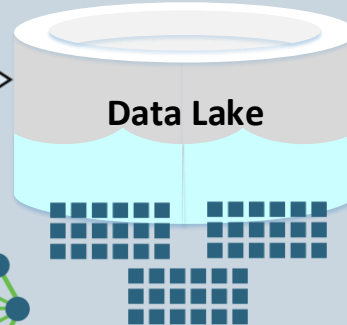
Distributed



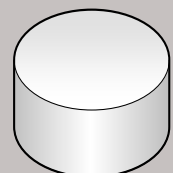
SCADA &  
Local



Enterprise/  
Central  
Historian



Data Lake

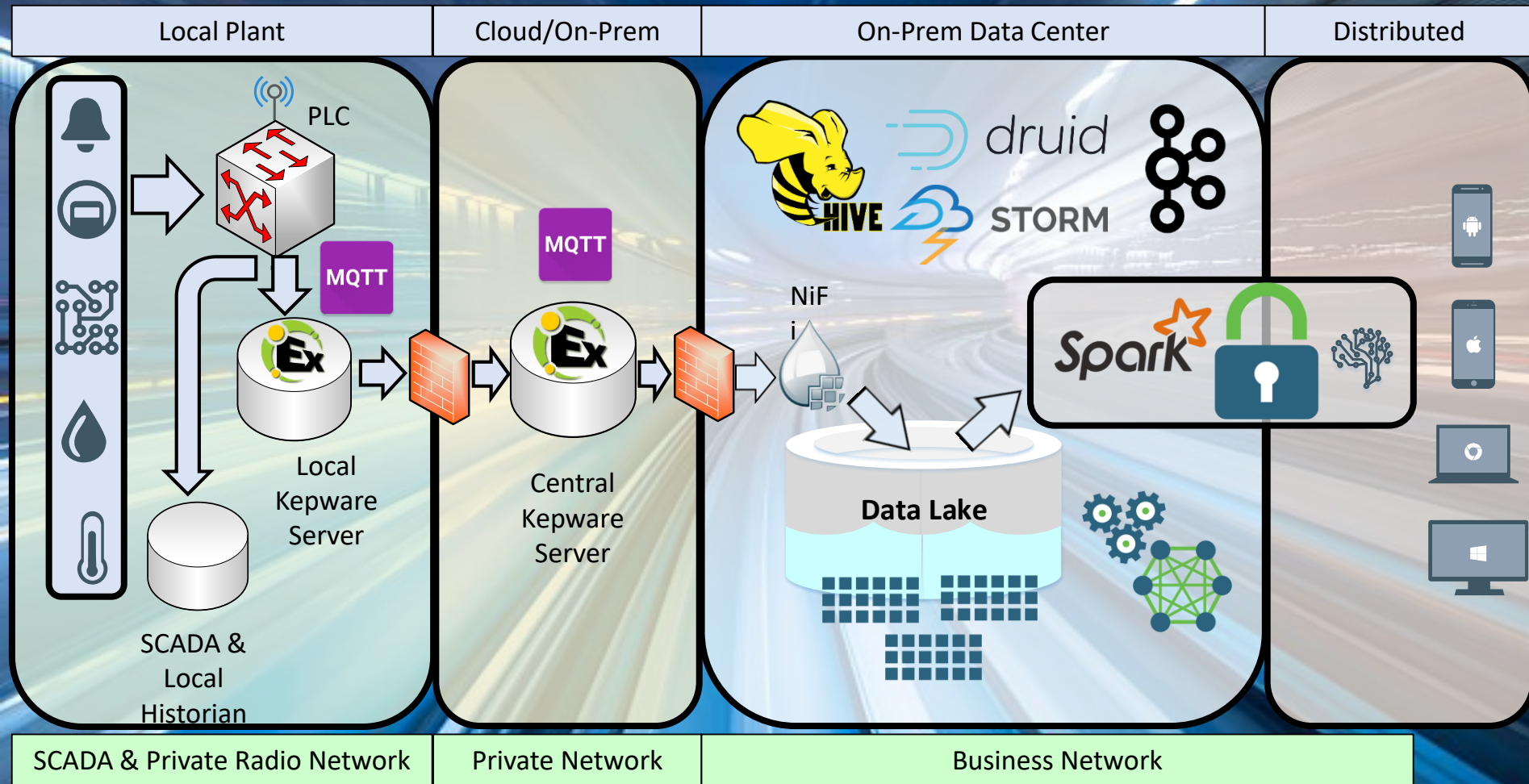


SCADA & Private Radio Network

Private Network

Business Network

# Data in Motion





# Learning Machines Helping

- Improved Plant Efficiency
- Improved Water Quality
- Improved Customer Experience





# Demo

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**DEMO**

 apporchid



AMERICAN WATER



**THANK YOU**

# Committee on Water and Task Force on Innovation



# Meter Ops App

Harnessing Big Data & Machine Learning



## Meter Data at American Water

- 4 million meters installed
- 250 million Meter readings
- 15 million Work Orders
- 180,000 Smart Meters
- Historical Weather data for 1,800 locations \* 24 hours \* 5 years



## Challenges with Data

- Identifying and fixing data quality issues
- Consolidating data across multiple sources with different formats
- Parsing descriptive text fields using Natural Language Processing to extract data



## Insights using Machine Learning

- Identify Problem types with Meters
  - Inactive Meters showing consumption
  - Meters showing backflows
  - Meters not running
  - Meters not transmitting readings
- Identify Meter Reading Issues
  - Due to Weather
  - Due to Equipment failures
  - Due to Meter Reader's decision





## Process Improvements

- Better Identification of Problem meters and reduced false positives
- Improved Meter Reading Efficiencies
- Better planning of resources to fix meter issues
- Identification of optimal Meter Manufacturers and Models



# Demo

# Committee on Water and Task Force on Innovation

# ANALYTICS IN WATER

July 2018

# RE IMAGIN ING

THE  
FUTURE  
UTILITY

 **accenture**consulting

# WHO IS ACCENTURE?

**Accenture is a leading global professional services company, providing a broad range of services and solutions in strategy, consulting, digital, technology and operations.**

Combining unmatched experience and specialized skills across more than 40 industries and all business functions—underpinned by the world’s largest delivery network—Accenture works at the intersection of business and technology to help clients improve their performance and create sustainable value for their stakeholders.

Accenture drives innovation to improve the way the world works and lives.



Accenture has approximately  
**435,000 people**  
serving clients in  
**120+ countries**

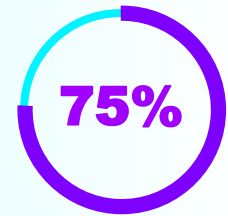


of the Global  
**Fortune 100**  
are Accenture clients



The company generated  
net revenues of  
**US\$34.9**  
**billion**

for the fiscal year ended  
Aug. 31, 2017



of the Global  
**Fortune 500**  
are Accenture clients

# ACCENTURE UTILITIES INDUSTRY GROUP At a Glance

The Accenture Utilities industry group brings deep industry knowledge, world-class capabilities, digital innovation and cutting-edge technology to clients to help them transform their businesses in the ever-evolving digital world



**Relationships**  
with **+200**  
of the world's  
leading utilities



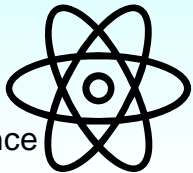
**+15,000** skilled  
utilities industry professionals

Working with  
9 of the 10  
top utilities on  
the Global



**Fortune 500**

Services are  
structured around the  
**Value Chain**  
to address specific  
industry issues



A strong alliance  
**Ecosystem**

**Investment**  
in differentiated  
capabilities



OMNETRIC  
A Siemens & Schneider Company

Structure

Realworld OO  
Systems B.V.



Industry executive  
**Forums**

Accenture International Utilities  
and Energy Conference (IUEC)

Accenture Smart Grid  
Leadership Network

- Power Generation
- Transmission and Distribution
- Retail and Customer Services
- Corporate Services



We help our clients to pursue

**Digital Transformation**

across the value chain to achieve  
sustainable growth by mastering:



Analytics



Cloud



Interactivity



Mobility



Security

Our utilities business  
represented approximately

**47%**

of our Resources Operating Group's  
net revenues in fiscal 2017.

**Decades**

of working with electric, gas and water utilities worldwide  
to reinvent for the next generation



# ANALYTICS IN WATER – WHY WE NEED IT



## Industry Challenges

Increasing demand in the face of aging infrastructure, rising operational costs, capital funding constraints and tightening environmental and quality controls have created the **perfect storm** for water utilities



**\$9.6B**

Value of water leaked globally



**\$1T**

Investment needed to replace aging infrastructure by 2033 in the US alone



**40%**

The expected rise in demand for water globally by 2020



**30%**

Rise in energy costs since 2004



## Industry Trends

There is a growing realization that technologically innovative ‘Smart Solution’ are the most, and possibly, some experts believe, the only affordable way of delivering these priorities by exploiting what is available



**29%**

Installed networks will be smart by 2020



**\$7.1 – 12.5B**

Amount saved in utilities each year from smart solutions globally



**18.7% CAGR**

The investment in smart solutions to reach \$3.3B by 2016

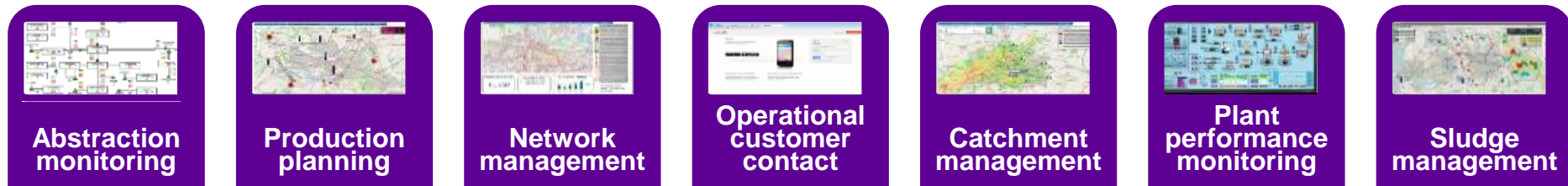


**60%**

Water companies targeting reduction in leakage and network operating costs



# SOLUTION COMPONENTS



## Accenture Water Analytics Platform

### User Interface

Dashboards, Reports

Geospatial Visualisation

Analytics

Optimisation models

### Reporting And Analytics

### Big Data Platform

Batch Services

Data Store

Data Integration

### Cloud platform

Security Services

Infrastructure services



Real-time systems

Energy Mgmt.

GIS

AMI

Weather

Historian

ERP

CRM

EAM

OMS

Environment Data

# BENEFITS

## BENEFITS

### New Way of working

Outage dates and cost of delay visible to all users. Site and area managers understand the cost while deciding to delay or cancel outages.

### Water Network Benefits

- ✓ 10% reduction in customer calls. Detectable events include pump failure, dropping SRES levels, WTW failures, CPP alerts etc.
- ✓ 5% quicker IVR/SMS response (zonal risk and FMZ cascade impacts)

### Waste Network Benefits

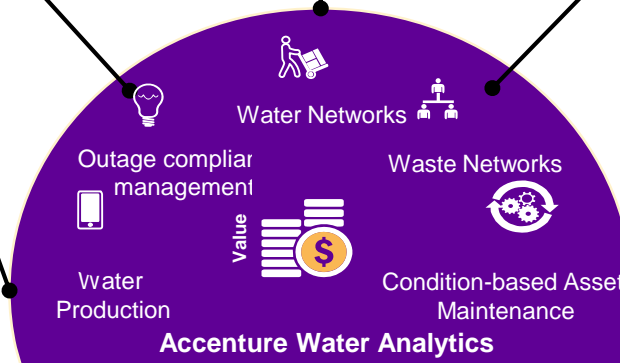
- ✓ 20% reduction in energy cost:
- ✓ Flooding Reduction: 10% reduction over historic flooding based on actionable interventions.

### Water Prod. Benefits

- ✓ 20% reduction in peak, 5% in Non peak energy tariff
- ✓ 5% reduction in chemical costs
- ✓ 10% reduction in unplanned outages .30% abstraction reduction

### Continuous Improvement

Assets identified as needing investment based on performance trends, alarm data and analysis of work orders raised.



## FEATURES

- IT/OT Integration
- Near Real time KPIs to monitor Asset health
- Rich Geospatial Visualization
- Asset Performance Trending
- Integrated Asset view across Regions
- Schematic Monitoring
- Work Oder monitoring
- Production Plan Optimizer

# CASE STUDY – ANALYTICS OPTIMIZATION

## Client Overview

Client is a private utility company responsible for the public water supply and waste water treatment in large parts of Greater London.

It has 15m waste water customers and 9m drinking water customers. It produces 2600 mega liters of drinking water per day. It's one of the largest clean water networks in the world with 102 water treatment works, 288 pumping stations, 235 clean water reservoirs. Drinking water quality is meeting 99.99 per cent of stringent tests.

## Business Challenge

- ✓ Client has a significant challenge to close an Opex gap of £120m in this regulatory period, as well as being able to commit to further efficiencies in AMP6.
- ✓ Client's strategy to deliver a stable and efficient service in AMP6 is based on an ability to have a much smarter capability to manage their assets, utilizing real-time information from the £90m of SCADA investment to date, plus another £300m+ investment in other technologies.



## How Accenture helped?

Move to a very different future involving:

- ✓ An extended and more intelligent control function that uses real-time information to make better and faster business decisions.
- ✓ To support their front line staff to make more informed and cost focused decisions regarding their assets.
- ✓ These capabilities allow client to meet AMP5 and AMP6 performance targets without burning more investment on brick and mortar solutions for which they don't have sufficient capital.
- ✓ Agile Delivery methods to improve the time to market.

## Business Benefits

- Overall Cost reduction ~ £ 11 Million per annum
- Reduce energy cost by avoiding peak tariff periods
- Reduce run-to-waste, currently 25mld per day on average
- Reduce system operation cost
- Reduce Customer call by 10%
- Speed up IVR/SMS response by 5%
- Reduce Chemical costs by 5%
- Optimize business process
- 10% reduction in unplanned outages
- Flooding reduction by 10%

# CASE STUDY – SMART METER INSIGHTS

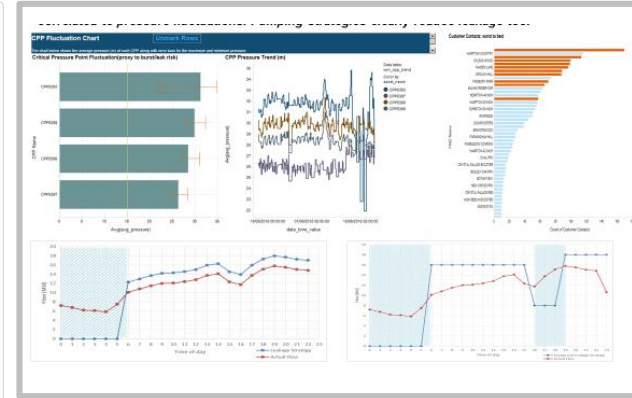
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## Business Challenge

- ✓ London has a water and sewer system which largely dates back to the Victorian era and is operating at maximum capacity and demand is increasing.
- ✓ Thames Water is using Smart metering as a strategic way of reducing the burden on the network through a reduction in Customer Side Leakage and Demand (through customer insight and understanding).



## How Accenture helped?

Move to a very different future involving:

- ✓ Detailed usage information
- ✓ Reduction in usage to bill cycle time
- ✓ Reduction in costs

## Business Benefits

- Proactive customer side leakage (through constant usage)
- Reduction in bad debt expense
- Proactive and targeted network side leakage detection and fixes
- Insight for Asset Strategy and Network Planning

# THANK YOU

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