

The background of the entire image is a dark blue gradient. On the left side, there is a faint, stylized image of the Golden Gate Bridge. On the right side, there is a faint silhouette of the San Francisco skyline, including the Transamerica Pyramid. The OSIsoft logo is centered at the top in white.

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# USERS CONFERENCE 2016

April 4-8, 2016 | San Francisco

**TRANSFORM**  
**YOUR WORLD**



# Using Data Analytics to Monitor and Reduce Energy Consumption

Presented by **Steve Wortendyke, Black & Veatch**  
**Paul Youk, City of Lawrence**  
**Pat Schlotzhauer, Black & Veatch**



# SEVEN FACTORS ENABLING THE RISE OF SMART CITIES

- Pervasive **wireless coverage**
- Transformation of public carrier business plans to accommodate the **Internet of Everything**
- Miniaturization of processors and the integration of communication modules into **intelligent devices**
- Abundant cheap **data storage** and processing power
- Rise of **cloud computing** and edge computing
- Access to vast data streams enabling potential for **rich analytics**
- Extensive improvements in **application development** and visual display capabilities



# SMART INTEGRATED INFRASTRUCTURE

## TWO ENDS OF THE SPECTRUM, WORKING SYNERGISTICALLY

### Integrated Infrastructure

Improves system performance by leveraging synergies between multiple infrastructure systems

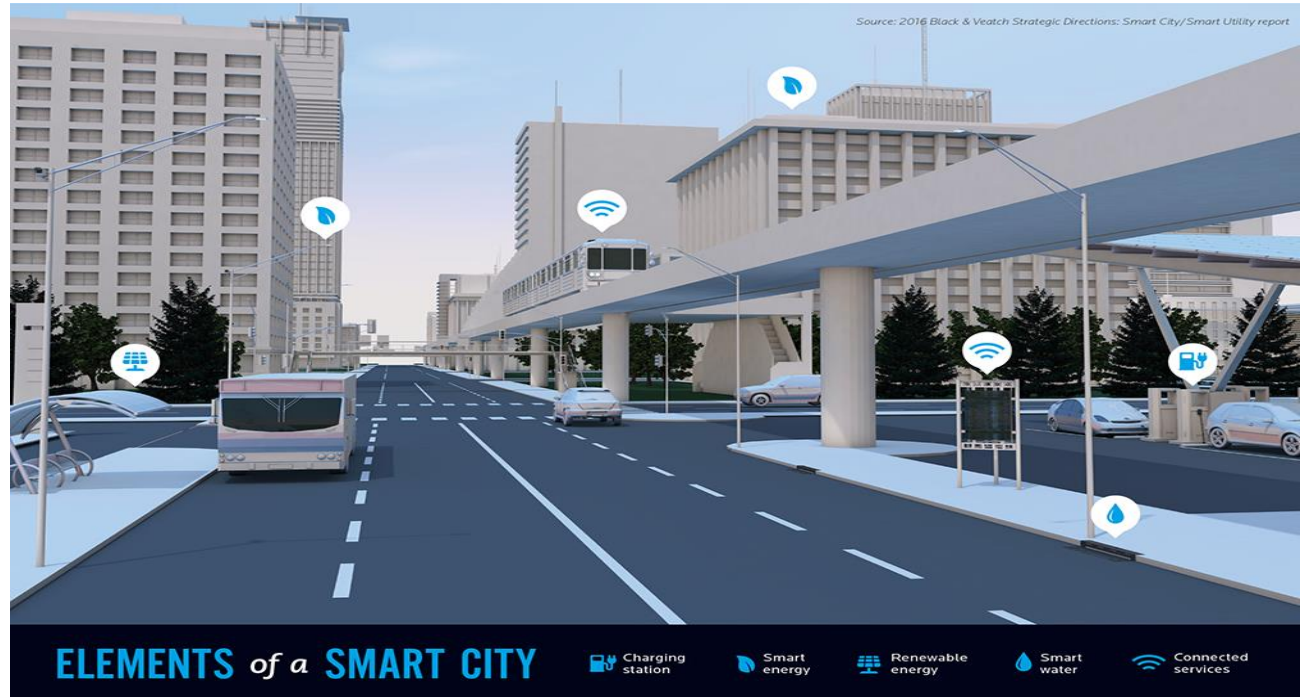


### Smart Analytics

Improve asset and financial performance by transforming data into actionable intelligence

# BENEFITS OF SMART INTEGRATED INFRASTRUCTURE

- Increased employment
- Energy savings
- Reduced water use
- Lower crime rates
- Less traffic
- Engaged citizens



Connected cities enhance quality of life



# BLACK & VEATCH IS A LEADER IN *CRITICAL HUMAN INFRASTRUCTURE™*

Energy



Telecommunications



Water



Transportation

## SERVICE AREAS

Program Management

Engineering, Procurement &  
Construction

Site Acquisition & Permitting

Management Consulting

Operations & Maintenance

Asset Management

Energy Management

Data Analytics

Security

Leading infrastructure solutions and the scale to support programs of all sizes

# BLACK & VEATCH – SMART CITY PROGRESSION

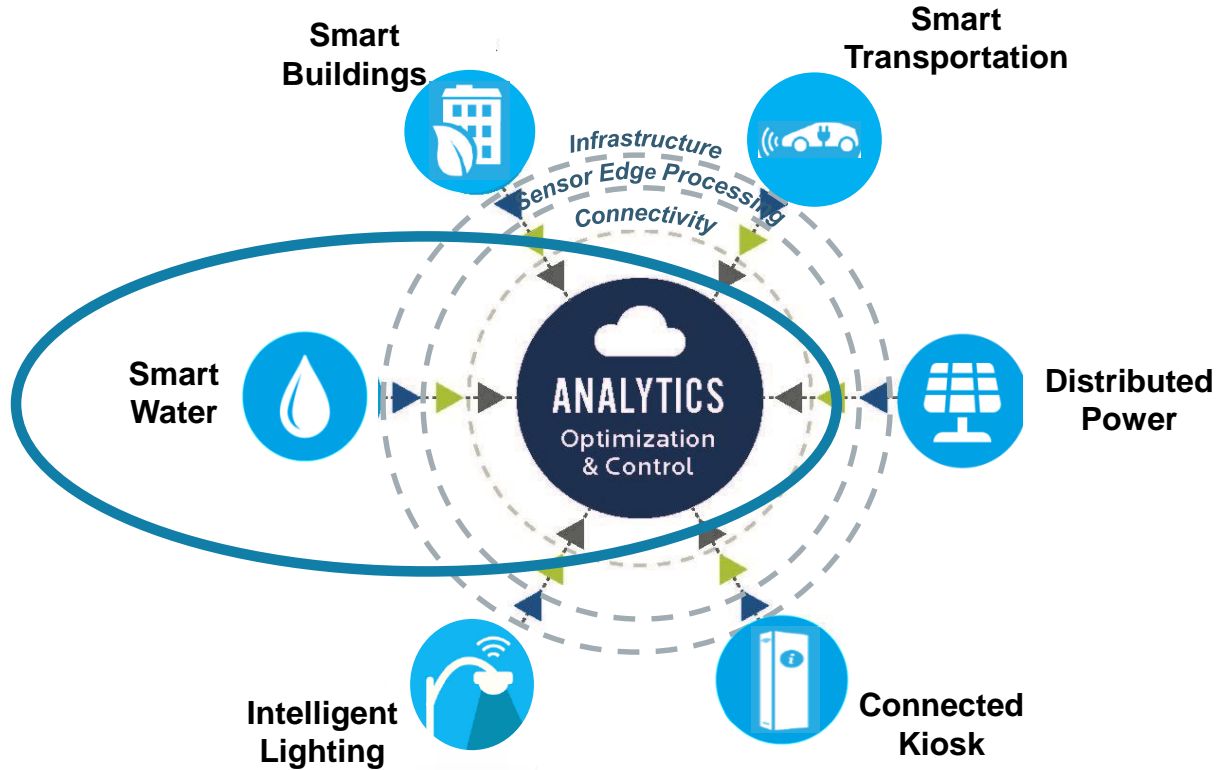
Black & Veatch is leading the industry in Smart City planning and engineering

Black & Veatch provides Smart City infrastructure integration

Black & Veatch uses data analytics to drive Smart City resilience and optimization using PI System tools

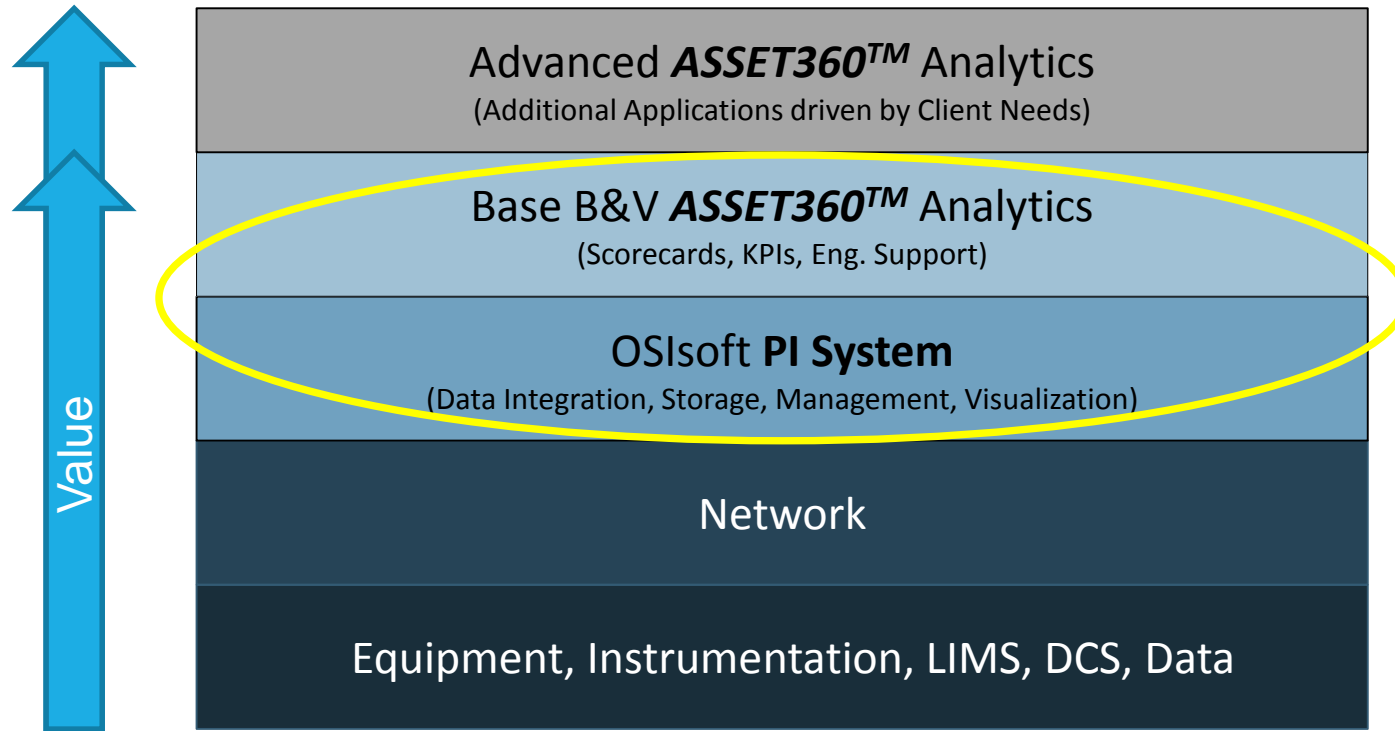


# CITIES BENEFIT FROM SYNERGIES THAT CULTIVATE SYSTEM-WIDE INTELLIGENCE





# ADVANCED ANALYTICS CAN SOLVE BIGGER PROBLEMS



## Benefit Areas

- Key Performance Indicators (KPIs)
  - Cost
  - Chemicals
  - Energy
- Descriptive Calculations
- Prescriptive Calculations
- Predictive Calculations

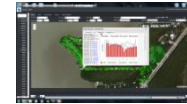
# DATA + ANALYTICS = INFORMED DECISIONS

Existing  
Data  
Sources



PI System is the backbone for data  
collection, data management and ad  
hoc data visualization

 **BLACK & VEATCH**  
Building a world of difference.<sup>®</sup>  
**Asset360™**



Ad Hoc Tools



Alerts



Issues Mgmt



Performance  
Analysis

## VISUALLY INTERPRETS INFORMATION

# ADVANTAGES OF ANALYTICS DRIVEN FROM THE DATA HUB

## PUTS CURRENT OPERATIONS AND FORWARD PLANNING INTO THE SAME CONTEXT

### Optimize

#### OPTIMIZE PERFORMANCE

- Allow operators to save energy and chemicals and optimize systems
- Train models and algorithms using **Alerts** to focus on optimization efforts.

#### DETECT AND DIAGNOSE

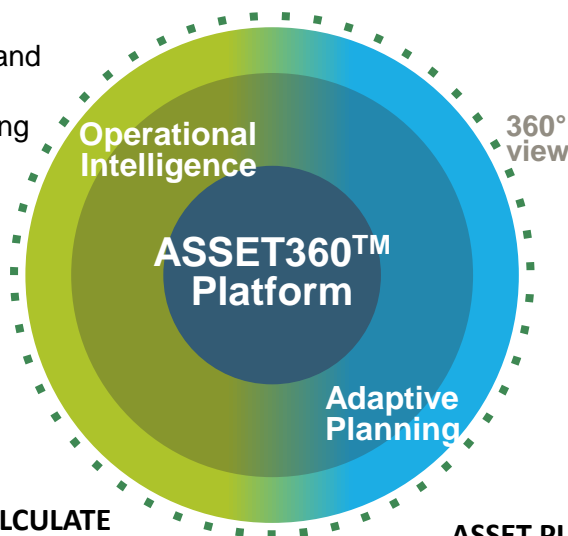
- **Alerts** that use models and advanced pattern recognition
- **Monitoring & Diagnostics** of Process, People and Tools

### Inform

#### AGGREGATE AND CALCULATE

- Merge data silos
- Mobile access with **Ad Hoc data tools**
- Calculate **Key Performance Indicators** (KPIs) related to cost, energy and chemicals

PAST – PRESENT – FUTURE



#### STRATEGIC PLANNING

- Capital prioritization
- Energy Make/Buy Efficiency
- Maintenance/Reliability
- Resource Prioritization
- Compliance

#### TACTICAL PLANNING

- Develop and track current year plans and budgets
- Opportunity identification
- Automated modeling tools
- Risk/Resilience planning

#### ASSET PLANNING

- **Predictive tool** to direct asset O&M decisions to CMMS systems.
- Configure **Alerts** to look for deviations in performance or conditions that support reliability-centered maintenance activities.

### ADAPT

# WHAT MIGHT A SMART UTILITY LOOK LIKE?

- Capitalize on intersections of data
  - Asset health – CMMS and SCADA
  - Current year plan – financial and SCADA
  - Treatment optimization – SCADA and laboratory
- Systems working with systems
  - AMI data for more than just a bill
    - Leak detection, pumping energy, production
  - Balance your wastewater as a resource
    - Collection systems, treatment, energy recovery, reuse, automated modeling
  - Whole life cycle asset management
    - CMMS plus condition and risk based



# Leveraging ASSET360™ for Finding leaks faster

## COMPANY and GOAL

Board of Public Utilities (BPU) Electric and Water Utility of the Unified Government of Wyandotte County, /Kansas City, Kansas wanted to **Find Leaks Faster and Optimize Pumping Energy**



## CHALLENGE

Large amount of data in different systems that was difficult analyze

- Analysis was done manually with exporting to spreadsheets
- Some leaks did not surface due to natural soils

## SOLUTION

Use the PI System and ASSET360 to bring data together and perform analytics

- Daily water accounting
- Analysis for trends and anomalies
- Predict water use and compare against pumping plan

## RESULTS

Immediate data accessibility showing real time water loss and anomalies

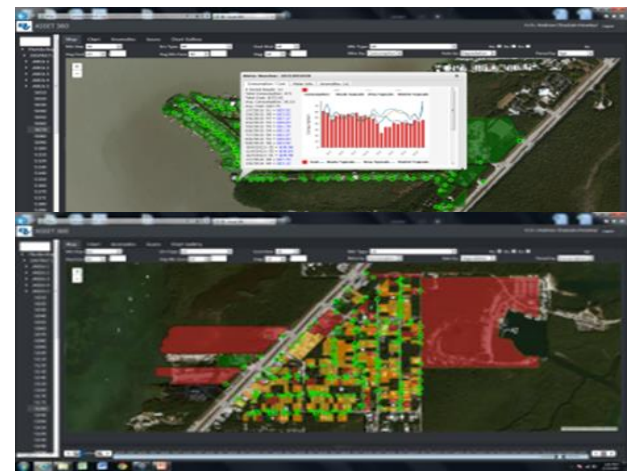
- Will help reduce costs for field crew locating leaks
- Automated water audit report will find issues with system and residential meters resulting in reduced billing errors



# Leveraging ASSET360™ for CONSERVATION AND ASSET MANAGEMENT

## COMPANY and GOAL

Florida Keys Aqueduct has a long distributed system that is aging and they need to manage a key asset – water meters



## CHALLENGE

Large amount of data that was difficult analyze and see patterns

- Analysis was done manually with exporting to spreadsheets
- Monthly data not seen as valuable

## SOLUTION

Use ASSET360 with GIS integration to bring data together and perform analytics

- Individual use analytics
- Heat map for low use and meter replacement
- Can see conservation campaigns and impacts

## RESULTS

Data visualization and accessibility provide savings form monthly read data

- Better management of customer complaints and billing errors
- Savings from targeted meter replacement strategies based on asset anomalies



# Leveraging ASSET360™ for Energy Optimization



- The City of Lawrence, Kansas provides water and wastewater services and wanted to optimize energy use at its Wastewater Plant. Answering energy questions is the proximate goal for this software.
- More broadly, the city also wants to dramatically improve its use of data in terms of answering questions with specific evidence and information, with the ultimate goal of making better decisions.

# City of Lawrence – Data Dilemmas

The City of Lawrence faces several not so unique challenges that prevent them from fully utilizing data for decision making processes.

- Institutional Assumptions and Biases
- Data in, Data inertial
- Data: Use Vs. Analysis



# Institutional Assumptions and Biases

Often, Lawrence Utilities seems to 'just know' certain things:

- So just how much does it cost to start Actiflo anyway? "\$10,000"??
- When should we make routine evening/morning  $Cl^2$  changes? And how large should they be?
- We still use trial and error + institutional assumptions far too often, and struggle to put our wealth of data to these questions.





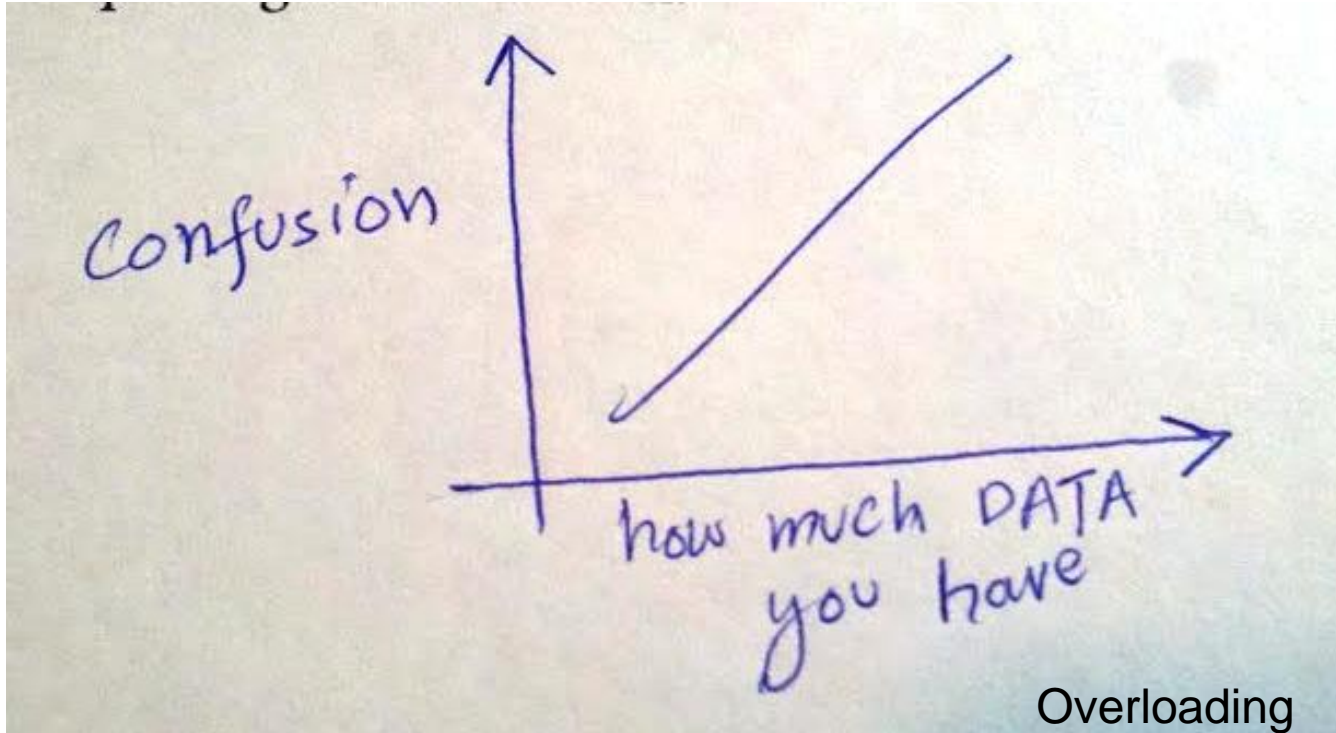
## Data In, Data Inertial

We are amazing at collecting and storing data (and meh at getting it out).

- Spread-a-bases and Excel
- Current processes are slow and require technical folks
- Data frequency issues in Excel
- We need more robust data tools, especially for integrating our various sources of data and easily visualizing our large quantities of data.



# Data: Use Vs. Analysis



**Good Proximate  
Use of SCADA Data.**

**Inconsistent  
ultimate use of data  
for analysis.**

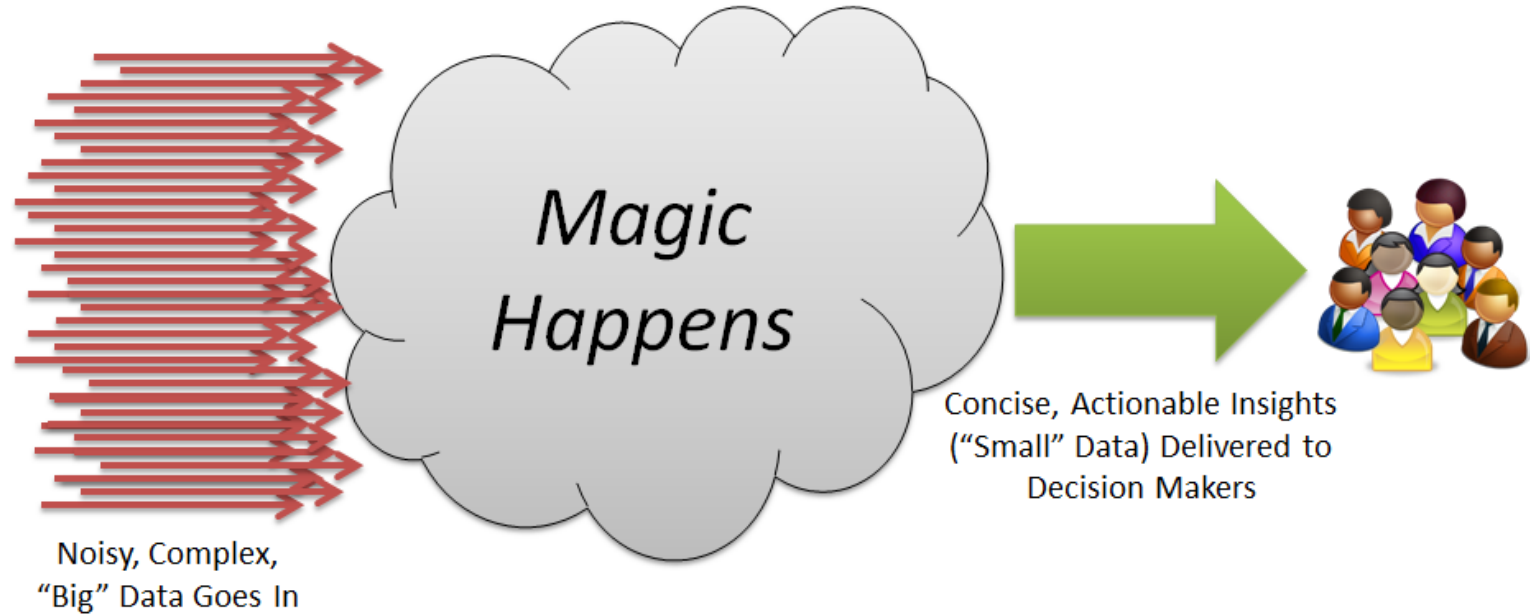
**Spotty analysis =  
Lack of proper  
optimization.**

**Quantity and  
Frequency of Data  
is a barrier to  
analysis.**

Overloading

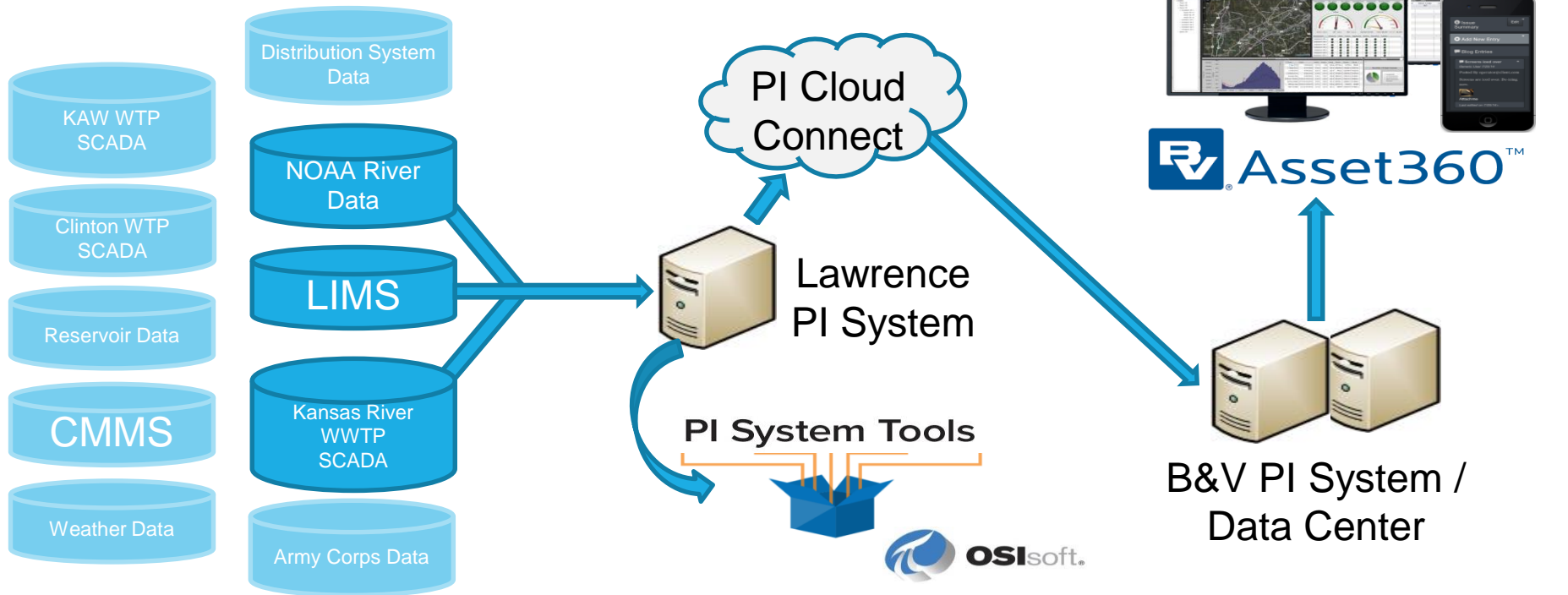


# What are we really trying to do? Make the Magic Happen.



Will OSIsoft be able to deliver the magic? TBD, but are off to a good start.

# BV solution – Scalable Data Integration



# BV solution – Asset360™ Performance Analyst

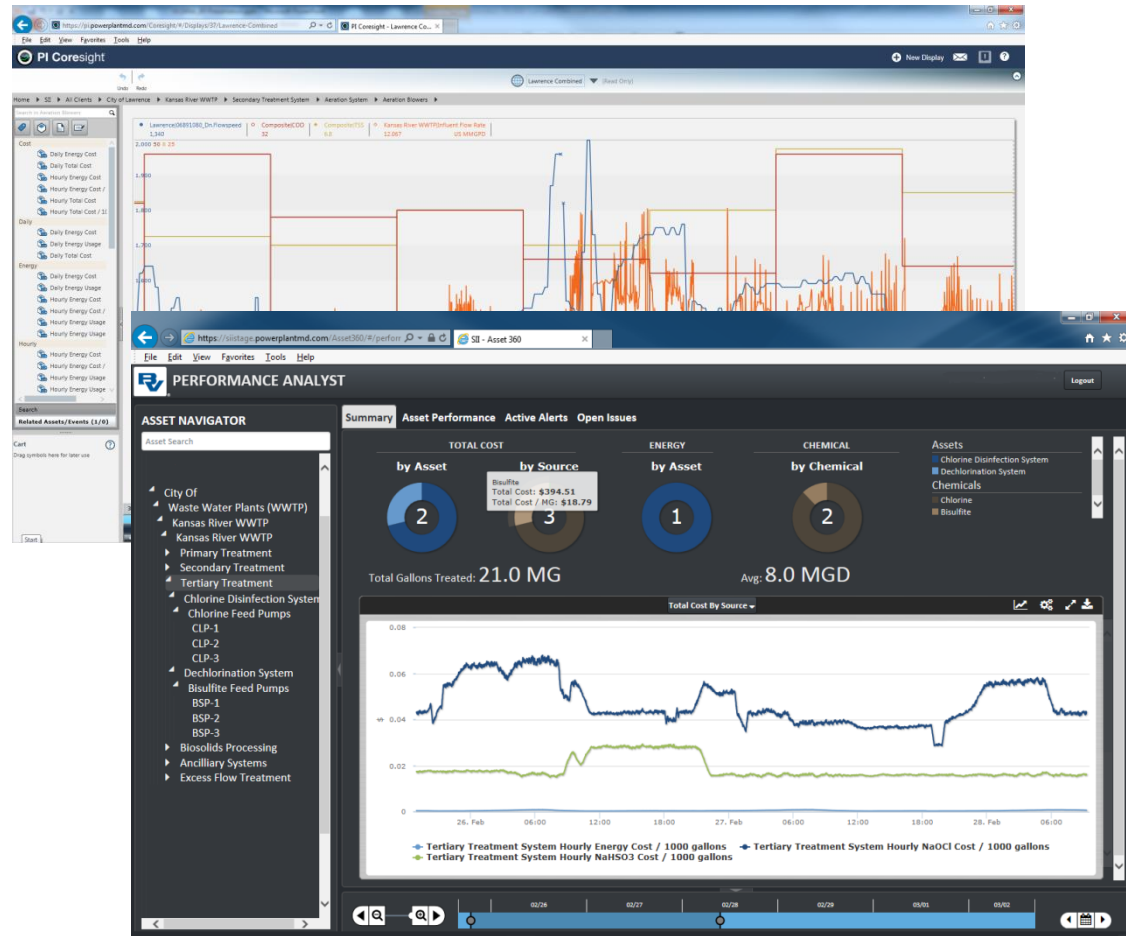
- Leverages the PI System and ASSET360™
- Performs standard calculations using SCADA and LIMS data
- Display, trend, and benchmark Energy and Chemical usage KPIs in real-time.





# Key Benefits

- Increases visibility and awareness across the utility
- Faster, easier access to all data sources
- Facilitates more informed decisions
- Expandable
- Remote monitoring of plant performance by B&V domain experts



## Contact Information

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Solution Lead - SII  
Black & Veatch

## Questions

Please wait for the **microphone** before asking your questions

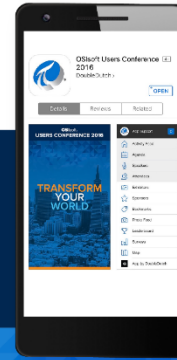


State your **name & company**

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감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado

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