

# Leveraging Big Data for Intelligent, Water Management

**Gary L.S. Wong, Principal, Global Water Industry**

OSIsoft, LLC., 777 Davis Street, San Leandro, California, USA

(email: [gwong@osisoft.com](mailto:gwong@osisoft.com))

## Scope / Topic

Big Data: Operational intelligence and real-time data management

## Platform Presentation

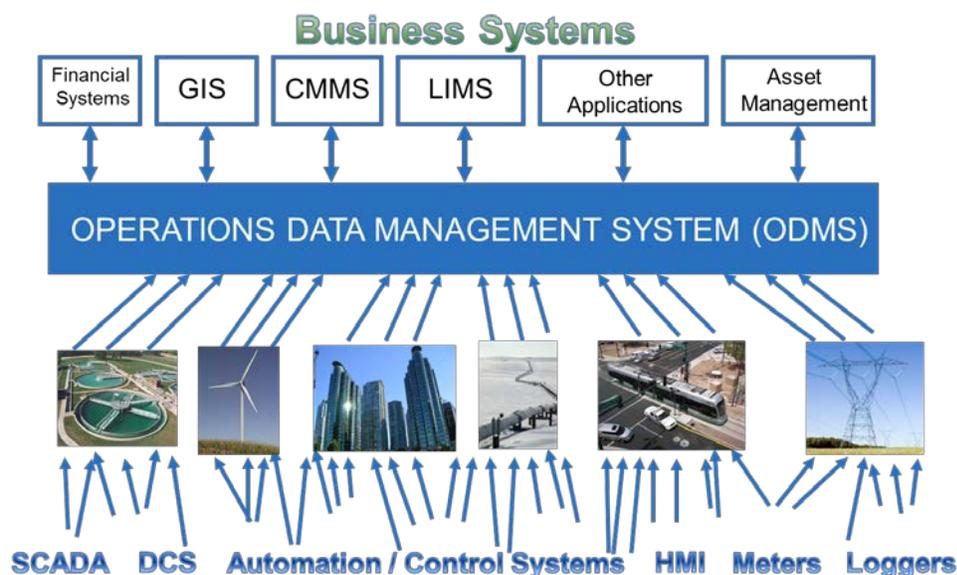
## Keywords

Big Data, Integration, Real-time Data Management, GIS, Operational Intelligence

## Abstract

For years, water utilities have relied on automation systems to help manage the water lifecycle and these systems generate vast amounts of data that must be effectively managed in order to enable intelligent decision making. Today, the term Big Data is used to describe many, complex sources of data that generate vast volumes, often in real-time. Within a water utility, Big Data includes such sources as control systems, telemetry, SCADA, geospatial systems, lab data, the weather, video data, and smart meters. The complexity comes into play as integrating Information Technology (IT) business systems with Operational Technology (OT) engineering systems is a must to address the water challenges now and into the future. See Figure 1.

This oral presentation will be co-presented with either Vitens or Evides and focuses on case studies where water utility managers are leveraging instantaneous access to Big Data from proven solutions to enable better real-time decision making and operational intelligence. Successes include detecting leaks within minutes, saving \$600,000 / year in water loss control, safeguarding water quality, saving millions of dollars in energy management and asset management. Immediate opportunities exist to collaborate and leverage these successes around the world.



**Figure 1:** Operational and business big Data integration and management through an Operations Data Management System.

## Introduction

With large volumes of data, utilities must be able to leverage that data to make informed decisions and take intelligent actions. The objectives are to examine how big data is managed with operations data management solutions and to show how water utilities are successful at using this information to make effective utility decisions.

## Materials and Methods

Several issues arise when managing large volumes of time series data. First of all, data managers must understand and realize this process control data is time series data which consists of a date, timestamp, and value. This is critical as the appropriate technology should be used to handle and manage this data. I.e. A time series database solution is ideal for effectively managing large volumes of time series data, however, many users rely on relational database technologies which leads to poor performance and excessive system support. Second of all, ease of access and speed of retrieval of raw and aggregate data greatly decreases as data volumes increase. Thirdly, many users are building their own time consuming and costly data collection, management, and analysis systems while proven COTS software exists that can connect to and manage continuous data from hundreds of different automation, process control and business systems. Lastly, without the proper system interfaces and technology, integrating operational time series data and relational business data into useful information becomes a roadblock to addressing business issues.

## Results and Conclusions

The findings and results of both technical and business successes are examined. The paper will discuss water case studies from Vitens, Evides, Metro Vancouver, Las Vegas Valley Water District, and Veolia Eau. A very brief summary of a few utilities are discussed in this abstract.

At Metro Vancouver and Las Vegas Valley Water District, calculations and analysis of operations data that took minutes or hours, now takes seconds to complete. Decision makers have the information at their fingertips.

Evides monitors their water production in real-time through GIS to make smarter decisions optimizing their process and Vitens can detect a leak within 2 minutes with over 96% accuracy. As a result of adopting the IWA/AWWA framework and technology integration with an ODMS solution, Halifax Water has reduced leakage of potable water from an Infrastructure Leakage Index (ILI) of 9.0 to 3.0, which means direct savings of \$600,000 per year (savings of ~\$2 per person served).

Incorporating the value chain of water and extending beyond utilities, major consumers of water and energy in the industrial and agricultural sector are leveraging ODMS solutions to better manage their facilities, water, and energy through the cloud. Collaboration and secure sharing of data between these large consumers and the local water and power utility enable higher efficiency, sustainability, and conservation. Much greater detail will be presented in the platform presentation and full paper.