Lessons Learned from Integrating SAP and GIS

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American Water Company Background

- American Water, through its subsidiaries, provides high-quality water and wastewater services to approximately 14 million people in more than 30 states, as well as parts of Canada. Headquartered in Voorhees, NJ, we are the largest publicly traded water and wastewater utility company in the United States, and are the parent company to our state subsidiaries. We employ more than 6,700 people who give back to the community each day by doing their part to provide the highest quality service possible. Our professionals are committed to customer service, operational excellence and the delivery of high-quality, reliable drinking water, safe and effective wastewater treatment and release and other water-related management services. Our teams live and work in the communities they serve.

- Though our business is complex, in simple terms, we have two types of operations — those in which we own the assets - our regulated operations - and those in which we manage assets and provide water and wastewater services for a municipality or other entity - our non-regulated operations. We principally serve residential homes and businesses, we also perform non-regulated contract operations for municipalities that own their utility systems. Additionally, American Water develops and implements solutions to help meet our country’s many water supply challenges.

- The primary mission of American Water's state subsidiaries is to be your local, trusted water resource company dedicated to delivering innovative solutions, environmental stewardship, and community infrastructure investment.
Primary Areas of Focus for Business Transformation

To increase focus on driving standardization, operational excellence, and so we’re able to continue delivering safe, reliable water, our program objectives are to ...

- Replace legacy systems near the end of useful lives
- Promote operating excellence, efficiency, and economies of scale
- Enhance the customer experience
- Increase employee effectiveness and satisfaction
Program Timeline

2011

2012

2013

2014

Blueprint

Implementation

Support

Enabling Projects

myCareer Solutions

myTime Solutions (Kronos)

Geographic Information System (GIS)

Computerized Maintenance Management System (CMMS)

Change Management

ERP* Design Build Test Deploy

EAM / CIS Design Build Test Deploy

= Go-live

*Note: ERP includes Finance, HR and Supply Chain

TBD
High-Level Overview | ERP, EAM, CIS

Enterprise Resource Planning (ERP)
- Hire To Retire
  - Time & Labor
  - Benefits
  - Learning
  - Retirement
- Record To Report
  Collects and delivers financial information to all of our stakeholders
- Procure To Pay
  Ensures we have goods & services to serve customers (e.g., chemicals to treat water, electricity, pipes)

Enterprise Asset Management (EAM)
- Plan To Build
  Managing our physical assets from water pipes and meters to water treatment and purification plants

Customer Information System (CIS)
- Order To Cash
  Managing work related to the customer life cycle from the point service is initiated until the account is closed, including meter reading, billing, payment process, and collection activities

Request To Completion
- EAM | Managing work related to customer field service work, scheduling, dispatch, and execution of field service, transmission and distribution, and production
- CIS | Managing work related to customer interaction as it relates to customer service center activity, resulting in a service order or other follow-up activity
Composite Asset Register

- Both the Enterprise Asset Management System and Geographic Information System repositories contain asset data.
- Integrating these assets allows the full perspective of asset information to be viewed across all applicable dimensions at varying levels of detail:
  - Spatial
  - Technical
  - Financial

While preserving each system’s representation and functionality for the same asset.

ASSET: A physical item that makes up the utility network and has financial, operational, and/or engineering characteristics.

Shared Data Questions:
- Who is the Master?
- Does it need to be shared?
- How should it be shared?
- Are the data models reconciled to support shared data?
Composite Asset Register

- EAM-GIS integration is the management of core asset data across EAM and GIS to enable more effective and efficient maintenance planning and programs; and load/growth, replacement, and reliability planning and programs with the end objectives of achieving optimal capital and O&M spend and maximized reliability.

- For a utility that has attained leading practice in T&D asset management, EAM is the T&D system of record for all maintenance plans, maintenance and inspection activities, inspection observations, measurements, and diagnostic asset analysis. In addition, GIS is the T&D system of record for the as-built model, spatial attribution, and complete as-built connectivity including all mains, valves, pumps, etc. in a water/wastewater system.

- EAM-GIS integration consists of:
  - A shared asset data model with identified data ownership
  - Integrated workflows and business processes to manage the creation, update, and viewing of asset data across EAM and GIS
  - Supporting application integration components
  - GIS-enabled EAM maintenance and inspection enhancements
  - Composite EAM and GIS data for reporting and analysis
Composite Asset Register

- EAM-GIS integration allows asset information to be viewed, shared, and leveraged across several required dimensions – spatial, technical, financial, and performance - at varying levels of detail

- EAM-GIS Integration is integration at the data entity level
  - It is not limited to location-based relationships
  - This is a fundamental construct that provides multi-dimensional asset intelligence for asset management, planning, and engineering users need to support their lifecycle asset information management needs
• **EAM-to-GIS integration flows through the entire asset management lifecycle**
  - Separate views maintained during design and build
  - As-built is the integration trigger
  - Integration heavily leveraged during Operate & Maintain
  - Carried through to retirement

• **Any downstream system which obtains asset data from either EAM or GIS, by default, becomes a participant in the integrated asset view**
Implementation at American Water

Legend
- GIS to SAP integration flow
- SAP to GIS integration flow

Integration Administration

- Integration Staging Database
- Extract SAP Asset Data
- Update SAP Asset Data
- Extract GIS Asset Data
- Update GIS Asset Data
- New and/or Changed Assets
- Notifications: Exceptions, Errors

Assets must exist in SAP before adds or changes from GIS will be processed.

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SAP Workflow(s)

GIS Workflow(s)
Challenges

• 24 GIS Databases across 14 states
• 291 SAP Top Level Functional Locations
  - Each representing a unique water or wastewater system
  - Consistent naming formats for unique identifiers across multiple systems
• SQL Server cursor updates to the GIS Databases for hundreds of thousands of assets consumes many gigabytes of disc space as well as creates thousands of entries in the state lineage table in SDE
• Very large water systems (i.e. - St. Louis County) delta processing consumes more than 8GB of RAM in the SAP processing queue.
Benefits

• Foundation for system integration laid
  ▶ The SAP equipment ID has been passed over to the GIS System when assets have been linked by the integration
  ▶ Use of a map to locate SAP linked features rather than SAP equipment hierarchy
  ▶ Ability to view Work Order and Notification Details from within GIS:
Other Asset Systems

- SCADA
- Security
- Incident Management
- Main Break / Overflow
Future Possibilities

- Analytical interaction between SAP and GIS
- View based integration?
- Mapping more fields between SAP and GIS with more efficient processing
Questions & Answers
Thank You!

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