SWAN Digital Twin H2O Work Group
(View Work Group page HERE)

GOAL
To develop a common strategy for developing Digital Twin technology for global water utilities that will provide a means for managing operations and assets in real-time for greater operational efficiency, enhanced lifecycle asset management, and reduced costs. “Active Members” of the Work Group will help identify and develop a common understanding of the role of: the hydraulic model, asset management, diverse data sets (GIS, IoT, SCADA, CMMS, etc.) in both real-time and historical data, machine learning algorithms, and application integration for the calibration and use of the Digital Twin.

OBJECTIVES
✓ Identify key challenges for utilities utilizing the hydraulic model in operational mode
✓ Identify key challenges with data accuracy and data normalization across multiple systems
✓ Develop a holistic view of a water system via the culmination of digital technologies: IoT, VR/AR, mobility, machine learning, cloud computing, drones, etc.
✓ Identify and develop best practices for hydraulic model calibration including the utilization of real-time data from consumption meters, GIS, SCADA, CMMS, and other IoT sensors
✓ Identify and develop best practices for aggregating digital twin subsystems (i.e. a pump digital twin)
✓ Identify and develop best practices for utilizing machine learning to help accurately model the water system
✓ Develop best practices for accessing data from the various silos of systems, applications, and IoT
✓ Develop best practices for application integration and application mobility
✓ Develop best practices for the collaboration of IT and OT in utilities

INVolVEMENT OPTIONS
We plan to have around four conference calls a year for updates on the progress of each subgroup effort, as well as plan for two in-person meetings a year in the form of a workshop or work session. Below, are two different ways to become involved with the Work Group.
1) **Become an “Active Member” (for SWAN Members only):** Participate in one of the two subgroups (described below) including quarterly calls, have your company logo featured on the Work Group page, and collaborate directly with leading SWAN members to advance global Digital Twin utility adoption.

2) **Join as an “Observer Member”:** Receive updates on Work Group events, research projects and quarterly newsletters.

**JOIN A SUBGROUP**
We welcome all SWAN Members to collaborate and contribute their knowledge by volunteering in one of the two subgroups, outlined below:

(1) **Holistic Digital Twin Technology Architecture** – *Led by Gigi Karmous-Edwards (Karmous-Edwards Consulting) and Andreu Fargas (Consorci Aigues de Tarragona)*

**Objectives:**
- Define the core technology components of a digital twin
- Identify best practices steps in migrating an existing batch-mode hydraulic/other model to a continuous-mode model
- Identify useful data sets for both the input parameters, as well as the calibration of the model
- Identify areas for integration with existing systems, i.e: SCADA, CMMS, GIS, work-order, CIS, etc.
- Identify and define key interfaces between the sub-systems
- Identify if there is a need for middleware/glue-code in the development of a digital twin, if so outline best practices
- Find commonalities and differences with models for 1) DW, 2) WW, 3) Storm Water, 4) Source Water
- Develop a high-level architectural diagram

**Tasks:**
- Outline the core components: simulation model (which models), data pairing (which data), middleware for data integration, visualization
- Create a table of desirable data sets that will be used by a utility and their main purpose
- Draw high-level architecture of digital twin
- Create a table of utility systems that will need to integrate or exchange data with the digital twin
(2) Outcomes and Applications Subgroup – Led by Colby Manwaring (CEO – Innovyze)

Undertaking a Digital Twin initiative without specific application goals and required outcomes can quickly become an organizational quagmire. The enormous possible scope of a digital twin coupled with the mountain of available data sources, analytics engines, user interface options, and human adoption techniques is exciting, but prioritized outcomes are the key to navigating options and delivering tangible benefits. The Outcomes and Applications Subgroup of the Digital Twin H2O Workgroup looks to support successful implementations of digital twins by achieving the following

Objectives:
- Identify the most common desired outcomes that drive digital twin adoption, creation, usage – answering the question of “Why implement a digital twin?”
- Discover and share best practices for organizational stakeholder engagement (operations, engineering, management, etc.) in setting/agreeing to goals and outcomes of digital twin implementation.
- Rationalize “effort vs. ROI” around the creation and usage of a digital twin for popular desired outcomes. Point to real-world experiences in organizations who have achieved these outcomes and can share outlines of the required effort.
- Identify the different users of digital twin for the range of outcomes (i.e. customer experience dept. vs. operational, vs. business and revenue, etc.
- Identify the user’s UI for retrieving that outcome? In other words, what will the operation staff see vs. what will the other users use for obtaining that outcome?

Tasks:
- Create and complete a survey of water utilities, public agencies, private consultants, etc. (SWAN member network) to identify the Top 10 desired outcomes. Process this survey data and publish to SWAN.
- Identify companies/individuals who are in process or have completed goal setting/scope definition of digital twin initiatives. Document best organizational practices from these. Present at future Digital Twin H2O Workgroup meeting or general SWAN event.
- Choose 3-5 outcomes and outline the “typical effort” and data/tools/people challenges to achieve these. Present at future Digital Twin H2O Workgroup meetings.

If you are interested in joining the Work Group as an “Active” or “Observer” Member, please indicate so on the Work Group page contact form (located at the bottom of the page).

If you have any questions; please contact us at: digitaltwin@swan-forum.com