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Webcast

Intelligent Water Systems: Digital Maturity Model

August 20, 2020

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WRF 4714 Outputs

Funded in 2017 under WRF's Focus Area Program

Provided a forum for utilities to interact directly with more experienced users of intelligent water technologies

- Three regional workshops
- 2-day Summit highlighting case studies (slides available on WRF website)

Developed Maturity model framework and tool





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Intelligent Water Systems: Digital Maturity Model

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The Data Revolution is Here



The Digital Water Utility





Aligns with the "Digital Organization" in other industries

• Overlays data collection, information creation, and insight to improve efficiency and decision making

The Digital Water Utility

Where did this idea come from?

- WERF Project SENG7R16:
 Leveraging Other Industries Big Data Management
 - Involved 39 water utilities in workshops and surveys
- WRF Project #4714: Intelligent Networks Summit and Workshops
 - Involved more than 50 water utility representatives in 3 workshops and 1 summit

Why define Digital Water Utility?

- What do we mean by Digital Water Utility?
- How do I know when I get there?
- How do I compare to other water utilities?

Data vs Information (DIKW)

- Data with no context is not useful
 - Measured value = 3 ft
- Add other data and context
 - Timestamp: 9/11/2019, 11:23
 - Location: Tank 3
 - Relative to tank floor
 - Starts to become more useful



Data vs Information (DIKW)

- Combine with other information
 - Same time yesterday, last week, last year



The Value of NOW

- The value of information decays exponentially over time
- Perform real-time analytics on data to provide real-time intelligence





Water Utilities Often Have..

- Advanced metering infrastructure (AMI)
- Customer information system (CIS)
- Computerized maintenance management systems (CMMS)
- Geographic Information Systems (GIS)
- Laboratory information management systems (LIMS)
- Operational optimization tools
- Supervisory control and data acquisition (SCADA) system
- Enterprise asset management system (EAMS)
- Surveillance and Reponses System (SRS)
- Other applications?

These rarely share information, producing separate outputs

AMI

CIS

GIS

LIMS

SCADA

EAMS

SRS

CMMS

Digital Water Utility Information Architecture



Characteristics of a Digital Water Utility



Strategy & Vision



The approach and foresight for development of a digital water utility

- Enables development of internal governance and management processes
- Promotes collaborative relationships with stakeholders
- Guides a successful digital water utility transformation

Risk & Resiliency



How the utility uses information to reduce risk and enhance resiliency

- Focuses on the utility's ability to plan, proactively identify and manage disruptions, and recover quickly
- Includes risk and resiliency components as a design element
- Data architecture supports resiliency
- Uses analytic tools to identify impacted customers based on system failures and operational outages





How information optimizes the workforce to advance the digital strategy

- Optimally manages staff core to meeting the utility's goals
- May require additional workforce
- Changes to organization remove organizational data latencies
- Roles may change due to digitization of the utility
- Training optimizes use of tools

Asset Management



How information is being used to manage assets

- Considers capabilities that support optimal management of the organization's assets
- Focus on predictive and planned management of assets
- Information helps optimize the availability of assets

Data Management



How information is collected, its quality maintained, transmitted to the correct point of analysis

- Data as the input must be accurate and available for processing
- Includes measurements from sensors, customer complaints or other interactions, social media posts, work order details, etc.
- Data transmitted using technologies such as radio, copper cable, fiber cable, or cellular
- Minimizes "dark data" where data goes to die
- Data system of record single source of truth

Integration & Interoperability

How information management systems are integrated across the organization

- Manages and fuses information to achieve cross-discipline interoperability
- Enables real-time situational awareness to drive informed decisions
- Connect and integrate all systems



Analytics & Information Use



Methods used for data analysis to produce useful, actionable information

- Converts data into information uses analytics with automated algorithms
- Increasing maturity reflects automated operations with significant flexibility and a high degree of situational awareness
- Real-time situational awareness to drive informed decisions
- Define, document and prioritize core analytics use cases







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Business Case Diagnostics

Benchmark Data





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Services

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Establish and Benchmark Current State with WRF¹ & SWAN² Endorsed Methodology



¹ WRF – Water Research Foundation, ² SWAN - Smart Water Networks Forum



Maturity Levels Defined for Each Category

Example for Data Management

Data are collected manually as needed.

Data sources may exist, with data collected and stored. Collection may not be continuous.

The right data are collected to support information creation. Data sources are confirmed or calibrated to check quality.

Data are collected and communicated in a timely manner. Data quality is monitored and managed.

Level 4: Unique

needed

Level 3:

Timely

Redundant data sources are eliminated so that only data that have a use are collected. Each data source is a single source of truth.

Level 5: Reliable

Data are validated, verified, and available, and considered highly reliable for making sound business decisions.



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Lessons Learned



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Key Takeaways

- Smart Water Journey is a complex process that requires proper planning
- Creating a Strategic Plan provides focus in implementing
- Critical for utilities to understand organizational strengths and weaknesses
- Assessing the digital maturity provides the utility with a roadmap to becoming a digital utility

Information Architecture – How do we do this?





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Knowledge

Information

Data



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Best practices A successful business strategy...



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Digital Utilities Best Practices

- Understand the maturity of the organization
- Develop a Strategic Plan to improve the digital maturity in key parts of the organization
- Align the Strategic Plan with the Mission and Vision of the Organization
- Collaborate and engage with all parts of the organization to gain acceptance before moving forward

Benchmarking Questionnaire



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Questions?

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Thank you!

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