

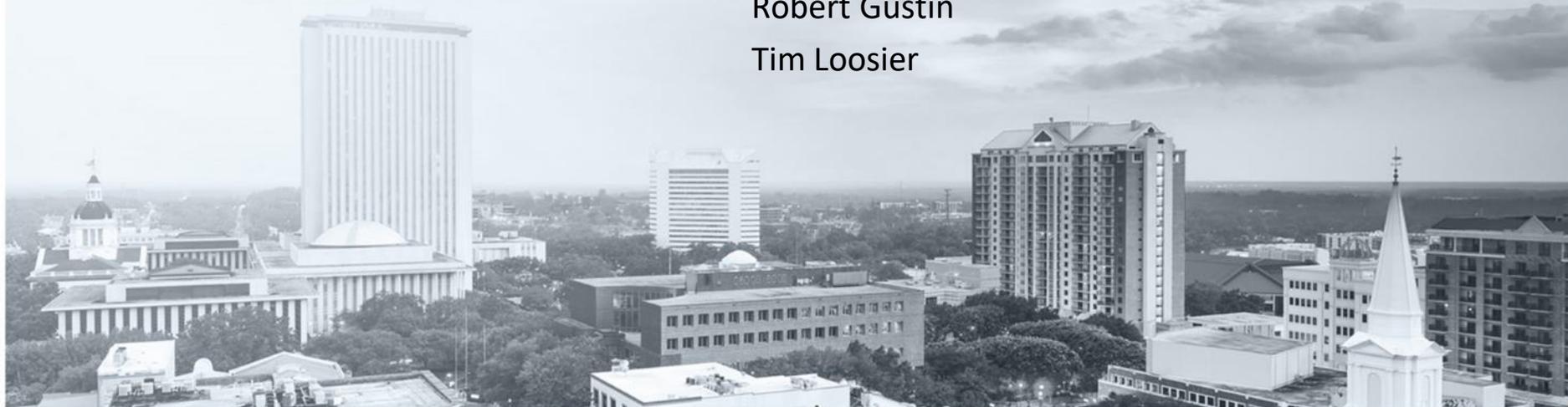


Improving Utility Operations through AMI Data Analytics

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Smart Water AMI Networks - Enhancing Utility Operations

- AWWA 2018 “State of the Water Industry” Report - renewal & replacement of aging infrastructure top of utility concerns
- Smart Water AMI Solutions today offer a myriad of data beyond billing, including operational data to improve overall utility operations and customer service
- Smart Water AMI Systems can support interoperable, enterprise-level, real-time data sharing
- Real-time enterprise applications allow utilities to turn AMI, GIS, CIS, and SCADA data into actionable data
- Sharing of such data can reduce operational expenditures & improve long-term capital planning



Simplified AMI System Architecture



Platform and Applications Support

Cloud-Based Platform Management

- AMR and AMI data integration
- Secure applications access
- Integration with 3rd party applications (APIs)
- Data processing and analytics
- Master data management
- Systems and operations management

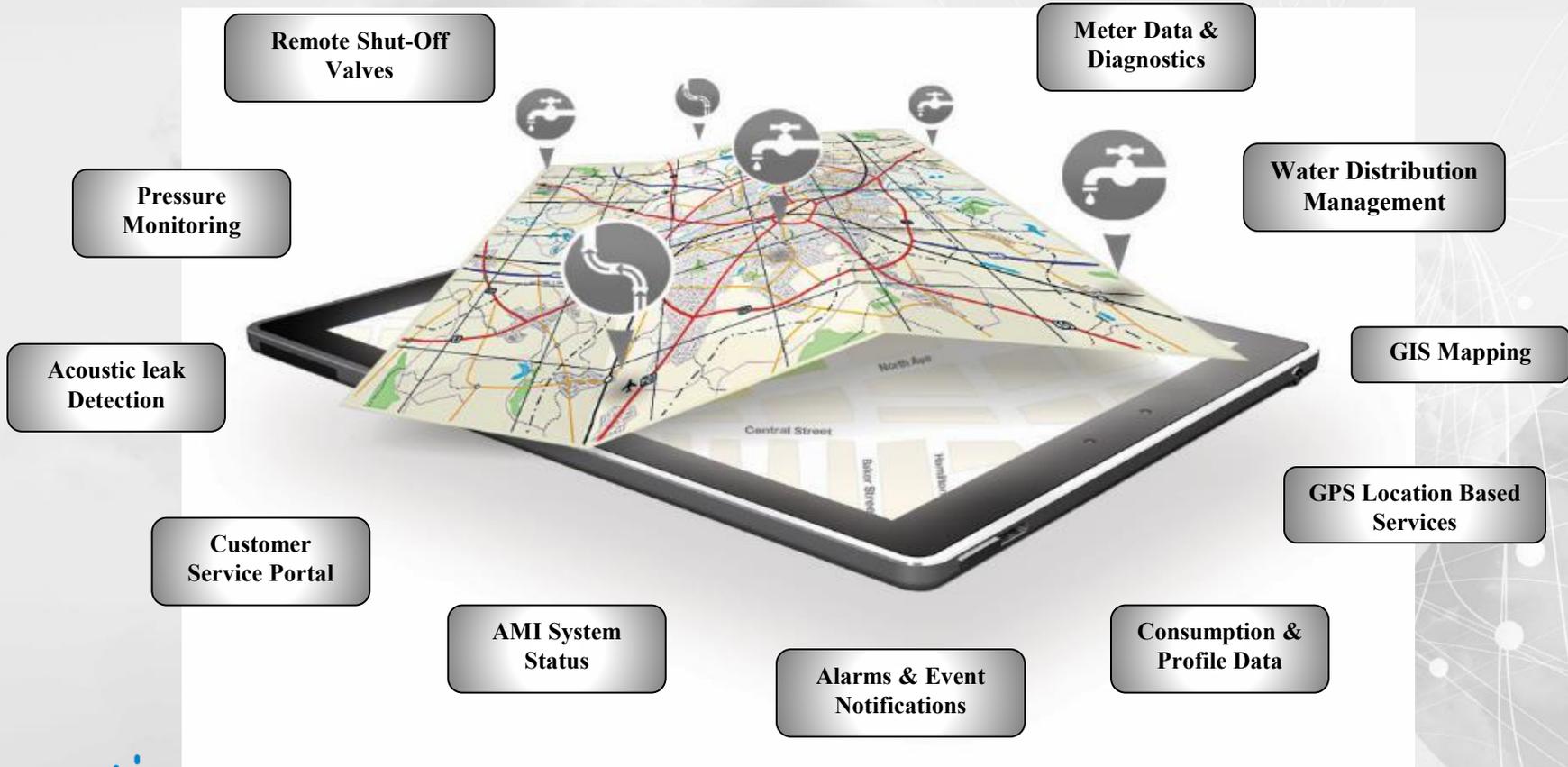
SaaS Software & Applications Support

- Utility owns the data
- Secure data managed in a “cloud-hosted” platform
- Data redundancy with back-up on multiple servers
- Web hosting provides confidence in data management and storage

Cloud-Based Data Management Platform Provides for Enhanced Security, Scalability, and Data Access Across the Utility



Managing the Data and Applications



Integrate and Share Data Seamlessly

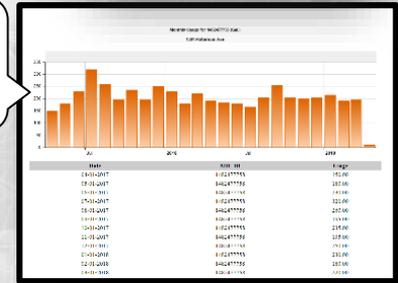
Create Actionable Data

- Import or export billing and event files
- Export consumption graphs to utility personnel to escalate work orders
- Email consumption activities to customers to resolve inquiries and billing disputes
- Resolve customer issues faster with consumption activity history
- Analyze individual trends and usage patterns
- Quickly identify potential leaks, excessive consumption, and reverse flow

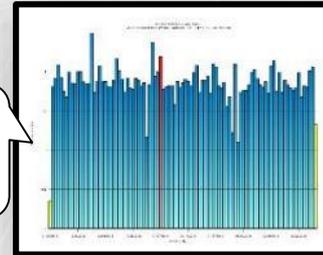
Access and Sharing of Data is Crucial to Utility Operations and Customer Support



Head End System



Android/iOS Compatible Devices

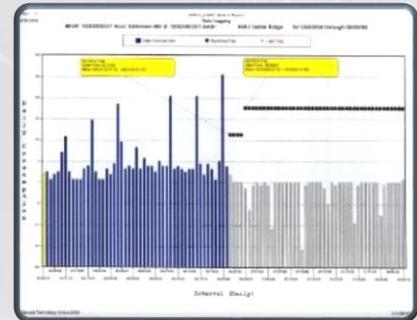
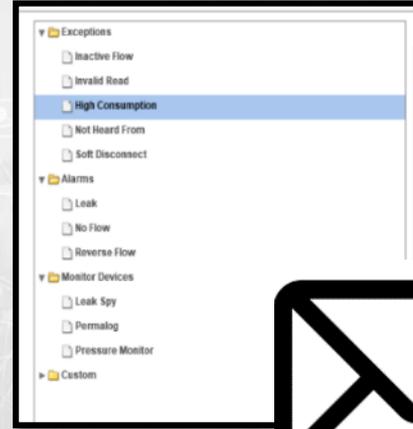


Analyze Data at the Source

Meter Data & Diagnostics

Typical encoded register alarms/flag information can be provided to utility personnel via email notification or text message upon the event occurring.

- Zero Consumption
- Reverse Flow Condition
- Invalid Read
- Tamper Condition
- High Consumption
- Not Heard From
- Soft Disconnect with Usage



Priority Alarms and Event Notifications for Improved Meter Operations and Customer Service

Consumption and Profile Data

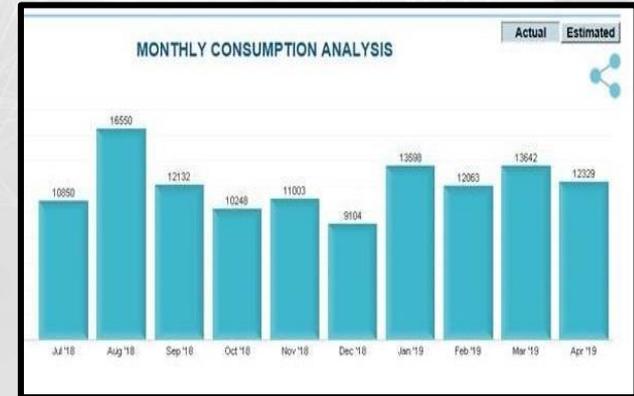
Daily Consumption Graph & Chart



Hourly Consumption



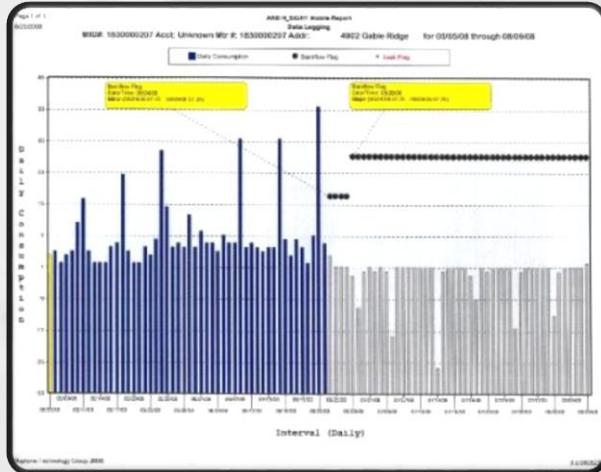
Monthly Consumption



Access to Current and Historical Consumption Data to aid in Billing and Conservation Efforts

Backflow and Leak Detection

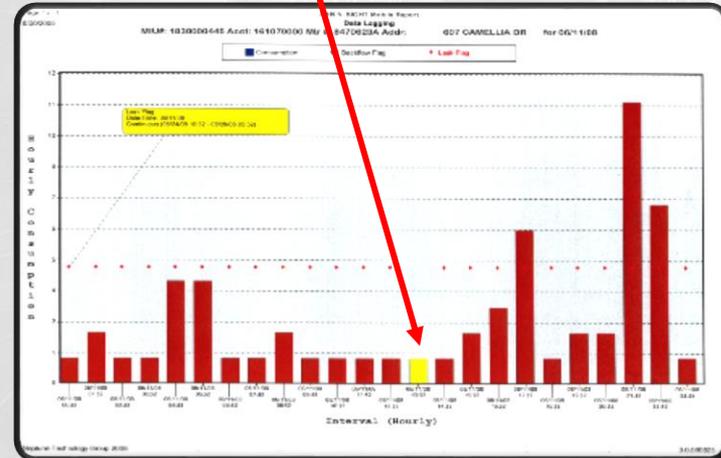
Daily Consumption – Major Backflow



Identification of Events and Anomalies for Water Quality and Reduce Non-Revenue Water

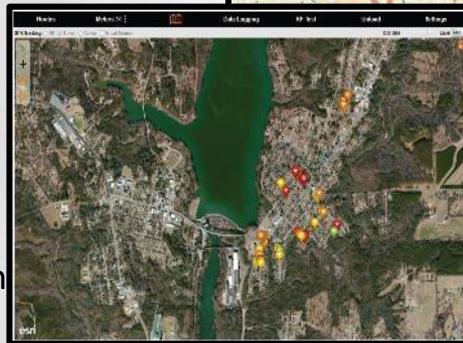
Hourly Interval Graph – Leak

- Usage never goes to zero
- Eight-digit resolution identified the leak
- Possibly undetected with a six-digit encoder



Integration with GIS Mapping

- Support a variety of map layers across the service area
- Mapping functionality
 - Configurable map views that can be saved for future access
 - Search capability to quickly identify points on the map
 - Selection tool to easily group a number of points at once
- Support for ESRI base map integration
- Available map layers include:
 - Leak
 - Reverse flow
 - Zero consumption
 - Soft-Disconnect
 - Not heard from
 - Missed
 - Inactive with usage
 - Collector information
 - Collector status
 - End-point status



- Continuous Consumption
- Major Reverse flow
- Top Accounts Consumption



Continuous Leaks

GIS Data and Mapping Provides Visibility to Distribution Assets and Water Operations

Distribution System Leak Detection

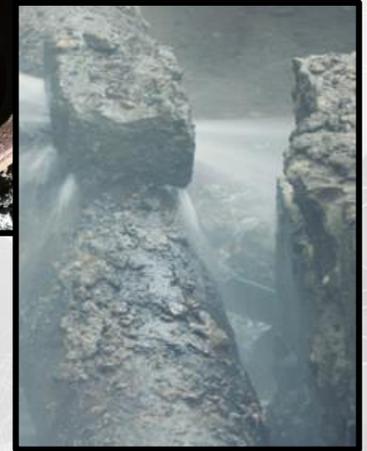
Acoustic Leak Detection Logger

- Mobile or fixed network solution
- Acoustic monitoring at night
- Frequency and level indicate possible leaks
- Leak status report
 - No leak, Small Leak, Large Leak
- Leak status layer available for mapping

Application Benefits

- Increase knowledge of the distribution system
- Respond more quickly to emergencies
- Set priorities for repair & replacement

Detect, Locate, and Repair Distribution System Leaks Quickly Before Evolving into Major Event



Distribution System Pressure Monitoring

Improved Distribution Operations

- Reduce non-revenue water
- Identify potential infrastructure failures related to pressure fluctuation
- Improve pump management and reduce energy costs
- Improve public health and safety

Smart Water Network Support

- AMI 15-minute interval measurement
- AMR hourly interval data-logging at MIU

Monitor and Manage Distribution System Pressure and Capacity for Improved Water Delivery



Pressure & Profile Screens



System Monitoring and Customer Service

Smart Water AMI Network Status

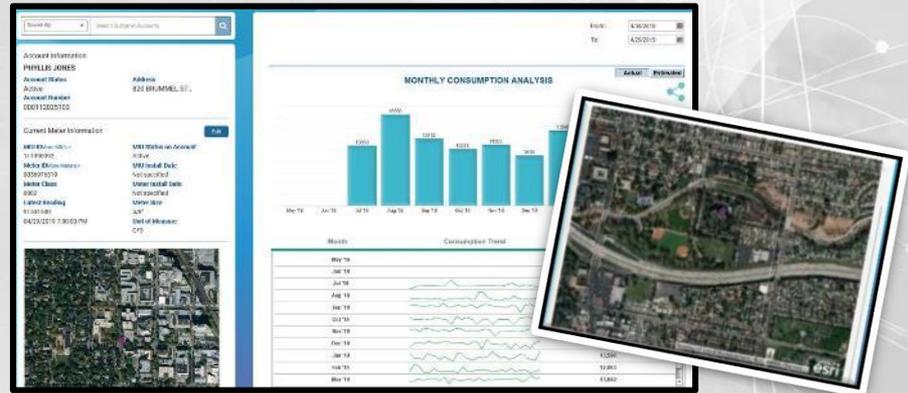
- View at-a-glance of the AMI system efficiency
- Dashboard of Key Performance Indicators (KPI's)
 - MIU efficiency
 - Data collector efficiency
 - Leak and reverse flow events



Customer Service Screens

- Quick access to customer account data
- A customer service tool to assist CSR's with
 - High water bill complaints
 - Comment tracking
- Advanced search capabilities
- Graphical and tabular consumption data

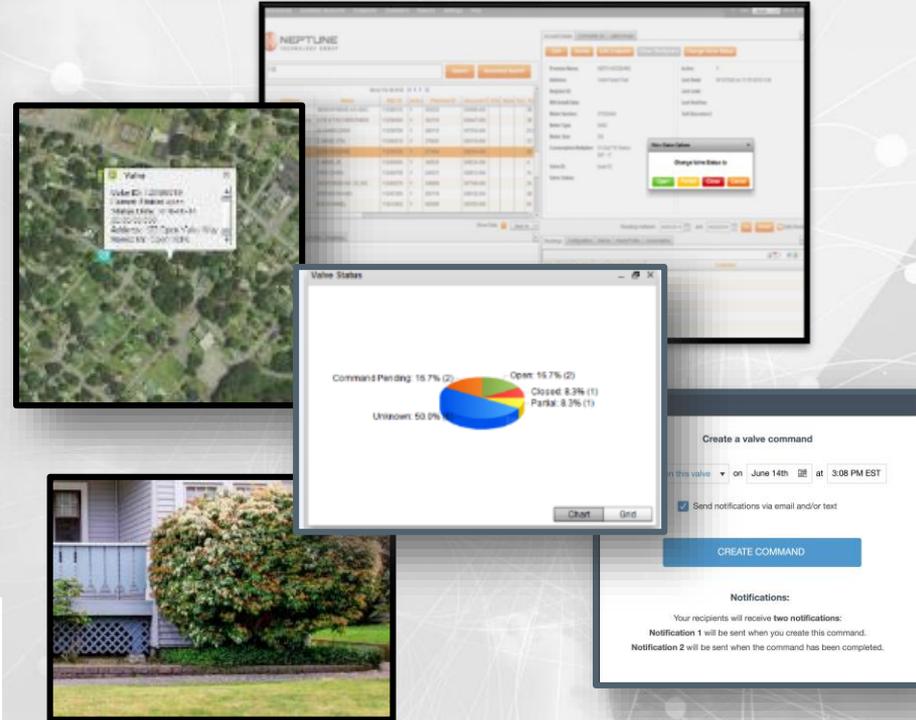
Monitoring Smart Water AMI Network Health and Improved Customer Service



Remote Shut-Off Valve (RSV)

RSV Operations Support

- Valve controlled remotely using Head End System (HES)
- HES provides for standardized reporting and map-based views of valve status
- Custom API's route commands through 3rd party enterprise (cloud-based system) via cellular wireless network
- Program for full shut off/on from office
- Program for 95% trickle flow shut off



Reduction in Work Orders and Costs Associated with Truck Rolls and Back-Office Support, Free up Resources and Funds for Capital Improvement Projects

Smart Water AMI Networks – Concluding Thoughts

- Today access to real-time and historical system data is crucial to optimizing utility operations and enhancing customer service
- Software applications play a crucial role in creating a Smart Water AMI Network to collect and leverage data across the utility enterprise
- Smart Water AMI Systems can support interoperable , enterprise-level, real-time data sharing (CIS, GIS, WMS, SCADA)
- By using host software analytics your utility can create key performance indicators (KPIs) for assets and systems to reduce operational expenditures & improve long-term capital planning
- Smart Water AMI Networks are no longer a vision to the future, but today's tool for utility excellence!





Thank You!