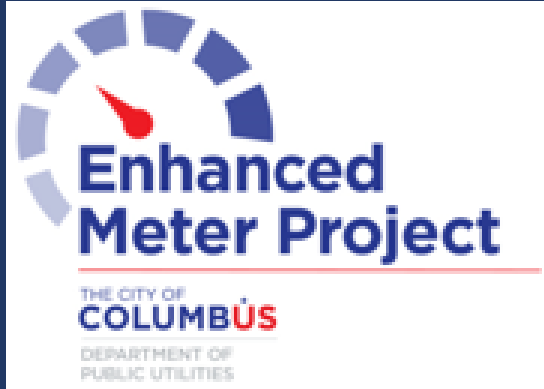


City of Columbus Department of Public Utilities (DPU)



Implementing An Advanced Metering System

November 14, 2023

Kevin Knisley



Objectives

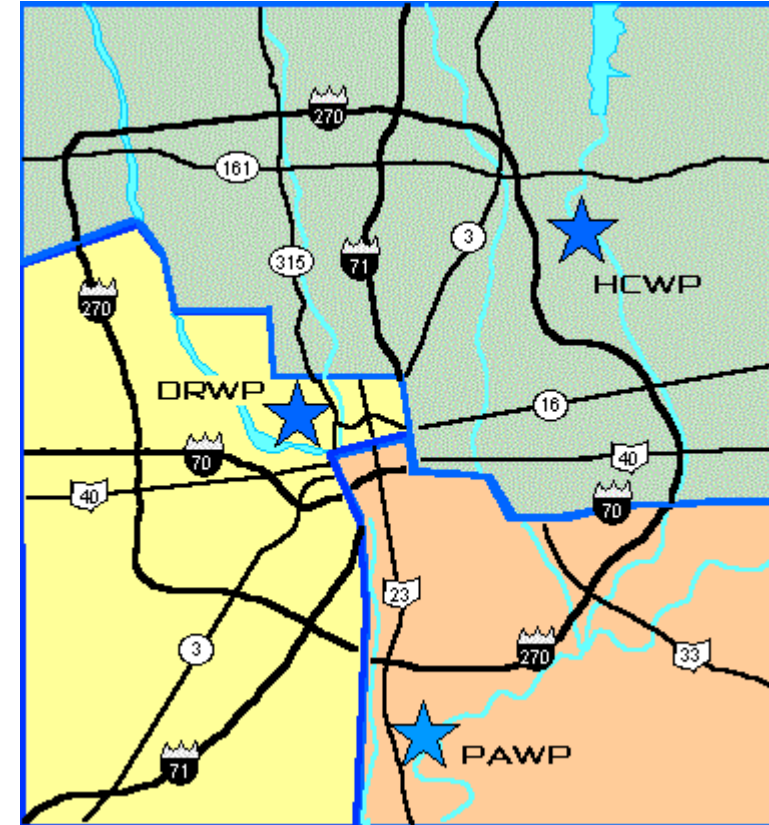


- Overview of the Department of Public Utilities
- Background of current meter reading practices and challenges
- The AMI solution
- Vendor selection
- Expected & realized benefits
- Systems Integrations
- Installation process
- Installation challenges

Overview

Water System

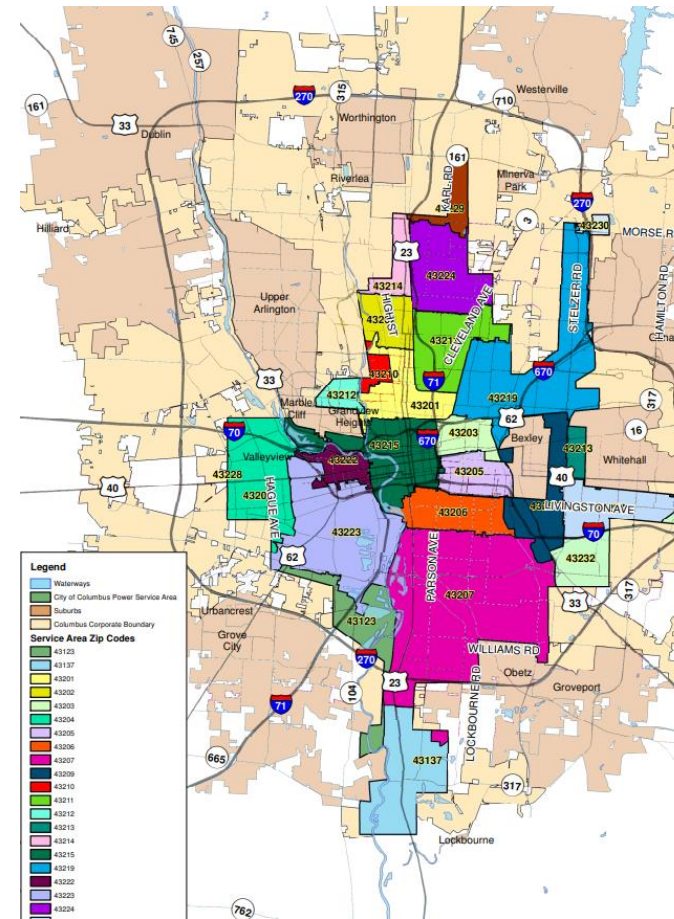
- Last year the Division of Water delivered 53 billion gallons of drinking water to over 1.36 million residents
- Currently have 3 water treatment plants
 - Dublin Road Water Plant (surface water)
 - Hap Cremean Water Plant (surface water)
 - Parsons Avenue Water Plant (ground water)
- A 4th water treatment plant is currently in design
- There are ~310,000 water meters in our system



Overview cont'd

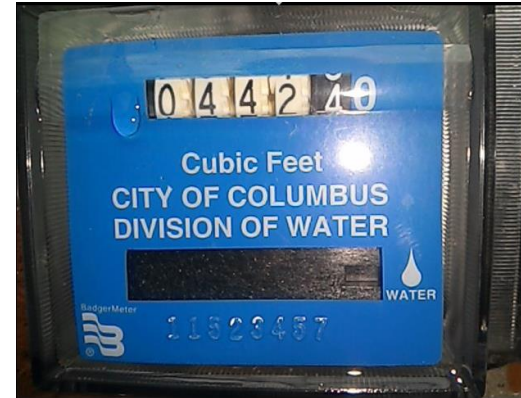
Power System

- The Division of Power is a full service, publicly owned electrical utility that provides power to industry, businesses and residential customers
- The city's street light system is funded from DOP generated revenue
- There are ~17,000 power meters in our system



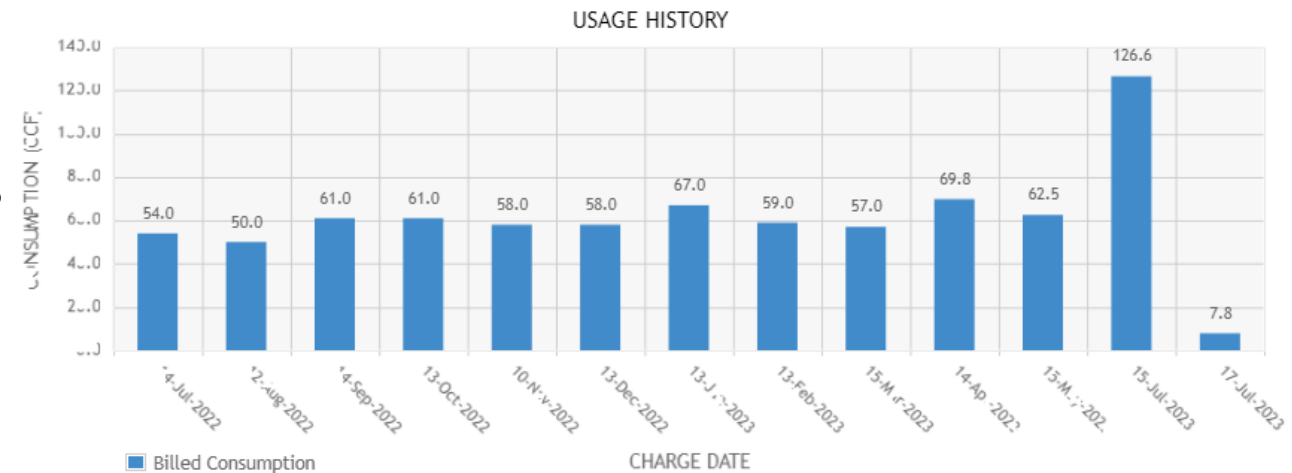
Current Meter Reading Practices

- Meters are read manually by meter readers
- Residential water meters are read quarterly
- Most commercial water and all electric meters are read monthly

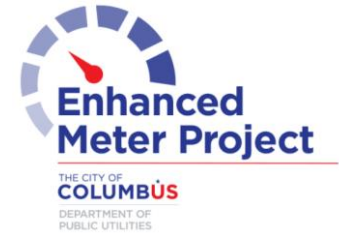


Challenges of Current Meter Reading Practices

- Field visit needed to collect readings
- One reading does not provide insight into consumption patterns
- Customers are often unaware of potential leaks or issues until after they receive a bill
- Technology is becoming obsolete



The AMI Solution



- In 2009, the Department started exploring AMI
- In 2010, an initial Business Case Study was performed
 - ~\$68M
- In 2016 our consultant (EMA, Inc.) provided a roadmap with possible solutions
 - Walk-by
 - Mobile
 - Fixed-base (AMI)
 - Hybrid
- We analyzed costs, benefits, and payback duration
 - Cost varied from ~\$96M for walk-by to \$110M for fixed-base
- Ultimately decided on fixed-base (AMI)



Vendor Selection

2019

- In 2019 we submitted an RFP to install a fixed-base system
- Ultimately decided to partner with Sensus, a Xylem Brand, to install their FlexNet System
 - Utility Metering Solutions (UMS), a subcontractor of Sensus, will perform meter replacement work

Budget

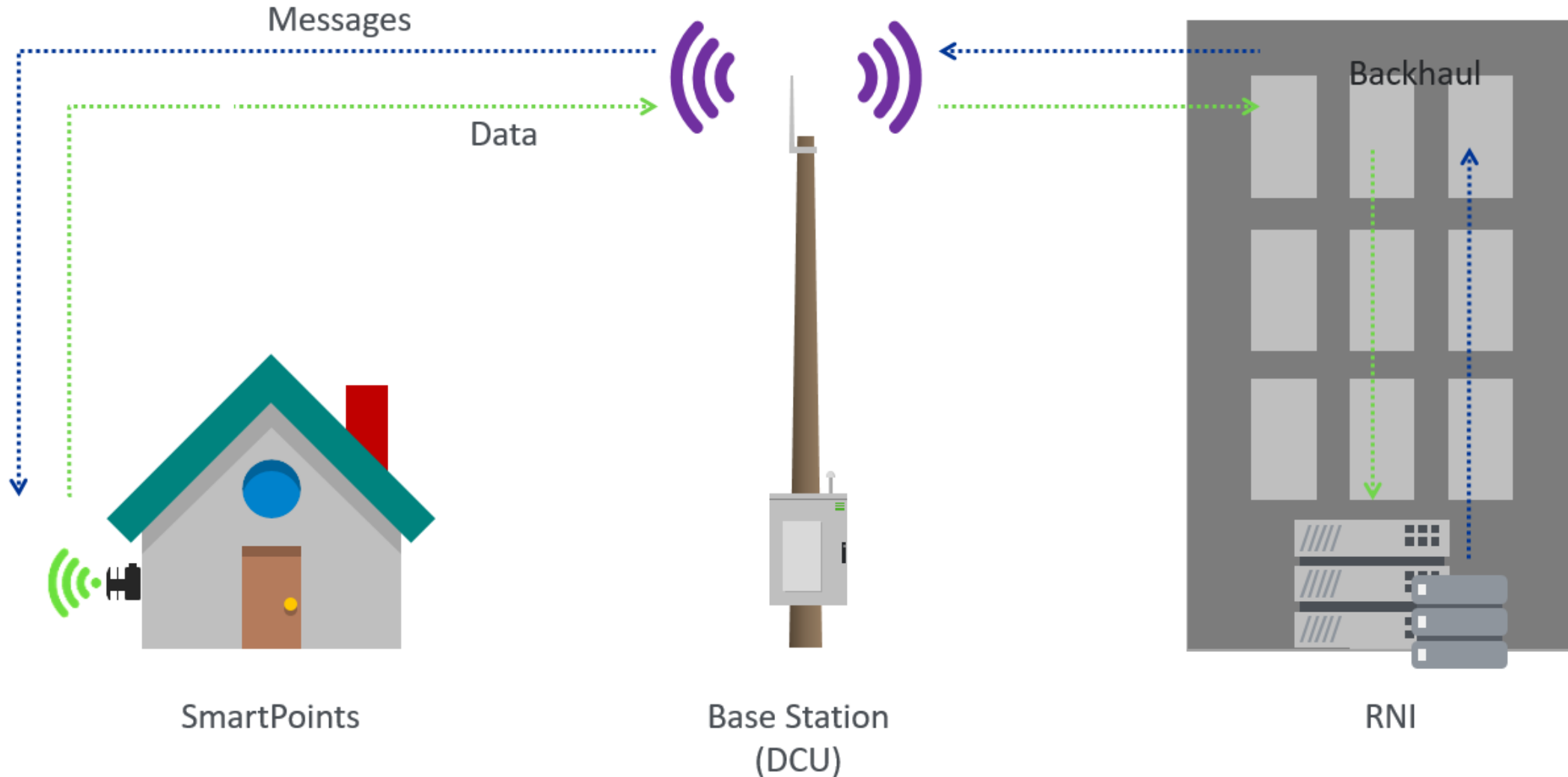
- Capital
 - ~\$78M – Sensus contracts
 - ~\$55M – meter equipment contracts
 - ~\$8M – program management
 - Funding secured through WSRLA
- Operating
 - ~\$1.5M annually
- Total
 - ~\$142M

2020

- Kickoff & Notice to Proceed: September 9, 2020
- Development workshops: October – November 2020
- Data Collector Units (DCU's): November 2020 – February 2021



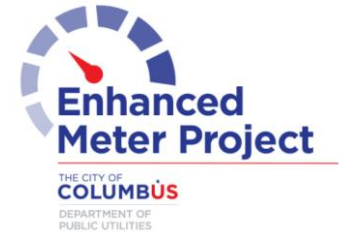
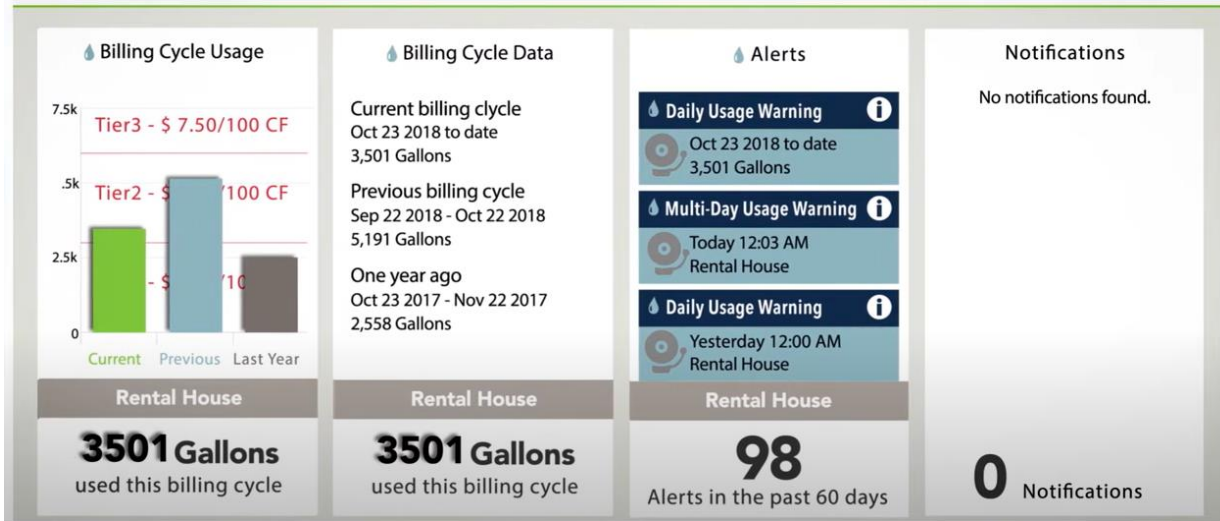
Major Components of FlexNet



Benefits

Enhance Customer Service

- An online customer portal will be developed where customers can:
 - Sign up for leak alerts about water usage
 - Vacation alerts (usage when marked as not home)
 - High consumption alerts (i.e. conservation)



Billing Cycle Usage Alert

Alert me when a meter is using more than a given amount in a billing cycle.

Meter # [REDACTED] NEW ALBAN OH 43054

Alert me when usage exceeds

Enabled Save

Daily Usage Alert

Alert me when a meter is using more than a given amount in a day.

Meter # [REDACTED] NEW ALBAN OH 43054

Average Use 2045 Gal

Alert me when usage exceeds

Enabled Save

Multi-Day Alert

Monitor meter usage over 7 days.

Meter # [REDACTED] NEW ALBAN OH 43054

Average Use 14313 Gal over 7 days

Monitor usage over 7 days

Alert me when usage exceeds

Enabled Save

Vacation Alerts

Temporarily override your normal daily alert usage.

Meter # [REDACTED] NEW ALBAN OH 43054

Starting on Ending on

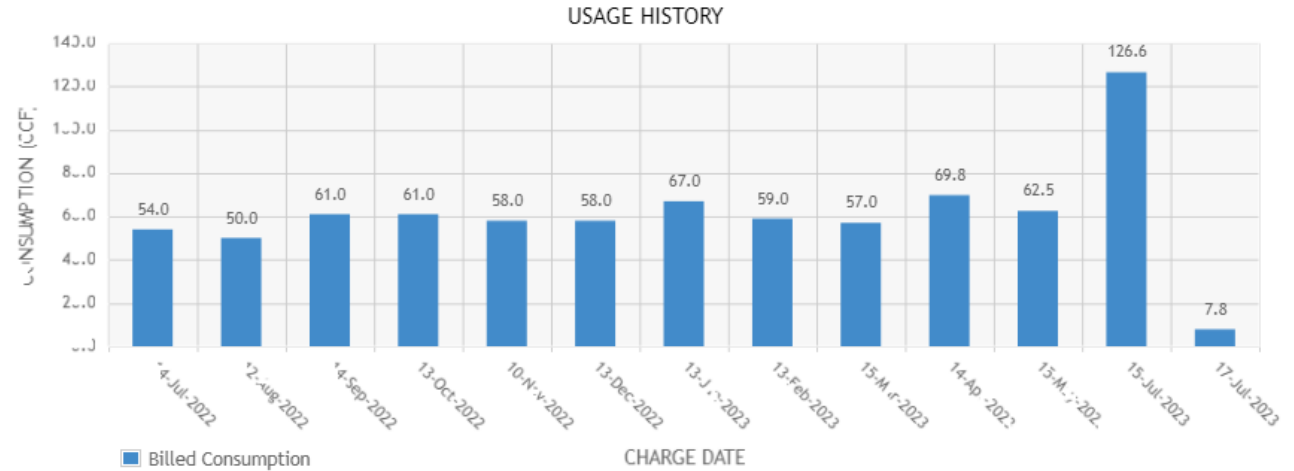
Alert me when usage exceeds

Enabled Save

Benefits cont'd

Enhance Customer Service cont'd

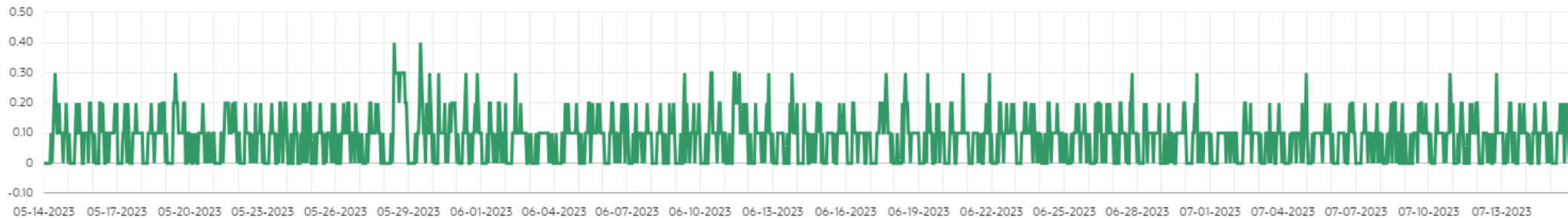
- Review their usage
- See how they're trending for the month
- Compare their usage to previous months
- Eliminate most estimated bills
- Reduction in outage duration for Power customers



Select Function ▾

Total 125.80 Minimum 0.00 at 05-14-2023 1:00:00AM EDT Maximum 0.40 at 05-28-2023 10:00:00AM EDT

CCF



05-14-2023 12:00:00AM EDT - 07-16-2023 12:00:00AM EDT

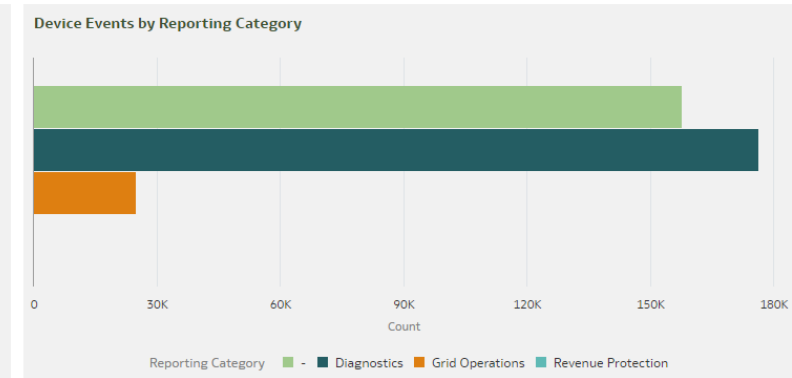
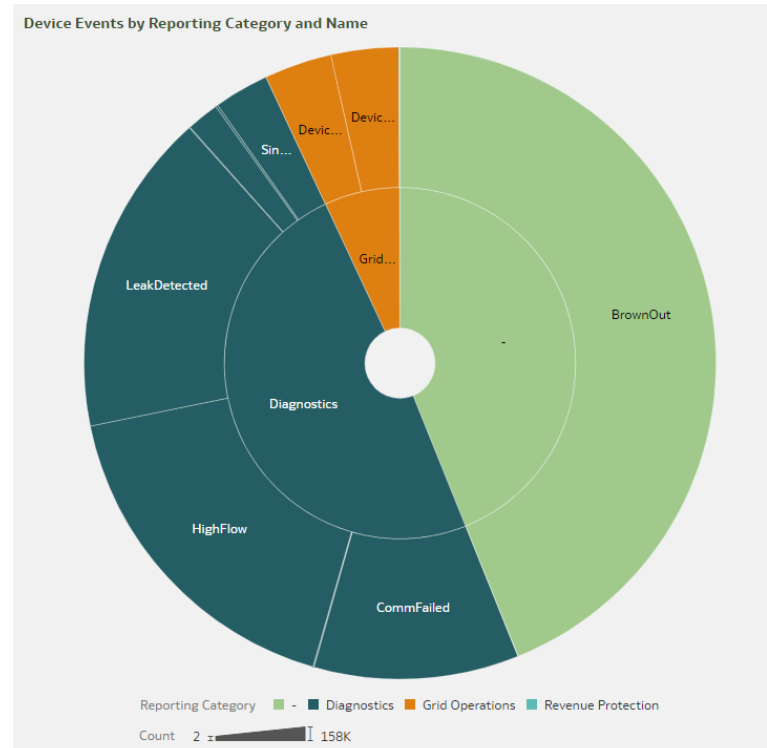
Benefits cont'd

Greater Operational Efficiency

- Reduce manual meter readings
- Reduce field inspections
- Real time final reads and check reads
- Real time analytics
- Remote connect/disconnect for Power customers

Sustain Equitable Meter Accuracy

- Replacement of meters
- Real time tamper detection
- Reduction of estimated readings



Device Events by Reporting Category and Name

Reporting Category	Standard Event Name	Device Count	Device Event Count
-	BrownOut	1,679	157,556
-	HighTemperatureShutoff	2	3
Grid Operations	LowSmartPointBatteryVolts	3	24
Revenue Protection	SwappedMeter	13	56
Diagnostics	CommFailed	141	37,606

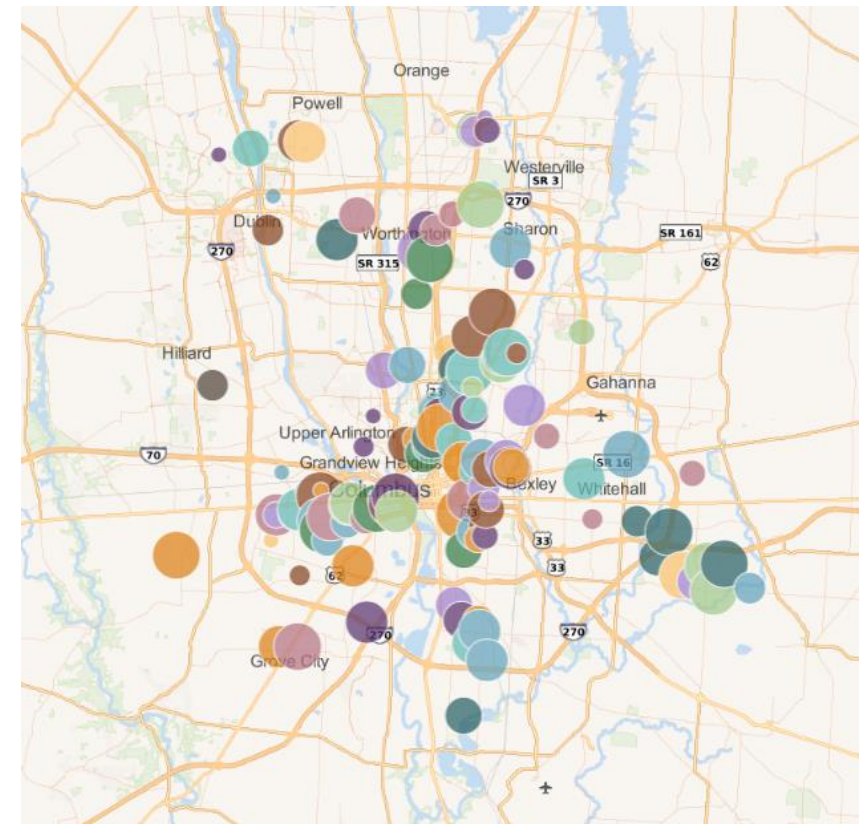
Standard Event Name

- BrownOut
- HighTemperatureShutoff
- LowSmartPointBatteryVolts
- SwappedMeter
- CommFailed
- EmptyPipe
- HighFlow
- LeakDetected
- MomentaryOutage
- OverVoltage
- ReverseFlow
- SinglePhaseFail
- DevicePowerOutage
- DevicePowerRestoration
- DeviceReverseRotation

Benefits cont'd

- Access to OUAV (Oracle Utilities Analytics Visualization)
- Can view meter device events and analyze trends

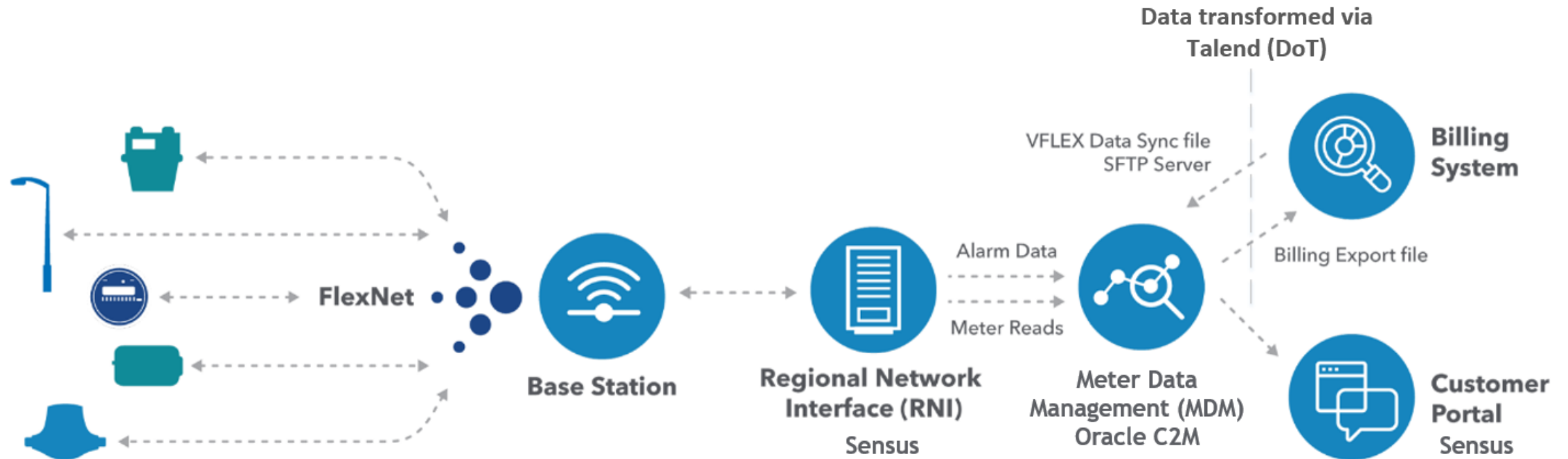
Map overview of Communication Failures



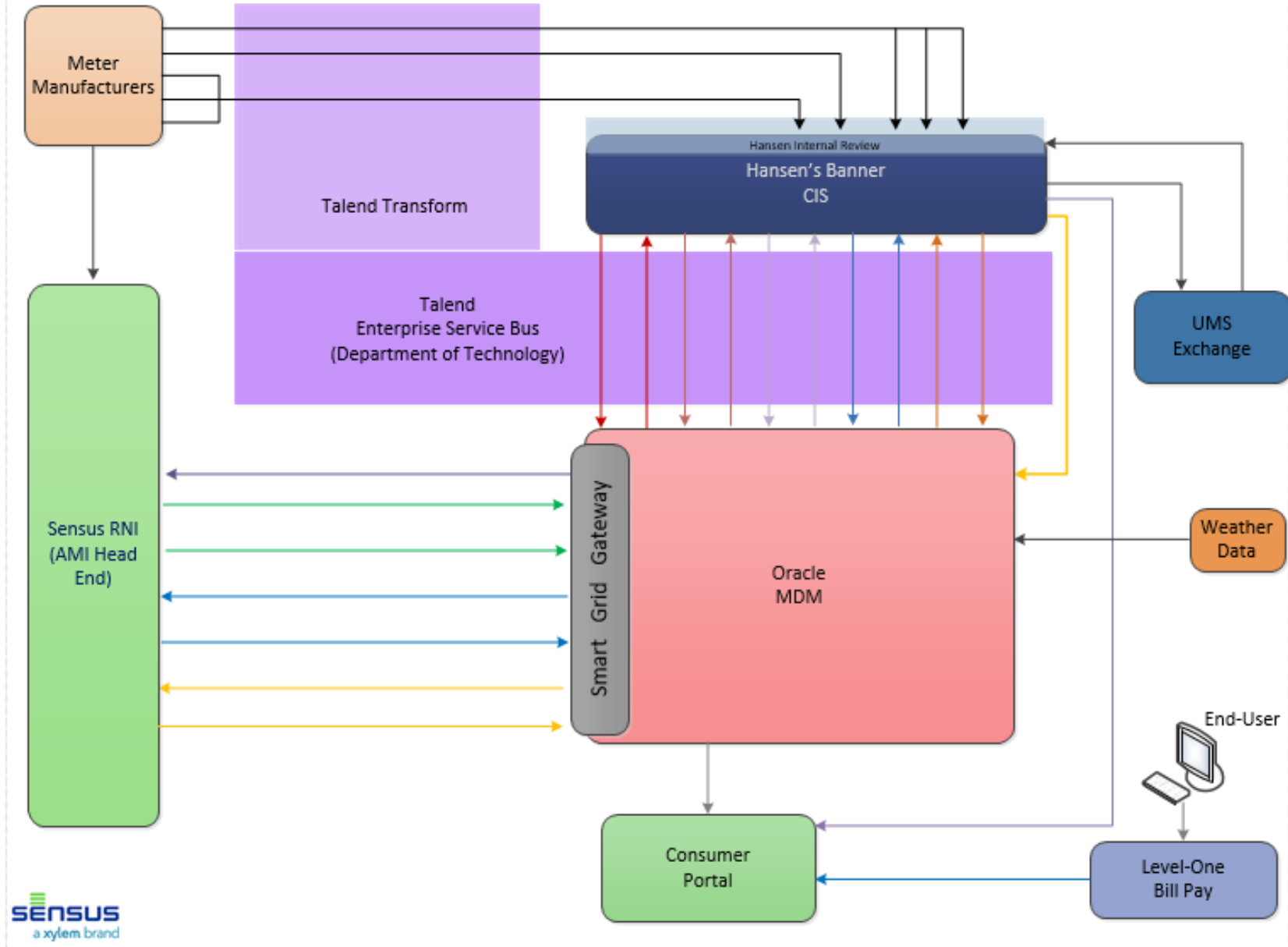
Software Integrations

- Originally scheduled: ~7 months
- Actual schedule: ~23 months
- Integrated new meter data management (MDM) software to existing billing system
- Extremely complex integration architecture

FlexNet Data Flow across Platforms



COLUMBUS INTEGRATION ARCHITECTURE

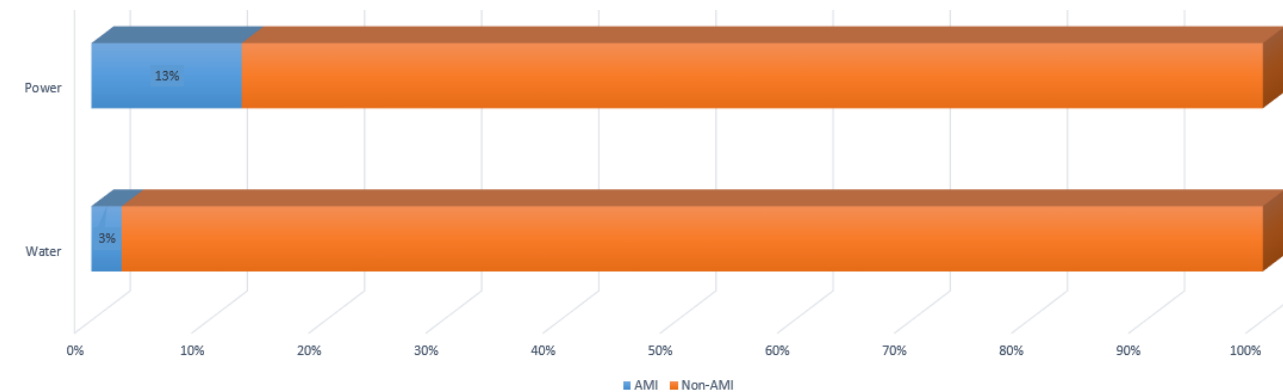


Installation Process

- The project will move throughout the service area following existing meter dispatching zones
- Water customers will be notified by UMS when the project is moving to their zone
 - There are 8 direct contact attempts
 - 6 by UMS, 2 by DPU
 - As zones become available the EMP project team meets with corresponding Area Commissions
- Customer will need to schedule an appointment
- Most power customers will not need an appointment
 - 48 hour notice prior to meter replacement
 - Power is expected to be out for approximately 15 minutes

Installation Challenges

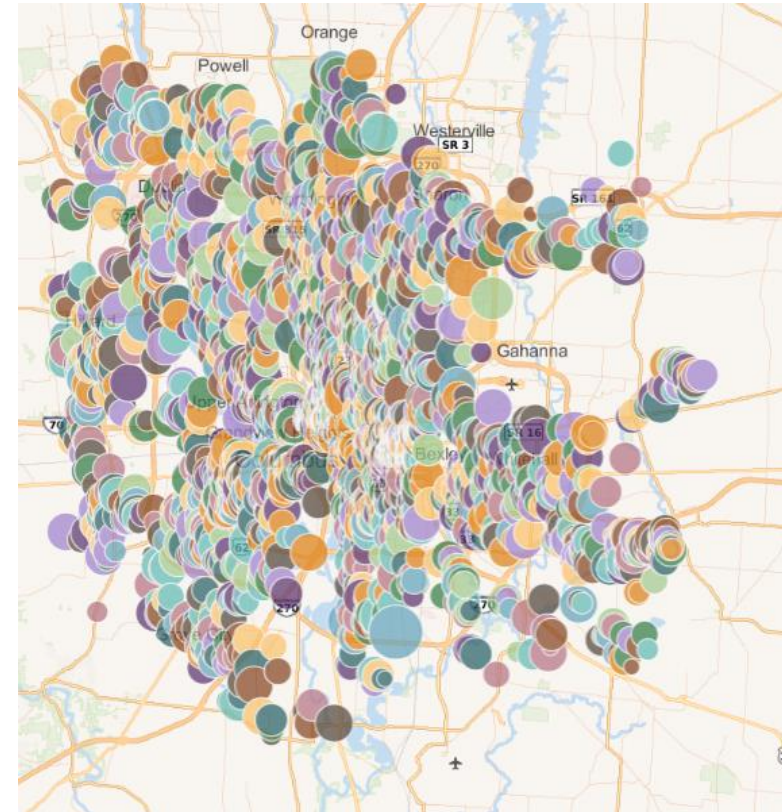
- Endpoint availability impacted by global supply chain shortages
- Used 2022 to stockpile inventory
- Water residential installs started January 23, 2023
- Commercial meter installs started February 6, 2023
- Pace is about 1/5th of where it would have been
- Project completion date extended from April 2024 to January 2027
- Challenges booking appointments post Covid



Installation Challenges cont'd

Understanding the specifics and limitations of your system

- Best practices for alert thresholds
 - What the system can and can't do
- Developing business processes
 - How to handle the various alerts
 - Who's reviewing the data?
 - Who's driving business decisions?



In Closing



- Do you receive water or power service from the City of Columbus Department of Public Utilities?
- If Yes, when you receive notification the project is in your area please schedule your appointment
 - Phone: 833-232-3202
 - Online: ColumbusEMP.org

Questions?



Contact: Kevin Knisley, Program Coordinator with the Division of Water

Phone: 614-645-7064

Email: kaknisley@columbus.gov

Visit the Enhanced Meter Project website: ColumbusEMP.org