

Water Utility Data Management Systems

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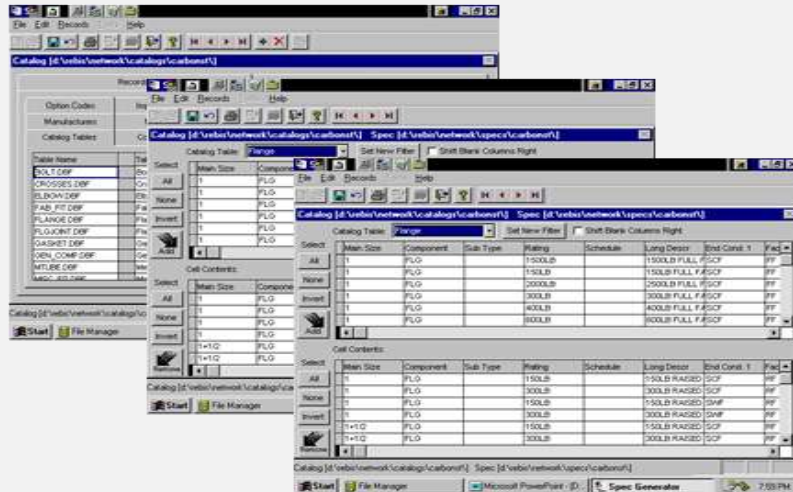
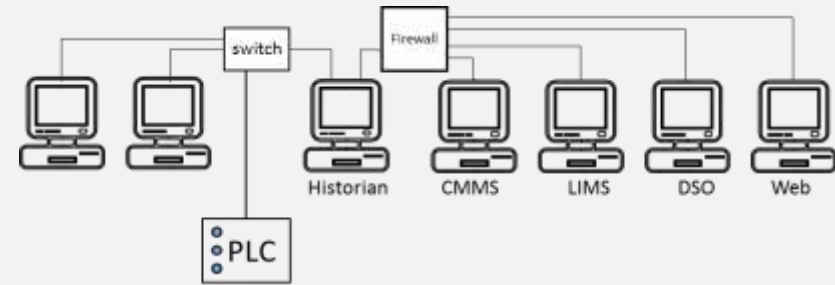


**Data management is the
function of planning,
controlling and delivering
data effectively.**

Data is the foundation of knowledge

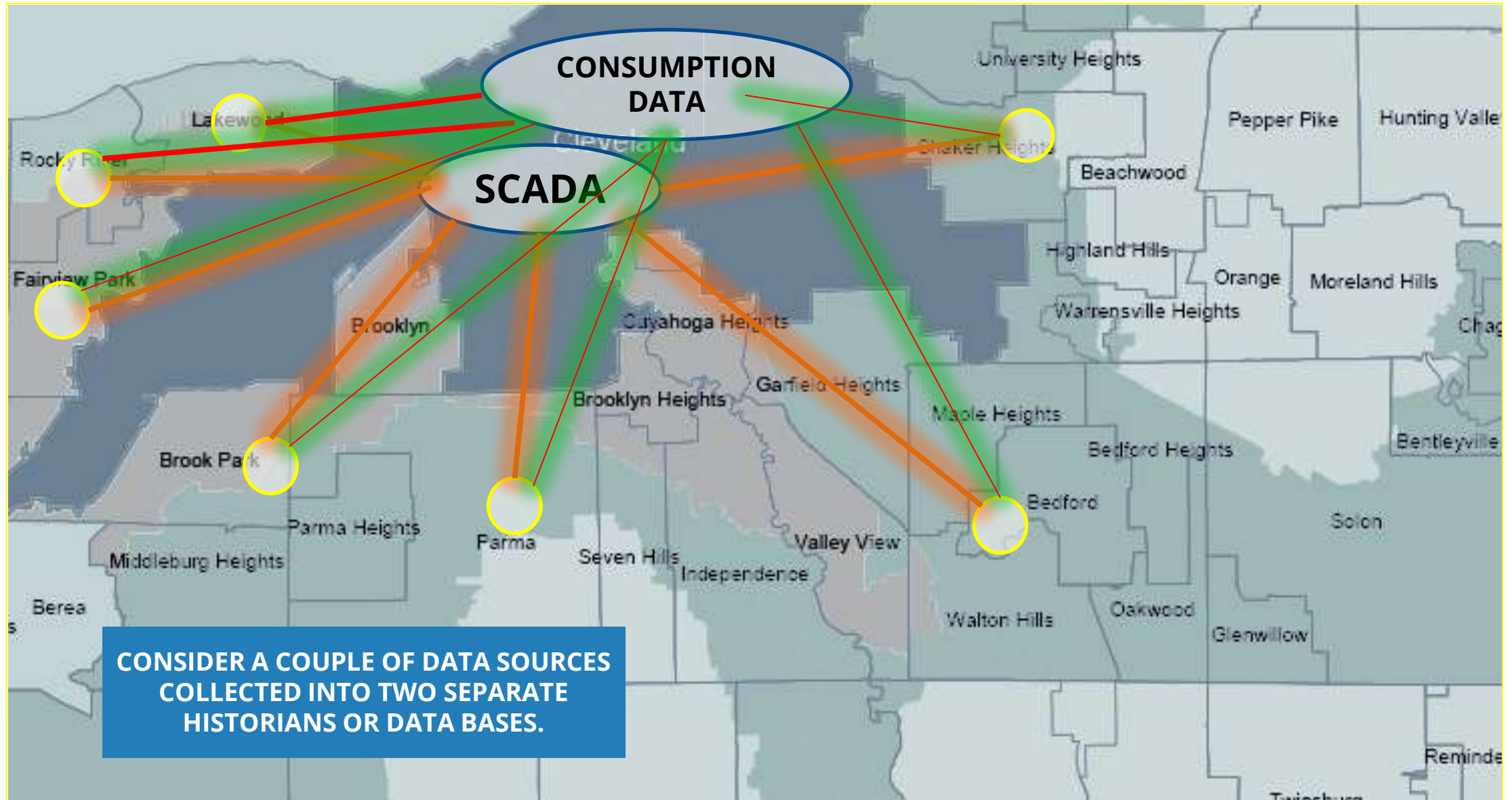
- ✓ You can do more with SCADA than monitoring and control.

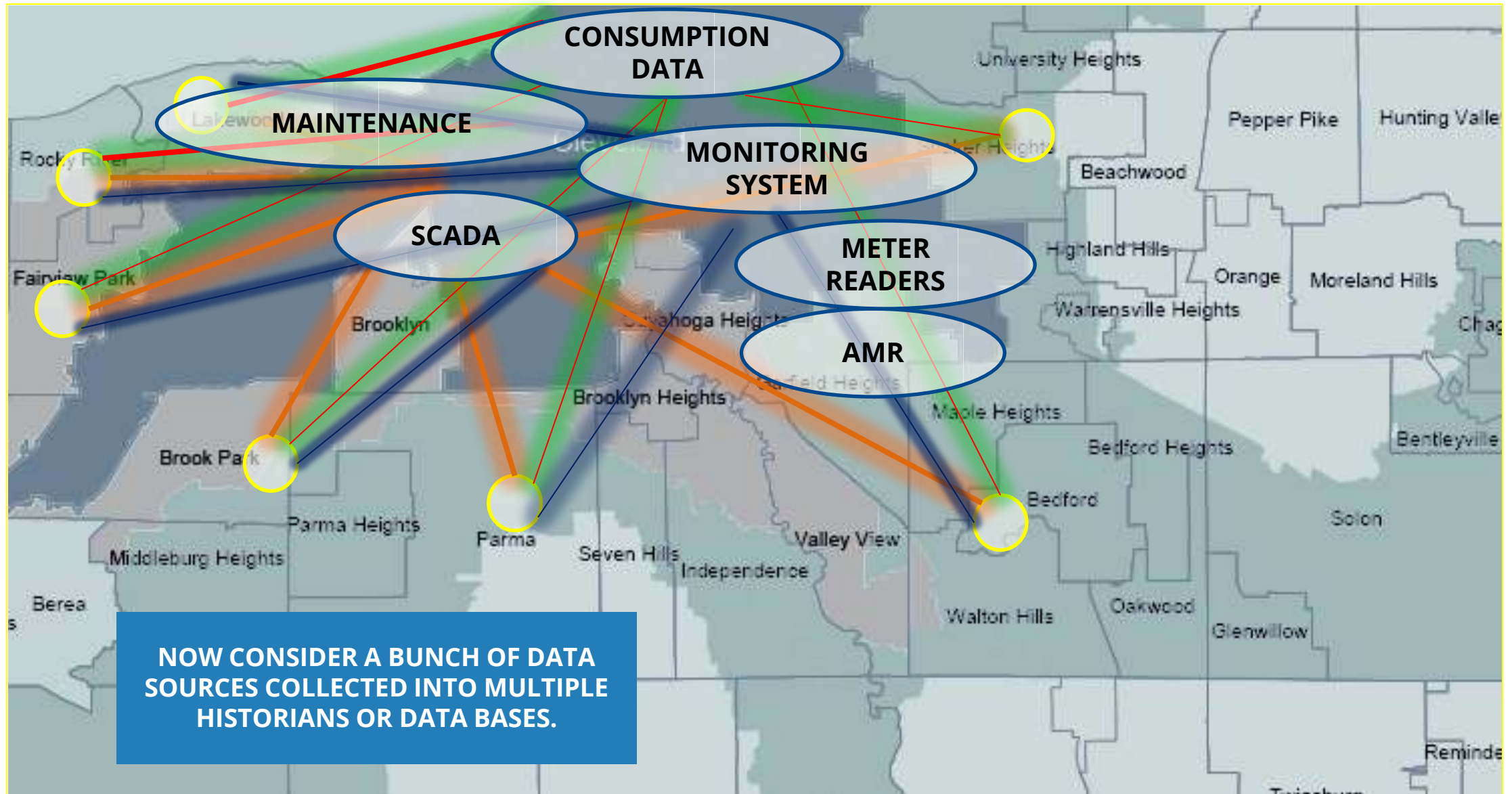
- ✓ Security is always a concern and there are many ways to address the issue.

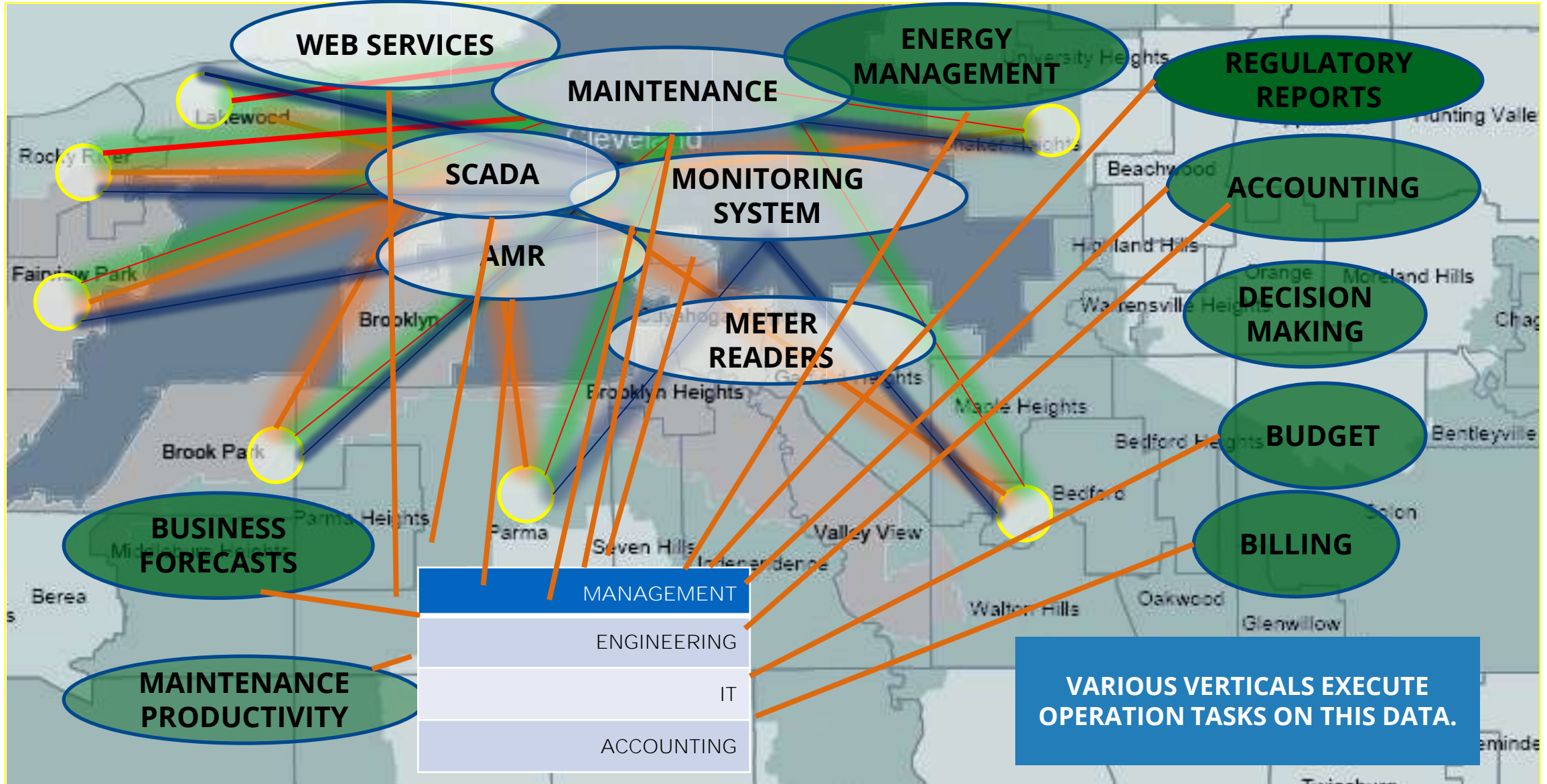


- ✓ Data can be used throughout an organization to achieve various business objectives.

- ✓ Sharing data within your computing investments provides another means to improve efficiency while reducing overall costs.





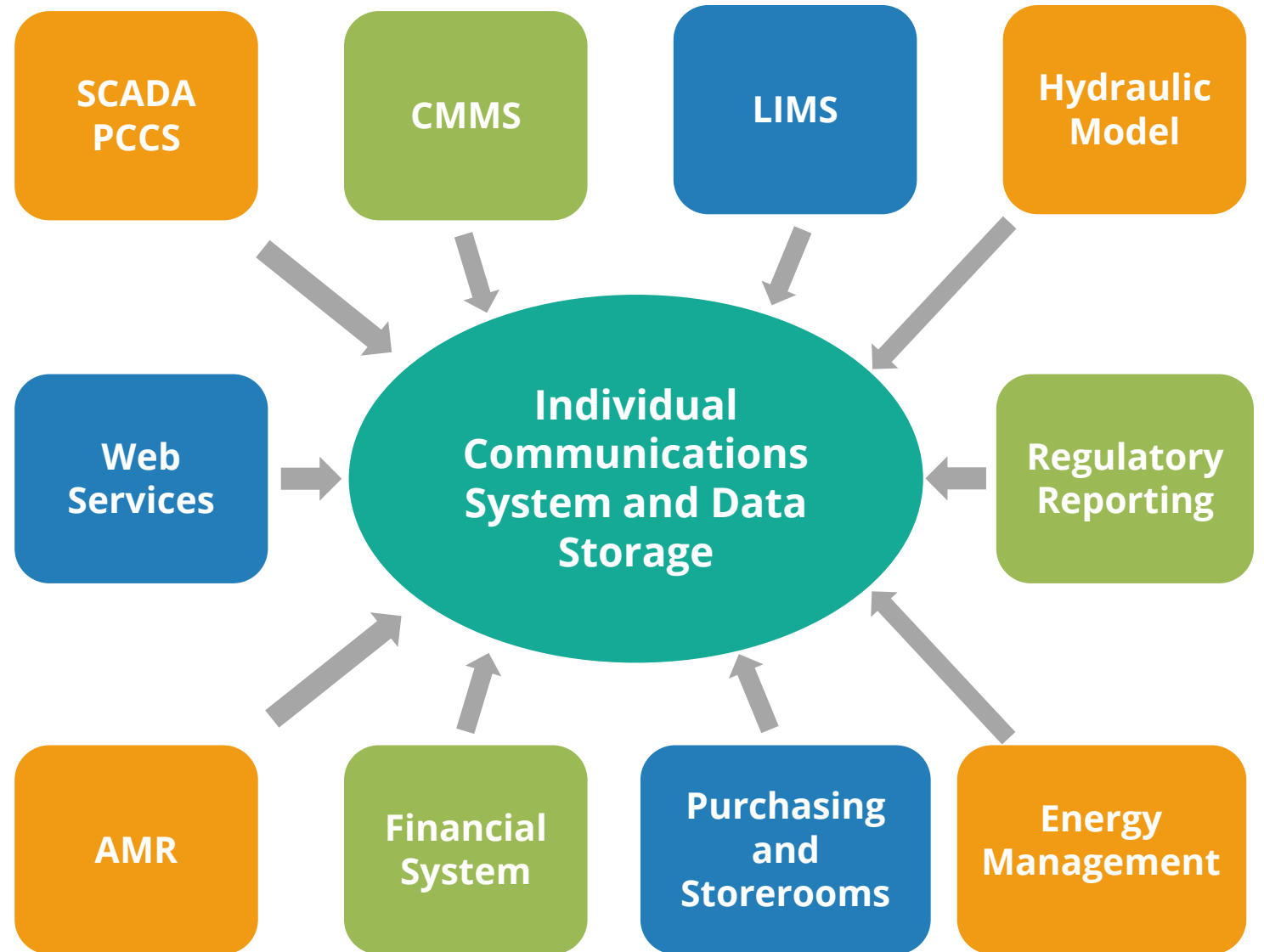


DATA ANATOMY

- What Data is Collected and Stored?
- Is the Data Base/Historian a cradle or a grave

DATA ANALYTICS

- Is data cross checked?
- Is data validated?
- Is data consolidated?
- Is data actionable?
- Can we track/extract costs
- Data Visualization



Single Source of Truth

- **Software Integration:** To create and structure information models and associated schemata such that every data element has an accurate and unique presentation.
- **Data Transparency:** Easily access and work with data no matter where it is located and the assurance that data being reported are accurate and are coming from the official source.
- User Interface and reporting tools that only has the SSOT as a backend.

Data Transparency

Accuracy: The data remains valid across all layers of the network and the multiple software frameworks.

Completeness: Refers to an indication of whether or not all the data necessary to meet the current and future business information demand are available.

Consistency: If the data exists in multiple databases or backends it has the same value.

Availability: Regardless of the use of data the system should provide it upon request every single time.

Security: Prevent unauthorized access or manipulation of data.

Data Mining and Analytics: Data structures that allow for knowledge discovery, statistics and analytical calculations.

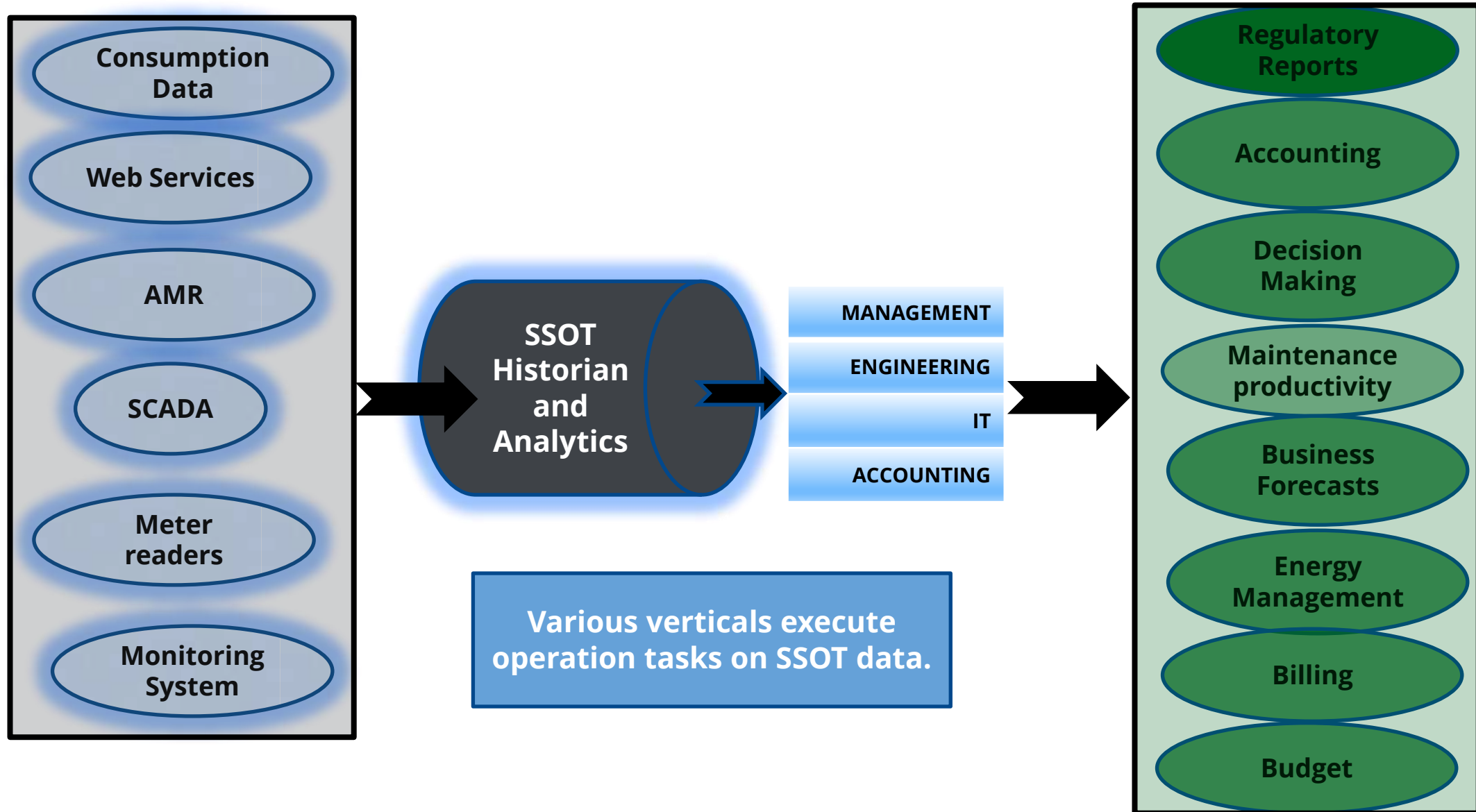


Why Data Transparency ?

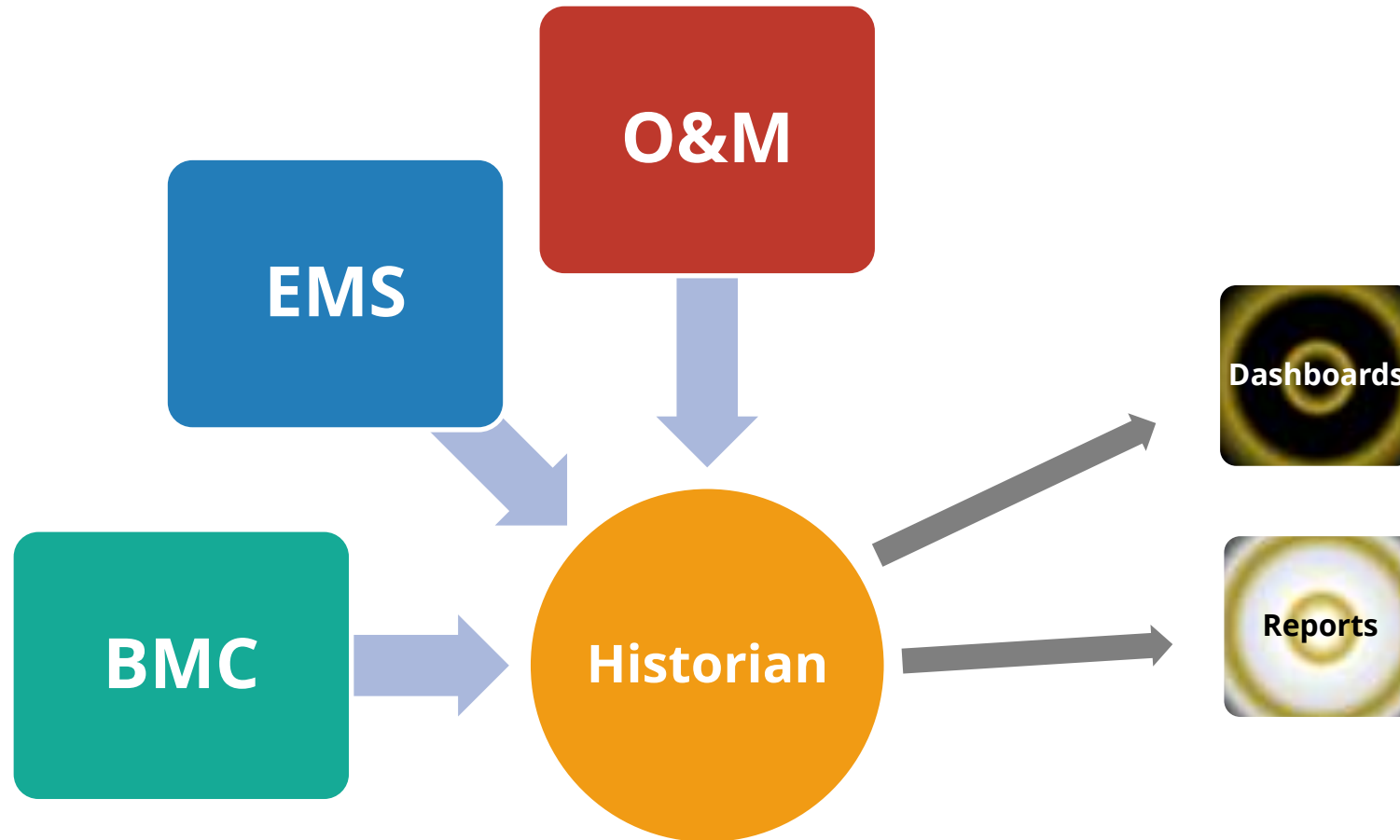
- **Business Forecast and Design making:** Allow decision-makers to make evidence-based decisions for current and future
- **Accountability for the services delivered:** Is the sum of the parts equal to the whole and where is the shortage.
- **Operation Efficiency:** Exposes sites operating efficiency and highlights the main deficiency contributors.
- **Maintenance productivity:** Comprehensive knowledge of the equipment operations is essential in preventing breakdowns and paired with performance analysis will help operation in developing accurate Predictive or preventive maintenance plan.
- **Accurate Reporting :** All the data necessary is available and accurate.

Why Data Transparency ?

- **Future Scalability** : Allows Engineering to use historic data to create a model to help make educated predictions for future demand and expansions.
- **Generation of Operating KPI's**: Use analytics to produce KPI's necessary in describing the system state as it pretrains to the multiple verticals.
- **Energy Management**: Exposes sites Energy consumptions and highlights the outliers.
- **Internal Accountability** : Exposes all sites internal operation and help create a measuring matrix for accurate operation per site.

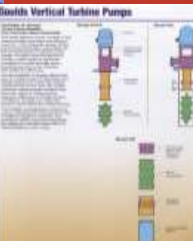
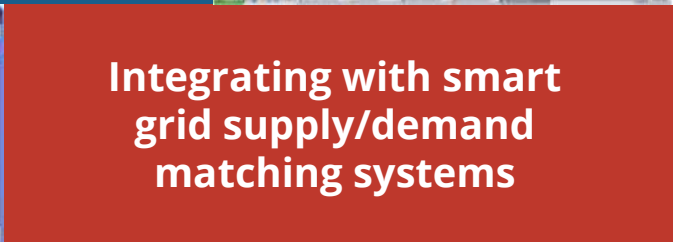
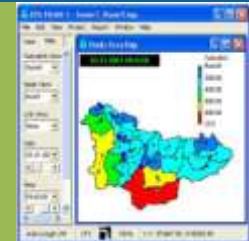
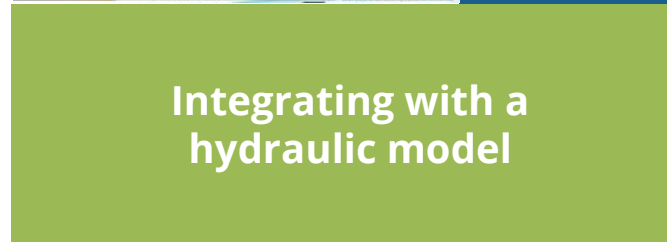
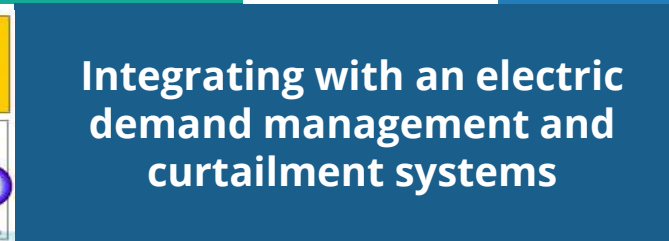
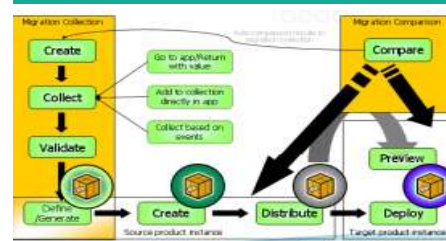
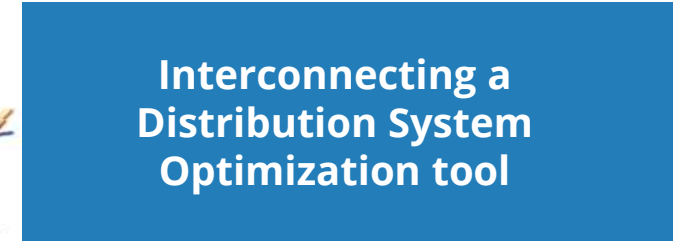
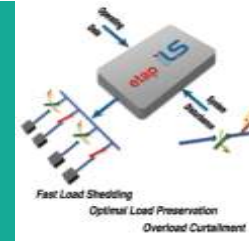
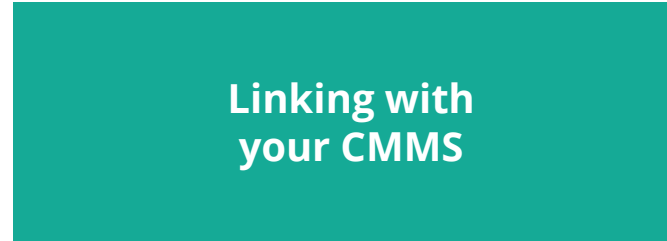


Single Pane of Glass



Leveraging Data

- Data Consolidation
- Data Verification
- Data mining and analytics
- Data Presentation



Establish Critical Success Factors

- Match data processing to unique enterprise needs
- Exceed established “Standards” to Best Practices
- Safety criteria or guidelines need to be established
- Data storage is becoming much cheaper relative to its value



ISOLATING SYSTEMS NOT PRACTICAL FOR DATA INTEGRATION NEEDS

DATA SYSTEMS ARE CRITICAL INFRASTRUCTURE

THE WORLD IS DIFFERENT TODAY

DEVELOP A PLAN

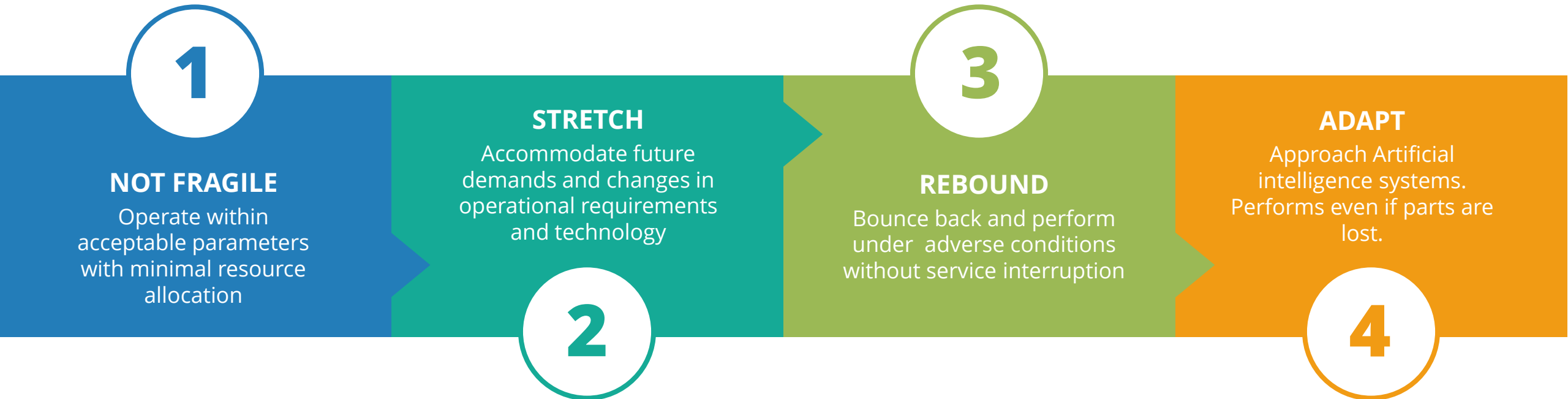
WHAT NEEDS SECURING?

WHO NEEDS TO ACCESS DATA?

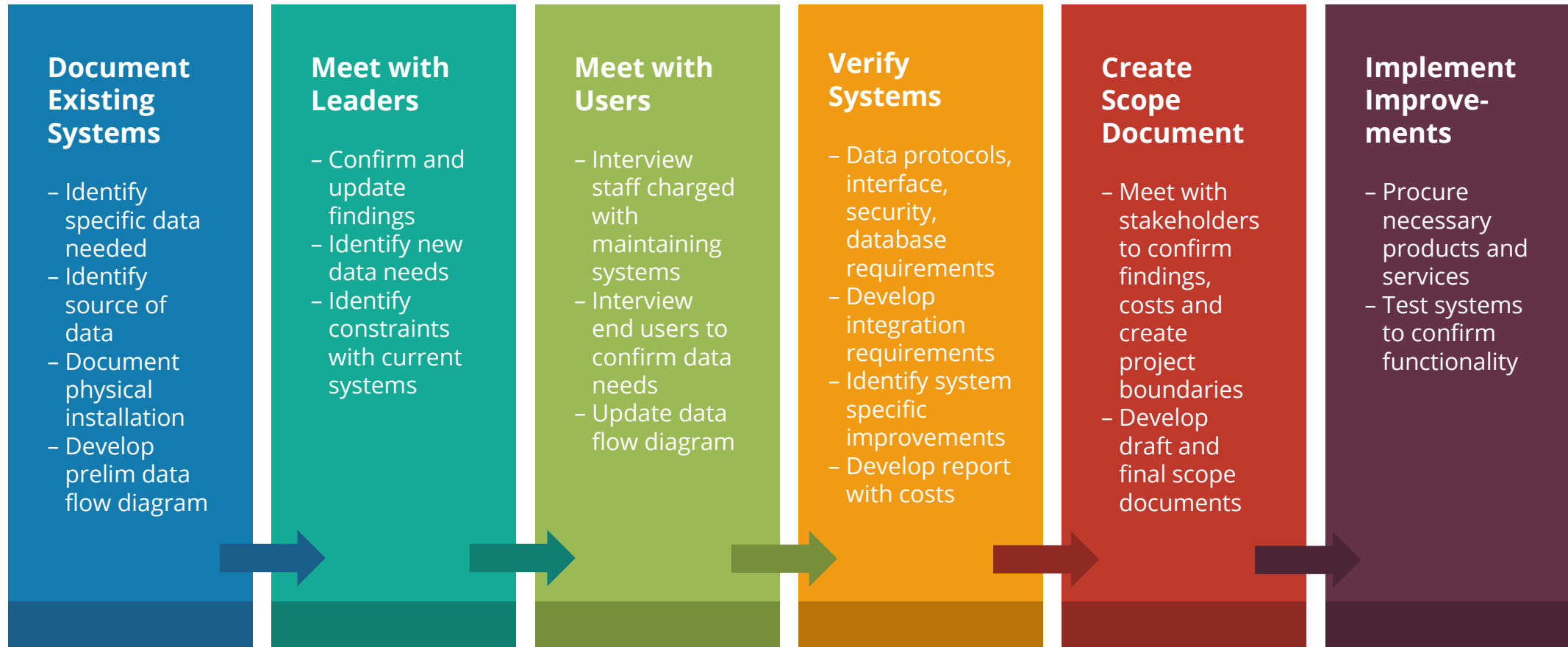
MANY RESOURCES AVAILABLE ON WEB



Resilient Systems

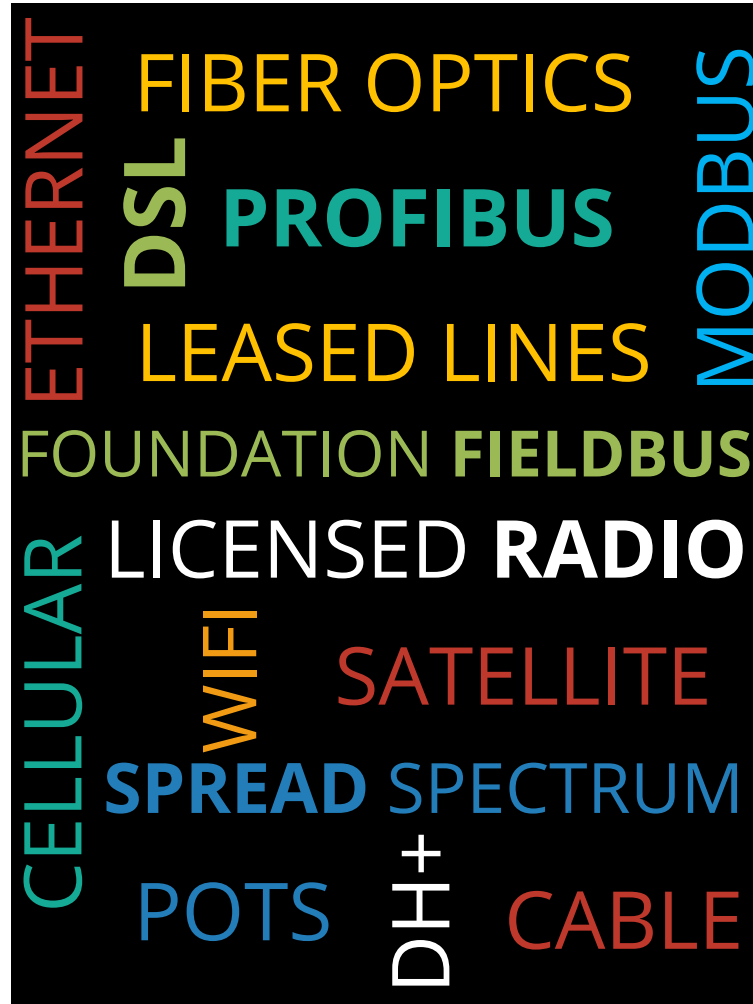


Developing a Data Management Roadmap



Communications and Networking

- Standardization
- Software Integration
- Data Consolidation
- Data Verification
- Data Security



MOVE DATA BETWEEN
DEVICES AND SYSTEMS

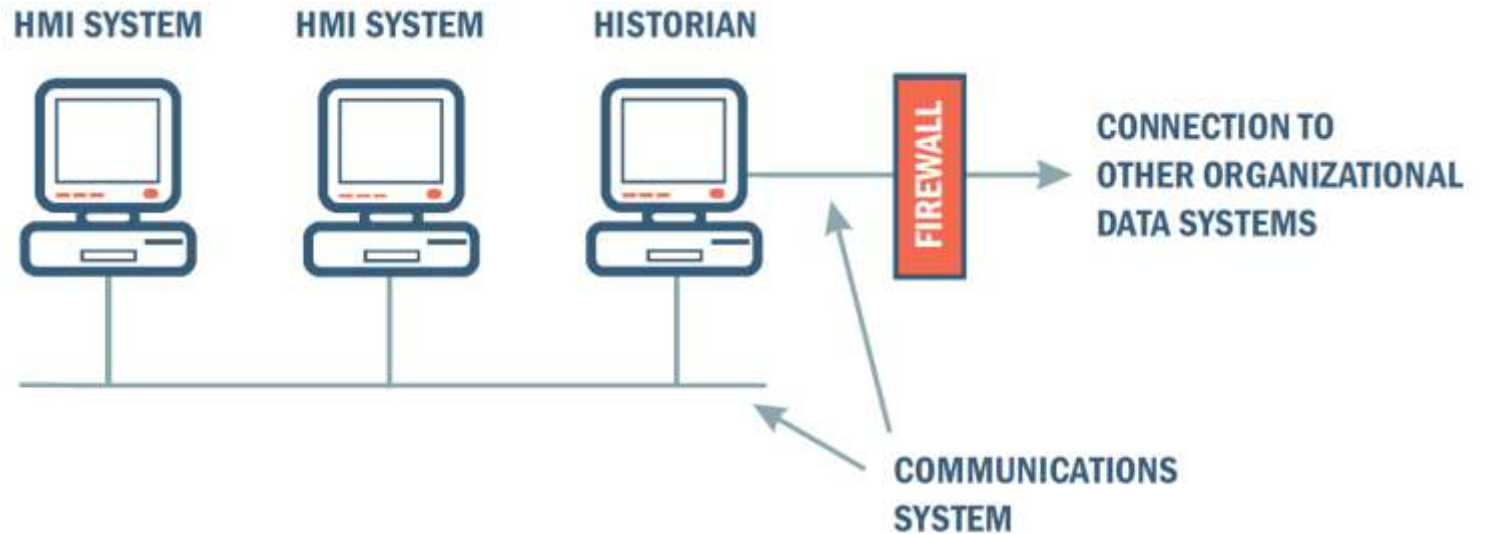
WIDE VARIETY
OF OPTIONS

MANY VENDORS FOR
PRODUCTS & SERVICES



Linking SCADA To Business System Architecture

- Standardization
- Software Integration
- Data Consolidation
- Data Verification
- Data Security



SEPARATE
NETWORKS
FOR SCADA
AND DATA

SCADA POPULATES
HISTORIAN(S) WHICH
SERVES DATA TO ALL
OTHER SYSTEMS

Challenges Using Typical SCADA

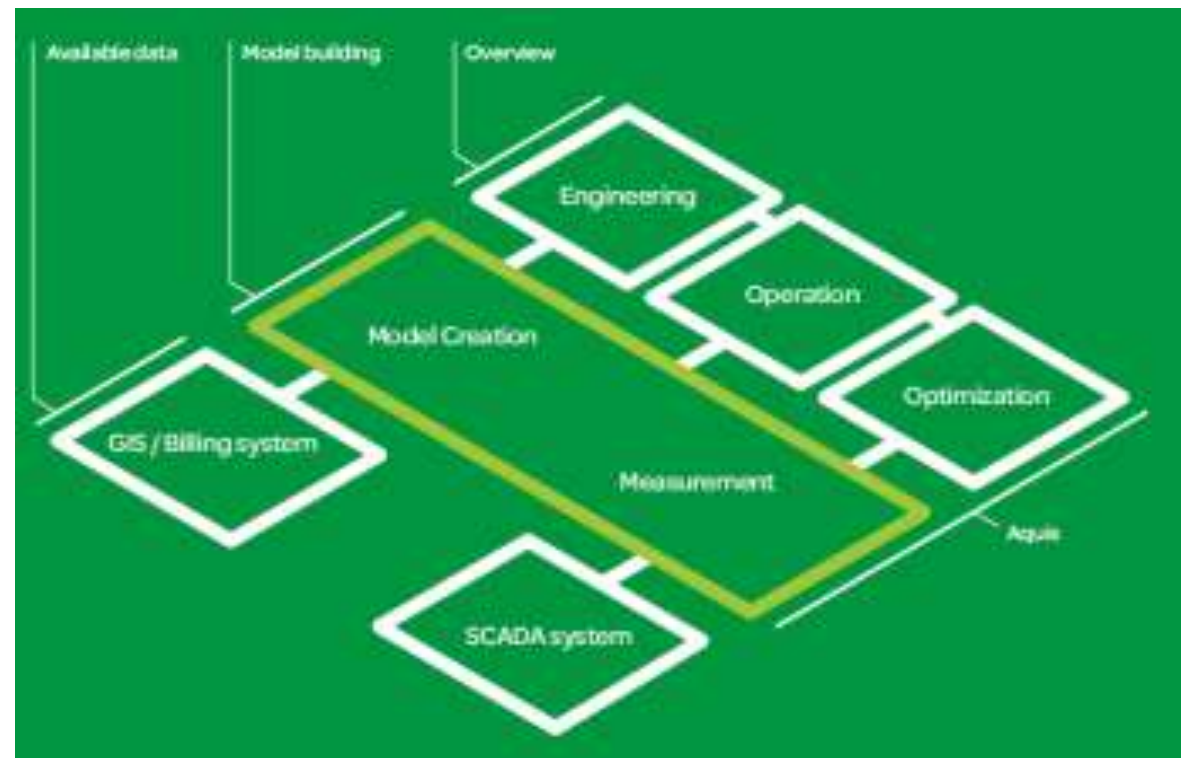
Operators have limited ability to anticipate events, react to emergency situations or efficiently plan O&M actions.



Linking Operator to Important Information?

Imports information already existing in the utility

- SCADA data
- GIS data
- Hydraulic models
- Billing data
- User profiles
- Offline data sources



Real-Time Hydraulic Modeling

An advanced operations tool for water utilities.

Enables operators to go back and forth in time.

Anticipates the impact of planned and unplanned events.

Recommends best operational options for day to day decisions.



Water Quality Monitoring

Water age monitoring and actions

Water blending

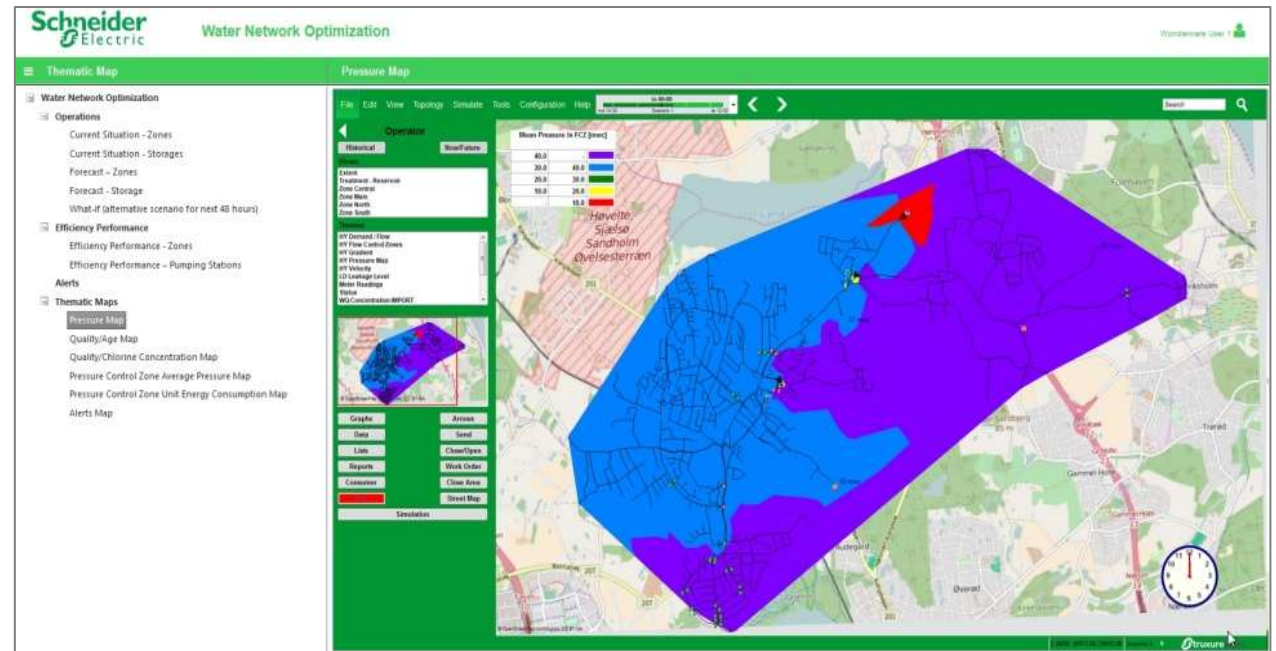
Pollution source tracing – Early warning

- Minimize reaction times and risks
- Forecasts pollution spread
- Identifies most likely area where it started
- Customer warning

Reduce Operation and Maintenance's Risk and Costs

Forecast network behavior:
service pressures, flows, etc.

- Discrepancies between the current and expected situation of the network
- Detection of malfunctioning / inaccurate equipment
- Augmented reality: Planning Tool

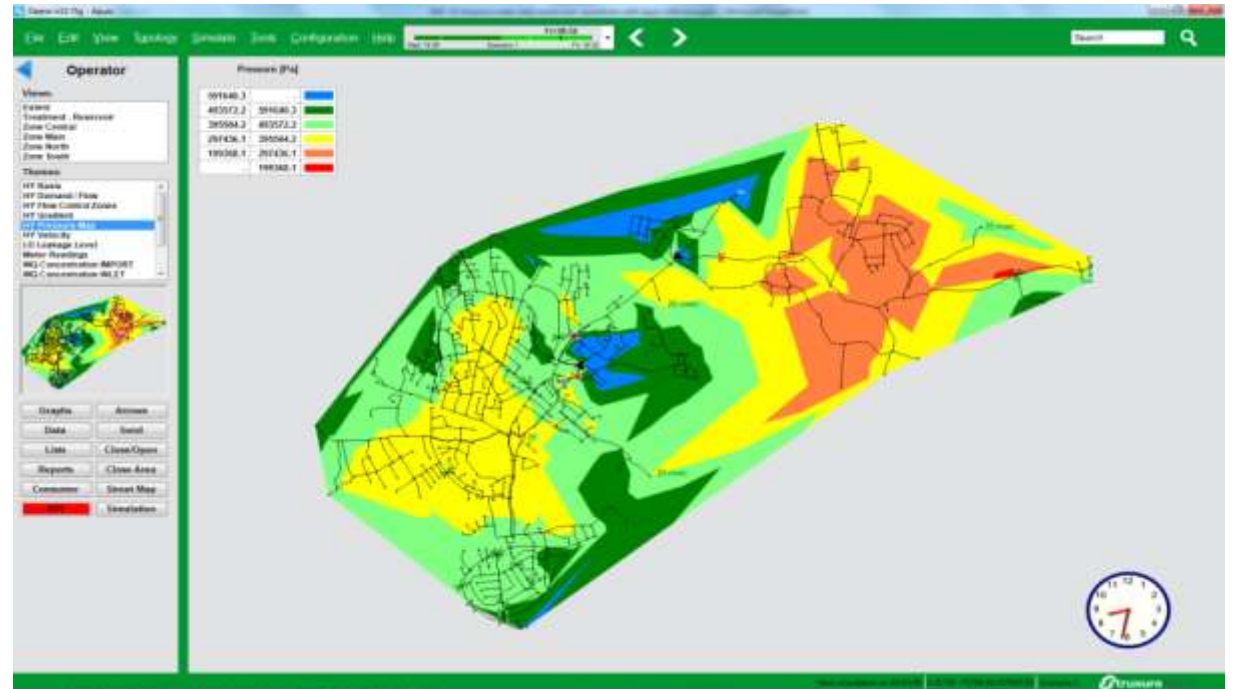


What – if Scenarios

What-if scenarios based on real-time data

Planned: e.g. Pump station shutdown for repair

Unplanned: e.g. pipe breaks, power loss, storm events



Simulation

Water Quality Modeling

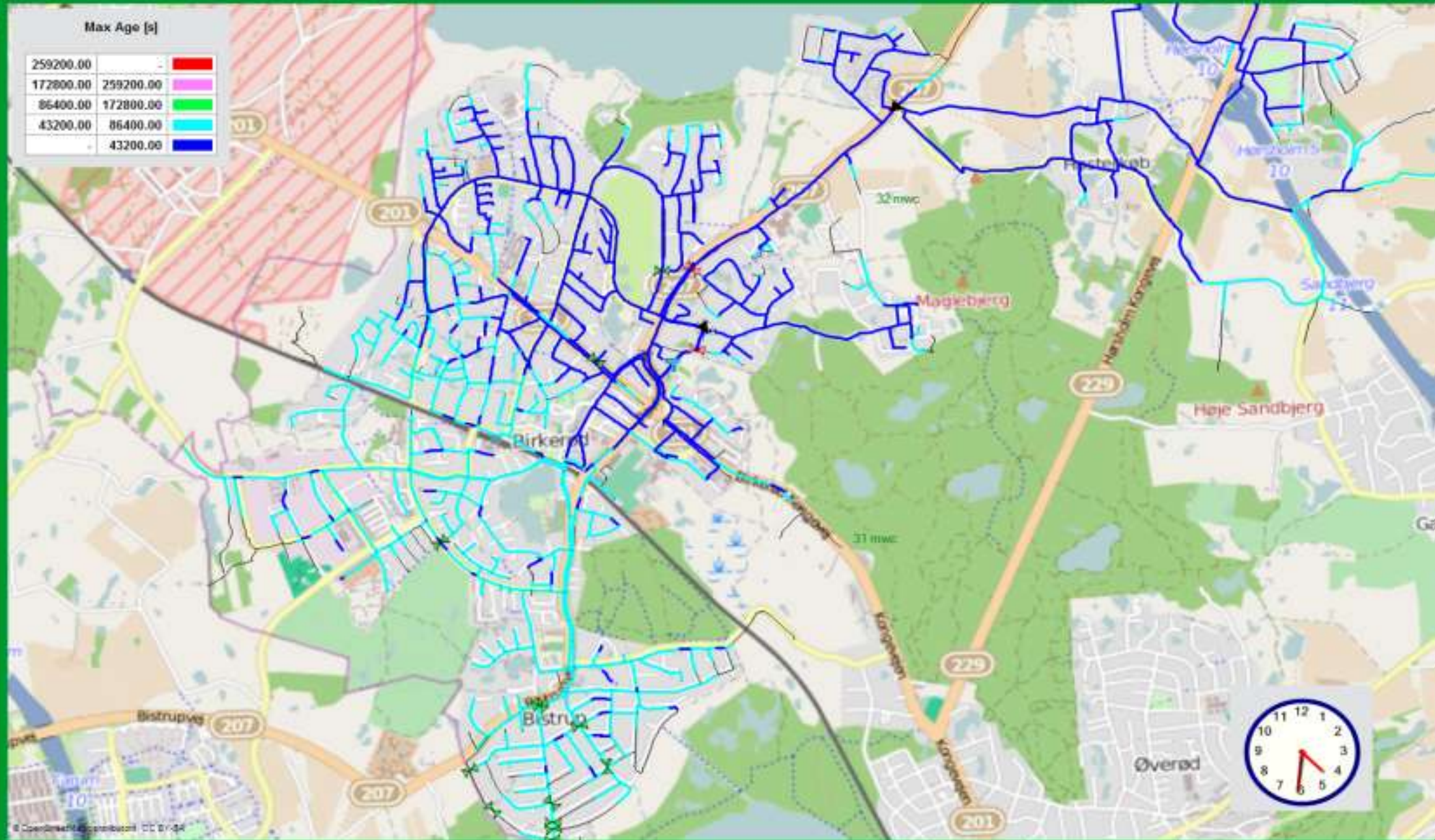
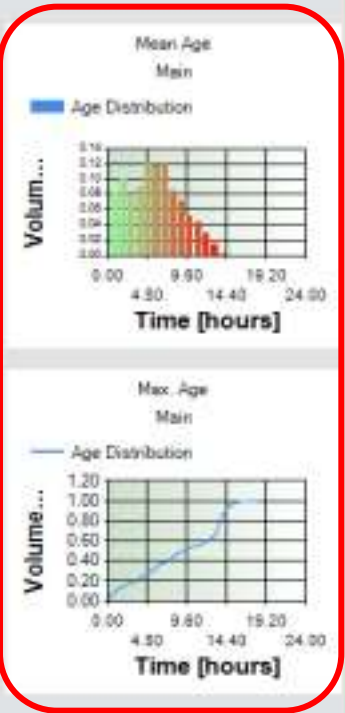
❑ Water age monitoring and actions

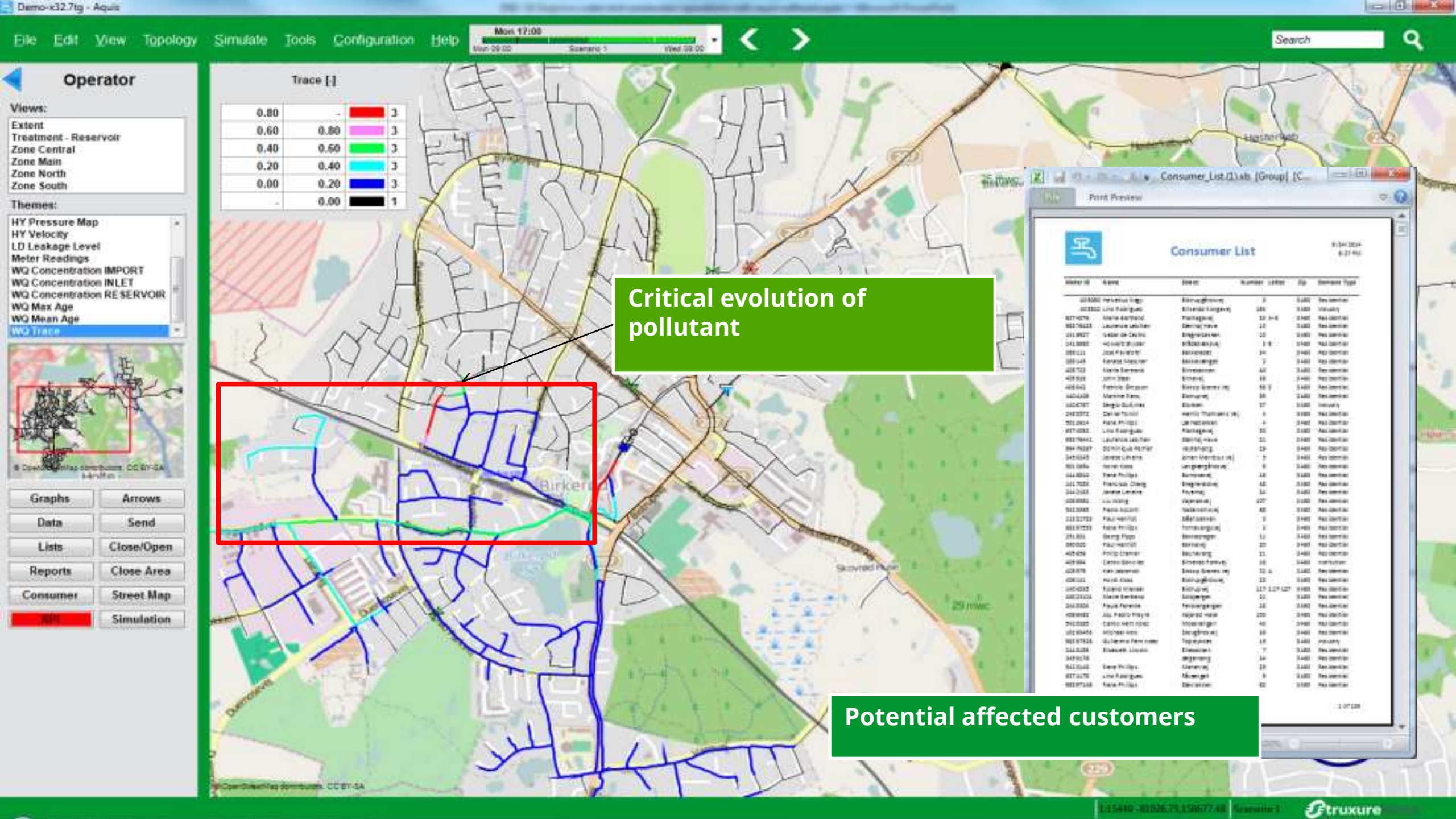
- Tracks and predicts the age of water in the network
- Helps plan for flushing and/or treatment
- Avoids low quality water (color, odor...).

❑ Water blend overview

- Information on blending of water sources that supply an area / customers
- Useful for source planning

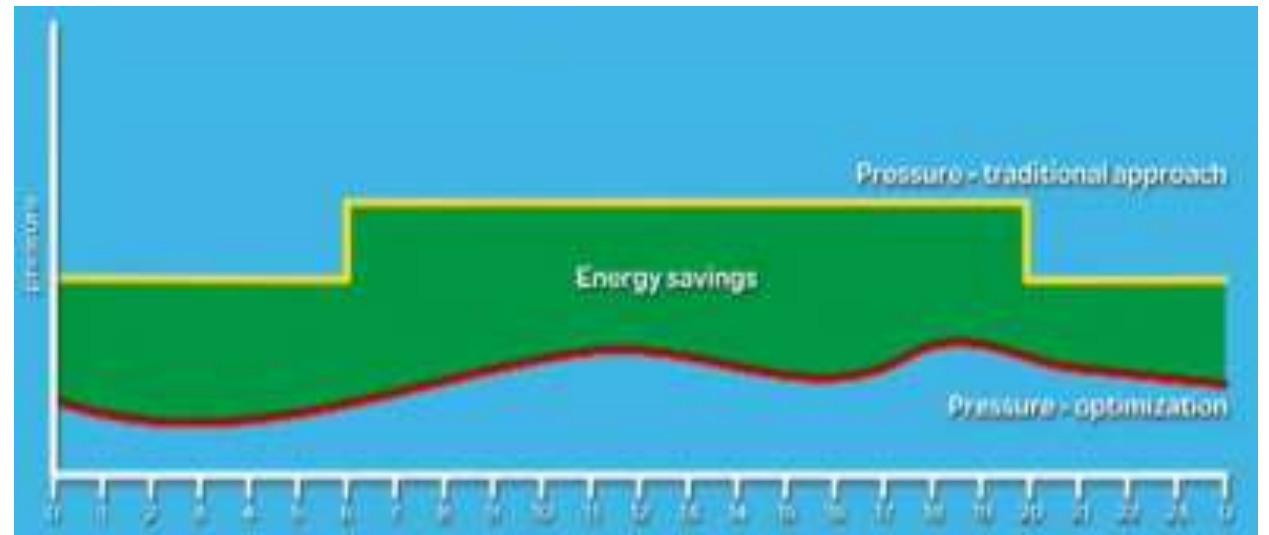
Water Quality Zone Main

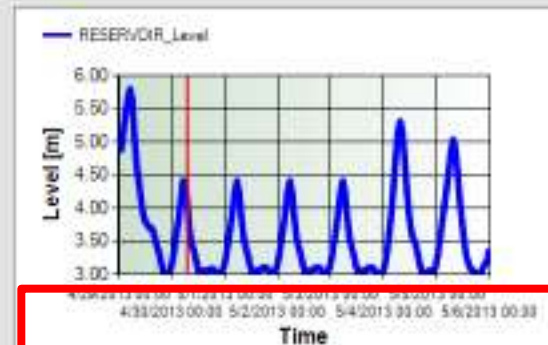
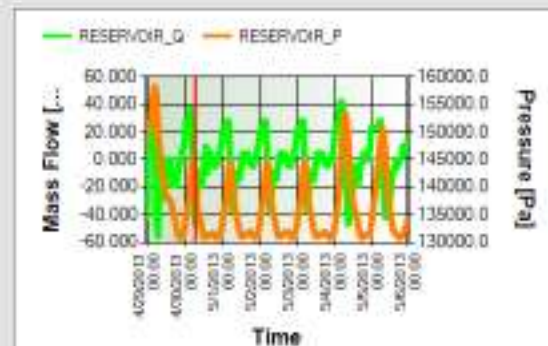
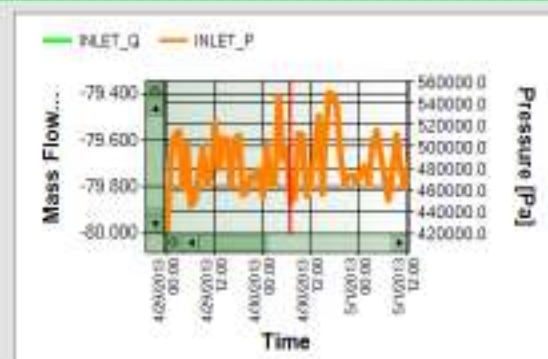




Energy Optimization

- Pressure, pump and reservoir optimization
- Proposes optimized pressures based on forecasted demands
- Sends points to SCADA for pump plan operation

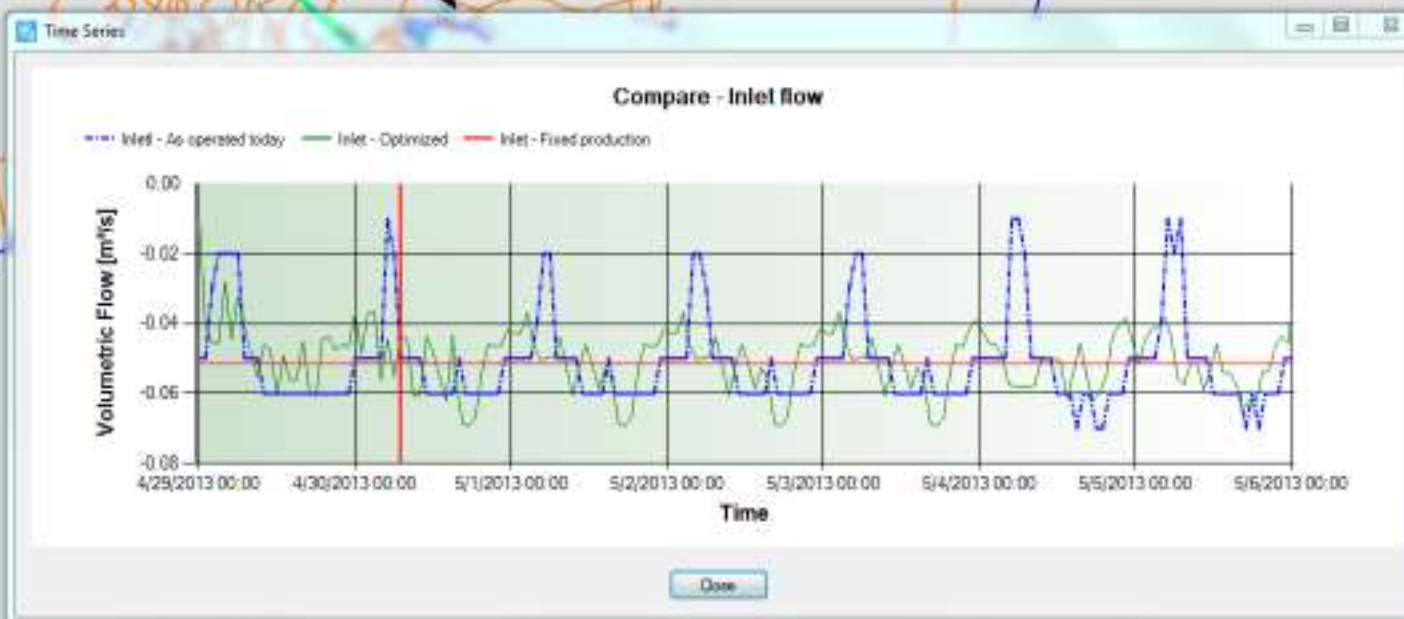
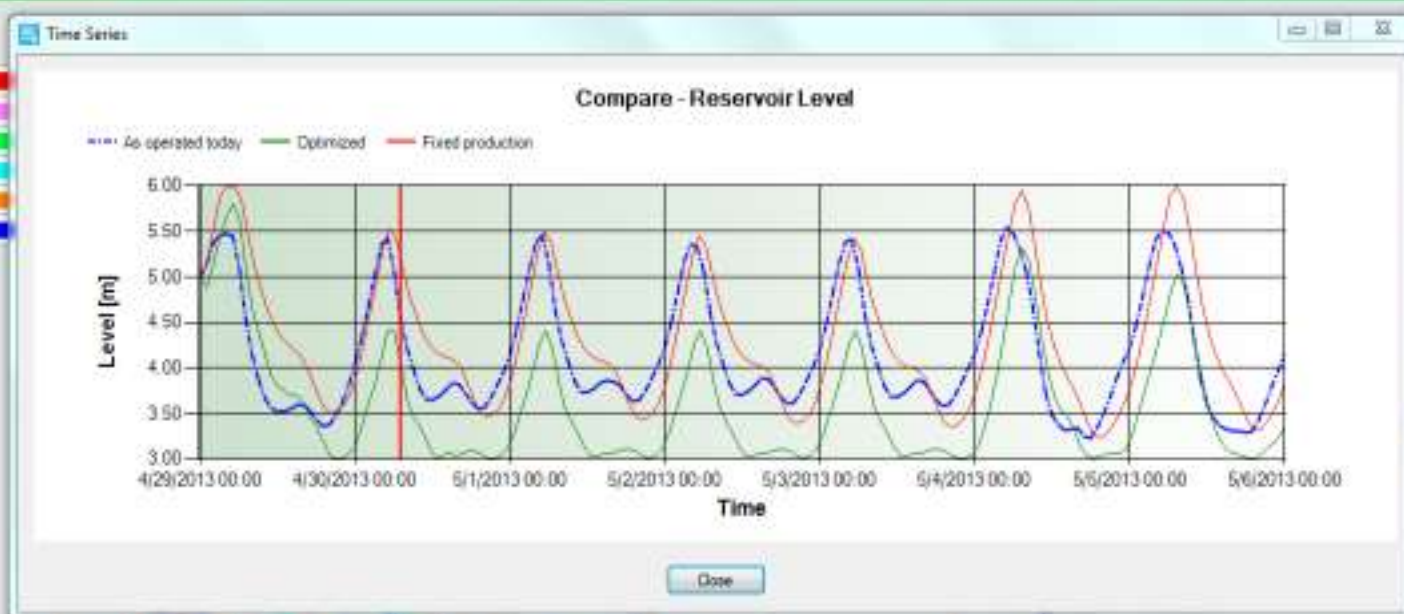




Costs: Optimized: 41153 CU
As is: 42817 CU
Fixed Production: 42184 CU

Velocity [m/s]

1.00	1.00	1.00
0.80	0.80	0.80
0.50	0.80	0.80
0.20	0.50	0.50
0.01	0.20	0.20
-	0.01	0.01



THANK YOU

