IT-OT-ET Convergence within the Electric Utilities Industry

How Operational Analytics Can Transform the Grid

Analysts project by 2025, **data from connected devices** will yield insights driving potential economic value of as much as **$11 trillion**


**Accenture** estimates the **Industrial Internet of Things (IIoT)** could add **$14.2 trillion** to the global economy by 2030.
Top Business Concerns – Global Survey Results

• 50% put a high priority on reducing their operating costs

• Only a third of people satisfied with their current level of analytics

• 96% see a clear strategic value in operational analytics

• Top 3 technology trends affecting utilities:
  – Real-time monitoring
  – Predictive analytics
  – IT-OT-ET convergence

2016 PennEnergy Research Study: Operational Analytics in the Power Industry
The Importance of Data
Making the right decision

• With all of the information available, how do you know you are making the right decision?
  – When is the best time to make the decision?
  – Are you making the decision too late or after the event?
  – How do you aid decision making?
  – Is lack of visibility into asset and operational performance hindering decision making?
Analytics within the Smart Grid
Definition of Operational Technology

- Remote sensing of objects and machines
- The Environment
- Real-time Data
- Controllers and sensors
- Remote Operations
- Data Historians
- SCADA
Definition of Information Technology

- Financial Data
- CRMs
- Business Transactions
- Manual Entry
- Billings
- Inventory
Asset Performance Modeling ... Powered by AssetWise
Take advantage of the Industrial Internet of Things

• Only going to get bigger.

• Due to growth of connected devices, open standards & the cost of smart technology decreasing.

• Using analytics to take advantage of the data can lead to lowering energy costs and realizing the potential of a complete Smart Grid.
Converging IT-OT-ET
AssetWise Operational Analytics

*Drive operational performance with context, clarity, and confidence*

- Analyze Data Trends
- Analyze Asset Conditions (Health)
- Conduct Predictive Operational Analysis
- Converge Operational, IT and Engineering data for decision support
- Monitor and visualize operations in real-time
- Validate Operational Data
The Future: Asset Performance Modeling
Asset Intelligence from Consolidated Data Sources

**FIELD DATA**
- Any ODBC Data
- Any OPC Data
- Analysis Tools
- Predictive Devices
- Data Historians
- EXP Handheld
- EXP Remote

**DATABASES**
- Equipment/Asset Hierarchy
- RCM or FMEA Data
- Maintenance Plans/Tasks
- Custom Data/Applications

**SPREADSHEETS**
- Data Historians
- EXP Handheld
- EXP Remote

**EAM / CMMS**
- Work Orders
- Corrective Work
- Notifications
- Work Requests
- Equipment/Location Hierarchy
- Work History/Failure Data
- Labor/Material Cost History
- Spare Parts/BOM
- Maintenance Plans/Tasks
- Equipment Criticality
- Failure Cause Codes

**INTEGRATION MANAGER**
- Performance Management
- Work Management
- Reliability Program Implementation
- Analysis & Optimization
- Strategy Development
- Continuous Improvement

**ONLINE DATA COLLECTION/UPLOAD**
- Predictive Devices
- Data Historians
- EXP Handheld
- EXP Remote

**OFFLINE DATA COLLECTION/UPLOAD**
- Any OPC Data
- Any ODBC Data
- Analysis Tools
- Predictive Devices
- Data Historians
- EXP Handheld
- EXP Remote

**ONLINE DATABASES**
- Equipment/Asset Hierarchy
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- Custom Data/Applications

**OSS DATA**
- Oracle
- SAP
- IBM, Maximo

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ISO55000

- Asset Management Standards
  - ISO 55000 Overview
  - ISO 55001 Management System Requirements
  - ISO 55002 Management System Guidelines

- Started with PAS 55

- Establishes the framework (WHAT)

- Does not define the method (HOW)

To purchase your copy of ISO 55000, go to: http://www.iso.org/iso/catalogue_detail?csnumber=55088
Operational Analytics examples
Solutions

- Collect data from Hydran dissolved gas monitoring systems, and transmit data via GPRS to a Web server.
- Visualization allows users to view all assets
- Drill down to view oil levels, temperatures, compressors etc in real-time on dashboards
- Notifications sent to engineers based on alarm levels when required
Typical transformer condition monitoring dashboard
Gas Levels and Alarm Dashboard
Go from reactionary to proactive
Benefits

• Improved reaction times resulting from the introduction of real-time monitoring and alerting
• Reduced costs due to scheduled maintenance
• Extended asset life by quantifying and managing risk
• Reduced disruption due to event alerts
• Increased decision making
Large Electricity Transmission Company Overhead Lines and Towers

CHALLENGES

• Unable to predict the corrosion rate of steel tower network
• Needed to identify problem lines and individual towers
• Unable to plan best financial strategies
Solutions

• This was created through a care and risk evaluation model

• Use the Bentley Amulet system to take all data that affects the degradation of steel, zinc, and organic coatings on all above ground steelwork

• This involved taking data from a variety of sources including:
  – temperature, humidity, time of wetness; pollution in the form of air-borne sulfur dioxide; location in altitude, proximity to sea, lakes, reservoirs, rivers, minor and major roads; and history, including installation date, coating records, and maintenance history

• Analytic techniques were used to calculate the long term risk
Typical example of corrosion index across a line
Benefits

• First time it was possible to predict the expected condition of transmission towers across a selection of the network.

• This allowed preventive and replacement strategies to be planned

• Reduced maintenance costs

• Manage and plan costs over a long-term strategy.

• Move from unplanned to proactive