



Practical Situational Awareness to Improve Safety & Reliability in Operations

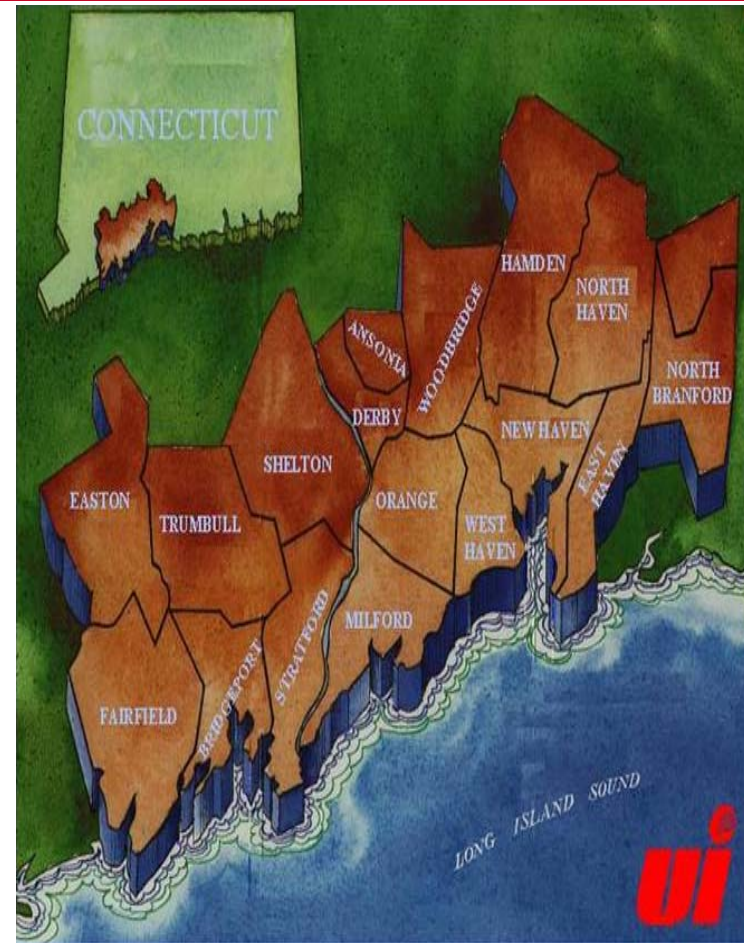
September 15, 2009



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United Illuminating

- UIL – Parent Company
- T&D Company
- Serves Greater Bridgeport and Greater New Haven Areas
 - 17 Cities and Towns
 - Mainly urban and suburban areas
 - 335 miles² (931 km²)
 - 320000 Customers
 - System Peak Load: 1456 MW



Transmission

- 115 kV and 345 kV
- 129 miles (215 km)

Distribution

- 3250 miles (5416 km)
- 13.8, 4.16, 2.4 kV
- 92% of Distribution System is 13.8 kV

Substations

- 26 stations
- 115/13.8 kV

Underground Networks

- Bridgeport
- New Haven



Justification for Funding

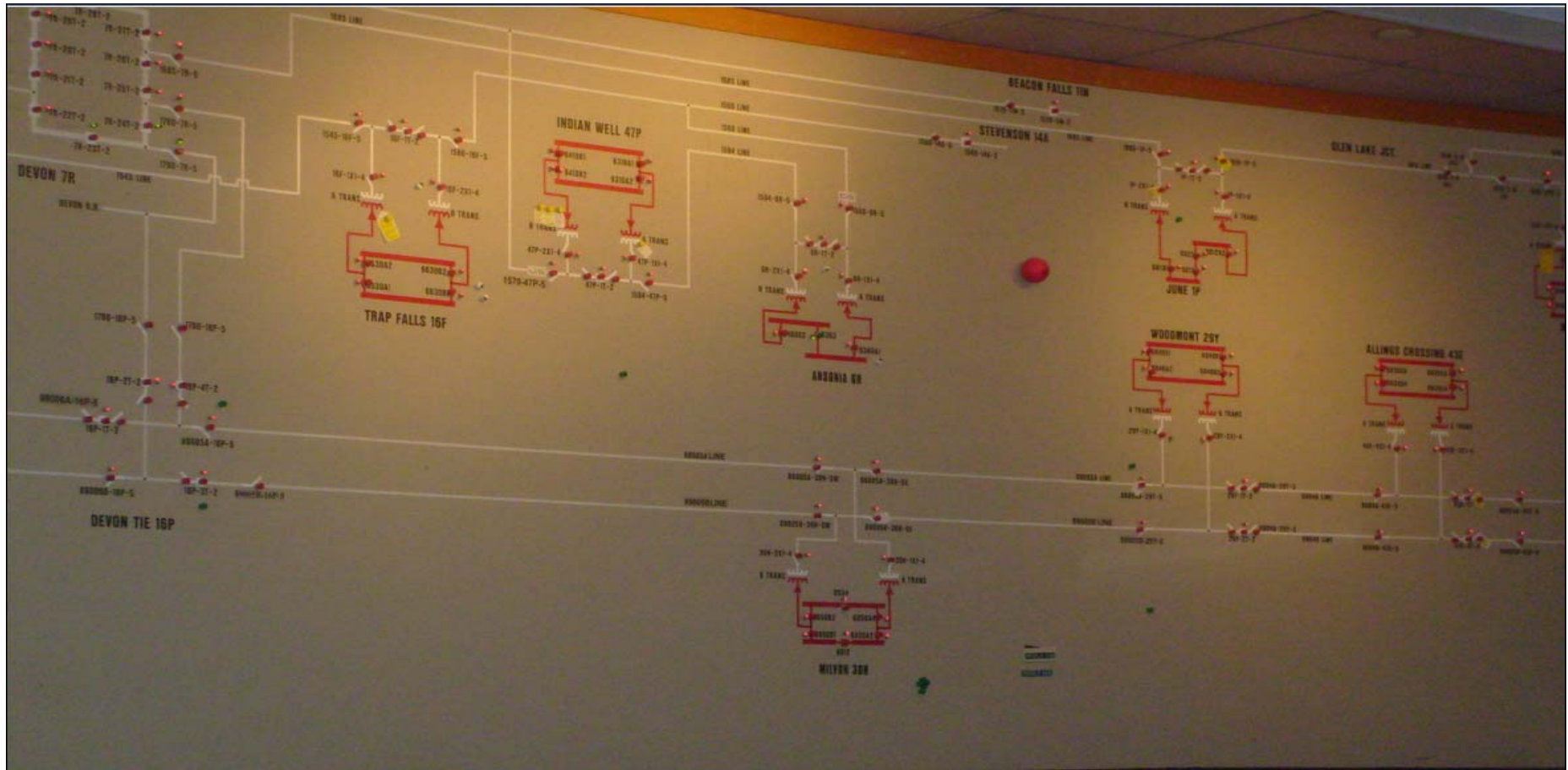
- We reached our real time viewing capacity
 - Current and Future Expansion Hindered
 - Cards for current wall not available
- Developed a need and strategy
 - Continuous view of the status and health of our system
 - Give Operators the information they need
 - Need real time status at all times (view momentary events)
 - Limited space so video cubes were not an option
 - Test platform for our new Operations Center (2012)
 - We could reuse some of the equipment
 - Expandable and flexible to meet our future needs
 - Maintain the same video footprint of our old wall

Why P-Tech?

- **Benefits for ease of implementation**
 - Allowed the use of less projectors (6 down to 4)
 - Lowered our on-going maintenance costs
 - Minimal time for internal person to gain a good overall operational knowledge of the system
 - Allowed creation of the display from an existing CAD file
 - Other option was to create from scratch via SCADA System
 - **Benefits gained for the Operators**
 - Allowed the use of animation to attract operators attention
 - Substation access, fire alarms, station occupied etc.
 - Line shading/coloring to indicate abnormal condition or response needed
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- Increased our overall Situational Awareness
 - Produced a video wall that highlights the abnormal
 - Provides real time information
 - Software is managed internally
 - We can create rules as needed to address business needs
 - Allowed our current space to be utilized to the fullest

Replaced MAPBOARD





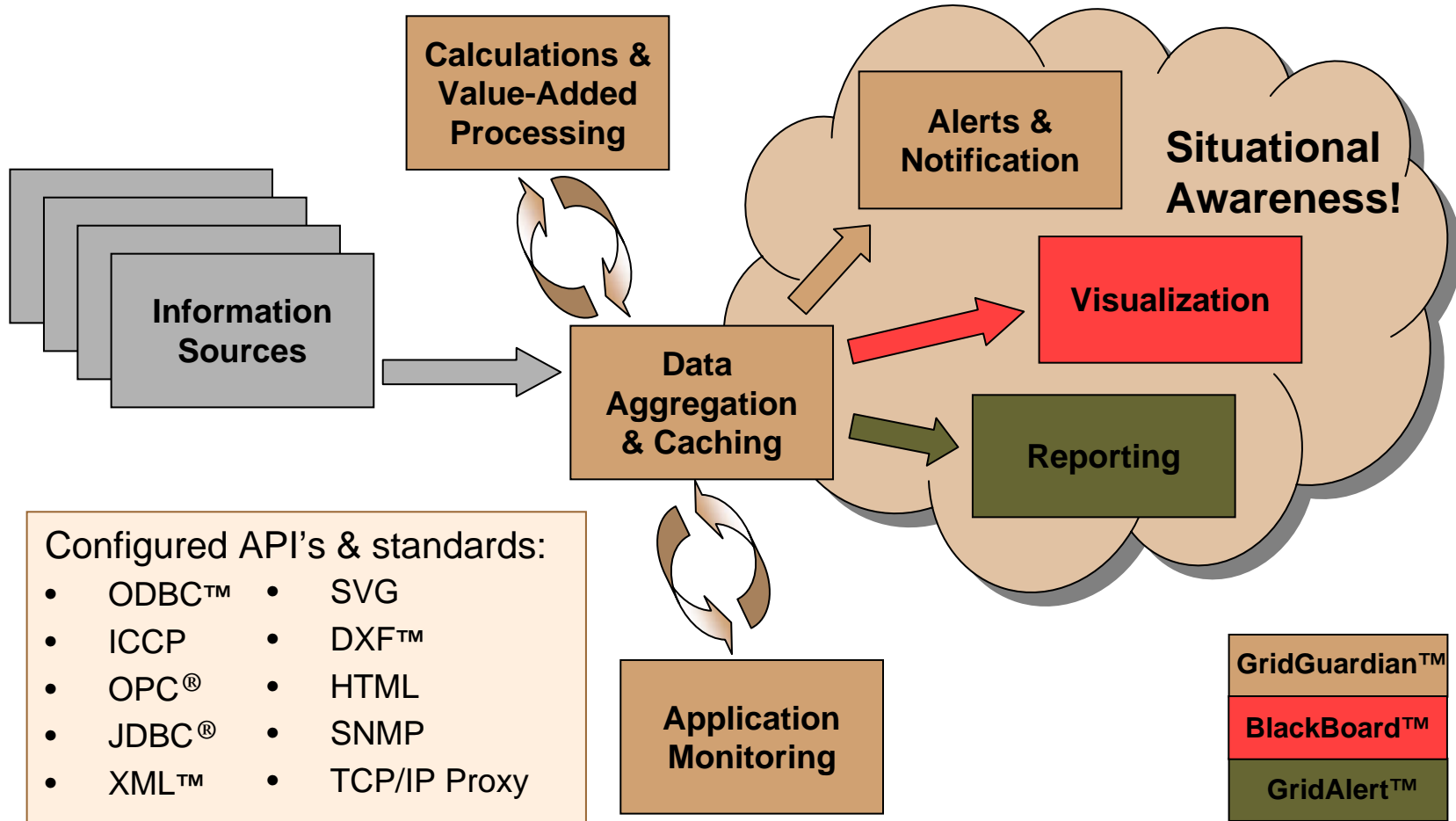
Primate Technologies

- Our corporate mission is:
 - To improve wide area situational awareness in control rooms
- Our software products achieve this by:
 - Monitoring mission-critical systems
 - Aggregating real-time information
 - Generating personalized alerts/notifications
 - Automating administrative tasks
 - Maintaining system independence for visualization
 - Rendering state-of-the-art displays
- Our primary customers are:
 - Dispatchers and Operators of electric systems
 - Engineering staff at control centers
 - Remote managers and stakeholders requiring real-time information from control centers

Business Overview

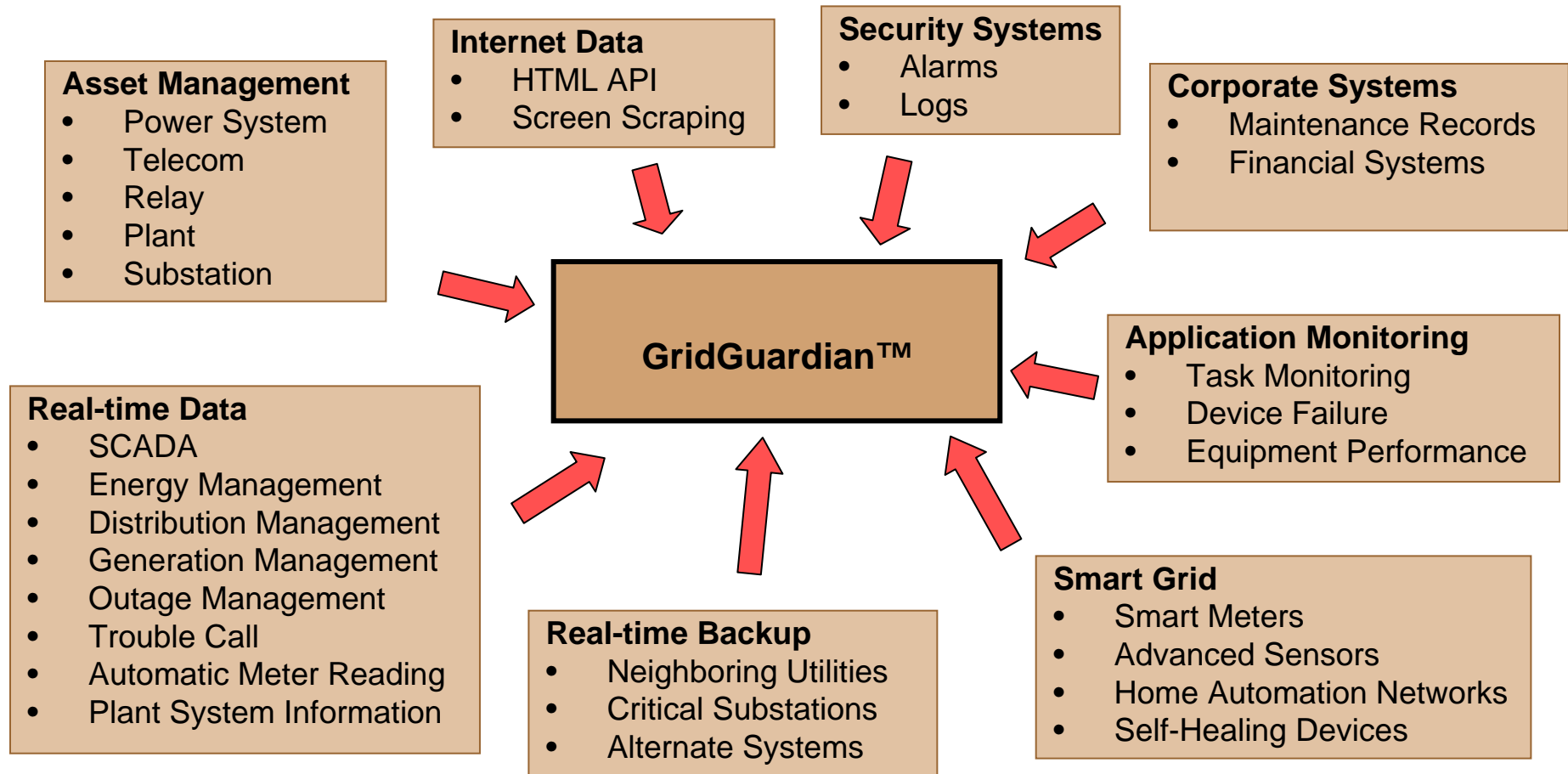
- Founded in 2001
- Leaders with 20+ years industry experience
- Privately-held, employee-owned company
- Headquartered in Melbourne, FL
- Additional offices: Savannah, GA
- 26 Customers in the electric utility industry
- A portfolio of 6 software products
- Training operators on Situational Awareness for continuing education hours at APDA meetings
- Stellar industry reputation

Technology Overview



ODBC is a trademark of Microsoft Corporation
 OPC is a registered trademark of OPC Foundation
 JDBC is a registered trademark of Sun Microsystems, Inc.
 XML is a trademark of MIT, INRIA or Keio on behalf of the World Wide Web Consortium
 DXF is a trademark of Autodesk, Inc.
 GridGuardian, BlackBoard, and GridAlert are trademarks of Primate Technologies, Inc.

Data Collection



GridGuardian is a trademark of Primate Technologies, Inc.

GridGuardian™ – “The Brains”

Major Features:

- Harvests real-time data from disparate systems
- Monitors the health of mission-critical system(s) *at an **application level***
- Uses rules to analyze diverse data
- Performs **personalized** notifications to *people & systems* based on system events & **escalates situations** as appropriate
- Provides intelligent alarming
- Serves data to other applications:
 - GridAlert™ (reporting)
 - BlackBoard™ (visualization)

BlackBoard™ - Visualization

- Improved displays
 - Scalable for various wall & window sizes using SVG
 - Proportional text size (without stepping between available font sizes)
 - Technologies employed to view massive amounts of real-time data
 - Integrated view of data from multiple systems, regardless of source
 - Displays that can adapt with changing system conditions
- Robust editor that works efficiently with large and complex displays
- Focused on VIEWING information, not controlling
 - Safe distribution of real-time information outside of control room
- Incorporates display content from a variety of sources
 - SCADA displays, engineering drawings, GIS systems, etc.
- Visualization techniques designed for large video walls

UI Project Phases

Initiation:

- Review proposal
- Clarify/finalize visualization objectives

Discovery:

- Audit available data & display sources
- Discuss industry best practices for visualization

Implementation:

- Formalize display design
- Finalize system architecture / procure equipment
- Import/transform display content
- Identify/map dynamic display content
- Implement & remotely test MultiSpeak interface
- Develop rules to support visualization objectives

On-site:

- Test static display on video wall (and refine based on feedback)
- Test real-time interface (values & pedigree)
- Test & commission the real-time display
- Train users and support team
- Factory / Site acceptance test

Warranty

Annual maintenance, support, and upgrades (with enhancements)

Interoperability

- **Experience with SCADA**
 - ABB
 - ACS
 - Areva
 - GE
 - Harris
 - OSI
 - Siemens
- **Geospatial Viewers**
 - Google Earth Mapping Services
 - Microsoft Virtual Earth
- **Wall Management Controllers**
 - Activu®
 - Barco
 - Jupiter
- **Display Wall Manufacturers**
 - Barco
 - Christie®
 - Clarity
 - Mitsubishi
 - Planar®
- **Other environments:**
 - GIS
 - Historians
 - Drawing Tools

Secure CIP Compliant Solutions

P-Tech Solutions:

- Secure data access & retrieval for all interfaces to systems
- Authentication for sign-on and communications, with security at a data level
- Session timeouts for desktop users
- Encryption for message transfers between clients and server
- Encryption for password storage
- Audit trails for system and user actions
- View only in order to prevent modification
- Independent source

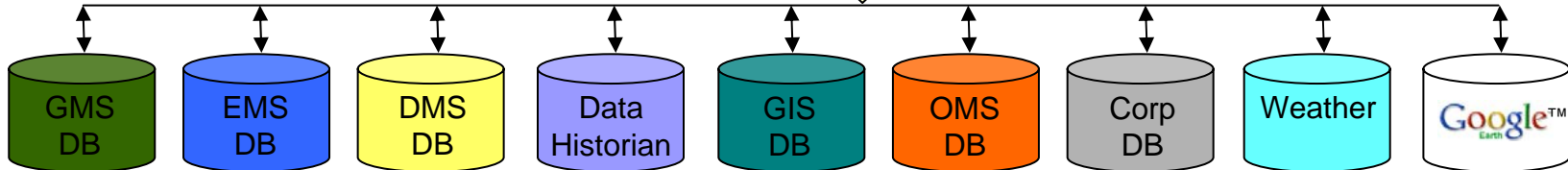
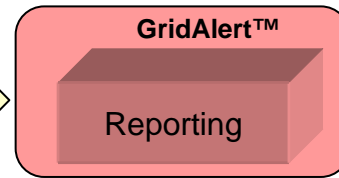
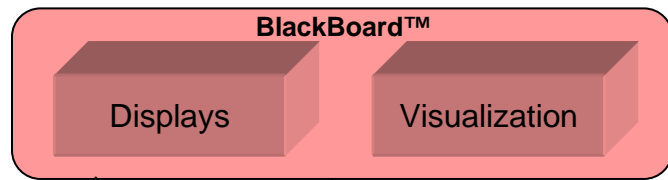
Benefits:

- Improve reliability
 - Improve security
 - Improve grid operating efficiency
 - Single, integrated view instead of an integrated collection of displays
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The United Illuminating Company

P-Tech's Situational Awareness Solution



GridGuardian, BlackBoard, and GridAlert are trademarks of Primate Technologies, Inc. Google Earth mapping services is a trademark of Google, Inc.



Questions?