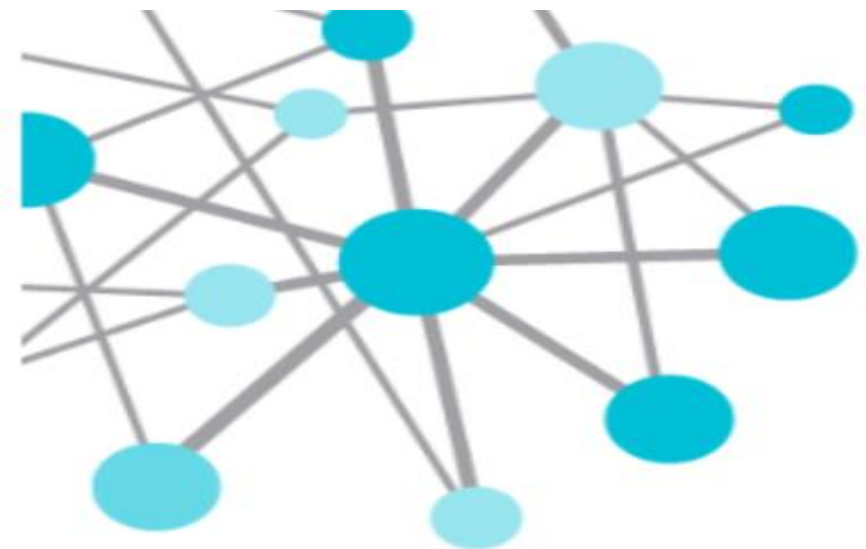




Presented by Matthew Musto, Senior Project Manager, New York ISO
Charles Alonge, Senior Software Developer, New York ISO

Agenda

- **About the NYISO**
- **A New State-of-the-Art Control Room**
- **NYISO PI System Infrastructure**
- **Dynamic Data Response**

Roles of the New York ISO



Reliable operation of the bulk electricity grid

- *Managing the flow of power on 11,000 circuit-miles of transmission lines from more than 300 generating units*



Administration of open and competitive wholesale electricity markets

- *Bringing together buyers and sellers of energy and related products and services*



Planning for New York's energy future

- *Assessing needs over a 10-year horizon and evaluating projects proposed to meet those needs*



Advancing the technological infrastructure of the electric system

- *Developing and deploying information technology and tools to make the grid smarter*

Old Power Control Center



**New York Power Pool
Power Control Center
1970**

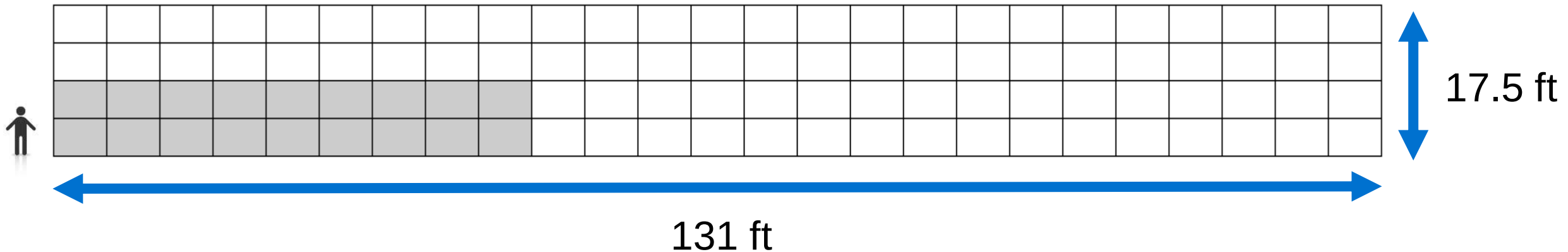


Building a New Control Center



...An All Digital Control Center

- 100 - 80" Mitsubishi LED cubes
- 147 Megapixels of flexible canvas
- Fully redundant system with <100ms failover



NYISO PI History

- ◆ PI System was first adopted at NYISO in 2001
 - *Began as EMS historian software (ICCP to PI, single server)*
- ◆ PI environment grew with SMD2 (RANGER) initiative 2003-2005
 - *Two collectives (Secure and Corporate)*
- ◆ High Frequency telemetry (Phase 1) data historized beginning in 2006
 - *Standalone system using OPC*
- ◆ Provided new opportunities:
 - *Multiple data streams to multiple PI collectives*
 - *PI useful for real-time visualization and reporting*
 - *Engineering, operations, and planning teams engaged*

Business Processes Served

- ♦ Real Time Operations Visualization and Alerting
 - *PI DataLink, PI Processbook, PI AF, PI Notifications, PI AN SDK*
- ♦ Engineering and Planning Data
 - *PI DataLink, PI Processbook, PI ODBC, PI OLEDB (SAS integration)*
- ♦ Billing and Settlements
 - *Custom Java application feeding billing and settlements system (PI JDBC)*
- ♦ Load Forecasting
 - *Load feed (PI JDBC) and diagnostics (X-Drivers) used for validating real-time load data and calibrating forecasts (PI AFSDK Applications)*
- ♦ Training/Simulation (Integration with DTS to replay events in training)

Data Historized with PI at NYISO

- ◆ EMS/BMS Measurements and Calculations (RANGER)
- ◆ Custom Calculations (Performance Equations)
- ◆ Vaisala Lightning Data Feed (Custom NYISO Interface)
- ◆ Analog Telemetry Data @ 10 Hz
 - *Data acquired from Programmable Logic Controller (PLC) using PI MODBUS over Ethernet Interface*



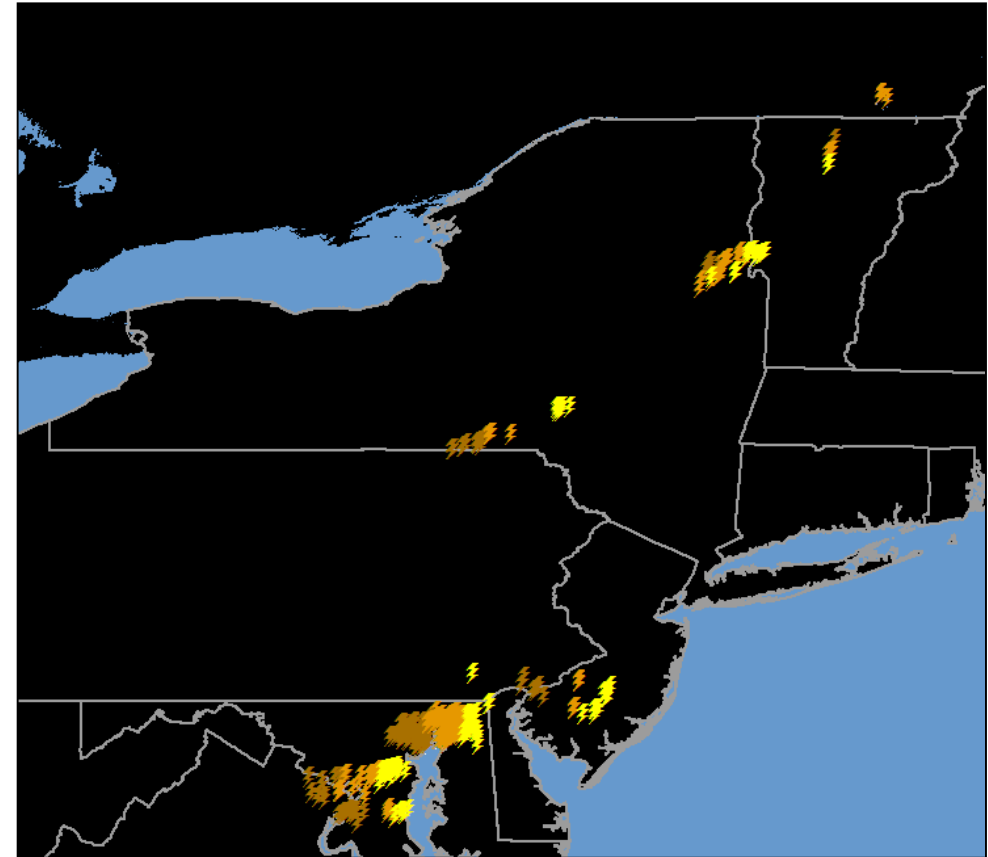
NYISO PI System Standards

- ◆ **Consistent PI Tag naming convention that simplifies the search for users (Substation Name, Generator/Voltage Code, Switch/Line Number, Engineering Unit)**
- ◆ **No 'Big Bang' AF Data Migration – Independent AF databases for project needs**
- ◆ **Hierarchy of assets normally broken down by region/zone**
- ◆ **Notifications and elements are derived from global templates**

Lightning Data Collection

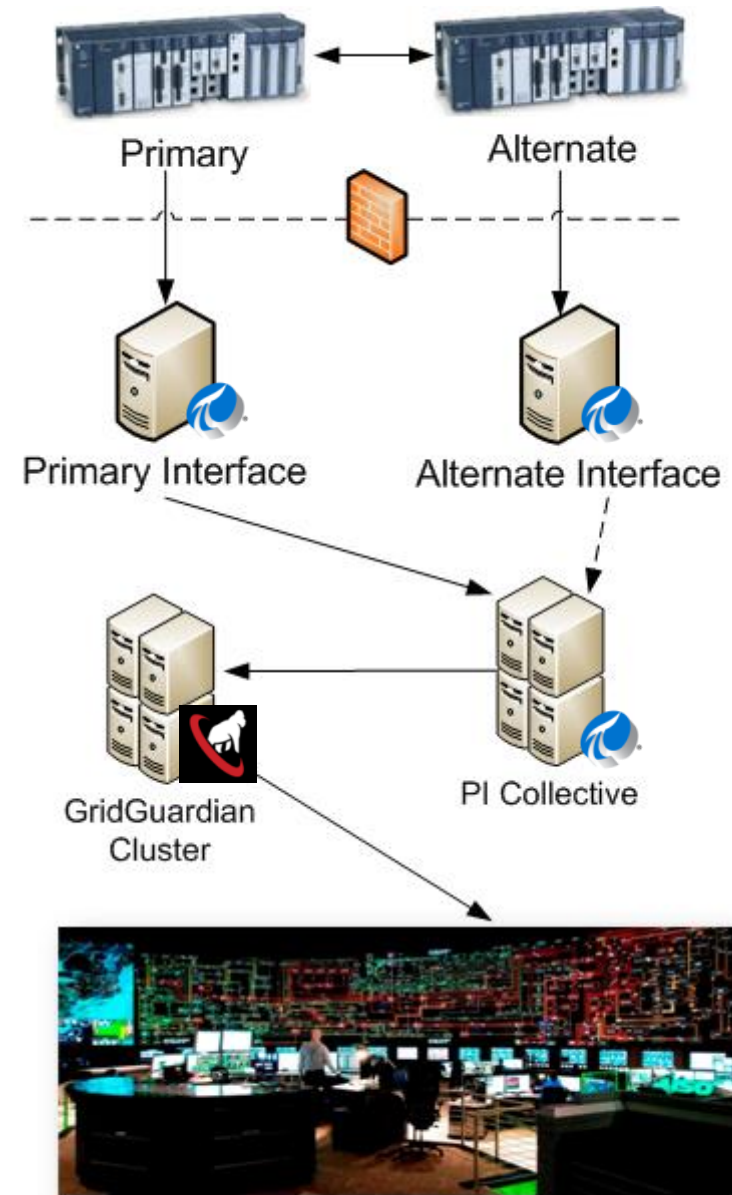


- ◆ Information provided via live feeds
 - *Location (Latitude, Longitude)*
 - *UTC Time (nanosecond)*
 - *Amplitude & Multiplicity*
 - *Type and Strike Angle*
- ◆ Custom PI SDK Application (Migration to AF SDK in Future)
- ◆ NYISO Uses
 - *Real Time Visualization*
 - *Planning Studies*

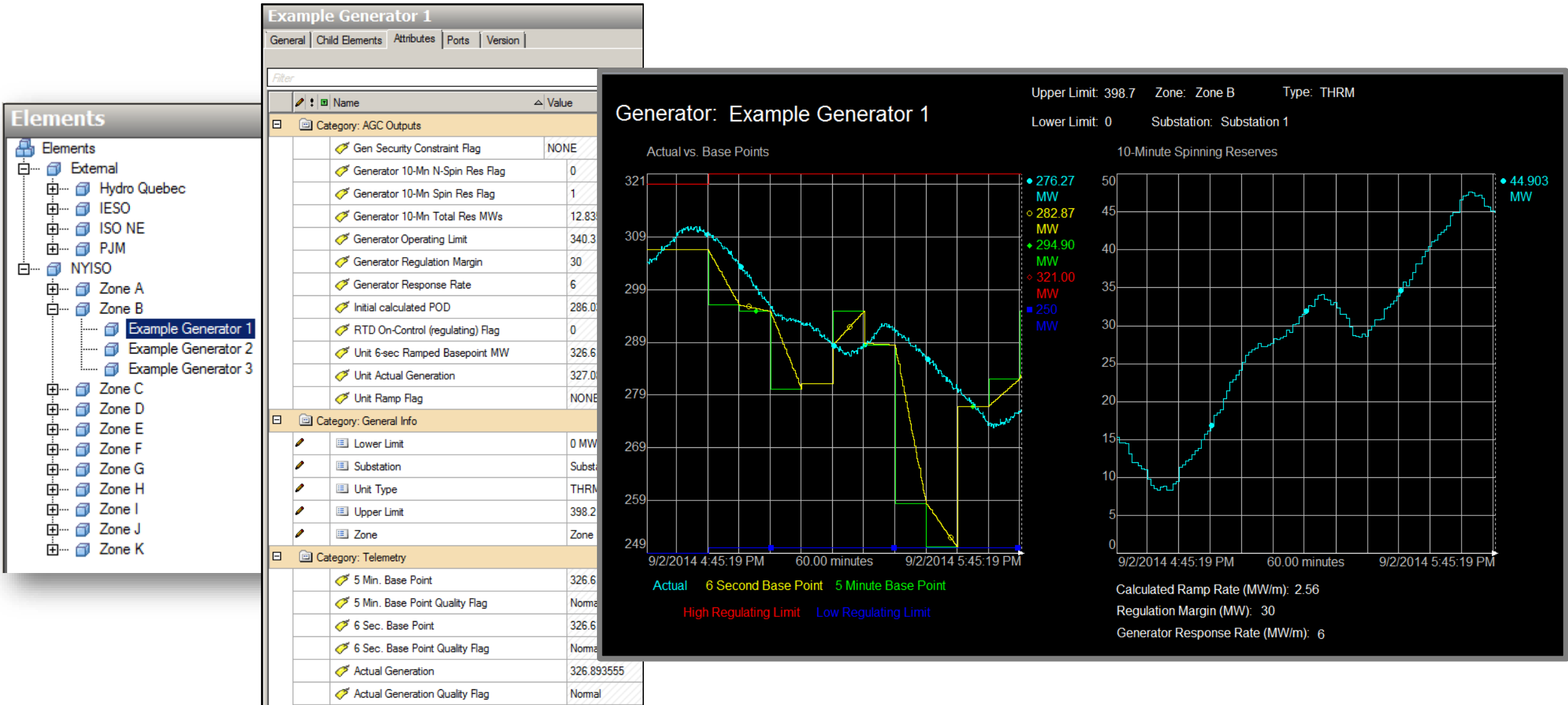


Phase 1 Data Collection

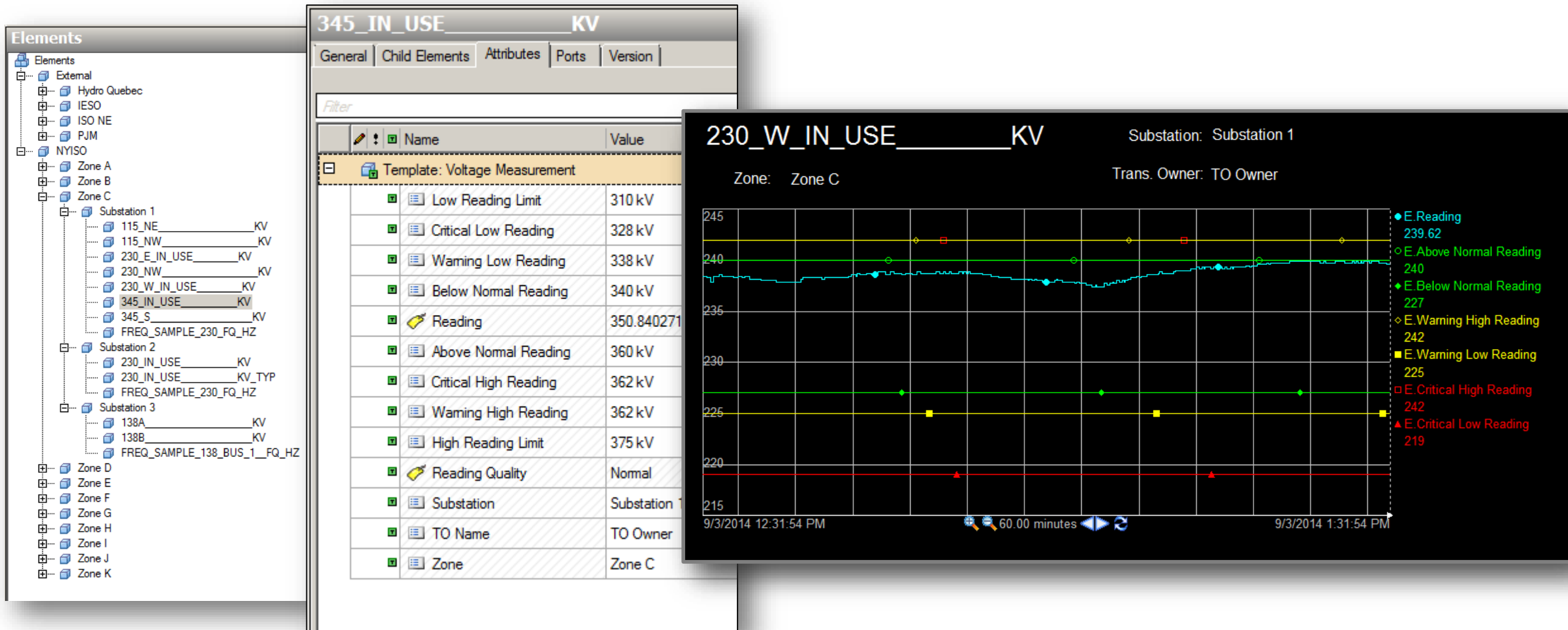
- ◆ Key New York Control Area Telemetry Info
 - *Tie Line Flows*
 - *Bus Voltages (230 kV and above)*
 - *Large Generation Units (≥ 500 MW)*
 - *System Frequencies*
- ◆ System Wide Calculations Included
 - *Area Control Error*
 - *Control Sub-setters*
- ◆ Enhances the main one line display
 - *Redundant data source to backup EMS and ICCP measurements and calculations*
 - *Phase 1 data used in any chart on the wall*



PI Asset Framework – Generator Tracking

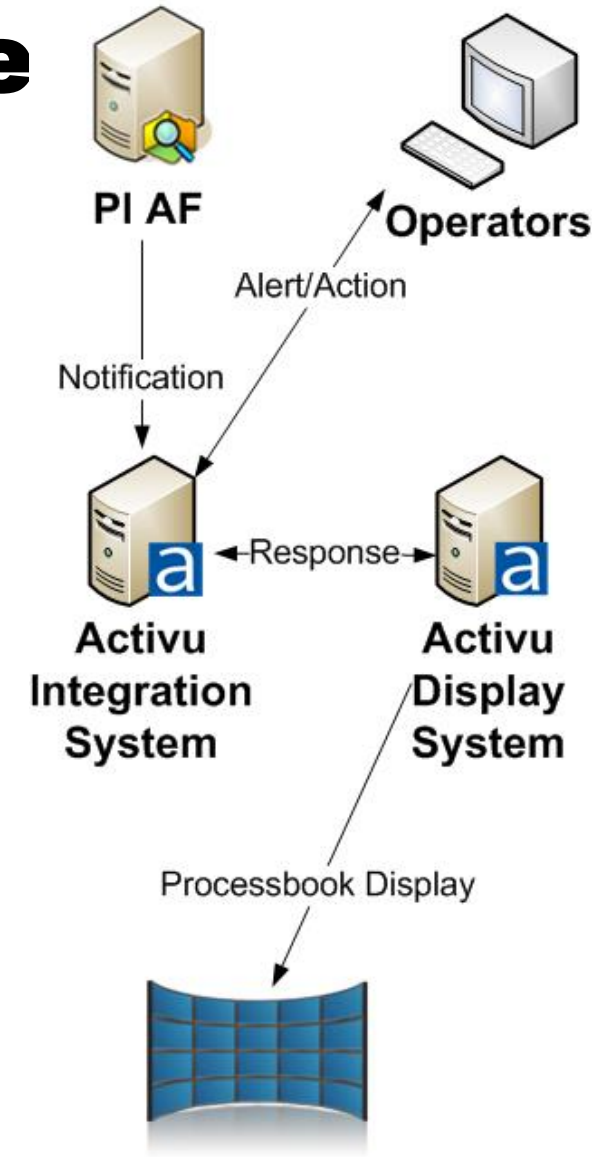


PI Asset Framework – Substation Alerting



NYISO Dynamic Data Response

- ◆ PI AF and Notifications provide a base for the dynamic data infrastructure
- ◆ Almost every wall display is or will be powered by PI data
- ◆ PI Notifications and PI Event Frames (future) on top of PI AF are driving our dynamic visualization responses
- ◆ Custom delivery channel using the AN SDK – Notification, context and priority integrated into the display system



Activu and PI Notifications

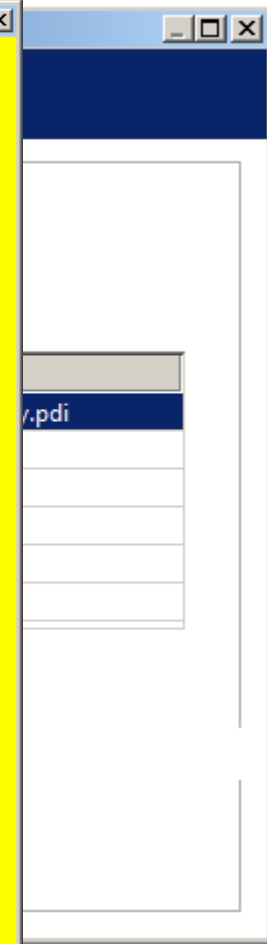
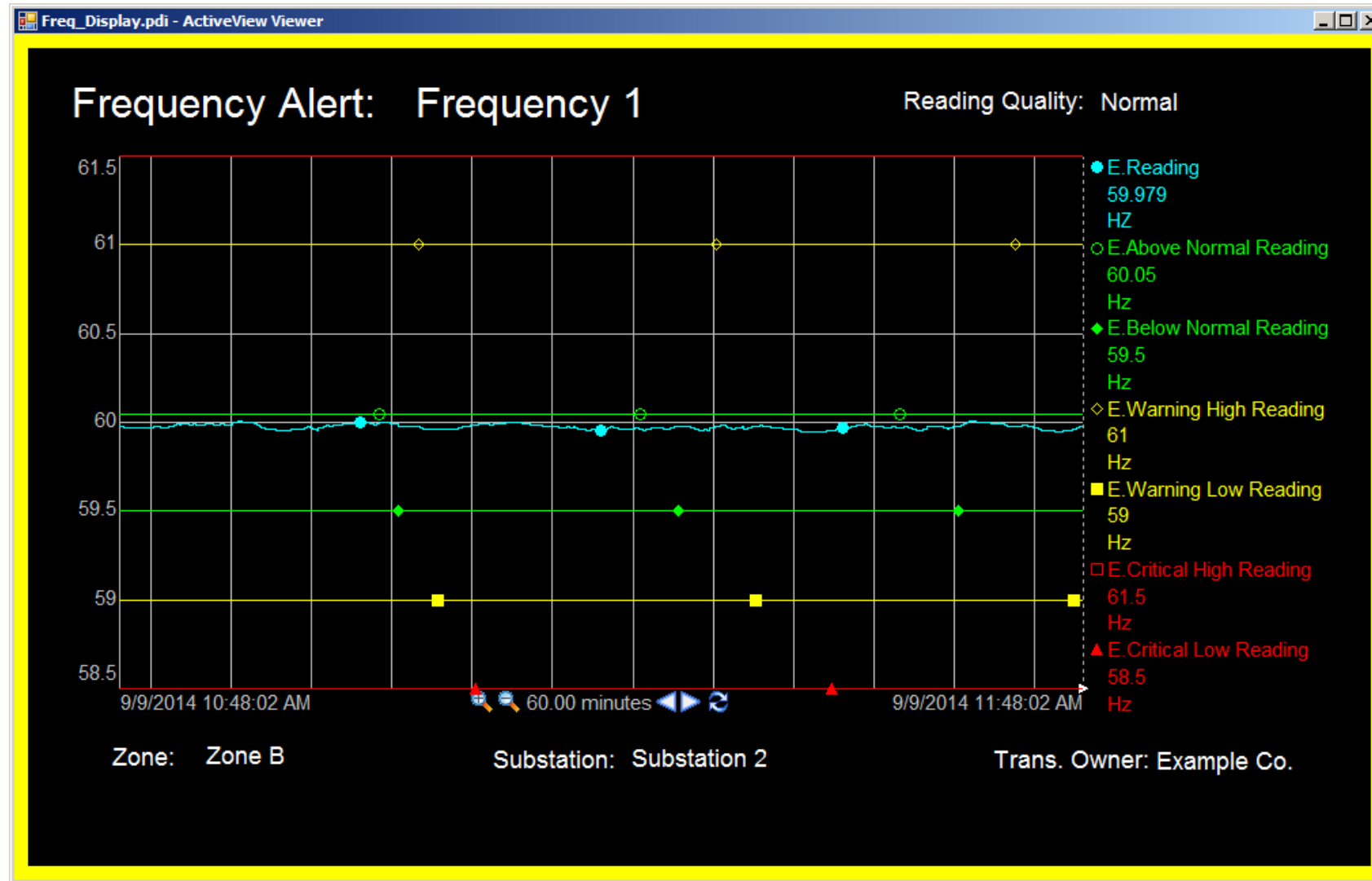
The screenshot displays the 'Activu Alert Configuration' application with several overlapping windows:

- Main Window:** Features a sidebar with 'Users', 'Activu Systems', and 'Alert Responses'. The 'Alert Responses' section is active.
- Add an Alert-Response Mapping (General):** Shows 'Alert-Response Properties' with fields for 'Third Party Alert' (NYIS), 'Name' (NYIS), and 'Description' (ACE). It includes a checkbox for 'Require User Confirmation' and a 'Confirmation time' field.
- Select an Alert:** A search window with 'Test' entered in the search bar. A list of alerts is shown below:

Name
115KV Test
230KV Test
345KV Test
765KV Test
Test Frequency 1
Test Frequency 2
NYISO ACE Test
Test Voltage 1
- Add an Alert-Response Mapping (Add a Response):** A sub-window for configuring the response. It includes:
 - Type of Response: Remove Source
 - Activu System: ActivuGallery
 - Activu Wall: WALL
 - Template Position: P1
 - Action Identifier: (empty field)
 - Action Parameter: (empty field)
 - Minimum wall time: 30 seconds

Buttons for 'Add Response' and 'Cancel' are visible at the bottom right of the 'Add a Response' window.

Activu and PI Notifications



ports received. Click here to display
n requests.



Conclusions

- ◆ **PI provides quick and easy access to several NYISO data sources**
- ◆ **Dynamic data response is the next big thing**
- ◆ **PI AF databases and Notifications integrate multiple data sources and add depth to NYISO alerts**
- ◆ **More depth can be added by using PI Event Frames for retrospective analysis with an eye towards leveraging new features for enhancements to existing dynamic data response and delivery**

Thank You!



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The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.

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