NASPI North American SynchroPhasor Initiative

SOUTHERN CALIFORNIA EDISON
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# Supporting SCE's Smart Grid Initiative

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# SCE Smart Grid Vision

SCE's vision of a smart grid is to develop and deploy a more reliable, secure, economic, efficient, safe and environmentally-friendly electric system covering all facets of electricity from production through transmission, distribution, and its smart use in homes, businesses and vehicles.

# SCE Wide-Area Situation Awareness System

## Phase 1 from 2010 – 2015

- Up to 80 SCE PMU/DFR and 80 PMUs from neighbor utilities with data rate up to 120 samples/second using C37.118 or IEC 61850 protocol
- Post-event analysis and fault location calculations immediately after a fault or event occurrence
- Include the following real-time and near real-time situation awareness applications
  - Voltage phase angle difference monitoring
  - Voltage stability monitoring
  - Low frequency oscillation monitoring
  - Fault location
- Support synchrophasor data exchange with various WECC entities

# SCE Wide-Area Situation Awareness System (WASAS)

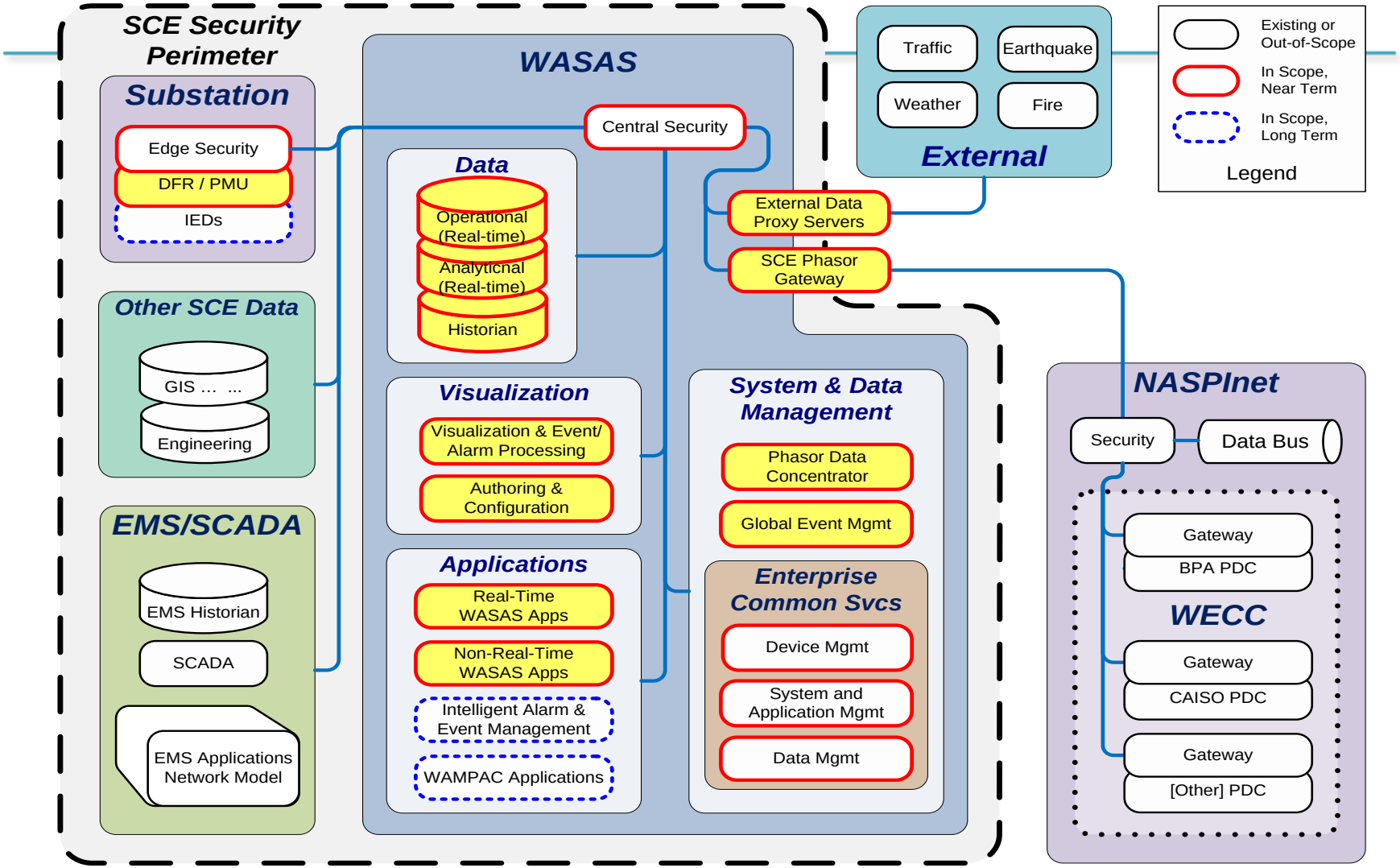
***Phase 2 from 2015 to 2019***

- Up to 500 SCE PMU/DFR
- Interface to WECCNet/NASPINet for data exchange
- WASAS evolves to become Wide Area Monitoring, Protection and Control System (WAMPAC)

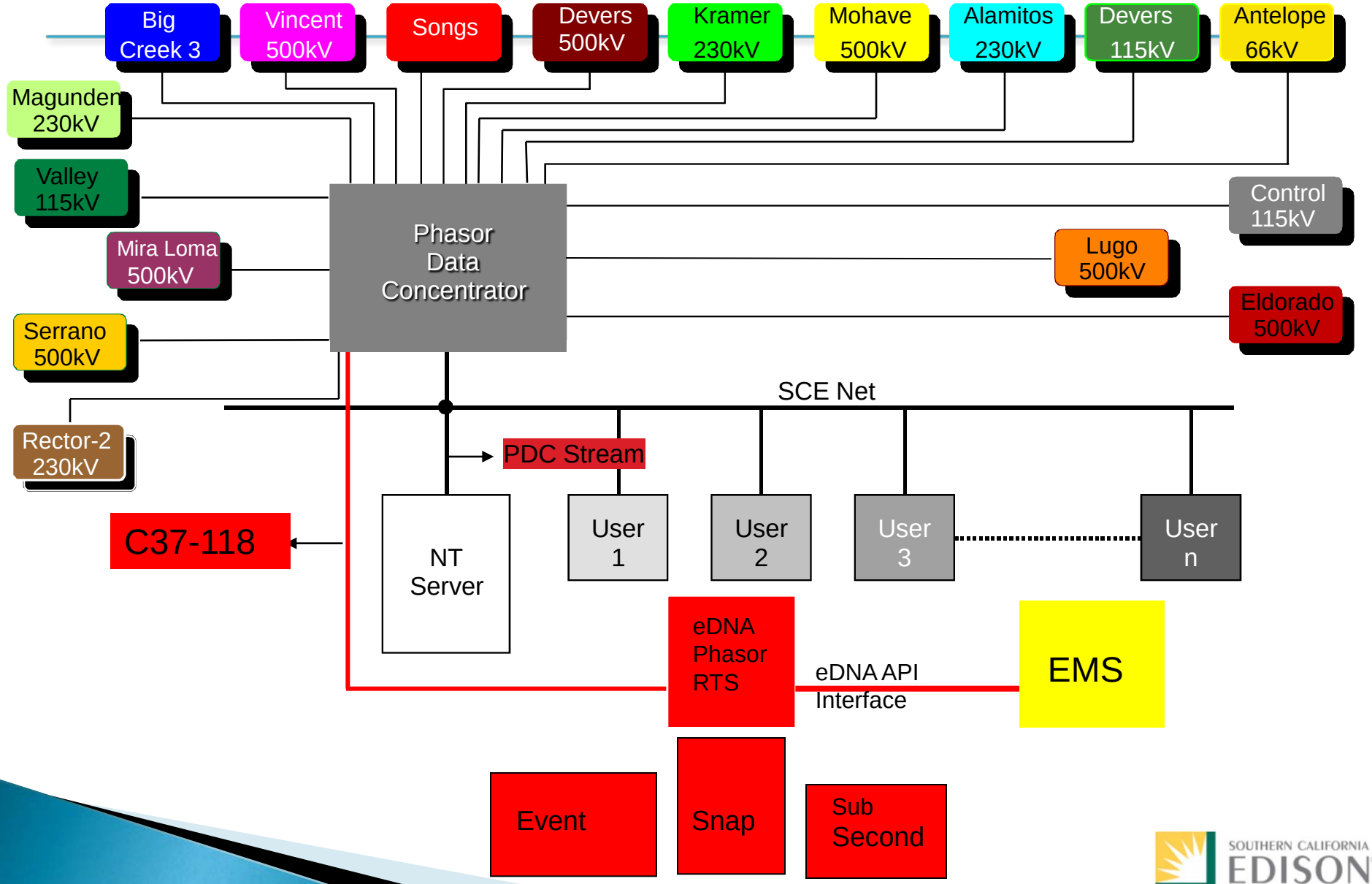
Application support:

- Small-Signal Stability Monitoring (optional)
- Real time thermal line rating monitoring
- Island identification and island condition monitoring
- Distributed generation / Independent power producer (DG / IPP) Applications

# WASAS Design Views – logical



# Current SCE Phasor Measurement System Network

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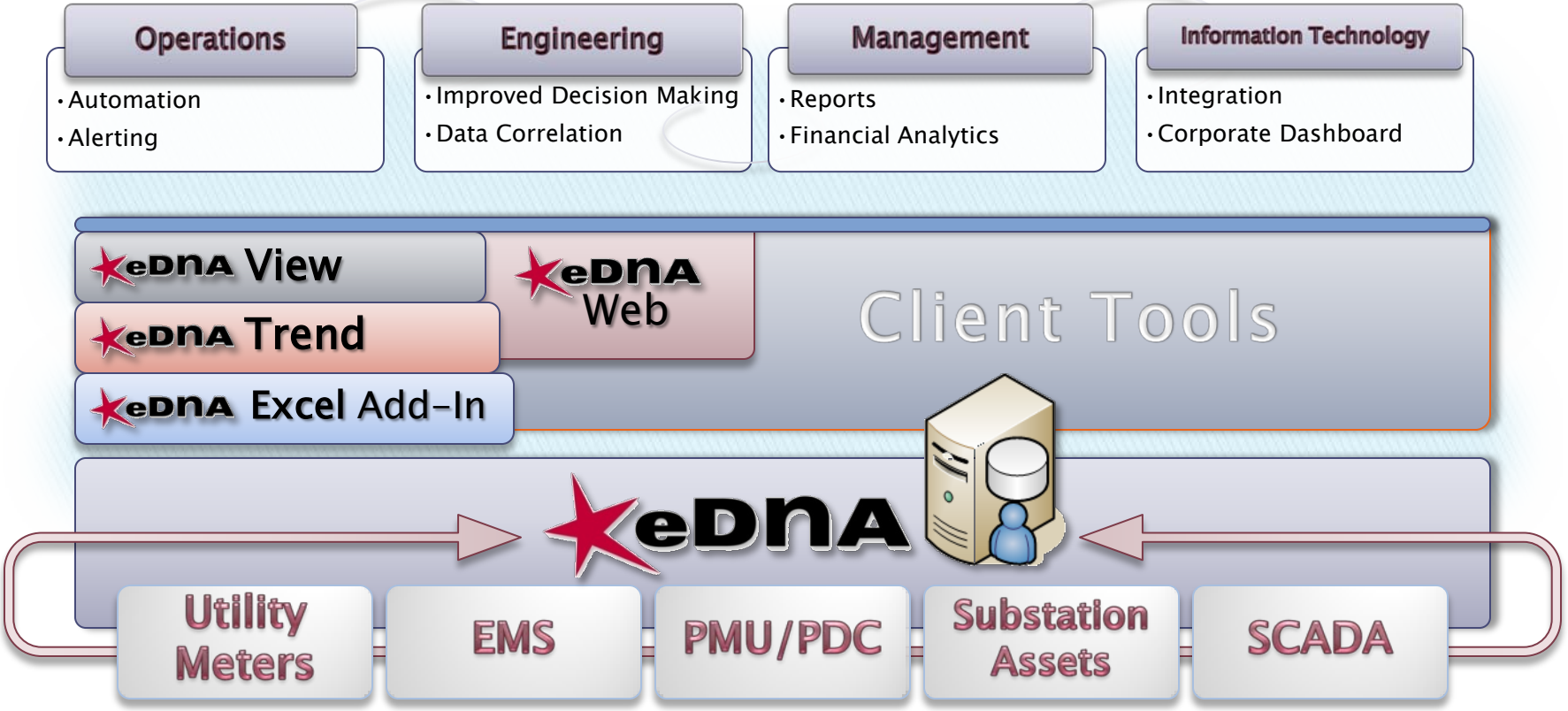
# Infrastructure



# eDNA Synchrophasor Data Management

- Stores all collected data online for configurable number of days in its original collected resolution (Rolling Archive)
- Snapshot archive of the data that can be efficiently stored online for many years
- Event archive management
- All data is stored in an archive such that the integrity and resolution of the measurement values are fully maintained (lossless compression)
- Rapid retrieval of data regardless of archive sizing

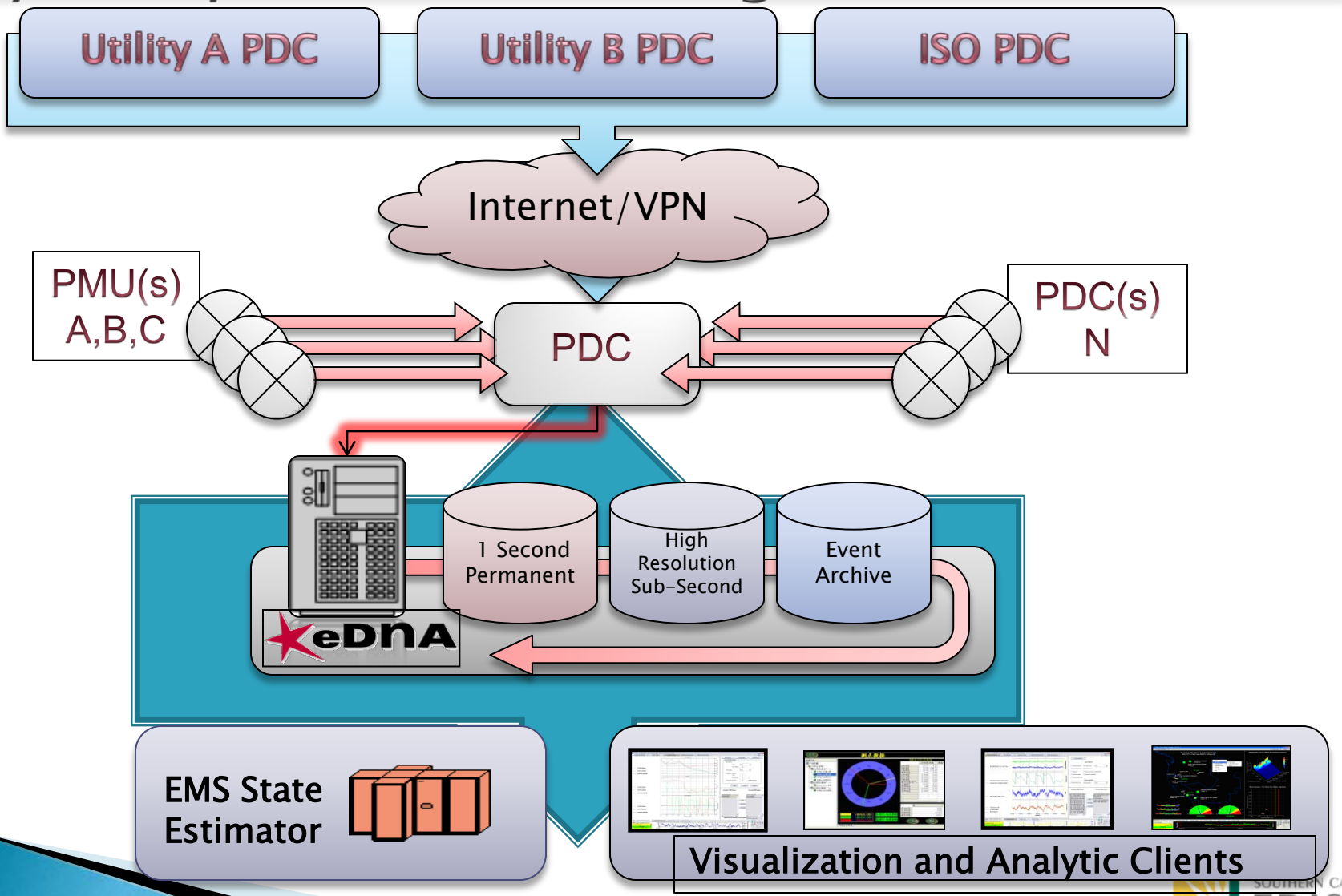
# Data Managment

- Integration of phasor data with other applications (OPC, ODBC Web Services and API's for integration with other systems)
- Ability to easily retrieve time synchronized snapshots of the Phasor information
- Output data via Excel, Binary Files (DST), Comtrade
- Any number of users and applications can access the real-time and historical data simultaneously without delay
- Data Management/Organization using a meta data model

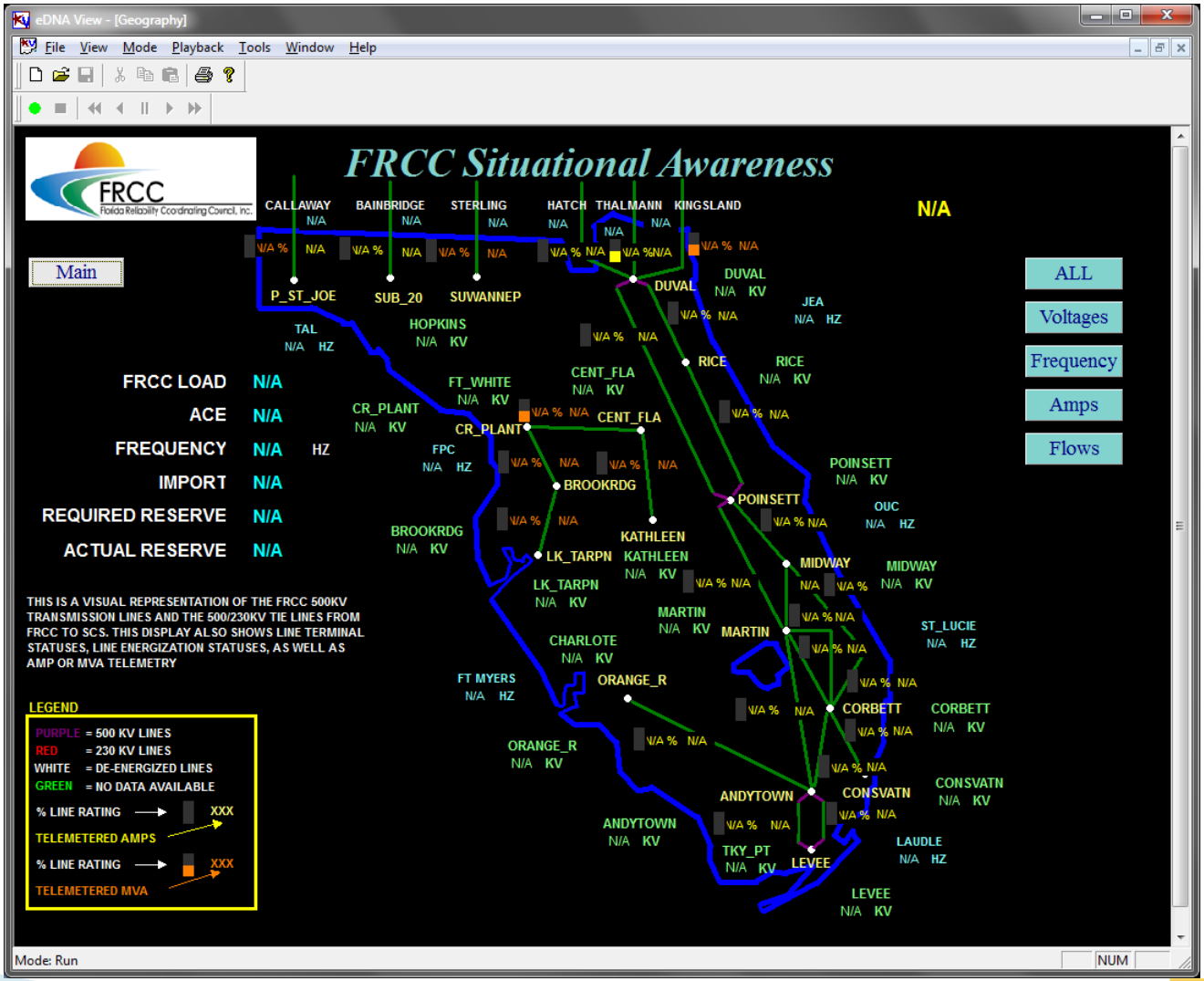
# Event Detection/Management

- Configure and generate alarms based on high/low limit checking for each collected measurement value
- Configure and generate alarms based on rate of change
- Alarm filtering (in alarm state for x period of time, alarm threshold violation x times over x period of time, etc.)
- Automatic storage of the data for a configurable amount of time (so much pre event and post event) based on the alarms
- Manually defined events to be stored in the event archive

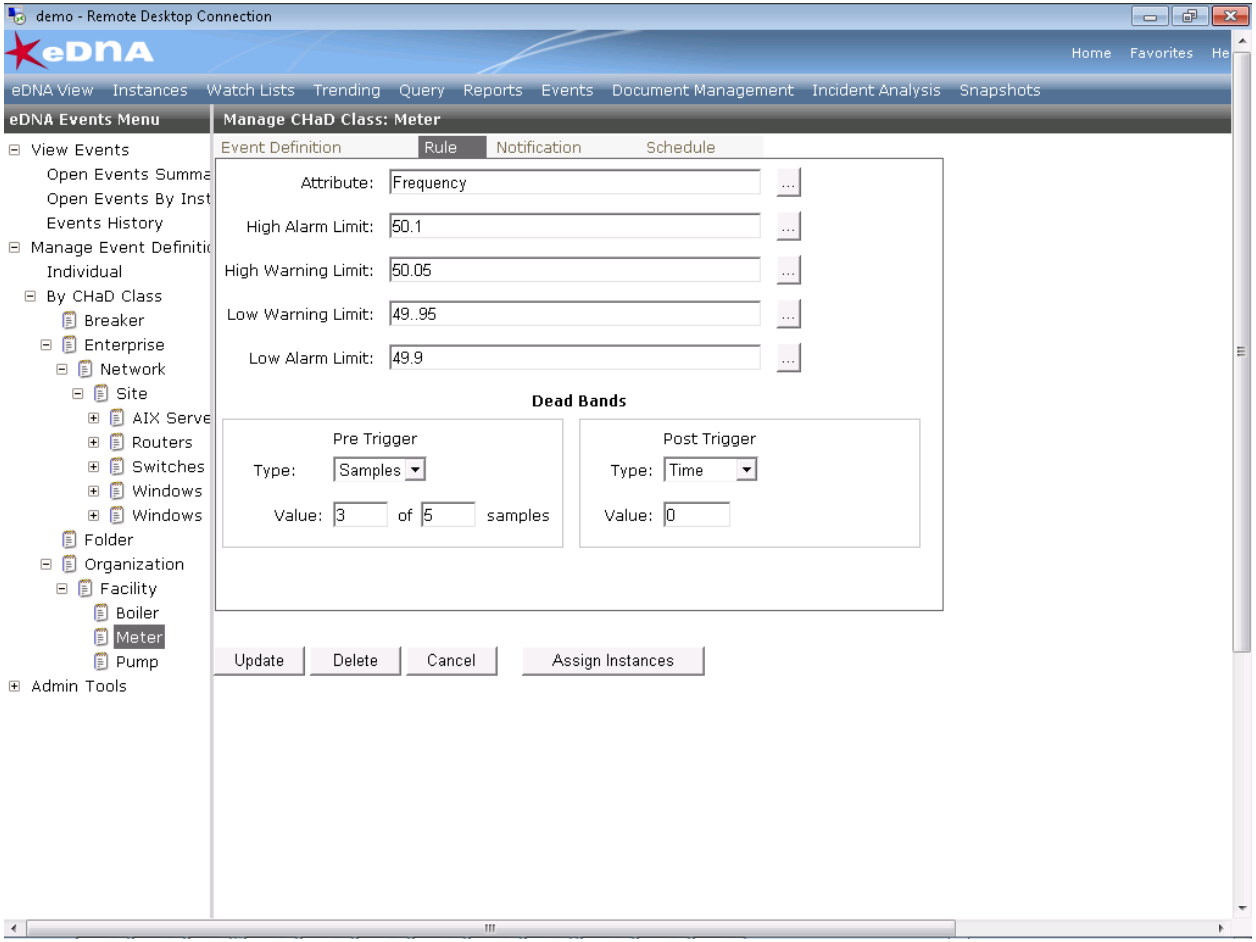
# Synchrophasor Data Management PDC



# Graphical View Displays



# Event Configuration Interface

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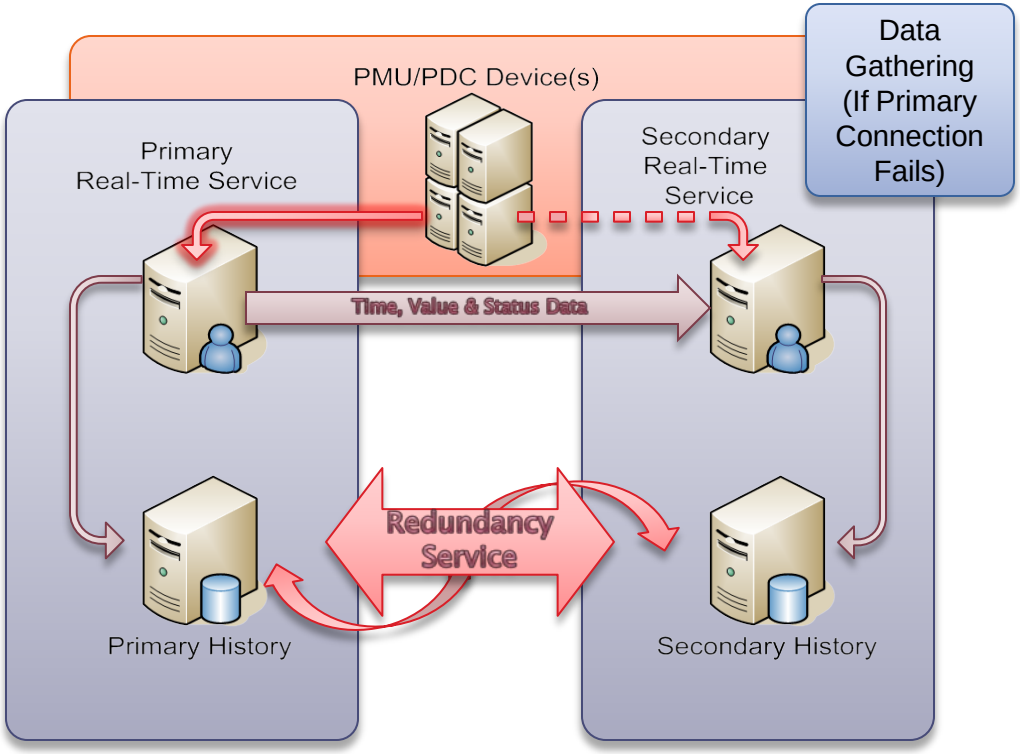
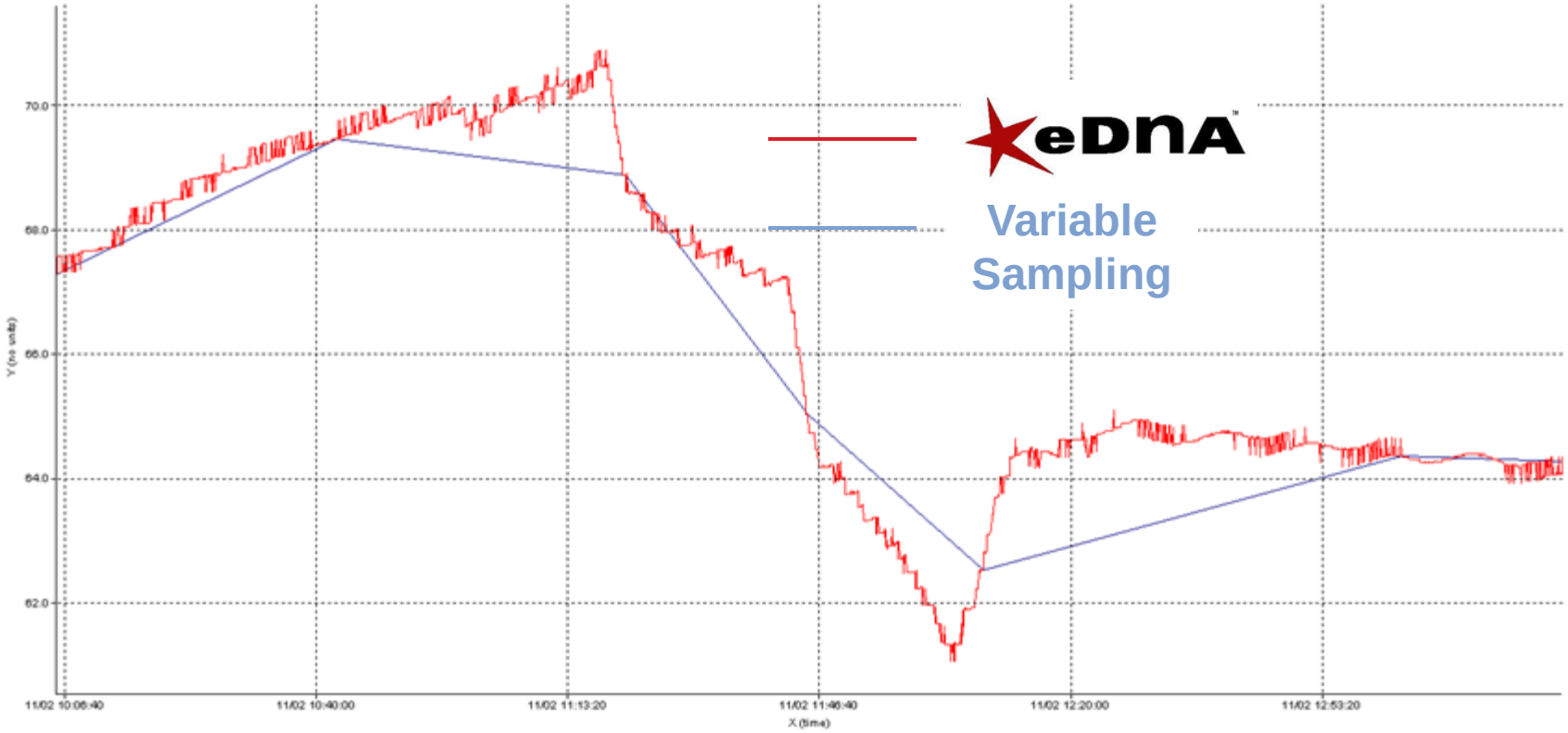
# Native System Redundancy

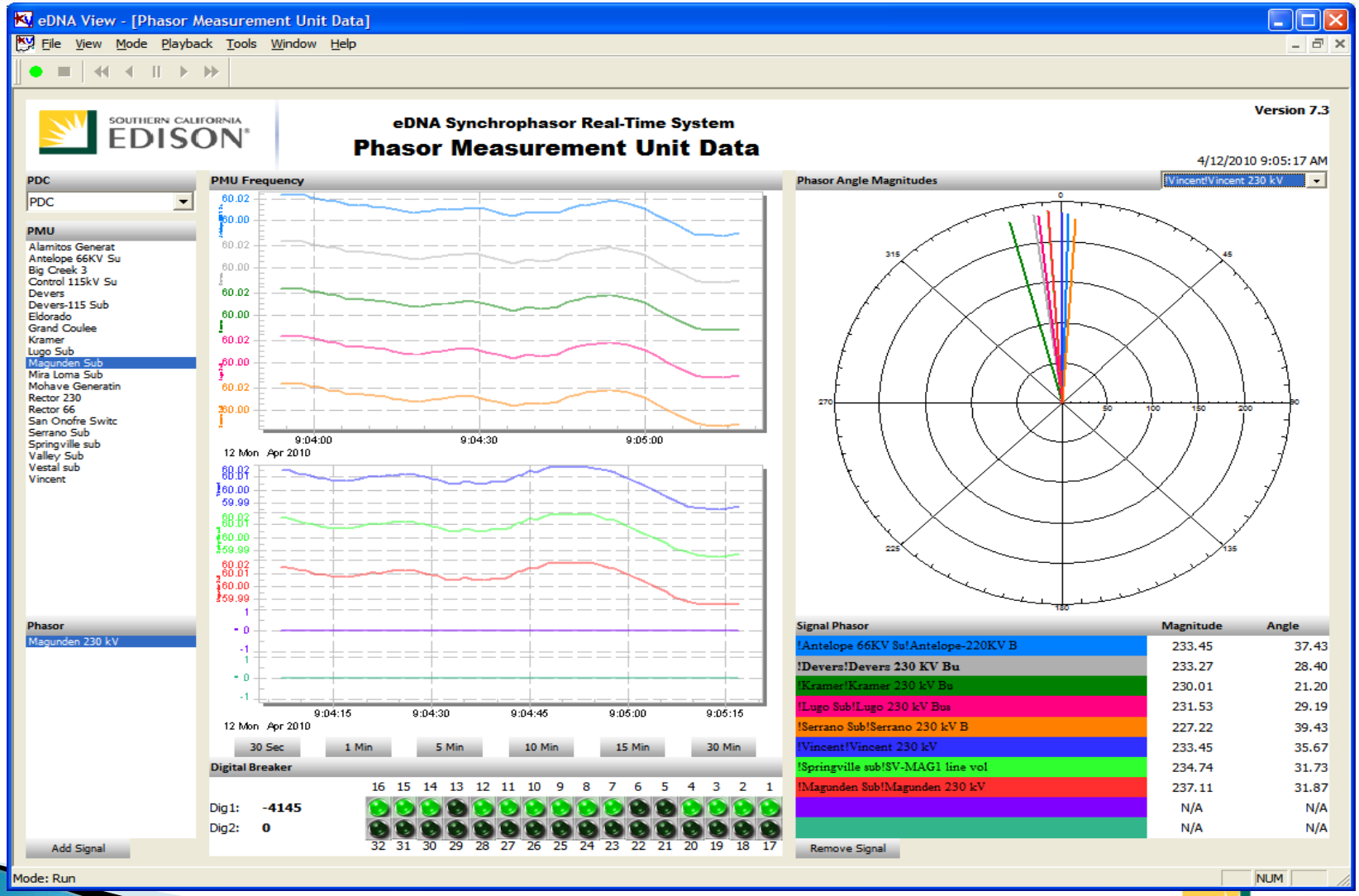



- Seamless Failover
- Operate Through System Failures and Maintenance
- 24x7 Fault Tolerance
- Built Into Core eDNA Architecture
- Eliminate Costly and Limited 3rd Party Solutions

# Data Accuracy & Fidelity



# Object Based Viewing of PMUs using CHaD

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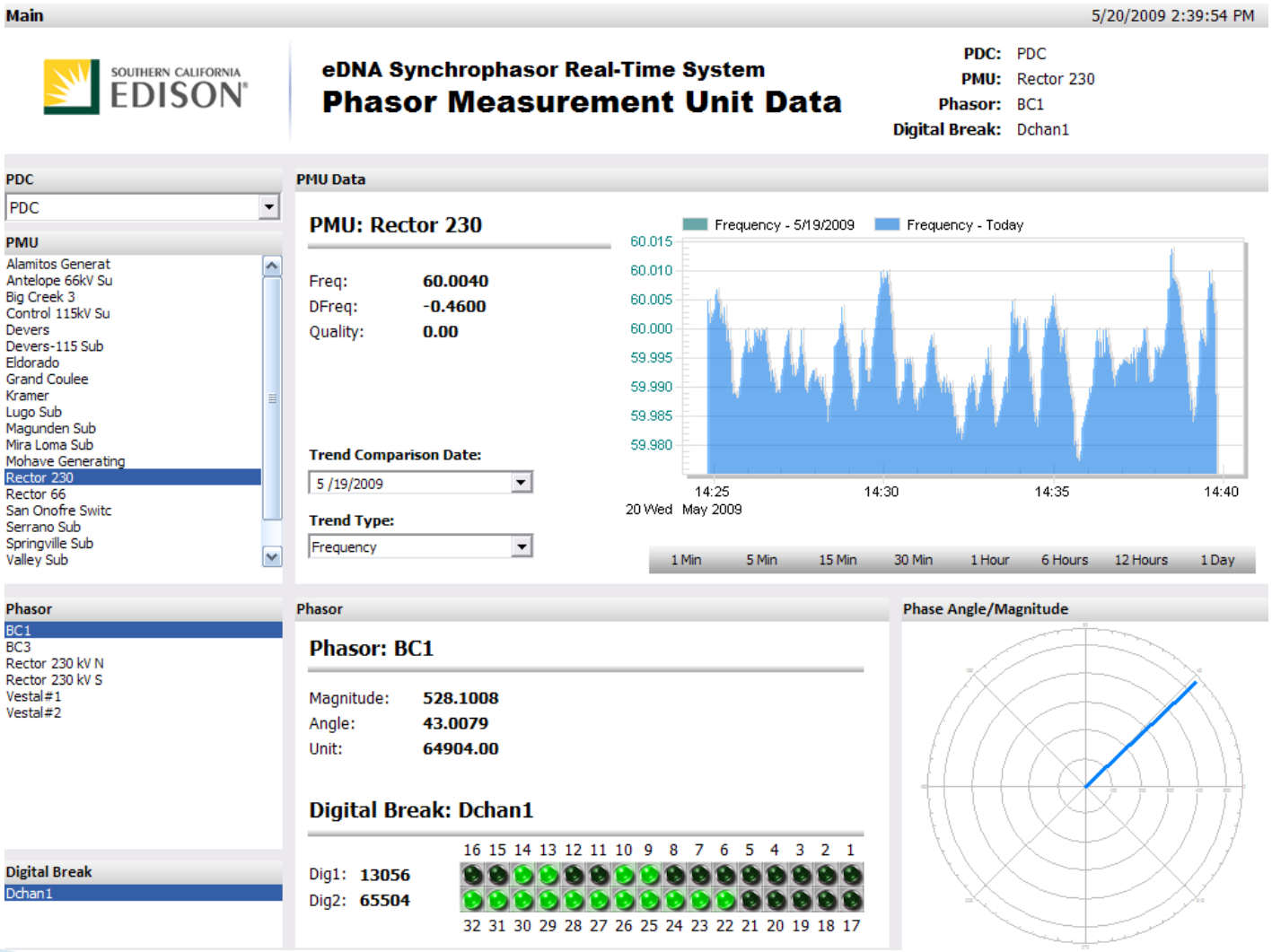
# eDNA View – Example Situational Awareness

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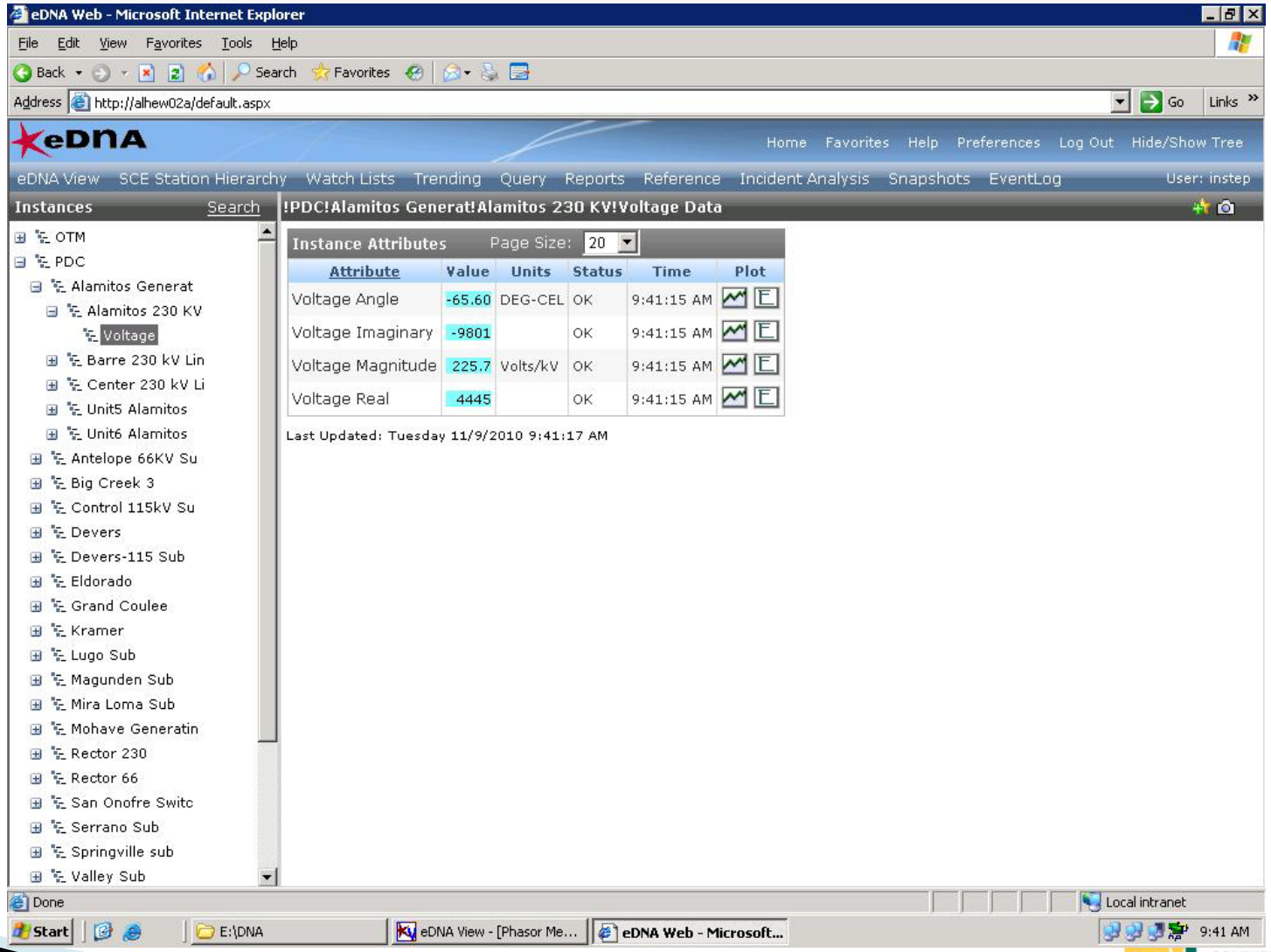
# Data Organization

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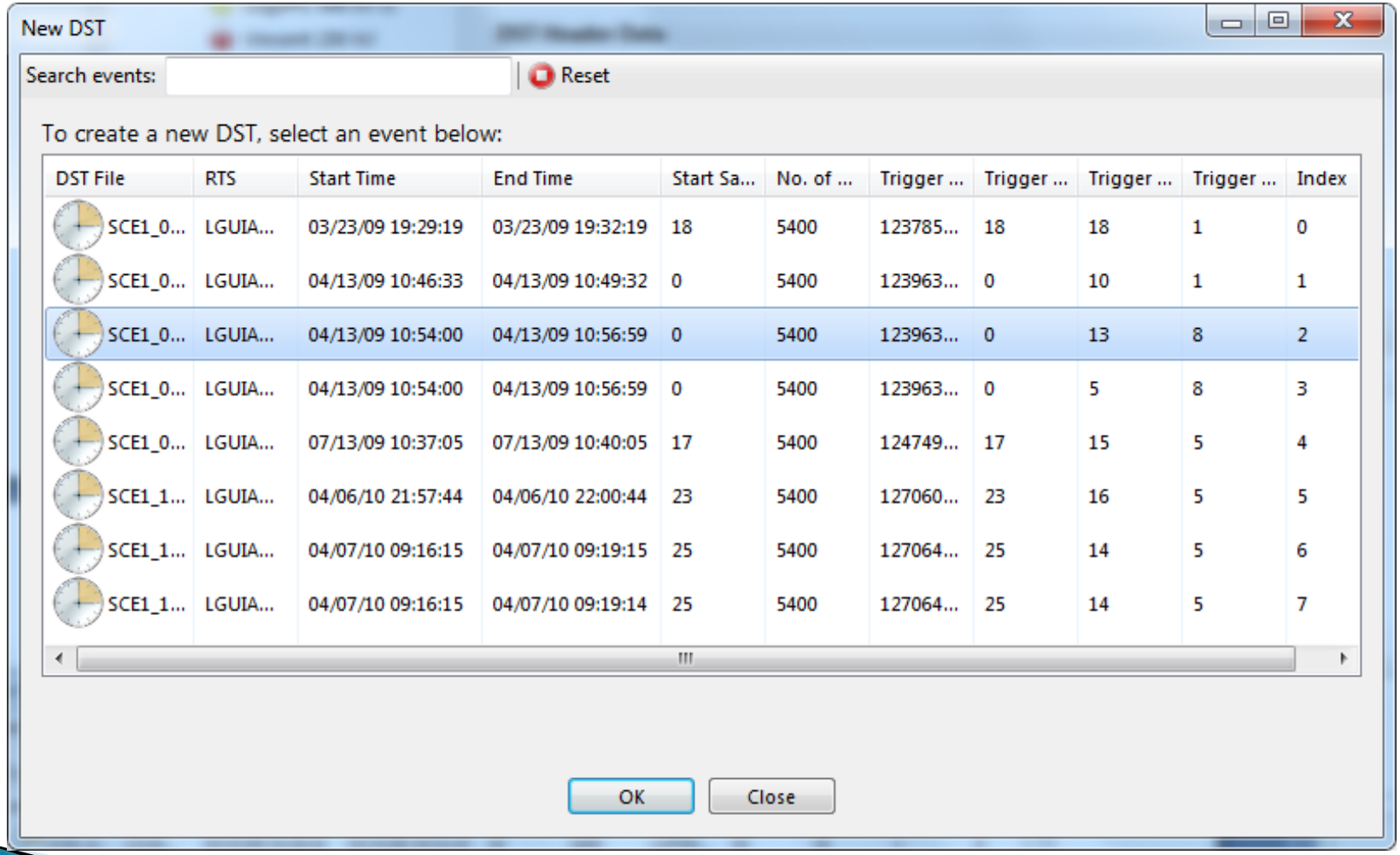
# Viewing Event Archive

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# Trending Analysis


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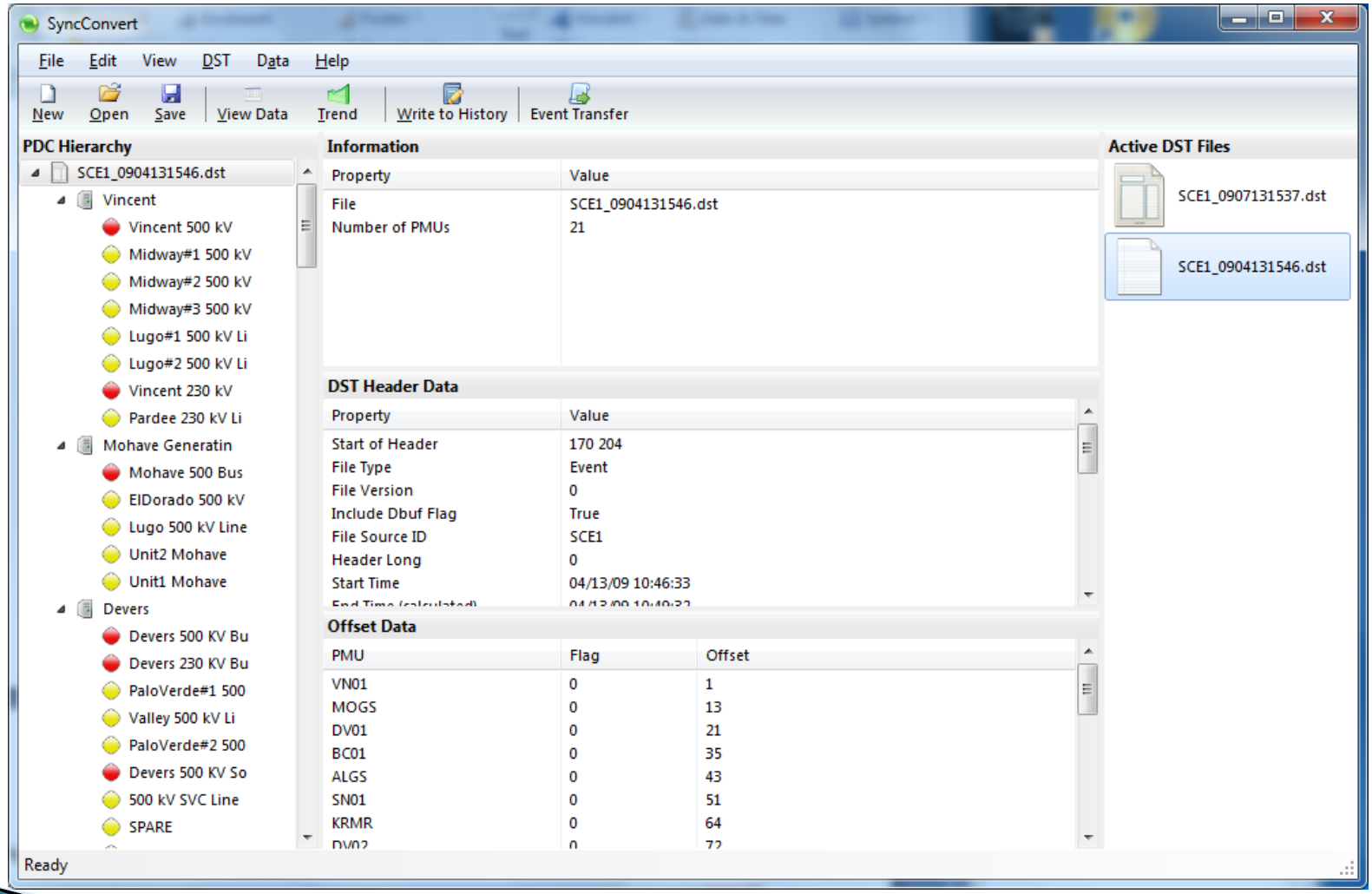
# DST File Created

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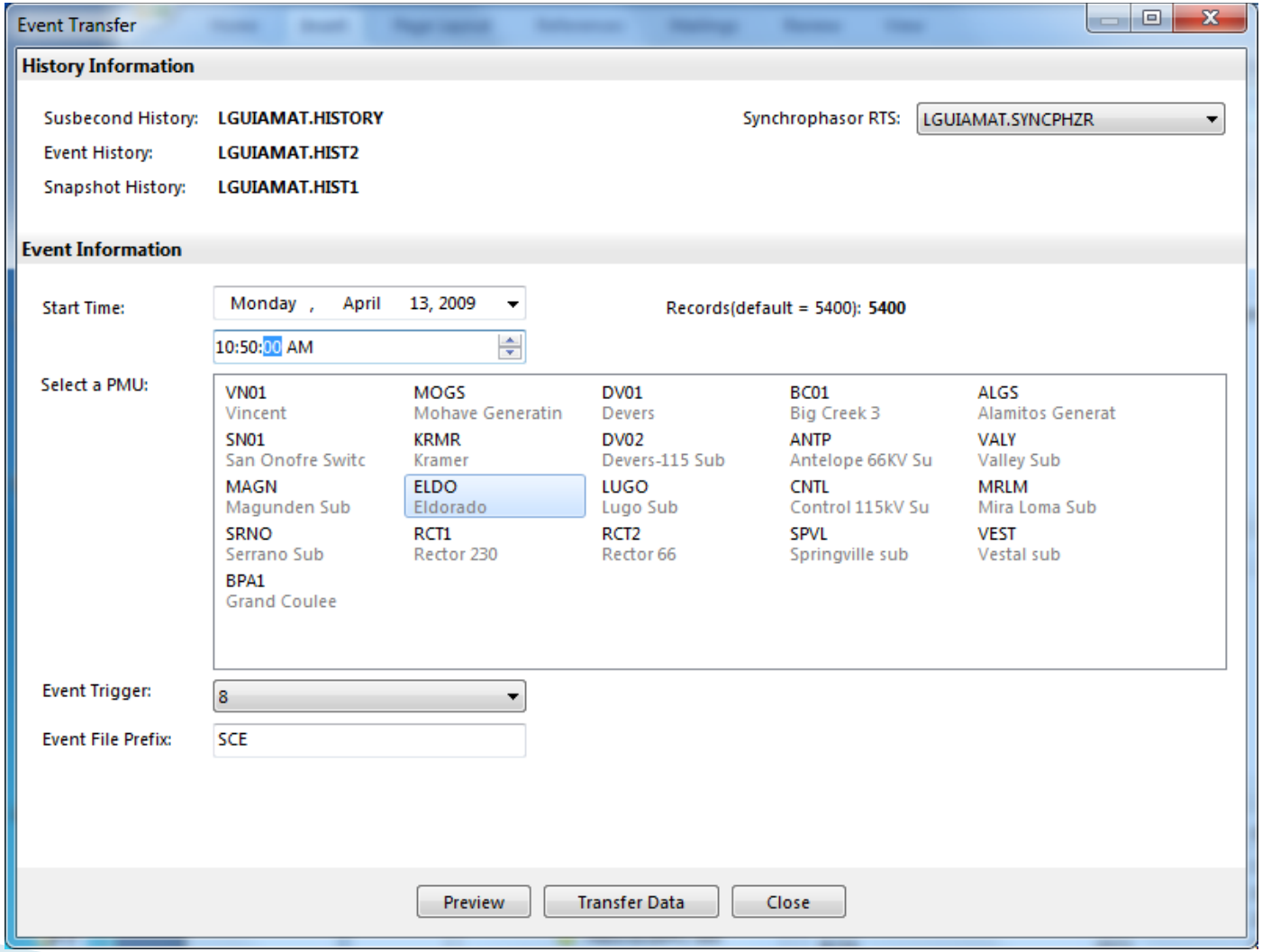
# Transfer from Streaming to Event Archive

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# Summary

- Need to Plan for the Data Management Infrastructure Now
- More than just a database of time series data
- Need to Organization Layer
- Need Event Archive
- Need Import / Export / Replay

# More Information

- Reception Tonight – InStep Booth
- Multiple Vendor Interoperability Demonstration – Tomorrow 8 AM

# Questions or Comments

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