DOE Transmission Reliability Program Overview

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Office of Power Technologies

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Office of Power Technologies Organization

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Mission

Develop technologies and policy options that will contribute to maintaining and enhancing the reliability of the Nation's electricity delivery system during the transition to competitive power markets.

Implementation Approach

Projects were planned and developed consistent with:

- Results of two electric industry leaders workshops
- R&D needs of other potential reliability research funders (including EPRI, California Energy Commission, National Science Foundation)

Activities are organized under four major areas:

- Real-Time Grid Reliability Management
- Reliability and Markets
- Distributed Energy Resource Integration
- Reliability Technology Issues and Needs Assessment

Real-Time Grid Reliability Management

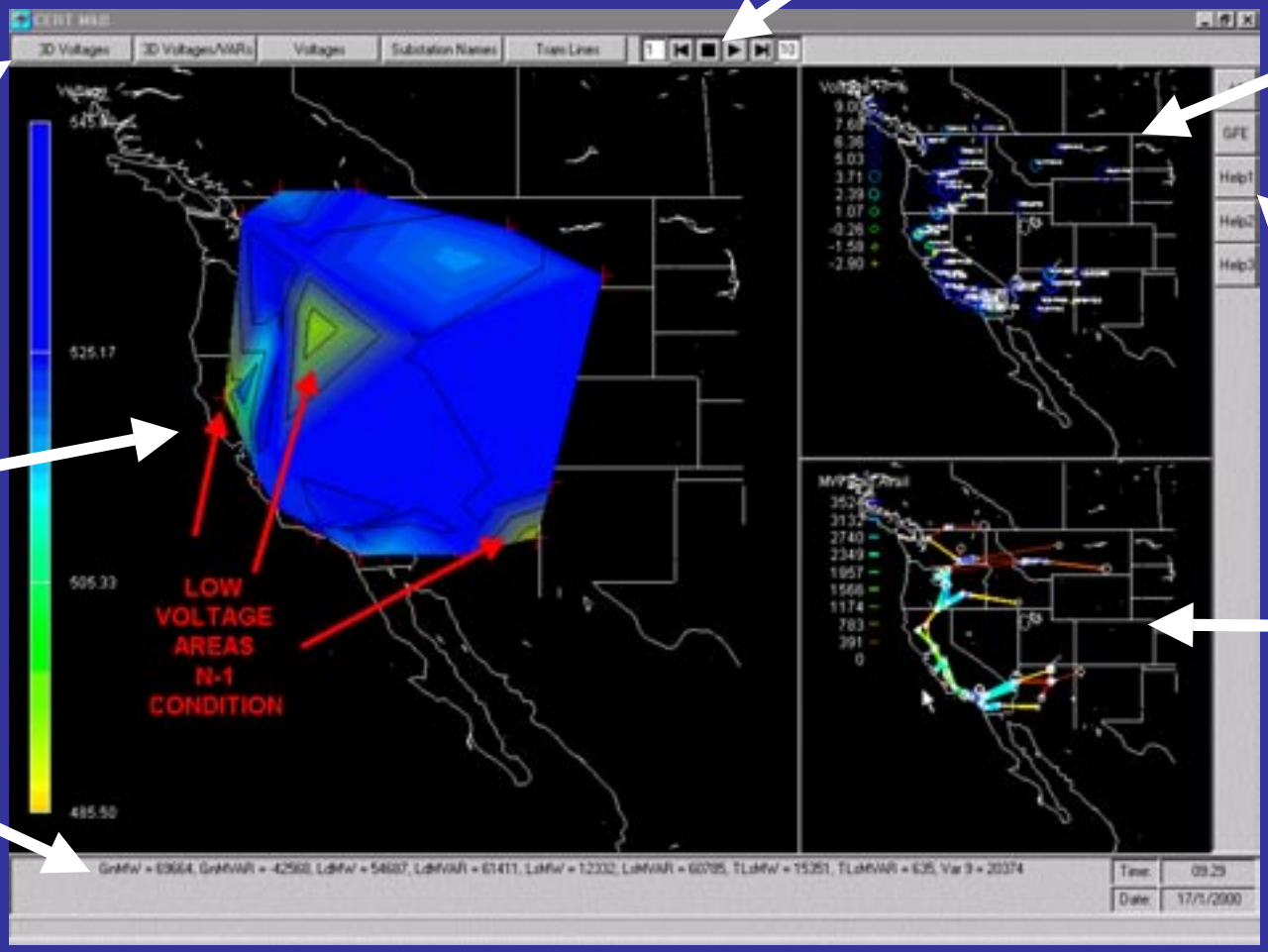
Objective:

Provide a continuing output of useful grid reliability technologies and tools that are responsive to operational challenges posed by utility restructuring and development of competitive markets.

Approach:

- Develop, test, evaluate, and demonstrate new real-time performance monitoring, reliability adequacy, and security analysis schemes, tools and operational procedures along with real-time control technologies based on advanced measurements
- Improve information visualization systems and their availability
- Develop performance metrics to measure and monitor grid reliability for transmission and distribution systems
- Disseminate these operational tools and processes to industry

VAR Monitoring Tool

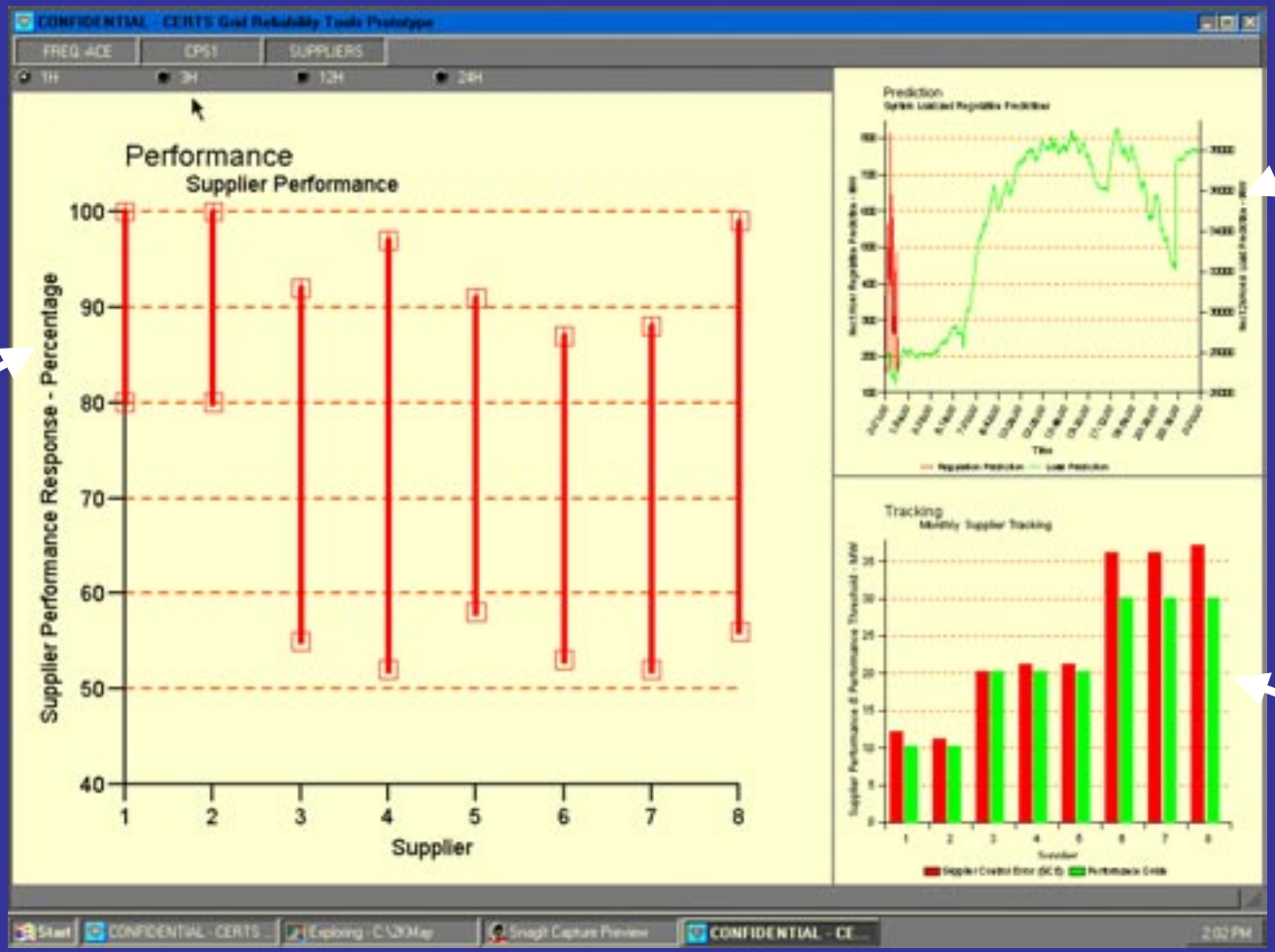


Ancillary Services Performance and Tracking

Performance

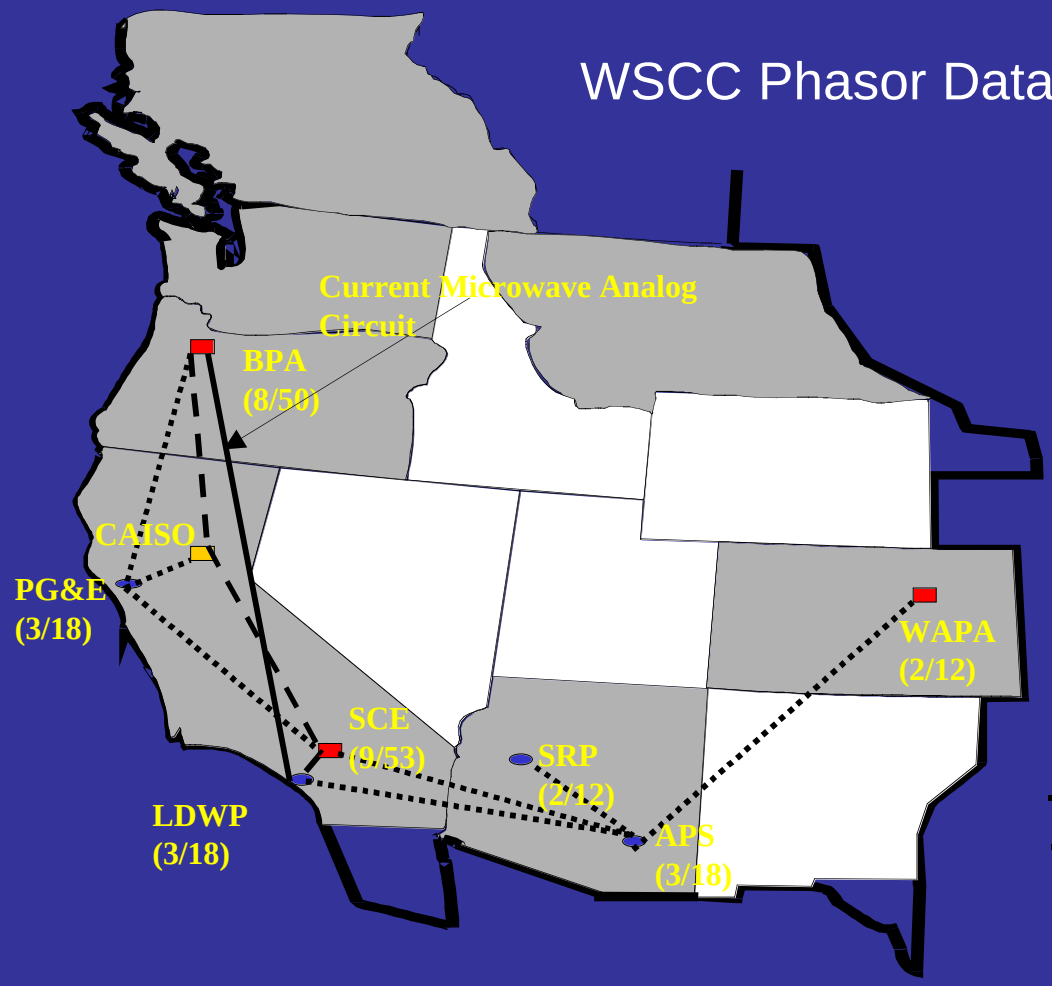
Prediction

Tracking



Phasor Measurement Security Applications

WSCC Phasor Data Communication Network

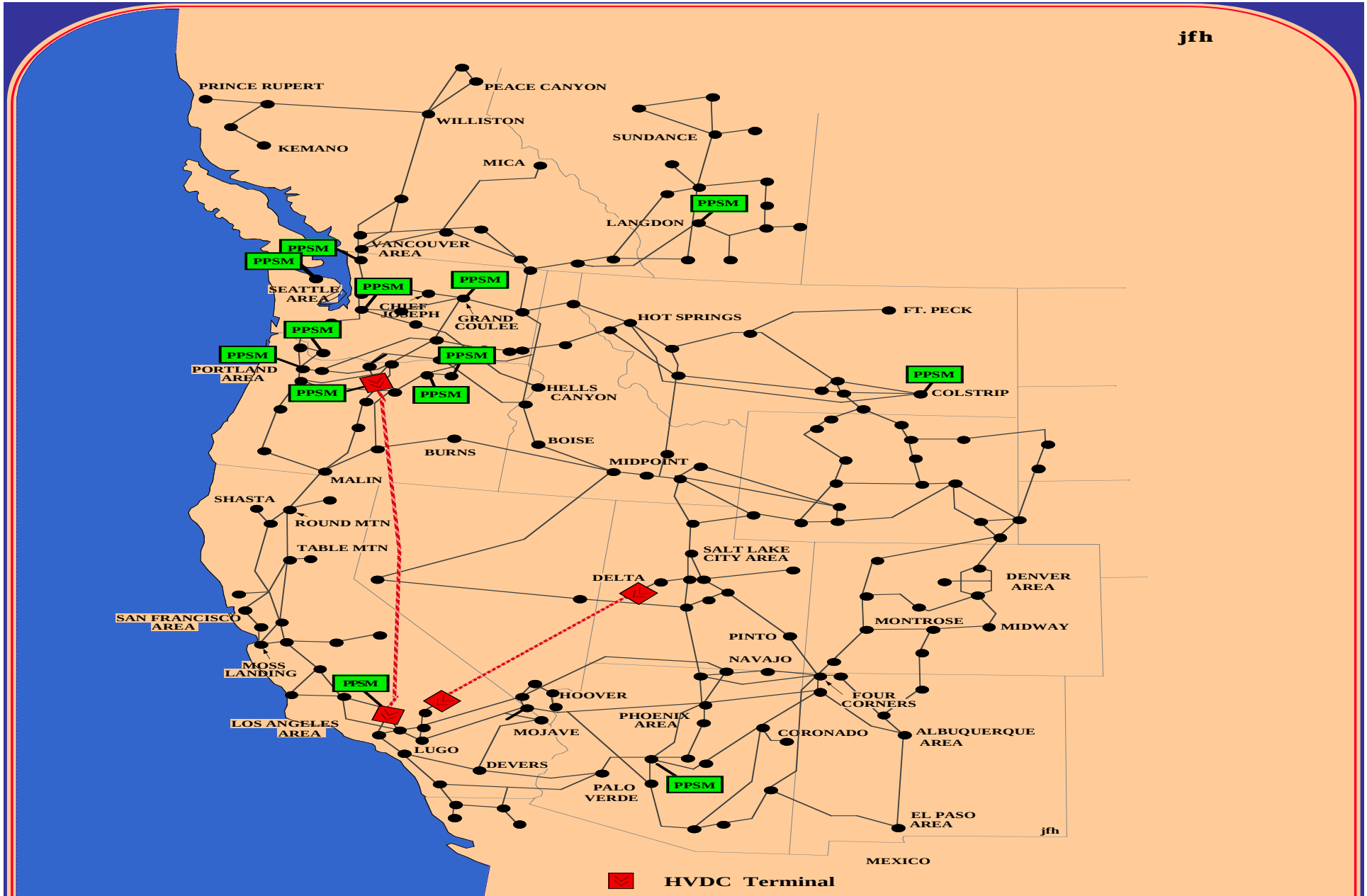


WSCC TOTALS

33 PMUs
151 Phasors
1 Inter Data Link
2 PDCs

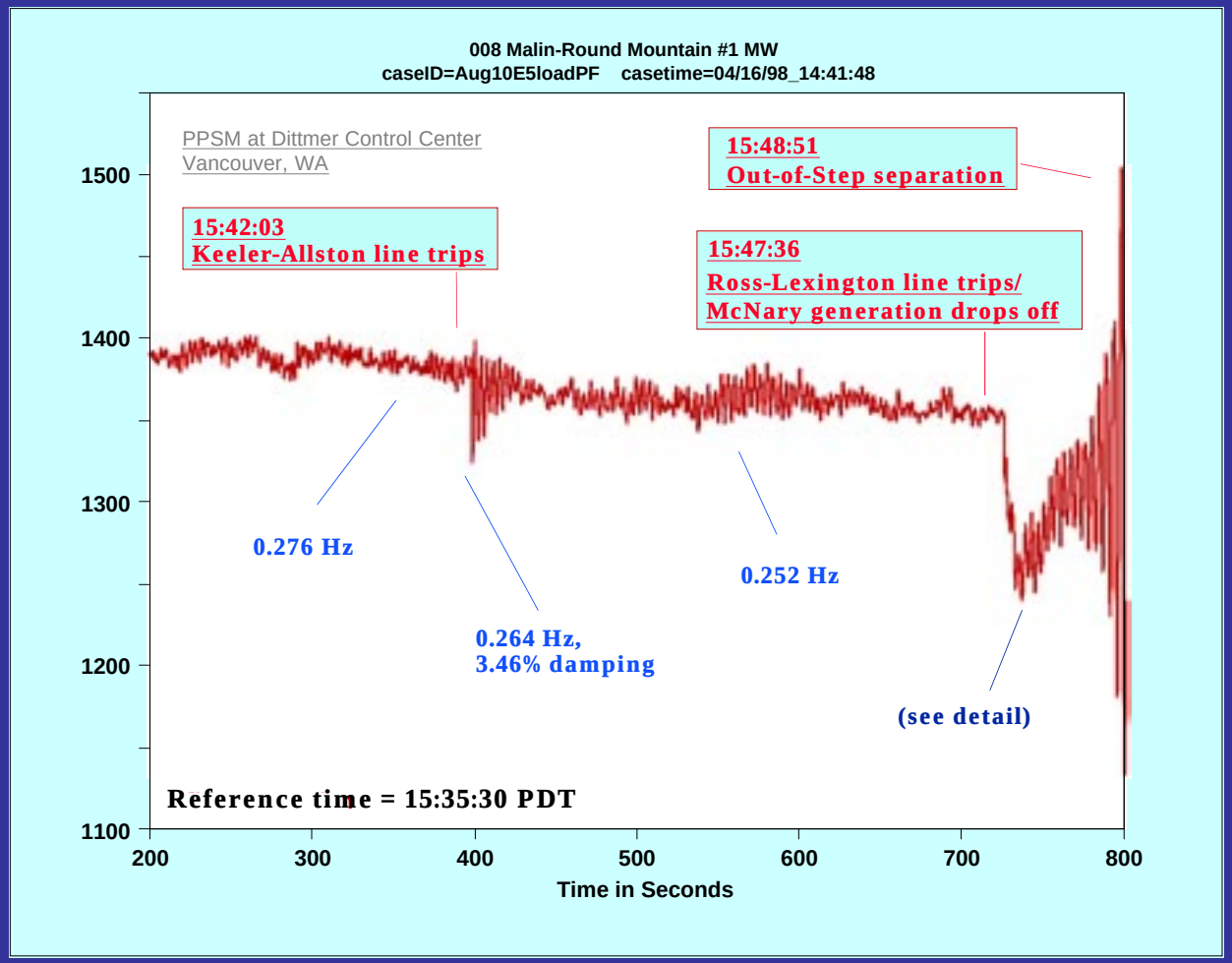
CONVENTIONS

- States with PMU Installations
- Custom Data Concentrator
- PDC
- Future PDC
- Current Data link
- Proposed PDC & Data links for CAISO
- Future Data link
- (aa/bb) # PMUs / # Phasors

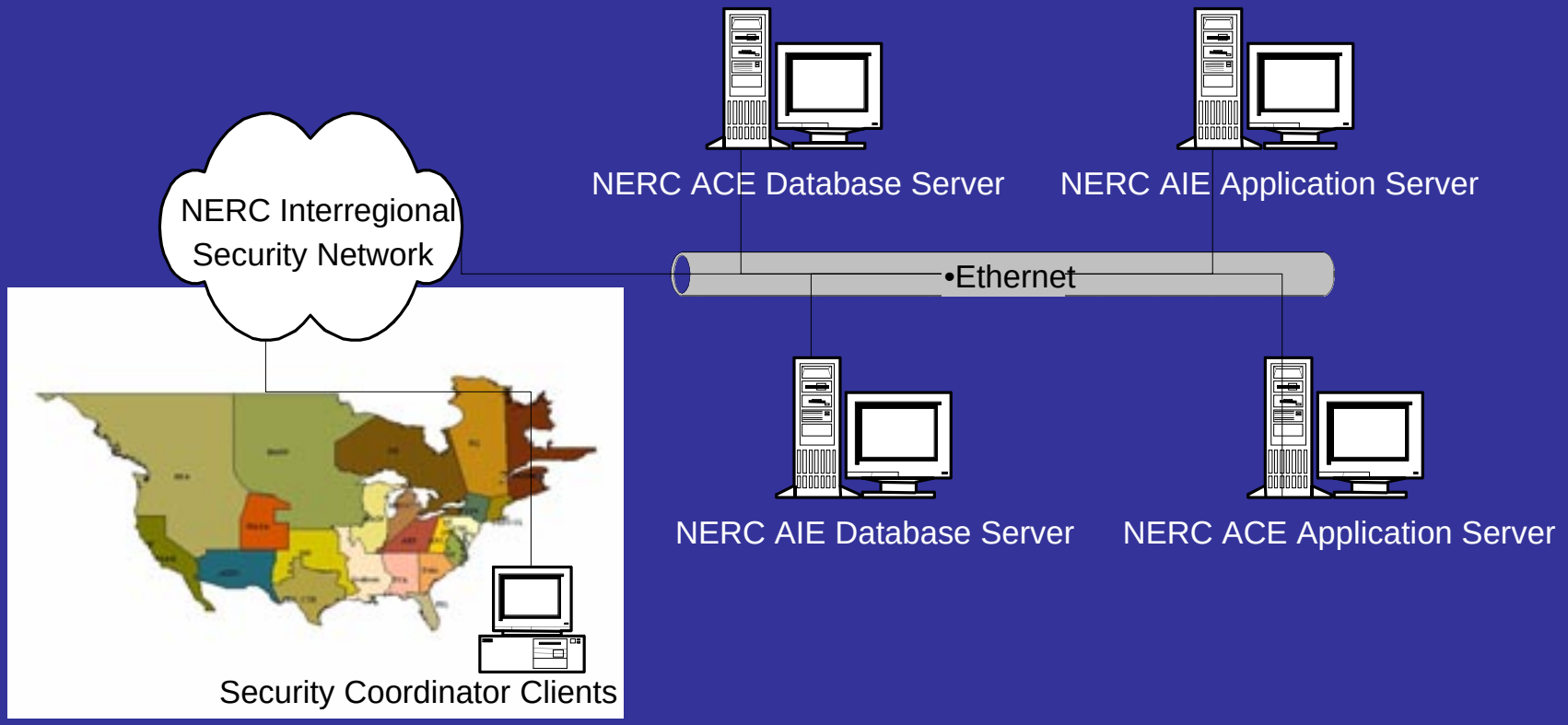


Configuration of BPA's PPSM Network for the WSCC breakup of August 10, 1996

Possible Warning Signs of the WSCC Breakup



NERC ACE & AIE Monitoring Systems



Transmission Congestion: Emerging Technology Solutions

- Advanced Composite Material Conductors
- Real Time System Monitoring and Control
- High Voltage DC Systems
- FACTS Controllers
- High Temperature Superconducting Cables and Equipment
- Energy Storage
- Strategic Locations of Distributed Generation
- Demand Responsive Load Programs

Resources

- DOE TR Program: www.eren.doe.gov/der/transmission
- CERTS: certs.lbl.gov
- PSERC: www.pserc.wisc.edu
- SEAB: www.hr.doe.gov/seab
- POST Final Report: www.policy.energy.gov