

DOE – CERTS Transmission Reliability R&D Internal Program Review

North American SynchroPhasor Initiative (NASPI)

Event Analysis Reports

Jim Dyer



Electric Power Group

dyer@ElectricPowerGroup.com

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Agenda

- Technical Support for Operations of Real Time Dynamics Monitoring System (RTDMS) for NASPI
- Support of the RTDMS Users' Group
- Support of NASPI Operations Implementation Task Team (OITT)

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NASPI-RTDMS Support



NASPI-RTDMS Support

- **Objective** – Enhance, maintain and support the RTDMS application, server, data base and client. Support users needs and provide an application that converts phasor data into useful information
- **Wide Area Situational Awareness** – following a recommendation from the 2003 EI Outage Investigation, RTDMS® was installed at TVA to provide the NASPI community with wide-area situational awareness for the entire Eastern Interconnection
- RTDMS has the ability to identify abnormal system behavior and creates portable **event files**
- Event files are available to authorized users of RTDMS for download from RTDMS Reports Website (password protected)
- Event files can be used in RTDMS and Phasor Grid Dynamics Analyzer (PGDA™) for **offline analysis**



NASPI-RTDMS Support

- The NASPI phasor network and RTDMS are currently experiencing data quality issues. As usable phasor data becomes available, we will continue to perform in-depth analysis of events to create ***Event Observation Reports***, containing:
 - System performance pre and post disturbance
 - Metric performance (frequency, voltage, modes)
- Event observation ***reports distributed*** to a representative of the footprint company and, upon approval, is used in presentations, briefings, and webinars



NASPI-RTDMS Support - Challenges

- *There are two (2) primary challenges associated with this project:*
 - Data quality - without usable data from key TOs and ISOs it is difficult to have situational awareness and a wide area perspective
 - Mitigation plan to be discussed later in this presentation
 - Sharing of findings from event analysis – for various reasons, many TOs are reluctant to have the observations from the “RTDMS® Event Observations Reports” shared with the NASPI community



DOE-NERC Plan to Address Data Quality Issue



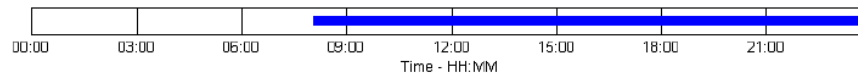
NASPI-TVA-RTDMS Support – Data Quality Issue

- **Bad data quality** due to PMU configuration issues or other NASPI network issues
 - 153 PMUs networked - approximately 70% of the PMUs in NASPI have <50% data availability

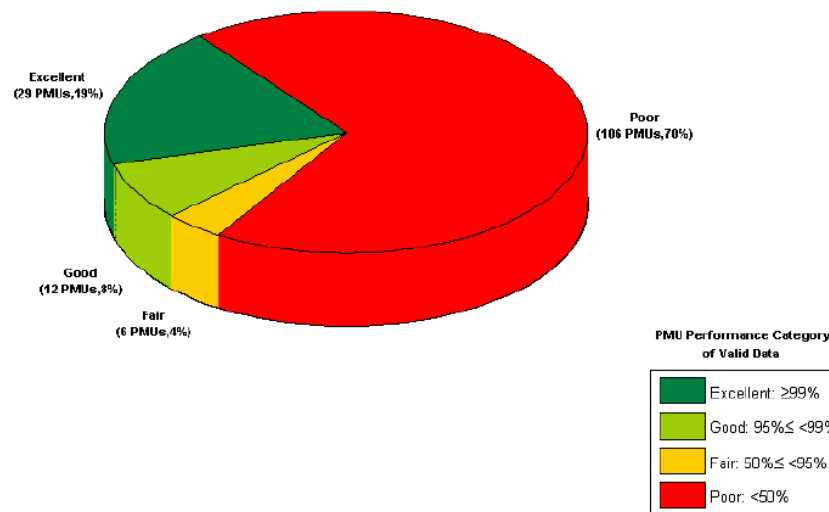
DATA QUALITY

Wednesday, May 16, 2012 (Central Daylight Time).

Data Availability (15.89 hours)



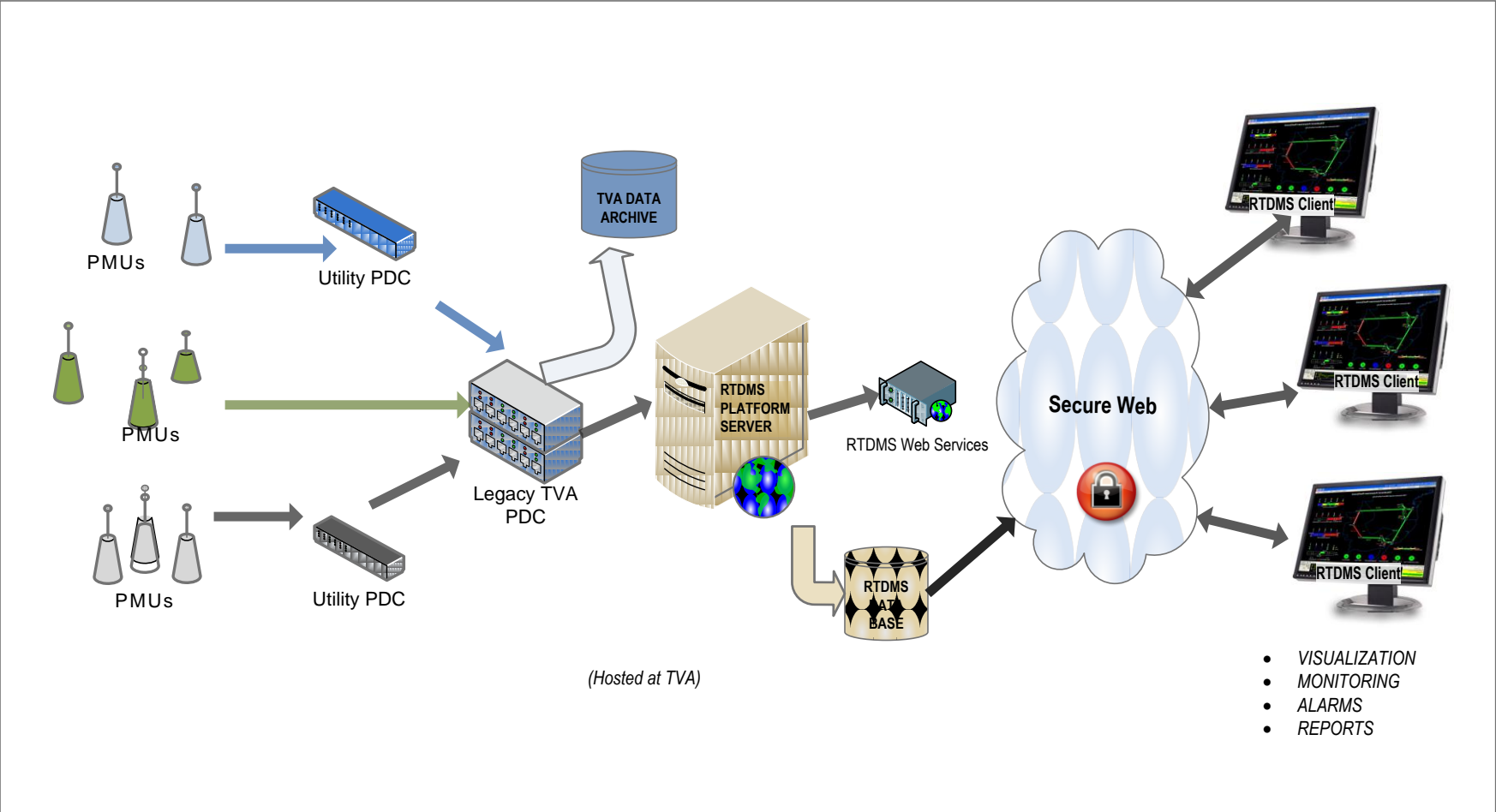
PMU Performance*



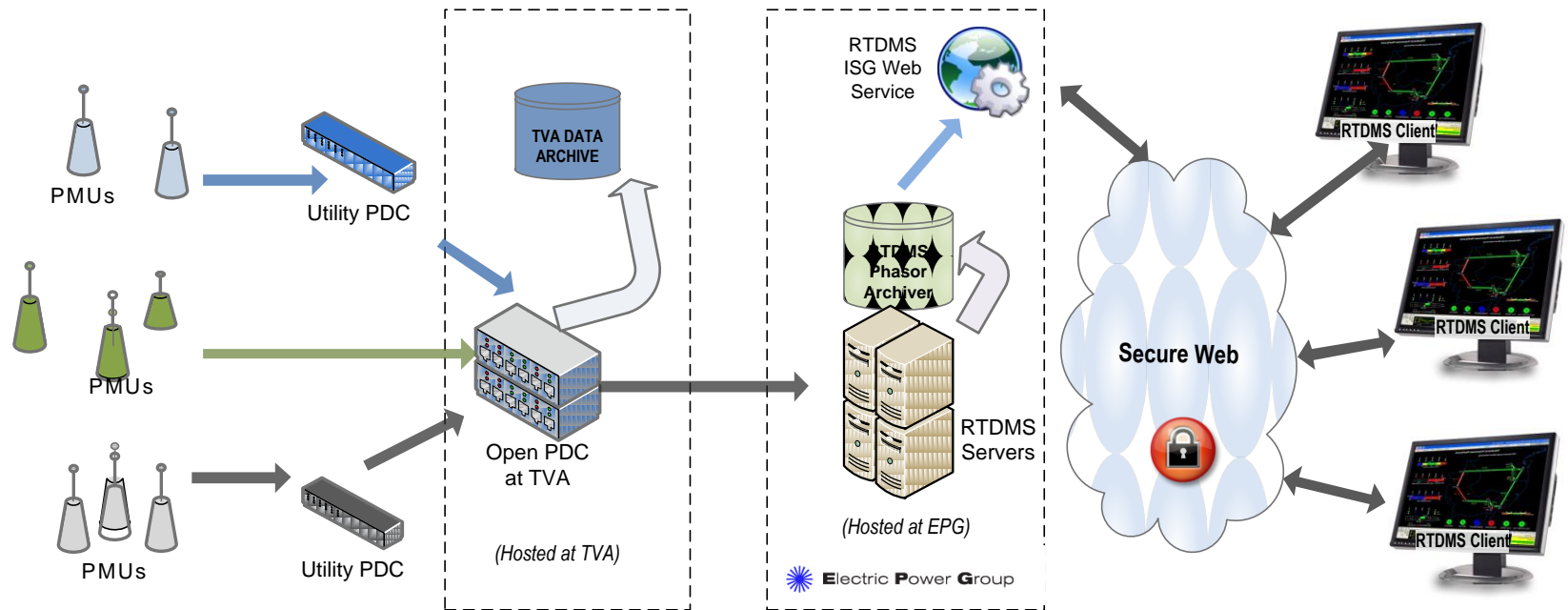
*PMU Performance is based on Archived Data only. (PMU Performance(%) = Valid Data / Total Archived Data * 100%)



NASPI RTDMS Deployment -- Current



NASPI RTDMS Deployment -- Plan



- VISUALIZATION
- MONITORING
- ALARMS
- REPORTS



NASPI-TVA-RTDMS Support – Plan to Address Data Quality Issue

- May 18, TVA established a VPN data link with EPG's data storage center in preparation to start streaming NASPI phasor data to EPG
- Once EPG starts receiving the streamed data, EPG will conduct a data acceptance test. During this period, EPG will aggressively work with data providers to resolve data quality issues
- Upon completion of data acceptance test, EPG will advise NASPI Users' the transition of the data hosting is complete
- EPG will be responsible for the security and operation of the RTDMS Server, the RTDMS Data Base, client access to database, and the confidentiality of data contained therein



NASPI-TVA-RTDMS Support – Plan to Address Data Quality Issue

- EPG's use of streamed phasor data is limited to use for NASPI only
- As data host, EPG will be in a position to quickly diagnose any RTDMS or data base related issues and resolve them in a timely manner



Support of the RTDMS Users' Group



Support of the RTDMS Users' Group

- **Objective** – Provide a forum for knowledge sharing and technical exchange on available applications, use cases, training, functionality and users needs
- **Users' Group Chair** – Clifton Black (So. Co) and **Co-Chair** – Naim Logic (SRP)
- **Participation** - There are 77 participants from 40 different organizations
- Supporting the **RTDMS Users' Group for NASPI** activities including:
 - ✓ Periodic webinars on case studies and event analysis
 - ✓ Functionality demonstrations and 'how-to' exercises
 - ✓ Provide a forum for users' to identify their tool and application needs.
- **Knowledge sharing** – provide system disturbances analysis reports, conduct webinars and hands-on workshops for information dissemination



Support of the RTDMS Users' Group

- **Better understanding** of the system
 - System dynamics/oscillations
 - Voltage Stability and Sensitivity
 - Grid stress/voltage angle difference
- **Two day Workshop** provides operators and engineers an opportunity to get hands-on RTDMS experience using phasor data from actual events (WECC and EI). Training session provides participants with **Continuing Education Hours** (CEH) credits
 - November 2011 – Sacramento, CA area (CAISO)
 - Fall of 2012 – Atlanta, GA (Southern Co.)
- **April 2012 Webinar** - Provided the group participants a overview of:
 - RTDMS 2012 Planned Functions
 - RTDMS 2012 Demo on the “look and feel”
 - RTDMS 2012 Release Plan
 - Video from the February 2012 – NASPI Visualization Workshop
- **NASPI Technical Training Session and Visualization Workshop** – EPG made presentations training techniques and enhanced visualization at both sessions in February



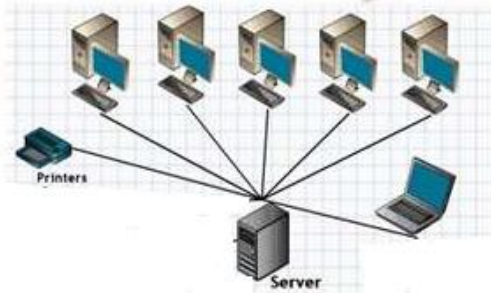
Support of the RTDMS Users' Training Workshop – Lessons Learnt

- ***Adequate staffing in different disciplines is key***
 - IT Support (computer, software and network)
 - Roamers (provide student support with application or network issues)
 - Application experts (demonstrate and explain the application functions and capabilities)
 - Technology experts (ability to analyze events and explain the technology in layman terms)
 - Operations experts (understand how the technology relates to and can support operations)
- ***Computer equipment and set-up to provide access to each participant***
 - Setting up a LAN, with adequate bandwidth and phasor event server
 - Provide each student with a laptop computer, with wireless mouse
 - Ensure each student will have a large screen to view application and events
 - Common computer OS and updated technology
 - Avoid any company imposed network administrator limitations
 - Mouse provides ease of navigation within the application
- ***Hands-on training using actual events***
- ***Coordination with the ISOs in awarding CEHs for students***



Support of the RTDMS Users' Group - Training Room Layout

Training Room
Local Area
Network with
Event Data Server



Two Person Teams



Support of the RTDMS Users' Group - Challenges

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 - Sharing of findings from event analysis – for various reasons, many TOs are reluctant to have the observations from the “RTDMS® Event Observations Reports” shared with the NASPI community



Support of NASPI Operations Implementation Task Team (OITT)



Support of NASPI Operations Implementation Task Team(OITT)

- **Objective** – A primary objective of the OITT is supporting the development and deployment of tools enabling those engaged in operational aspects of grid reliability to have a wide-area situational awareness of the bulk power grid
- **OITT Co-Chairs** are Tony Johnson (SCE) and Kevin Frankeny (MISO)
- Since 2004, EPG has supported the needs (i.e., meeting minutes, presentations) of the OITT Chair and Co-Chair, been an active participant in the monthly conference calls and Work Group breakout sessions
- Summarize event analysis results for **presentation** to footprint company and, as appropriate, to NASPI Task Teams and RTDMS Users Group
- Provide technical consultation to Team Leaders and participants



Continued Support in 2013?



Continued Support in 2013 - Yes

- In 2013, the majority of the PMUs and network infrastructure, co-funded by DOE, will have been deployed and data quality issues to be resolved.
- **Technical Support for Operations of RTDMS for NASPI**
 - Continued support provides a real-time tool for wide area situational awareness in the EI.
- **Support of the RTDMS Users' Group**
 - Initial focus has been on technology learning
 - Interest in use of technology increasing with investments in PMUs and infrastructure as a result of ARRA SGIG awards
 - Focus shifting to data quality, use of metrics in real-time operations, linking synchrophasor technology with operator actions
 - Need to continue RTDMS Users Group until technology is fully operational
- **Support of NASPI OITT**
 - Continued support provides assistance to Team Leaders, information sharing and technical consultation to Team Leaders and participants



Thank You.

Questions?

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