DOE 2008 V&C Peer Review Meeting

NASPInet Specification Project

Dr. Yi Hu
Quanta Technology LLC

L’Enfant Plaza Hotel, Washington D.C.
October 21, 2008
NASPI and its mission

- NASPI – North American SynchroPhasor Initiative
  - An industry forum to promote wide adoption of synchrophasor technology
  - DOE sponsored past EIPP, WECC activities
  - Transitioned to NERC (ERO) since 2007

- NASPI’s mission
  - To create a robust, widely available and secure synchronized data (Synchrophasor) measurement infrastructure for the interconnected North American electric power system with associated analysis and monitoring tools for better planning and operation, and improved reliability
NASPI envisioned capability evolution

Roadmap for Capability Evolution Indicating Time to Achievement, Priority of Industry Need, and Severity of Deployment Challenge (11/30/07)

- Angle/Frequency Monitoring
- Post-mortem Analysis (Including Compliance Monitoring)
- Voltage Stability Monitoring
- Thermal Overload Monitoring
- Improved State Estimation
- Steady-state Model Benchmarking
- DG/IPP Applications
- Power System Restoration
- Congestion Management
- Dynamic Model Benchmarking
- Planned Power System Separation
- State Estimation (Boundary Conditions)
- Deployment Challenge
- Linear State Measurement
- Real Time Control
- Adaptive Protection
- WA-PSS Stabilization

1 to 3 Years

3 to 5 Years

> 5 Years

NASPInet Specification Project

© 2008 Quanta Technology LLC.
DOE/NASPI envisioned NASPInet

- Synchrophasor data flows
  - Within NASPInet
    - Among connected utilities
    - Utilities to Regional Reliability Coordinators
  - Between Regional Reliability Coordinators to NERC (ERO)

- Will be used to connect tens of thousands and possibly millions of PMUs and support a wide range of critical applications in the future
DOE/NASPI envisioned NASPInet (cont.)
Phasor Gateway & Data Bus roles in NASPInet

- **Phasor Gateway (PG)**
  - Sole access point to DB for inter-organizational synchrophasor traffic
  - Administer and disseminate cyber security and access rights
  - Monitor and maintain data integrity
  - Manage traffic format and timing compatibility
  - Manage traffic priority according to Service Classes of the data

- **Data Bus (DB)**
  - Provide connectivity among PGs and other elements of the NASPInet
  - Provide Quality of Service (QoS) for reliable and redundant delivery of real-time operational data
  - Provide QoS conformance monitoring for Service Classes
  - Enforce conformance with cyber security and access control policies
NASPInet services

- Name services
  - Component registration, and Name registration

- Cyber security services
  - Authentication, Key management, Non-repudiation, Data integrity, Data confidentiality, Access authorization and control, and Trust management

- Data and control services
  - Chain of custody, Connection management, and Configuration management
NASPIInet characteristics

- A decentralized data publishing/subscribing system
- All transported data must meet their Quality of Service level requirements
- Publishers of data shall be able to maintain full control on the accessibility of their data
- Subscribers shall be ensured that data will only come from publishers they subscribed to
- Resilient to various types of cyber attacks and certain level of system failures
- Highly flexible, scalable, and manageable
- Vendor neutrality
Objective, deliverables & schedule of the project

- **Objective**
  - Produce detailed Phasor Gateway and Data Bus functional requirement specifications to be used by DOE in subsequent NASPInet procurement

- **Key deliverables**
  - Conceptual framework of NASPInet
  - Draft specifications for Phasor Gateway and Data Bus
  - Final specifications for Phasor Gateway and Data Bus

- **Schedule**
  - Started September 27, 2008
  - To be completed by April 27, 2009
Project approach

- **Technical approach**
  - Employ proven system design and specification development approach
  - Adhere to open standards
  - Adopt proven technologies and engineering solutions
  - Enable implementation flexibility

- **Project team**
  - Quanta Technology: Hu, Tram, Martin, Uluski, Donnelly
  - Enspiria: Helmer, Cioni
  - Iowa State University: Govindarasu

- **Stakeholder Input**
  - NASPI Interface: DNMTT
  - Outreach efforts: Project team will actively solicit input and feedbacks from utilities and vendors
Project deliverables forecast

Oct 2008
- Start

Dec 2008
- Conceptual Design Report to DNMGT

Feb 2009
- Status Report to NASPI Work Group
- Draft Specification to DNMGT

Apr 2009
- Final Specification to DNMGT
Questions?