D&NMTT

Virtual Breakout Session 2025-01-30

Dan Brancaccio
Executive Advisor Quanta Technology
dbrancaccio@quanta-technology.com

Agenda

- D&NMTT
  - Mission Statement
  - Communication Protocols
- STTP Backfilling (Ritchie Carroll GPA)
- Data Quality (Kliff Hopson BPA)
- D&NMTT Work Topics
  - Archive Systems
  - Network Architecture
  - Redundant Systems
  - Cloud
  - Questionnaire

Mission Statement

The NASPI **Data and Network Management Task Team** (DNMTT) is dedicated to enhancing the reliability, security, and efficiency of synchrophasor data networks across North America. Our mission is to develop best practices, frameworks, and guidance for the collection, management, and secure exchange of ***high-quality*** time-synchronized measurement data. We collaborate with industry stakeholders to optimize data availability, support grid resilience, and advance the use of synchrophasor technology for real-time monitoring, analysis, and decision-making. Through research, innovation, and stakeholder engagement, we strive to ensure the integrity and interoperability of synchrophasor networks, enabling a smarter, more resilient power grid. **Promote the correct use of Sample Rate vs. Report Rate**

Mission Data Quality

High-quality data is essential for reliable decision-making, especially in applications such as power grid monitoring and real-time network management. Three key factors define high-quality data: accuracy, precision, and availability.

- **Accuracy** – Data must correctly represent the true state of the system. If measurements deviate significantly from reality due to errors, noise, or calibration issues, they can lead to incorrect conclusions and unreliable operations.
- **Precision** – Data should be consistent and reproducible across multiple measurements. Even if data is accurate, inconsistent readings can introduce uncertainty, reducing confidence in analytical models and control decisions.
- **Availability** – High accuracy and precision are meaningless if data is missing, delayed, or incomplete. Data availability ensures that critical information is continuously accessible when needed, without gaps that could hinder real-time monitoring and post event analytics.

Mission Networks are Complicated

- **Random** – Something is random if it has no predictable pattern or order. Each outcome is independent, and there is no underlying rule governing the results. Example: rolling a fair die.
- **Chaotic** – A system is chaotic if it follows deterministic rules but is highly sensitive to initial conditions, making long-term prediction nearly impossible. Small differences in starting points can lead to vastly different outcomes. Example: weather systems.
- **Stochastic** – A process is stochastic if it has a random component but may follow probabilistic rules or patterns. Unlike purely random events, stochastic processes can exhibit some structure. Example: **network traffic**.

Communication Protocols

- Network Layer Protocols
  - *Makes sure the data gets to the right destination*.
  - TCP/IP and UDP operate at the transport and network layers and provide generic mechanisms for sending data between devices.
- Synchrophasor Communication Protocols (Application Layer Protocols)
  - *Makes sure the data is understandable and useful*.
  - IEEE PC37.118.2-2024
  - *The ballot has closed.*
  - IEC 61850
  - *Applicability, Vendor Support, etc.*
  - STTP
  - *IEEE P2664-2024 Streaming Telemetry Transport Protocol (STTP)*

Archive Systems

What’s new

Time series

Relational

Object Oriented

NoSQL

Hierarchical

Network Architecture

Wide Area

Field Networks

Control Center

Corporate

Redundant Systems

Field Devices

Network

Archive

Active-Active

Fail over

Best Practices

Cloud

Lessons learned

Security concerns

Costs

Use cases

Root cause analysis

Time stamp issues from GPS

Questionnaire

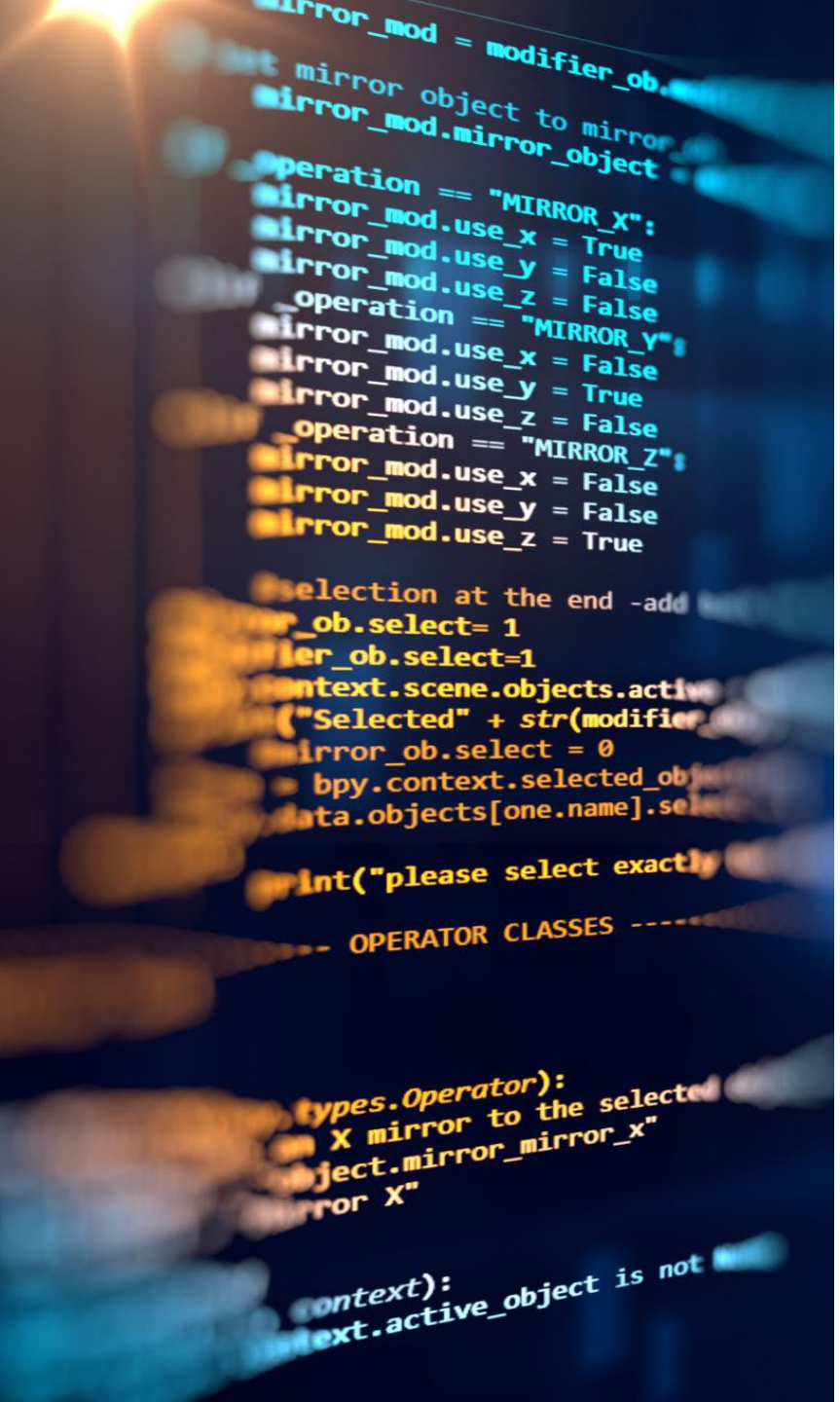
Archive Strategies

NERC CIP 15-minute decisions

Redundancy

Cloud

Data Sharing



Discussion Topics / Work topics

Sample rate vs Report Rate

Frequency measurements

Definition of terms

Database performance

Network recommendations

PTP at data and control centers