

NASPI D&NMTT

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Agenda

D&NMTT

Mission Statement

PMU / POW / COMTRADE / SCADA Data in the Cloud Chris Carpenter, Quanta Technology

Streaming

Event-Triggered

Point-on-Wave Measurements for Disturbance Monitoring– Kaustav Chatterjee
PNNL

D&NMTT Work Topics

Data Formats

Communication Protocols

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**

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.

- Synchronizer Communication Protocols (Application Layer Protocols)

- *Makes sure the data is understandable and useful.*
- IEEE P37.118.2-2024
 - *The ballot has closed.*
- IEC 61850
 - *Applicability, Vendor Support, etc.*
- STTP
 - *IEEE P2664-2024 Streaming Telemetry Transport Protocol (STTP)*
- Several IEEE standard groups are working on other communication protocols we will investigate to determine applicability

Synchronized Point on Wave Half Step

SCADA

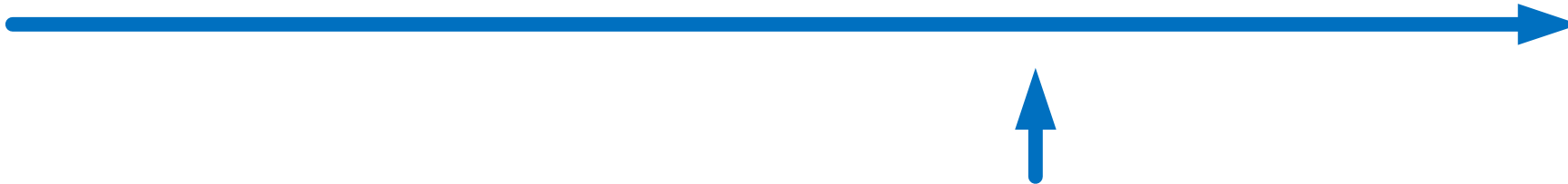
Report Rate: 0.25Hz
Sample Rate: ?
Time Sync: No

Synchrophasor

Report Rate: 60Hz
Sample Rate: 960Hz
Time Sync: Yes

SynchroPOW

Report Rate: 3KHz
Sample Rate: 3KHz
Time Sync: Yes



PQ Sync

Report Rate: 60Hz
Sample Rate: 15.4KHz
Time Sync: Yes

Calculations in the box

Work on an industry recommendation to be more precise when describing Sample Rate to differentiate between samples per cycle and samples per second

Protocols

C37.118.2-2024

COMTRADE

PSRC H8 Application of COMTRADE for Synchrophasor Data Approved by IEEE PSRC Subcommittee H on May 13, 2010 as a PSRC Report

Archive Systems

What's new

Time series

Relational

Object Oriented

NoSQL

Hierarchical

Graph

Look at new time series databases

Redundant Systems

Field Devices

Network

Archive

Active-Active

Fail over

Best Practices

Questionnaire

Archive Strategies

NERC CIP 15-minute decisions

Redundancy

Cloud

Data Sharing



Discussion Topics / Work topics

Sample rate vs Report Rate

Samples pre second vs samples per cycle

Frequency measurements

Definition of terms

Nyquist Limit

Database performance

Network recommendations

PTP at data and control centers

Metadata

- External asset linkage & topology context**

Persistent IDs for Bus/Line/Terminal/Breaker, EMS/SCADA tag(s), substation code, geo (lat/long) with accuracy, and network model version they map to.

- Installation & transducer details**

CT/VT ratios & classes, burden, wiring/polarity verification status (method/date/result), MU/IED port/channel, anti-alias filter cutoff/order, sensor location notes (bay/structure).

- Calibration & uncertainty model**

Calibration date/method, gain/phase offsets by channel, temperature drift spec, **ENOB** of ADC and noise floor, TVE vs. frequency/voltage ranges (as a model, not just a flag).

Example JSON

```
{"P":[{"I":"HELMS:IA","V":["HELMS:VA","GREGG:Vpos"],"S":"OUT"},{"I":"HELMS:IB","V":["HELMS:VB"],"S":"OUT"}],"D":[{"T":"HELMS:Vpos","R":"GREGG:Vpos"},{"T":"HELMS:V_A","R":"HELMS:V_B"}]}
```