EIDSN's Purposes

- Facilitate an efficient, effective and secure network for the sharing of operating reliability data among its members and participants.

- Promote the reliable and efficient operation of the Bulk Electric System (BES) through use of Electric Information Network (EInet).

- Currently includes sharing both SCADA and synchrophasor data among appropriate entities.

- Facilitate the adoption, development and support for various software tools for members and participants that promote the reliable and efficient operation of the Bulk Electric System.

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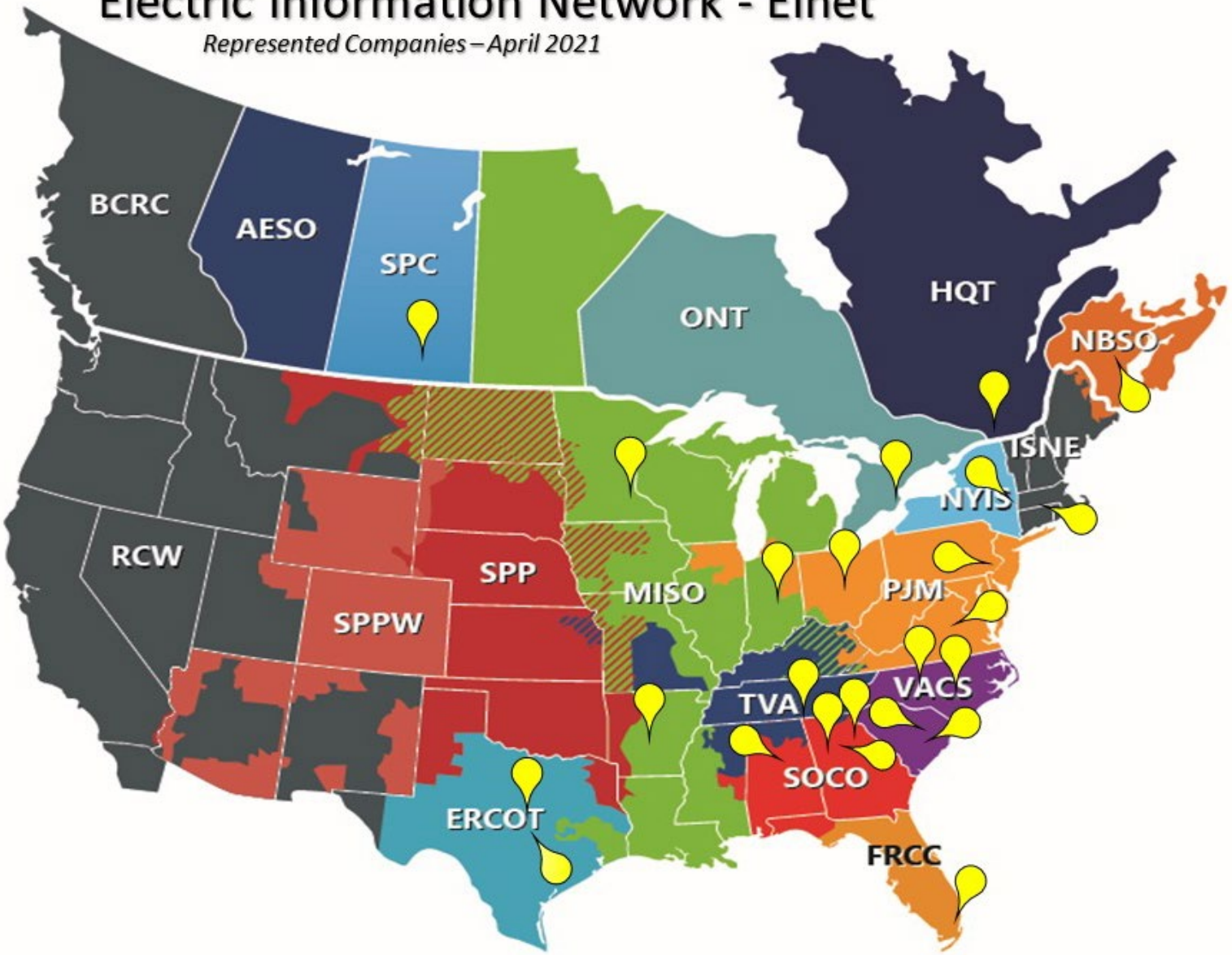
Electric Information Network - EInet

Represented Companies – April 2021



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Joining EIDSN, Inc.

- Nonstock, nonprofit corporation - 501(c)(6)

- In early 2018, EIDSN's Board of Directors approved the removal of the geographic restriction for joining the Company
  - Any NERC designated Reliability Coordinator (RC), Transmission Operator (TOP), Transmission Owner (TO), and Balancing Authority (BA) in North America can join as Member or Participant

- Agreements requiring execution
  - Master Confidentiality Agreement
  - Network Service Agreement
  - Member OR Participant Agreement

EInet & Synchrophasor Data

- A growing number of EInet node owners are sharing production synchrophasor data with partners across EInet
- TVA is one of the more recent members to share
- Initial TVA experiences and questions spawned discussions within the Technical Committee and effort to canvas members to understand bigger picture
  - Who is sharing with who?
  - Which other members are contemplating synchrophasor data exchange?
  - Bandwidth consumption forecasts and monitoring
  - # of phasors/PMU's and types in scope by company
  - Data Retention period (compressed and uncompressed)

EInet & Synchrophasor Data

Current Usage Findings to Date

- Various companies were polled and responded with privileged information that can be summarized here
- There are a wide variety of data types, asymmetrical flows, and retention policies.
- Approach is different per company/ISO based on the relevant need, and even may be different depending on external or internal endpoint.
    - E.g. TVA external traffic positive sequence only, internal is sent with all phases
- Bandwidth can be an issue as can be naming conventions

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Potential Next Steps Under Review

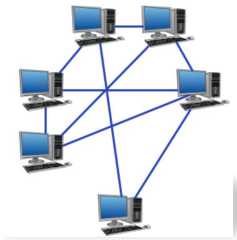
Protocol Change Options

- C37.118 is not efficient in this use case (a pmu per signal)
- Potential optional use of STTP (Streaming Telemetry Transport Protocol)
  - Pros – less bandwidth intensive (TCP with STTP lossless compression), design better suited for publish/subscribe use case relevant here
  - Cons – vendor software support? (proposed IEEE standard 2664)

FEATURE	IEEE C37.118	IEC 61850 90-5	STTP
Structure	Frame	Frame	Dynamic
Efficiency	Good	Fair	Excellent - TCP Fair - UDP
Data Loss (low volume)	None - TCP	None - TCP	None
Data Loss (high volume)	Low - TCP[26] Some - UDP[27]	Low - TCP Some - UDP	None - TCP Minimal - UDP
Scalability	Fair	Fair	Excellent
Encryption	No	Yes	Yes
Extensible Metadata	No	No[28]	Yes
Multicast Supported	Yes	Yes	Limited

Possible Architecture Considerations

- Duplicate traffic is common on a many to many topology
- Hub and Spoke Topology could allow for more efficient transfer of measurements with minimal duplication
- Central hub concept would need to be fully vetted however



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