

# NASPInet 2.0

## Network Guidance Document

### Overview of draft

NASPI Work Group Meeting  
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# Background

- Review of PMU experience completed:
  - *NASPI 2014 (DNMTT) Survey Synchrophasor System Networks – Results and Findings* (July 2015)
  - *Assessment of Existing Synchrophasor Networks* (PNNL-27557), <https://www.naspi.org/node/723> (July 2018)
- Key conclusion: Time to update NASPInet ideas for new needs and technologies
- DOE funded PNNL to develop a new NASPInet guidance document for *NASPInet 2.0*

# NASPInet 2.0 Document

- Guidance and framework
  - Not an architecture specification or specific design
- Update of original specification based on experience and modern network architecture protocols and additional considerations:
  - Emerging technologies
  - New protocol
  - Forward-looking use cases include
    - Wide-area closed loop protection and control
    - Adaptive protection
    - Distribution system applications
  - System issues and priorities, including cyber-sec

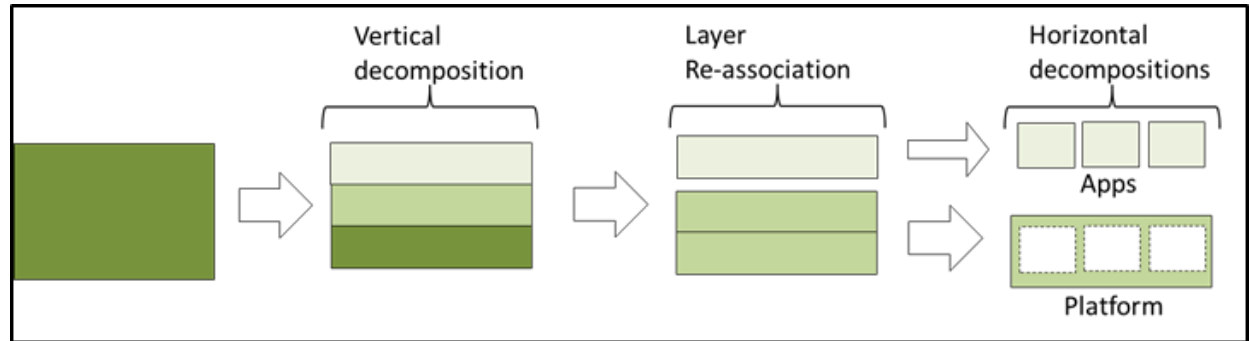
# Key Paradigm Change

- Old and worn: Data bus
  - Gateways & concentrators
  - Centralized management
  - Transmission only
  
- New and way cool: Platform
  - Layering
  - Shared observability
  - Distributed structure



# Focus on the platform

- PMU networks are partitioned into two primary layers:
  - Platform
  - Applications



- The focus of the guidance is the platform, which will be stable as applications evolve.

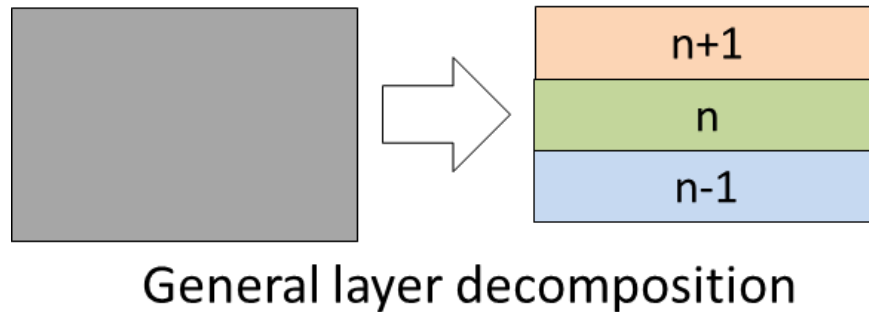
# Platform is an Architectural Concept

- This is about structure: how system elements are grouped, organized and related to each other
- Distinguish common support capabilities (“foundation” or “core”) from uses or applications

A platform is a stable collection of components that provide fundamental or commonly-needed capabilities and services to a variable set of uses or applications through well-defined interoperable interfaces.

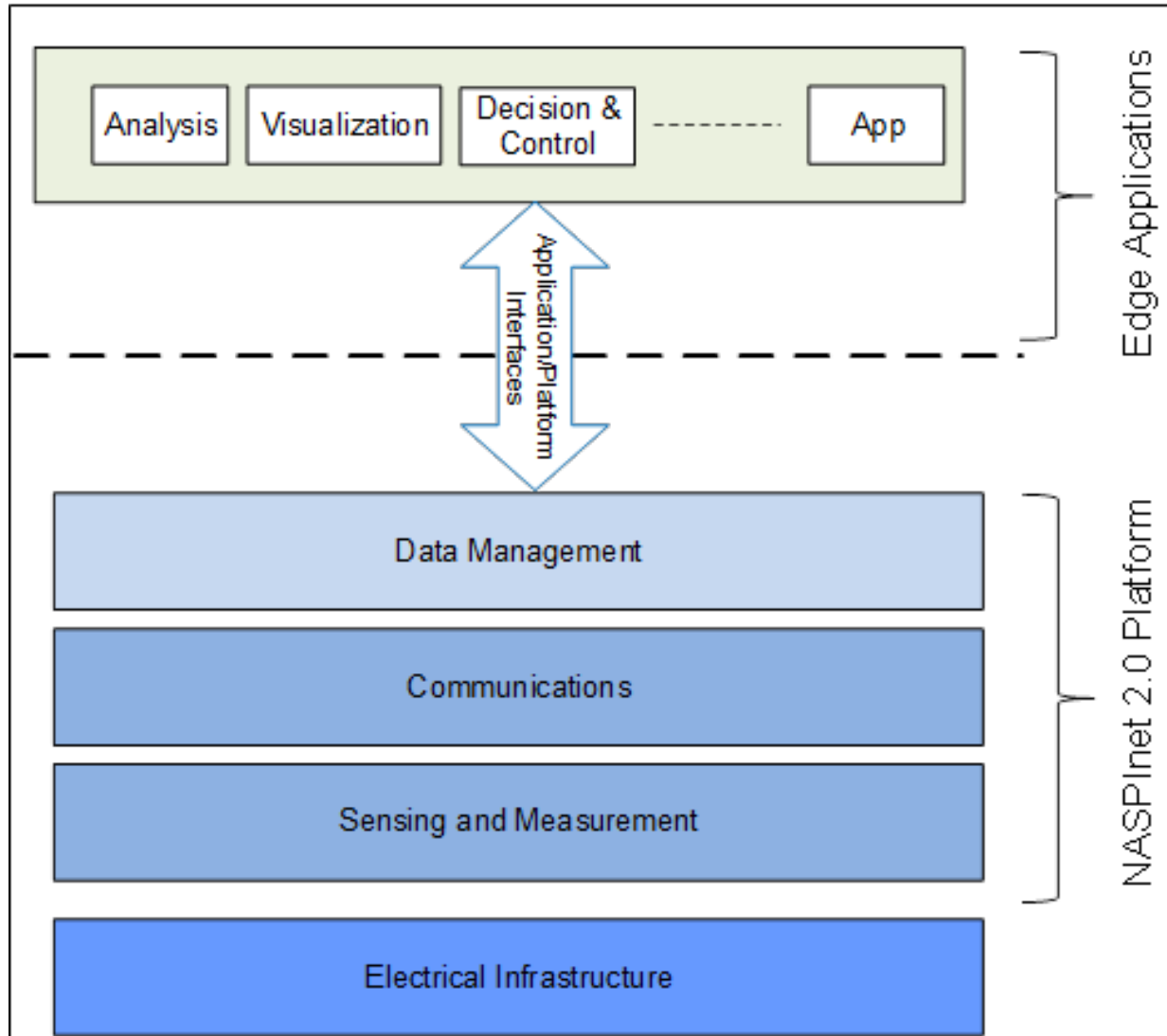
# Layering is Powerful Architectural Concept

- Partition system into two or more stacked layers



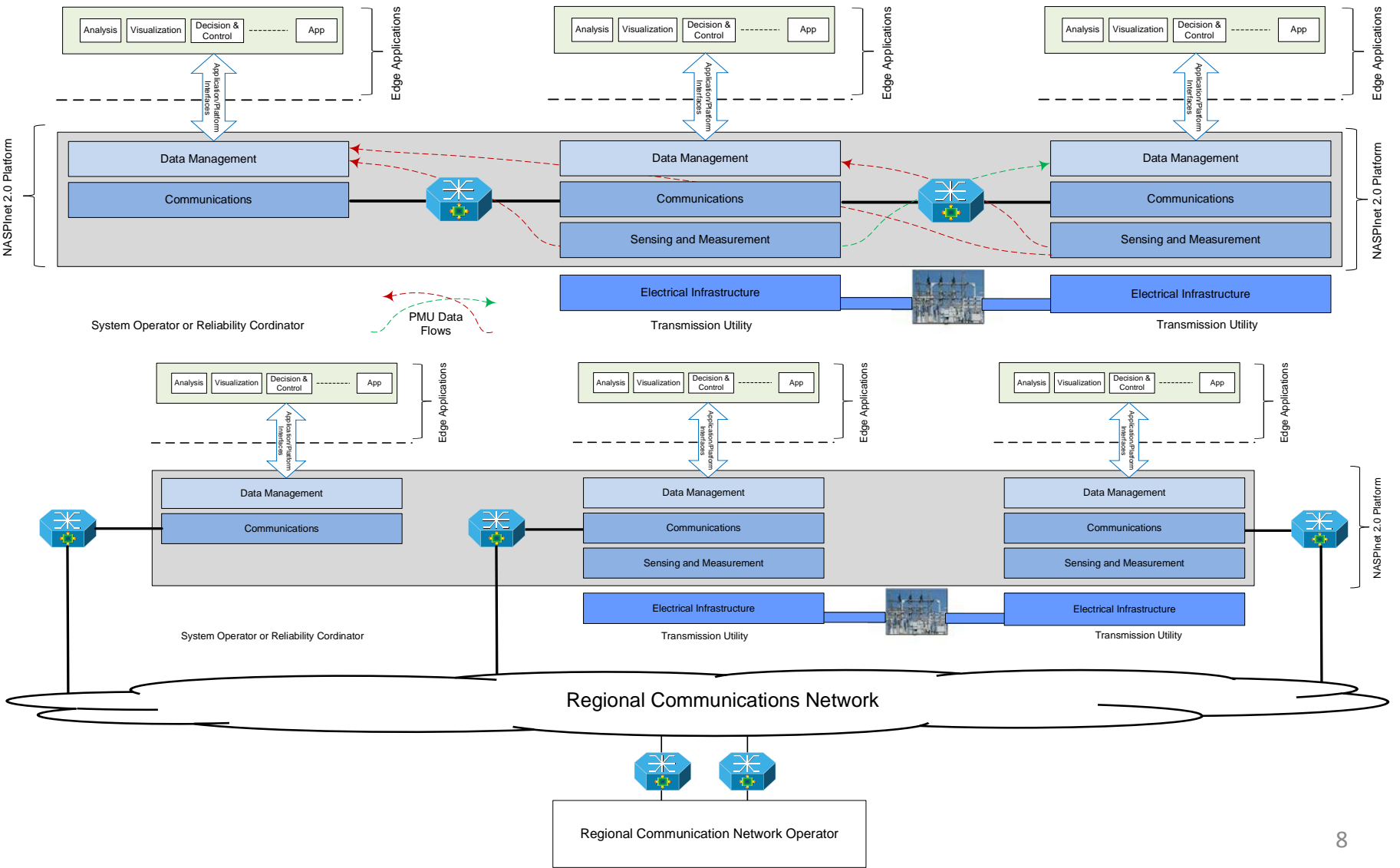
- When there are at least three layers, layer  $n$  isolates layer  $n-1$  from layer  $n+1$
- This provides strong extensibility and investment future-proofing

# The NASPInet 2.0 Platform is Layered





# Distributed Observability Platform

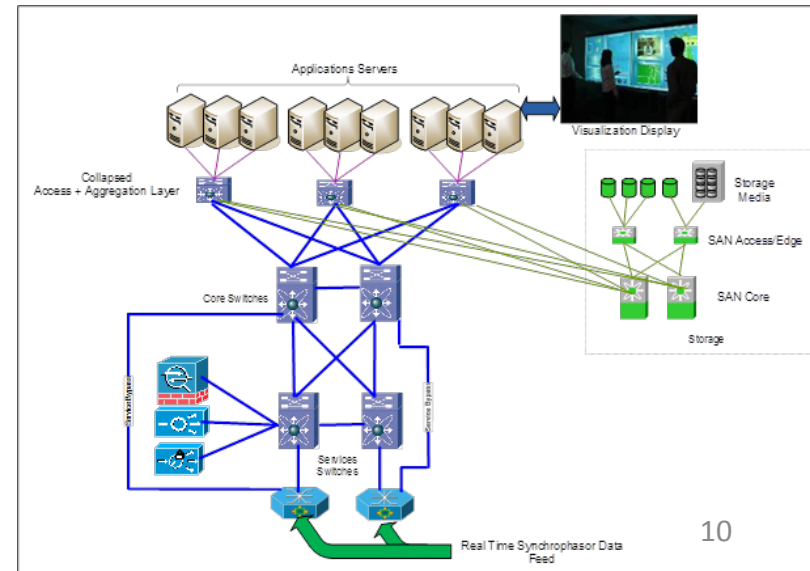
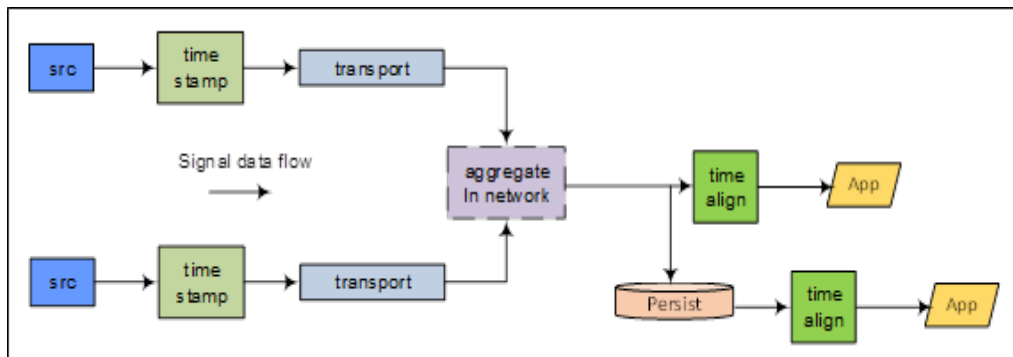
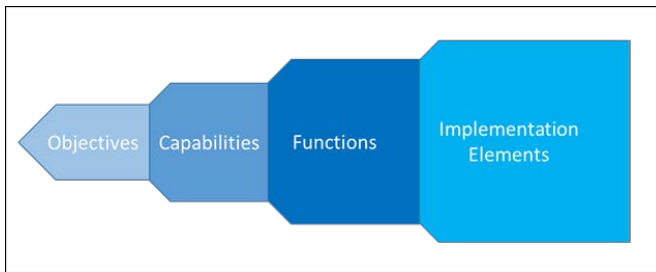
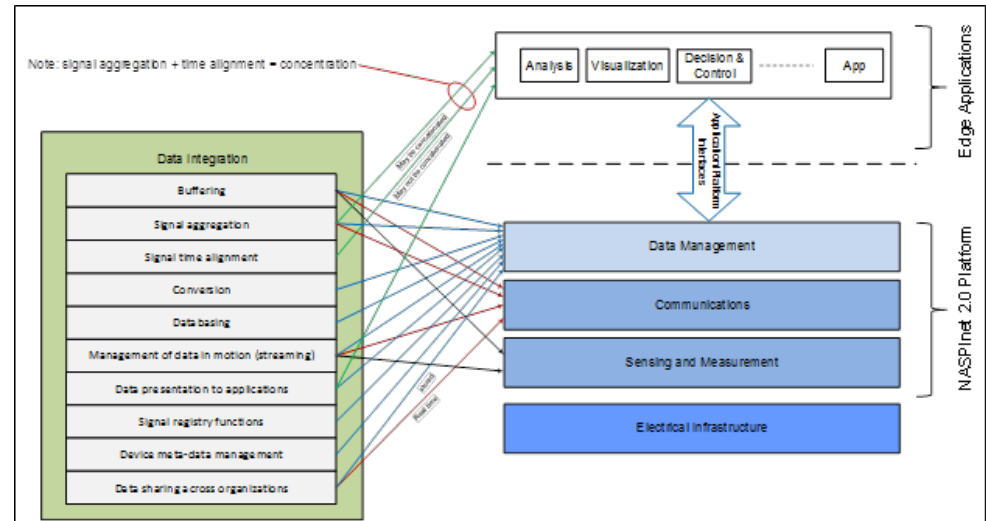


# Topic Areas

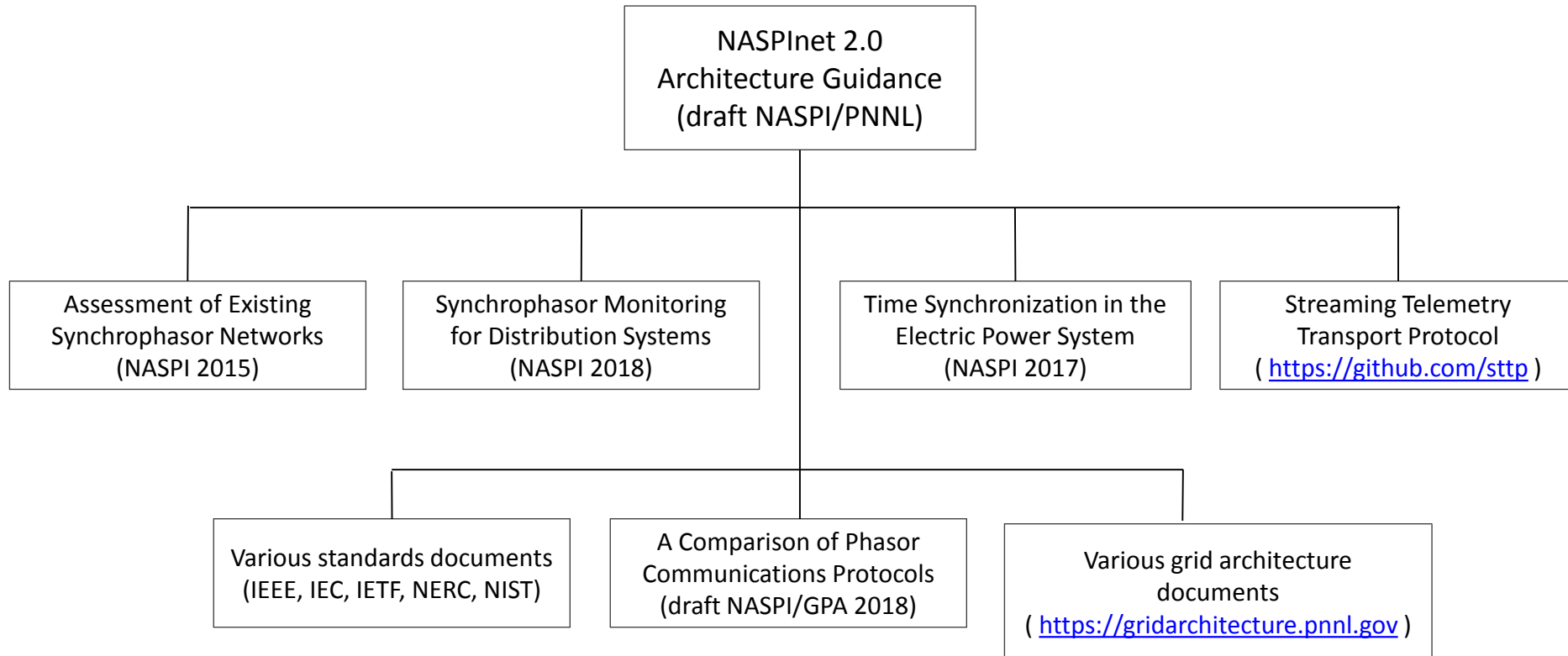
- Background & Purpose
- Scope
- Purposes of PMU Networks
- Overview of Applications
- Emerging Uses for PMUs
- Other Relevant Emerging Trends
- Implications and Systemic Issues
- Key Definitions and Concepts
- Foundational Principles
- Synchrophasor Problem Domain Reference Model
- NASPInet 2.0 Architecture Principles, Objectives, Capabilities, and Functions
- NASPInet 2.0 Components and Structures
- Relevant Standards
- Summary General Guidance for NASPInet 2.0
- Guidance on Newer/Emerging Technologies
- Glossary
- Appendices

# Document Summary Specs

- Approx. 85 pages
- 51 diagrams
- 7 tables
- 49 citations
- 5 Appendices



# NASPInet 2.0 Document Tree



# Next Steps

- Draft doc will be posted at [www.naspi.org](http://www.naspi.org) and sent to DNMTT members
- Review: feedback from DNMTT and elsewhere
  - Email comments to [Jeffrey.taft@pnnl.gov](mailto:Jeffrey.taft@pnnl.gov)
  - Deadline for feedback on NASPInet 2.0 Guidance: November 30, 2018
- Update document based on feedback
- Finalization & posting

# Thank You

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