



**What is NASPINet, Anyway?**

**The Global Leader  
in DDS**





# Mission-Critical Networks



# Why Use Data Distribution MW?

- Reliability
  - Redundant sources, sinks, networks
  - Automatic failover
  - Reliable multicast
- Performance
  - 500k msgs/sec with < .5ms latency
  - Smart filtering & BW
  - Compression
- Transparency
  - 70+ platforms & langs
  - Ethernet, shm, wireless, satellite, switched fabrics
- Tough cases
  - Slow consumers
  - Late joiners
  - De-duplication
  - Lossy links
- Security
- Scalability
- Ease of use
  - Discovery
  - Tools
- Integration
  - Databases
  - Web services
- Vibrant Standard



# What is NASPINet?

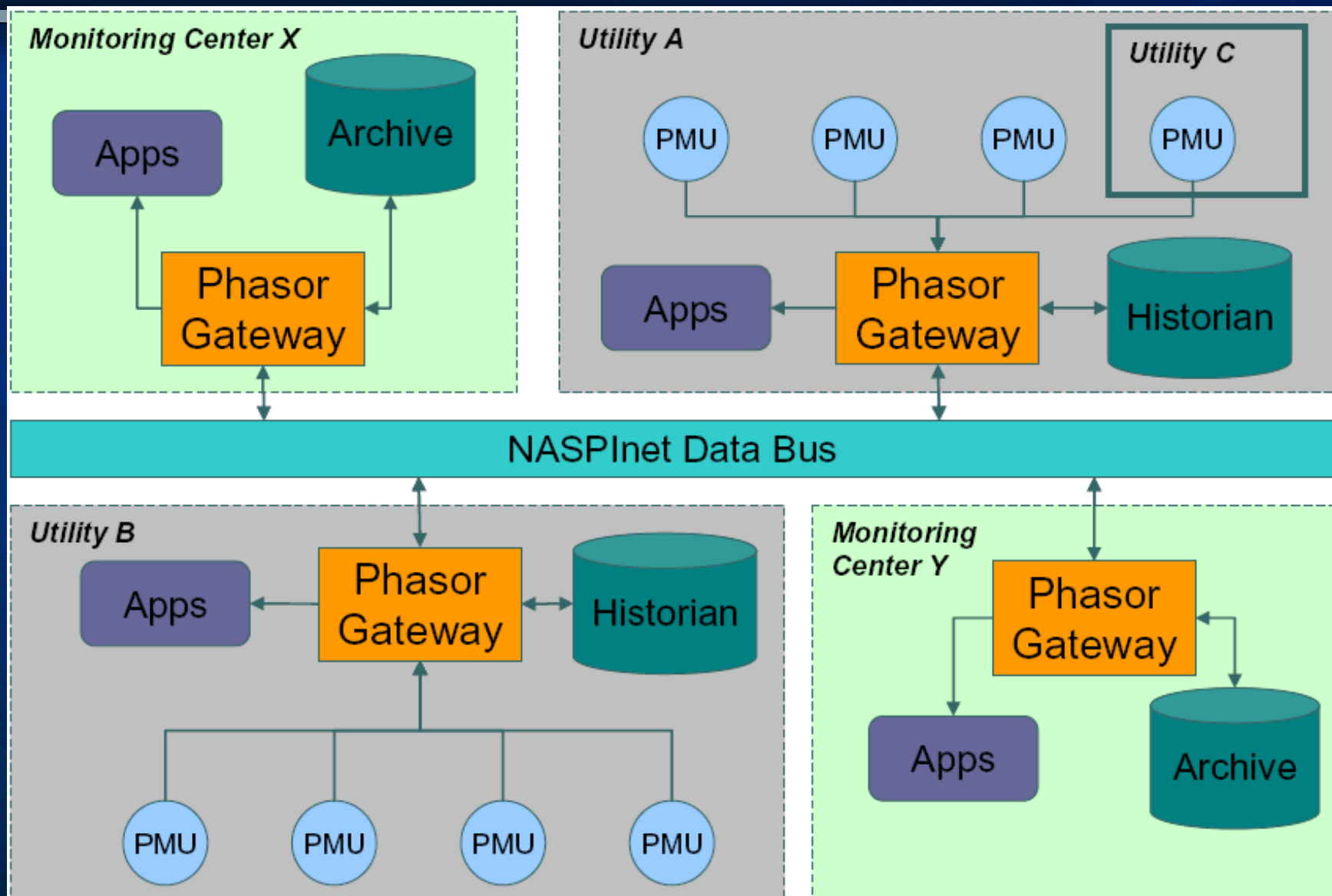
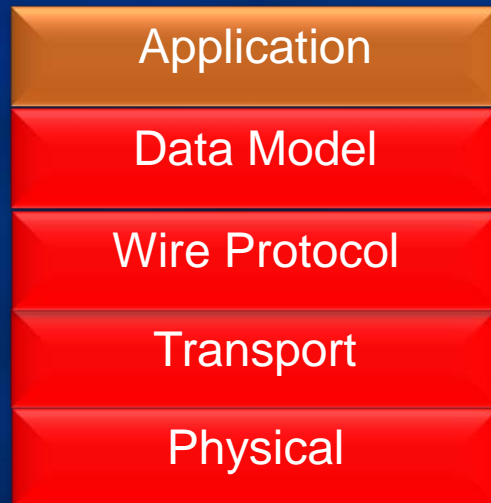


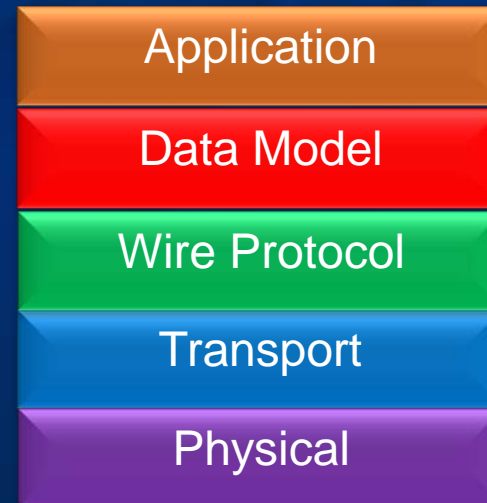
Figure 1 Basic NASPINet Architecture

# Network Standards Options

## Stovepipe

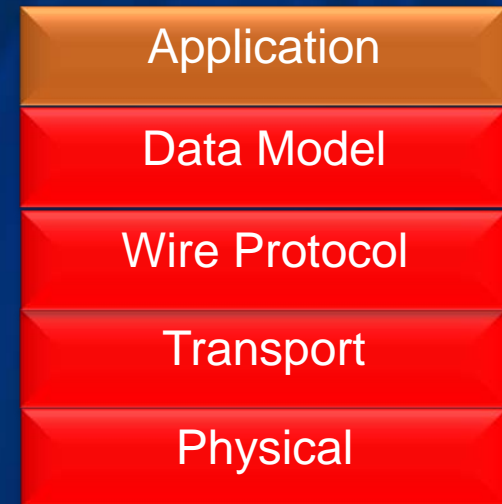


## Layered



# Stovepipes

- Definition
  - Any layer that is unique to the domain is part of the stovepipe
- Critical Questions
  - Does the Data Model (API) impact on-the-wire bits?
  - Are the layers widely used?





# If the Data Model Impacts Bits



- Adding new functionality changes bits
  - Incompatible changes!
  - Slow...requires a new standard
  - Unique...leads to lock in
- Stovepipes stifle evolution
  - Systems struggle to add new functionality & new demands

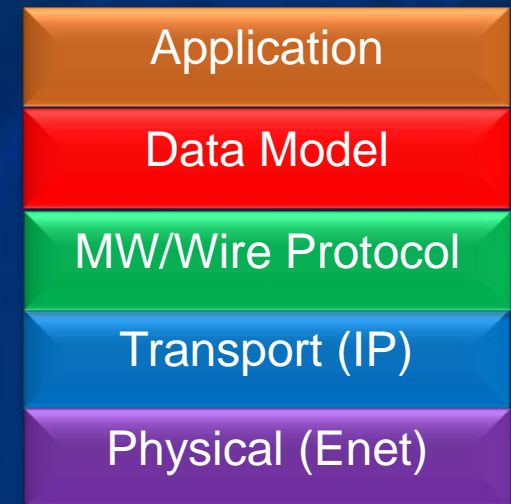


# If the Layers are Widely Used

- Costs go down
- Applications benefit from lessons learned in other industries
  - Especially unforeseen future demands
- Integration technology becomes critical...and good
- Latest innovations are rushed to market
  - Notably: Security!
- Faster, better, and cheaper

# Layered

- A “middleware” layer
  - Separates the data model from the protocol
  - Generic data model / interface definition capability
- Allows “services” that can operate on any data model
- Add a new functionality?
  - Add a new model; everything else comes for free



# Integration Ease



- DDS integrated
  - C37.118
  - Redundant SEL PMUs
  - SEL's viewer
  - Excel
  - GPA OpenPDC
  - GPA PMU Connection Tester
  - Multiple platforms
- With
  - Automatic discovery
  - Full redundancy & failover
  - Reliable multicast
  - Security
    - Authentication/access control
    - NAT routers/firewalls
- Total time: ~2 person-months
- All applications run unmodified
  - Only the bits change, not the APIs
  - Routing handles conversions

# Why Build Stovepipes?

- Many stovepipes
  - Aegis, JAUS, UAS, STANAG 4586
- Why?
  - Increment easier than rethink
  - Outside comfort zone
  - “Open” implies risk
- Stovepipes can make sense!





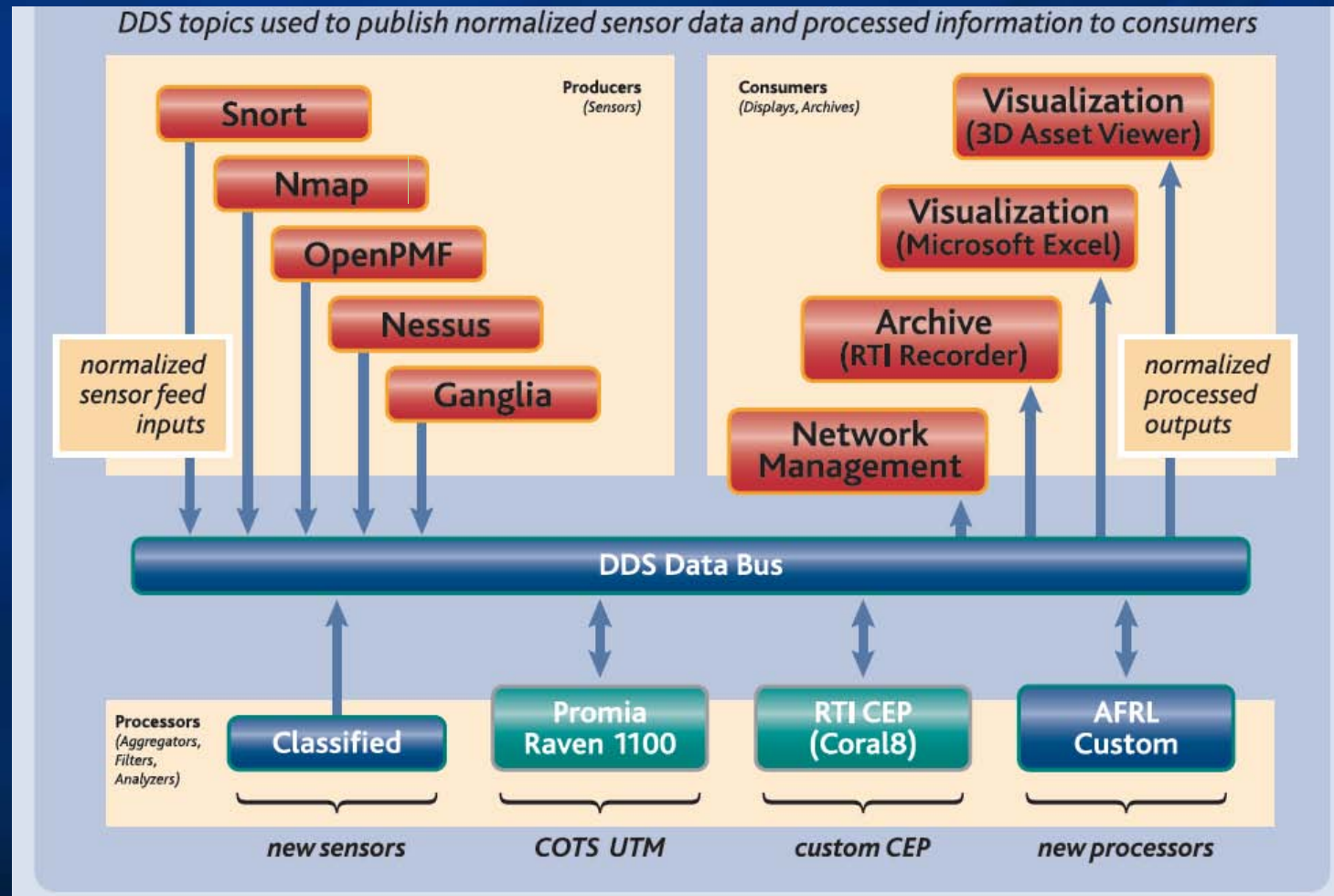
# DDS in Power Systems



- DDS makes sense in generation stations
  - Wind farms, distributed plants
  - SCADA systems
  - Delivers performance and reliability that other protocols cannot
- 61850 makes sense in substations
- Does DDS make sense in NASPInet?
  - Easily integrate C37.118, 61850 systems
  - Easily integrate new functions
  - 61850 over DDS...a single protocol for all classes

# New Functions Example

## Security Situational Awareness



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# What is NASPINet, Anyway?



- A network to view synchrophasors from multiple generating stations
- An opportunity to network the grid
  - Synchrophasors are only the first killer app
- Someday
  - Control, costing, ...
  - Millions of stations
  - Security situational awareness
  - Many other apps



The Network is the Computer

The Network is the Grid