



Data & Network Management Task Team Report Out

October 18, 2012
Atlanta, GA





DNMTT breakout agenda

- Dan Lutter, Allied Partners LLC and Dick Wilson
 - Review operational requirement for Smart Grid real time operational network
- Dave Bakken WSU and Bob Braden USC
 - Cloud Computing
 - GridStat+DETER
- John Hoag Ohio University
 - End-to-End Latency in Synchrophasor Communications



Platform for SG projects

- Lessons learned in Broadcast Television Industry
 - A lot of the same issues confronting SGIG implementers
 - Net Insight use of Nimbra MSR appliances
 - Transport agnostic
 - Improved QoS over any IP network
 - Protection mechanisms
 - Secure and reliable multicasting
 - Provide for separate service for Time Transfer



GridStat – Cloud Computing

- GridStat overview/update
- Focus on Cloud Computing advantages
 - Reduced cost of operation / Ability to setup services quickly
 - Better utilization of equipment
 - Scalable quickly or “on demand” – Tertiary Monitoring Centers
 - Could deploy massive parallel computation on large data stores
 - Different fault diagnosis algorithms could be run in parallel



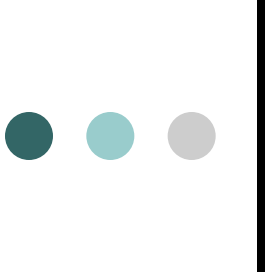
DETER – DEFT Consortium

- Bob Braden updated topics that were explored at earlier DNMTT meetings
- DETER is an emulation testbed designed for testing different networking topologies, OS's, protocol stack, applications and tools
- DEFT Consortium (PNNL, UIUC/TCIPG, ISI)
 - Objective: Modeling of cyber / physical systems
 - Emulate C37.118 frames between PNNL and Illinois University flowing across WAN to “control center” at ISI
 - PNNL and Illinois built their own sites
 - PMUs were simulated and real



DETER – GridStat

- GridStat has also been used DETER to demonstrate some its work
- Emulated GridStat Components
 - Publish Subscribe paradigm
 - Redundant forwarding
 - Multicasting (at middleware level)
 - Down sampling for “rate based” traffic (i.e. constant rate packet streaming)
- Demonstrated a complete model of GridStat over emulated networks using BPA transmission system. data



End-to-End Latency in Synchrophasor Communications

How to get necessary telecom capabilities
(interconnection, interoperability, performance)

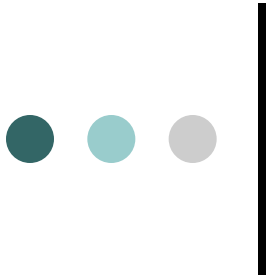
- Many factors contribute to latency,
- Deterministic Components: TDM propagation and transmission delays, Processing at PMU/PDC, route / switch; overhead including Crypto
- John accurately determined latency for ISO project



End-to-End Latency in Synchrophasor Communications

Root Causes for Latency

- No acceptance test before going into production iperf, trace
- Lack of bandwidth to support muxing several sources
- Misconfigured route/switch
 - Duplex; lack of policing; lack of RAM; too much RAM
- Security appliances [FW, IDS/IPS] saturated (DDOS?)
- Unwanted topology change – to some longer path
- Endpoint Lacking RAM – OS page thrashing
- Check logs



Thank you for participating!

