SGIG Project Design

Presenter
Jim McNierney, Lead Architect, Smart Grid Technologies
jmcnieri@nyiso.com
New York Independent System Operator
NASPI Working Group Meeting
October, 17-18, 2012
Atlanta, GA
Acknowledgment & Disclaimer

- **Acknowledgment:** This material is based upon work supported by the Department of Energy under Award Number(s) DE-OE0000368

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Design Goals

❖ **Data:**
  - 99.95% data availability - End-to-End Latency < 100 ms

❖ **Systems:**
  - Each NYISO PDC available > 99.95%
  - All application functions within NYISO (without resorting to back up) available > 99.95%
WAN Design

PMN Scope
HA & Disaster Recovery

- Dual Redundant Architecture
  - Intra-site failover – MS Clustering
  - Inter-site failover – Domain Name Services (DNS) manipulation
    - Clients directed to primary site unless service is disrupted
    - Application Servers directed to primary PDC cluster unless service is disrupted
    - Active / Active data streams from WAN into NYISO Control Center/s

- Data Retention for Archive
  - 90 days Real Time, 24 Months Historical DB
Design / Architecture

TO's Primary PDC

NYISO Primary Site

NYISO Secondary Site

TO's Backup PDC

Provider A

Provider B

PDC

App Server

Data Stores RT & Hist

Web Tier

PDAC To EMS Interface

Integration Server

Integration Server

Integration Server

Integration Server

PDAC Components at Primary and Backup sites are Active-Passive

Routers at each TO site are Active-Passive. Data from each site flows over one WAN at a time

Duel Redundant Paths to EMS
Performance Monitoring

- Utilizing Simple Network Management Protocol (SNMP) V3 for incorporation into NOC monitoring systems
- Performance and uptime statistics part of reporting package for PMU and PDC devices
- Discussions with downstream Transmission Owner partners to determine process and points of contact for maintenance
Data Quality and Availability

- Mixed results thus far
- Implementations are now completing.
  - Each PMU installation is being vetted through SCADA data comparison/s
- Personnel shifts from project centric to ongoing maintenance
  - Establish maintenance contacts early
Data Quality and Availability

- Anecdotally, DFR upgrades have been more reliable than new PMU installs
- New technology for our Transmission Owners.
- Time errors have occurred with some installations (PDC problem)
Phasor Data-Sharing

- Currently sharing data with MISO
  - Plans to do the same with other ISO/RTOs in the Eastern Interconnection

- Plans for an applications portal to share application functions with NY Transmission Owner staff

- Not currently sharing any data with researchers.
Major Operational Applications Using Phasor Data

- Wide-area situational awareness
  - Electric Power Group’s RTDMS
  - Integrated into control room applications
    - Downsampled stream into EMS
    - Alerts / Alarm notifications into EMS via SCADA points
      - Operational date: June 2013
- Renewable generation integration
  - Phasor Measurement Unit placement study placed some PMU devices near Wind Farms
    - June 2013
- Line monitoring and/or dynamic line ratings
  - Currently no applications planned for in project effort
- State estimation
  - EMS Vendor - ABB
    - Operational readiness date: TBD based on vetting data and function
- Active participation on the part of Grid Operations in design, implementation and testing.
Challenges and Lessons Learned

- Biggest technical challenges to date have been:
  - **New Networking technologies (VPLS)**
    - Use of UDP for data transport
  - **Authoritative source being the CIM – CIM extensions for PMU registry**

- Biggest programmatic or execution challenges to date?
  - **Coordination of efforts with multiple organizations for device installations**
  - **Communications system design**
    - Contracting for SLA regarding latency
  - **Data archiving**
    - Retention policies – Business Case for large historian
    - Historical archive of inter-regional data
  - **Operator or staff training**
The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state’s bulk electricity grid, administering New York’s competitive wholesale electricity markets, conducting comprehensive long-term planning for the state’s electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.