SGIG Project Design

Presenter

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Acknowledgment & Disclaimer

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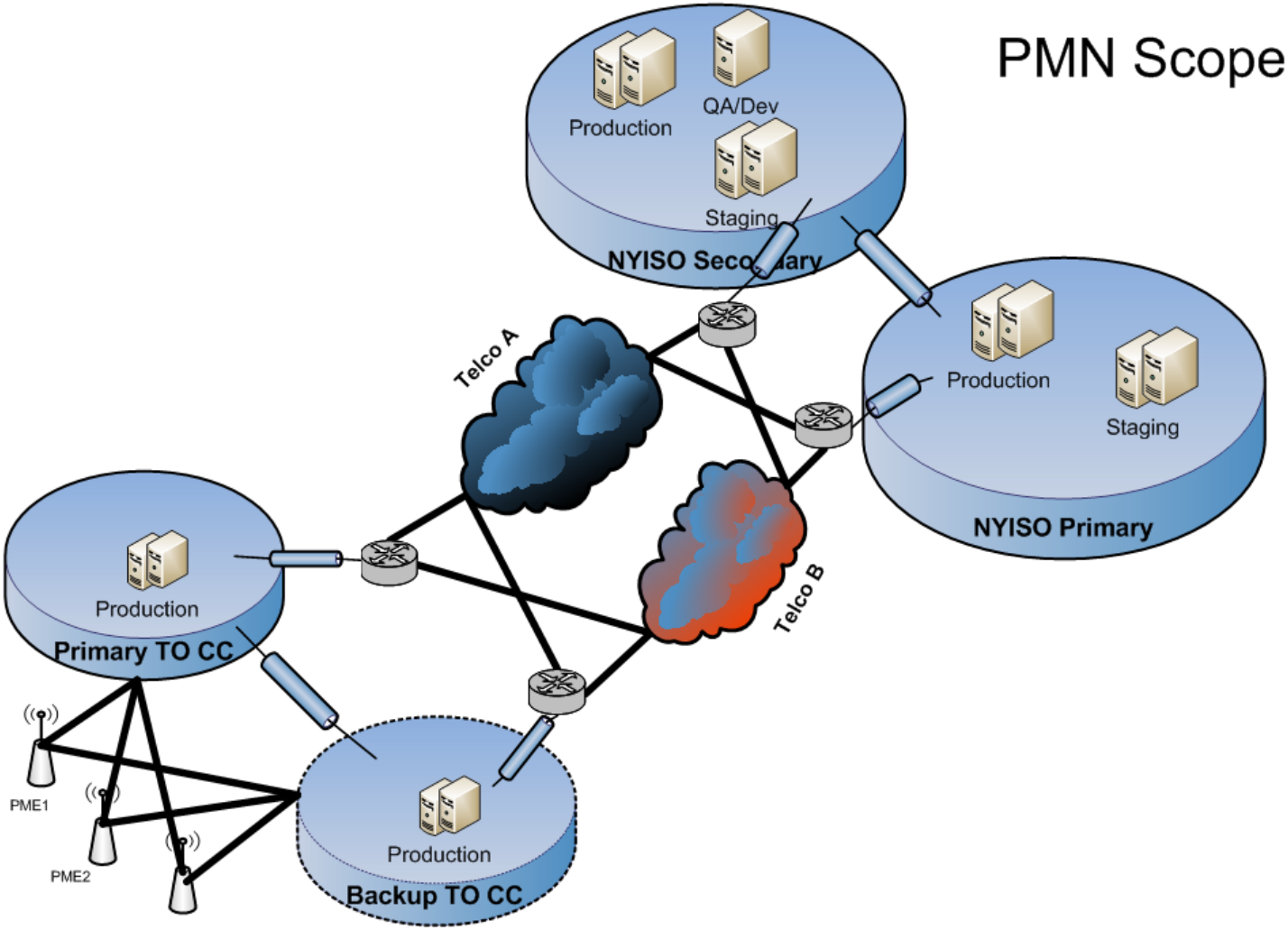
Design Goals

- **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%***

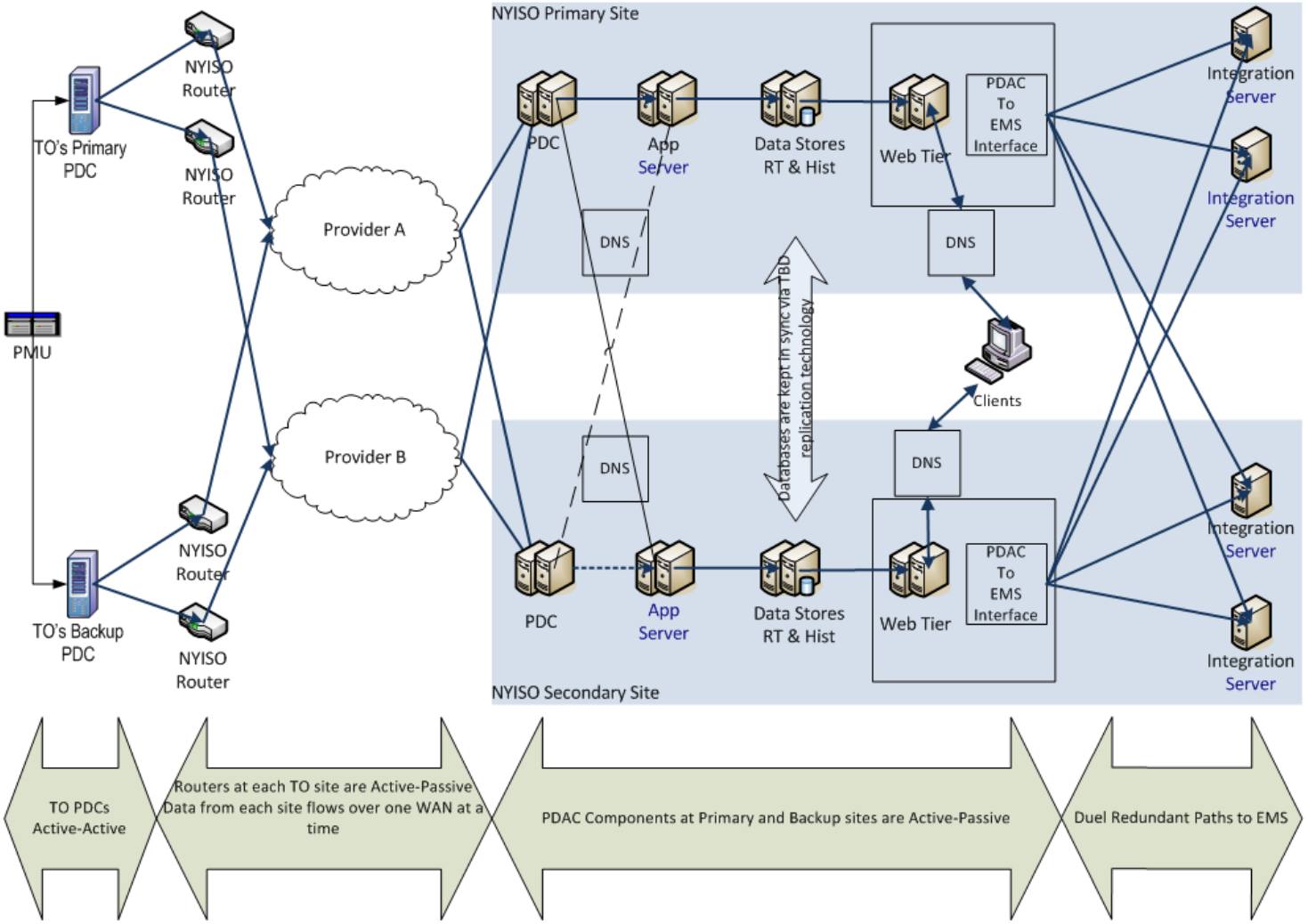
WAN Design



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



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.**

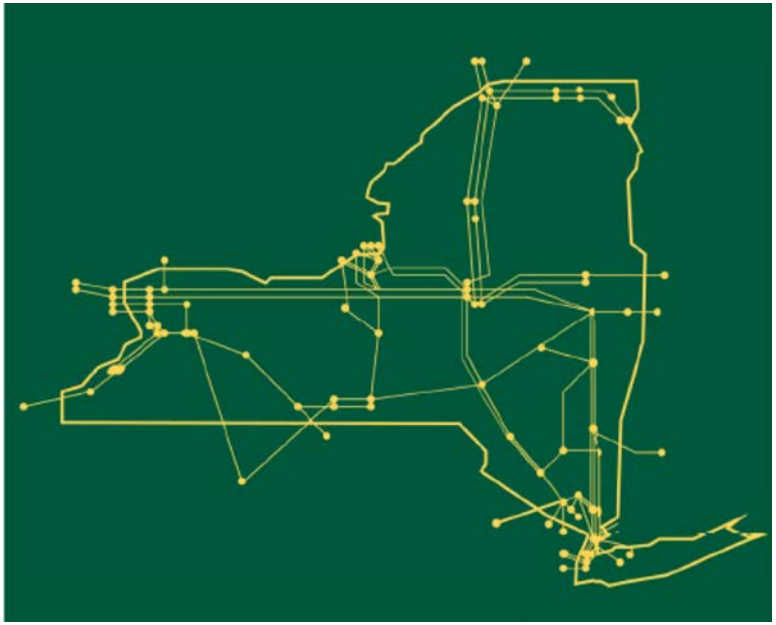
Major Operational Applications Using Phasor Data

- **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.



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