

Design Goals for Data & Systems at PJM

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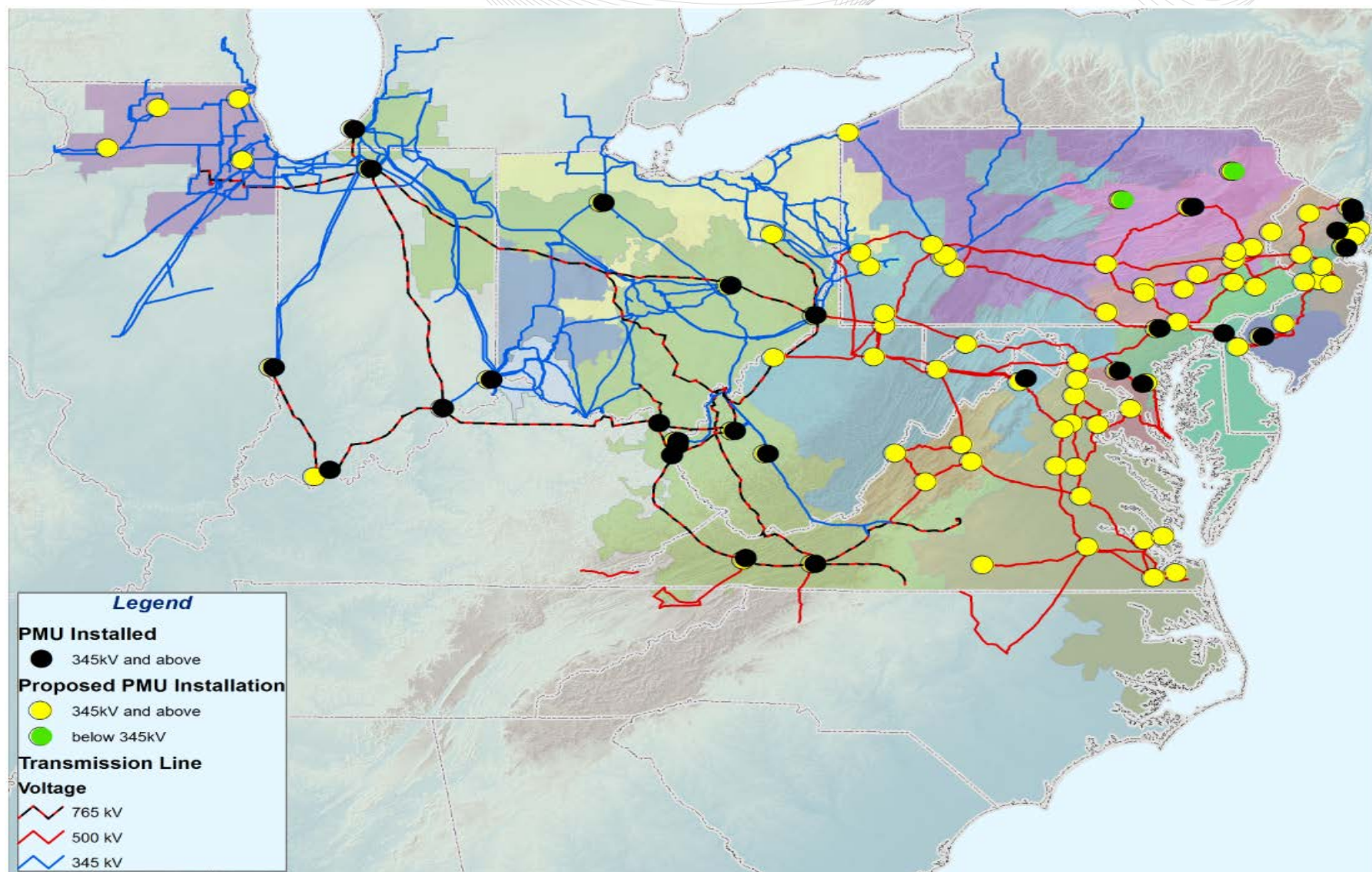
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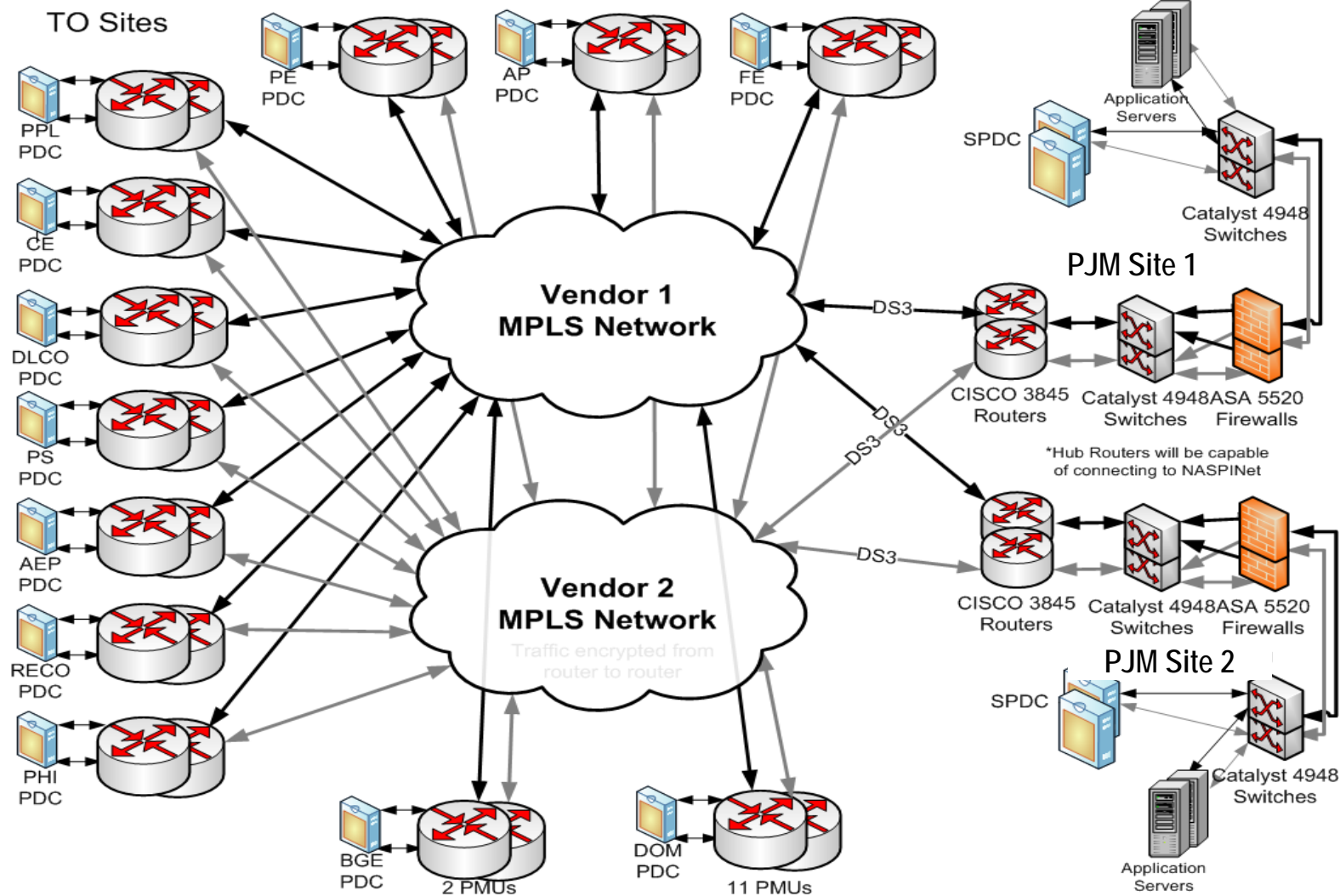
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- High-Availability
- Performance Monitoring
- Operational Support
- Design Goals for Data & Systems







- IT Operation Center
-24x7
- Tivoli
 - Windows logs and Application logs
- Applications' own performance report



- IT Operation Center
 - Alert – Response – Follow-up action
 - Develop Standard Operating Procedures
- Intelligent Event Processor (IEP)
 - Alarms from applications



- Data:
 - 99.99% data available, 99% with STAT = 0, & 90% with End-to-End Latency < 100 ms (all per Hr.)
- Systems
 - Each PDC available > 99.99%, Each major application individually (without resorting to back up) available > 99.99% (per day)

- 71% of PMUs with “Good” (or better) rating
- 45% of PMUs delivering Timely data
 - With latency under .5 seconds
- 35% of PMUS are both “Good” and “Timely”
- Poor Quality – Root Cause
 - PMU Calibration - Loss of telecom connection
 - GPS Clock issues - Server overload
 - Data Name limitations - Aliasing at PDC
 - Loose cables - PDC configurations

- **Application Security**

- PJM and TO technical implementation comply with their Security Standards including CIP.
- EPG software (ePDC, RTDMS, PGDA) to ensure:
 - proper programming standards are implemented.
 - software complies with PJM Security Standards including CIP

- **Independent Testing**

- PMUs and PDCs in use by the Project.
- Virginia Tech provides testing (to C37.118 standards) as information to the TOs and PJM.

-----12 Transmission Owners -----
-----90 Substations-----
-----360 PMUs-----
-----720 Measurements-----
-----4096 bytes per PMU Message-----
-----30 Messages per second sent to PJM-----
----- Each PMU generates 108,000 database rows per hour -----
----- Estimated 1 TB of Storage / mo for 100 Substations -----

1,302,528* bytes of data, per second, streaming from
all PJM PMUs into the PJM PDC and Applications

*Additional, almost same amount of data will be coming from other interconnections

