



PJM Success Story / 2018 Project Update

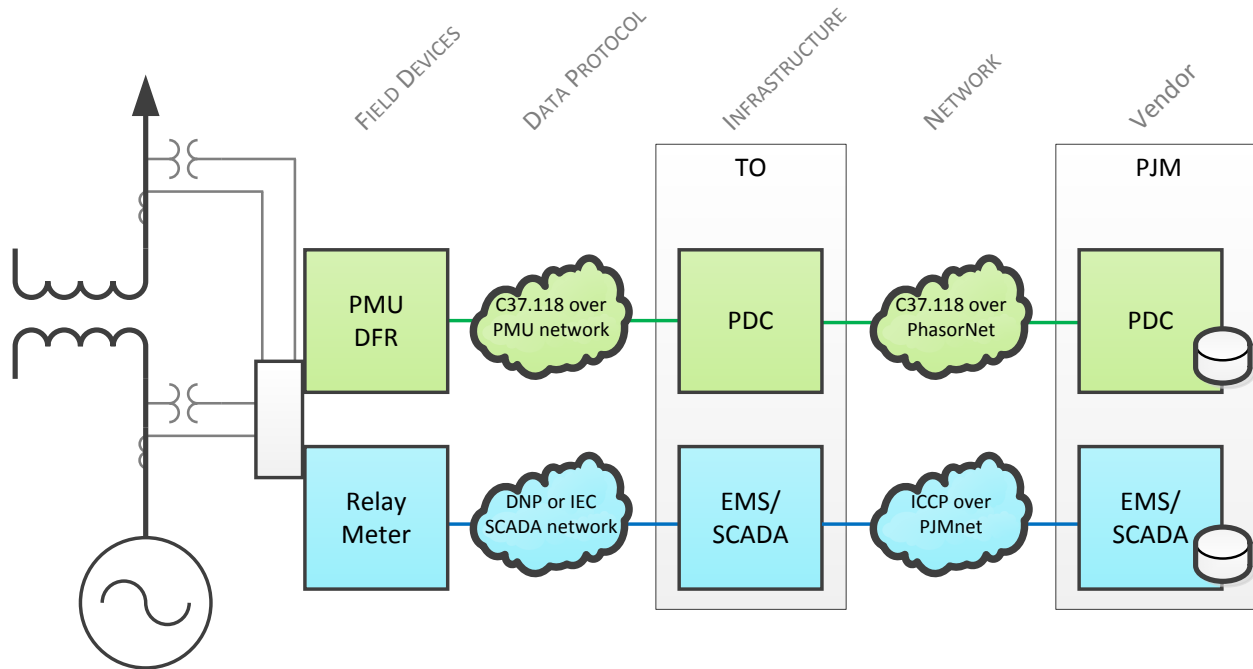
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- PMU Resilience
- Oscillation Detection
- Islanding Detection
- Model Validation
- Integration into Existing Tools

How can Synchrophasor data improve PJM's operational resilience?

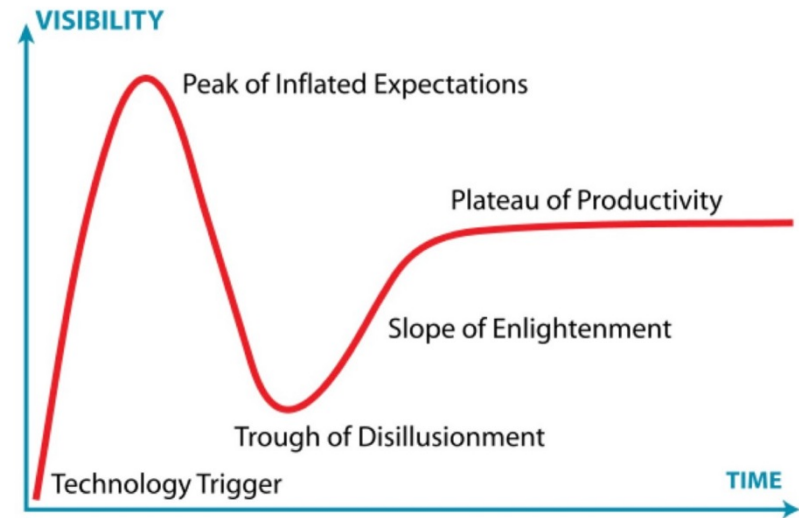
- PMU data can be used to replicate and reinforce existing operational functions
 - State Estimation
 - IROL
 - ACE
 - Voltage monitoring
 - Thermal monitoring
- In-use applications unique to synchronized measurements
 - Detecting system islands
 - Oscillation monitoring

Technology

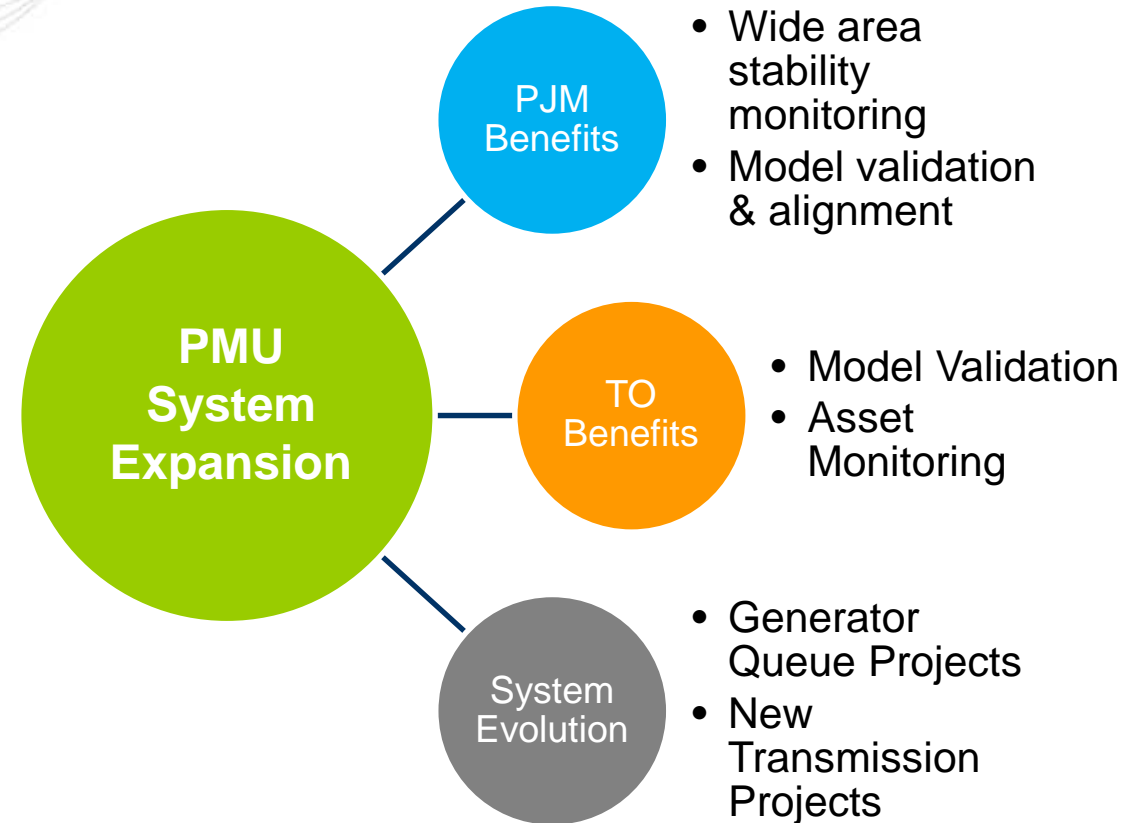


Policy

Gartner Hype Cycle



- PMUs improve real time dynamics monitoring
 - Oscillations
 - System Islands
- PMUs improve model validation
- Needs for System Resilience
 - Improve visibility
 - Backup essential functions



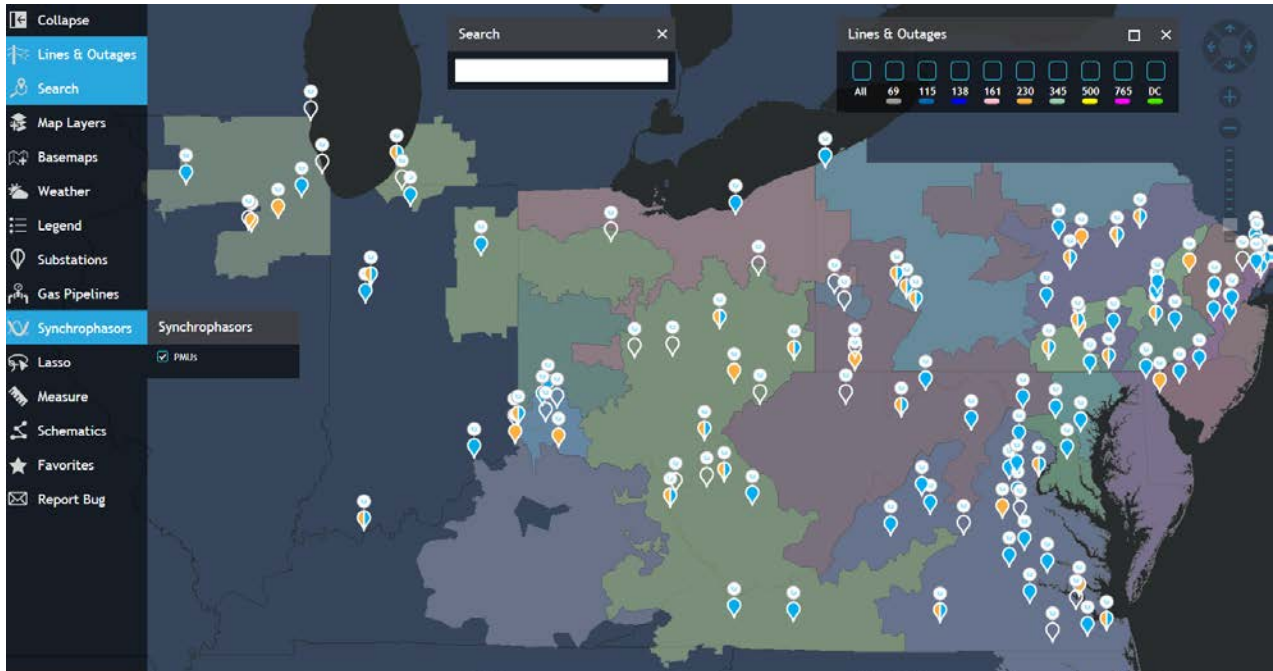
- Transmission owners are looking to PJM to procedural-ize our need for PMUs
 - Key Applications
 - Observability Requirements
 - Planning-based implementation
- Wide-area Monitoring
- Initiate Post-event Analysis
- Set guidelines for PMU data quality, adherence to standards, device configuration

- Simulator-based Operator Training
- Installed new version of RTDMS
- Stakeholder Engagement
- DIMA Visualization

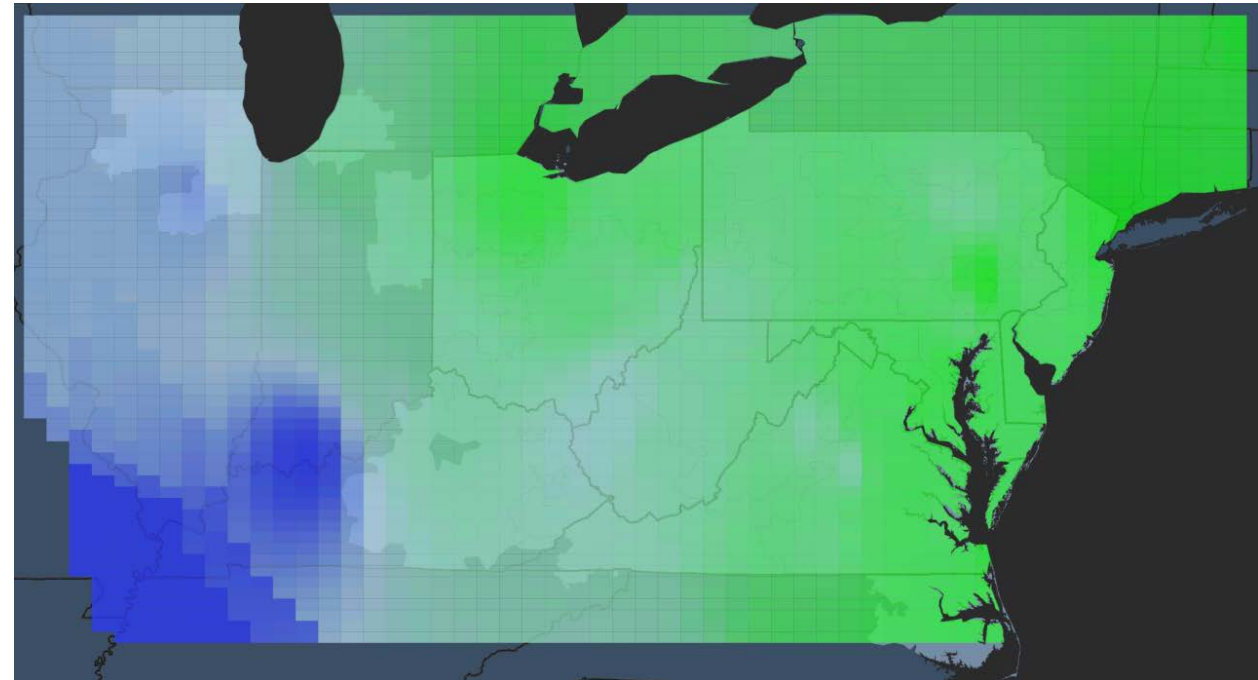
- PMU Location information added to DIMA in 2017

2018 plans include:

- Expanding PMU location information to external areas
- Data heatmaps



PMU Location Markers



Wide-area angle display

- 30 minute generic dataset available on pjm.com
- 30 Hz frequency and voltage data during static and dynamic (generator trip) conditions
- No signal names, locations, or event time
- Request form available here: <http://pjm.com/markets-and-operations/advanced-tech-pilots/private-generic-pmu-data.aspx>

