American Electric Power SynchroPhasor Deployment
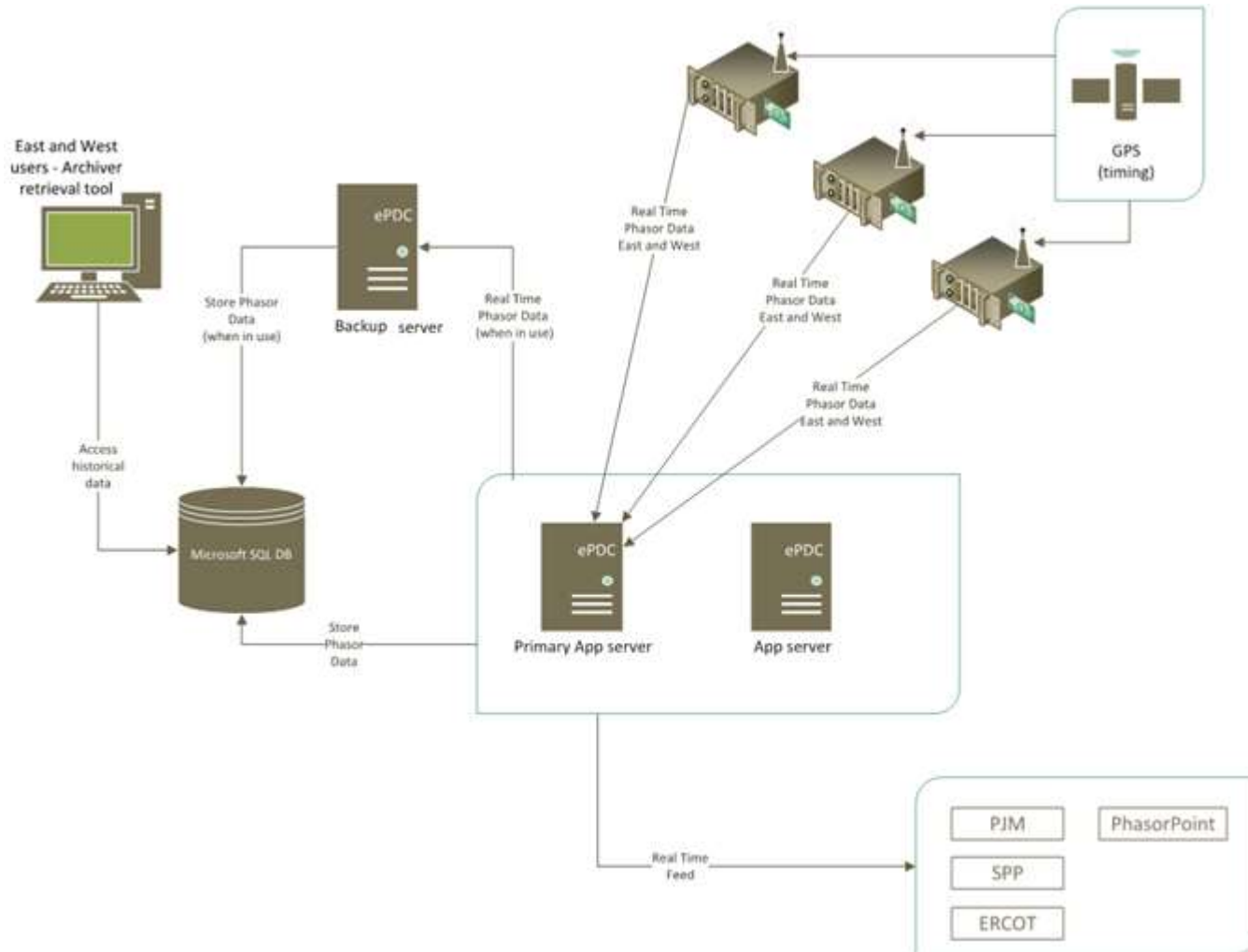
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Current SynchroPhasor Deployment

SynchroPhasor Deployment

- AEP uses predominately GE and SEL relays installed in substations to collect and stream PMU data back to our centralized data concentrator.

- The data concentrator sends the data to several groups both inside and outside of AEP.

- We currently store all measurements for all PMUs for 6 months on a SQL database.

SynchroPhasor Data Usage

- Stream data in real time to RTO's

- Stream data in real time to AEP Operations

- Historical data is used by the AEP System Performance Analysis group to research events and perform grid analysis

SynchroPhasor Improvements

- Issues:
  - Situations arise where older historical data is required
    - Grid development planning
    - Historical event analysis
  - Response times for PMU issue resolution is too long
  - We don't have a good way to see PMU issues without manually going through the data
- Goals:
  - Improve historical data retention
  - Increase the visibility of data quality issues for faster response times

SynchroPhasor Improvements

- ## Data Retention
  - Design a multi-database approach based on physical location of PMUs.
  - Acquire a modern software solution for accessing large amounts of historical data.

- ## Data Quality
  - Acquire a reporting tool to provide an in depth real time view into the quality of the data being collected and send out alerts when issues are detected.

Future SynchroPhasor Deployment
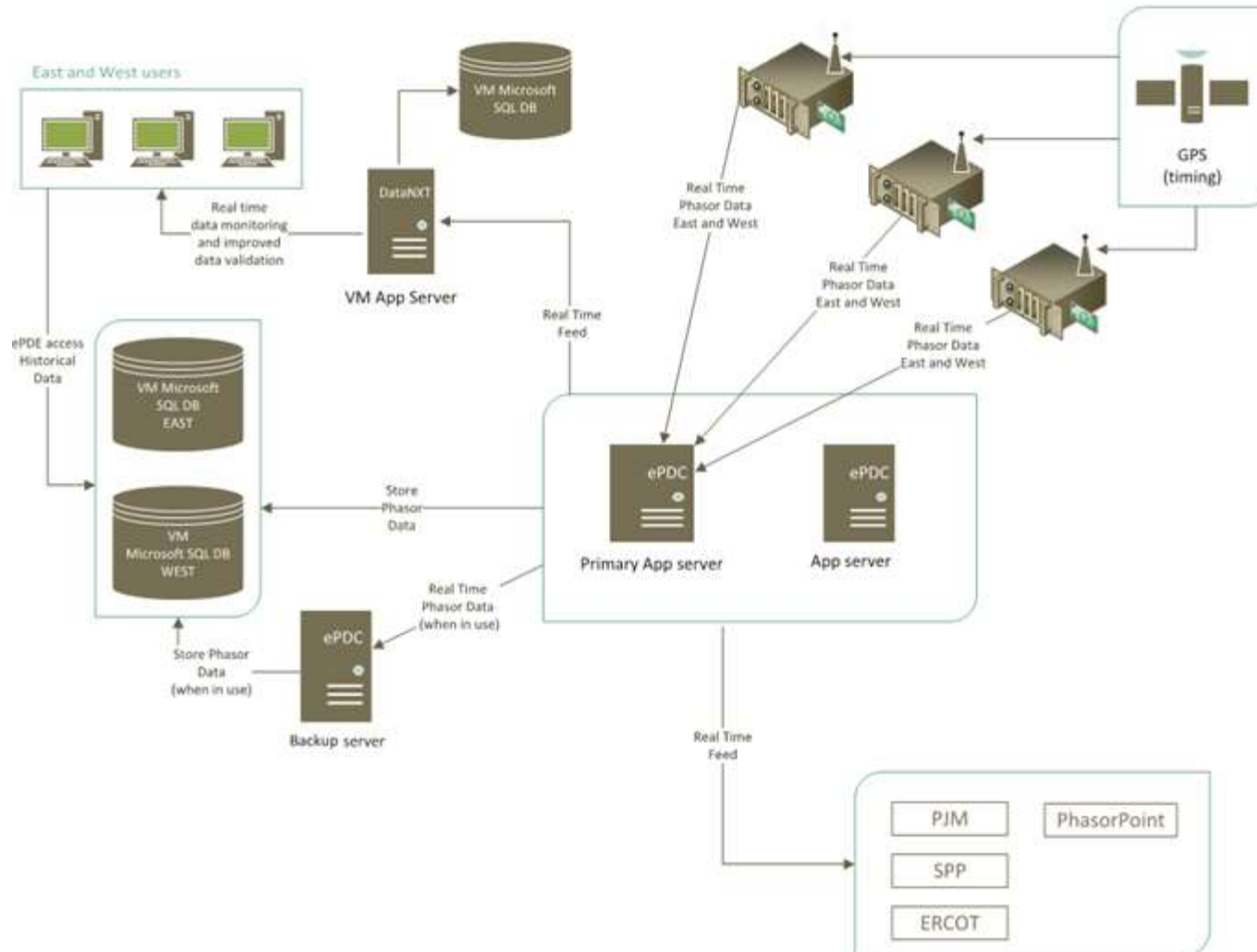
SynchroPhasor Growth

- 270 PMUs enabled as of October 2019
  - An increase of 40 PMUs over the past year
- Estimated growth of 60-80 PMUs over the next year
- New PMUs to collect data from are identified by the RTO's, AEP Operations, and AEP System Performance Analysis groups based on need.

BOUNDLESS ENERGY℠

New PMU Considerations

- The AEP Transmission System & Asset Monitoring group will get requests from other entities from both inside and outside of AEP for additional PMU data.
  - Those groups provide the location they would like PMU data for, why its being requested, and rank them by priority.
- Reasons why PMU data is requested
  - Linear State Estimation
  - Interconnection Flow Monitoring
  - Generation Interconnection Monitoring
  - Load Monitoring/Modeling
    - Large Customer Loads
  - Asset Monitoring

New PMU Considerations

- Available PMUs
  - What devices do we have in the area and are they PMU capable?
  - If not, what are the alternatives or is a project required to upgrade a device to be PMU capable.
- Network Bandwidth
  - The Station Network Analysis group at AEP will perform an analysis at the station of the proposed new PMU based on the new data being collected and determine if there is sufficient bandwidth.
  - If not, what are the alternatives or is a project required to upgrade the station network.
- Based on our analysis we'll enable a new PMU where feasible