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Building Connections

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INTERNATIONAL DISTRICT ENERGY ASSOCIATION

An Integrated solution for UTA Micro-grid

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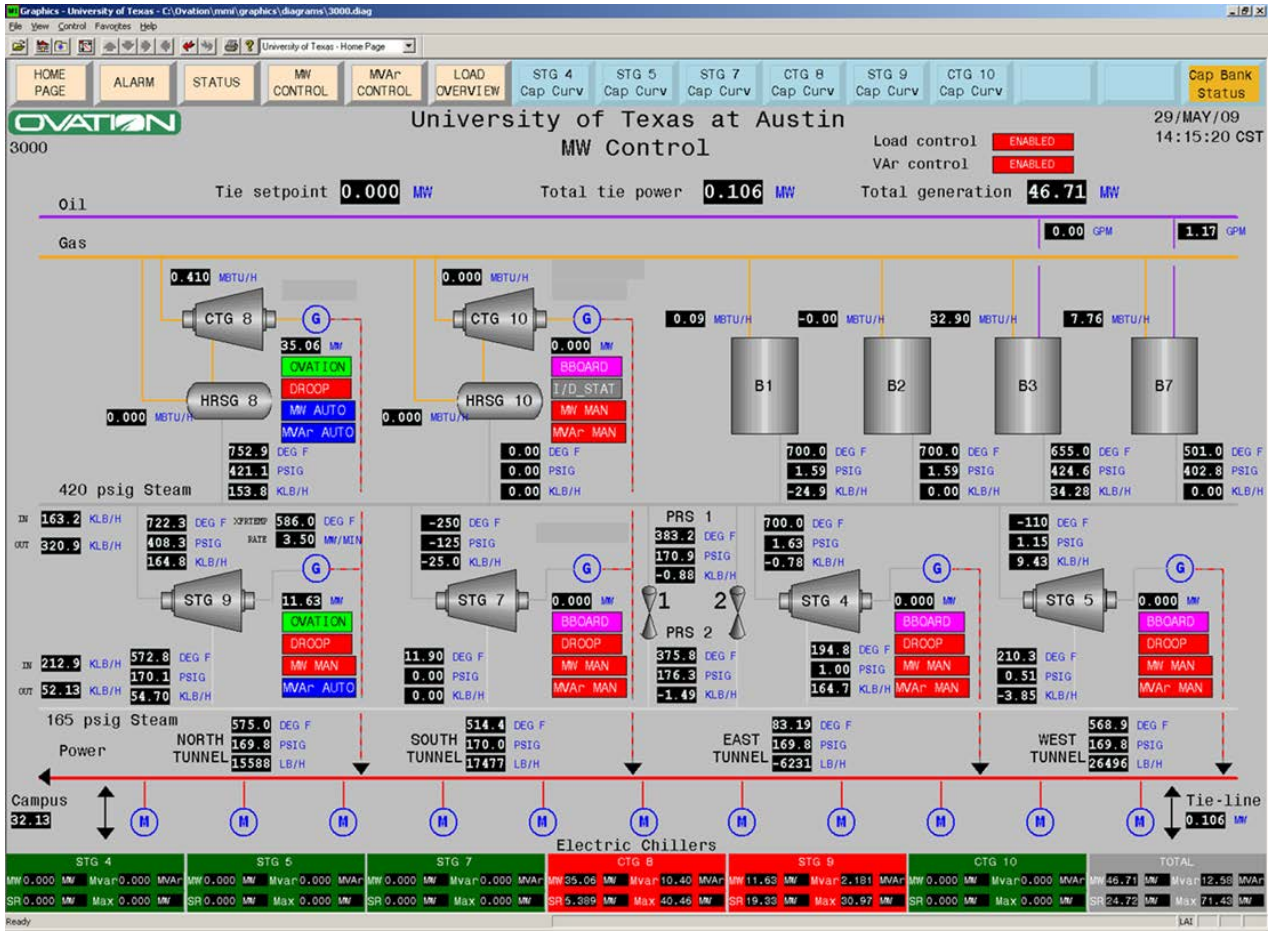
An Integrated solution for UTA micro-grid

- UT Austin micro-grid components
- Control functions that make this system unique in achieving high efficiency and reliability levels
- Upgrade of such system, and the non-dependence of the Texas grid

An Integrated solution for UTA micro-grid

UT Microgrid components - Generation:

- Two combustion gas turbine generators
- Two heat recovery steam generators (HRSG)
- Four steam turbine generators
- Four natural gas-fired boilers
- Two TES + Five Chilling Stations (17 Electric Chillers)



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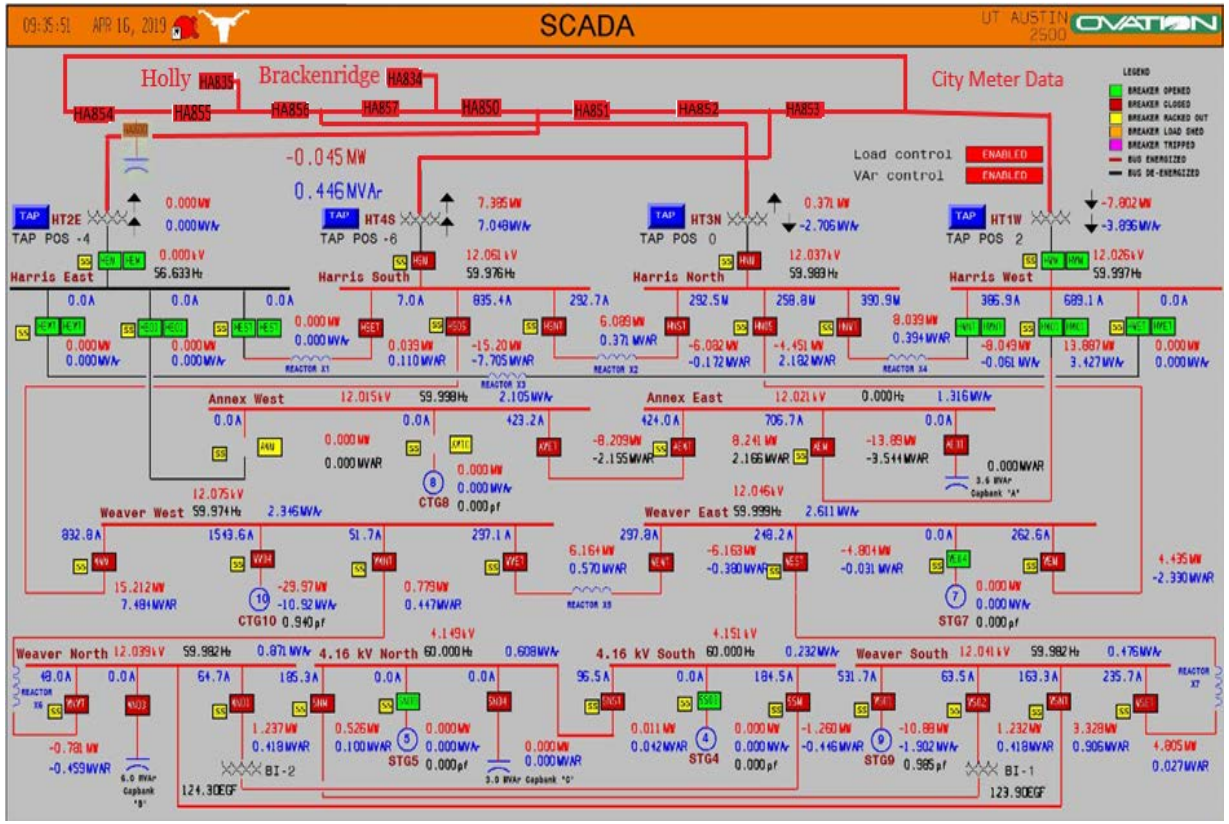
UT Microgrid components - Distribution:

- Two 69 kV transmission feeds forming a loop
- N+2 Redundancy for Power via Substation and Stand-By
- Four City-Tie connections
- Six pairs distribution load centers



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UT Microgrid has all main control functions encountered in other typical installations:

- Point of Common Coupling (PCC) Monitoring – AE 69kV Breaker Status
- PCC – UTA MW Controller Net Zero Power to ERCOT Grid
- Frequency Control when Islanding
- Load Shedding Built-in
- Voltage (Reactive Power) Control
- Transformer Tap Changer Control
- Remote Breaker Control and Monitoring
- Campus Building Outage Instantaneous Notification – email & text
- Texas Grid Synchronization

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Advantages of UT Microgrid

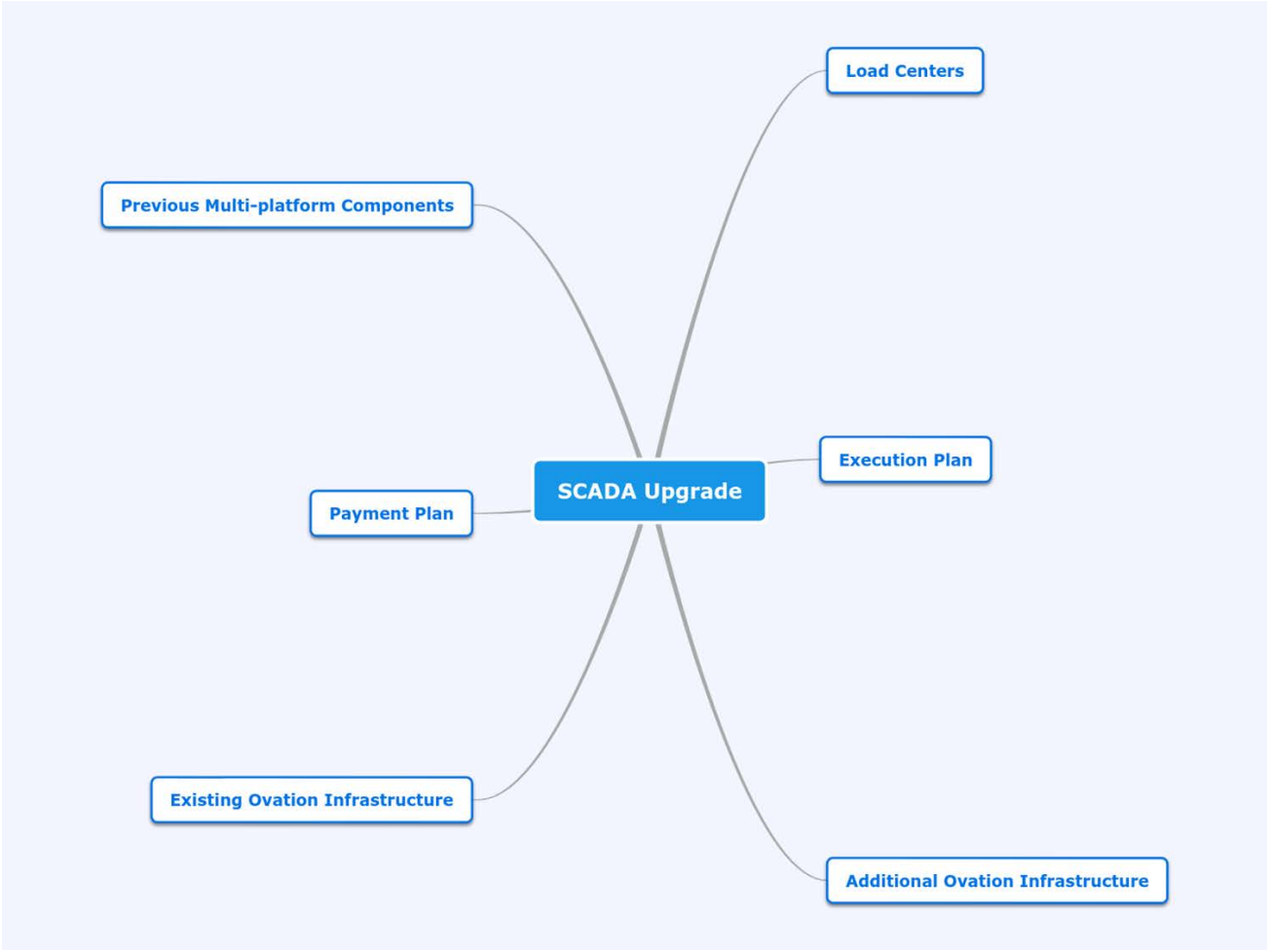
- Helps reduce transmission losses
- Provide high quality and reliable electrical energy supply to critical loads
  - During a grid disturbance can separate and run as an island – keep critical loads on
- During peak grid power demands can prevent main grid overloads
- Provides power affordably to Campus
- Microgrid encourages the use of the renewable energy sources – not available at UT at this time
- Reduces the electricity costs to its users by generating all of its electricity needs

SCADA Upgrade – Project Description

This project scope consisted of the upgrade of the Supervisory Control and Data Acquisition (SCADA), electrical distribution system in Main Campus.

The plan was to integrate six (6) load centers, across the Austin Campus, into the existing mission critical control & data acquisition Ovation distributed control system (DCS)

Project took three years for implementation after contracting was completed



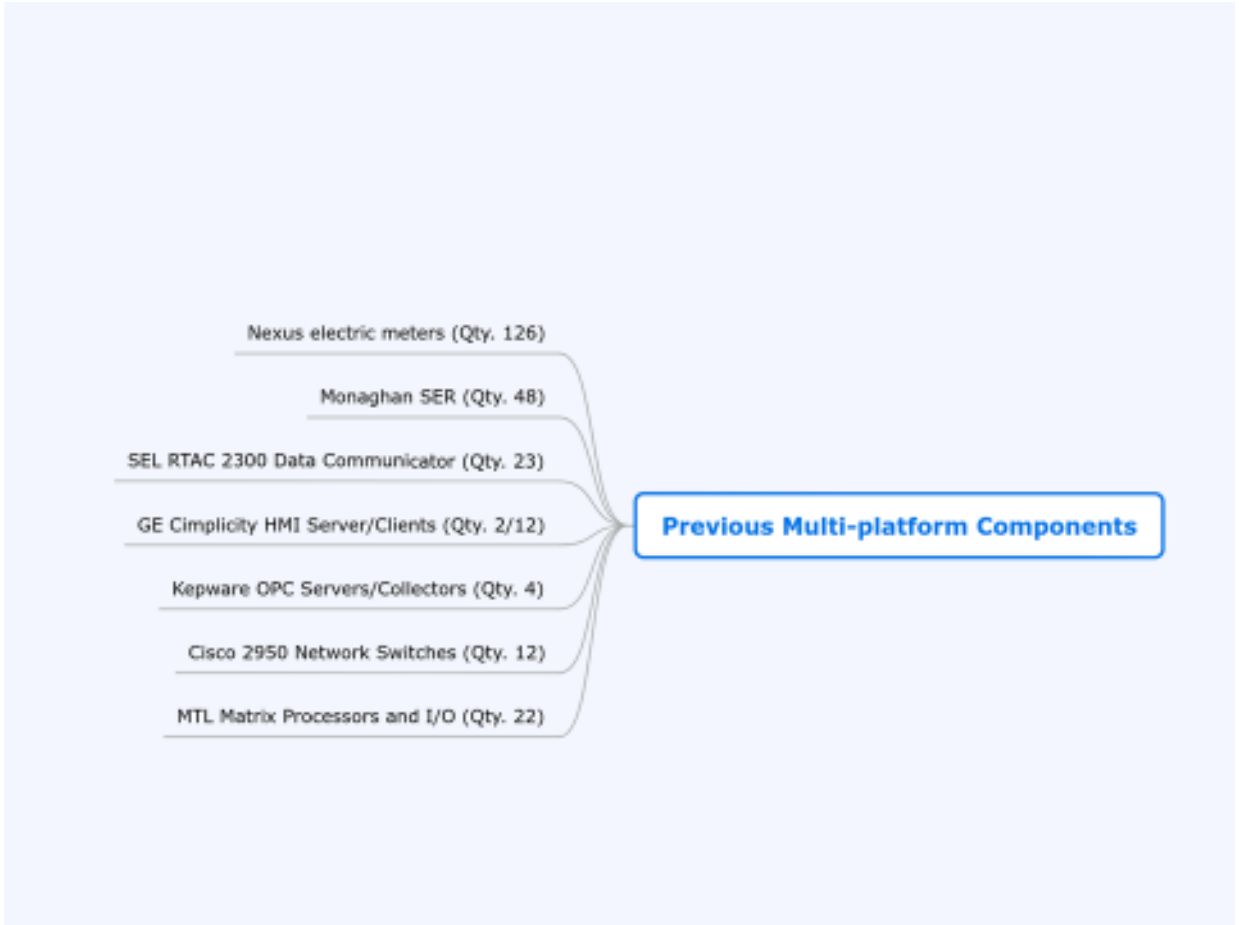
SCADA Upgrade – Why needed

OEM products were at end-of-life

Multi-platform made it difficult to control

Components not-compatible with new technology, i.e. Ethernet and networking

Cost to maintain was elevated due to legacy non-supported products



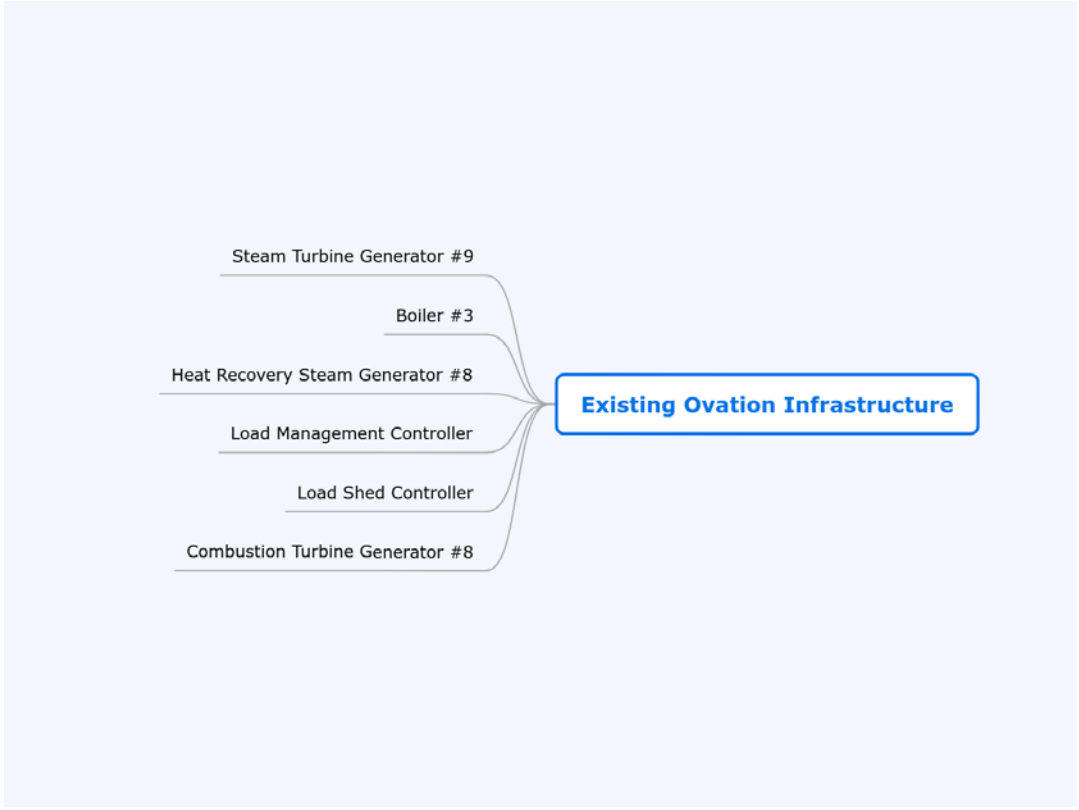
SCADA Upgrade – Made sense using available infrastructure

Power Producers:

- CTG8
- HRSG8
- STG9
- STG7
- Boiler 3

Campus Electrical Control System

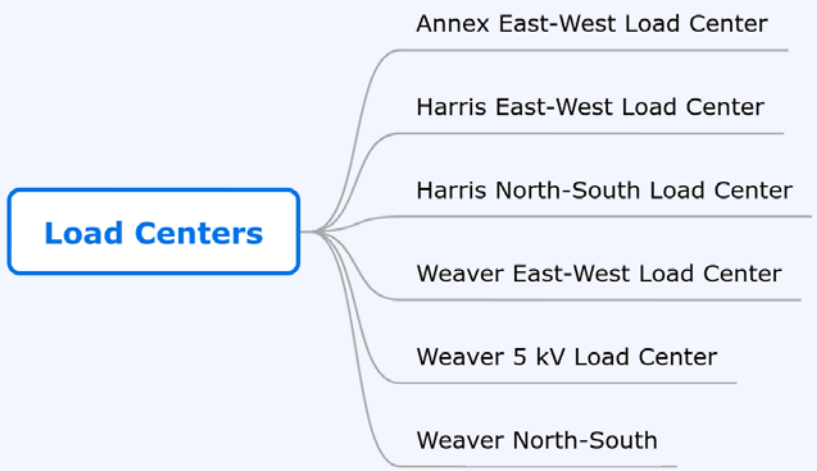
- Load Management Controller
- Load Shed Controller



SCADA Upgrade – Made sense using Available Infrastructure

Plan was to integrate six (6) load centers, across the Austin Campus, into the existing mission critical control & data acquisition Ovation distributed control system

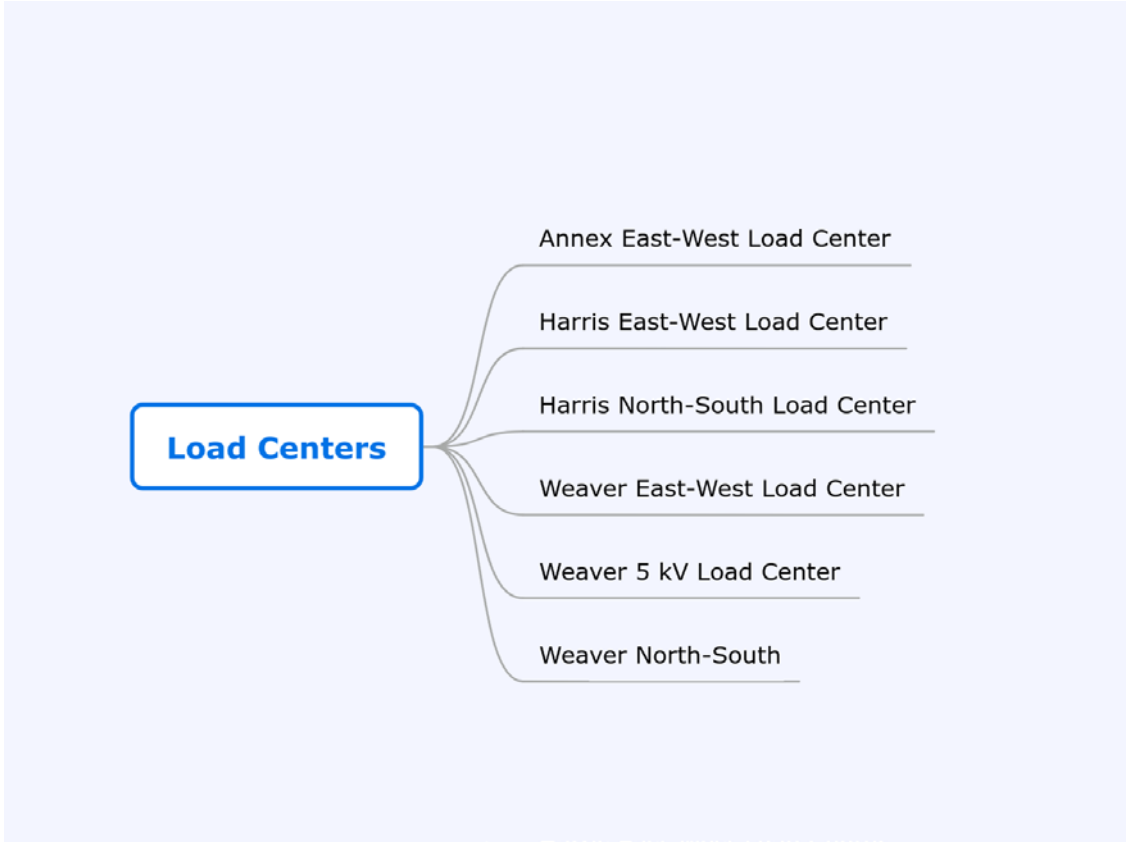
By integrating these load centers into the existing Ovation network, which covers 30% of the existing infrastructure, UEM was able to consolidate different manufacturers products into one platform



SCADA Upgrade – Common Platform

Ovation platform used for all process applications

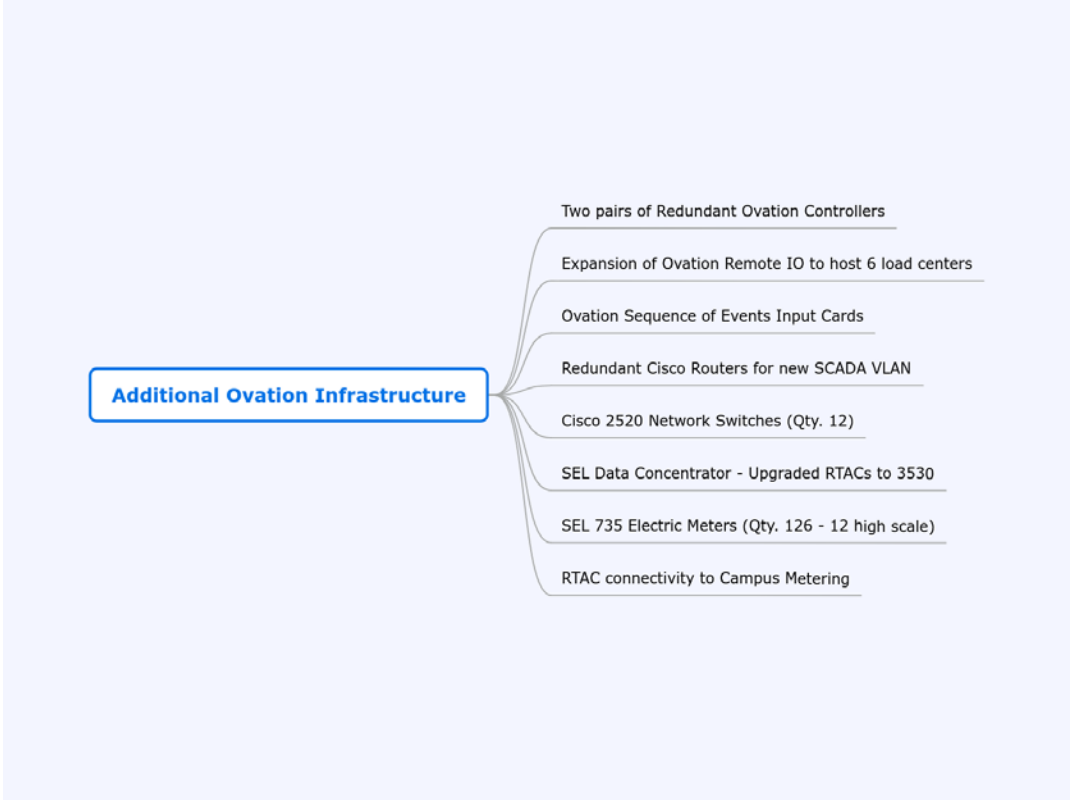
- Develops and maintains system database, process graphics, and control logic
- Power Plant Ops has a view and control of graphics and control logic
- Power Plant Operations can drill down and identify specific breakers and/or relay statuses, and identify their locations using Ovation
- Alarms can easily be configured for all feed breaker to identify faults in a timely manner



SCADA Upgrade – Upgrade Features

Ovation platform used for all process applications

- The existing Ovation network is ~ 8,500-point utilization out of a 200,000-point capacity; therefore, UEM ended up with ample room for expansion
- Ovation network expanded with additional fan-out network switches for expansion
- Controllers and workstations added without requiring any additional network switches.
- Additional IO capacity with about 20~40% spare capacity per new IO panel
- Schweitzer Engineering Laboratories (SEL) 2030 Communications processor replaced with a SEL 3530 Real Time Automation Controller (RTAC),
- Nexus meters with SEL Power Quality & Revenue meters for each load center



SCADA Upgrade – Execution

All the phases except phase 7 involved:

- Working with the existing SCADA components,
- Shutting down half a lineup at a time, and replacing the hardware with Ovation components
- Utilizing the existing Ovation platform/version
- The last phase was the upgrade to the latest Ovation platform control network:
  - hardware and software components that got UT ahead by not having to do another upgrade until 2032

SCADA Upgrade – Execution

- In House work through the course of three years;
- In house installation
  - 6000 electrical man-hours
  - 9000 programmer man-hours
    1800 I/O points connections
- Minimum disruptions
- Collaborative Commissioning efforts Ops/Controls/Emerson

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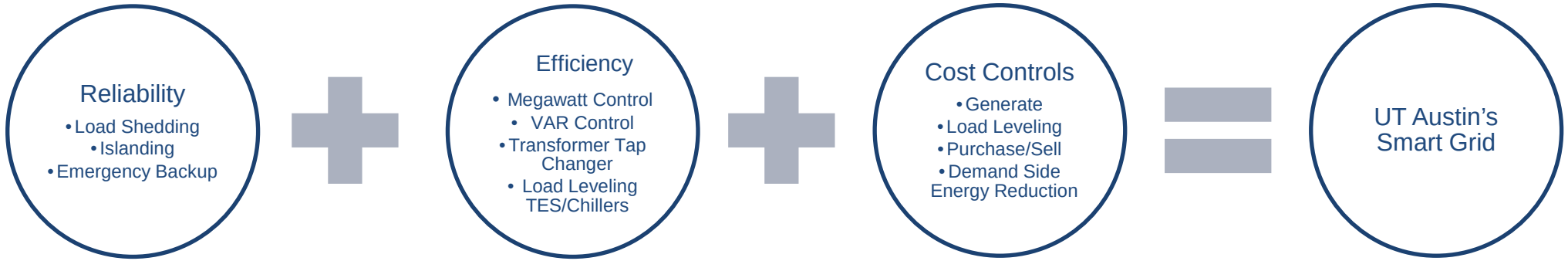

Q&A

Thank You!

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Thank You!