

Managing a very large PI System

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MISO Overview



MARKET AREA



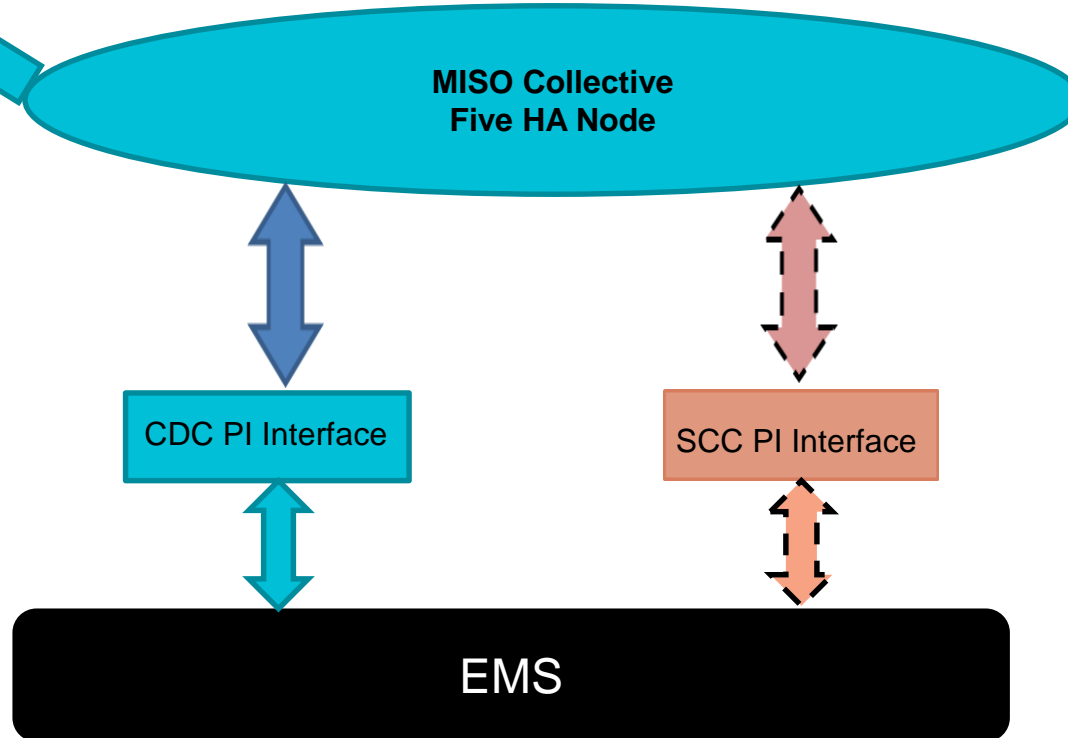
RELIABILITY COORDINATION AREA

- Not-for-profit, member based organization administering wholesale electricity markets.
- Generation Capacity
 - 175,436 MW (Market)
 - 200,906 MW (Reliability)
- Historic Peak Load (set July 20, 2011)
 - 126,337 MW (Market)
 - 132,893 MW (Reliability)
- 65,787 miles of transmission
 - 500kV, 345kV, 230kV, 161kV,
138kV, 120kV, 115kV, 69kV
- 15 states (Reliability)
- One Canadian province

Miso PI System



PI Users



PI System Details



- 700,000 PI Tag System
- 2 GB data (PI Archives) every 13 hours
- *Five HA PI servers*
- *Eight PI Interface Servers – Esca habConnect Interface*
- *Four PI Advanced Computing Engine (PI ACE) Servers*
- *Two PI WebParts Servers*
- *PI Clients – PI ProcessBook, PI DataLink, PI Webparts, PI-OLEDB*

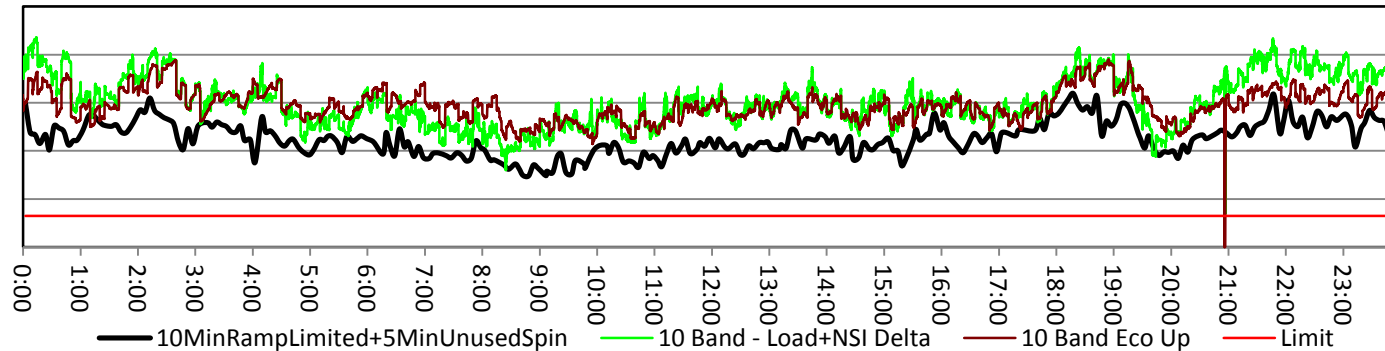
PI Data Usage

Performance Metrics

Process to monitor and improve reliability of the electric system using PI data ensuring the efficient, most economic use of generation and transmission assets.

Some Category -- Control Performance, Spinning Reserve, Regulation Deployment, ...

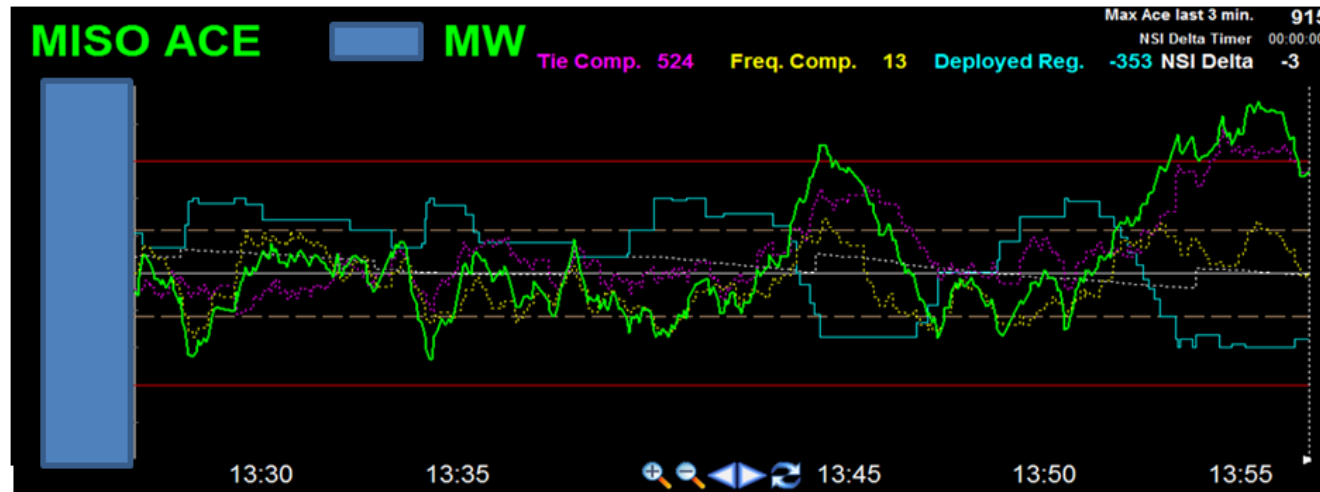
Spinning Reserve



PI Data Usage

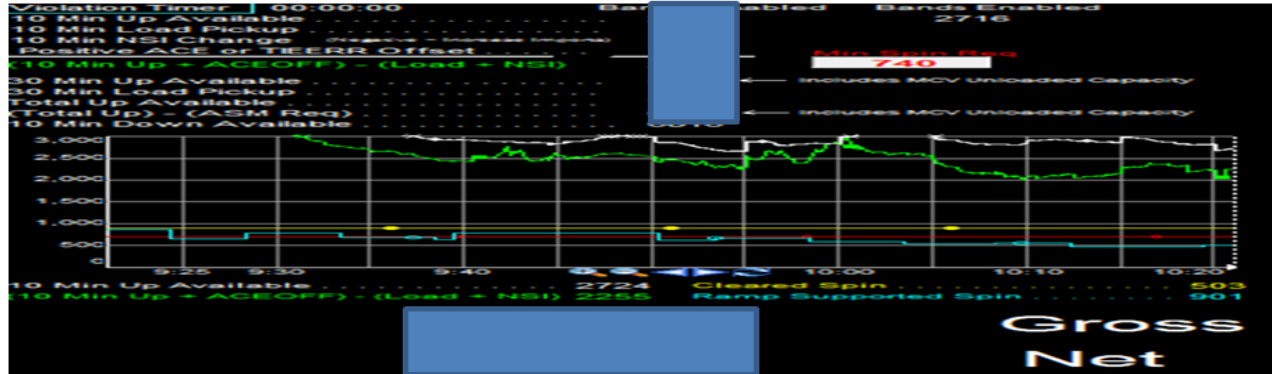
NERC Compliance Data

Using PI data in Real-time and historical analysis to compliance with NERC Standards for
Disturbance Control Standards (DCS) Performance
Control Performance Standard (CPS) Performance
Balancing Authority ACE Limit (BAAL) Performance

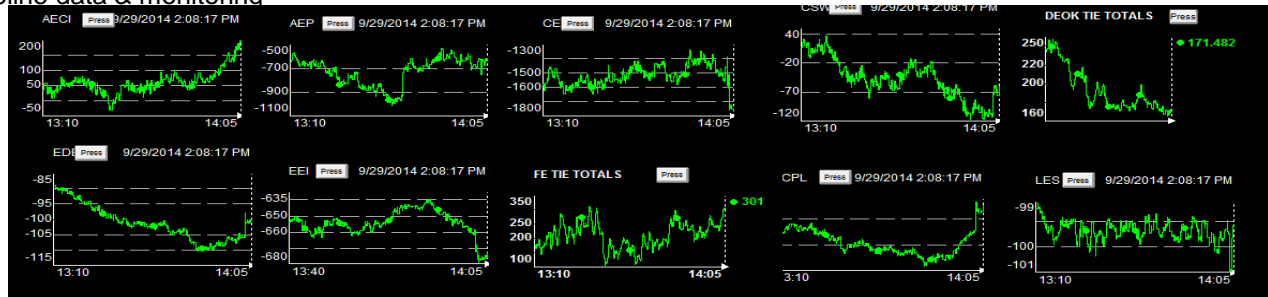


PI Data Usage

Real Time Balancing Authority Generation and Tie Line Monitoring



Tie line data & monitoring

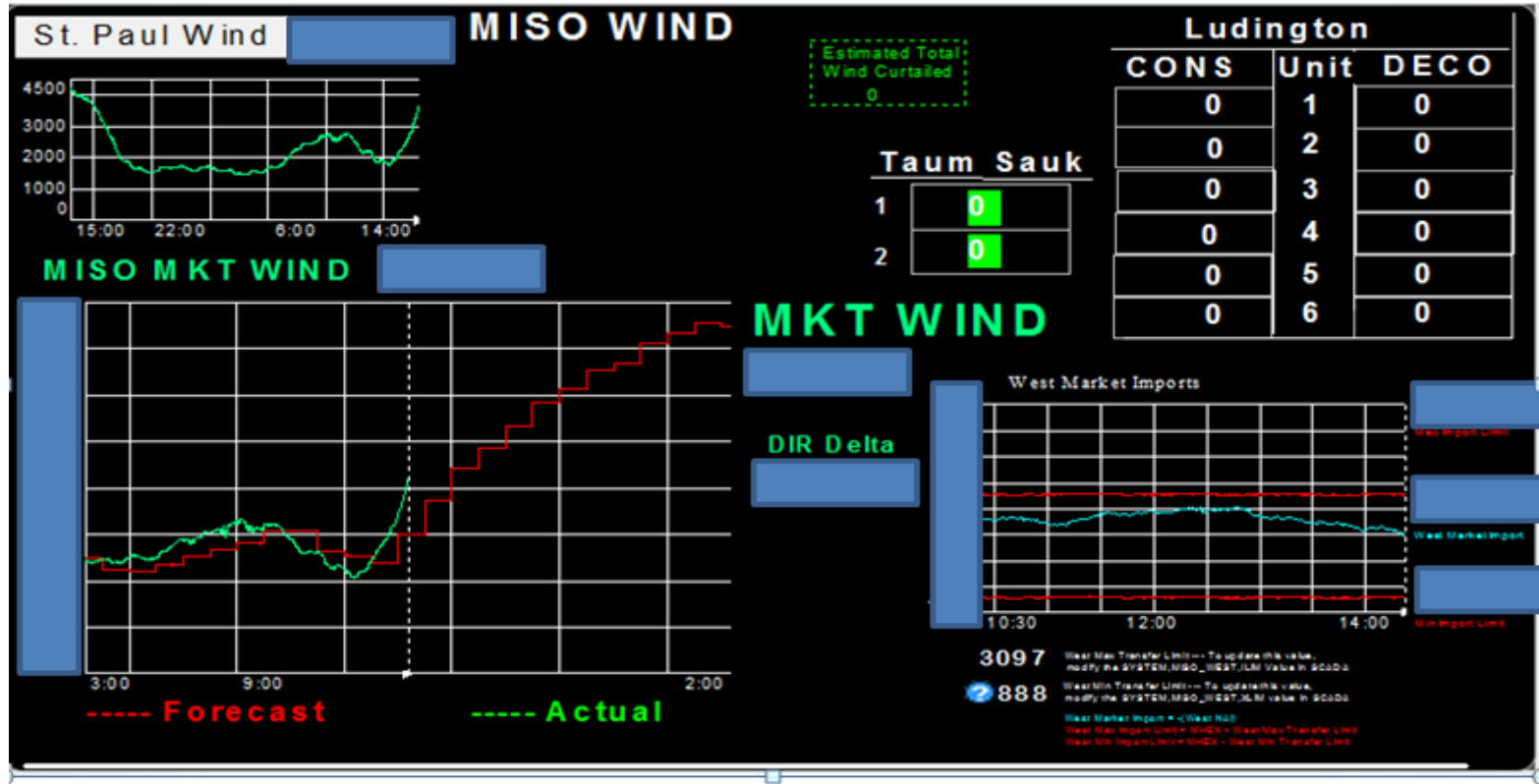


PI Data Usage

EMS Data Trending and Historical Analysis and EMS Oncall Support



PI Data Usage

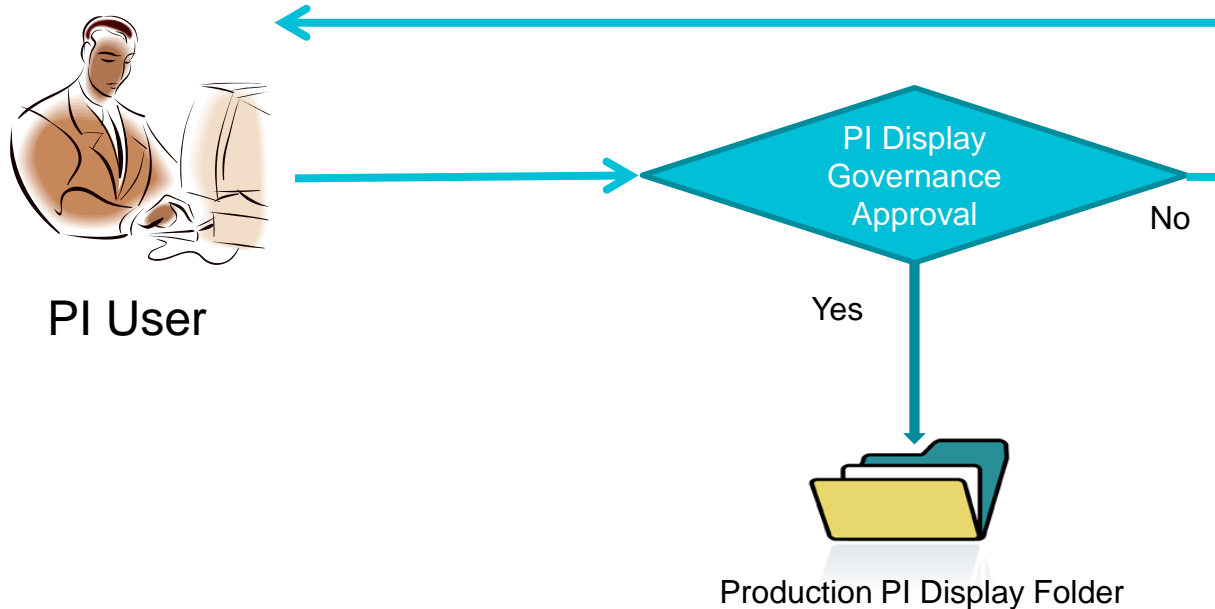


Managing PI System

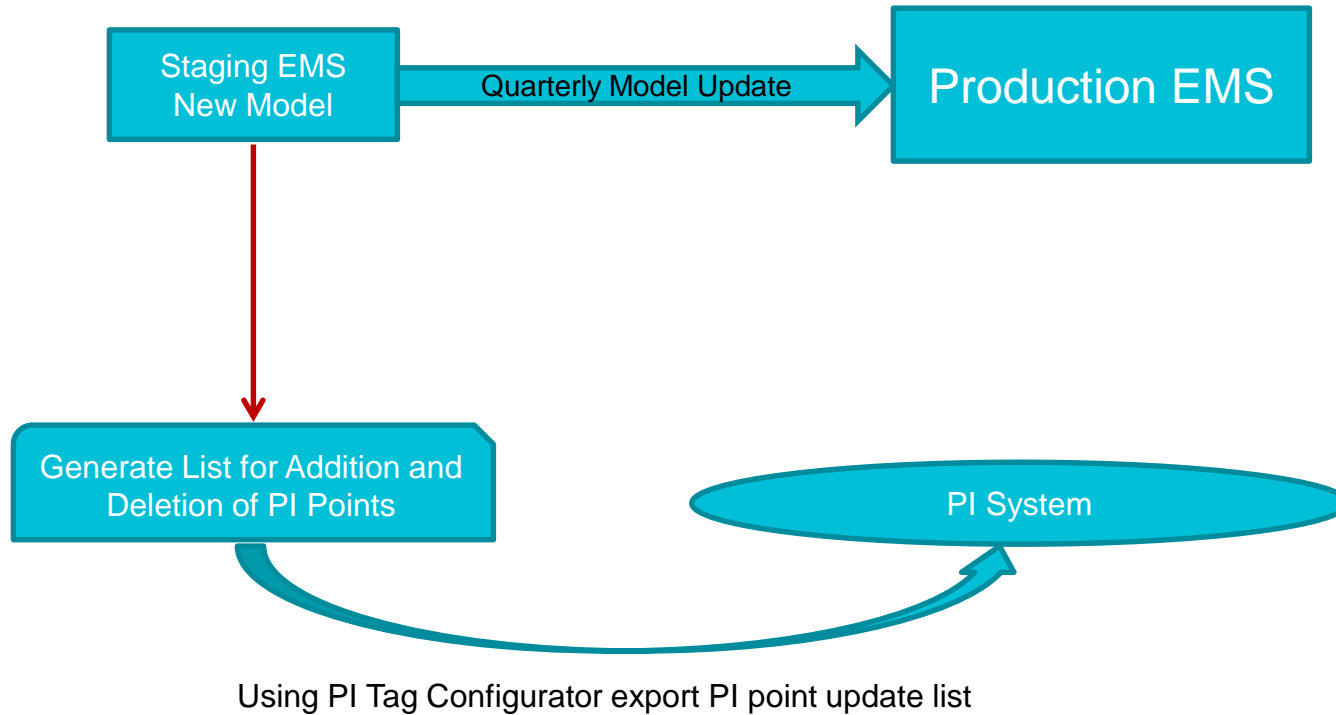


- PI Display Management
- PI Point Update
- Offline Storage of PI Archive Data
- PI Software and Operating System Upgrade
- PI System Failover

PI Display Management

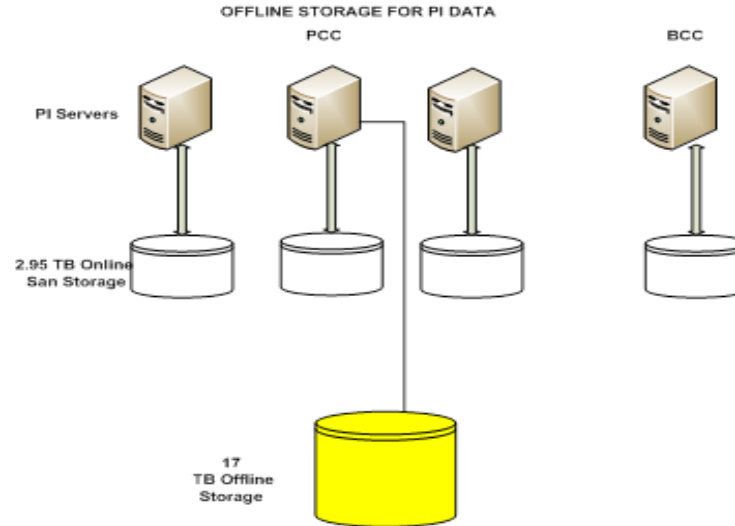


PI Point Update



Offline Storage

Miso implemented off-line storage of PI data by moving out PI data archive files (older than two years) to offline, un-replicated, mid-tier, less expensive storage. The PI system host two years of on-line data for PI users.



PI Software Upgrade



PI System are upgraded every two years.

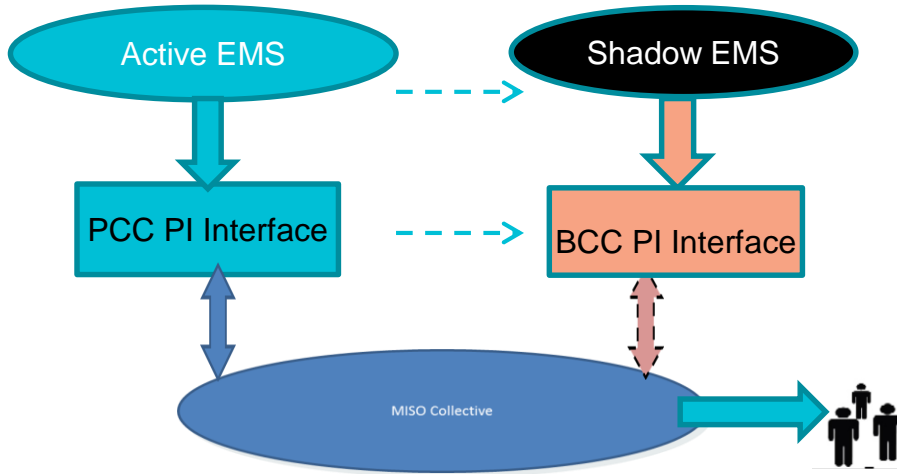
Any Emergency Patch or Update will be implemented

PI servers are patched twice a year

PI user accounts are managed by Active Directory

PI System Failover

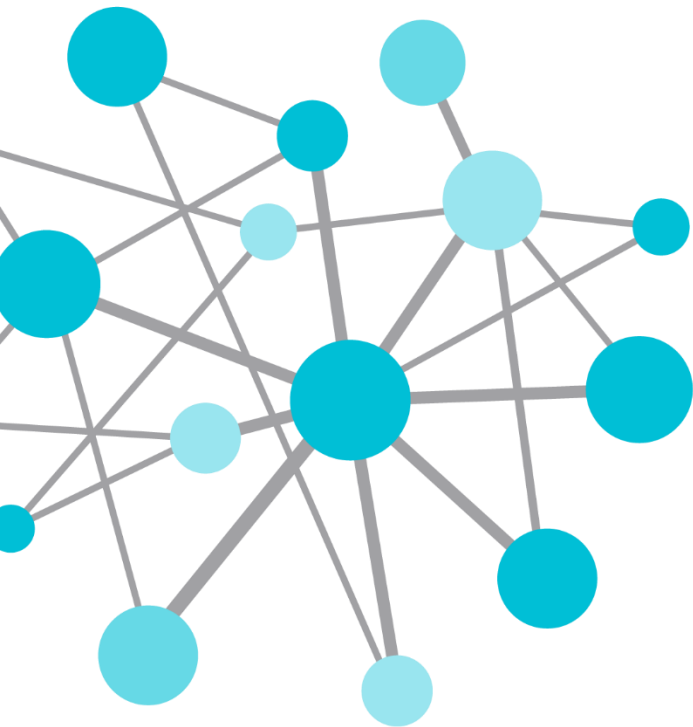
PI interfaces switchover between PCC and BCC sites executed using a script.



Conclusion

PI is important to Real -Time Operations for managing key aspects of grid reliability and integrating market data with EMS data and operator friendly interface.

“While PI up time is better than 99%, our PI Administrators are able to respond and correct issues within minutes and often correct any issues prior to Operations noticing a problem”



Questions ?

Contact Info



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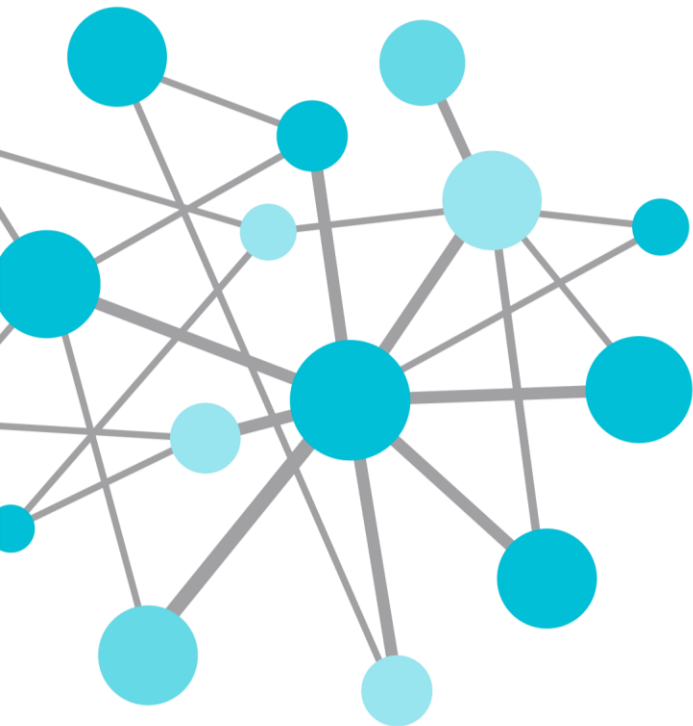
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