

Argonne National Laboratory

B240 Data Center

B240 Data Center

- A 25,000 sq. ft. facility located in building 240 (TCS) known as "the Core"
 - 20,000 sq. ft. of data center
 - 5,000 sq. ft. of M & E space
- Facility is home to the Mira IBM Blue Gene/Q supercomputer as well as many other HPC installations
- Multi-tenant facility
 - LCF: Leadership Computing Facility
 - MCS: Math & Computer Sciences
 - CIS: Computer Information Services
 - CELS: Computing, Environment & Life Sciences
 - Remaining space is used by smaller organizations or managed by one of the above groups



Overview

- Building 240 is a leased facility; currently operated by Kennedy Wilson Properties
- Building management has contracted facility engineering from an outside company (ABLE Engineering) which monitors the facility infrastructure and notifies datacenter personnel of issues and concerns
- Building management contracts with multiple service providers for maintenance and service of facility infrastructure
- Johnson Control's Metasys BMS is used for command and control of Facility infrastructure
- A Read-Only mirror of the BMS is in process to give Argonne personnel access to the operational data
- Read-only access to the 3 UPS systems is in progress and will be integrated into LCF operations and other monitoring
- Another system for electrical branch circuit monitoring is also in process to integrate that data
- Eventually all data will be integrated into a DCIM tool for monitoring, alarming and reporting





Data Center Infrastructure Management

- ServerTech Sentry Power Manager provides power, temperature, humidity alarms and display for some of the room cabinets
- LCF monitors service processors in each of the BG/Q machines for monitoring of critical environmental data pertaining to MIRA
- Integration of the multiple monitoring platforms in use in B240 is currently planned
- Some of these tools do not provide the necessary protocols needed for direct integration into the tool. Other methods are being investigated



Cooling

- There are two separate cooling loops in the data center
- The primary loop feeds the air handlers providing cooling the entire space
 - The room cooling elements provide forced air into a 47 inch deep under floor plenum
 - The warmed air is returned through a ceiling plenum to the air handling units for cooling
 - (8) York air handling units
 - (2) 630 ton York chillers
 - (2) York cooling towers



Cooling Continued

Secondary cooling loop

- MIRA has a second chilled water loop that delivers 42 deg. F. water to the heat exchangers. 64 deg. F chilled water is delivered to the internal processing units.
- The chiller plant is located in a separate building near the data center. This building is maintained by Argonne Facilities Management Services
 - (3) 1300 ton York chillers
 - (2) York cooling towers
 - (2) redundant heat exchangers
 - (3) redundant AHU pumps
- The chiller plant is capable of generating much more chilled water than MIRA needs. The additional water is added to the campus chilled water loop
- The internal and external chilled water loops are separated by redundant heat exchangers and necessary support equipment
 - This was done because it was found that silica was leaching from the concrete lined pipes used to bring the chilled water from the plant to the data center



Electrical

- Two (mostly) redundant 20MW feeds, with two additional 30MW feeds in process
 - (11) Eaton IQ250 meters and Digitrip 1150 meters measure datacenter power
 - (3) 750kVA Chloride UPS units
 - (18) CYBEREX PDUs
 - (6) 480v;3phase; direct circuit panels



Electrical cont.

- MIRA
 - (12) 480v;3phase; direct circuit panels feed the BG/Q machines
 - (4) 480v; 3 phase; 60 A circuits per machine
 - (7) I/O racks each with (2) 480v; 3 phase; 60A circuits
 - MIRA Storage power is fed from the CYBEREX PDUs





Discussion

Questions & Answers

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