

Fermilab's Enterprise Quality Grid Computing Center



Energy Conservation Measures

- ✓ Separate hot, cold aisles
- ✓ Cold aisle air containment
- ✓ Blanking and threshold panels on racks
- ✓ Elevated cold aisle temperatures
- ✓ Overhead cabling
- ✓ Cold air supply under raised floors with air conditioners ducted to hot air layer near ceiling
- ✓ Air conditioning mated to temperature sensor in front of computer racks
- ✓ UPS units with greater than 90 percent efficiency

Temperature Monitoring

- 24/7 web-based temperature monitoring.
- Thermocouple sensors provide readings.



White temperature probe positioned on a rack (thermocouple)



Webserver box with thermocouple connections

Enabling Scientific Research

The GCC distributes and stores experiment data that's accessible by collaborators worldwide, providing computing support for:

- **Compact Muon Solenoid (CMS)** experiment, running analysis jobs (typically 120-200k jobs/week), collecting 4-5 petabytes of data per year (CMS has a 200GB per second network allocation) and filling one tape robot every 2 years.
- **Lattice Quantum Chromodynamics (LQCD)** experiment, including high performance computing (Lattice Gauge calculations).
- **CDF and Dzero**, Run II experiments that utilize GCC resources for reconstruction and analysis (turning raw data into physics objects). Support continues for Monte-Carlo production and analyses.
- **Dark Energy experiments**, including massive surveys, simulations and high precision models.
- Accelerator modeling



Enstore tape library



Energy-efficient overhead cabling



Paul Mackenzie next to the Lattice QCD farm

Former Wide Band Lab (1997)

GCC conversion (2004)

