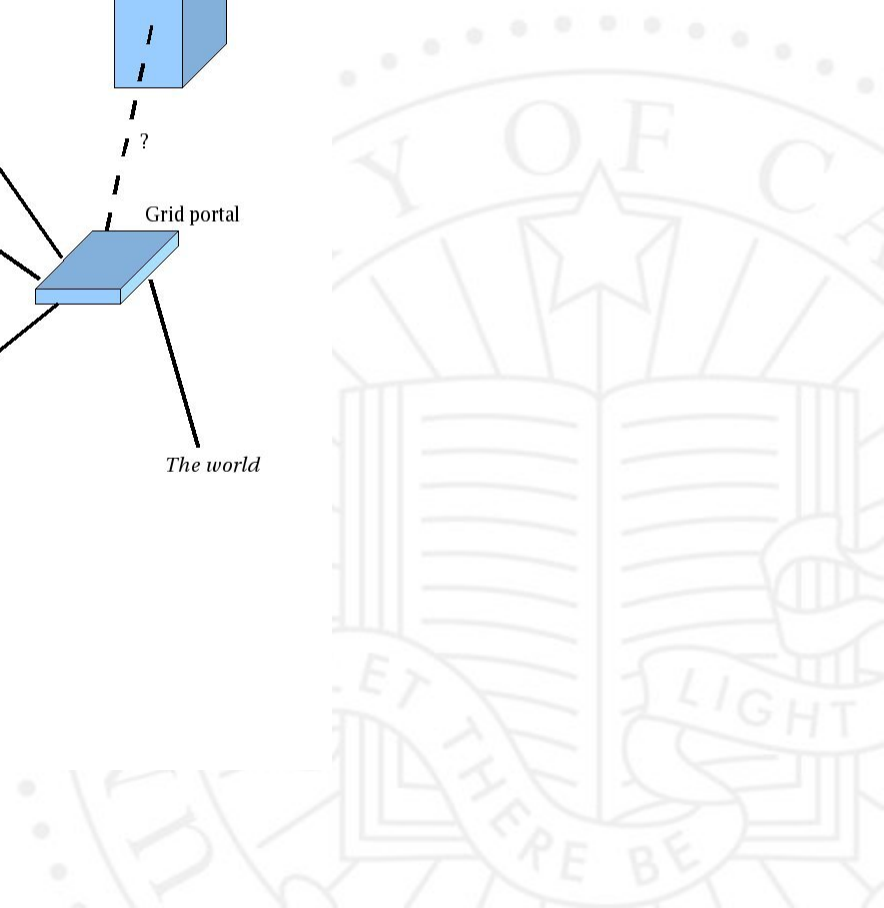
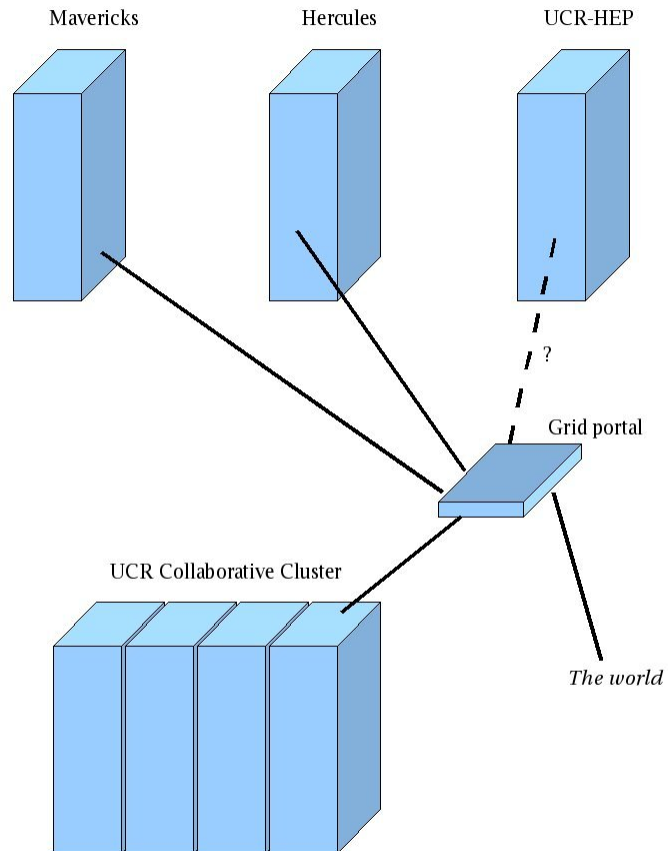


# Grid and HPC Computing at UCR

Bill Strossman



# UCR Grid



# Overview

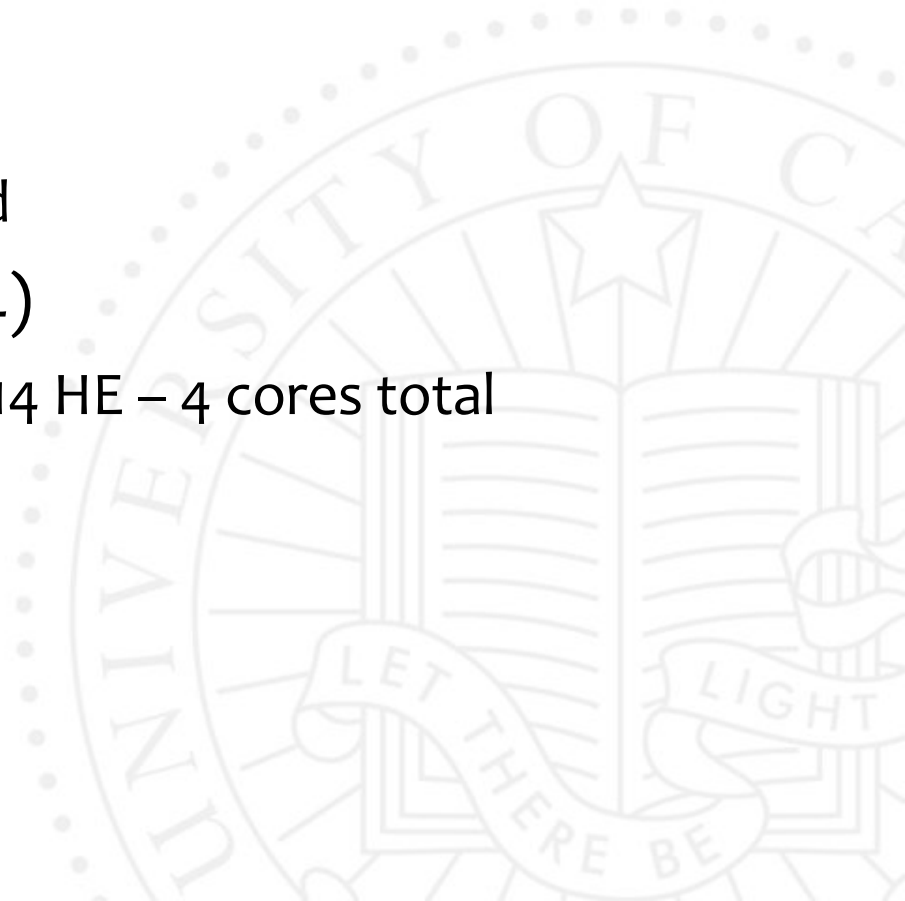
- Three cluster models
  - Collaborative cluster
    - Built to campus standards
    - Centrally located and managed by C & C staff
  - Dedicated clusters
    - Built to campus standards
    - Funded entirely by PIs, managed by C & C staff
  - Departmental clusters
    - Built to PI specifications
    - Managed by PI funded staff

# UCR Collaborative Cluster

- Owner: Computing and Communications
- Hardware
  - Master node
    - (2) AMD Opteron 2214 HE – 4 cores total
    - 8 GB RAM
    - (2) 80 GB drives, (4) 750 GB drives
    - (4) 1 Gb/s ethernet
  - Networking
    - HP Procurve S412Zl 10 Gb / 1 Gb switch
    - Silverstorm 9120 Infiniband switch

# UCR Collaborative Cluster

- Compute nodes (64)
  - (2) AMD Opteron 2214 HE – 4 cores total
  - 8 GB RAM
  - (1) 80 GB drive
  - (4) 1 Gb/s ethernet
  - (1) 20 Gb/s infiniband
- Application nodes (4)
  - (2) AMD Opteron 2214 HE – 4 cores total
  - 8 GB RAM
  - (2) 750 GB drives
  - (2) 1 Gb/s ethernet

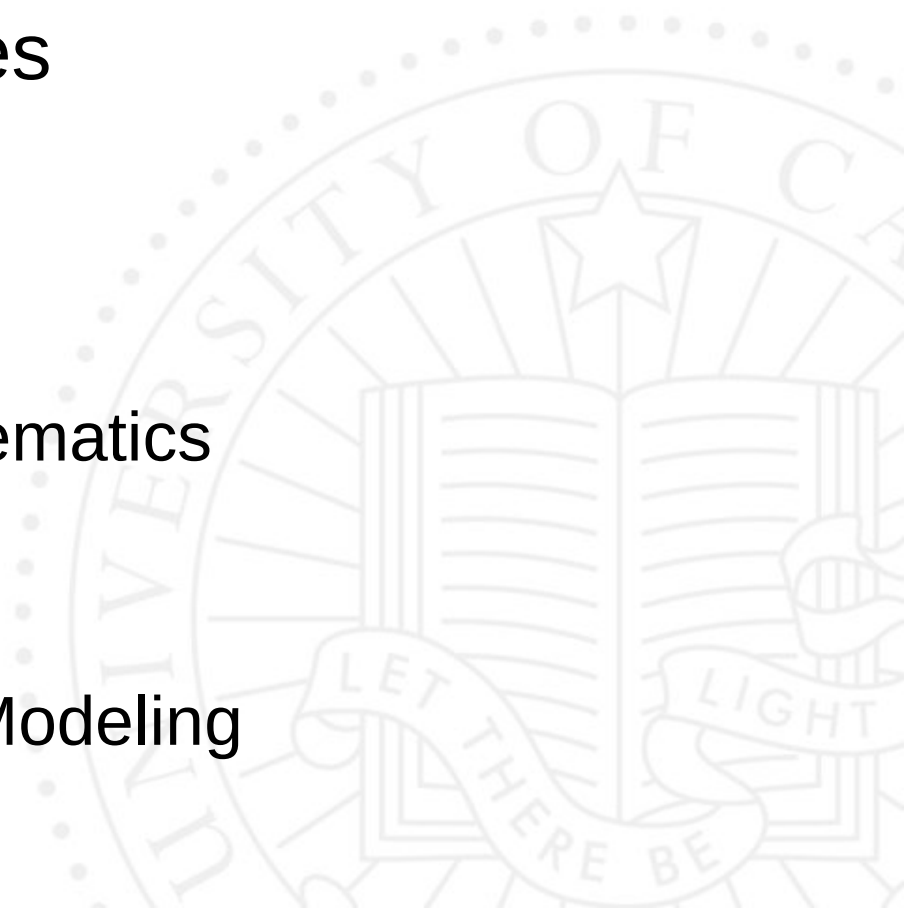


# UCR Collaborative Cluster

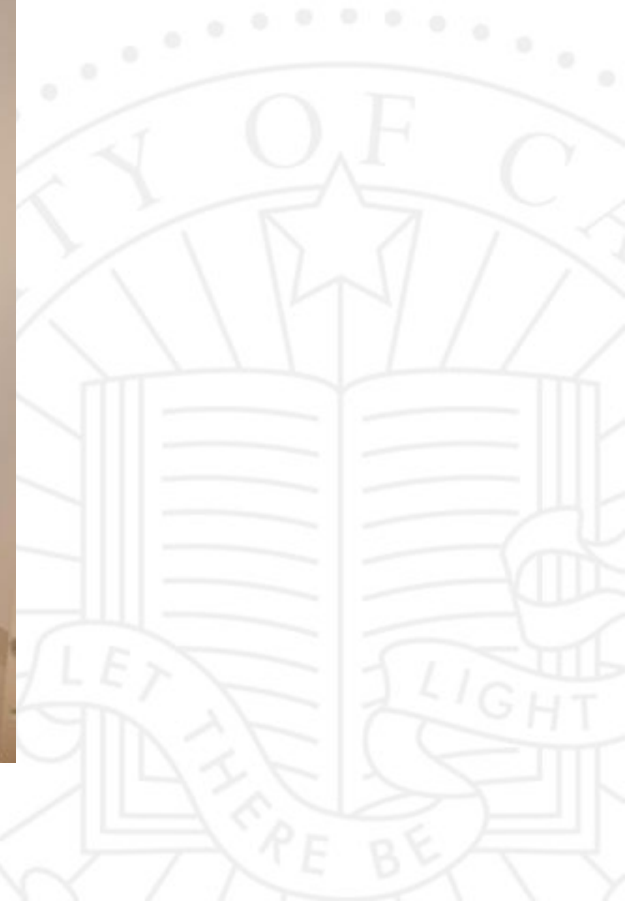
- Storage nodes
  - (2) Sun X4500, (48) 1 TB drives – 32 TB
  - 10 Gb/s ethernet
- Intended for researchers with higher end computational needs but limited funds.
- Occasional users – have access to 40 nodes to run the occasional short job.
- Regular users – have access to 24 nodes and any additional nodes they contribute to the cluster. They also are allocated more time than occasional users.

# UCR Collaborative Cluster

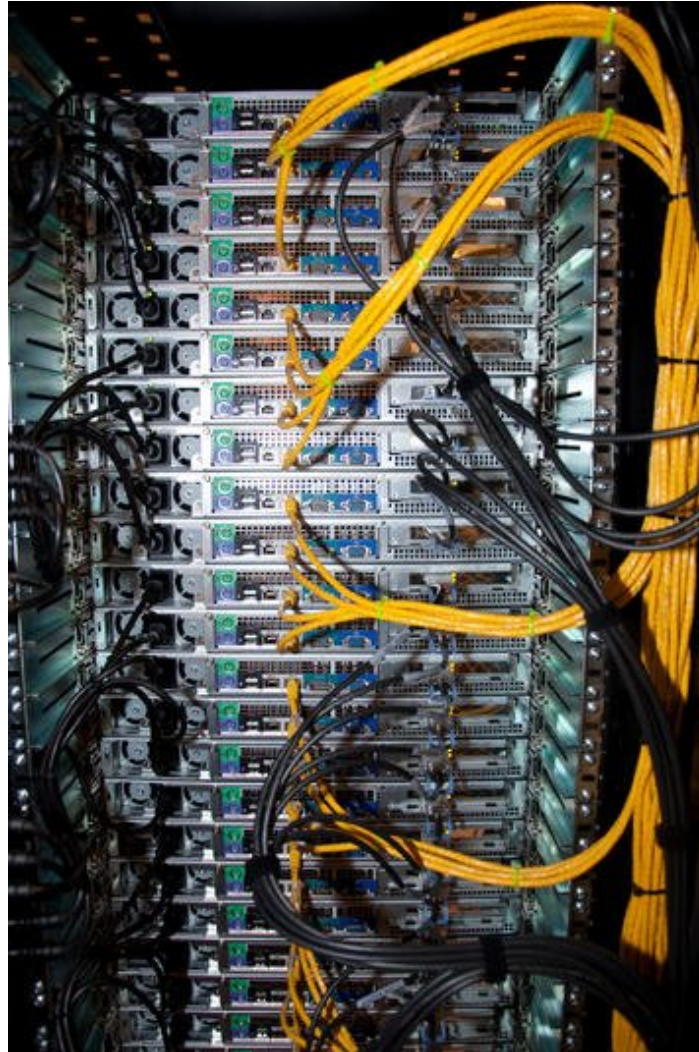
- UC Grid status
  - On UC Grid
  - Adapting applications for use with grid portal
- Software categories
  - Development
  - Database
  - Chemistry
  - Science and Mathematics
  - Statistics
  - Social Sciences
  - Visualization and Modeling



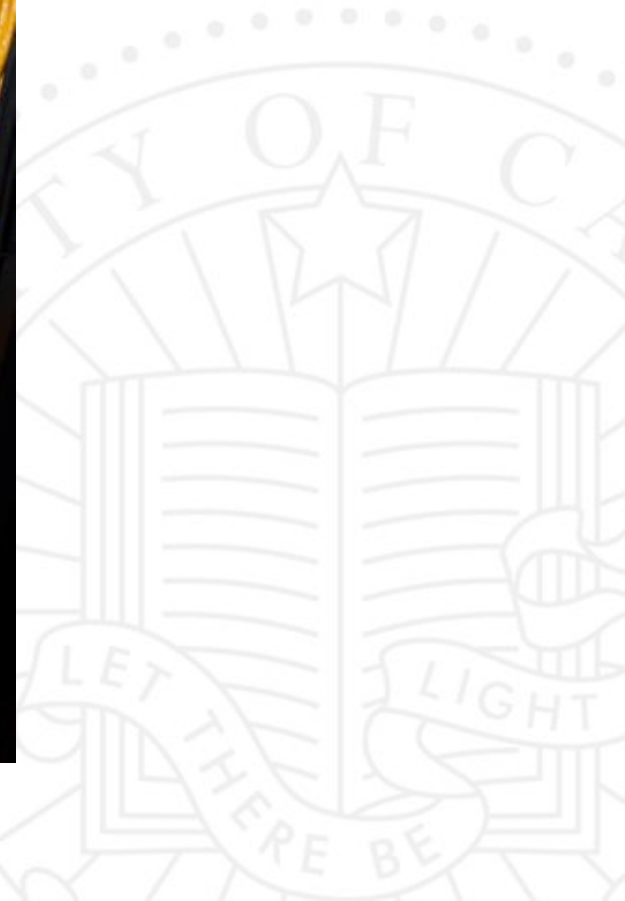
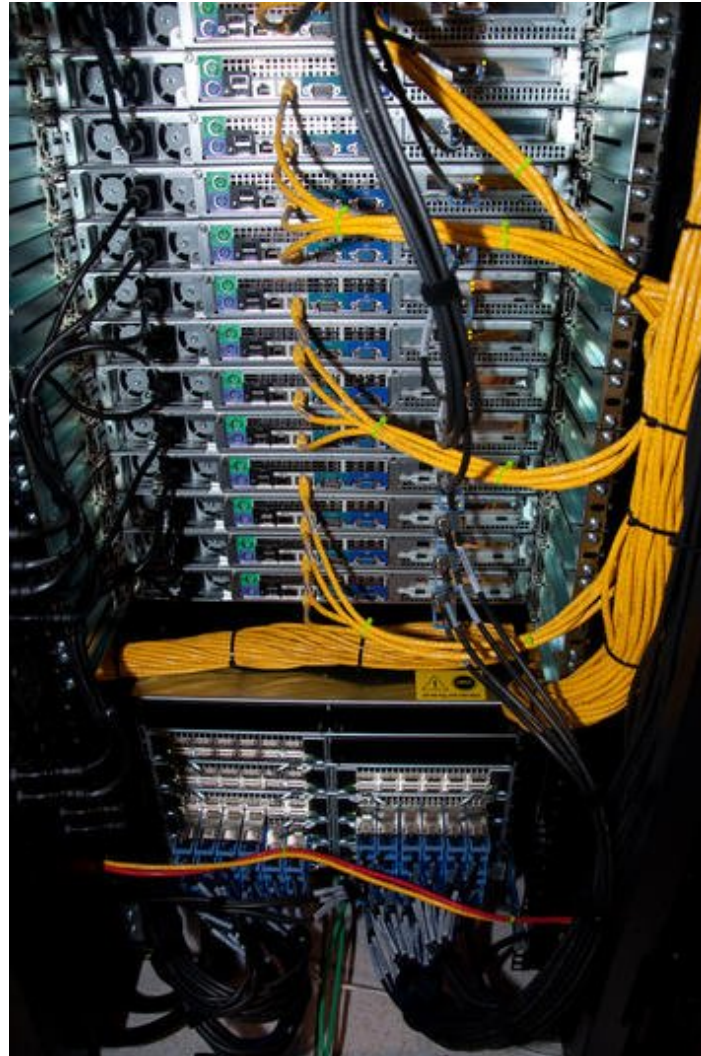
# UCR Collaborative Cluster



# UCR Collaborative Cluster



# UCR Collaborative Cluster



# Mavericks Cluster

- Owner: Gregory Beran (Chemistry)
- Model: Dedicated cluster
- Hardware
  - Master node
    - (1) Intel Xeon E5410 – 4 cores total
    - 8 GB RAM
    - (2) 80 GB drives, (4) 750 GB drives
    - (2) 1 Gb/s ethernet
  - Compute nodes (14)
    - (2) Intel Xeon E5420 – 8 cores total
    - 16 GB RAM
    - (3) 750 GB drives
    - (2) 1 Gb/s ethernet

# Mavericks Cluster

- Hardware - continued
  - Networking
    - 1 Gbit switch
  - Specialized software
    - Q-Chem
    - Gaussian
  - UC Grid status
    - Needs grid appliance

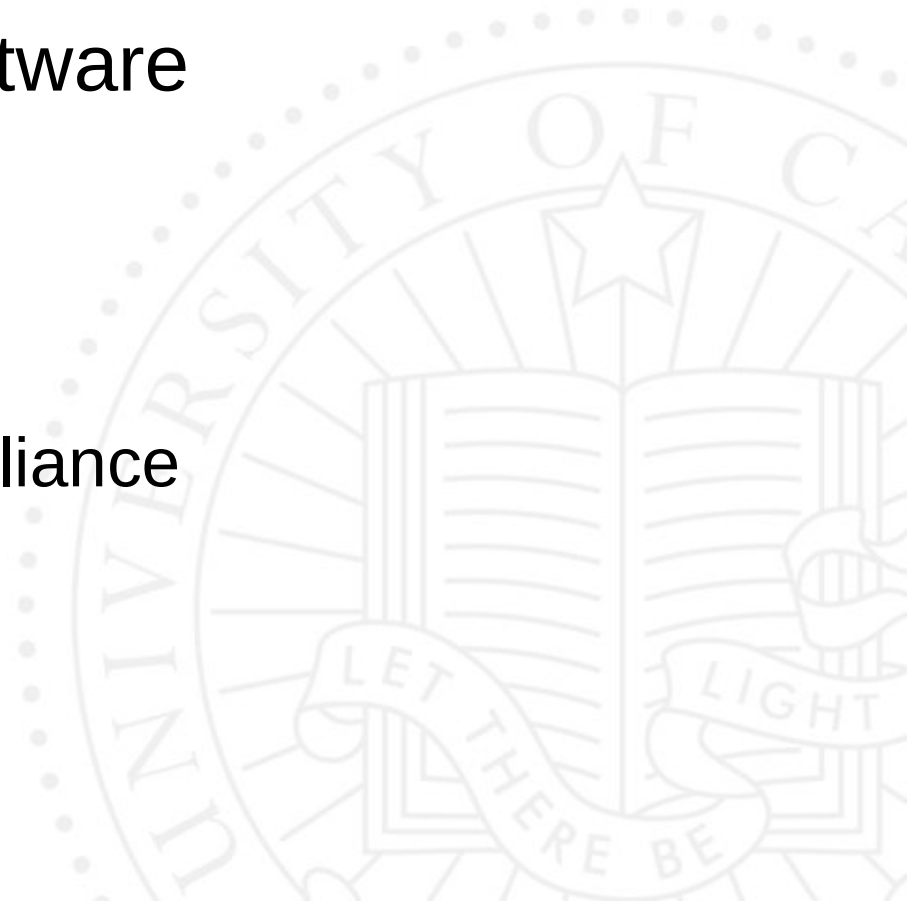


# Hercules Cluster

- Owner: Dmitri Morikis (Bioengineering)
- Model: Dedicated cluster
- Hardware
  - Master node
    - (2) AMD Opteron 2216 – 4 cores total
    - 8 GB RAM
    - (2) 250 GB drives, (3) 1 TB drives
    - (4) 1 Gb/s ethernet
  - Compute nodes (10)
    - (2) AMD Opteron 2216 – 4 cores total
    - 8 GB RAM
    - (1) 80 GB drive
    - (2) 1 Gb/s ethernet
    - (1) 20 Gb/s infiniband

# Hercules Cluster

- Hardware - continued
  - Networking
    - 1 Gb/s ethernet switch
    - 20 Gb/s infiniband switch
- Specialized software
  - NAMD
  - CHARMM
- UC Grid status
  - Needs grid appliance



# UCR-HEP Cluster

- Owner: High Energy Physics
- Model: Departmental cluster
- Hardware
  - Master node
    - (2) AMD Opteron 275 – 4 cores total
    - 4 GB RAM
    - (2) 250 GB drives
    - (3) 1 Gb/s ethernet
  - Compute nodes (10)
    - (2) AMD Opteron – 4 cores total
    - 8 GB RAM
    - (2) 250 GB drives
    - (2) 1 Gb/s ethernet

# UCR-HEP Cluster

- Hardware - continued
  - Storage nodes (4)
    - (2) AMD Opteron 250 – 2 cores total
    - 4 GB RAM
    - (1) 250 GB drive
    - (2) 1 Gb/s ethernet
    - (1) Fibre channel HBA
    - (1) Externally attached (FC) 7 TB array (Apple Xserve RAID)
  - Grid Status
    - Fully functional on Open Science Grid
    - Integrate with UC Grid????

# Future Directions

- Add existing campus clusters to UC Grid
- Double number of compute nodes on UCR Collaborative Cluster
- Established Faculty Research Technology group to guide direction of shared resources

