



Office of the Vice President for Research
Texas A&M University

Enhancement of Computational Sciences and Engineering

Richard E. Ewing
Vice President for Research
Texas A&M University

High Performance Computing Day
May 2, 2007



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Imperatives

- Vision 2020
 - Texas A&M University strives to be recognized as one of the ten best public universities in the nation by the year 2020; this requires cyberinfrastructure support
- National Dialogue:
 - Impact of Information Technology on the Future of the Comprehensive Research University



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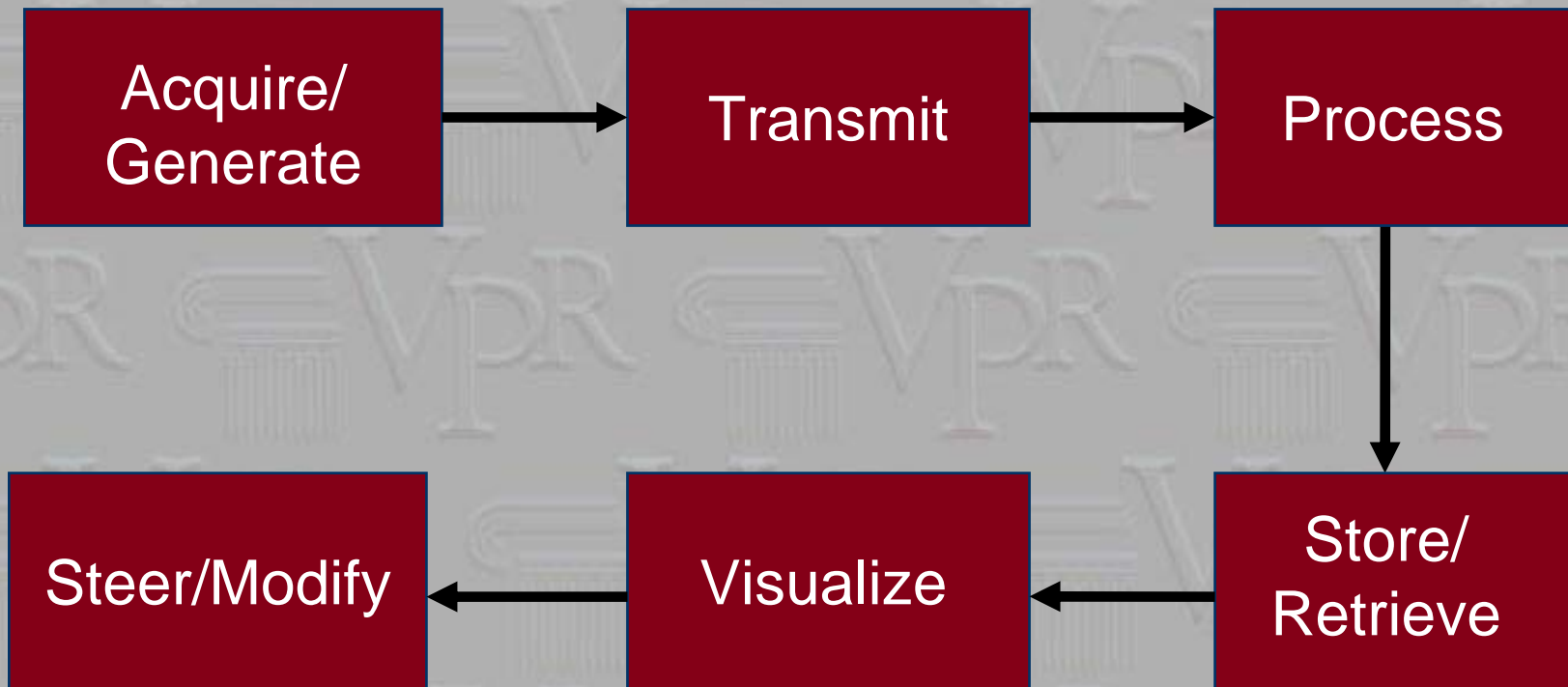
Hardware Infrastructure

- Data Acquisition Equipment
- Networks and Routing: LEARN and Texas GENI
- High Performance Computing
- Mass Storage Silos
- Immersive Visualization



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Development of New Knowledge from Information





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DATA PROCESSING

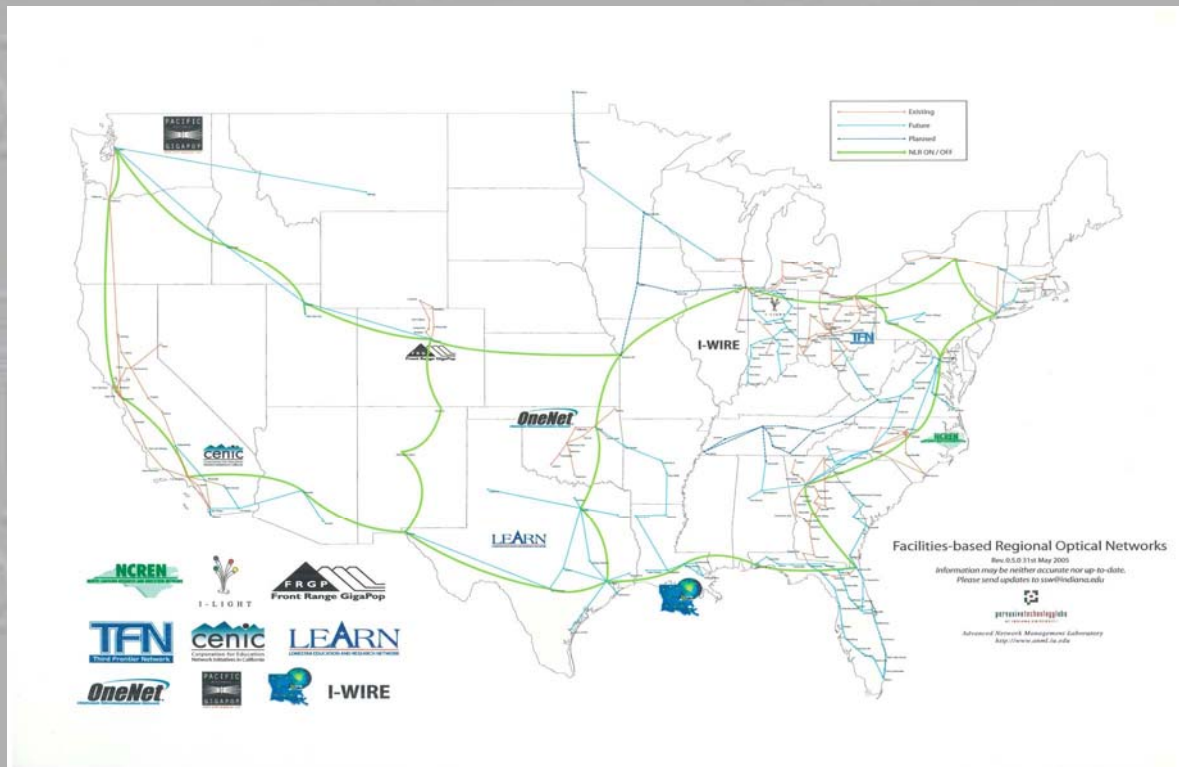
The image illustrates the data processing workflow for seismic data. It is divided into several key components:

- Server Infrastructure:** A photograph of a server room with rows of black server racks, representing the hardware used for data storage and processing.
- Workstation:** A computer workstation with multiple monitors displaying various 3D geological and seismic models, representing the software and user interface used for data analysis.
- RAW DATA:** A seismic data plot showing multiple traces of seismic waves, representing the initial, unprocessed data.
- 3D ANSWER:** A 3D velocity field model showing a complex geological structure with a yellow and orange color gradient, representing the final processed and interpreted data.



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Facilities-based Regional Optical Networks

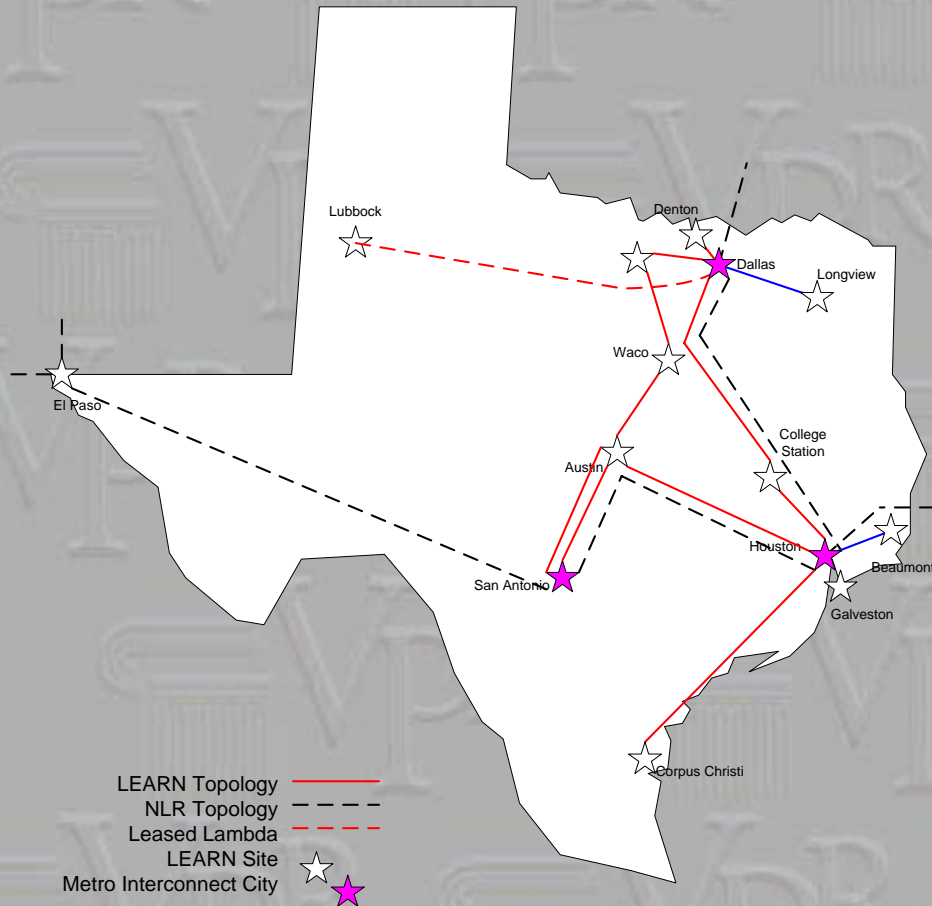




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LEARN Topology

LEARN Topology for State





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Hydra and x86 Clusters

Capability/Capacity Computing





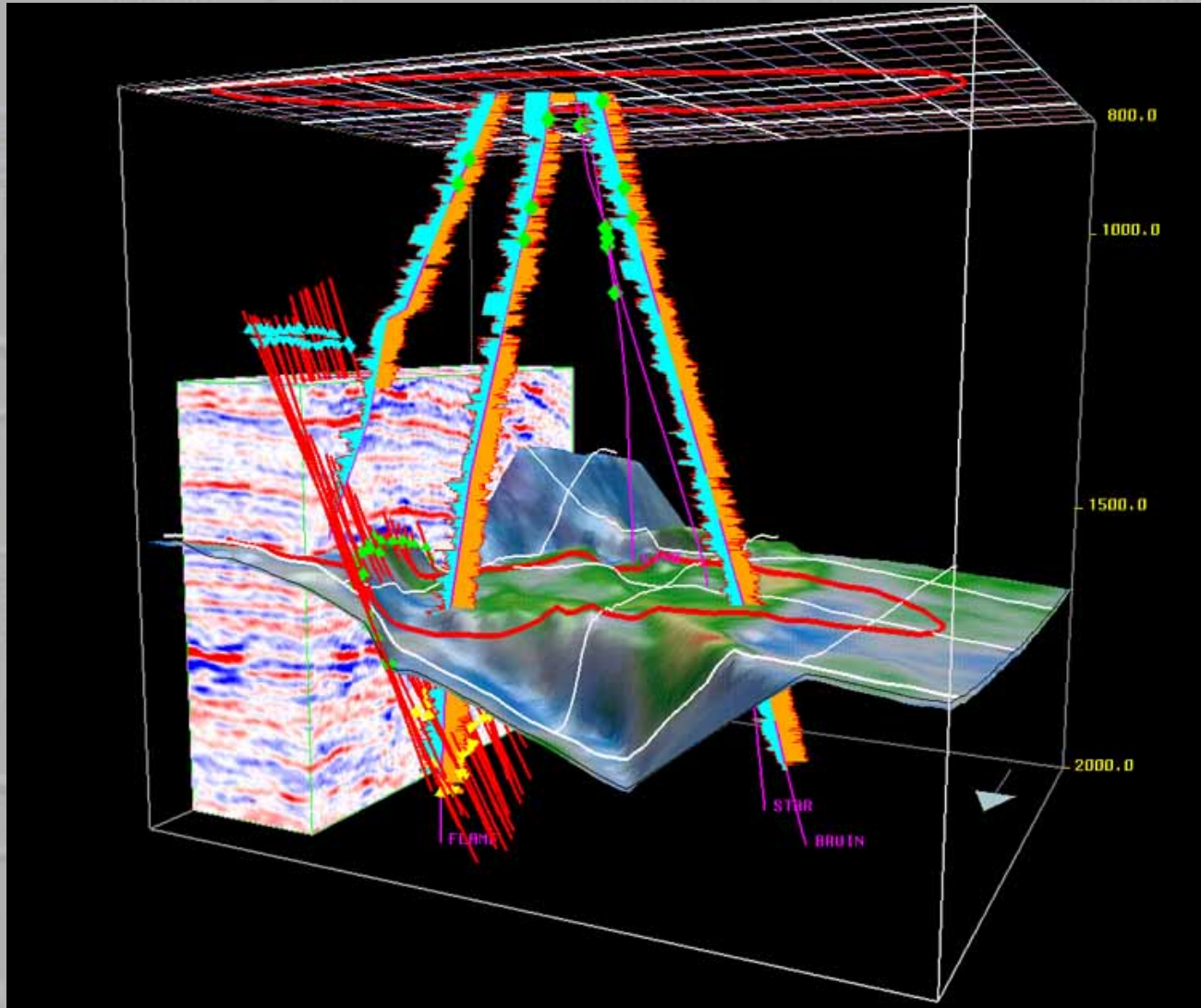
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Storage





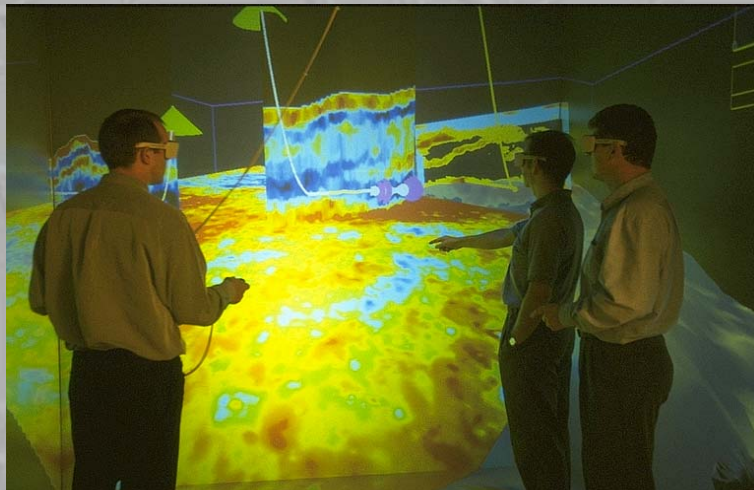
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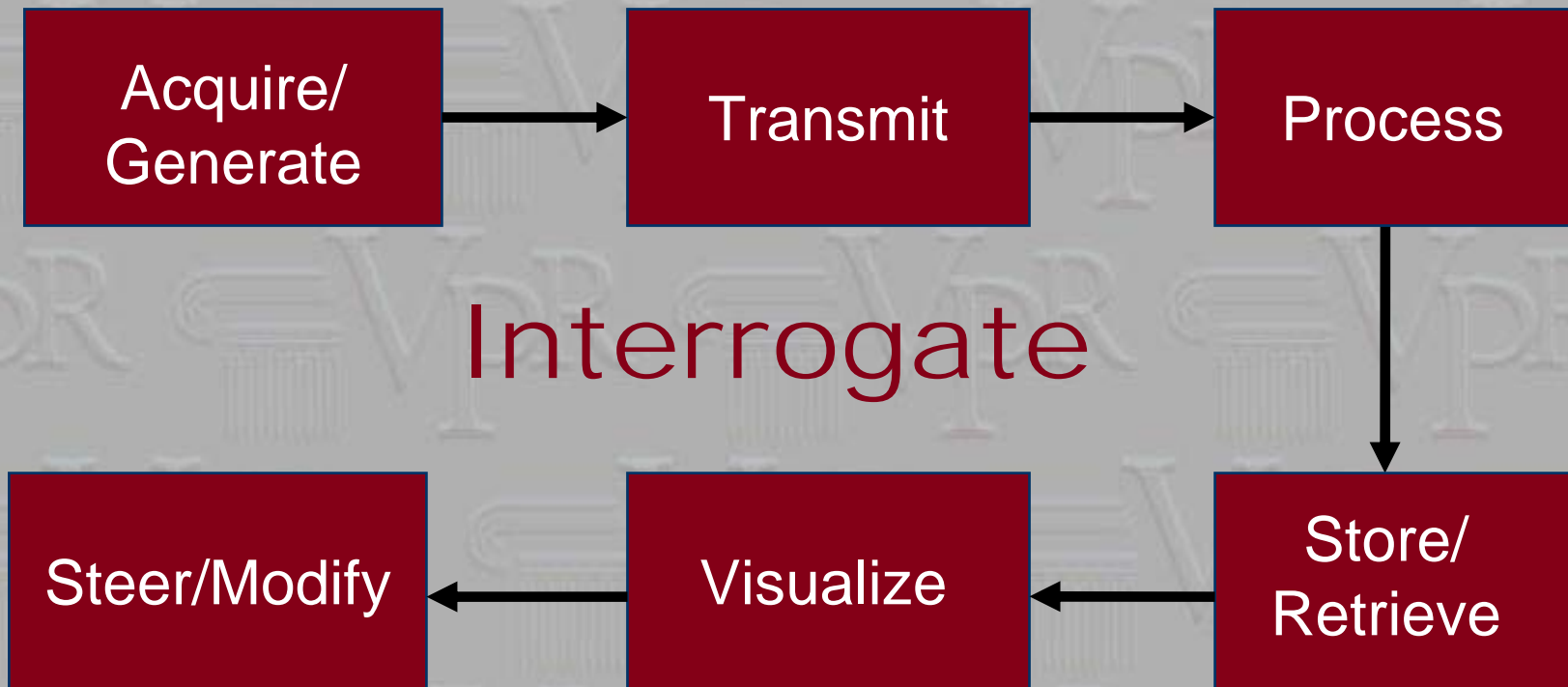
Visualization







Development of New Knowledge from Information

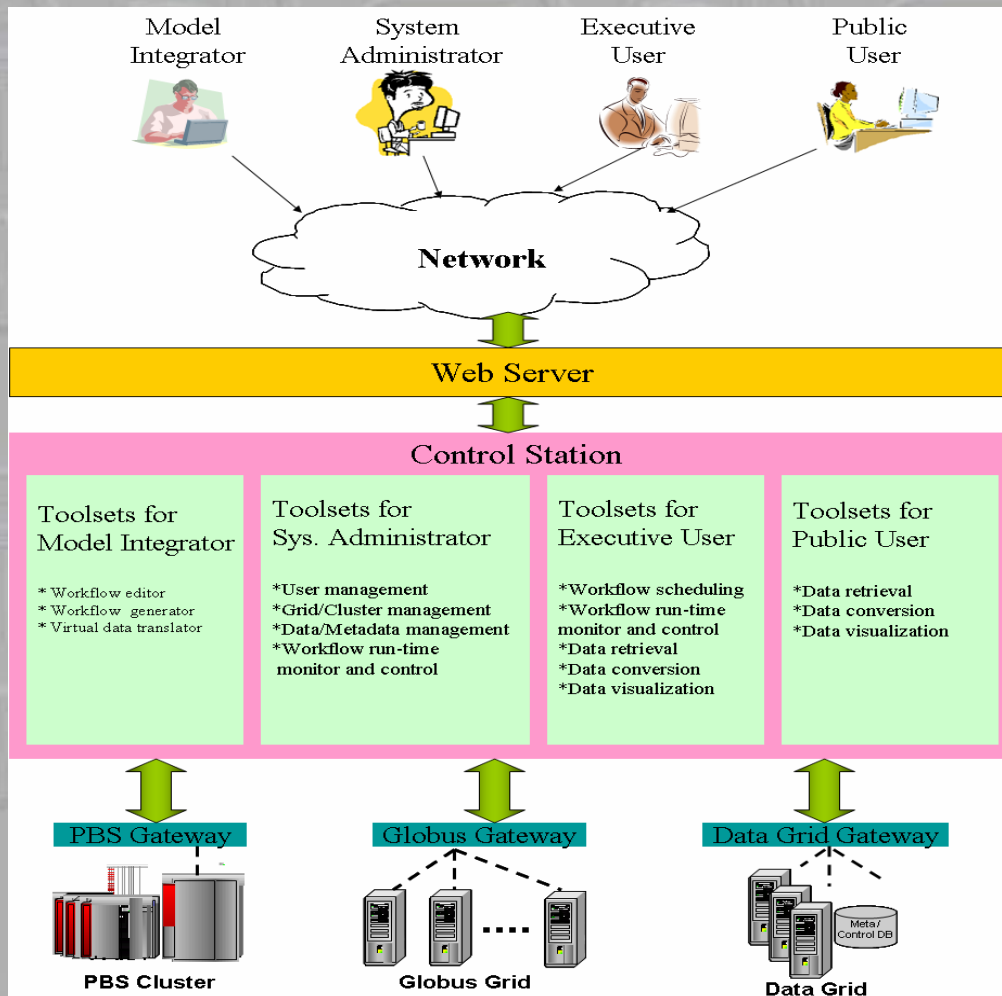




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Vision of Advanced Data Center

An Integrated Platform for Scientific Computing Data Center Management





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Enables Basic and Translational Research

- Biotech, Functional Genomics, Proteomics
- Global Climate/Ocean Modeling
- Petroleum Exploration and Production
- Materials Sciences – Nanotechnologies
- Aerospace and Astrophysics Applications
- Health and Environmental Applications
- Distributed Real-Time Design
- Information Science



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Information Science Research

- Digital Library Research
- Data Fusion/Metadata
- Data Interrogation
- Data Security
- Multimedia
- Informatics



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Computational Sciences and Engineering Taskforce

- Interdisciplinary Task Force
 - Assess needs and directions for scientific computing
 - Hardware, Software, and User Support
 - Identify potential start-up clusters
 - Evaluate matching grant proposals
 - Assist in developing large cyberinfrastructure proposals
 - Evaluate internal research proposals – seed money
 - Advocate HPC growth and community support
- Administration funds to support user needs



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