

ITGC High Performance Research Computing Recommendations

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ITGC Focus Areas - High-Performance Research Computing

Charge:

Engage principal investigators, institute directors, and research computing experts in the development of strategies to leverage UC's investment in and deployment of high performance computing services to the broadest possible user base throughout UC.

UC Research Computing Group

- **Co-Chairs:** Jim Davis, UCLA; Chuck Rowley, UCR
- **Consultant:** David Walker, UCOP
- **Steering Group Members:**
 - Henry Brady, UCB
 - John Rundle, UCD
 - Frank Wessel, UCI
 - Michael Witherell, UCSB
 - Peter Yellowlees, UCD
- **ITLC UC Research Computing Group** (all campuses, labs, SDSC)

Premise 1

- UC should play a leadership role in helping to solve state/national/global problems challenging society.

These include: energy development, use and management; homeland security; environmental impact and management; infectious disease management; food and water supply; health management and earthquake preparedness.

Premise 2

- The California / US value share in a global market will hinge on vision and application of "knowledge" and "information" that can be applied in highly targeted and use-specific ways.

For example, product design, just-in-time product production, assembly and/or delivery, highly refined social and economic analyses, just-in-time community /demographic analysis, substantially shortened product life cycles and data and information integration on macro scales.

Premise 3

- The California / US mind share and intellectual property impact of knowledge and information for use at macro system levels will stem from understandings and technologies at micro levels

i.e. the cell, the molecule or the individual. There will be great escalation in the amounts of data and information used in research and development.

Premise 4

- A transition to global supply chains and smart manufacturing sites will require more effective decision support, more expansive use of automation, data and data interpretation, and a new generation workforce that is trained and oriented toward a knowledge and information economy.

Simulation, modeling, optimization, design, ubiquitous sensing, data aggregation and interpretation, and large-scale / wide area data management, visualization and analysis are critical tools.

IT Guidance Committee

High Performance Research Computing Work Group Recommendations

UC Grid

- Create UC Grid as an operational infrastructure to enable the discovery and sharing of computing resources within UC.
 - Initial 3 campus pilot
 - Participation from all campuses/labs
 - Identify existing / new resources appropriate for broad sharing

Strategies for High Performance Research Computing Resource Sharing

- Develop **incentives** to encourage resource sharing
- **Create new resources** specifically for sharing (e.g., computing clusters, storage, software licenses)
- Develop short / long term **data center space plans** to accommodate co-location of shared assets and free up valuable campus space resources
- Develop **new shared HPRC service models** (with system administration and end user support)
- Address **"high end" requirements of research faculty** needing significant flexible, on demand HPC resources

Research Data Storage

- Identify a **framework for data storage** within the UC Grid architecture to guide UC's collective stewardship of research data
- Develop **“packaged” offerings** (including facilities and system administration) to the UC research community: high availability storage, back-up and retrieval, access controls
- Develop **interoperability standards** among data storage services and with UC Grid resources.
- Collaborate with Digital Stewardship work group and CDL's **digital preservation** group.

IT Infrastructure Support for the UC Research Community

- Identify a **base level of IT tools and services** for all UC researchers
- Integrate these tools and services into a **“Researcher Portal”** environment
- Create a local, campus and system-wide **support model** that leverages and enhances extensive discipline-aware, end-user computing support services

Funding for Research Cyberinfrastructure

- Develop a strategy for stable funding for research cyber infrastructure to maintain UC's research competitiveness
 - Basic research tools and services
 - Advanced functionality
- Develop a funding model that subsidizes resource sharing
- Leverage opportunistic funding (e.g., grants) when possible

Position and Promote UC Research Excellence

- Promote (at the state and federal level) UC research competitiveness relative to cyber infrastructure commitments and readiness
- Articulate UC research priorities related to large scale problems of interest to the State and the nation and initiate discussions with grant agencies, federal relations and our elected representatives.