The Cornell Center for Advanced Computing
Sustainability Model

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Four people walk into a bar….

• Why are we here?
  – We support/provide research computing at our institutions
  – We share common challenges
  – We care about training & enabling the next generation of computational scientists
  – We want to play a meaningful role in the national cyberinfrastructure ecosystem
Research Computing

- Strategic and important firsts
- Constantly changing
- Necessary for more and more disciplines
- One size does not fit all
- Data management and analysis challenges
- Expensive

First full 3D simulations of the complicated flows of ionized matter drawn into rotating magnetized stars (Cornell’s M. Romanova, R. Lovelace, and the US-Russia Plasma Astrophysics Collaboration)
Shared Challenges –

What keeps us up at night ...

• Budgets and funding
• Sustainability
• Facilities
• Resources
  – Staffing
  – Computing
  – Data storage
  – Networking
  – Visualization
• Research users
  – Our “customers”
The Next Generation of Computational Scientists

• Our nation’s ability to lead in innovation and discovery requires continual growth in the quantity and quality of computational scientists.

• Broadening participation and reaching under-represented groups is strategic and critical for our nation’s future.

• What are our respective roles in effectively supporting the national need to educate and train the next generation of computational scientists?
The National Cyberinfrastructure (CI) Ecosystem

• We all want to play a meaningful and financially sustainable CI role
  – How do we accomplish this?
  – What are the opportunities at the various tiers of the Branscom Pyramid?

• Campus bridging initiative is an opportunity
  – What is the motivation?
  – Competition or collaboration?
  – How do we sustain bridging activities?

• What are the funding opportunities?
  – Leadership vs. partnership
My Goals for this Workshop

• This workshop is a unique opportunity to help and learn from each other

• The more we can share and be open with each other, the more productive this meeting will be for all of us

• I’d like to share the CAC story and I’m eager to hear your stories …
The Funding Rollercoaster
Changing the Cornell CAC Funding Model
Focus on Service

CAC’s mission is to enable the success of Cornell researchers, collaborators, and supporters whose work demands advanced computing solutions.

512-core simulation of networks of coordinated amino acid variation in Hepatitis C virus, a major cause of liver disease worldwide, enabled by the MATLAB on the TeraGrid experimental resource at CAC.
The CAC Recovery Model

• Value
  – Better than using graduate students
  – Transparency
  – Clearly communicate your costs and benefits

• Fairness
  – No wheeling & dealing

• Economies of scale & scope
  – Compelling solutions available due to wide distribution of costs

• Cost recovery
  – Sustainability
  – Compelling metrics of success & ROI
Developing the Recovery Model

- Understand the technical requirements and financial limitations of researchers at your institution
- Develop services that meet these requirements and provide competitive rates, seeking economies of scale and scope wherever possible
- Perform detailed cost analyses to provide these services in a sustainable way
- Work with your institutions’ leadership to apply financial subsidies toward the rates for services
- Listen to your “customers” and be willing to adapt
CAC Services

- Consulting
- Cluster maintenance
- Disk storage
- Computing
- Training and education
How Are We Doing?

Metrics of Success & ROI

• CAC completing 2\textsuperscript{nd} year of cost recovery model

• We have met our recovery projections and continue to see steady growth of \( \sim 10\% \) in all areas
  – Number of researcher consulting engagements
  – Number of researchers supported
  – Number of grants we are written into
  – Number of terabytes sold
  – Number clusters maintained
  – Number of compute cycles sold

• It’s clear that some steady state level of University subsidy will continue to be required
Funding Opportunities

• CAC continues to provide supporting roles in Cornell proposals.

• CAC continues to look for partnership opportunities with other institutions where our special skills strengthen their proposals, such as:
  – Data analysis
  – CAC Virtual Workshops (VWs)
    • Using our web based training technology and internal or external Subject Matter Experts to develop high quality education and outreach (NSF, DOD, corporate awards …)

• CAC continues to look for opportunities to compete for national cyberinfrastructure grants
  – NSF MATLAB on TeraGrid experimental resource award
Industry & Vendor Relationships

- CAC’s focus on providing advanced computing services based on technologies which provide optimal economies of scale makes us more relevant to industry and vendors.

- Having a sustainable recovery model forces us to do a great job of identifying key technologies and implementing “right-sized solutions”.

- Having vendor partners we can rely on to provide the best price/performance and maintenance support is essential.
Successful Models are Sustainable Models

• A successful recovery/funding model will be institutionalized
  – Enables a broad array of researchers
  – Is efficient and fair
  – Provides economies of scale
  – Saves money and provides value

• Sustainability is not based on winning a single major grant or on the efforts of a particular director and/or management team
  – Model must be documented so that the institution stands behind it over time and expects it to be acted upon
  – Model must allow room for strategic change and growth
  – Model should allow core staff to focus on their jobs rather than weekly worries about the funding roller coaster
Call to Action

• Please actively participate and contribute to the breakout sessions
• Use the breaks and meals as networking opportunities to explore the breakout topics in depth
• Continue to watch the workshop wiki even after the event
  – We’ll be soliciting contributions & feedback during the development of workshop report
• Let’s continue to discuss these topics at other meetings:
  – CASC:  www.casc.org
  – EDUCAUSE:  www.educause.edu
  – SC10, etc.:  supercomputing.org/
  – TeraGrid:  www.teragrid.org
Thank you!

• See details in our position paper on the wiki:
  “Overview of the Cornell University Center for Advanced Computing Sustainable Funding Model”
  By: David Lifka, Resa Alvord, Susan Mehringer, Paul Redfern

• Complete workshop info is on Sustainable Research Computing Centers (SRCC) wiki:
  – www.cac.cornell.edu/SRCC

• Questions?