Campus Cyberinfrastructure Initiatives

XSEDE

Extreme Science and Engineering
Discovery Environment

NERCOMP Meeting

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Rich Knepper

Deputy Director

Cornell Center for Advanced Computing

XSEDE Manager for Cyberinfrastructure Resource Integration

rich.knepper@cornell.edu

XSEDE Overview

XSEDE:

- Is an NSF-funded virtual organization

- Integrates and coordinates the sharing of advanced digital services (e.g. supercomputers, visualization, data analysis resources)

- Serves researchers nationally to support science

- Provides users with seamless integration to NSF's high-performance computing and data resources

https://www.xsede.org/about/what-we-do

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XSEDE Programs and Activities

Provides the expertise to ensure that researchers can make the most of the supercomputers and tools, including:

- Extended Collaborative Support Service (ECSS) – team experts with researchers

- XSEDE Cyberinfrastructure Integration (XCI) - provides an advanced hardware and software architecture that allows for individualized user experiences

- XSEDE User Portal web interface allows users to monitor and access XSEDE resources, manage jobs on those resources, report issues, and analyze and visualize results.

- Coordinated allocations of NSF's high-end resources and digital services, through the XSEDE Resource Allocation Service (RAS) team.

- A powerful and extensible network, maintained by the XSEDE Operations team, with fast connections to the XSEDE Service Providers

- Training, Education, and Outreach through the Community Engagement & Enrichment (CEE) team that expand participation in XSEDE-based projects, curriculum development, and traditional training opportunities.

- Advanced support for novel and innovative projects.

- A fellowship program that brings Campus Champions to work closely with XSEDE advanced user support staff.

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Cyberinfrastructure Resource Integration

- Mission: To leverage the aggregate national cyberinfrastructure in XSEDE Service Providers, campuses, and regional partnerships in order to maximize support for research initiatives.

- In the larger scheme
  - Help propagate the best practices from the supercomputing centers that support XSEDE
  - Provide resources for campus cyberinfrastructure staff to leverage
  - Make it easier for researchers transitioning from campus to XSEDE

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CRI initiatives

- Software toolkits
  - Implement systems on campus or cloud resources
- Consulting services
  - Help campuses integrate and connect
- Service Provider coordination
  - Information Publishing Framework
  - Resource Description Registry

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XCRI Software Toolkits

- XCBC Cluster Distribution
  - Complete cluster package
  - Basic installation and resource management, scheduler, administration tools
- XNIT software repository
  - Scientific software
  - Libraries for development
- Virtual Cluster toolkit
  - Deploy XCBC Cluster on a cloud resource like Jetstream
  - Scalable to create more instances when needed
- Metrics and monitoring toolkit
  - Usage and overall health information

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Software strategies

- Open source packages (that you can get support for)
- Basic administration methods (ansible)
- Packages distributed through XSEDE Community Software Repository
- Scripts and configurations distributed through github

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Consulting Services

- Site visits for integrating clusters
- Help through help@xsede.org to our engineers
- Forums, documentation, slack channels
- Connecting technical staff to other folks doing the same things

Results

- 7 site visits for cluster installations, with an aggregate 764 TeraFlops

- 105 subscribers to software package repositories

- Virtual clusters supporting Science Gateways (SEAGrid and Ultrascan) on the Jetstream system

- 46 service providers in the XSEDE SP Forum

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Outcomes

- Basis for new business analytics program at Bentley University (see http://bit.ly/xsede-ba for details)

- Computer Science program at U Texas El Paso

- "Big Green" cluster at Marshall for physics, genomics research

- Building a community of cluster admins that rely on each other

- Contribute user experiences back to OpenHPC tech council

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Questions?

- XCRI is available to
  - Do site visits to stand up clusters
  - Provide consulting on cyberinfrastructure
  - Help facilitate integrating into national cyberinfrastructure
- Contact us at help@xsede.org

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