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The Service Provider Forum

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XSEDE

Extreme Science and Engineering
Discovery Environment

NSF

Outline

- What is XSEDE?

- What is the XSEDE Federation and Service Provider Forum?

- What's here for me?

XSEDE – accelerating scientific discovery

XSEDE's Vision:

a world of digitally enabled scholars, researchers, and engineers participating in multidisciplinary collaborations while seamlessly accessing advanced computing resources and sharing data to tackle society's grand challenges.

XSEDE's Mission:

to enhance the productivity of a growing community of scholars, researchers, and engineers through access to advanced digital services that support open research by coordinating and adding value to the leading cyberinfrastructure resources funded by the NSF and other agencies.

XSEDE's Place in the Ecosystem: *"connector of services"*

- Actively integrating capabilities into the XSEDE infrastructure
  - work directly with providers in process
- Enabling broader community to integrate new capabilities into ecosystem
  - provide training and documentation
  - educating the workforce
- Federate/interoperate/integrate with other CI providers
  - OSG, PRACE, EGI, Compute Canada, RIKEN, …
- Provide CI support to major disciplinary projects
  - LIGO, LSST, iPlant/CyVerse, OOI, …

XSEDE is uniquely positioned to play this role.

What is XSEDE?

- XSEDE is a virtual organization that provides "shared services" between the NSF-funded and campus cyberinfrastructure services.

- XSEDE does *NOT* directly provide computers, storage systems, or networks.

- XSEDE does link those services together, and provide shared:

  - Allocations

  - Support

  - Tickets, Documentation, Training

  - Education and Outreach

- So, if XSEDE does not provide the computers, who does?

What is the Service Provider Forum?

- The Service Provider Forum is where the group of those that provide CI services to the university community – often in conjunction with XSEDE – get together.
  - To Advise XSEDE
  - To Exchange best practices
 - To advocate for things of common interest.

What is the XSEDE Federation

- The XSEDE Federation is the group of organizations that have a formal affiliation with XSEDE.

- This includes:
  - Service Providers (i.e. TACC, PSC, SDSC, etc.)
  - Other organizations that have some collaboration with XSEDE (PRACE, Compute Canada, RIKEN, etc.)
  - Not all Service Providers simply provide supercomputing:
    - Science Gateways Community Institute.
    - National Center for Genome Analysis Studies.

Federation vs. Forum

- This confuses everybody.

- All Service Providers that are in the Federation are in the Forum.

- Not all Federation members are Service Providers
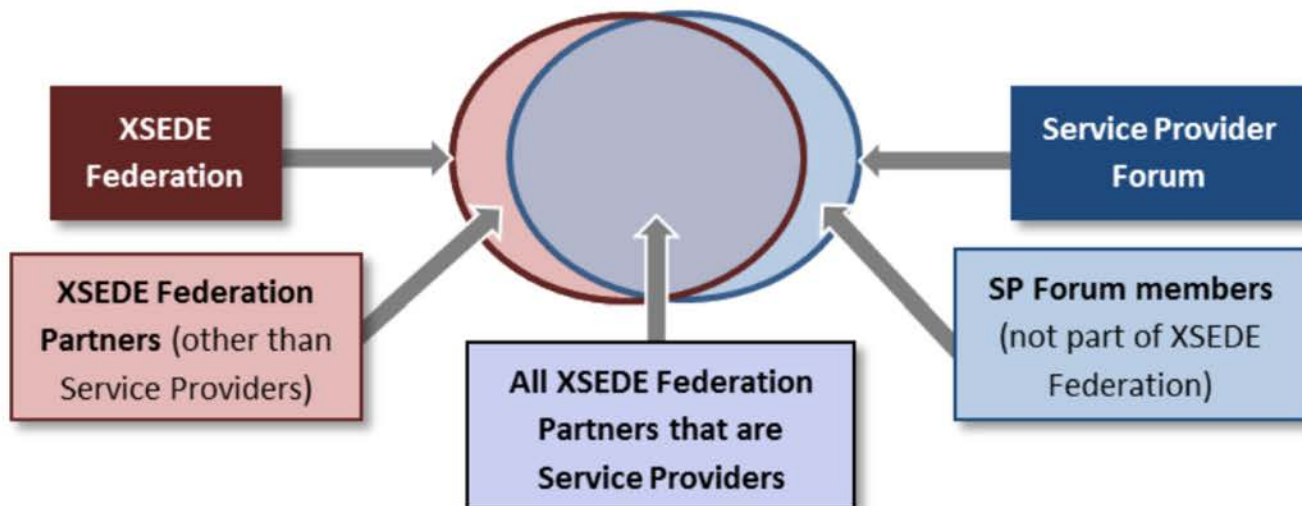
"Levels" of Resource Providers

- There are 3 kinds of Service Providers:
  - "Level 1" - Provide an XSEDE Allocated Digital Service, and are fully integrated with XSEDE
    - e.g. Stampede2, Bridges, Comet, Wrangler, Jetstream).
    - Usually, these are NSF-funded with a mandate to be part of XSEDE.
  - "Level 2" – Provides one or more services that are at least partially available through XSEDE to the national user community, and have at least some integration.
    - E.g. Stanford Xtreme, LSU SuperMIC, SGCI
    - Often, agreed to make a fraction of a local resource available through XSEDE in an MRI or other proposal

"Levels" of Resource Providers

- There are 3 kinds of Service Providers:
    - "Level 3"
        - advertise the characteristics of one or more digital services via XSEDE mechanisms
        - might make those resources or services accessible via XSEDE compatible interfaces
        - but need not make digital services available "locally" via XSEDE services or interfaces
        - are not required to share services with the XSEDE user community
    - Many campuses show off their local clusters through the XSEDE portal this way – some may make use of some XSEDE Services, e.g. Single Sign On Hub or Allocations.

	SP Level		
	Level 1	Level 2	Level 3
Expectations of XSEDE by XSEDE Federation Service Providers			
Technical Expectations			
XSEDE will publish information on the digital service/resource via XSEDE Information Services	Yes	Yes	Yes
XSEDE will provide the SP opportunities to participate in training, workshop, and conference activities	Yes	Yes	Yes
XSEDE will monitor XSEDE-compatible services by XSEDE Operations	Yes	Yes	No
XSEDE will provide for allocation of the service via the XSEDE Resource Allocation Committee (XRAC) process	Yes	Optional	No
XSEDE will provide access to XSEDEnet to the SP	10Gb/s	Optional	No
XSEDE will provide XSEDE Accounting/Account Management Services to the SP	Yes	Yes	No
Support			
XSEDE will provide support for XSEDE client and server software (XSS) installed at the SP	Yes	Yes	No
XSEDE will provide SP access to the XSEDE Ticket System	Yes	Yes	No
XSEDE will work with the SP to provide User Support for provided digital service	Yes	No	No
XSEDE will route incoming tickets to SP via XSEDE Ticket System	Yes	Yes	No
Coordination between XSEDE and SP training, education, and outreach goals	Yes	Optional	No

XSEDE

Expectations of XSEDE Federation Service Providers by XSEDE	Level 1	SP Level Level 2	Level 3
Technical Expectations			
SP will provide and maintain digital service/resource info in XSEDE Information Services	Yes	Yes	Yes
SP will provide documentation and training materials for XSEDE compatible services offered	Yes	Yes	Optional
SP will provide training and workshops to XSEDE user community	Yes	Optional	Optional
SP will attend the annual XSEDE conference	Yes	Yes	Optional
SP will provide access to XSEDE-compatible digital service/resource for monitoring by XSEDE Operations	Yes	Yes	No
SP will make a significant portion of the service/resource available for allocation via the XSEDE Resource Allocation Committee (XRAC) process	Yes	Optional	No
SP will provide XSEDEnet connectivity to its users	Dedicated 10Gb/s	Optional	No
SP will participate in XSEDE Accounting/Account Management Services	Yes	Yes	No
SP will actively participate in XSEDE Operations as appropriate for the service, including providing the necessary information, human resources, and technology to comply with XSEDE security, accounting, allocation, user support, and other services	Yes	Yes	No
Support			
SP will install and maintain appropriate XSEDE Software and Services (XSS). (Documentation of the XSS is currently defined in the _XSEDE SP Software and Services Baseline_ and the _XSEDE Technical Security Baseline noted above_)	Yes	Partial	No
SP will route higher-level XSEDE tickets to XSEDE via XSEDE Ticket System	Yes	Yes	No
SP will provide User Support for provided digital service	Yes	Optional	No
Coordination between XSEDE and SP training, education and outreach goals	Yes	Optional	No

Who is a member now?

- Five L1 members: PSC, SDSC, TACC, Indiana, OSG

- Six L2 members: LSU, Stanford, Purdue, NCAR, SGCI, NCSA (Blue Waters)

- Twenty L3 Members.

Nice in theory – what does the Forum really do?

- The Forum meets via phone every 2 weeks, and usually in person at PEARC and SC.

- Essentially, there are two kinds of activities:
  - Advise on the XSEDE – Service Provider Interface
  - Discuss other areas of mutual interest; particularly handling of timely technical issues.

XSEDE – Service Provider Interface

- A fairly common topic is advising XSEDE.

  – Formal feedback:

    • Input on XSEDE's annual project plans.

    • Memos to NSF about XSEDE policy issues

    • Memos to XSEDE leadership about requested changes.

    • Recent examples: PY8 plans, XRAC Reviewers Manual, Restructuring of the XSEDE Database of services.

  – Informal feedback

    • Regular briefings and discussion from XSEDE operations and other XSEDE managers.   Significant chances to impact XSEDE Operations.

      – E.g. advocating to extend the SSO to L3s.

Areas of Mutual Interest

- Discuss technical issues and get advice from peers on a wide range of technical topics.
  - What are you doing about Controlled Unclassified Information?
  - How are we impacted by Globus changes?
  - Who is using Containers, and how?
- Respond to NSF Requests for Comments.
  - (i.e. Service provider response for input on NSF CI2030 plan).

Can my campus join?

- Yes!

- If you were an L1 or an L2, you would probably know by now.

- If you want to be an L3, the minimum commitment is to advertise any digital service through XSEDE (can be a campus cluster, a software service, a training site, etc.).
  - You do *not* need to open this service up to XSEDE users, but you can.

- Application letter template at XSEDE Web Site.

Some more stuff about XSEDE and it's Service Providers

Total Research Funding Supported by XSEDE to Date

$2.84 billion in research supported by XSEDE
July 2011-March 2017

All Others, $311.7M, 11%

DOC, $53.7M, 2%

NASA, $113.1M, 4%

DOD, $217.5M, 8%

DOE, $558.2M, 20%

NSF, $978.5M, 34%

NIH, $607.2M, 21%
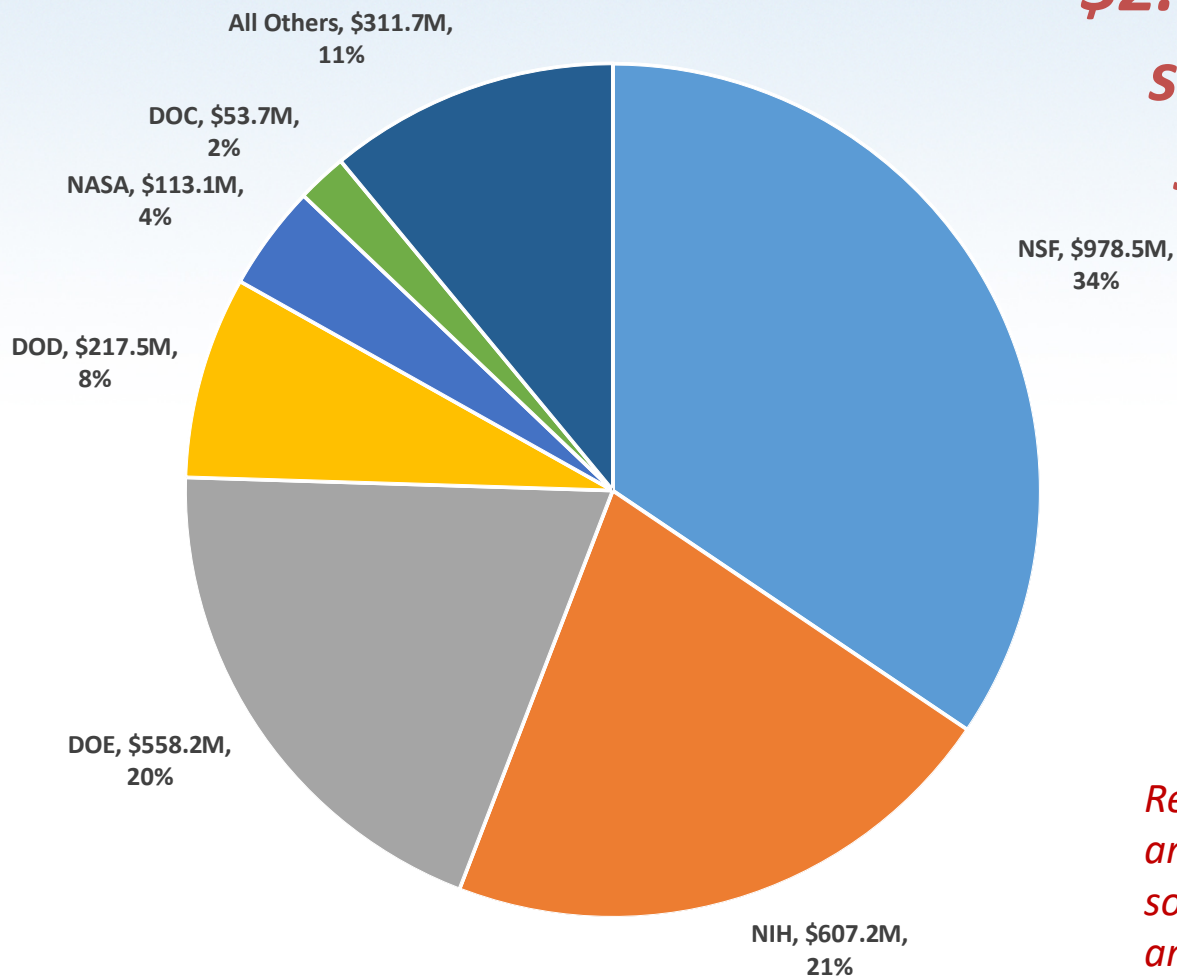
Research funding only. XSEDE leverages and integrates additional infrastructure, some funded by NSF (e.g. Track 2 systems) and some not (e.g. Internet2).

XSEDE's Distinguishing Characteristics: *World-class Leadership*

- Partnership led by NCSA, PSC, TACC, SDSC and NICS
  - CI centers with deep experience

- Partners who strongly complement these CI centers with expertise in science, engineering, technology and education

Michael Levitt, Nobel Laureate

"computational structural biology, the field that I pioneered with Martin Karplus and Arieh Warshel, has ***certainly grown and matured through access to NSF-funded programs like XSEDE***. [...] Our 2013 Nobel Prize in chemistry represents a huge step forward in the perception that high-performance computing is now of clear importance in a field of study previously considered as being purely experimental. ***The importance of XSEDE lies in its ability to work across many disciplines with a broad spectrum of users extending from novices to the most experienced users and all this at no cost of the researcher.***"

National Science Foundation, "Computational Science Takes the Nobel Stage," February 11, 2014, http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=130427.

Significant Contributions to Community by XSEDE:
Supporting the Community

- Annually supporting 25,000 researchers and students (6,000 + 9,000) via allocated access to resources
  - this is potentially a limit given current resources
  - science gateways allowing many more to leverage XSEDE-allocated resources
  - many more leveraging unallocated services via the XSEDE User Portal
- More than 21,000 publications supported to date
  - analysis shows significantly higher citation rate than other publications in the same journals
- Over 15,000 active users of XSEDE User Portal
- Over 900 proposals for major compute allocations reviewed annually
  - a comparable number of requests for startup and educational allocations
- More than 77,000 user requests addressed to date
  - answering questions and resolving technical issues
- To date, completed more than 375 projects that assisted computational research teams
  - users reported an average productivity gain of 18.75 months
  - average three months investment of XSEDE staff time

Allocation of XSEDE Resources

- XSEDE resources are allocated through a peer-reviewed process.

- Open to any US open science researcher (or collaborators of US researchers) regardless of funding source.

- XSEDE resources are provided at NO COST to the end user through NSF funding (~$100M/year).

How do I get started using XSEDE

- To get started using XSEDE a researcher needs to:
  - Apply for an Allocation, or
  - Get added to an existing allocation

- To do either of these things, you should start with the **XSEDE User Portal**
  - **https://portal.xsede.org**

Getting an Allocation

- If you do not yet have an allocation, you can use the portal to acquire one.

- If you are a first time investigator, request a startup allocation.

ECSS – Extended Collaborative Support Services

- Expertise available in a wide range of areas
  - Performance analysis
  - Petascale optimization
  - Gateways and web portals
  - Specialized scientific software
- Can solicit ECSS support at any time though the Allocations tab in the XSEDE User Portal
- Requires written justification and a project plan
- Inquire at help@xsede.org

ECSS can include

- Porting applications to new resources
- Providing help for portal and gateway development
- Implementing algorithmic enhancements
- Implementing parallel math libraries
- Improving scalability of codes to higher processor counts
- Optimizing codes to efficiently utilize specific resources
- Assisting with visualization, workflow, data analysis, and data transfer

Questions? Need Help?

- First, try searching the knowledge base or other documentation
- Next, submit a ticket
  - portal.xsede.org -> My XSEDE -> Tickets
- Send email
  - help@xsede.org
- Or call the Help Desk
  - 1-866-907-2383

Need more training?

- portal.xsede.org -> Training
  - Course Calendar
  - On-line training

Thanks!

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