Getting Started on Jetstream2

Danny Havert – Indiana University
Systems Programmer/Analyst
Research Cloud Services
djhavert@iu.edu

Zach Graber – Indiana University
Systems Programmer/Analyst
Research Cloud Services
zegraber@iu.edu

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Agenda

Introduction to Jetstream2 (30 min)
- ACCESS account and training allocation
- What is Jetstream2? Whom is it for?
- How to apply for an allocation - ACCESS

Getting access to Jestream2 (15 min)
- Logging in to Exosphere

Using Jetstream2 - Hands on Demo (45 min)
- Creating an instance
- Logging in to your instance
- Using the software collection
- Attaching volumes for data storage
- Transferring Data to and from your instance
- Saving and Sharing Images
- Web hosting - one liner
- Shelving Instance
Accessing Jetstream2

Before you can use Jetstream2 you must first have an ACCESS ID and be on an active Jetstream2 allocation! Fill out this form to participate in the tutorial.

https://forms.gle/gnBbx2CS1LPgm2LK7
Getting an ACCESS ID

In order to Apply for an allocation OR be able to login to any resources an Access ID is required.

Go To

https://operations.access-ci.org/identity/new-user
Jetstream2 is designed to be user-friendly for educators and researchers who have limited experience with high performance computing (HPC) or cloud computing.

- NSF funded. We serve academic communities with no access to such resources.
- It provides a uniquely flexible environment for researchers looking to take advantage of the latest cloud-native approaches.
- Available for Education - use it for courses!
What’s Special About Cloud Computing?

● Create your own ‘virtual machine’ (VM)
● Full sudo (admin) access. Use your VM how you want.
  ○ Install the software you need.
● On-demand resources. No sharing or queue times.
  ○ Keep your jobs running as long as you want.
● Interactive computing environment
  ○ With graphical desktop
● Full internet access with Persistent IPs
CONECTnet
Advanced Layer 2 Services (AL2S) platform

INFORMATION

COMMERCIAL CLOUD

INTERNET®

TACC CYBERINFRASTRUCTURE

R E G I O N A L
Compute
8 Nodes
1,024 Cores
4 TB RAM
Storage
869 TB
Accelerators
2 Nodes
1 TB RAM
8 GPUs

R E G I O N A L
Compute
8 Nodes
1,024 Cores
4 TB RAM
Storage
869 TB

ARIZONA STATE UNIVERSITY CYBERINFRASTRUCTURE

R E G I O N A L
Compute
8 Nodes
1,024 Cores
4 TB RAM

UNIVERSITY OF HAWAI'I CYBERINFRASTRUCTURE

R E G I O N A L
Compute
416 Nodes
53,248 Cores
224 TB RAM
Storage
96 Nodes
15 PB
Accelerators
90 Nodes
45 TB RAM
360 GPUs

INDiana University
CYBERINFRASTRUCTURE

R E G I O N A L
Compute
8 Nodes
1,024 Cores
4 TB RAM
Storage
869 TB
Jetstream2 VM Sizes

- Three different resources:
  - CPU
    - Up to 64 cores, 250 GB RAM
  - Large Memory
    - Up to 128 cores, 1000 GB RAM
  - GPU
    - Up to 32 CPU cores, 125 GB RAM, and a full NVIDIA 40GB Ampere A100 GPU
  - Storage
    - Default: 1 TB
    - More on Request

View the full list: https://docs.jetstream-cloud.org/general/vmsizes/
Use Cases

- On-demand access to powerful computer for high performance analysis.
  - Useful for teaching a course in which students have this need.
- Teach a course where each student gets their own VM to work on.
  - Network security, reproducible development environment, etc.
- Write, debug, and execute code with interactive GUI applications
  - Use a GPU if needed.
- Host a file server or database. Receive, store, and serve data to colleagues.
- Host a website or web-app to share with students or colleagues.
Accessing Jetstream2

Go To https://jetstream2.exosphere.app/

Before you can use Jetstream2 you must first have an ACCESS ID and be on an active allocation with Jetstream2 resources!
What is Access?

Provides Access to National Advanced Computing Resources

https://access-ci.org/

The NSF’s ACCESS (Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support) program builds upon the successes of the 11-year XSEDE project, while also expanding the ecosystem with capabilities for new modes of research and further democratizing participation.
Allocation Process

1. CREATE ACCOUNT
2. SELECT OPPORTUNITY
3. REQUEST ALLOCATION
4. RECEIVE CREDITS
5. EXCHANGE CREDITS
Getting Your Own Allocation

[Image]

Applying for an allocation is like applying for a small grant that provides computational resources.

The first level of application “Explore ACCESS” is a single form and only takes a few minutes. Allocations are usually approved in a few days. ~$40,000 worth of cloud resources for a few minutes of effort.
## Allocation Tiers

<table>
<thead>
<tr>
<th>Explore</th>
<th>Discover</th>
<th>Accelerate</th>
<th>Maximize</th>
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</thead>
<tbody>
<tr>
<td>400,000 credits</td>
<td>1,500,000 credits</td>
<td>3,000,000 credits</td>
<td>N/A</td>
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<tr>
<td>CV and Brief Summary</td>
<td>CV &amp; 1-page proposal</td>
<td>3-page proposal &amp; panel review</td>
<td>10 page proposal &amp; panel review</td>
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<tr>
<td>Grad student projects</td>
<td>Modest resource needs</td>
<td>Mid-scale resource needs</td>
<td>Large-scale projects in need of massive amounts of computational resources</td>
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<td>Small labs</td>
<td>Mid-sized projects</td>
<td>Multi-grant collaborative projects</td>
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<td>Benchmarking</td>
<td>Campus Champions</td>
<td>Science Gateways with growing communities</td>
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<tr>
<td>Small classes</td>
<td>Large classes</td>
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</table>
Allocation Details

● Allocation must be submitted by the PI of the project
● Who can be a PI?
  ○ Any educator or research at a U.S. academic, non-profit research, or educational institution
● What about grad students?
  ○ Yes! Can receive Explore tier, just need a letter of collaboration from your PI.
● Anyone with an ACCESS ID can be added to a project
  ○ Getting an ACCESS ID is free and easy - useful for adding students
● Allocations must be renewed annually
● Projects can be “upgraded” by applying for the next-level allocation tier
Allocations Are Awarded Credits

- Credits are exchanged for computational time or storage on supercomputers.
- For Jetstream2, 1 ACCESS credit = 1 Service Unit (SU) = 1 CPU hour.
- What are some common usage scenarios?
  - Running the equivalent of a high-end laptop (8 cores, 32 GB RAM) for 40 hours a week for 2 years
    - 35,000 SUs
  - A server that can handle moderate traffic for 5 years uninterrupted
    - 175,000 SUs
  - Using an entire A100 GPU on average 40 hours a week for 2 years
    - 530,000 SUs
    - Note: We have smaller GPU instances that aren’t as costly.
### What Resources are Available?

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana University (IU)</td>
<td>Jetstream2</td>
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<tr>
<td>Johns Hopkins University</td>
<td>Rockfish</td>
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<td>National Center for</td>
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<tr>
<td>Supercomputing</td>
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<td>Applications (NCSA)</td>
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<td>Open Science Grid (OSG)</td>
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<td>Open Storage Network (OSN)</td>
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<tr>
<td>Pittsburgh Supercomputing</td>
<td>Bridges-2</td>
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<tr>
<td>University of Delaware</td>
<td>D ARWIN</td>
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<td>Purdue University</td>
<td>Anvil</td>
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<td>San Diego Supercomputer</td>
<td>Expanse</td>
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<td>Center (SDSC)</td>
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<td>Stony Brook University</td>
<td>Ookami</td>
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<tr>
<td>Texas Advanced Computing</td>
<td>Stampeda2</td>
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<tr>
<td>Center (TACC)</td>
<td>Ranch</td>
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<tr>
<td>Texas A&amp;M University</td>
<td>FASTER</td>
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<td>University of Kentucky</td>
<td>K YRIC</td>
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**Additional Resources:**

- Indiana Jetstream2 GPU
- Indiana Jetstream2 Large Memory
- Indiana Jetstream2 Storage
Demo
Accessing Jetstream2

Go To https://jetstream2.exosphere.app/

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Acknowledgements

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Jetstream2 partners

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The University of Arizona
Cornell University
University of Hawaii
Johns Hopkins University
TACC
UCAR

Jetstream2

http://jetstream-cloud.org/
National Science Foundation Award #ACI-2005506
Documentation and Support

Jetstream2 Website
https://jetstream-cloud.org/index.html

Reach out to Jetstream2 support at
help@jetstream-cloud.org

Documentation:
https://docs.jetstream-cloud.org/

Or directly to Research Cloud Services:
rcsadm@iu.edu

Jetstream2 Login (Exosphere)
https://jetstream2.exosphere.app/ My email:
djhavert@iu.edu