

Jetstream

Cloud Facility for Advancing Scientific Communities

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funded by the National Science Foundation
Award #ACI-1445604

Cloud Computing Terms ...simplified

- **Image:** a file on a disk. It will be booted to create an...
- **Instance:** a running virtual server; i.e. something you can log into.
- **Flavor:** the size of a running instance; i.e. #core, RAM, disk
- **Hypervisor:** the thing the instance runs on; something akin to a software defined hardware compute server.
- **Snapshot:** the process of taking an instance and turning it to an image.
- **State:** something worth remembering; i.e. the state of the system

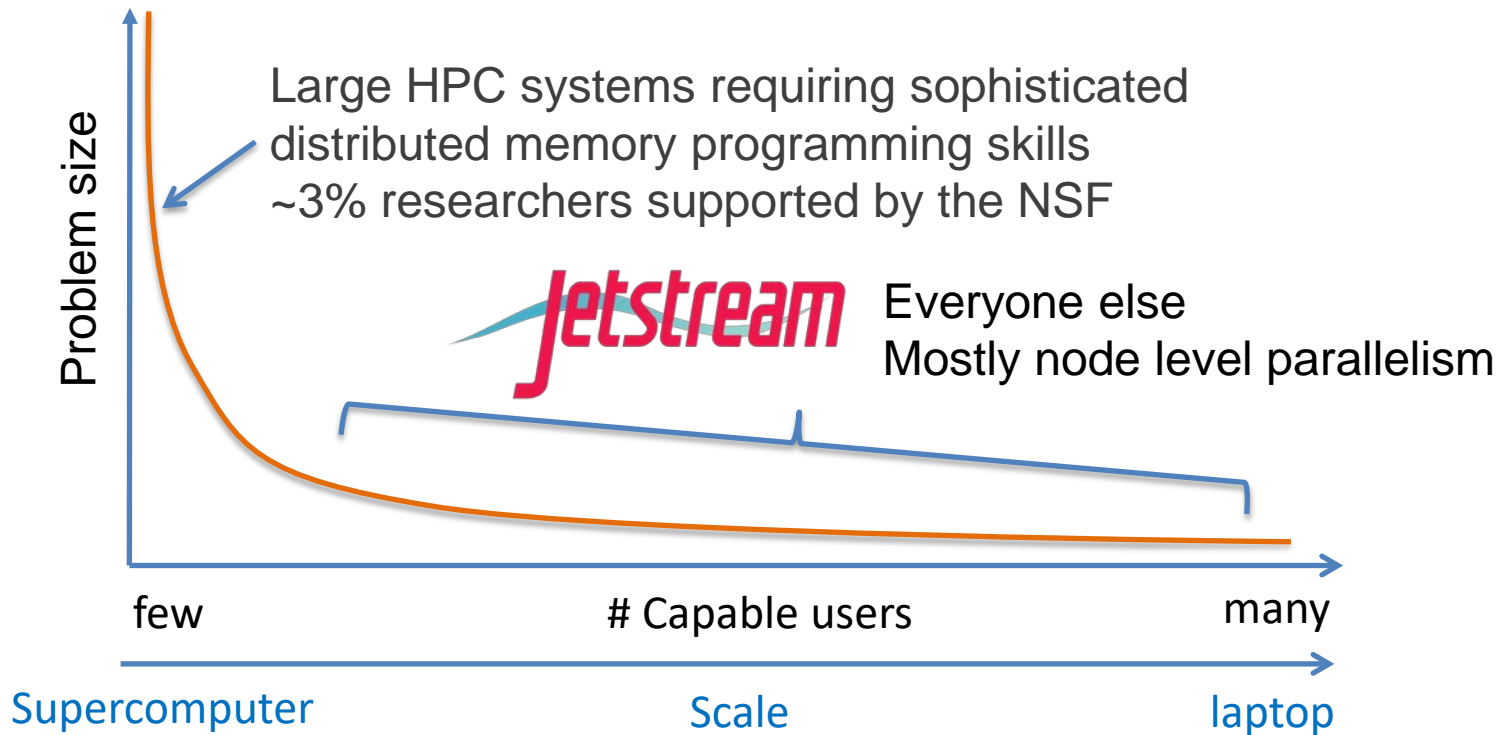
Cloud Computing Terms ...simplified (Cont.)

- **Object store:** a blob of bits; it has a starting address & a size. There may be metadata associated with the object. The data is consumed in a streaming manner.
- **Block store:** a software defined entity akin to an unformatted hardware disk drive.
- **Filesystem:** hierarchical in nature, directories & files, ability to open, seek, read, write.
- **Persistent storage:** If you pull the plug, it will still exist when power is restored. Safe to store data or state here.
- **Ephemeral storage:** If you pull the plug, it no longer exists. (Don't put your data here!!!)

What is Jetstream?

- **User-friendly**, widely accessible cloud environment
 - **User-selectable library** of preconfigured virtual machines
 - Interactive computing
 - Software maintained by domain specialist
 - No need for system administration skills
 - The “Atmosphere” side
 - **Programmable cyberinfrastructure**
 - Go beyond batch computing
 - Implement modern cloud computing techniques
 - Common modality for science gateways
 - The “API” side

“Long tail” of the Science



What is Jetstream?

(Cont.)

- **Primary goal** is to **expand the user base** of NSF's eXtreme Digital (XD) program resources beyond the current community of users.
- **Lowering the hurdle** to onboard to XSEDE resources
 - Desire to **ease** the **allocation request** process
 - **Easy-Button**; quick access but limited ability. (Beta)
- **Creating communities**
 - Domain developers **create, install, and maintain** the software
 - **Encourage collaboration** within the domains
 - **Operating system** level software is professionally **patched and maintained**
- **Repeatability**: store & publish images via IU Scholarworks & create a DOI

What is Jetstream?

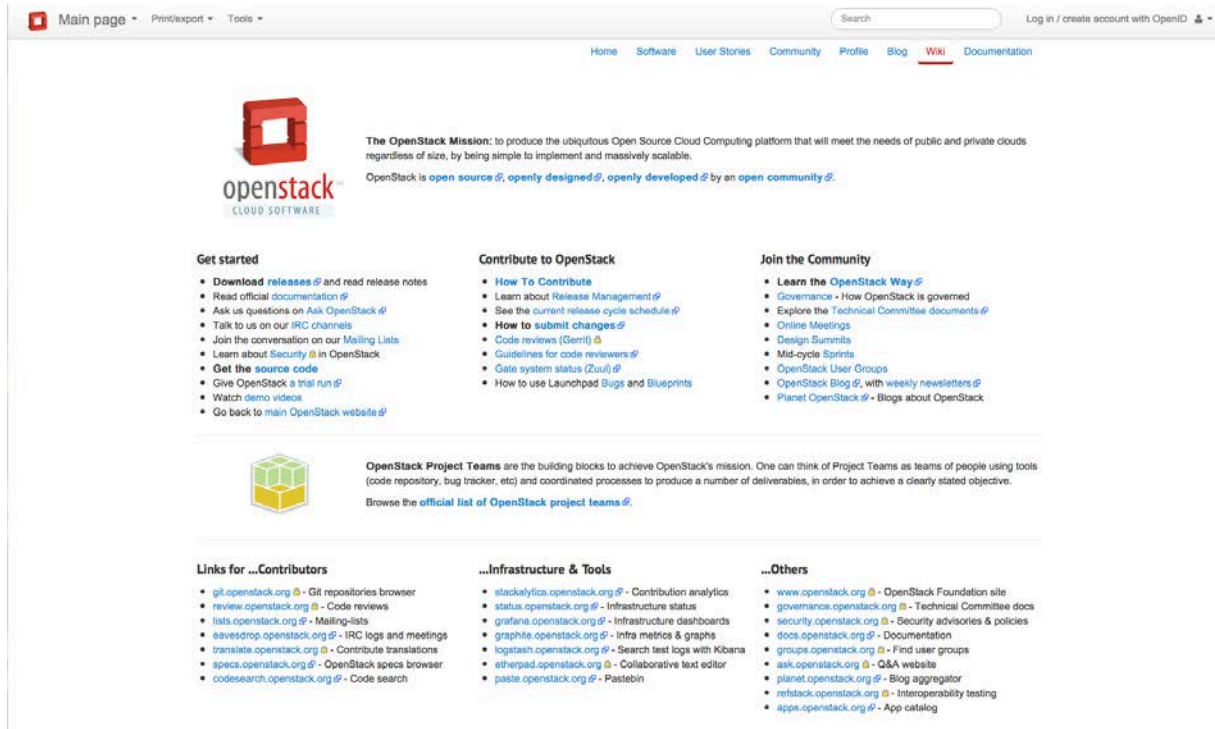
(Cont.)

- **Cloudy Technologies:** clouds are more the just virtual machines (VM)
 - **Old way:** robust (expensive) infrastructure, weak (cheap) software
 - You expect the hardware to not fail
 - State in maintained in volatile data structures
 - **Cloudy way:** commodity infrastructure, robust software
 - Expect & plan for infrastructure to fail
 - Put intelligence into the software to handle infrastructure failure
 - **Cows, not pets:**
 - pets have **state**, you name them, you get attached to them, you put forth great amount of care and effort
 - cows **do not** have **state**, you expect to have high turnover, you do not get attached to them, you give them numbers instead of names

What is Jetstream? (cont)

- **Software layers**
 - **Atmosphere** web interface
 - library of images, generic, domain specific
 - simplify VM administration
 - **OpenStack**: software tools for building and managing cloud computing platforms for public and private clouds.
 - **KVM** hypervisor: what the VMs run on
 - **Ceph**: storage platform that stores data on a single distributed computer cluster, and provides interfaces for **object-**, **block-** and *file-level* storage.
 - **Operating systems**: CentOS, Ubuntu, Windows?
 - **Applications**; e.g. software developed by the domain specialist, gateways, etc.

OpenStack Organization



The screenshot shows the OpenStack website homepage. At the top, there is a navigation bar with links for Home, Software, User Stories, Community, Profile, Blog, Wiki, and Documentation. A search bar and a login/registration link are also present. The main content area features the OpenStack logo and a mission statement: "The OpenStack Mission: to produce the ubiquitous Open Source Cloud Computing platform that will meet the needs of public and private clouds regardless of size, by being simple to implement and massively scalable." Below this, it states "OpenStack is open source, openly designed, openly developed by an open community." The page is organized into several sections: "Get started" with links to releases, documentation, IRC channels, mailing lists, security, source code, and demo videos; "Contribute to OpenStack" with links for how to contribute, release management, submit changes, code reviews, guidelines, system status, and Launchpad; "Join the Community" with links to learn the OpenStack way, governance, technical documents, online meetings, design summits, sprints, user groups, newsletters, and Planet OpenStack; "OpenStack Project Teams" explaining their role and providing a link to the official list; and three columns of "Links for ...Contributors", "...Infrastructure & Tools", and "...Others" listing various external resources.

OpenStack : the Project Navigator

The screenshot shows the OpenStack Project Navigator website. At the top, there is a blue navigation bar with the OpenStack logo, a search bar, and links for SOFTWARE, USERS, COMMUNITY, MARKETPLACE, EVENTS, LEARN, DOCS, JOIN, and LOGIN. Below the navigation bar, the page title is "Software". Underneath, there are tabs for OVERVIEW, PROJECT NAVIGATOR (selected), SAMPLE CONFIGURATIONS, GET STARTED, ROADMAP, LATEST RELEASES, and SOURCE CODE. A search bar is present with the text "Enter a keyword". The main content area is titled "Browse All OpenStack Projects" and includes a brief description of the Project Navigator's purpose. Below this, there is a section for "Core Services (6 Results)" displaying six project cards. Each card shows the project name, category, a brief description, and three circular gauges for Adoption, Maturity, and Age. The cards are: NOVA (Compute, 33% Adoption, 8 on 10 Maturity, 6 on 10 Age), NEUTRON (Networking, 84% Adoption, 8 on 10 Maturity, 5 on 10 Age), SWIFT (Object Storage, 52% Adoption, 7 on 10 Maturity, 6 on 10 Age), CINDER (Block Storage), KEYSTONE (Identity), and GLANCE (Image Service).

<http://www.openstack.org/software/project-navigator/>

Openstack Projects ...the core services

Service	Name	Adoption	Maturity	Age
Identity	Keystone	96%	7/8	5 yrs
Images	Glance	95%	6/8	7 yrs
Block device	Cinder	88%	7/8	5 yrs
Networking	Neutron	93%	7/8	5 yrs
Compute	Nova	95%	8/8	7 yrs
Object device	Swift	52%	7/8	7 yrs

<https://www.openstack.org/software/project-navigator/>

Openstack Projects ...some other services

Service	Name	Adoption	Maturity	Age
Dashboard	Horizon	87%	6/8	5 yrs
Telemetry	Ceilometer	55%	1/8	4 yrs
Orchestration	Heat	67%	6/8	4 yrs
Containers	Magnum	11%	2/8	2 yrs
Map/Reduce	Sahara	10%	3/8	3 yrs

<https://www.openstack.org/software/project-navigator/>



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Openstack Projects ...some other services

Service	Name	Adoption	Maturity	Age
Shared Filesystems	Manila	14%	5/8	3 yrs
Workflow	Mistral	5%	1/7	1 yr
Load Balancing as a Service	Octavia	>0%	1/7	1 yr

<https://www.openstack.org/software/project-navigator/>



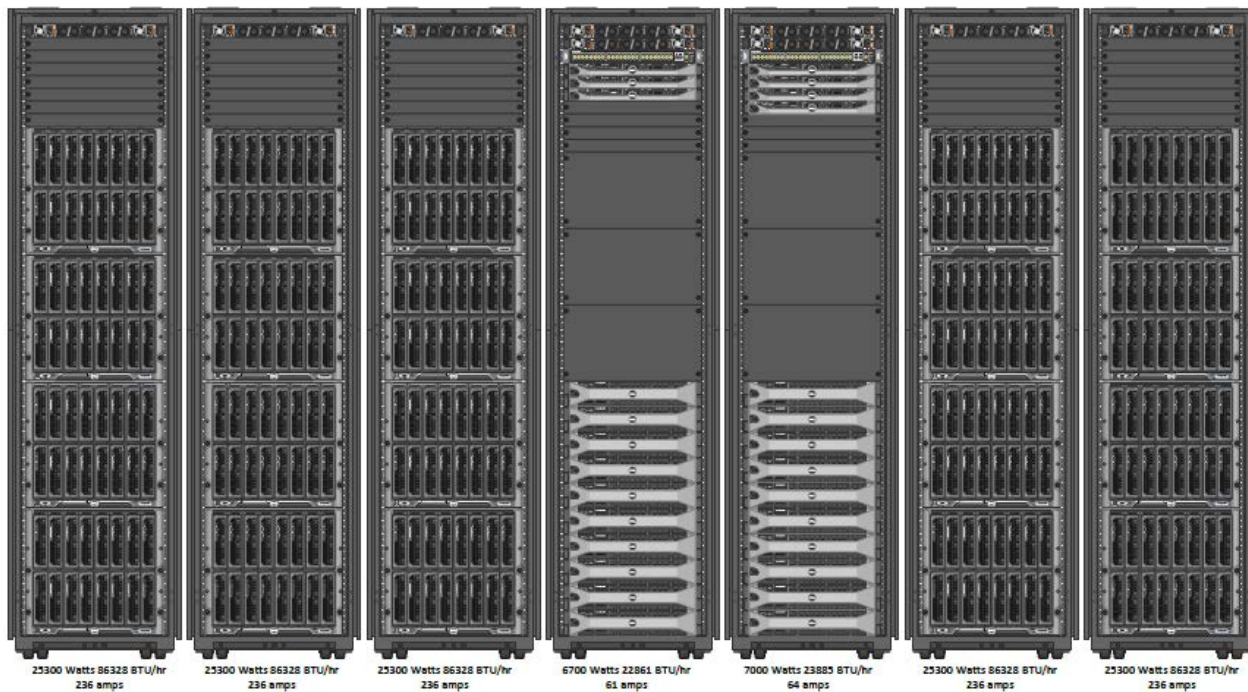
funded by the National Science Foundation
Award #ACI-1445604



Production Cloud Hardware (per site)

Hardware	Number	Specifications	Function (IU)
Dell PowerEdge M630 blades	320	2X Intel E5-2680v3 "Haswell" 24 cores @ 2.5 GHz 128 GB RAM 2 TB local disk	Compute hosts OpenStack services
Dell PowerEdge R630 1U server	7	2X Intel E5-2680v3 "Haswell" 24 cores @ 2.5 GHz 128 GB RAM 2 TB local disk	Cluster management, High Availability, Databases, RabbitMQ
Dell PowerEdge R730xd 2U servers	20	2X Intel E5-2680v3 "Haswell" 24 cores @ 2.5 GHz 64 GB RAM 48 TB storage for Ceph pool	~1 PB Ceph storage
Dell S6000-ON network switches	9	32+2 40 Gb/s ports	Top of Rack & Spine 2 to 1 Fat Tree topology

Jetstream Production Hardware

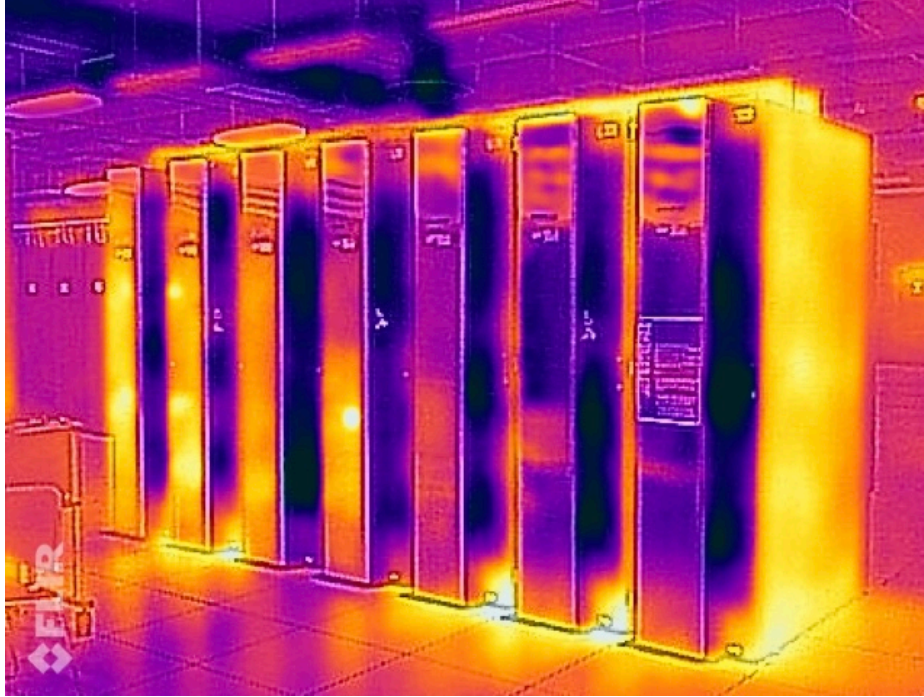


Just for fun: Happy Cluster – Mad Cluster



ChilledDoor™
Rack Cooling System
by
motivair™

Infrared image of Jetstream



ChilledDoor™
Rack Cooling System
by
motivair®

Jetstream
<http://jetstream-cloud.org/>



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Jetstream - TACC

APC InRow RC cooling units



- Placing in-row moves source of cooling closer to the heat load which helps to eliminate hot/cold air mixing.
- Hot air is ingested at the rear and cold air is expelled at the.
- Rack inlet monitoring provides controlled server inlet temperatures.

IUB Data Center

Inside the Research Pod



IU Data Center

<https://dcops.iu.edu>



<https://www.youtube.com/watch?v=zdHvnt3D7Tc&feature=share>



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Award #ACI-1445604



HPC results : VM vs BareMetal Comparison

Benchmark	VM/ BareMetal	Units	What's tested
HPL	97%	FLOPS	floating point execution rate for solving a system of linear equations
DGEMM	98%	FLOPS	floating point execution rate for double precision real matrix-matrix multiplication
Bandwidth	88%	B/s	bytes/unit_time it takes to transmit a 2MB message from one node to another
Latency	97%	s	time required to send an 8-byte message from one node to another

HPCC results : VM vs BareMetal Comparison (Cont.)

Benchmark	VM/ BareMetal	Units	What's tested
Random	80%	up/s	rate of random updates of memory
Stream	77%	B/s	sustained memory bandwidth
MPI-FFT	67%	FLOPS	floating point rate of execution of double precision complex one-dimensional Discrete Fourier Transform
Ptrans	64%	B/s	rate of transfer for large arrays of data from multiprocessor's memory

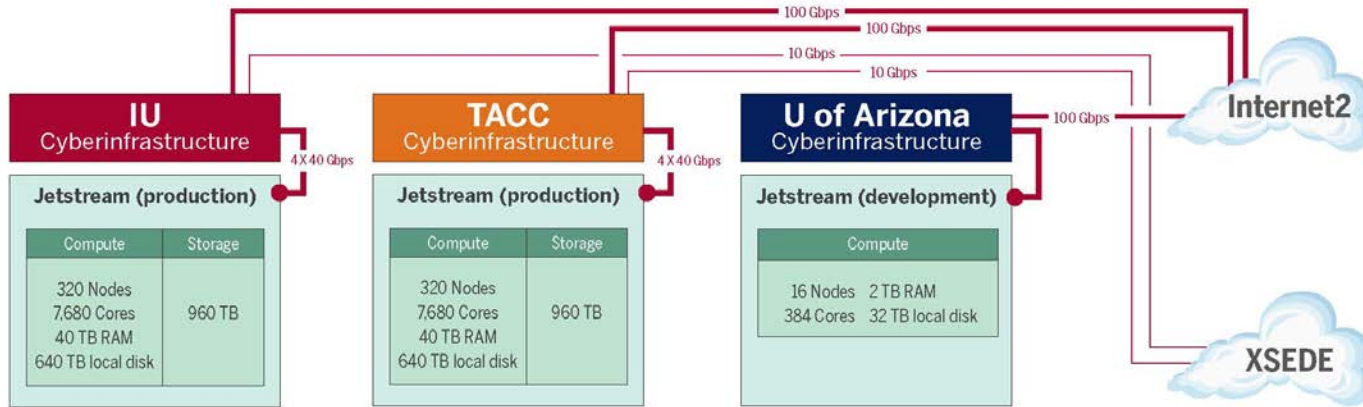
VM Instance Sizes (Flavors)

Instance Type	vCPUs	RAM(GB)	Storage(GB)	Instances/Node
Tiny	1	2	8	46
Small	2	4	20	23
Medium	6	16	60	7
Large	10	30	120/60*	4
X-Large	22	60	240/60*	2
XX-Large	44	120	480/60*	1

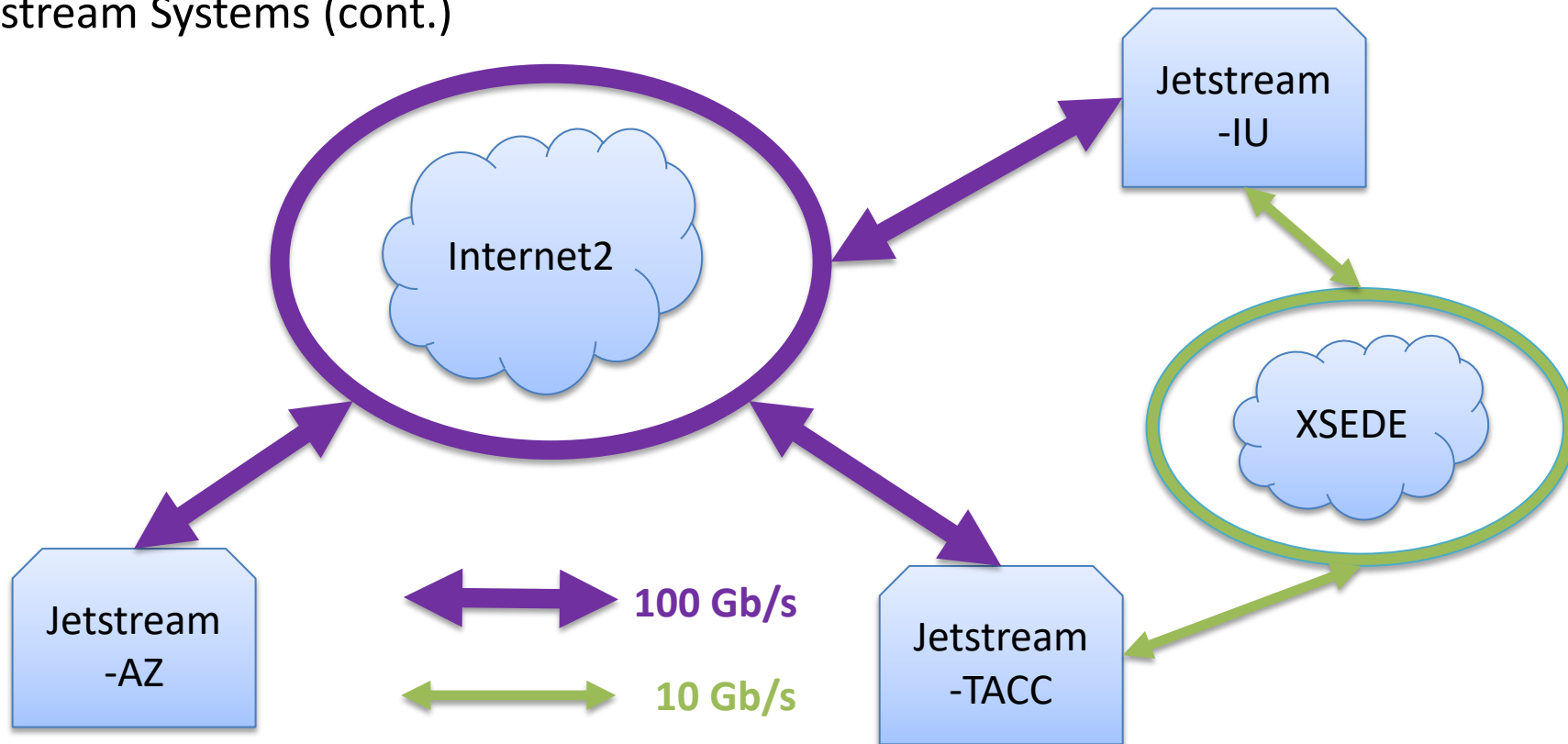
Node config: dual Intel E-2680v3 “Haswell”, 24 physical cores/node @ 2.5 GHz, 128 GB RAM, dual 1 TB local disks.

* Effective 29-Mar-2017

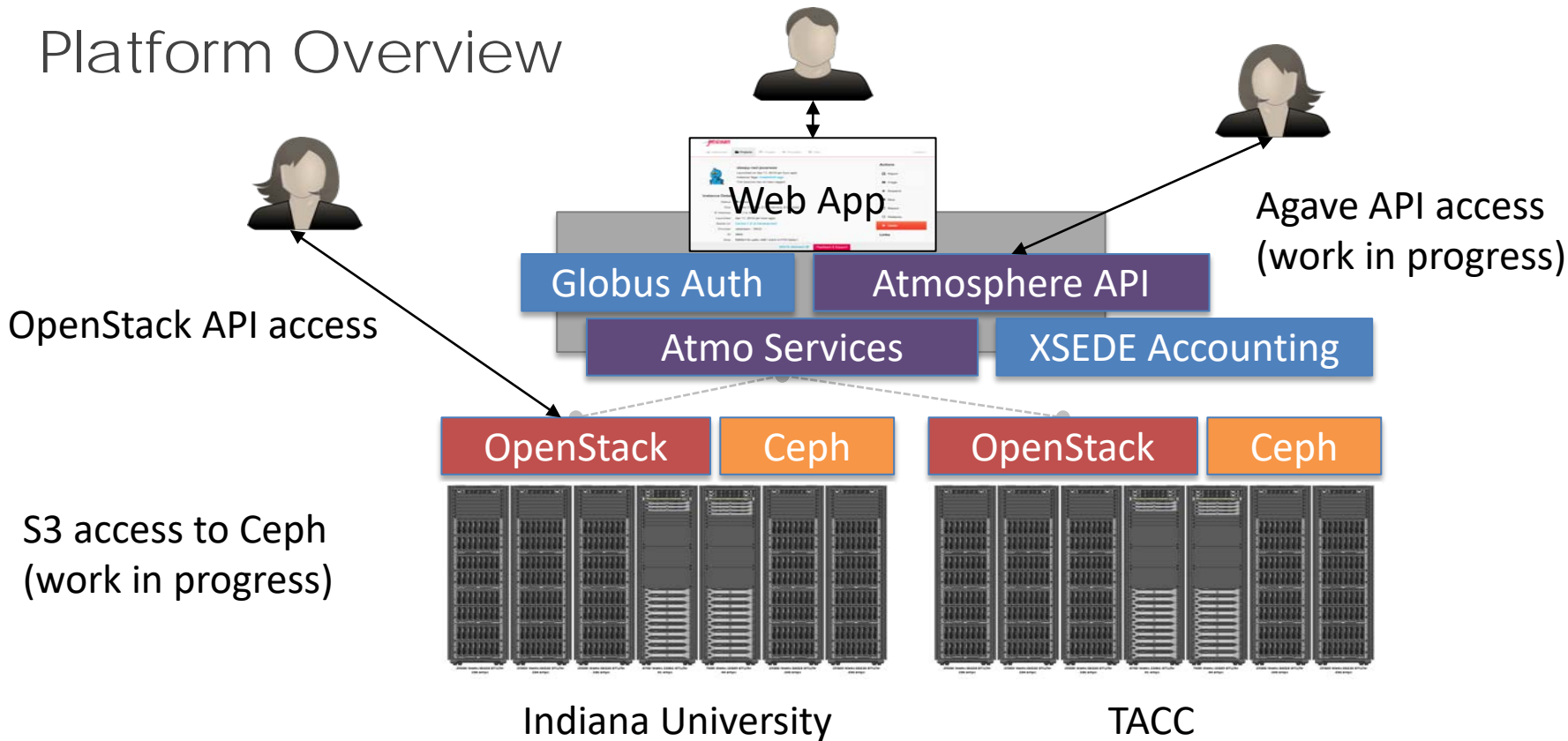
Jetstream Systems



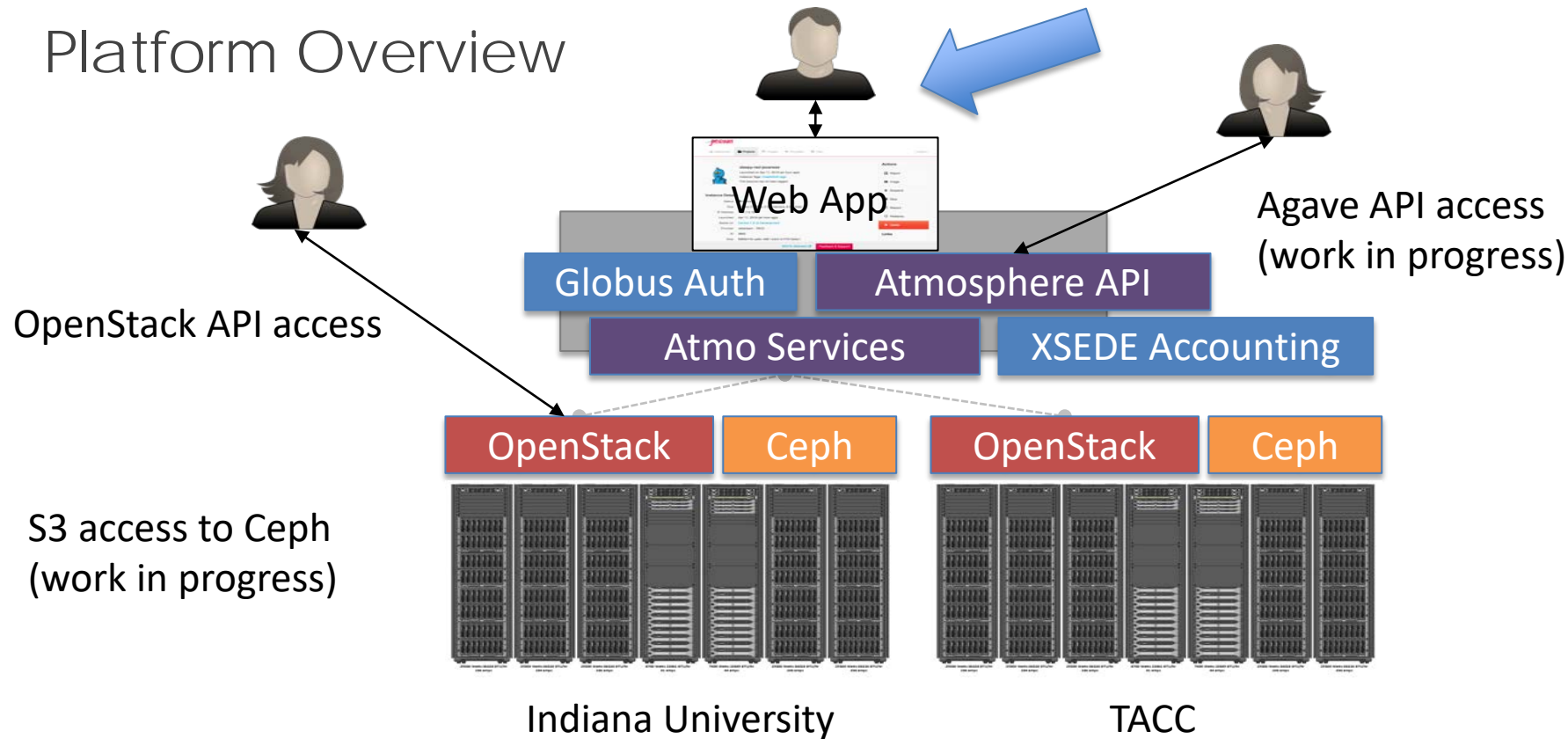
Jetstream Systems (cont.)



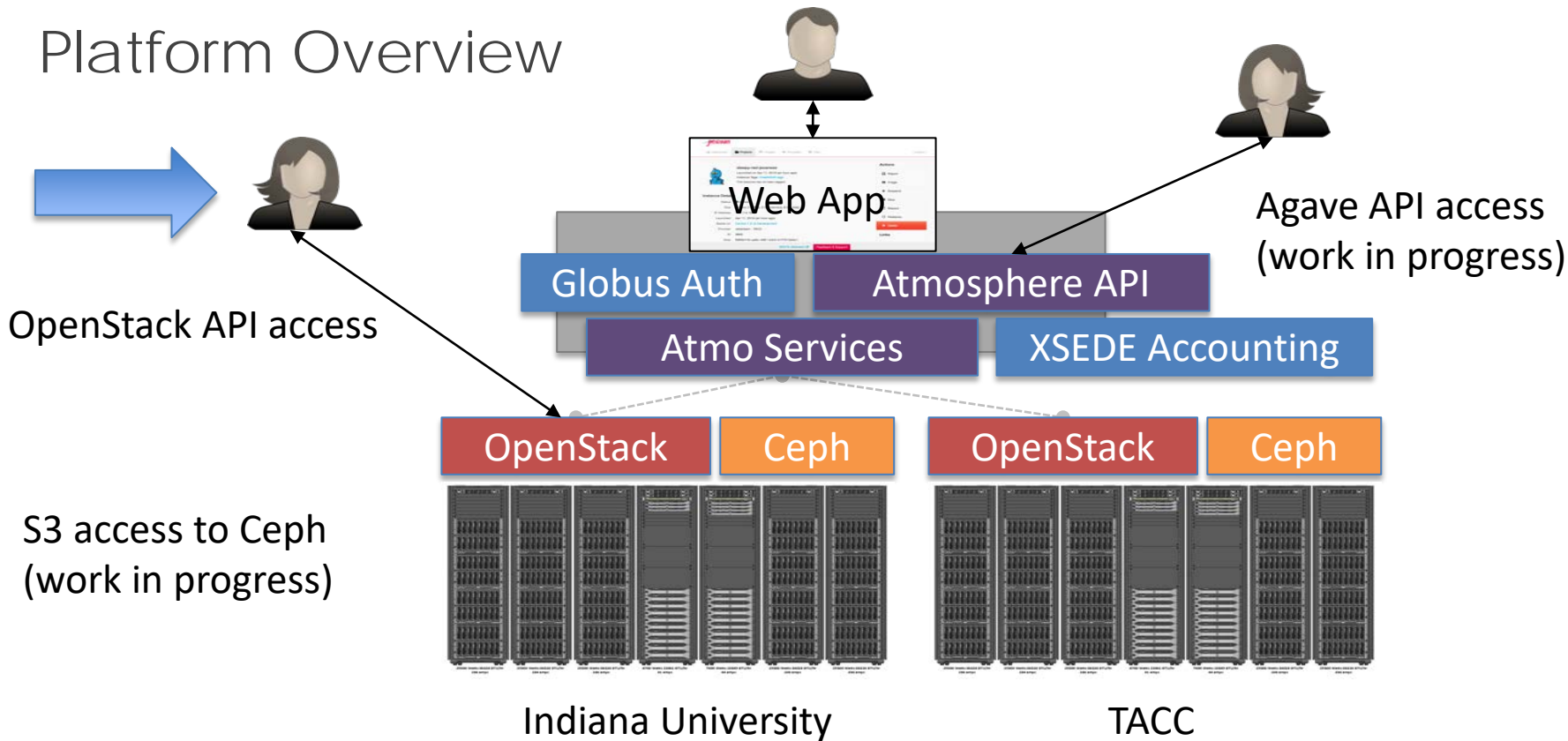
Platform Overview



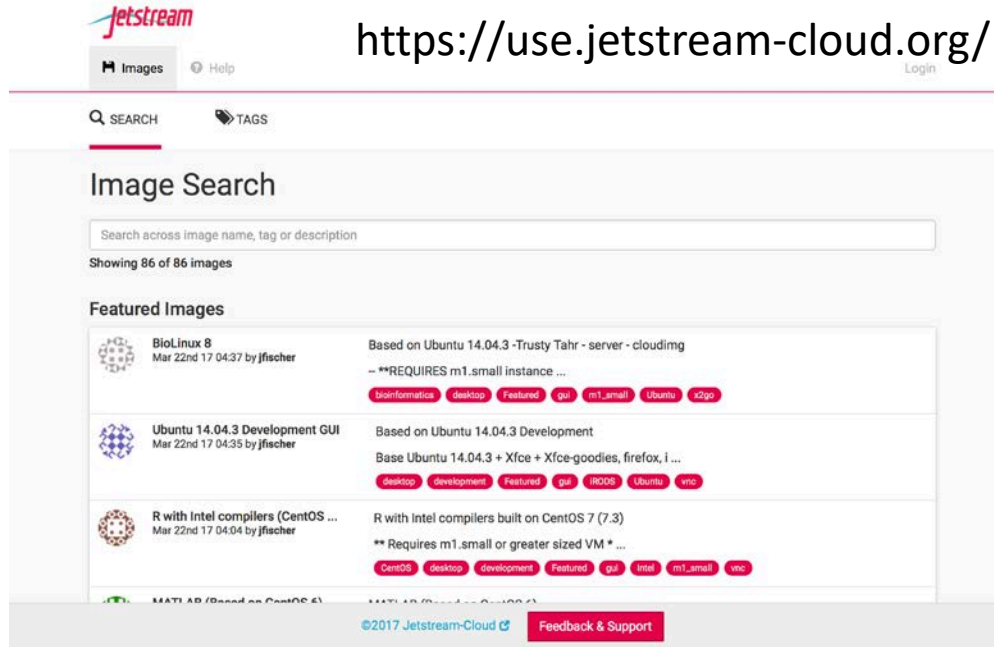
Platform Overview



Platform Overview



Jetstream's Atmosphere Interface



The screenshot shows the Jetstream Atmosphere interface. At the top left is the Jetstream logo. Below it are navigation links for 'Images' and 'Help', and a 'Login' link on the right. A search bar is present with 'SEARCH' and 'TAGS' options. The main content area is titled 'Image Search' and contains a search input field with the placeholder text 'Search across image name, tag or description'. Below the search bar, it says 'Showing 86 of 86 images'. The 'Featured Images' section lists three items:

- BioLinux 8**: Mar 22nd 17 04:37 by jfischer. Based on Ubuntu 14.04.3 -Trusty Tahr - server - cloudimg. --**REQUIRES m1.small instance ...
- Ubuntu 14.04.3 Development GUI**: Mar 22nd 17 04:35 by jfischer. Based on Ubuntu 14.04.3 Development. Base Ubuntu 14.04.3 + Xfce + Xfce-goodies, firefox, l ...
- R with Intel compilers (CentOS ...)**: Mar 22nd 17 04:04 by jfischer. R with intel compilers built on CentOS 7 (7.3). ** Requires m1.small or greater sized VM * ...

At the bottom of the page, there is a copyright notice '©2017 Jetstream-Cloud' and a 'Feedback & Support' button.

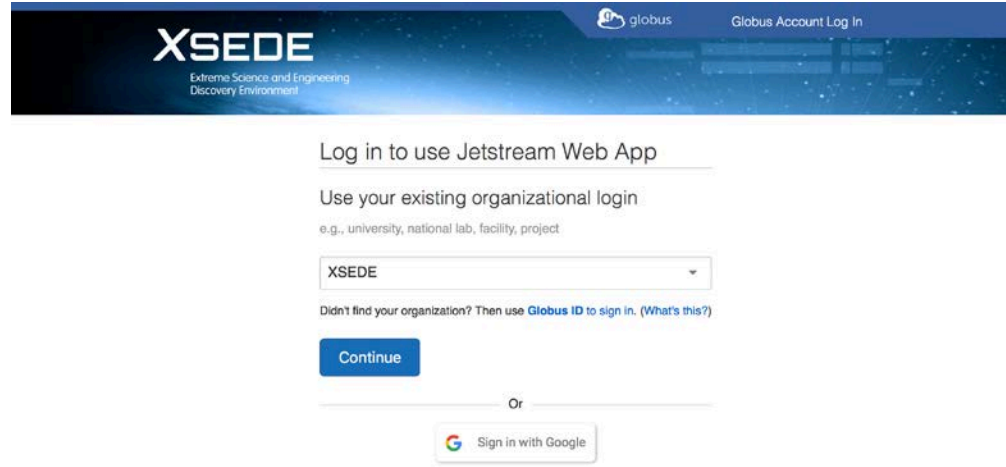
<https://use.jetstream-cloud.org/>

- No login required at this point
- You will be able to peruse the image library
- Based upon the work of the CyVerse team of Univ of AZ
- See cyverse.org for further details concerning the Atmosphere interface

Jetstream's Atmosphere Interface

Globus Auth under the hood

Pick identity provider

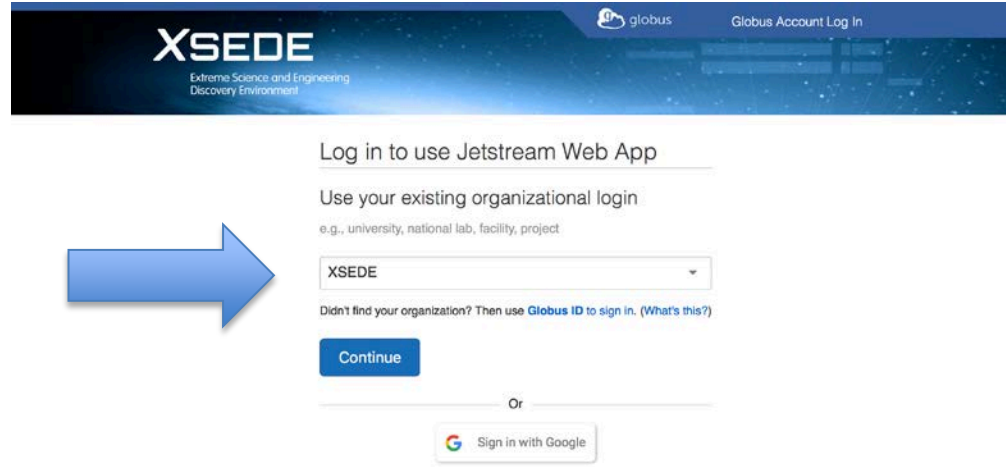


The screenshot shows the XSEDE login page. At the top left is the XSEDE logo with the tagline "Extreme Science and Engineering Discovery Environment". At the top right are the Globus logo and a "Globus Account Log In" link. The main heading is "Log in to use Jetstream Web App". Below this is the instruction "Use your existing organizational login" with the example "e.g., university, national lab, facility, project". A dropdown menu is set to "XSEDE". A link says "Didn't find your organization? Then use Globus ID to sign in. (What's this?)". A blue "Continue" button is present. Below the button is an "Or" separator and a "Sign in with Google" button.

Jetstream's Atmosphere Interface

Globus Auth under the hood

Pick identity provider



XSEDE
Extreme Science and Engineering
Discovery Environment

globus Globus Account Log In

Log in to use Jetstream Web App

Use your existing organizational login
e.g., university, national lab, facility, project

XSEDE

Didn't find your organization? Then use [Globus ID to sign in.](#) ([What's this?](#))

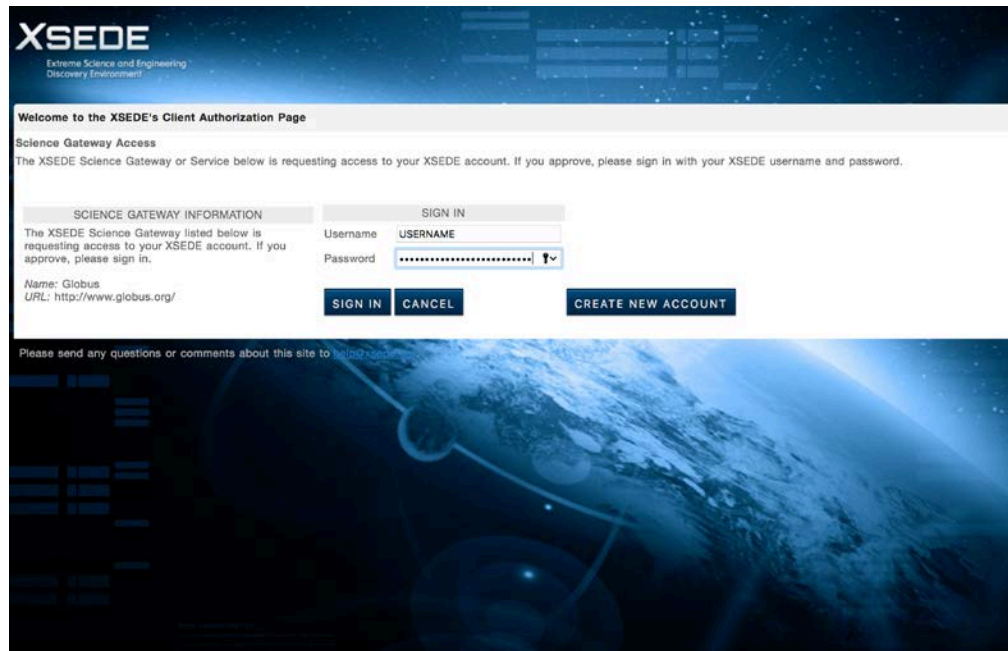
Continue

Or

Sign in with Google

Jetstream's Atmosphere Interface

Authenticate with the
chosen identity provider



XSEDE
Extreme Science and Engineering
Discovery Environment

Welcome to the XSEDE's Client Authorization Page

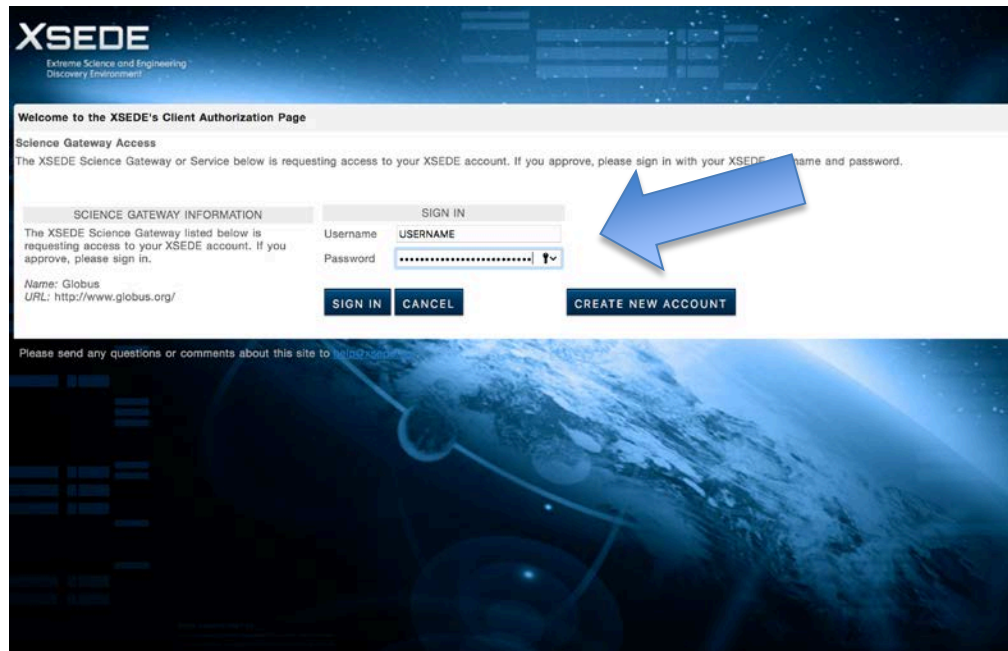
Science Gateway Access
The XSEDE Science Gateway or Service below is requesting access to your XSEDE account. If you approve, please sign in with your XSEDE username and password.

SCIENCE GATEWAY INFORMATION	SIGN IN
The XSEDE Science Gateway listed below is requesting access to your XSEDE account. If you approve, please sign in.	Username <input type="text" value="USERNAME"/>
Name: Globus URL: http://www.globus.org/	Password <input type="password" value="*****"/>
	<input type="button" value="SIGN IN"/> <input type="button" value="CANCEL"/> <input type="button" value="CREATE NEW ACCOUNT"/>

Please send any questions or comments about this site to help@xse.de

Jetstream's Atmosphere Interface

Authenticate with the
chosen identity provider



XSEDE
Extreme Science and Engineering
Discovery Environment

Welcome to the XSEDE's Client Authorization Page

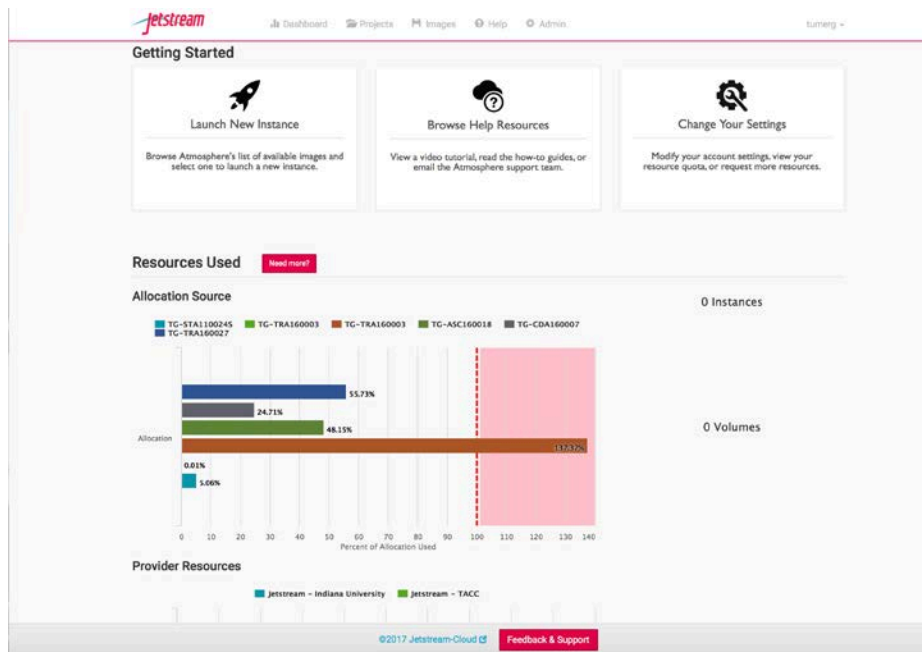
Science Gateway Access
The XSEDE Science Gateway or Service below is requesting access to your XSEDE account. If you approve, please sign in with your XSEDE username and password.

SCIENCE GATEWAY INFORMATION	SIGN IN
The XSEDE Science Gateway listed below is requesting access to your XSEDE account. If you approve, please sign in.	Username <input type="text" value="USERNAME"/>
Name: Globus URL: http://www.globus.org/	Password <input type="password" value="*****"/>
	<input type="button" value="SIGN IN"/> <input type="button" value="CANCEL"/> <input type="button" value="CREATE NEW ACCOUNT"/>

Please send any questions or comments about this site to help@xse.de

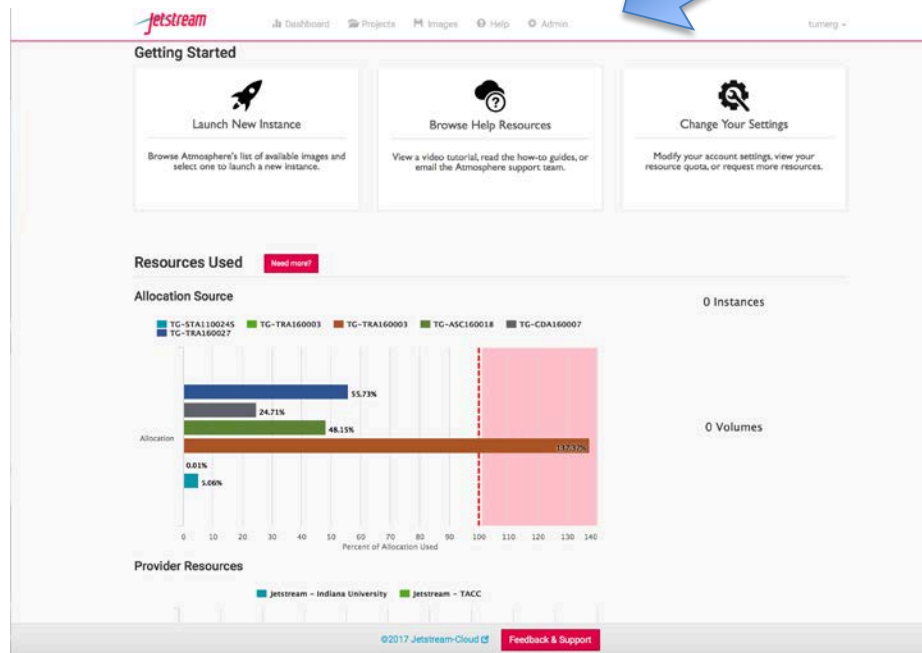
Jetstream's Atmosphere Interface

user's home dashboard



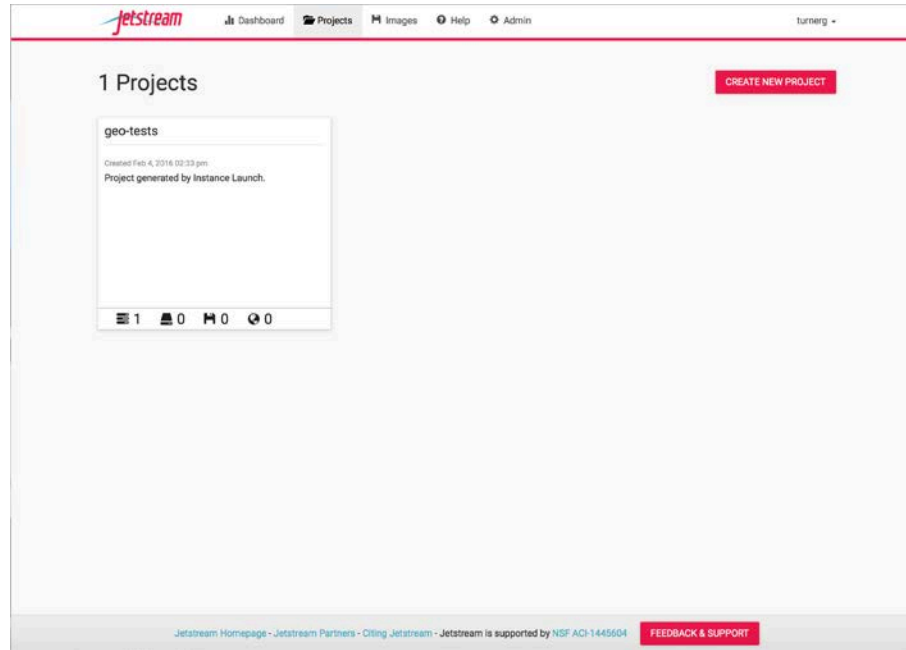
Jetstream's Atmosphere Interface

user's home dashboard



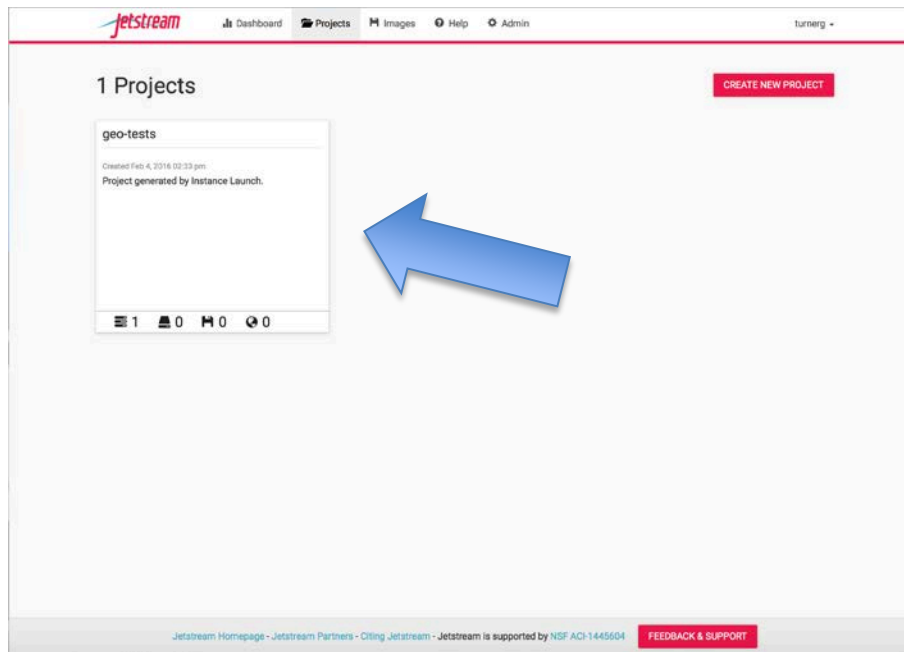
Jetstream's Atmosphere Interface

user's project dashboard



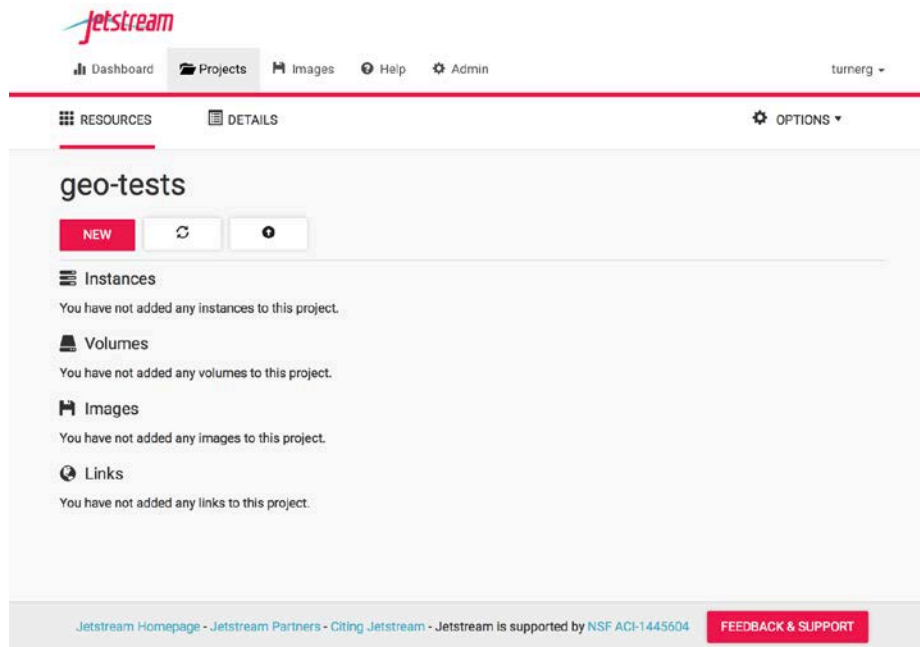
Jetstream's Atmosphere Interface

user's project dashboard



Jetstream's Atmosphere Interface

user's project details



The screenshot displays the Jetstream Atmosphere interface for a user's project details. At the top, the Jetstream logo is on the left, and navigation links for Dashboard, Projects, Images, Help, and Admin are in the center. The user's name 'turnerg' is on the right. Below the navigation bar, there are tabs for 'RESOURCES' and 'DETAILS', with 'DETAILS' selected. An 'OPTIONS' menu is also visible. The main content area is titled 'geo-tests' and contains a 'NEW' button, a refresh icon, and a settings icon. Below this, there are sections for 'Instances', 'Volumes', 'Images', and 'Links', each with a message stating 'You have not added any [resource] to this project.' At the bottom of the interface, there is a footer with links to the Jetstream Homepage, Partners, and Citing Jetstream, along with the text 'Jetstream is supported by NSF ACI-1445604' and a 'FEEDBACK & SUPPORT' button.

Jetstream's Atmosphere Interface

Instance ready for use



The screenshot displays the Jetstream Atmosphere interface. At the top, there is a navigation bar with the Jetstream logo, a user profile 'turnerg', and menu items for Dashboard, Projects, Images, Help, and Admin. Below this is a secondary navigation bar with 'RESOURCES' and 'DETAILS' tabs, and an 'OPTIONS' gear icon. The main content area is titled 'geo-tests' and includes a 'NEW' button, a refresh icon, and a help icon. A table titled 'Instances' shows one instance: 'geo-demo-CentOS7-001' with a status of 'Active', IP address '149.165.156.173', size 'M1.Small', and provider 'Jetstream - Indiana University'. Below the table are sections for 'Volumes', 'Images', and 'Links', each with a message stating that no items have been added to the project. At the bottom, there is a footer with navigation links and a 'FEEDBACK & SUPPORT' button.

Name	Status	Activity	IP Address	Size	Provider
<input type="checkbox"/> geo-demo-CentOS7-001	Active	N/A	149.165.156.173	M1.Small	Jetstream - Indiana University

Jetstream's Atmosphere Interface

starting an instance

The screenshot displays the Jetstream Atmosphere interface. At the top, the Jetstream logo is on the left, and navigation links for Dashboard, Projects, Images, Help, and Admin are in the center. The user 'turnerg' is logged in on the right. Below the navigation bar, there are tabs for RESOURCES and DETAILS, and an OPTIONS menu. The main content area is titled 'geo-tests' and features a 'NEW' button with a dropdown menu containing 'Instance', 'Volume', 'Link', and 'Volumes'. Below this, there are sections for 'Instances to this project', 'Volumes', 'Images', and 'Links', each with a message stating 'You have not added any [resource] to this project.' At the bottom of the interface, there is a footer with links to the Jetstream Homepage, Partners, and Citing Jetstream, along with the text 'Jetstream is supported by NSF ACI-1445604' and a 'FEEDBACK & SUPPORT' button.

Jetstream's Atmosphere Interface

pick an image from library

Launch an Instance / Select an Image

First choose an image for your instance

Show Featured Show Favorites Show All

Search across image name, tag or description

Showing first 11 images

Image Icon	Image Name	Description	Tags
	CentOS 6 (6.8) Development GUI	Based on CentOS 6 (6.8) Development - updated from 6.7 to 6.8	CentOS desktop development Featured gui iRODS vnc
	Centos 7 (7.3) Development GUI	Centos 7 (7.3) Development GUI	CentOS development Featured gui iRODS
	Galaxy Standalone	Galaxy Standalone - based on Ubuntu 14.04.4 LTS This is a standalone Galaxy server that comes preconfigured with	community-contributed Featured m1_large Ubuntu

Advanced Options

CANCEL LAUNCH INSTANCE

Jetstream's Atmosphere Interface

Instance's details; e.g. name, flavor, allocation, etc.

Launch an Instance / Basic Options

Basic Info

Instance Name: geo-demo-CentOS7-001

Base Image Version: 1.10

Project: geo-tests

Resources

Allocation Source: TG-TRA160003

Provider: Jetstream - Indiana University

Instance Size: m1.small (CPU: 2, Mem: 4 GB, Disk: 20 GB)

Allocation Used: 72% of 1500000 SUs from TG-TRA160003

Resources Instance will Use

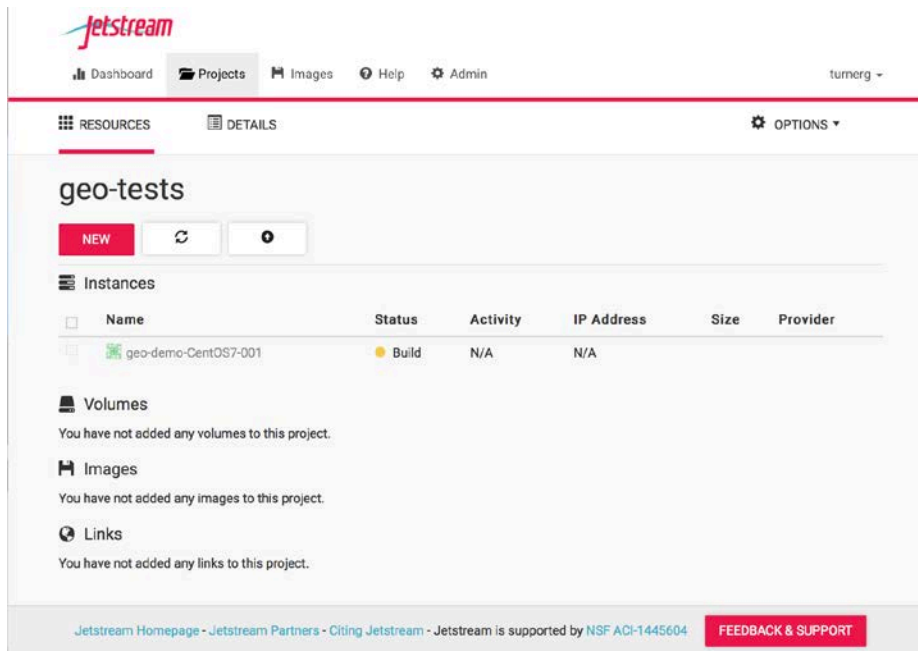
A total of 2 of 132 allotted CPUs

A total of 4 of 360 allotted GBs of Memory

← Back Advanced Options CANCEL LAUNCH INSTANCE

Jetstream's Atmosphere Interface

Instance is building

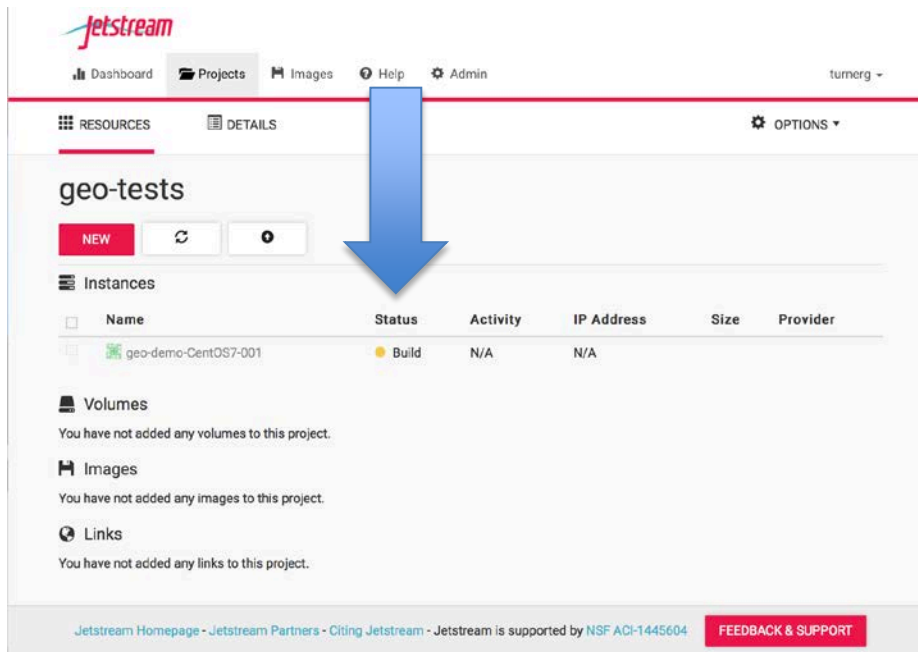


The screenshot displays the Jetstream Atmosphere interface. At the top, there is a navigation bar with the Jetstream logo, a user profile 'turnerg', and menu items for Dashboard, Projects, Images, Help, and Admin. Below this is a secondary navigation bar with 'RESOURCES' and 'DETAILS' tabs, and an 'OPTIONS' dropdown. The main content area is titled 'geo-tests' and includes a 'NEW' button, a refresh icon, and a help icon. A table titled 'Instances' shows one instance: 'geo-demo-CentOS7-001' with a status of 'Build', activity of 'N/A', and IP address of 'N/A'. Below the table are sections for 'Volumes', 'Images', and 'Links', each with a message stating 'You have not added any [volumes/images/links] to this project.' At the bottom, there is a footer with links to the Jetstream Homepage, Partners, and Citing Jetstream, along with a note that Jetstream is supported by NSF ACI-1445604 and a 'FEEDBACK & SUPPORT' button.

Name	Status	Activity	IP Address	Size	Provider
geo-demo-CentOS7-001	Build	N/A	N/A		

Jetstream's Atmosphere Interface

Instance is building



The screenshot displays the Jetstream Atmosphere interface for a project named "geo-tests". The top navigation bar includes "Dashboard", "Projects", "Images", "Help", and "Admin". The user "turnerg" is logged in. The main content area shows the project name "geo-tests" and a "NEW" button. Below this is a table of instances:

Name	Status	Activity	IP Address	Size	Provider
geo-demo-CentOS7-001	Build	N/A	N/A		

Below the instances table, there are sections for "Volumes", "Images", and "Links", each with a message stating "You have not added any [resources] to this project." At the bottom, there is a footer with links to "Jetstream Homepage", "Jetstream Partners", and "Citing Jetstream", along with a "FEEDBACK & SUPPORT" button.

Jetstream's Atmosphere Interface

...still building

The screenshot shows the Jetstream Atmosphere interface. At the top, there is a navigation bar with 'Dashboard', 'Projects', 'Images', 'Help', and 'Admin'. Below this is a secondary navigation bar with 'RESOURCES' and 'DETAILS'. The main content area is titled 'geo-tests' and includes a 'NEW' button, a refresh icon, and a settings icon. Under the 'Instances' section, there is a table with the following data:

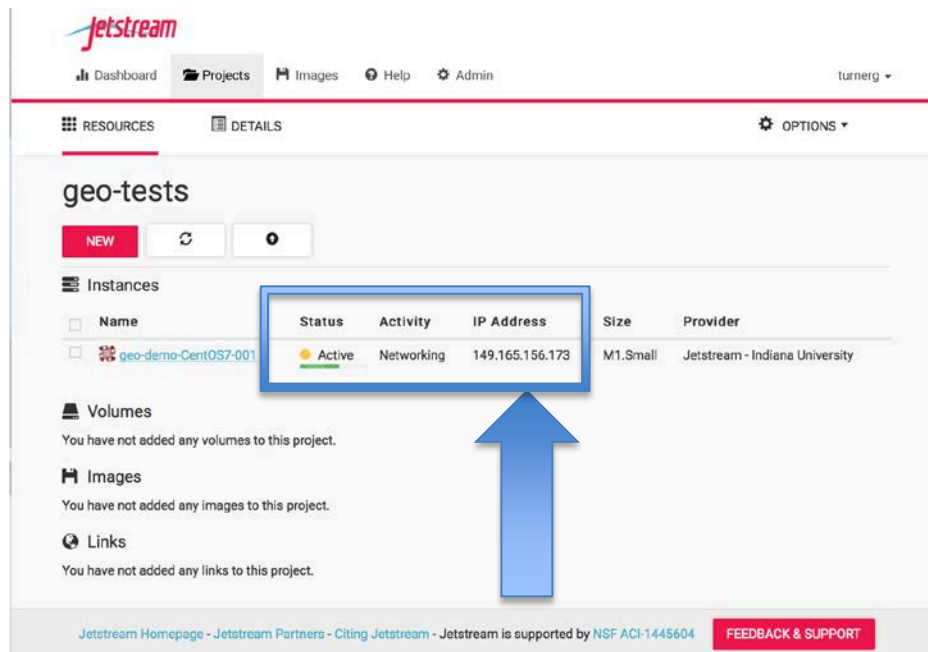
Name	Status	Activity	IP Address	Size	Provider
geo-demo-CentOS7-001	Active	Initializing	172.18.63.4	11.Small	Jetstream - Indiana University

Below the table, there are sections for 'Volumes', 'Images', and 'Links', each with a message stating 'You have not added any [resources] to this project.' At the bottom of the interface, there is a footer with links to 'Jetstream Homepage', 'Jetstream Partners', 'Citing Jetstream', and 'Jetstream is supported by NSF ACI-1445604', along with a 'FEEDBACK & SUPPORT' button.

Atmosphere is doing the hard part (systems administration) of virtualized computing

Jetstream's Atmosphere Interface

...still building



The screenshot shows the Jetstream Atmosphere interface. At the top, there is a navigation bar with 'Dashboard', 'Projects', 'Images', 'Help', and 'Admin'. The user 'turnerg' is logged in. Below the navigation bar, there are tabs for 'RESOURCES' and 'DETAILS', and an 'OPTIONS' button. The main content area is titled 'geo-tests' and contains a 'NEW' button, a refresh icon, and a settings icon. Underneath, there is a section for 'Instances' with a table. A blue box highlights the 'Status', 'Activity', and 'IP Address' columns of the table, and a blue arrow points to the 'IP Address' column. The table has the following data:

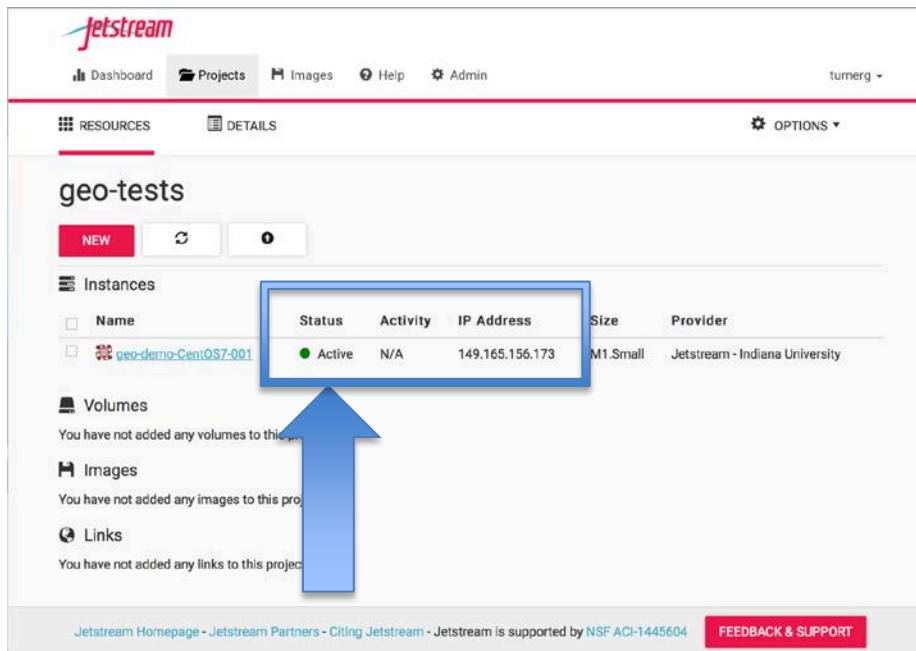
Name	Status	Activity	IP Address	Size	Provider
<input type="checkbox"/> geo-demo-CentOS7-001	Active	Networking	149.165.156.173	M1.Small	Jetstream - Indiana University

Below the table, there are sections for 'Volumes', 'Images', and 'Links', each with a message stating 'You have not added any [resources] to this project.' At the bottom of the interface, there is a footer with links to 'Jetstream Homepage', 'Jetstream Partners', 'Citing Jetstream', and 'Jetstream is supported by NSF ACI-1445604', along with a 'FEEDBACK & SUPPORT' button.

Atmosphere is doing the hard part (systems administration) of virtualized computing; e.g. building the network, routers, & virtual switches

Jetstream's Atmosphere Interface

Instance ready for use



The screenshot shows the Jetstream Atmosphere interface. The top navigation bar includes 'Dashboard', 'Projects', 'Images', 'Help', and 'Admin'. The user 'turnerg' is logged in. The main content area is titled 'geo-tests' and features a 'NEW' button and a refresh icon. Below this is a table of instances:

Name	Status	Activity	IP Address	Size	Provider
<input type="checkbox"/> geo-demo-CentOS7-001	Active	N/A	149.165.156.173	M1.Small	Jetstream - Indiana University

Below the table are sections for 'Volumes', 'Images', and 'Links', each with a message indicating that no items have been added to the project.

...and in the end, all you need to do is log in and start doing science & engineering

Jetstream's Atmosphere Interface

User's instance dashboard

The screenshot displays the Jetstream Atmosphere interface for a user named 'turnerg'. The main content area shows the details for an instance named 'geo-tests'. The instance is associated with the resource 'geo-demo-CentOS7-001' and is currently active. The allocation source is 'TG-TRA160003', and 72% of the 1500000 SUs are used. The instance details include: Status: Active, Activity: N/A, Size: m1.small (2 CPUs, 4 GB memory, 20 GB disk), IP Address: 149.165.156.173, Launched: May 10, 2017 (7 minutes ago), ID: 12234, and Alias: 637d02c7-b993-4577-bfbb-d1057267c30b. The Actions menu on the right includes Report, Image, Suspend, Shelve, Stop, Reboot, Redeploy, and Delete. The Links menu includes Open Web Shell and Open Web Desktop. The footer contains the Jetstream logo, a list of partners, and a feedback link.

Jetstream's Atmosphere Interface

User's instance dashboard
Instance's details

Allocation Source

TG-TRA160003

Allocation Used

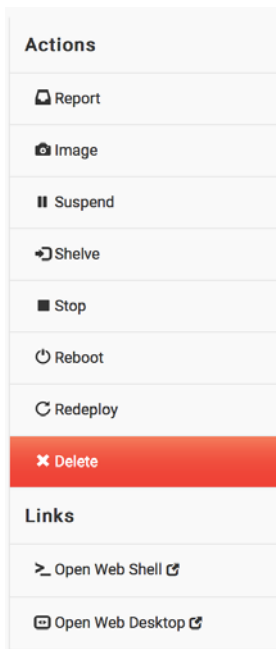
72% of 1500000 SUs from TG-TRA160003

Instance Details

Status	● Active
Activity	N/A
Size	m1.small (2 CPUs, 4 GB memory, 20 GB disk)
IP Address	149.165.156.173 Copy
Launched	May 10, 2017 (7 minutes ago)
ID	12234
Alias	637dd2c7-b993-4577-bfbb-d10572d7c30b Copy

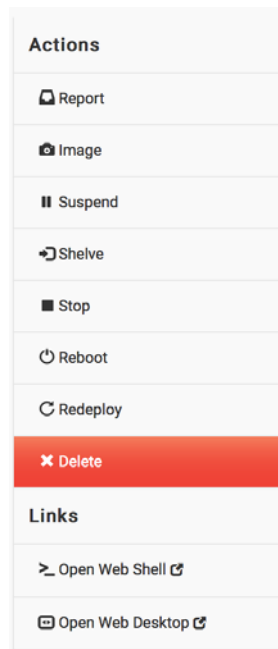
Jetstream's Atmosphere Interface

User's instance dashboard
Action requests



Jetstream's Atmosphere Interface

User's instance dashboard
Action requests



Open Web Shell

Jetstream's Atmosphere Interface

Web Shell access to instance
External ssh access also available



```
The following SSH identities are being used for this connection:
turnerg_default

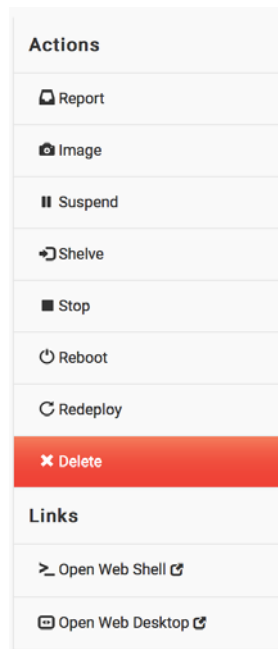
Warning: Permanently added '149.165.156.173' (ECDSA) to the list of known hosts.
Last login: Wed May 18 11:47:17 2017
welcome to

Atmosphere

[js-156-173] turnerg --->
```

Jetstream's Atmosphere Interface

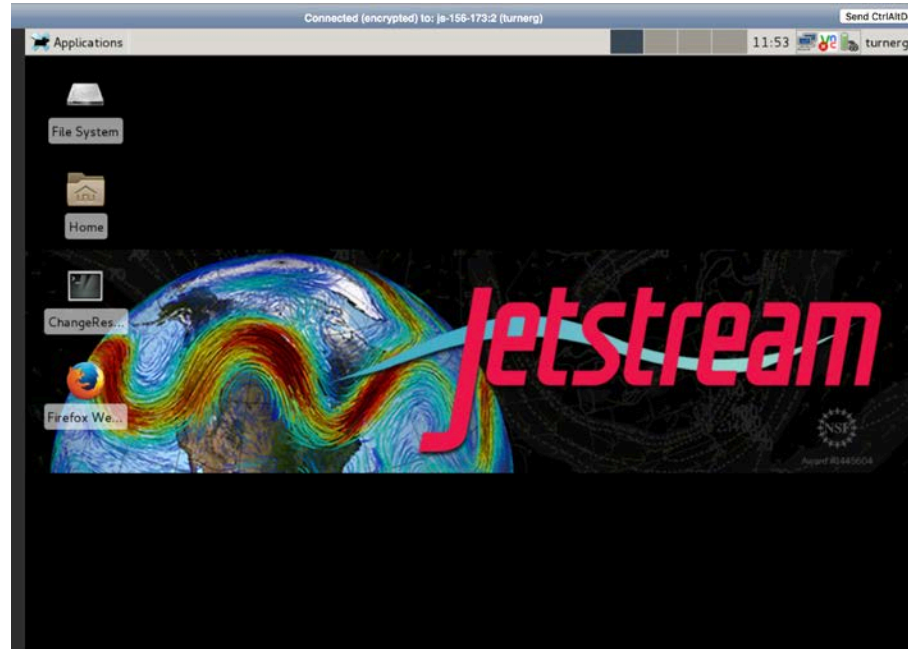
User's instance dashboard
Action requests



Open Web Desktop

Jetstream's Atmosphere Interface

Web desktop access to instance
VNC access also available



API Access to Jetstream

- What was **unexpected**
 - **Demand** for **programmable cyberinfrastructure**
 - Great platform for learning system administration skills
 - Great platform for **teaching & learning cloudy technologies**
- **Command line clients**
- **Horizon dashboard** very popular; but, incomplete
- **Programmatic control**; python is popular
- **Slack channel** for collaboration API users of Jetstream

How do we onboard users onto Jetstream?

- An **XSEDE User Portal (XUP) account** is required. They are free! Get one at <https://portal.xsede.org>
- **Work with your XSEDE Campus Champion.**
- Submit an **allocations request**
 - Read the Allocations Overview - <https://portal.xsede.org/allocations-overview>
 - Writeup an allocation request – **start with a Startup or Education request** - <https://portal.xsede.org/successful-requests>
- **Easy Button:** instant access to small, limited instances while the allocation request is processed and the user is vetted.

Jetstream Information Sources

- Twitter: @jetstream-cloud
- Jetstream's web interface: <https://use.jetstream-cloud.org/>
- XSEDE User Portal account is required to actually login: <https://portal.xsede.org>
- Jetstream Home page: <http://jetstream-cloud.org/>
- Jetstream's Public Wiki: <https://iujetstream.atlassian.net/wiki/display/JWT/Jetstream+Public+Wiki>

Jetstream Information Sources (Cont.)

- Paper describing Jetstream [Jetstream: A self-provisioned, scalable science and engineering cloud environment](#)
- Configuration management: <https://github.com/jetstream-cloud/Jetstream-Salt-States>
- **For questions, comments, etc. of any manner, help@xsede.org**
 - Put Jetstream in the Subject line for proper routing.

Jetstream Partners



funded by the National Science Foundation
Award #ACI-1445604



Questions?

Project website: <http://jetstream-cloud.org/>

Project email: jethelp@iu.edu

Direct email: turnerg@iu.edu

License Terms

- Turner, G.. 2017. Jetstream: Cloud Facility for Advancing Scientific Communities: Modeling Research in the Cloud Workshop, UCAR, Boulder, CO. Also available at: <http://jetstream-cloud.org/publications.php>
- Jetstream is supported by NSF award 1445604 (Craig Stewart, IU, PI)
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- This research was supported in part by the Indiana University Pervasive Technology Institute, which was established with the assistance of a major award from the Lilly Endowment, Inc. Opinions presented here are those of the author(s) and do not necessarily represent the views of the NSF, IUPTI, IU, or the Lilly Endowment, Inc.
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