

# Jetstream

## Jetstream Overview

Jetstream: A national research and education cloud

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Award #ACI-1445604

# What is Jetstream?

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- First managed production cloud for science and engineering research
- Interactive computing and data analysis resources “on demand”
- Part of the NSF eXtreme Digital (XD) program



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# What is Jetstream?

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- Focus on ease-of-use, broad accessibility
- Reproducibility: Share VMs and then store, publish via IU Scholarworks (DOI)
- Will support persistent gateways (iPlant, Galaxy, generic “SciGAP” build-a-gateway image)
- The primary goal set by IU and its partners in implementing Jetstream is to create a resource that expands the users of XD program resources beyond the current community of users.
- VM library, custom VMs, or “private computing system”

# Not just another XD resource (Why Jetstream?)

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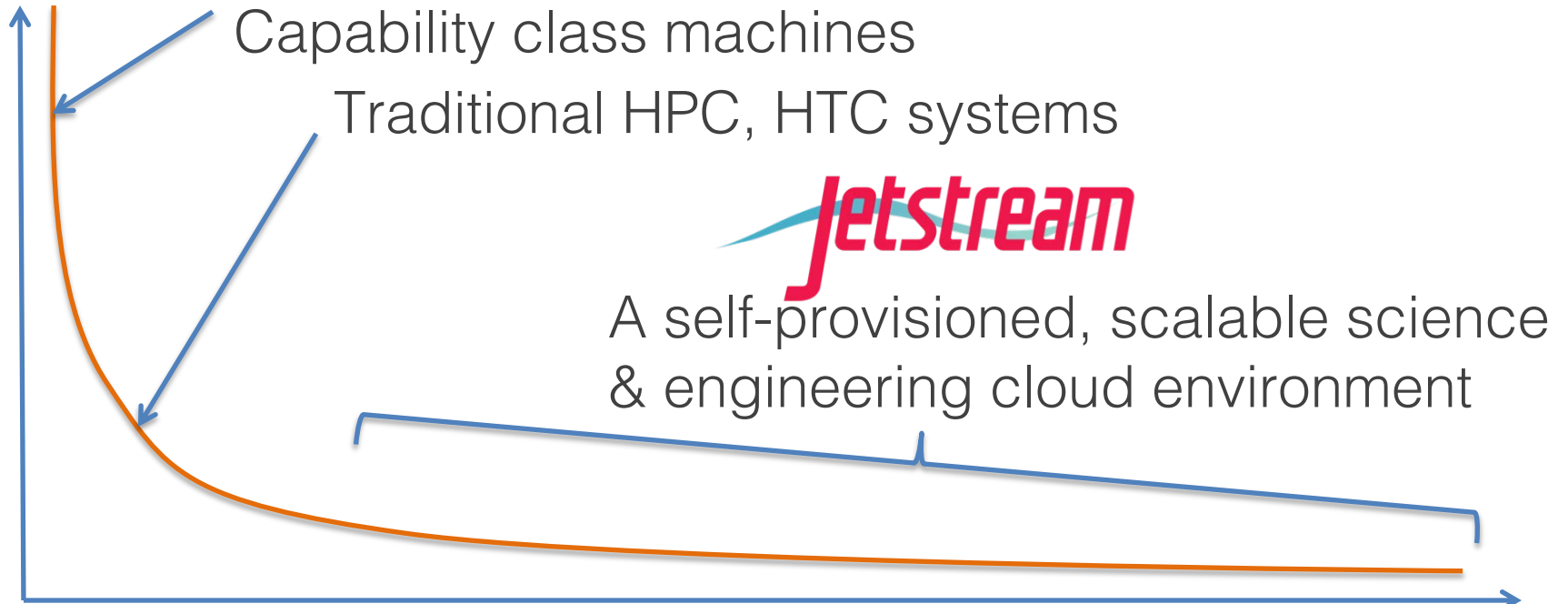
- National Science Foundation (NSF) estimates that 299,000 researchers, educators, and learners received direct support during the year ending September 2013
- Only 1.5% of those completed a computation, data analysis, or visualization task on XD resources
- Less than 3% had an account on the XSEDE portal.
- Jetstream will be a new, interactive cloud-based system that, through its scale and flexibility, will dramatically enhance the diversity and size of the US researcher community benefiting from XD resources.

# Who will use Jetstream?

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- For the researcher needing a handful of cores (1 to 44/VM)
- Software creators and researchers needing to create their own customized virtual machines and workflows
- Science gateway creators using Jetstream as either the frontend or processor for scientific jobs
- STEM Educators teaching on a variety of subjects

# “Long tail” of the NSF XD Ecosystem



# Science Domains

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- Biology: iPlant and Galaxy VMs – Galaxy Gateways vs Galaxy VM image
- Earth Science: NSIDC data analysis, EarthCube ECITE/CHORDS
- Field Station Research: VM-based data collection and analysis tools to support data sharing and collaboration
- GIS: Deliver the CyberGIS toolkit and provide access to ArcGIS in a VM using IU's existing site license
- Network Science: Build VMs with CShell tool builders to deliver network analysis tools interactively, Network Workbench gateway and VM
- Social Sciences: Create VMs that allow selection of data from the Odum Institute in a way that retains provenance and version information
- Computer Science/Cyberinfrastructure: RADICAL Tools, several education allocations
- Whatever you do, probably ...unless you run large scale MPI codes or HTC workloads!

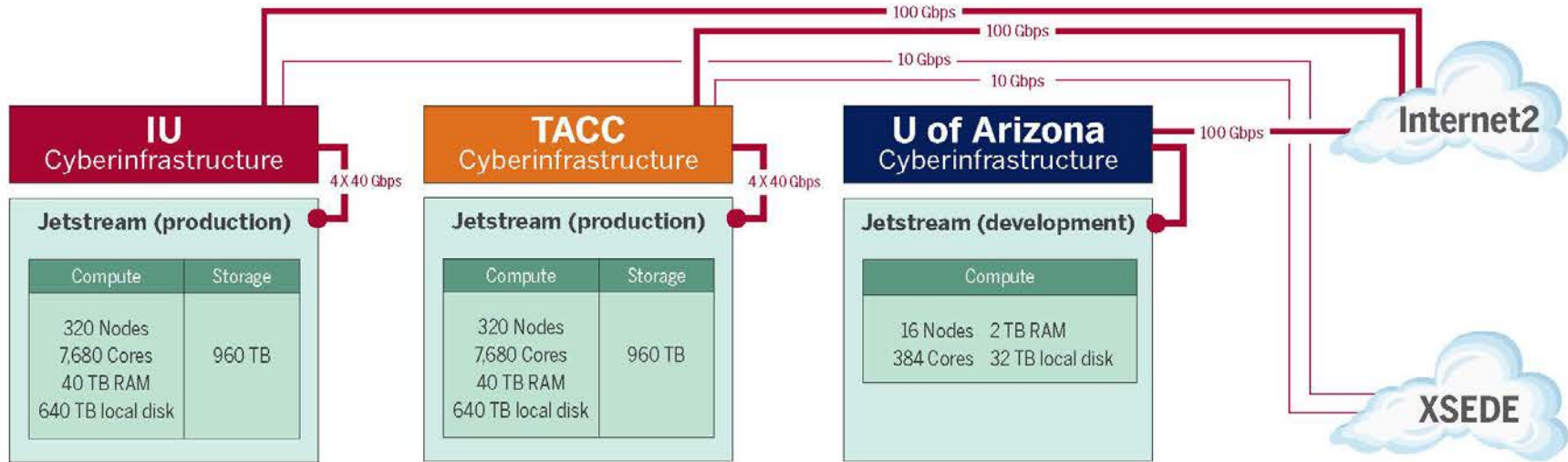
# 21st century workforce development

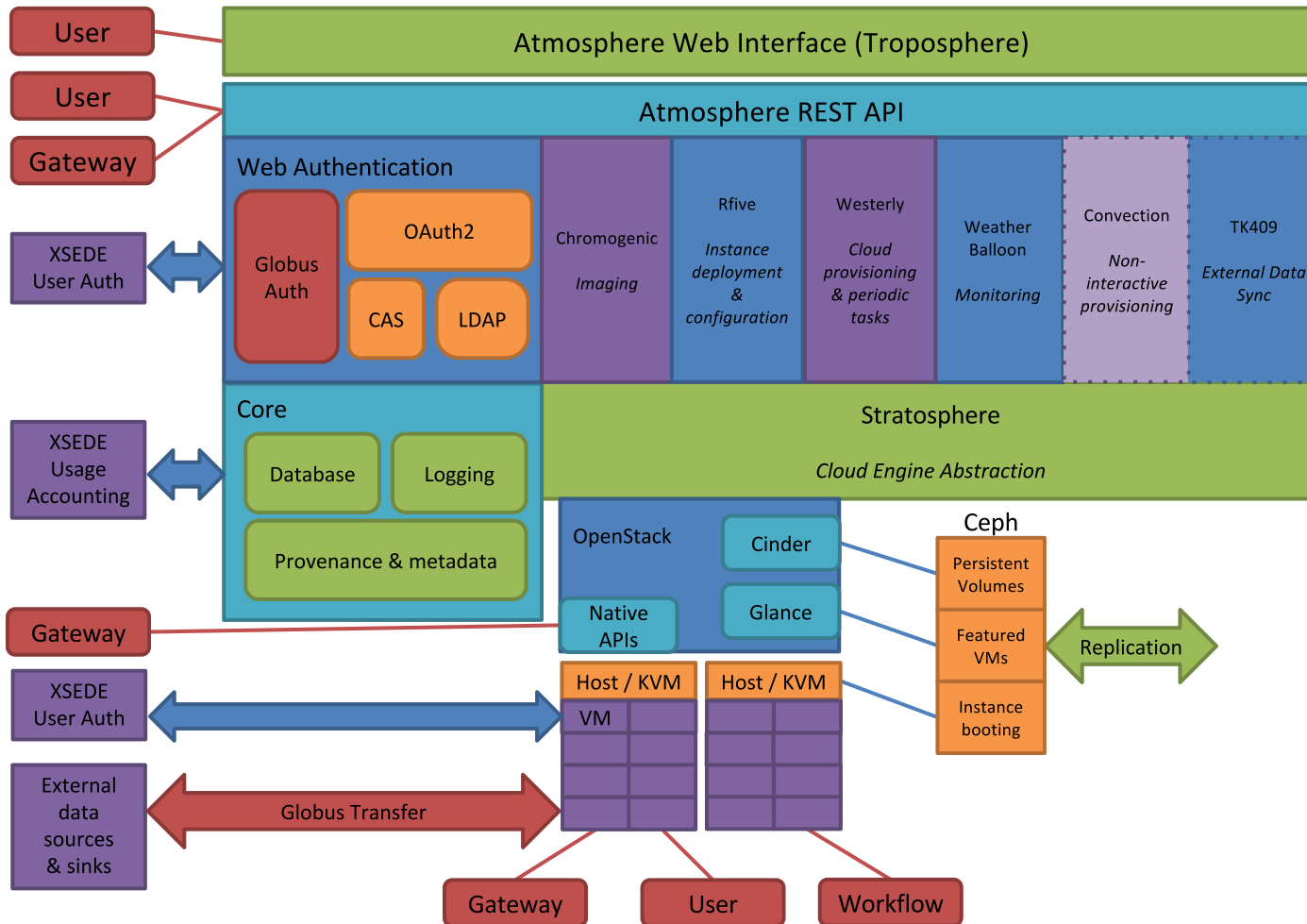
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- Specialized virtual Linux desktops and applications to enable research and research education at small colleges and universities
- HBCUs (Historically Black Colleges and Universities)
- MSIs (Minority Serving Institutions)
- Tribal colleges
- Higher-education institutions in EPSCoR States



# Jetstream System Overview





# The Jetstream Interface

The screenshot shows the 'Getting Started' page of the Jetstream interface. It features three main action cards: 'Launch New Instance' (with a rocket icon), 'Browse Help Resources' (with a question mark icon), and 'Change Your Settings' (with a gear icon). Below these is a 'Resources in Use' section with a bar chart showing 'Percent of Allocation Used' for CPU, Memory, Storage, Volumes, and Allocation. A donut chart indicates '1 Instances' (active - deploy\_error) and '0 Volumes'. An 'Instance History' section shows a list of 5 instances launched. The page includes navigation links for Dashboard, Projects, Images, Providers, and Help, and a user profile 'jfisher-'. At the bottom, there is a URL bar with 'http://www.jetstream-cloud.org/application/images/5', a copyright notice '©2016 Jetstream', and a 'Feedback & Support' button.

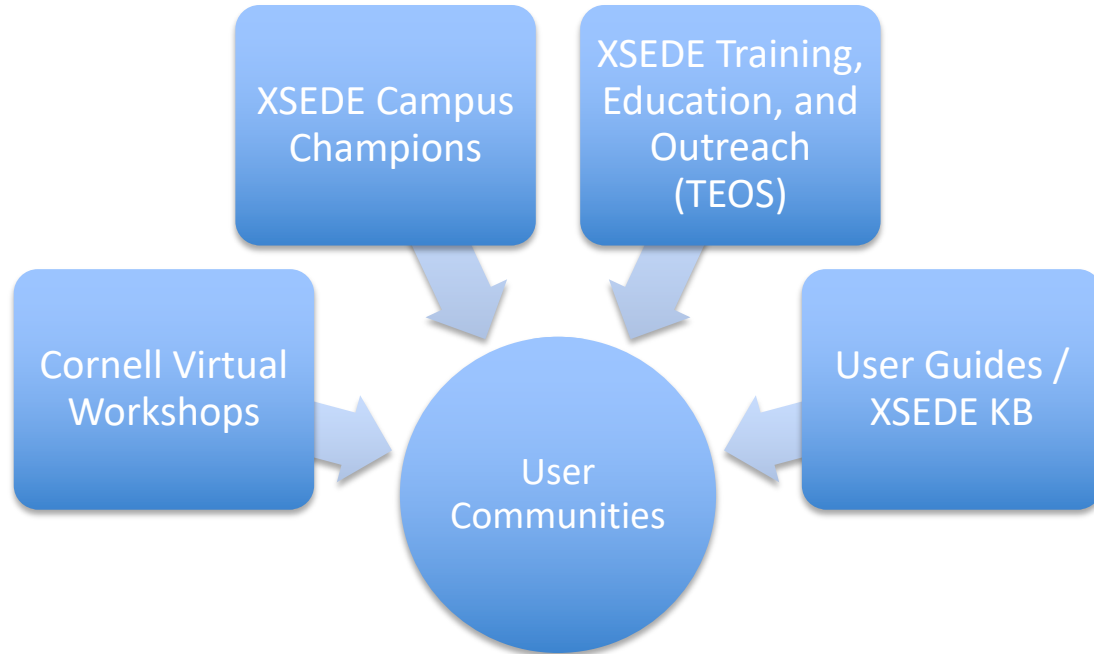
The screenshot shows the 'Images' page of the Jetstream interface. It features a search bar with the text 'Search across image name, tag or description'. Below the search bar, it displays 'Showing 7 of 7 images' and a toggle for 'List' and 'Grid' views. The 'Featured Images' section highlights two images: 'MAKER-P 2.28 with CCTools 5' and 'TSW Workshop Williams 1.2'. Each image card includes a green icon, the image name, the creator 'edwintest3', the creation date and time, and a brief description. The 'All Images' section lists the same two images. The page includes navigation links for Dashboard, Projects, Images, Providers, and Help, and a user profile 'jfisher-'. At the bottom, there is a URL bar with 'http://www.jetstream-cloud.org/application/images/5', a copyright notice '©2016 Jetstream', and a 'Feedback & Support' button.

# Now that we've seen the interface...

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- How do we expect gateway users will use Jetstream ?
  - API access, persistent or on demand (or both!)
- What about Comet?
  - A little different scope – Virtual cluster vs total control over VM and nodes
- But...Bridges...
  - Implementation still remains to be seen, but not an on demand resource
- All excellent options, depending on your needs

# Supporting Jetstream Users



# Jetstream Timeline...what comes next?

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- Production system has arrived and is installed at both locations
- Early operations mode is underway at IU and TACC
- As of mid March 2016, there were 24 XSEDE projects on Jetstream and 99 distinct users – growing daily!
- Acceptance work on production systems is proceeding with the NSF review scheduled for the first week of May
- Full, unrestricted operations after system is accepted
- Soliciting research allocation requests NOW as well as Startups and Education allocations

# Where can I get help or learn more?

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- Production:
  - User guides: <https://portal.xsede.org/user-guides>
  - XSEDE KB: <https://portal.xsede.org/knowledge-base>
  - Email: [help@xsede.org](mailto:help@xsede.org)
  - Campus Champions: <https://www.xsede.org/campus-champions>
  - Training Videos / Virtual Workshops (TBD)
- Early operations:
  - <http://jetstream-cloud.org/> & <http://wiki.jetstream-cloud.org>
  - Early use: [help@jetstream-cloud.org](mailto:help@jetstream-cloud.org)

# Jetstream Partner Organizations

## Initial construction partners

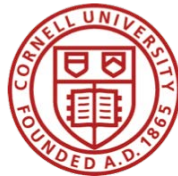


THE UNIVERSITY  
OF ARIZONA.



JOHNS HOPKINS  
UNIVERSITY

## Management & Operations partners



## Application / community lead partners



UNIVERSITY  
of ARKANSAS  
AT PINE BLUFF  
—1873—



UNC  
THE ODUM INSTITUTE



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# Questions?

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

Project email: [help@jetstream-cloud.org](mailto:help@jetstream-cloud.org) Direct email: [jeremy@iu.edu](mailto:jeremy@iu.edu)

## License Terms

- Fischer, Jeremy. March 25, 2016. Jetstream Overview – Gateways Community Call. Also available at: <http://jetstream-cloud.org/publications.php>
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