Hands-on with Jetstream

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What is Jetstream?

A **production cloud platform** for NSF-sponsored researchers

- Provides **on-demand interactive computing** and analysis
- Enables **configurable environments** and architectures
- Supports **computational reproducibility** and sharing
- Democratizes access to **cloud-native software**
- Focused on **ease of use** for all adopters

Expands the community of users who benefit from NSF investment in shared cyberinfrastructure

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http://jetstream-cloud.org/

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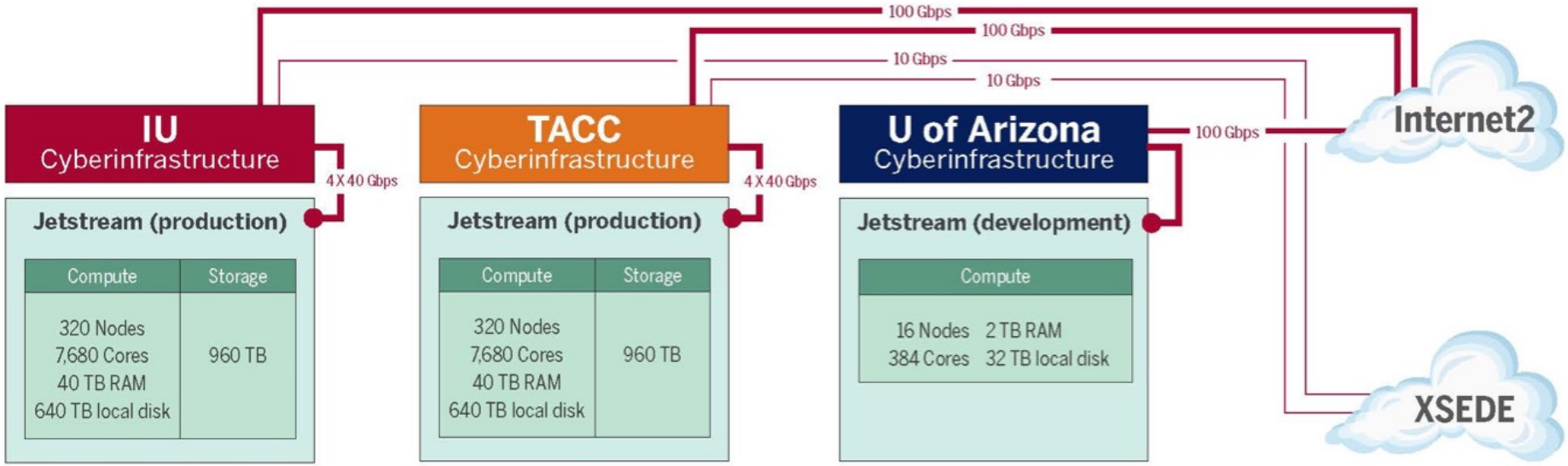
System Overview



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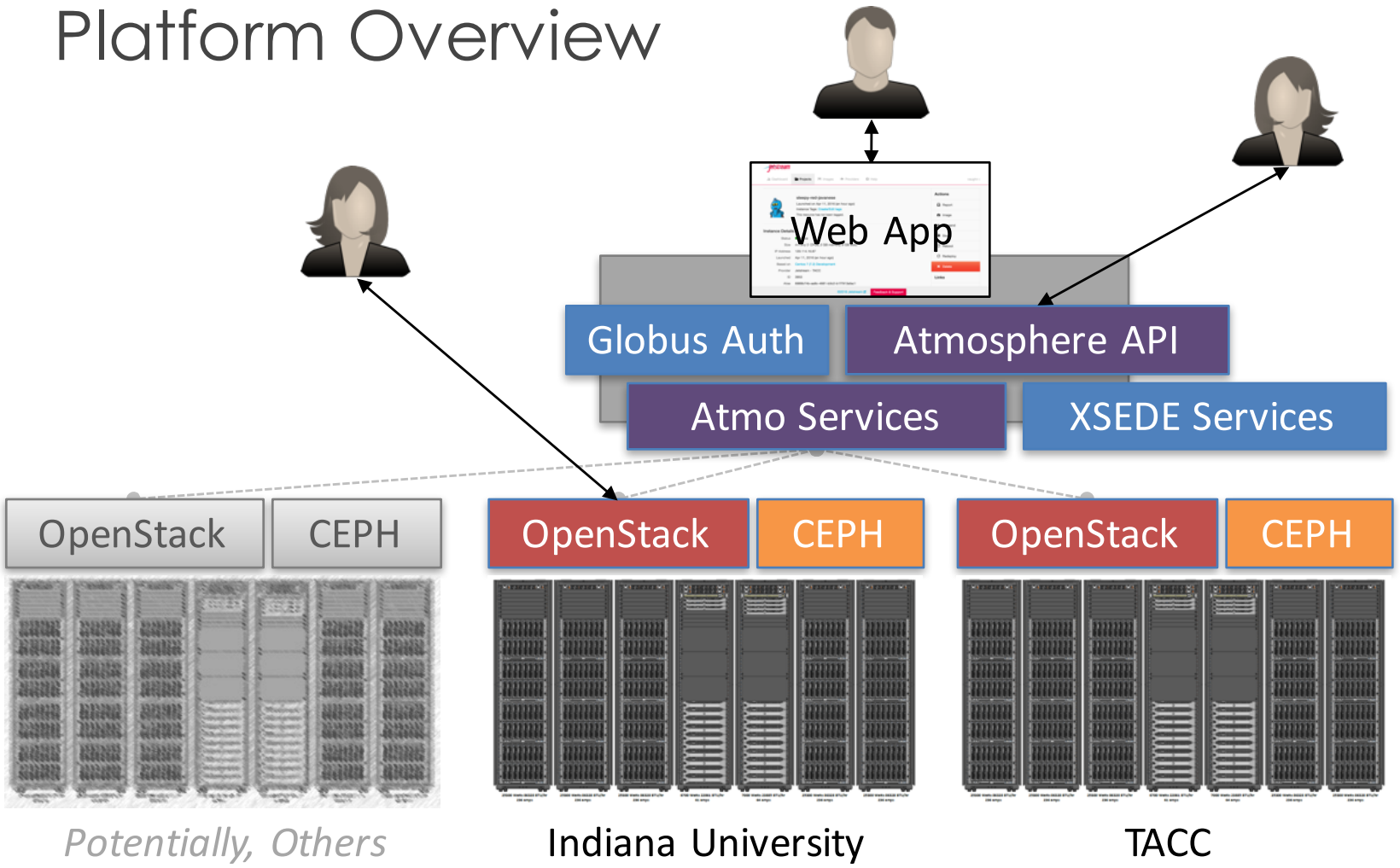

Usage modalities

Three modes of use

- Interactive user access, via web interface and VNC/SSH
- Persistent access via Science Gateways and other "always on" services
- Services launched programmatically on demand; e.g. elastic compute techniques

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Hardware Specifics

VM Host Configuration

- Dual Intel E-2680v3 “Haswell”
- 24 physical cores/node @ 2.5 GHz (Hyperthreading on)
- 128 GB RAM
- Dual 1 TB local disks
- 10GB dual uplink NIC
- Running Centos7+KVM Hypervisor

CEPH Storage

- 20x Dell 730xd per cloud
- 2x10Gbs bonded NIC per 730xd
- Running CEPH 0.94.5 Hammer
- Configured as OpenStack Storage

Flavor	vCPUs	RAM	Storage	Per Node
m.tiny	1	2	20	46
m.small	2	4	40	23
m.medium	6	16	130	7
m.large	10	30	230	4
m.xlarge	22	60	460	2
m.xxlarge	44	120	920	1

- Storage is XSEDE-allocated
- Implemented on backend as OpenStack Volumes
- Each user gets 10 volumes up to 500GB total storage
- Exploring object storage as well but that’s in the future

What do you optimize for?

- HPC
  - Utilization
  - Capability or Capacity Science
  - Checkpoint/Restart I/O
  - Memory/Network Bandwidth & Latency
- Cloud
  - Availability and continuity
  - Multi-level API Interactions
  - On-demand/Interactive Use
  - Using commodity components

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Reservations & Queueing

- HPC
  - Staples of the HPC world with powerful tools (e.g. Moab/Slurm)
  - Decades of expertise and tuning
  - Condo computing "anti-batch"
- Cloud
  - No reservations, no queueing, refocus
    - Some opposition to these concepts
  - Reserved instances perceived as "anti-cloud"
  - Factions in OS community
    still pushing to enable them like in public cloud$

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Opportunities & Challenges

- Opportunities
  - Serving an unmet need with immense & intense interest
  - Affordable HA
  - Satisfying users' visions (SUNY & Galaxy)
- Challenges
  - Need "cloud-washing" for users/staff
    - What, no parallel file system?
  - Logs are verbose and cryptic
  - Rapid development cycle
    - Quickly deprecate functionality
    - Undocumented change
  - Public IPv4 IPs (why IPv6 is important!)

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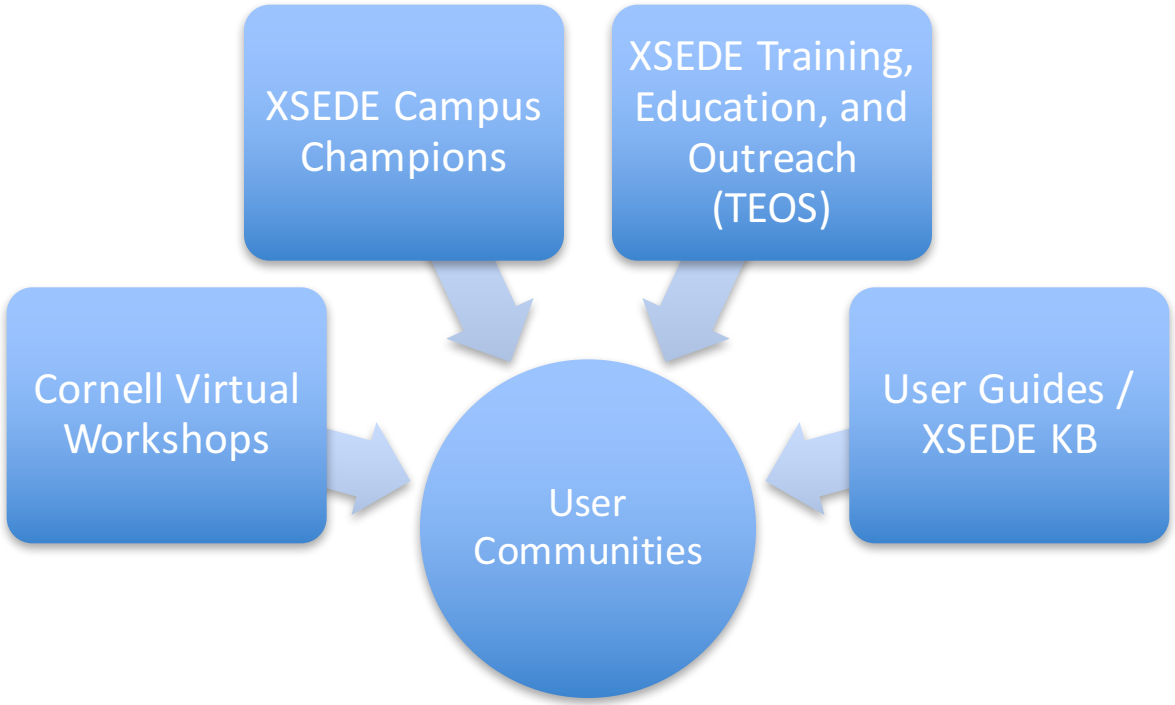
Supporting Jetstream Users



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Jetstream Timeline…what comes next?

- Both sites have all required software components installed, configured, and operational
- Transitioning to full operations September 1
- Early July 2016: **118 XSEDE projects and 250+ users**
- Soliciting *Research* allocation requests NOW plus *Startup* and *Education* allocations – including Science Gateways!
- Adding services as deemed useful/mature (Heat, Ceilometer, Magnum, Trove, Manila, etc)
- Atmosphere enhancements, too

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Where can I get help or learn more?

- Production:
  - Wiki: http://wiki.jetstream-cloud.org
  - User guides: https://portal.xsede.org/user-guides
  - XSEDE KB: https://portal.xsede.org/knowledge-base
  - Email: help@xsede.org
  - Campus Champions: https://www.xsede.org/campus-champions
  - Training Videos / Virtual Workshops (TBD)

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