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Jetstream2: Accelerating Science and Engineering on Demand

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Director for Advanced Cyberinfrastructure

Jetstream & Jetstream2 Primary Investigator

PEARC20 – July 29, 2020

Panel: Introduction of the new NSF Innovative HPC Systems

Jetstream2

What is Jetstream2 and why does it exist?

- Significant evolution of the Jetstream cloud resource
- Under 10% NSF investment –> support for 24% of institutions, 23% of active PIs, and 32% of users*
- Jetstream has provided 6x more SUs than any other XSEDE resource for Education
- Emphasis on ease-of-use, broad accessibility, *AI for Everyone*
- Will provide on-demand *interactive* computing and persistent services for science gateways
- Enables *configurable* environments; *programmable cyberinfrastructure*

*Based on XDMoD data at Workload Analysis Report: http://arxiv.org/abs/1801.04306

Jetstream2

Jetstream2 Capabilities

Enhancing IaaS model of Jetstream:

- Improved orchestration support
- Elastic virtual clusters
- Federated JupyterHubs

Commitment to >99% uptime

- Critical for science gateway hosting
- Hybrid-cloud support

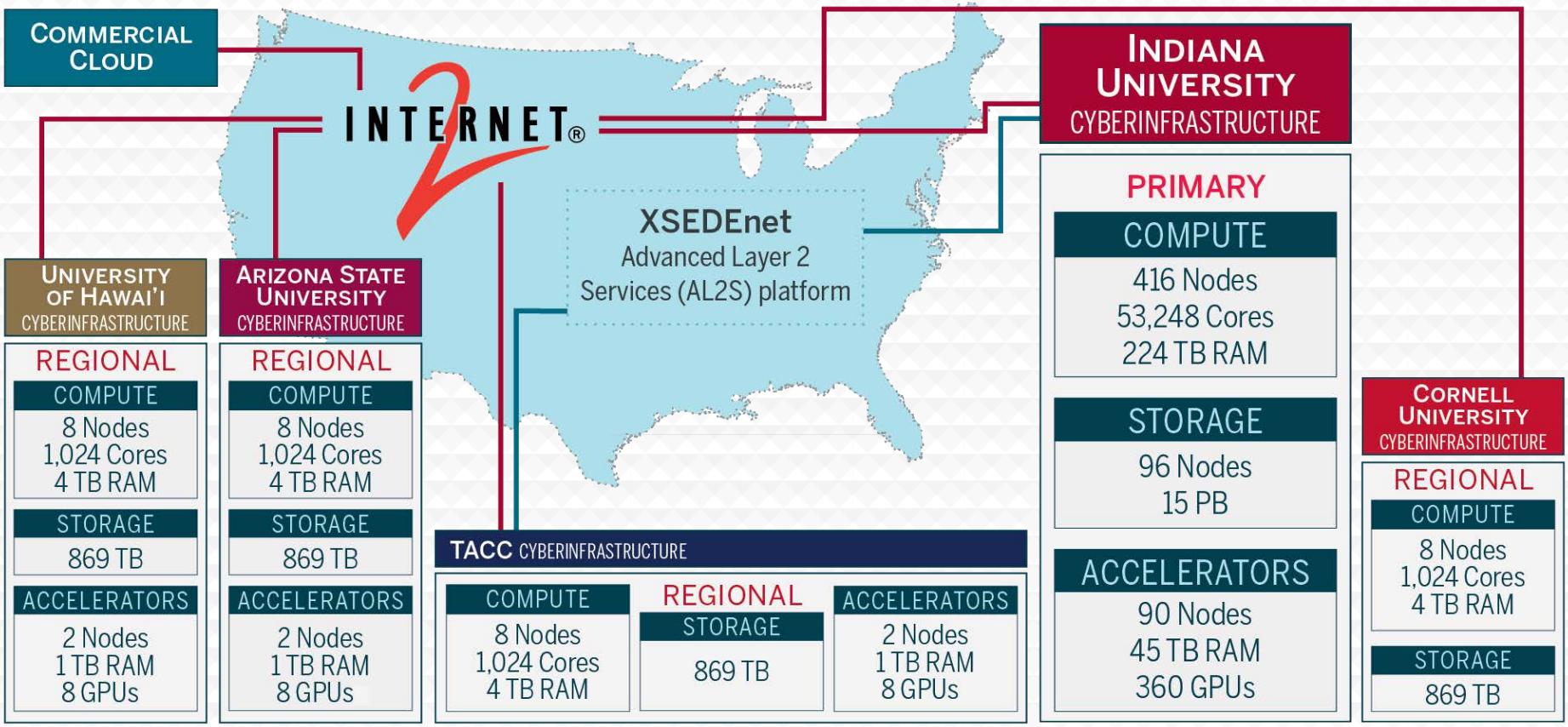
Revamped User Interface

- Unified instance management
- Multi-instance launch

Feb 12, 2019 – Jet stream region called "Jet N6"
NASA/JPL-Caltech/SwRI/MSSS/Kevin M. Gill

- >57K cores of next-gen AMD EPYC processors
- >360 NVIDIA A100 GPUs will provide vGPUs via NVIDIA's MIG feature
- >18PB of storage (NVMe and disk hybrid)
- 100GbE Mellanox network

Jetstream2


COMMERCIAL CLOUD
INTERNET2®
XSEDEnet
Advanced Layer 2 Services (AL2S) platform
INDIANA UNIVERSITY CYBERINFRASTRUCTURE
PRIMARY
COMPUTE
416 Nodes
53,248 Cores
224 TB RAM
STORAGE
96 Nodes
15 PB
ACCELERATORS
90 Nodes
45 TB RAM
360 GPUs
UNIVERSITY OF HAWAI'I CYBERINFRASTRUCTURE
REGIONAL
COMPUTE
8 Nodes
1,024 Cores
4 TB RAM
STORAGE
869 TB
ACCELERATORS
2 Nodes
1 TB RAM
8 GPUs
ARIZONA STATE UNIVERSITY CYBERINFRASTRUCTURE
REGIONAL
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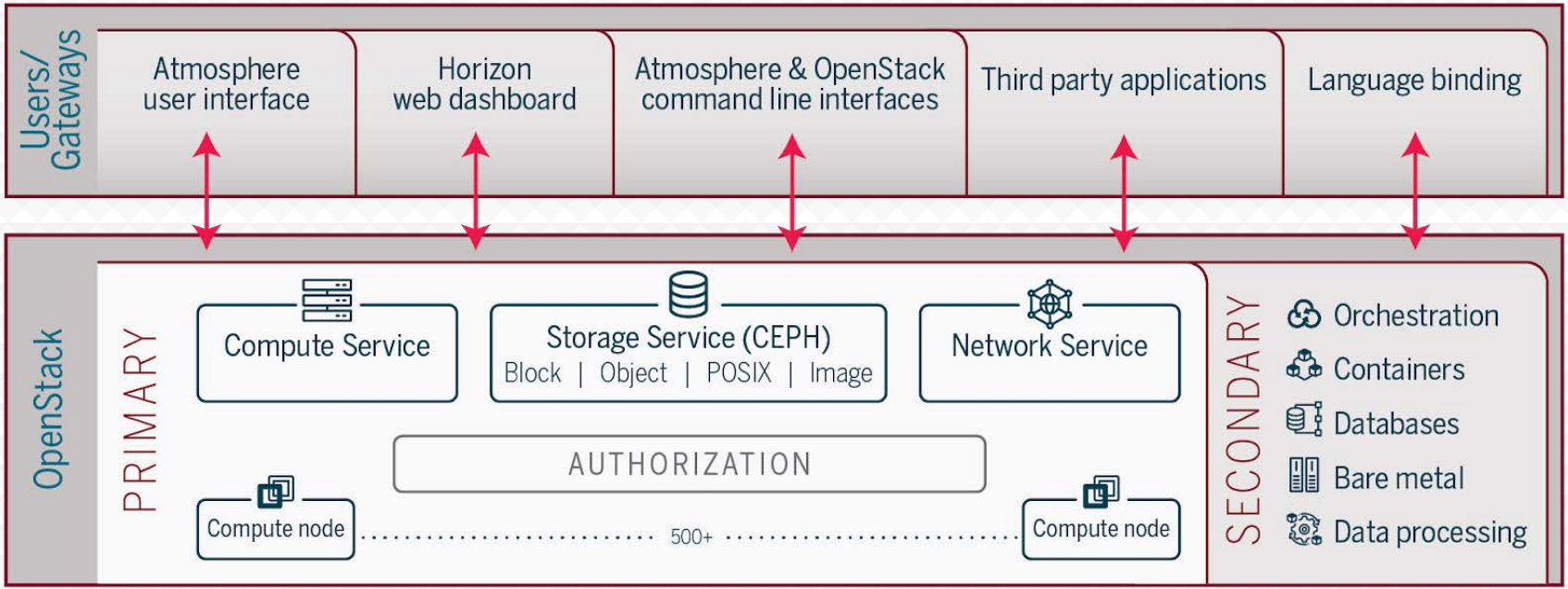
Jetstream2

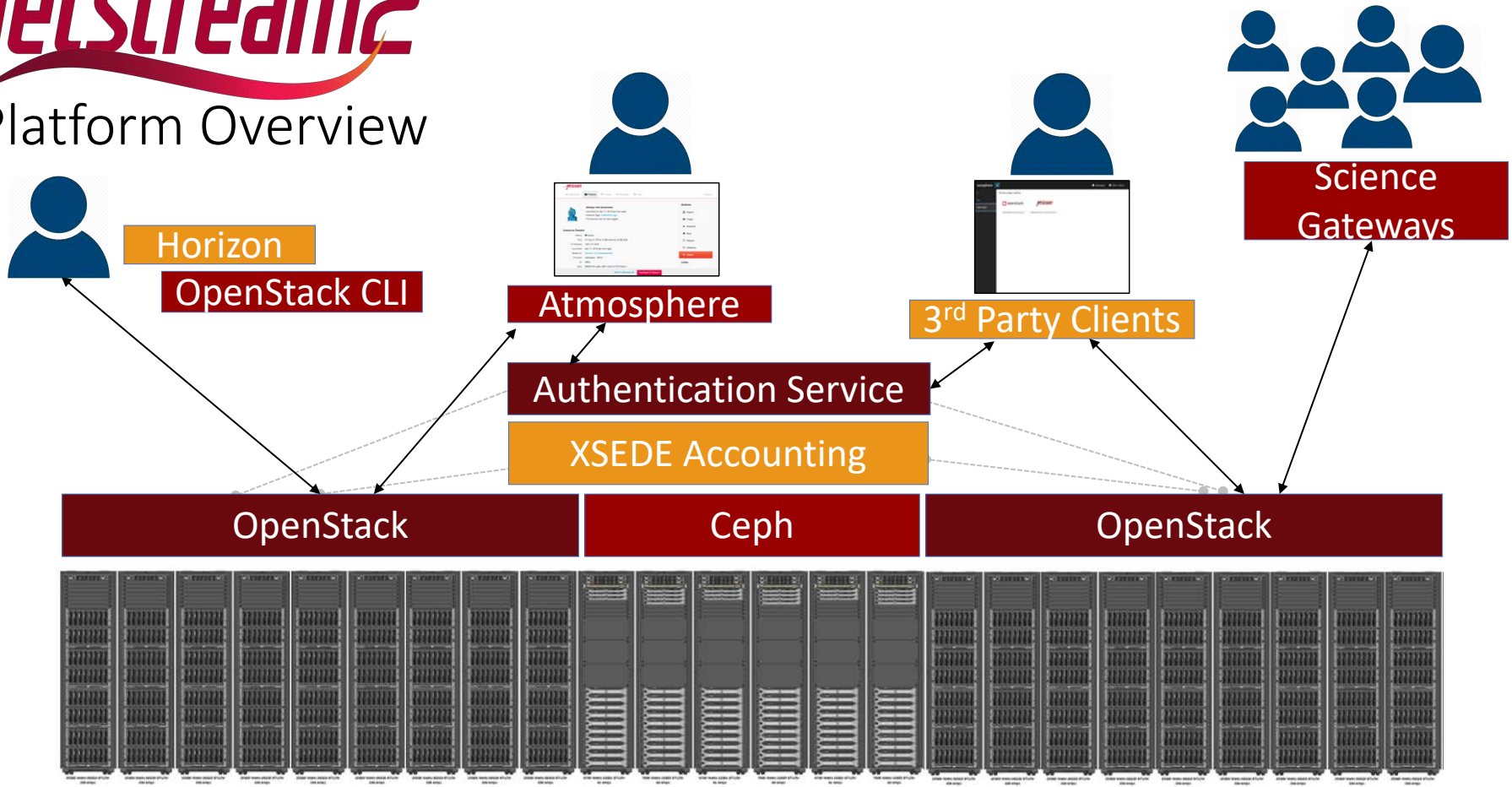
Conceptual Jetstream2 Architecture



Jetstream2

Jetstream2

Platform Overview



Jetstream2 Core System

Timeline

- Jetstream now in 5th year of operations
- Jetstream extension requested through November 2021
- Jetstream2
  - Early operations planned for August 2021
  - Production operations by October 2021

Flickr user Oiluj Samall Zeid - Lejos de Yulín

Jetstream2

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Jetstream2 partners

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http://jetstream-cloud.org/
National Science Foundation
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