Jetstream2: Accelerating cloud computing via Jetstream

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Jetstream1 System Overview

http://wiki.jetstream-cloud.org/Network+configuration+and+policies
Quick Jetstream1 Facts

• vCPU ranges from 1 core to 44 cores
• Ram on flavors ranges from 2gb to 120gb
• Atmosphere gives 100gb of block storage per user by default (may request more)
• API side allows 1TB per allocation by default (shared between all allocation users – may request more)
• GPUs (NVIDIA V100) available on a limited basis as ¼ vGPU, ½ vGPU, or 1 vGPU
What worked?

• Allowing API access and full control (root privileges)

• “Indefinite workflows” – allowing instances to run continuously – providing PIs renew their allocations

• Development of trial allocations

What didn’t work?

• Forcing small allocations into the research allocation process

• Lack of multi-year allocations

• Lack of shared data set storage
Lessons learned

Challenges -> Inspired changes

• Storage capacity -> Larger HDD pool and new flash storage
• Homogeneous hardware -> Inclusion of NVIDIA GPUs (w/MIG) and memory diversity
• Separate OpenStack domains -> Unification of “Atmosphere” domain
• Virtual networking architecture/maintenance -> Increase offload capabilities via Cumulus Networks software and Mellanox hardware (NAT & simulation)
• Acceptance & integration into national CI ecosystem -> Changes to our metrics/KPIs & accounting processes
• Deployment diversity -> Leverage single technology for config management
Jetstream2 Capabilities

Enhancing IaaS model of Jetstream:
• Improved orchestration support
• Elastic virtual clusters
• Federated JupyterHubs
• Ease storage sharing (CephFS w/Manilla)

Commitment to >99% uptime
• Critical for science gateway hosting
• Hybrid-cloud support

Revamped User Interface
• Unified instance management
• Multi-instance launch

>57K cores of next-gen AMD EPYC processors
>360 NVIDIA A100 GPUs will provide vGPUs via NVIDIA’s MIG feature
>17PB of storage (NVMe and disk hybrid)
100GbE Mellanox network
Timeline

• Jetstream now in 5th year of operations
• Jetstream extension granted by the NSF through November 2021
• Extension through March 2022 in process
• Jetstream2
  • Early operations planned for December 2021
  • Production operations by January 2022

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