Jetstream Overview: A national research and education cloud – Lightning Edition

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What is Jetstream and why does it exist?

- NSF’s first production cloud facility
- Focus on ease-of-use, broad accessibility
- User-selectable library of preconfigured virtual machines
- Provides on-demand interactive computing and analysis or persistent services such as gateways
- Enables configurable environments; programmable cyberinfrastructure
Who uses Jetstream?

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

http://wiki.jetstream-cloud.org/Network+configuration+and+policies
Platform Overview

- Atmosphere API
- Globus Auth
- Atmo Services
- XSEDE Accounting
- OpenStack
- Ceph

Indiana University

TACC
# Key Allocation Areas on Jetstream (Dec 2018 – Nov 2019)

<table>
<thead>
<tr>
<th>Discipline or area of interest</th>
<th># of Jetstream allocations</th>
<th>SUs allocated on Jetstream</th>
<th>SU Increase/Decrease on Jetstream over previous year</th>
<th>% of SUs allocated on Jetstream</th>
<th>% of all SUs allocated on all XSEDE-supported systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences</td>
<td>75</td>
<td>7,267,083</td>
<td>54.15% Decrease</td>
<td>7.60%</td>
<td>4.66%</td>
</tr>
<tr>
<td>Computer Science / Advance Scientific Computing</td>
<td>141</td>
<td>17,034,146</td>
<td>22.28% Increase</td>
<td>17.82%</td>
<td>6.11%</td>
</tr>
<tr>
<td>Earth Sciences / Geosciences</td>
<td>27</td>
<td>4,255,441</td>
<td>138.65% Increase</td>
<td>4.45%</td>
<td>1.37%</td>
</tr>
<tr>
<td>Electrical/ Mechanical/ Chemical Systems</td>
<td>13</td>
<td>7,516,478</td>
<td>560.71% Increase</td>
<td>3.85%</td>
<td>10.84%</td>
</tr>
<tr>
<td>Engineering</td>
<td>9</td>
<td>316,406</td>
<td>32.56% Decrease</td>
<td>0.33%</td>
<td>0.32%</td>
</tr>
<tr>
<td>Information, Robotics, and Intelligent Systems</td>
<td>15</td>
<td>3,265,334</td>
<td>994.80% Increase</td>
<td>3.42%</td>
<td>0.77%</td>
</tr>
<tr>
<td>Molecular Biosciences</td>
<td>82</td>
<td>15,561,599</td>
<td>58.61% Increase</td>
<td>16.28%</td>
<td>19.94%</td>
</tr>
<tr>
<td>Neuroscience and Behavioral Sciences</td>
<td>33</td>
<td>9,161,826</td>
<td>0.53% Increase</td>
<td>9.59%</td>
<td>2.98%</td>
</tr>
<tr>
<td>Ocean and Atmospheric Sciences</td>
<td>12</td>
<td>5,484,897</td>
<td>49.81% Increase</td>
<td>5.74%</td>
<td>5.31%</td>
</tr>
<tr>
<td>Physics</td>
<td>16</td>
<td>6,517,597</td>
<td>160.97% Increase</td>
<td>6.82%</td>
<td>11.11%</td>
</tr>
<tr>
<td>Social Sciences and Humanities</td>
<td>32</td>
<td>4,465,626</td>
<td>170.11% Increase</td>
<td>4.67%</td>
<td>1.16%</td>
</tr>
<tr>
<td>Training and Education</td>
<td>110</td>
<td>15,337,763</td>
<td>8.65% Increase</td>
<td>16.05%</td>
<td>4.29%</td>
</tr>
</tbody>
</table>
Key Project: Galaxy

Jetstream usage from usegalaxy.org

- Bursting to Jetstream increased usegalaxy.org’s under-load capacity and throughput
- Jetstream well suited for near-immediate execution (no queue waiting)
- 27,902 distinct users have executed jobs on Jetstream via usegalaxy.org (as of January 14, 2020)
Some success stories...

- 55 million core hours in startup allocations to date
- 37 million core hours in education allocations to date
- 143 million core hours in research allocations to date
- Over 337 million core hours awarded over all allocation types to date
- Over 8800 active user accounts to date
- Over 4900 of those users have been students
- Over 41,000 users served via science gateways hosted on Jetstream
Jetstream usage highlights – 1 July 2020

- 406 XSEDE projects covering 78 fields of science and over 2100 active users representing 206 institutions
- 80% of Jetstream users have not used any other XSEDE system
- >337M CPU hours allocated to XSEDE projects since June 2016
- 38 active science gateways
- 43 education/teaching allocations serving over 700 students presently
- 1189 mean active VMs in previous qtr, 1632 peak active VM count
- Highest user satisfaction in most recent XSEDE survey
Questions?

- Project email: help@jetstream-cloud.org Direct email: jeremy@iu.edu

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