University at Buffalo
Center for Computational Research

Ohio Supercomputer Center

VIRGINIA TECH

OPEN OnDemand

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User Group BoF Agenda

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1. **About Open OnDemand**
2. Open OnDemand 2.0 Project Roadmap
3. Key Items of Note
4. Open Floor Discussion

OPEN OnDemand

Supercomputing. Seamlessly.

Open OnDemand: Open, Interactive HPC Via the Web

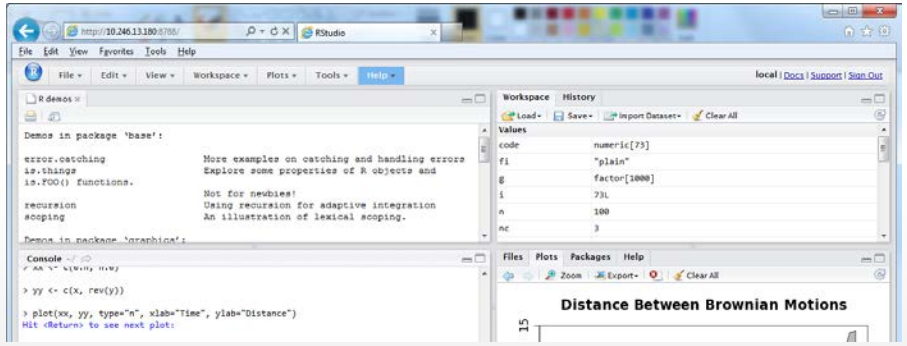
Provides an easy to install and use, web-based access to supercomputers, resulting in intuitive, innovative support for interactive supercomputing.

Features include:

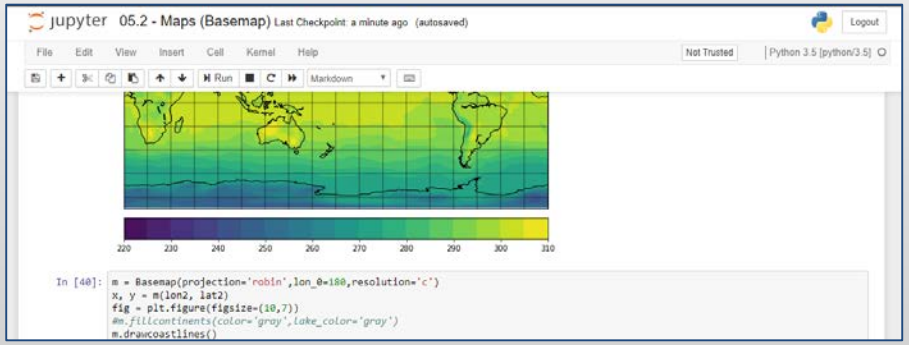
- Plugin-free web experience
- Easy file management
- Command-line shell access
- Job management and monitoring
- Graphical desktop environments and applications

Interactive Apps & Cluster Access

RStudio Server – R IDE

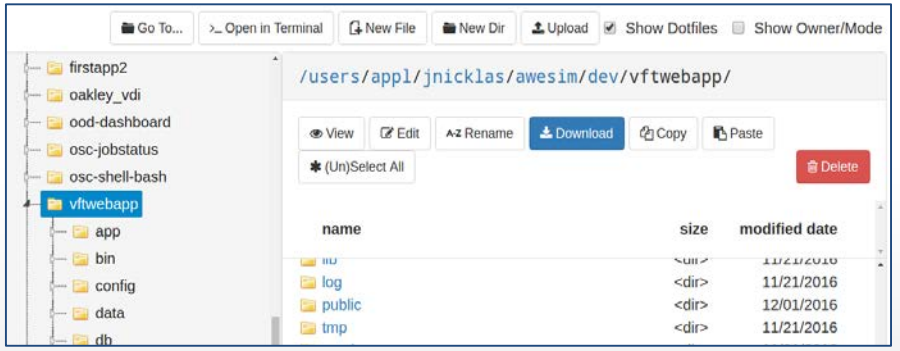


Jupyter Notebook – Python IDE

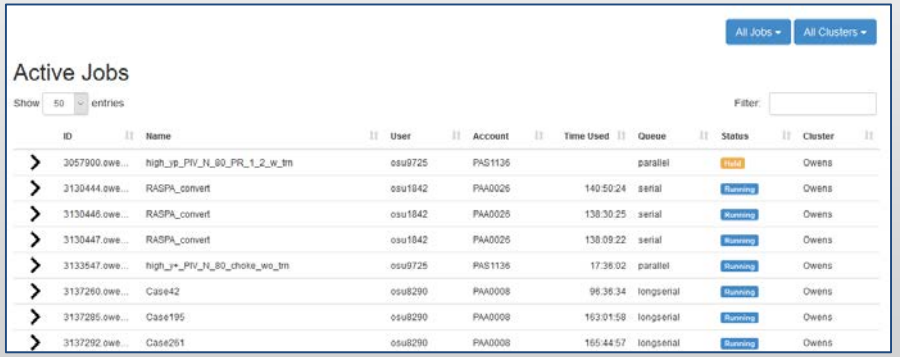


And many more, such as ANSYS Workbench, Abaqus/CAE, MATLAB, Paraview, COMSOL Multiphysics

File Access (browse, edit, etc)



Manage Jobs (view, submit, etc)



And many more, such as in-browser SSH terminal, job constructors, VNC desktops

Example Current Engagements and Deployments

Production Deployments

In Process of Installing

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Virginia Tech

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OPEN OnDemand

Open OnDemand 2.0 Project Overview

- OnDemand 1.x: 3 year NSF SI2 award (#1534949)
- OnDemand 2.x: 5 year NSF CSSI award (#1835725)
  - Collaborators: SUNY Buffalo, Virginia Tech

- Four areas
  - **Visibility:** Enhancing resource use visibility by integrating Open XDMoD
  - **Scalability:** support more types of computing resources and software
  - **Accessibility:** appeal to more scientists in more fields of science
  - **Engagement:** establish community of HPC users and administrators

Visibility: 5 year goals (bolded year 1 focus)

1. Integrate XDMoD Metrics into OnDemand
   - **Incorporate Job Accounting and Performance Summary**
   - **Develop direct link capability to XDMoD from OnDemand**
   - **Provide OnDemand usage metrics through XDMoD**
   - Link to XDMoD Job Viewer from Active Jobs app

2. Efficiency to Users
   - Develop User Report Card
   - Support user customization of their OOD dashboard
   - Improve summary data and report card based on user feedback
   - DL/ML automated detection to optimize user efficiency

Open XDMoD and OnDemand Integration

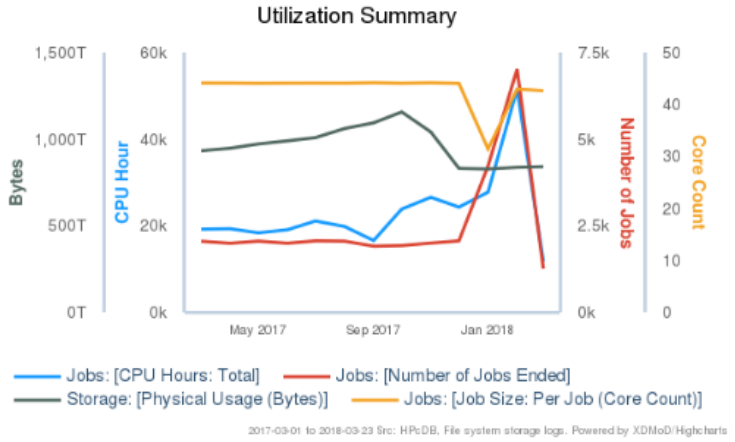
CCR OnDemand BETA | Files | Jobs | Clusters | Interactive Apps | Help | Logged in as smgallo | Log Out

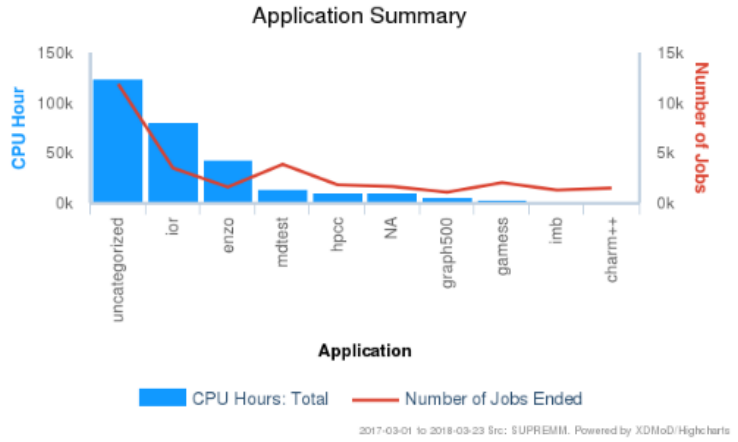
OnDemand provides an integrated, single access point for CCR's HPC resources

Users can transfer files, access a shell environment on the cluster front-end login server, launch interactive and remote visualization jobs, and monitor jobs all without installing any client software or web plug-ins. Access these features using the menus at the top of this page. Note that many of the apps will launch in a new tab or new browser window but the dashboard will remain open in the original window.

Utilization Summary

	Previous Month	Previous Quarter	Year To Date
Total CPU Hours	51,541	74,617	298,725
Number of Jobs	7,017	5,973	32,551
Average Job Size (Cores)	42.1	43.9	44.1
Storage (GB)	834	1,008	964,150

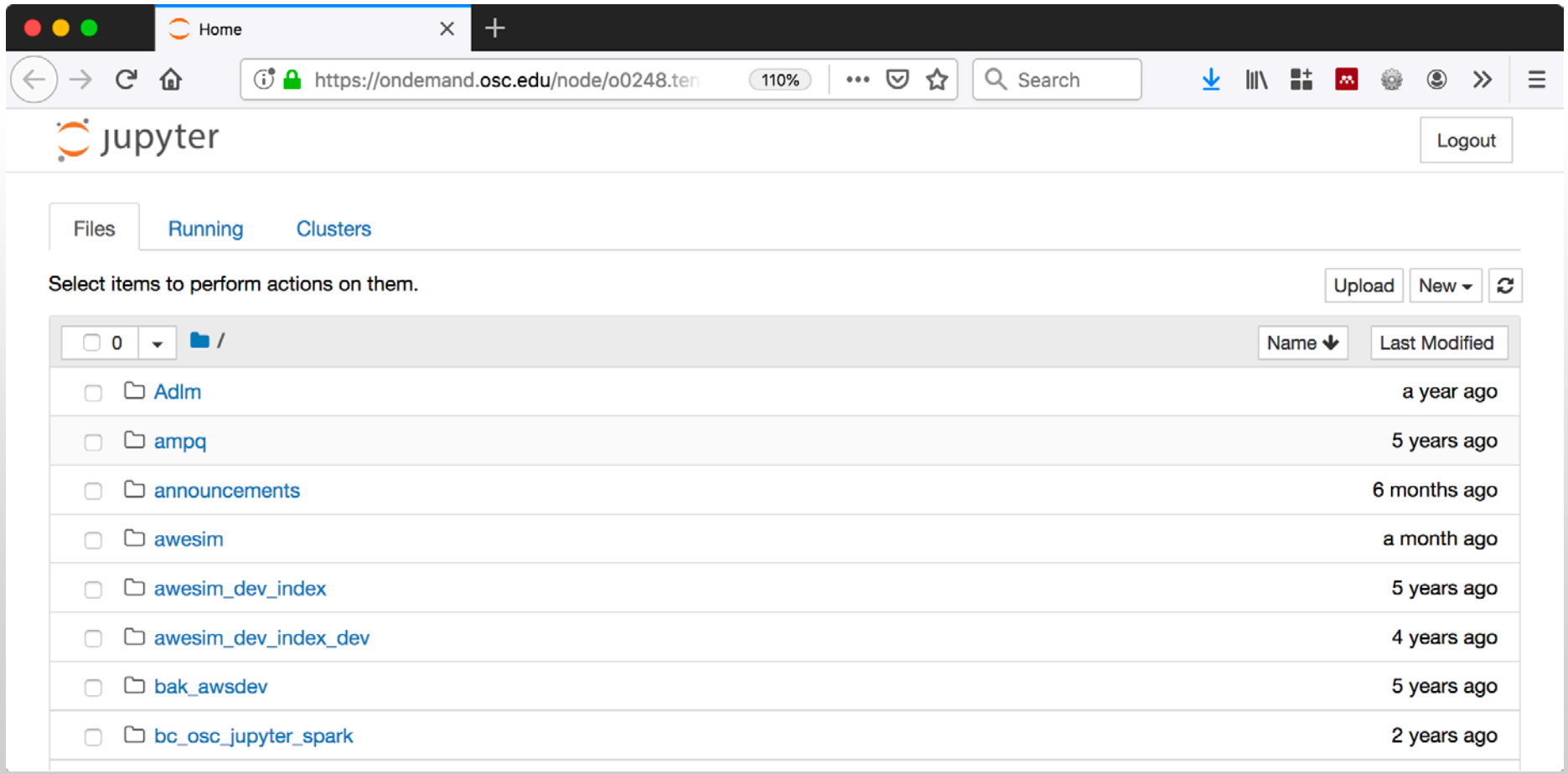




Scalability: 5 year goals (bolded year 1 focus)

1. Extendibility
   - **Interactive work without a batch scheduler**
   - **Increase number of languages to build and deploy apps in**
   - Support app development with REST API or ported App Kit
2. Performance
   - **Reduce response times, start up times, memory usage**
   - Support horizontal scaling of Per User NGINX processes
   - Implement persistence options to support things like caching

Scalability: Interactive without a batch scheduler - immediate access



kubernetes

openstack.

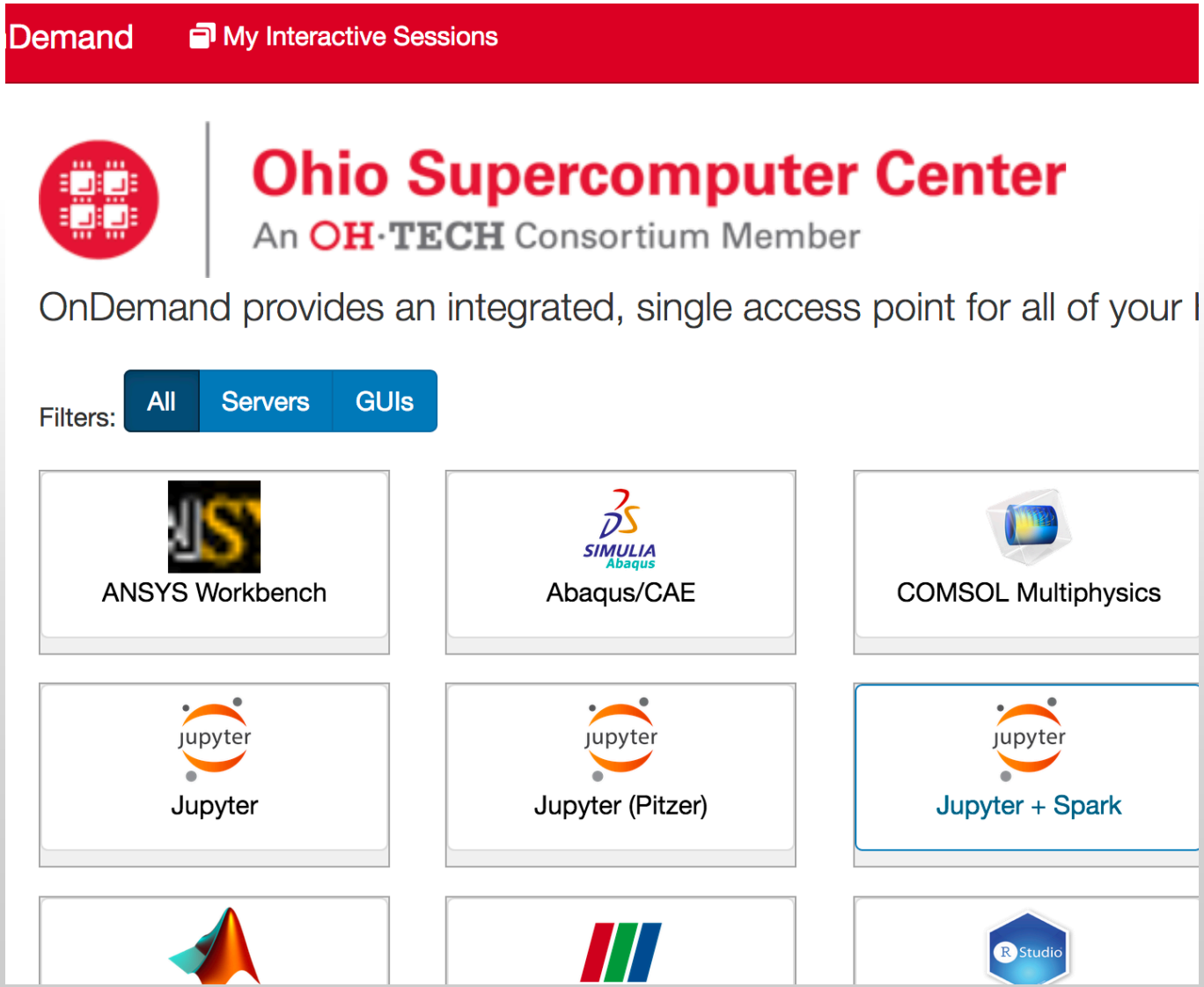
aws

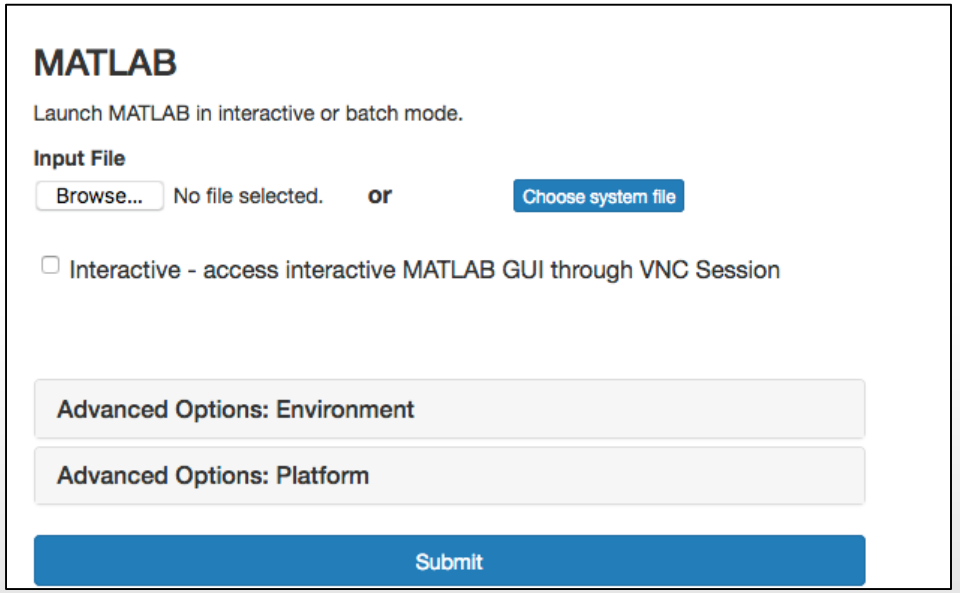
Google Cloud

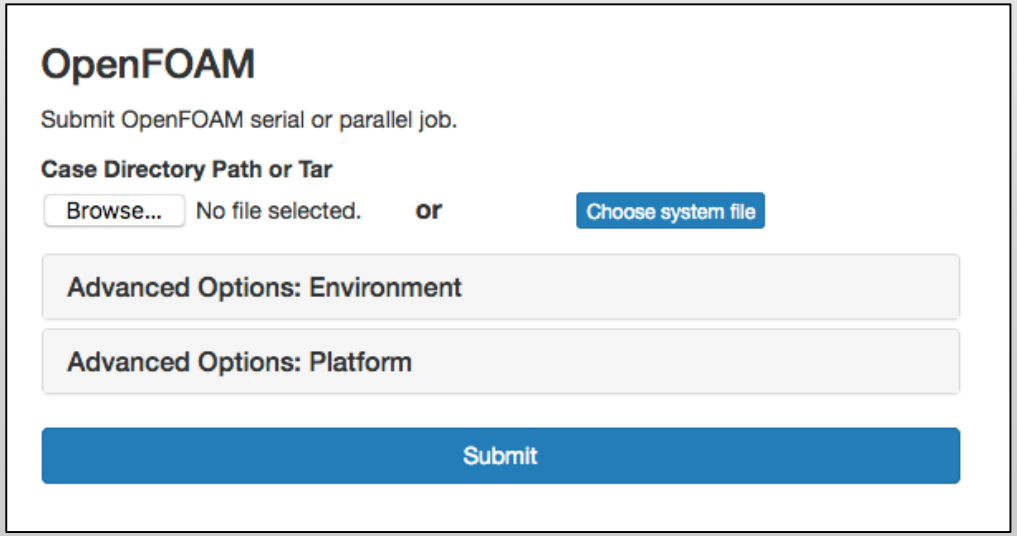
Accessibility: 5 year goals (bolded year 1 focus)

1. **Improve Job Management**
2. **Reduce Administrative Load (installation, config., etc)**
3. **Streamlining interface (reduce steps to accomplish a task)**
4. Integrate Job/File Management, and App Launching interface
5. Integrated IDE for job and app development

Complete Software Catalog and Integrated App Plugin







Engagement: 5 year goals

1. Targeting non traditional HPC disciplines
2. Advocating for the beginner user
3. Outreach
4. Ensure the project is community guided (Advisory Group)
   - Members create local focus groups of users to gather feedback
   - Help identify apps to expand access to non traditional domains

Leveraging OnDemand in Gateway Opportunities (LOGO)

- National-scale Science Gateway community emerging
  - Want to avoid duplication of effort
- NSF is interested in the “science of cyberinfrastructure”
  - OnDemand’s unique architecture is an opportunity for study
- How should OnDemand integrate/extend existing Gateway solutions?
  - Sandstone HPC, Galaxy, Apache Airavata

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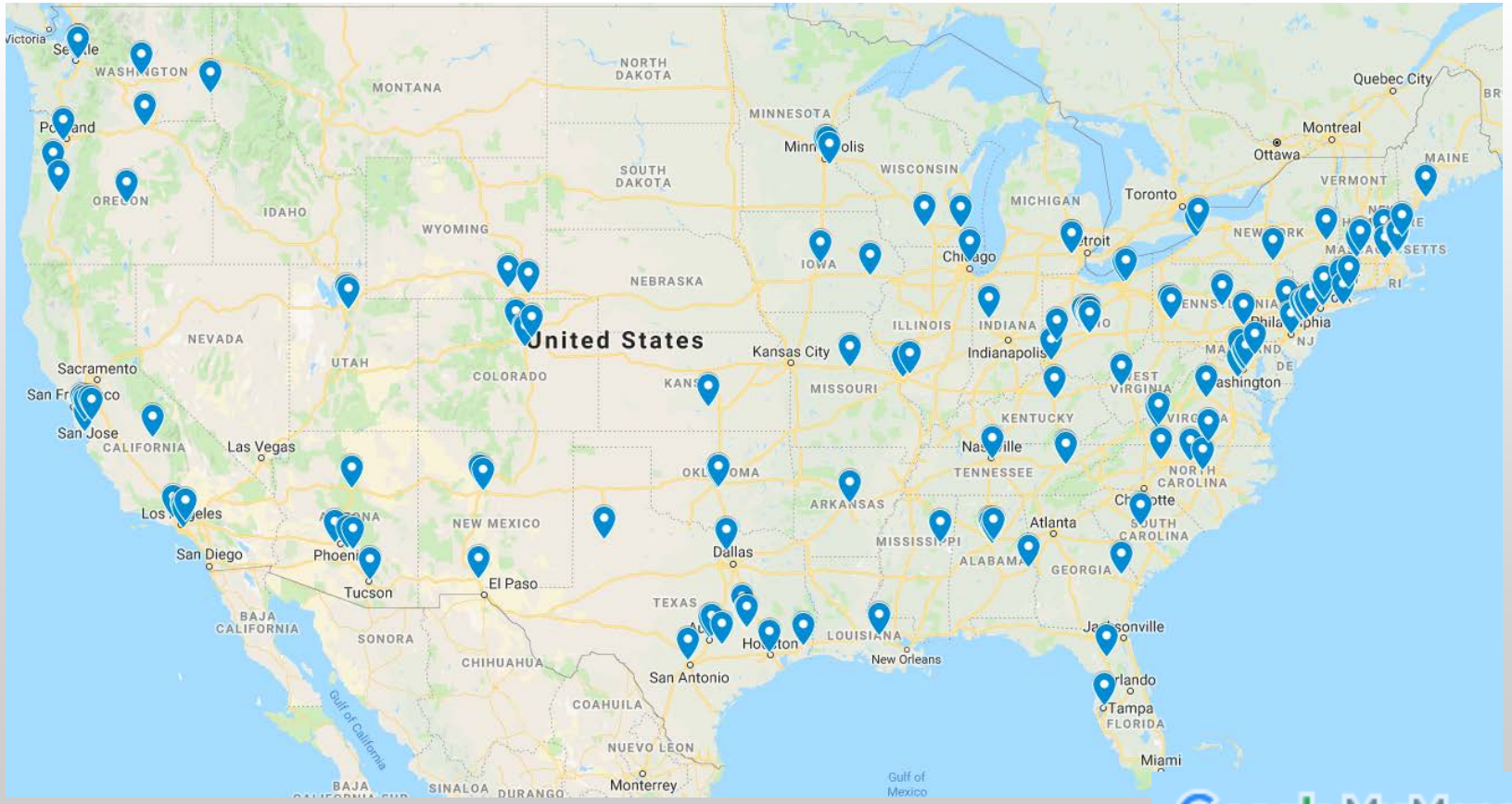
OPEN OnDemand

Approx Number of Institutions based on RPM logs

- 136 unique US locations
- 70 unique international locations



- Map data @2019 Google, INEGI, ORION-ME

Google My Maps

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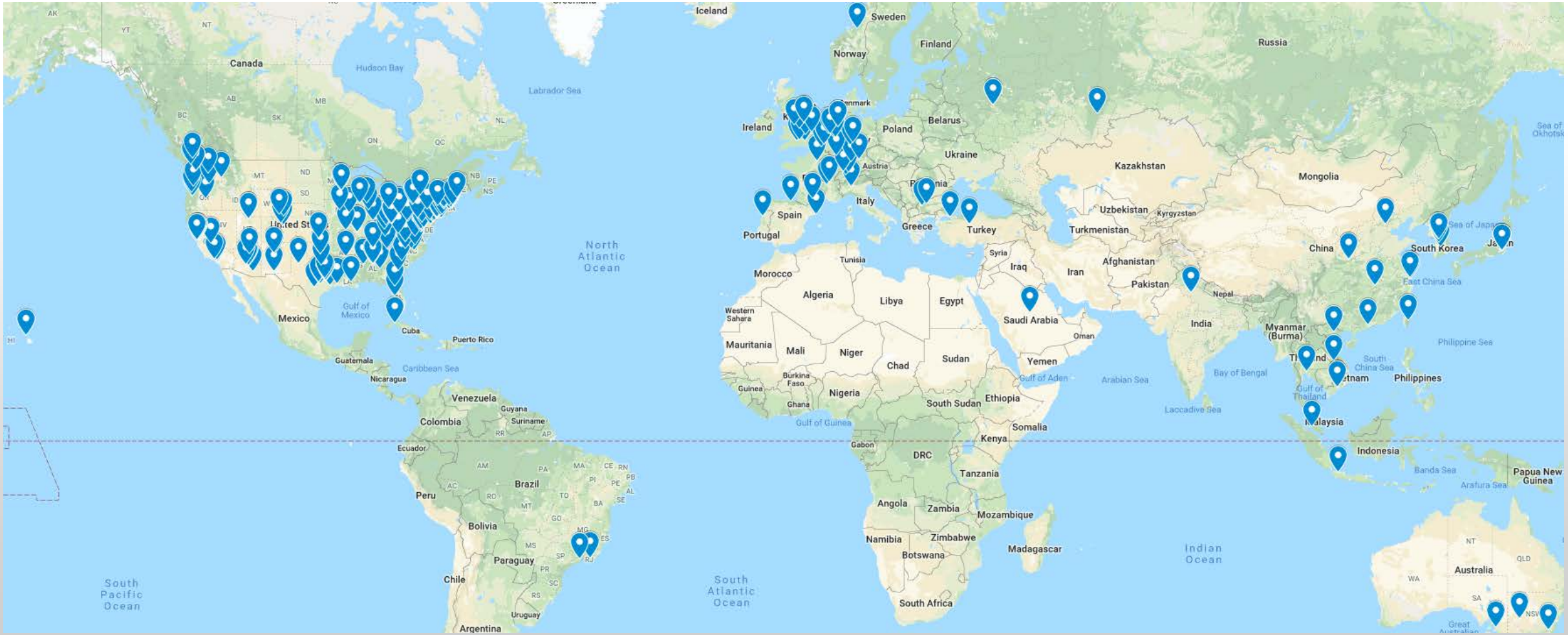

- Map data @2019 Google, INEGI, ORION-ME

Google My Maps

User Survey Results

- Questions included:
  - Usefulness, design, functionality ratings
  - How would you change the design, functionality

- 28 responses (1 best, 5 worst)
  - Overall OOD usefulness: 1.73 mean
  - OOD Interface design efficacy: 2.31 mean
  - OOD Interface functionality: 2.08 mean

- Conclusion: OOD is useful but there is room for improvement

Nor-Tech

NOR-TECH
People Friendly Technology

AN OPEN DOOR TO OPEN SOURCE

NOW EVEN HPC NEOPHYTES CAN TAKE ADVANTAGE OF THE ENORMOUS COST-SAVINGS OF OPEN SOURCE.

Open OnDemand makes Open Source HPC as easy as using a desktop or website.

We are the only enterprise offering Open OnDemand and the only company able to integrate it into OpenHPC.

BENEFITS INCLUDE:

- Keeps initial and recurring licensing costs way down
- No ongoing licensing fees for cluster management software
- Much easier to use than command lines

SERVICES AVAILABLE

Nor-Tech has been a primary innovator in the HPC cluster space for more than a decade. Our elite staff of expert engineers, averaging more than a decade of hands-on experience, are consistently conquering industry challenges that our competitors long abandoned as insurmountable. The result is a suite of cost-effective NT-EZ branded services that remove the classic obstacles to high performance computing

We are continually evaluating additional areas where we can innovate in order to bring more value to our clients

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software.

Nor-Tech's NT-EZ Suite

•**NT-EZ Remote Visualization:** Storage access too slow? With NT-EZ Remote Visualization, big data files don't have to be transferred to the user's location to be viewed for post processing. Only keyboard, mouse and screen bits travel to the user location.

•**NT-EZ Storage Guard:** This monitors cluster storage usage and alerts the user if available storage is reaching critically low levels. This keeps clusters stable and reliable. Without this feature, the client will run out of storage without warning causing the cluster job to crash.

•**NT-EZ SATM (System Ambient Temperature Monitor):** This prevents cluster failure due to excessive heat. SATM emails alerts to the client warning that the server room ambient temperature is too high. When the ambient temperature climbs above a preset threshold the cluster.

•**NT-EZ RCR Rapid Cluster Recovery/Bare Metal Backup:** Run manual cluster backups or schedule backups seamlessly. This not only backs up the cluster data, but also backs up an image of both the data and the OS. In the event of a disaster the whole cluster software and applications environment can easily be recovered. This adds a level of reliability to our clusters

•**NT-EZ Remote Monitoring & Management:** This provides an easy way for our clients to use and manage complex equipment such as a High Performance Compute Cluster without HPC expertise in-house. This service is provided on either a scheduled basis or an as needed basis. The scheduled service [illegible] us to find and fix small problems before they become disasters. [illegible] is sold in blocks of hours ahead of when the service may be needed.

•**NT-EZ Open OnDemand© Plus:** This delivers a GUI through a browser instead of only a CLI. Use NT-EZ Open OnDemand Plus instead of cryptic file editors and Linux utilities, which are not user friendly. Nor-Tech adapted Open OnDemand Plus to work with Open HPC our most prevalent Open Source cluster management suite.

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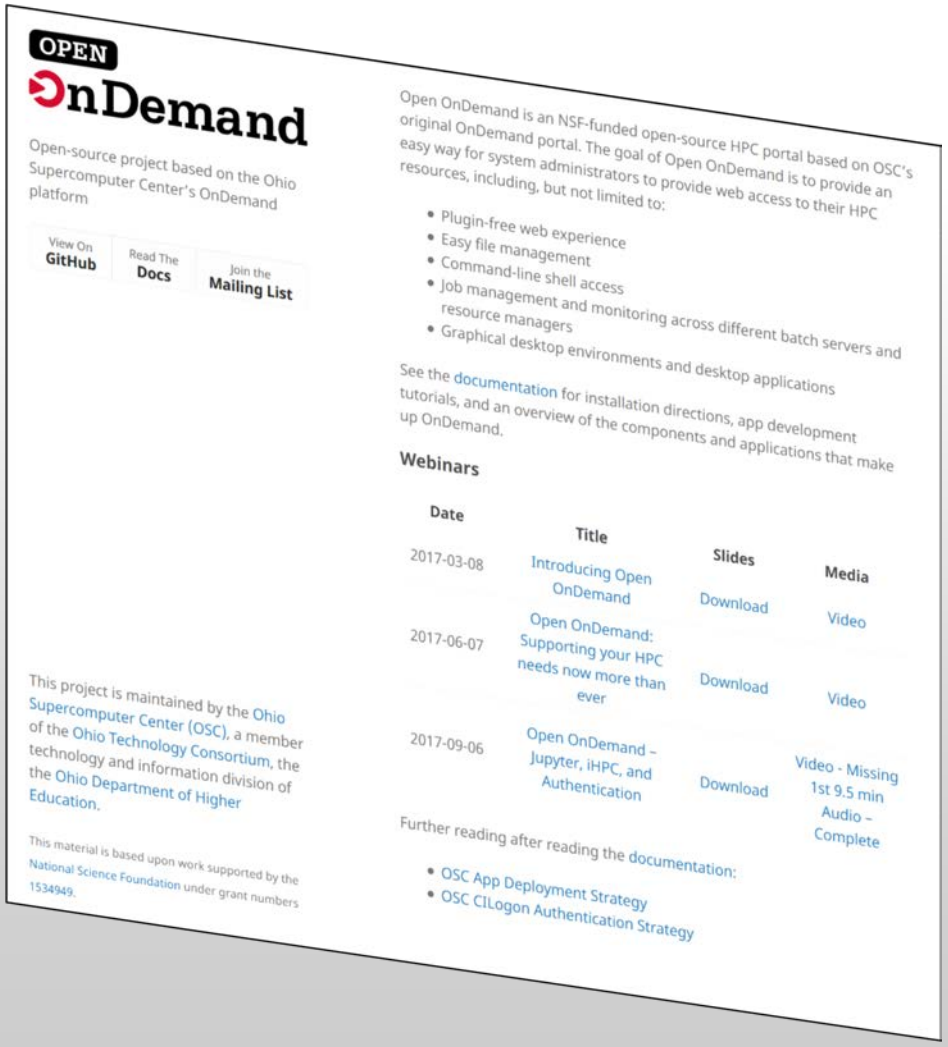
OPEN OnDemand

Staying in Touch

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- Use our Discourse
  - https://discourse.osc.edu/c/open-ondemand
- Join our mailing list
  - https://lists.osu.edu/mailman/listinfo/ood-users
- Our webinars are planned roughly quarterly
  - Let us know what you'd like to learn about next