University at Buffalo
Center for Computational Research

Ohio Supercomputer Center

VIRGINIA TECH

OPEN OnDemand

Alan Chalker, Ph.D.

Jeff Ohrstrom, Travis Ravert & Gerald Byrket

OSC has a job opening on the Open OnDemand team!

Full details are available here:

https://www.oh-tech.org/employment#ohio-supercomputer-center

This work is supported by the National Science Foundation of the United States under the awards NSF SI2-SSE-1534949 and CSSI-Software-Frameworks-1835725.

User Group BoF Agenda

University at Buffalo Center for Computational Research | Ohio Supercomputer Center | Virginia Tech

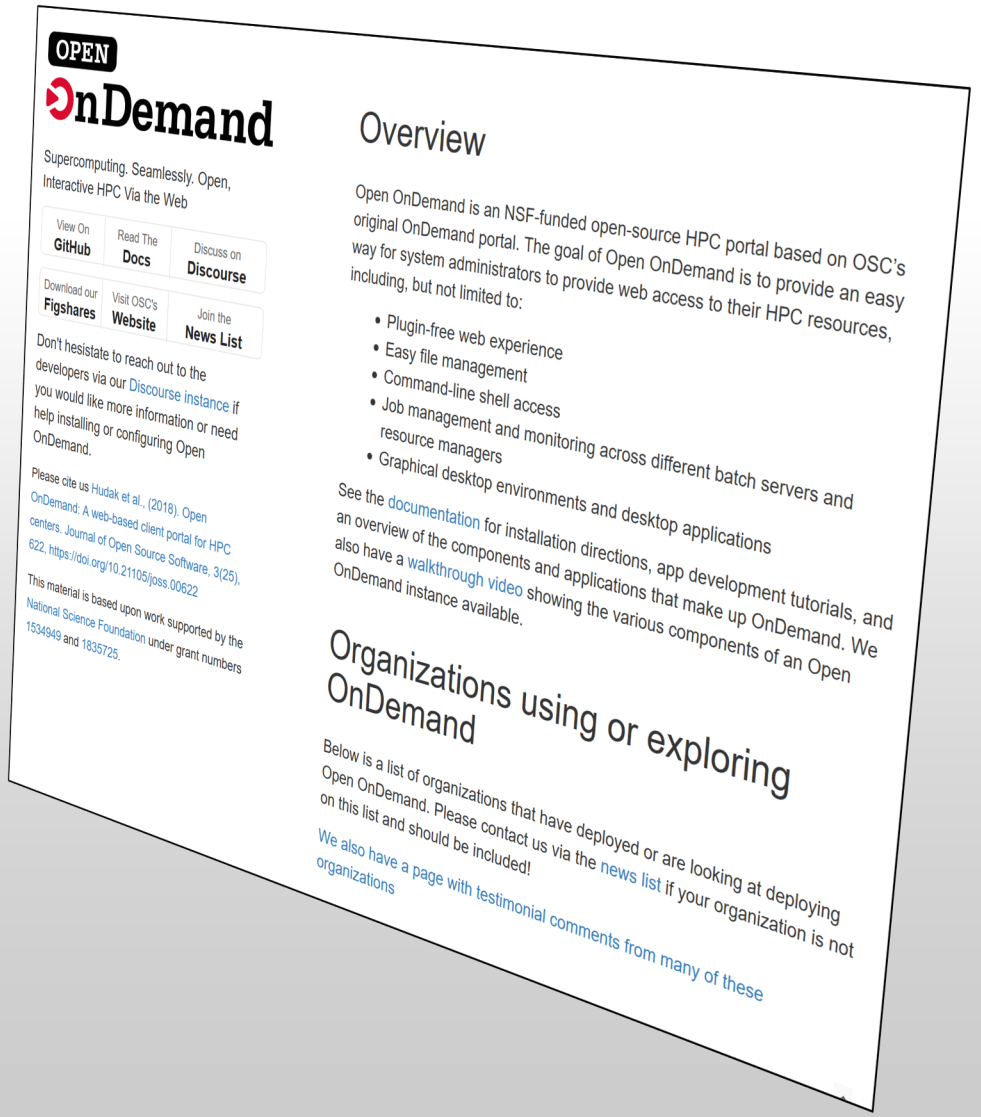
1. **About Open OnDemand**
2. New Features
3. Key Items of Note
4. Open Floor Discussion

OPEN OnDemand

Find Out More!

openondemand.org

- Use our Discourse instance for help
- Join our mailing list for updates
- Our webinars are roughly quarterly



Supercomputing. Seamlessly.

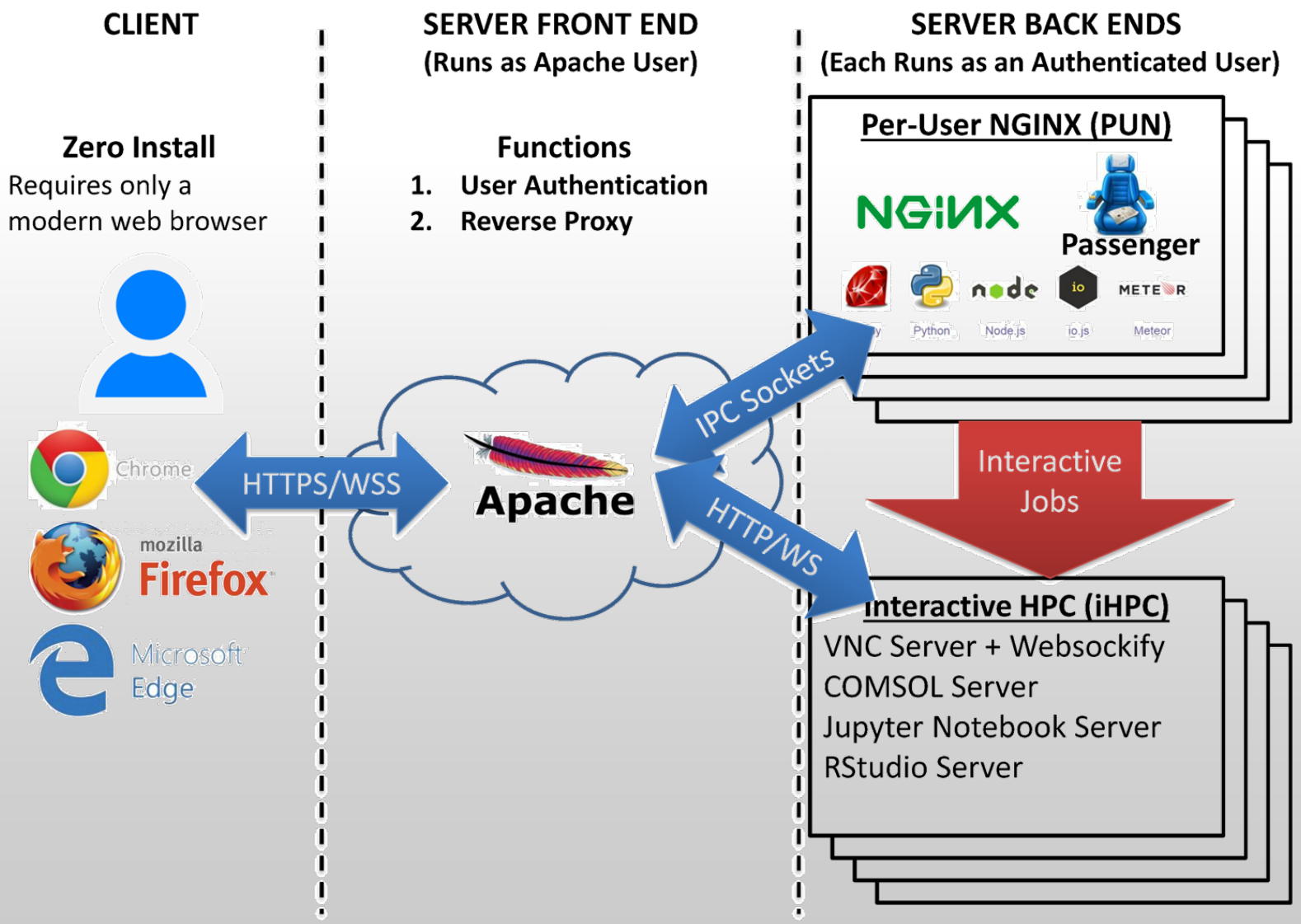
An intuitive, innovative, and interactive interface to remote computing resources

Open OnDemand helps computational researchers and students efficiently utilize remote computing resources by making them easy to access from any device. It helps computer center staff support a wide range of clients by simplifying the user interface and experience.

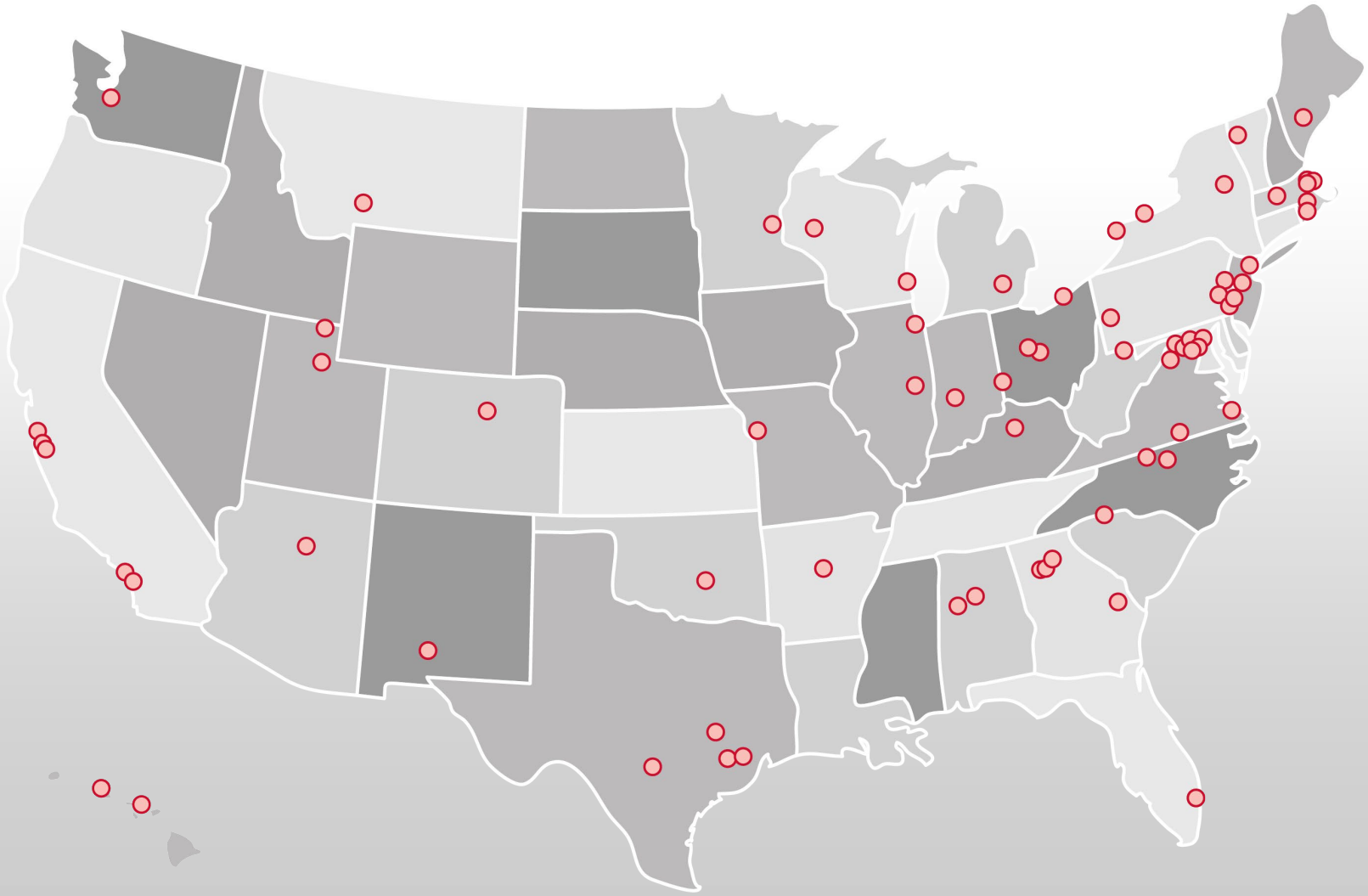
<u>Key Benefits & Impact</u>

- Key benefit to you, the end user:
  You can use any web browser to access resources at a computing service provider.
- Key benefit to you, the computer center staff:
  A wide range of clients/needs can utilize your computing resources.
- Overall impact:
  Users are able to use remote computing resources faster and more efficiently.

Architecture



Approx Number of Institutions based on RPM logs



- 136 unique US locations
- 70 unique international locations

Production Deployments

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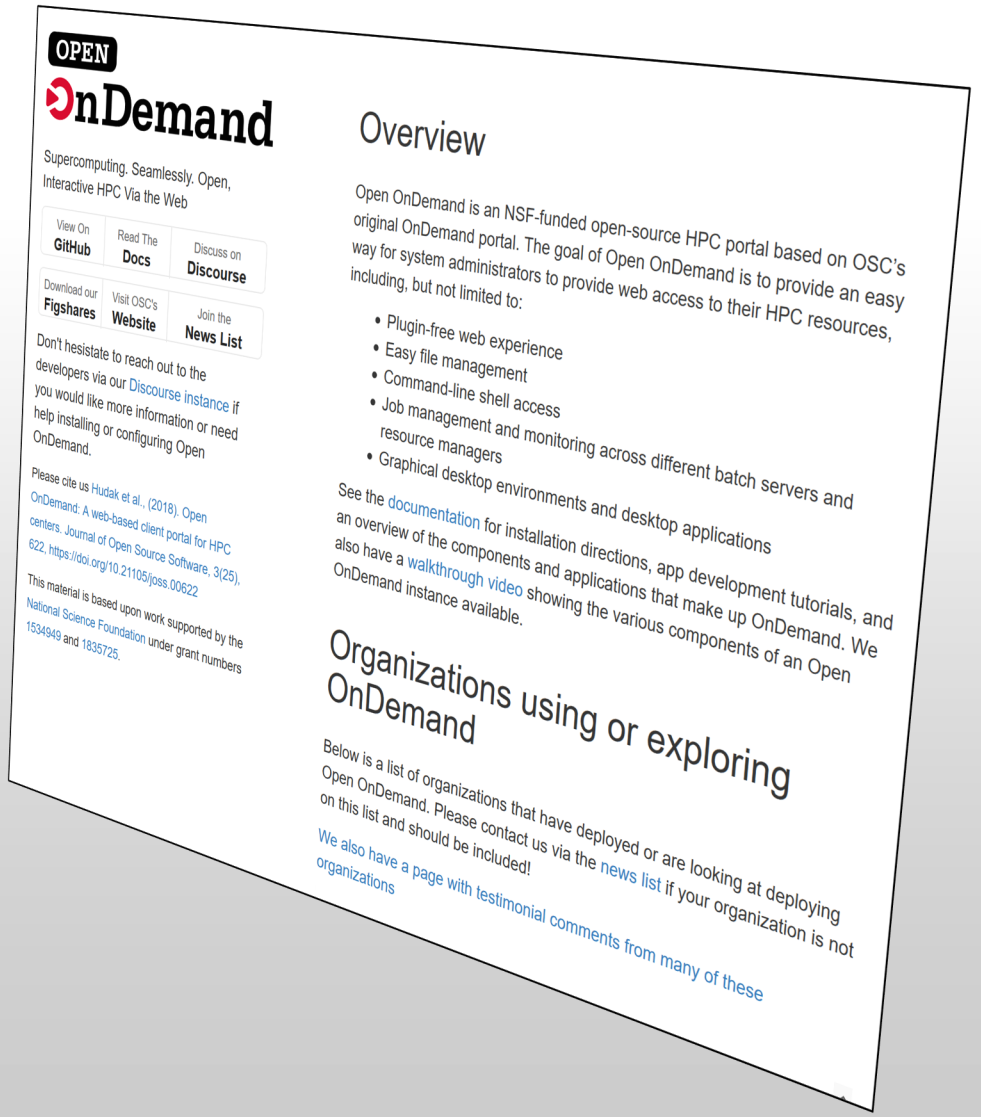

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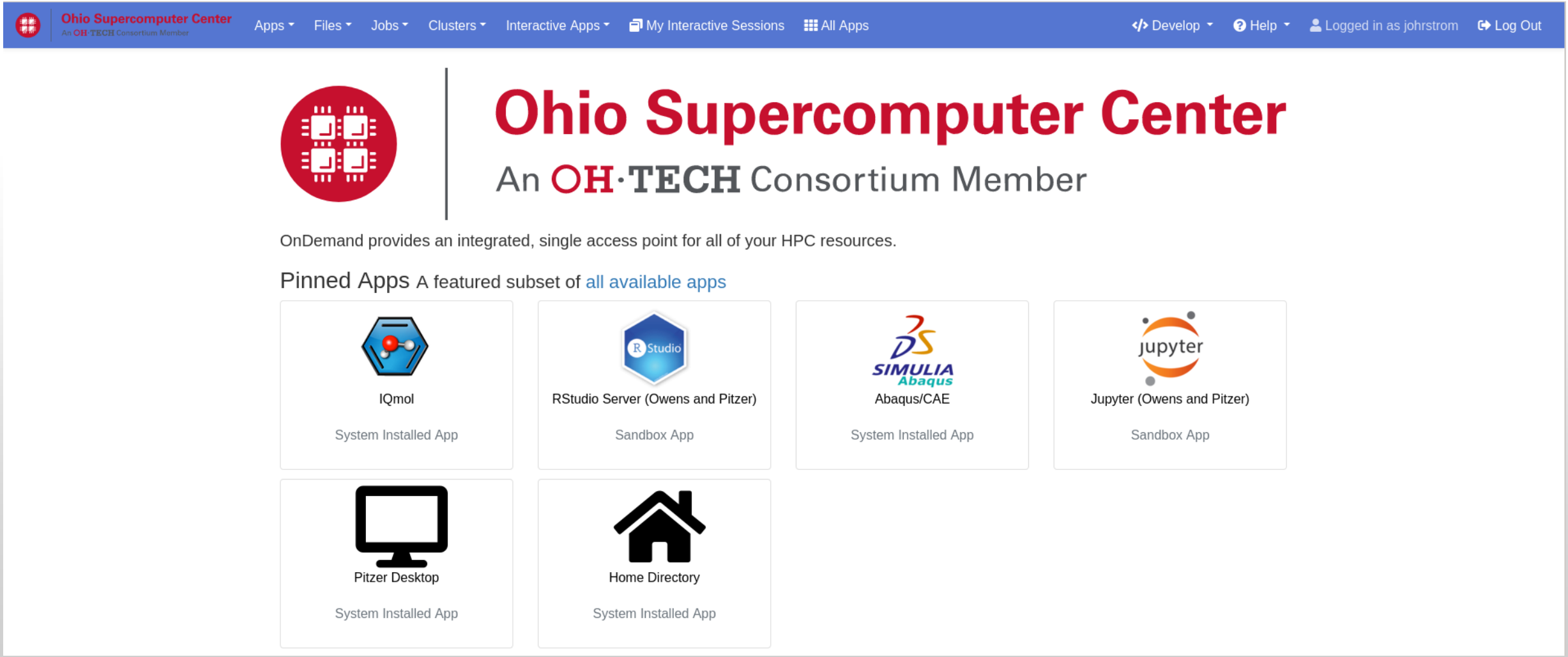
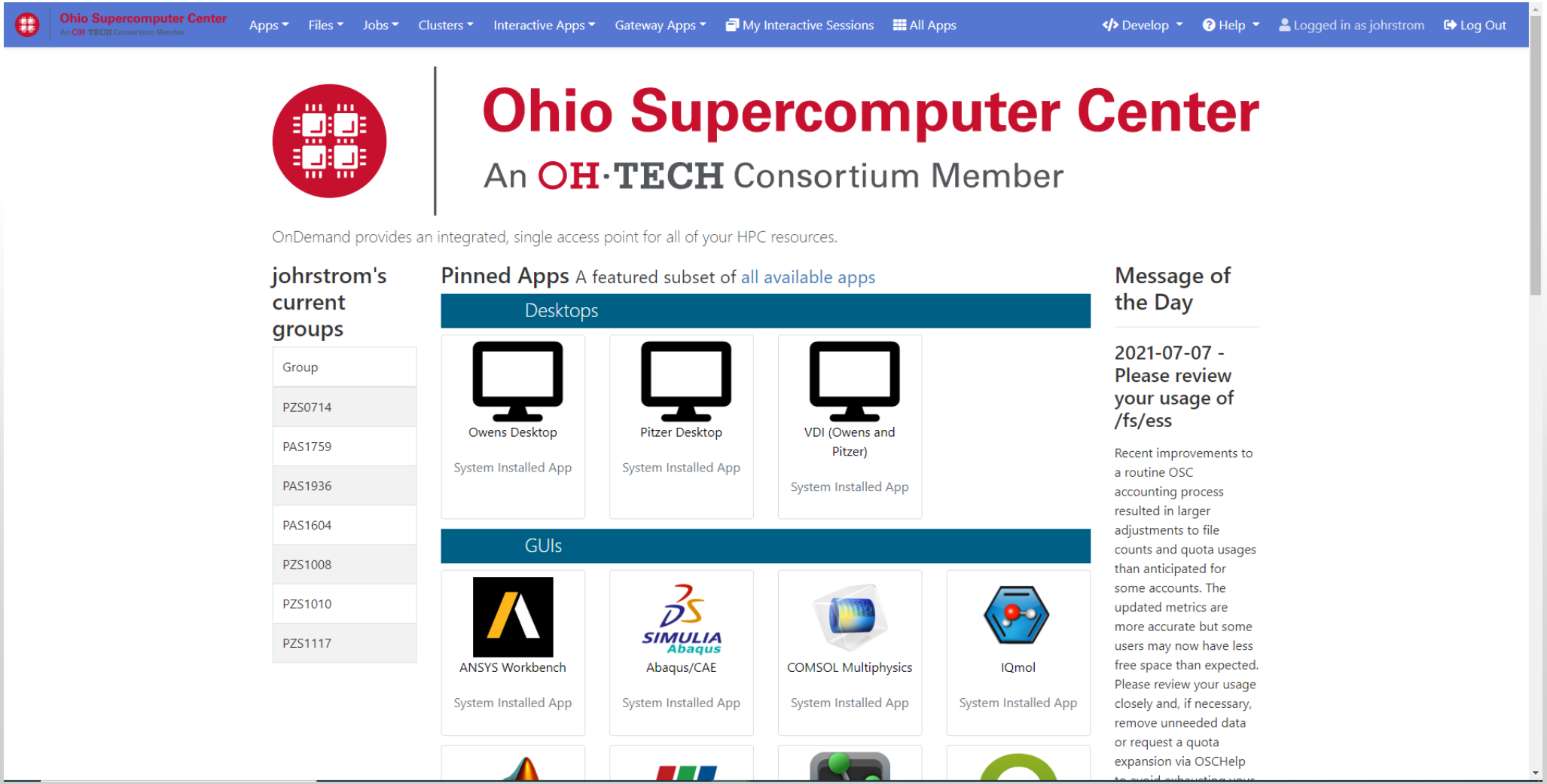
OPEN OnDemand

Pinning Apps to the Dashboard

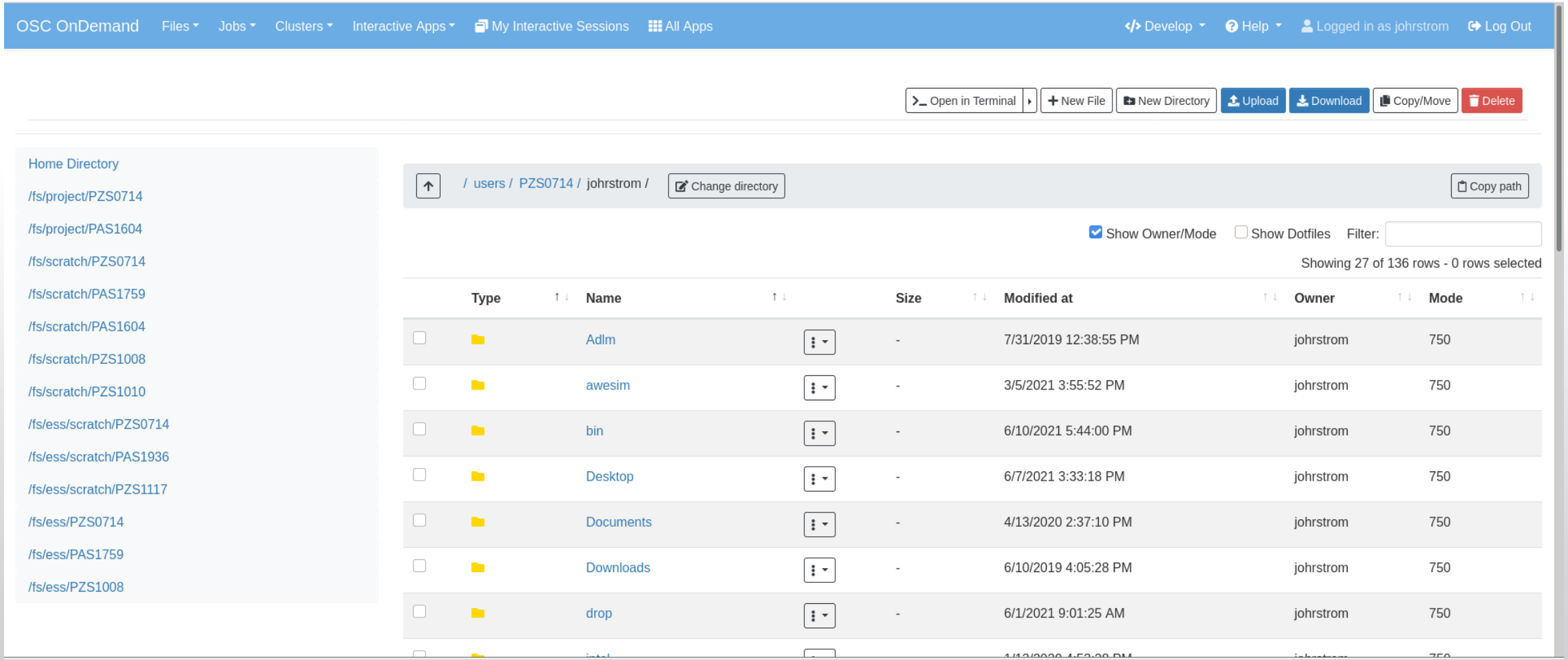


Configurable Landing Page Layout



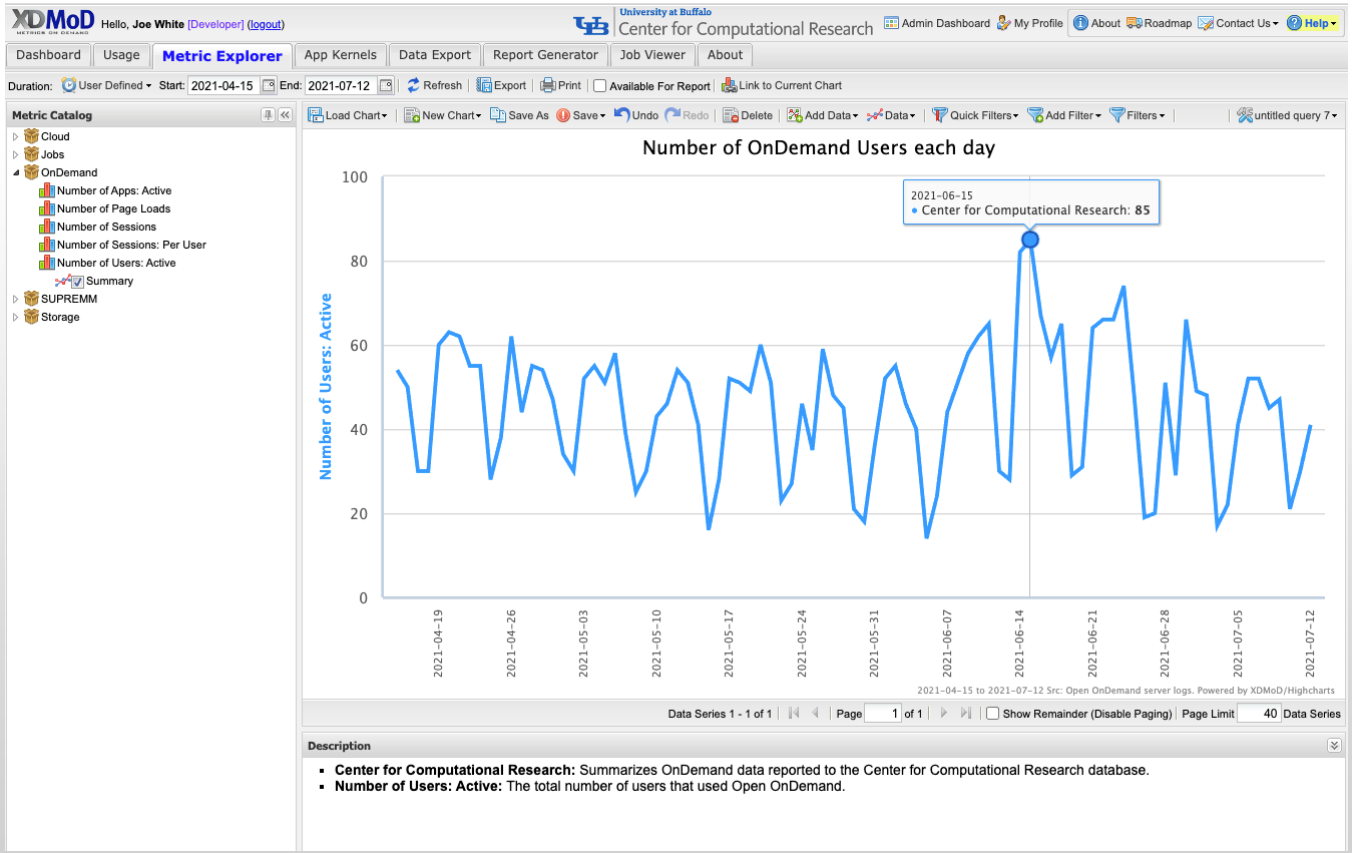
Add custom widgets- Left most groups widget is completely custom

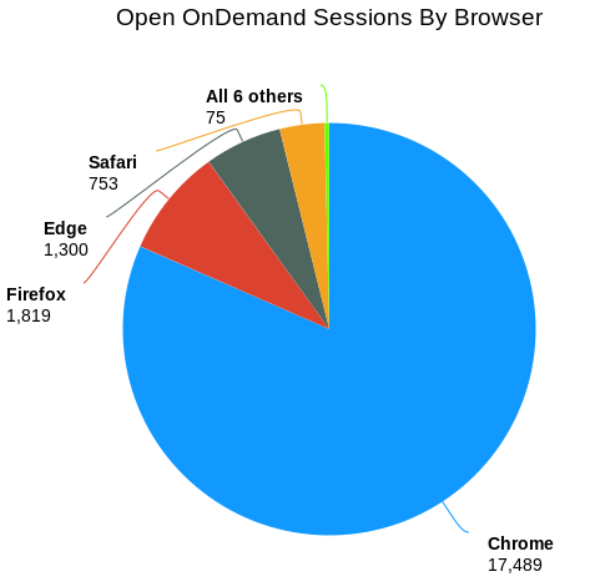
New Files App

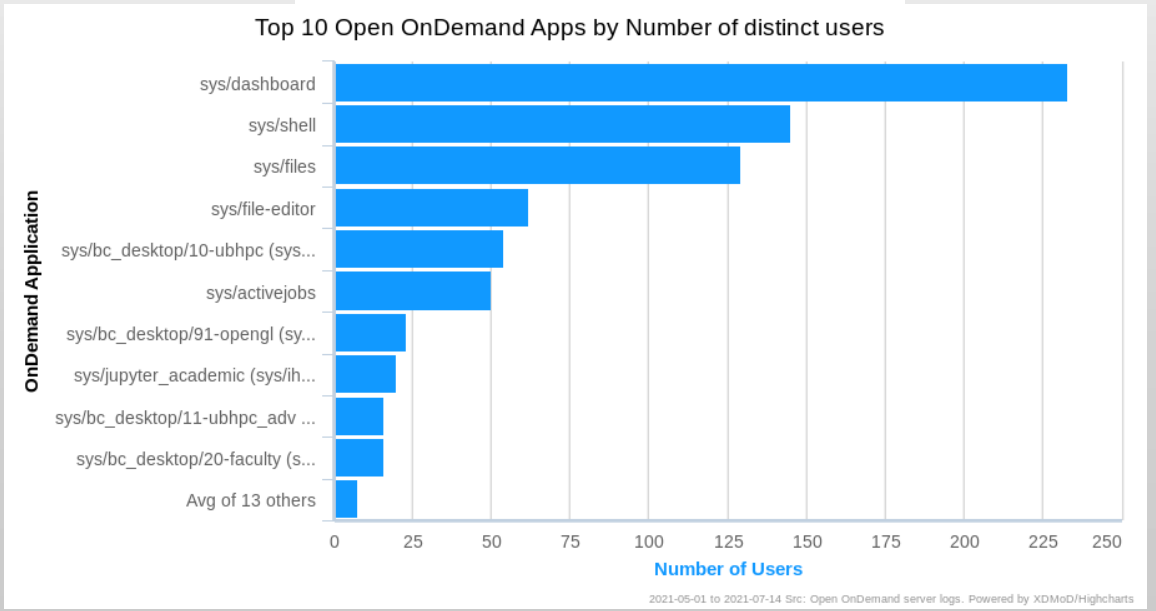


This will make it easier to maintain and add new features.

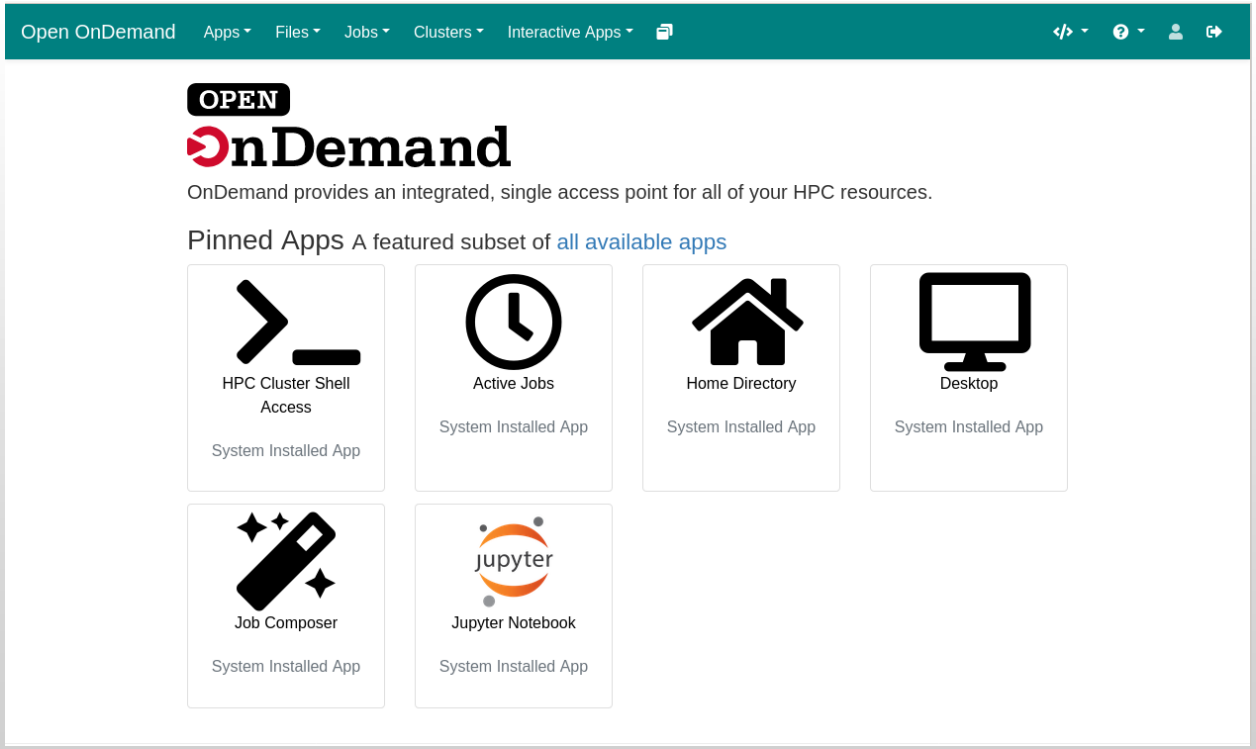
OnDemand Metrics in XDMoD

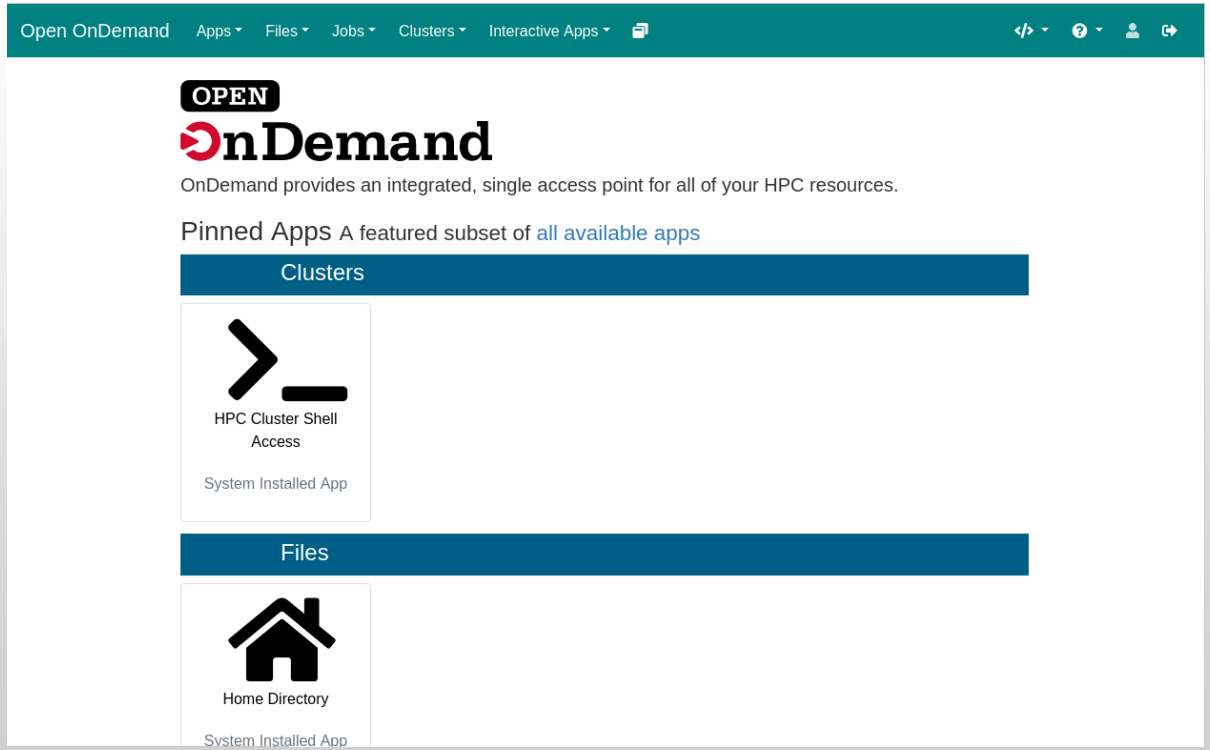






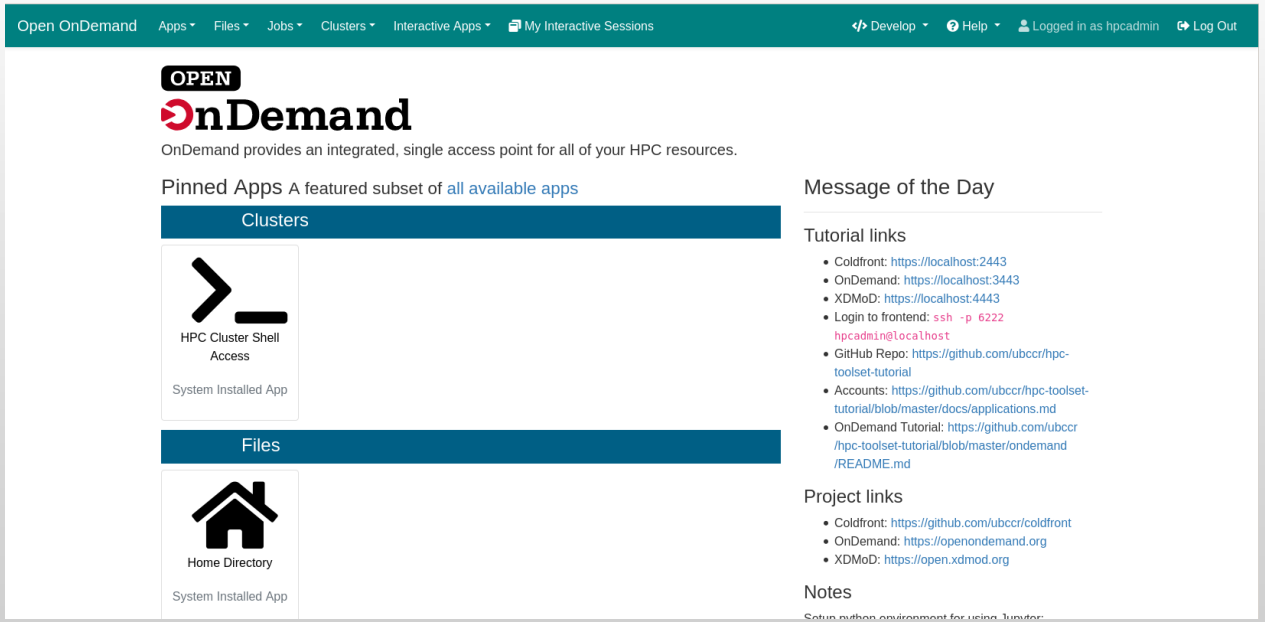
Dashboard Example: Pinning Apps to the dashboard



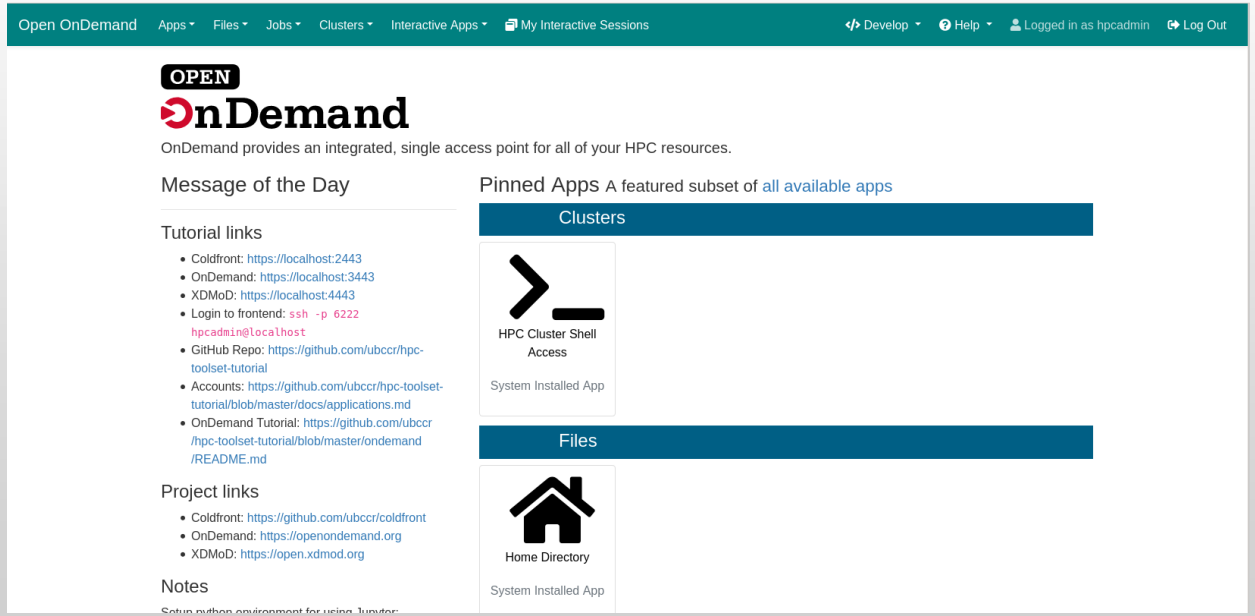


Dashboard Example: Changing the layout

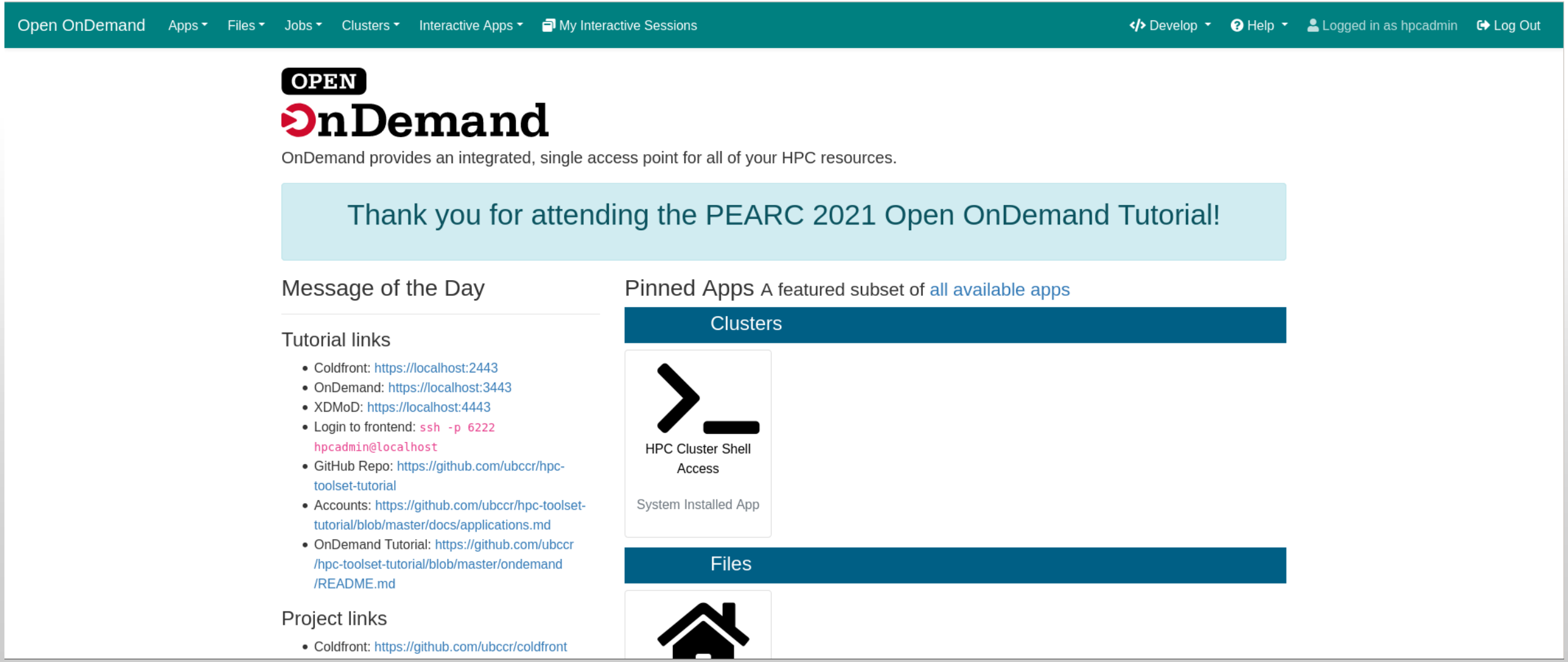
Before



After



Dashboard Example: Adding a new widget



Kubernetes

- Documentation for using Kubernetes as a resource for Open OnDemand is online.
- It's been in since 1.8, but 2.0 had lots of updates.
- Running in production at OSC.
- https://osc.github.io/ood-documentation/latest/installation/resource-manager/kubernetes.html

In Progress – dynamic javascript

- Hide options depending on current selection
  - hide *hugemem* when cluster changes to *owens.*
- Set min & max
  - Set *hugemem's* min and max to 42 when cluster changes to *owens.*
- Set a field based on another
  - Set account to *python27* when *2.7* option is chosen.
- Semantics use the existing `data-` attributes.
- More to come!

```
- [
    "gpu",
    # this bad option is kept here so that in testing, it doesn't throw errors
    data-option-for-not-real-choice: false,
    data-max-some-element-for-3rd-element-value: 10,
    data-max-bc-num-slots-for-cluster-owens: 28,
    data-min-bc-num-slots-for-cluster-owens: 2,
    data-max-bc-num-slots-for-cluster-oakley: 40,
    data-min-bc-num-slots-for-cluster-oakley: 3,
  ]
- [
    "hugemem",
    data-option-for-cluster-oakley: false,
    data-max-bc-num-slots-for-cluster-owens: 42,
    data-min-bc-num-slots-for-cluster-owens: 42
  ]
- [
    "advanced",
    data-option-for-cluster-oakley: false,
    data-max-bc-num-slots-for-cluster-oakley: 9001
  ]
```

```
- [
    "2.7",
    data-option-for-node-type-advanced: false,
    data-set-bc-account: 'python27'
  ]
```

In Progress – Debian support

Rake task `rake package:deb` merged earlier this week

- Ubuntu 20.04 is the first target platform

Nightly RPMs available

- New RPM every day. Only deployed in the dev environment at OSC.
- https://yum.osc.edu/ondemand/nightly/

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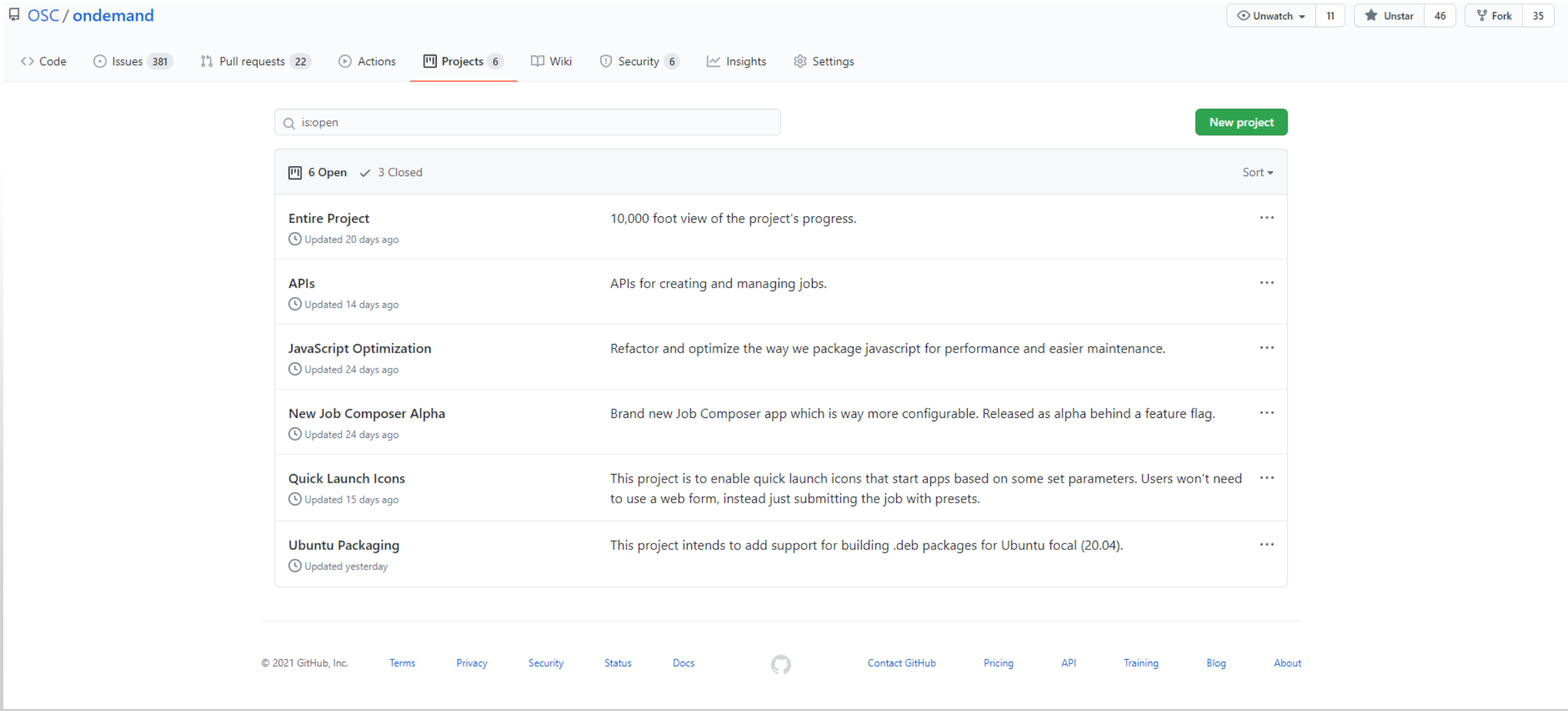
OPEN OnDemand

Project Planning Revamp

- We're trying to drive engagement on features that matter.
- GitHub Projects now show the progress of large upcoming features
  - Examples are new Job Composer or Ubuntu packaging
- There's an 'Entire Project' that shows estimated version of different features
- GitHub milestones track smaller issues to a given release.

GitHub Projects



https://github.com/OSC/ondemand/projects

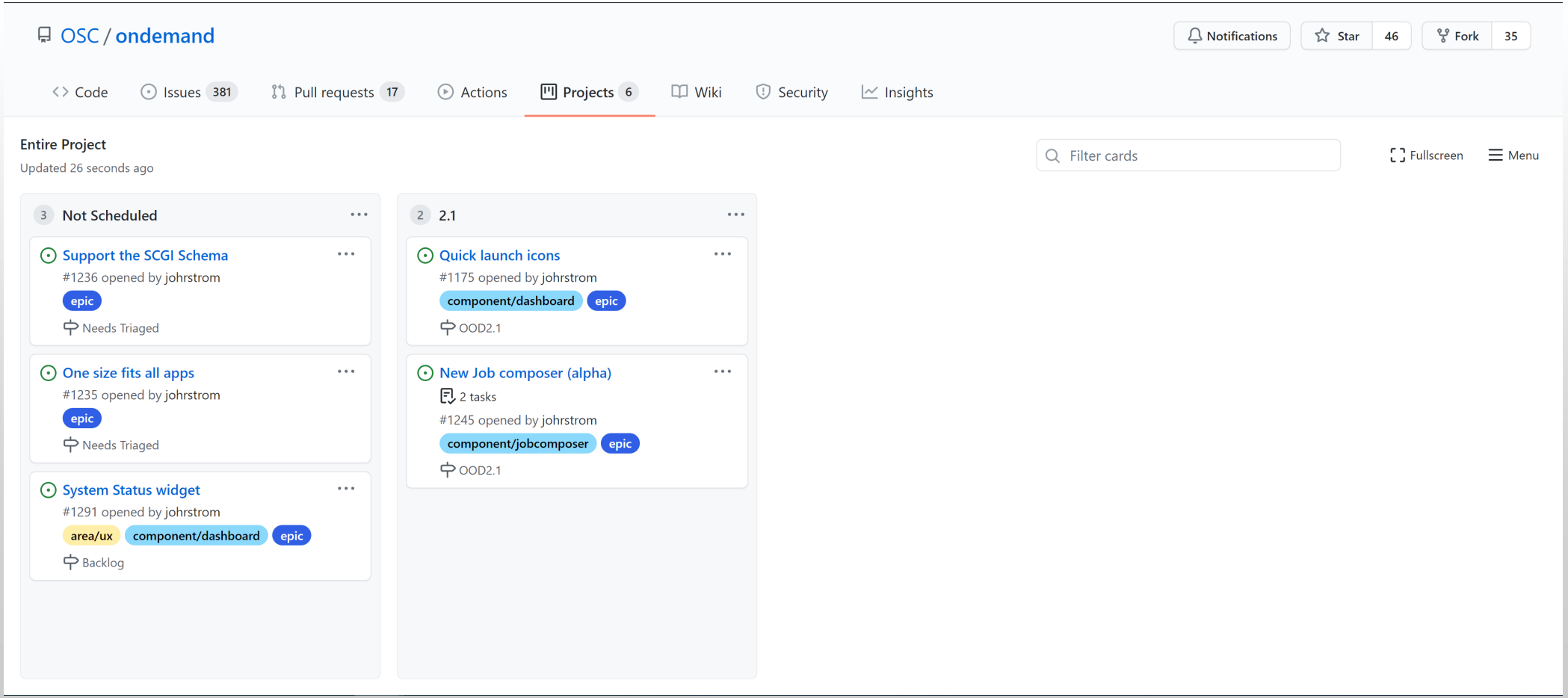
Current Projects in Flight

- APIs
- New Job Composer (alpha)
- Quick Launch Icons
- Ubuntu Packaging
- Kubernetes

Comment on tickets or react with thumbs +/- 1!

Entire Project View

- Entire Project view shows feature commitments
- Trying to limit promises in progress



Microsoft Azure / Google Cloud Instances

Azure HPC OnDemand Platform: Cloud HPC made easy.

By xpillons

Published 07-12-2021 07:01 AM 1,099 Views

As many customers are looking at running their HPC workloads in the cloud, onboarding effort and cost are key consideration. As an HPC administrator, in such process you try to provide a unified user experience with a minimal disruption, in which the end users and the cluster administrators can retrieve most of their on-premises environment while leveraging the power of running in the cloud.

The ***Specialized Workloads for Industry and Mission*** team that works on some of the most complex HPC customer and partner scenarios has built a solution accelerator **Azure HPC OnDemand Platform** (aka **az-hop**) available in the Azure/az-hop public GitHub repository to help our HPC customers onboard faster. **az-hop** delivers a complete HPC cluster solution ready for users to run applications, which is easy to deploy and manage for HPC administrators. **az-hop** leverages the various Azure building blocks and can be used as-is, or easily customized and extended to meet any uncovered requirements.

Based on our experience, from years of customer engagements, we have identified some common principles that are important to our customers and designed **az-hop** with these in mind:

- A pre-packaged HPC Cluster easy to deploy in an existing subscription, which contains all the key building blocks and best practices to run a production HPC environment in Azure,
- A unified and secured access for end users and administrators, so each one can reuse their on-premises tools and scripts,
- A solution to integrate applications under the same unified cloud experience,
- Build on standards, common tools and open blocks so it can be easily extended and customized to accommodate the unique requirements of each customer.

CloudyCluster & GCP: Introducing HPC VM Pre-Tuned Images

Feb. 8, 2021 - Today, we're excited to announce the release of version 3.1.1 of CloudyCluster on Google Cloud Platform, leveraging a CentOS 7-based Virtual Machine (VM) image optimized for high performance computing (HPC) workloads. This new release is designed with a focus on tightly-coupled MPI workloads. **Read the full blog here-->**

INTERACTIVE RESEARCH COMPUTING

With the latest release of CloudyCluster, users can now take advantage of the GUI developed by OSC and the cloudyCluster Team. This new inclusion offers non-computer scientists a pathway to cloud-based HPC tools, without having to utilize the CLI. Upload and Download files with a file browser-like interface. You can now: draft job scripts with the built-in Job Script tool, spin-up new computing instances with or without a variety of GPU Acceleration, and have them tear down automatically after your specified work window. The current release includes JupyterLab with Jupyter Notebooks in Python 3 for true interactive code testing.

CloudyCluster online documentation-->

Open OnDemand Project-->

Second TrustedCI Engagement

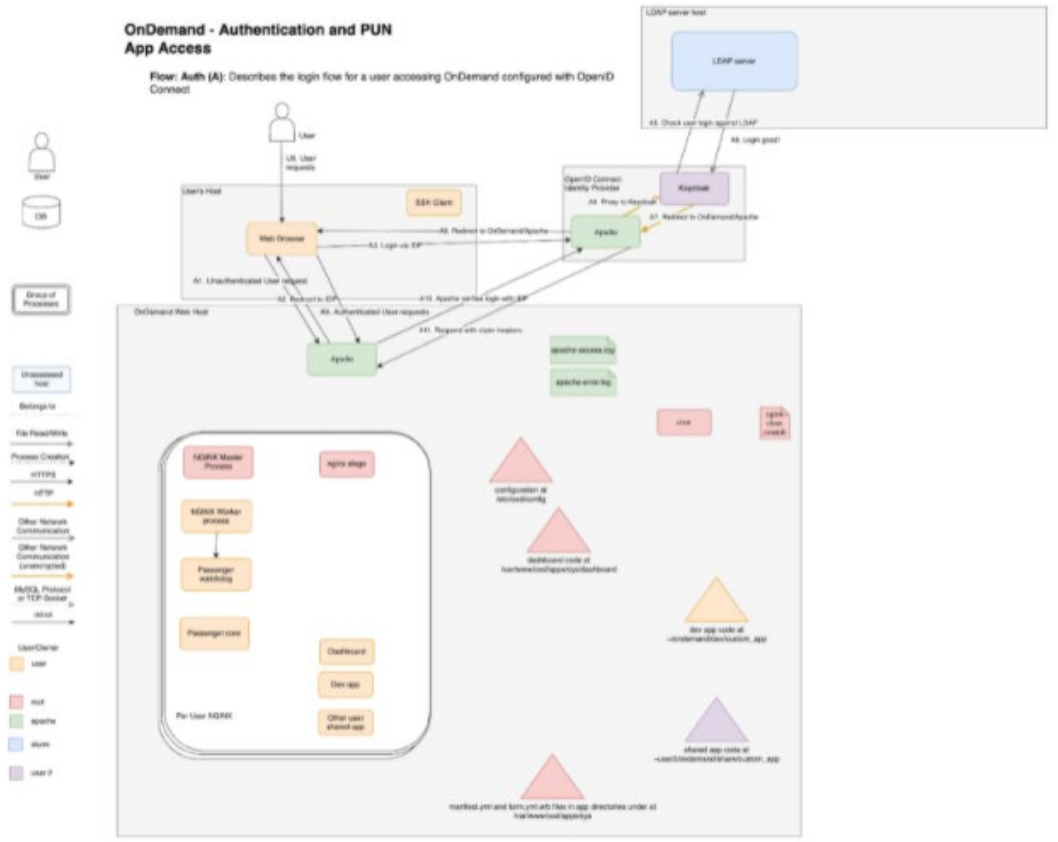


Figure D1. Authentication Flow for Open OnDemand version 1.8.19

Intel Case Studies

Case Study

High Performance Computing (HPC)
Intel® Xeon® Scalable Processors

intel

Ohio Supercomputer Center OnDemand Portal Accelerates Remote Learning

Web-based interface provides students with HPC virtual laboratories based on Intel Xeon Scalable processors

Ohio Supercomputer Center Clusters

Pitzer

- Dell EMC PowerEdge C6420 servers with CoolIT Systems' Direct Contact Liquid Cooling coupled with Dell EMC PowerEdge R740 servers
- Intel Xeon Platinum 8268 processors
- Intel Xeon Gold 6148 processors

Owens

- Dell EMC PowerEdge servers including C6320, R730 and R930 servers
- Intel Xeon E5 2680 v4 processors

intel XEON PLATINUM inside

intel XEON GOLD inside

Ohio Supercomputer Center
An OH·TECH Consortium Member

DELL Technologies

Executive Summary

Because of the COVID-19 pandemic, students at Ohio State University (OSU) and many other schools have had to adapt to remote learning situations. This proved to be especially challenging for work normally done in labs for a wide range of areas such as science, math, computer science, statistics, business, and other disciplines.

But, thanks to the Ohio Supercomputer Center (OSC), OSU was well prepared for the switch to remote learning. Plus, they were able to provide other universities with virtual laboratory portals as well. The center provides these virtual computer labs by offering students an easy to use web-based interface in a tool they developed called OnDemand. The students use customized dashboards developed by OSC for access to digital labs across multiple disciplines of classes including architecture, statistics, crop sciences and more. When students log on to OSC OnDemand, they have access to an OSC supercomputer capable of running large workloads with advanced processing capabilities not typically available to users on their own computers.

Challenge

Historically, the high performance computing (HPC) community did their work via a command-line interface to enter system commands and move through files or directories, as well as run programs. Lack of a web-interface in HPC led to the perception that HPC work was lagging behind in ease of use.

Many students have only used web-based graphical user interfaces (GUIs) and are not interested in spending time learning about file systems, directories, and command line entries. Scientists and engineers would rather spend their time advancing their disciplines than learning HPC. Developing an easy-to-use web-based interface would lower the barrier to entry so that students, commercial clients, and government researchers have access to OSC supercomputer cluster systems.

Solution

Alan Chalker, Ph.D., Director of OSC Strategic Programs, explained that the inspiration behind OSC OnDemand was that every other technology developed web-based user portals so end-users could easily interact with the technology.

OnDemand is an accessible web interface that allows anyone with OSC access to log into and use one of the OSC supercomputer clusters. This would allow students, researchers, or commercial customers need to meet their most challenging data processing and research simulation needs.

OnDemand's novel architecture ensures that clients can utilize any modern web browser and helps utilize the underlying system security and user management.

HPC wire

Since 1987 - Covering the Fastest Computers in the World and the People Who Run Them

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OnDemand Portal Accelerates HPC Work for Academic and Industrial Users

By Linda Barney

December 21, 2020

Editor's note: This special guest post explores the use of the OnDemand and Open OnDemand web interfaces, developed by Ohio Supercomputer Center to facilitate use of powerful HPC resources, and used by academia and industry, including NASCAR.

Historically, the HPC community has done their work via a command-line interface to enter system commands and move through files or directories, as well as run programs. To facilitate greater use of its significant computational resources, Ohio Supercomputer Center (OSC) developed OnDemand, an accessible web interface that allows anyone with OSC access to log into and use one of the OSC supercomputer clusters. With funding through the National Science Foundation (NSF), OSC created an open source version called Open OnDemand (OOD) that allows research institutions and universities to run their own instance of OnDemand. In addition, OSC created a special OnDemand portal for commercial customers called AweSim OnDemand.

OSC addresses the computational demands of academic and industrial research communities with a robust shared infrastructure. Pictured is OSC's Dell/Intel Owens cluster. "Owens" is the namesake of J.C. "Jesse" Owens, who won four gold medals at the 1936 Olympics.

OSC's OnDemand high performance computing environment includes clusters based on Intel Xeon processors. Pitzer, OSC's newest system, is an Intel Xeon processor-based cluster built by Dell. When students and customers log onto OSC OnDemand, they have access to a supercomputer capable of running large workloads with advanced processing capabilities not typically available to all users on their own computers. Running on an OSC cluster accelerates the time to insight during data analysis and lowers the cost-per-terabyte during data processing. One AweSim user, NASCAR, uses workflows developed by TotalSim to perform simulations of race cars.

Monthly Meetings

Tips and Tricks calls

- First Thursday of the month
- 1PM – 2PM ET
- OOD community presenter

Open Office Hours

- Second Tuesday of the month
- 11:15 AM – 12:45 PM ET
- Project team available to answer any questions

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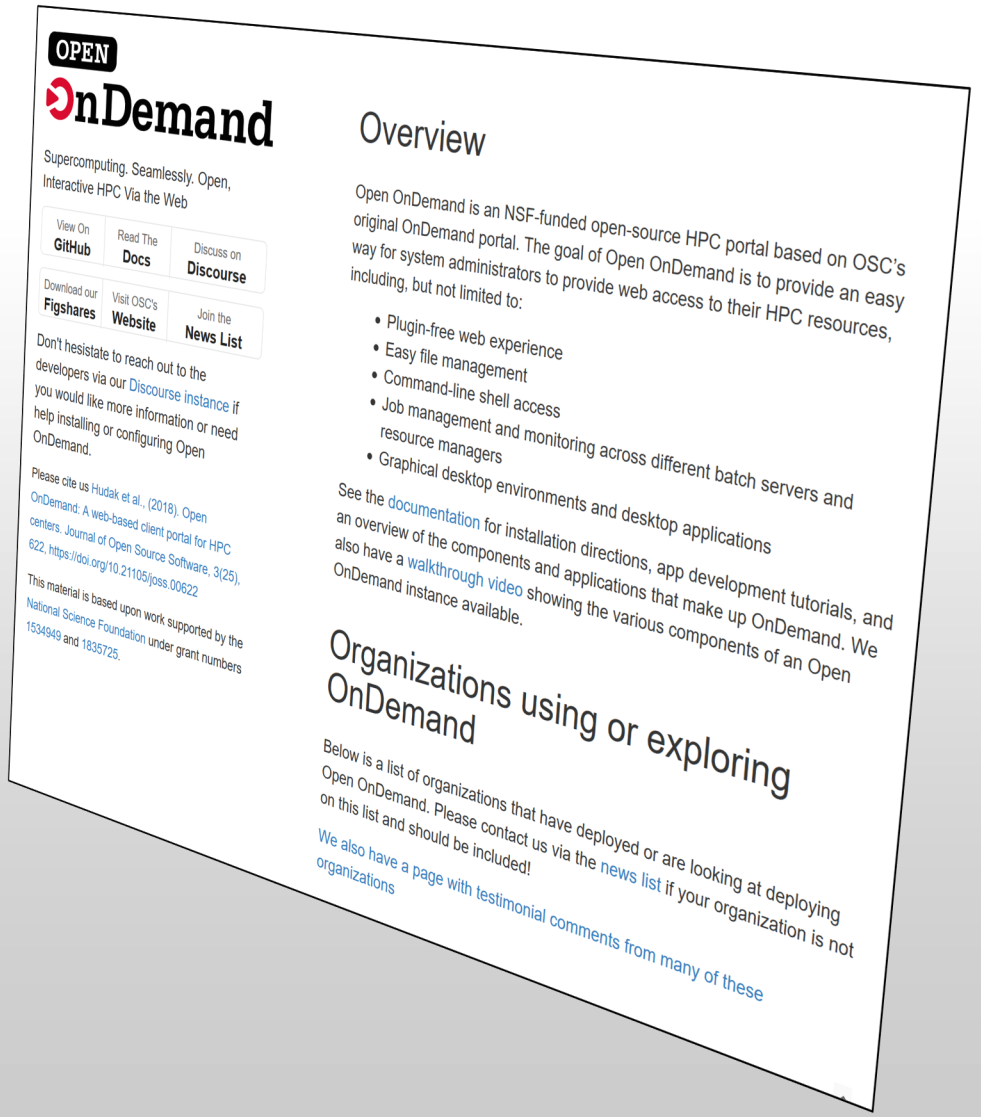

OPEN OnDemand

Supercomputing. Seamlessly. Open, Interactive HPC Via the Web

View On GitHub | Read The Docs | Discuss on Discourse

Download our Figshares | Visit OSC's Website | Join the News List

Don't hesistate to reach out to the developers via our Discourse instance if you would like more information or need help installing or configuring Open OnDemand.

Please cite us Hudak et al., (2018). Open OnDemand: A web-based client portal for HPC centers. Journal of Open Source Software, 3(25), 622, https://doi.org/10.21105/joss.00622

This material is based upon work supported by the National Science Foundation under grant numbers 1534949 and 1835725.

Overview

Open OnDemand is an NSF-funded open-source HPC portal based on OSC's original OnDemand portal. The goal of Open OnDemand is to provide an easy way for system administrators to provide web access to their HPC resources, including, but not limited to:

- Plugin-free web experience
- Easy file management
- Command-line shell access
- Job management and monitoring across different batch servers and resource managers
- Graphical desktop environments and desktop applications

See the documentation for installation directions, app development tutorials, and an overview of the components and applications that make up OnDemand. We also have a walkthrough video showing the various components of an Open OnDemand instance available.

Organizations using or exploring OnDemand

Below is a list of organizations that have deployed or are looking at deploying Open OnDemand. Please contact us via the news list if your organization is not on this list and should be included!

We also have a page with testimonial comments from many of these organizations