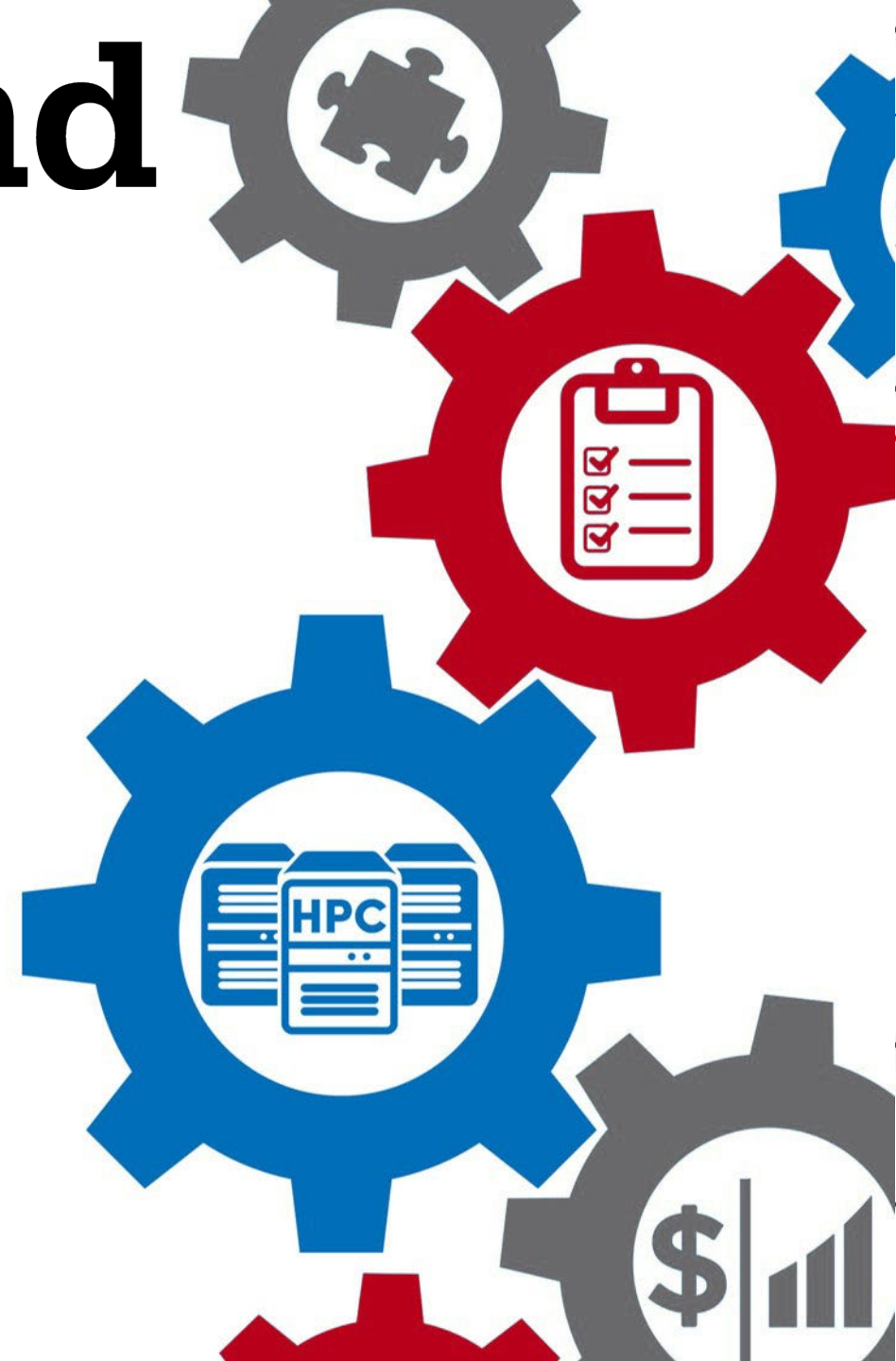


**OPEN**

**OnDemand**

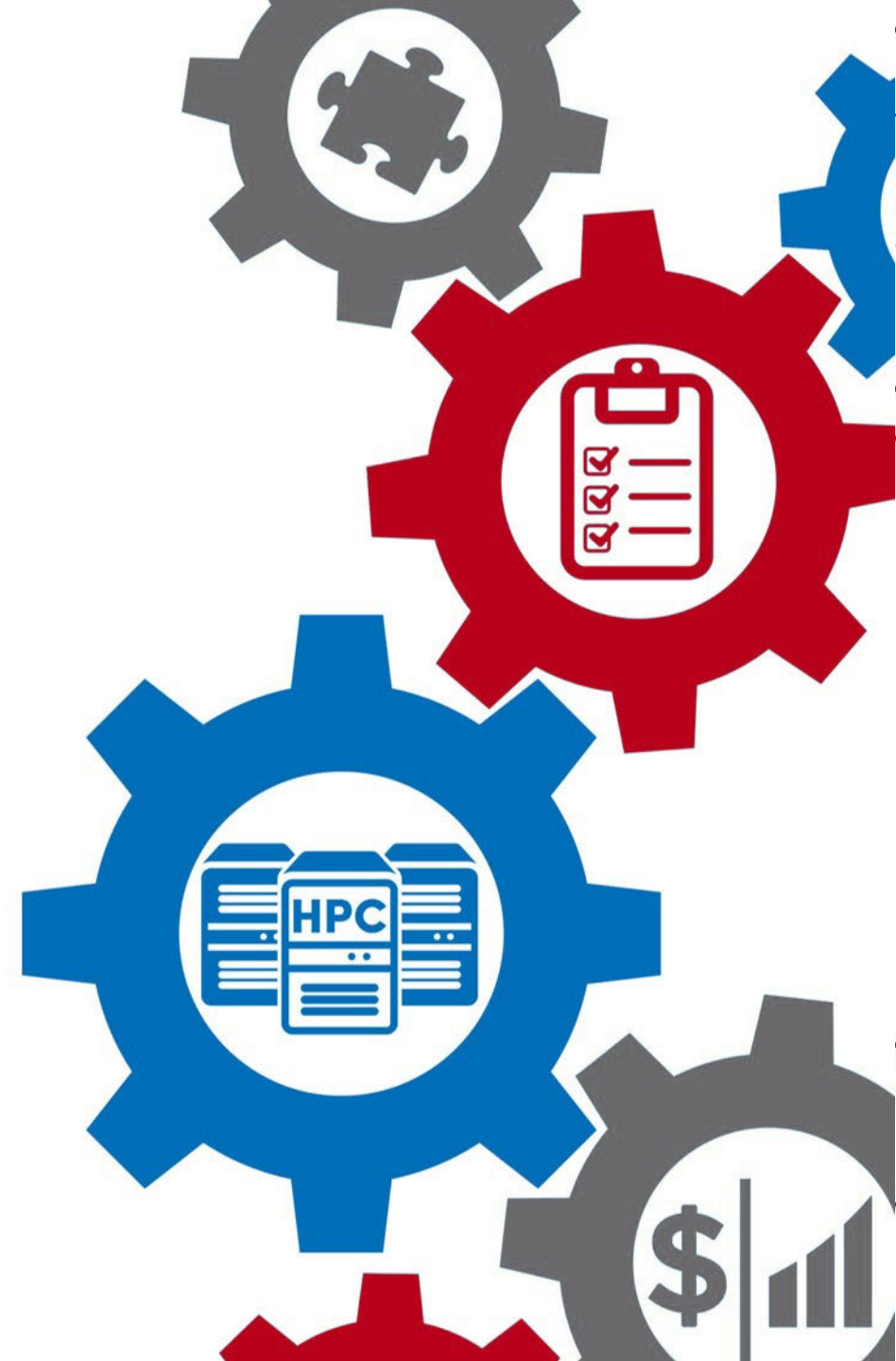
## Open, Interactive HPC via the Web

Alan Chalker  
Travis Ravert  
Jeff Ohrstrom  
Gerald Byrket



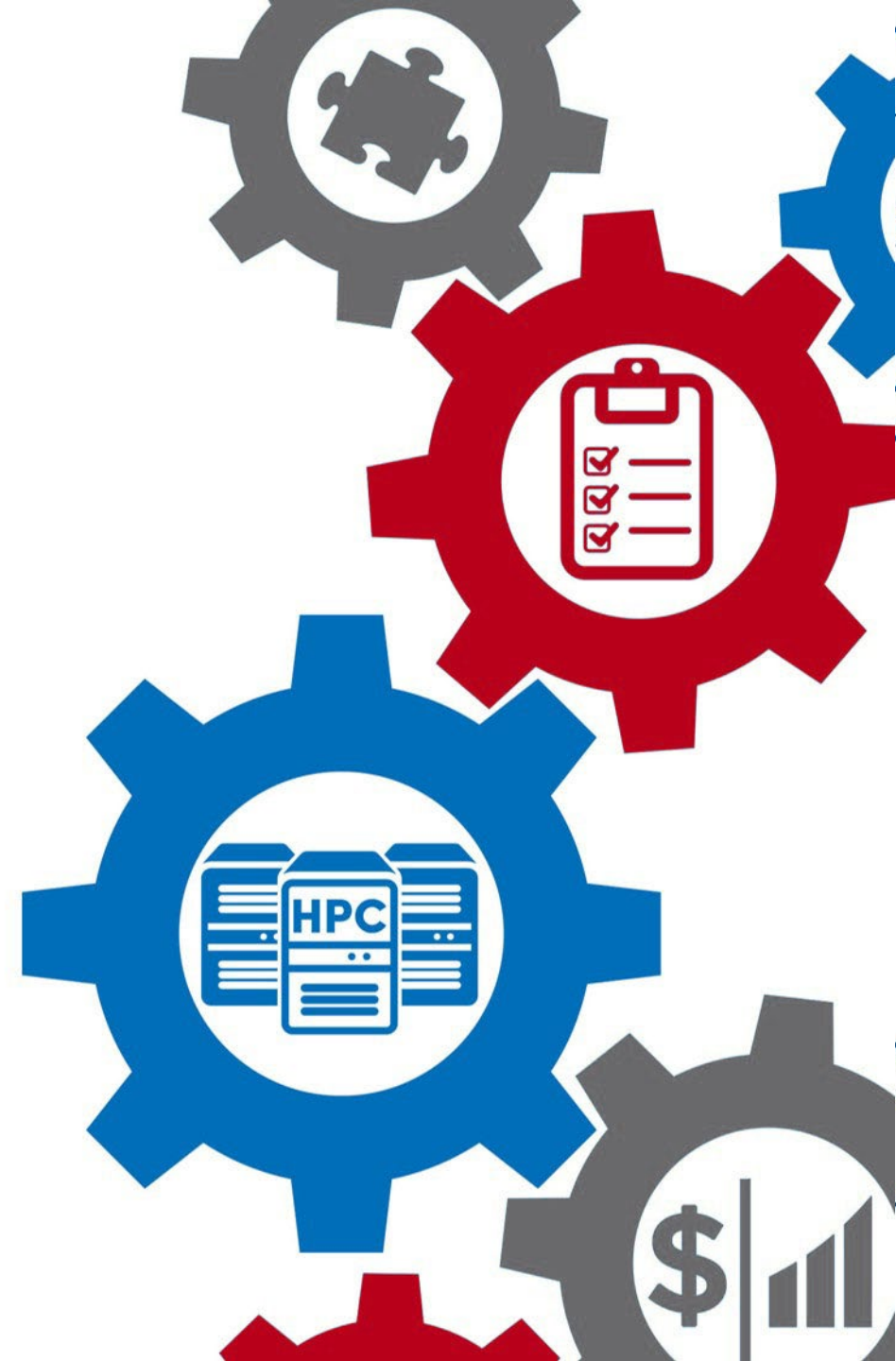
# Agenda

- Tutorial Goals
- Intro to Open OnDemand
- Docker Container Installation
- Dashboard Customization
- Example Interactive App Creation
- Wrap Up



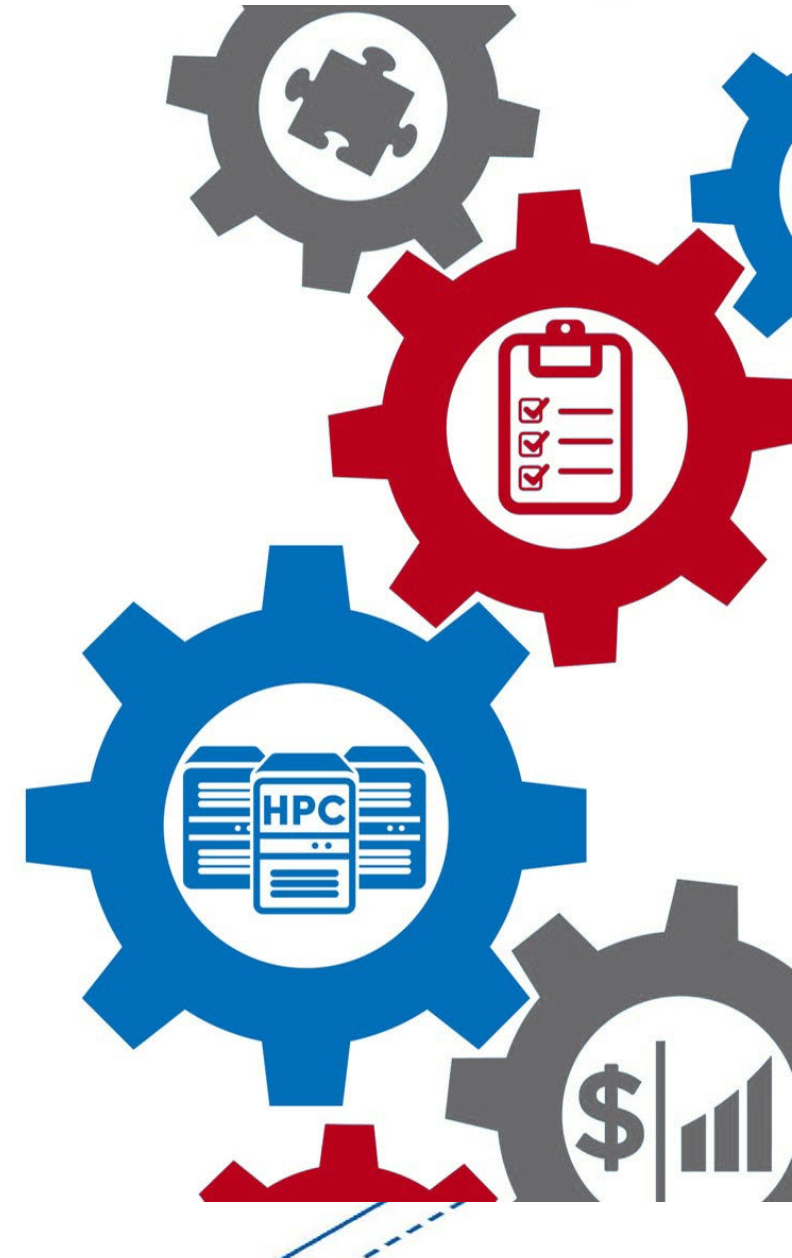
# Tutorial Goals:

- Provide an overview of Open OnDemand
- Show how to setup a cluster in a container to practice
- Demonstrate features of interest to Gateways community
- Detail resources for questions & help



# Introduction to Open OnDemand

Alan Chalker



# Connecting computing power with powerful minds

Open OnDemand empowers students, researchers, and industry professionals with remote web access to supercomputers

## Run Open OnDemand

Access your organization's supercomputers through the web from anywhere, on any device

### Zero installation

Run Open OnDemand entirely in your browser. No client software installation required.

### Easy to use

Start computing immediately. A simple interface makes Open OnDemand easy to learn and use.

### Compatible with any device

Launch on any device with a browser - even a mobile phone or tablet.

## Install Open OnDemand

Administer remote access to your supercomputers to transform the way users work and learn

### Low barrier to entry

Empower users of all skill levels by offering an alternative to command-line interface.

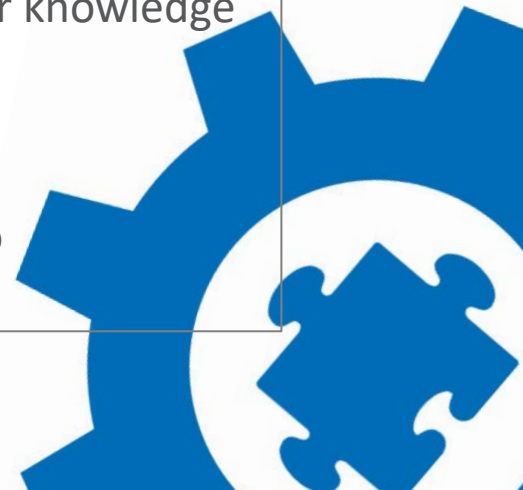
### Free and open source

Install Open OnDemand for free, and gather knowledge from our large open-source community.

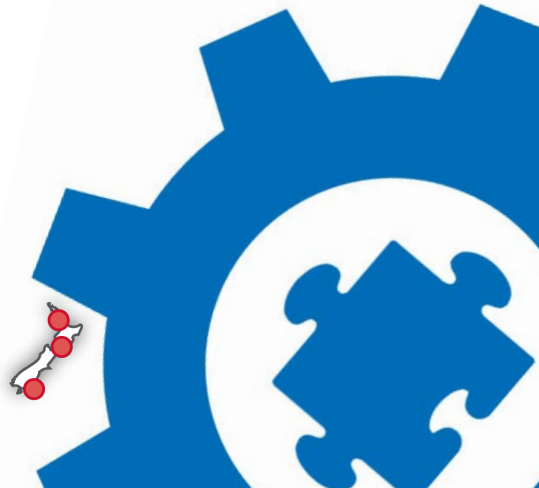
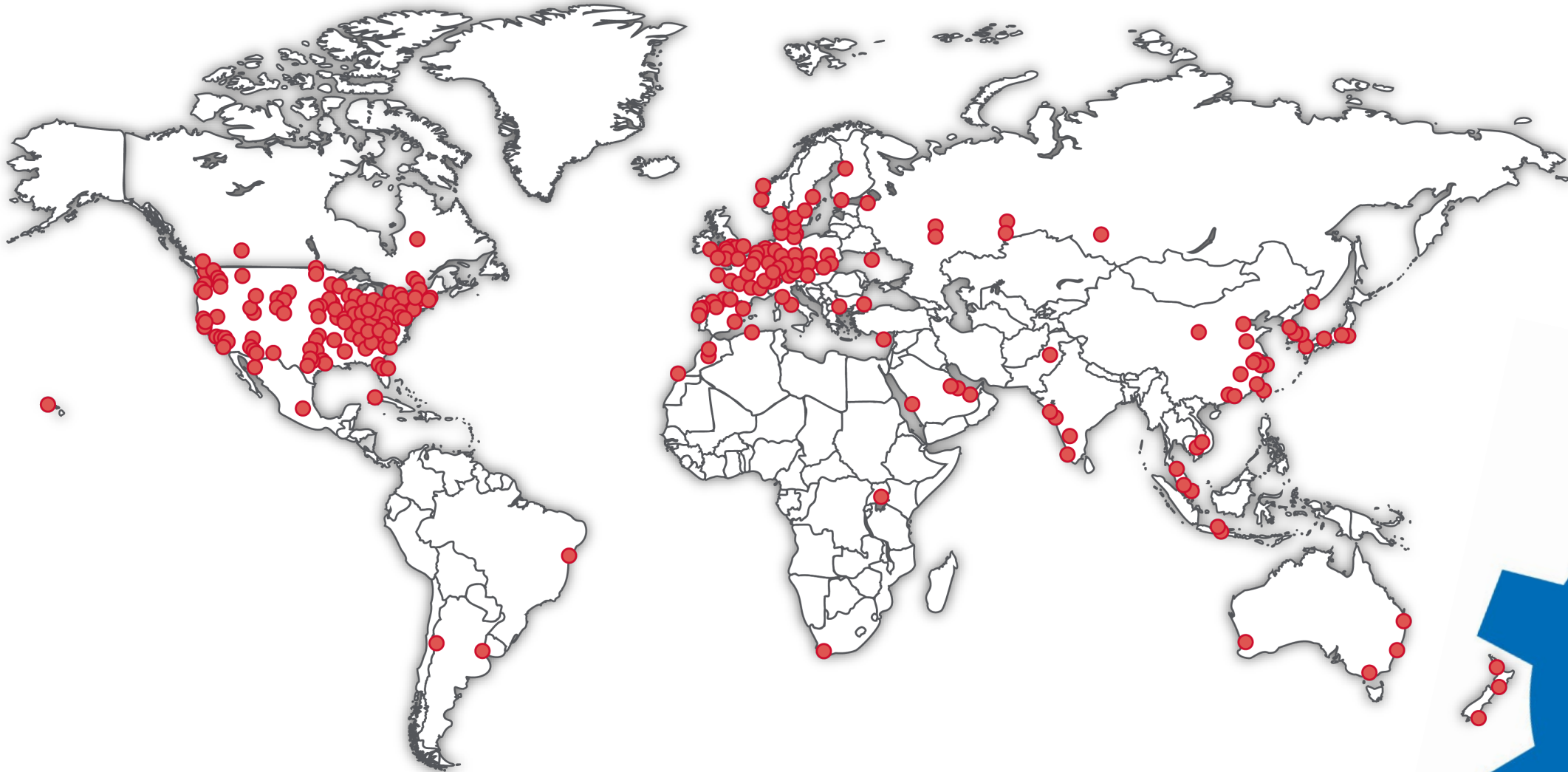
### Configurable and flexible

Create and deploy your own applications to meet your users' unique needs.

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.



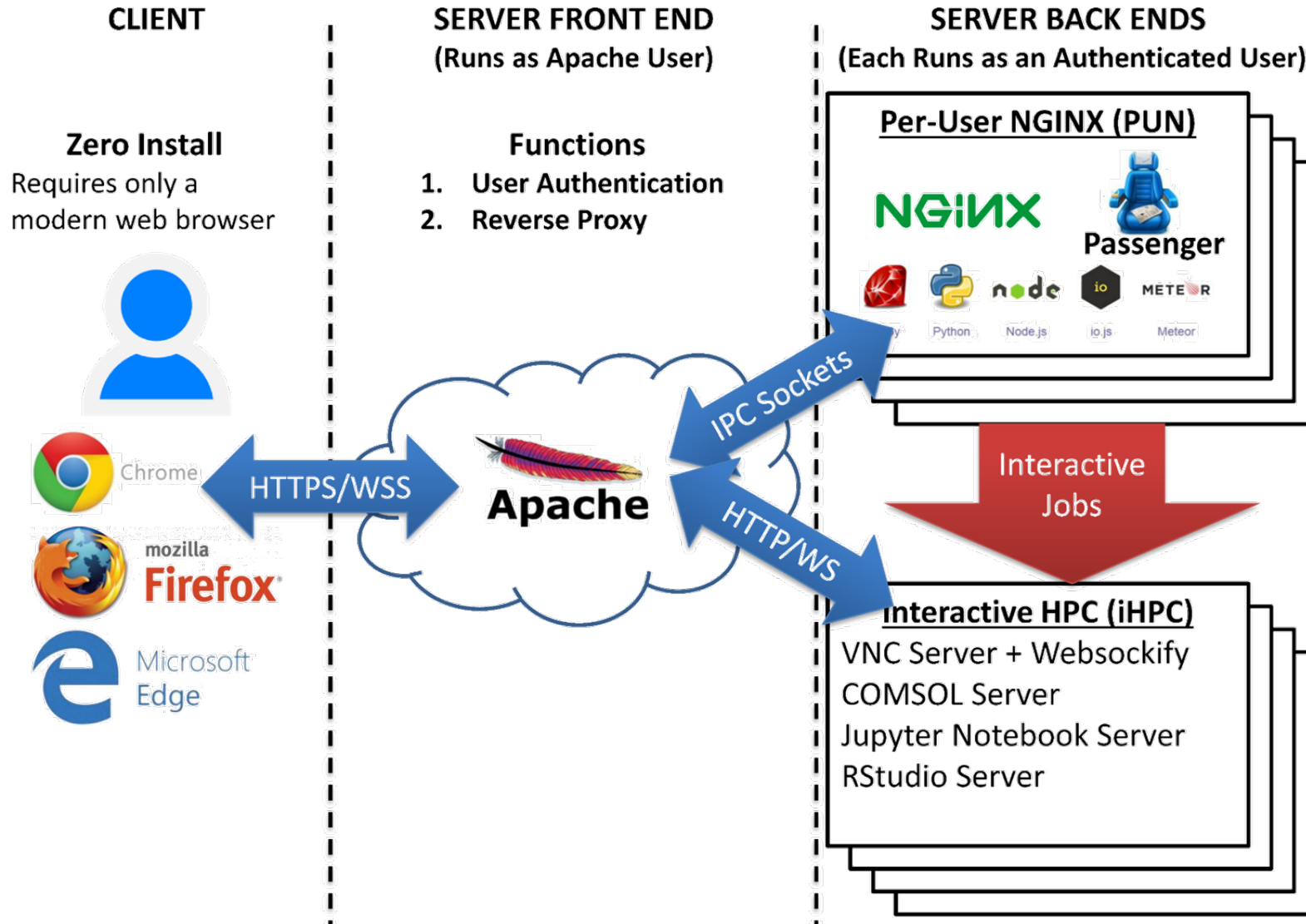
Almost 400 active installations worldwide





**Don't see your logo?  
Let us know!**







## Check out the Project on GitHub

See all the projects at: <https://github.com/OSC/ondemand/projects>

Large features currently stated for release: <https://github.com/OSC/ondemand/projects/10>

Feel free to comment or react to tickets. Open feature requests or anything. We want to hear from you!



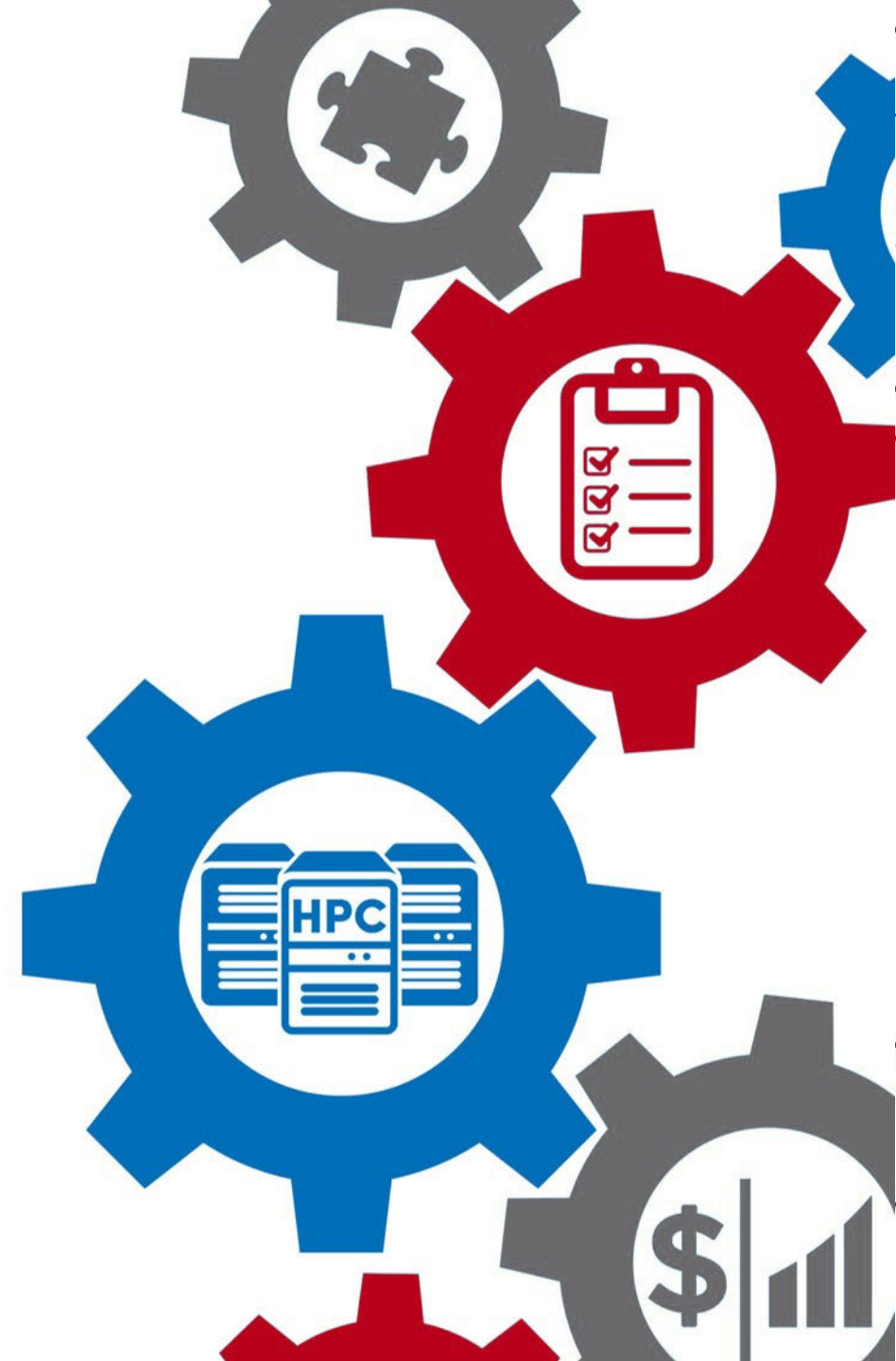
**WE WANT YOU!**

If you have an idea or want to work on any of the features or bug fixes, please feel free to reach out to us and we will get you started. We always want to include our community in the Open OnDemand efforts.



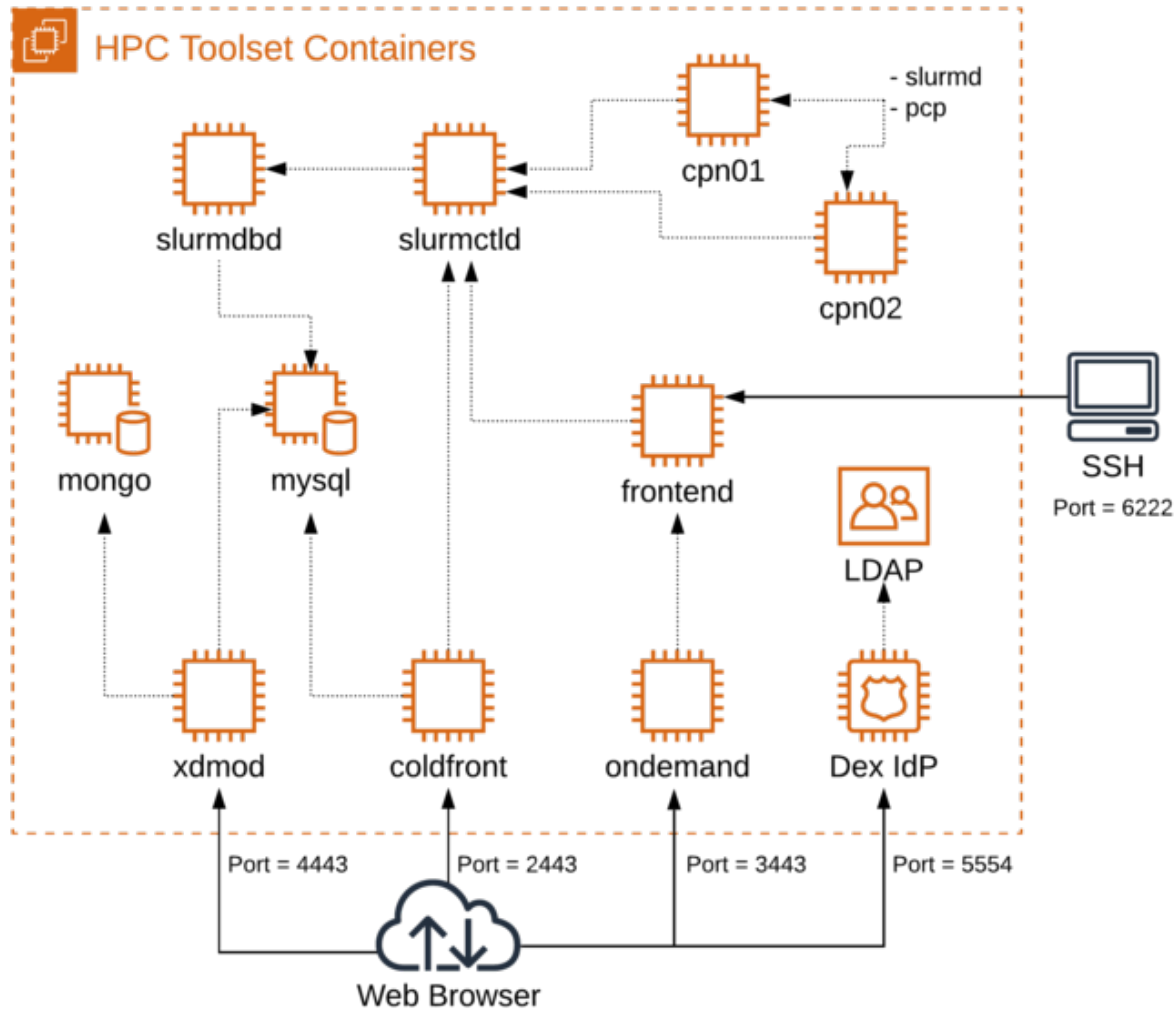
# Docker Container Installation

Travis Ravert



# Tutorial Container Architecture

<https://github.com/ubccr/hpc-toolset-tutorial>



## Clone the Github Repo:

```
git clone https://github.com/ubccr/hpc-toolset-tutorial
cd hpc-toolset-tutorial
./hpcts start
```

\* The first time you do this, you'll be download ~20GB worth of containers from Docker Hub. This can take a long time depending on your network speeds. After downloaded, the containers are started and services launched.

**WARNING!!! DO NOT** run these containers on production systems. This project is for educational purposes only. The container images we publish for the tutorial are configured with hard coded insecure passwords and should be run locally in development for testing and learning only.



# Tutorial Walk Through

<https://github.com/ubccr/hpc-toolset-tutorial>

Keep the applications page open for easy access to account usernames/passwords and portal URLs:

<https://github.com/ubccr/hpc-toolset-tutorial/blob/master/docs/applications.md>



# Customizing the OnDemand Dashboard

Travis Ravert



## Hands on Tutorial: Dashboard in Development Mode

### It Covers:

- Setting up the dashboard in development mode
- Changing the navigation bar color
- 2.0 Features:
  - Pinning Apps to the dashboard
  - Changing the layout of the dashboard
  - Adding custom widgets to the dashboard



# Dashboard Tutorial: Pinning Apps to the dashboard

- Pinning Apps and then grouping them

Open OnDemand Apps Files Jobs Clusters Interactive Apps

**OPEN**  
**OnDemand**  
OnDemand provides an integrated, single access point for all of your HPC resources.

Pinned Apps A featured subset of [all available apps](#)

|  |  |  |                                     |
|--|--|--|-------------------------------------|
| <br>HPC Cluster Shell Access<br>System Installed App | <br>Active Jobs<br>System Installed App      | <br>Home Directory<br>System Installed App | <br>Desktop<br>System Installed App |
| <br>Job Composer<br>System Installed App             | <br>Jupyter Notebook<br>System Installed App |  |                                     |

Open OnDemand Apps Files Jobs Clusters Interactive Apps

**OPEN**  
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Pinned Apps A featured subset of [all available apps](#)

**Clusters**

|  |
|--|
| <br>HPC Cluster Shell Access<br>System Installed App |
|--|

**Files**

|  |
|--|
| <br>Home Directory<br>System Installed App |
|--|



# Dashboard Tutorial: Changing the layout

- Change the layout so that Message of the Day is on the left

Before

Open OnDemand | Apps | Files | Jobs | Clusters | Interactive Apps | My Interactive Sessions | Develop | Help | Logged in as hpcadmin | Log Out

**OPEN OnDemand**  
OnDemand provides an integrated, single access point for all of your HPC resources.

Pinned Apps A featured subset of all available apps

**Clusters**

HPC Cluster Shell Access  
System Installed App

**Files**

Home Directory  
System Installed App

**Message of the Day**

**Tutorial links**

- Coldfront: <https://localhost:2443>
- OnDemand: <https://localhost:3443>
- XDMoD: <https://localhost:4443>
- Login to frontend: `ssh -p 6222 hpcadmin@localhost`
- GitHub Repo: <https://github.com/ubccr/hpc-toolset-tutorial>
- Accounts: <https://github.com/ubccr/hpc-toolset-tutorial/blob/master/docs/applications.md>
- OnDemand Tutorial: <https://github.com/ubccr/hpc-toolset-tutorial/blob/master/ondemand/README.md>

**Project links**

- Coldfront: <https://github.com/ubccr/coldfront>
- OnDemand: <https://openondemand.org>
- XDMoD: <https://open.xdmod.org>

**Notes**

Setup custom environment for using Jupyter

After

Open OnDemand | Apps | Files | Jobs | Clusters | Interactive Apps | My Interactive Sessions | Develop | Help | Logged in as hpcadmin | Log Out

**OPEN OnDemand**  
OnDemand provides an integrated, single access point for all of your HPC resources.

**Message of the Day**

**Tutorial links**

- Coldfront: <https://localhost:2443>
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- OnDemand Tutorial: <https://github.com/ubccr/hpc-toolset-tutorial/blob/master/ondemand/README.md>

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**Notes**

Setup custom environment for using Jupyter

Pinned Apps A featured subset of all available apps

**Clusters**

HPC Cluster Shell Access  
System Installed App

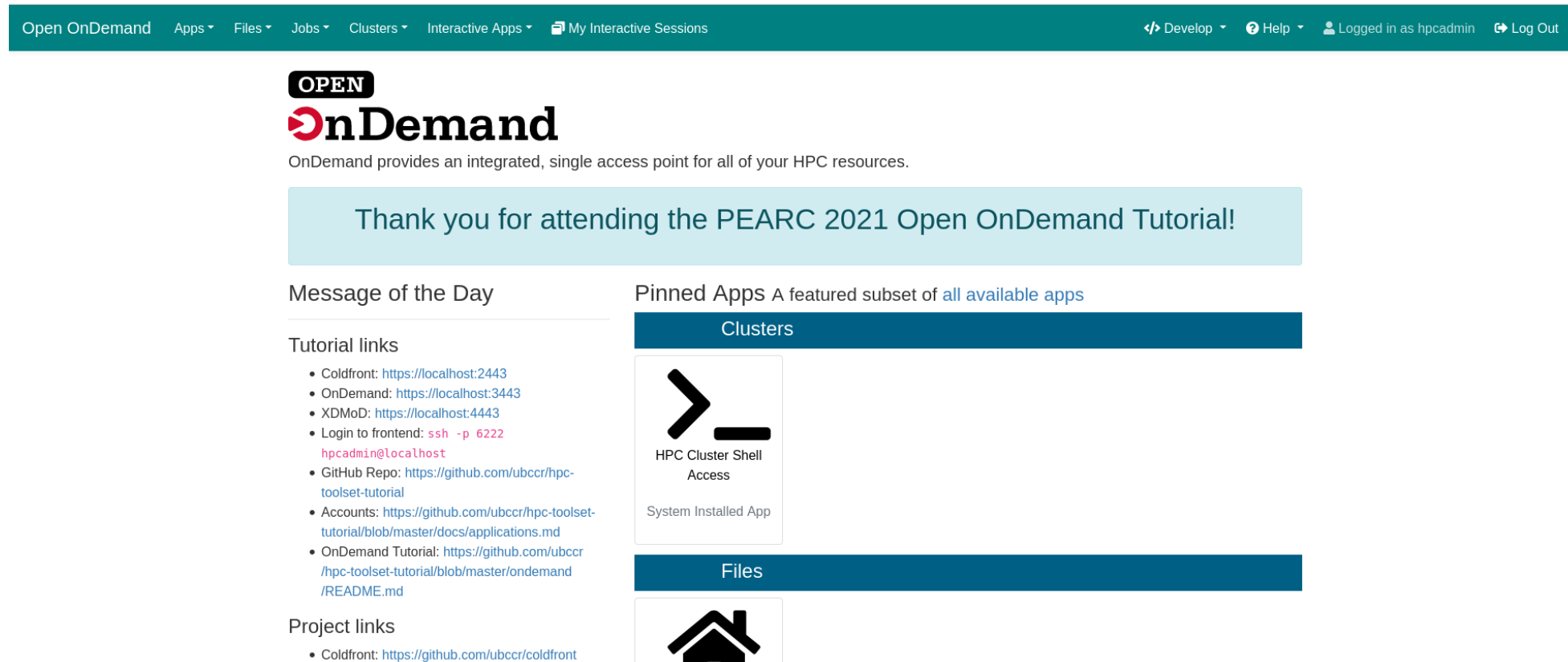
**Files**

Home Directory  
System Installed App



# Dashboard Tutorial: Adding a new widget

- Add a new custom widget



The screenshot shows the Open OnDemand dashboard interface. At the top is a navigation bar with links for 'Open OnDemand', 'Apps', 'Files', 'Jobs', 'Clusters', 'Interactive Apps', and 'My Interactive Sessions'. On the right side of the navigation bar, there are links for 'Develop', 'Help', 'Logged in as hpcadmin', and 'Log Out'.

The main content area features the 'OPEN OnDemand' logo and a message: 'OnDemand provides an integrated, single access point for all of your HPC resources.' Below this is a light blue banner that reads: 'Thank you for attending the PEARC 2021 Open OnDemand Tutorial!'.

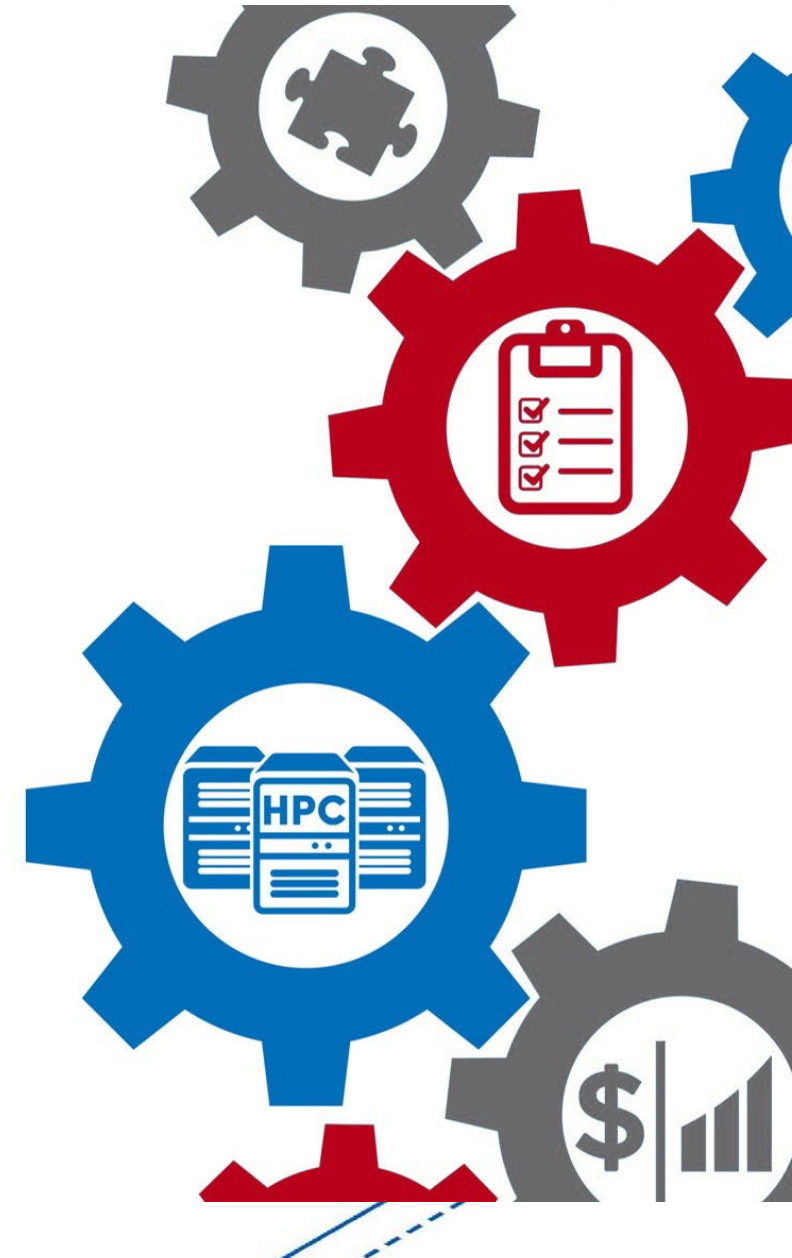
The dashboard is divided into several sections:

- Message of the Day:** A section for daily messages.
- Tutorial links:** A list of links for tutorials and documentation:
  - Coldfront: <https://localhost:2443>
  - OnDemand: <https://localhost:3443>
  - XDMoD: <https://localhost:4443>
  - Login to frontend: `ssh -p 6222 hpcadmin@localhost`
  - GitHub Repo: <https://github.com/ubccr/hpc-toolset-tutorial>
  - Accounts: <https://github.com/ubccr/hpc-toolset-tutorial/blob/master/docs/applications.md>
  - OnDemand Tutorial: <https://github.com/ubccr/hpc-toolset-tutorial/blob/master/ondemand/README.md>
- Project links:** A list of links for project pages:
  - Coldfront: <https://github.com/ubccr/coldfront>
- Pinned Apps:** A section titled 'Pinned Apps A featured subset of all available apps' containing two app cards:
  - Clusters:** Features an icon of a right-pointing chevron and a horizontal bar. The text reads 'HPC Cluster Shell Access' and 'System Installed App'.
  - Files:** Features an icon of a house with a chimney.



# Create a Jupyter “Interactive App Plugin”

Travis Ravert



## Hands on Tutorial: Create a Jupyter “Interactive App Plugin”

### It Covers:

- Getting the app to work.
- Checking logfiles to debugging failures.
- Changing the types of form items
  - From text input to select widgets
- Adding new form options
- Using Native scheduler options
- Explanations of files
- Promoting the app to production



## Jupyter Tutorial: Get the App working

- Jupyter example application doesn't work out of the box
  - Configure it to use this cluster
  - Configure it to use the correct Jupyter installation
- The card is shown when a successful Jupyter job is launched

**HPC Tutorial Jupyter (2)** 1 node | 1 core | Running

Host: `>_cpn01` Delete

Created at: 2020-07-21 19:27:37 UTC

Time Remaining: 59 minutes

Session ID: b71ea2ba-83ec-40ea-9011-7dd5b834b31f

[Connect to Jupyter](#)



## Jupyter Tutorial: Modify the Partition


- Change the partition element to be a select dropdown instead of a text field


Partition


  
**Compute**  
Debug

# Jupyter Tutorial: Deploy to production

- Deploy the app to production for other users

|   |
|---|
| Interactive Apps  |
| Desktops  |
|  HPC Desktop |

|   |
|---|
| Tutorial Apps   |
| Machine Learning  |
|  HPC Tutorial Jupyter |

|  |
|--|
| Tutorial Apps [Sandbox]  |
| Machine Learning   |
|  HPC Tutorial Jupyter |



## Jupyter Tutorial: Set the memory request for the job

- Use the `script.native` attributes to set the `--mem` SLURM argument

Memory (MB)



RSS Memory

Launch

\* The HPC Tutorial Jupyter session data for this session can be accessed under the [data root directory](#).



## Jupyter Tutorial: Limit the number of nodes

- Put an upper limit on the number of nodes allowed

### Number of nodes

17

Please select a value that is no more than the number of nodes allowed when the session starts.  
2.

\* The HPC Tutorial Jupyter session data for this session can be accessed under the [data root directory](#).





## Jupyter Tutorial: Add a radio button to start JupyterLab

- Add radio buttons so users can boot JupyterLab or Jupyter Notebook

Mode

- Jupyter Lab
- Jupyter Notebook



## Jupyter Tutorial: Delete unused fields

- Delete unused fields to clean up the form

### Partition

Compute

### Number of hours

1

### Number of nodes

1

### Memory (MB)

600

RSS Memory

Use JupyterLab instead of Jupyter Notebook?

JupyterLab is the next generation of Jupyter, and is completely compatible with existing Jupyter Notebooks.

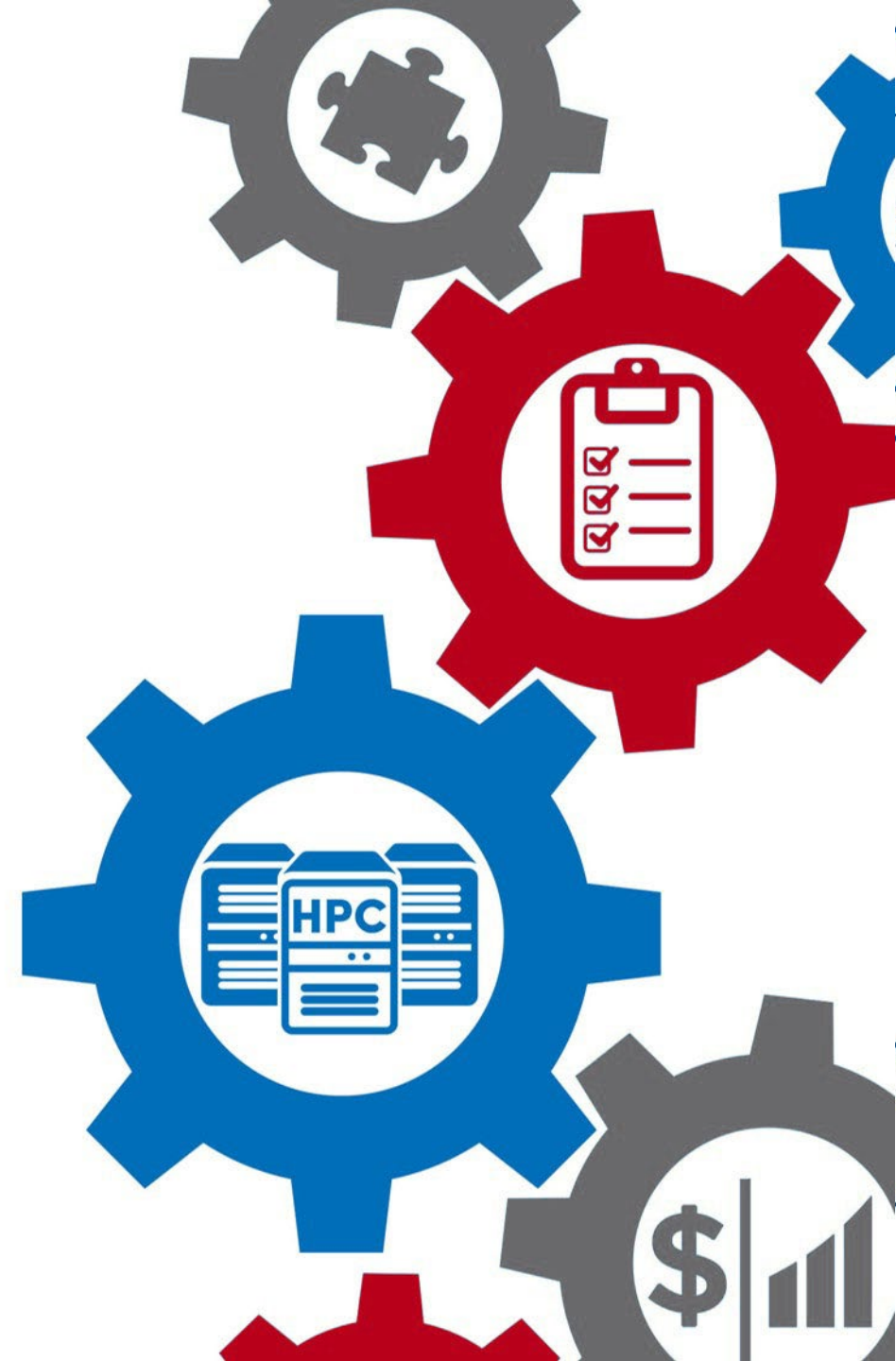
Launch

\* The HPC Tutorial Jupyter session data for this session can be accessed under the [data root directory](#).



# Wrap Up

Alan Chalker



## Funding and other acknowledgements:

- OnDemand is supported by the National Science Foundation – award numbers [NSF#1534949](#) and [NSF#1935725](#)
- We gratefully acknowledge the partnership with Virginia Tech and Univ. of Buffalo on our current joint NSF project



## How to reach us:

Use our Discourse instance for help

<https://discourse.openondemand.org/>

Monthly “Tips and Tricks” webinars – 1<sup>st</sup> Thursday of the month (Thanks Martin Cuma!) – recordings on website

Monthly open office hours – 2<sup>nd</sup> Tues of the month

Submit a Github issue

**Visit us at the  
OnDemand table at  
Gateways next week!**

*Supercomputing. Seamlessly.*  
Open, Interactive HPC Via the Web  
openondemand.org

