

# Open OnDemand: Access Clusters, Gateways and Interactive Apps

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## About

### Project Description

Open OnDemand, developed by the Ohio Supercomputer Center and funded by the National Science Foundation, is an innovative, open-source, web-based portal for accessing high performance computing services available to HPC centers worldwide.

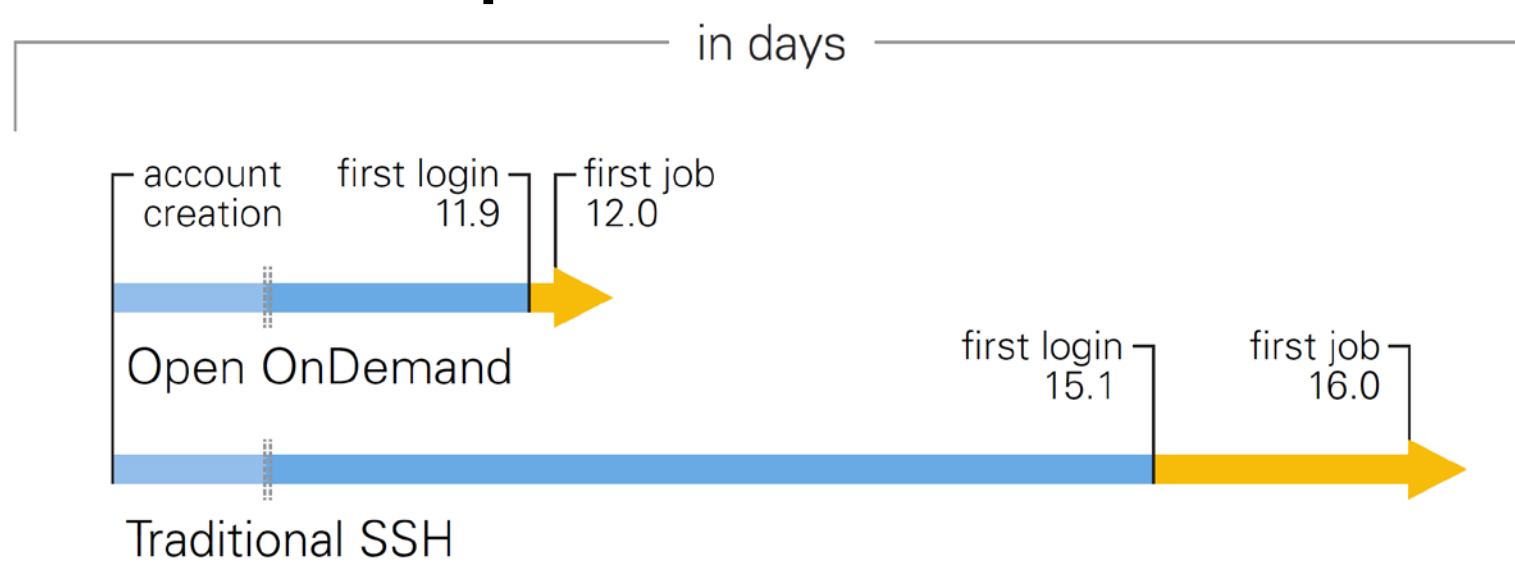
Through Open OnDemand, HPC clients can upload and download files, create, edit, submit and monitor jobs, create and share apps, run interactive applications and connect via SSH, all via a web browser, with no client software to install and configure. All you need is a web browser, a username and a password to access powerful computing services.

### Open OnDemand Concepts

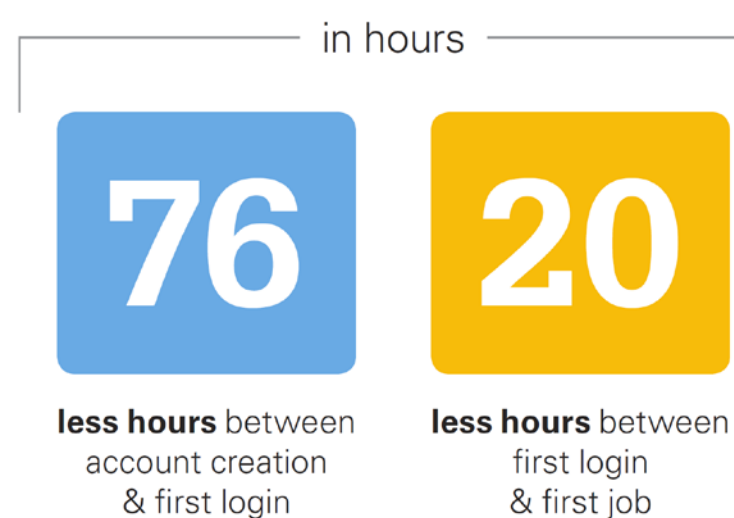


- Cluster Access
  - Replace traditional command line access with web
  - File Browser, File Editor, Shell Access
- Gateway Apps
  - Allow anyone on cluster to create and share gateways
  - Provides app kit for building apps that interact with HPC batch scheduler
- Interactive apps
  - Users can connect to interactive apps running in batch jobs (e.g., VNC, Jupyter, RStudio Server, COMSOL Server)
  - Provides remote desktop interface

### Impact – Time to Science



- OnDemand users start working faster than traditional users, both in terms of first login and first job submission
- Data set: Median times from 1712 OSC accounts created in 2017



## For HPC Users

- Single point of entry for HPC Access
- User needs three things: URL, Username, Password
- Single sign-on
- Completely browser-based (Zero install, Zero user configuration, Firewall friendly)

### Example Cluster Access

The block contains three screenshots. The top one shows a file browser interface with a sidebar on the left and a main pane showing a directory listing. The middle one shows a table of 'Active Jobs' with columns for ID, Name, User, Account, Time Used, Queue, Status, and Cluster. The bottom one shows a terminal window with a grid of colored bars representing data.

- File access:
  - Browse
  - View
  - Edit
- Job control:
  - Submit
  - Monitor
  - Delete
- Terminal access:

### Example Interactive Apps

The screenshot shows a Jupyter notebook interface with a map of the United States. Below the map is a code cell with Python code for plotting a map using Basemap.

- Existing support for ANSYS Workbench, Abaqus/CAE, COMSOL Multiphysics, MATLAB, Paraview, Jupyter + Spark, RStudio Server, and more.

### App Publishing

- App developer interface enables users to copy, modify, and run apps in their home directory
- App developer configures menu category in manifest
- Admin copies the app code to the deployment directory to permit every user to launch the app

## For HPC Admins

- Firewall friendly (all traffic over https port)
- Installable on a range of cluster sizes and architectures
- Per-user architecture for security
- Easy onboarding of users new to HPC
- Proxy connects browser to applications running on compute node

### Custom Branding Examples

The block contains three screenshots of different Open OnDemand portals. The first is for 'OPEN OnDemand' with a dark theme. The second is for 'Bridges OnDemand' with a light theme and server rack graphics. The third is for the 'Ohio Supercomputer Center' with a red and white theme.

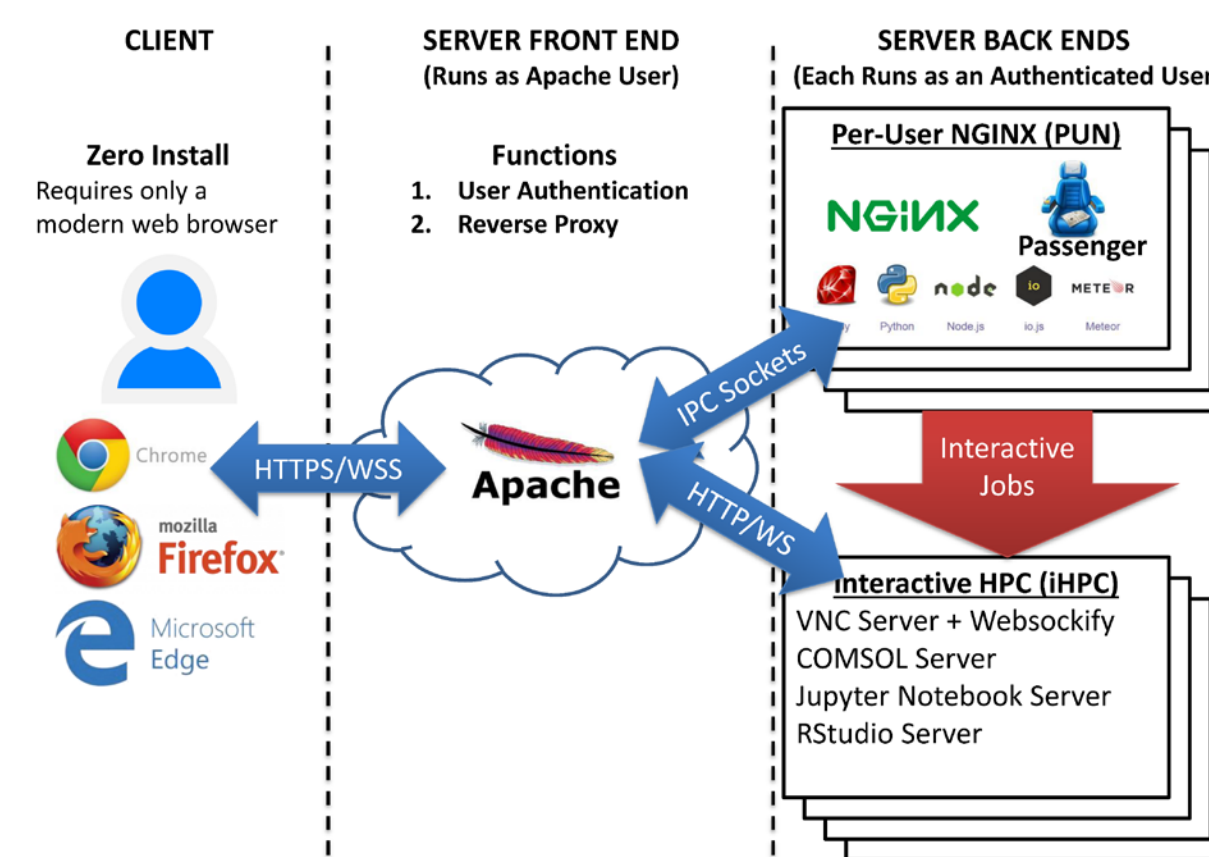
- Add an institution logo
- Change portal name
- Modify navbar color
- Display optional MOTD and/or announcements

### Build Gateways in Open OnDemand

- Build Gateways fast
  - App Kit libraries and templates
  - No need for additional web deployment
  - No account management - uses existing system accounts
- Build Gateways different
  - “Plug in” existing tools from the platform
  - File browser, editor, terminal, VNC

### Open OnDemand Architecture

- Single persistent Apache front end
- NSF-sponsored CILogon service for authentication
- Upon authentication, per-user NGINX (PUN) server launched as that system user, serves apps to user
- PUN apps submit jobs that launch per-job web server which serve VNC, COMSOL and others on cluster



## Project Status

### Institutional Engagements

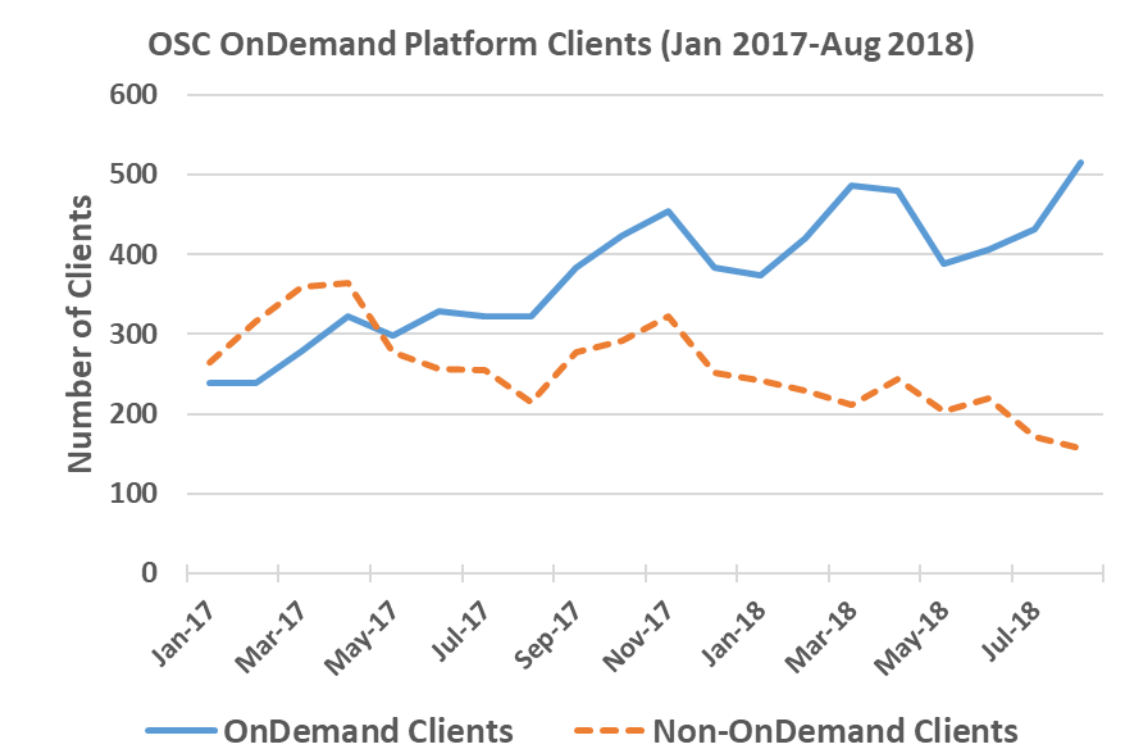


### Project Roadmap

- Work began in 2012, initial launch at OSC in January 2013
- NSF award in 2015 towards an open-source version
- Future work: Usage reporting, core application enhancements, more authentication options

### OnDemand Deployments at OSC

- First launched on Sep. 9, 2016
- OSC's portals serving clients globally
- Percentage of clients has steadily increased since launch



### Get Started!

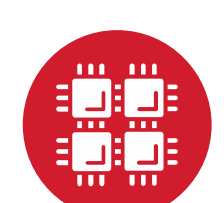
- Documentation available at: <https://github.com/OSC/Open-OnDemand> or by visiting - <http://openondemand.org>
- Send email to [ood-users-request@lists.osc.edu](mailto:ood-users-request@lists.osc.edu) with the subject "subscribe" to join the mailing list today



Open OnDemand website QR code

### Acknowledgements

- This work is supported by:
  - National Science Foundation of the United States under the award NSF SI2-SSE-1534949
  - Ohio Supercomputer Center. 1987. Ohio Supercomputer Center. Columbus OH: Ohio Supercomputer Center. <http://osc.edu/ark:19495/f5s1ph7>



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