Using Open OnDemand on Wulver

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NJIT High Performance Computing

Outline

Introduction and Dashboard

Overview and benefits

File Management and Jobs

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Interactive Apps Configuration

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Additional Tools and Support

Introduction to Open OnDemand

What is Open OnDemand?

Open OnDemand is an open-source web portal offering browser-based access to HPC clusters.

Simplified HPC Access

The platform eliminates the need for SSH or third-party tools, streamlining the process of connecting to HPC resources.

Intuitive User Interface

It features a graphical user interface, making high-performance computing straightforward for researchers and scientists.

Designed for All Users

Open OnDemand is suitable for both beginners and advanced HPC users, improving accessibility and productivity across research teams.

How Open OnDemand Works

Access Portal

Users open a web browser and navigate to the institution's Open OnDemand portal, eliminating the need for SSH or specialized software.

- Portal Login
- Access from Browser
- No SSH Required

Authenticate & Launch

Users log in using institutional credentials. The portal authenticates access and provides dashboard for managing resources.

- User Authentication
- Personalized Dashboard

Select HPC Resources

Through the graphical interface, users choose applications, submit jobs, or interact with HPC clusters.

- Job Submission Forms
- Graphical Application Launchers
- Resource Selection

Monitor & Retrieve Results

Users can track job progress, view logs, and download results directly through the portal, making the HPC workflow seamless.

- Job Monitoring Tools
- Log Access
- File Download Options

Traditional HPC vs. Open OnDemand

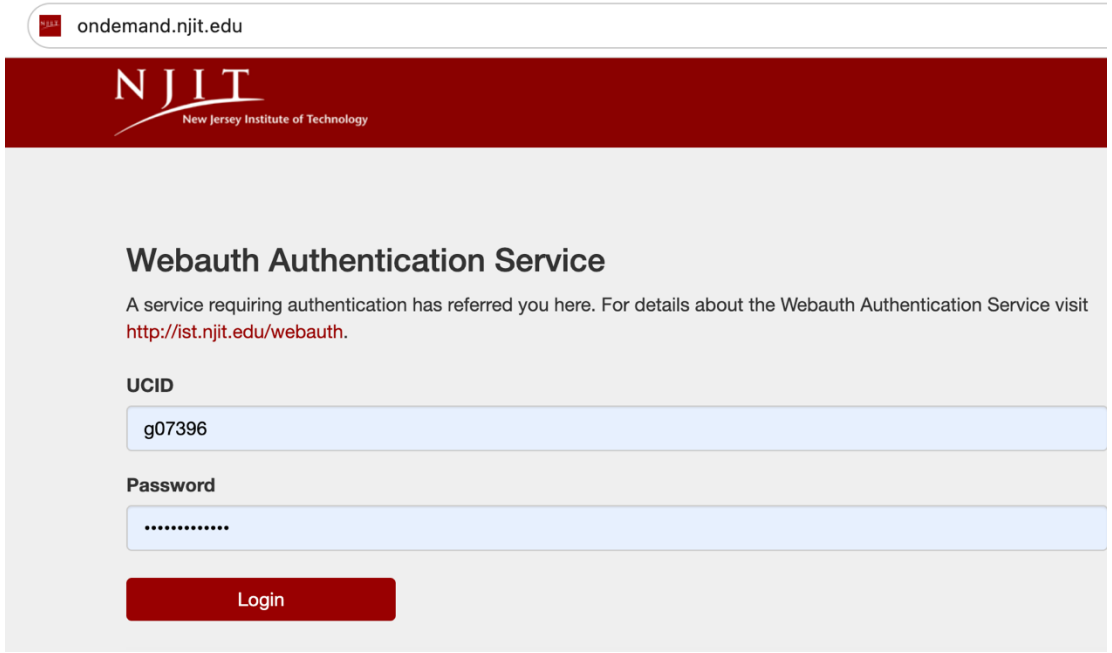
Traditional HPC Access Challenges

- Requires SSH access to connect to HPC clusters
- Relies on Linux terminal command-line interface
- No graphical user interface (GUI) available
- Steep learning curve for new users unfamiliar with commands

Open OnDemand Benefits

- Simplifies file management with an intuitive GUI
- Provides web-based command-line shell access
- Allows creation, viewing, and management of jobs via graphical tools
- Enables running interactive desktop and applications like MATLAB, RStudio, Jupyter Notebook

Accessing Open OnDemand at NJIT



Open OnDemand Portal URL

Visit: https://ondemand.njit.edu to access the NJIT Open OnDemand platform.

Login Credentials Required

Log in using your UCID and password to ensure secure access to resources.

VPN Requirement for Off-Campus Access

Use VPN if connecting from off-campus to maintain secure and authorized entry to the platform.

Open On Demand Dashboard

Files

Quick access to common directories allowing easy file browsing and management within the HPC environment.

Jobs Menu

Manage Slurm jobs efficiently, including submitting new jobs and monitoring current job statuses.

Cluster Access

Interact directly with cluster resources to utilize computing power effectively for HPC tasks.

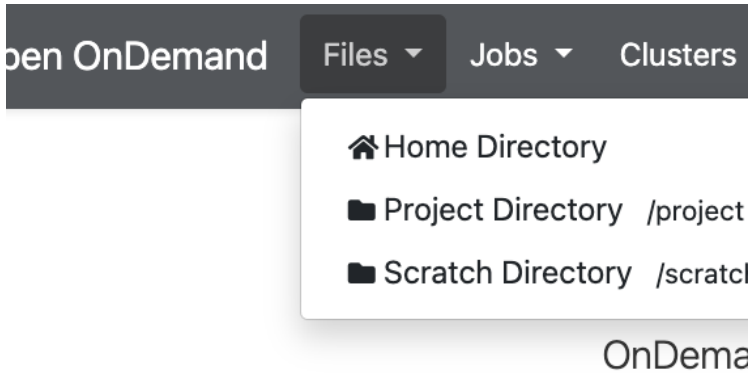
Interactive Applications

Launch supported interactive applications such as MATLAB, RStudio, and Jupyter Notebook from the dashboard.

My Interactive Sessions

View and manage your running interactive sessions to monitor resource usage and control session lifecycle.

File Manager in Open OnDemand



Accessing File Manager

Access File Manager via the 'Files' dropdown on the Open OnDemand dashboard.

Navigating Directories

Navigate through home, project, and scratch spaces to locate needed directories and files.

Viewing Directory Contents

View directory contents with a clear and organized interface showing files and folders.

Toolbar Functions

Use the toolbar to change directories quickly, open a terminal session for command-line operations, and create or upload new files.

Key Toolbar Features

Toolbar features include directory navigation buttons, terminal launch, file creation, and upload options for efficient file handling.

User-Friendly Operations

The File Manager simplifies file operations without requiring command-line expertise

Jobs Menu and Active Jobs

Jobs Menu

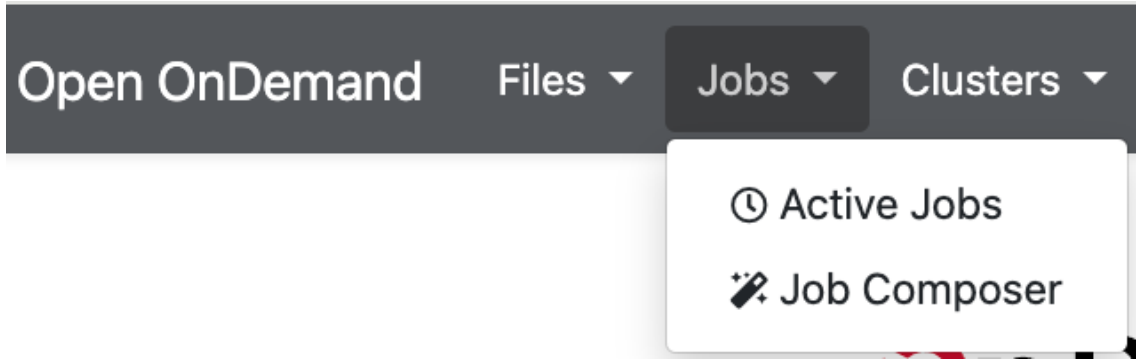
Provides shortcuts to widgets for creating new Slurm jobs as well as viewing the status of your current ones.

Active Jobs

The Active Jobs window opens in a new tab which shows the list of all the active jobs in the cluster.

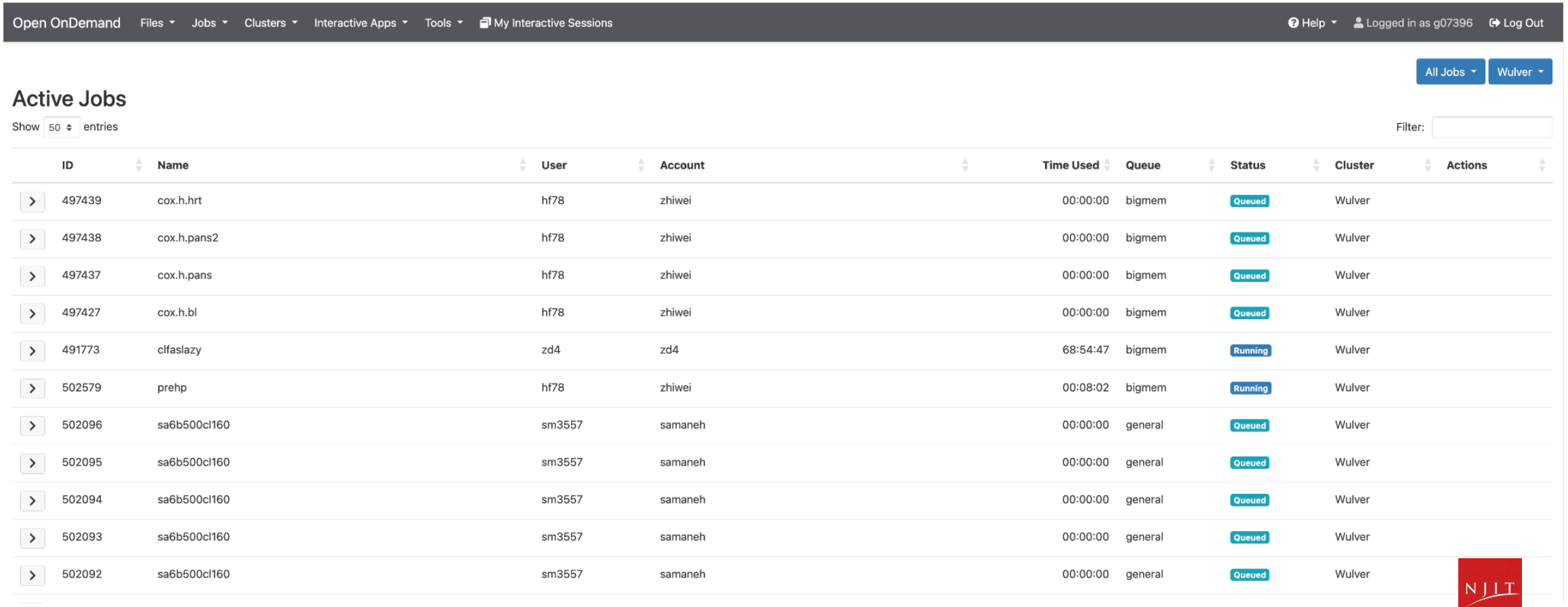
Job Monitoring

Users can monitor job status, view job details, and track progress conveniently within the Open OnDemand portal.



Active Jobs

- The Active Jobs window opens in a new tab which shows the list of all the active jobs in the cluster.



Job Composer: Creating New Jobs

From Default Template

- Create a new job with the system's default template
- Best for standard job submissions
- Navigate: Job Composer > New Job > From Default Template

From Template

- Choose from predefined templates for various applications
- Navigate: Job Composer > New Job > From Template
- Select the desired template from the list

From Specified Path

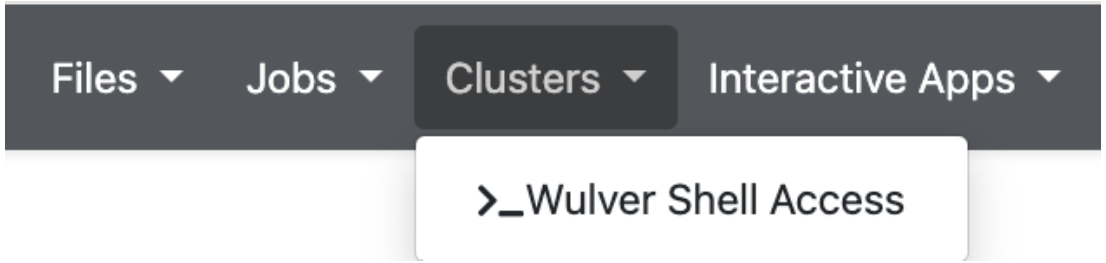
- Copy files from a chosen directory to create a job
- Ideal for using existing scripts or data
- Navigate to Job Composer > New Job > From Specified Path
- Configure job options as needed

From Selected Job

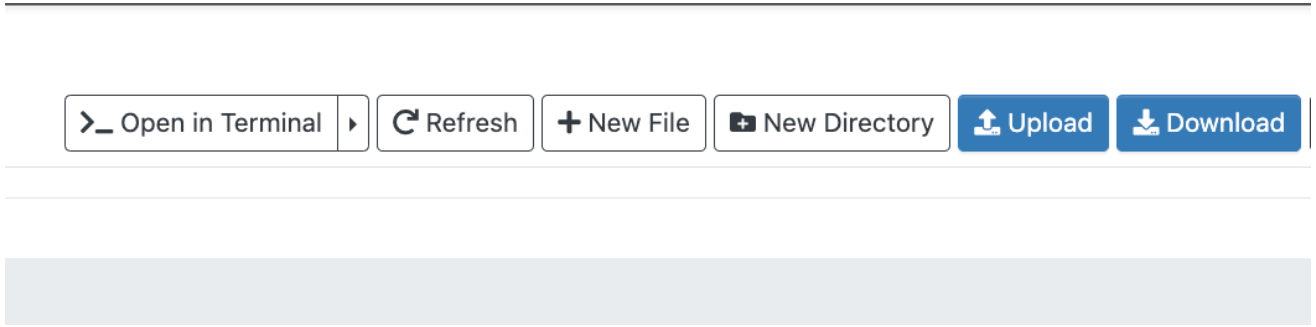
- Duplicate existing jobs to modify or rerun quickly
- In Job Composer, select a job, then click New Job > From Selected Job
- Reuse configurations and scripts to save time

Login Shell

Under Clusters -> Shell Access



Under Files



Interactive Apps

Interactive Apps Purpose

Interactive Apps let users start and connect to batch jobs easily.

Command-line Elimination

No command-line needed to start interactive apps.

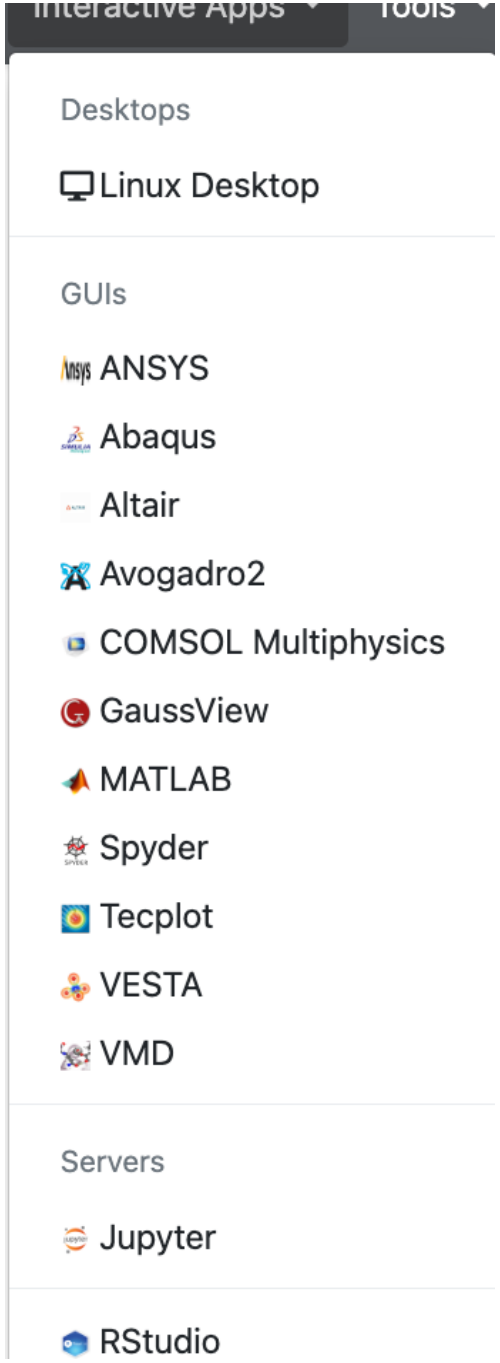
Common Applications

Supported interactive apps include:

Compute Desktop, Jupyter, MATLAB, RStudio, etc

Resource Configuration

When launching, users select allocation (CPU vs. GPU), partition, resources (memory, CPUs), and walltime to tailor their interactive app sessions.

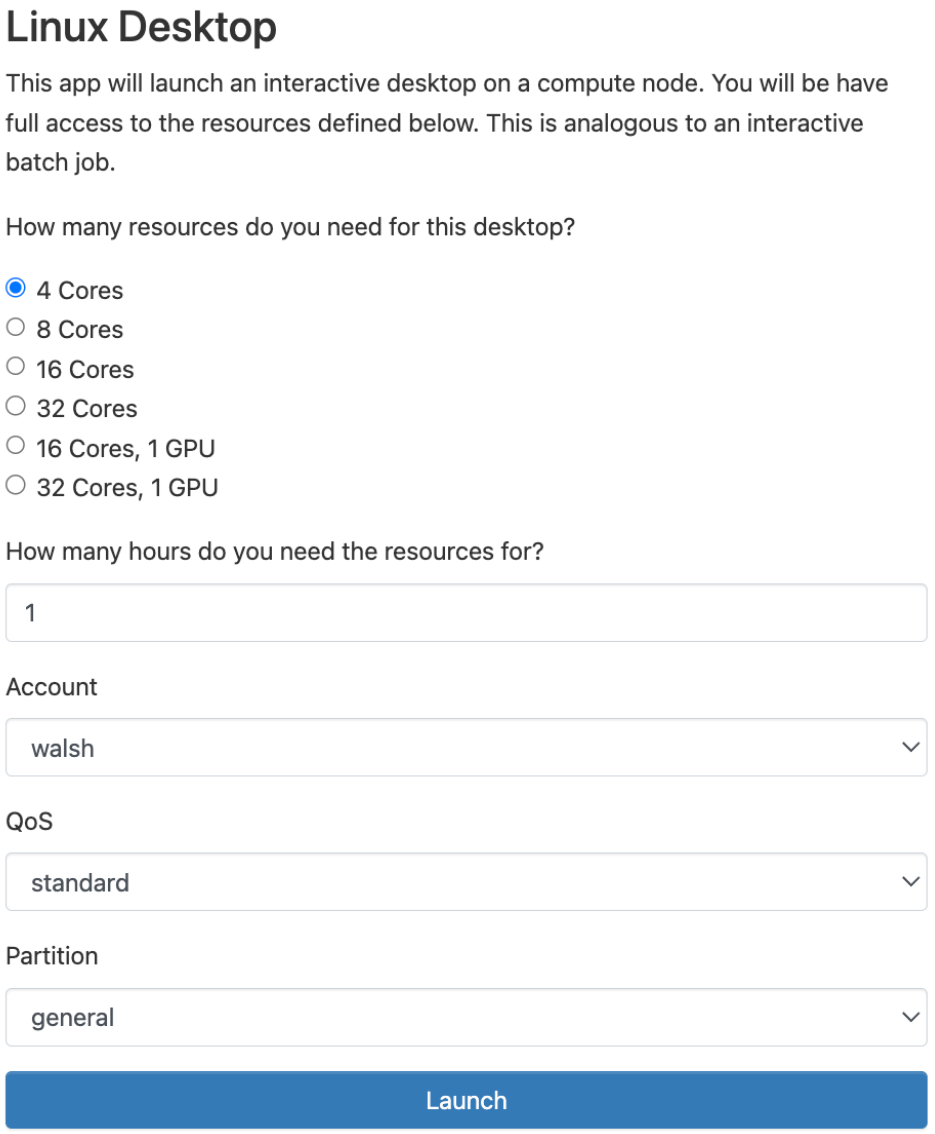


Interactive Apps

- Select allocation (CPU vs. GPU) based on your computational needs.
- Choose the partition appropriate for your job.
- Configure memory, number of CPUs, and GPUs if applicable.
- Set wall time to define session duration.
- Specify account and load necessary modules for your environment.

Open OnDemand Linux Desktop

- The first step is to select the Interactive apps and then click the Desktop in the Open OnDemand dashboard.
- Fill in the form to launch the interactive desktop on the compute nodes.



Launching the Interactive Session

Linux Desktop (503190) 1 node | 4 cores | Running

Host: >_n0008

Delete

Created at: 2025-04-26 20:18:44 EDT

Time Remaining: 59 minutes

Session ID: f3915aca-4c6d-471f-87b6-802243a6575f

Compression

0 (low) to 9 (high)

Image Quality

0 (low) to 9 (high)

Launch Linux Desktop

View Only (Share-able Link)

Jupyter Notebook in Open OnDemand

What is Jupyter Notebook?

A web-based interactive computing environment for creating and sharing documents that contain live code, equations, visualizations, and narrative text.

Launching Jupyter Notebook

From the Open OnDemand dashboard, go to Interactive Apps > Jupyter Notebook.

Requirements for Use

- Your environment must have Jupyter Notebook installed. (conda install -c conda-forge jupyter notebook)
- You need jupyter to run the Notebook environment, and ipykernel to execute Python code within it.

Jupyter Notebook

Jupyter

This app will launch a Jupyter server

Mode

- ○ Jupyter Lab
- ◉ Jupyter Notebook

Type of Environment

Conda environment

- Select the type of environment in which you want to use Jupyter.
- Choose `Conda environemnt` if you have created Conda environment with Jupyter Notebook and other Python packages installed
- If you select `Python module`, it will load **System Installed JupyterLab or JupyterNotebook**. Please note you may not have additional packages to run the Python script
- System installed Jupyter has **NumPy, Matplotlib, SciPy** and you don't have permission to install the additional packages.
- Refer to the Conda Documentation for instructions on creating a Conda environment and installing packages within it.

Conda Environment to be Activated

tensorflow

- Select the name of environment to be activated. This field is mandatory if you choose `Conda environemnt`.
- Your environment must have **Jupyter Notebook**. Check Jupyter Documentation for details.

Enter the full path of the case directory

/project/hpcadmins/g07396/

- Keeping it blank will set the default directory which is `$HOME`

Account

walsh

Partition

general

QOS

debug

Number of hours (max 72)

1

Maximum wall time requested

Number of cores (max 64)

1

Number of cores on node

Number of GPUs (max 4)

Total GB memory (max 480)

4

- This field is optional. By default, 4 GB of memory per core will be used unless specified here.
- For SU calculation, the memory value will be divided by 4 GB, and the result will be used to determine SU usage.
- For example, if 4 cores and 128GB of memeory are requested, the SU will be calculated based on 128/4=32 cores.

☐ Get email notifications

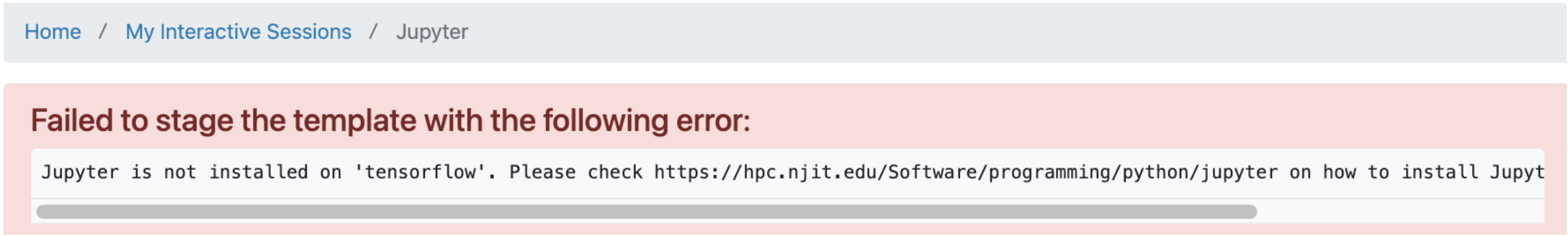
- Receive an email when the session starts,and ends.
- Guest users will not receive any notifications.

Launch

NJIT

Jupyter Notebook

Your environment must have Jupyter Notebook installed. (conda install -c conda-forge jupyter notebook)

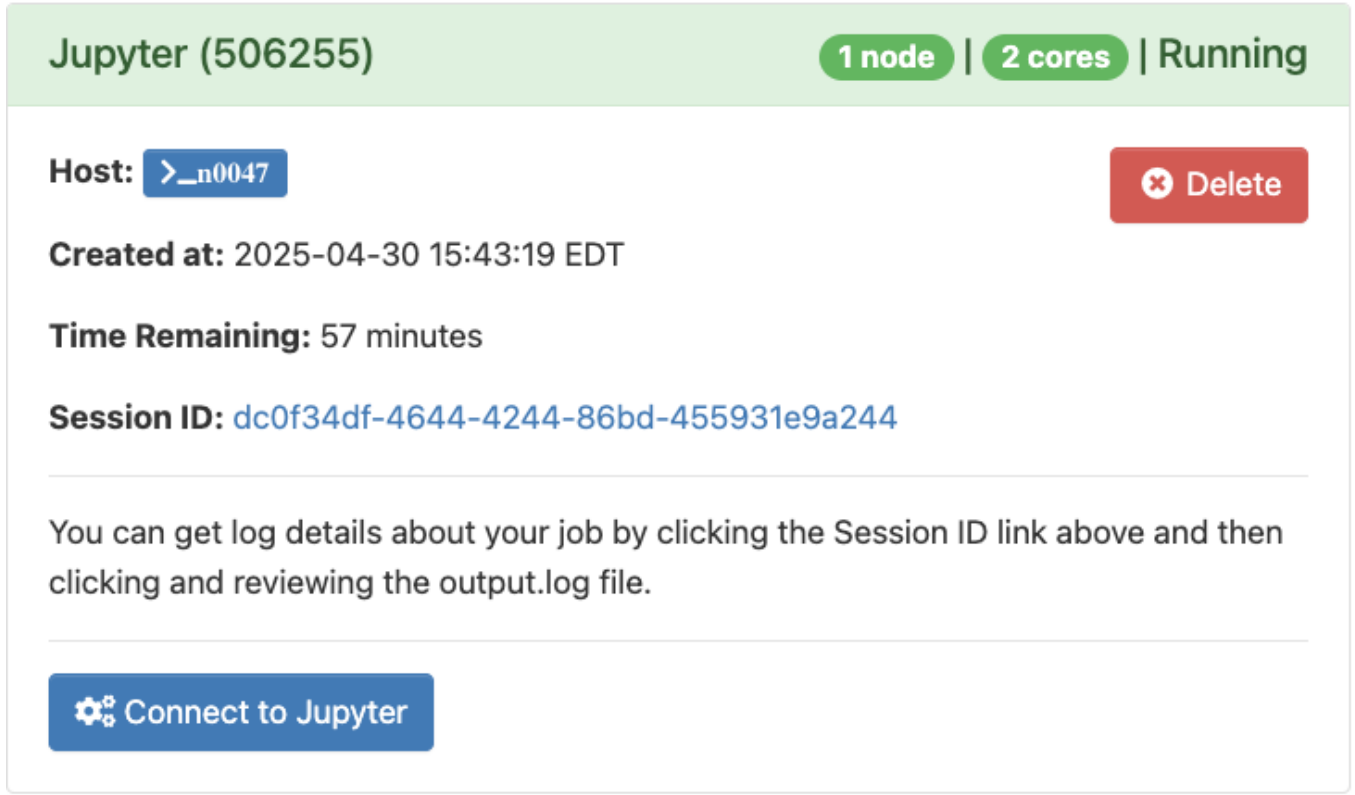


The jupyter metapackage, installed via conda install -c conda-forge jupyter, includes:

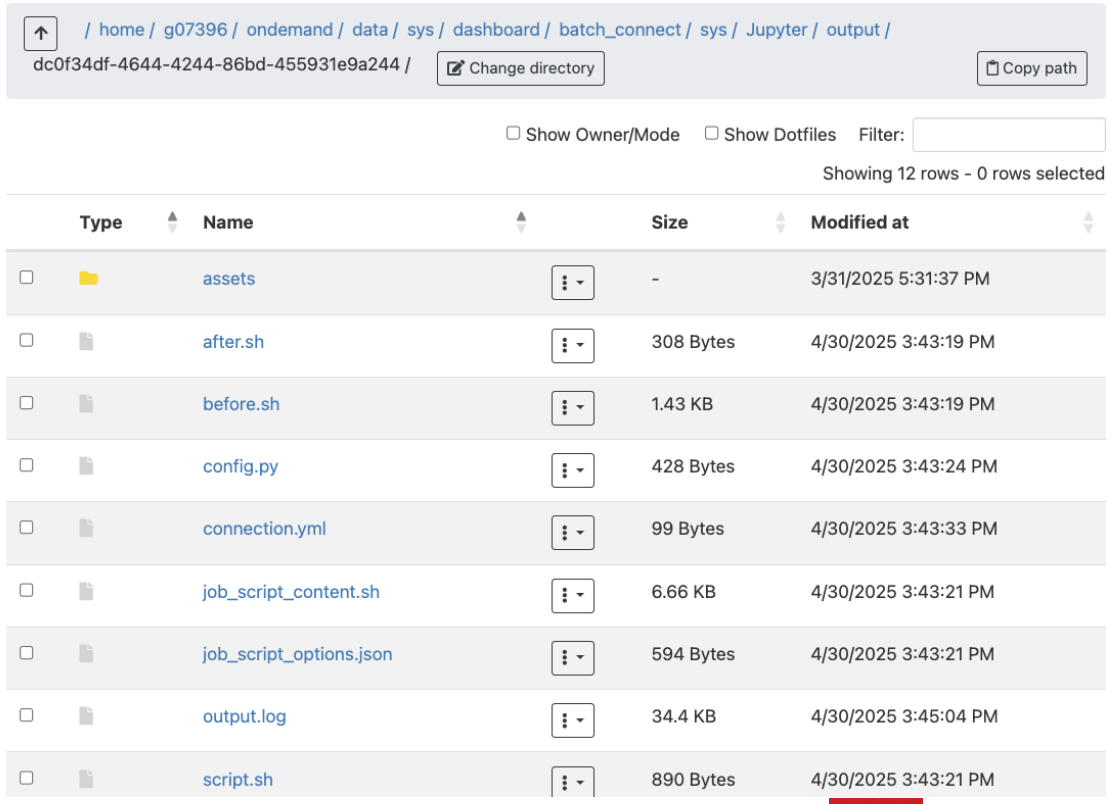
- **IPyKernel**: The Python kernel for executing code in Jupyter Notebooks.
- **Notebook**: The web server and interface for creating and interacting with Jupyter Notebooks.

Jupyter Notebook

Launch Jupyter Notebook session



Check logs



Using Jupyter Notebook Effectively

Practical tips for running and managing Jupyter Notebook sessions on Open OnDemand

- Manage your notebooks within the session; remember to save your work frequently to prevent data loss.
- Allocate appropriate resources (CPU, memory, time) based on your task's requirements to ensure smooth performance.
- Shut down sessions when finished to free up system resources.
- Check "My Interactive Sessions" and click "Delete" to terminate active sessions.
- For custom environments, ensure the ipykernel package is installed to access different Python environments.

RStudio in Open OnDemand

What is RStudio?

An integrated development environment (IDE) for R, providing tools for coding, history, connections, and more. Ideal for statistical computing, data visualization, and working with R packages.

Launching RStudio in Open OnDemand

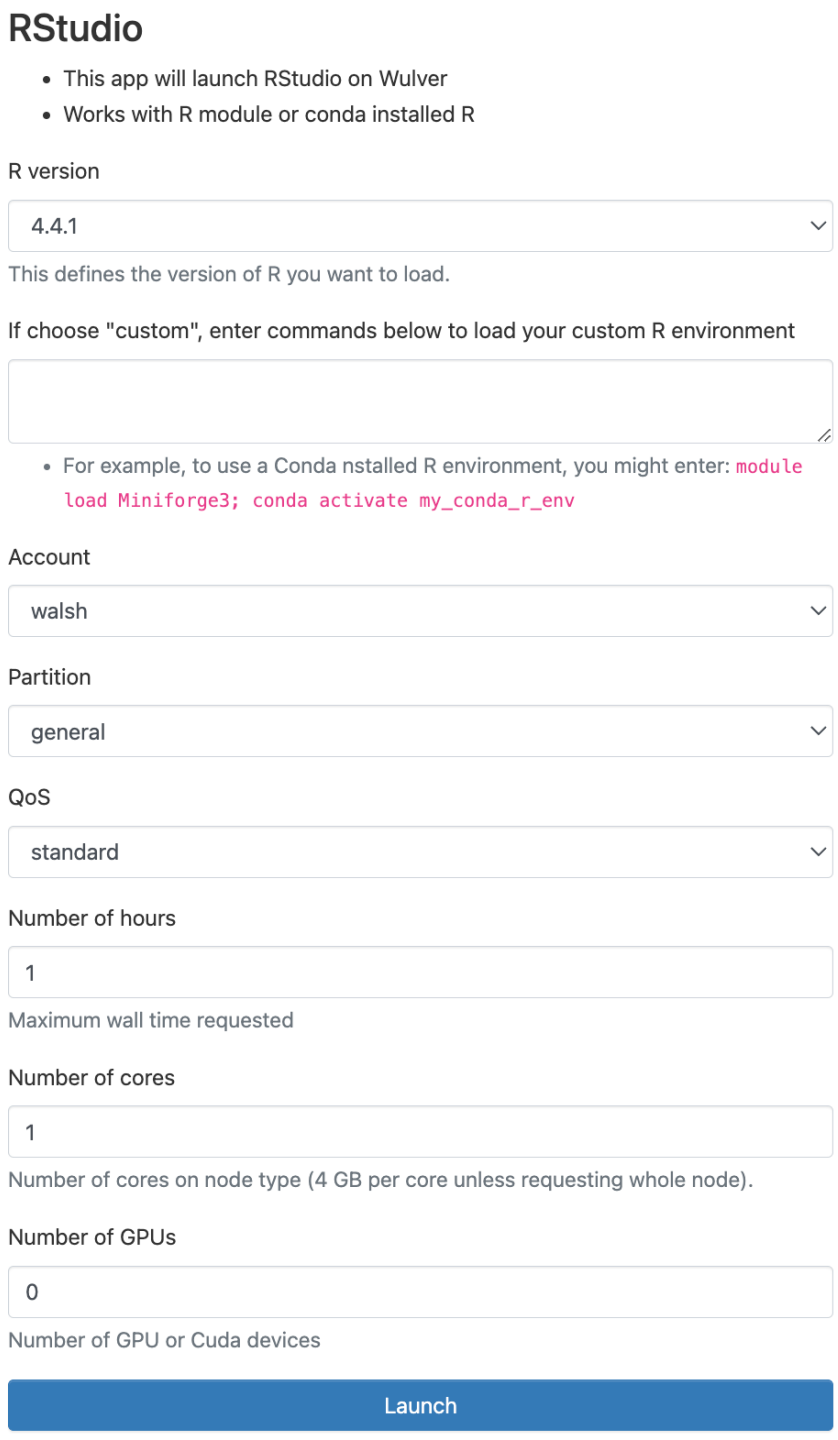
Access from the dashboard under Interactive Apps > RStudio Server. Choose between running on a shared node for low-intensity tasks or as a Slurm batch job for intensive tasks.

Resource Configuration Options

Select R version, account, partition, QOS, walltime, number of cores, and number of GPUs if using a GPU partition when launching your RStudio session.

Rstudio

- The first step is to select the Interactive apps and then click the RStudio Server in the Open OnDemand dashboard.
- Then you will see a form which needs to be filled to launch the RStudio Server on the compute nodes.



Launch Rstudio

RStudio (503799)

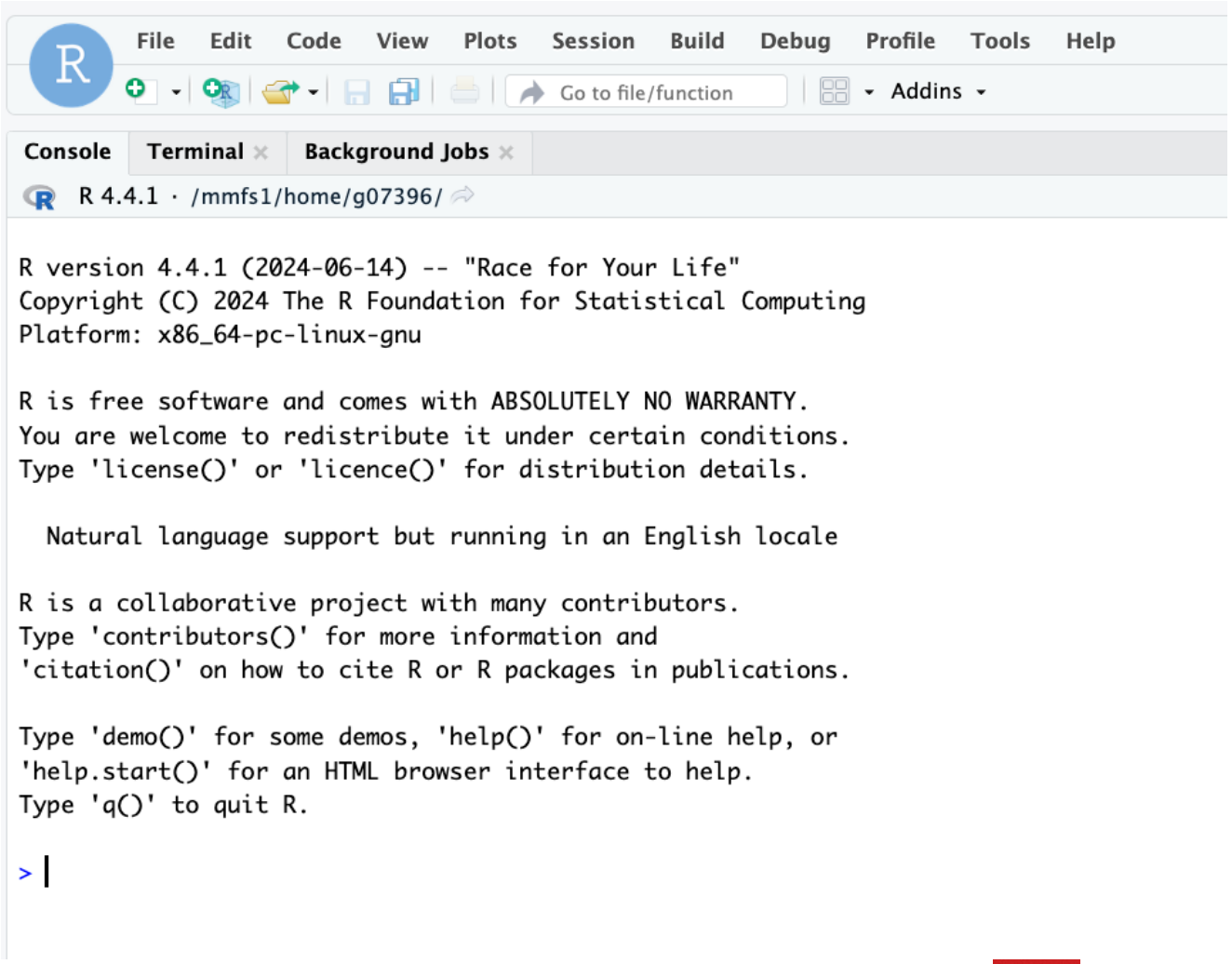
Host: >_n0056

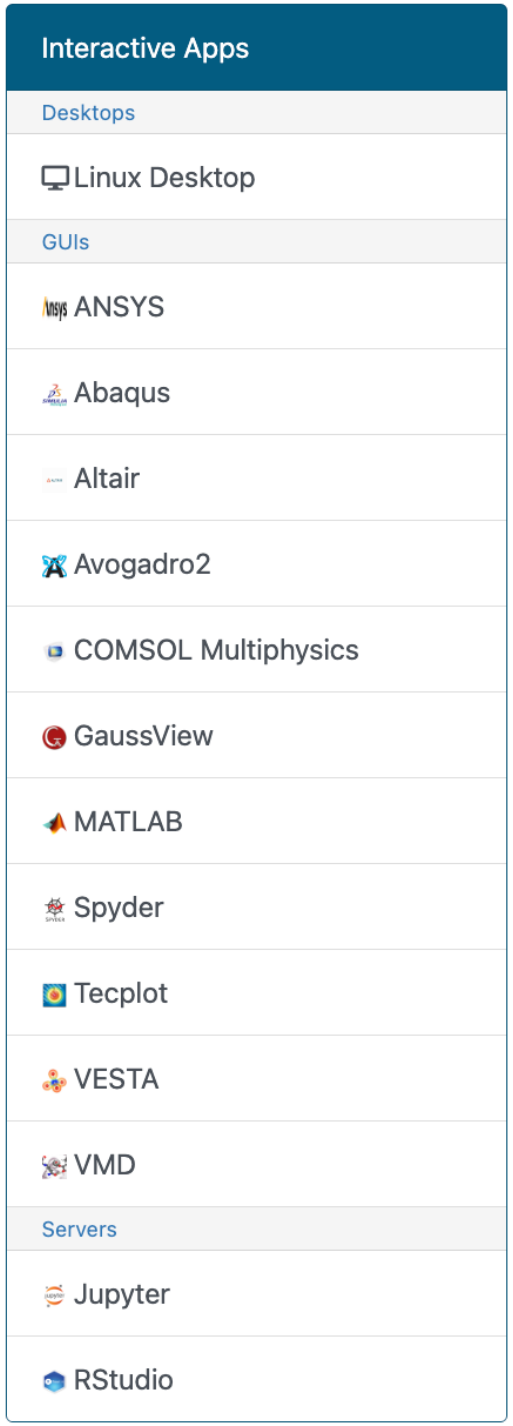
Created at: 2025-04-27 21:34:03 EDT

Time Remaining: 27 minutes

Session ID: bf251d48-9fe3-4038-b334-b51dabad08ff

® Connect to RStudio Server

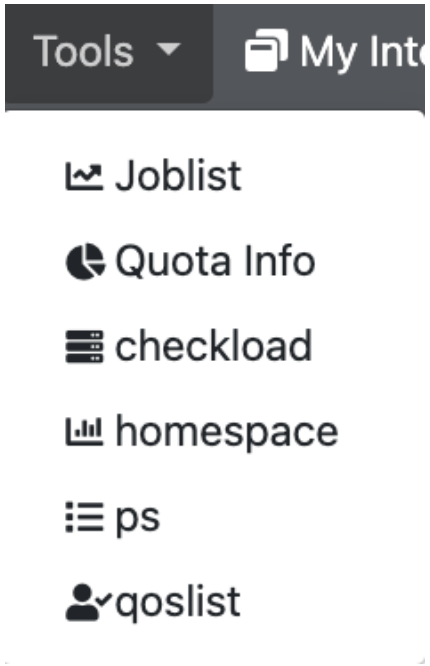




Other Interactive Apps

- Interactive Apps include ANSYS, Abaqua, COMSOL, GaussView, Spyder, Tecplot, BESTA, VMD, Matlab, and more.
- These applications offer flexibility and ease of use for complex HPC tasks without requiring command-line expertise.

Tools



Joblist

The Joblist tool provides information about your past jobs run in the specified period and the service Units(SU) consumed.

Quota Info

Quotainfo is a tool to check disk usage quotas, helping users keep track of their allocated storage space on HPC clusters.

Additional Tools Available

Checkload

The checkload tool provides real-time information about the current load on the HPC cluster, assisting users in monitoring the CPU load, state across all compute nodes

Homespace

Homespace tool offers details about the home directory space usage, enabling users to manage their files and storage efficiently within their personal workspace.

qoslist

Displaying All QOS Entries for a User Across All Associated Accounts

Key Features Recap

File Management

Upload, download, view, and edit files easily via the web-based file manager. Navigate home, project, and scratch spaces with directory browsing and file operations.

Web-based Shell Access

Access a command-line shell through the browser without needing SSH. Execute commands directly on the HPC cluster with terminal access integrated within the portal.

Launching GUI Applications

Run interactive graphical applications such as Jupyter Notebook, RStudio, MATLAB, and more through the Interactive Apps feature, simplifying usage without command-line commands.

Job Submission and Monitoring

Submit, manage, and monitor batch jobs using the Job Composer and Jobs Menu. View active jobs in the Active Jobs window and download job output files easily.

Graphical Desktop Sessions

Access full graphical Linux desktop environments via browser-based sessions, allowing users to work in a familiar desktop interface remotely on HPC resources.

Getting Help & Support for NJIT HPC

NJIT HPC Documentation

Please visit: NJIT HPC website at https://hpc.njit.edu.

Open OnDemand Documentation

Explore official Open OnDemand documentation for detailed instructions and troubleshooting at https://openondemand.org.

HPC Support Email

Open a ticket using email: hpc@njit.edu to request help or report problems with HPC services.

Research Computing Facilitator

Consult with the Research Computing Facilitator and help with HPC user/course assistance.

Office Hour

Date: Every Monday and Wednesday

Location: GITC 2404

Time: 2:00 PM - 4:00 PM