

Using Open OnDemand on Wulver

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Outline

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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

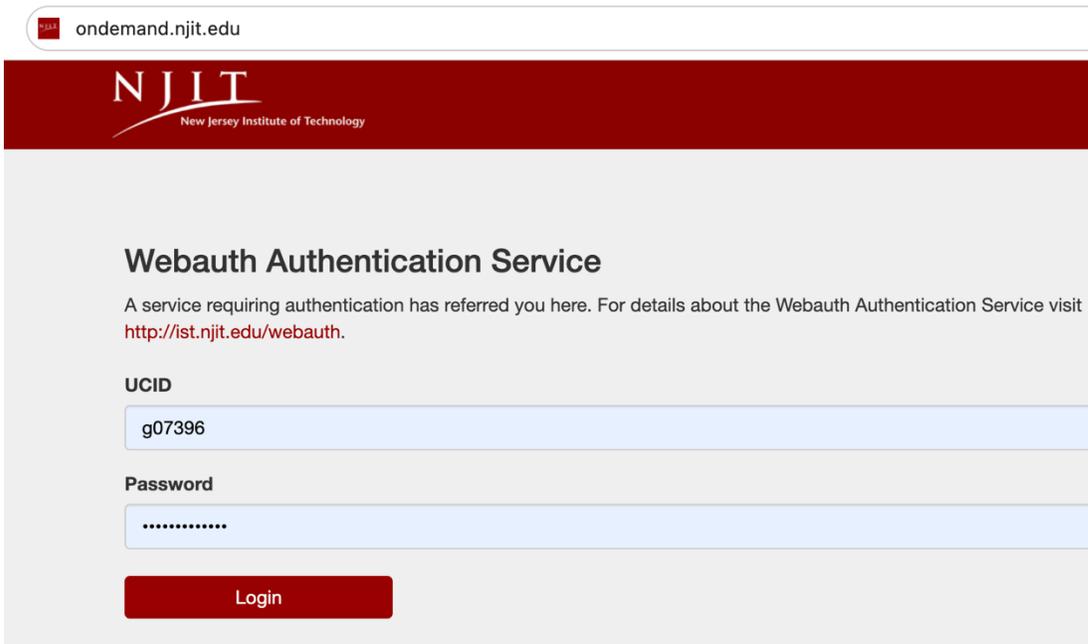
- Requires SSH access to connect to HPC clusters
- Relies on Linux terminal command-line interface
- No graphical user interface (GUI) available
- Steep learning curve for new users unfamiliar with commands



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



The screenshot shows the web browser address bar with the URL `ondemand.njit.edu`. Below the address bar is a dark red header with the NJIT logo and the text "New Jersey Institute of Technology". The main content area is light gray and features the heading "Webauth Authentication Service". Below the heading is a paragraph of text: "A service requiring authentication has referred you here. For details about the Webauth Authentication Service visit <http://ist.njit.edu/webauth>". There are two input fields: one for "UCID" containing the text "g07396" and one for "Password" containing a series of dots. At the bottom of the form is a red "Login" button.

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

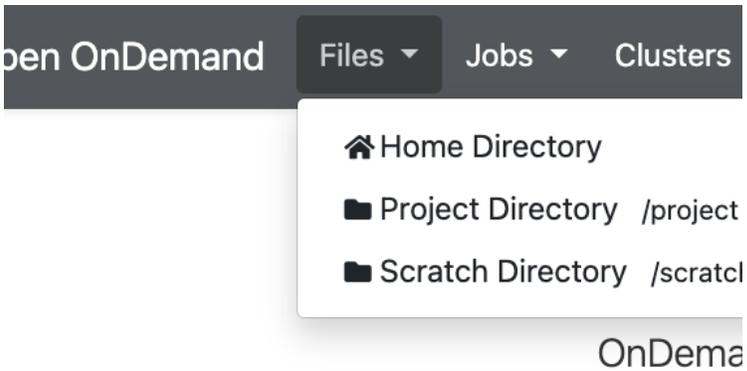
Launch supported interactive applications such as MATLAB, RStudio, and Jupyter Notebook from the dashboard.



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

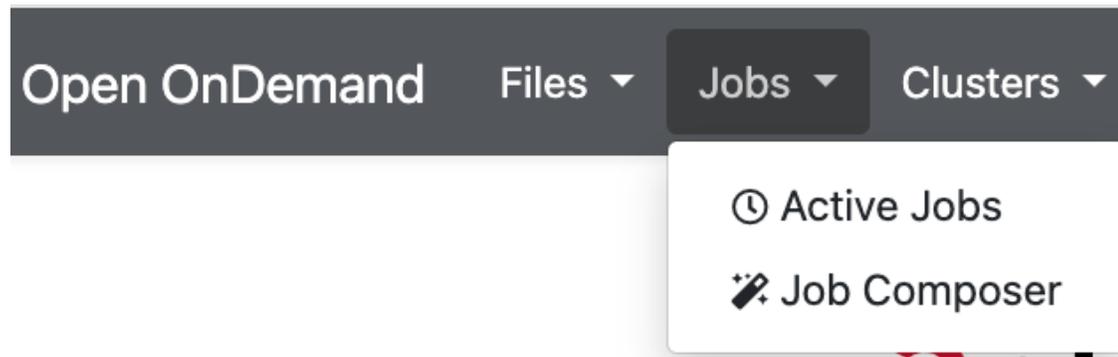
Provides shortcuts to widgets for creating new Slurm jobs as well as viewing the status of your current ones.

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.

Open OnDemand Files Jobs Clusters Interactive Apps Tools My Interactive Sessions Help Logged in as g07396 Log Out

All Jobs Wulver

Active Jobs

Show 50 entries Filter:

ID	Name	User	Account	Time Used	Queue	Status	Cluster	Actions
> 497439	cox.h.hrt	hf78	zhiwei	00:00:00	bigmem	Queued	Wulver	
> 497438	cox.h.pans2	hf78	zhiwei	00:00:00	bigmem	Queued	Wulver	
> 497437	cox.h.pans	hf78	zhiwei	00:00:00	bigmem	Queued	Wulver	
> 497427	cox.h.bl	hf78	zhiwei	00:00:00	bigmem	Queued	Wulver	
> 491773	cfaslazy	zd4	zd4	68:54:47	bigmem	Running	Wulver	
> 502579	prehp	hf78	zhiwei	00:08:02	bigmem	Running	Wulver	
> 502096	sa6b500cl160	sm3557	samaneh	00:00:00	general	Queued	Wulver	
> 502095	sa6b500cl160	sm3557	samaneh	00:00:00	general	Queued	Wulver	
> 502094	sa6b500cl160	sm3557	samaneh	00:00:00	general	Queued	Wulver	
> 502093	sa6b500cl160	sm3557	samaneh	00:00:00	general	Queued	Wulver	
> 502092	sa6b500cl160	sm3557	samaneh	00:00:00	general	Queued	Wulver	



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

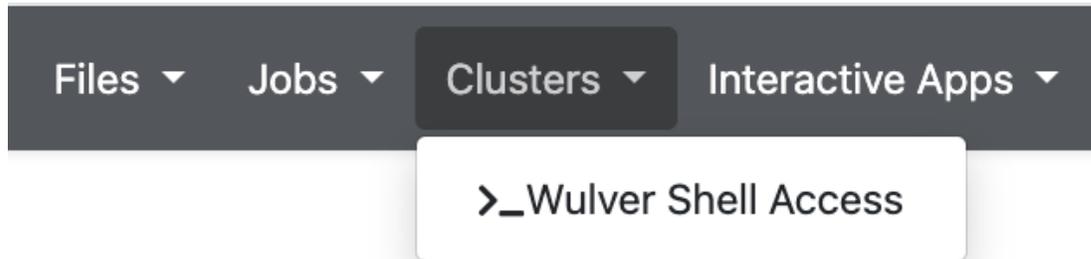
- Copy files from a chosen directory to create a job
- Ideal for using existing scripts or data
- Navigate to Job Composer > New Job > From Specified Path
- Configure job options as needed

From Selected Job

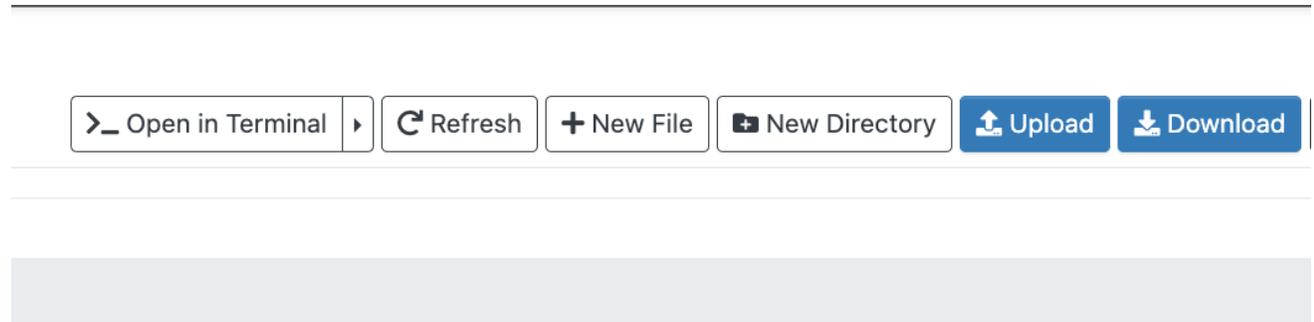
- Duplicate existing jobs to modify or rerun quickly
- In Job Composer, select a job, then click New Job > From Selected Job
- Reuse configurations and scripts to save time

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

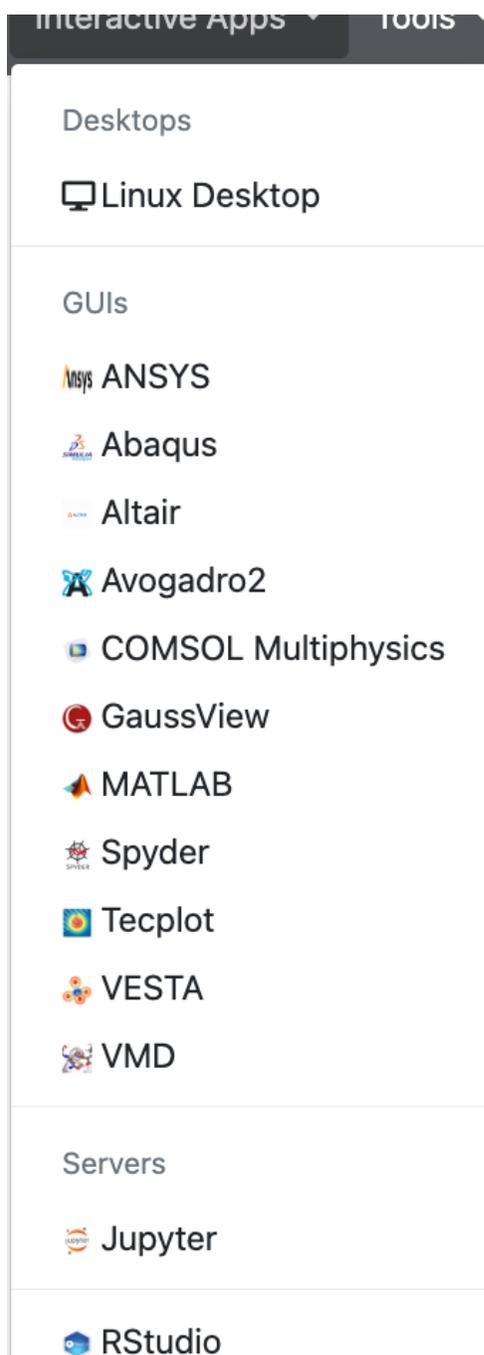
Supported interactive apps include:

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.

Linux Desktop

This app will launch an interactive desktop on a compute node. You will have full access to the resources defined below. This is analogous to an interactive batch job.

How many resources do you need for this desktop?

- 4 Cores
- 8 Cores
- 16 Cores
- 32 Cores
- 16 Cores, 1 GPU
- 32 Cores, 1 GPU

How many hours do you need the resources for?

Account

QoS

Partition



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 mameory 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



Jupyter Notebook

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

[Home](#) / [My Interactive Sessions](#) / [Jupyter](#)

Failed to stage the template with the following error:

```
Jupyter is not installed on 'tensorflow'. Please check https://hpc.njit.edu/Software/programming/python/jupyter on how to install Jupyter
```

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

Jupyter (506255)

1 node | 2 cores | Running

Host: >_n0047

Delete

Created at: 2025-04-30 15:43:19 EDT

Time Remaining: 57 minutes

Session ID: [dc0f34df-4644-4244-86bd-455931e9a244](#)

You can get log details about your job by clicking the Session ID link above and then clicking and reviewing the output.log file.

Connect to Jupyter

Check logs

/ home / g07396 / ondemand / data / sys / dashboard / batch_connect / sys / Jupyter / output /
dc0f34df-4644-4244-86bd-455931e9a244 /

Change directory

Copy path

Show Owner/Mode Show Dotfiles Filter:

Showing 12 rows - 0 rows selected

Type	Name	Size	Modified at
assets	-	3/31/2025 5:31:37 PM	
after.sh	308 Bytes	4/30/2025 3:43:19 PM	
before.sh	1.43 KB	4/30/2025 3:43:19 PM	
config.py	428 Bytes	4/30/2025 3:43:24 PM	
connection.yml	99 Bytes	4/30/2025 3:43:33 PM	
job_script_content.sh	6.66 KB	4/30/2025 3:43:21 PM	
job_script_options.json	594 Bytes	4/30/2025 3:43:21 PM	
output.log	34.4 KB	4/30/2025 3:45:04 PM	
script.sh	890 Bytes	4/30/2025 3:43:21 PM	



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.

RStudio

- This app will launch RStudio on Wulver
- Works with R module or conda installed R

R version

4.4.1

This defines the version of R you want to load.

If choose "custom", enter commands below to load your custom R environment

- For example, to use a Conda nstalled R environment, you might enter: `module load Miniforge3; conda activate my_conda_r_env`

Account

walsh

Partition

general

QoS

standard

Number of hours

1

Maximum wall time requested

Number of cores

1

Number of cores on node type (4 GB per core unless requesting whole node).

Number of GPUs

0

Number of GPU or Cuda devices

Launch



Launch Rstudio

RStudio (503799)

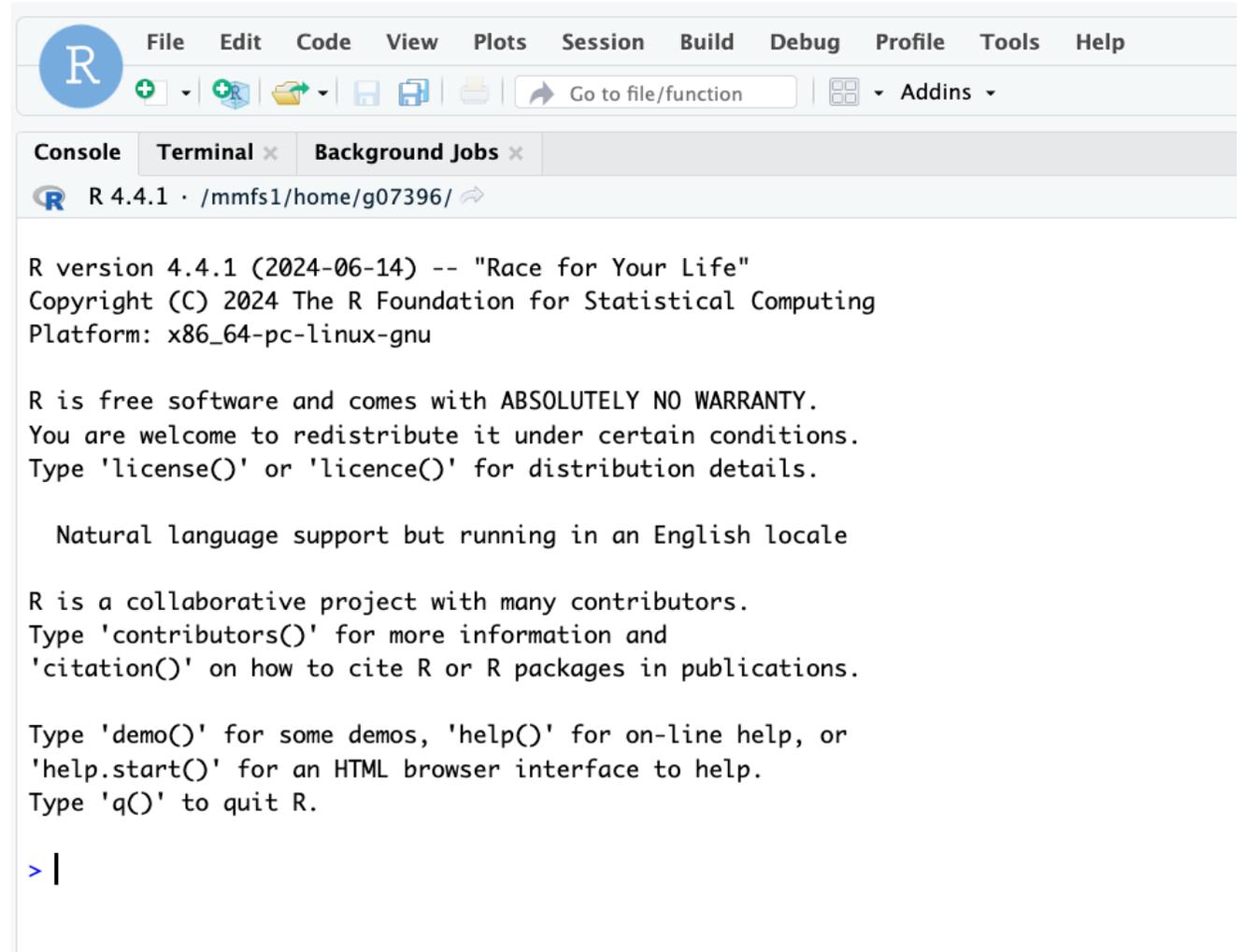
Host: >_n0056

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

Time Remaining: 27 minutes

Session ID: [bf251d48-9fe3-4038-b334-b51dabad08ff](#)

 Connect to RStudio Server



```
R 4.4.1 · /mmfs1/home/g07396/

R version 4.4.1 (2024-06-14) -- "Race for Your Life"
Copyright (C) 2024 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> |
```

Interactive Apps

Desktops

 Linux Desktop

GUIs

 ANSYS

 Abaqus

 Altair

 Avogadro2

 COMSOL Multiphysics

 GaussView

 MATLAB

 Spyder

 Tecplot

 VESTA

 VMD

Servers

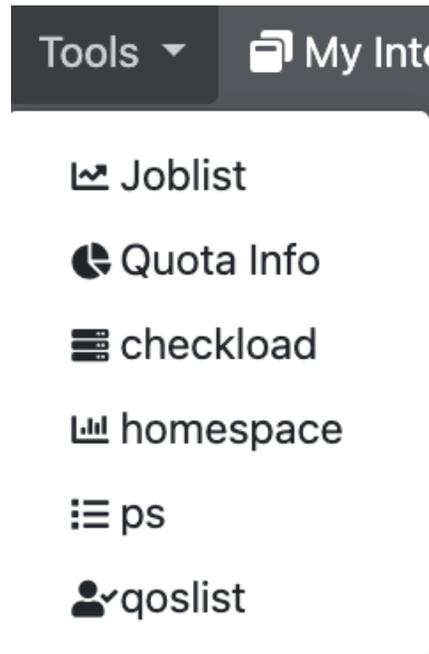
 Jupyter

 RStudio

Other Interactive Apps

- Interactive Apps include ANSYS, Abaqus, 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



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.

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.

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.

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.

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