

Open OnDemand on Lawrencium

Sapana Soni

Outline

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7. [Jobs: job management and submission](#)

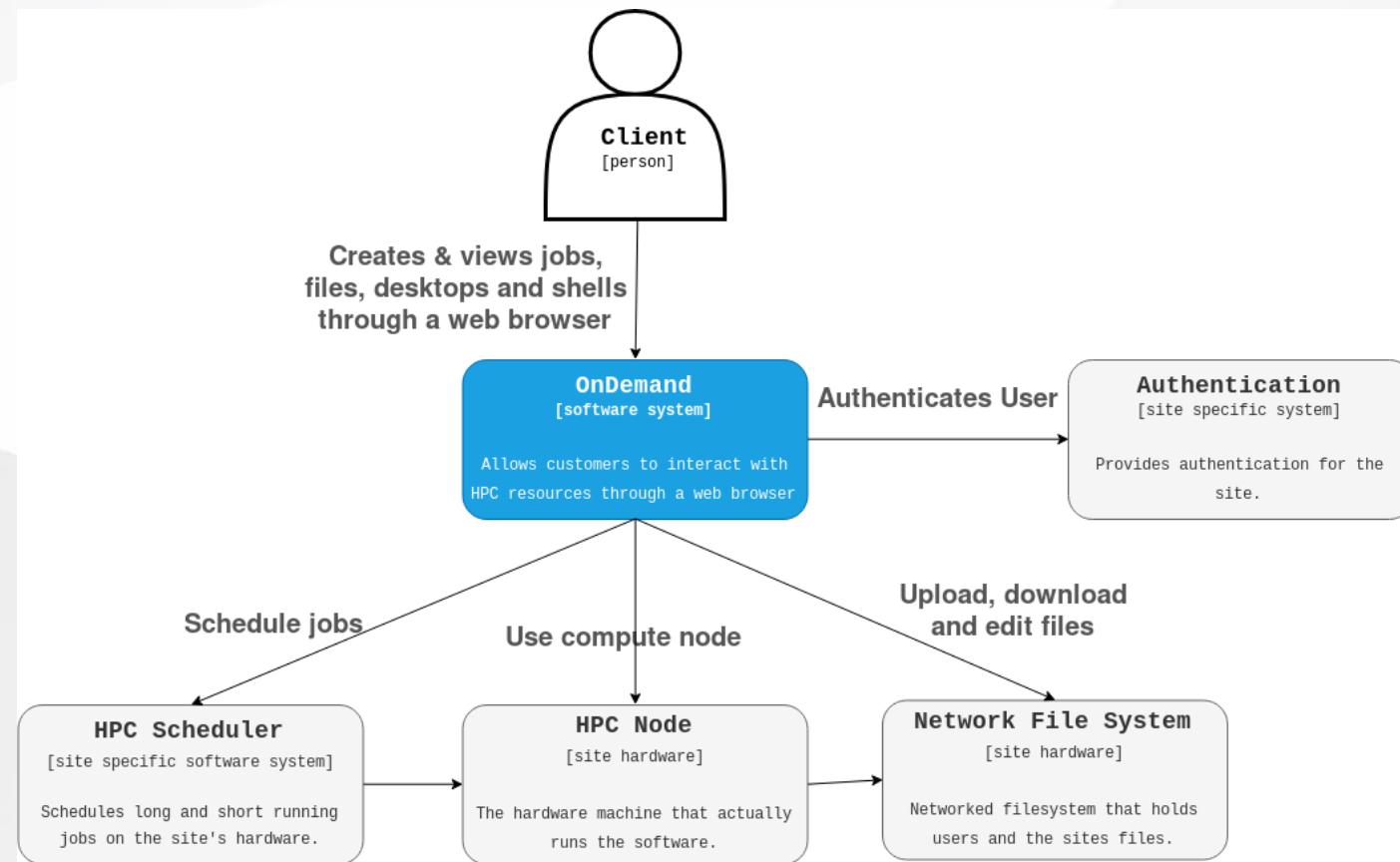
Training style : mostly demonstration

- If you have account on Lawrencium then open OOD dashboard and try it yourself as we go.
- Don't have account on Lawrencium? Don't worry! You can watch for now and try it later using training material.
- Training material is available on GitHub(https://github.com/lbnl-science-it/OOD_training_july2022.git/).
- Recording for the training will be available in the same GitHub repository.

Introduction

- What is Open OnDemand?
 - OpenOnDemand is a web platform that provides an easy access to the cluster's HPC resources and services.
 - Designed and developed by Ohio Supercomputer Center.
- Why OOD?
 - **New users:** intuitive and easy access to computing resources, removes barrier in using HPC resources for their research.
 - **Advanced users:** alternate and convenient way to traditional command line access

- How OOD works at system level?

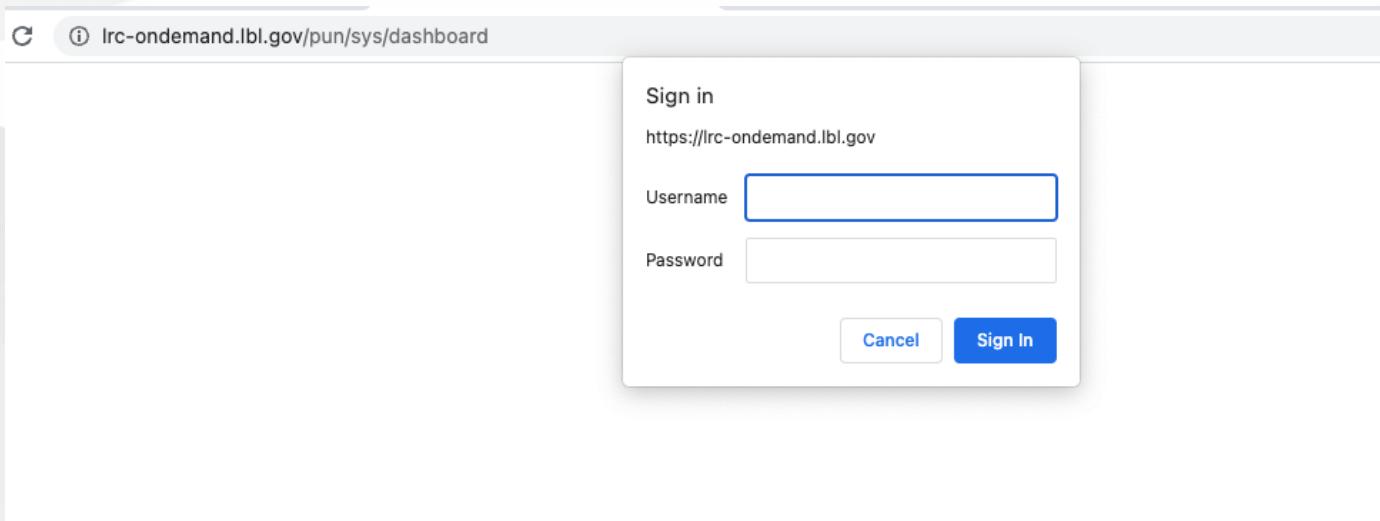


Users are able to use HPC services more efficiently through Open OnDemand.

Accessing OOD on Lawrencium

1. Web link to connect : <https://lrc-on-demand.lbl.gov/>

Note: Use Chrome or Firefox to brows this page. Safari has known [authentication issues](#).



2. Use your LRC username and PIN+one-time password (OTP)
- same credentials you use to login Lawrencium cluster

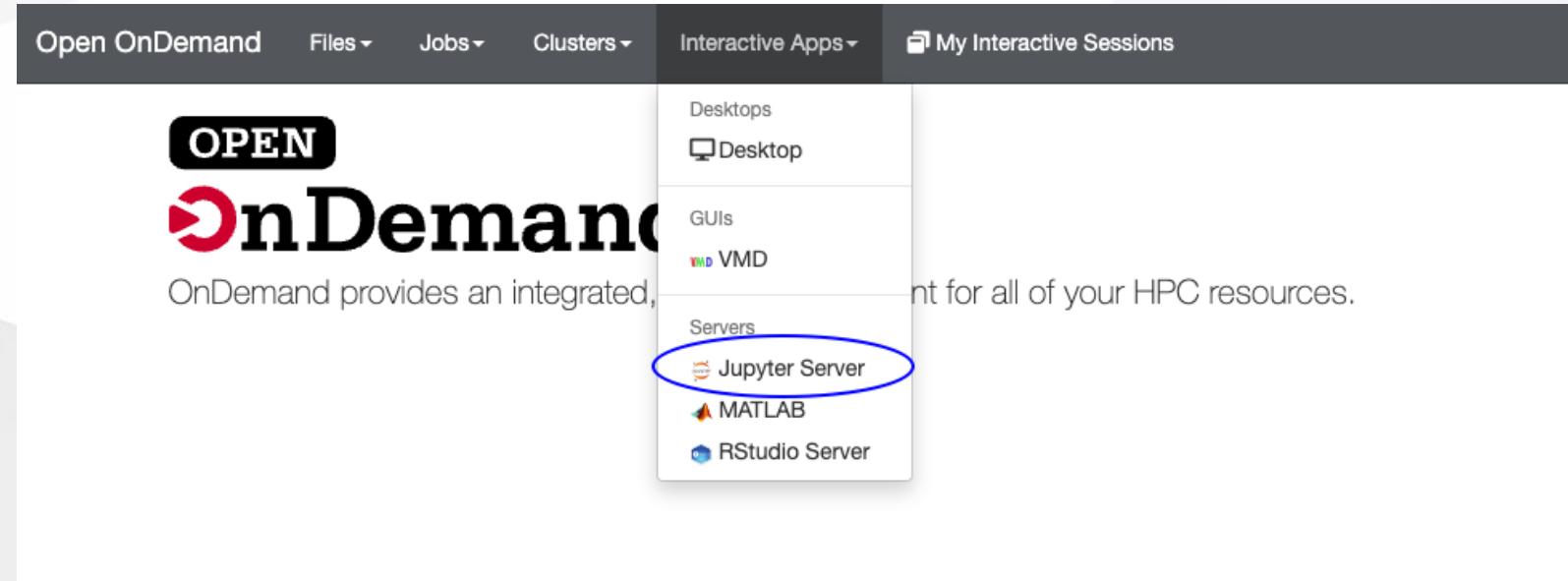
OOD Dashboard on Lawrencium

On successful authentication you will see a OOD dashboard.

The screenshot shows the OnDemand interface on a web browser. At the top, there is a dark navigation bar with white text containing links for 'Open OnDemand', 'Files', 'Jobs', 'Clusters', 'Interactive Apps', 'My Interactive Sessions', 'Help', and 'Log Out'. Below the navigation bar, the main content area features a large 'OPEN' button with a red arrow icon. To its right is the 'OnDemand' logo, which consists of a red arrow pointing right followed by the word 'OnDemand' in a bold, black, sans-serif font. Below the logo, a subtext reads 'OnDemand provides an integrated, single access point for all of your HPC resources.' The rest of the page is a plain white space.

Interactive Apps: Jupyter server

Click on **Interactive apps --> Jupyter Server** to open Jupyter notebook



Interactive mode

Home / My Interactive Sessions / Jupyter Server

Interactive Apps

- Desktops
- Desktop
- GUIs
- VMD
- Servers
- Jupyter Server**
- MATLAB
- RStudio Server

Jupyter Server version: d96c37b

This app will launch a [Jupyter](#) server using [Python](#) on the [LBNL](#) Science-IT Laboratory Research Computing([LRC](#)) Infrastructure clusters.

Type of use

interactive_mode, for exploration

Choose the mode of running your Jupyter Server

Wall Clock Time

1

How many hours do you want to run this Jupyter Server for ?

Number of CPU cores per Node

1

Please specify the number of CPU cores you want per node for this Jupyter Server

Email address (optional)

Enter your email address if you would like to receive an email when the session starts. Leave blank for no email.

Launch

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

Compute mode

Interactive Apps

- Desktops
- Desktop
- GUIs
- VMs
- Servers
 - Jupyter Server
 - MATLAB
 - RStudio Server

Jupyter Server version: d96c37b

This app will launch a [Jupyter](#) server using [Python](#) on the [LBNL Science-IT](#) Laboratory Research Computing([LRC](#)) Infrastructure clusters.

Type of use

compute_mode

Choose the mode of running your Jupyter Server

Wall Clock Time

1

How many hours do you want to run this Jupyter Server for ?

Name of the job

test

SLURM Partition

cf1

Choose the name of the SLURM Partition in which you want to launch this Jupyter Server

SLURM Project/Account Name

scs

For non Lawrencium partitions you can leave this blank.

SLURM QoS Name

cf_debug

Most users can leave it black for default assignment, Lawrencium Condo users want to specify their condo QoS name

Number of Nodes

1

Please specify the number of nodes you want for this Jupyter Server

Email address (optional)

Enter your email address if you would like to receive an email when the session starts. Leave blank for no email.

Launch

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

```
(base) [spsoni@n0003 ~]$ sacctmgr show association -p user=spsoni
Cluster|Account|User|Partition|Share|Priority|GrpJobs|GrpTRES|GrpSubmit|GrpWall|Grp
xTRES|MaxTRESPerNode|MaxSubmit|MaxWall|MaxTRESMins|QOS|Def QOS|GrpTRESRunMins|
perceus-00|dirac1|spsoni|ood_inter|1|||||||lr_interactive|||
perceus-00|dirac1|spsoni|dirac1|1|||||||normal|||
perceus-00|scs|spsoni|etna_shared|1|||||||normal|||
perceus-00|scs|spsoni|etna|1|||||||normal|||
perceus-00|scs|spsoni|etna_gpu|1|||||||normal|||
perceus-00|scs|spsoni|ood_inter|1|||||||lr_interactive|||
perceus-00|scs|spsoni|es1|1|||||||es_debug,es_lowprio,es_normal|||
perceus-00|scs|spsoni|cf1|1|||||||cf_debug,cf_lowprio,cf_normal|||
perceus-00|scs|spsoni|cm1|1|||||||cm1_debug,cm1_normal|||
perceus-00|scs|spsoni|lr_bigmem|1|||||||lr_debug,lr_normal|||
perceus-00|scs|spsoni|lr6|1|||||||lr6_lowprio,lr_debug,lr_normal|||
perceus-00|scs|spsoni|lr5|1|||||||lr_debug,lr_lowprio,lr_normal|||
perceus-00|scs|spsoni|lr4|1|||||||lr_debug,lr_lowprio,lr_normal|||
perceus-00|scs|spsoni|lr3|1|||||||lr_debug,lr_lowprio,lr_normal|||
```

Session was successfully created.

Home / My Interactive Sessions

Interactive Apps

- Desktops
- Desktop
- GUIs
- VMD
- Servers
- Jupyter Server
- MATLAB
- RStudio Server

Jupyter Server (51665742)

1 node | 64 cores | Starting

Created at: 2022-07-21 13:56:39 PDT

Time Remaining: 59 minutes

Session ID: 032d6e1a-efbc-406b-8ceb-4eab3c54dc95

Your session is currently starting... Please be patient as this process can take a few minutes.

Delete

Session was successfully created.

Home / My Interactive Sessions

Interactive Apps

- Desktops
- Desktop
- GUIs
- VMD
- Servers
- Jupyter Server
- MATLAB
- RStudio Server

Jupyter Server (51665742)

1 node | 64 cores | Running

Host: >_n0014.ct1

Created at: 2022-07-21 13:56:39 PDT

Time Remaining: 58 minutes

Session ID: 032d6e1a-efbc-406b-8ceb-4eab3c54dc95

Connect to Jupyter

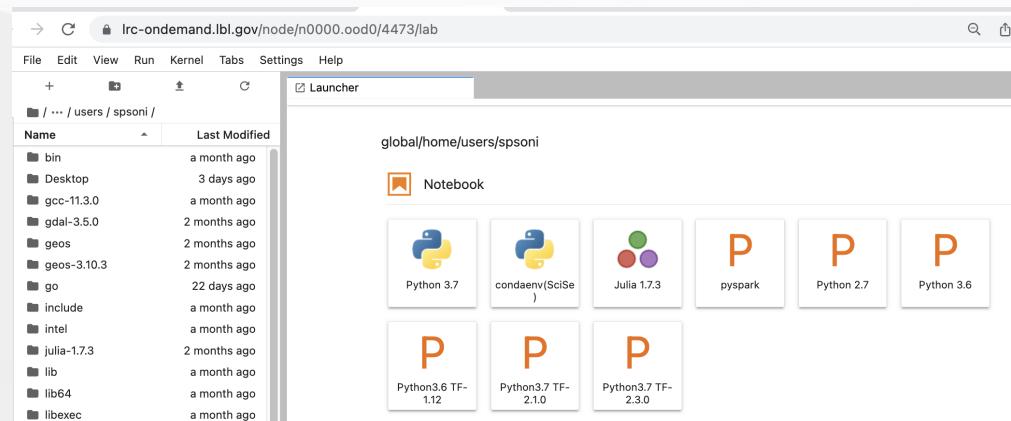
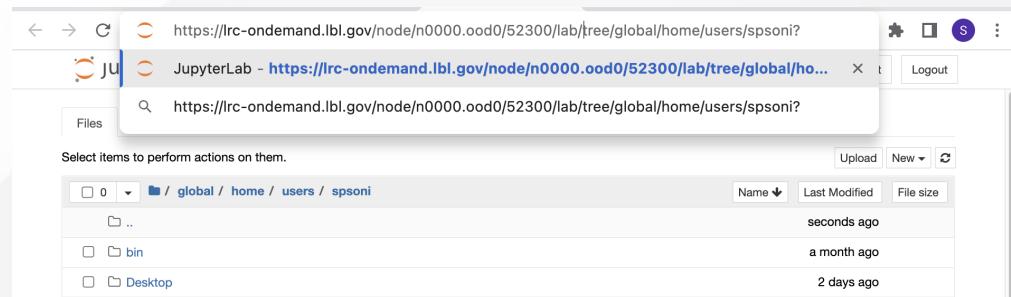


The screenshot shows a Jupyter Notebook cell with the title 'Untitled1'. The cell contains the code 'print("Hello World!")'. The output of the cell is 'Hello World!', displayed in green text. The notebook is running on a node at irc-on-demand.lbl.gov with a last checkpoint on 07/12/2022. The interface includes a standard toolbar with file operations and a kernel selection dropdown set to 'Python 3.6'.

```
In [3]: print("Hello World!")
```

Hello World!

To load Jupyter lab simply add
lab/ before **tree/** in jupyter
server url.



Customizing Jupyter Kernels : Python and Julia

If you'd like to use a different language or version of python or different conda environment not indicated in the drop-down menu of jupyter notebook you'll need to create your own kernel.

Python:

There are two ways to add python kernel to jupyter notebook.

1. Using conda environment
2. Manually creating a new kernel

[Click here for details.](#)

Customizing python kernel using conda environment

```
# Creating a pykernel for 3.9.12 version of python and installing packages
module load python/3.9.12
# Create the environment in your home directory:
conda create --name=py39 python=3.9 ipykernel
source activate py39
python -m ipykernel install --user --name py39 --display-name="py39(Sci)"
conda install -c conda-forge scipy
```

Creating environment in scratch space: \$USER is your own username.

```
conda create -p /global/scratch/users/$USER/py39_scr python=3.9 ipykernel
source activate /global/scratch/users/$USER/py39_scr
python -m ipykernel install --name=py39_scr --prefix=/global/scratch/users/$USER/py39_scr --display-name="py39_scratch"
#create symlink to kernel in custom path
ln -s /global/scratch/users/$USER/py39 /global/home/users/$USER/.local/share/jupyter/kernels/py39
```

You need to create a symlink in /global/home/users/\$USER/.local/share/jupyter/kernels/ directory so that kernel appears in the jupyter notebook.

Julia:

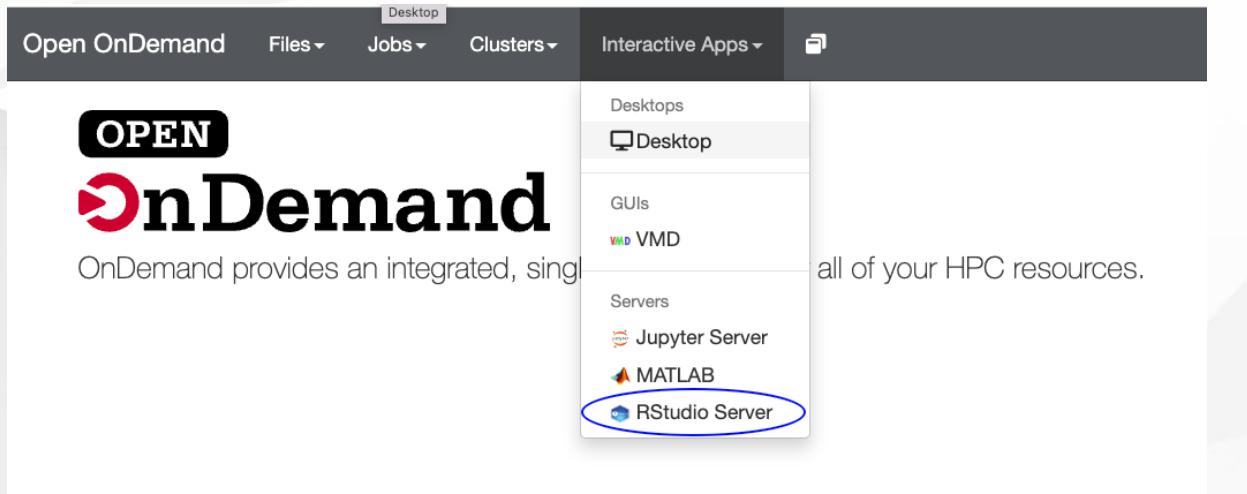
Julia kernel can be added in Jupyter for writing a Julia code in Jupyter notebook. To add a Julia kernel to Jupyter we only need to add the IJulia package.

```
module load julia/1.0.3
julia --version
julia
using Pkg
Pkg.add("IJulia")
Pkg.build("IJulia")
```

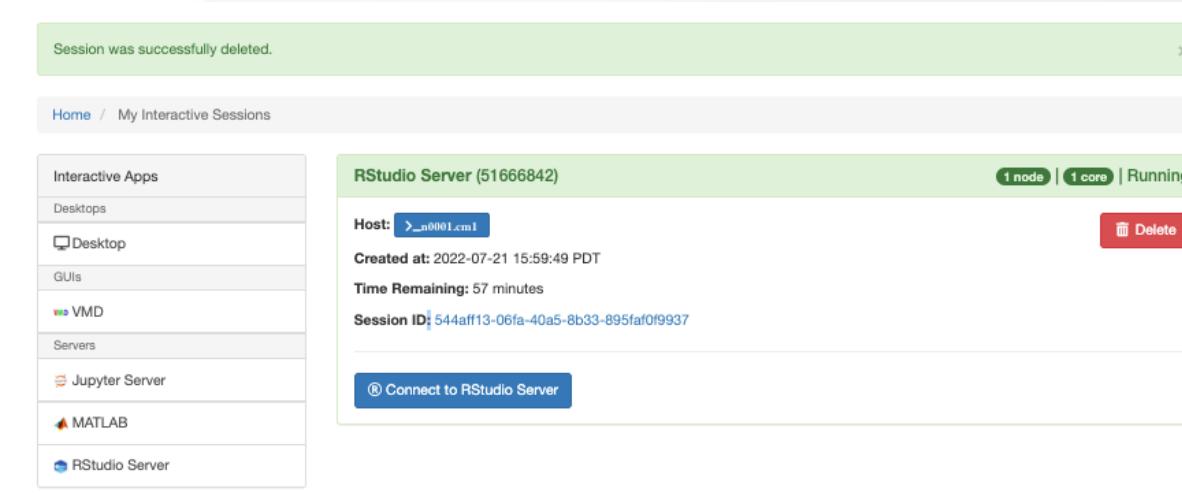
To remove unwanted jupyter kernel use following commands.

```
module load python/3.9.12
jupyter kernelspec list
jupyter kernelspec uninstall julia-1.0
jupyter kernelspec uninstall py39
```

Interactive Apps: RStudio



The screenshot shows the OnDemand interface. At the top, there's a navigation bar with 'Open OnDemand', 'Files', 'Jobs', 'Clusters', 'Interactive Apps', and a search icon. Below this, the main area features the 'OnDemand' logo and the text 'OnDemand provides an integrated, sing...'. To the right, there's a sidebar with a list of interactive applications: Desktops (selected), GUIs (VMD), Servers (Jupyter Server, MATLAB), and RStudio Server (circled in blue). The main content area says 'all of your HPC resources.'



The screenshot shows the 'My Interactive Sessions' page. It displays a green success message 'Session was successfully deleted.' Above the list of sessions. The list includes: 'Interactive Apps' (Desktops, GUIs, VMD, Servers, MATLAB, RStudio Server), 'RStudio Server (51666842)' (Host: >_n0001.cml, Created at: 2022-07-21 15:59:49 PDT, Time Remaining: 57 minutes, Session ID: 544aff13-06fa-40a5-8b33-895faf0f9937, Connect to RStudio Server button), and a 'Delete' button.

Compute and interactive mode

Home / My Interactive Sessions / RStudio Server

| |
|-----------------------|
| Interactive Apps |
| Desktops |
| <i>Desktop</i> |
| GUls |
| <i>VMD</i> |
| Servers |
| <i>Jupyter Server</i> |
| <i>MATLAB</i> |
| RStudio Server |

RStudio Server version: d96c37b

This app will launch a RStudio Server an IDE for R on the LBNL Science-IT Laboratory Research Computing(LRC) Infrastructure clusters.

Type of use

interactive_mode, for exploration

Choose the mode of running your Rstudio Server

Wall Clock Time

1

How many hours do you want to run this Rstudio Server for ?

Number of CPU cores per Node

1

Please specify the number of CPU cores you want per node for this Rstudio Server

Email address (optional)

Enter your email address if you would like to receive an email when the session starts. Leave blank for no email.

Launch

* The RStudio Server session data for this session can be accessed under the data root directory.

Home / My Interactive Sessions / RStudio Server

| |
|-----------------------|
| Interactive Apps |
| Desktops |
| <i>Desktop</i> |
| GUls |
| <i>VMD</i> |
| Servers |
| <i>Jupyter Server</i> |
| <i>MATLAB</i> |
| RStudio Server |

RStudio Server version: d96c37b

This app will launch a RStudio Server an IDE for R on the LBNL Science-IT Laboratory Research Computing(LRC) Infrastructure clusters.

Type of use

compute_mode

Choose the mode of running your Rstudio Server

Wall Clock Time

1

How many hours do you want to run this Rstudio Server for ?

Name of the job

test

SLURM Partition

cf1

Choose the name of the SLURM Partition in which you want to launch this Rstudio Server

SLURM Project/Account Name

scs

For non Lawrencium partitions you can leave this blank.

SLURM QoS Name

cf_normal

Most users can leave it black for default assignment, Lawrencium Condo users want to specify their condo QoS name

Number of Nodes

1

Please specify the number of nodes you want for this Rstudio Server

Email address (optional)

Enter your email address if you would like to receive an email when the session starts. Leave blank for no email.

Launch

* The RStudio Server session data for this session can be accessed under the data root

Interactive Apps: MATLAB

The screenshot shows the Open OnDemand web interface. At the top, there's a navigation bar with links for Desktop, Open OnDemand, Files, Jobs, Clusters, Interactive Apps, and a search icon. The 'Interactive Apps' dropdown is open, showing options: Desktops (selected), GUIs, VMD, Servers, Jupyter Server, MATLAB (circled in blue), and RStudio Server. Below the menu, the text "OnDemand provides an integrated, singl..." is visible, followed by "all of your HPC resources."

The screenshot shows a MATLAB session details page. At the top, it says "Home / My Interactive Sessions". The main section is titled "Interactive Apps" and lists "MATLAB (51666979)". To the right, there are status indicators: "1 node | 1 core | Running". Below this, session details are provided: Host (>_n0000.ood0), Created at: 2022-07-21 16:24:34 PDT, Time Remaining: 59 minutes, and Session ID: 58dfcbce-9c5e-432d-b02d-87043985df5c. There are also sliders for Compression (0 to 9) and Image Quality (0 to 9), and a "Launch MATLAB" button. A "View Only (Shareable Link)" button is located at the bottom right.

Interactive Apps: Desktop

The screenshot shows the OnDemand interface. At the top, there's a navigation bar with 'Open OnDemand', 'Files', 'Jobs', 'Clusters', 'Interactive Apps', and 'My Interactive Sessions'. Below the navigation bar, the 'Interactive Apps' menu is open, showing categories: Desktops, GUIs, and Servers. The 'Desktops' category is highlighted and has a blue oval around it. Under 'Desktops', there are icons for 'Desktop', 'VMD', 'Jupyter Server', 'MATLAB', and 'RStudio Server'. To the right of the menu, there's a message: 'OnDemand provides an integrated access point for all of your HPC resources.'

Home / My Interactive Sessions / Desktop

Interactive Apps

Desktops

Desktop

GUIs

VMD

Servers

Jupyter Server

MATLAB

RStudio Server

Desktop version: 31a024e

This app will launch an interactive desktop on the [LBNL Science-IT](#) Laboratory Research Computing([LRC](#)) Infrastructure clusters. You will be able to launch GUI applications directly on the desktop.

Name of the Job

OOD_desktop_test

SLURM Partition

cf1

The SLURM Partition in which you want to launch this Desktop session.

SLURM Account/Project Name

scs

The SLURM account (i.e., the value of the -A or --account flag used when submitting a SLURM job).

SLURM QoS Name

cf_debug

The QoS you want run under.

Number of Compute Nodes

1

The number of nodes you want for your Desktop session.

Wall Clock Time

1

The maximum number of hours your Jupyter session will run for. To save PCA credits or free up resources for your condo group members, you should delete your session when you are done.

Email Address (Optional)

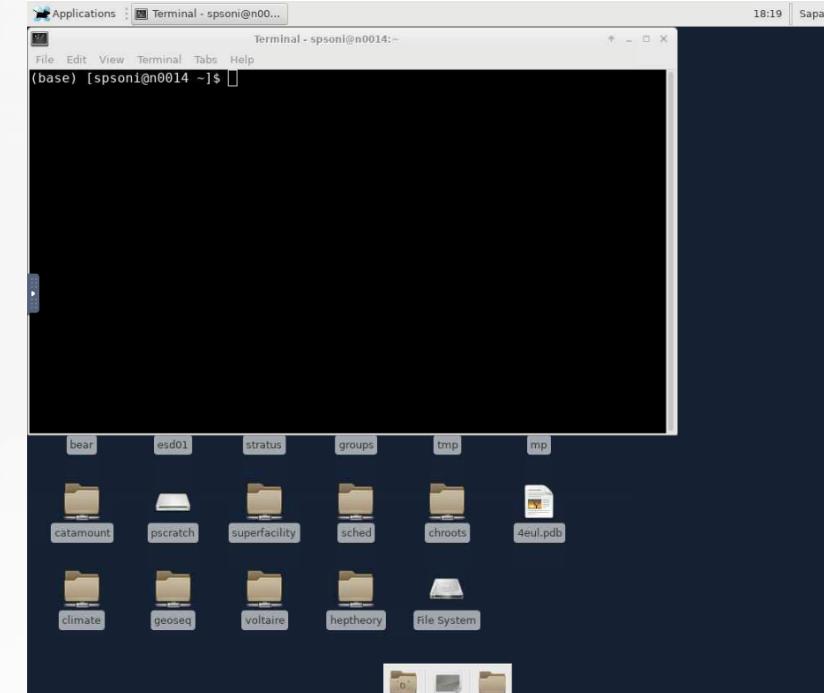
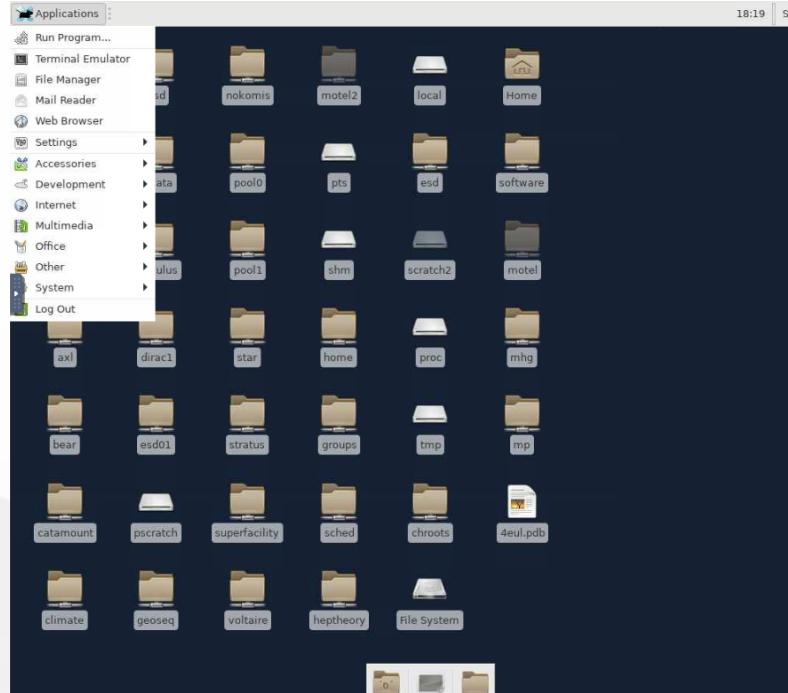
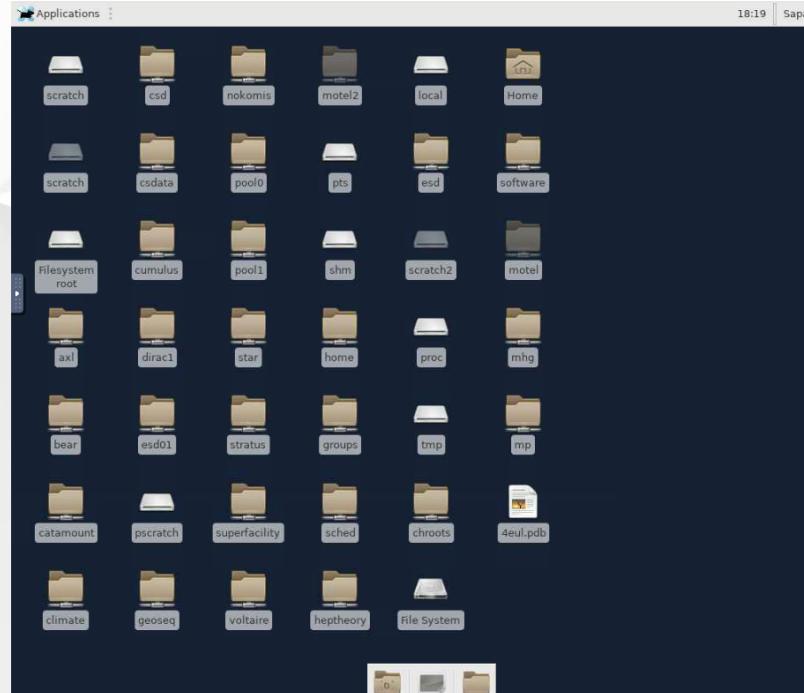
Enter your email address if you would like to receive an email when the session starts. Leave blank for no email.

Launch

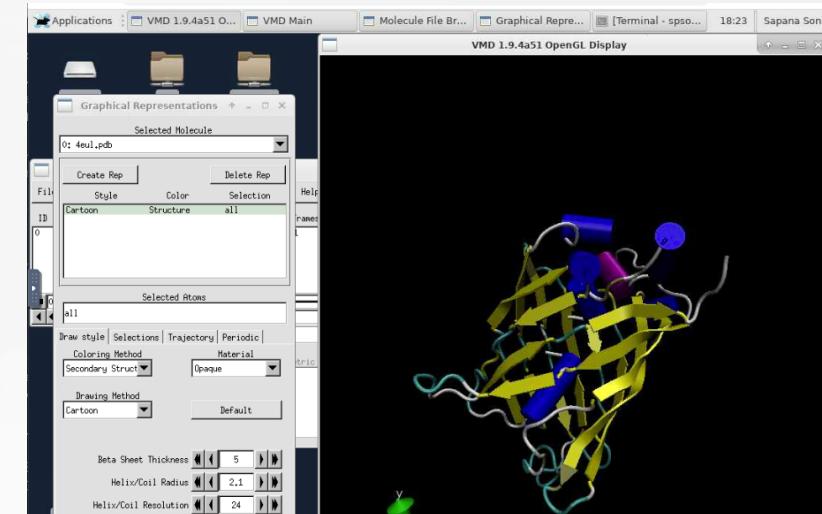
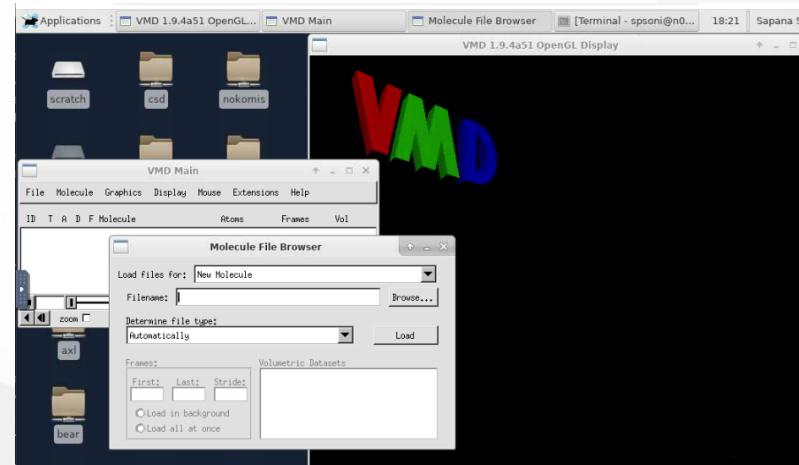
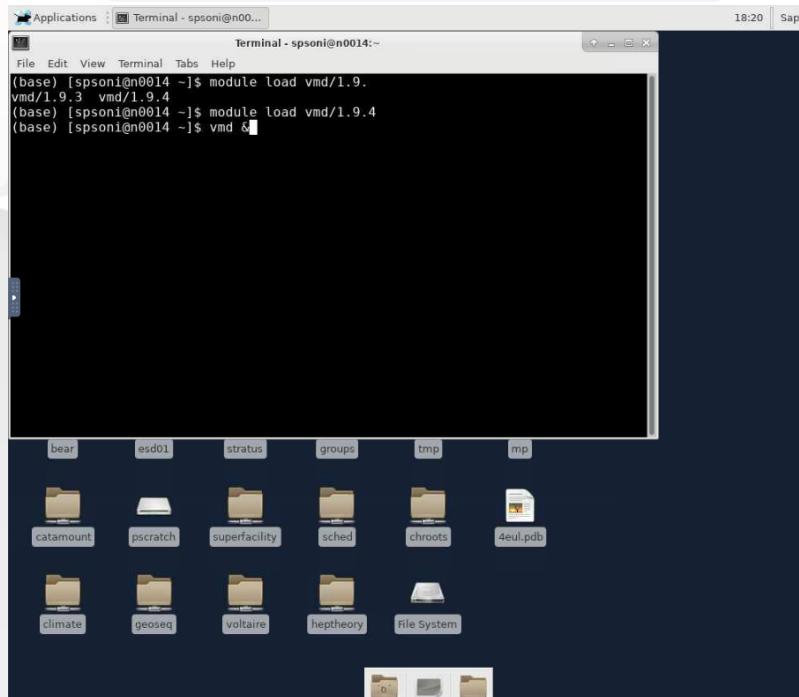
* The Desktop session data for this session can be accessed under the [data root](#) directory.

The screenshot shows a running desktop session. At the top, there's a green header bar with the message 'Session was successfully deleted.' Below the header, the 'Interactive Apps' menu is shown again. In the center, there's a card for a 'Desktop (51668171)' session. The card displays: 'Host: [2001:4d8:1001:1::1](#)', 'Created at: 2022-07-21 18:17:33 PDT', 'Time Remaining: 59 minutes', and 'Session ID: 645aabba-caa9-4f1b-a5c0-973421f951fb'. There are also sliders for 'Compression' and 'Image Quality', both set to 5. At the bottom of the card is a 'Launch Desktop' button and a 'View Only (Share-able Link)' button.

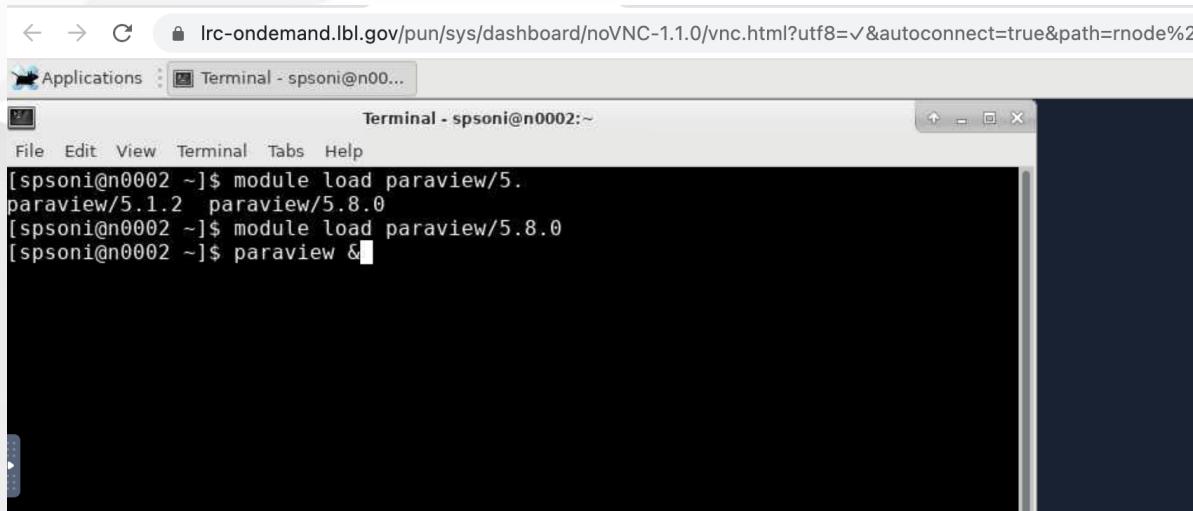
Desktop



Using Desktop to launch VMD

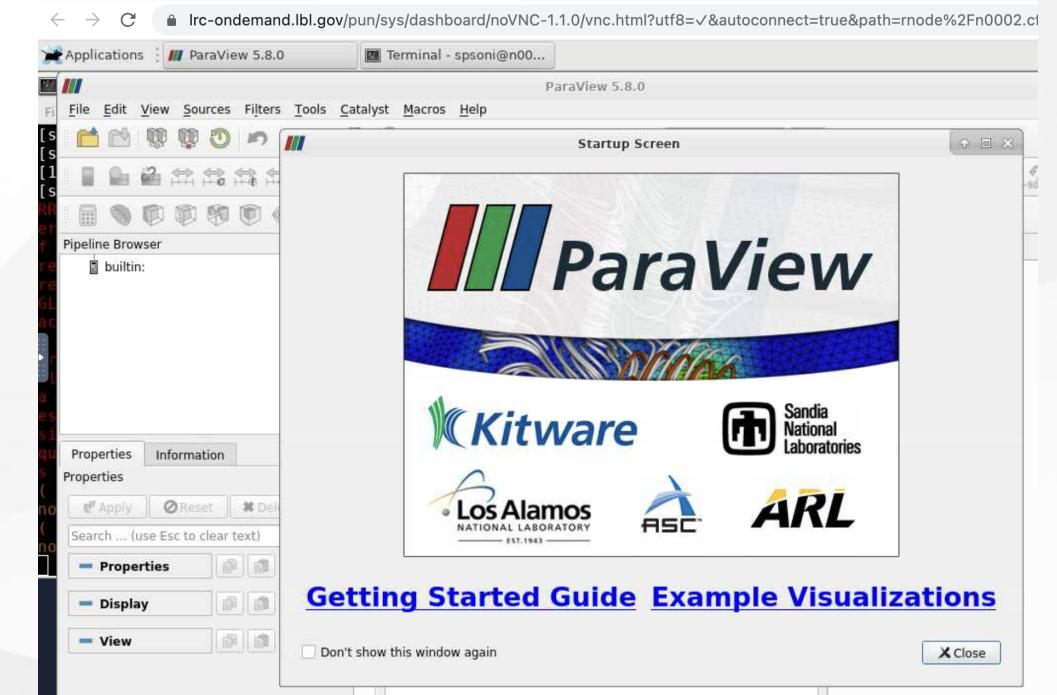


Using Desktop to launch ParaView



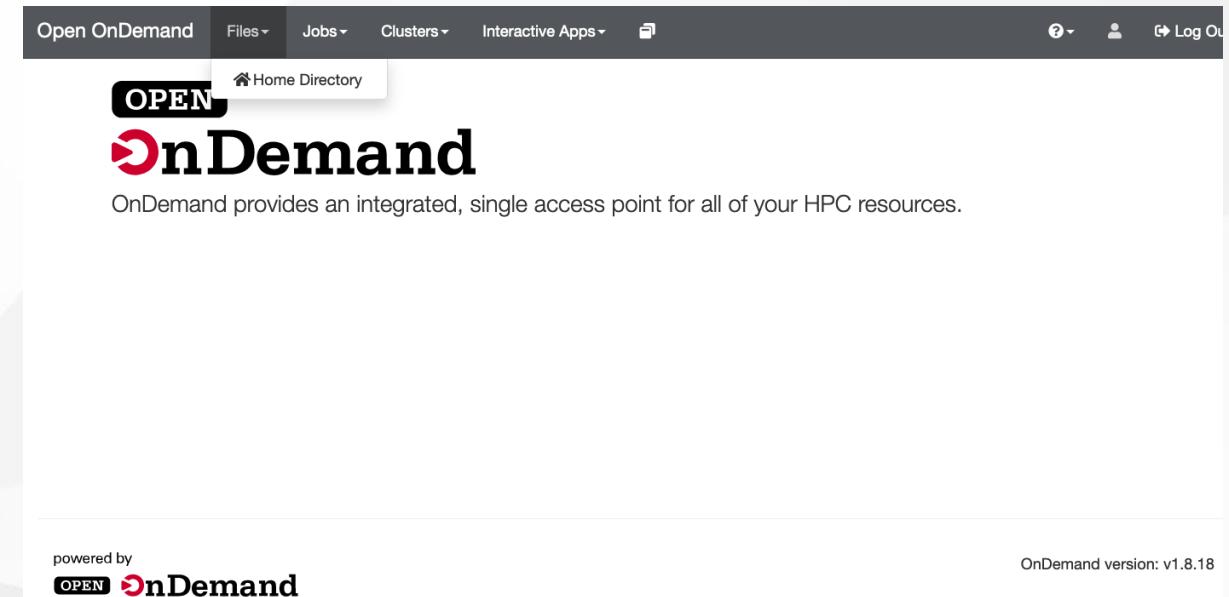
A screenshot of a terminal window titled "Terminal - spsoni@n002:~". The window shows the following command history:

```
[spsoni@n002 ~]$ module load paraview/5.  
paraview/5.1.2 paraview/5.8.0  
[spsoni@n002 ~]$ module load paraview/5.8.0  
[spsoni@n002 ~]$ paraview &
```



Files: file management

- **Conventional approach: command line**
 - Linux file editors for editing files: vi, vim, nano, emacs
 - File transfer: scp, rsync
- **Globus for file transfer**
- **Open OnDemand: Files feature**
 - view and edit text files
 - create or rename or delete files
 - create or rename or delete directories
 - file/directory upload and download



Files : Home directory

The screenshot shows a file manager interface with the following details:

- Toolbar:** Go To..., Open in Terminal, New File, New Dir, Upload, Show Dotfiles, Show Owner/Mode.
- Path:** /global/home/users/spsoni/
- Buttons:** View, Edit, A-Z Rename/Move, Download, Copy, Paste, (Un)Select All, Delete.
- Table:** A list of files and directories in the current directory.

| name | size | modified date |
|-------------|------|---------------|
| .. | dir | 07/24/2022 |
| Desktop | dir | 07/08/2022 |
| OCEAN | dir | 06/09/2022 |
| R | dir | 06/13/2022 |
| bin | dir | 06/14/2022 |
| gcc-11.3.0 | dir | 06/09/2022 |
| gdal-3.5.0 | dir | 06/09/2022 |
| geos | dir | 06/09/2022 |
| geos-3.10.3 | dir | 06/09/2022 |
| go | dir | 07/05/2022 |
| include | dir | 06/29/2022 |
| intel | dir | 06/16/2022 |
| julia-1.7.3 | dir | 05/17/2022 |
| lib | dir | 06/13/2022 |
| lib64 | dir | 06/29/2022 |
| libexec | dir | 06/13/2022 |
| libssh | dir | 06/13/2022 |
| libssh2 | dir | 06/13/2022 |
| libssh2-0.9 | dir | 06/13/2022 |
| myproject | dir | 06/13/2022 |
| ondemand | dir | 06/13/2022 |

Clusters: LRC shell access

The screenshot shows the OnDemand web interface. At the top, there is a navigation bar with links for Open OnDemand, Files, Jobs, Clusters (which is the active tab), Interactive Apps, and a search icon. Below the navigation bar, there is a banner with the text "OPEN OnDemand". The main content area displays the message: "OnDemand provides an integrated, single access point for all of your HPC resources." At the bottom left, it says "powered by OPEN OnDemand", and at the bottom right, it indicates "OnDemand version: v1.8.18".

The screenshot shows a terminal window with the following text:

Lawrence Berkeley National Laboratory operates this computer system under a contract with the U.S. Department of Energy. It is the property of the United States Government and is for authorized use only. The use of this system may be monitored for computer security purposes. Any unauthorized access to this system is prohibited and is subject to criminal and civil penalties under Federal Laws including but not limited to Public Laws 83-703 and 99-474. Each time you use this system (from here, from home, or on your personal laptop connected to an LBNL system), you consent to such interception, auditing, and related activity by authorizing personnel; further, LBNL may detain, access, and copy files from a non LBNL computer when there is reason to believe misuse has occurred.

* LBNL Computer Protection Emergency phone number: 486-7770
* LBNL Security Webpage: <http://www.lbl.gov/security/>
* LBNL Backup Services: <https://commons.lbl.gov/display/itdivision/Backups>

We have WEEKLY office hours on Wednesdays starting 7/24/2019!
Request a virtual consultation at <https://sites.google.com/a/lbl.gov/hpc/getting-help>
Time: 10:30am-noon on Wednesdays

[spsoni@n000 ~]\$

Job submission and management

The screenshot shows the OnDemand web interface. At the top, there is a navigation bar with links for "Open OnDemand", "Files", "Jobs", "Clusters", "Interactive Apps", and a user icon. Below the navigation bar is a search bar with placeholder text "Active Jobs" and "Job Composer". The main content area features the "OnDemand" logo with a red "O" and a black "n". A sub-headline states "OnDemand provides an integrated, single access point for all of your HPC resources." At the bottom left, it says "powered by" followed by the "OnDemand" logo. At the bottom right, it indicates "OnDemand version: v1.8.18".

The screenshot shows the "Active Jobs" list page. The title is "Active Jobs" and the subtitle is "Showing 1 to 1 of 1 entries". The table has columns for ID, Name, User, Account, Time Used, Queue, Status, Cluster, and Actions. There is one entry: ID 51694850, Name OOD_desktop_test, User spsoni, Account scs, Time Used 00:00:09, Queue cf1, Status Running, Cluster LRC, and Actions (a trash bin icon). Navigation buttons at the bottom include "Previous" (with page number 1), "Next", and "Filter" (with a search input field).

| ID | Name | User | Account | Time Used | Queue | Status | Cluster | Actions |
|------------|------------------|--------|---------|-----------|-------|---------|---------|---------|
| > 51694850 | OOD_desktop_test | spsoni | scs | 00:00:09 | cf1 | Running | LRC | |

Job composer and template

Open OnDemand / Job Composer Jobs Templates ⚡ Help

Jobs

+ New Job ▾

Edit Files Job Options Open Terminal Submit Stop Delete

Show 25 entries Search:

| Created | Name | ID | Cluster | Status |
|----------------------|---------------|----------|---------|---------------|
| July 24, 2022 5:24pm | GPU Slurm Job | 51694976 | LRC | Not Submitted |
| July 24, 2022 5:16pm | MPI Slurm Job | 51694976 | LRC | Completed |
| July 24, 2022 5:12pm | GPU Slurm Job | 51694958 | LRC | Completed |

Showing 1 to 3 of 3 entries Previous 1 Next

★ Create Template

Job Details

Job Name: GPU Slurm Job

Submit to: LRC

Account: Not specified

Script location: /global/home/users/spsoni/ondemand/data/sys/myjobs/projects/d

Open OnDemand / Job Composer Jobs Templates ⚡ Help

Templates

To create a new job, select a template to copy, fill out the form to the right, and click "Create New Job".

+ New Template Copy Template

View Files Open Terminal Delete

Show 10 entries Search:

| Name | Cluster | Source |
|-----------------------------|---------|------------------|
| GPU Slurm Job | Lrc | System Templates |
| MPI Slurm Job | Lrc | System Templates |
| Simple Sequential Slurm Job | Lrc | System Templates |

Showing 1 to 3 of 3 entries Previous 1 Next

Create New "GPU Slurm Job"

A basic template for GPU job on a Slurm system

Job Name: GPU Slurm Job

Cluster: LRC

Script Name: gpu_job.sh

Create New Job Reset

Submission script

★ Create Template

ch:

Delete

Status: Not Submitted

Completed

Completed

Previous 1 Next

Job Details

Job Name: **GPU Slurm Job**

Submit to: LRC

Account: Not specified

Script location: /global/home/users/spsoni/ondemand/data/sys/myjobs/projects/default/4

Script name: gpu_job.sh

Folder Contents:

Folder Contents:

gpu_job.sh

Submit Script

gpu_job.sh

Script contents:

```
#!/bin/bash

#SBATCH --job-name=test
#SBATCH --nodes=1
#SBATCH --time=00:30:00
#SBATCH --qos=es_normal
#SBATCH --account=scs
#SBATCH --partition=es1
#SBATCH --gres=gpu:1
#SBATCH --ntasks=2
#SBATCH --output=%j.output
#SBATCH --error=%j.err
#SBATCH --job-name=test

cd $SLURM_SUBMIT_DIR
echo "How to submit GPU jobs" > output_file
nvidia-smi -L >> output_file
```

Open Editor

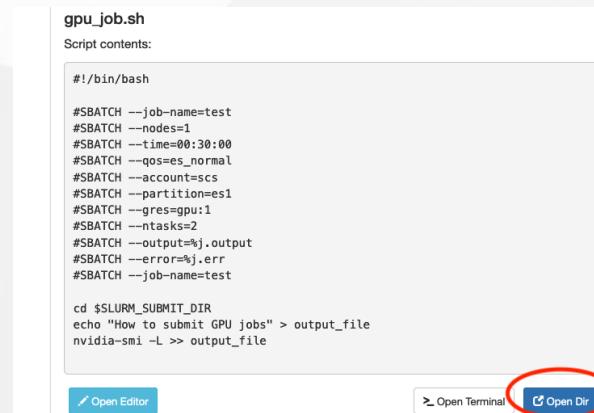
Open Terminal

Open Dir

Jobs: submission directory

Job composer creates a working directory by default on the path
/global/home/users/spsoni/ondemand/data/sys/myjobs/projects/default

- **Use default path:** Copy/upload all the files required for the jobs on this path before hitting Submit button.
 - click 'Open Dir' button at the bottom of the job script content.
 - using a file explorer upload or transfer files



OR

- **Set different working directory:** If you want to use files saved on different location and would like to run job in that directory, for example: scratch.
 - add following command line in your job script

```
cd /global/scratch/users/spsoni/my_working_dir
```

Note: Use path you aim to set for your working directory.

Log out and clean up

- Log out of the portal
- Clean up
 - The portal stores temporary files for interactive apps on the path \$HOME//ondemand/data/sys/dashboard/batch_connect/sys
 - It is a good practice to clean up this directory periodically.

```
rm -rf $HOME/ondemand/data/sys/dashboard/batch_connect/sys/*
```

Getting help

- Virtual office hours:
 - Time: 10.30 am to noon every Wednesday
 - Online [request](#)
- Send us tickets at hpcshelp@lbl.gov
- More information about LBNL Supercluster and scientific computing services can be found [here](#).

Your feedback is important to us for improving HPC services and training.
Please fill out [training survey](#)

