



The Institute for Quantitative Social Science



Getting Started on the FASRC
Clusters with Open OnDemand



Faculty of Arts and Sciences Research Computing

Learning objectives

- What is Open OnDemand (OOD)?
- Accessing OOD
- Launching apps
- RStudio Server
- Jupyter Notebook
 - Create conda environment (i.e., jupyter kernel)
- Files tab
- Jobs tab
- Remote Desktop
- FASSE proxy

Some definitions

- **OOD**: Open On Demand
- **Cluster**: large group of servers with lots of memory and processors
- **Cannon**: cluster that handles level 2 data. Named after the 19th century Harvard astronomer Annie Jump Cannon.
- **FASSE**: cluster that handles level 3 data. FAS Secure Enclave.

Glossary of these terms: docs.rc.fas.harvard.edu/kb/glossary

What is Open OnDemand (OOD)?

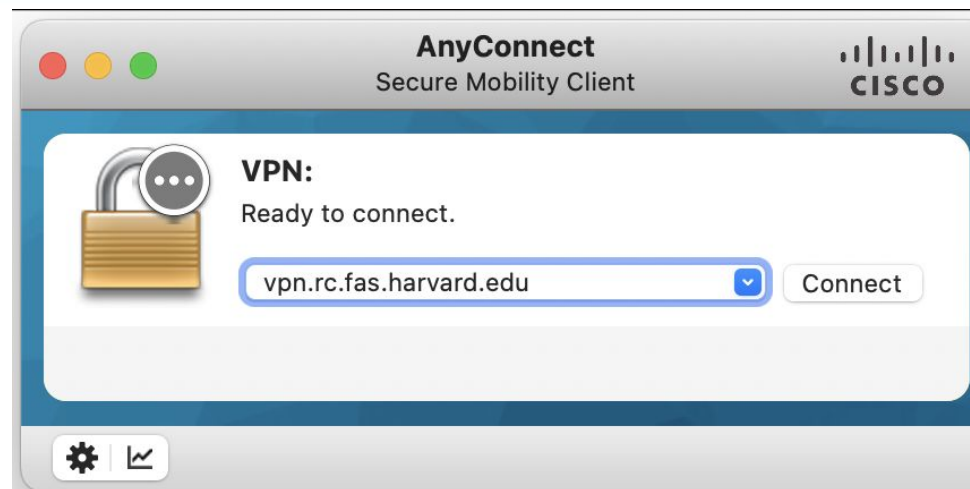
- Open-source web portal to access clusters
- Web-based
 - Uses modern browser like Google Chrome, Mozilla Firefox, or Microsoft Edge.
 - Safari does not support all of OOD's features
 - No software other than a browser needs be installed on your local laptop/desktop
- Easy to learn and use
- Very similar to desktop applications
- The easiest way to run graphical applications remotely on a cluster




How to access OOD on FASRC Clusters

1. Get an account
 - You can choose a username. The default is first initial, last name. I'll use jharvard as an example
 - This is NOT necessarily the same as your HarvardKey username.
2. Log onto the FASRC VPN. This is NOT the generic Harvard VPN.
 - vpn.rc.fas.harvard.edu
 - username is
 - jharvard@fasrc (Cannon)
 - jharvard@fasse (FASSE)
3. Log into Open On Demand for your cluster
 - username is just jharvard, nothing else
 - Cannon link: <https://rcood.rc.fas.harvard.edu>
 - FASSE link: <https://fasseood.rc.fas.harvard.edu>

Connecting to VPN



Cisco AnyConnect | vpn.rc.fas.harvard.edu

 Please enter your RC username and password.

!!! IF YOU HAVE ISSUES UPGRADING YOUR VPN CLIENT:
Please manually download and install by logging into <https://vpn.rc.fas.harvard.edu>

This system is for authorized users at Harvard University.
No other use is permitted.


SUM1 VPN

Username:

Password:

Two-Step Verification Code:

Cisco AnyConnect | vpn.rc.fas.harvard.edu

 Please enter your RC username and password.

!!! IF YOU HAVE ISSUES UPGRADING YOUR VPN CLIENT:
Please manually download and install by logging into <https://vpn.rc.fas.harvard.edu>

This system is for authorized users at Harvard University.
No other use is permitted.

SUM1 VPN

Username:

Password:

Two-Step Verification Code:

Signing in to the OOD Dashboard

When you load the site

<https://rcood.rc.fas.harvard.edu>

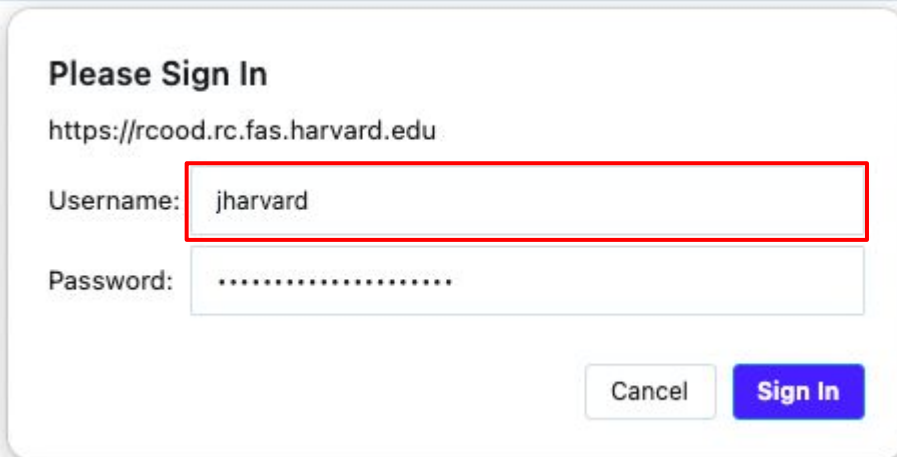
or

<https://fasseood.rc.fas.harvard.edu>

You will be prompted to log in.

Unlike when you log in to the VPN, on the website you need to use

ONLY your username, NOT username@cluster

A sign-in form titled "Please Sign In" for the URL https://rcood.rc.fas.harvard.edu. It contains two input fields: "Username:" with the text "jharvard" and "Password:" with masked characters. The "Username:" field is highlighted with a red border. At the bottom right are "Cancel" and "Sign In" buttons.

Please Sign In

<https://rcood.rc.fas.harvard.edu>

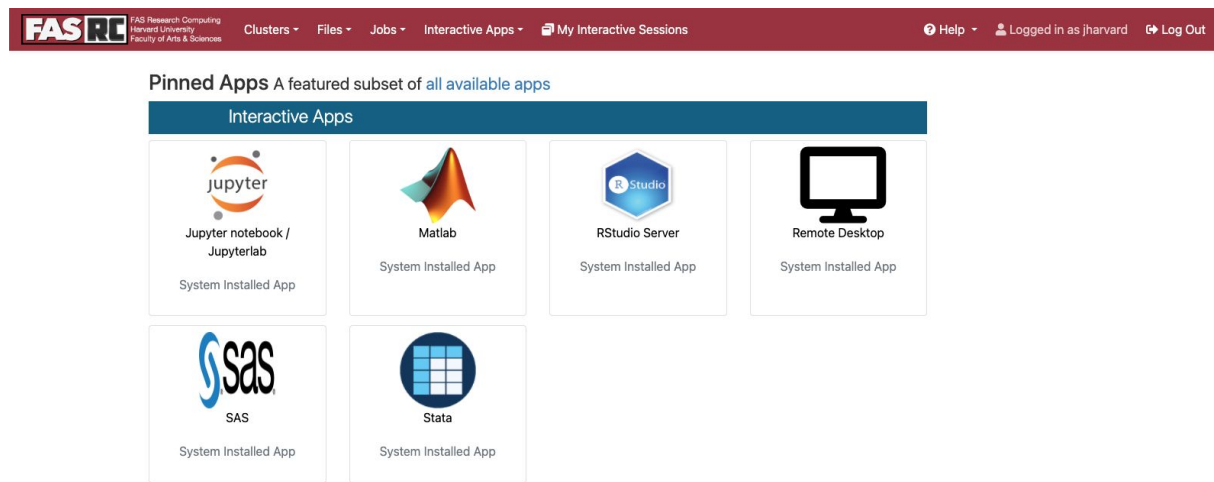
Username: jharvard

Password:

Cancel Sign In

OOD dashboard on Cannon and FASSE

Cannon



The screenshot shows the Cannon OOD dashboard. At the top is a navigation bar with the FAS RC logo, user information (Logged in as jharvard), and links for Clusters, Files, Jobs, Interactive Apps, and My Interactive Sessions. Below the navigation bar, a section titled "Pinned Apps A featured subset of all available apps" displays a grid of application tiles. The tiles include Jupyter (Jupyter notebook / Jupyterlab), Matlab, RStudio Server, Remote Desktop, SAS, and Stata, each labeled as a "System Installed App".



Welcome to FAS-RC Cluster

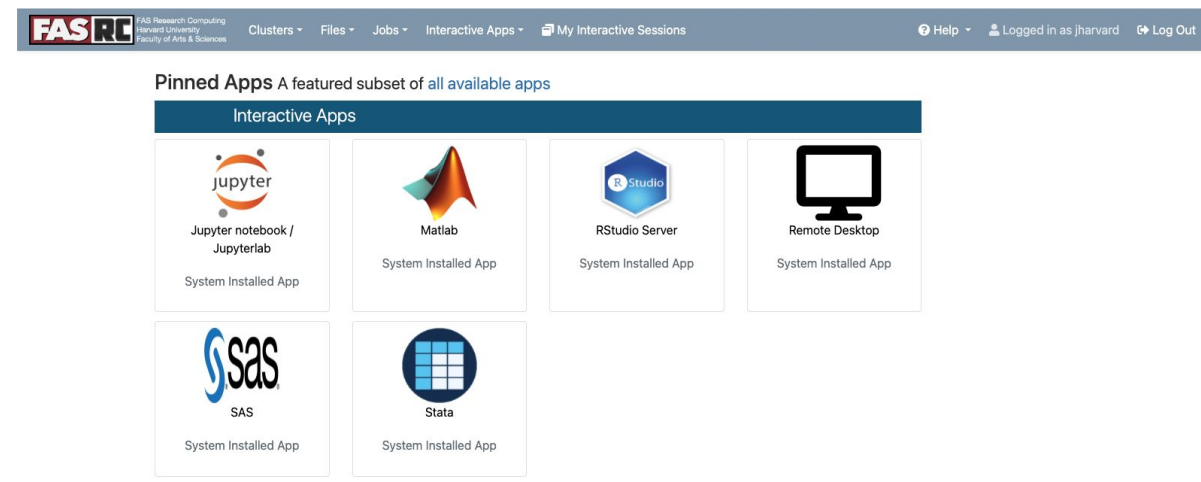
The Computing Cluster is a resource for the research community, hosted by Research Computing at Harvard University's Faculty of Arts and Sciences.

To apply for an account please refer to [this webpage](#).

From this web service you can submit your jobs, check running jobs, and open interactive graphical sessions to run your favorite applications.

<https://rcood.rc.fas.harvard.edu>

FASSE



The screenshot shows the FASSE OOD dashboard. It has a similar layout to the Cannon dashboard, with a navigation bar at the top and a "Pinned Apps" section below. The application tiles are identical: Jupyter, Matlab, RStudio Server, Remote Desktop, SAS, and Stata, all marked as "System Installed App".



Welcome to FASSE

The Computing Cluster is a resource for the research community, hosted by Research Computing at Harvard University's Faculty of Arts and Sciences.

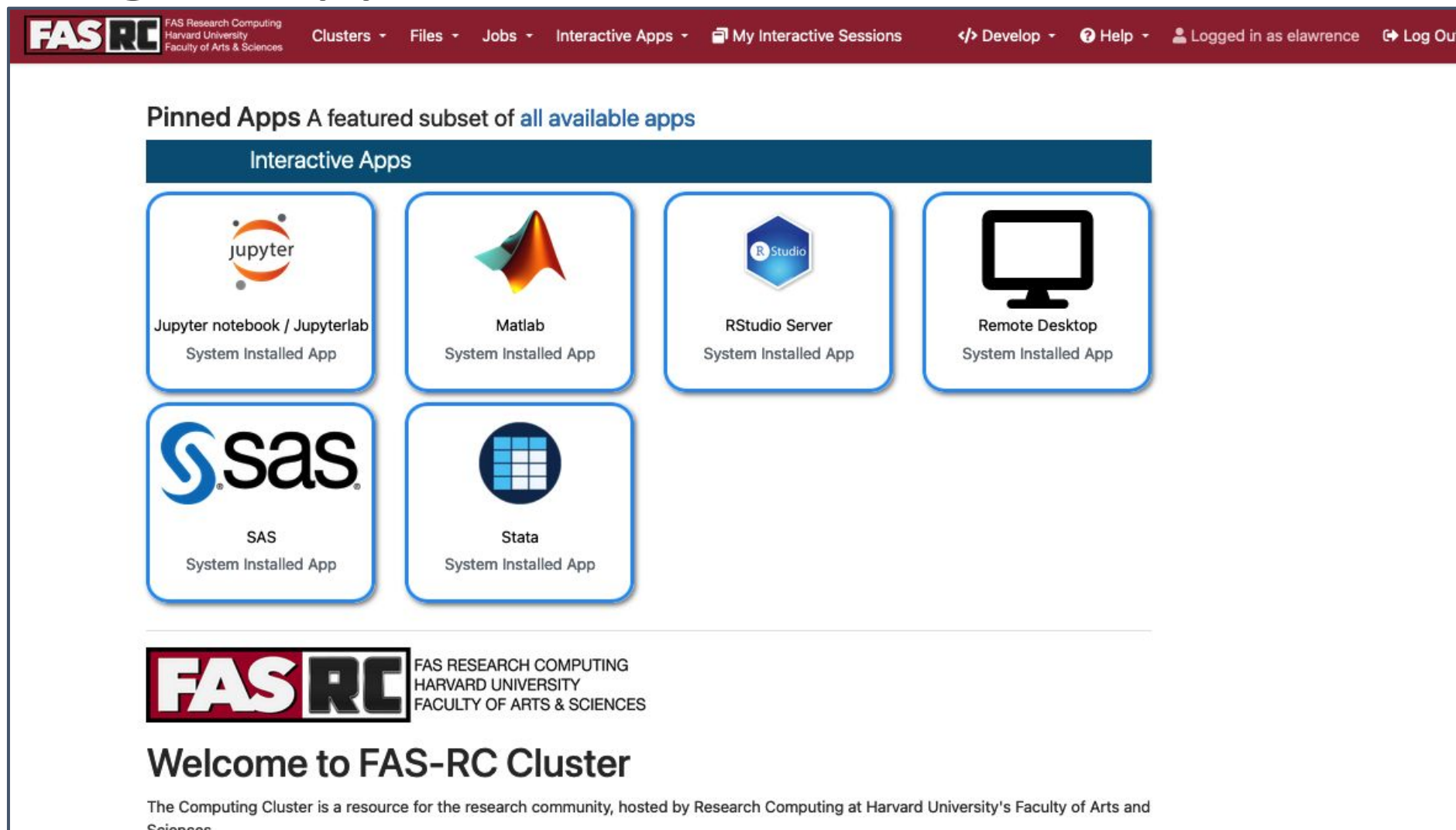
To apply for an account please refer to [this webpage](#).

From this web service you can submit your jobs, check running jobs, and open interactive graphical sessions to run your favorite applications.

These are some examples of the things you will be able to do :

<https://fasseood.rc.fas.harvard.edu>

Launching an app from the Dashboard



The screenshot displays the FAS RC dashboard interface. At the top is a dark red navigation bar with the FAS RC logo and text on the left, and a series of menu items (Clusters, Files, Jobs, Interactive Apps, My Interactive Sessions, Develop, Help, Logged in as elawrence, Log Out) on the right. Below the navigation bar, the main content area is titled "Pinned Apps A featured subset of all available apps". Underneath this title is a blue header for "Interactive Apps". This header contains six app tiles arranged in two rows. Each tile features a logo, the app name, and the text "System Installed App". The apps shown are Jupyter notebook / Jupyterlab, Matlab, RStudio Server, Remote Desktop, SAS, and Stata. At the bottom of the dashboard, there is a large FAS RC logo followed by the text "FAS RESEARCH COMPUTING HARVARD UNIVERSITY FACULTY OF ARTS & SCIENCES". Below this is the heading "Welcome to FAS-RC Cluster" and a paragraph of text: "The Computing Cluster is a resource for the research community, hosted by Research Computing at Harvard University's Faculty of Arts and Sciences".

FAS RC FAS Research Computing
Harvard University
Faculty of Arts & Sciences

Clusters Files Jobs Interactive Apps My Interactive Sessions Develop Help Logged in as elawrence Log Out

Pinned Apps A featured subset of all available apps


Interactive Apps


- Jupyter notebook / Jupyterlab
System Installed App
- Matlab
System Installed App
- RStudio Server
System Installed App
- Remote Desktop
System Installed App
- SAS
System Installed App
- Stata
System Installed App



FAS RC FAS RESEARCH COMPUTING
HARVARD UNIVERSITY
FACULTY OF ARTS & SCIENCES

Welcome to FAS-RC Cluster

The Computing Cluster is a resource for the research community, hosted by Research Computing at Harvard University's Faculty of Arts and Sciences

 FAS Research Computing
Harvard University
Faculty of Arts & Sciences


Clusters ▾ Files ▾ Jobs ▾ Interactive Apps ▾ 


</> ▾ ? ▾  


Home / My Interactive Sessions

Interactive Apps


Desktop Apps


 Matlab

 SAS


 Stata


Desktops

 Containerized
FAS-RC Remote
Desktop

 Remote Desktop

Web Apps

 HeavyAI

 Jupyter notebook /
Jupyterlab

RStudio Server (46756894) 1 node | 2 cores | Running


Host: `>_ holy8a24301.rc.fas.harvard.edu` ✕ Delete

Created at: 2024-09-13 09:22:59 EDT

Time Remaining: 7 hours and 54 minutes

Session ID: 57388d39-0aec-4936-911d-89d61d5e9b37

Ⓡ Connect to RStudio Server

Remote Desktop (46704693) Completed | 

Created at: 2024-09-12 15:10:48 EDT ✕ Delete

Session ID: 5854954d-bdba-45e0-a8a6-af267318cd4d

For debugging purposes, this card will be retained for 6 more days

Remote Desktop

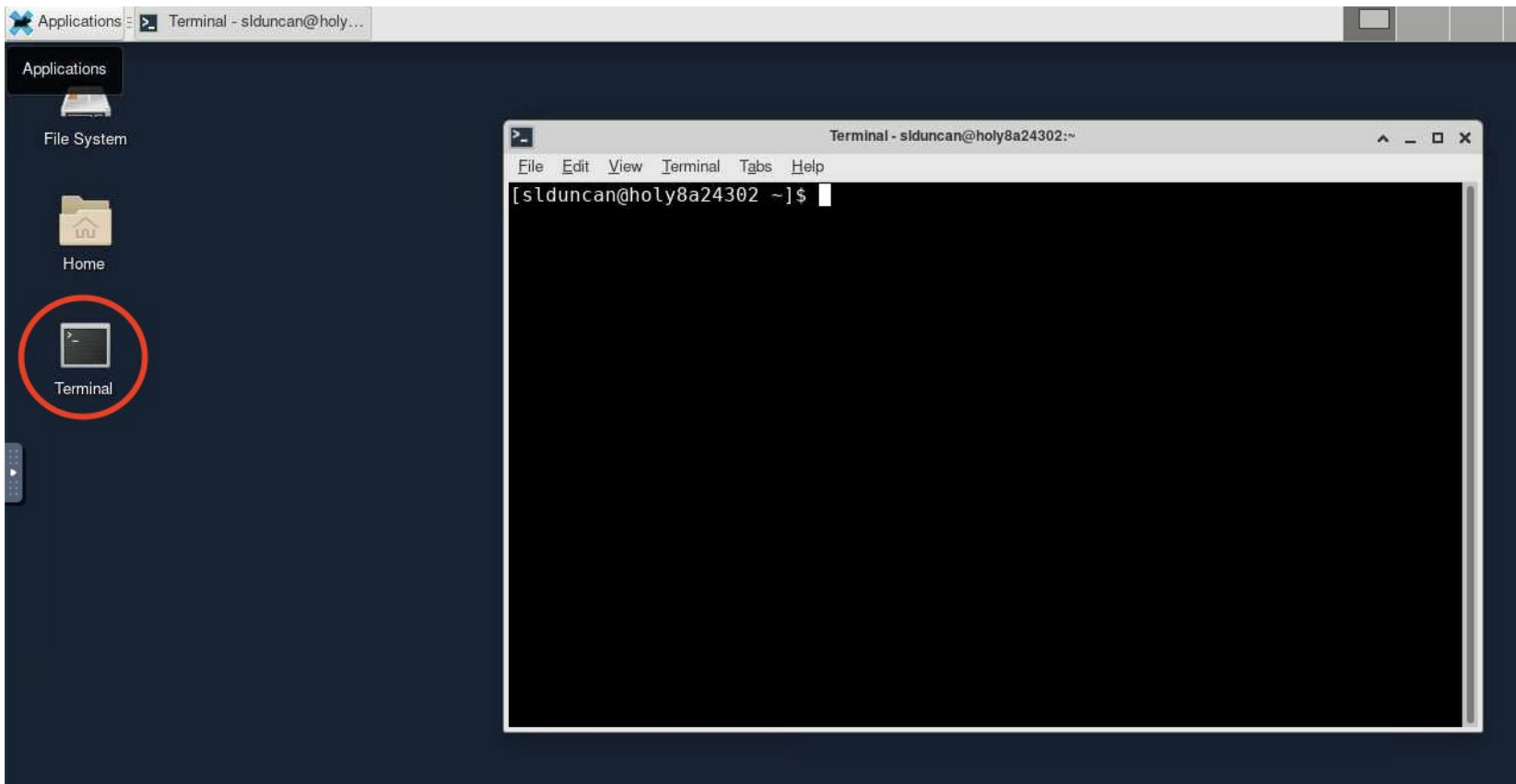
- Not as necessary as it used to be
- **For running long Jupyter Notebook sessions**
- Terminal
- Can also be used to open multiple applications in a single window
- Choose the defaults for resolution

Resolution

width	1024	px	height	768	px
-------	------	----	--------	-----	----

Starting a terminal

- Double click on the icon that looks like a computer screen
- From there you can type in any commands you want to



Running Jupyter Notebook in Remote Desktop

- Very important: Jupyter Notebook will not continue to run if you close the Jupyter notebook page! The cell that is running will lose the data and output files will not be written
- 1. Solution: run Remote Desktop app and launch Jupyter Notebook from within Remote Desktop
- 2. Documentation:
https://docs.rc.fas.harvard.edu/kb/ood-remote-desktop-how-to-open-software/#Jupyter_Notebook

```
#Jupyter Notebook
[jharvard@holy7c02111 ~]$ module load python
[jharvard@holy7c02111 ~]$ mamba activate OOD_env
[jharvard@holy7c02111 ~]$ jupyter notebook
```

Creating your own kernel for Jupyter Notebook

- You can create your own kernels, but some command line needed
 - Note: a kernel is the same as a conda, python, or mamba environment
1. Open a terminal in the "Remote Desktop" app
⇒ Don't create mamba environments inside Jupyter Notebook/Lab!
 2. Create mamba environment and install package `ipykernel` and `nb_conda_kernels`

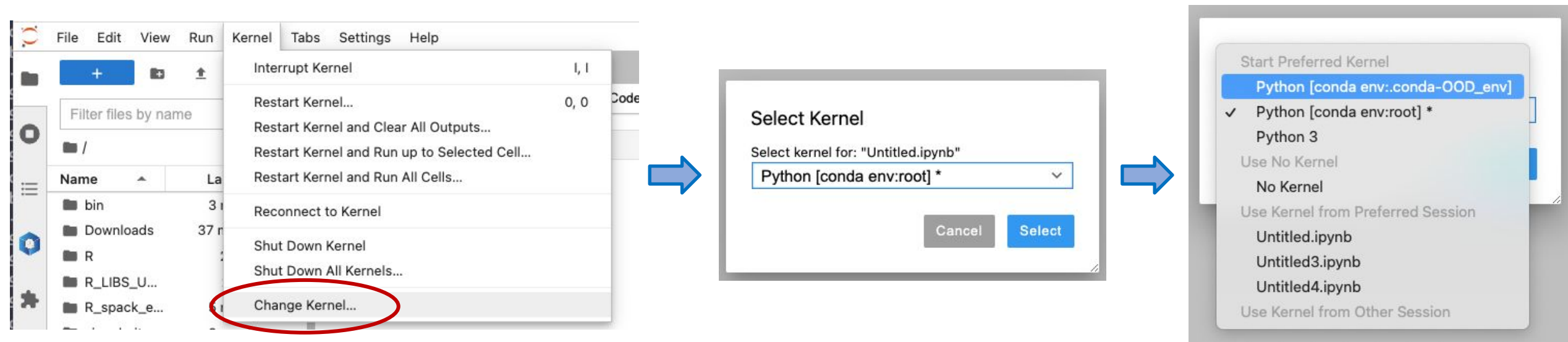
3.

```
[jharvard@holy7c02111 ~]$ module load python
[jharvard@holy7c02111 ~]$ mamba create -n OOD_env python=3.11 pip wheel numpy
[jharvard@holy7c02111 ~]$ mamba activate OOD_env
(OOD_env) [jharvard@holy7c02111 ~]$ mamba install ipykernel nb_conda_kernels
```

https://docs.rc.fas.harvard.edu/kb/python-package-installation/#Use_mamba_environment_in_Jupyter_Notebooks

Using your new environment in Jupyter Notebook

3. Launch **new** Jupyter Notebook session (existing session will not work!)
4. Select newly created mamba environment as the kernel
 - a. Open a notebook
 - b. On the top menu, click Kernel -> Select Kernel -> Click on OOD_env



Opening Multiple Applications in Remote Desktop

Documentation: <https://docs.rc.fas.harvard.edu/kb/ood-remote-desktop-how-to-open-software/>

- It can be used to launch most GUI applications
 1. Load module
 2. Set environmental variables (if needed)
 3. Launch software
- You can have multiple applications open

```
# Matlab
[jharvard@holly7c02111 ~]$ module load matlab
[jharvard@holly7c02111 ~]$ matlab -desktop -softwareopengl &

#PyCharm
[jharvard@holly7c02111 ~]$ module load python
[jharvard@holly7c02111 ~]$ module load pycharm-community
[jharvard@holly7c02111 ~]$ pycharm.sh
```

Applications: MATLAB R2022b - acad... Welcome to PyCharm Terminal - slduncan@holy...

HOME PLOTS APPS

New Script New Live Script New Open Find Files Compare Import Data

FILE

Current Folder

Name Downloads Temp slduncan.bashrc

Command Window

New to MATLAB

Details

Workspace

Name Value

PyCharm 2023.1

Projects

Customize

Plugins

Learn

Welcome

Create a new project

Open existing project

New Project

Take a tour

New to PyCharm

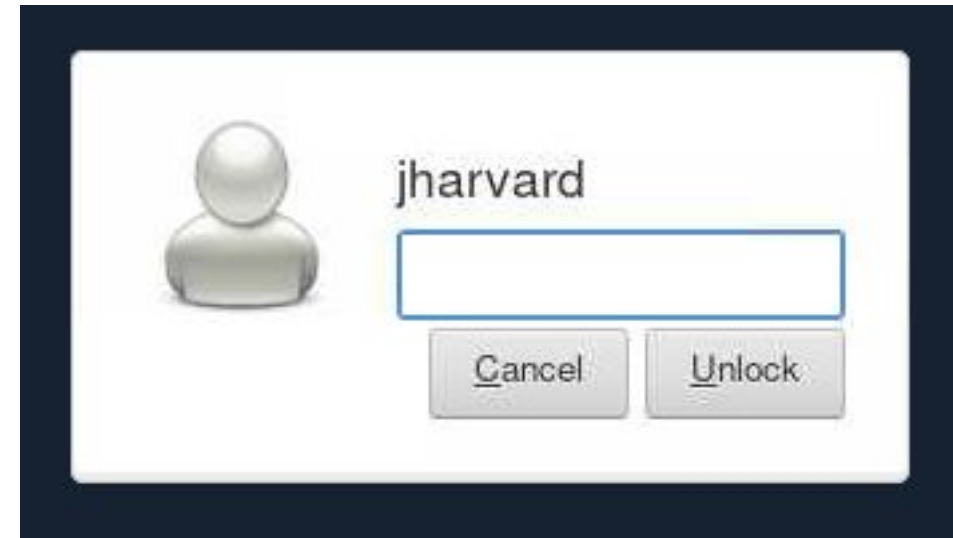
Start Tour

Terminal - slduncan@holy8a24301:~

```
File Edit View Terminal Tabs Help
[slduncan@holy8a24301 ~]$ module load matlab
[slduncan@holy8a24301 ~]$ matlab -desktop -softwareopengl &
[1] 2448085
[slduncan@holy8a24301 ~]$ MATLAB is selecting SOFTWARE OPEN
module load python
[slduncan@holy8a24301 ~]$ module load pycharm-community
[slduncan@holy8a24301 ~]$ pycharm.sh
CompileCommand: exclude com/intellij/openapi/vfs/impl/FileP
nd bool exclude = true
Sep 12, 2024 3:13:03 PM java.util.prefs.FileSystemPreferenc
INFO: Created user preferences directory.
2024-09-12 15:13:11,585 [ 7648] WARN - #c.i.o.v.n.p.l.V
on differs from the implementation version: log null vs imp
2024-09-12 15:13:11,959 [ 8022] WARN - #c.i.o.a.i.Actio
"Visual Studio" not found PluginDescriptor(name=IDEA CORE,
criptorPath=plugin.xml, path=/n/sw/helmod-rocky8/apps/Core/
3.1-fasrc01/lib, version=231.8109.197, package=com.intellij
true)
2024-09-12 15:13:11,962 [ 8025] WARN - #c.i.o.a.i.Actio
"Eclipse" not found PluginDescriptor(name=IDEA CORE, id=co
rPath=plugin.xml, path=/n/sw/helmod-rocky8/apps/Core/pychar
src01/lib, version=231.8109.197, package=com.intellij.feedb
2024-09-12 15:13:11,963 [ 8026] WARN - #c.i.o.a.i.Actio
"NetBeans 6.5" not found PluginDescriptor(name=IDEA CORE,
```

Inactivity lock out

- It may lock out due to inactivity
- Use your FASRC password to unlock



Filling out a form to launch an app

- Request the resources that you need
(If you don't know for a first trial run, use similar resources as your laptop/desktop)

- Partition (Name): depends on [Cannon](#) vs [FASSE](#)
- Memory (RAM): amount of memory in GB
- Number of cores: recommended at least 2
- Number of GPUs: if ≥ 1 , make sure you **select** a gpu partition
- Allocated time: time you would like your session to run.

the minimum and/or maximum
values of each field depends on
the selected partition

- Email for status notification: to know when job starts, ends
- Reservation: if you have a special reservation (this requires approval from FASRC)
- Account: use this if you have more than one PI_lab affiliation



Interactive Apps

Desktop Apps

Matlab

SAS

Stata

Desktops

KNIME

Containerized
FAS-RC Remote
Desktop

Remote Desktop

Web Apps

HeavyAI

Jupyter notebook /
Jupyterlab

RStudio Server

RStudio Server

This app will launch an [RStudio Server](#) instance on a FAS RC compute node. This app provides a common software environment for FAS Informatics workshops and general-purpose single-node RStudio Server jobs.

See [RStudio Server OOD app](#) for more information.

- User-installed R libraries will be installed in `~/R/ifxrstudio/<IMAGE_TAG>`.

Partition

`sbatch -p, --partition=<partition_names>`

[Slurm partition](#) name (e.g., **shared**), or comma-separated list of partition names (e.g., **shared,test**)

Memory Allocation in GB

`sbatch --mem=<size>G`

Number of CPUs to allocate



Slurm Partitions

Partition is the term that Slurm uses for queues. Partitions can be thought of as a set of resources and parameters around their use (See also: [Convenient Slurm Commands](#)). You can find out what partitions you have access to using the `spart` command. FASSE has [different partitions than Cannon](#).

Note: In the case where no resources have been requested explicitly, default resources that get allocated to a job on Cannon or FASSE are, `serial_requeue` for the partition, 10 minutes for the time, 1 core, and 100 MB for the memory.

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Slurm Partitions

[Partition Details](#)

[Submitting Batch Jobs Using the sbatch Command](#)

[Notifications by Email:](#)

[It is important to accurately request resources, especially memory](#)

[Monitoring Job Progress with squeue and sacct](#)

[See Broader Queue with showq](#)

[Canceling Jobs with](#)

Partition	Nodes	Cores per Node	CPU Core Types	Mem per Node (GB)	Time Limit	Max Jobs	Max Cores	GPU Capable?	/scratch size (GB)
sapphire	186	112	Intel "Sapphire Rapids"	990	3 days	none	none	No	396
shared	310	48	Intel "Cascade Lake"	184	3 days	none	none	No	68
bigmem	4	112	Intel "Sapphire Rapids"	1988	3 days	none	none	No	396
bigmem_intermediate	3	64	Intel "Ice Lake"	2000	14 days	none	none	No	396
gpu	36	64	Intel "Ice Lake"	990	3 days	none	none	Yes (4 A100/node)	396
intermediate	12	112	Intel "Sapphire Rapids"	990	14 days	none	none	No	396
unrestricted	8	48	Intel "Cascade Lake"	184	none	none	none	No	68
test	18	112	Intel "Sapphire Rapids"	990	12 Hours	5	112	No	396
gpu_test	14	64	Intel	487	12	5	64	Yes (8 A100 MIG)	172



Allocated Time (expressed in MM , or HH:MM:SS , or DD-HH:MM)

02-08:00

sbatch -t, --time=<time>

R version

R 4.3.3 (Bioconductor 3.18, RStudio 2023.09.1) ▾

This defines the version of R/Bioconductor you want to use.

☐ I would like to receive an email when the session starts

(optional) email address for job status notification

(optional) Slurm Reservation

sbatch --reservation=<name>

Leave blank if you do not have a Slurm reservation

☒ Start rstudio with a new configuration

Checking this box will start rstudio with a fresh configuration.

This is useful if you need to run different instances at the same time with different configurations.

Leave the box unchecked if you want rstudio to start with the default configuration you have in your ~/.rstudio



(optional) Slurm Account

sbatch -A, --account=<account>

Leave blank if you do not have multiple Slurm accounts

Additional Slurm options

additional slurm options (**long format option only**)

Example : `--constraint=intel --exclusive`

Please make sure the options you select are compatible with other fields in the form.

Also, please make sure you use **long format option only**
(e.g. `--nodelist=holy7c24502` instead of `-w holy7c24502`)

Launch

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

powered by

OPEN OnDemand



You are on b-
cannonoodb-12


OnDemand
version: 3.1.7


Menu bar



- My Interactive Sessions
- Files
- Jobs
- Interactive apps

My Interactive Sessions


 FAS Research Computing
Harvard University
Faculty of Arts & Sciences


Clusters ▾ Files ▾ Jobs ▾ Interactive Apps ▾ 


Home / My Interactive Sessions

Interactive Apps


Desktop Apps


 Matlab

 SAS

 Stata

Desktops

 Containerized
FAS-RC Remote
Desktop

 Remote Desktop

Web Apps

How to Use

Remote Desktop (46759691) **1 node** | **2 cores** | Running

Host: `>_ holy8a24302.rc.fas.harvard.edu` ✕ Delete

Created at: 2024-09-13 10:32:39 EDT

Time Remaining: 3 hours and 3 minutes

Session ID: 380cba87-f2a5-41dd-a6c3-adc70efbad72

noVNC Connection

VNC Desktop Client



Compression  0 (low) to 9 (high)

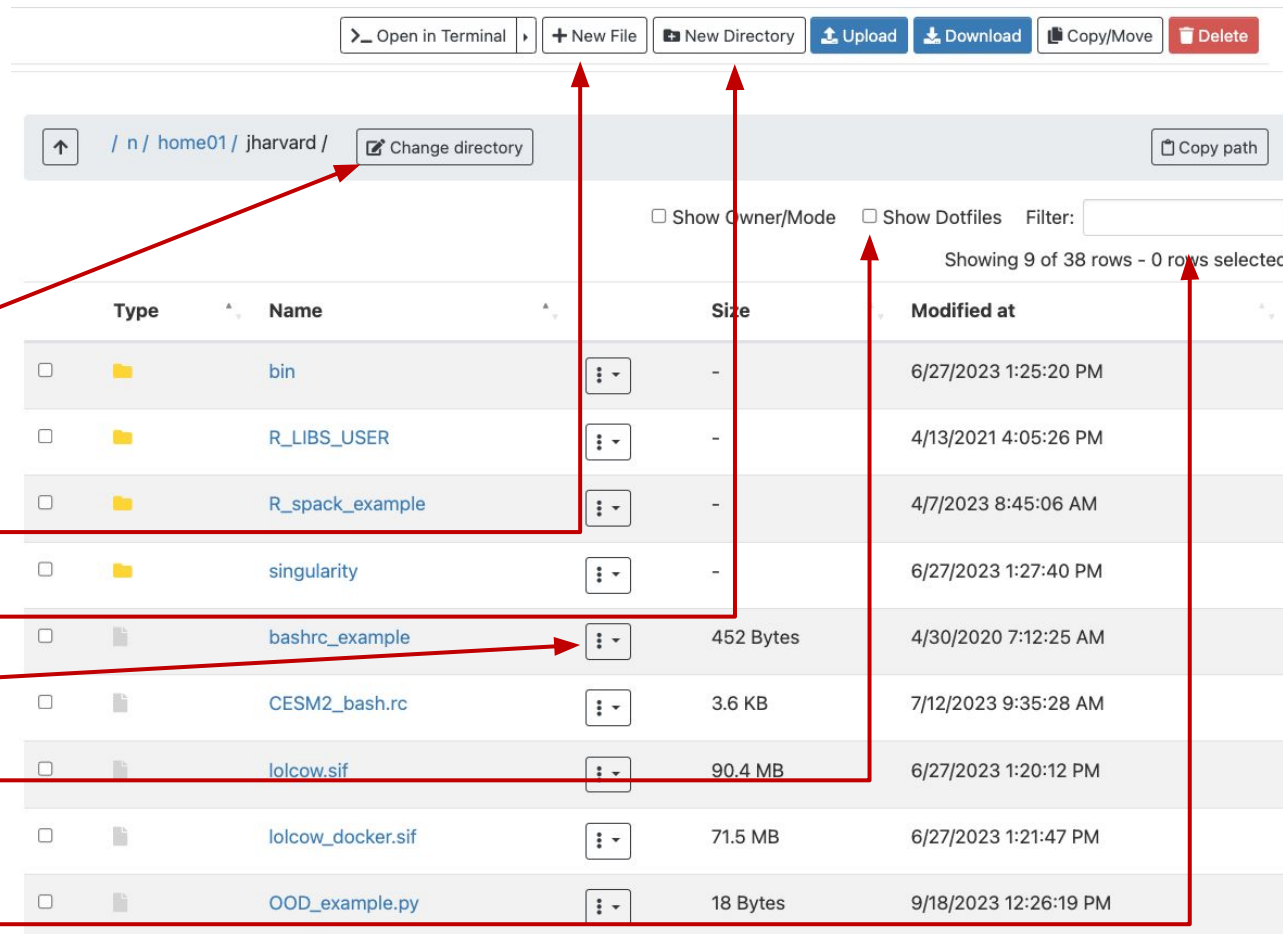
Image Quality  0 (low) to 9 (high)

Launch Remote Desktop

View Only (Share-able Link)

Files tab

- Default options: home directory and holyscratch
- Click on “Change directory” to go to a lab share at /n/holylabs/LABS
- Create new file
- Create new directory (i.e., folder)
- Click on three dots for options
- Check “Show Dotfiles” to see hidden files
- Filter to find files or directories in current directory



The screenshot shows the FAS Research Computing Files tab interface. At the top, there is a navigation bar with buttons: "Open in Terminal", "New File", "New Directory", "Upload", "Download", "Copy/Move", and "Delete". Below this is a breadcrumb path: "/ n / home01 / jharvard /" with a "Change directory" button and a "Copy path" button. A table lists files and directories with columns: Type, Name, Size, and Modified at. The table shows several folders (bin, R_LIBS_USER, R_spack_example, singularity) and files (bashrc_example, CESM2_bash.rc, lolcow.sif, lolcow_docker.sif, OOD_example.py). Red arrows point from the list items to the "Change directory" button, "New File" button, "New Directory" button, the three-dot menu for "bashrc_example", the "Show Dotfiles" checkbox, and the "Filter" input field.


Type	Name	Size	Modified at
Folder	bin	-	6/27/2023 1:25:20 PM
Folder	R_LIBS_USER	-	4/13/2021 4:05:26 PM
Folder	R_spack_example	-	4/7/2023 8:45:06 AM
Folder	singularity	-	6/27/2023 1:27:40 PM
File	bashrc_example	452 Bytes	4/30/2020 7:12:25 AM
File	CESM2_bash.rc	3.6 KB	7/12/2023 9:35:28 AM
File	lolcow.sif	90.4 MB	6/27/2023 1:20:12 PM
File	lolcow_docker.sif	71.5 MB	6/27/2023 1:21:47 PM
File	OOD_example.py	18 Bytes	9/18/2023 12:26:19 PM

Active Jobs and their details in the Jobs tab

Active Jobs

Show entries

Filter:

ID	Name	User	Account	Time Used	Queue	Status	Cluster	Actions
>	2469887	.fasrcood/sys/dashboard/sys/RemoteDesktop	jharvard	jharvard_lab	01:35:49	serial_requeue	Completed	Cannon Cluster
▼	2474168	.fasrcood/sys/dashboard/sys/Jupyter	jharvard	jharvard_lab	00:09:37	test	Running	Cannon Cluster 

Running .fasrcood/sys/dashboard/sys/Jupyter 2474168

Cluster	Cannon Cluster
Job Id	2474168
Job Name	.fasrcood/sys/dashboard/sys/Jupyter
User	jharvard
Account	jharvard_lab
Partition	test
State	RUNNING
Reason	None
Total Nodes	1
Node List	holy7c02412
Total CPUs	2
Time Limit	2:00:00
Time Used	9:39
Memory	8192M

A failed job

Matlab (2474322)

Undetermined

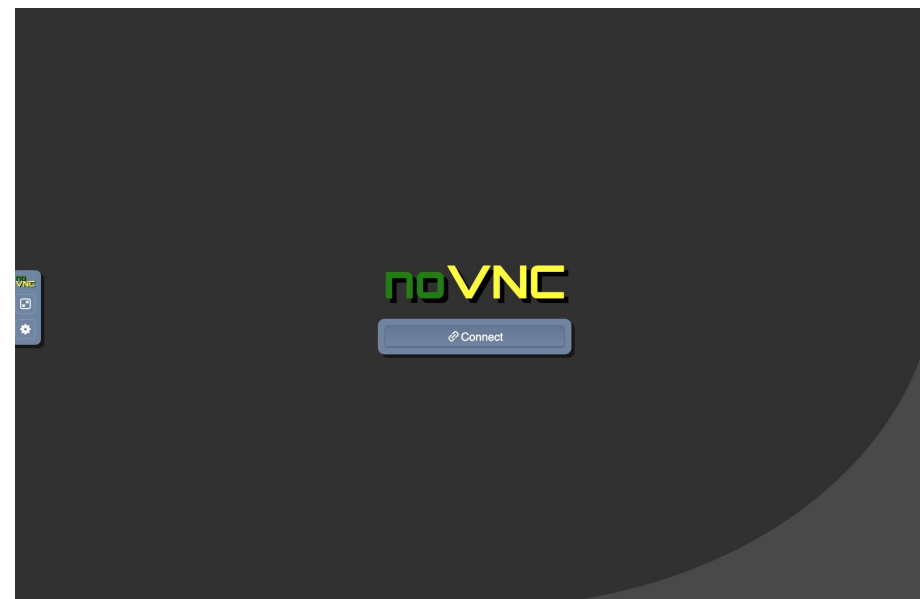
Created at: 2023-09-18 15:28:06 EDT

Time Requested: 1 hour

Session ID: 0847d7b8-1d3f-4a61-877d-582272b74ec0

Your session has entered a bad state. Feel free to contact support for further information.

Delete




Active Jobs

Show 50 entries

Filter:

ID	Name	User	Account	Time Used	Queue	Status	Cluster	Actions
> 2469887	.fasrcood/sys/dashboard/sys/RemoteDesktop	jharvard	jharvard_lab	01:35:49	serial_requeue	Completed	Cannon Cluster	
> 2474322	.fasrcood/sys/dashboard/sys/Matlab	jharvard	jharvard_lab	00:02:27	test	Undetermined	Cannon Cluster	
> 2474168	.fasrcood/sys/dashboard/sys/Jupyter	jharvard	jharvard_lab	00:15:45	test	Running	Cannon Cluster	

Diagnosing a failed job

▼	2474322	.fasrcood/sys/dashboard/sys/Matlab	jharvard	jharvard_lab	00:02:27	test	Undetermined	Cannon Cluster	
Undetermined .fasrcood/sys/dashboard/sys/Matlab 2474322									
Cluster		Cannon Cluster							
Job Id		2474322							
Job Name		.fasrcood/sys/dashboard/sys/Matlab							
User		jharvard							
Account		jharvard_lab							
Partition		test							
State		OUT_OF_MEMORY							
Reason		OutOfMemory							
Total Nodes		1							
Total CPUs		2							
Time Limit		1:00:00							
Time Used		2:27							
Memory		4096M							

Detailed job information from the command line

If job no longer appears on “Active Jobs”, check job status from command line with slurm job ID

slurm job ID

RStudio Server (2464856)
Completed

Created at: 2023-09-18 12:42:03 EDT
Delete

Session ID: 743455f6-39e6-40db-85ab-4fcc9b903117

For debugging purposes, this card will be retained for 6 more days

```
[jharvard@boslogin01 ~]$ sacct -j 2464856
```

JobID	JobName	Partition	Account	AllocCPUS	State	ExitCode
2464856	.fasrcood+	test	jharvard_+	2	TIMEOUT	0:0
2464856.bat+	batch		jharvard_+	2	CANCELLED	0:15
2464856.ext+	extern		jharvard_+	2	COMPLETED	0:0

```
[jharvard@holly7c02111 ~]$ sacct -j 2471535
```

JobID	JobName	Partition	Account	AllocCPUS	State	ExitCode
2471535	.fasrcood+	test	jharvard_+	2	OUT_OF_ME+	0:125
2471535.bat+	batch		jharvard_+	2	OUT_OF_ME+	0:125
2471535.ext+	extern		jharvard_+	2	COMPLETED	0:0

Closing running OOD windows/tabs

- In most OOD apps, you can close the browser tab while the code is running, and the code will continue to run on the background
- Jupyter Notebook will not! The cell that is running will lose the data and output files will not be written
 - Solution: run Remote Desktop app and launch Jupyter Notebook from within Remote Desktop
 - Documentation:
https://docs.rc.fas.harvard.edu/kb/ood-remote-desktop-how-to-open-software/#Jupyter_Notebook
- Because closing tabs does not end the application, it is important to cancel your job when you are done using it. Otherwise it will be charged to your lab's fairshare.

FASSE proxy

Documentation: <https://docs.rc.fas.harvard.edu/kb/proxy-settings/>

- You may need to set FASSE proxy on
 - RStudio server if you are unable to reach CRAN and download R packages
 - Stata if you are unable to load libraries via http
 - Firefox (web browsing)
 - Jupyter Notebook
 - Access Github
 - (Basically, anything outside of FASSE)

Quickstart Guides for using the FASRC Clusters

- Cannon Quickstart Guide
 - <https://docs.rc.fas.harvard.edu/kb/iqss-cannon-quickstart-guide>
- FASSE Quickstart Guide
 - <https://docs.rc.fas.harvard.edu/kb/iqss-fasse-quickstart-guide>
- Quickstart guides have more than just information on OOD
 - how to do text based access
 - office hours, training, tickets

FASRC documentation

- FASRC docs: <https://docs.rc.fas.harvard.edu/>
- GitHub User_codes: https://github.com/fasrc/User_Codes/
- Getting help
 - Office hours: <https://www.rc.fas.harvard.edu/training/office-hours/>
 - Ticket
 - Email: rchelp@rc.fas.harvard.edu to open a ticket with us

Additional trainings

Training calendar: <https://www.rc.fas.harvard.edu/upcoming-training/>

Training materials: <https://docs.rc.fas.harvard.edu/kb/training-materials/>

Training session evaluation

Please, fill out our training session evaluation. Your feedback is essential for us to improve our trainings!!

<https://tinyurl.com/FASRCworkshop>



Thank you :)
FAS Research Computing