



Getting Started on the FASRC clusters with Open OnDemand

Learning objectives

- What is Open OnDemand (OOD)?
- How to access OOD?
- Understanding the form to launch apps
- RStudio Server
- Jupyter Notebook
 - Create conda environment (i.e., jupyter kernel)
- Remote Desktop
- FASSE proxy
- Files tab
- Jobs tab

What is Open OnDemand (OOD)?

- Open-source web portal to access clusters
- Web-based, no software needs be installed on your local laptop/desktop (except for a modern browser like Google Chrome, Mozilla Firefox)
- Easy to use and simple to learn
- Very similar to desktop applications
- The easiest way to run GUI applications remotely on a cluster
- Safari is not recommended for OOD



How to access OOD







- FASRC account
- Connect to the FASRC VPN
- On a browser, type:
 - Cannon: <https://rcood.rc.fas.harvard.edu>
 - FASSE: <https://fasseood.rc.fas.harvard.edu>

OOD dashboard on Cannon and FASSE

Cannon



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		



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



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
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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>


Filling 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 (partition name): depends on the cluster, check link below
 - 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
- 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

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

RStudio Server vs. RStudio Desktop

RStudio Server

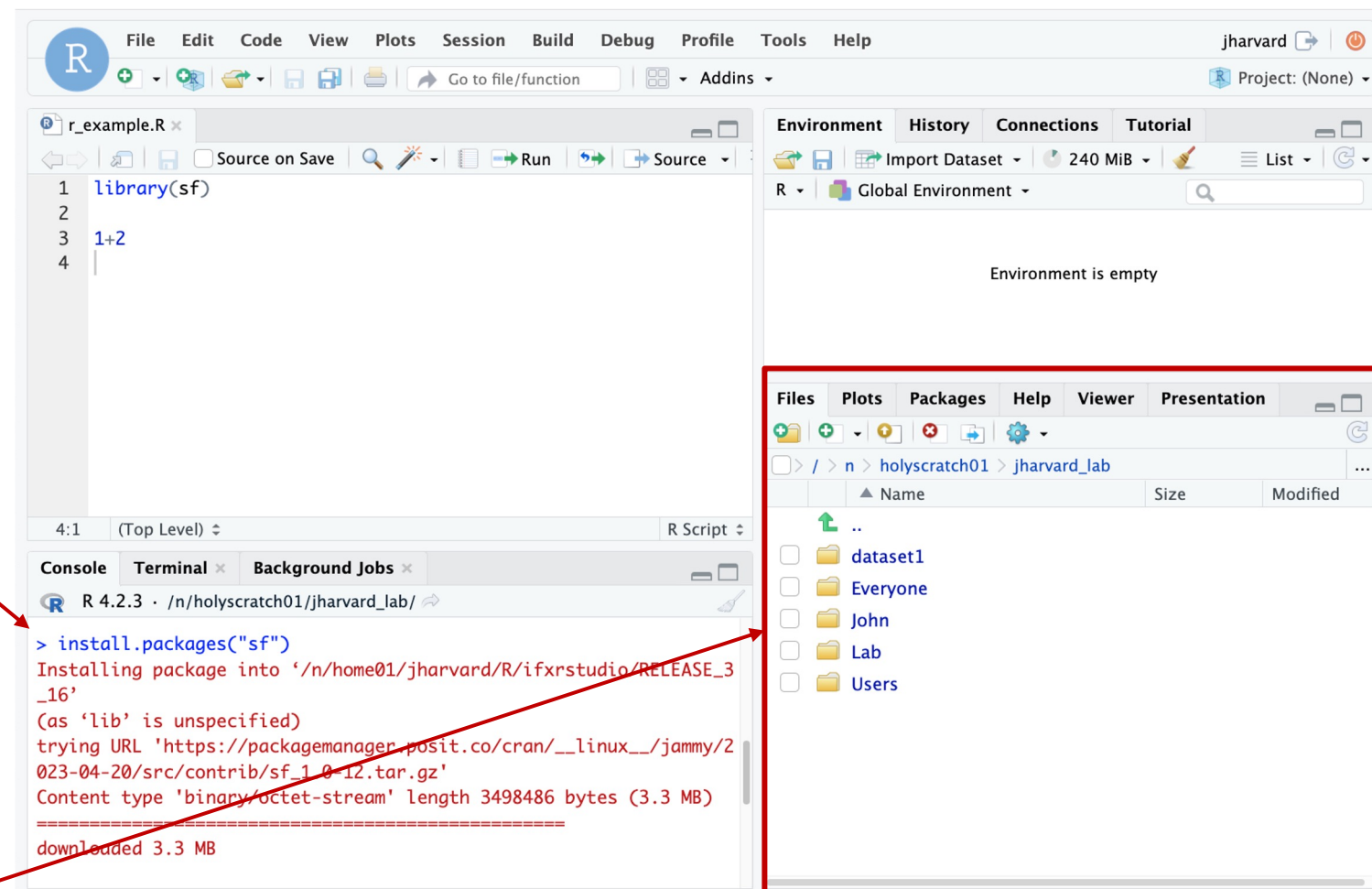
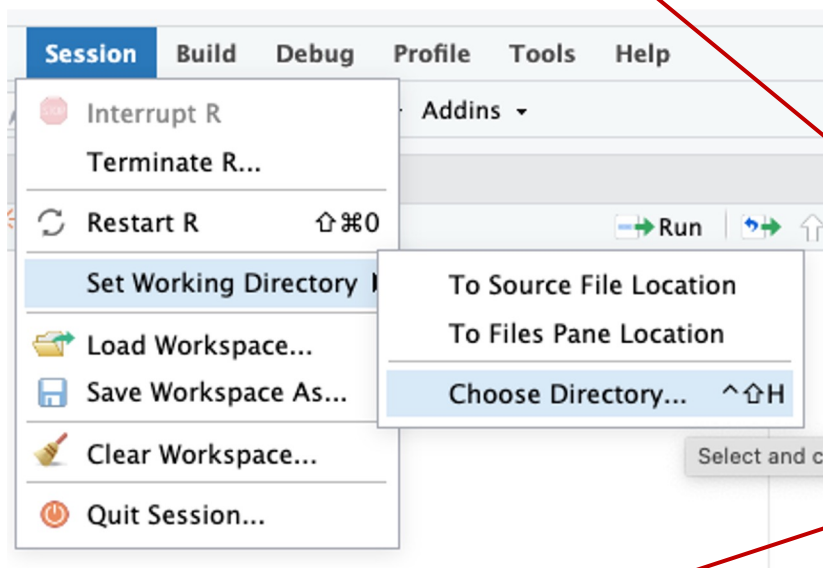
- Go-to RStudio application with easy-to-install packages (pre-compiled)
- Cannot set `R_LIBS_USER` (location where packages are saved)
- `R_LIBS_USER` is set to `~/R/ifxrstudio/\`
- Cannot use `module load`
- Cannot use slurm commands (e.g. `sbatch`)

RStudio Desktop

- Highly customized environment
- Can set `R_LIBS_USER`
- Can use `module load` → you can set specific compilers (e.g. `openmpi`, `gcc`)
- Can use slurm commands (e.g. `sbatch`)

RStudio Server

- Package install
- Change directory



- Open file

Jupyter Notebook (1)

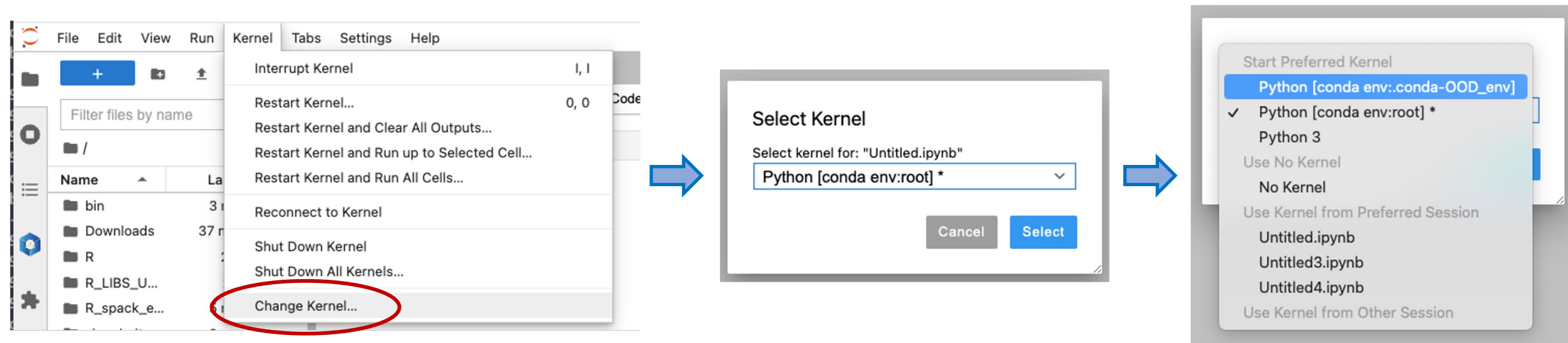
- You can create your own kernels, but some command line needed
 - Note: kernels is the same as conda, python, mamba environment
1. Launch "Remote Desktop" app
⇒ Don't create conda environments inside Jupyter Notebook/Lab!!
 2. Create conda environment and install package `ipykernel`

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

<https://docs.rc.fas.harvard.edu/kb/python/#Mamba>

Jupyter Notebook (2)

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



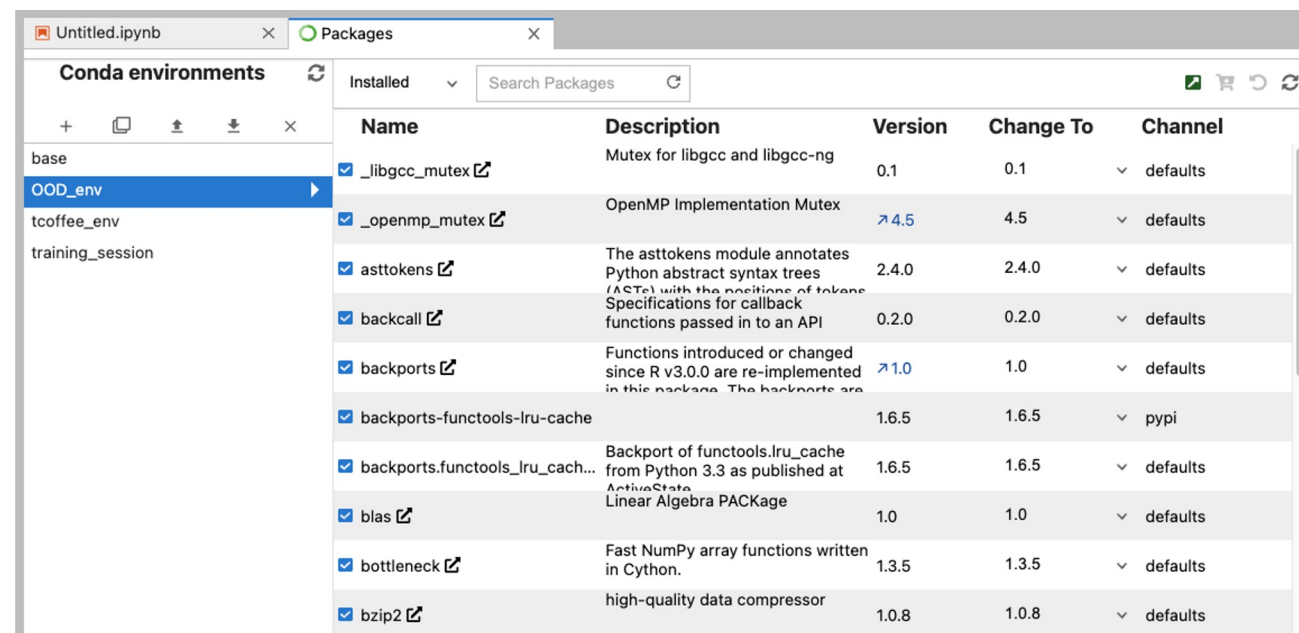
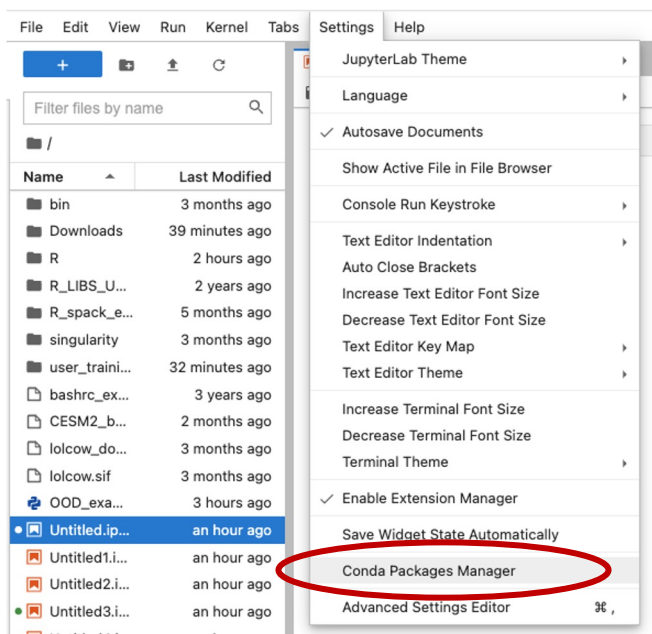
Jupyter Notebook (3)

5. Managing (install, uninstall, update) packages

a. We recommend using the command line

<https://docs.rc.fas.harvard.edu/kb/python/#Mamba>

b. You can also use the conda package manager: On the top menu, click Settings -> Conda Package Manager -> OOD_env



Remote Desktop

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

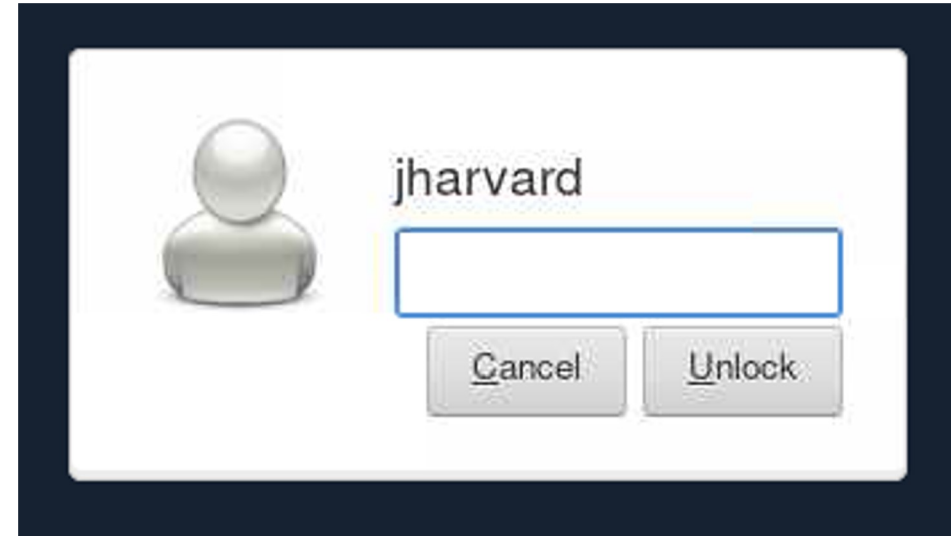
- It can be used to launch most GUI applications
- How?
 1. Load module
 2. Set environmental variables (if needed)
 3. Launch software
- You can have multiple applications open

```
# Matlab
[jharvard@holy7c02111 ~]$ module load matlab
[jharvard@holy7c02111 ~]$ matlab -desktop -softwareopengl &

#PyCharm
[jharvard@holy7c02111 ~]$ module load python
[jharvard@holy7c02111 ~]$ module load pycharm-community
[jharvard@holy7c02111 ~]$ pycharm.sh
```

Remote Desktop

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



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

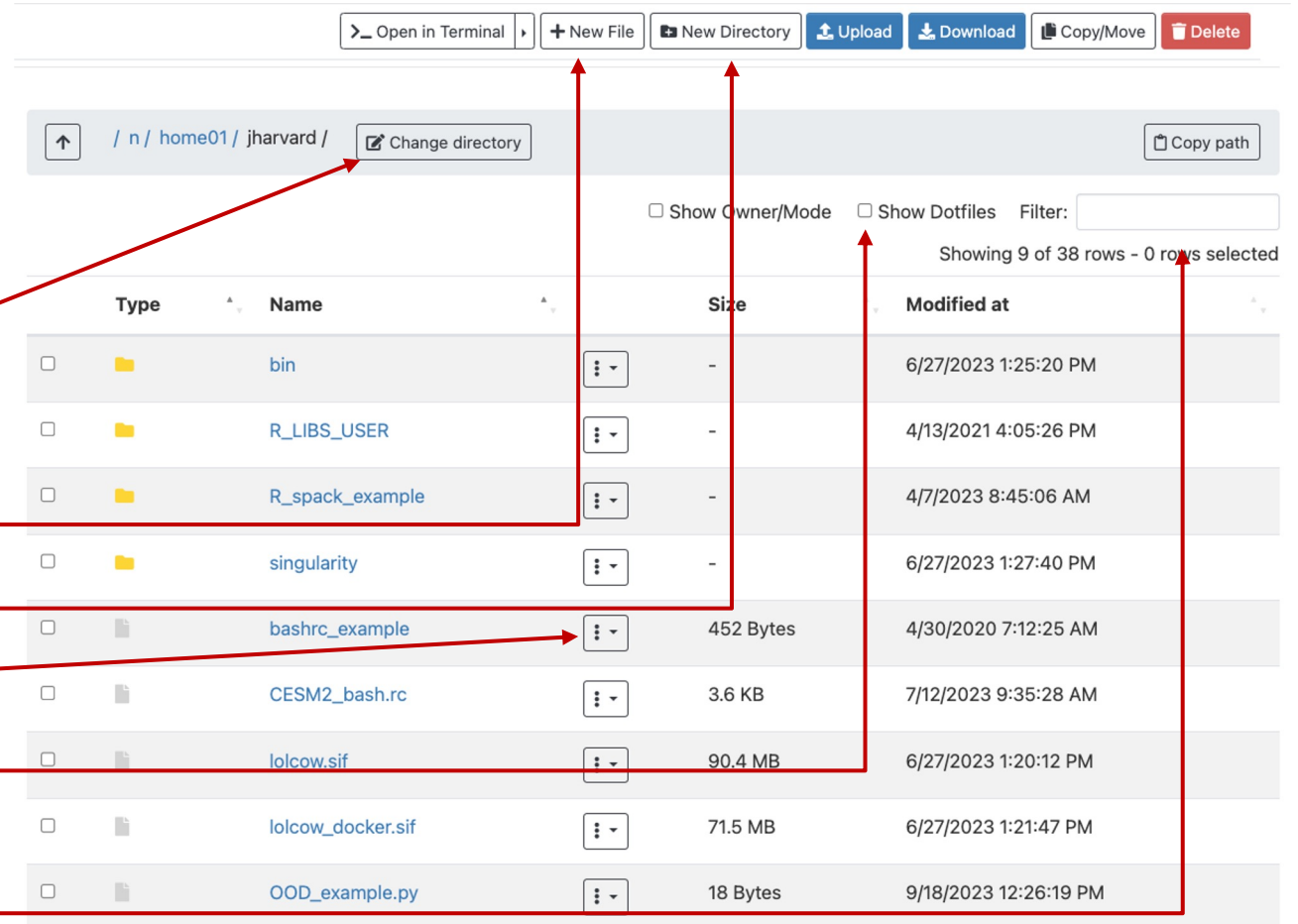
FASSE proxy

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)

Files tab

- Default options: home directory and holyscratch
- Click on “Change directory” to go to a lab share
- 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 are buttons for "Open in Terminal", "New File", "New Directory", "Upload", "Download", "Copy/Move", and "Delete". Below these is a breadcrumb navigation bar showing the current directory: "/ n / home01 / jharvard /". A "Change directory" button is next to the breadcrumb, and a "Copy path" button is on the right. Below the breadcrumb, there are checkboxes for "Show Owner/Mode" and "Show Dotfiles", and a "Filter:" input field. The main content area displays a table of files and directories. The table has columns for "Type", "Name", "Size", and "Modified at". The files listed are: bin, R_LIBS_USER, R_spack_example, singularity, bashrc_example, CESM2_bash.rc, lolcow.sif, lolcow_docker.sif, and OOD_example.py. Red arrows point from the list items in the text to specific features in the interface: "Change directory" button, "New File" button, "New Directory" button, "three dots" menu icon, "Show Dotfiles" checkbox, and "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

Jobs tab (1)

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

Jobs tab (2)

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	

Jobs tab (3)

▼	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							

Job tab (4)

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

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
 - Portal: http://portal.rc.fas.harvard.edu/rcrt/submit_ticket (requires login)
 - Email: rchelp@rc.fas.harvard.edu

Upcoming trainings

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

Getting started on the FASRC clusters with CLI (command line interface)

- Users familiar with command-line interface
- New to Cannon and FASSE, but familiar with HPC systems
- Working FASRC account with cluster access
- Content
 - Submit interactive job
 - Submit batch job
 - Monitor jobs
 - Cluster software (modules, spack)



Thank you :)
FAS Research Computing