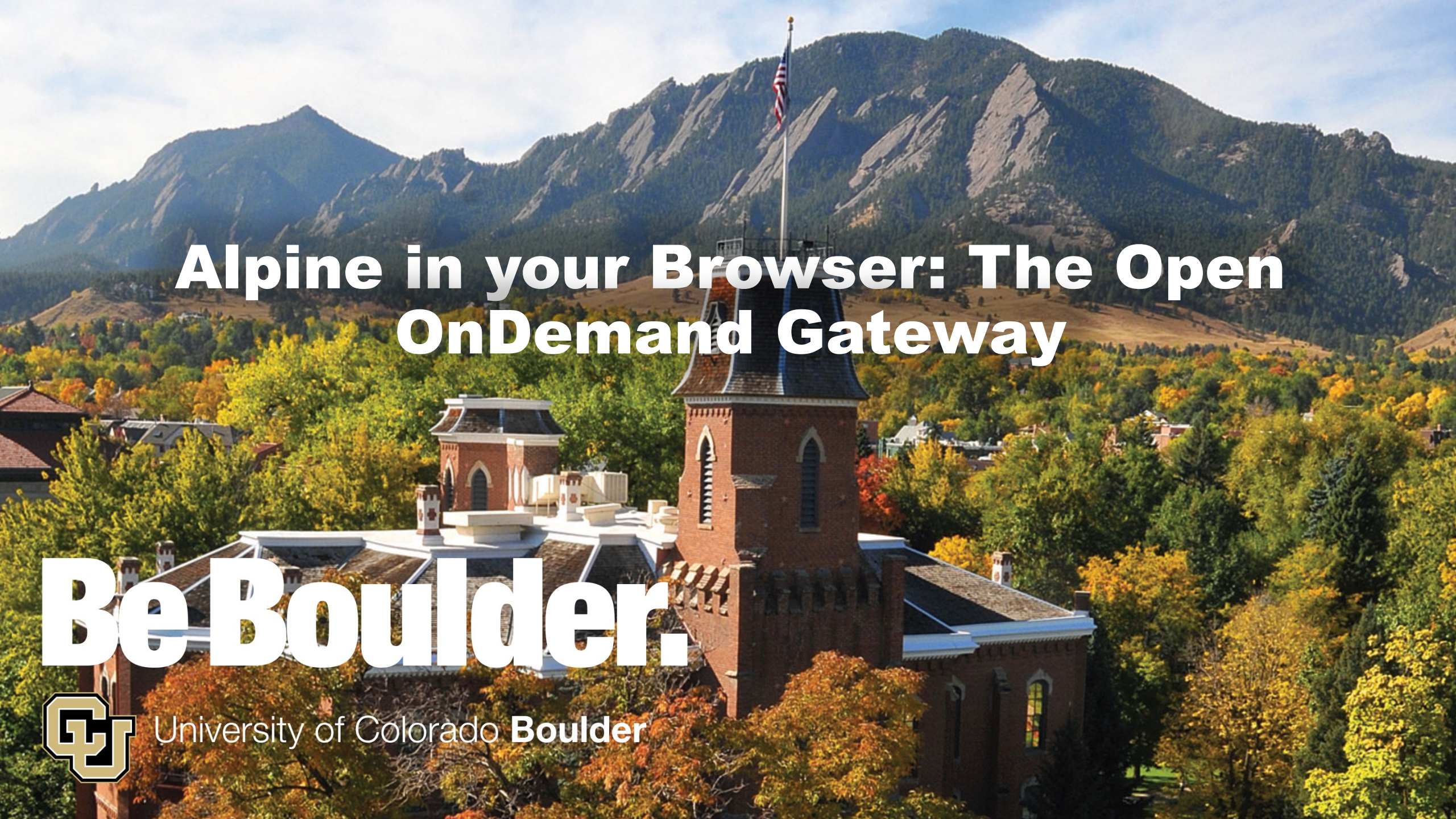

Alpine in your Browser: The Open OnDemand Gateway
Be Boulder.
University of Colorado Boulder

Alpine in your Browser! The Open OnDemand Gateway

Instructors: Trevor Hall, Brandon Reyes

- Website: www.rc.colorado.edu
- Helpdesk: rc-help@colorado.edu
- Slides: https://github.com/ResearchComputing/OpenOnDemand

- Survey: http://tinyurl.com/curc-survey18

RMACC Cyber Infrastructure

- https://ask.cyberinfrastructure.org/c/rmacc/65
- This forum provides an opportunity for RMACC members to converse amongst themselves and with the larger global research computing community.
- The “go to” general Q&A platform for the global research computing community - researchers, facilitators, research software engineers, CI engineers, sys admins and others.

Agenda

- About Open OnDemand
  - What is ACCESS-CI?
- How to log in to Open OnDemand
- Features of Open OnDemand
  - Using the Shell
  - File Transfer
  - Job Monitoring and Composer
- Interactive Applications
  - Demos!

Open OnDemand

- Open OnDemand is an NSF-funded open-source HPC portal based on the Ohio Supercomputing Center's original OnDemand portal
- Enables web access to HPC resources, including:
  - Easy file management
  - Command-line shell access
  - Job management and monitoring across different batch servers and resource managers
  - Graphical desktop environments and desktop applications

Open OnDemand (at CURC)

- Open OnDemand provides a browser-based interface to interact with Alpine and Blanca!
- All CURC users can access Open OnDemand
  - CU Users: https://ondemand.rc.colorado.edu/
  - CSU, AMC, RMACC users: https://ondemand-rmacc.rc.colorado.edu
- Notable Features:
  - SSH-free terminal access
  - Remote desktop
  - Jupyter Notebooks
  - RStudio
  - MATLAB

ACCESS-CI (RMACC Users Only)

- ACCESS-CI provides:
  - Allocations
  - Support
  - Operations
  - Metrics
- Supports CURC by managing RMACC users
- Get an ACCESS-CI Account: https://identity.access-ci.org/new-user.html

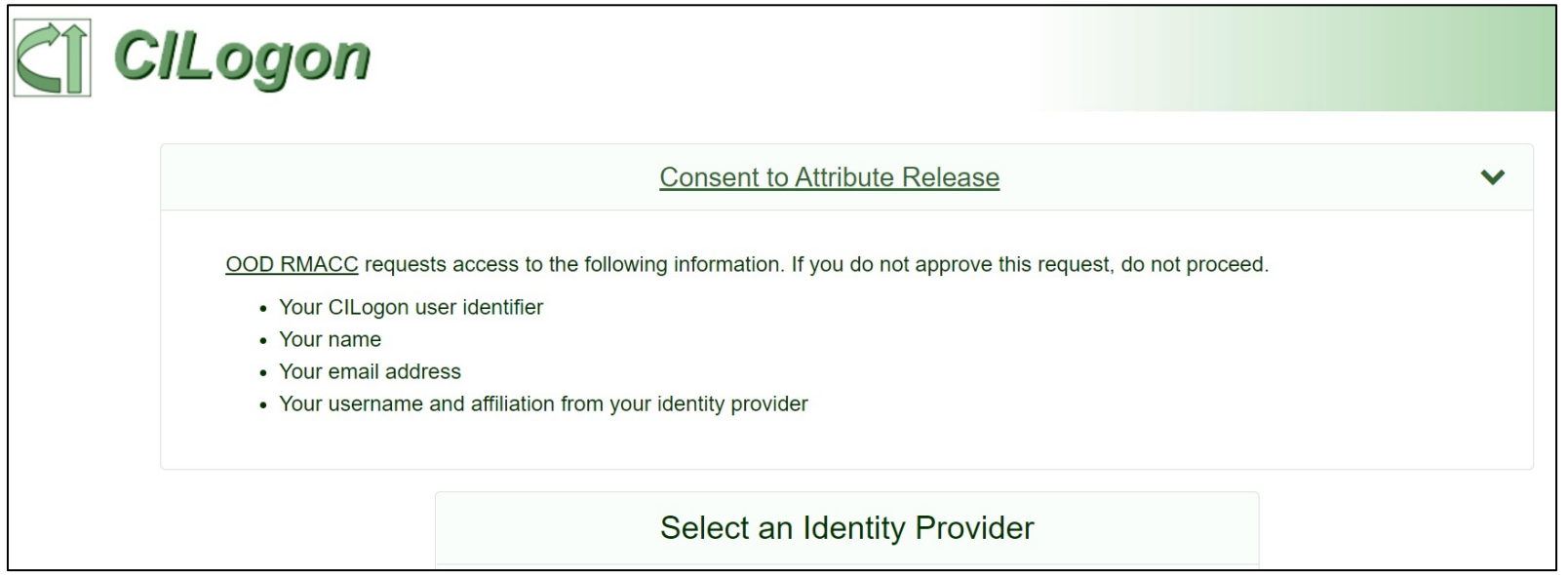
ACCESS-CI (RMACC Users Only)

- Once you have an ACCESS-CI Account, reach out to us with the following information:
  - Your ACCESS-CI username
  - Your institutional affiliation
  - Your role
  - Your department
  - Your first and last name
  - Your preferred email address
- We will provision you an account!

Logging in to Open OnDemand

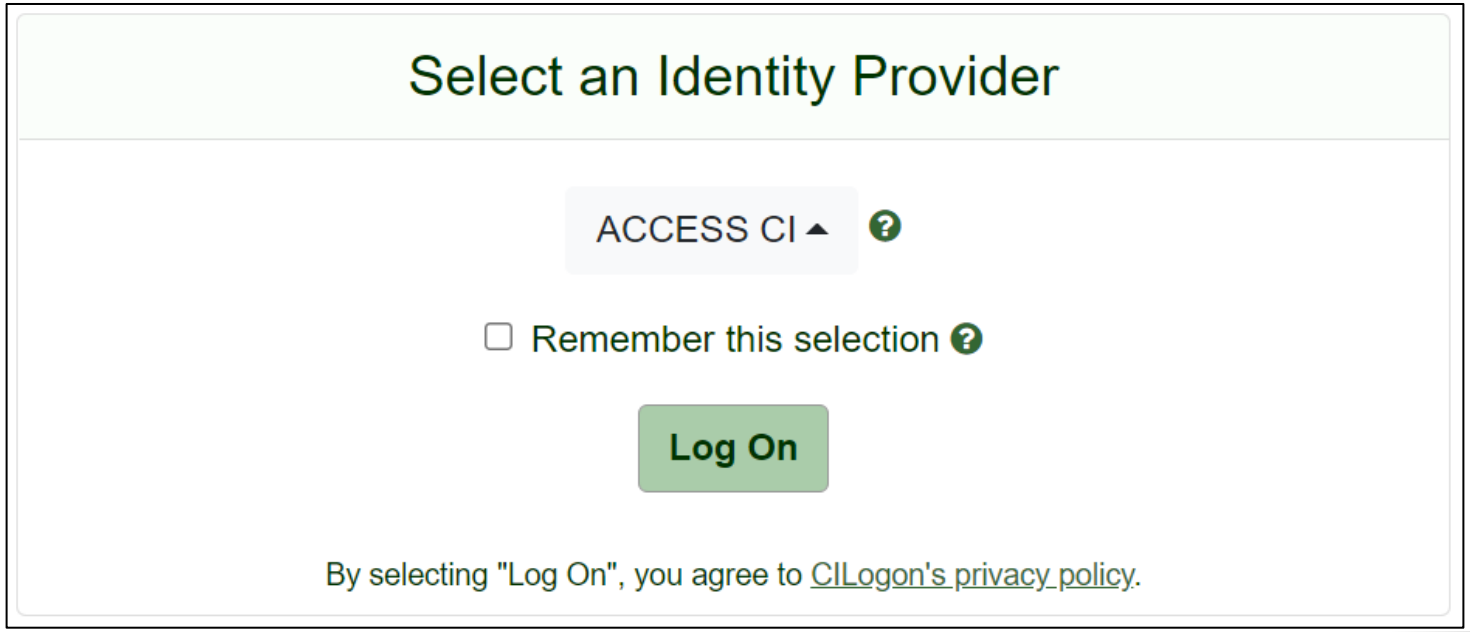
Logging In

- CU Boulder: https://ondemand.rc.colorado.edu/
- RMACC: https://ondemand-rmacc.rc.colorado.edu
  - You will be re-directed to the CILogon sign-in page:



Logging In (RMACC Users Only)

- Select your identity provider.
  - If you are a CSU user, select ‘Colorado State University’
  - If you are from **any** other institution, select ‘ACCESS CI (XSEDE)’

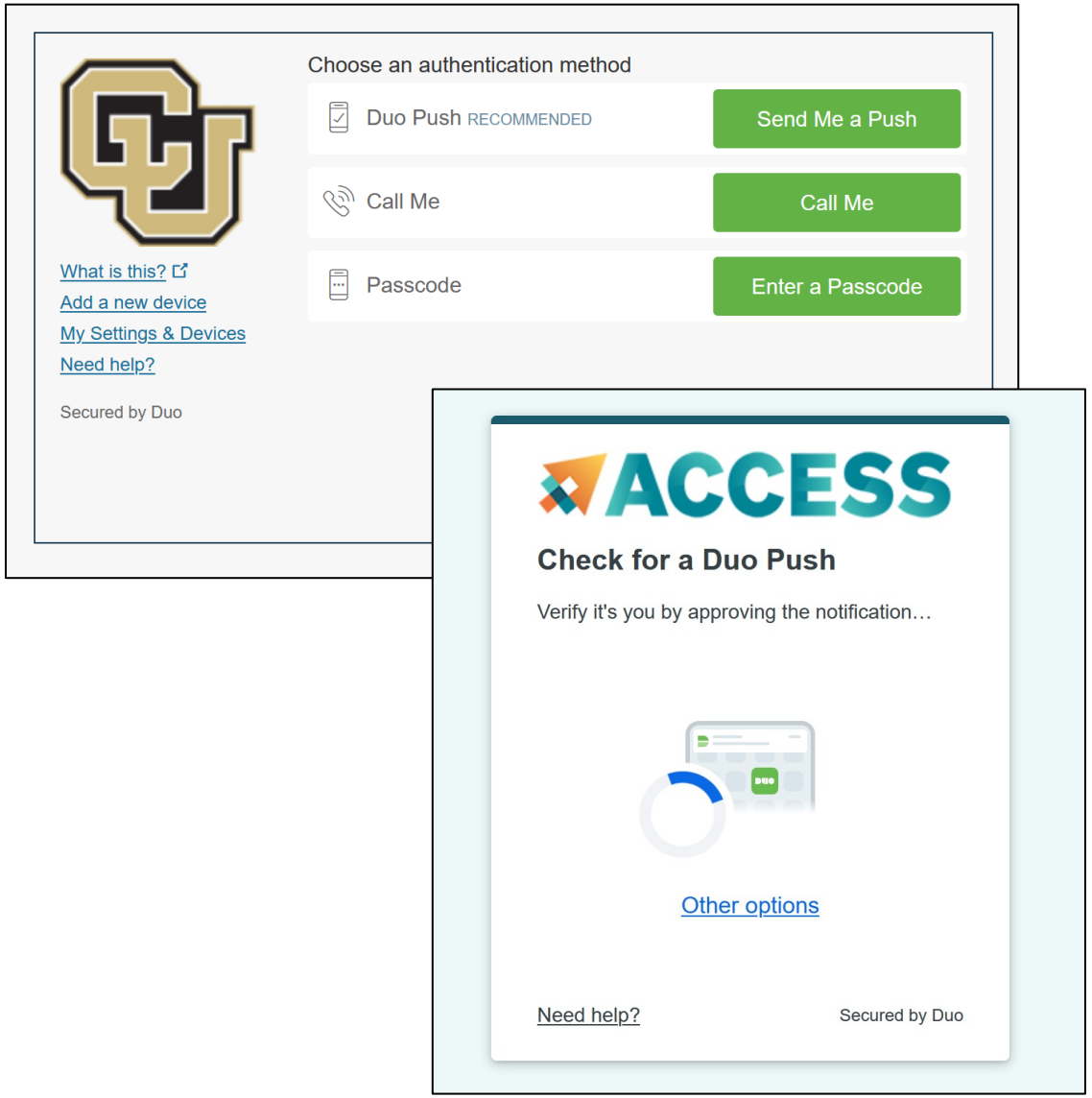


Logging In (cont.)

- CU Boulder: Authenticate with your Identikey and Password
- CSU: Authenticate with your EID and Password
- RMACC: You will be redirected to the ACCESS-CI login page
  - Use your ACCESS username and password

Logging In

- Duo 2-Factor Authentication is a requirement for the security of our systems.
- CU Boulder and CSU users must have this configured prior to logging in
- RMACC users will be prompted to set up Duo 2FA upon logging in for the first time



Demo: Logging in to Open OnDemand

https://ondemand.rc.colorado.edu/

https://ondemand-rmacc.rc.colorado.edu

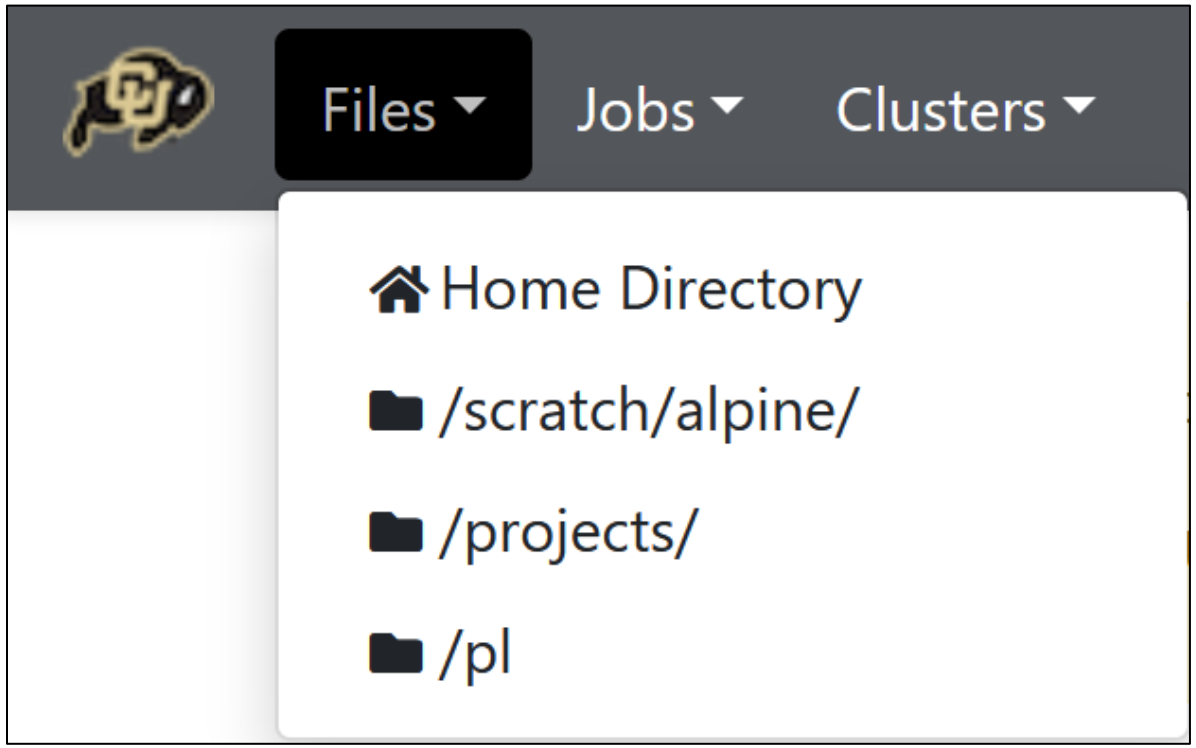
Features of Open OnDemand

OnDemand Home Page

- From the home page, you can access the following Open OnDemand Features:
  - Files
  - Jobs
  - Clusters
  - Interactive Apps
  - My Interactive Sessions

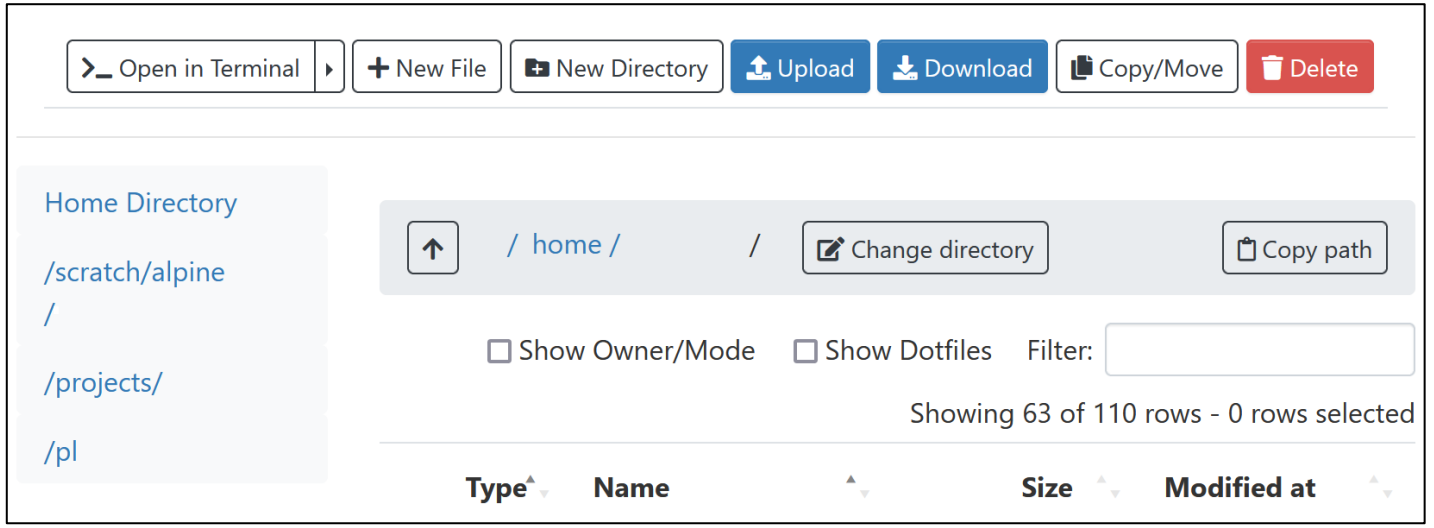
Files

- Open OnDemand allows you to navigate and manipulate your files
- You can access your entire CURC filesystem using this tool:
  - /home
  - /projects
  - /scratch/alpine
  - /pl (if applicable)



Files Management

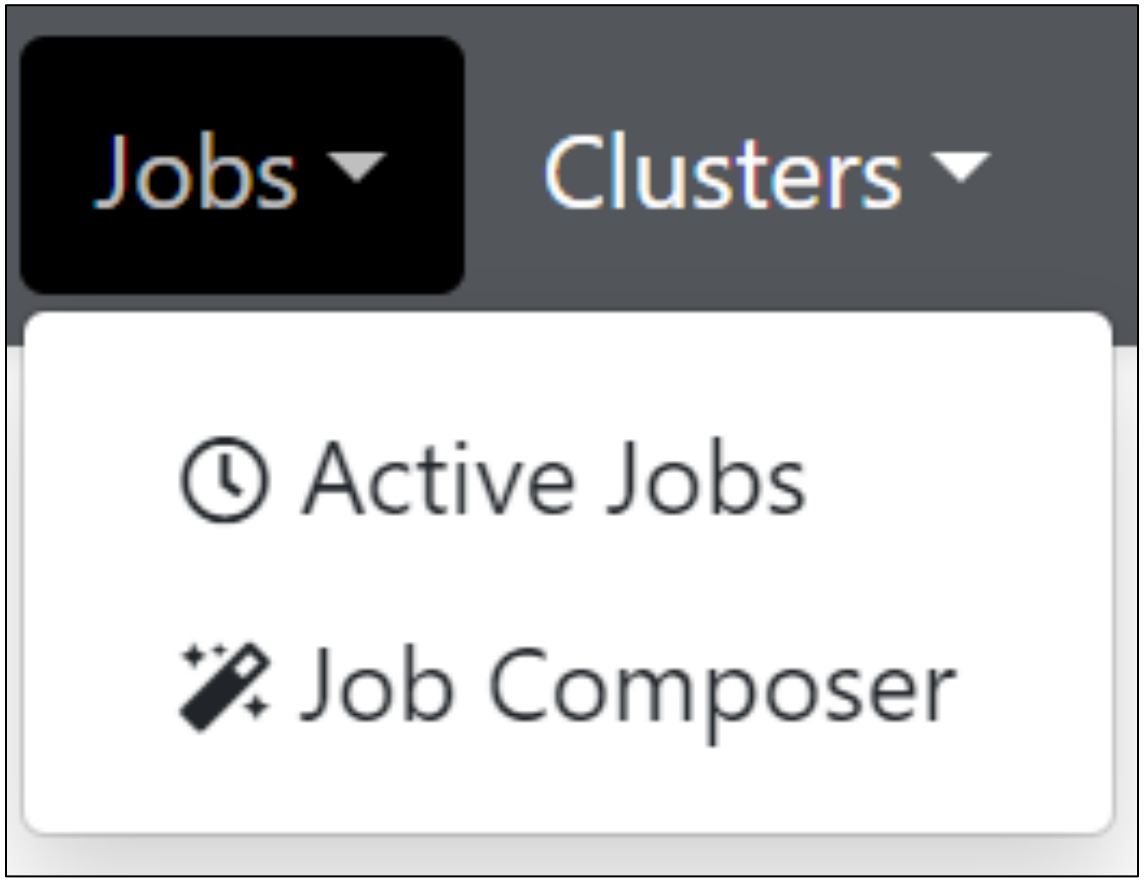
- On the files page you can:
  - Upload data
  - Download files
  - Create new files
  - Edit files
  - Copy/move data
  - Delete files
  - Create directories



Demo: File Transfer

Jobs

- Open OnDemand allows you to monitor jobs running on the system
  - You can monitor your own jobs, but you can also monitor **all** queued and running jobs
- You can also create and submit jobs using the **Job Composer** tool



Active Jobs

All Jobs ▾ All Clusters ▾

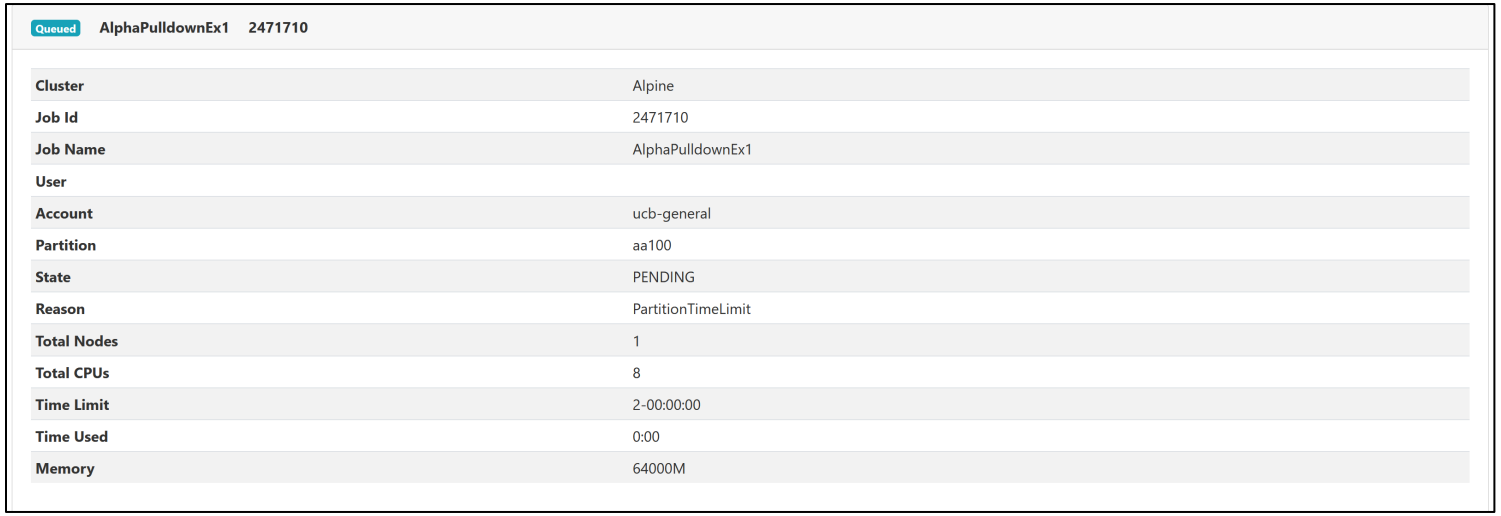
Active Jobs

Show 50 ▲▼ entries Filter:

	ID	Name	User	Account	Time Used	Queue	Status	Cluster	Actions
>	17096	sys/dashboard/sys/cu-desktop-presets		rmacc-general	00:33:24	core-gpu	Running	Core	
>	17102	sys/dashboard/sys/cu-desktop-presets		ucb-general	00:08:31	core-gpu	Running	Core	
>	17103	sys/dashboard/sys/bc_desktop/core		ucb-general	00:08:19	viz	Completed	Core	
>	17095	sys/dashboard/sys/bc_desktop/core		ucb-general	01:19:59	viz	Running	Core	
>	17100	sys/dashboard/sys/bc_desktop/core		ucb-general	00:10:58	viz	Running	Core	
>	17068	sys/dashboard/sys/bc_desktop/core		ucb-general	17:51:09	viz	Running	Core	

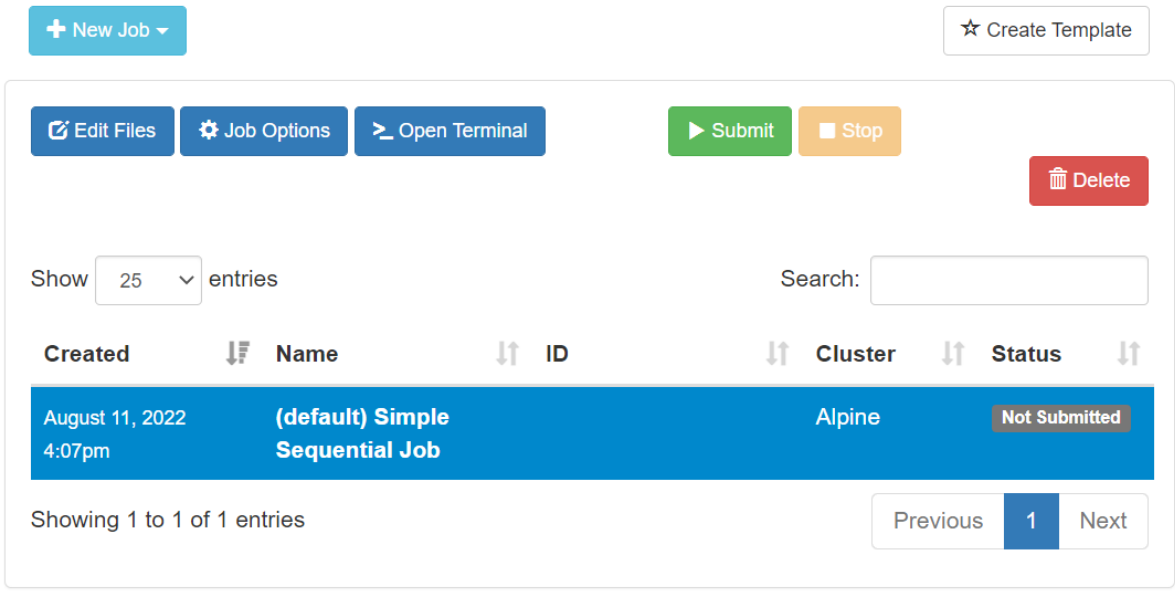
Active Jobs (cont.)

- Here you'll see a list of jobs on the selected cluster(s)
- If you select one of them, you can see details about the job



Job Composer

- With the Job Composer, you can create a script and submit to the scheduler
- Default templates are available, but you can use your own templates or edit using the built-in editor



Job Composer Options

Name

(default) Simple Sequential Job

Cluster

Alpine

Specify job script

main_job.sh

Files larger than 65KB are omitted for the job script field

Account

Account is an optional field. If not set, the account may be auto-set by the submit filter.

Job array specification

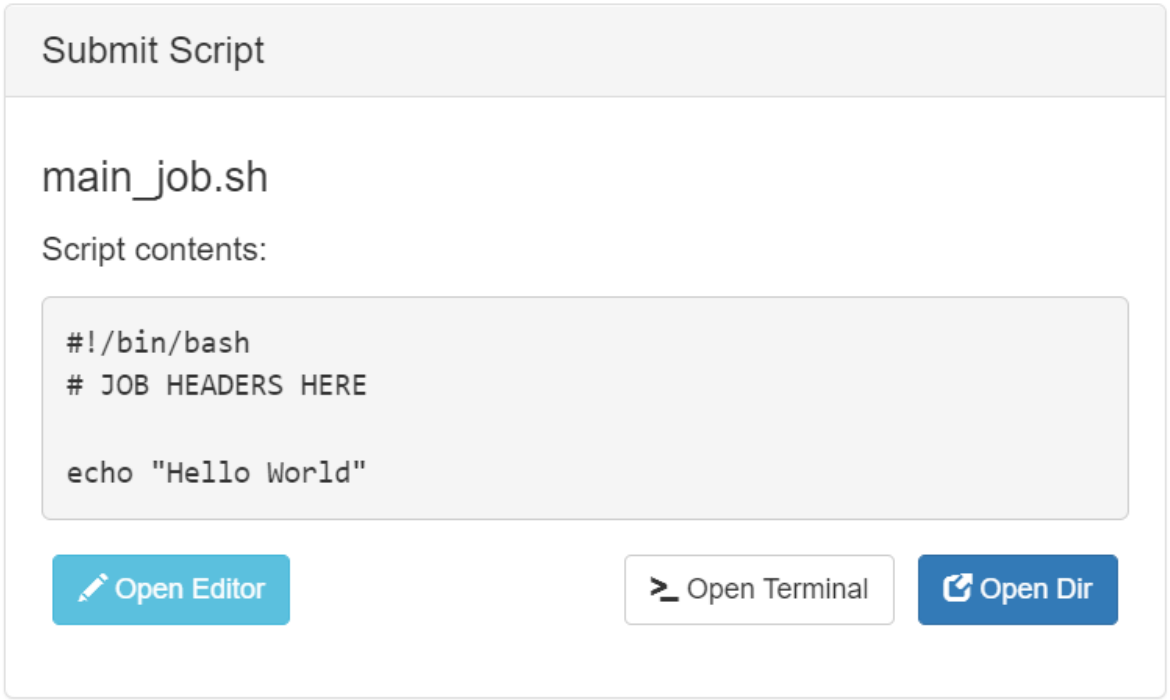
1-10

Job arrays are optional. e.g. 1-10

☐ Copy environment

Save Reset Back

Job Composer Script

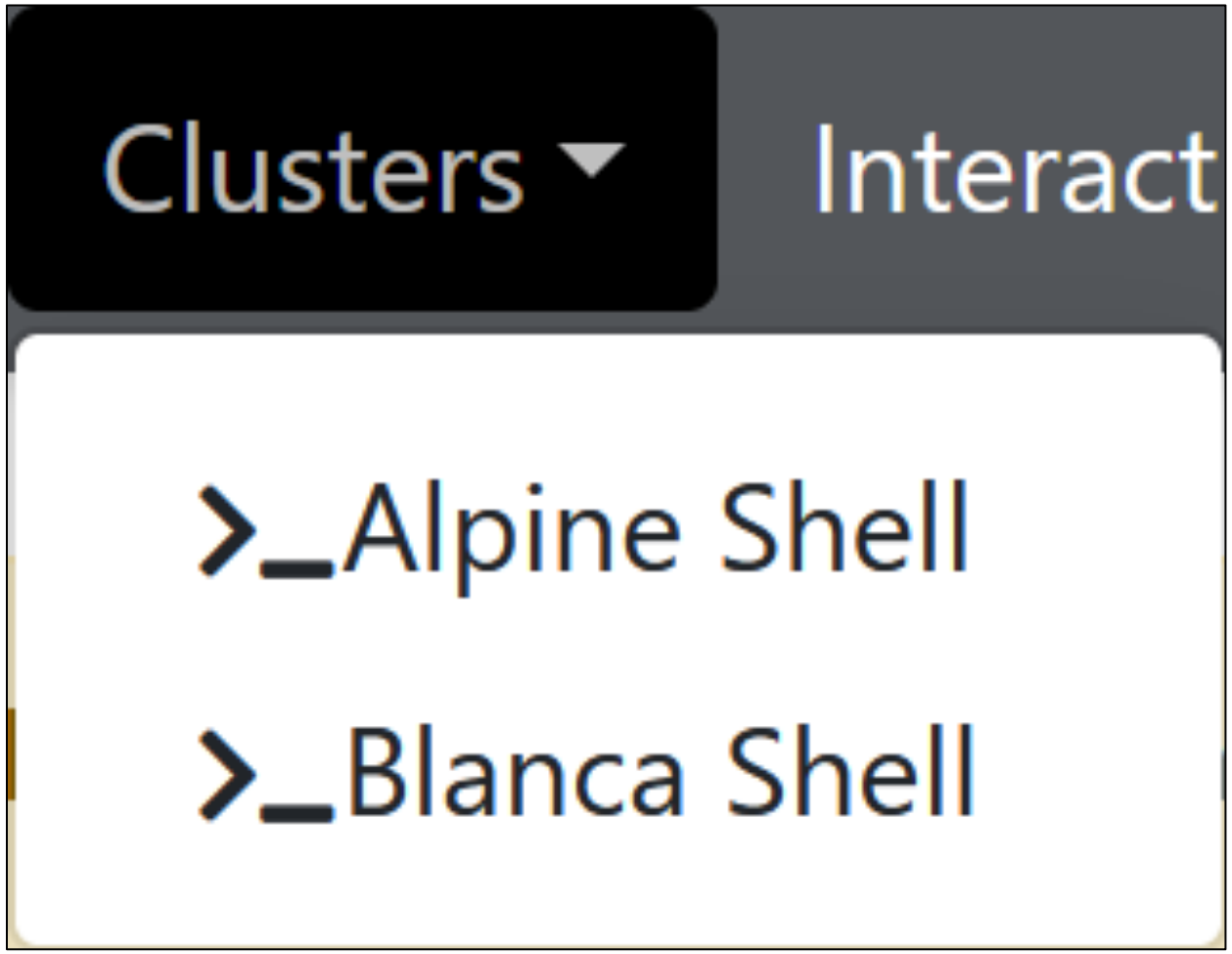


- Once you've added all of the options for your job, you can view the script template
- You can edit this file using OnDemand's built-in text editor

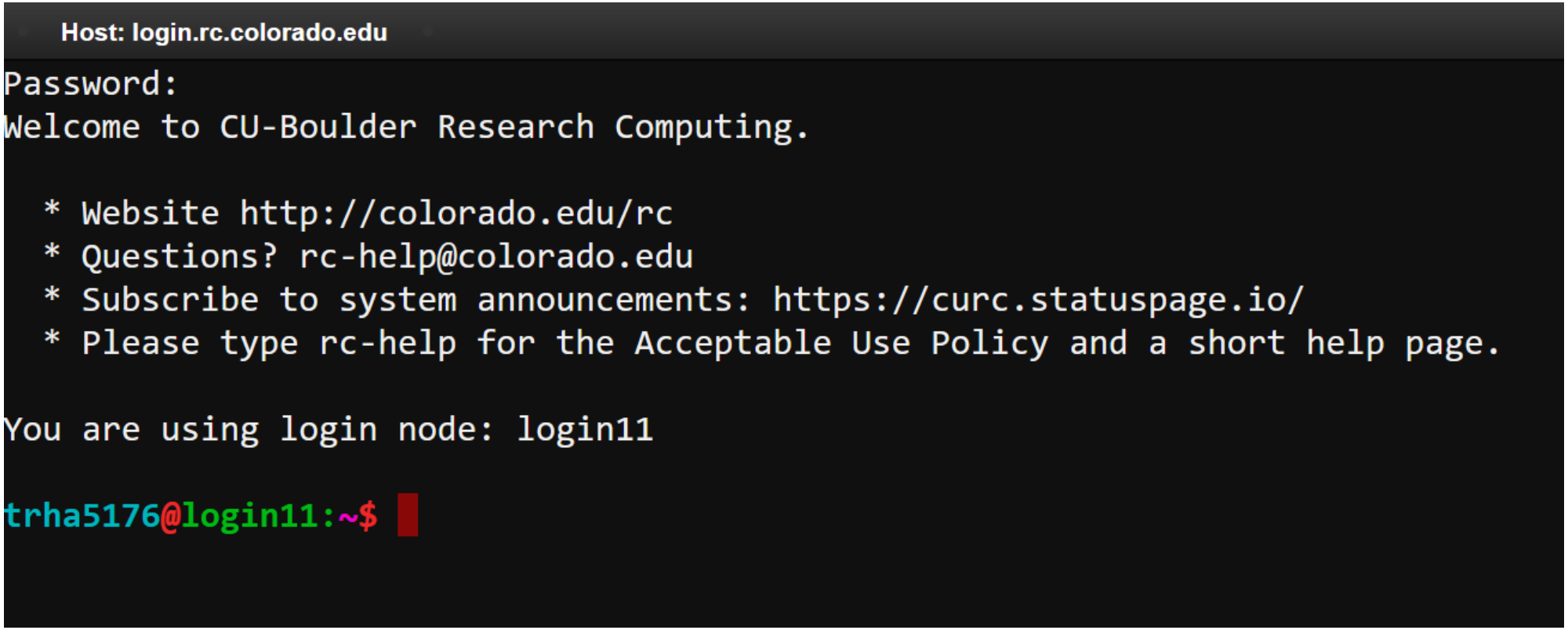
Demo: Using the Job Composer

Clusters

- Open OnDemand allows you to open a terminal in your browser, no SSH required



Terminal

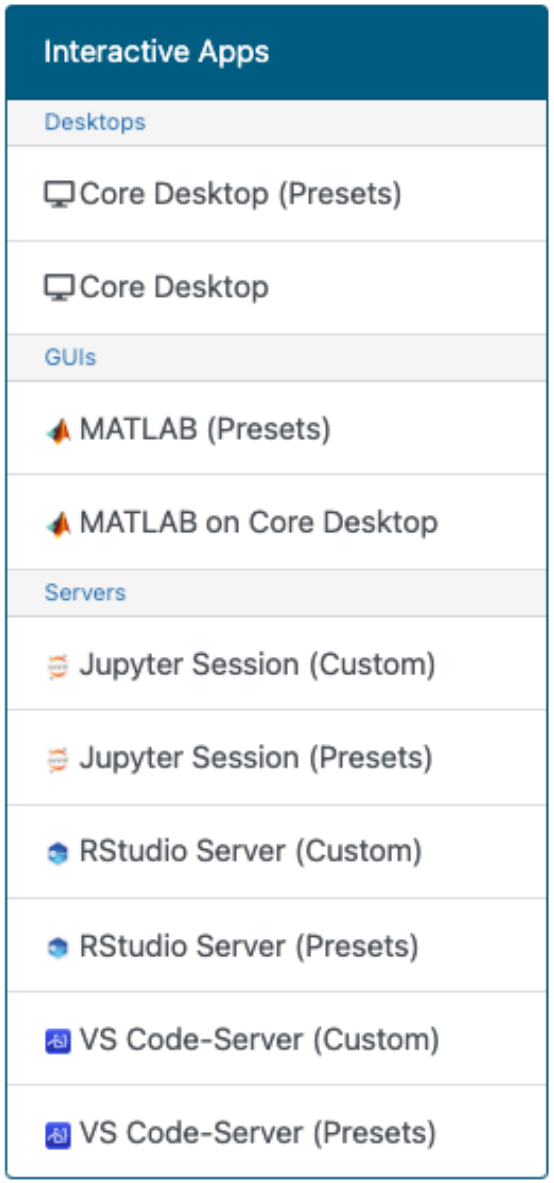

Host: login.rc.colorado.edu
Password:
Welcome to CU-Boulder Research Computing.
* Website http://colorado.edu/rc
* Questions? rc-help@colorado.edu
* Subscribe to system announcements: https://curc.statuspage.io/
* Please type rc-help for the Acceptable Use Policy and a short help page.
You are using login node: login11
trha5176@login11:~$

Interactive Applications

https://curc.readthedocs.io/en/latest/gateways/OnDemand.html

Interactive Apps

- Interactive apps are comprised of built-in Graphical User Interfaces (GUIs) for many of the most popular research applications
- Current Offerings Include:
  - Jupyter Notebooks
  - Remote desktop (Core Desktop)
  - RStudio
  - MATLAB
  - VS Code-Server
  - …with more coming soon!



Interactive Apps (cont.)

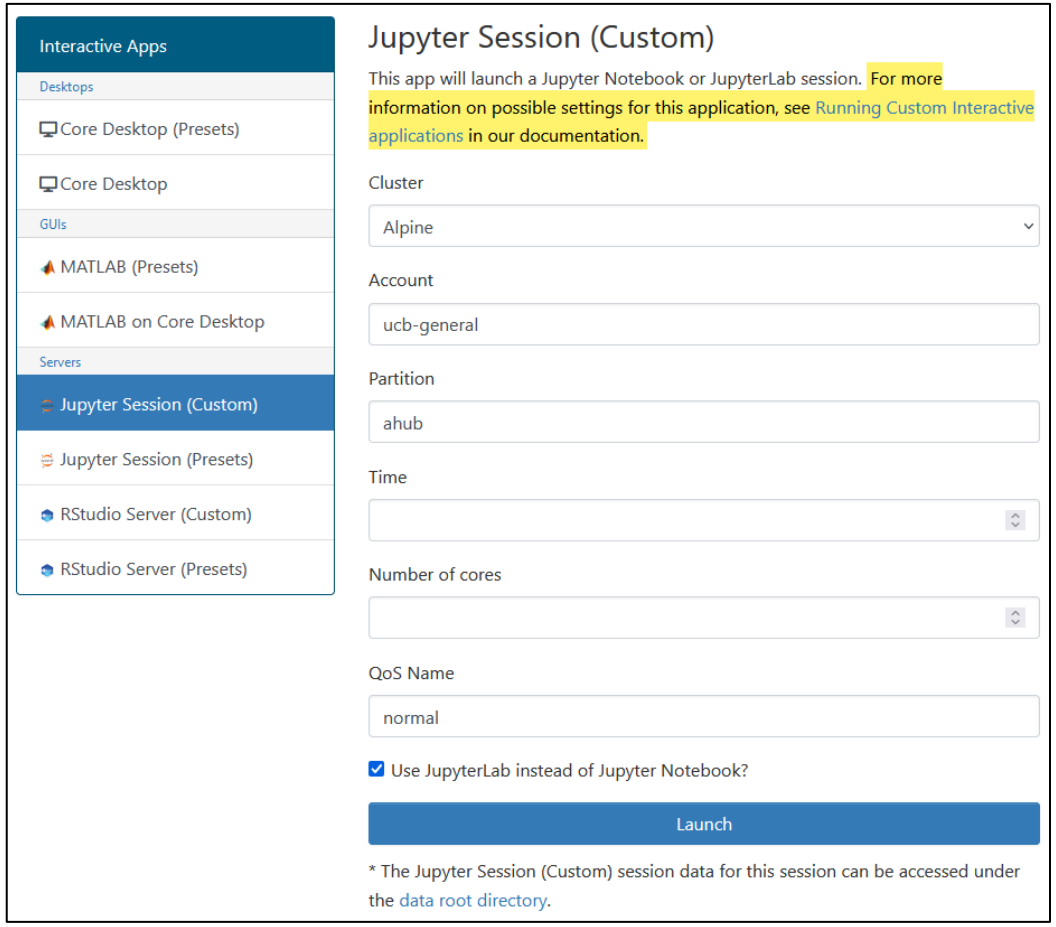
- Each app comes with two spawning options:
  - ‘Custom’ allows you to spawn a session with customizable configurations
    - If your configurations are incompatible, your job will not run!
  - ‘Presets’ allows you to spawn a session with common, functional configurations
    - Works ‘out of the box’

Custom Application Inputs

Input	Description
Cluster	Possible options are Alpine and Blanca
Account	The account you would like to use: • Standard CU Boulder value → “ucb-general” • Standard CSU value → “csu-general” • Standard RMACC value → “rmacc-general” • Standard AMC value → “amc-general” • Can use project allocations e.g. “ucbXXX_asc1”
Partition	Specifies a particular node type to use e.g. “ahub”
Number of cores	The number of physical CPU cores for the job
Memory [GB]	The total amount of memory allocated for the Job
QoS Name	Quality of Service (QoS) constrains or modifies certain job characteristics
Time	The duration of the job, in hours

Jupyter Sessions

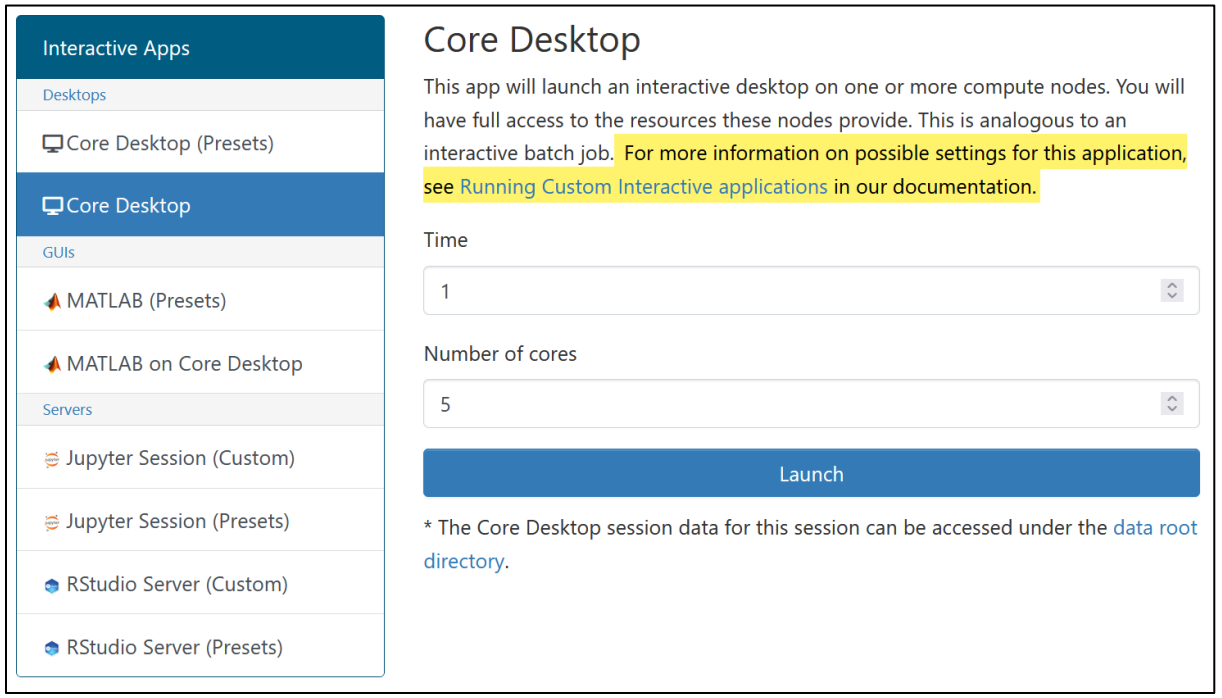
- You can spawn a Jupyter Notebook using JupyterLab or Jupyter Notebook
- If you want to use a custom environment, you must create a Jupyter Kernel
  - https://curc.readthedocs.io/en/latest/gateways/jupyterhub.html?#creating-your-own-custom-jupyter-kernel
  - Easiest to do with a conda environment
- One can access a single Alpine GPU via the “Custom” application



Demo: Jupyter Session

Core Desktop

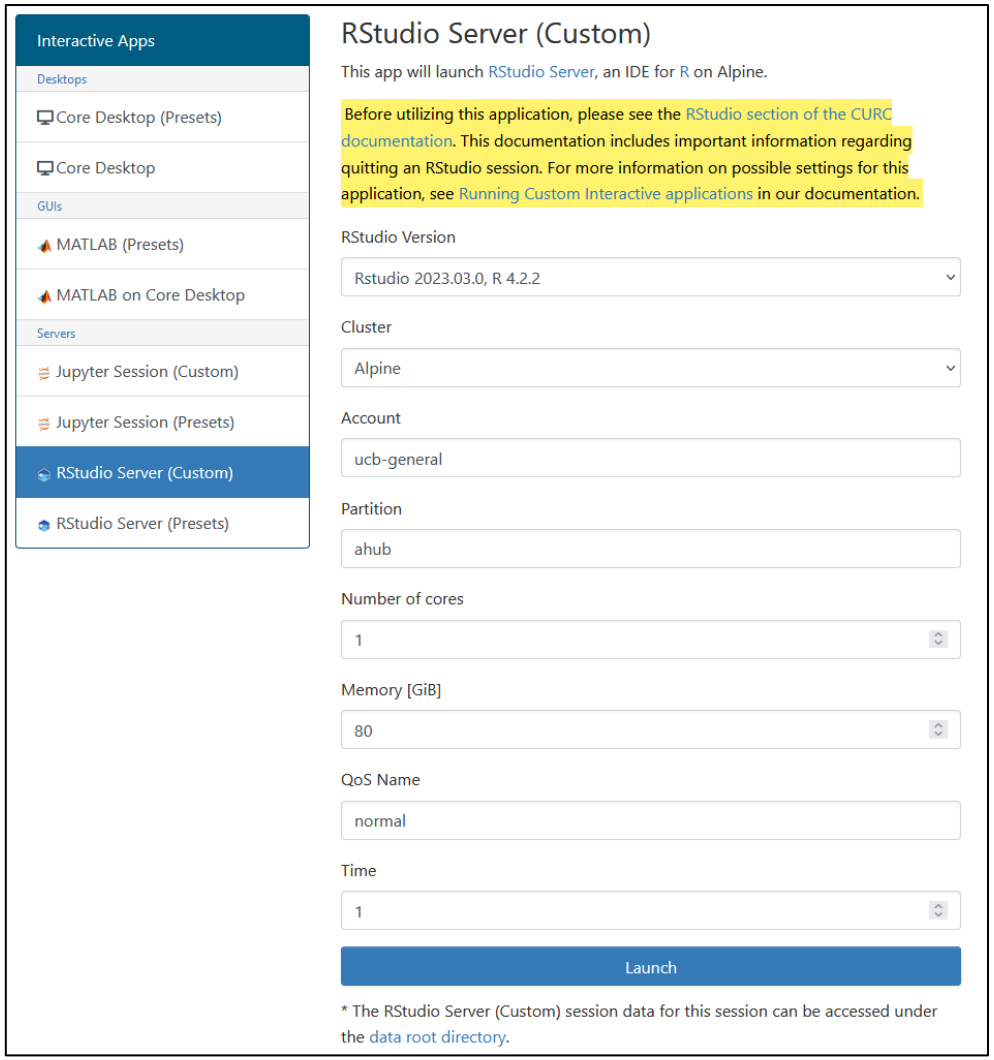
- A remote desktop i.e. an interactive desktop
- Ran on their own compute nodes (not Alpine or Blanca)
- All jobs are launched on shared GPUs
  - Not meant for serious GPU workflows!
- **Very useful for running GUI based software**



Demo: Core Desktop

RStudio Server

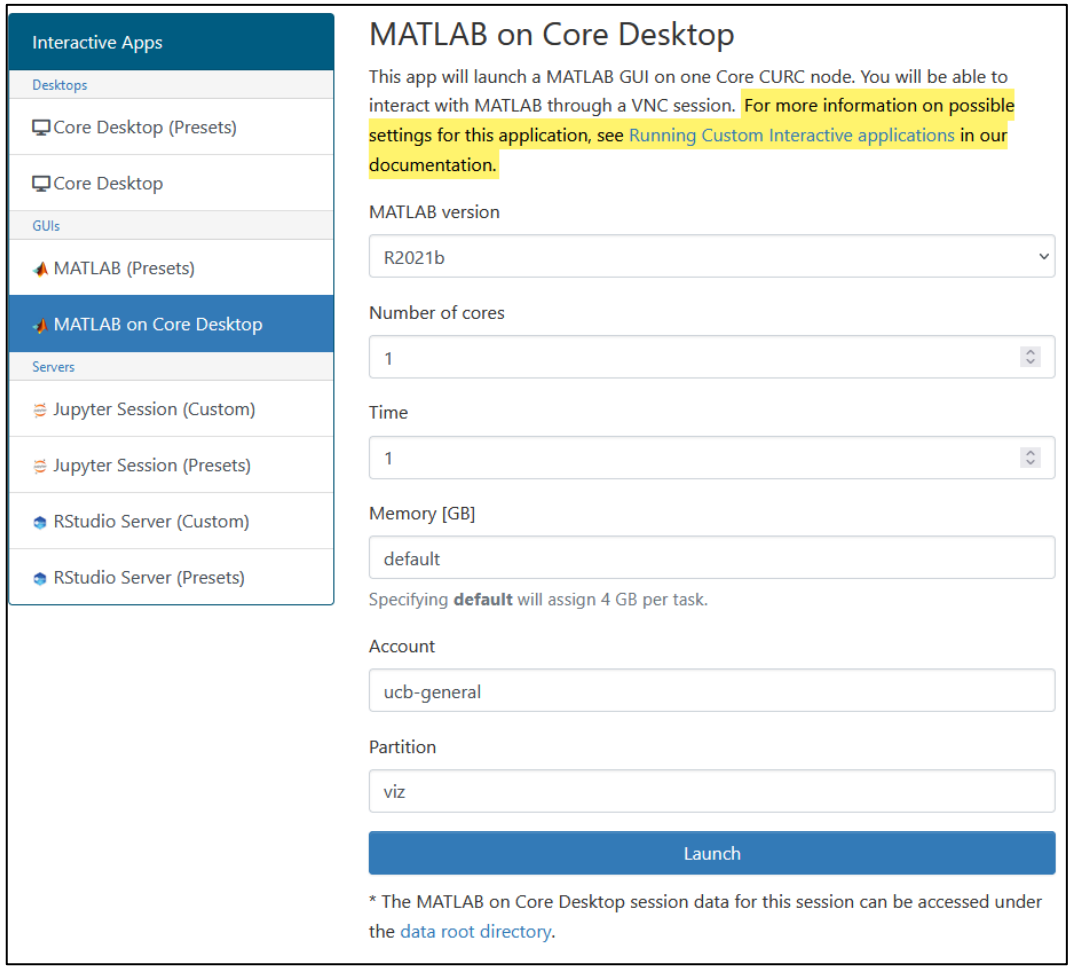
- Allows you to use RStudio, an Integrated Development Environment (IDE) for R
- Currently in a Beta phase
  - Quirks may pop up
- Ran inside an Apptainer container
  - Most R libraries are easily installable, but some may fail
    - We can help, just reach out to us!



Demo: RStudio

MATLAB

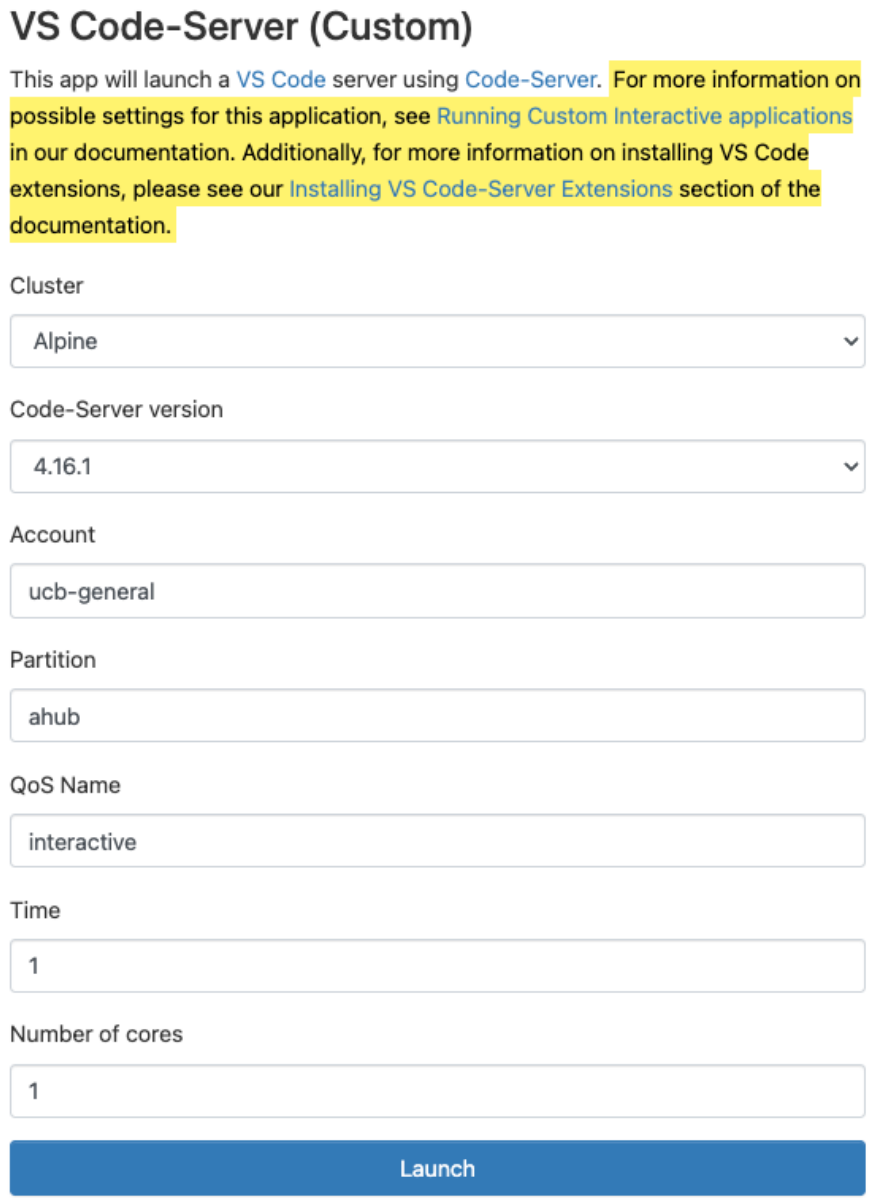
- Launches a MATLAB GUI using Core Desktop
  - Same setup as Core Desktop
- Not meant for serious workflows!
- Several MATLAB versions are available
  - Using the default R2021b can improve load times (locally installed)



Demo: MATLAB

VS Code-Server

- Launches Visual Studio (VS) Code in your browser
  - Uses the software Code-Server
    - Contains a majority of standard VS Code functionality
- Downloading extensions may have to be done differently
  - https://curc.readthedocs.io/en/latest/gateways/OnDemand.html#installing-vs-code-server-extensions



Demo: VS Code-Server

Review: Learning Goals

- ~~About Open OnDemand~~
  - ~~What is ACCESS-CI?~~
- ~~How to log in to Open OnDemand~~
- ~~Features of Open OnDemand~~
  - ~~Using the Shell~~
  - ~~File Transfer~~
  - ~~Job Monitoring and Composer~~
- ~~Interactive Applications~~
  - ~~Demos!~~

Questions?

CURC User Policies: https://curc.readthedocs.io/en/latest/additional-resources/policies.html?highlight=policies#curc-user-policies

Survey and feedback

http://tinyurl.com/curc-survey18