



Alpine in your Browser with Open OnDemand



Research Computing
UNIVERSITY OF COLORADO **BOULDER**

Be Boulder.

Alpine in your Browser with Open OnDemand

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- Website: www.rc.colorado.edu
- Helpdesk: rc-help@colorado.edu
- Slides:
https://github.com/ResearchComputing/alpine_in_your_browser_with_ood_primer
- Survey: <http://tinyurl.com/curc-survey18>

Agenda

- About Open OnDemand
 - What is ACCESS-CI?
- How to log in to Open OnDemand
- Features of Open OnDemand
 - Using the Shell
 - File Transfer
- 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>



Advanced Cyberinfrastructure Coordination Ecosystem:
Services & Support

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!

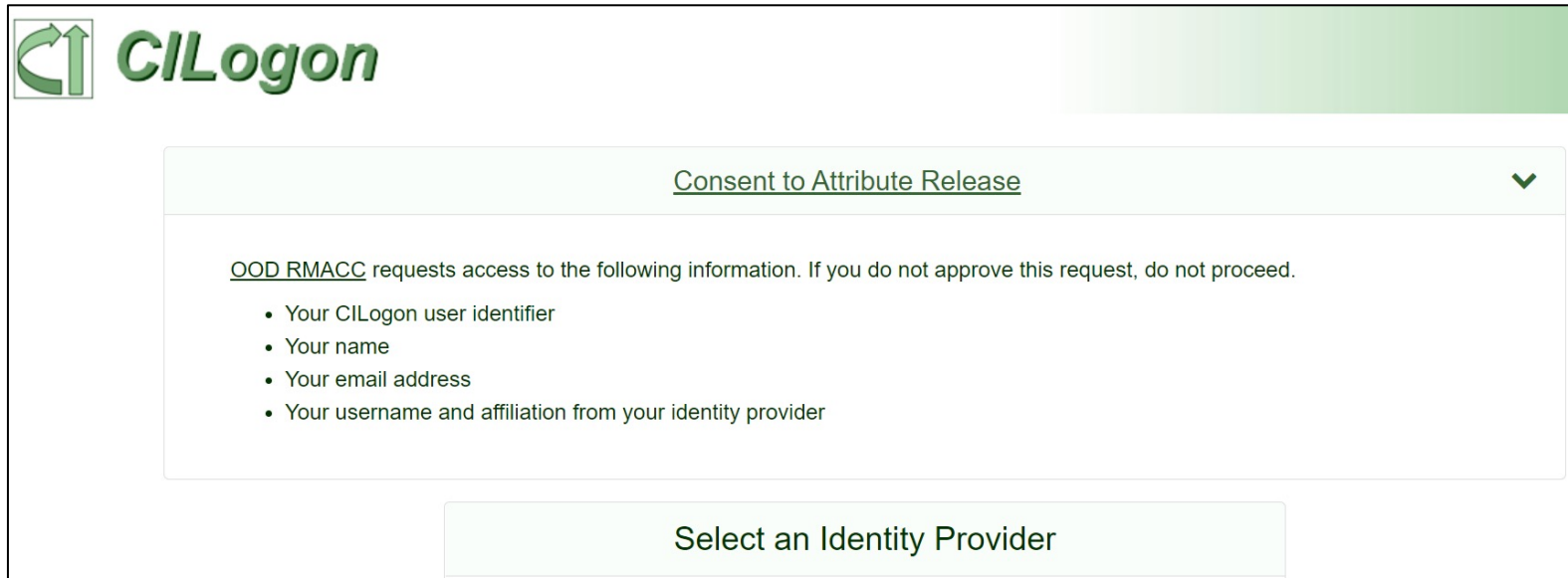



Advanced Cyberinfrastructure Coordination Ecosystem:
Services & Support

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:



 **CILogon**

[Consent to Attribute Release](#) ▼

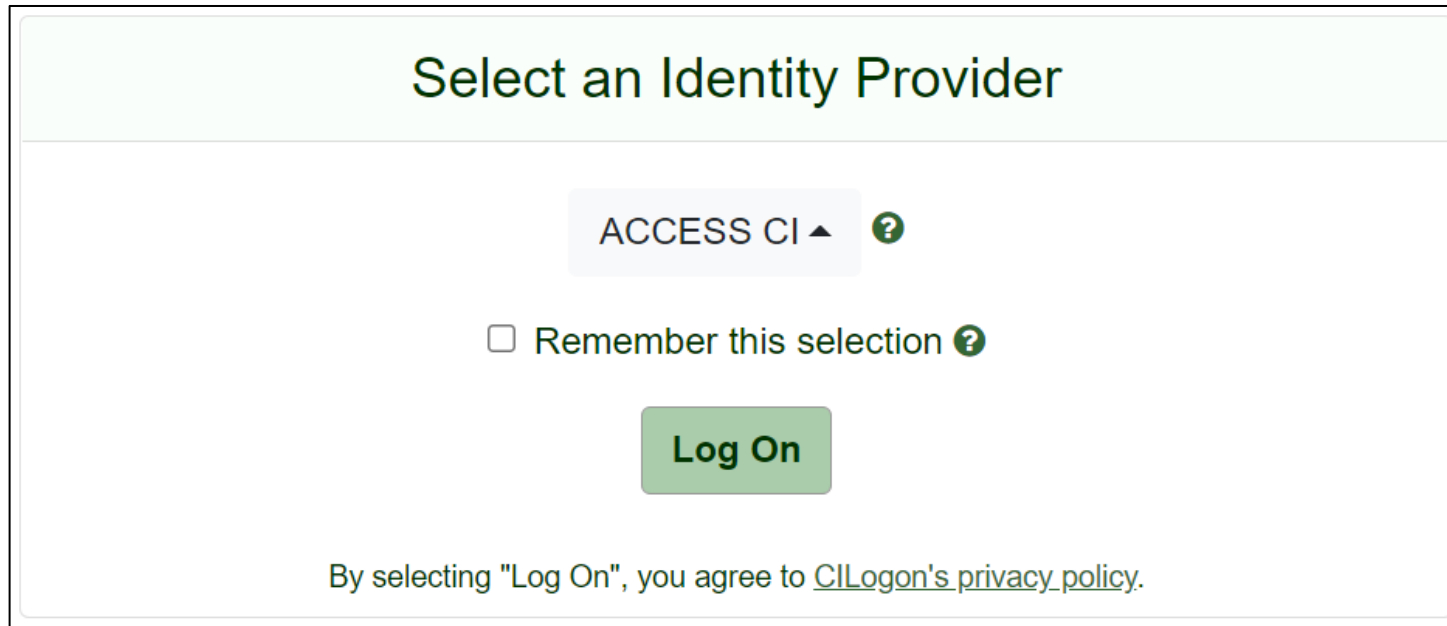
OOD RMACC requests access to the following information. If you do not approve this request, do not proceed.

- Your CILogon user identifier
- Your name
- Your email address
- Your username and affiliation from your identity provider

Select an Identity Provider

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)'

A screenshot of a web form titled "Select an Identity Provider". The form has a light green header bar with the title. Below the header, there is a dropdown menu currently showing "ACCESS CI" with a small upward arrow and a green question mark icon to its right. Below the dropdown is a checkbox labeled "Remember this selection" followed by a green question mark icon. At the bottom of the form is a green "Log On" button. Below the button, there is a line of text: "By selecting 'Log On', you agree to [CILogon's privacy policy](#)." data-bbox="212 447 778 882"/>

Select an Identity Provider

ACCESS CI ▲ ?


☐ Remember this selection ?

Log On

By selecting "Log On", you agree to [CILogon's privacy policy](#).

Logging In (cont.)

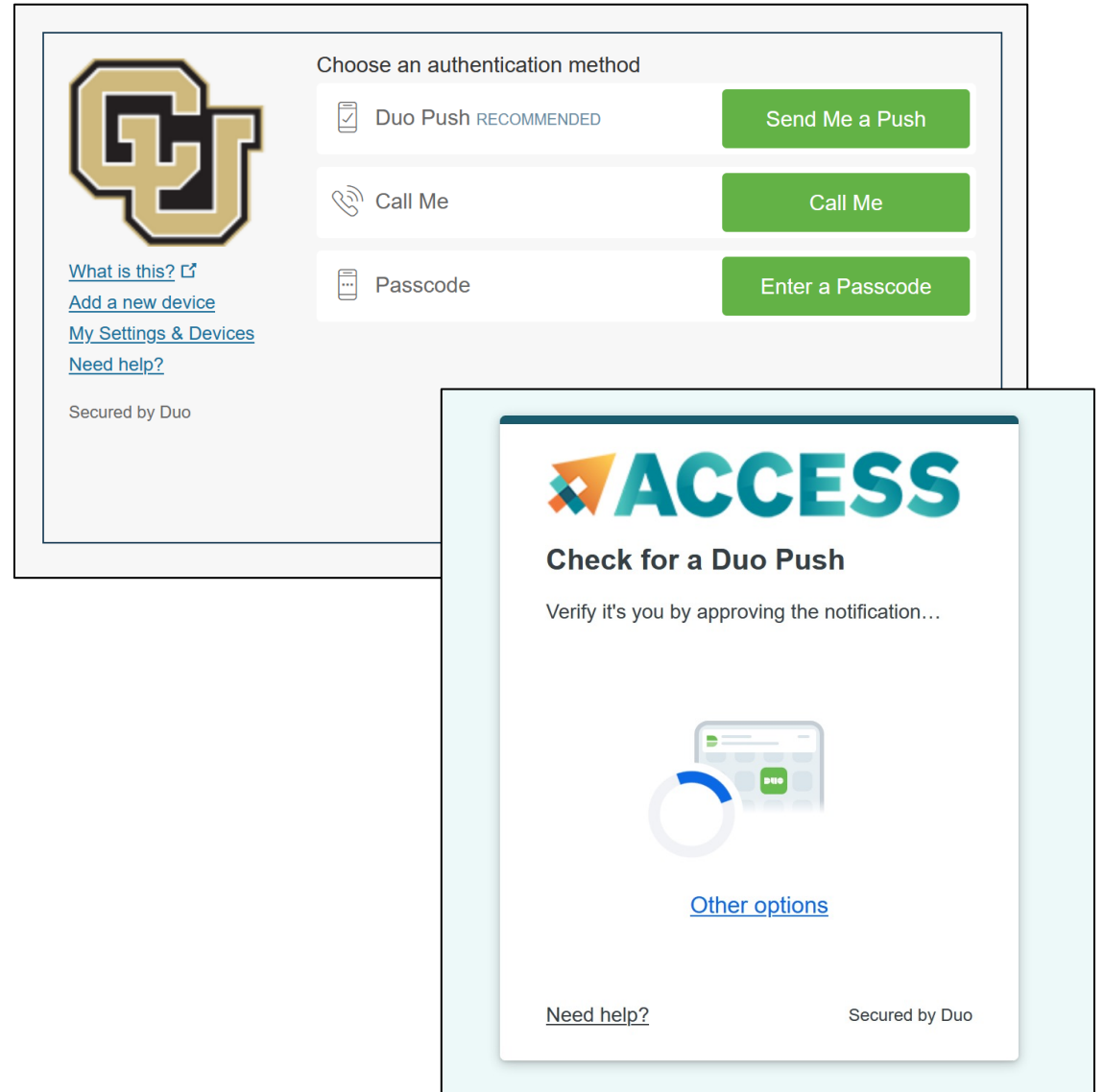
- CU Boulder: Authenticate with your Identikey and Password
- CSU: Authenticate with your EID and Password
- RMACC: You will be redirected to the ACCESS-CI login page
 - Use your ACCESS username and password



The screenshot shows the ACCESS-CI login interface. At the top left is the ACCESS logo, which consists of a stylized 'A' made of three colored triangles (orange, blue, and green) followed by the word 'ACCESS' in blue. Below the logo, the text 'Login to CILogon' is displayed. Underneath this are two input fields: the first is labeled 'ACCESS Username' and the second is labeled 'ACCESS Password'. Below the password field is a blue 'Login' button. At the bottom of the page, there is a green circular arrow icon with an upward-pointing arrow inside, followed by the text 'CILogon' in a green, italicized font.

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

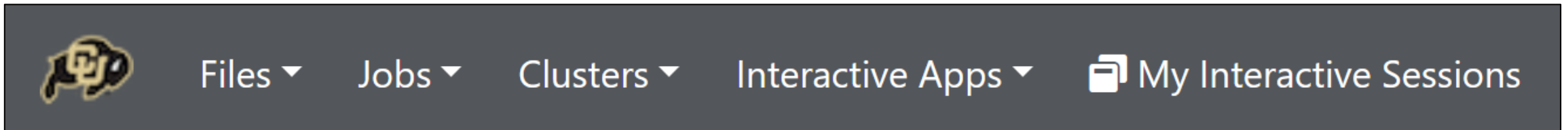
<https://ondemand.rc.colorado.edu/>

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

Features of Open OnDemand

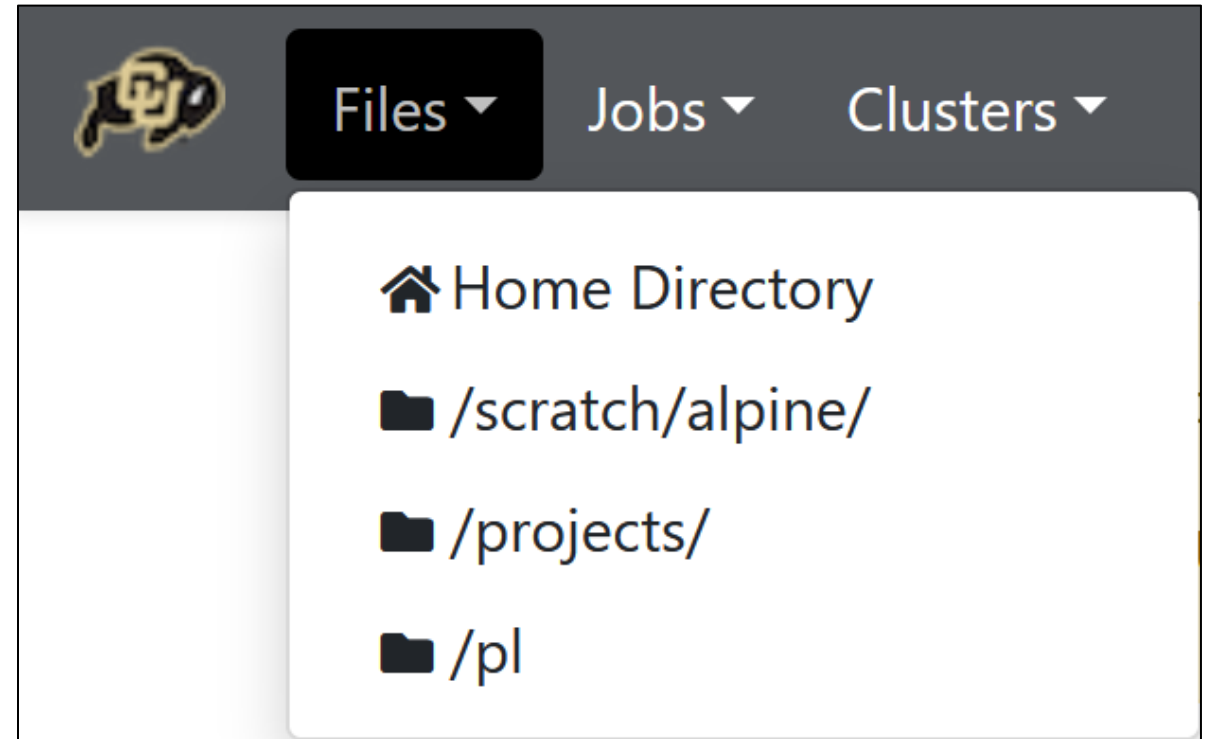
OnDemand Home Page

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



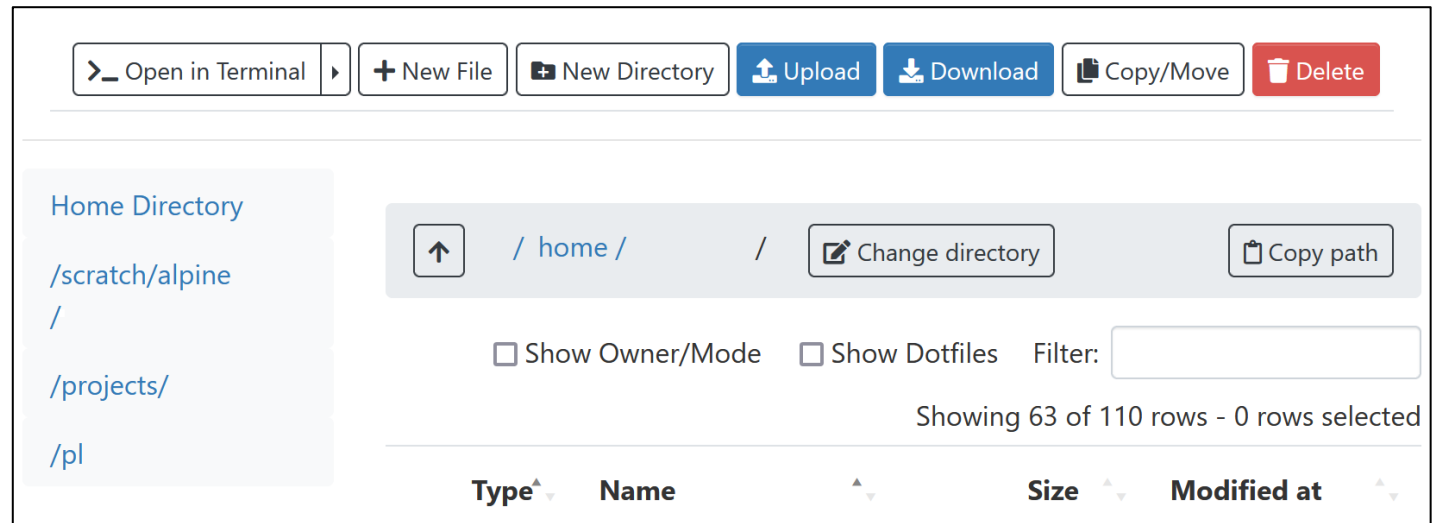
Files

- 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

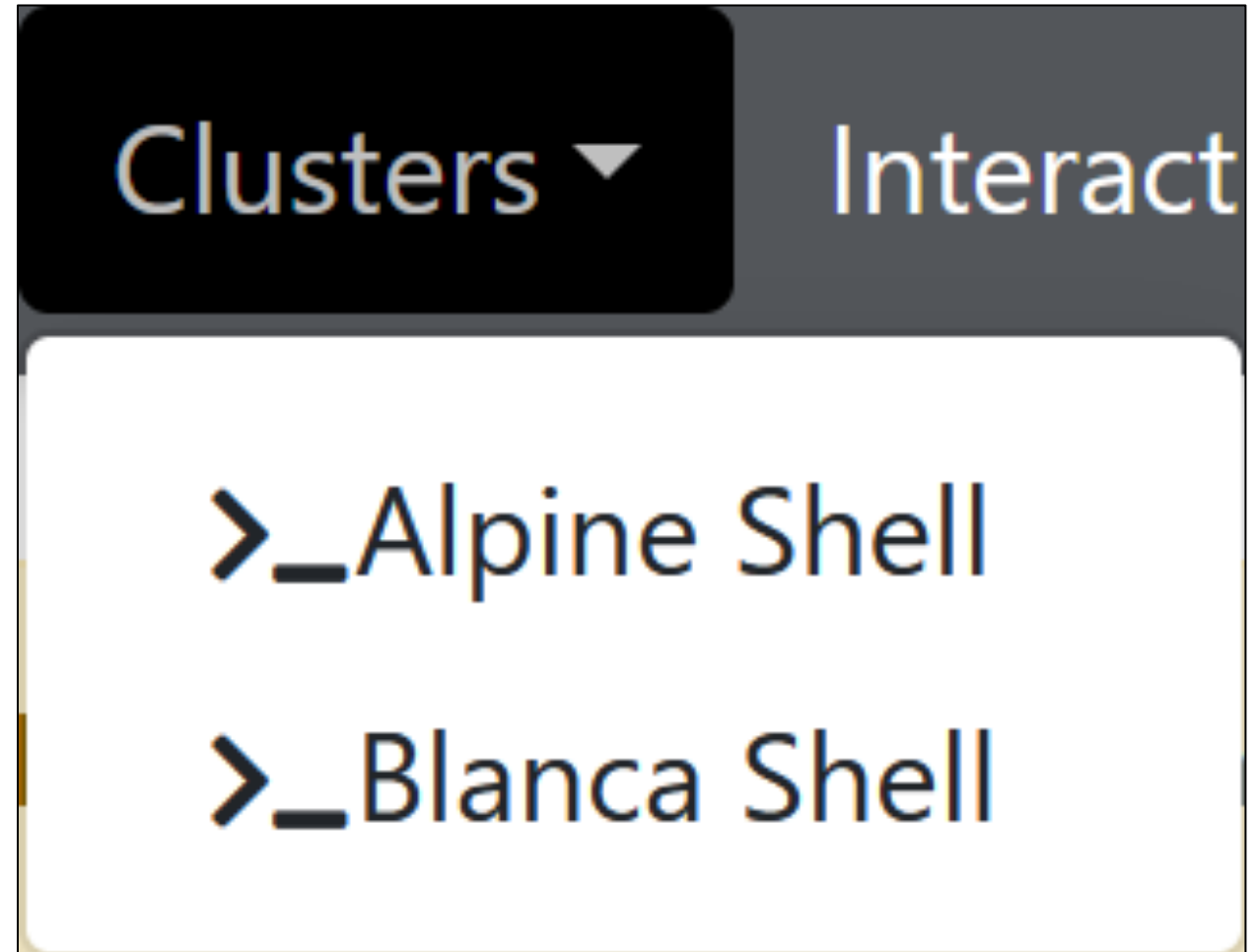
- On the files page you can:
 - Upload data
 - Download files
 - Create new files
 - Edit files
 - Copy/move data
 - Delete files
 - Create directories



Demo: File Transfer

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	
Desktops	
	Core Desktop (Presets)
	Core Desktop
GUIs	
	MATLAB (Presets)
	MATLAB on Core Desktop
Servers	
	Jupyter Session (Custom)
	Jupyter Session (Presets)
	RStudio Server (Custom)
	RStudio Server (Presets)
	VS Code-Server (Custom)
	VS Code-Server (Presets)

Interactive Apps (cont.)

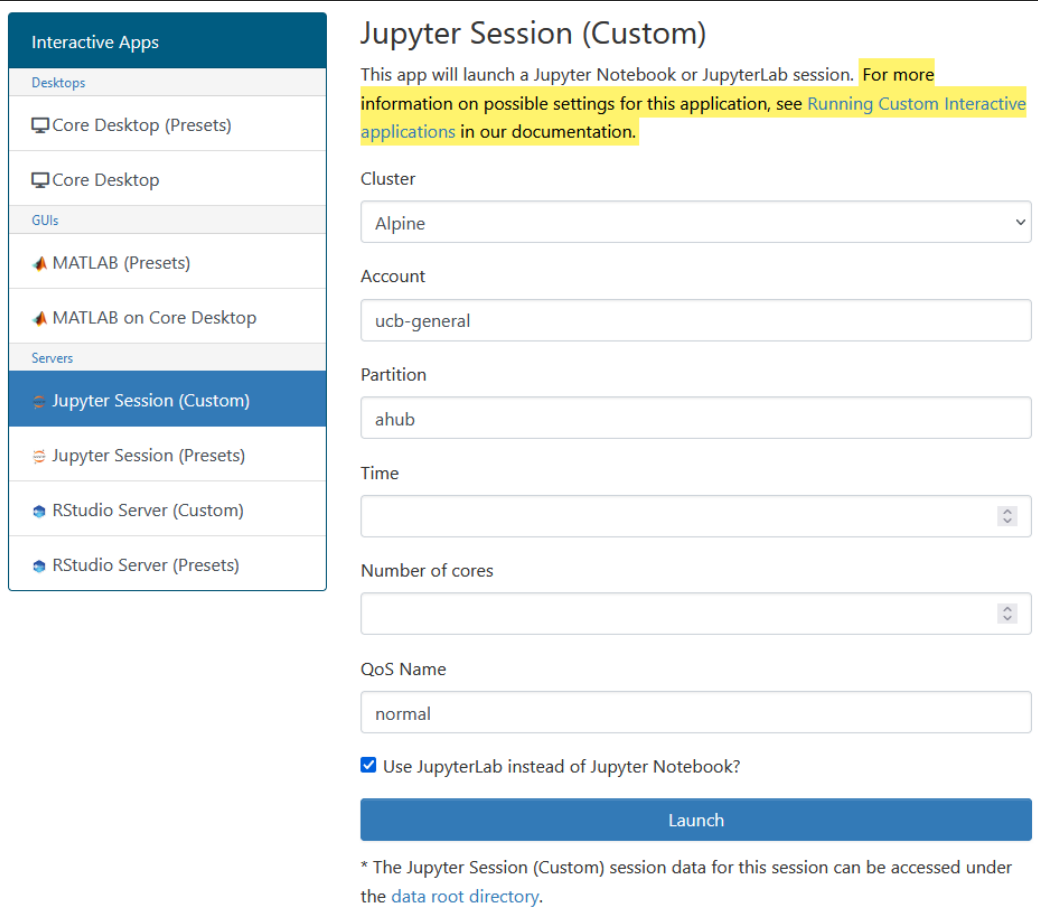
- Each app comes with two spawning options:
 - ‘Custom’ allows you to spawn a session with customizable configurations
 - If your configurations are incompatible, your job will not run!
 - ‘Presets’ allows you to spawn a session with common, functional configurations
 - Works ‘out of the box’

Custom Application Inputs

Input	Description
Cluster	Possible options are Alpine and Blanca
Account	The account you would like to use: <ul style="list-style-type: none">• 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



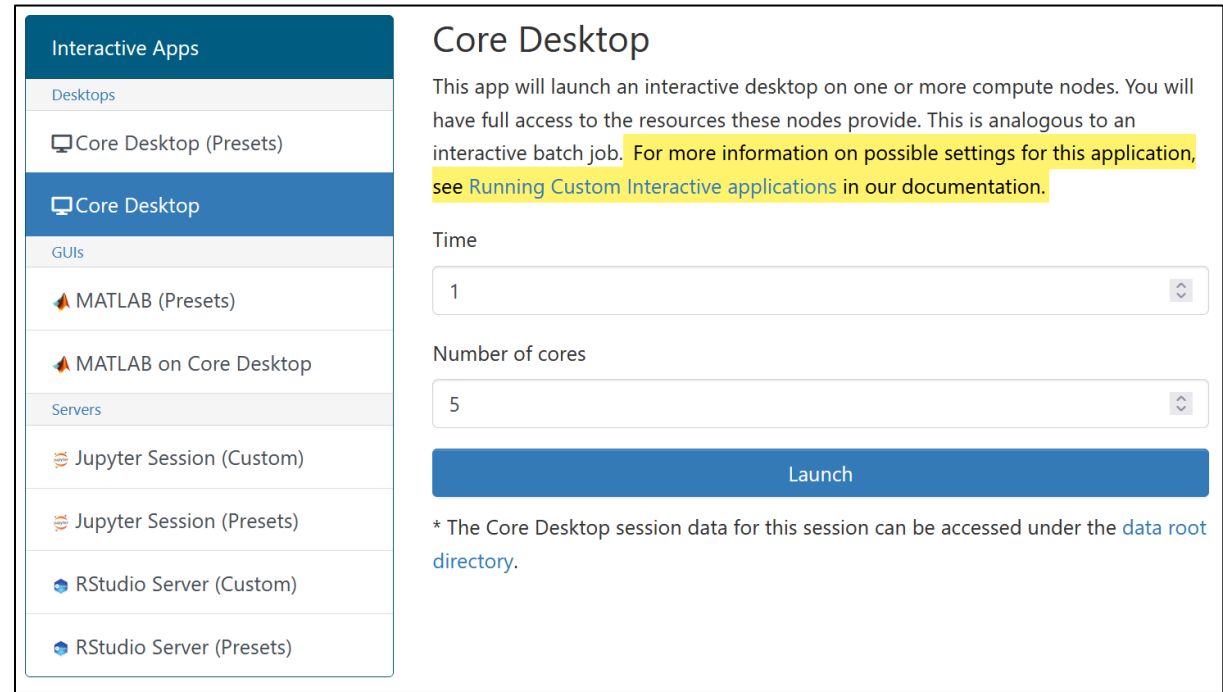
The screenshot shows the 'Interactive Apps' sidebar on the left with categories: Desktops, GUIs, and Servers. Under Servers, 'Jupyter Session (Custom)' is selected. The main panel is titled 'Jupyter Session (Custom)' and contains the following fields:

- Description:** This app will launch a Jupyter Notebook or JupyterLab session. For more information on possible settings for this application, see [Running Custom Interactive applications](#) in our documentation.
- Cluster:** Alpine (dropdown menu)
- Account:** ucb-general (text input)
- Partition:** ahub (text input)
- Time:** (empty input with up/down arrows)
- Number of cores:** (empty input with up/down arrows)
- QoS Name:** normal (text input)
- Checkbox:** ☒ Use JupyterLab instead of Jupyter Notebook?
- Launch Button:** A blue button labeled 'Launch'.
- Footnote:** * The Jupyter Session (Custom) session data for this session can be accessed under the [data root directory](#).

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**



Interactive Apps

Desktops

- Core Desktop (Presets)
- Core Desktop**

GUIs

- MATLAB (Presets)
- MATLAB on Core Desktop

Servers

- Jupyter Session (Custom)
- Jupyter Session (Presets)
- RStudio Server (Custom)
- RStudio Server (Presets)

Core Desktop

This app will launch an interactive desktop on one or more compute nodes. You will have full access to the resources these nodes provide. This is analogous to an interactive batch job. For more information on possible settings for this application, see [Running Custom Interactive applications](#) in our documentation.

Time

1

Number of cores

5

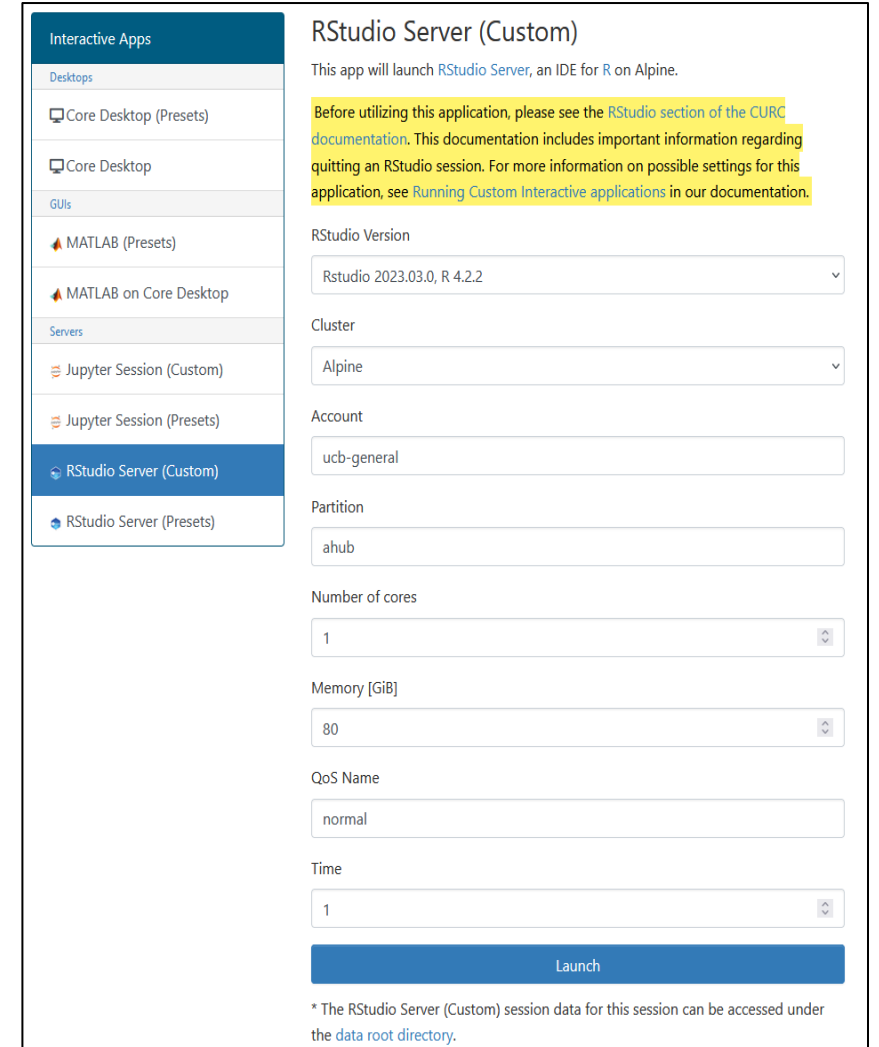
Launch

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

Demo: Core Desktop

RStudio Server

- Allows you to use RStudio, an Integrated Development Environment (IDE) for R
- Currently in a Beta phase
- Ran inside an Apptainer container
 - Most R libraries are easily installable, but some may fail due to dependency issues.
 - Documentation for installing dependencies can be found at <https://curc.readthedocs.io/en/latest/gateways/OnDemand.html#installing-dependencies-for-rstudio-currently-available-only-on-alpine>
 - **First launch** of application can take several minutes (use 4 cores), subsequent launches will be fast!

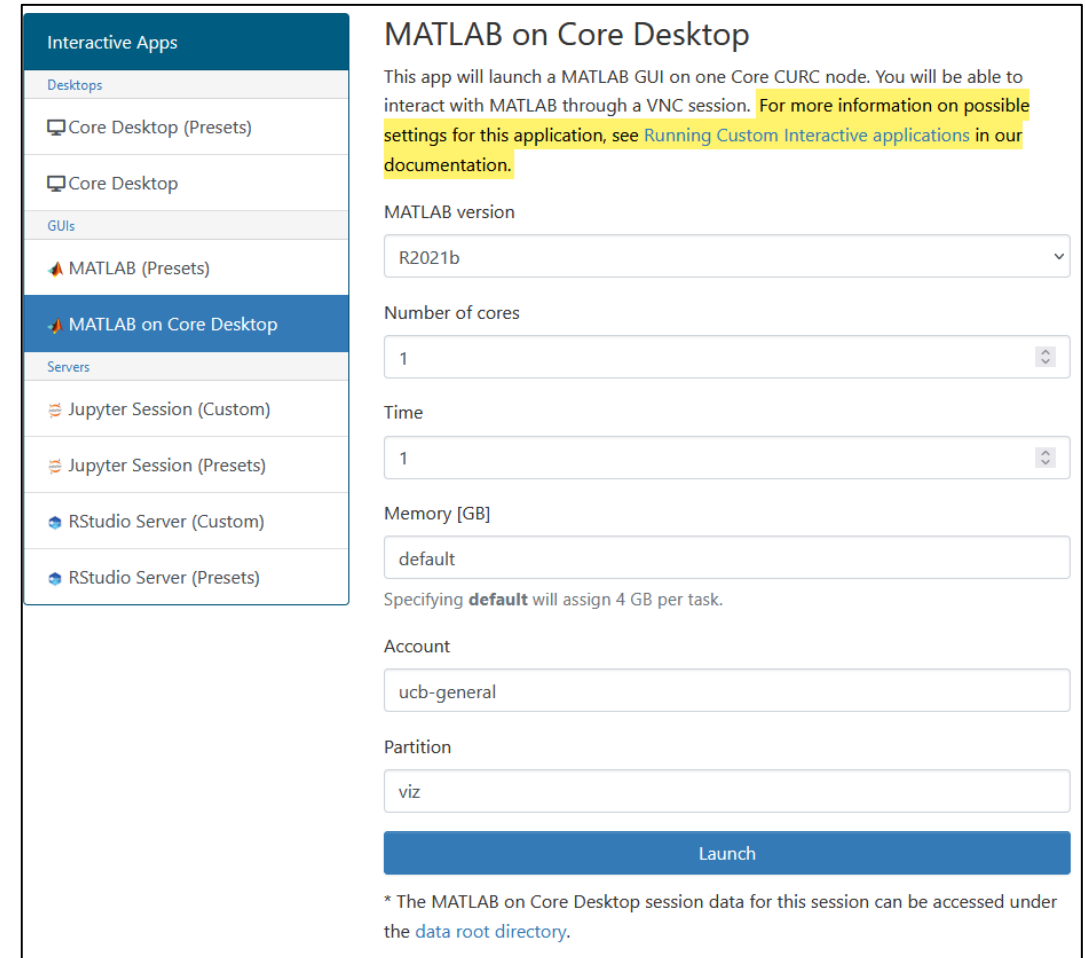


The screenshot shows the 'RStudio Server (Custom)' configuration page. On the left is a sidebar with a tree view under 'Interactive Apps' containing categories: Desktops (Core Desktop (Presets), Core Desktop), GUIs (MATLAB (Presets), MATLAB on Core Desktop), Servers (Jupyter Session (Custom), Jupyter Session (Presets), RStudio Server (Custom) - selected, RStudio Server (Presets)). The main panel has the title 'RStudio Server (Custom)' and a description: 'This app will launch RStudio Server, an IDE for R on Alpine.' Below this is a yellow-highlighted warning: 'Before utilizing this application, please see the RStudio section of the CURC documentation. This documentation includes important information regarding quitting an RStudio session. For more information on possible settings for this application, see Running Custom Interactive applications in our documentation.' The configuration fields include: RStudio Version (dropdown: Rstudio 2023.03.0, R 4.2.2), Cluster (dropdown: Alpine), Account (text: ucb-general), Partition (text: ahub), Number of cores (dropdown: 1), Memory [GiB] (dropdown: 80), QoS Name (text: normal), and Time (dropdown: 1). A blue 'Launch' button is at the bottom. A footnote states: '* The RStudio Server (Custom) session data for this session can be accessed under the data root directory.'

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)



The screenshot shows a web-based configuration interface for launching MATLAB on a Core Desktop. On the left is a sidebar with a tree view under 'Interactive Apps'. The 'Desktops' section contains 'Core Desktop (Presets)' and 'Core Desktop'. The 'GUIs' section contains 'MATLAB (Presets)' and 'MATLAB on Core Desktop' (which is selected and highlighted in blue). The 'Servers' section contains 'Jupyter Session (Custom)', 'Jupyter Session (Presets)', 'RStudio Server (Custom)', and 'RStudio Server (Presets)'. The main panel is titled 'MATLAB on Core Desktop' and contains the following fields: a text box with a description stating it launches a MATLAB GUI on one Core CURC node via VNC, with a link to documentation; a 'MATLAB version' dropdown menu set to 'R2021b'; a 'Number of cores' dropdown menu set to '1'; a 'Time' dropdown menu set to '1'; a 'Memory [GB]' dropdown menu set to 'default' with a note that 'default' assigns 4 GB per task; an 'Account' text field set to 'ucb-general'; and a 'Partition' text field set to 'viz'. At the bottom is a blue 'Launch' button. A footnote at the bottom states: '* The MATLAB on Core Desktop session data for this session can be accessed under the [data root directory](#)'.

Interactive Apps

Desktops

- Core Desktop (Presets)
- Core Desktop

GUIs

- MATLAB (Presets)
- MATLAB on Core Desktop**

Servers

- Jupyter Session (Custom)
- Jupyter Session (Presets)
- RStudio Server (Custom)
- RStudio Server (Presets)

MATLAB on Core Desktop

This app will launch a MATLAB GUI on one Core CURC node. You will be able to interact with MATLAB through a VNC session. For more information on possible settings for this application, see [Running Custom Interactive applications in our documentation](#).

MATLAB version

R2021b

Number of cores

1

Time

1

Memory [GB]

default

Specifying **default** will assign 4 GB per task.

Account

ucb-general

Partition

viz

Launch

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

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>

VS Code-Server (Custom)

This app will launch a VS Code server using Code-Server. For more information on possible settings for this application, see [Running Custom Interactive applications](#) in our documentation. Additionally, for more information on installing VS Code extensions, please see our [Installing VS Code-Server Extensions](#) section of the documentation.

Cluster

Alpine

Code-Server version

4.16.1

Account

ucb-general

Partition

ahub

QoS Name

interactive

Time

1

Number of cores

1

Launch

Demo: VS Code-Server

Survey and feedback

<http://tinyurl.com/curc-survey18>

