



New User Seminar

Website: www.rc.colorado.edu

Documentation: <https://curc.readthedocs.io>

Helpdesk: rc-help@colorado.edu



Meet the User Support Team



Layla
Freeborn



Brandon
Reyes



Andy
Monaghan



Michael
Schneider



John
Reiland



Dylan
Gottlieb



Mohal
Khandelwal



Ragan
Lee



Research Computing
UNIVERSITY OF COLORADO BOULDER

Be Boulder.

RC Resources

Tech Support

- High Performance Computing
- Data Management
- Cloud Computing
- Secure Research

Human Support

- Training Materials & Workshops
- Consultations & Office Hours
- Help Tickets

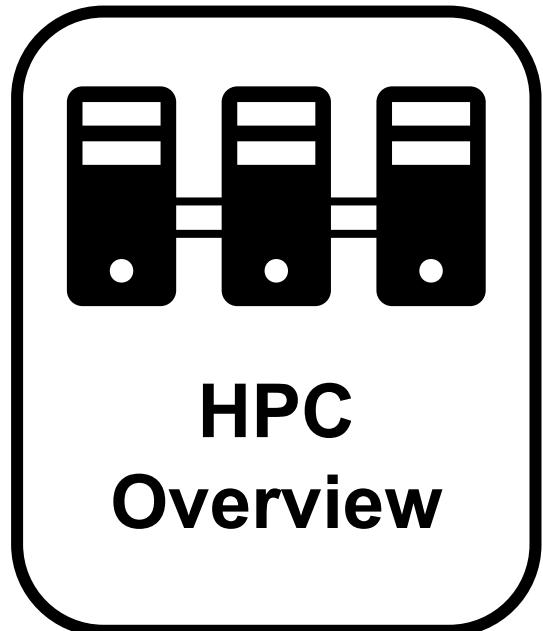


Ask Questions

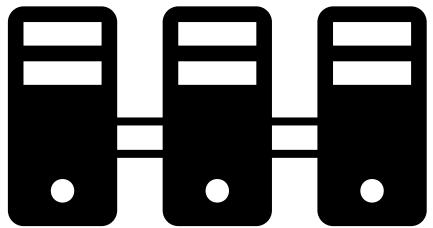


Discuss Ideas

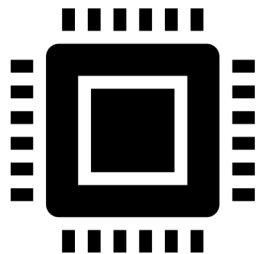
Learning Goals



Learning Goals

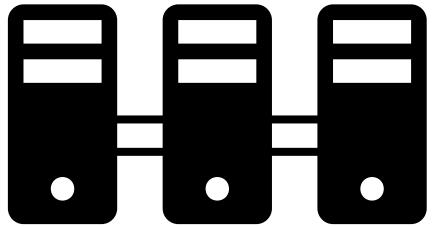


HPC
Overview

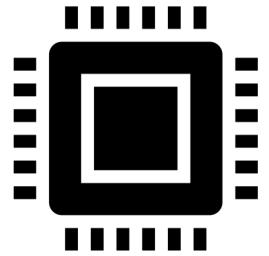


Nodes &
Partitions

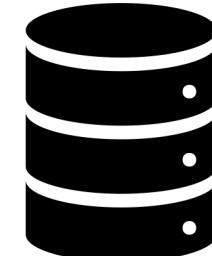
Learning Goals



HPC
Overview

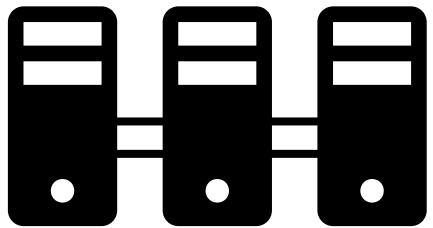


Nodes &
Partitions

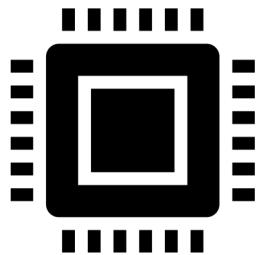


Data
Storage

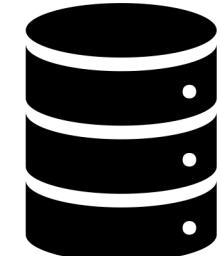
Learning Goals



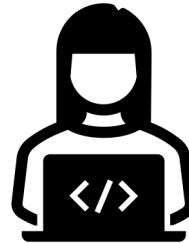
HPC
Overview



Nodes &
Partitions



Data
Storage



System
Access

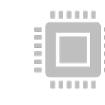
High Performance Computing



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Overview



Nodes



Data



Login

Be Boulder.

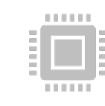
High Performance Computing



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Overview



Nodes



Data



Login

High Performance Computing



Scale

vs

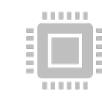
Speed



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Overview



Nodes



Data

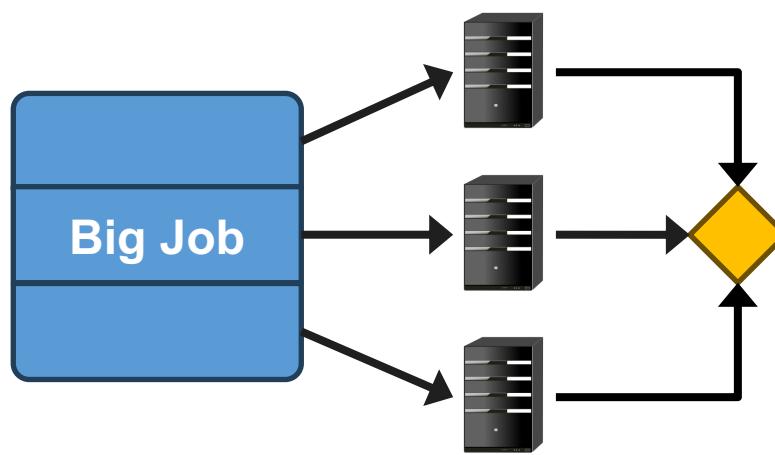


Login

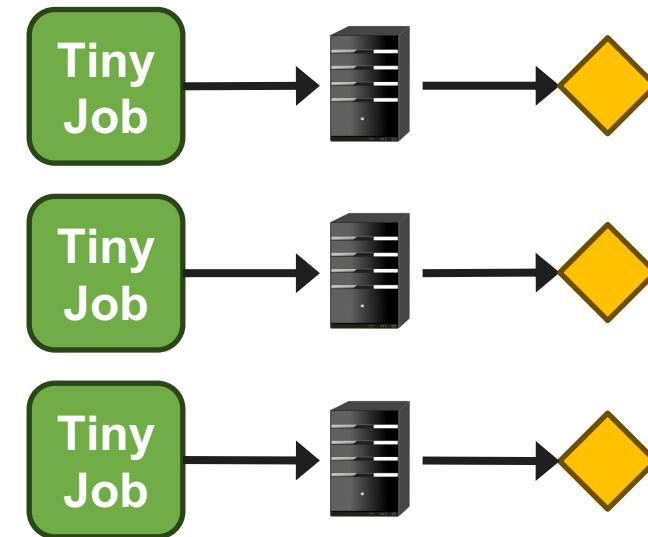
12

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What can / use HPC for?



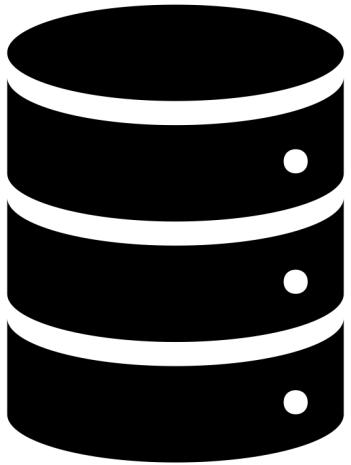
Parallel Jobs



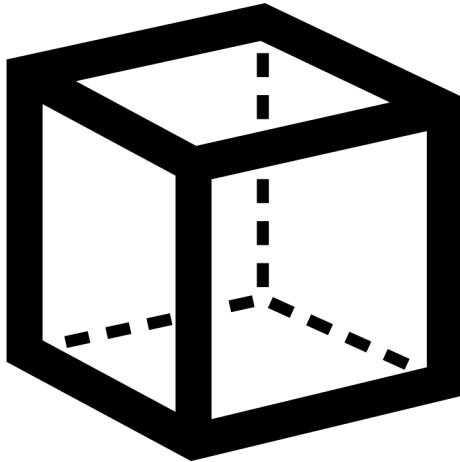
Serial Jobs



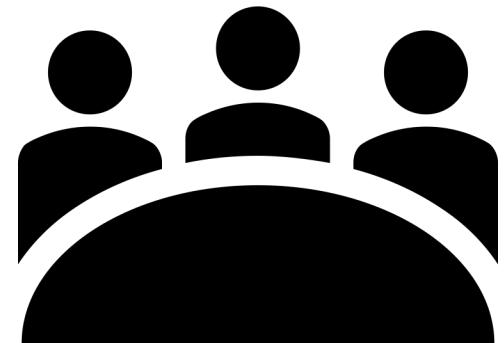
What can / use HPC for?



Big Data



Viz/Rendering



**Shared Work
Environment**



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Overview



Nodes



Data



Login

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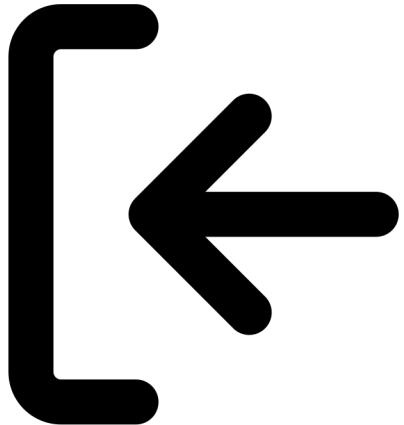
HPC Cluster: Alpine



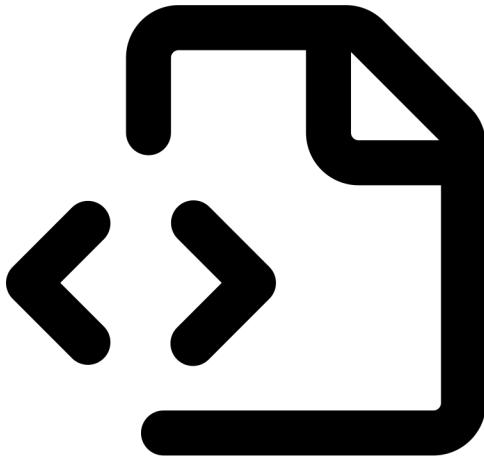
- Heterogeneous cluster
- Hardware provided by CU Boulder, CSU, and AMC
- Access available to CU Boulder, CSU, AMC and RMACC users



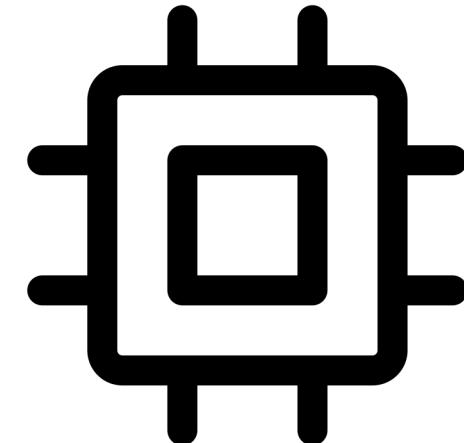
Node Types



LOGIN



COMPILE



COMPUTE



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Overview



Nodes



Data

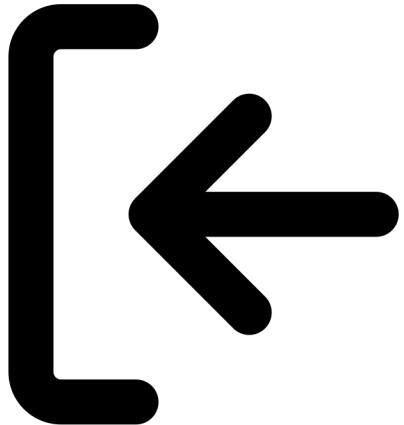


Login

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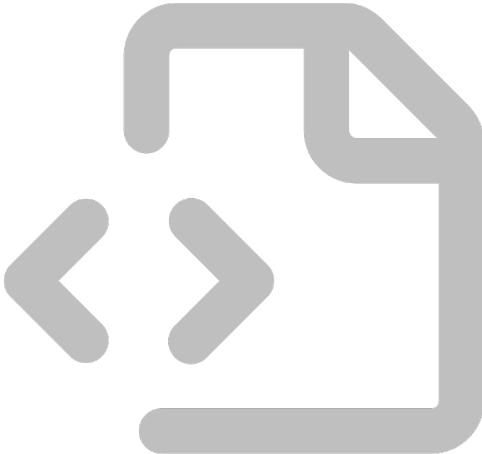
Be Boulder.

Node Types

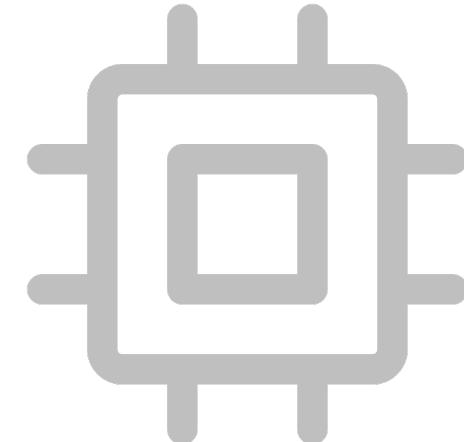


LOGIN

- Entry to system
- View or edit files
- Submit jobs



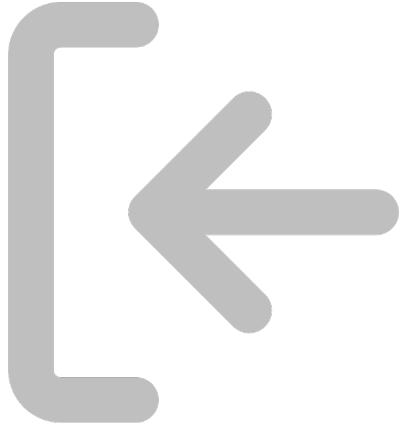
COMPILE



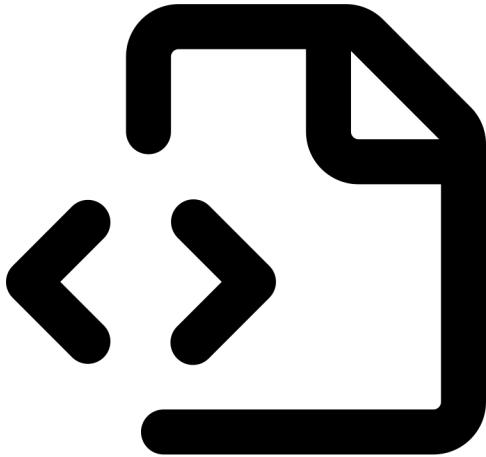
COMPUTE



Node Types

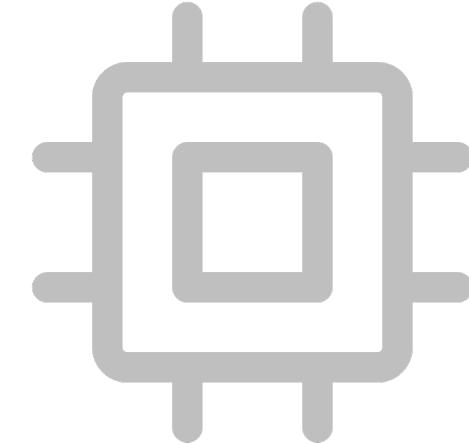


LOGIN



COMPILE

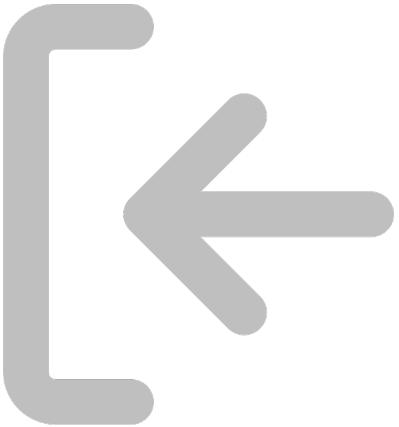
- View or edit files
- Submit jobs
- **Compile code**
- **Install software**



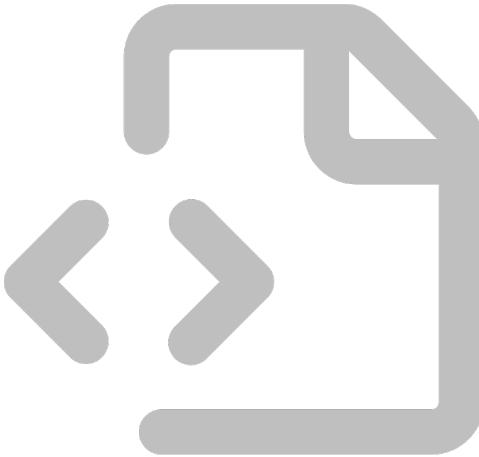
COMPUTE



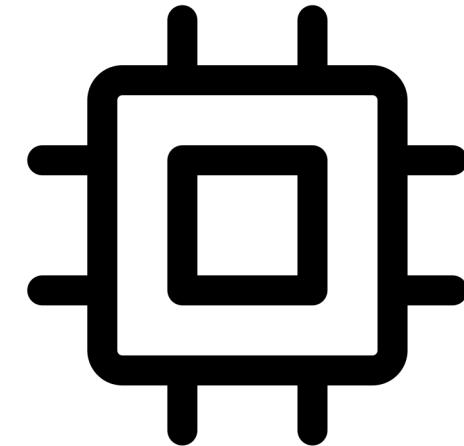
Node Types



LOGIN



COMPILE



COMPUTE

- Run scheduled jobs
- Handle calculations



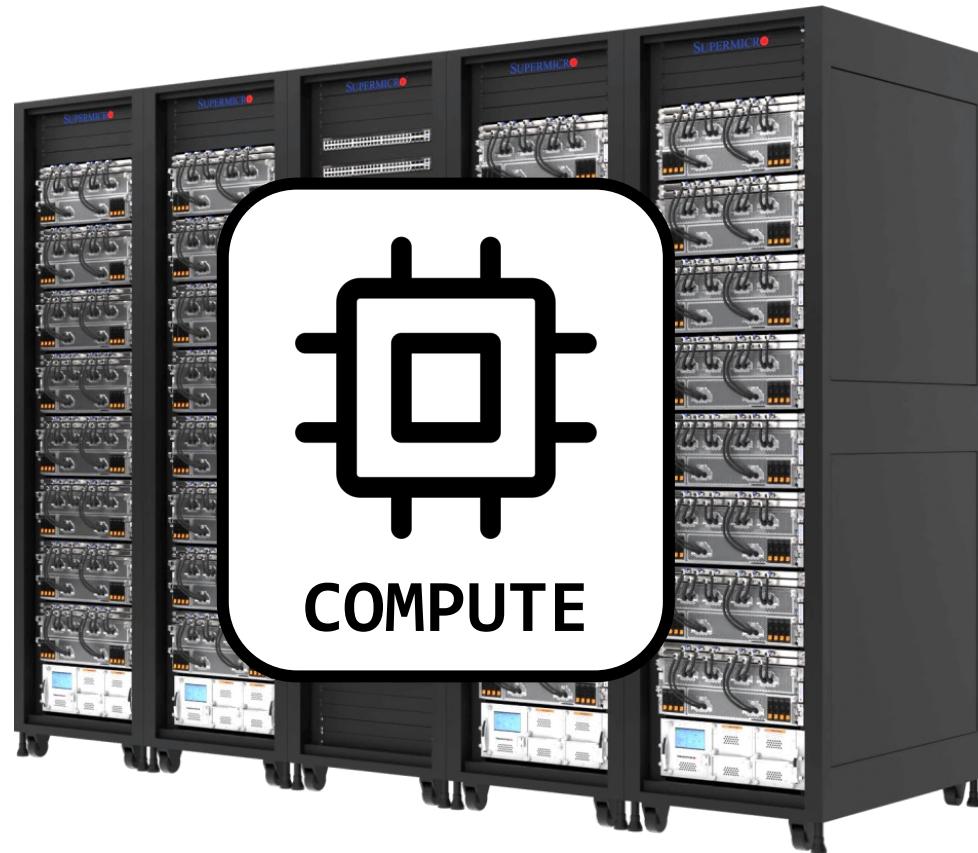
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Alpine Partitions



Alpine Partitions

amilan
General Usage



Alpine Partitions

amilan

General Usage

amem

High Memory



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Overview



Nodes



Data



Login

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Alpine Partitions

amilan

General Usage

amem

High Memory



aa100

Nvidia GPU's



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Overview



Nodes



Data



Login

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Alpine Partitions

amilan

General Usage

amem

High Memory

aa100

Nvidia GPU's

ami100

AMD GPU's



Data Storage

Core

- Personal Storage
- Includes 3 Directories
 - /home (2 GB)
 - /projects (250 GB)
 - /scratch (10 TB)



Data Storage

Core

- Personal Storage
- Includes 3 Directories
 - /home (2 GB)
 - /projects (250 GB)
 - /scratch (10 TB)

PL

- PetaLibrary
- Tiered Storage
 - Active, Archive
- Requires Funding
- Starts at 1 TB



Core

Home

- Personal data
- Config files
- OnDemand data
- Do not share!

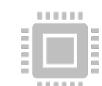
2 GB



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Overview



Nodes



Data



Login

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Core

Home

- Personal data
- Config files
- OnDemand data
- Do not share!

2 GB

Projects

- Code, Job scripts
- Installed software
- Shared data

250 GB



Core

Home

- Personal data
- Config files
- OnDemand data
- Do not share!

2 GB

Projects

- Code, Job scripts
- Installed software
- Shared data

250 GB

Scratch

- Job data (in/out)
- Shared data
- Deleted after 90 days

10 TB



PetaLibrary

Active

- Performance tier
- Accessible by all node
- No file limit



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Overview



Nodes



Data



Login

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PetaLibrary

Active

- Performance tier
- Accessible by all node
- No file limit

Archive

- Integrity tier
- Accessible by login node only
- 10,000 File Limit



PetaLibrary

Active

- Performance tier
- Accessible by all node
- No file limit

Archive

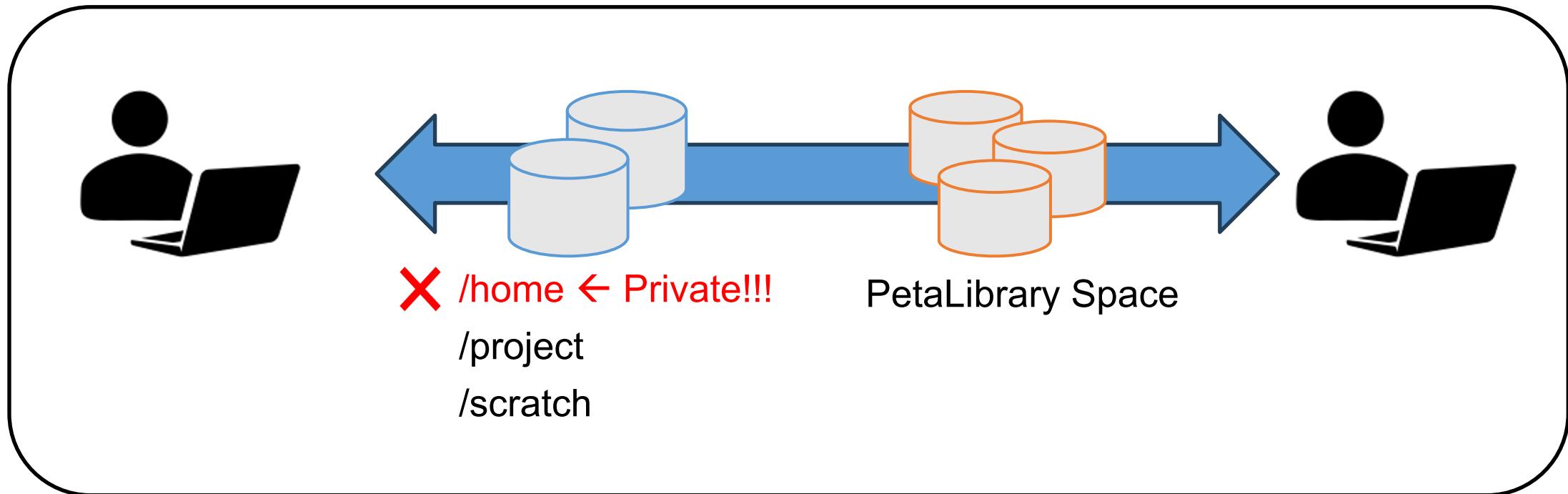
- Integrity tier
- Accessible by login node only
- 10,000 File Limit

Active + Archive

- Active synced to archive
- Updated every 15 minutes
- No file limit



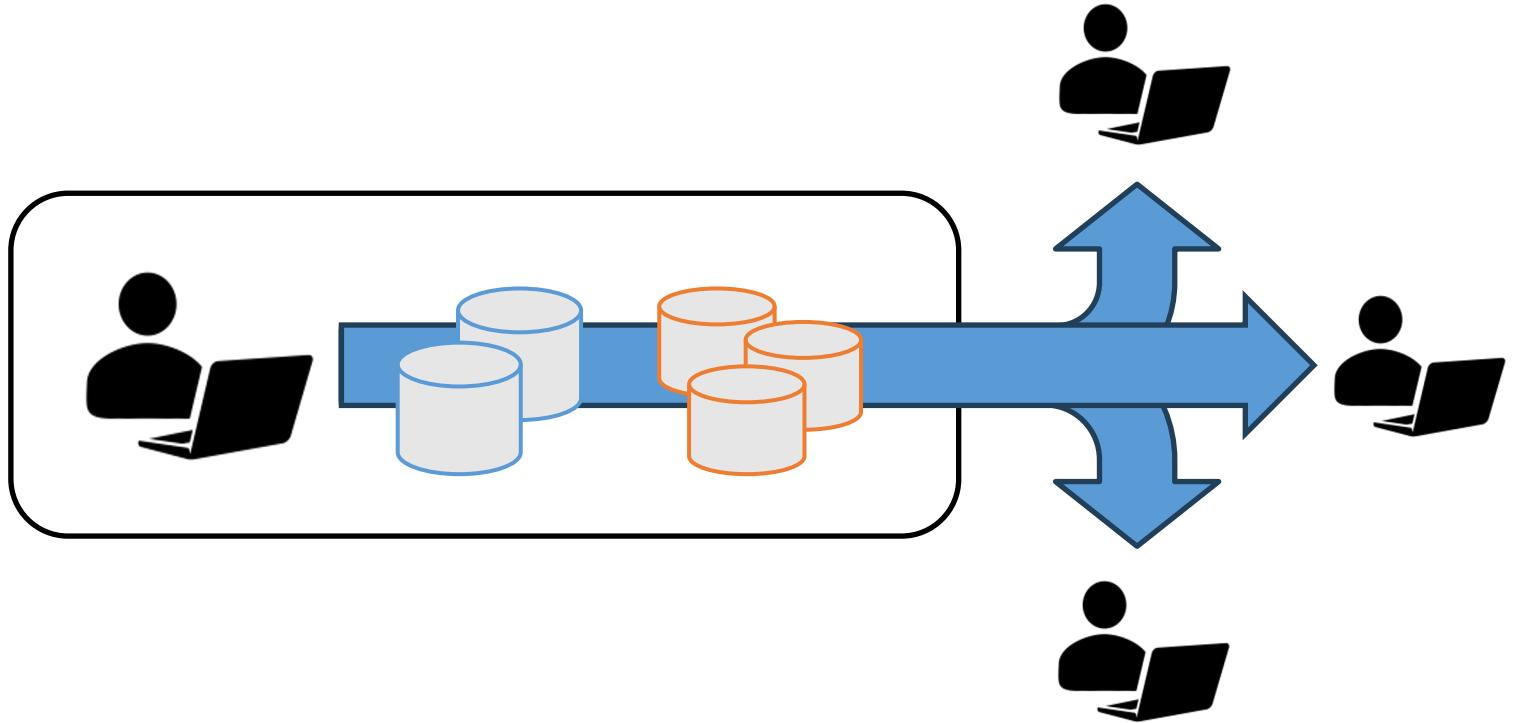
Data Sharing: Within RC



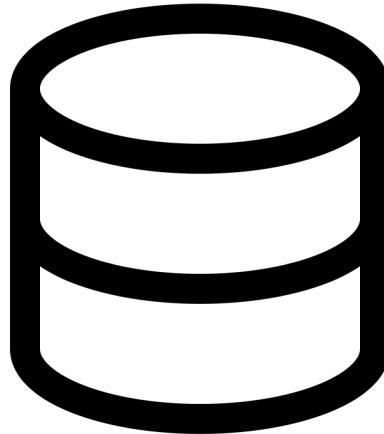
Data Sharing: Outside RC

Large Data Transfers:

- Globus (Recommended)
- Data Transfer Nodes (DTN)
- Terminal/Command Line:
 - rsync
 - rclone
 - sftp
 - scp



Data Transfer Nodes



DATA (DTN)

- Support data transfers
- Can be selected when using scp, sftp, or ssh transfers



Acceptable data storage and use

CURC systems and services **should not be used to store** any data that is US government Classified, nor any Controlled Unclassified Information.

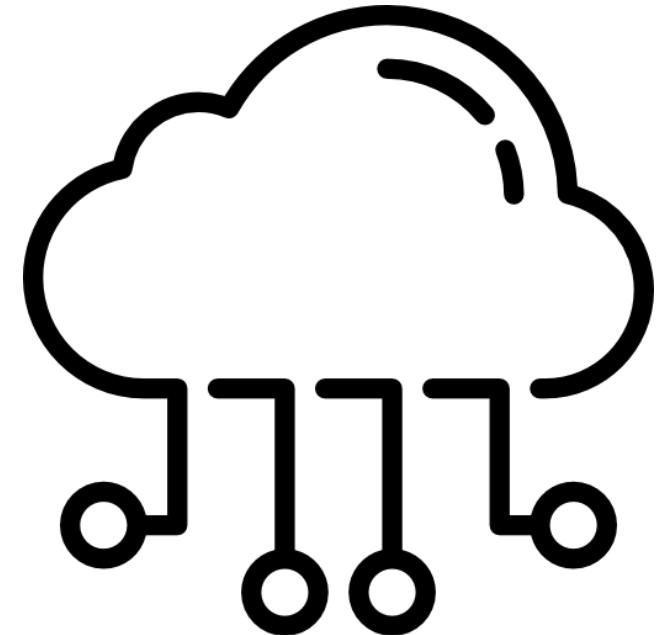
For users requiring storage for sensitive data types, please see the secure research computing resources:

<https://www.colorado.edu/rc/secure-research-computing-resources>



Cloud Computing

- CURC supports AWS, Azure, and GCP
- Alternative to HPC
- Enhance HPC



How to Access RC Resources?

1. Get an RC account
2. Set up two-factor authentication with Duo
3. Log in
4. Create greatness! (responsibly)



Getting an Account

- CU Boulder, CSU users and affiliates:
 - Request an account through the RC Account request portal:
<https://rcamp.rc.colorado.edu/accounts/account-request/create/organization>
- AMC, RMACC users and affiliates:
 - Request an account through the ACCESS-CI User Registration Portal:
<https://identity.access-ci.org/new-user.html>



Your RC Account

Access to:

1. Alpine Cluster
2. Core Storage
3. PetaLibrary Storage*
4. Open OnDemand
5. Approximately 2,000 Service Units (SUs) per month

*If purchased



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Overview



Nodes



Data



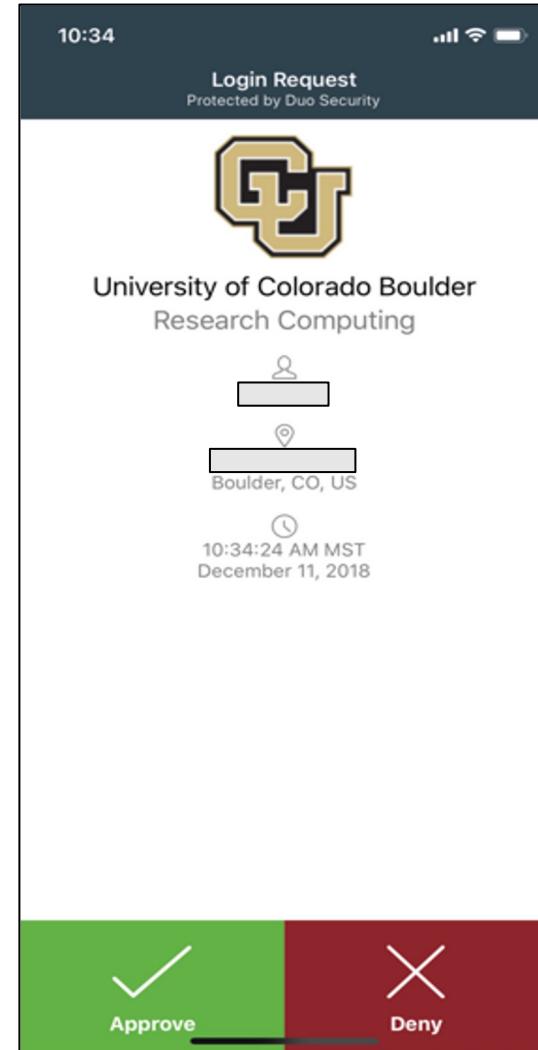
Login

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Duo Authentication

1. Duo smartphone app (recommended)
2. Phone Call/Text is an alternatives



Terminal Access

- Mac or Linux
 - Terminal application
- Windows
 - PuTTY
 - Powershell
- Open OnDemand (*alternative for CU affiliates*)
 - For those less familiar with Linux (ondemand.rc.colorado.edu/)

```
[user0083@login1 ~]$ pwd  
/home/user0083  
[user0083@login1 ~]$ █
```



Demo: Logging in via Terminal

To login to an RC login node:

```
$ ssh <username>@login.rc.colorado.edu
```

Supply your IdentiKey* password and your Duo app will alert you to confirm the login

* Exclusive to CU and CSU accounts



Demo: logging in with OnDemand

CURC Open OnDemand is a browser based, integrated, single access point for all of your HPC resources at CU Research Computing.

- CU Boulder: Visit <https://ondemand.rc.colorado.edu>.
- Other RMACC Institutions: Visit <https://ondemand-rmacc.rc.colorado.edu/>



Help! I'm stuck, where do I go?

- **Documentation:** curc.readthedocs.io/
- **Trainings with Center for Research Data and Digital Scholarship (CRDDS):** <https://www.colorado.edu/crdds/>
- **Helpdesk:** rc-help@colorado.edu
- **Consult Hours (Tuesday 12:00-1:00 in-person or virtually, Thursday 1:00-2:00 virtually)**

Helpdesk Tickets

To: rc-help@colorado.edu

Dear Research Computing,

Help! My code won't run!
Help!

Help please,
John

To: rc-help@colorado.edu

Dear Research Computing,

I am running into issues running my Python script. I am using a conda environment called my_python_env with the pytorch software, and I am receiving the following error. I am not sure how to troubleshoot. My job ID is 620350. Let me know what I can try!

`sbatch: error: Batch job submission failed: Invalid partition name specified.`

Thanks,
John



Survey and feedback

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

