

O2 Portal – Simplifying the Interaction and Experience of Using an HPC Environment

RC TRAINING | SUMMER 2023



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Contact information

 Email: rchelp@hms.harvard.edu

 Website: <https://it.hms.harvard.edu/rc>

 Phone: 617-432-2000 (HMS IT Service Desk, 8:00 am - 5:00 pm)

 Twitter: http://twitter.com/hms_rc

 Location: 1635 Tremont Street

 Office hours: Wednesdays 1:00-3:00 pm (Currently via Zoom - <https://rc.hms.harvard.edu/office-hours>)

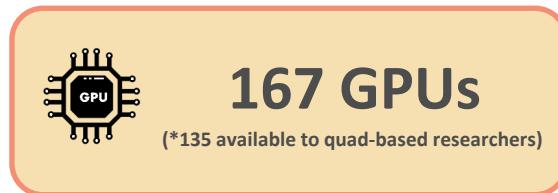
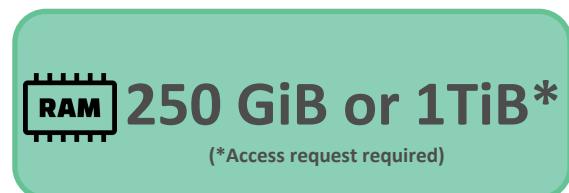


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What is O2?

- HMS Research Computing's newest High-Performance Compute cluster
- SLURM scheduler



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How to get an O2 account?

- Available to both, on-quad and off-quad researchers
 - off-quad - researchers from labs whose PIs **do not** have a primary or secondary faculty appointment in an [HMS Blavatnik Institute Basic or Social Science Department](#)
 - off-quad researchers are charged for O2 jobs and storage
- More information at [How to request or retain an O2 account](#)



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Important Note about O2 Storage

- O2 can only be used to store data of Harvard Security Level 3 and below.
- None of the standard filesystems are automatically encrypted, and **cannot** be used for HIPAA-protected or other secure data (Harvard's data security above level 3) unless those data have been de-identified.



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HMS Storage Offerings

- Options - <https://it.hms.harvard.edu/our-services/research-computing/services/storage>
- O2 Primary Storage
 - /home 100GiB
 - /n/data1, /n/data2, /n/groups
 - backups
- O2 Scratch
 - /n/scratch3
 - 10TiB; 30 day retention, no backups

Purpose/Used For	Active			Standby Standard
	Scratch	Compute	Collaborations	
Transient files used during a single job on the HMS High-Performance Compute (HPC) Cluster.	▪ Active research data that is frequently accessed, modified, or computed against.	▪ Run many analyses simultaneously on a High-Performance Compute (HPC) Cluster.	▪ Share documents and files with colleagues, both within and outside of your department.	▪ Infrequently accessed data, directly available for reference, retrieval, or analysis.
/n/scratch3	n/scratch3	n/data1 n/data2 n/groups	\research.files	\standby.files n/standby
Write Speed	 High	 High	 Medium	 Medium
Read Speed	 High	 High	 Medium	 Medium



O2 Cluster Status

- <https://harvardmed.atlassian.net/l/cp/zLMdWTYs>

O2 Cluster Status

Created by Bergman, Andrew L., last modified about an hour ago

This page shows all service outages for the O2 cluster, including planned maintenance and unplanned events.

We also post updates on the [HMS RC Twitter page](#).

ONLINE

July 8: notes after the July OS/Slurm update

- Jupyter Notebooks users should start a new environment and remove any old runtime directories.
- "sbatch" no longer uses the "-x11" option in the new version of Slurm. Just remove it from your script and X forwarding should work by default.
 - "srun" commands still require "-x11" to enable X forwarding, though.
- If you have any custom built software, you may need to recompile or relink it on O2.



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Data Management

- 1. Planning: Plan ahead**
- 2. Active Research: Document**
- 3. Dissemination: Share confidently**

Note: be sure to ask your PI and your department about standard practices in your field!

Harvard Biomedical Data Management Website: <https://datamanagement.hms.harvard.edu>

Resources: <https://datamanagement.hms.harvard.edu/about/what-research-data-management/rdm-resources>

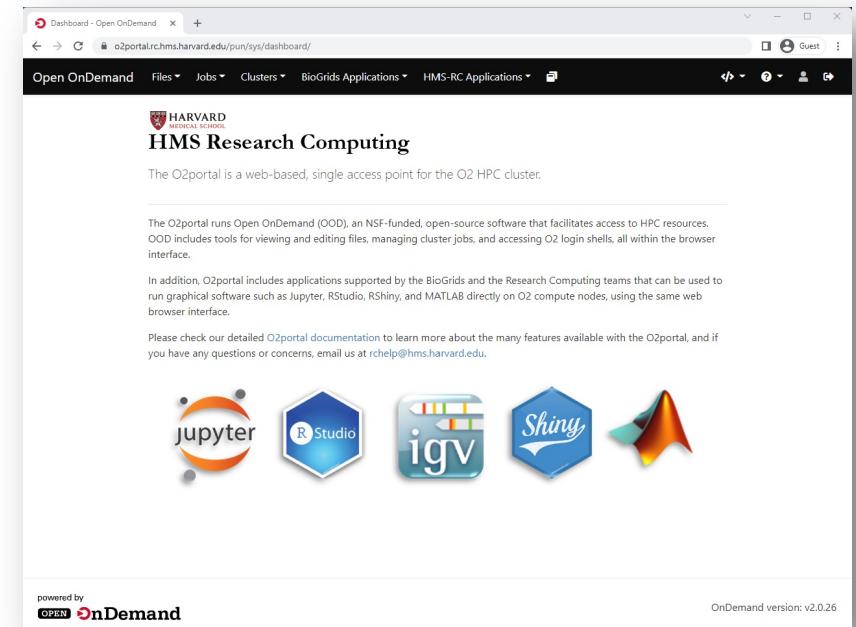


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O2 portal – O2 web-based access point

- Powered by Open OnDemand
- Developed by Ohio Supercomputer Center (OSC)
- NSF Funded

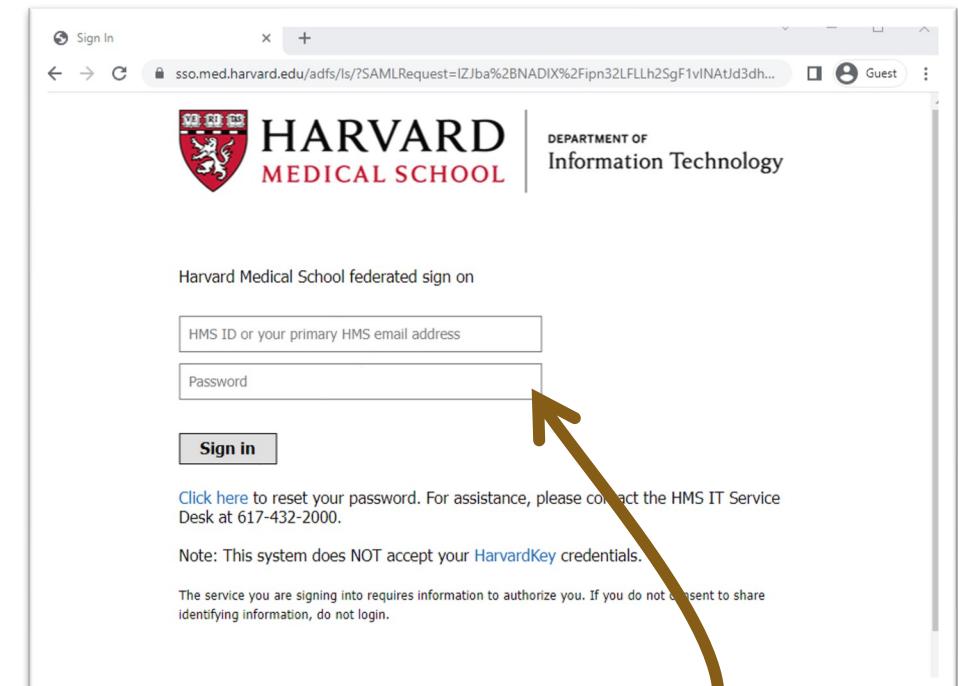
A screenshot of a web browser displaying the O2 portal dashboard. The title bar shows "Dashboard - Open OnDemand" and the URL "o2portal.rc.hms.harvard.edu/pun/sys/dashboard/". The main content area is titled "HMS Research Computing" and includes the Harvard Medical School logo. It provides a brief overview of the O2 portal, stating it is a web-based, single access point for the O2 HPC cluster, powered by Open OnDemand (OOD). It mentions that OOD includes tools for viewing and editing files, managing cluster jobs, and accessing O2 login shells. Below this, it notes that the portal includes applications supported by the BioGrids and Research Computing teams, such as Jupyter, R Studio, igv, Shiny, and MATLAB. At the bottom, it says "powered by OPEN OnDemand" and "OnDemand version: v2.0.26".

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Requirements to Access the O2 Portal

- O2 account
- Setup 2FA authentication



Authenticate with HMS ID



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Transfer Files



Submit Jobs



Monitor Jobs



Terminal



View/Edit Files



Applications



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Transfer Files



Submit Jobs



Monitor Jobs



Terminal



View/Edit Files



Applications



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Transfer Files

Open OnDemand

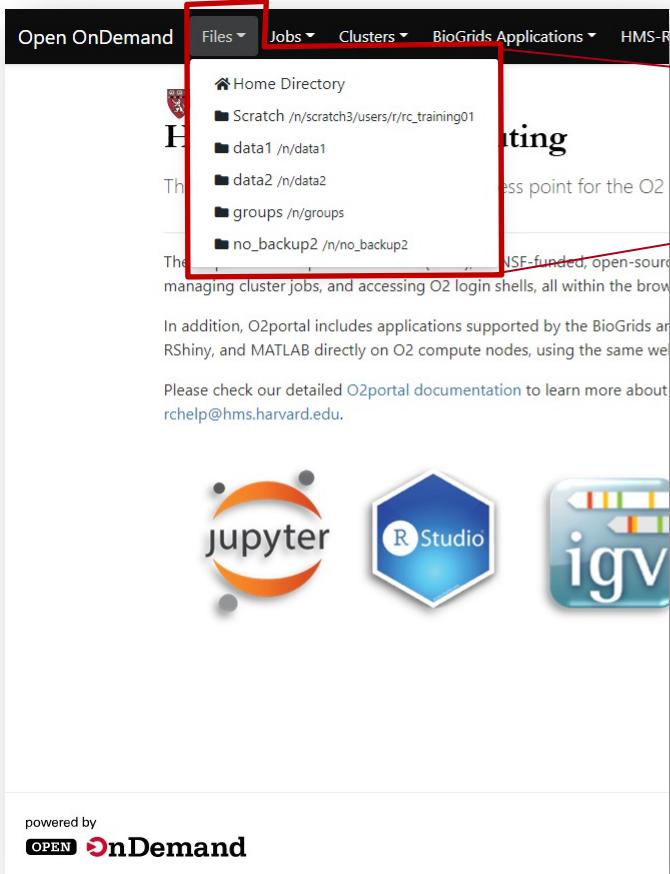
Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-R

The O2portal interface provides a single access point for the O2 cluster, allowing users to manage their files, run jobs, and interact with the cluster's resources. The interface is designed to be user-friendly and accessible from any web browser. It includes features such as a file browser, a job submission interface, and a cluster management tool. The O2portal interface is built on top of the Open OnDemand platform, which is a powerful and flexible system for managing distributed computing resources.

In addition, O2portal includes applications supported by the BioGrids and RShiny teams, such as Jupyter notebooks, R Studio, and igv.js. These applications can be run directly on the O2 compute nodes, providing a seamless workflow for data analysis and visualization.

Please check our detailed [O2portal documentation](#) to learn more about O2portal. If you have any questions or need assistance, please contact us at rchelp@hms.harvard.edu.

powered by
OPEN OnDemand



Select a filesystem



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Transfer Files

Upload

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ My Interactive Sessions ? Help ▾ Logged in as rc_training01 Log Out

Open in Terminal + New File + New Directory **Upload** Download Copy/Move Delete

Home Directory

Scratch

data1

data2

groups

no_backup2

Drop files here, [browse files](#) or
[browse folders](#)

Empty directories will be included in the upload only when a directory upload is initiated via drag and drop. This is because the File and Directory Entries API is available only on a drop event, not during an input change event.

Powered by Uppy

powered by
OPEN OnDemand

OnDemand version: v2.0.26



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Transfer Files

Download

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ My Interactive Sessions ? Help ▾ Logged in as rc_training01 Log Out

Open in Terminal + New File New Directory Upload Download Copy/Move Delete

Home Directory

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data1

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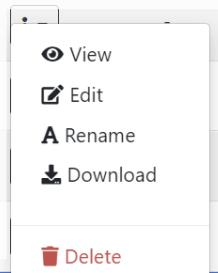
no_backup2

Up / home / rc_training01 / Change directory Copy path

Show Owner/Mode Show Dotfiles Filter:

Showing 5 of 16 rows - 1 rows selected

Type	Name	Size	Modified at
Folder	ondemand		8/8/2022 5:01:26 PM
Folder	programs		8/8/2022 4:00:36 PM
Folder	R		8/8/2022 5:09:16 PM
Folder	tissue_project		8/8/2022 3:59:27 PM
File	rstudio_launcher.sh	0 Bytes	8/8/2022 4:01:16 PM



powered by
OPEN OnDemand

OnDemand version: v2.0.26



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Transfer Files

Within O2

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ My Interactive Sessions ? Help ▾ Logged in as rc_training01 Log Out

Open in Terminal + New File New Directory Upload Download Copy/Move Delete

Copy or move the files below from /home/rc_training01 to the current directory:

/ home / rc_training01 Change directory Copy path

Show Owner/Mode Show Dotfiles Filter: Showing 3 of 9 rows - 1 rows selected

Type	Name	Size	Modified at
programs	programs	-	8/8/2022 4:00:36 PM
tissue_project	tissue_project	-	8/8/2022 3:59:27 PM
rstudio_launcher.sh	rstudio_launcher.sh	0 Bytes	8/8/2022 4:01:16 PM

Home Directory Scratch data1 data2 groups no_backup2

Copy Move

powered by **OPEN** OnDemand OnDemand version: v2.0.26

- 1 Select file or directory
- 2 Click on “Copy/Move”
- 3 Move to target location
- 4 Click on Copy or Move



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Transfer Files

Within O2

c Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ My Interactive Sessions ? Help ▾ Logged in as rc_training01 Log Out

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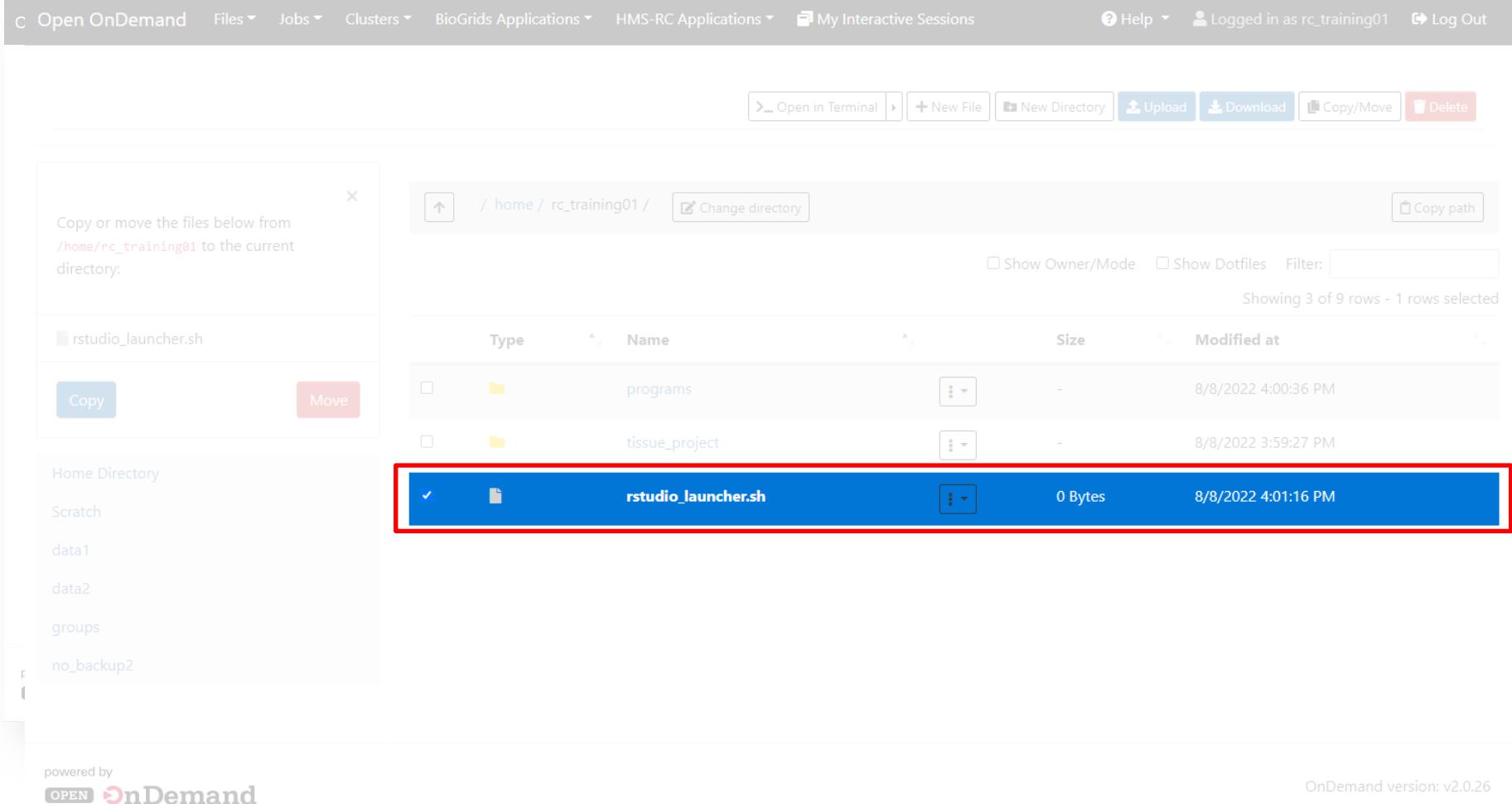
/home/rc_training01/ Change directory Copy path

Show Owner/Mode Show Dotfiles Filter: Showing 3 of 9 rows - 1 rows selected

Type	Name	Size	Modified at
programs	programs	-	8/8/2022 4:00:36 PM
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rstudio_launcher.sh	rstudio_launcher.sh	0 Bytes	8/8/2022 4:01:16 PM

Home Directory Scratch data1 data2 groups no_backup2

powered by **OPEN** OnDemand OnDemand version: v2.0.26



1 Select file or directory

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Transfer Files

Within O2

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ My Interactive Sessions ? Help ▾ Logged in as rc_training01 Log Out

Open in Terminal + New File New Directory Upload Downloads Copy/Move Delete

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/ home / rc_training01 Change directory Copy path

Show Owner/Mode Show Dotfiles Filter: Showing 3 of 9 rows - 1 rows selected

Type	Name	Size	Modified at
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tissue_project		-	8/8/2022 3:59:27 PM
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Copy Move

Home Directory
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powered by **OPEN** OnDemand OnDemand version: v2.0.26

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Transfer Files

Within O2

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rstudio_launcher.sh	rstudio_launcher.sh	0 Bytes	8/8/2022 4:01:16 PM

Copy Move

Home Directory Scratch data1 data2 groups no_backup2

powered by **OPEN** OnDemand OnDemand version: v2.0.26

1 Select file or directory

2 Click on “Copy/Move”

3 Move to target location

4 Click on Copy or Move



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Transfer Files

Within O2

The screenshot shows the Open OnDemand interface with the 'Transfer Files' tab selected. The top navigation bar includes links for Open OnDemand, Files, Jobs, Clusters, BioGrids Applications, HMS-RC Applications, My Interactive Sessions, Help, Log In, and Log Out. Below the navigation is a toolbar with buttons for Open in Terminal, New File, New Directory, Upload, Download, Copy/Move, and Delete.

The main area displays a file browser with the current directory set to /home/rc_training01. A sidebar on the left lists Home Directory, Scratch, data1, data2, groups, and no_backup2. The main content area shows a list of files and directories:

Type	Name	Size	Modified at
File	rstudio_launcher.sh	0 Bytes	8/8/2022 4:01:16 PM
Directory	programs	-	8/8/2022 4:00:36 PM
Directory	tissue_project	-	8/8/2022 3:59:27 PM

A red box highlights the 'rstudio_launcher.sh' file in the list, with 'Copy' and 'Move' buttons visible next to it. The 'Copy' button is blue, and the 'Move' button is red.

At the bottom, there is a note: "powered by OPEN OnDemand" and "OnDemand version: v2.0.26".

- 1 Select file or directory
- 2 Click on “Copy/Move”
- 3 Move to target location
- 4 Click on Copy or Move



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Submit Jobs

*A job is a **resource** request sent to O2 via the O2 Portal containing one or more **tasks**.*



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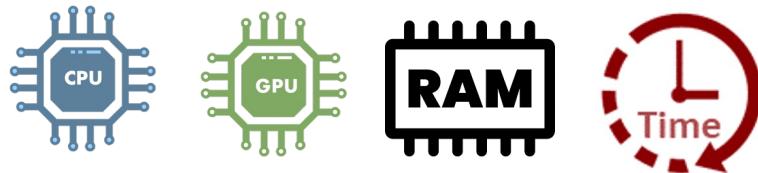
RESEARCH COMPUTING



Submit Jobs

*A job is a **resource** request sent to O2 via the O2 Portal containing one or more **tasks**.*

Resources



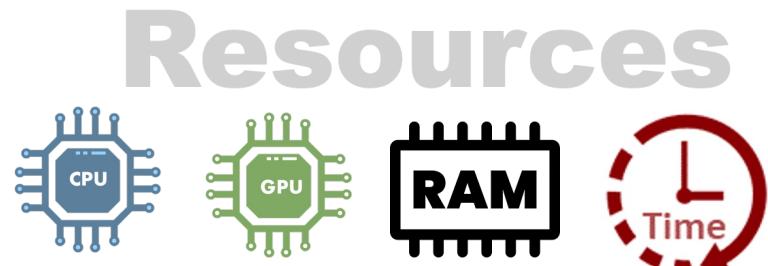
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Submit Jobs

A job is a **resource** request sent to O2 via the O2 Portal containing one or more **tasks**.



Launch Application



Data Analysis



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Transfer Files



Submit Jobs



Monitor Jobs

Terminal



View/Edit Files



Applications



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Monitor Jobs

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ **My Interactive Sessions** ? Help ▾ Logged in as rc_training01 Log Out

RStudio Environment (59163745)

Queued

Delete

RStudio Environment (14087611)

1 node | 1 core | Running

Delete

Host: compute-e-16-230.o2.rc.hms.harvard.edu

Created at: 2022-08-08 17:03:32 EDT

Time Requested: 1 hour

Ses:

Ple

req

Time Remaining: 58 minutes

Session ID: d262e7ff-eee2-4bb9-97e3-89c6ce0e4959

Progress & Error log: [output.log](#)

® Connect to RStudio Server

Job Status



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Monitor Jobs

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ **My Interactive Sessions** Help ▾ Logged in as rc_training01 Log Out

RStudio Environment (14087611) **1 node | 1 core | Running**

Host: compute-e-16-230.o2.rc.hms.harvard.edu [Delete](#)

Created at: 2023-08-01 16:05:01 EDT

Time Remaining: 58 minutes

Session ID: [d262e7ff-eee2-4bb9-97e3-89c6ce0e4959](#)

Progress & Error log: [output.log](#)

[Connect to RStudio Server](#)

Important!
(Stop the job)



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Monitor Jobs

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ **My Interactive Sessions** Help ▾ Logged in as rc_training01 Log Out

RStudio Environment (14087611) **1 node | 1 core | Running**

Host: compute-e-16-230.o2.rc.hms.harvard.edu [Delete](#)

Created at: 2023-08-01 16:05:01 EDT

Time Remaining: 58 minutes

Session ID: [d262e7ff-eee2-4bb9-97e3-89c6ce0e4959](#)

Progress & Error log: [output.log](#) **Link to log file** ←

[Connect to RStudio Server](#)



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Monitor Jobs

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ **My Interactive Sessions** ? Help ▾ Logged in as rc_training01 Log Out

RStudio Environment (14087611) **1 node | 1 core | Running**

Host: compute-e-16-230.o2.rc.hms.harvard.edu Delete

Created at: 2023-08-01 16:05:01 EDT

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Session ID: [d262e7ff-eee2-4bb9-97e3-89c6ce0e4959](#)

Progress & Error log: [output.log](#)

[Connect to RStudio Server](#)

Open Application



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Transfer Files



Submit Jobs



Monitor Jobs

Terminal



View/Edit Files



Applications



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Terminal

The O2portal is a web-based, single access point for the O2 HPC cluster.

The O2portal runs Open OnDemand (OOD), an NSF-funded, open-source software that facilitates access to high-performance computing resources.

```
rc_training01@transfer06:~$ [rc_training01@login02:~]$
```

Host: transfer.rc.hms.harvard.edu Themes: Default

running kernel 3.10.0 born on 2020-08-11

==== 02 =====

News (Jan 3 2022)

+-----+
| ##### RC Core launched in July 2021 ##### |
| Since July 2021, researchers whose PI does not have a primary or secondary |
| faculty appointment in an HMS Basic or Social Science Department will incur |
| charges to their lab for O2 usage. Details at: it.hms.harvard.edu/rc/core |
+-----+

Contact HMS Research Computing:
E-mail rchelp@hms.harvard.edu
Web it.hms.harvard.edu/rc
Twitter @hms_rc

[rc_training01@transfer06 ~]\$

```
rc_training01@login02:~$ [rc_training01@login02:~]$
```

Host: o2.hms.harvard.edu Themes: Default

running kernel 3.10.0 born on 2021-09-27

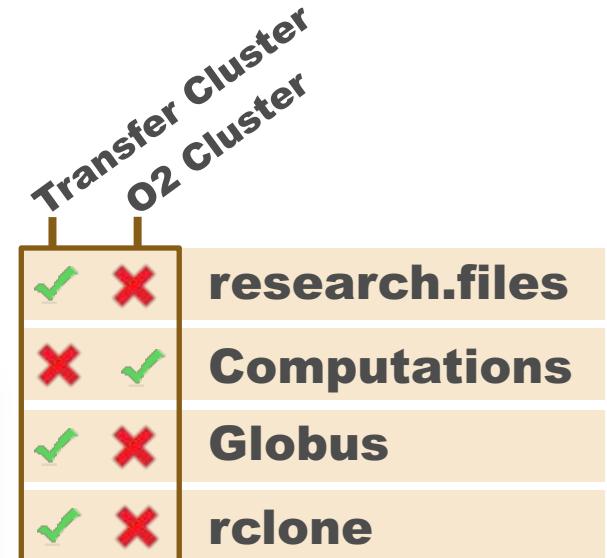
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+-----+

Contact HMS Research Computing:
E-mail rchelp@hms.harvard.edu
Web it.hms.harvard.edu/rc
Twitter @hms_rc

[rc_training01@login02 ~]\$



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Transfer Files



Submit Jobs



Monitor Jobs



Terminal



View/Edit Files



Applications



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View/Edit Files

Open OnDemand Files ▾ Jobs ▾ Clusters ▾ BioGrids Applications ▾ HMS-RC Applications ▾ My Interactive Sessions ? Help ▾ Logged in as rc_training01 Log Out

Open in Terminal + New File New Directory Upload Download Copy/Move Delete

Home Directory

Scratch

data1

data2

groups

no_backup2

/ home / rc_training01 / Change directory Copy path

Show Owner/Mode Show Dotfiles Filter: Showing 3 of 9 rows - 0 rows selected

Type	Name	Size	Modified at
Folder	programs	-	8/8/2022 4:00:36 PM
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File	rstudio_launcher.sh	0 Bytes	8/8/2022 4:01:16 PM

View Edit Rename Download Delete

powered by **OPEN** OnDemand OnDemand version: v2.0.26



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Transfer Files



Submit Jobs



Monitor Jobs



Terminal



View/Edit Files



Applications



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1. Select Application



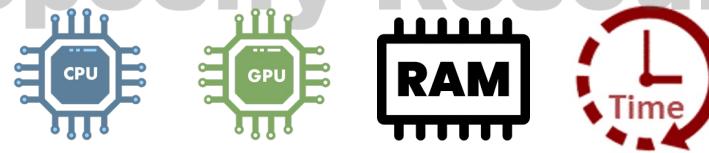


Applications

1. Select Application



2. Specify Resources



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Applications

1. Select Application



2. Specify Resources



3. Launch Application

Launch



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Applications

- Two sets of scientific software applications provided by BioGrids and HMS Research Computing

BioGrids Applications

GUIs
IGV
IDE
Jupyter
RStudio

HMS-RC Applications

GUIs
Desktop Mate
Graphical User Interface (GUI)
MATLAB
Relion
IDE
VSCode
Jupyter
MATLAB-proxy-app
RStudio Environment
Shiny (Internal)



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Documentation

The O2portal is a web-based, single access point for the O2 HPC cluster. The O2portal runs Open OnDemand (OOD), an NSF-funded, open-source software that facilitates access to HPC resources. OOD includes tools for viewing and editing files, managing cluster jobs, and accessing O2 login shells, all within the browser interface. In addition, O2portal includes applications supported by the BioGrids and the Research Computing teams that can be used to run graphical software such as Jupyter, RStudio, RShiny, and MATLAB directly on O2 compute nodes, using the same web browser interface. Please check our detailed [O2portal documentation](#) to learn more about the many features available with the O2portal, and if you have any questions or concerns, email us at rchelp@hms.harvard.edu.

HMS Research Computing

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Please check our detailed [O2portal documentation](#) to learn more about the many features available with the O2portal, and if you have any questions or concerns, email us at rchelp@hms.harvard.edu.

Applications:

- jupyter
- R Studio
- igv
- Shiny
- MATLAB

O2 Portal Documentation in Confluence

How to use HMS RC Desktop App

O2Portal - Jupyter App HMS - RStudio on O2

O2Portal

Created by William (Gaby) Rodriguez
Last updated: Jun 09, 2022 by Amir Karger • 4 min read • 8 people viewed

- How to login to O2Portal
- Features available in O2Portal
- Computational Applications available in O2Portal
 - HMS Research Computing Applications
 - BioGrids Applications
- F.A.Q.

The O2Portal runs Open OnDemand (OOD), an NSF-funded, open-source software that facilitates access to HPC resources. Open OnDemand was created and is maintained by the Ohio Supercomputer Center.

The O2Portal provides easy access to HMS' O2 cluster and includes tools for viewing/editing files, managing cluster jobs, accessing login shells and more, entirely via the same single-sign-on web-based interface.

How to login to O2Portal

⚠️ You must have an O2 account in order to use the O2Portal

<https://harvardmed.atlassian.net/l/cp/vZ58cLoQ>



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Contact information

 Email: rchelp@hms.harvard.edu

 Website: <https://it.hms.harvard.edu/rc>

 Phone: 617-432-2000 (HMS IT Service Desk, 8:00 am - 5:00 pm)

 Twitter: http://twitter.com/hms_rc

 Location: 1635 Tremont Street

 Office hours: Wednesdays 1:00-3:00 pm (Currently via Zoom - <https://rc.hms.harvard.edu/office-hours>)



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