

Overview

O2 is a platform for Linux-based high performance computing at Harvard Medical School. The name is derived from being the next generation of the HMS "Orchestra" cluster, hence "O"2.

- O2 is managed by the [Research Computing Group](#), part of [HMS IT](#).
- O2 is an HPC cluster built on Linux and the [Slurm](#) open source job scheduler.
- Please [submit a request](#) for O2 help or feedback.
- Follow us on [Twitter](#) for updates and alerts about service outages.

Getting Started with O2 and Slurm

- [Basic guide to O2 and the Slurm job scheduler](#) **New users, start here!**
- [Switching workflows from Orchestra to O2](#) **Orchestra users, start here!**
- [How to login to O2](#)
- [Frequently Asked Questions about O2](#)
- [Security on O2](#)

O2 Jobs and the Slurm scheduler

- [How to choose a partition](#) (the Slurm equivalent to job queues in LSF)
- [Troubleshooting your O2 jobs](#)
- [Parallel Jobs in O2](#)
- [Using O2 GPU resources](#)
- [O2 HPC Cluster and Computing Nodes Hardware Information](#)
- [Job Priority](#)
- [Examples of O2 commands](#)
- [Get information about current and past jobs](#)

Software and Programming on O2

- [Using research applications on O2](#)
- [Using MATLAB on O2](#)
- [Using Mathematica on O2](#)
- [Using Conda on O2](#)
- [Using Java on O2](#)
- [Using Jupyter on O2](#)
- [Maintain your own library of software for different languages](#)
 - [Personal Python packages](#)
 - [Personal R packages](#)
 - [Personal Perl packages](#)
- [Installing custom software](#)
- [Using Genome Browsers \(IGV, UCSC Genome Browser\)](#)
- [Available Software on O2](#)

Cluster Status

DEGRADED PERFORMANCE

Our [cluster status page](#) has details of service outages and planned maintenance.

September 18 - Service Degradation

O2 has been experiencing intermittent problems with its authentication system on login, transfer, and compute nodes. This issue can potentially result in: slow or failed logins to O2, Missing group membership, Failed job submissions. We are working with the software vendor to resolve this.

August 9 - Service Degradation

New jobs are intermittently not starting on the cluster (or the sbatch command has errors) due to an issue with cluster-storage communication. We believe that currently running jobs are still executing normally. Disk read/writes may be slower than usual, which can cause other commands to be slow. We will provide details as we get them.

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.

Two Factor Authentication:

All O2 cluster logins [from outside of the HMS network](#) require two-factor authentication. Please see:

- [Two Factor Authentication on O2](#)
- [Two Factor Authentication FAQ](#)
- [How to setup your HMS Duo profile](#)

Community Events

User Training

- Classes are offered each semester to the HMS community to help you ramp up your research skills!
- Please check the [User Training page](#) for courses, dates, and registration

General UNIX Information

- Using X11 applications remotely
- UNIX permissions tutorial
- O2 cron service

Data Storage

- There are a number of storage options available for research data.
- Copying files to and from O2 (including downloading from websites)
- If you had an Orchestra account, you will get access to the same home directory and shared network storage from O2.

Office Hours

- RC's Office Hours are held every Wednesday, 1 - 3 PM.
 - As part of the HMS response to COVID-19, office hours are being held online, using Zoom.
 - During these hours only, you can join the Zoom meeting room for a consultation.
- Please contact us first with a support request before joining office hours so we can better help you!

Intermediate Slurm

- Research Computing Group custom workflows
- Get more informative slurm email notification
- Report CPU/Mem usage in slurm job standard output
- screen: go back to the same terminal window from anywhere, anytime
- tmux: go back to the same terminal window from anywhere, anytime
- Install and run HiC-Pro-2.10.0
- Install and run salmon-0.10.0 and Trinity-2.6.6
- Aspera and sratoolkit to download NCBI SRA data
- Batch small jobs together as a big job
- sratoolkit/2.10.7 to download dbGAP data

Grants and Citation Information

- Text about Research Computing and O2 for grant applications
- Published papers that cite HMS Research Computing resources