Massachusetts Institute of Technology

User Workflows on SubMIT
how users get physics done efficiently using our system

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How do users sign up to use SubMIT?

The account request and generation process is streamlined, requiring only approval from the SubMIT Team

Users send an email to submit-help@mit.edu requesting access

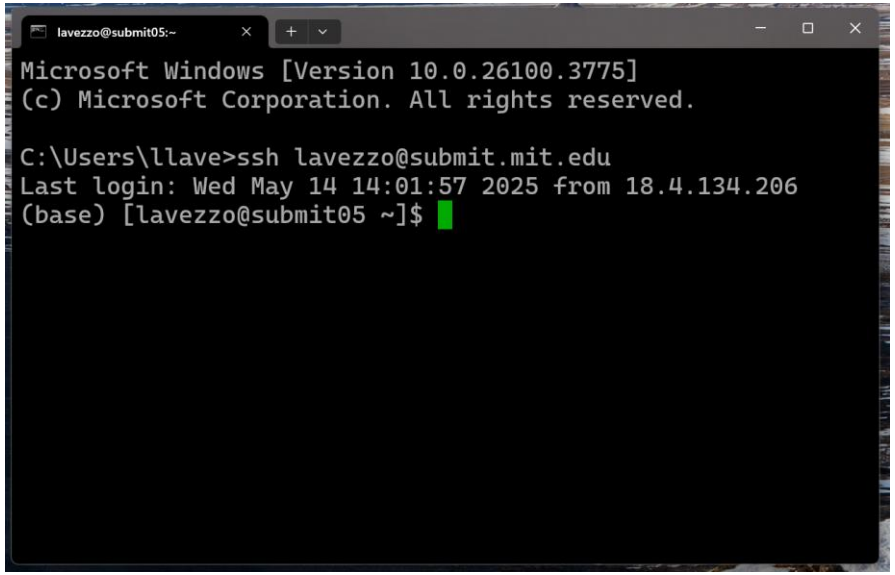
SubMIT Team verifies they should have access and approves their request

Account is automatically created, and the user receives a welcome email

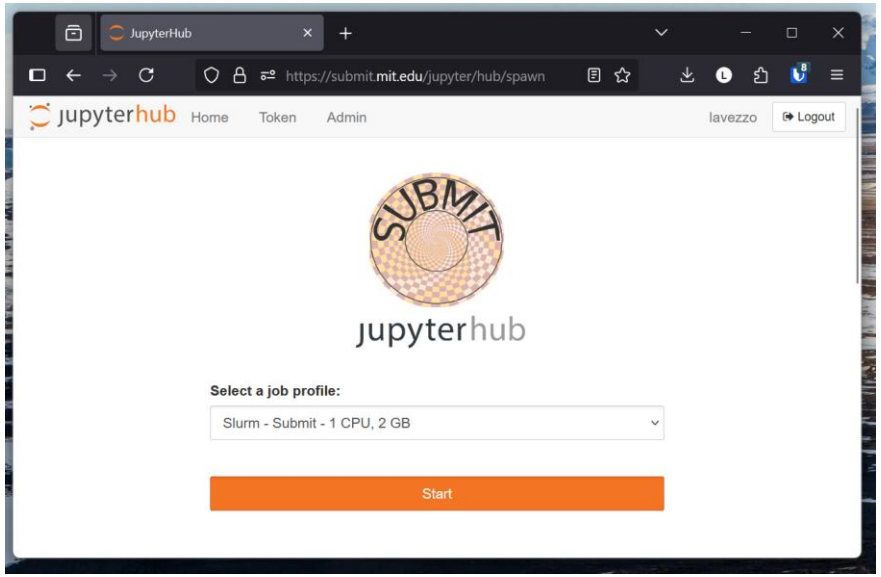
How do users interact with SubMIT?

Access is straightforward via a terminal (SSH) or web-browser (JupyterHub), both providing full access and functionality of the SubMIT system, using secure keys and Touchstone, respectively, to authenticate users

Terminal



Web-browser



What do users get on the system?

By default, each user is granted the following storage spaces

5 GB	**/home/submit/user**	Code, plots, small outputs	Fast access (100 Gb/s) Backed up daily
50 GB	**/work/submit/user**	Software & libraries	Fast access (100 Gb/s)
1TB	**/ceph/submit/user**	Large data storage	(new!) CephFS Fast access (100 Gb/s)

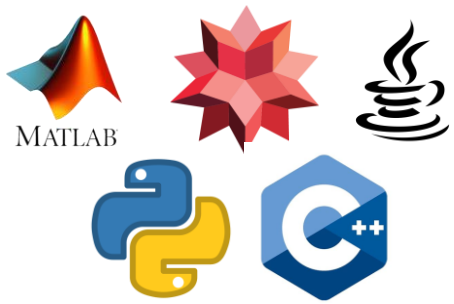
Fast, flexible system with a lot of space granted for free

We support group area storage, with several groups having bought disks for extra space

XTB	**/ceph/submit/group**	Large data storage	Fast access (100 Gb/s) CephFS

What software can users access on SubMIT?

The user has a suite of tools they can leverage to get their work done: some are maintained centrally by the SubMIT Team, but users can install things themselves via package managers and containers



Centrally managed standard libraries and software available natively

Users have access to conda as an environment and package manager

Containers supported via podman/docker and singularity

Specialized software supported: OpenMPI, Dask, CernVM-FS, XRootD, ... as requested by users!

What computing resources are available for users?

All users have access to

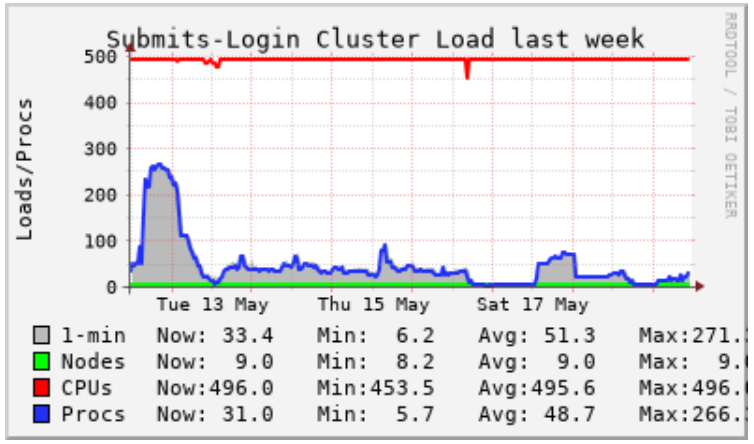
Interactive nodes	SubMIT login nodes to develop and debug workflows interactively	6 machines
Slurm	SubMIT worker nodes dedicated for compute	~1500 CPUs, ~20 GPUs
HTCondor	Large batch systems (MIT T3, MIT T2, OSG)	Several thousand of CPUs available per user

Increasing computational need and complexity

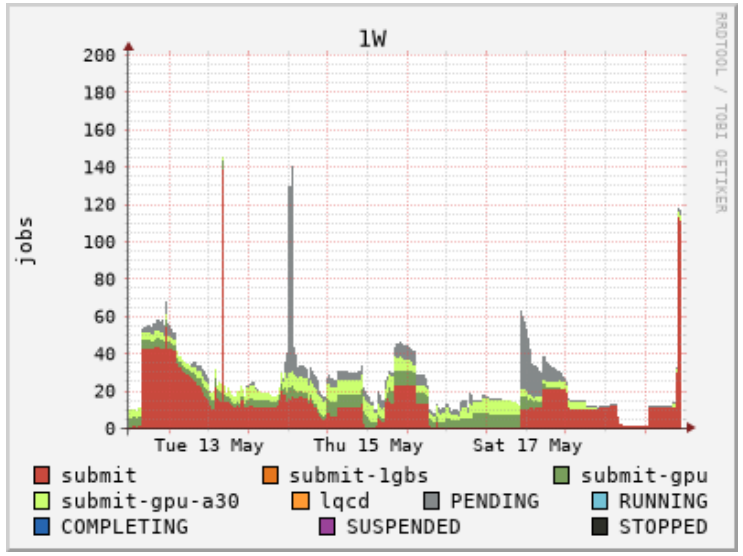
What computing resources are available for users?

Different workflows necessitate different resources, but all are appreciated by users

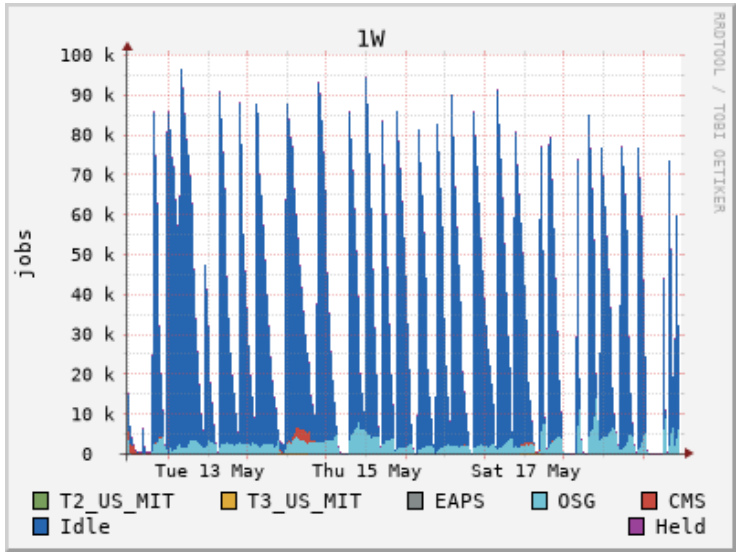
Interactive nodes



Slurm



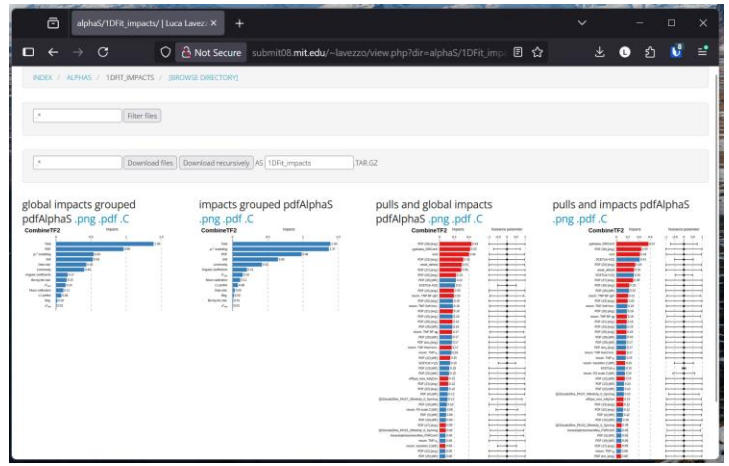
HTCondor



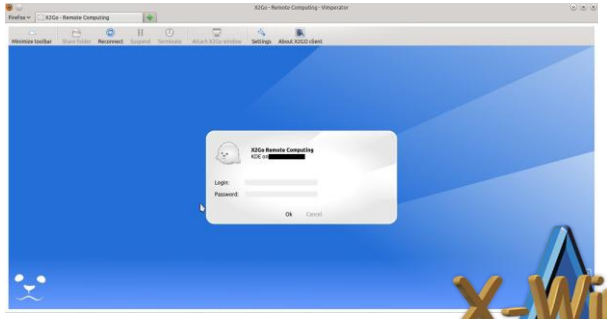
What else is supported by SubMIT?

Many other features have been added to the system over the years outside of the ‘core software’ as requested by users or groups; for example:

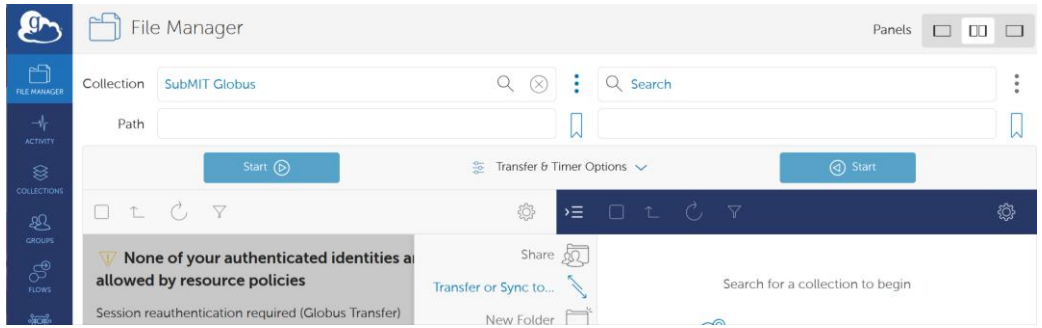
Parallel computing software
Dask Gateway and OpenMPI
integrated with Slurm



Personal and group websites
to share files and display plots



Remote desktop applications
like X-Win32 and X2Go



Globus endpoint for
data transfer and sharing

Summary of the SubMIT system

SubMIT is now a mature system which

- is easy to join for members of the Department of Physics
- is straightforward to interact with via terminal or web-browser
- has large, fast storage space available with a modern and efficient filesystem
- has suite of software tools centrally maintained or supported for users to access any software they need
- has access to large compute pools via batch-submission