SubMIT Status & News

Basic Computing Services in the Physics Department

David Walter

3rd June 2025

SubMIT User meeting

Cosman Room (6C-442) (MIT)

Introduction

Time to do an analysis on your laptop are over
- Upcoming experiments will produce multi-exabyte-scale datasets
- Theoretical physics becomes increasingly computational
- Fast time to insight essential for efficient physics data analysis

Call for interactive, user-friendly, scalable Analysis Facility
- Provide basic computing services for everyone in the MIT physics department
- Enable easy access for newcomers to start their physics analysis
- Support advanced customization for experienced users
- Ensure sufficient and efficient computing resources through fair sharing

Such that you can focus on research
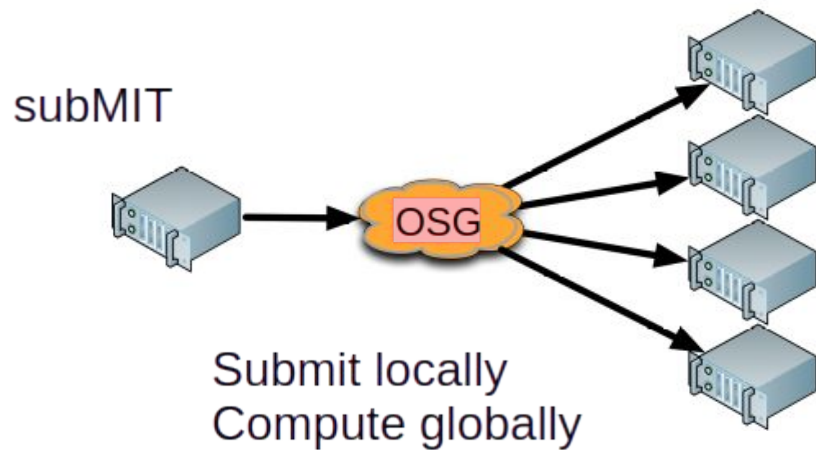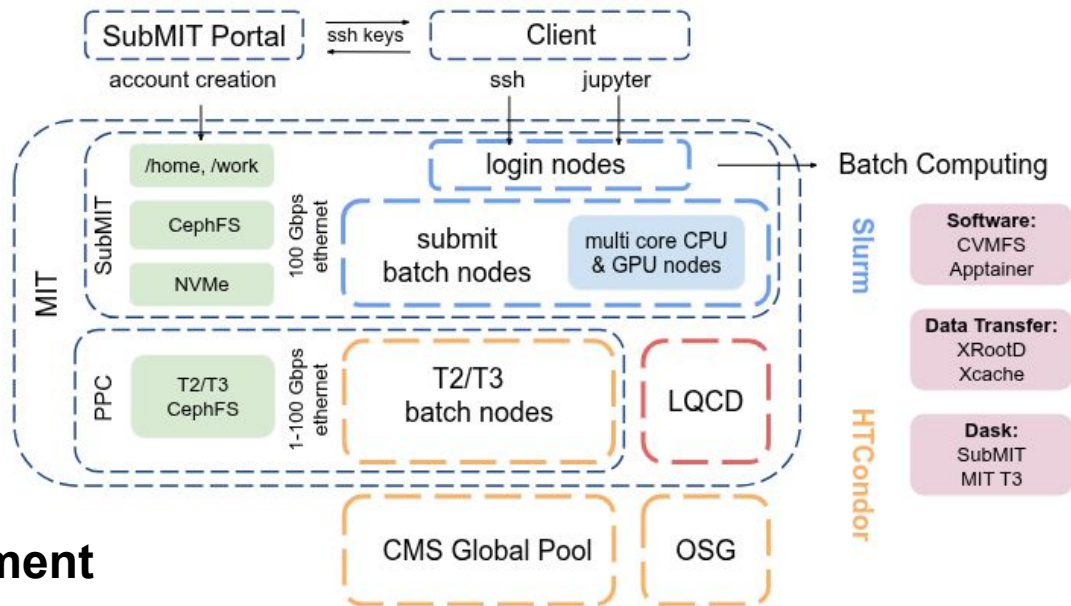
The system

Local batch system

- O(1000 cores); ~30GPUs
- Interactive SSH login pool
- Jupyterhub access

Convenient software environment

- Alma Linux 9 native
- Python, C++, Java, ...
- Containers (singularity/ podman)
- Virtual environments (Conda)

Access to larger external resources

- Open Science Grid (OSG)
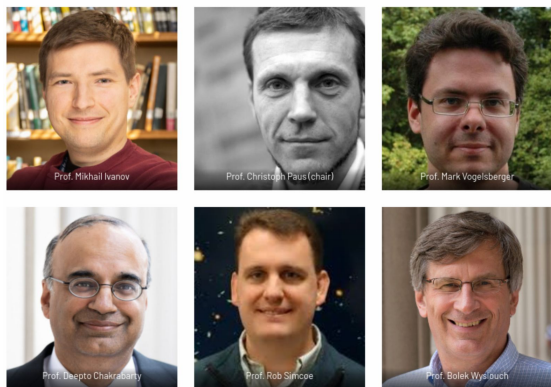- CMS Tier-2 and Tier-3

Organization

Steering committee
- Oversight
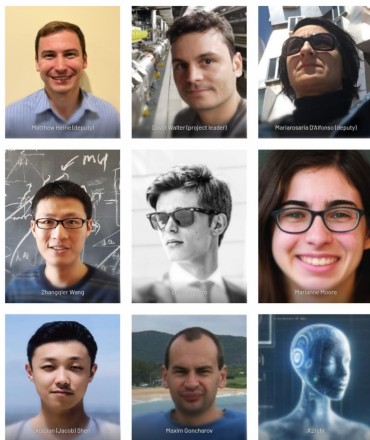- Funding

Meeting monthly with project team leader & deputies

Project team
- Implementation
- Operation
- Maintenance
- Support

Meeting weekly
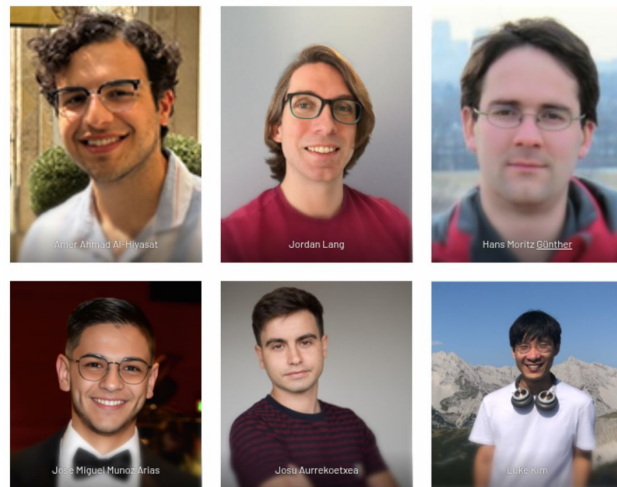
Project Team

SubMIT Hosting team

Users group
- Information flow
- Feedback
- Requests

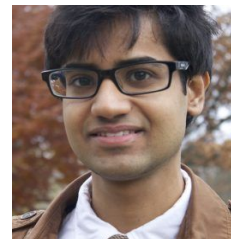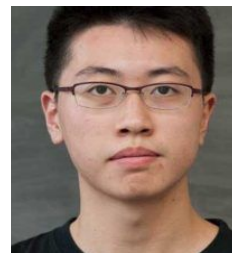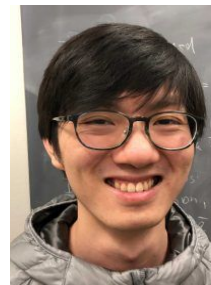Meeting monthly in open user group meetings

Farewell for outgoing user representatives

Outgoing user representatives
- Kaliroë Pappas
- Siddharth Mishra-Sharma
- Yitian Sun
- Molly Taylor
- Yin Lin
- Prajwal Mohan Murty

Many thanks and good luck for your future!

Welcome incoming user representatives

Current user group
- Amer Ahmad Al-Hiyasat,
  ABCP, Biophysics
- Hans Moritz Günther, MKI,
- Jordan Lang, LNS, relativistic heavy ion (CMS)
- Jose Miguel Munez Arias, LNS/IAIFI nucelar
- Josu Aurrekoetxea, CTP cosmology
- Luke Kim, CMT

Warm welcome and looking forward!

Room for 1-2 more user representatives

Annual review

- SubMIT performance evaluated

What happened in the past year?

A few of this past year's key realizations:

- Upgraded the operating system on all machines from CentOS7 to AlmaLinux 9
- Changed the /data file system from gluster to cephFS
- Integrated 6 machines (75 to 77, 82, 95 and 96) to provide hundreds of additional cores and increase the storage space by 3 times so we can continue to accomodate new users
- Installed OpenMPI and added a Globus endpoint
- Hosting A2rchi directly on the system
- Added network links to reach 100 Gbps
- Set up loose restrictions to improve the overall stability, e.g. by enforcing users to access the GPU nodes via slurm rather than direct login
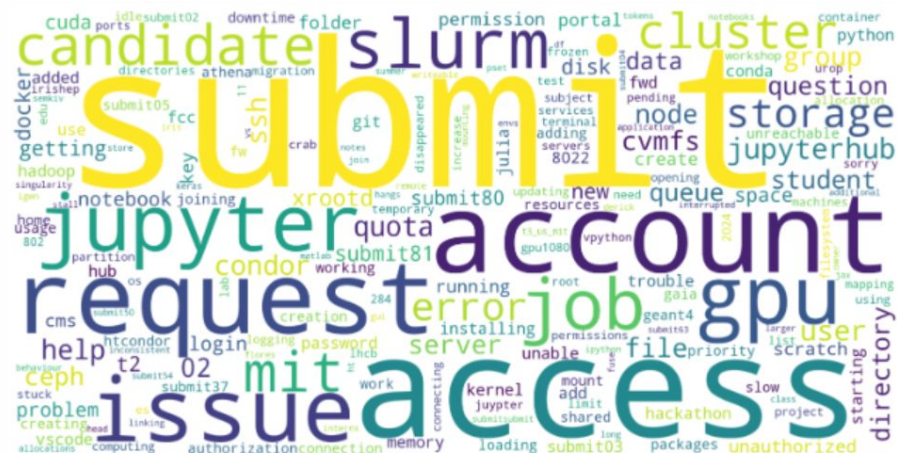
News

Annual SubMIT review
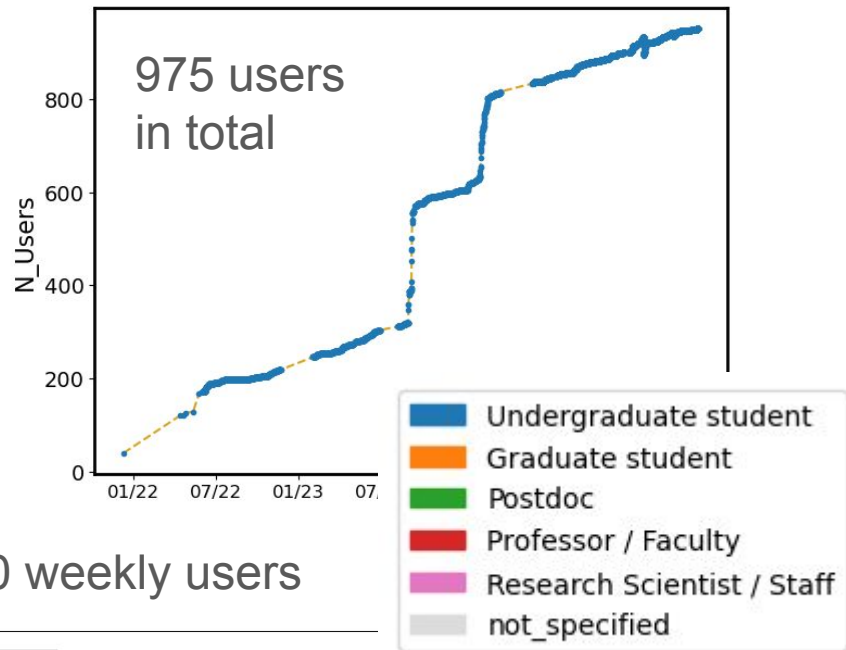
by **Marianne Moore** - May 23, 2025

On May 22, SubMIT had its annual review where the project team presented to the steering committee a summary of the cluster's performance and recent upgrades. SubMIT started on December 9, 2021 and has now grown to 975 users, with consistently 50-80 weekly active users. From its inception, SubMIT's goal has been to allow Physics researchers to access high-performance resources, enabling easy access for newcomers while supporting advanced customization for experienced users.
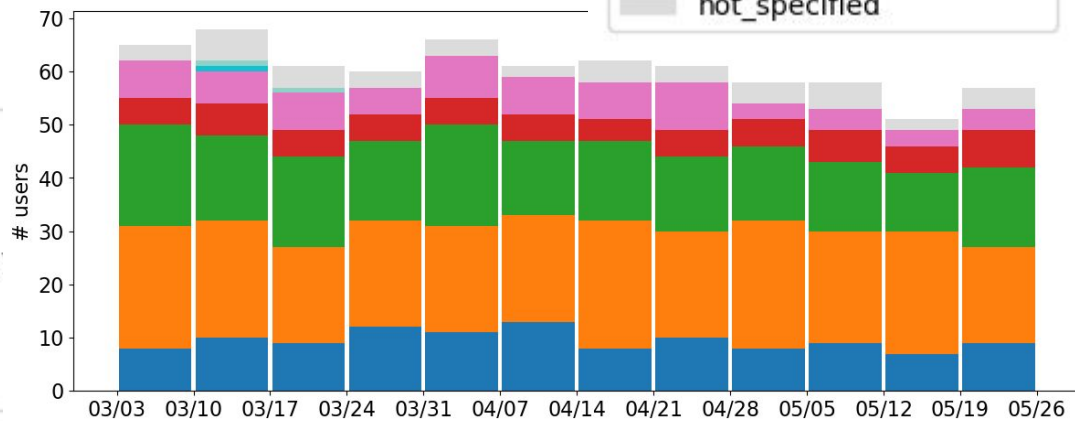
SubMIT status

- Actively use across all career stages and departments

975 users in total
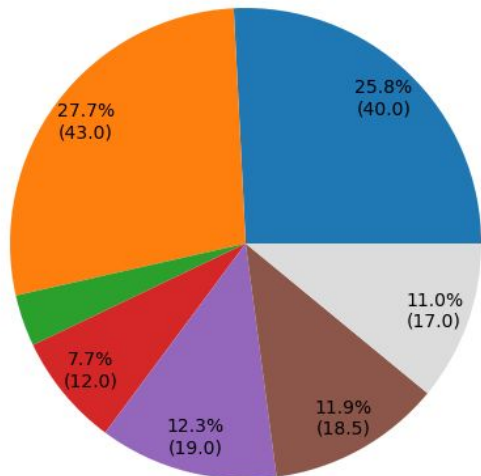
other
Experimental Nuclear & Particle Physics
External to the physics department
Atomic, Biophysics, Condensed Matter, & Plasma Ph
Astrophysics
Theoretical Nuclear & Particle Physics
not_specified

Undergraduate student
Graduate student
Postdoc
Professor / Faculty
Research Scientist / Staff
not_specified

50-70 weekly users

Work completed

Globus

- Data transfer system
- Added description on [submit users guide](#)

Introducing Globus on SubMIT

by **Xuejian Shen** – May 16, 2025

We are excited to announce that **Globus** **data transfer services are now available on SubMIT**. Globus provides a fast, secure, and user-friendly way to transfer large datasets between SubMIT, personal devices, and external clusters. Anyone with an MIT credential can now log in to Globus and access the endpoint we installed on SubMIT. Users can browse, manage, and transfer files using the web-based Globus interface. A tutorial is available on [our documentation site](#) to help you get started.
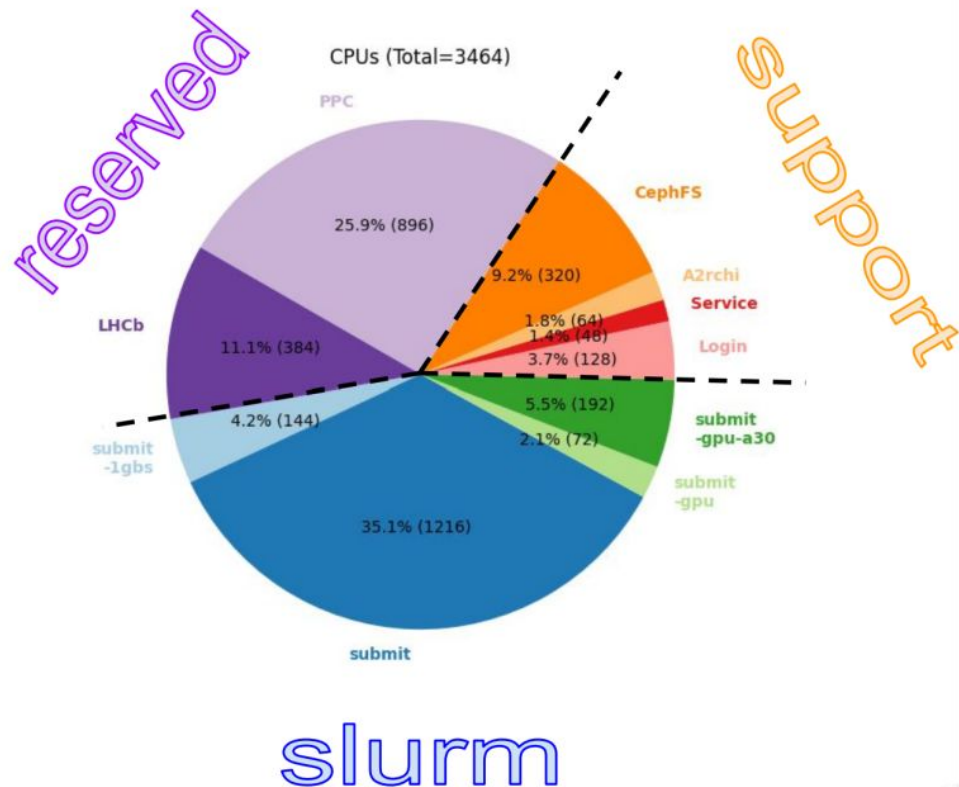
Work ongoing

Optimizing slurm resources

- Previous adaption to cgroups v2 improves control over resources
- New resources added
- Exploring further improvements

Restructuring of partitions

- 1 CPU and 1GPU partition
- Select feature via "constraint" (e.g. fast ethernet, specific GPU, …)

Watch out for upcoming news

Today's agenda

- Any comment/question?

SubMIT Users Meeting - operated by Physics Basic Computing Services

Tuesday Jun 3, 2025, 10:00 AM → 11:00 AM America/New_York

Cosman Room (6C-442) (MIT)

Description The SubMIT analysis facility is for anyone in the Physics Department and is a set of servers that provide interactive access to substantial storage at high speeds, enabling sophisticated data analyses with very fast turnaround times. Additionally, it seamlessly integrates massive processing resources for large-scale tasks by connecting to a set of powerful batch processing systems.

More information about SubMIT: https://submit.mit.edu/

Zoom: https://mit.zoom.us/j/95955196439

10:00 AM → 10:10 AM **SubMIT Overview & News**   ⏱10m
Speaker: David Walter

10:10 AM → 10:20 AM **Discussion**   ⏱10m
Speakers: Amer Al-Hiyasat (MIT), Hans Moritz Guenther (Massachusetts Institute of Technology), Jordan Lang (Massachusetts Institute of Technology), Jose Miguel Munoz Arias (Massachusetts Institute of Technology), Josu Aurrekoetxea (Massachusetts Institute of Technology), Luke Kim (student@mit.edu)

10:20 AM → 10:50 AM **Simulating heavy quarks in quark gluon plasma**   ⏱30m
Speaker: Jean Du Plessis (Massachusetts Institute of Technology)

Backup