

subMIT Overview

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Introduction

- subMIT system provides an interactive login pool + scale-out to batch resources
 - Home directories
 - Convenient software environment (CentOS7 native, docker/singularity images, conda)
 - SSH or Jupyterhub access
 - Local batch system with $O(1000)$ cores, >50 GPU's
 - Local storage (1TB/user), 10's of TB for larger group datasets
 - Fast networking: 100 Gbps ethernet
 - RoCE (RDMA over Converged Ethernet) should be possible for MPI applications, but not extensively tested/commissioned yet
 - Physical location: Machines at both Bates and Building 24
 - Convenient access to larger external resources (OSG, CMS Tier-2 and Tier-3, LQCD Cluster, EAPS)

Introduction

- Additional resources in the process of being integrated
 - More disk storage
 - Integration of existing computing resources from research groups
 - Purchase of several large core count/high memory machines by research groups for additional computing resources and to support specialized workflows and/or R&D where large single node scaling is useful

Introduction: subMIT Website



subMIT

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Overview

The subMIT login pool is designed to let users login safely, prepare and test their research, and submit their jobs to the large computing resource of their choice. There are for now a limited number of resources connected but we are working on quickly expanding them.

[Get your account on SubMIT Portal](#)

Access

ssh <user>@submit.mit.edu

jupyterhub

Status

Servers

Slurm queue

Condor queue

Expert

Resources

- >1 TB of free storage per user
- 100s of cores and GPUs available interactively and through Slurm
- Access to OSG, CMS T3 and T2, LQCD Cluster, and EAPS

Software

- Python, anaconda, Julia, Matlab, singularity, and much more!

- Website (with User's Guide/Instructions):

<https://submit.mit.edu/>

- Overview and general information
- Direct JupyterHub access
- User's Guide:

<https://submit.mit.edu/submit-users-guide/>

User's Guide - subMIT

Contents:

- [User's guide - subMIT login pool](#)
- [Getting started](#)
- [Things that work and things that do not](#)
- [Available software](#)
- [Running interactively and batch jobs](#)
- [User quota and storage at submit](#)
- [Monitoring at submit](#)
- [GPU resources](#)
- [Data backup](#)

Table of Contents

- [User's Guide - subMIT Indices and tables](#)
- [Next topic](#)
- [This Page](#)
- [Show Source](#)

Quick search

Go

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Introduction: Project Organization

- Formally the project is organized as ***Basic Computing Services*** in the Physics Department
 - **Project Team:** Implementation/Operations/Maintenance of the system
 - **Users Group:** Contact point between the user community and the project team, forum for user feedback, requests, information flow to and from users
 - **Steering Committee:** Faculty oversight, funding, etc
 - See https://submit.mit.edu/?page_id=6

Users Group In Practice

- Monthly meetings
 - Advertised and open to the broader community
 - Topical presentations from project team, Users Group representatives, or other users or community members
 - Forum for feedback and information flow between the user community and the project team
 - Regular timeslot: Tuesday 10:00-11:00 EST
- Users Group representatives
 - Identified representatives from research groups across the department
 - Attend the monthly meetings
 - Provide feedback from your groups/community
 - Distribute information/news from the project team

Users Group Representatives

- Users group has been formed with initial set of representatives (JB as coordinator)
 - Users Group representative (associated faculty/group)
 - Yin Lin (Phiala Shanahan)
 - Siddharth Mishra-Sharma (Jesse Thaler)
 - Prajwal Mohan Murthy (Bob Redwine)
 - Kaliroë Pappas (LNS Neutrino/Dark Matter)
 - Sunghan Ro (Julien TAILLEUR)
 - Yitian Sun (Tracy Slatyer)
 - Molly Taylor (LNS Heavy Ion Group)
 - More representatives to come in the near future

Users Group Kickoff Meeting

- First meeting of Users group took place on Nov. 22
 - Agenda: <https://indico.mit.edu/event/653/>
 - Introduction on Users Group and subMIT project
 - Short introduction of research/computing use cases/needs/thoughts from Users Group representatives

The screenshot displays a Zoom meeting agenda for the 'Users Group Kickoff Meeting'. The meeting is scheduled for Tuesday, Nov 22, 2022, from 10:00 AM to 11:00 AM in the America/New_York time zone, taking place in Kolker Room (26-414) at MIT. The agenda includes three items: an Introduction by Joshua Bendavid (10:00-10:10 AM), a Roundtable with Users Group Representatives by Molly Taylor, Prajwal MohanMurthy, Siddharth Mishra-Sharma, Sung Han Ro, Yin Lin, and Yitian Sun (10:10-10:40 AM), and a Discussion (10:40-11:00 AM). Each item lists the speaker(s) and associated documents.

Users Group Kickoff Meeting

Tuesday Nov 22, 2022, 10:00 AM → 11:00 AM America/New_York

Kolker Room (26-414) (MIT)

Description <https://mit.zoom.us/j/96743699673?pwd=b3h2Q3c3cVQwYWY12blhMUG5SWXZCZz09>

10:00 AM → 10:10 AM **Introduction** 10m

Speaker: Joshua Bendavid (Massachusetts Institute of Technology)

subMIT Users Grou...

10:10 AM → 10:40 AM **Roundtable with Users Group Representatives** 30m

Speakers: Molly Taylor (Massachusetts Institute of Technology), Prajwal MohanMurthy (Massachusetts Institute of Technology), Siddharth Mishra-Sharma (Massachusetts Institute of Technology), Sung Han Ro (Massachusetts Institute of Technology), Yin Lin (Massachusetts Institute of Technology), Yitian Sun (Massachusetts Institute of Technology)

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10:40 AM → 11:00 AM **Discussion** 20m

Storage breakdown

- Several different storage areas are available covering different use cases
 - /home/submit/<username>
 - Home directories (nfs server), redundant disk array with backups
 - 5GB quota
 - Use for software development and (small) critical data
 - /work/submit/<username>
 - Work directory, no backups (but redundant disk array)
 - 50GB quota
 - Use for software installation (conda or docker/singularity images)
 - /data/submit/<username>
 - Large distributed disk system, no backups, but redundancy against disk failure (“erasure coding”)
 - 1TB user quota, larger quotas available in dedicated group directories
 - Store large datasets here
 - /scratch/submit/<username>
 - Fast NVMe SSD array
 - Currently experimental/under development
 - /cvmfs/
 - Read-only distributed storage for distributing software, singularity images, etc
 - Several CERN-related repositories are available
 - Local repository /cvmfs/cvmfs.cmsaf.mit.edu where additional software or data can be added if needed
- Please ask if you have any questions about which storage to use or if more space is needed for a particular purpose and we will find a good solution for you

Communication Channels

- User support mailing list: submit-help@mit.edu
- Slack workspace: <https://mit-submit.slack.com>
 - “help-desk” channel
- Monthly Users Group Meetings
 - Open for discussion
 - Open for user contributions: contact the full set of Users Group representatives at submit-usersgroup@mit.edu if you have a presentation or discussion topic for an upcoming meeting
 - Next meeting tentatively Jan. 27
- Discuss with Users Group representative from your group or “nearby” group
- Discuss with your group and identify/nominate a Users Group representative

Important Topic Requiring User Feedback

- Linux distribution upgrade
 - Current CentOS 7 distribution reaches EOL for maintenance updates in June 2024
 - Decision by Red Hat to reorganize CentOS project and releases has created uncertainty for upgrade paths and disrupted logical transition from CentOS 7->8
 - Decision on next distribution to be carefully considered
 - Ease of transition
 - Support lifetime
 - Functionality
 - Consider direction being taken at other universities and labs
 - Discussion to be held in coordination with Users Group and broader community
 - Ease transition for users through well-supported and documented use of containers
- Dedicated discussion later this morning

Today's Workshop

The screenshot shows the Indico page for the "Workshop on Basic Computing Services in the Physics Department - subMIT". The page header includes the date "January 6, 2023" and the MIT logo. A search bar is present. The main content area has a sidebar with navigation links: Overview, Timetable, Contribution List, My Conference, My Contributions, and Participant List. The main text describes the subMIT computing facility as a login pool for basic research computing resources. It states that the one-day workshop will provide an overview and updates on the system and plans, as well as topical presentations. There will also be a tutorial session/hands-on help time and a presentation from the Office of Research Computing and Data (ORCD). More information is available at <https://submit.mit.edu>. The workshop will take place in the Kolker Room and a Zoom connection will be available at <https://mit.zoom.us/j/96743699673?pwd=b3h2Q3c3cVQwYW12bWlMUGSSWXZCZz09>. At the bottom, there are event details: "Starts Jan 6, 2023, 9:00 AM" and "Ends Jan 6, 2023, 5:00 PM" in the America/New_York timezone. The location is "MIT, Kolker Room (26-414)" and the website is "subMIT Project Website".

- Indico page with timetable and slides:
 - <https://indico.mit.edu/e/subMITWorkshop2023>
- Overview of subMIT project, resources, software environment
- Discussion on Linux distribution upgrade
- Tutorial/Hands-on help session
- Invited talk from James Cuff on ORCD
- Topical presentations
- Kolker Room + Zoom
- See also agenda of previous workshop (Jan. 2022)
 - <https://indico.cern.ch/event/1108229/>

09:00	Introduction/subMIT Project Overview <i>Kolker Room (26-414), MIT</i>	<i>Joshua Bendavid</i> 09:00 - 09:30
	Introduction to ORCD <i>Kolker Room (26-414), MIT</i>	<i>James Cuff</i> 09:30 - 10:00
10:00	Available software and environments <i>Kolker Room (26-414), MIT</i>	<i>Matthew Heine</i> 10:00 - 10:30
	Discussion on Linux Distribution Upgrade <i>Kolker Room (26-414), MIT</i>	10:30 - 11:00
11:00	Tutorial/Hands-on help session	
12:00	<i>Kolker Room (26-414), MIT</i>	11:00 - 12:30
	Lunch Break	
13:00	<i>Kolker Room (26-414), MIT</i>	12:30 - 14:00
14:00	subMIT as an Analysis Facility <i>Kolker Room (26-414), MIT</i>	<i>Mariarosaria D'Alfonso</i> 14:00 - 14:30
	Feedback and Experience with Julia etc <i>Kolker Room (26-414), MIT</i>	<i>Washington Taylor</i> 14:30 - 14:50
15:00	Analysis of ABRACADABRA Data <i>Kolker Room (26-414), MIT</i>	<i>Kalireo Pappas</i> 14:50 - 15:10
	Plans/feedback/experience from Lattice QCD <i>Kolker Room (26-414), MIT</i>	<i>Yin Lin</i> 15:10 - 15:40
	Plans/Feedback/Experience from Kavli <i>Kolker Room (26-414), MIT</i>	<i>Joshua Borrow</i> 15:40 - 16:10
16:00	Additional Topical Presentations/Discussion <i>Kolker Room (26-414), MIT</i>	16:10 - 17:00