Getting Help: Getting the Most out of User Support

Tuesday, August 8, 2023

Agenda

- Workflow
- Available Resources
- Identify the most appropriate resource
- Helpdesk
- Common Issues

Workflow

- Understand you problem
  - Identify the issue.
    - Personal issue:
      - General issues: access issue, permissions issue, code issue, scheduler, etc
    - System Issue
      - file system not available, resource not available
  - Is the specific error message
    - Ex. If the running jobs is returning an error
      - Is it code dependent
      - Is it system dependent
- Identify the correct support

Available Resources

- What are the available resources
  - Yourself
  - Colleagues
  - Web (community forums, user guides, git repositories)
  - Helpdesk

Identify the most appropriate resource

- Internal
  - Yourself, Colleagues
    - Sanity check, Legacy Lab Code
  - The Web
    - Generic errors
- External
  - The Software Provider
    - Software specific error or bug
      - Github documentation
  - The Resource Provider
    - Resource specific question (file systems, nodes)
    - Performance
    - At the end of your rope ☺

Help Desk

- Help Desk
  - While help desk staff are exceptional, they should be considered general practitioners
  - Provide adequate information for helpdesk to start investigating
    - Username, Account, System, Jobid, specific error message if available, etc.
      - sacct, file paths, submit scripts
      - Include nodes in outputfile name
    - The user with the problem should submit the help ticket
  - Always be nice to the support desk! ☺

Help Desk: Useful Information

- Resource, UserID/Username, Account/Project/Allocation
- JobId:
  - List of Node(s) that job ran on
  - Working directory (submit script anme)
  - Location of .err and .out files
  - Project
  - Start time
  - End time
  - Resources requested

Slurm tools for job information:

- SLURM: Cluster management and job scheduling system
- Slurm Tools available for job information
  - Squeue
    - Used to view information about queued or running jobs

    >squeue –j 23646362
  - scontrol
    - Used is used to view Slurm configuration for queued or running jobs

    >scontrol show job 2425622
  - sacct for completed jobs
    - Can be used to displays accounting data for jobs and job steps

    >sacct -j 24256222 –all

    For additional assistance with tools use the
    >man <<command>>

Common Issues: Resource Access

- Access
  - Password and username issues (ACCESS, UCSD)
    - Indicator message: Enter verification code
    - https://allocations.access-ci.org/profile (if username is not available for the resource then the account has not been created yet) Generally it takes about 1 business day for accounts to be fully functional.
  - ssh keys
    - Indicator message: Enter password
- Unable to access system
  - Check specific error message
  - User News
    - Subscribe to be notified
    - Check on User Portal -- https://portal.xsede.org/user-news

Common Issues: Job Submissions

- Allocations
- Job Scripts
  - Error message
    - sbatch: error: Project balance is not enough to run the job
    - sbatch: error: QOSMaxNodePerJobLimit
      - sbatch: error: Batch job submission failed: Job violates accounting/QOS policy (job submit limit, user's size and/or time limits)
  - Queues/Partitions
  - Time Limits
  - Expanse-client tool
  - OOM
  - New Software stack

Common Issues

- Expanse-client tool

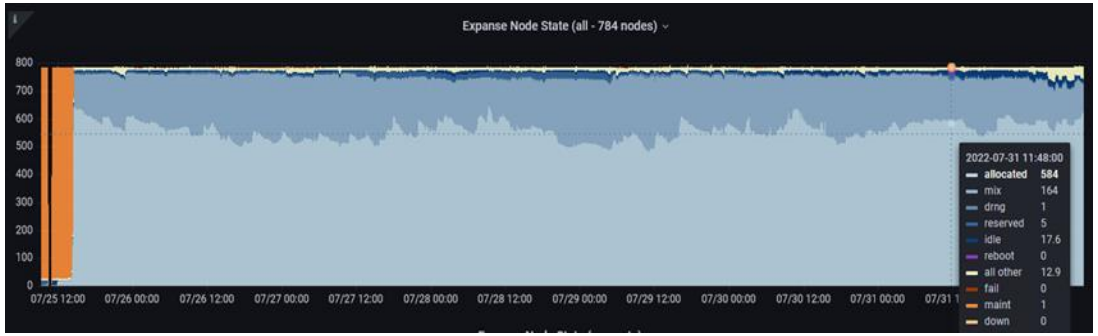
```
[nickel@login01 ~]$ expanse-client
Allows querying the user statistics.

Usage:
  expanse-client [command]

Available Commands:
  completion  Generate the autocompletion script fo
  help        Help about any command
  project     Get project information
  resource    Get resources
  user        Get user information

Flags:
  -a, --auth      authenticate the request
  -h, --help      help for expanse-client
  -p, --plain     plain no graphics output
  -v, --verbose   verbose output

Use "expanse-client [command] --help" for more information about a command.
```

```
[nickel@login01 ~]$ expanse-client user nickel -r expanse_gpu -p

 Resource  expanse_gpu

 NAME    STATE  PROJECT  TG PROJECT     USED  AVAILABLE  USED BY PROJECT
-------------------------------------------------------------------------
 nickel  allow  ddp324                    0       5000               21
 nickel  allow  ddp386                    0       2500               74
 nickel  allow  sds154   TG-ASC150024     0        100              517
 nickel  allow  sds166   TG-STA160003     0       2500                3
 nickel  allow  use300                    9     269000            63638
[nickel@login01 ~]$ ^C
[nickel@login01 ~]$ expanse-client user nickel -p

 Resource  expanse

 NAME    STATE  PROJECT  TG PROJECT     USED  AVAILABLE  USED BY PROJECT
-------------------------------------------------------------------------
 nickel  allow  ddp386                    2     110000             9163
 nickel  allow  sds154   TG-ASC150024     0       1000            16572
 nickel  allow  sds166   TG-STA160003     0     100000            56528
 nickel  allow  use300                 5856    5050000          3457273
```

```
[nickel@login01 ~]$ expanse-client resource
Available resources:
expanse
expanse_gpu
expanse_industry
expanse_industry_gpu
```

Common Issues: Queue and Time Limits

Partition Name	Max Walltime	Max Nodes/Job	Max Running Jobs	Max Running + Queued Jobs	Charge Factor	Notes
compute	48 hrs	32	32	64	1	Exclusive access to regular compute nodes; *limit applies per group*
ind-compute	48 hrs	32	32	64	1	Exclusive access to Industry compute nodes; *limit applies per group*
shared	48 hrs	1	4096	4096	1	Single-node jobs using fewer than 128 cores
ind-shared	48 hrs	1	32	64	1	Single-node Industry jobs using fewer than 128 cores
gpu	48 hrs	4	4	8 (32 Tres GPU)	1	Used for exclusive access to the GPU nodes
ind-gpu	48 hrs	4	4	8 (32 Tres GPU)	1	Exclusive access to the Industry GPU nodes
gpu-shared	48 hrs	1	24	24 (24 Tres GPU)	1	Single-node job using fewer than 4 GPUs
ind-gpu-shared	48 hrs	1	24	24 (24 Tres GPU)	1	Single-node job using fewer than 4 Industry GPUs
large-shared	48 hrs	1	1	4	1	Single-node jobs using large memory up to 2 TB (minimum memory required 256G)
debug	30 min	2	1	2	1	Priority access to shared nodes set aside for testing of jobs with short walltime and limited resources
gpu-debug	30 min	2	1	2	1	Priority access to gpu-shared nodes set aside for testing of jobs with short walltime and limited resources; *max two gpus per job*
preempt	7 days	32		128	.8	Non-refundable discounted jobs to run on free nodes that can be pre-empted by jobs submitted to any other queue
gpu-preempt	7 days	1		24 (24 Tres GPU)	.8	Non-refundable discounted jobs to run on unallocated nodes that can be pre-empted by higher priority queues



https://www.sdsc.edu/support/user_guides/expanse.html#running

Common Issues: Charging

- Charging is based on what is requested, not how resources are used
- Charging is based on the Maximum of memory and CPU core fraction

- Example for CPU
  - Max [3600 * #CPU cores, 1800 * #Mem in GB] / 3600 * (wallclock time in secs/3600)
- Minimum charge for any job is 1SU

Common Issues: Job Status

- squeue -- reports status and reason codes
  - Queued Jobs

```
[nickel@login01 ~]$ squeue | more
             JOBID PARTITION     NAME     USER ST       TIME  NODES NODELIST(REASON)
          13574113   compute 80dgree_   yweng3 PD       0:00      2 (MaxMemPerLimit)
          12668967   compute 0-xtensi  kavousi PD       0:00      1 (MaxMemPerLimit)
          14756880   compute job001_p  amytsai PD       0:00     10 (Reservation)
          14800161   compute namd-com sasadian PD       0:00      6 (QOSMaxCpuPerUserLimit)
          14800218   compute namd-com sasadian PD       0:00      6 (QOSMaxCpuPerUserLimit)
          14789098   compute bl_8JHNp    uscms PD       0:00      1 (MaxJobsPerAccount)
```

  - Running jobs

```
14813206   compute post0110 lpegolot  R   16:30:28      1 exp-9-35
14800090   compute namd-com sasadian  R   16:13:01      6 exp-2-29,exp-3-23,exp-4-33,exp-7-20,exp-9-[03,26]
14764467   compute V1WTReRU  aminkvh  R   16:08:56      1 exp-2-54
14773832   compute V4R1639Q  aminkvh  R   15:55:58      1 exp-8-14
14800092   compute namd-com sasadian  R   15:29:28      6 exp-4-29,exp-7-[07,39-40],exp-9-[28,41]
14812166   compute  scratch mlaskow2  R   15:53:59      1 exp-10-20
14812167   compute  scratch mlaskow2  R   15:39:34      1 exp-8-48
14800158   compute namd-com sasadian  R   15:17:18      6 exp-2-[26,50],exp-4-[52-53],exp-7-[42-43]
14812168   compute  scratch mlaskow2  R   15:20:01      1 exp-10-37
```

Common Issues: Reasons

- squeue – Common “reasons” for pending jobs
  - MaxMemPerLimit
    - Max. mem per Node = 243G
  - QOSMaxNodePerUserLimit
  - Priority
  - ReqNodeNotAvail, Unavailable nodes: exp-x-xx
- File system not available
  - We have added a slurm directive #SBATCH –constraint = “lustre” to indicate if your job is using the lustre file system. If this is provided, the scheduler will not launch the job on a node that is missing lustre.
- System Maintenance
  - https://support.access-ci.org/outages

Common Issues: Software

- Available Software
  - Module spider
    - Module spider <<software_package>>
- Software installs
  - Help desk
- Software specific error messages
  - Github repo issues file

Allocations

- SDSC allocates resources via three methods ACCESS-CI, HPC@UC, and Industrial program
  - ACCESS-CI: (Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support) is an NSF advanced computing and data resource. ACCESS-CI maintains an innovative, agile, integrated, robust, trustworthy and sustainable CI ecosystem including Compute, Storage and Cloud resources to support S&E research and education. (https://access-ci.org/)
  - HPC@UC: Available to UC folks to gain quick access to limited compute and storage resources with goal to graduate to ACCESS proposal
  - Industrial Partners: Purchase SUs on our Industry Rack

ACCESS-CI: Expanse Allocation

- Trial allocation: 100 GPU and/or 1000 CPU hours
  - consult@sdsc.edu
- Apply for allocations through ACCESS
  - https://allocations.access-ci.org/prepare-requests-overview

Allocation	Credit Threshold
Explore ACCESS	400,000
Discover ACCESS	1,500,000
Accelerate ACCESS	3,000,000
Maximize ACCESS	Not awarded in credits.

Allocation Levels

Opportunity	Explore	Discover	Accelerate	Maximize
Purpose	Resource evaluation, grad student projects, small classes and training events, benchmarking, code development and porting, similar small-scale uses.	Grants with modest resource needs, Campus Champions, large classes and training events, NSF graduate fellowships, benchmarking and code testing at scale, gateway development.	Mid-scale resource needs, consolidating multi-grant programs, collaborative projects, preparation for Maximize ACCESS requests, gateways with growing communities.	Large-scale research projects.

HPC@UC

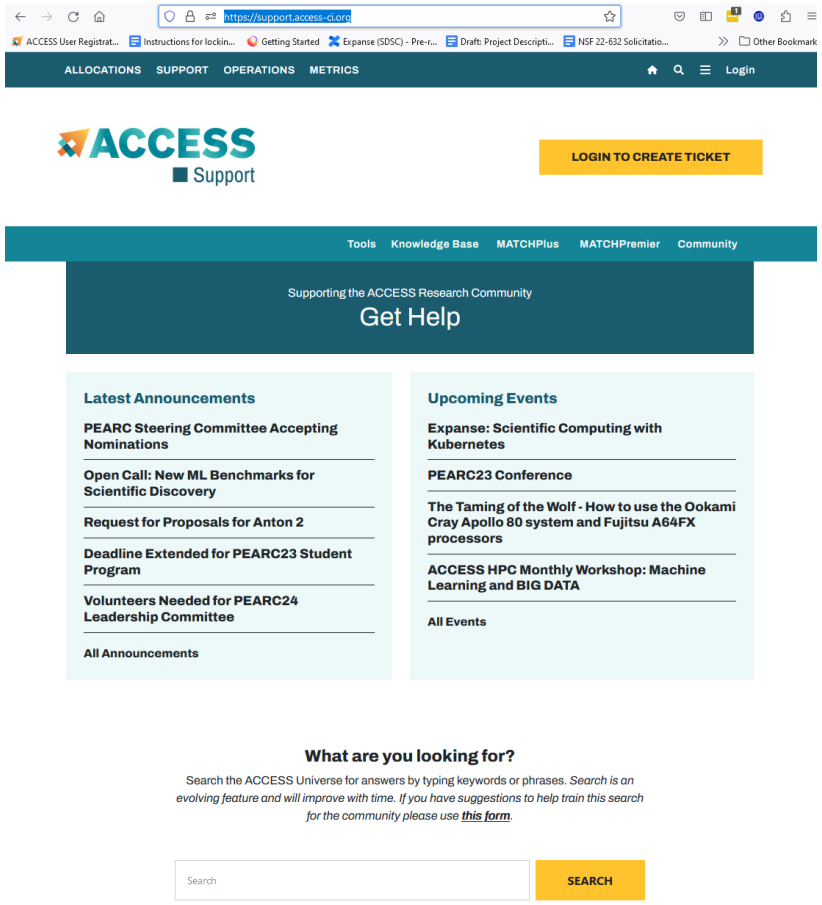
- Request HPC@UC at: https://www.sdsc.edu/support/hpc_uc_apply-exp.html
- Up to 500K core-hours of computing, associated data storage, and access to SDSC expertise to assist their research team.
- Awards are active for one year. NO supplements, renwals or Extensions
- Applicants must not have an active ACCESS award
- Developed to support onboarding to ACCESS and larger, formal allocation requests
- SDSC staff will assist in developing these allocation applications.
- Applications are reviewed on an ongoing basis. Applicants will be notified within 10 business days of the review decision.
- https://www.sdsc.edu/collaborate/hpc_at_uc.html

How much time do I need

- 1 CPU and less then 2GB of memory are charged 1 CPU Service Unit(1SU = 1 core/hour).
- 1 GPU and up to 10 CPUs and 92 GB of memory are charged 1 GPU Service Unit (SU)/hour. This job will be charged 1 GPU SU/hour.
- The minimum charge for any job is 1 SU.
- 1 Expanse SUs = 1 ACCESS Credit
- 1 Expanse GPU SU = 54 Expanse SUs (for conversion)

How to reach support

- consult@sdsc.edu
- https://support.access-ci.org/



Review

- Understand your problem
- Engage with appropriate support tools
- Provide relevant information to reduce iterations

- Always be nice to the support desk! ☺

Questions?