AI Cluster - Slurm

Cluster is up and running now. Anyone with a CS account who wishes to test it out should do so.

Feedback is requested:

#ai-cluster Discord channel or email Phil Kauffman (kauffman@cs dot uchicago dot edu).

Knowledge of how to use Slurm already is preferred at this stage of testing.

The information from the older cluster mostly applies and I suggest you read that documentation: https://howto.cs.uchicago.edu/techstaff:slurm

Infrastructure

Summary of nodes installed on the cluster

Computer/GPU Nodes

- 6x nodes
 - 2x Xeon Gold 6130 CPU @ 2.10GHz (64 threads)
 - 192G RAM
 - 4x Nvidia GeForce RTX2080Ti
- 2x nodes
 - 2x Xeon Gold 6130 CPU @ 2.10GHz (64 threads)
 - ∘ 384G RAM
 - 4x Nvidia Quadro RTX 8000
- all:
- zfs mirror mounted at /local
 - compression to Iz4: Usually this has a performance gain as less data is read and written to disk with a small overhead in CPU usage.
 - As of right now there is no mechanism to clean up /local. At some point I'll probably put a find command in cron that deletes files older than 90 days or so.

Storage

- ai-storage1:
 - 41T total storage
 - uplink to cluster network: 2x 25G
 - /home/<username>
 - We intend to set user quotas, however, there are no quotas right now.
 - /net/projects: (Please ignore this for now)
 - Lives on the home directory server.

- Idea would be to create a dataset with a quota for people to use.
- Normal LDAP groups that you are used to and available everywhere else would control access to these directories. e.g. jonaslab, sandlab
- ai-storage2:
 - ∘ 41T total storage
 - uplink to cluster network: 2x 25G
 - /net/scratch: Create yourself a directory /net/scratch/\$USER. Use it for whatever you want.
 - Eventually data will be auto deleted after X amount of time. Maybe 90 days or whatever we determine makes sense.
- ai-storage3:
 - zfs mirror with previous snapshots of 'ai-storage1'.
 - NOT a backup.
 - Not enabled yet.

Login

There are a set of front end nodes that give you access to the Slurm cluster. You will connect through these nodes and need to be on these nodes to submit jobs to the cluster.

ssh cnetid@fe.ai.cs.uchicago.edu

• Requires a CS account.

File Transfer

You will use the FE nodes to transfer your files onto the cluster storage infrastructure. The network connections on those nodes are 2x 10G each.

Quota

• By default users are given a quota of 20G.

Demo

kauffman3 is my CS test account.

\$ ssh kauffman3@fe.ai.cs.uchicago.edu

I've created a couple scripts that run some of the Slurm commands but with more useful output. cs-sinfo and cs-squeue being the only two right now.

kauffman3@fe01:~\$ cs-sinfo

NODELIST	NODES	PARTITION	STATE	CPL	JS S:C:T	MEMORY	TMP_DISK	WEIGHT
AVAIL_FEATURES REASON GRES								
a[001-006]	6	geforce*	idle	64	2:16:2	190000	0	1
'turing,geforce,rtx2080ti,11g' none gpu:rtx2080ti:4								
a[007-008]	2	quadro	idle	64	2:16:2	383000	0	1
'turing,qua	none		gpu:rtx8000:4					

```
kauffman3@fe01:~$ cs-squeue

JOBID PARTITION USER NAME NODELIST

TRES_PER_NSTATE TIME
```

List the device number of the devices I've requested from Slurm. # These numbers map to /dev/nvidia?

```
kauffman3@fe01:~$ cat ./show_cuda_devices.sh
#!/bin/bash
hostname
echo $CUDA_VISIBLE_DEVICES
```

Give me all four GPUs on systems 1-6

```
kauffman3@fe01:~$ srun -p geforce --gres=gpu:4 -w a[001-006]
./show_cuda_devices.sh
a001
0,1,2,3
a002
0,1,2,3
a006
0,1,2,3
a005
0,1,2,3
a004
0,1,2,3
a003
0,1,2,3
```

give me all GPUs on systems 7-8 # these are the Quadro RTX 8000s

```
kauffman3@fe01:~$ srun -p quadro --gres=gpu:4 -w a[007-008]
./show_cuda_devices.sh
a008
0,1,2,3
a007
0,1,2,3
```

Notes on CUDA_VISIBLE_DEVICES

CUDA VISIBLE DEVICES: Displays relative gpu device number available to you.

- Last update: 2020/12/02 10:27
 - This variable should NOT be modified. Ever.
 - Relative means that if you requested one gpu it will show up as 0. Even if all other gpus on the server are being used by others.

Fairshare/QOS

By default all usage is tracked and charged to a users default account. A fairshare value is computed and used in prioritizing a job on submission.

Details are being worked out for anyone that donates to the cluster. This will be some sort of tiered system where you get to use a higher priority when you need it. You will need to charge an account on job submission --account=<name> and most likely select the priority level you wish to use and that you are allowed to use: --gos=<level>

Asked Questions

Do we have a max job runtime?

Yes. 4 hours. This is done per partition. You are expected to write your code to accommodate for this.

PartitionName=geforce Nodes=a[001-006] Default=YES DefMemPerCPU=2900

MaxTime=04:00:00 State=UP Shared

=YES

PartitionName=quadro Nodes=a[007-008] Default=NO DefMemPerCPU=5900

MaxTime=04:00:00 State=UP Shared=

YES

From

https://howto.cs.uchicago.edu/ - How do I?

Permanent link:

https://howto.cs.uchicago.edu/techstaff:aicluster?rev=1606926432

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