THE OHIO STATE UNIVERSITY

ASC Unity Cluster

Quick Introduction

go.osu.edu/unitycompute

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What is the ASC Unity Cluster?

The Unity cluster is a local high-performance computing (HPC) environment maintained by Arts and Sciences Technology Services (ASCTech). Unity is designed to accommodate researchers with their intense computational and storage needs.

Why would I need to use it?

- Calculation takes **too long** on your laptop/desktop
- Calculation has **too many** runs
- Data is **too large** (disk/memory) for your computer
- Keeps your computer **free** to do daily tasks
- Licensed **software** or specific **version** needed

Who can use it?

Any Arts and Sciences affiliated customer

- Undergrad/Grad/Post Doc
- Faculty
- Staff
- Sponsored Guest Accounts

* Must be in Unity-Users group. Requests made via Support Request. http://go.osu.edu/unitysupportticket

What runs in the cluster?

Any executable that runs on RHEL7/8. This includes and is not limited to:

- CUDA, OpenACC, OpenCL
- OpenMP, MPI
- Matlab, Mathematica
- R, Python, C, C++, Fortran, Perl, Lua, Julia, etc...
- Spark/Hadoop
- Machine Learning (TensorFlow, Caffe)
- Containers!
- Any compiled software that has a finite compute limit

What does **not** run in the cluster?

Service based applications that should be a VM or separate hardware

- Apache (web service)
- MySQL/Postgres (databases)
- Any software that is a service that must be running permanently.

Many of these should be a VM unless computational intensive.

Are there limits?

- Jobs are limited by a **walltime** of 2 weeks (extension?)
- max **1000 jobs submitted** at a time
- There is a limit of **30 running** jobs (# of nodes).
- Login/Head node has a **20 min compute** limit
- Home directories have a **100GB** limit (project space available upon request)

Unity Hardware

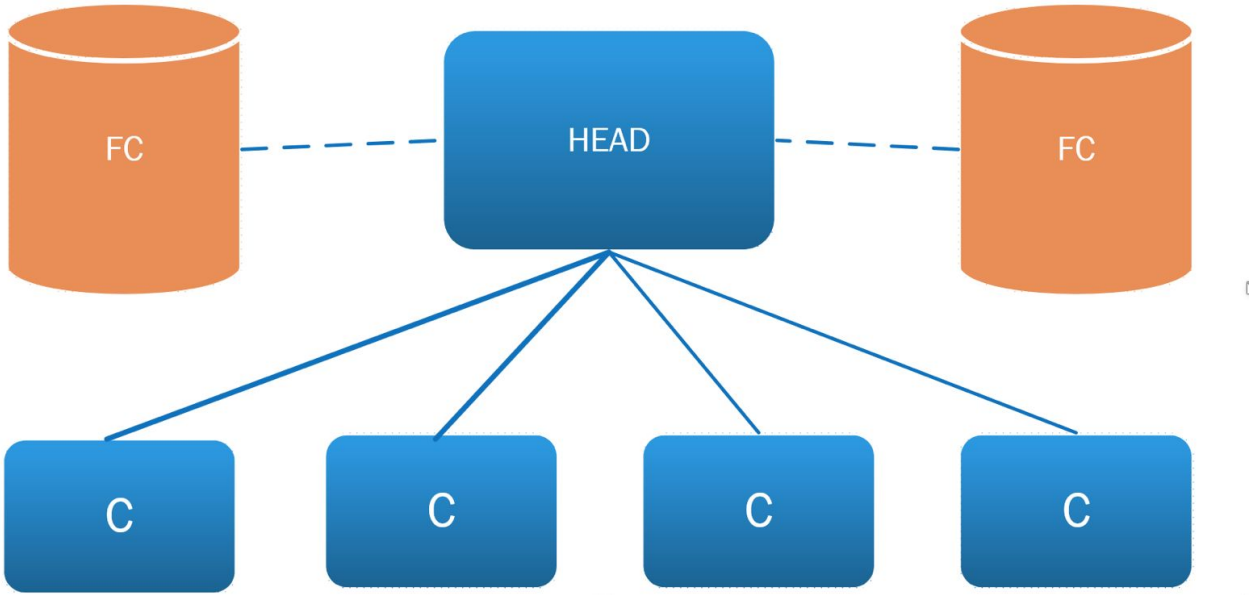
- ~107 nodes (29 Shared nodes, ~4000 cores)
- Heterogeneous cluster mixed architectures
- 16 NVIDIA GPUs
- 512GB -> 16GB RAM (private 1.5TB and 1.0TB)
- 56core -> 16core

OSC resources

Pitzer 29,344 cores on 646 nodes (164 GPUs)

Owens 23,392 cores on 824 nodes (160 GPUs)

How does it work?



Accessing Unity off-campus

- You must be on a campus network or tunnel in
- Jumphost or VPN will tunnel to ASC networks
- See http://go.osu.edu/jumpunity/

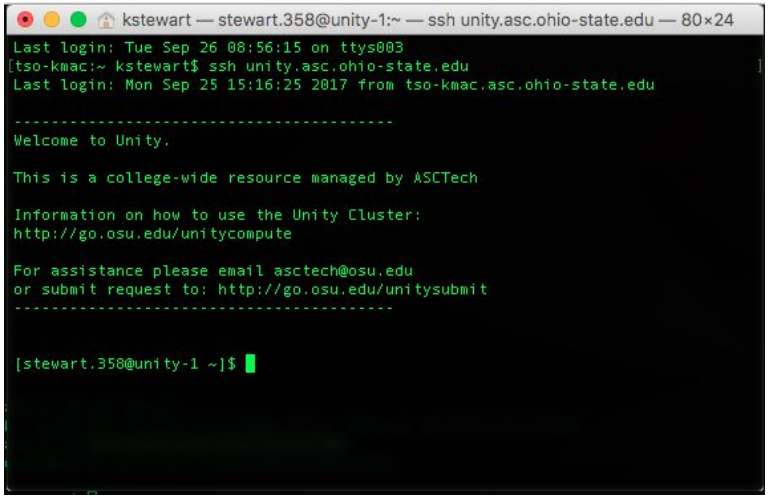
```
ssh -J jump.asc.ohio-state.edu unity.asc.ohio-state.edu
```

OR

```
ssh -J jump.asc.ohio-state.edu:2200 unity.asc.ohio-state.edu
```

Logging in via SSH

Putty/WSL on Windows or terminal on Linux and Mac OS X



SLURM (BATCH manager)

SLURM controls where/when you can run

sinteractive for interactive shell
sbatch submit batch jobs
scancel delete your job
squeue status of the queue
seff see efficiency of job

Interactive shell

Default values (1hour wall, 1 core, 3GB mem)

bash> **`sinteractive`**

Batch script

sbatch data pulled from file

```
bash> sbatch mycalc.sbatch
```

Sample mycalc.sbatch script

```
#SBATCH --job-name=mycalc-run42
#SBATCH --time=02:00:00
#SBATCH --nodes=1
#SBATCH --ntasks-per-node=1
#SBATCH --mem=10g
#SBATCH --output=mycalc-run42_%j.log
#SBATCH --mail-type=ALL
#SBATCH --mail-user=stewart.358@osu.edu


module load matlab
matlab -nodisplay -nosplash < matlab-bench.m
```

Troubleshooting

- Make note of the Job ID
- Check your output and error files
- Try your job interactively
- Submit ticket request via web or email to ASCTech (asctech@osu.edu)

Modules (lmod)

Lmod is used to manage multiple versions of software and their dependencies.

module avail (list available modules)
module spider cuda (search for a module)
module load gnu/6.1.0 (load module)
module list (list loaded modules)

Contact info:

asctech@osu.edu

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Unity Website

https://go.osu.edu/unitycompute

Direct ticket

http://go.osu.edu/unitysupportticket