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
- Special **software**/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/unitysubmit

What runs in the cluster?

Any executable that runs on RHEL7. 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)
- 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
- MySQL/Postgres
- 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
- There is no limit on **number of jobs** submitted
- There may be a limit of **actively running** jobs
- Login/Head node has a **20 min compute** limit
- Home directories have a **100GB** limit

Unity Hardware

- 18 nodes (10 Exclusive and 8 Shared nodes)
- Heterogeneous cluster mixed architectures
- 5 nodes with NVIDIA GPUs (P100s 12GB/16GB)
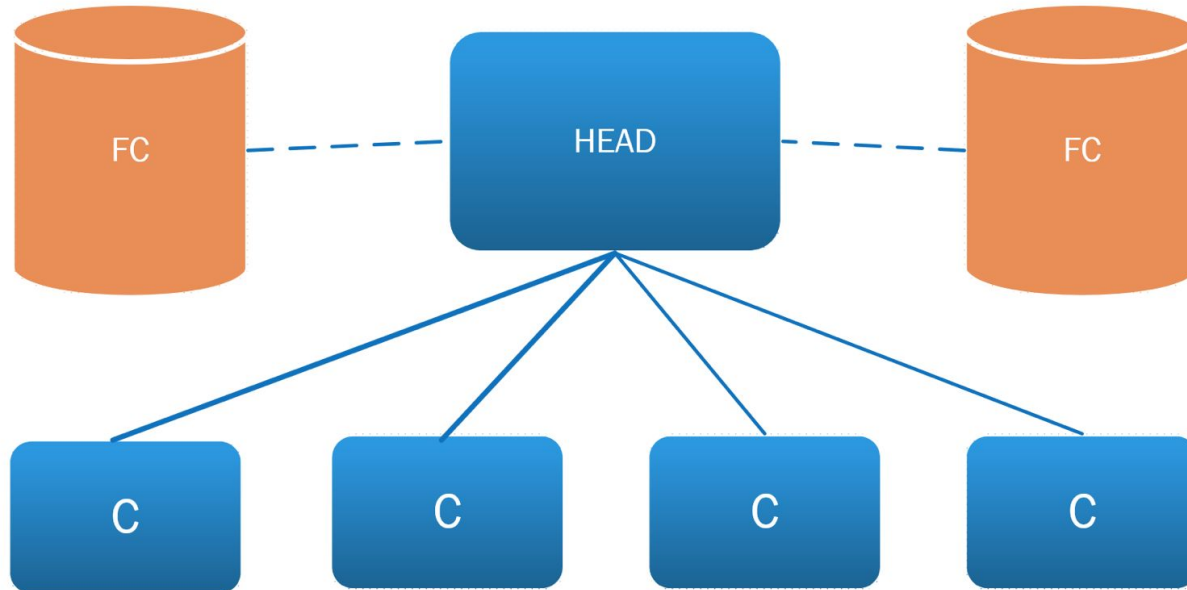- 512GB->16GB RAM (private 1.5TB and 1.0TB)
- 28core->16core

OSC resources

    Owens 23,500 cores on 820 nodes (160 GPUs)

    Ruby 4800 cores on 240 nodes (20 GPUs)

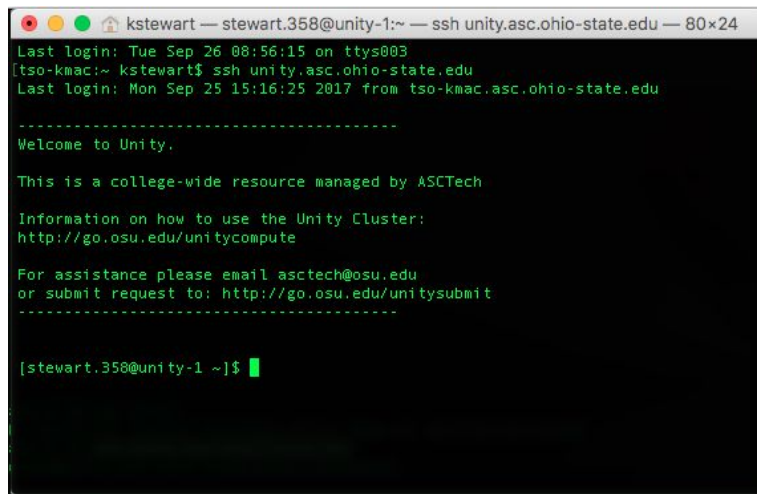   Oakley 8304 cores on 692 nodes (128 GPUs)

How does it work?

Logging in via SSH
Putty on Windows or terminal on Linux and Mac OS X

Torque/Moab (BATCH manager)

Torque is the resource manager and Moab is the scheduler for the compute cluster

qsub for job submission

qdel for deleting your job

showq for viewing the queue

qstat for listing running jobs

Interactive qsub

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

bash> `qsub -I`

batch script qsub

QSub data pulled from file

bash> **qsub** `myjob.pbs`

Sample myjob.pbs script

```
#PBS -N KeithJob
#PBS -l walltime=1:00:00
#PBS -l nodes=1:ppn=4
#PBS -l mem=4GB
#PBS -j oe
#PBS -m abe
#PBS -M stewart.358@osu.edu

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

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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

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)

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Unity Website
https://go.osu.edu/unitycompute

Direct ticket

http://go.osu.edu/unitysubmit