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Introduction to the HPC for HLT

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Intro to HPC



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■ HPC = High Performance Computing



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Tip

- HPC = High Performance Computing
- Cluster of computers (supercomputer)



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Tip

- HPC = High Performance Computing
- Cluster of computers (supercomputer)
- UA has two clusters



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■ Large dataset (too large for your laptop)

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- Large dataset (too large for your laptop)
- Long running computation



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- Large dataset (too large for your laptop)
- Long running computation
- Need to run many experiments/programs (batch computing)



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- Large dataset (too large for your laptop)
- Long running computation
- Need to run many experiments/programs (batch computing)
- Parallelize your computation



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- Large dataset (too large for your laptop)
- Long running computation
- Need to run many experiments/programs (batch) computing)
- Parallelize your computation
- GPUs for machine learning



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- Large dataset (too large for your laptop)
- Long running computation
- Need to run many experiments/programs (batch computing)
- Parallelize your computation
- GPUs for machine learning
- It's free!*



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- Large dataset (too large for your laptop)
- Long running computation
- Need to run many experiments/programs (batch) computing)
- Parallelize your computation
- GPUs for machine learning
- It's free!*

Documentation

■ http://hpc.arizona.edu



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https://ood.hpc.arizona.edu



Basic shell commands

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Command	Description		
cd /path/to/dir	Move to the specified directory.		
ls	List files in current directory (or specify a path).		
mkdir -p /path/to/dir	Create the specified directory structure.		
less filename.txt	Show contents of a file. Use arrow keys to scroll and $\ensuremath{\mathtt{q}}$ to exit (quit).		



Where to store stuff

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Location	Max Size	File Limits	Backups?
/extra/netid	200 GB	600 files/GB	no
~/home	15 GB	n/a	nightly
/tmp	varies	n/a	no



Accessing preinstalled software

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[hahnpowell@login2 ~] \$ singularity



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[hahnpowell@login2 ~] \$ singularity

-bash: singularity: command not found



Environment modules

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- n module load singularity/3/3.4.2
- 2 singularity --version



Environment modules

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- 1 module load singularity/3/3.4.2
- 2 singularity --version

singularity version 3.4.2



Modules: Common tasks

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What modules are available?

Available software

What modules have been loaded?

module list

1 module avail



Modules: Common tasks

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Save currently loaded modules for later use

1 module save module-name-here

Tips

Load saved modules

1 module restore module-name-here



Modules: Common tasks

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Learn more

■ See https://modules.readthedocs.io/



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Things to remember

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■ El Gato ≠ Ocelote

- Different OS version
- Different hardware
- **.**.



Things to remember

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 $\blacksquare \ \, \mathsf{El} \ \, \mathsf{Gato} \neq \mathsf{Ocelote}$

Why might this be a concern?



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Anatomy of a PBS script

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https://github.com/ua-hlt-program/ua-hpc-recipes (dev branch)



Anatomy of a PBS script

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https://github.com/ua-hlt-program/ua-hpc-recipes (dev branch)

Additional resources

 For GUI-based PBS script construction, check out the job composer



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Questions?



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