Introduction to Modules at CHPC

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16 February 2021
Overview of Talk

- Why Modules
- Where to find information
- How to setup to use modules
- Module basics
- Advanced Modules
- Demonstration
What modules do

• Modules are a way of managing the user’s shell environment in an interactive session or a batch job
Why Modules

- Modules lets users dynamically change the environment – including easily adding and removing directories needed for a given task from $PATH etc – without needing to log out and back in.
- Easy to switch between version of a package or application – again without having to start a new session.
- Useful when packages have conflicts in their environment settings.
Module Documentation at CHPC

- https://www.chpc.utah.edu/documentation/software/modules.php
- https://www.chpc.utah.edu/documentation/software/modules-advanced.php
- Video -- https://www.youtube.com/watch?v=Cu6C5INLDAY

We make use of TACC’s LMOD

- https://www.tacc.utexas.edu/research-development/tacc-projects/lmod
- LUA based
All accounts automatically use modules –

- This is done via the login scripts CHPC provides all accounts, even if you have older dot files

- CHPC uses modules to set up environments upon login: chpc/1.0
Recommendations & Helpful Hints

• Keep both the cshell and bash versions of provided login scripts in your home directory
  – Standard CHPC provided scripts found in /uufs/chpc.utah.edu/sys/modulefiles/templates

• **DO NOT** make changes in the .tcshrc and .bashrc

• Use the .custom.csh/.custom.sh to load modules for programs regularly used in ssh sessions

• Use .aliases file to create aliases – but do not set other environment variables in this file; if this file exists it will be sourced during login

• Module spider (more later) is easiest way to search for modules
Basic Module commands

- **module** - shows the list of module commands
- **module load <name>** - loads module name (shortcut: **ml <name>**)
- **module unload <name>** - unloads module name (**ml -<name>**)
- **module avail** - shows a list of "available" modules (**ml av**)
- **module list** - shows a list of loaded modules (**ml**)
- **module help** - prints help for the module command
- **module help <name>** - prints help for module
- **module show <name>** - prints the module file
- **module purge** - unload all modules
- **module reset system** – resets to system default (only chpc module loaded)
- **module swap <name1> <name2>** - swaps between two modules
- **module spider <string>** - shows all modules that have string in name
CHPC Module Organization

• Core
  – Contains modules for applications independent of both the compiler and MPI implementation

• Compiler
  – Contains modules for applications dependent on a compiler (& version) but not on a MPI implementation

• MPI
  – Contains modules for applications dependent on both a compiler and a MPI implementation

*Modules themselves are named by application name/version*
Other Information

- We also define module “families”; can only have one module in a family loaded at one time
  - Used for python, compilers, mpi, R
  - For example, if you have intel loaded, and load any gcc it will unload intel

- Parallel versions of boost, HDF5 have separate modules
  - hdf5 for module for serial build, phdf5 for module for parallel build
  - boost for serial, pboost for parallel
Default, aliases, and hidden modules

- For some applications have a default module – one that is installed if you do not provide a specific version
  - typically the latest version is specified to be the default
- For some modules, especially those with long version names, there is also an alias defined
  - `ml intel/18` loads the default 2018 intel version (2018.1.193)
  - `ml intel/18.0` loads the 2018.1.163 version
- We have depreciated older installations and their modules so some have been hidden
  - `module --show_hidden avail`
Module avail command

• **module avail** shows all modules available based on already loaded module
  – This also marks default (D), already loaded (L), gpu specific (g) and aliases

• Some modules are dependent on other modules based on organization
  – these modules are not listed unless the modules they depend on are loaded
Module show command

- Format `module show modulename/version`
- Shows you the content of the module file
- This is useful if there is information on running the program included in the module
- Only works if module is available, i.e., you have modules that it depends on loaded
Module spider command

- **module spider** shows all modules, including modules that aren't available

- Use **module spider <string>** to see a subset of modules with **string** in name, and how to either load the module or how to get more detailed information on how to load
Advanced Modules

• Users can create “save lists” for commonly needed environments
• Users can write and use their own modules, creating modules for their own installations
• Contact CHPC if you need assistance doing this
Getting Help

• CHPC website
  – www.chpc.utah.edu
    • Getting started guide, cluster usage guides, software manual pages, CHPC policies

• Service-Now issue/incident tracking system
  – Email: helpdesk@chpc.utah.edu

• Help Desk: 405 INSCC, 581-6440 (9-6 M-F)
• We use chpc-hpc-users@lists.utah.edu for sending messages to users