Introduction to computing, architecture and the UNIX OS

HORT 530

Lab 1

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Working with UNIX servers

- Connect to the Scholar cluster, SSH clients
- User space
- SFTP clients

Scholar : Our class server

Sub-Cluster	Number of Nodes	Processors per Node	Cores per Node	Memory per Node	Interconnect
Head	7	Two 10-Core Intel CPUs	20	512-768 GB	56 Gbps FDR Infiniband
A	8	Two 10-Core Intel CPUs	20	64 GB	

- Scholar is a Linux cluster maintained by Purdue and is available for all computational classes.
- Secure Shell (SSH) protocol is the most common way to connect to remote UNIX/LINUX servers.
- The specific SSH client you use depends on your client (laptop) OS.
- Linux and MacOS have built-in clients.
- PuTTY is the most common client on Windows machines.

Scholar resources

- Temporary UNIX user account for the duration of this class.
- Home directory with 25GB storage.
- Temporary storage up to 250GB on scratch.

Connecting to Scholar

- You all have an account on Scholar for the duration of this class.
- You can log in to Scholar using your Purdue account.
- You will need an SSH client to attempt the connection.

https://www.rcac.purdue.edu/knowledge/scholar

Logging in from Windows

- Download the MobaXterm program from here: http://mobaxterm.mobatek.net/download.html

- Open mobaxterm.exe and start a new session:
  - server: scholar.rcac.purdue.edu
- Accept the server host key (Only needed for the first log in).

Logging in from Windows contd…

- Login as: <Your purdue account> 
  - Eg: login as: kvarala

- Password: <Your BoilerKey> 

Log in success!!

```
hort-hla-desk17141:~ kvarala$ ssh kvarala@scholar.rcac.purdue.edu
Password:
Last login: Tue Jan  8 10:18:30 2019 from hort-hla-desk17141.agriculture.purdue.edu
================================================================================
==                    Welcome to the Scholar Cluster                          ==
==                                                                            ==
==    Scholar consists of:                                                    ==
==                                                                            ==
==    Nodes:                                                                  ==
==    Scholar-A    ppn=20    64 GB memory                                     ==
==                                                                            ==
==    Scratch:                                                                ==
==    Quota: 250 GB / 250k files                                              ==
==    Path: $CLUSTER_SCRATCH                                                  ==
==    Type command: "myquota"                                                 ==
==                                                                            ==
==    Queues:                                                                 ==
==    Type command: "qlist"                                                   ==
==                                                                            ==
==    Software:                                                               ==
==    Type command: "module avail" or "module spider"                         ==
==                                                                            ==
==    User guide:                                                             ==
==    www.rcac.purdue.edu/knowledge/scholar                                   ==
==                                                                            ==
==    Help:                                                                   ==
==    www.rcac.purdue.edu/help                                                ==
==                                                                            ==
==    News:                                                                   ==
==    www.rcac.purdue.edu/news/Scholar                                        ==
==                                                                            ==
================================================================================
scholar-fe06:~ kvarala$
```

Logging in from MacOS

- Go to Applications -> Utilities -> Terminal

- Type the command:

ssh <Your Purdue account>@scholar.rcac.purdue.edu 

- An alternate client you can use is iTerm2
  - https://www.iterm2.com/

Logging in from Linux

- All Linux distros will have the Terminal client.
- Depending on your distro the way you access the client may differ.
- On Ubuntu, press Ctrl+Alt+T
- Type the command:

ssh <Your Purdue account>@scholar.rcac.purdue.edu 

Setting up SSH keys

- Set up SSH keys to allow quick login from authenticated machine.

- https://www.rcac.purdue.edu/knowledge/scholar/accounts/login/sshkeys

User space on Scholar

- You have two places to store your files called Home and Scratch

- For example:
  - Home: /home/kvarala
  - Scratch: /scratch/scholar/k/kvarala

Type	Filesystem	Size	Limit	Use	Files	Limit	Use
home	kvarala	71.9MB	25.0GB	0.28%	0k	-	-
scratch	scholar	4KB	100.0TB	0.00%	0k	2,000k	0.00%

Data Units

Data Unit	Size
Bit	1 or 0
Byte	8 Bits
KiloByte (KB)	1,024 Bytes
MegaByte (MB)	1,024 KB
GigaByte (GB)	1,024 MB
TeraByte (TB)	1,024 GB
PetaByte (PB)	1,024 TB
ExaByte (EB)	1,024 PB
ZettaByte (ZB)	1,024 EB

User space

- All UNIX files, including system and user files reside in a hierarchical directory structure.
- The lowest level or base of this structure is called the ‘root’ directory. (Directory == Folder)
- The root directory is represented as /
- Every user has a defined home directory
  - My home is: /home/kvarala

Secure File Transfer (SFTP)

- An application of SSH protocol to transfer files instead of commands.
- SFTP clients used to establish file transfer connection.
- Windows: WinSCP (https://winscp.net/eng/download.php)
- MacOS: FileZilla (https://filezilla-project.org/download.php?platform=osx)
- Find the Course syllabus file on your local machine and copy it to your home directory on Scholar.

Long term storage

- https://www.rcac.purdue.edu/knowledge/fortress/accounts
- Fortress is a long term archive storage solution.
- Transfer files to and from Fortress using the Globus service : https://transfer.rcac.purdue.edu
- Install Globus connect on your laptop and setup it up as an endpoint.