Introduction to UNIX at MSI

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www.msi.umn.edu/tutorial/
Overview

• UNIX Overview
• Logging into MSI
Frequently Asked Questions

msi.umn.edu > Resources > FAQ

Website will be updated soon
What’s the difference between Linux and UNIX?

The terms can be used interchangeably.
UNIX

- UNIX is the operating system of choice for engineering and scientific workstations
- Originally developed in the late 1960s
- Unix is flexible, secure and based on open standards
- Programs are often designed “to do one simple thing right”
- Unix provides ways for interconnecting these simple programs to work together and perform more complex tasks
Getting Started

- MSI account
- Service Units required to access MSI HPC systems
- Open a terminal while sitting at the machine
- A shell provides an interface for the user to interact with the operating system
- BASH is the default shell at MSI
Bastion Host

- login.msi.umn.edu
- Connect to bastion host before connecting to HPC systems
- Cannot run software on bastion host (login.msi.umn.edu)
Running Software at MSI

“Lab” systems
- Interactively from computer labs
- Interactively from remote connection (NICE)
- Batch – submit job (qsub)

HPC systems
- Interactively (limited time)
- Batch – submit job (qsub)
Accessing Machines at MSI

- `ssh [options] username@machinename.msi.umn.edu`
- `[options] X-forwarding`
  - `-X` set up environment to port graphics
  - `-Y` for Macs
- `machine`
  - `itasca, mesabi, etc.`

- **Examples:**
  - `ssh -Y rowe@login.msi.umn.edu`
  - `ssh -Y rowe@itasca.msi.umn.edu`
Options to Connect to MSI Systems

• Cannot remotely login directly to machines at MSI
  – ssh login.msi.umn.edu
  – NICE Virtual Network Computing – Install Client
  – Citrix/Xen - For Windows-specific software – Install Client

• Cannot run software directly from login (bastion host)

• www.msi.umn.edu/remote-access
Remote Login with ssh

Login to the bastion host
login.msi.umn.edu

Use isub or ssh to connect to other machines

• isub is an MSI specific command
• Expects bash shell
• Syntax:
  
  ssh [-X][-Y] [user@]host1

• Examples:
  
  ssh -Y rowe@login.msi.umn.edu
  isub
  or
  isub –noprobe

*Users cannot launch software directly on login.msi.umn.edu

• Use VPN if not on UMN campus
• Download VPN from UMN OIT
• May need to download ssh client, ssh, PuTTY
• Not good when running graphical software
Remote Login Using NICE

- Download DCV client
- Like running from a Linux workstation
- Can run software from “terminal”
- Use VPN is not on UMN campus
isub

- isub is a wrapper to ssh and qsub, designed specifically for interactive use.
- isub is unique to MSI
- Only used from NX or lab.msi.umn.edu
- Not needed from NICE or HPC systems or laboratory systems

Example:

```
isub -n nodes=1:ppn=4 -m 16GB -w 24:00:00
```

Check [https://www.msi.umn.edu/isub](https://www.msi.umn.edu/isub) for more details

If you are connecting login.msi.umn.edu, you cannot run any software directly on that node.
For submitting jobs to batch queue

#!/bin/bash -l
#PBS -l nodes=1:ppn=1,mem=1gb,walltime=01:00:00
#PBS -m abe
cd /home/msi/username/Testpbs
module load intel
./test < input.dat > output.dat

Submit job: qsub script.pbs
Check status: showq -u username

More details can be found at https://www.msi.umn.edu/labs/pbs
Running Software

• Modules
  – `module load software`
  – `module avail software`
  – `module list software`
  – `module unload software`
  – Example of running software:
    `module load avizo`
    `avizo`

http://modules.sourceforge.net/
File Transfer

• Files can be transferred to MSI Linux storage using SCP or SFTP or RSYNC

```
scp [[user@]host1:]filename1[[user@]host2:]filename2
```

```
scp temp.ps login.msi.umn.edu:/scratch/newfile.ps
```

• Applications
  • Filezilla (Mac)
  • WinSCP (Windows)
Citrix

- Windows software
- xen.msi.umn.edu
MSI File System

Full path is /home/support/chityala
The Anatomy of a Command

% ls -alrth /scratch

ls (command or utility name)

-alrth (options – modify behavior of the command)

/scratch (argument – what is being operated on)
Basic Commands

**ls (-l, -rt, -h)**
- List contents of the directory

**mkdir**
- Make a new directory

**Cd**
- Change into a directory

**man**
- Open the manual

**cp (-r)**
- Copy a file

**mv**
- Move or rename a file

**ssh (-X, -Y)**
- Login remotely

**scp (-r)**
- Copy files to/from a remote machine

**w, uptime**
- Find who else is logged in

**rmdir**
- Remove a directory

**rm (-r, -f)**
- Remove a file

Note that “rm -rf *” is one of the most dangerous commands in the universe.
Basic Commands

ls (-l, -rt, -h)  list contents of the directory
mkdir            make a new directory
cd               change into a directory
man              open the manual
cp (-r)           copy a file
mv               move or rename a file
ssh (-X, -Y)     login remotely
scp (-r)         copy files to/from a remote machine
w, uptime        find who else is logged in
rmdir            remove a directory
rm (-r,-f)       remove a file
find             find a file

Note that “rm –rf *” is one of the most dangerous commands in the universe
Text Editing

- vi
- emacs
- nedit, gedit – graphical, work similar to Notepad or TextEdit
Get Help on a Command

• man ls
  – CTRL+F pages forward
  – CTRL+B pages back
• The ‘up’ and ‘down’ arrows allow finer grain control
• “:q” quits the help file
• apropos
Command Completion

• **TAB**

• Finishes the current command, filename, directory or shows any of the above that match the current string.

• Learn to use **TAB** often!
Stay Organized

- Keep your files arranged
  - System studied
  - File Type
  - Date
  - Program used
- Make directories, subdirectories, subsubdirectories, subsubsubdirectories and so on
- Name your files carefully. **Avoid use of spaces in file names** — it’s usually allowed but requires extra work to use, in practice
Caveats

• If you delete a file, it’s GONE! There is no “Recycle Bin” step. The file may be able to be recovered from a backup by contacting help@msi.umn.edu.

• If you overwrite a file it has been changed forever.

• Home directories are backed up nightly.

• The scratch spaces are not backed up.
Physical Access to Labs

- Every lab needs card access
- See the lab web pages
- Contact help@msi.umn.edu for more information
Data Storage

- Home directories the same for all systems
- Scratch directories in labs and HPC systems
- **shared** space for group collaboration
- **public** space for world access
Questions?

• MSI help desk is staffed Monday through Friday from 8:30 AM – 5:00 PM
• Walk-in help is available in Walter 587
• Consultant by appointment
• Email help@msi.umn.edu
• Phone 612-626-0802
• www.msi.umn.edu