Unix-Basic Cheat Sheet (Terminal)

Server Management-SSH

Command	Description
ssh user@ssh.fsl.byu.edu	connect to fsl host as user (It ask you for your password)
whoami	who you are logged in as
date	shows the current date and time
man *command*	show the manual for *command* function (e.g., man ls). To quit man type: q
pwd	prints working directory (displays the full path, or your location on the filesystem)
ls	lists contents of current directory
ls -l	lists contents of current directory with extra details
ls -l -tr	lists contents of current directory with extra details by recently modified at the end of list
ls *.txt	lists all files in ending in .txt
cd	change directory to your home directory
cd ~	change directory to your home directory
cd mydir	change directory to mydir subdirectory
cd ..	changes to directory above current one
cd -	change directory to the last directory you were in before changing to wherever you are now

Wildcard characters

*	matches any character. example: ls *.pl lists any file ending with ".pl" ; rm dataset* will remove all files beginning with "dataset"
[xyz]	matches any character in the brackets (x, y, or z). example: cat do[or]m.txt will display the contents of either doom.txt or dorm.txt

Copying files and directories

mkdir mynewdir	makes a directory called mynewdir
cp myfile mynewfile	copies myfile to mynewfile (Note: if mynewfile already exists, this will overwrite it)
cp –r dir newdir	copies the whole directory dir to newdir. –r must be specified to copy directory contents recursively
scp myfile username@ssh.fsl.byu.edu:/fslhome/username/	copies files from your computer to the byu clusters (it ask you for your password). Note: path is the location in your computer that you want that folder, use pwd for that purpose.
scp username@ssh.fsl.byu.edu:/fslhome/username/myfile	copies files from the byu clusters user home directory to your computer in the current directory
scp –r mydir username@ssh.fsl.byu.edu:/fslhome/username/	copies files from your computer to the byu clusters user home directory (it ask you for your password). Note: path is the location in your computer that you want that folder, use pwd for that purpose.
scp –r username@ssh.fsl.byu.edu:/fslhome/username/mydir path/mydir	copies files from the byu clusters to your computer

Deleting and moving files and directories

rm myfile	removes file called myfile
rm –f myfile	removes myfile without asking you for confirmation. Useful if using wildcards to remove files ***
rm –rf mydir	this will delete directory mydir along with all its content without asking you for confirmation! ***
mv myfile newlocdir	moves myfile into the destination directory newlocdir
mv myfile newname	renames file to newname. if a file called newname exists, this will overwrite it!
mv dir subdir	moves the directory called dir to the directory called subdir
mv dir newdirname	renames directory dir to newdirname

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File Contents

Command	Description
`cat new.txt`	displays the contents of new.txt
`more new.txt`	displays the contents of new.txt screen by screen. Spacebar to page down, q to quit
`head new.txt`	displays first 10 lines of new.txt
`tail new.txt`	displays last 10 lines of new.txt

VIM Text editor

`vim filename`	opens filename in terminal
SHIFT + zz	quits vim

Compression and expansion of files

`tar cf file.tar` *`file1 file2`*	Create a tar named "file.tar" containing *file1 and file 2*
`tar cf file.tar *.*`	create a tar named file.tar containing all files in folder
`tar czf file.tar.gz` *`file1 file2`*	Create a tar with Gzip compression containing *file1 and file 2*
`tar cjf file.tar.bz2` *`file1 file2`*	Create a tar with Bzip2 compression containing *file1 and file 2*
`tar xf file.tar`	Extract the files from "file.tar"
`tar xzf file.tar.gz`	Extract the files from "files.tar.gz"
`tar xjf file.tar.bz2`	Extract the files from "file.tar.bz2"
`gzip` *`file`*	Compress *file* and renames it to "file.gz"
`gzip -d` *`file.gz`*	Decompresses *file.gz* back to file
`unzip file.zip`	Decompresses *file.zip*

Sbatch jobs:

Intro video:
https://www.youtube.com/watch?v=U42qlYkzP9k&index=4&list=PL326A5EB4E3B16FED

1) Make a text file (e.g., mytest.job) that contains:
Basic batch job

```
#!/bin/bash

#SBATCH --time= 6-12:00:00   # walltime in days-hours:minutes:seconds (max 7-00:00:00 -- 7 days)
#SBATCH --ntasks=1   # number of processor cores (i.e. tasks)
#SBATCH --mem-per-cpu=4gb   # memory in gb or mb per CPU core
#SBATCH --mail-user=XXXXXXXX@gmail.com   # your email address
#SBATCH --mail-type=BEGIN #email you when the job begins
#SBATCH --mail-type=END #email you when the job ends


cd /fslhome/user_name/compute/mydirectory

[HERE your commands e.g.: perl myscript.pl inputfile.txt]
```

Batch job with modules:
https://marylou.byu.edu/documentation/apps/softwareModuleList

RaxML job

```
#!/bin/bash

#SBATCH --time=12:00:00   # walltime in days-hours:minutes:seconds (max 7-00:00:00 -- 7 days)
#SBATCH --ntasks=1   # number of processor cores (i.e. tasks)
#SBATCH --nodes=2   # number of nodes
#SBATCH --mem-per-cpu=1gb   # memory per CPU core
#SBATCH --mail-user=XXXXXXXX@gmail.com   # your email address
#SBATCH --mail-type=BEGIN #email you when the job begins
#SBATCH --mail-type=END #email you when the job ends

module load raxml/7.7.8

cd /fslhome/user_name/compute/mydirectory_raxml

raxmlHPC-SSE3 -N 10 -m GTRCAT -s myalign.phy -n myalign.phy [Note: see RAxML commands]
```

MrBayes job

```
#!/bin/bash

#SBATCH --time=12:00:00   # walltime in days-hours:minutes:seconds (max 7-00:00:00 -- 7 days)
#SBATCH --ntasks=16   # number of processor cores (i.e. tasks)
#SBATCH --nodes=1   # number of nodes
#SBATCH --mem-per-cpu=250Mb   # memory per CPU core
#SBATCH --mail-user=XXXXXXXX@gmail.com   # your email address
#SBATCH --mail-type=BEGIN #email you when the job begins
#SBATCH --mail-type=END #email you when the job ends

module load mrbayes/3.2.4_intel-15.0.0

PROG="mb_beagle_sse_mpi"

#---Change “myfilealigned.nex” to the name of your input file with MrBayes block--------#
ARGS="myfilealigned.nex"

cd /fslhome/user_name/compute/mydirectory_mrbayes

mpirun -np **NODES** $PROG $ARGS

exit 0
```

BEAST job

```
#!/bin/bash

#SBATCH --time=12:00:00   # walltime in days-hours:minutes:seconds (max 7-00:00:00 -- 7 days)
#SBATCH --ntasks=1   # number of processor cores (i.e. tasks)
#SBATCH --nodes=1   # number of nodes
#SBATCH --cpus-per-task=12
#SBATCH --mem-per-cpu=1Gb   # memory per CPU core
#SBATCH --mail-user=XXXXXXXX@gmail.com   # your email address
#SBATCH --mail-type=BEGIN #email you when the job begins
#SBATCH --mail-type=END #email you when the job ends

module load beast/2.1.3

cd /fslhome/user_name/compute/mydirectory_beast

BEAGLE_INSTANCES=$SLURM_CPUS_ON_NODE

beast -beagle_SSE -beagle_instances $BEAGLE_INSTANCES mybeast_file.xml

exit 0
```

R environment job

```
#!/bin/bash

#SBATCH --time=12:00:00   # walltime in days-hours:minutes:seconds (max 7-00:00:00 -- 7 days)
#SBATCH --ntasks=1   # number of processor cores (i.e. tasks)
#SBATCH --nodes=1   # number of nodes
#SBATCH --cpus-per-task=12
#SBATCH --mem-per-cpu=1Gb   # memory per CPU core
#SBATCH --mail-user=XXXXXXXX@gmail.com   # your email address
#SBATCH --mail-type=BEGIN #email you when the job begins
#SBATCH --mail-type=END #email you when the job ends

module load r/3.1.1

mkdir /fslhome/user_name/R/R_libs # you need to create this repository for your libraries only once

cd /fslhome/user_name/compute/mydirectory_R

R --vanilla < simple_script.r
```

---

simple_script.r

```
##Simple job in R

install.packages("ape", repos="http://cran.r-project.org", lib="/fslhome/user_name/R/R_libs")

library("ape", lib="/fslhome/user_name/R/R_libs")

random_trees <- rtree(10) # generate a random, non-ultrametric tree of 10 tips

write.nexus (random_trees, file = "mytrees.tre")


## end simple_script.r
```

More info:

https://www.osc.edu/documentation/howto/install-local-R-packages

2) Copy your files and job directories to the BYU cluster. You can use 'FileZilla' which is a free, cross-platform FTP (**File Transfer Protocol)** application software.

https://filezilla-project.org/

Binaries are available for Windows, Linux, and Mac OS X.

If this is your first time, you need to set up the FTP connection:

Host: ssh.fsl.byu.edu
Username: user_name
Password: your password
Port: 22 (SSH Remote Login Protocol)

Then, you can 'drag and drop' your folders and files (including your job files) to the BYU cluster

3) To submit jobs, you will need to locate your job file (e.g., mytest.job)

```
sbatch mytest.job
```

Your job will be scheduled and run based on Job Scheduler see video:

https://www.youtube.com/watch?v=h8TZokyI6yo&list=PL326A5EB4E3B16FED&index=2

Your can check the status of your job

```
squeue -u user_name
```

4) If, for some reason, you want to cancel a job , find the job id name with and then cancel it

```
squeue -u user_name
scancel jobnumber
```