BlueCrystal Reference Card

Advanced Computer Research Centre
https://www.acrc.bris.ac.uk/

Logging In

ssh   Secure shell.
options include:
-X   Enables X11 forwarding.
example:
ssh *user*@**bluecrystalp3**

Transferring Files

scp   Secure copy.
options include:
-r   Recursively copy entire directories.
examples:
scp *local.tar.gz* *user*@**bluecrystalp2**:~
scp -r *user*@**bluecrystalp2**:*/remote/path* .

winscp scp/sftp GUI for windows.

Checking Your Quota

showquota

Configuring Your Environment

module Interface to modules package.
options include:
avail   List all available modulefiles.
add   Load modulefile into shell environment.
del   Remove modulefile from shell environment.
list   List loaded modulefiles.

whatis   Display the modulefile information.
example:
module add openmpi/gcc/64/1.6.5
$HOME/.bashrc   BASH startup file
Make your environment customisation persistent, and available on compute nodes, by storing, e.g. your module commands in this file.

Using the Queuing System

qsub   Submit job to queuing system.
example:
qsub *submission-script*
where the following submission script contains the minimal information required to submission a serial program to the *veryshort* queue (wallclock limit 2hrs):

```
#!/bin/bash
#PBS -l nodes=1:ppn=1,walltime=02:00:00
cd $PBS_O_WORKDIR
./my-serial-program
```

for a multi-threaded program:

```
#!/bin/bash
#PBS -l nodes=1:ppn=4,walltime=02:00:00
cd $PBS_O_WORKDIR
./my-multi-threaded-program
```

for an MPI (distributed memory parallel) program:

```
#!/bin/bash
#PBS -l nodes=2:ppn=4,walltime=02:00:00
cd $PBS_O_WORKDIR
cat $PBS_NODEFILE > machine.file.$PBS_JOBID
numnodes=`wc $PBS_NODEFILE | awk '{print $1}'`
mpirun -np $numnodes -machinefile \
machine.file.$PBS_JOBID ./my-mpi-program
```

Ensure that you have the appropriate module add commands in your shell start-up file (e.g. ~/.bashrc).

qstat   Show status of batch jobs.
options include:
-u *user* Show only *user*'s jobs.
-n   List nodes allocated to a job.
showq Show status of batch jobs—alternative format.
qdel   Delete batch job with given job ID.
example:
qdel 673615

Some Useful Linux Commands

File/Directory Basics

ls   List directory contents.
examples:
ls -ltr   Long listing, most recently modified last.
ls -h   File sizes in readable format e.g. 1K, 234M.
pwd   Print working directory.
cd   Change current directory.
examples:
cd ..   Change to directory above.
cd */path/to/dir* Change to directory given in path.
cp   Copy files and directories.
examples:
cp *file1 file2*   create a copy of file1 called file2.
cp -r *dir1 dir2* recursively copy dir1.
mv   Move (rename) files and directories.
examples:
mv *file1 file2*   Rename file1 as file2.
mv *dir1 /new/path*   Move dir1 to a new location.
rm   Remove files or directories.
examples:
rm -i *file1*   Prompt before deleting file1.
rm -rf *dir1*   Recursively & forcefully remove dir1.
mkdir   Make directories.
rmdir   Remove empty directories.
ln   Make links between files and directories.
examples:
ln -s */path/to/dir1 ./dir1* Symbolically link to dir1.

Viewing & Manipulating Text Files

head   Output the first part of files.
example:
head -7 *file.txt*   View first 7 lines of file.txt.
tail   Output the last part of files.
example:
tail -7 *file.txt*   View last 7 lines of file.txt.
cat   Concatenate files and print to stdout.
example:
cat *file1.txt file2.txt*   Append file2.txt to file1.txt.
wc *file.txt*   Print line, word and byte counts.
diff *file1.txt file2.txt*   Compare files, line by line.
cut   Print selected parts from each line of files.
example:
cut -d',' -f1,2 *file.csv*   Print first two columns of
                                   file.csv.
paste   Merge lines of files.
example:
paste *file1.txt file2.txt* Concatenate each line of
                                   file1.txt and file2.txt, in turn,
                                   and print.
sort   Sort lines of files.
examples:
sort -d *file1.txt*   Print contents of file1.txt in
                                   dictionary order.
sort -nr *file1.txt*   Print contents in reversed
                                   (descending) numerical order.
uniq   Report or omit repeated lines.
example:
uniq *file1.txt*   Print only unique lines of file1.txt.
sed   Stream editor for filtering and transforming.
examples:
sed 's/cat/bat/g' *file1.txt*   replace all instances of
                                   'cat' in file1.txt with 'bat'.
sed 's/*ed//g' *file1.txt*   replace all words in file1.txt
                                   ending with 'ed' with the
                                   empty string.
awk   Pattern scanning and processing language.

example:
awk '{print $2}' *file1.txt*   Print second column
                                   of file1.txt.
gedit   Text editor.
emacs Text editor.

Redirection and Pipelines
>   Redirect stdout.
example:
cat *file1 file2* > file1-and-2
<   Redirect stdin.
>>   Redirect stdout and append.
example
cat *file1-and-2 file3* >> file-1-and-2-and-3
| Pipe stdout from one cmd to stdin of another.
example:
head -7 *file1* | tail -1   view 7th line of file1

Viewing Other Files
od   Dump files in octal and other (e.g. binary)
            formats.
nm   List symbols from object (& library) files.
example:
nm *mylib.a* | less   view symbols in mylib.a, one
                                   page at a time.
ldd   Report shared library dependencies.
example:
ldd *myprog.exe*   View myprog.exe's dependencies.

File Properties
file   Determine file type.
touch   Change file timestamps.
example:
touch *file1*   Updates access and modification times
                          of file1 to the present time.
chmod Change file mode bits.
example:
chmod a+r *file.txt*   Allow all to read file.txt.
chown Change file owner and group.
md5sum   Compute/check MD5 message digest.
du   Estimate file space usage.

example:
du -sh .   Summarize (in readable format) total
                       usage of file-tree rooted in current dir.
df   Report file system disk space usage.
example:
df -h .   Report usage (including available space) for
             file system holding current dir.

Searching For Things
grep   Print lines matching a pattern.
examples:
grep -n 'foo' *file.txt*   Print all lines (prefixing the
                                   line number) containing 'foo'
                                   in file.txt.
grep -i 'foo' *   Print all lines containing 'foo' (case
                       insensitive) from all files in current
                       dir.
find   Search for files in a directory hierarchy.
which Locate a command.
example:
which *gcc*   Report location of gcc compiler.
whoami   Print effective userid.
man   An interface on on-line reference manuals.
info   Read Info documents.
?   Wildcard: matches a single character.
*****   Wildcard: matches any sequence of characters.

Compressing and Combining
tar   Archiving utility.
example:
tar -xzf *archive.tar.gz*   Unpack compressed archive.
gzip   Compress files.
example:
gzip *file.txt*   Compress file.txt.
gunzip Expand files.

Process Management
top   Display Linux tasks.
kill   Send a signal to a process.
fg   Place a job in the foreground.
bg   Place a job in the background.