Getting started with BC4

1 Logging on to BC4

From a Linux or Mac computer simply use the built-in `ssh` client and connect to one of the main login nodes. Open a terminal window and type:

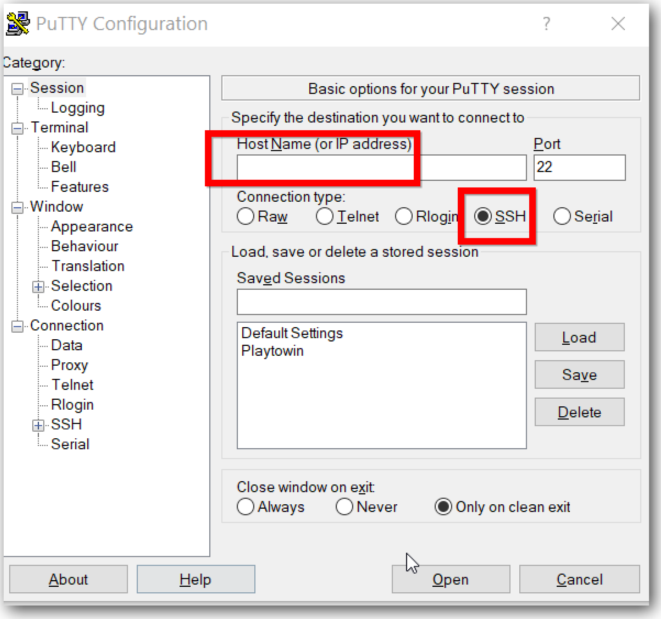
```
$ ssh -X username@bc4login.acrc.bris.ac.uk
```

Remember to replace the `username` part with your UoB username. It will prompt you for a password. Type this in (your typed text is not displayed) and hit `[enter]`. Something like this will be outputted:

```
$ ssh -X username@bc4login.acrc.bris.ac.uk
username@bc4login.acrc.bris.ac.uk's password:
Warning: untrusted X11 forwarding setup failed: xauth key data not generated
*** This system is available to authorised users only ***

[username@bc4login3 ]$
```

On Windows you will need to download an `ssh` client such as **Putty**, shown in Fig. 1, or **bitvise ssh** and setup a connection to BC4 similar to above.



PuTTY Configuration

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address)

Port: 22

Connection type: ○ Raw ○ Telnet ○ Rlogin ● SSH ○ Serial

Load, save or delete a stored session

Saved Sessions

Default Settings
Playtowin

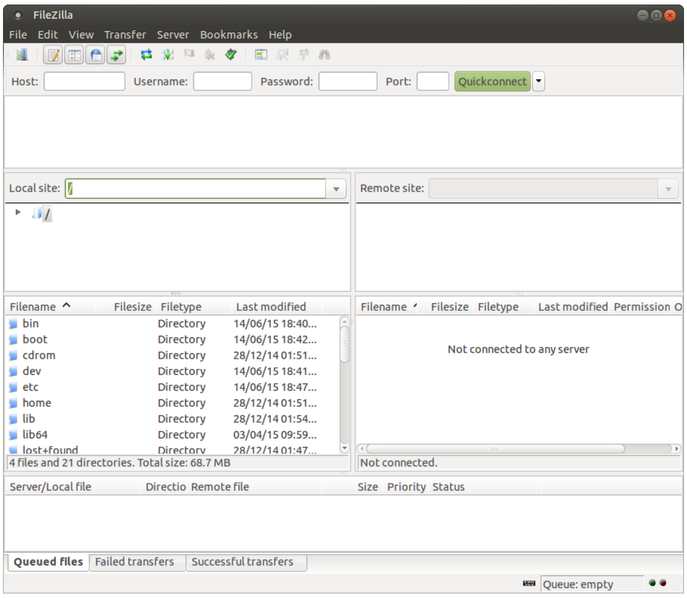
Close window on exit: ○ Always ○ Never ● Only on clean exit

Figure 1: The `ssh` client **Putty** popular on Windows. To login to BC4 use the Host Name is `bc4login.acrc.bris.ac.uk` and ensure that the `ssh` protocol is used.

To connect to the cluster create a session using:
Host Name: `bc4login.acrc.bris.ac.uk`
Connection type: `ssh`
Port: 22 (leave as default)

Hit “Open” to connect! A terminal windows should appear similar to that described above for Linux and Mac machines where you will enter your UoB credentials.

In addition to an ssh terminal it is essential to have a secure file transfer sftp client open and logged in. A good choice **FileZilla** which fool-proof and reliable cross-platform client for downloading and uploading files to and from a remote computer.



Filename	Filesize	Filetype	Last modified
bin		Directory	14/06/15 18:40...
boot		Directory	14/06/15 18:42...
cdrom		Directory	28/12/14 01:51...
dev		Directory	14/06/15 18:41...
etc		Directory	14/06/15 18:47...
home		Directory	28/12/14 01:51...
lib		Directory	28/12/14 01:54...
lib64		Directory	03/04/15 09:59...
lost+found		Directory	28/12/14 01:47...

4 files and 21 directories. Total size: 68.7 MB

Filename	Filesize	Filetype	Last modified	Permission	O

Not connected to any server

Not connected.

Server/Local file	Directio	Remote file	Size	Priority	Status

Queue: empty

Figure 2: The sftp client **FileZilla** can be used on Windows, Mac or Linux machines. Use the Quickconnect feature to login to BC4.

Download and install on your computer the FileZilla client from https://filezilla-project.org. Once opened the program will display a familiar split-view file browser window with the left hand side of the screen showing your local files, as shown in Fig. 2. When you connect to the cluster, your cluster files will appear on the right hand side.

To connect to the cluster, we’ll just need to enter our credentials in the top bar of the application:

Host: sftp://bc4login.acrc.bris.ac.uk
User: <Your UoB username>
Password: Your UoB password
Port: (leave blank to use the default port)

Hit “Quickconnect” to connect! You should see your remote files appear on the right hand side of the screen. You can drag-and-drop files between the left (local) and right (remote) sides of the screen to transfer files.

2 Linux command-line instructions

Essentially all high-performance computing clusters use a Unix-based operating system (often a variant of Linux) and your interactions with such resources will almost certainly be via command-line instructions. It is therefore essential we start with an overview of the some useful basic commands:

Let’s start with some commands to assist in nagivating the filesystem. To see the name of the **present working directory** use the pwd command typing

```
$ pwd
/Users/username/Documents/course
```

To **list** the contents of the current directory use the `ls` command as

```
$ ls
test            data.zip
file1
```

To list **all** the details of the current directory contents type

```
$ ls -al
drwx------    3 username  staff     96  8 Jul  2019 test
-rwxr-xr-x   43 username  staff   1376  4 Oct  2018 file1
-rwxrwxrwx    3 username  staff     96  3 Apr  2020 data.zip
```

The character being `d` tells that `test` is a directory while the − for the rest of the contents indicates they are regular files. The string of characters like `rwxr-xr-x` is the permission string, and the last entry is the filename. To **change directory** to `test` listed above use the `cd` command as

```
$ cd test
```

To go back the next directory one level up type

```
$ cd ..
```

This should return us to our original directory.

Next let's look at manipulating files and directories. To change the permissions on a file `file1` so it is executable type use `chmod` as

```
$ chmod +x file1
```

To make a **copy** of a file `file1` called `file2` use `cp` command by typing

```
$ cp file1 file2
```

To **remove** (or delete) a file `file1` use the `rm` command as

```
$ rm file1
```

To **make a directory** `store` at our current location we have the `mkdir` command

```
$ mkdir store
```

To **move** a file `file2` to subdirectory `store` and rename use the `mv` command

```
$ mv file2 store/file1
```

To **remove** a directory `store` we can use the `rm` command again

```
$ rm -r store
```

The `-r` flag indicates that you want to remove the directory and any files or subdirectories inside it. To see the Linux manual for any command (like `chmod`) use `man` as

```
$ man chmod
CHMOD(1)                  BSD General Commands Manual                 CHMOD(1)

NAME
    chmod -- change file modes or Access Control Lists

SYNOPSIS
    chmod [-fv] [-R [-H | -L | -P]] mode file ...
    chmod [-fv] [-R [-H | -L | -P]] [-a | +a | =a] ACE file ...
    chmod [-fhv] [-R [-H | -L | -P]] [-E] file ...
    chmod [-fhv] [-R [-H | -L | -P]] [-C] file ...
    chmod [-fhv] [-R [-H | -L | -P]] [-N] file ...

DESCRIPTION
    The chmod utility modifies the file mode bits of the listed files as
    specified by the mode operand. It may also be used to modify the Access
    Control Lists (ACLs) associated with the listed files.
    ...
```

This will give an exhaustive list of all the flags and options available for any command. Press `[space]` to scroll and `[control]+[c]` to quit.

Finally, some useful tricks. Use the [↑] and [↓] keys on the keyboard to retrieve previously typed commands so you can avoid typing them in again. Use the `[tab]` key to auto-complete your commands, for example, `cd t` + `[tab]` should auto-complete as `cd test`. □