UNIVERSITY OF BIRMINGHAM

Birmingham Environment for Academic Research

Introduction to Linux Quick Reference Guide

Research Computing Team

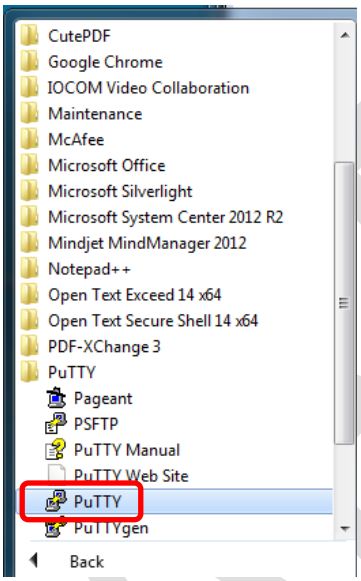
V1.0

Contents

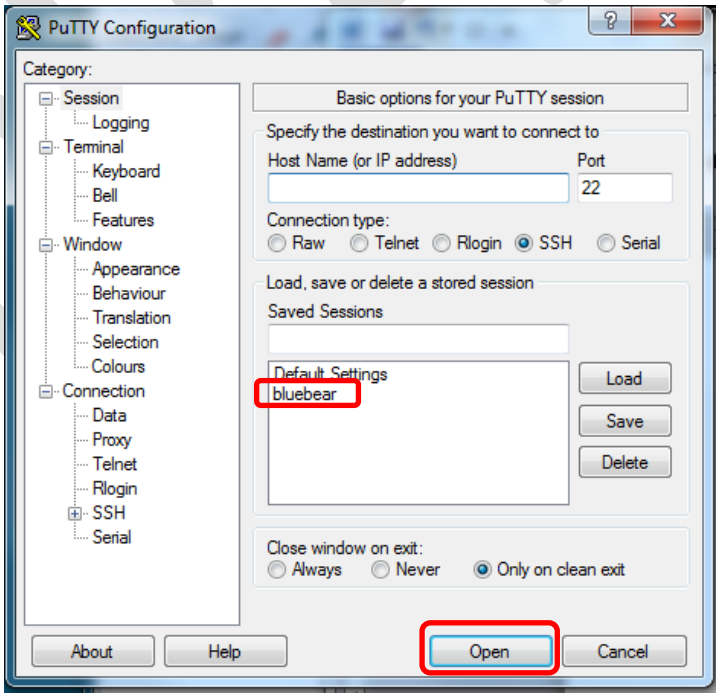
This guide assumes that PuTTY is setup and configured for BlueBear per the instructions found at (https://intranet.birmingham.ac.uk/it/teams/infrastructure/research/bear/bluebear/accessing-bluebear-using-putty-and-exceed.aspx#ConfiguringPuTTY)

Double-click on the 

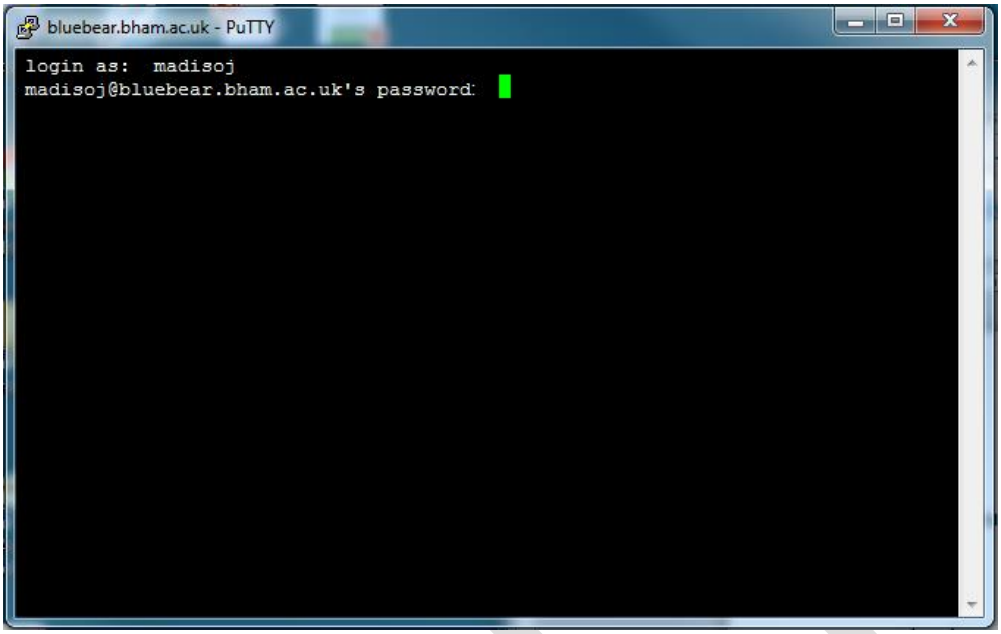
icon on your desktop, or go to the Start button in Windows¦ All Programs ¦ PuTTY ¦ click once on PuTTY to start the program.



Double-click on bluebear to start the program or click once on bluebear and click Open.



Log in using your user ID and password.



The Basics

Command	What it means	Example
ls	Displays a list of files within the current directory	*ls*
mkdir	Make directory	*mkdir unixfiles*
cd	Change directory	*cd unixfiles*
pwd	Present working directory	*pdw*
rm (remove file) or rmdir (remove directory)	Remove directory	*rmdir unixfiles*
cp	Copy a file	*cp file1 file2* (this will make a copy of file1 and place it in the current directory with the name file2)
mv	Move a file	*mv file1 file2* (this will rename file1 to file2)
touch	**touch** creates new, empty files	*touch file 3*
less	**less** writes the contents of a file to the screen a page at a time	*less linuxintro.txt*
head	**head** writes the first ten lines of the file to the screen	*head linuxintro.txt*
tail	**tail** writes the last ten lines of the file to the screen	*tail linuxintro.txt*
grep	**grep** (global regular expression print) searches input files for specific words or patterns and print the results	*grep "touch" linuxintro.txt*
awk	**awk** is a pattern scanner	*awk –F: '{print $1}' /etc/group*

sed	**sed (stream editor)** changes test as you read a file (in Windows terms, it's a search and replace'	*sed -e 's/ldap/cat/' /etc/nsswitch.conf > ~/nsswitch.conf*
diff	**diff** shows the difference between to files	*diff /etc/nsswitch.conf ~/nsswitch.conf*
man	**man** will display the on-line manual which explains the options associated with the command	*man sort*
ln -s	Link creates a soft link or shortcut	*ln –s /home/user1/myfile/tmp/link_to_myfile*
tar (traditionally tape archive)	Groups a set of files together into a single file. Similar to zipping a file	*tar -cvpf ~/newfile.tar ~/testdir*
gzip or **bzip2**	These are often used to compress files	*gzip -9 ~/newfile.tar*

Directory / File Permissions

Directory Permissions	File Permissions
r **(list contents of directory)**	**r** (read the file)
w **(Create new files/folders)**	**w** (write to the file)
x **(traverse, e.g. cd to the directory)**	**x** (execute or run)

u	User/owner
g	Group owner
o	All other users
a	All, user/owner, group owner, and all others

To show permissions on the home directory, type: ls –ld ~/

```
[madisoj@bb2login02 ~]$ ls -ld ~/
drwx------ 6 madisoj users 32768 Oct  5 08:21 /gpfs/bb/madisoj/
[madisoj@bb2login02 ~]$
```

To make a new directory called testdir	Type: mkdir testdir
To create a new, empty file called testfile	Type: touch testdir/testfile
To assign read, write, execute permissions to testdir (the directory)	Type: chmod g+rwx testdir
To view testdir permissions	Type: ls –ld testdir
To assign read permission to 'others' to testfile	Type: chmod o+x testdir/testfile

```
[madisoj@bb2login02 ~]$ mkdir testdir
[madisoj@bb2login02 ~]$ touch testdir/testfile
[madisoj@bb2login02 ~]$ chmod g+rwx testdir
[madisoj@bb2login02 ~]$ ls -ld testdir
drwxrwx--- 2 madisoj users 512 Oct  5 08:29 testdir
[madisoj@bb2login02 ~]$ chmod o+x testdir/testfile
[madisoj@bb2login02 ~]$
```

Bit masks can also be used:

- chmod 755 directory
- chmod u+rwx,go+rx directory

Process Management

- Everything you execute causes at least 1 process to be generated
- Programs which "fork" may create multiple sub-processes
- The command top shows the processes running using most CPU (q to exit)
- Processes may be in several different states:
    - Running in foreground
    - Suspended (stopped, no further processing happens)
    - Backgrounded (running but no longer attached to terminal)
    - Zombie (In a bad way, typically no longer doing anything useful)
- Command line processes can be stopped using CTRL+z
- Running **bg** will then background the process
- **jobs** lists processes from the current terminal and their state
- **fg** returns a suspended or background process to the controlling shell

Process Priority

- Each process has a priority which determines home much CPU time will be allocated when the CPU is busy with many applications
- **renice** can be used to change the priority of a process (users can only reduce)
- On shared systems, it is "sociable" to **renice** heavy compute processes which you are leaving running

Signals

HUP	Tells a process to reread a config
TERM	Tells a process to terminate
KILL	Forcefully kills a process
kill –SIGNAL processID	HUP and TERM rely on signal handler in code

Looking for Processes

- The command **ps** will list your running processes and their processID
- **ps -ef | grep vi**
  - The above command would look for processes called vi