

The University of Queensland

Research Computing Centre

Connecting to HPC

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Document Status

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Cluster Connection Tools

The following table lists some of the tools available that can be used to connect to the HPCs so you can

- transfer files
- operate command line sessions
- display X11 graphics on your local computer

This list is not an endorsement of any particular tool.

Use at your own risk.

	Windows	Linux	Mac	Android
File Transfers	FileZilla CyberDuck WinSCP psftp	FileZilla CyberDuck scp at the command line gftp	FileZilla CyberDuck scp at the command line RBrowser Fugu (inactive)	Turbo Client Synchronise Ultimate
Command Line Sessions	PuTTY MobaXterm	ssh at the command line PuTTY	ssh at the command line Fugu (inactive)	Serverauditor JuiceSSH
X11 Servers	Xming MobaXterm	X11 is installed by default	X11 is now a separate project called XQuartz	Search for "X11 server" in Play Store

Just search the internet for them by name if any of these links are out-of-date.

Individual Login Nodes and Cluster Aliases

Cluster	Login Nodes	Cluster Login Alias
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Awoonga	awoonga1.rcc.uq.edu.au	awoonga.rcc.uq.edu.au
FlashLite	flashlite1.rcc.uq.edu.au	flashlite.rcc.uq.edu.au
	flashlite2.rcc.uq.edu.au	
Tinaroo	tinaroo1.rcc.uq.edu.au	tinaroo.rcc.uq.edu.au
	tinaroo2.rcc.uq.edu.au	
Wiener	wiener.hpc.dc.uq.edu.au	wiener.hpc.dc.uq.edu.au

Encryption

It is all about trust!

Your command line connection tool or file transfer tool will need to establish an encrypted "tunnel" through which your username, password and data will pass between your computer and the server.

As part of establishing an encrypted connection, your command line connection or file transfer tool will connect to the server and need to validate its identity.

If it has never connected to that server before (or the server has updated its identity) you will be prompted to confirm that you trust the server.

Only say "Yes" if the server identity that is offered to you by your software matches what it should be!

The host keys for HPC systems are as follows.

All the login nodes for a particular cluster should use the same key.

Host Key Fingerprints for HPC

The following table lists the md5sum "fingerprints" for each cluster for different key types.

Your connection tool should show you one or more of these when it challenges you about your connection.

Cluster	Key Type/Algorithm	Host Key Finger Print
Awoonga	ssh-rsa	99:c0:b3:70:d4:e5:47:0d:ef:89:45:5c:37:21:b4:96
	ssh-ed25519	5a:a2:c4:87:ae:28:77:6d:af:73:7b:9f:4f:fa:1d:6b
	ecdsa-sha2-nistp521	fc:b6:22:38:95:b8:8b:72:b2:f6:a7:6a:f2:03:fb:41
FlashLite	ssh-rsa	b8:5c:2f:d9:76:ce:d2:23:a6:00:21:db:73:8a:3a:f1
	ssh-ed25519	d6:76:cd:1a:79:c4:ed:c4:2d:3f:ff:59:61:fc:ea:ec
	ecdsa-sha2-nistp521	d5:d5:d7:1d:2b:6b:61:61:c1:67:f8:da:1c:bd:3d:96
Tinaroo		
	host	SHA256:1o+e0tTtxK51l+T3UIL3q7sVgbqSheVvcfdin20ELMA
	ssh-rsa	SHA256:yi4wnEfZ0v0seUWSvgMetBDaDGfovihej+Pjfn80gFg
	ssh-dsa	SHA256:0/p35uohoBWeEwniIGzbQrWAJCSLQN91qwQzA3ejifk
	ssh-ecdsa	SHA256:sr36dGBdatgkneopSSe1UJj1b6Uo42jjgRXbGqFs9UY
	ssh-ed25519	SHA256:0c7633cZvPLUHVnJeBwDDau8XS+sDRw+bsjT5QNfjaA
Wiener	ssh-rsa	66:4b:0c:f0:ec:e2:43:c0:5b:d6:d0:0b:73:e3:ad:86
	ecdsa-sha2-nistp521	84:e4:c0:0b:fe:ef:38:89:39:9d:11:28:24:0e:12:58

You can verify these fingerprints using these commands on the login node:

```
ssh-keygen -lf /etc/ssh/ssh_host_key.pub
ssh-keygen -lf /etc/ssh/ssh_host_rsa_key.pub
ssh-keygen -lf /etc/ssh/ssh_host_dsa_key.pub
ssh-keygen -lf /etc/ssh/ssh_host_ecdsa_key.pub
ssh-keygen -lf /etc/ssh/ssh_host_ed25519_key.pub
```

Even if you are using the browser based access tools, the connection will be encrypted (using https instead of http). The web server's identity is verified by an independent trust authority.

Command Line Connections

PuTTY SSH Client

The putty command-line connection tool is available on Windows and Linux.

Useful Configuration Options for PuTTY

PuTTY supports a variety of options and shortcuts.

My favourite combination of settings in Windows are available through the PuTTY Configuration.

If you modify settings in various places within the PuTTY Configuration tool, you must return to the Sessions and save the profile so you can re-use it later.

Section	Item	Value	Note
Session	Host Name	enter full hostname	
Session	Saved Sessions	e.g. uqdgree5 at Tinaroo	
Terminal			Nothing needed
Window	Columns Rows	values	depends on your needs
Window	Lines of scrollbar	2000	has a minor affect on the RAM used by the program
Window/Appearance	Font Settings	select	use fixed width fonts
Window/Colours	Use System Colours	check	gives you a dark background screen
Connection	Keep alive	120	every 120s it will send a keep alive packet
Connection	auto-login username	uq...	enter your UQ username
Connection/SSH/Auth	Allow agent forwarding	check	allows you to use keys and key tool pageant
Connection/SSH/Auth	Private key file for authentication	browse for the putty key file	allows you to login using key not password
Connection/SSH/X11	Enable X11 forwarding	check	allows you to display X11 graphics (e.g. using Xming)

If you modify settings in various places within the PuTTY Configuration tool, you must return to the Sessions and save the profile so you can re-use it later.

The ssh command for Linux and Mac

If you use a Linux or Mac computer, you can use the command line ssh command.

The ssh command has a rich set of features that can be invoked at the command line. See the `man ssh` for details.

The file `$HOME/.ssh/config` can be used to create convenient aliases that can help launch ssh in specific and complex modes (including proxy commands). See `man ssh_config` for syntax.

An ssh config example

The following is a `.ssh/config` shorthand for connecting to a GPU server in Euramoo as my UQ-ness, using my key, with SSH key agent and X11 forwardings enabled.

The command used to connect is then just `ssh gpu04`

```
Host gpu04
    Hostname eura04-gpu.qld.nectar.org.au
    Protocol 2
    Port 22
    IdentityFile ~/.ssh/id_rsa
    IdentitiesOnly yes
    User uqdgree5
    ForwardAgent yes
    ForwardX11 yes
```

Stayin' Alive

To ensure that your connection stays viable during periods of inactivity, you should add these to options to mimick the "Keep Alive" option for PuTTY SSH described above.

The following settings will try every 2 minutes (120 seconds) and also allow for 3 failed attempts before terminating the connection.

```
ServerAliveInterval 120
ServerAliveCountMax 3
```

You can also search the internet for something like how to ensure an ssh connection stays open.

For further information about these and the myriad of other options for the ssh command, please refer to the `ssh` and `ssh_config` system manual pages.

Displaying X11 Graphics

Your work on HPC can sometimes involve the need to display graphical outputs.

There are two options available to you.

1. launch the graphical application from an SSH connection that has X11 forwarding enabled (see above)
You will also need to have activated an X11 server program like Xming if you are using Windows.
2. launch the graphical application from within a Browser Remote Desktop session on Tinaroo (see below).

Note that needing to be running a graphical user interface on your HPC application is not a valid excuse for running that application on the login nodes or remote desktop nodes.

Please use either of these techniques

1. for tasks that fit within the maximum walltime of the Interactive queue, submit an interactive job to the batch system with X11 forwarding enabled (see the PBSPro User Guide)
2. for tasks that take longer than the time available in the Interactive queue, you can submit a "sleeper" job and once it starts, `ssh -X` to the node your job is sleeping on.

What are .bashrc and .bash_profile ?

To help you get your linux environment set up just right, there are some standard configuration files that get automatically "sourced" when you start your shell (login or connect for file transfers).

`$HOME/.bashrc` gets sourced every time you connect to HPC (e.g. ssh, scp but also when a batch job starts up)

`$HOME/.bash_profile` only gets used when you connect interactively (i.e. not for scp but for ssh and interactive batch jobs)

Getting command output because you have a command in `.bashrc` will possibly cause a sftp connection tool to think there is a problem and to drop the connection.

You should avoid putting commands to be executed in your `$HOME/.bashrc` file. Just use `.bashrc` for setting environment variables, and the like.

When you want to have something that runs every time you actually interactively log in, you should put it in your

`$HOME/.bash_profile`

Web Browser Access to HPCs

There is no longer a remote desktop service on Tinaroo

Tinaroo HPC no longer supports a graphical remote desktop via web browser.

CVL Workbenches on Wiener

For users of the [Characterization Virtual Laboratory workbenches](#), there is a remote desktop facility provided at each participating site.

The CVL workbenches provide a suite of ready-to-use graphical applications from drop down menus.

CVL Workbenches are run on the GPU equipped nodes within the Wiener HPC.

How to Register for CVL Workbenches

Access to CVL Workbenches requires registration as a CVL user.

For the Wiener hosted desktops, you register for a [Wiener account](#) in the usual way and request CVL access.

How to Access CVL Workbenches

Once access to CVL workbenches has been granted (on one or both UQ systems) you can access the CVL workbenches [here](#)

File Transfer Connections

Using WinSCP

Start WinSCP and enter the following parameters

Parameter	Value	Notes
File protocol	Either SFTP or SCP	SFTP is better for large text files
Host name	tinaroo1.rcc.uq.edu.au	tinaroo.rcc.uq.edu.au will also work as well
Port number	22	Usually 22 for encryption
User name	Your UQ User Name	
Password		Leave blank, do not save passwords in profiles

Click Save so you can re-use this profile default name for the profile is username@servername

Click Login to commence the connection to the server. You will be prompted for your password (do not save it).

The WinSCP application will have a split screen with your Windows computer on the left and the linux server (tinaroo1) on the right.

By default, you will land in your home directory on Tinaroo, however you should be able to save a different landing point for future connections (using bookmarks and/or preferences).

More details about options for file transfers are covered in the File Transfers User Guide