# Accessing the Teaching Linux Farm remotely
from Windows systems

Many/most of the software required for taught courses is available on the department's teaching Linux farm, which can be accessed from home machines (desktop or laptop).   This uses a *Secure Shell* connection (SSH).   Windows systems usually require an `ssh` client to be explicitly installed (as this is not included as part of a typical installation).

The software that we recommend is called **MobaXterm**, and this can be obtained from
https://mobaxterm.mobatek.net/download-home-edition.html
Download the `Installer edition` zip archive, open it, and run the MSI installer found there.
Then follow the Setup Wizard as usual.
This will typically install an icon on your desktop (as well as an entry in the Start Menu)
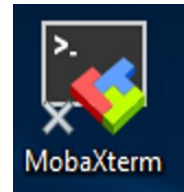
Configuring MobaXterm

The first time you use MobaXterm, you will need to supply details of the connection to set up.   This information will then be saved, and can be used again for subsequent connections. MobaXterm supports a variety of different types of session – in this document we will only consider a simple SSH connection to the departmental teaching Linux farm.

There are (currently) eight systems making up this farm – these are named
`lxfarm01.csc.liv.ac.uk` through to `lxfarm08.csc.liv.ac.uk`.
The available software and configuration of these systems should be exactly the same – you can choose any one of these machines. If a particular machine is not available (or seems overloaded), simply disconnect and choose a different one.
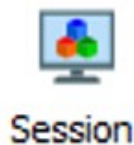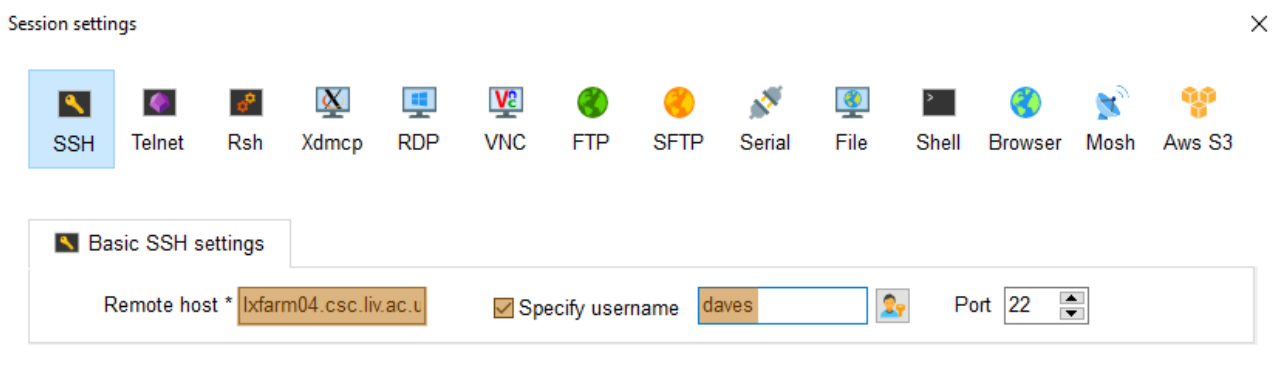
Click the *Session* icon *(left)* in the buttons bar across the top of the window.
Then click the *SSH* session button *(right)* and fill in the fields as follows:

> `Remote Host`   `lxfarm{XX}.csc.liv.ac.uk`
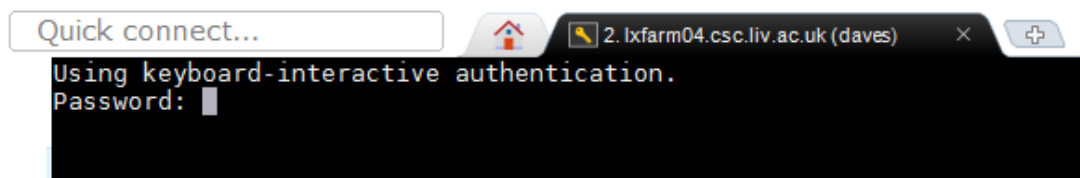> Check the box `Specify username` and enter your University username

The rest of the settings (*Advanced, Terminal*, etc) can be left at the default values.
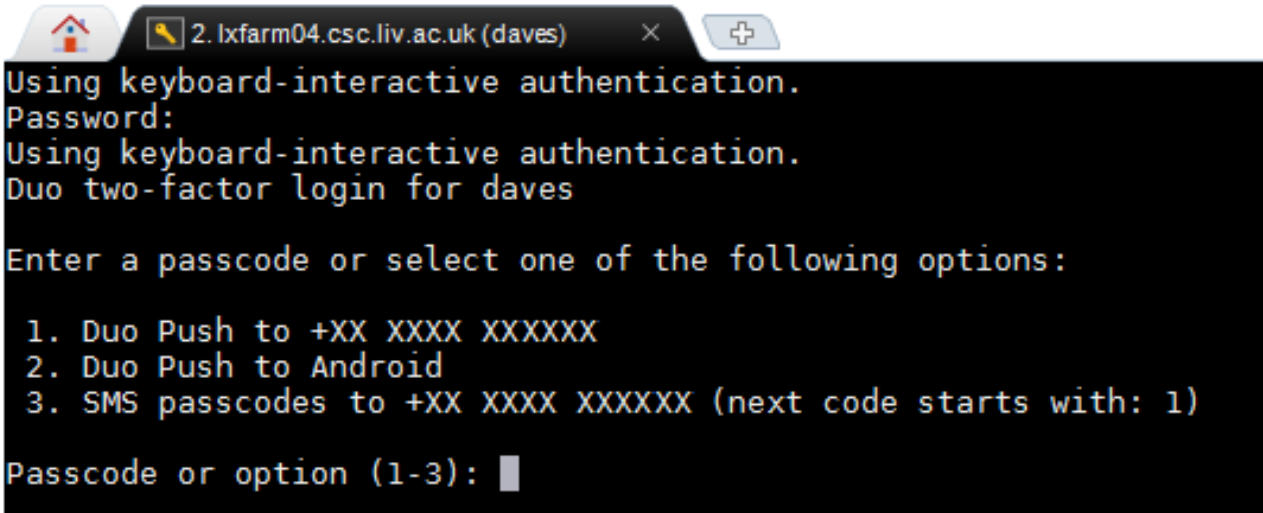

Then click OK

You will be asked to supply your University password (and press Return).

Two factor authentication

Following an increase in security exploits targetting universities in recent weeks, there is now a second authentication step required before you can start using these systems.

Once you have supplied the username and (correct) password, you will be asked to select a *Duo Push* challenge to a registered device (typically a mobile phone or tablet) and confirm this request via a dedicated app running on that device.

Alternatively, you will have the option to generate a challenge code, sent by SMS text message to your registered phone, which should then be entered on the terminal.

Note that in both cases, you will need to have registered your phone (and/or other device) with the University two-factor authentication scheme before starting to use the teaching farm systems.   This can be done via the URL https://duoenrolment.liverpool.ac.uk/

The system `lxfarm08.csc.liv.ac.uk` is configured slightly differently, and will not offer this choice of options – instead it will automatically send the challenge to the primary registered device. This is to aid with SSH-tunnelling services (such as MySQL Workbench, or remote file editing) where the terminal prompts are not always visible or interactively accessible.

There is more information about the University's Duo two-factor authentication mechanism at https://s.liv.ac.uk/708

Shell session

Once you have confirmed the login request (either via the *Duo mobile* app, or the SMS code), you will be logged into the chosen system, and can run Linux commands on that machine. For text-based commands, the output will be shown in the same ***MobaXterm*** terminal window – graphical commands should open up a new window on your local display.
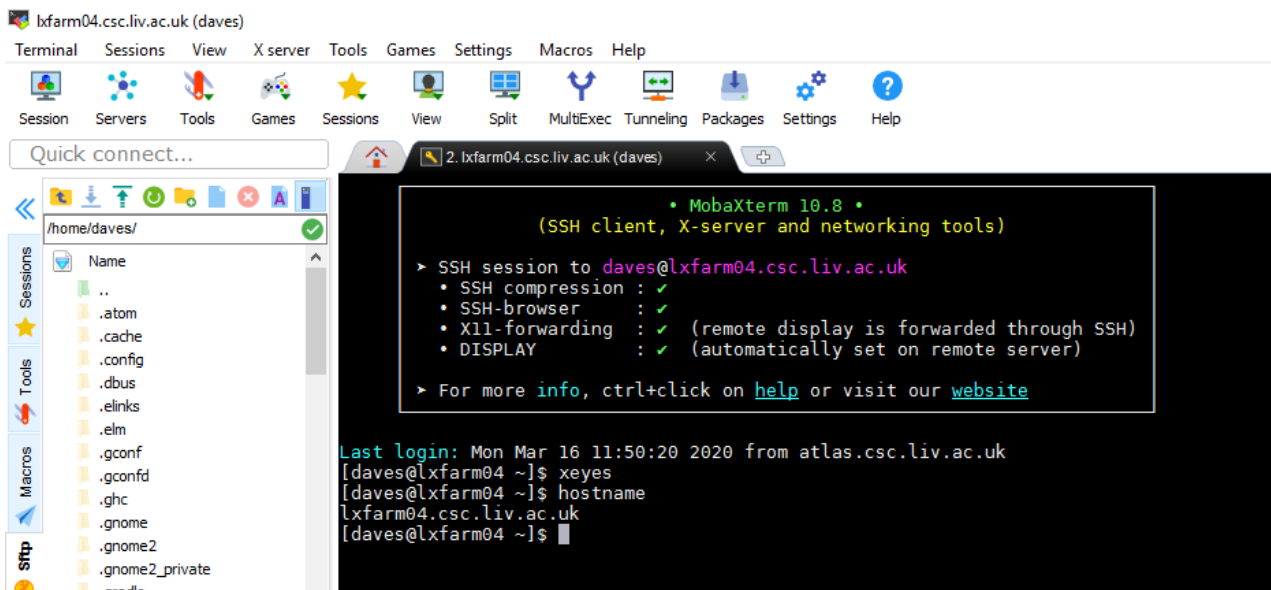
Note that immediately after logging in, you will be informed of the time and source (IP address) of the last successful login session. (Note that one consequence of introducing the Duo two-factor authentication is that this will now *always* be reported as a numeric IP address).
If you do not recognise this connection, please inform the CS technical team immediately by emailing CSC-HELPDESK@liverpool.ac.uk You may also wish to change your password.

When reporting this, or any other issue with the system, it is extremely helpful to include details of which Linux machine you were using (which should appear as part of the command prompt), and the date & time any problem occurred. If you're not sure which system you're on, the command `hostname` will also show this information *(see above)*.

When you have finished with the session, use the command `exit` to disconnect, and then close the ***Terminal*** window, as usual.
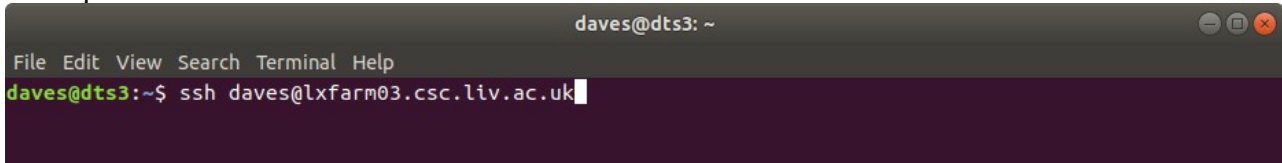 Note that closing the ***Terminal*** window *without* first `exit`ing from the Linux system may leave processes running on that Linux farm machine, and could cause problems in the future.

This will then log you into the selected teaching Linux farm machine, and give you a command prompt.
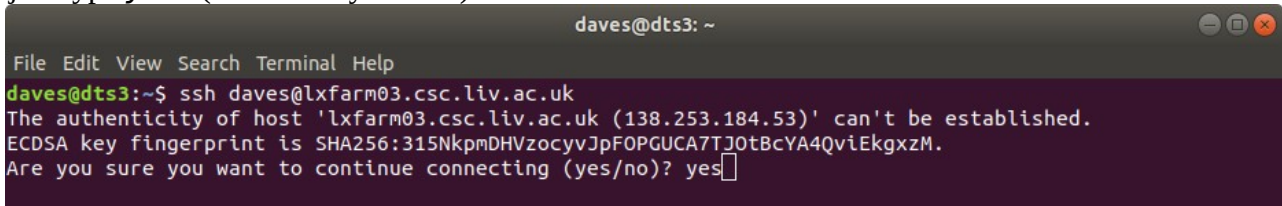
To connect to one of these systems, type the command `ssh` into the ***Terminal*** window, together with your University username, and the name of the chosen machine (separated by the @ sign). Then press Return

```
daves@dts3: ~
File Edit View Search Terminal Help
daves@dts3:~$ ssh daves@lxfarm03.csc.liv.ac.uk
```

(Note that if your username on the local machine happens to be the same as your University username, then you can omit the `username@` element.   But if in any doubt, keep it in)
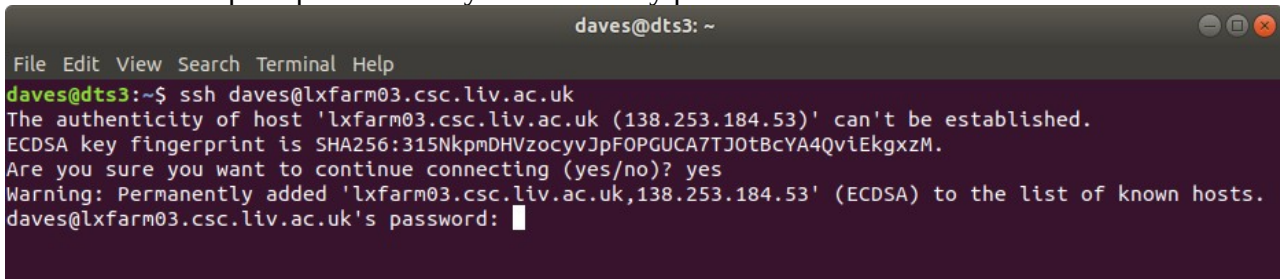
The very first time that you connect to a particular machine, you will be asked to confirm that this is the system you expect – in most circumstances this *digital fingerprint* is pretty meaningless, so just type `yes` (followed by Return)

```
daves@dts3: ~
File Edit View Search Terminal Help
daves@dts3:~$ ssh daves@lxfarm03.csc.liv.ac.uk
The authenticity of host 'lxfarm03.csc.liv.ac.uk (138.253.184.53)' can't be established.
ECDSA key fingerprint is SHA256:315NkpmDHVzocyvJpFOPGUCA7TJOtBcYA4QviEkgxzM.
Are you sure you want to continue connecting (yes/no)? yes
```

The next time you connect **to the same machine**, the fingerprint will be checked automatically, and you should not be prompted for this again (as long as the fingerprint matches).
If you choose a different system within the teaching Linux farm, then you'll get a similar prompt for that new machine (but with a different fingerprint).

You will then be prompted to enter your University password.

```
                              daves@dts3: ~                                    ⊖ ⊡ ⊗

File  Edit  View  Search  Terminal  Help
daves@dts3:~$ ssh daves@lxfarm03.csc.liv.ac.uk
The authenticity of host 'lxfarm03.csc.liv.ac.uk (138.253.184.53)' can't be established.
ECDSA key fingerprint is SHA256:315NkpmDHVzocyvJpFOPGUCA7TJOtBcYA4QviEkgxzM.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'lxfarm03.csc.liv.ac.uk,138.253.184.53' (ECDSA) to the list of known hosts.
daves@lxfarm03.csc.liv.ac.uk's password: █
```

Note that this whole connection is encrypted, so the password (or anything else you type) cannot be intercepted or read while crossing the Internet. This is the same idea as secure web pages (`https`)

Once you have supplied the (correct) password, you will be logged into the chosen system, and can run Linux commands on that machine. For text-based commands, the output will be shown in the same *Terminal* window – graphical commands *should* open up a new window on your local display.   If this does not happen (and you need to run such a graphical application), then disconnect from the Linux system (see below), and re-connect using the command

<p align="center">ssh -X <i>username</i>@lxfarm<i>NN</i>.csc.liv.ac.uk</p>

```
                              daves@dts3: ~                                    ⊖ ⊡ ⊗

File  Edit  View  Search  Terminal  Help
daves@dts3:~$ ssh daves@lxfarm03.csc.liv.ac.uk
daves@lxfarm03.csc.liv.ac.uk's password:
Last login: Tue Mar 24 15:38:44 2020 from 2.31.248.251
[daves@lxfarm03 ~]$ hostname
lxfarm03.csc.liv.ac.uk
[daves@lxfarm03 ~]$ █
```

Note that immediately after logging in, you will be informed of the time and source (IP address or hostname) of the last successful login session.   If you do not recognise this connection, please inform the CS technical team immediately by emailing CSC-HELPDESK@liverpool.ac.uk
You may also wish to change your password.

When reporting this, or any other issue with the system, it is extremely helpful to include details of which Linux machine you were using (which should now appear as part of the command prompt), and the date & time any problem occurred. If you're not sure which system you're on, the command `hostname` will also show this information (see above).

When you have finished with the session, use the command `exit` to disconnect, and return you to the local machine.   You can then close the *Terminal* window, as usual.
   Note that closing the *Terminal* window *without* first `exit`ing from the Linux system may leave processes running on that Linux farm machine, and could cause problems in the future.