

Nuffield Department of Primary Care Health Sciences

ORCHID CPRD Research Service

Connection and setup documentation

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Accessing Primary Care Health Sciences ORCHID Platform

Introduction

The Primary Care Health Sciences ORCHID CPRD Platform is provided to aid researchers working on CPRD data.

The service provides access to a number of different virtual desktops and other services located in the ORCHID Open network. Data is held within a central Microsoft SQL Server database with connectivity provided via ODBC on the various compute platforms.

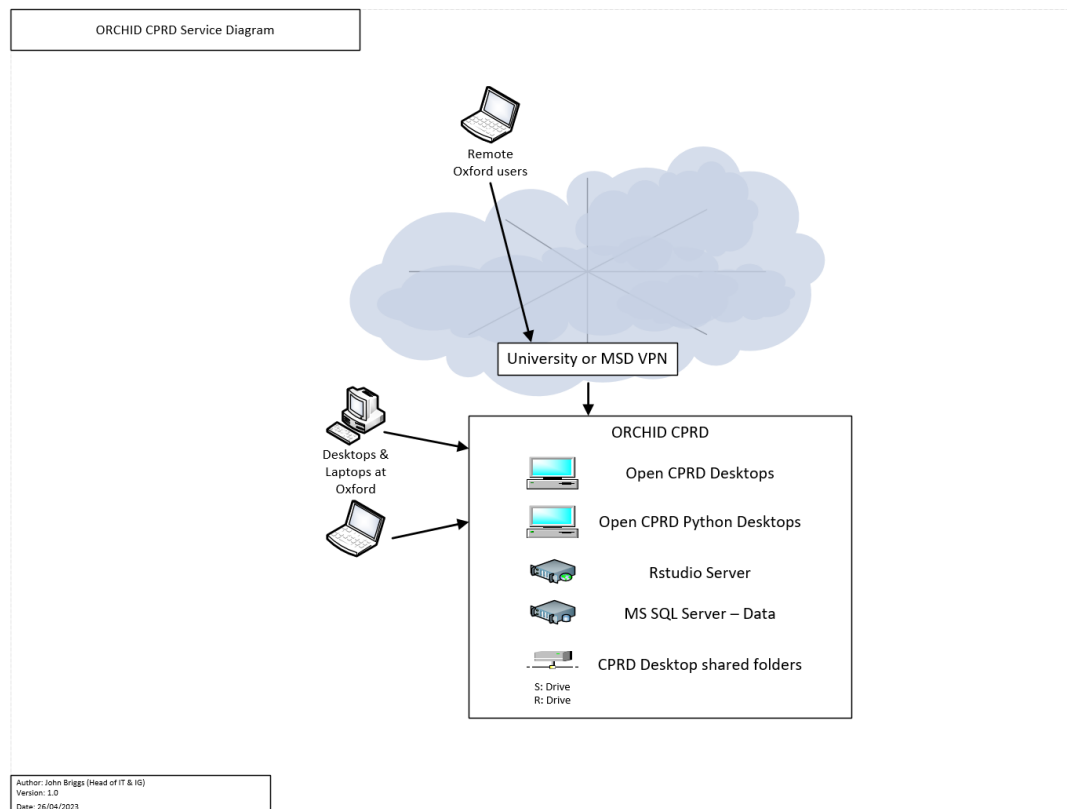


Figure 1, ORCHID CPRD services for end users

The CPRD virtual desktops are accessible from your physical device and provides access to CPRD datasets, compute services and storage services. You can access your local drives via the remote desktops through drive redirection to facilitate transfer of scripts and results data. Access to the internet is permitted, although additional applications should not be installed directly on the virtual desktops, these should be requested via the PHC IT Team.

Data and scripts for your research project should be stored in the relevant R: drive folder, only store what you need to do your work on the data in the shared drives and your local profile (Documents folder on the virtual desktops).

User guide

This guide will take you through the steps for setting up your access to the Primary Care Health Sciences ORCHID CPRD platform and provide access to the various remote desktops.

In order to follow this guide you will need the follow:

- a Microsoft Windows based computer running Windows 10 or an Apple Mac running OSX 10.9 or greater with access to the internet
- an Android running version 7.1 or greater or an iPhone running iOS version 12 or above, or a mobile with SMS text ability
- VPN connection either via MSD VPN or the Oxford IT Services VPN

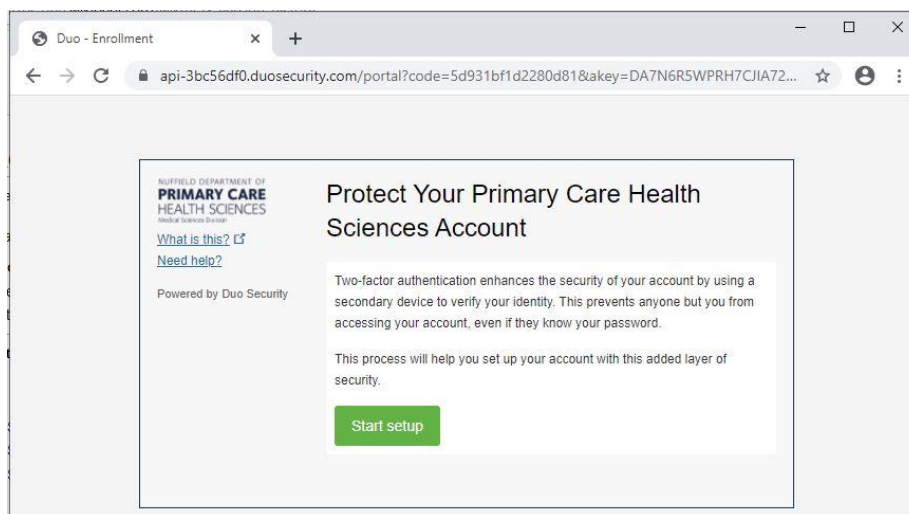
Additionally on Mac OSX you need to install the Microsoft Remote Desktop app from the Apple App store.

Setting up your DUO app

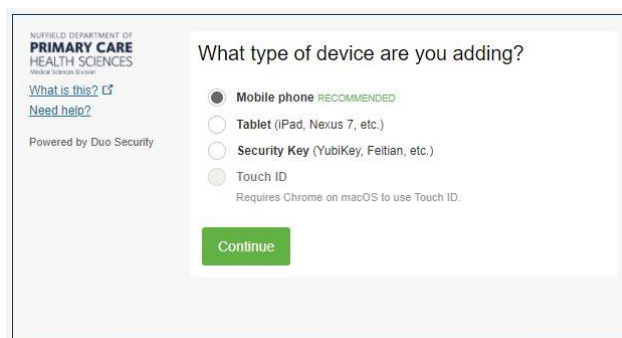
As part of the login requirement for ORCHID, we have implemented a two factor authentication for the login process using a product called DUO. As part of the on-boarding process you will have received an email from Duo Security no-reply@duosecurity.com inviting you setup your Duo access app.

First install the Duo Mobile app from your App store (App store for iOS, Google Play for Android)

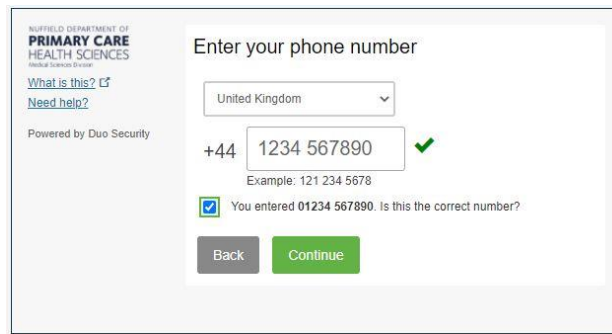
Clicking on the link in the email takes you to the following website



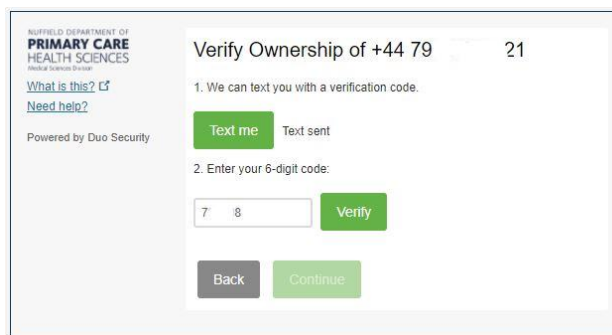
Click on 'Start Setup' to proceed to the following screen:



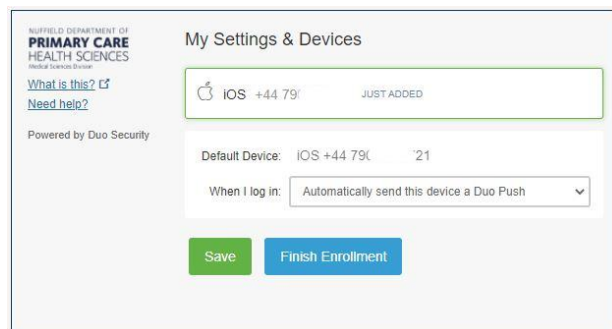
Select the type of device you want to use. It is recommended to use the 'Mobile phone' option but if you don't want to provide a mobile number you can select the 'Tablet' option. By using the mobile option and entering your phone number you are able to request codes via SMS text message as an additional option.



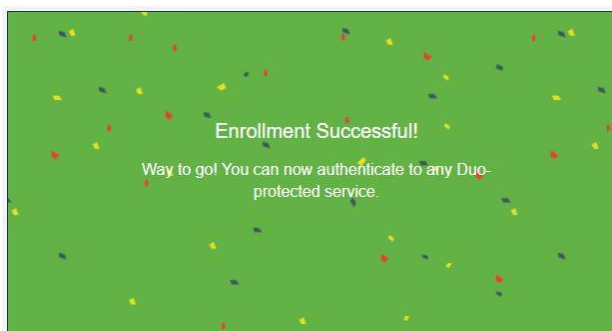
Enter your mobile number and choose the correct county from the drop down list. Note you don't need to enter the initial '0' on the phone number. If you have chosen not to provide a mobile number move on to 'Using the 'Tablet' option in Duo'.



You will receive a text message to your mobile number containing a 6 digit code. Enter this into the box and click 'Verify' before moving on. This ensures the mobile number you entered is the device you have.



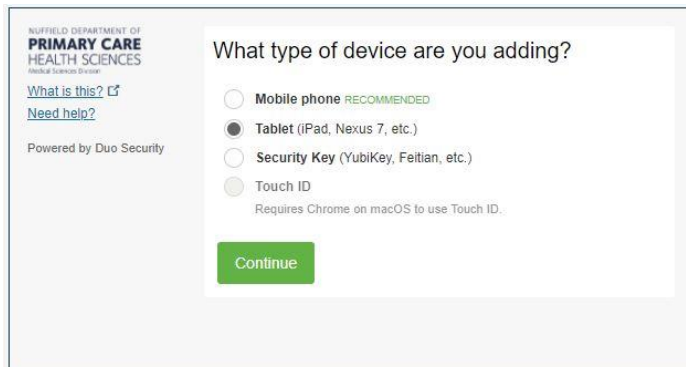
You'll now be asked for your preferred default prompt for authentication. Choose either 'Ask me to choose an authentication method', which will prompt for the method each time you log on, or 'Automatically send this device a Duo Push' to have your device automatically prompt you to confirm your login. Once chosen click 'Finish Enrolment'.




Your Duo account is setup, move to the section 'Downloading the Remote Desktop configuration file'.

Using the 'Tablet' option in Duo

If you don't want to supply your mobile number simply select 'Tablet' when asked what type of device you are using.



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Powered by Duo Security

What type of device are you adding?

☐ Mobile phone RECOMMENDED

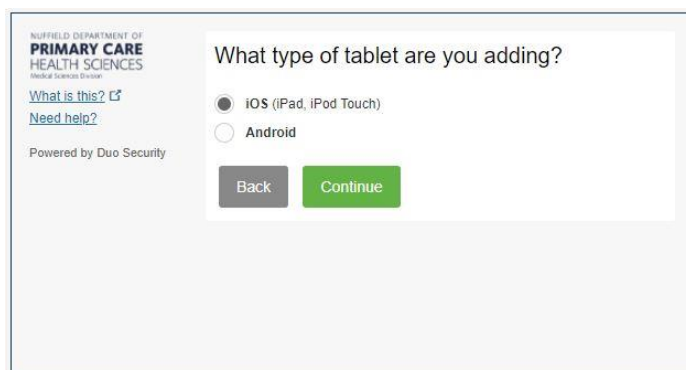
☒ Tablet (iPad, Nexus 7, etc.)

☐ Security Key (YubiKey, Feitian, etc.)


☐ Touch ID
Requires Chrome on macOS to use Touch ID.

[Continue](#)

Click next to take you to the following screen



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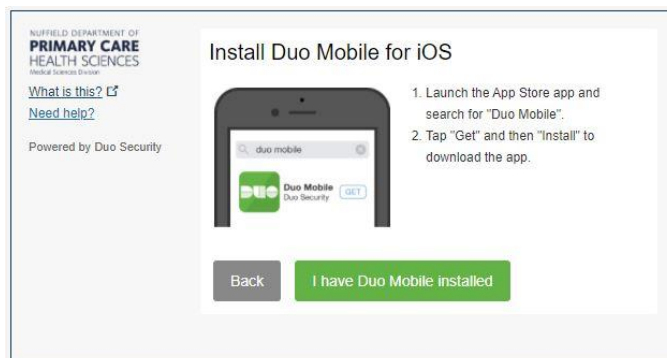
What type of tablet are you adding?

☒ iOS (iPad, iPod Touch)


☐ Android

[Back](#) [Continue](#)

Select your tablet/phone version and click 'Continue'




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Install Duo Mobile for iOS




1. Launch the App Store app and search for "Duo Mobile".
2. Tap "Get" and then "Install" to download the app.

[Back](#) [I have Duo Mobile installed](#)

You'll be prompted to install DUO from your app store (if you haven't done this yet please do so now). Once completed click on 'I have Duo Mobile installed'.




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Activate Duo Mobile for iOS

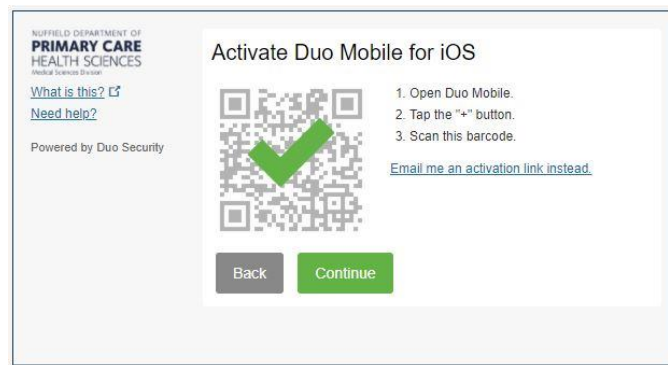


1. Open Duo Mobile.
2. Tap the "+" button.
3. Scan this barcode.

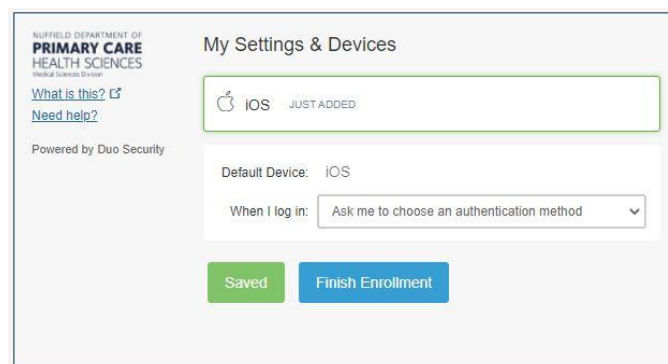
[Email me an activation link instead.](#)

[Back](#) [Continue](#)

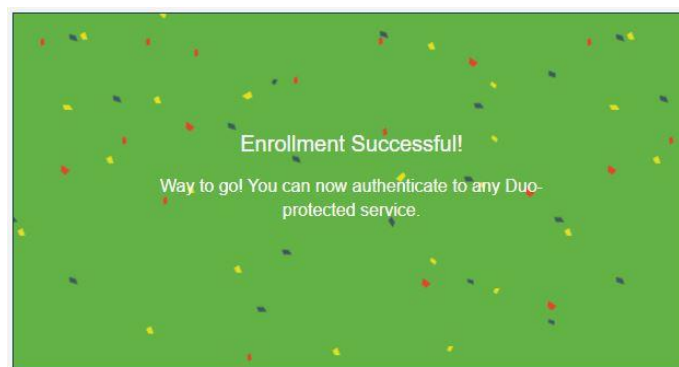
Open the Duo Mobile app on your device and press the '+' icon at the top of the display to add a new account. If you're prompted to allow the device to notify you and access your camera please allow these. Point the phone camera at the QR screen to setup your App.



Once scanned you will see the green tick, click on 'Continue'



You'll now be asked for your preferred default prompt for authentication. Choose either 'Ask me to choose an authentication method', which will prompt for the method each time you log on, or 'Automatically send this device a Duo Push' to have your device automatically prompt you to confirm your login. Once chosen click 'Finish Enrolment'.



Your Duo account is now setup.

Changing your DUO device or reporting issues

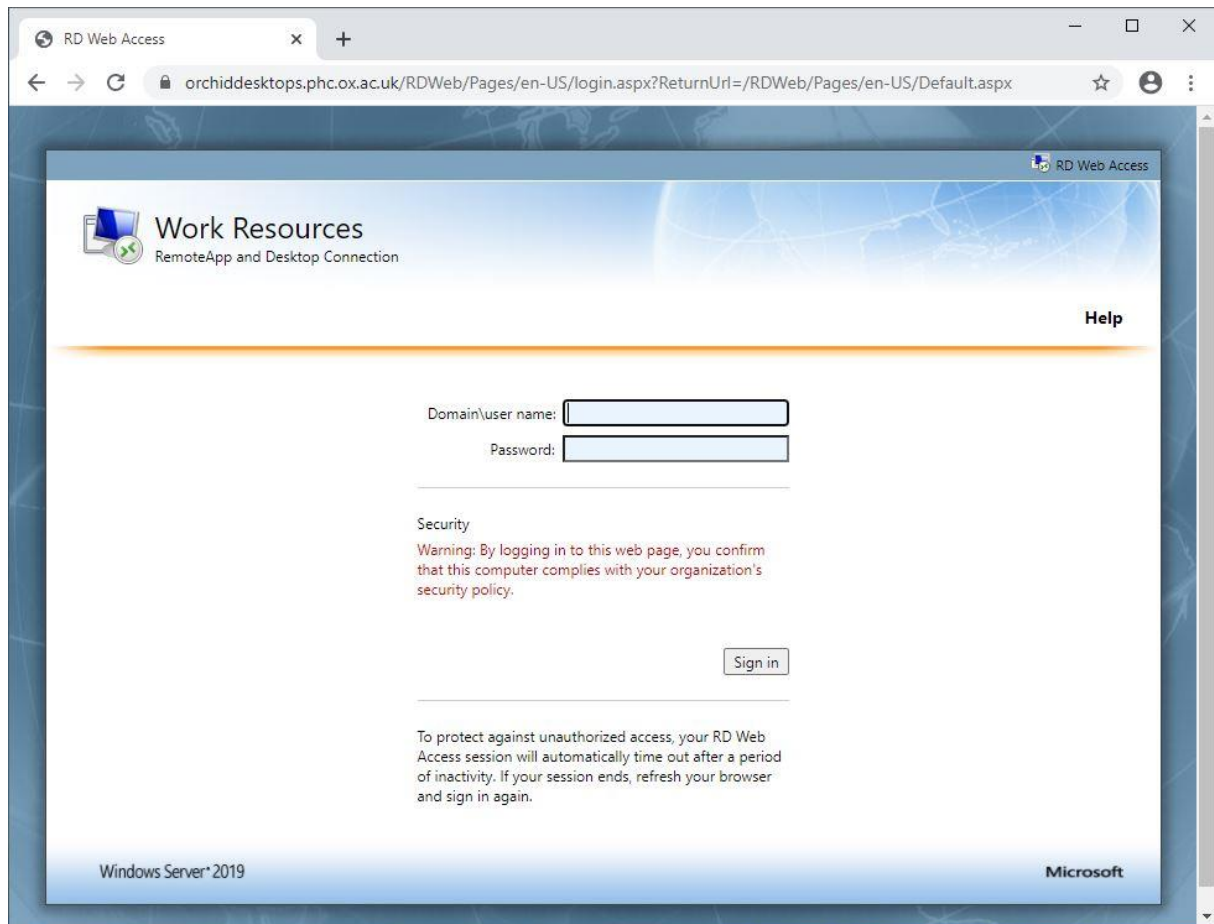
Should you need to change the device you are using for your Duo MFA, please contact the ORCHID IT support team via it-support@phc.ox.ac.uk email address.

If you think your DUO account or device have become compromised or lost/stolen, you **must** contact the datasecurity@phc.ox.ac.uk email address as soon as possible so the device can be disabled within 24 hours of the incident.

Downloading the Remote Desktop configuration file

Before continuing, please ensure you are connected to either the [Oxford University VPN](#) or the [MSD IT VPN](#) service, or you are connected to the wired network at the department.

To connect to ORCHID you will use Remote Desktop Protocol (RDP) connection files, as this provides the most flexibility for controlling the size of the display and other options. To download the RDP settings file visit <https://orchiddesktops.phc.ox.ac.uk/RDWeb> from any web browser. You will see the following web page:



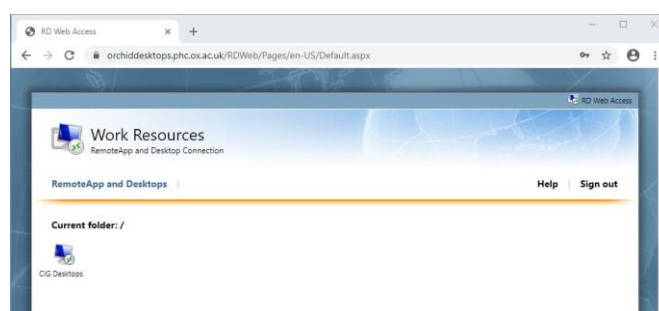
Use your ORCHID username and password in the following format:

- Username: orchid\Your given username
- Password: The initial password provide to you

Domain\user name:

Password:

Once you have entered the correct username and password you'll then be shown the desktops you have access to as follows. Note the exact desktops can change over time depending on which services you might be accessing.



Click on a desktop icon to download the corresponding connection file to your computer. For Windows 10 and Apple Mac machines this is normally to your 'Downloads' folder.

You can now click on the 'Sign out' option at the top of the web page as you have downloaded the connection file.



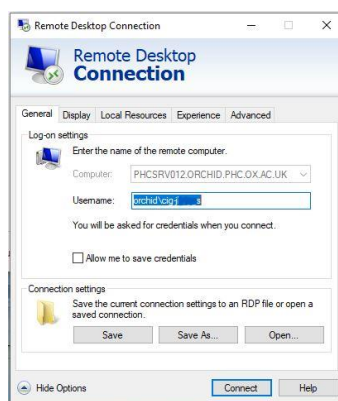
Connecting to your desktop

Before you connect to your desktop we recommend you move the file from the Downloads folder to another location, perhaps your desktop or an alternative location within 'Documents' for example.

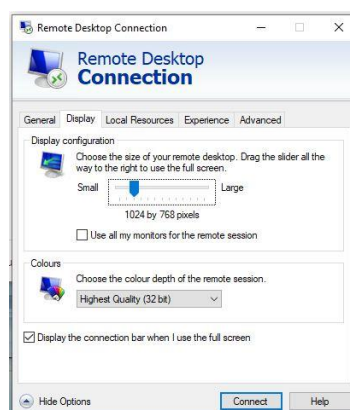
Once you have moved the connection file we recommend you edit this file to change the resolution of the display to something suitable for your working pattern. By default the connection file will open full-screen across up to 2 monitors, which may not be the best configuration depending on how you like to work.

On Windows machines

Locate your RDP file and right click for the context menu, select 'Edit'. The connection details will be displayed (see below)



Click on the 'Display' tab to show the following:

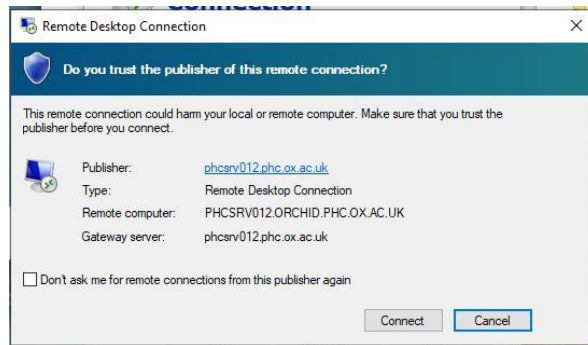


Change the Display configuration slider to a suitable resolution and select the check box if you want to use all monitors (up to a maximum of 2) when in full screen mode.

If you're on a slower link reducing the Colours may help improve responsiveness.

Click on the 'General' tab and click 'Save' to save these changes to the file so the next time you connect it will use these settings. If you want you can also enter the username into the 'Username' field, remembering to use the 'orchid\your username' format.

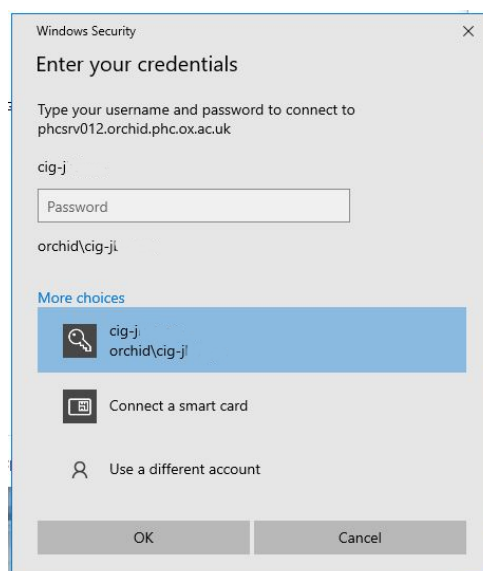
Once you have made the necessary changes clicking on 'Connect' will start the connection process. You'll be prompted to 'trust' the connection as follows:



Click the radio button to not prompt again if you wish, then click 'Connect'.



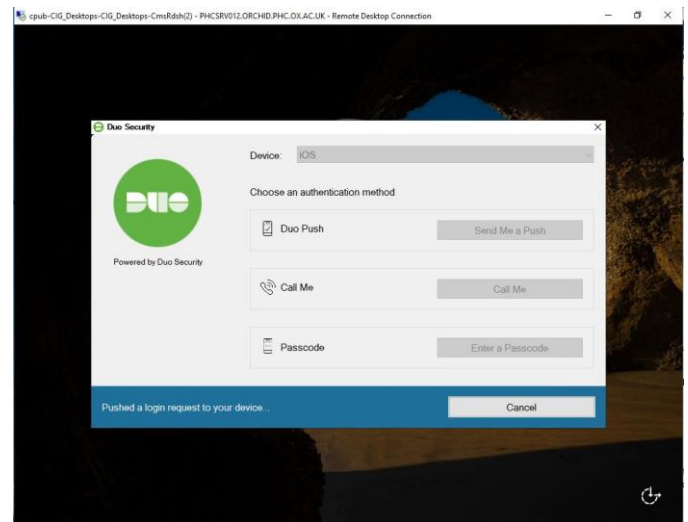
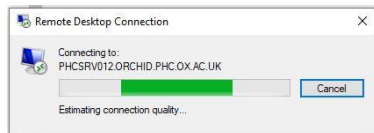
This window is now asking for your password. Check that the correct username is shown, if not click on 'More choices', then on 'Use a different account' (you may need to scroll this window down to reveal this option) which will then allow you to enter your new details into the 'Username' field (remember to use the orchid\your username format).



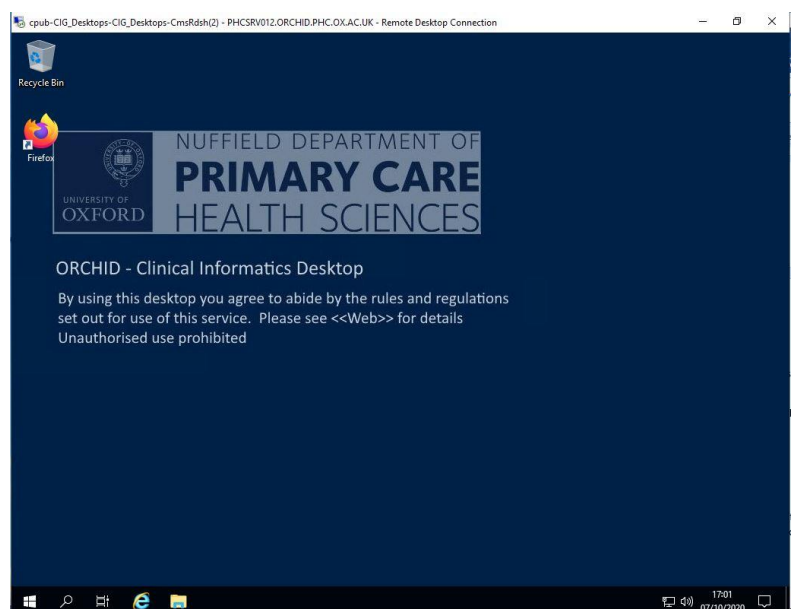
Once you have your username and password entered, click on 'OK' to open the connection.



You'll see this window appear as it starts the connection then finally the desktop will appear.



Select your chosen method for authentication (if you haven't set it to automatically push) and then respond to the request for the method, then use the Duo app on your mobile (or enter the text code) to complete the login process.

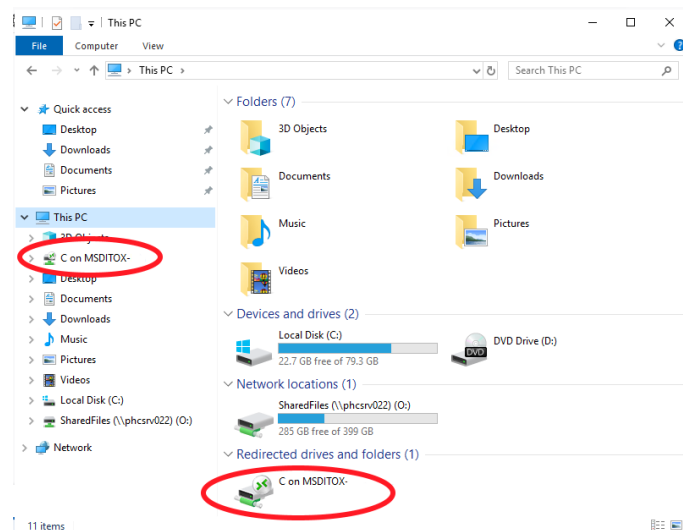


Congratulations you have successfully logged into your ORCHID desktop.

Accessing Local Drives

When using the CPRD Windows Desktop you are able to connect local drives to the virtual machine to allow for the transfer of data to and from the Open Desktop. This feature is only available on the Windows Desktop, not via services such as R Studio.

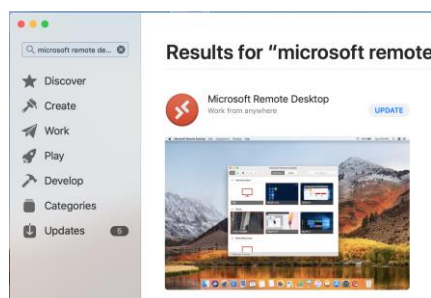
To access your local drives, look for the drive letter within Windows Explorer on the virtual desktop, for example below you can see the C: drive on the local machine.



Clicking on this icon will show you your local C drive within the Open Desktop. Please note transfers to the virtual desktop will depend on your current internet connection, and is dictated by how fast your upload link is.

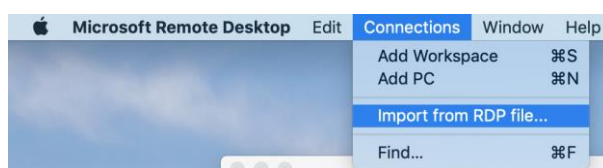
On Apple Mac machines

Ensure you have the Microsoft Remote Desktop client.

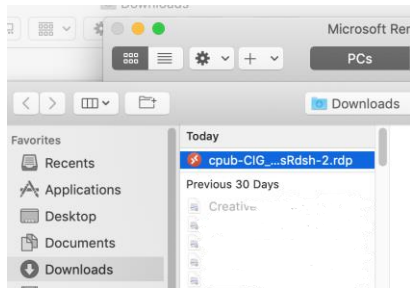


Once installed, you can open RDP files directly by double-clicking on the icon, or import settings into Microsoft Remote Desktop client. Our recommendation is to import the files as you can then modify the settings (resolution etc) and keep these settings between connections.

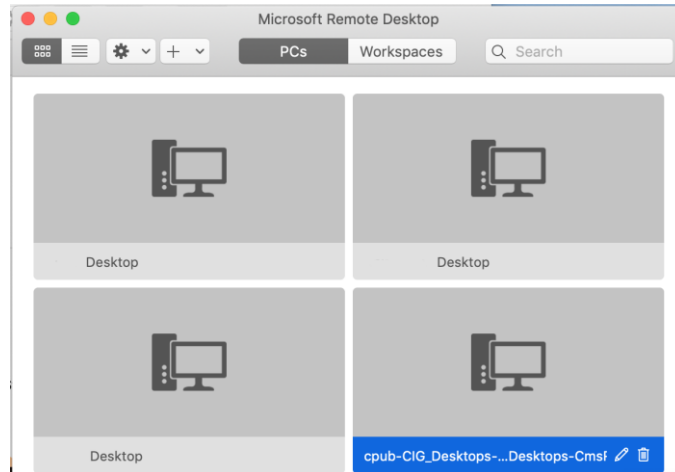
To import the RDP file, open Microsoft Remote Desktop, from the menu, select 'Connections | Import from RDP file...'



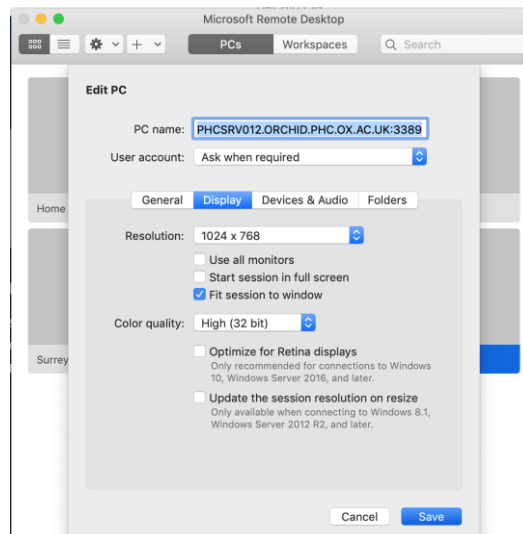
Select the RDP file downloaded from the ORCHID desktop website



Clicking on 'Import' will bring the RDP settings into the client.



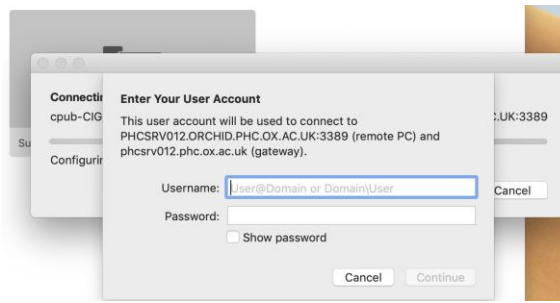
To edit the settings, select the desktop and click on the 'pencil' icon. This will open the settings dialog and allow you to change, for example, the screen resolution.



Please ensure you don't change the 'PC name' field at the top, or any of the 'Gateway' settings as this will prevent you from connecting to the desktop. Also the ability to enable Cut & Paste (under Devices & Audio) or enable folder redirection (Folders tab) is only available on the Open desktops. These settings are ignored for any CIG desktops.

Once you have completed any changes, click on the 'Save' button. These will now be default for any future sessions.

To connect to the desktop, double-click the RDP connection you want and you'll be prompted to enter your username and password:



Enter your password ensuring that this is in the format below

orchid\<YOUR ORCHID USERNAME>

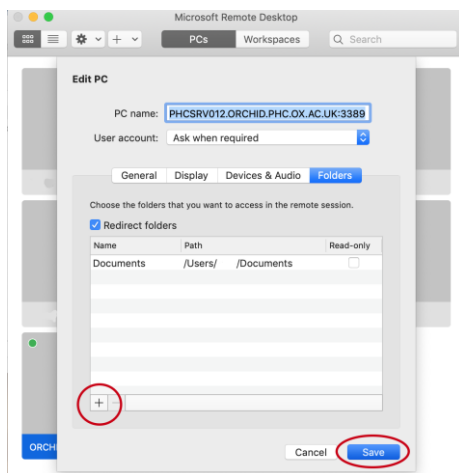
Then use the password for your ORCHID account. Your connection will then be made and you will be prompted for your DUO MFA authentication in the same way as for the Windows instructions previously.

Accessing Local Drives on the Mac

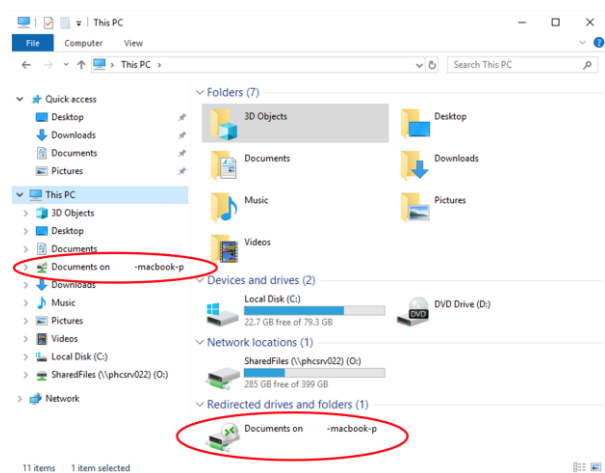
When using the Open Desktop you are able to connect local drives to the virtual machine to allow for the transfer of data to and from the Open Desktop. This feature is only available on the Open Desktop, no other desktop supports this. If you want to move a file to your CIG desktop, first upload this to your Open Desktop then use the Web Transfer service from the Open Desktop to submit this file for transfer approval (see Web Transfer later in this guide).

You need to setup your RDP connection by choosing the folder or drive to share. Edit your RDP file and select the 'Folders' tab. Pick the required folder or drive from the chooser window (click on the '+') and click 'Save' when done.

To access your local drives, look for the drive letter within Windows Explorer on the virtual desktop, for example below you can see the C: drive on the local machine.



1. Pick your required folder



2. Access from within the Open Desktop

Accessing computational resources

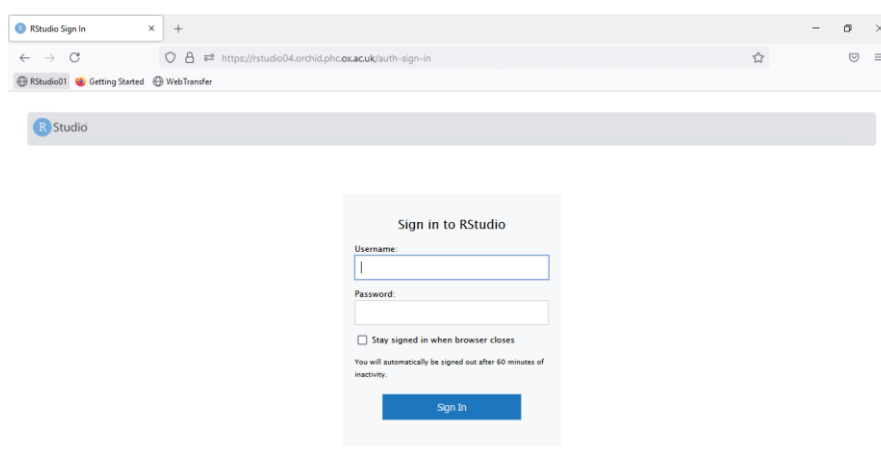
Additional compute resources are available to conduct your analysis on the data, in fact most of the hard work should be done on these compute resources rather than the virtual desktops which are more designed as a gateway to the additional services.

R Studio Server

One of the main resources you will use is the R Studio server. This is available from any of the CPRD Desktops and can be accessed via a web browser navigating to <http://rstudio04.orchid.phc.ox.ac.uk>

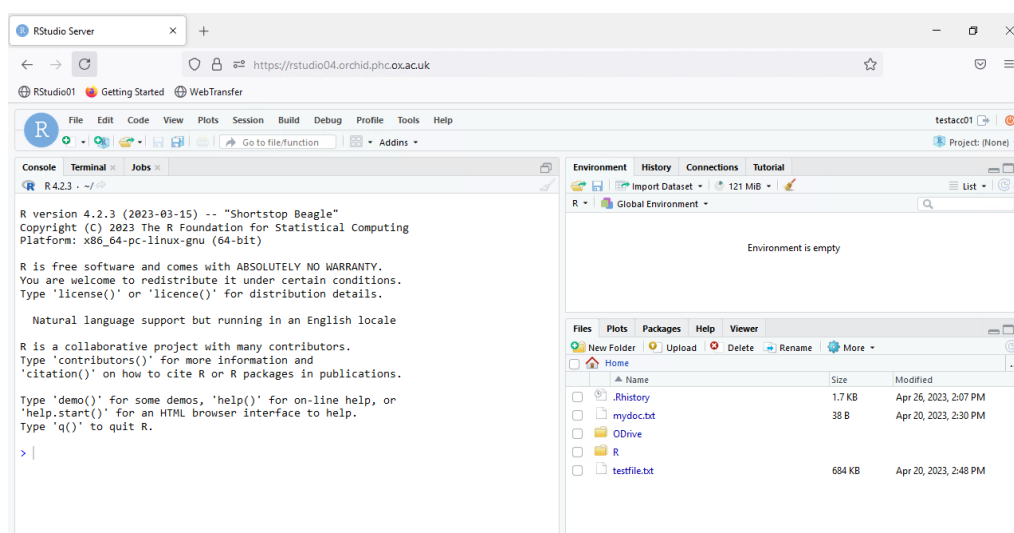
The recommended web browser is Firefox, Google Chrome is not available on the CPRD desktops.

Once you click on the link you'll be presented with the R Studio server login page.



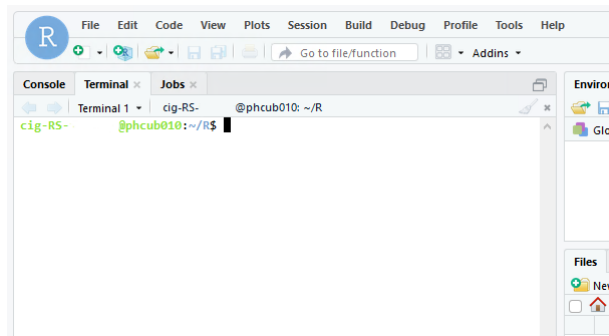
The R Studio service requires a different username and password, you may have been sent this as part of your joining instructions. This uses the format 'cig-RS-AAAAAA' and you will have been sent an initial password.

Log into the service using your cig-RS username and password to get to the main R Studio web interface (see below)



Changing R Studio password

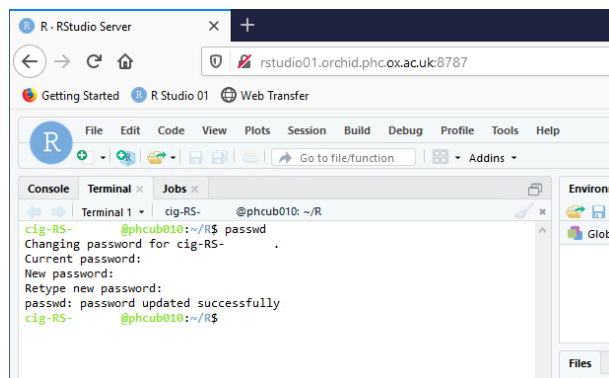
This can be completed via the 'Terminal' interface tab in the left hand side of the main window. Click on this tab to bring up the terminal view.




Once in the terminal type:

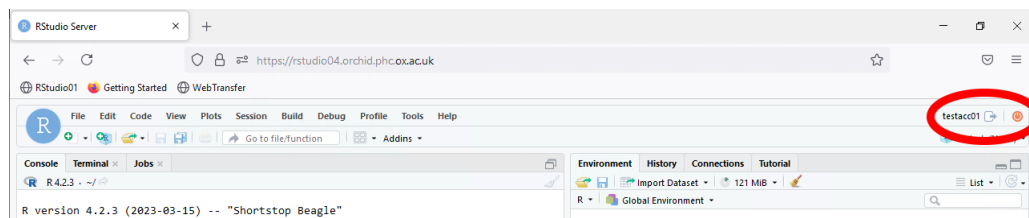
`passwd`

To initiate the password change. You will be asked to type in your current password, then to enter a new password (twice).



If the passwords match you will see the success message.

Once you have finished with R Studio you can log off the service by clicking on the  icon in the top right of the web page (see below). This will log you out of the session and take you back to the login page.

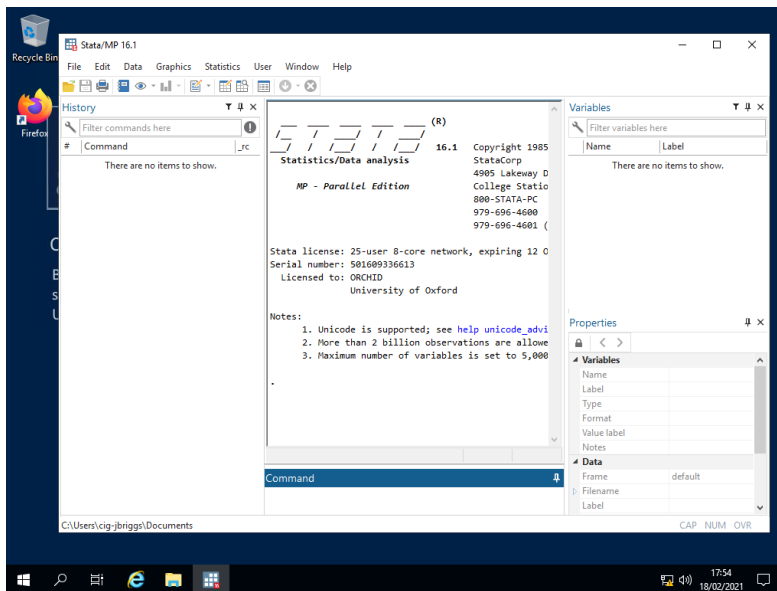


STATA Server

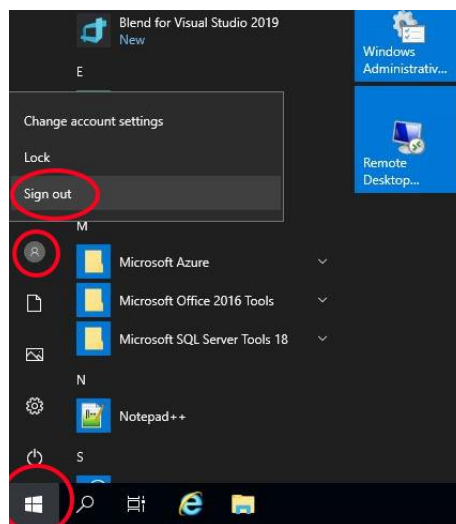
The CPRD STATA server is configured with an MP8 licence for up to 8 concurrent connections.

Access to this server is by the Open CPRD STATA virtual desktop, the RDP connection file for this can be downloaded from <https://orchiddesktops.phc.ox.ac.uk/RDWeb> and configured in the same way as the normal RDP files.

The username and password is the same as for all the other ORCHID desktops and once logged in you can open STATA as you would on any normal Windows based system.



Once you have finished with your STATA analysis, please LOG OFF the session completely by click on the 'Windows' icon, clicking on your user profile icon and selecting 'Log off'



This will ensure you are no longer consuming any licences for STATA and the resources are available for other users of the service.

Notes on using your ORCHID desktop

Changing your ORCHID password

You can change your ORCHID password from the virtual desktops by pressing 'Ctrl-Alt-End' to bring up the lock screen, then click on 'Change a password'. You'll need to enter your current password and then your new password (twice). Please remember to use at least one letter, one number and a symbol, plus its best practice to mix capitalisation as well.

If you are using a Mac, you can use the 'Ctrl-Alt-Fn-Backspace' key combination to bring up the same menu.

Changing your ORCHID password via the Web

You can also change your ORCHID password via the following website from your own computer.

<https://orchiddesktops.phc.ox.ac.uk/RDWeb/Pages/en-US/password.aspx>

You will need to be connected to either the Oxford central IT VPN or the MSD VPN.

Changing an expired ORCHID password

All ORCHID passwords expire after 90 days as part of the security requirements. You can change your password anytime within the 90 days by using either of the two options above, however if you find your ORCHID password has expired, you won't be able to log onto the desktops until you change it. You can use the same web link shown above to change an expired password. Once changed you can then log back on to your ORCHID desktops.

The system will also send a reminder email when your password is due to expire reminding you to change this before the last day. These are normally sent to all accounts due to expire in the next 21 days. Make sure these emails don't fall into your 'Junk' mail.

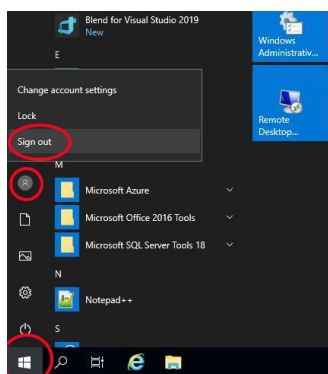
Logging off the remote desktops

When using your desktop you may find the screen will lock and require you to re-enter your ORCHID password, and also re-enter your Duo passcode. This is part of the security features setup on the ORCHID platform to ensure data is secure from unauthorised access.

When you have finished using your ORCHID desktop please ensure you log off the desktop rather than disconnecting as this will free up resources for other users. If you are running a long computation of another similar process then you can disconnect from the desktop (click on the 'X' in the top right) and your process will continue to run. To re-connect simply open your RDP connection again to retrieve your desktop as it was.

Once you have finished your computation please ensure you log off the desktop to free the resources.

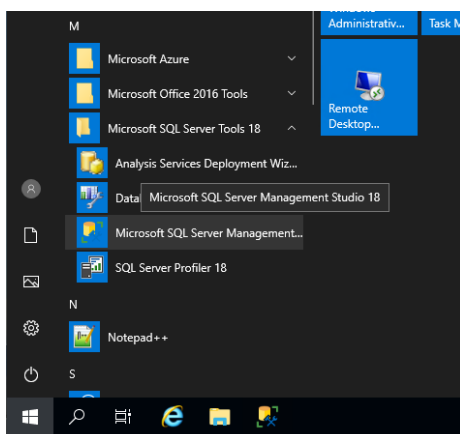
To log off, select the 'Windows' icon in the bottom left of the remote desktop window, click on the 'person' icon and choose 'Sign out' (see screen below).



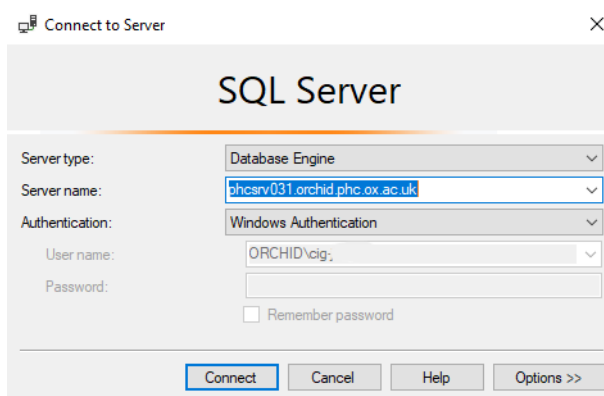
Accessing the SQL Server

The CPRD data is stored on the SQL Server held within the network. You are able to use the Microsoft SQL Server Management Studio (SSMS) application from the virtual desktops to browse and query the various datasets that you have access to.

Open the MS SQL Server Management Studio application from the Windows menu under 'Microsoft SQL Server Tools 18' sub-item.



The name of the CPRD SQL Server is **phcsrv031.orchid.phc.ox.ac.uk** and you should leave the 'Authentication' setting as 'Windows Authentication'. This will use your ORCHID username that you logged onto the desktop with to authenticate with the server.



If you're not able to access the SQL server it is likely that you have not been setup with the required database access. You will need to contact your project lead and request access to the required dataset once it is ready.

Accessing the SQL Server from STATA

The CPRD STATA server has an ODBC connection ready to go for pulling data from the SQL Server. You can connect to this by issuing the following STATA commands

```
odbc query "CPRDSQL"
```

Loading data can be done by executing an SQL Select statement, for example (this will not execute unless you have access to this database and table):

```
odbc load, exec("SELECT TOP (10) * FROM [CPRD21].[dbo].[Practice]") dsn("CPRSSQL")
```

We recommend using SSMS to craft your SELECT statement first before importing into STATA. This will allow you to narrow down your data selection and reduce the amount of memory required to process your analysis.

Accessing the SQL Server from RStudio

The CPRD RStudio server has an ODBC configuration using the FreeTDS driver that allows you to pull data from the SQL Server.

Using the library DBI you can import data into R using the following commands:

```
library(DBI)

con <- dbConnect(odbc::odbc(), 'CPRDSQL', timeout=10, Database='CPRD21',
uid=rstudioapi::showPrompt(title="Username", message="Username", default=""),
pwd=rstudioapi::askForPassword())
```

This will create a connection via ODBC using the DSN CPRDSQL to a database called CPRD21 and will prompt you for a username and password. When entering the username remember to add orchid\ in front of your CIG username. You can replace the R code after the `uid` entry with your username, but using the R API calls allows for code re-use without having to worry about stripping out usernames & passwords.

Once connected you can query a table using the following:

```
mydata <- DBI::dbGetQuery(con, "SELECT TOP (10) * FROM [CPRD21].[dbo].[Practice]")
head(mydata)
```

This will select the top 10 rows from the table Practice and display the values.

Don't forget to disconnect from the database when you are finished using

```
dbDisconnect(con)
```

For more information see <https://cran.r-project.org/web/packages/odbc/odbc.pdf> plus other reference material online.

We recommend using SSMS to craft your SELECT statement first before importing into R. This will allow you to narrow down your data selection and reduce the amount of memory required to process your analysis.

File storage within ORCHID

The different ORCHID desktops all provide a small amount of local personal file storage which can be used via the normal Windows Documents folder. Any files stored here are only available to your user account via the same desktop pool. It is not possible to share files from this location, and each separate desktop pool has its own, separate Documents folder with the following sizes:

Desktop pool	Maximum 'Documents' capacity
Open CPRD Desktops	20GB
Open CPRD PythonDesktops	20GB
Open CPRD STATA Dekstops	20GB

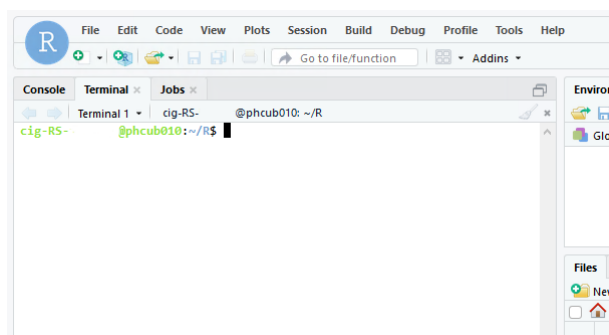
There are also shared folders and individual project folders available which should be used as the main storage area for scripts, documents, code and other project related material. These shared areas are set out below, note these drive letters only apply to Windows based services

Share drive	Usage	Permissions
S:	General shared drive for all users of CPRD resources	Various depending on requirements
R:	Project level shared folders for storage of project related data, code and documentation	Each project folder has separate permissions

R Studio server – Connecting to shared drives

The R Studio server is a Linux based service and does not support the use of drive letters in the same way as Windows. You can manually add a file server to your R Studio server via the 'mount' command by following the steps below.

Open R Studio and click on the 'Terminal' tab next to the 'Command' tab



We recommend creating a folder under your home directory which will be where you 'mount' your network drive. This only needs to be done once, enter the command below:

```
cd ~  
mkdir RDrive
```

This will create a folder called 'RDrive' which we'll use to 'mount' the top level of the Windows based R: drive to. Next you need to find your UnixID for your account. From the terminal tab type:

```
id
```

This will display the details of your account and groups you are a member of. The first entry will be 'uid=10XX' and this is the number for your account. Make a note of this. Don't use the 'gid' number this won't work.

Next you need to type the following command:

```
sudo mount -t cifs //phcsrv026.orchid.phc.ox.ac.uk/RDrive ~/RDrive -o  
rw,uid=<YOUR USER ID found above>,username= YOUR CIG USERNAME HERE
```

So if your user ID was 1999, you would use the following command (don't cut and paste this command as it won't work)

```
sudo mount -t cifs //phcsrv026.orchid.phc.ox.ac.uk/RDrive ~/RDrive -o  
rw,uid=1999,username= YOUR CIG USERNAME HERE
```

Replacing the 'YOUR CIG USERNAME HERE' with your main username (not the RStudio one with 'RS' in the middle).

When you press return you'll be prompted for your RStudio password (the one to go with your cig-RS- username) to allow the mount command to process, followed by a prompt to enter your main CIG password which will allow you to connect to the share. You can press the 'Tab' key to keep your CIG password from being displayed.

For example, assuming you have the following usernames:

```
ORCHID CIG: cig-myuser  
RStudio: cig-RS-myuser  
UID: 1999
```

To mount the drive you would run the following command

```
sudo mount -t cifs //phcsrv026.orchid.phc.ox.ac.uk/RDrive ~/RDrive -o  
rw,uid=1999,username=cig-myuser
```

Once mounted you can then view the folders and files on the R: drive via the RDrive folder in your home directory (~/.RDrive).

When you have finished using the network drive please ensure you remove it by running the following command in the terminal window

```
sudo umount ~/RDrive
```

STATA Server

The STATA server is a Windows based service and is configured to provide the same local drive mappings as the CPRD Desktops, so you will find the S: and R: drive available on the STATA server.

These can be used to move data and scripts from the shared and projects areas to the STATA server for running on the STATA server.

Service maintenance windows

There are regular maintenance windows for all the various services and systems that power ORCHID and can be found at the ORCHID website.

The main service window you are most likely to notice is the one for applying updates to the virtual desktops. This is scheduled on the fourth weekend of each month and will involve a restart of all the virtual desktops within ORCHID. Please ensure you have saved all work and not running any long computation jobs on the Friday before the fourth weekend as these restarts are automatic and cannot be stopped.

Please look out for emails announcing these maintenance windows around the beginning of the 4th week of each month. These emails will confirm the services that are affected and the duration of the outage.