

ECE297 Quick Start Guide VNC

“Long distance, it’s the next best thing to being there.”

- Bell telephone ad from the 1970’s

1 Remote Access

This guide describes how to use VNC (**V**irtual **N**etwork **C**omputing) and SSH (**S**ecure **S**hell) to remotely access the UG lab machines with a graphical interface. This will allow you to work on your project from another internet connected computer (such as a machine at home).

Using VNC you get the same graphical interface and programming environment you would get sitting in front of one of the UG lab machines. This allows you to focus on developing your project, and not on making it compile correctly on your own machine.

2 Connecting to UG machines with SSH

SSH allows us to securely connect to machines remotely. SSH can be used to send information securely across the internet¹ from a remote machine to a local machine. In this guide we use SSH to connect to a graphical VNC session running on a remote UG lab machine.

Setting up SSH is dependant on your operating system. Instructions for some common operating systems are covered below:

2.1 Using SSH on Windows with PuTTY

1. Install the SSH client PuTTY, available at: <http://www.chiark.greenend.org.uk/~sgtatham/putty/>
2. Launch PuTTY and create a profile for ugXXX²:
 - (a) Type `ugXXX.eecg.utoronto.ca` in the Host Name field.
 - (b) Type `ugXXX` in the “Saved Sessions” field.
 - (c) Click “Save”.
 - (d) On the left panel, go to Connection → SSH → Tunnels.
 - (e) Forward local port 5901 to remote port 5901 (on ugXXX) by specifying:
 - “Source port” = 5901
 - “Destination” = `127.0.0.1:5901`
 - Click “Add”.
 - (f) On the left panel, go back to Session.
 - (g) Click “Save”.
3. SSH to ugXXX by selecting the profile “ugXXX” and clicking “Open”.
4. If you are asked to accept the hosts “key fingerprint” verify you are connected to the correct machine, and then select “Yes”.
5. Enter your username and password when prompted.

¹This is sometimes referred to as *tunnelling*.

²Note that ugXXX must be replaced by a machine in the range ug132-ug180 or ug201-ug249 as described [here](#).

2.2 Using SSH on Linux and Mac OS X

1. Launch a terminal session
2. SSH to ugXXX with port forwarding (where *user* is your UG username):
 - `ssh -L 5901:127.0.0.1:5901 user@ugXXX.eecg.toronto.edu`
3. Enter your password when prompted.

3 Configuring VNC

We now need to tell VNC how to start the graphical user interface. This is done with the `xstartup` file. Follow the steps in Listing 1 to create the `xstartup` file.

```
1 #Move to your home directory (i.e. ~) on ugXXX (where XXX is the machine number)
2 ugXXX: > cd ~
3 #Make the .vnc directory
4 ugXXX:~> mkdir -p .vnc
5 #Copy the xstartup file
6 ugXXX:~> cp /cad2/ece297s/public/vnc/xstartup .vnc/xstartup
7 #Make sure it is executable
8 ugXXX:~> chmod u+x .vnc/xstartup
```

Listing 1: Creating the VNC xstartup file

4 Managing a VNC Session

To create a VNC session follow Listing 2.

```
1 #Create a VNC session with resolution 1920x1080 and full 24-bit colour
2 #
3 #Note: The first time you do this you will be prompted to create a password
4 ugXXX:~> vncserver -geometry 1920x1080 -depth 24 :1
5
6 You will require a password to access your desktops.
7
8 Password:
9 Verify:
10
11 New 'ugXXX.eecg:1 (kmurray)' desktop is ugXXX.eecg:1
12
13 Starting applications specified in /homes/k/kmurray/.vnc/xstartup
14 Log file is /homes/k/kmurray/.vnc/ugXXX.eecg:1.log
15
16 #We now have a VNC session on display ':1' on machine ugXXX
17 #Note that file paths (e.g. /homes/k/kmurray/.vnc/ugXXX.eecg:1.log) will vary
    depending on your user name
```

Listing 2: Creating a VNC session

To force a VNC session to end follow Listing 3.

```
1 #You can end a VNC session by killing it.  
2 #You must specify the display number associated with the session you got when  
   creating it  
3 ugXXX:~> vncserver -kill :1  
4 Killing Xvnc4 process ID YYYYY
```

Listing 3: Ending a VNC session

5 Connecting to a VNC Session

To connect to a VNC session you must have:

- An active SSH session forwarding the VNC session port to your local machine as described in Section 2.
- A currently running VNC server on a UG machine as described in Listing 2 of Section 4.

Setting up a VNC client is dependant on your operating system. Instructions for some common operating systems are covered below:

5.1 Connecting to a VNC Session on Windows

1. Download and install a free VNC client such as Tight VNC: <http://www.tightvnc.com/download.php>
 - You only need to install the VNC *client* component
2. Launch the VNC client (also referred to as the viewer)
3. Enter 127.0.0.1:1 in the 'Remote Host' field
4. Click Connect
5. Enter the password you specified when setting up your VNC session

5.2 Connecting to a VNC Session on Mac OS X

Use the instructions for Linux below, but you may find it easier to download the binary distribution of TigerVNC (<http://www.tigervnc.org>) for Mac OS X. TigerVNC is a branch of TightVNC.

5.3 Connecting to a VNC Session on Linux

1. Install a VNC client package for your distribution, such as `xtightvncviewer` on Ubuntu/Debian.
2. In another terminal on you local machine run your VNC client specifying 127.0.0.1:1 as the host and display. For example:
 - `vncviewer 127.0.0.1:1`
3. Enter the password you specified when setting up your VNC session

6 Transferring Files

It can also be useful to transfer files between your home computer and the remote (*ugxxx*) computer.

6.1 Transferring files between *ugxxx* and a Linux computer

```
1 #Copy myfile from your local computer to ugXXX
2 ugXXX:~> scp myhostname:myfile myfile
3 #Copy myfile2 from ugXXX to your local computer
4 ugXXX:~> scp myfile2 myhostname:myfile2
```

Listing 4: Using scp to transfer files

6.2 Transferring files between *ugxxx* and a Windows computer

1. Download and install a file transfer program such as WinSCP: <http://winscp.net/eng/download.php>
2. Launch WinSCP and drag files between the window panes representing your local (home) computer and the remote (*ugxxx*) computer.

7 Troubleshooting

1. When launching the VNC server in Listing 2, it gives an error message saying: **"A VNC server is already running as :1". What should I do?**

This means that there is already a VNC server that uses display :1.

- (a) First, check if it is an old VNC server that you created. Type `ps` to check what processes are running on the *ugxxx* machine.
`ps aux | grep vnc`
- (b) If you see a line like that below, a vnc server (Xvnc4) is running and in this case it was created by a user named *vaughn*.
`vaughn 10003 1.0 0.7 48052 31356 pts/0 S 05:24 0:06 Xvnc4 :1 -desktop stuff deleted`
- (c) If you are this user, you can just start a VNC client on your home machine and it will connect to this server. If you want to get rid of this vnc server, you can also stop it with
`kill 10003`

where the number is the *process id* listed second in the output from the `ps` command.

If this VNC server was created by another user, you can simply choose another display #, for example 5. Here is what you need to change:

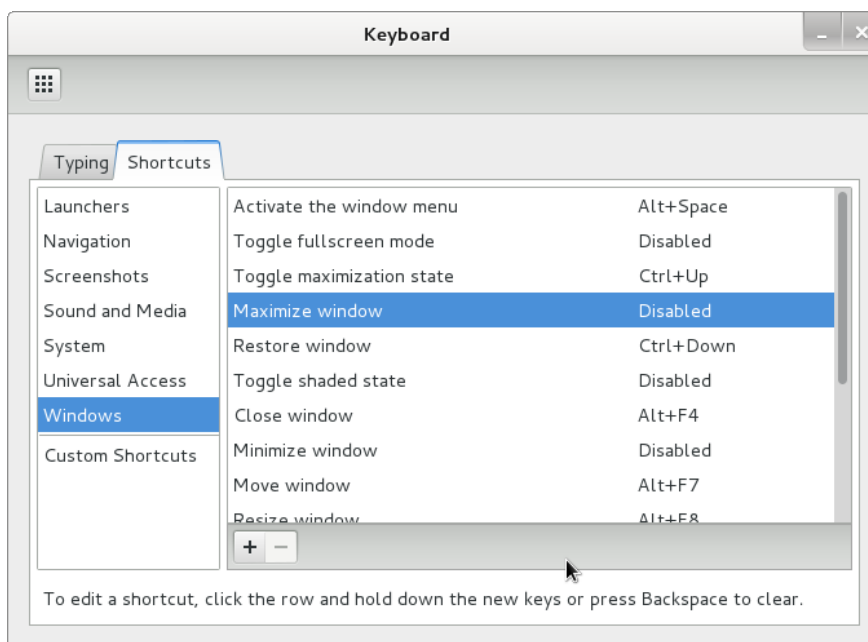
- (a) In Listing 2, the command should be:
`vncserver -geometry 1920x1080 -depth 24 :5`
- (b) In Section 2 the forwarded port should be 5905.

For display :*x*, the remote VNC server listens on the port 5900 + *x*, thus you need to forward the correct port back to your local machine.

- i. On **Windows** using PuTTY you would set port forwarding as:
 - “Source port” = 5905
 - “Destination” = 127.0.0.1:5905
 - ii. On **Mac OS X** and **Linux** you would use:


```
ssh -L 5905:127.0.0.1:5905 user@ugXXX.eecg.toronto.edu
```
 - (c) In Section 5 the host and display should be: 127.0.0.1:5
2. **The up and down arrow keys don't work in VNC; they are making the current window maximize and shrink instead of moving my cursor.**

On the remote `ugxxx` machine (i.e. in the VNC client window) click on your name in the top right corner of the window. Select System Settings ⇒ Keyboard ⇒ Shortcuts ⇒ Windows. Select some other key combination for “Maximize Window” and “Restore Window” than “Super+Up” and “Super+Down”.



3. **I went to full screen mode in VNC and now I can't get out of it.**

Press `Ctrl+Alt+Shift+f`

4. **I can't connect to the VNC server or it doesn't display anything.**

VNC prints any error messages that occur when it tries to start up a display in files ending in `.log` in directory `~/ .vnc/`. For example, if you are running on machine `ug185` on port 3, any error messages will be in `~/ .vnc/ug185.eecg:3.log`. Read this file carefully to see what the problem might be. Unfortunately, there are quite a few harmless warnings printed to this file even when VNC is running normally, which makes it harder to interpret.

5. **I forgot my VNC password.**

Run the `vncpasswd` command (from any command prompt) to select a new password.

8 Acknowledgements

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