Remote GUI access to a Linux computer using Tightvnc

The command line is a great way to manage a remote Linux computer if you don't mind typing in commands, but sometimes you need to be able to view a GUI. Short of a very long cable one of the best ways of doing this is using the VNC protocol (Virtual Network Computing).

The following are instructions on how to configure this on the Raspberry Pi (Debian based distribution). It should be similar for any other Debian based distribution (eg. Ubuntu). Some other distributions use different software install tools and possibly different init setup tools.

If this is used in combination with the guide to running the Raspberry Pi headless with Debian Linux then it can be used to setup a Raspberry Pi for remote access without ever needing to connect it to a monitor.

Choosing TightVNC

There are several software projects that support VNC. I have chosen to use TightVNC because it is free open source software (GPL2), provides compression to allow it to work over a slow network (Internet) and is readily available in the software repositories.

Client server model

VNC follows the traditional client sever model. The server software runs on the host to be accessed, and client software

runs on the local machine that wishes to control the host. The server and client do not have to be the same (eg. the client can be RealVNC when the server is TightVNC), but some features may only work when the same client and server are used.

Install the TightVNC server software

First refresh the software repository information using
```
sudo apt-get update
```
This is particularly important if you have just installed the operating system as the repository information may be incomplete.

Install the server software from the repositories:
```
sudo apt-get install tightvncserver
```

Start server and configure a password

The first time you run the server it will prompt you to set a password. This is the password that you use when connecting remotely.

```
/usr/bin/tightvncserver
```

There is no need to create a view only password, unless you have a specific need.

When the server starts it will tell you which virtual desktop has been setup. In this case:
```
New 'X' desktop is raspberrypi:1
```
says that it's virtual desktop 1. You would connect to this using :1 at the end of the IP address in the client, this is the one we will setup to start automatically later.

You can run multiple instances. Each time you start tightvncserver

it will use the next available desktop, but in most cases you will just need one.

Adding Tightvnc to the startup

To have Tightvnc startup automatically we need to create a new init file.
below is the code we will be adding, but to make it a little easier you can download the file from this webserver.

1.
```
#!/bin/sh
```

2.
```
### BEGIN INIT INFO
```

3.
```
# Provides:              tightvncserver
```

4.
```
# Required-Start:    $local_fs
```

5.
```
# Required-Stop:     $local_fs
```

6.
```
# Default-Start:     2 3 4 5
```

7.
```
# Default-Stop:      0 1 6
```

8.
```
# Short-Description: Start/stop tightvnc
server
```

9.
```
### END INIT INFO
```

10.
```

```

11.
```
# More details see:
```

12.
```
# http://www.penguintutor.com/linux/tigh
tvnc
```

13.

14.
```
### Customize this entry
```

15.
```
# Set the USER variable to the name of t
he user to start tightvncserver under
```

16.
```
export USER='pi'
```

17.
```
### End customization required
```

18.

19.
```
eval cd ~$USER
```

20.
```

```

21.
```
case "$1" in
```

22.
```
    start)
```

23.
```
        su $USER -c '/usr/bin/tightvncserver :1'
```

24.
```
        echo "Starting TightVNC server for $USER "
```

25.
```
        ;;
```

26.
```
    stop)
```

```
27.        pkill Xtightvnc

28.        echo "Tightvncserver stopped"

29.        ;;

30.     *)

31.        echo "Usage: /etc/init.d/tightvncser
       ver {start|stop}"

32.        exit 1

33.        ;;
```

34. | `esac`

35. | `exit 0`

To download use the following commands:

```
wget http://www.penguintutor.com/otherfiles/tightvncserver-init.txt

sudo mv tightvncserver-init.txt /etc/init.d/tightvncserver
```

You may need to change the variable on line 16. It is currently set to pi which is the default username on the Raspberry Pi Debian image. Set this to whatever username you want to login to TightVNC as. Do not put root as the user.

Change the file so it is owned by root (not strictly neccessary, but is the standard ownership for init files
`sudo chown root:root /etc/init.d/tightvncserver`

Make the file executable by running
`sudo chmod 755 /etc/init.d/tightvncserver`

Add the script to the default runlevels with the command
`sudo update-rc.d tightvncserver defaults`

TightVNC will now start at startup. I'd recommend you reboot at this point to make sure it's working, but you can just stop and start if you don't want to reboot.

You can manually start and stop it using

```
sudo /etc/init.d/tightvncserver start
```

and

```
sudo /etc/init.d/tightvncserver stop
```

Note that this is designed for running only one instance of TightVNC on the computer. If you want to be able to start and stop specific instances of TightVNC then you will need to tweak the startup script appropriately.

Installing Tightvnc viewer (VNC client) on a Linux computer

On a Linux computer you can install the viewer with

```
sudo apt-get install xtightvncviewer
```

or if that is not in the repositories try:

```
sudo apt-get install ssvnc
```

This will work with Debian / Ubuntu based distributions only, for other distributions use the normal package manager.

Note that ssvnc - which is the version I installed on my Kubuntu computer is based on tightvnc, but also has the ability to configure the ssh tunnelling (see later) through the GUI.

Login using

```
xtightvncviewer 192.168.1.6:1
```

(replace with your own IP address as appropriate)
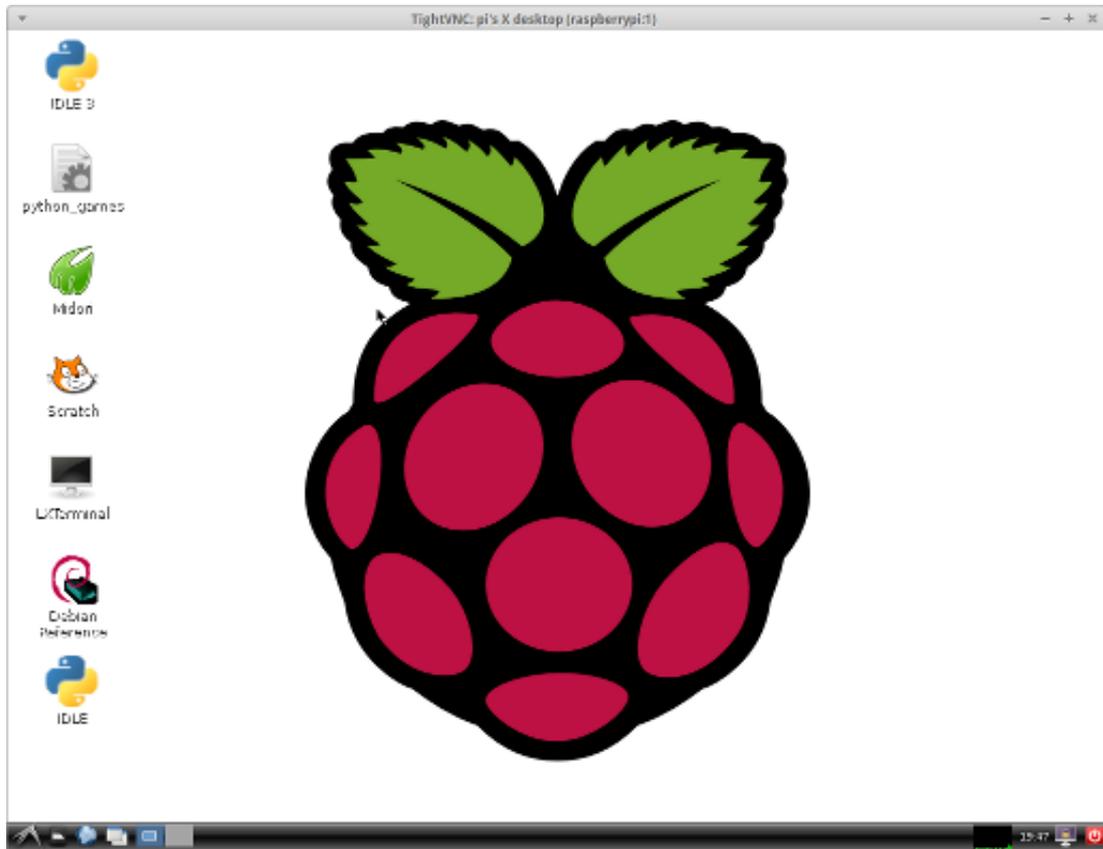
Installing Tightvnc view on a Windows computer

To access from Windows or using the Java Client download from TightVNC.com

Securing TightVNC

TightVNC allows anyone that knows the password to login as the user that it's running under. It also does this without encryption so anyone can snoop in on the session. Fortunately there is a secure solution, which is to tunnel the connection over an ssh (secure shell) login.

First step is to restrict Tightvnc to the local computer only. This is done by adding the option -localhost when starting the tightvncserver. To do this edit line 23 in the /etc/init.d/tightvncserver file to read:</>

```
    su $USER -c '/usr/bin/tightvncserver -l
ocalhost :1'
```

Then restart the server.

To login using ssh - first login to the host computer using ssh

```
ssh pi@192.168.1.6 -L 5901:localhost:5901
```

The -L option creates the tunnel, from the current computer (default) port 5901 to the host computer (as localhost) port 5901. Port 5901 is the default port for display 1, 5902 for display 2 etc.

To connect using tightvnc now use the command

```
xtightvncviewer 127.0.0.1:1
```

Note that your previous terminal will now be logged into the Raspberry Pi so you will need to start a new terminal or tab to run the viewer.

If using Windows then the ssh tunnel can be created from within PuTTY
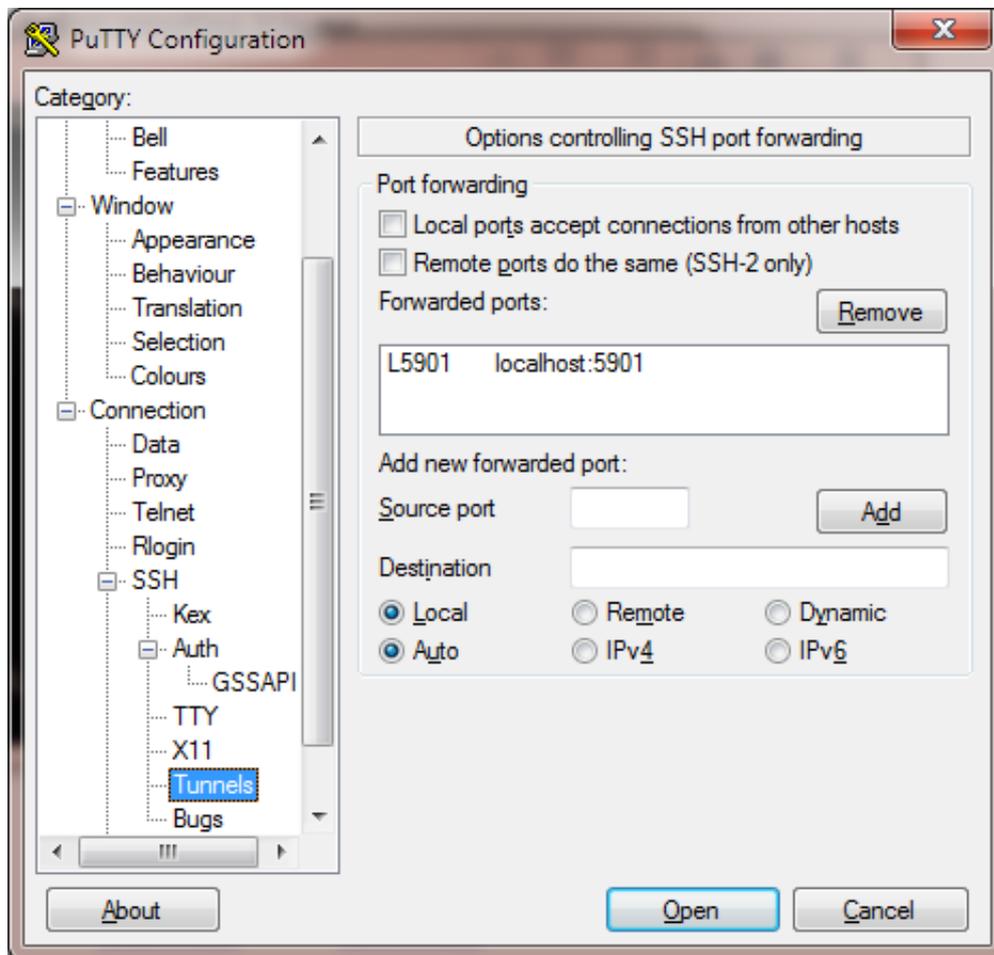
Then connect using the vnc client using 127.0.0.1:1.

You can now use the GUI to run applications on the Raspberry Pi without needing a monitor or keyboard. If you have port forwarding set on your router you can do this over the Internet.

Starting your window manager

The instructions above are sufficient for the Raspberry Pi running Debian. You may however need to make a further configuration change to start your normal window manager / application launcher. If you get a blank screen when connecting edit the file ~/.vnc/xstartup and replace the line /etc/X11/Xsession with one of the following as appropriate.

```
exec ck-launch-session startlxde  #for an l
xde session

exec ck-launch-session gnome-session    #fo
r a gnome-session

exec ck-launch-session openbox-session  #fo
r an openbox desktop

exec ck-launch-session startxfce4       #fo
r an xfce desktop

exec ck-launch-session icewm    #for an ice
wm desktop

exec ck-launch-session startkde #for a kde
desktop
```

For instance with Ubuntu you would use the entry for gnome, for xubuntu you would use xfce and for kubuntu use kde. The Raspberry Pi uses lxde, but this is started automatically on the Raspberry Pi there is no need to add it to the xstartup file.