

Secure Shell Virtual Network Computing

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Minimal Requirements

- IPv4 Networking
- SSH-2 Client
- VNC Client
- 2 PCs

Recommended Requirements

- IPv4 Networking
- OpenSSH 6.7p1 or later or PuTTY 0.69 or later
- Remmina 1.1.0 or newer or 1.2.1.2 or newer
- Laptop Running
 - Debian 8 or newer or Ubuntu 16.04 or newer
 - Windows 7 or newer
- Raspberry Pi B series
 - Class provided image on SD Card

Get Software

- Windows
 - <http://www.uvnc.com/downloads.html>
 - <http://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>
 - Install the MSI Files
- Debian & Ubuntu
 - `sudo aptitude update`
 - `sudo aptitude install ssh remmina`

Move the Unit file to the Pi

```
cd sshvnc_ws/src/ansible/template/  
scp x11vnc.service pi@$PINAME:
```

Windows Move the Unit file to the Pi

```
Windows PowerShell
PS C:\Users\Oflameo\Documents\sshvnc_ws-master\src\ansible\template> ls

Directory: C:\Users\Oflameo\Documents\sshvnc_ws-master\src\ansible\template

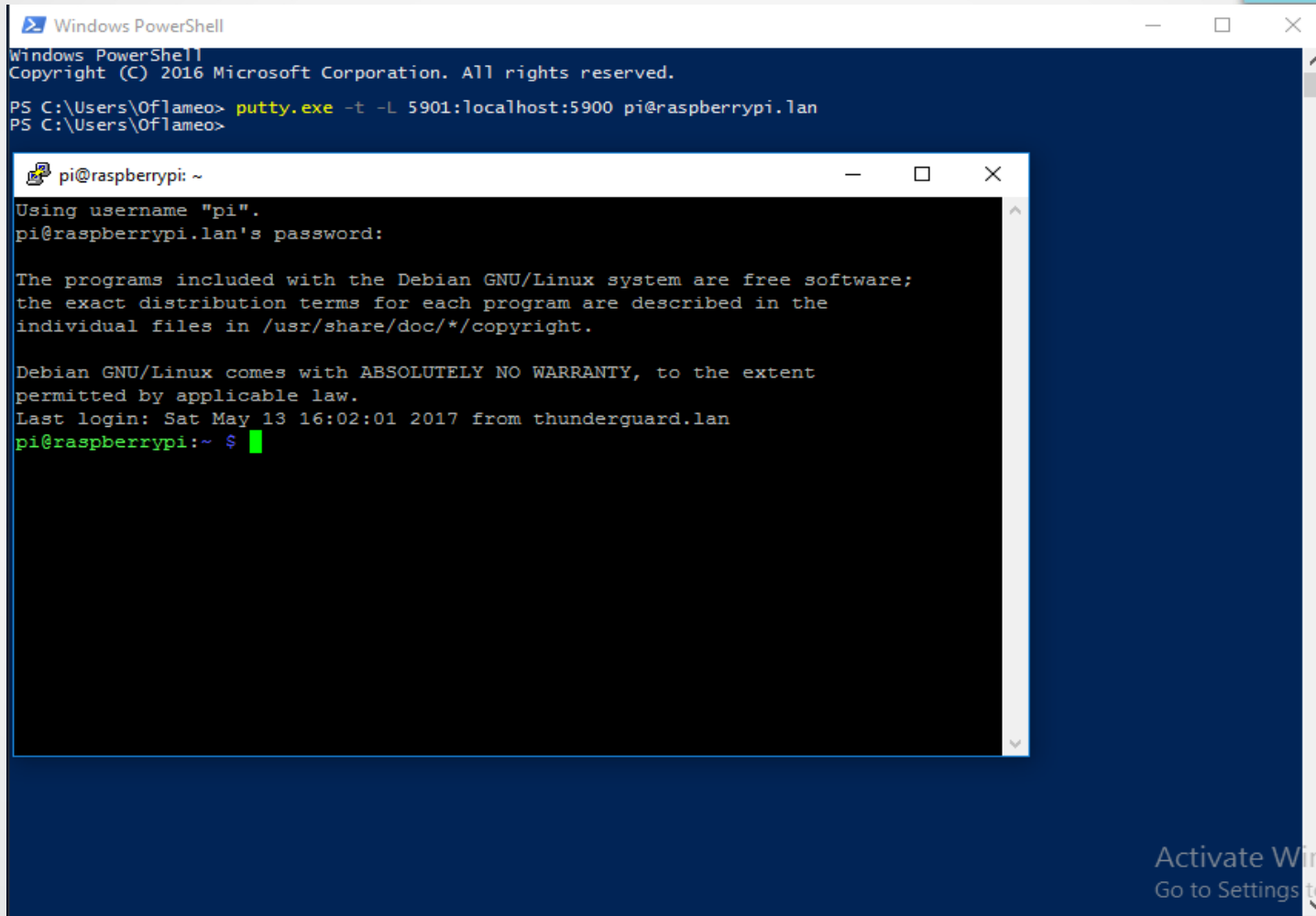
Mode                LastWriteTime         Length Name
----                -
-a----           5/13/2017   9:26 AM             394 x11vnc.service

PS C:\Users\Oflameo\Documents\sshvnc_ws-master\src\ansible\template> pscp .\x11vnc.service pi@raspberrypi.lan:
pi@raspberrypi.lan's password:
x11vnc.service      | 0 kB |   0.4 kB/s | ETA: 00:00:00 | 100%
PS C:\Users\Oflameo\Documents\sshvnc_ws-master\src\ansible\template> _
```

Connect to Pi

```
ssh -t -L 5901:localhost:5900 pi@$PINAME
```

Windows Connect to Pi



```
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\Users\Oflameo> putty.exe -t -L 5901:localhost:5900 pi@raspberrypi.lan
PS C:\Users\Oflameo>
```

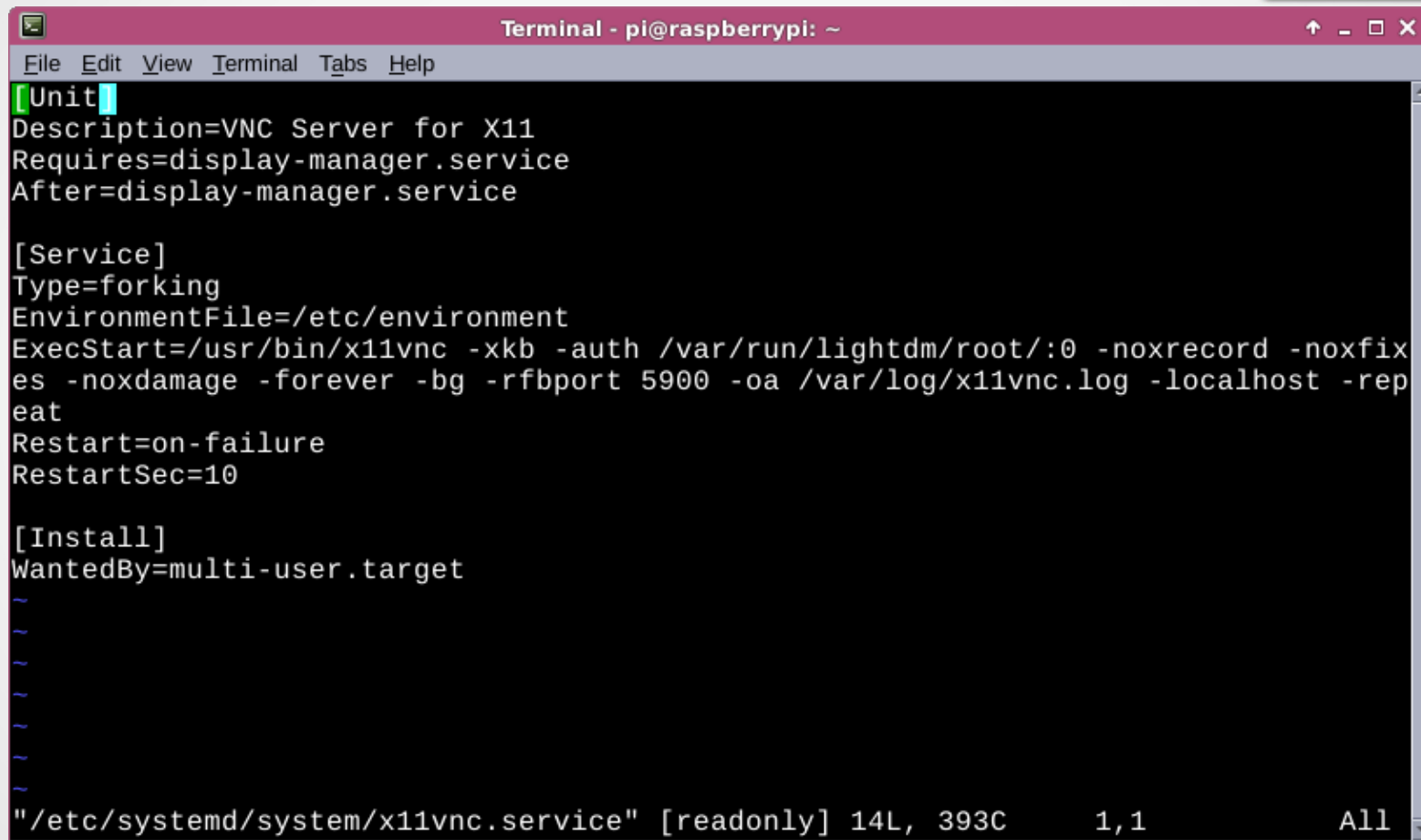
```
pi@raspberrypi: ~
Using username "pi".
pi@raspberrypi.lan's password:

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sat May 13 16:02:01 2017 from thunderguard.lan
pi@raspberrypi:~ $
```

Activate Win
Go to Settings to

vim x11vnc.service



The screenshot shows a terminal window titled "Terminal - pi@raspberrypi: ~". The window contains the contents of the `x11vnc.service` file, which is being edited in vim. The file content is as follows:

```
[Unit]
Description=VNC Server for X11
Requires=display-manager.service
After=display-manager.service

[Service]
Type=forking
EnvironmentFile=/etc/environment
ExecStart=/usr/bin/x11vnc -xkb -auth /var/run/lightdm/root/:0 -noxrecord -noxfixes -noxdamage -forever -bg -rfbport 5900 -oa /var/log/x11vnc.log -localhost -repeat
Restart=on-failure
RestartSec=10

[Install]
WantedBy=multi-user.target
```

At the bottom of the terminal window, the status bar shows: `"/etc/systemd/system/x11vnc.service" [readonly] 14L, 393C 1,1 All`.

X11vnc options

- xkb : enable modifier tweaking mode
- auth : guesses where XAUTHORITY file is
- noxrecord : disable any use of the RECORD extension
- noxfixes : do not use the XFIXES extension to draw the exact cursor shape even if it is available
- noxdamage : do not use the X DAMAGE extension to detect framebuffer changes even if it is available
- forever : keep listening for more connections rather than exiting as soon as the first client(s) disconnect. Same as

More X11vnc options

- `bg` : go into the background after screen setup
- `rfbport` : the VNC port to listen on
- `oa` : opens log file in append mode
- `localhost` : Only allow client connections from hosts 127.0.0.1 and ::1
- `repeat` : enables X server key auto repeat when VNC clients are connected

Get Systemd to load file

```
sudo mv x11vnc.service /etc/systemd/system
```

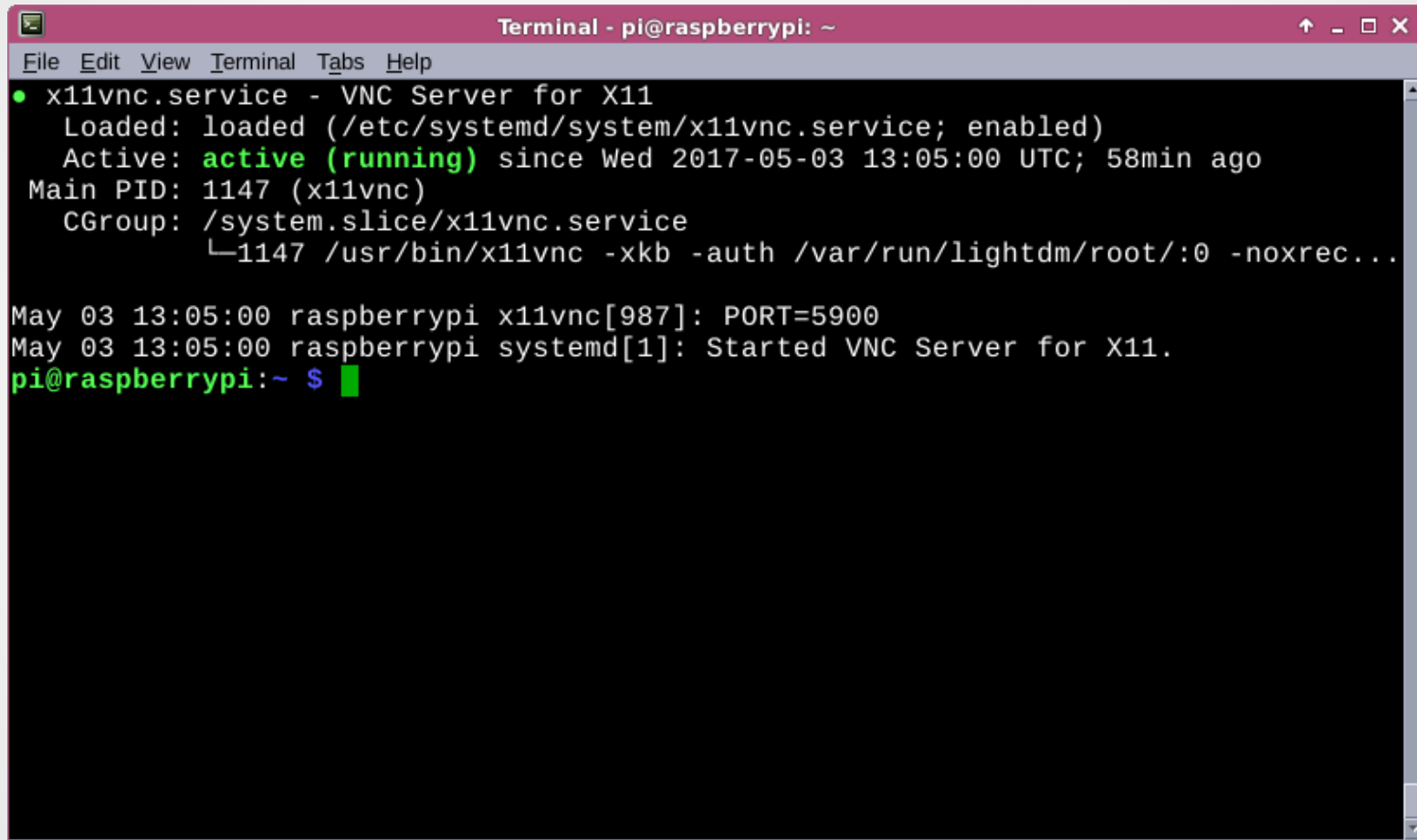
```
sudo systemctl daemon-reload
```

```
systemctl enable x11vnc
```

```
systemctl start x11vnc
```

```
systemctl status x11vnc
```

Status should show running

A terminal window titled "Terminal - pi@raspberrypi: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal output shows the status of the x11vnc.service. It is loaded and enabled, active (running) since Wed 2017-05-03 13:05:00 UTC, 58min ago. The main PID is 1147 (x11vnc) and the CGroup is /system.slice/x11vnc.service. The command line for the service is /usr/bin/x11vnc -xkb -auth /var/run/lightdm/root/:0 -noxrec... Below this, two log messages are shown: "May 03 13:05:00 raspberrypi x11vnc[987]: PORT=5900" and "May 03 13:05:00 raspberrypi systemd[1]: Started VNC Server for X11." The prompt "pi@raspberrypi:~ \$" is at the bottom.

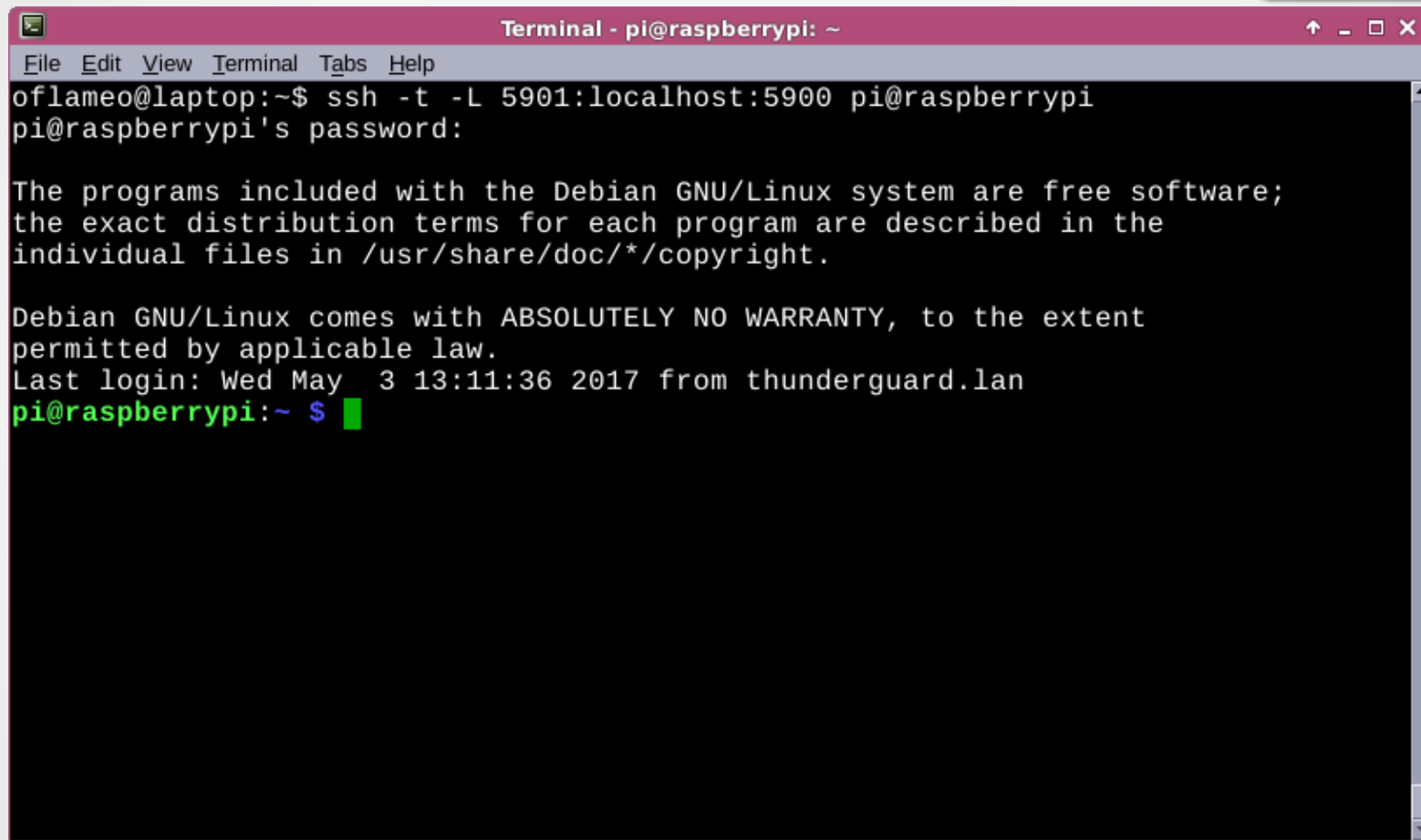
```
Terminal - pi@raspberrypi: ~
File Edit View Terminal Tabs Help
• x11vnc.service - VNC Server for X11
  Loaded: loaded (/etc/systemd/system/x11vnc.service; enabled)
  Active: active (running) since Wed 2017-05-03 13:05:00 UTC; 58min ago
  Main PID: 1147 (x11vnc)
  CGroup: /system.slice/x11vnc.service
          └─1147 /usr/bin/x11vnc -xkb -auth /var/run/lightdm/root/:0 -noxrec...

May 03 13:05:00 raspberrypi x11vnc[987]: PORT=5900
May 03 13:05:00 raspberrypi systemd[1]: Started VNC Server for X11.
pi@raspberrypi:~ $
```

Disconnect from Pi

exit

Connect to Pi Again

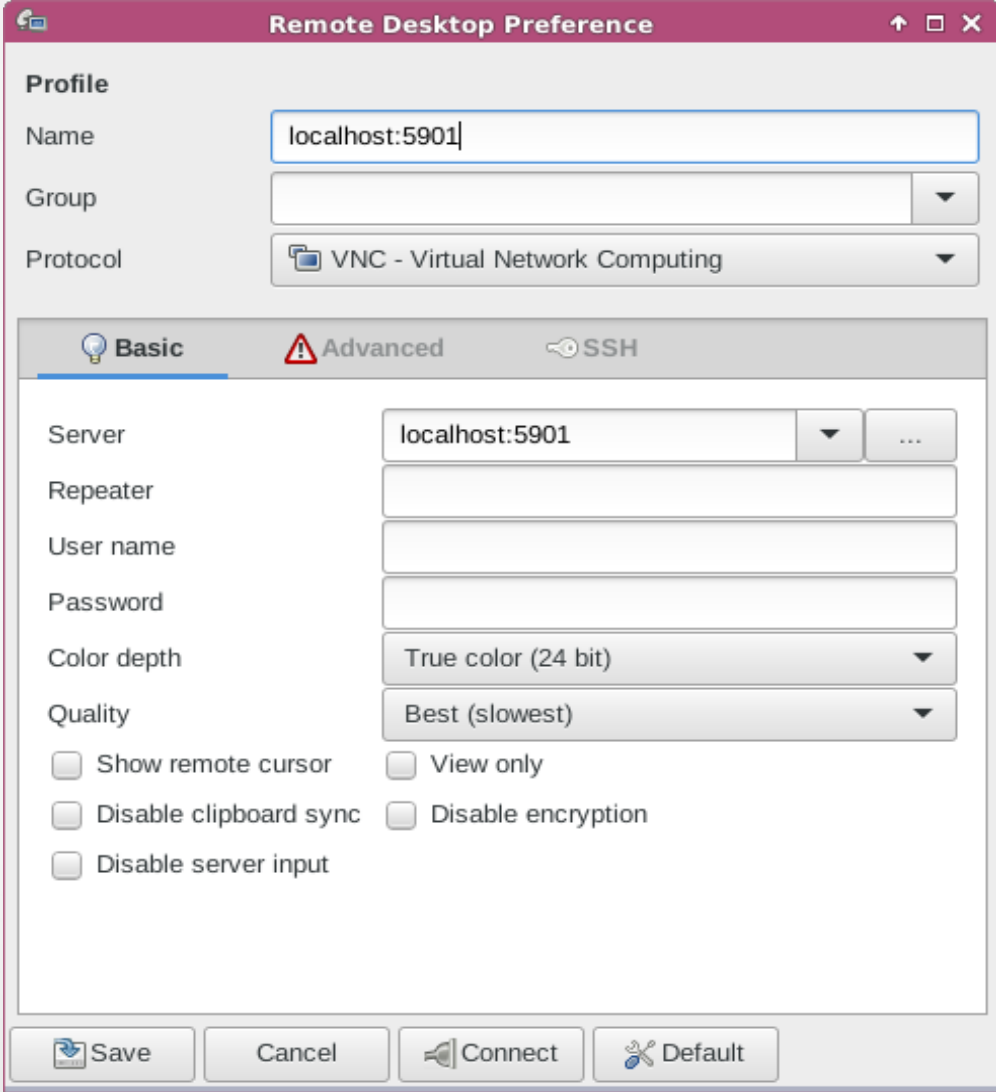


```
Terminal - pi@raspberrypi: ~
File Edit View Terminal Tabs Help
oflameo@laptop:~$ ssh -t -L 5901:localhost:5900 pi@raspberrypi
pi@raspberrypi's password:

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed May  3 13:11:36 2017 from thunderguard.lan
pi@raspberrypi:~ $
```

Configure new VNC connection



The image shows a 'Remote Desktop Preference' dialog box with a purple title bar. It contains a 'Profile' section at the top with fields for Name, Group, and Protocol. Below this is a tabbed interface with 'Basic', 'Advanced', and 'SSH' tabs. The 'Basic' tab is active, showing fields for Server, Repeater, User name, Password, Color depth, and Quality, along with several unchecked checkboxes. At the bottom are buttons for Save, Cancel, Connect, and Default.

Remote Desktop Preference

Profile

Name: localhost:5901

Group:

Protocol: VNC - Virtual Network Computing

Basic | Advanced | SSH

Server: localhost:5901

Repeater:

User name:

Password:

Color depth: True color (24 bit)

Quality: Best (slowest)

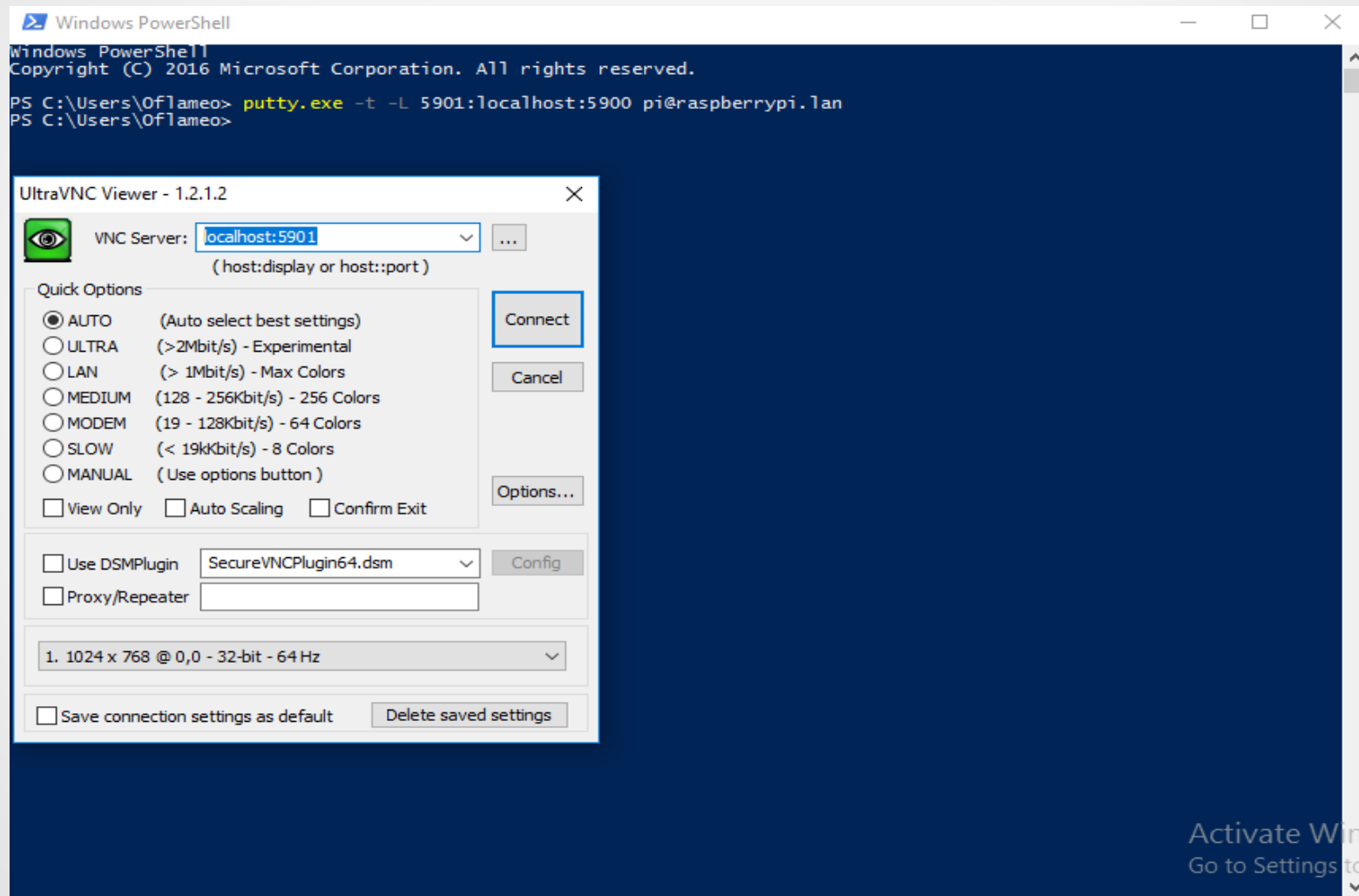
☐ Show remote cursor ☐ View only

☐ Disable clipboard sync ☐ Disable encryption

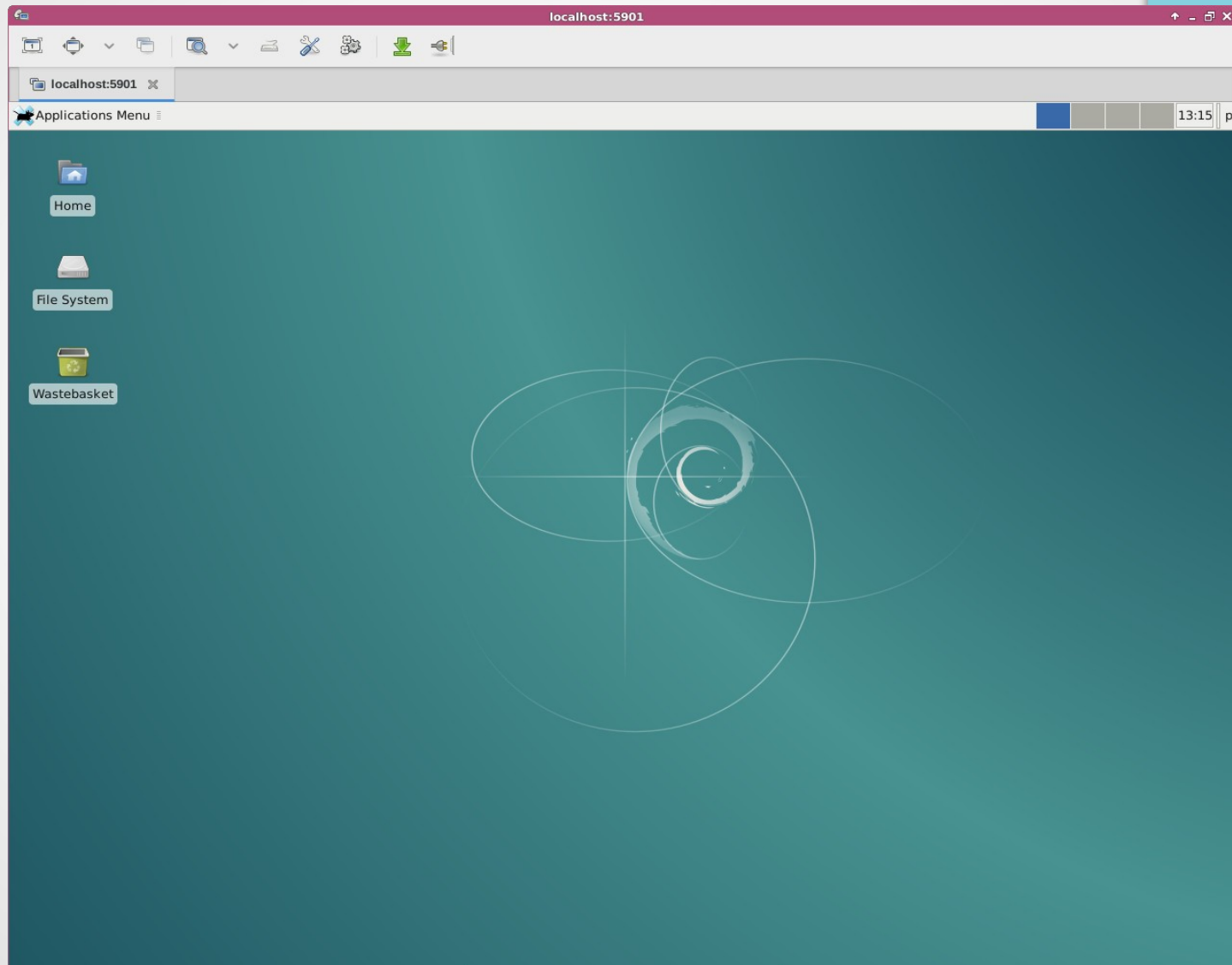
☐ Disable server input

Save Cancel Connect Default

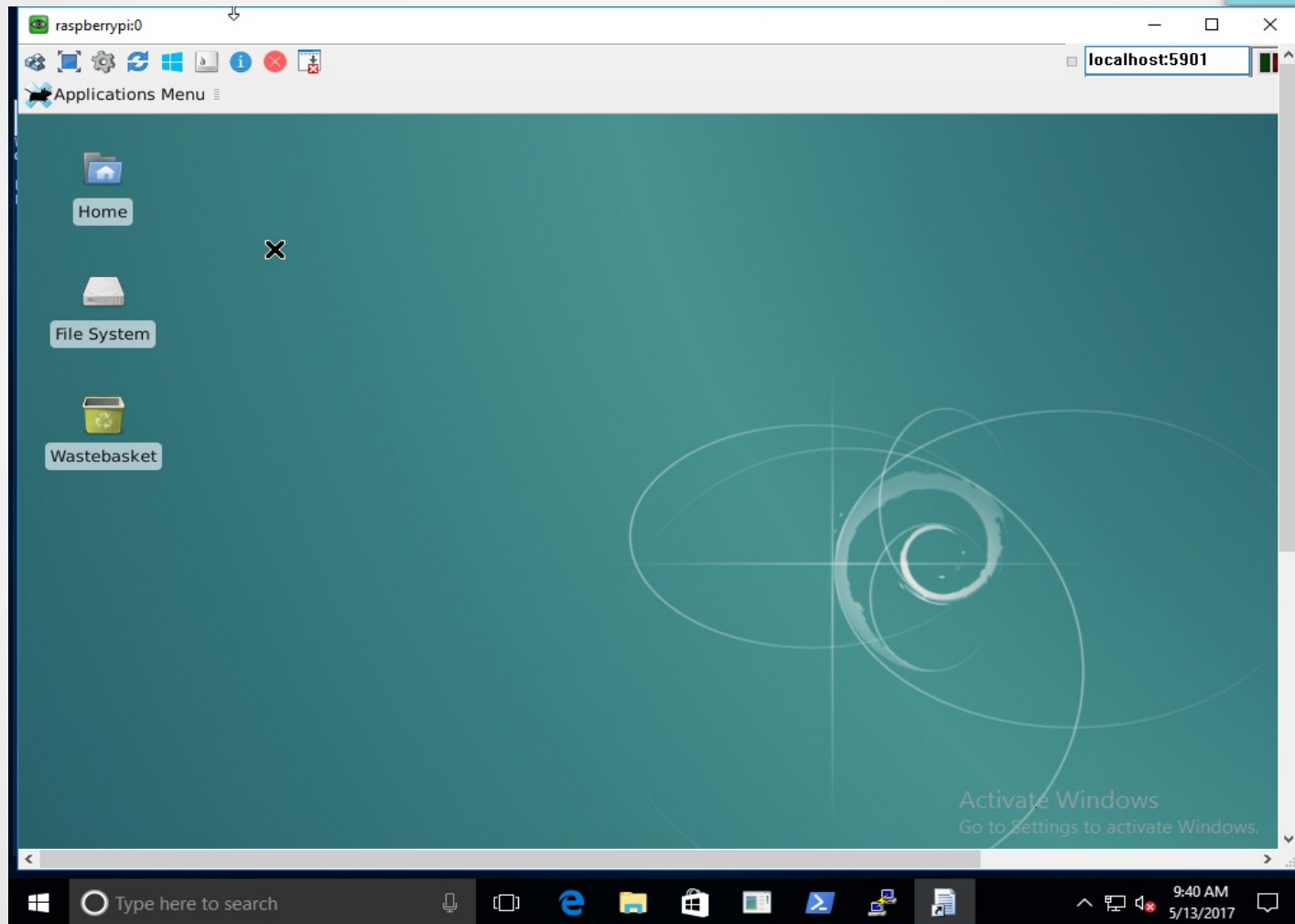
Windows Configure new VNC connection



Connect to VNC



Windows Connect to VNC



Sources

- `man 1 x11vnc`
- `man 1 ssh`
- `man 5 systemd.unit`
- <https://wiki.archlinux.org/index.php/x11vnc>
- <http://www.hackpittsburgh.org/wiki/index.php?title=ComputerStuff>
- <https://www.lxtreme.nl/blog/headless-x11/>