

# Comunicación remota coa Raspi

## Obxectivos

- Comunicarse coa Raspberry Pi sen necesidade de estar diante do su monitor asociado
- Comunicarse en remoto coa Raspberry Pi, empregando o entorno visual, sen necesidade de ter periféricos conectados á Raspberry Pi
- Instalar e configurar programas empregando apt-get
- Conseguir o cinto branco-amarelo do NINJA do terminal

# Comunicación remota coa Raspi

## Contidos

- Uso básico de apt-get
- Instalación e configuración do servidor SSH
- Como obter a IP da Raspi
- Conexión dende outro equipo usando SSH
- Instalación e configuración do servidor VNC
- Conexión dende outro equipo usando VNC

# Comunicación remota coa Raspi

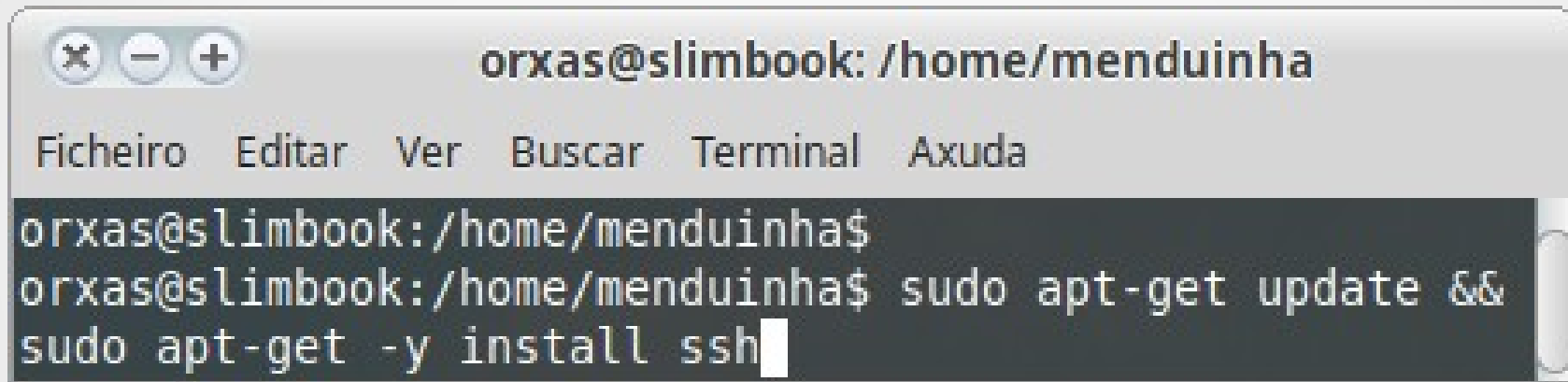
- Haberá moitos proxectos nos que precisemos controlar a Raspi e non lle poidamos conectar un monitor, teclado e rato.
- Neses casos é útil ter algún xeito de acceder a ela para reprogramala, actualizar SW, comprobar logs, etc
- A opción máis sinxela é habilitar un terminal remoto seguro (Secure Shell, ssh).
- A opción máis complicada é habilitar unha conexión VNC (Virtual Network Computing), aínda que despois resulta máis fácil para usuarios inexpertos.

# Comunicación remota - ssh

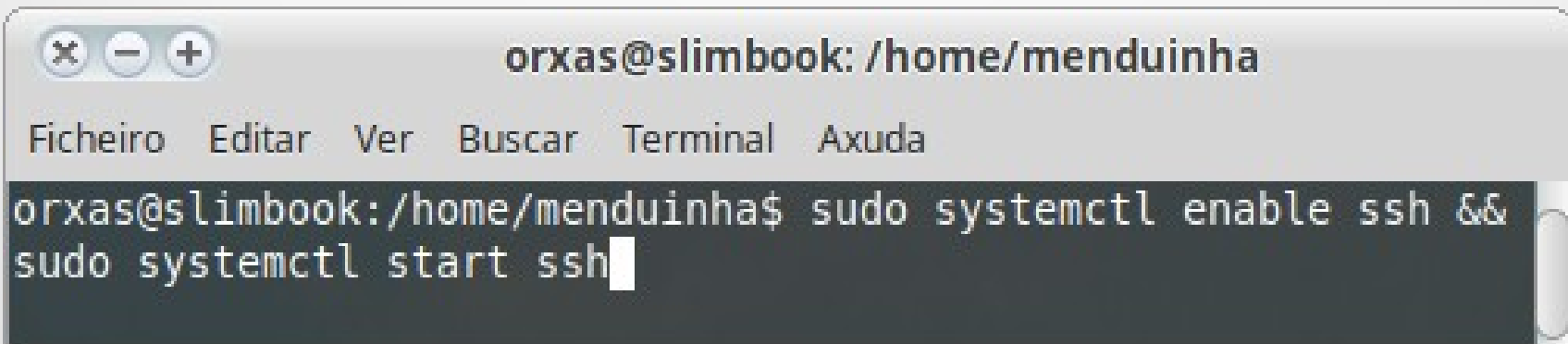
- Para habilitar ssh podemos hacerlo usando a utilidade raspi-config:
  - no terminal escribemos 'raspi-config', aparécenos un menú tipo teletexto e
  - escollemos '5. Interfacing options', accedemos a un novo menú,
  - no que escollemos 'P2. SSH'
  - habilitamos e xa está
- Outra opción é a habitual nos sistemas Debian: usando o terminal. É método que chamo 'Ninja'.

# Comunicación remota - ssh

- Instalamos ssh e habilitamos o servizo, escribindo:



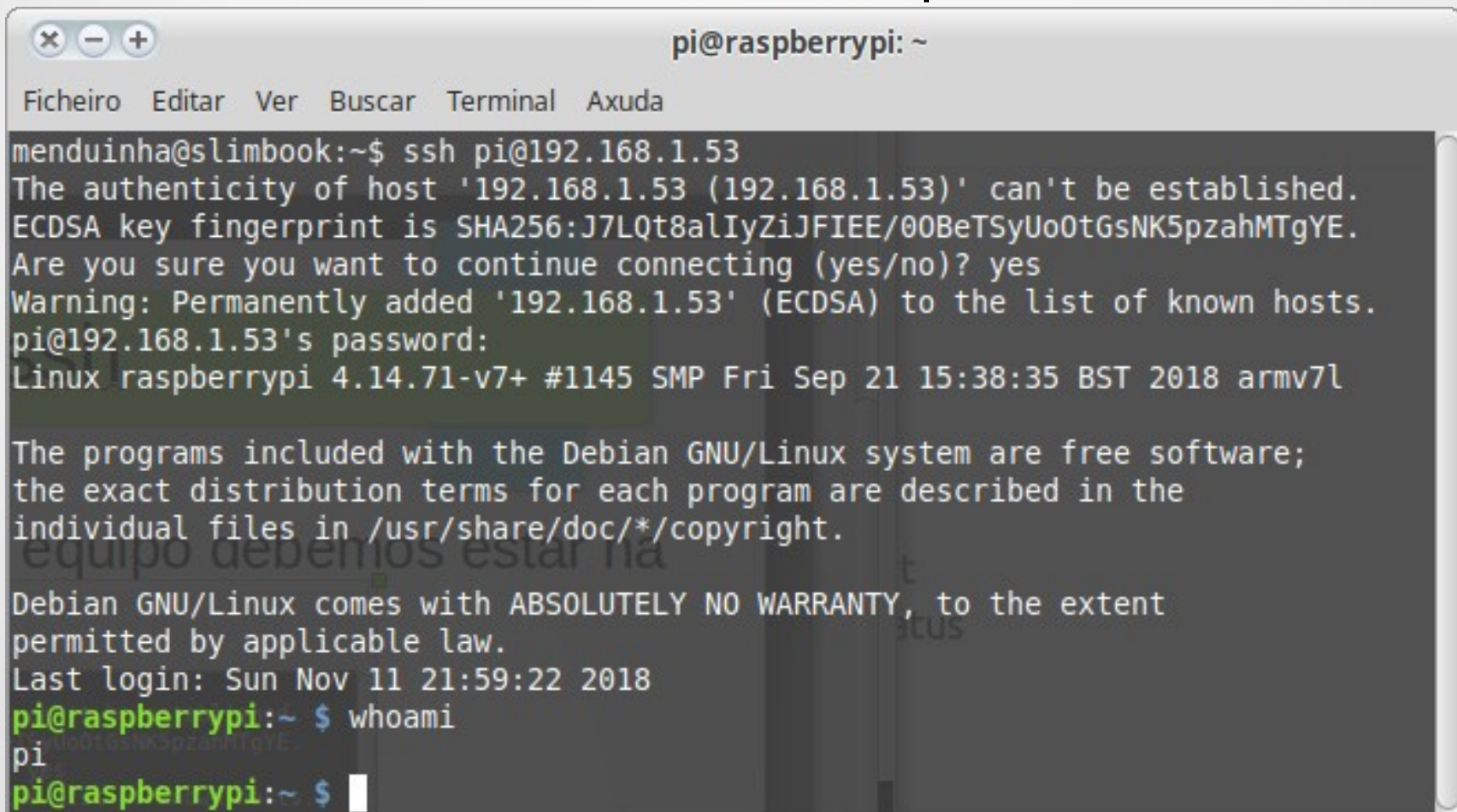
```
orxas@slimbook: /home/menduinha
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda
orxas@slimbook:/home/menduinha$
orxas@slimbook:/home/menduinha$ sudo apt-get update &&
sudo apt-get -y install ssh
```



```
orxas@slimbook: /home/menduinha
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda
orxas@slimbook:/home/menduinha$ sudo systemctl enable ssh &&
sudo systemctl start ssh
```

# Comunicación remota - ssh

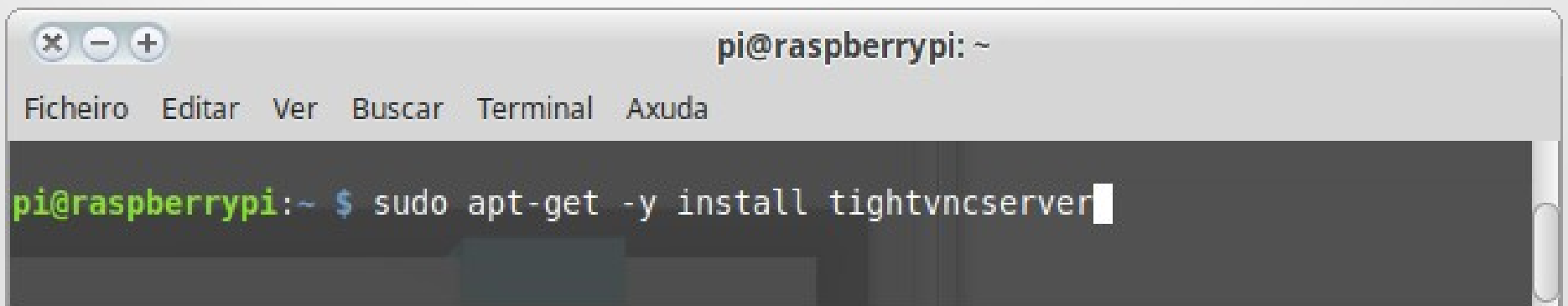
- Para conectarnos desde outro equipo debemos estar na mesma rede e coñecer a IP da Raspi:



```
pi@raspberrypi: ~  
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda  
menduinha@slimbook:~$ ssh pi@192.168.1.53  
The authenticity of host '192.168.1.53 (192.168.1.53)' can't be established.  
ECDSA key fingerprint is SHA256:J7LQt8aIyZiJFIEE/00BeTSyUo0tGsNK5pzahMTgYE.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '192.168.1.53' (ECDSA) to the list of known hosts.  
pi@192.168.1.53's password:  
Linux raspberrypi 4.14.71-v7+ #1145 SMP Fri Sep 21 15:38:35 BST 2018 armv7l  
  
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: Sun Nov 11 21:59:22 2018  
pi@raspberrypi:~ $ whoami  
pi  
pi@raspberrypi:~ $
```

# Comunicación remota - VNC

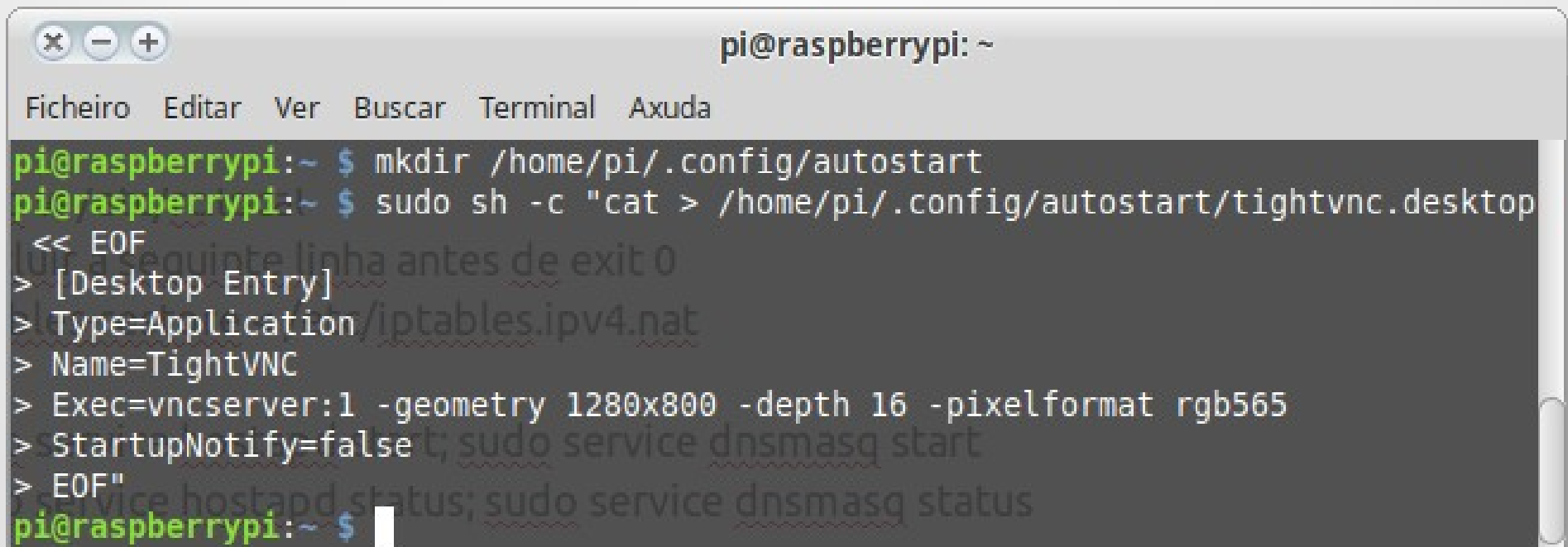
- Para habilitar VNC, precisamos instalar o servidor e crear un arquivo de configuración.
- O servidor que imos empregar é tightvncserver.
- Podemos aproveitar a conexión ssh para instalar o servidor.
- Necesitaremos ademais crear un arquivo de configuración para que se arranque automaticamente o servidor VNC.



```
pi@raspberrypi: ~  
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda  
pi@raspberrypi:~ $ sudo apt-get -y install tightvncserver
```

# Comunicación remota - VNC

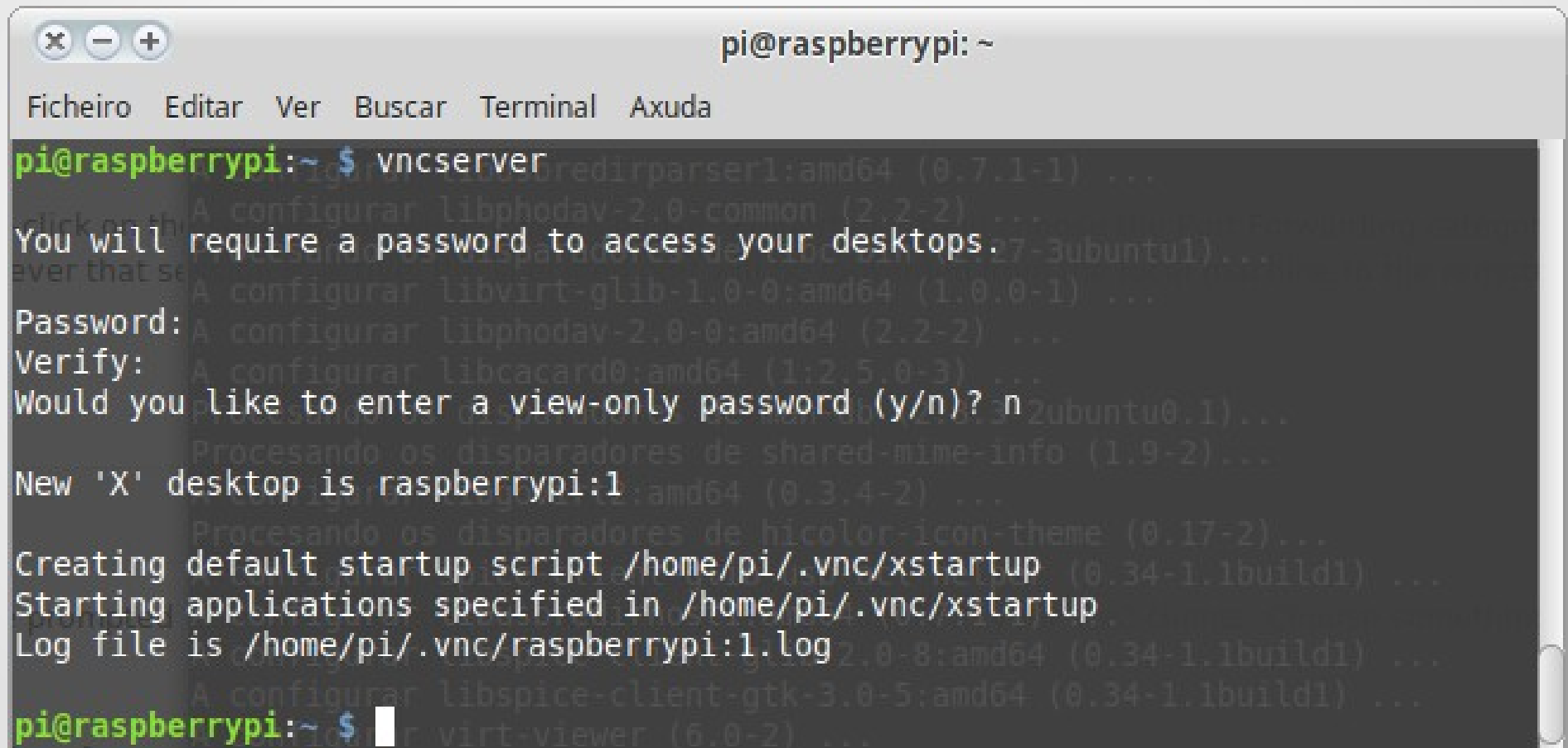
- Para escribir o archivo de configuración imos hacer de dúas formas igual de válidas: (a) usando o terminal ssh e (b) usando o entorno gráfico.
- (a) Usando o terminal ssh:



```
pi@raspberrypi: ~  
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda  
pi@raspberrypi:~ $ mkdir /home/pi/.config/autostart  
pi@raspberrypi:~ $ sudo sh -c "cat > /home/pi/.config/autostart/tightvnc.desktop  
<< EOF  
> [Desktop Entry  
> Type=Application  
> Name=TightVNC  
> Exec=vncserver:1 -geometry 1280x800 -depth 16 -pixelformat rgb565  
> StartupNotify=false  
> EOF"  
pi@raspberrypi:~ $
```

# Comunicación remota - VNC

- (a) Usando o terminal ssh (cont.)



```
pi@raspberrypi: ~  
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda  
pi@raspberrypi:~$ vncserver  
You will require a password to access your desktops.  
Password:  
Verify:  
Would you like to enter a view-only password (y/n)? n  
New 'X' desktop is raspberrypi:1  
Creating default startup script /home/pi/.vnc/xstartup  
Starting applications specified in /home/pi/.vnc/xstartup  
Log file is /home/pi/.vnc/raspberrypi:1.log  
pi@raspberrypi:~$
```

# Comunicación remota - VNC

- (b) empregando o entorno gráfico da Raspi

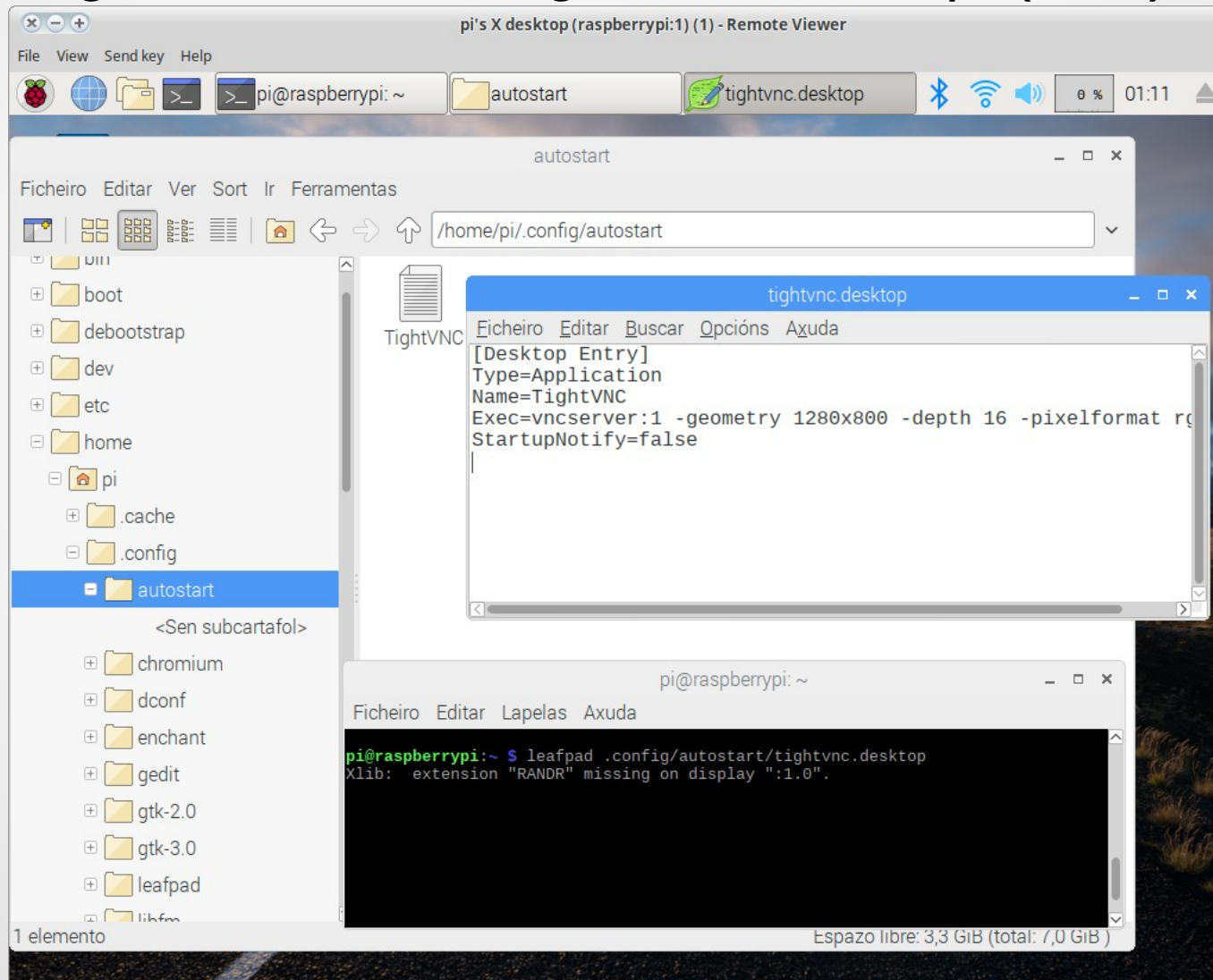
Se non nos sentimos cómodos creando un arquivo co terminal, podemos crealo localmente diante da Raspi e usando o editor gráfico do menú ferramentas.

Imos crear un arquivo chamado 'tightvncserver.desktop' coa ruta completa:

```
/home/pi/.config/autostart/tightvnc.desktop
```

# Comunicación remota - VNC

- (b) empregando o entorno gráfico da Raspi (cont)

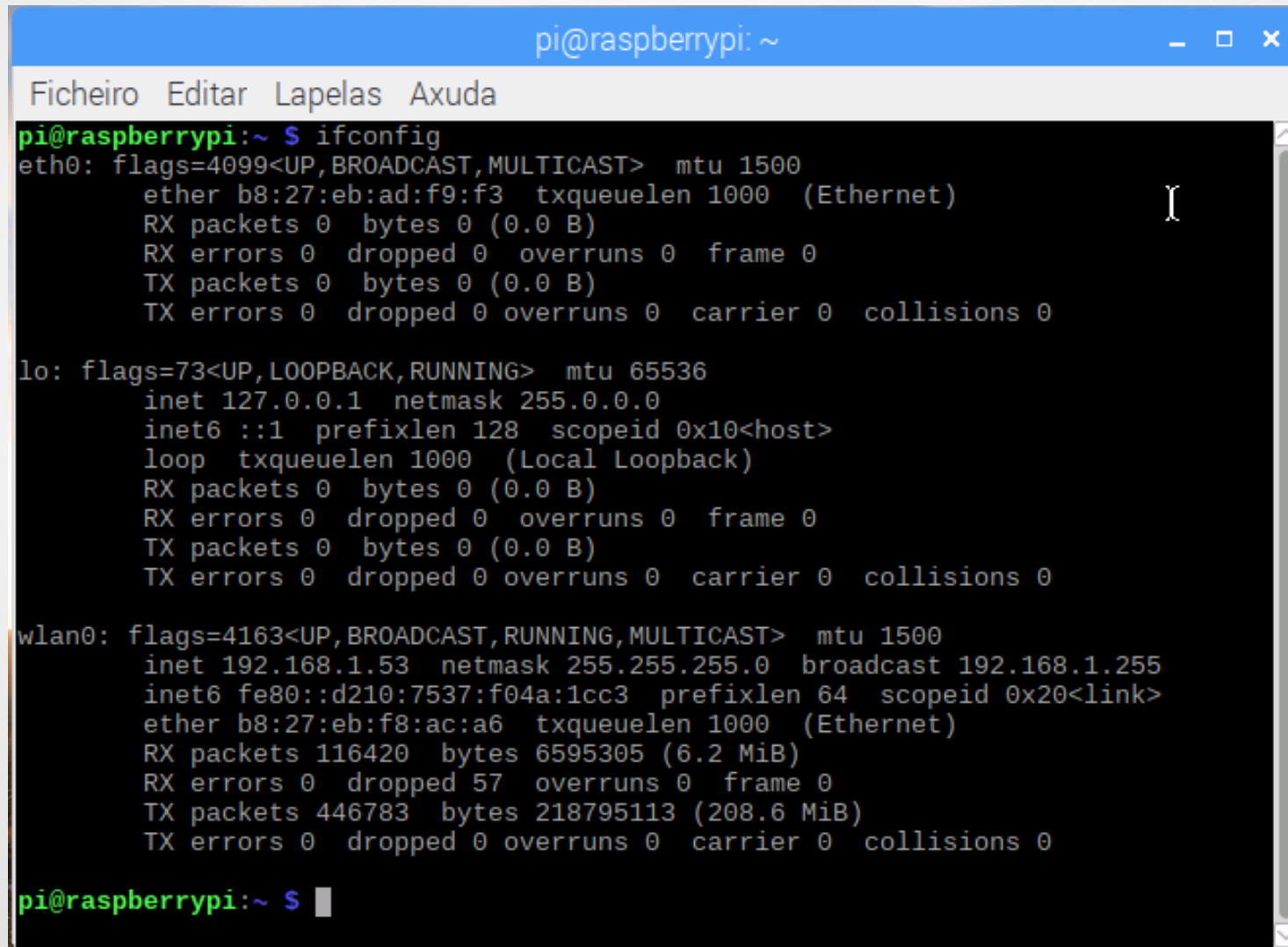


# Comunicación remota - VNC

- Para conectarnos desde outro ordenador precisamos:
    - estar na mesma rede e
    - coñecer a IP da Raspi
  - Un cliente VNC:
    - MacOSX: ten cliente por defecto ou pódese instalar RealVNC
      - <https://www.realvnc.com/en/connect/download/vnc/>
    - Windows: hai cliente TightVNC:
      - <http://www.tightvnc.com/download.php>
    - Linux: gncviewer, ou xtightvncviewer
- Pregunta para Ninjas: Sabemos instalalo?

# Comunicación remota - VNC

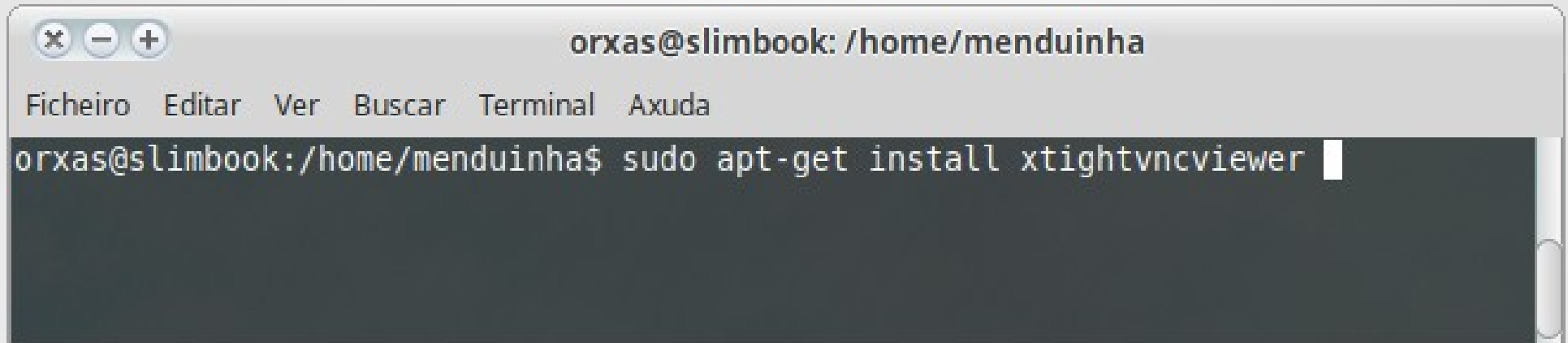
- Averiguar IP da Raspi:



```
pi@raspberrypi: ~  
Ficheiro Editar Lapelas Axuda  
pi@raspberrypi:~ $ ifconfig  
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500  
    ether b8:27:eb:ad:f9:f3 txqueuelen 1000 (Ethernet)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1 netmask 255.0.0.0  
    inet6 ::1 prefixlen 128 scopeid 0x10<host>  
    loop txqueuelen 1000 (Local Loopback)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 192.168.1.53 netmask 255.255.255.0 broadcast 192.168.1.255  
    inet6 fe80::d210:7537:f04a:1cc3 prefixlen 64 scopeid 0x20<link>  
    ether b8:27:eb:f8:ac:a6 txqueuelen 1000 (Ethernet)  
    RX packets 116420 bytes 6595305 (6.2 MiB)  
    RX errors 0 dropped 57 overruns 0 frame 0  
    TX packets 446783 bytes 218795113 (208.6 MiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
pi@raspberrypi:~ $
```

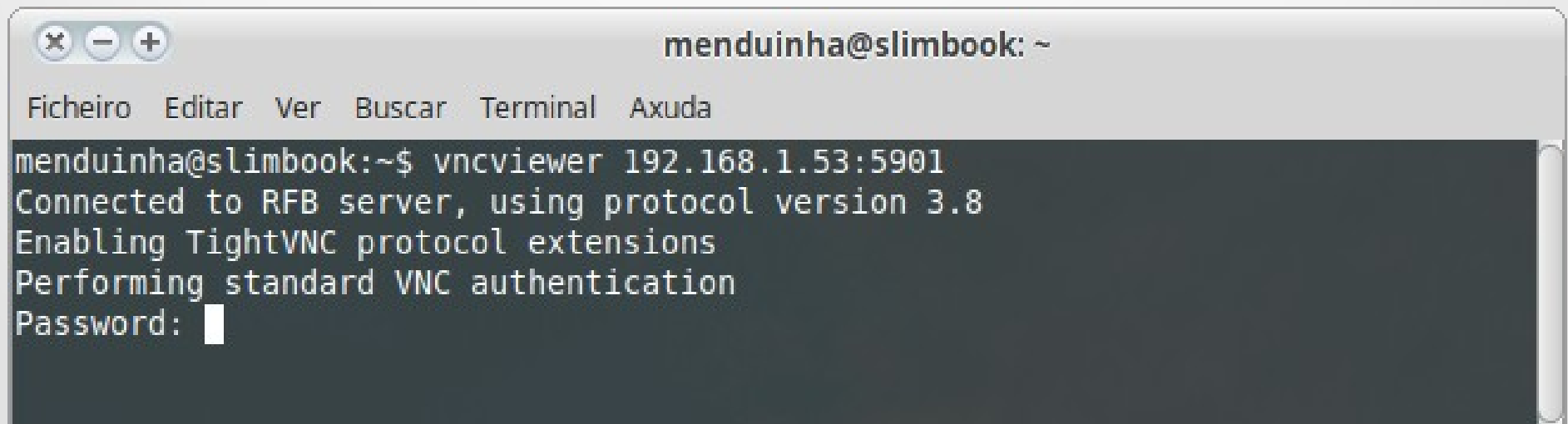
# Comunicación remota - VNC

- Instalar xtightvncviewer en Linux:



```
orxas@slimbook: /home/menduinha
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda
orxas@slimbook:/home/menduinha$ sudo apt-get install xtightvncviewer
```

- Conectarse á Raspi:



```
menduinha@slimbook: ~
Ficheiro  Editar  Ver  Buscar  Terminal  Axuda
menduinha@slimbook:~$ vncviewer 192.168.1.53:5901
Connected to RFB server, using protocol version 3.8
Enabling TightVNC protocol extensions
Performing standard VNC authentication
Password:
```

# Comunicación remota - VNC

- Tamén temos opción de facelo dende o entorno gráfico:

The screenshot displays a Linux desktop environment with a teal background. The top panel shows the system menu and the date 'Mér 14 de Nov, 22:56'. The left sidebar contains 'Lugares' (Places) and 'Sistema' (System) sections. The main area shows the 'Aplicativos' (Applications) window with the 'Internet' category selected, displaying various web browsers and chat applications. A 'Connection details' dialog box is open, showing the 'Connection Address' field and a 'Recent connections' list containing 'vnc://192.168.1.53:5901'. Below the dialog, two terminal windows are visible. The first terminal window, titled 'orxas@slimbook: /home/menduinha', shows the command `sudo apt-get install xtightvncviewer` being entered. The second terminal window, titled 'menduinha@slimbook: ~', shows the output of the `vncviewer` command: `vncviewer 192.168.1.53:5901`, indicating a successful connection to the RFB server.

# Comunicación remota - VNC

The screenshot displays a VNC session titled "TightVNC: pi's X desktop (raspberrypi:1)". The desktop environment includes a terminal window with the following output:

```
pi@raspberrypi:~$ ifconfig
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether b8:27:eb:ad:f9:f3 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.53 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::d210:7537:f04a:1cc3 prefixlen 64 scopeid 0x20<link>
    ether b8:27:eb:f8:ac:a6 txqueuelen 1000 (Ethernet)
    RX packets 116420 bytes 6595305 (6.2 MiB)
    RX errors 0 dropped 57 overruns 0 frame 0
    TX packets 446783 bytes 218795113 (208.6 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

pi@raspberrypi:~$
```

The desktop also shows a file manager window titled "Computador" and a terminal window with the command "vncviewer 192.168.1.255" and its output, including the password prompt.