ThinLinX Operating System (TLXOS)

User Manual

TLXOS 4.11.1 Recommended & TLXOS 4.8.3 LTS

12th February 2023

1 Introduction

The ThinLinX Operating System (TLXOS) is the result of Nineteen years development of Thin Client Hardware & Software by Australia's ThinLinX Pty Ltd.

ThinLinX designed and manufactured our own Thin Client hardware for over Ten years. We have changed our focus over the last nine years to Software only, concentrating all our efforts into creating high performance Thin Client and Digital Signage Software for X86 & ARM Architecture devices.

TLXOS supports our powerful new Digital Signage modes which allows even a lowly US$10 RPi Zero V1.1 W to play images and full screen Video at very low CPU load. This model and the new US$15 RPi Zero 2 W are perfect for single display Digital Signage such as images and Videos. If your requirements include Images, Video, Web and PDF or Dual Screen we recommend an RPi4B with 1GB or more RAM which currently sells for US$35

We also support Rak Wireless IoT LoRaWAN Gateway boards using either TLXOS RPiIoT for the RPi Zero V1.1 models or TLXOS RPi for all other models. The add on Rak LoRaWAN wireless board when combined with TLXOS creates a Gateway between the Internet connected RPi and remote IoT devices using the LoRaWAN Protocol.

TLXOS is installed via a SD Card, USB stick, CD Rom or PXE boot. Diskless PXE boot of TLXOS on all devices including the Raspberry Pi 3B+, RPi 4 and RPi400 is also available. The RPi4 and RPi 400 can also diskless boot but only after the EEPROM is updated. You can use the RPi Imager program to flash a SD card using software that will update the RPi EEPROM to set the boot order you need (including PXE boot). After you create the SD Card, just insert it into the RPi and reboot, this will update the RPi EEPROM with your boot order choice. If you want to use our Diskless Boot or PXE Provision mode, you will need to choose the Network Boot option

Every year more and more low cost devices suitable for use as Digital Signage, IoT or Thin Clients are appearing in the market, ranging from the US$10 "Raspberry Pi V1.1 Zero W" to the Intel NUC & Compute Stick range. ThinLinX has optimized TLXOS to deliver maximum Thin Client performance by adding optimizations and making full use of any integrated H.264 Hardware decoders

2 TLXOS installation

TLXOS is available for X86 based Small Form Factor (SFF) devices such as the Intel NUC, Intel Compute sticks and any relatively new Intel Chipset device. Support for AMD based devices has recently been added. If you have an Intel or AMD device please download the 30 Day free trial

of the TLXOS IFF as this version includes optimizations and H.264 Hardware decoder support for Intel and AMD Chipsets.

A generic X86 32-Bit version of TLXOS is available to repurpose PC's and Laptops

An ARM Hard Float version of TLXOS is available for the Raspberry Pi Zero 2 W and all the other models including the RPi2, RPi3, RPi4 and RPi400, this version supports the RPi H.264 hardware decoder and delivers exceptional VMware Horizon Blast, Parallels RAS and Microsoft RDP performance at very low cost. Citrix HDX is also supported but currently only using software JPEG decoding, we are hoping at some future date to once again support H.264 hardware decode for Citrix HDX

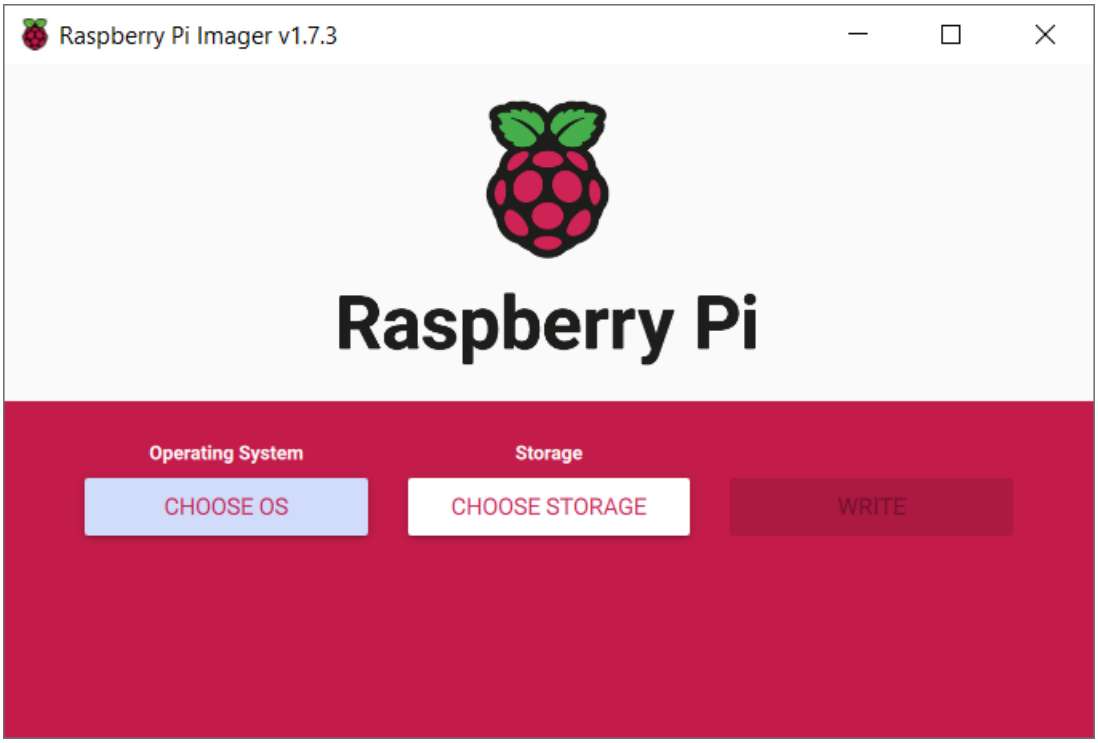
TLXOS & TMS can be downloaded from the ThinLinX TLXOS & TMS Download Page

In the case of the RPi you can either download and install TLXOS from the link above or boot any RPi from the NOOBS bootloader while tapping Shift, then select TLXOS from the list of installable OS choices

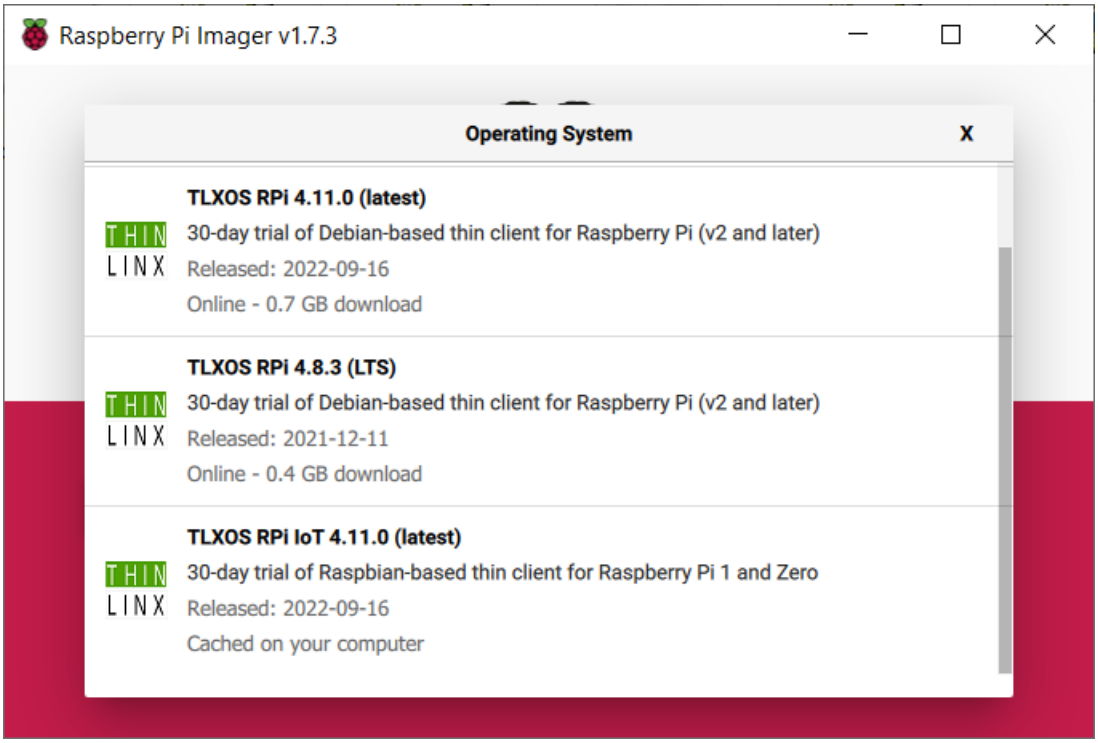
The Raspberry Pi Foundation have recently released a new installer called the Raspberry Pi Imager that you download from https://www.raspberrypi.org/downloads/

This imager is available for Windows, Linux and MacOS, it is very easy to use, see images below showing a TLXOS installation

You choose the SD Card from the Storage selection, then either select an Operating System to install or select erase the SD, prior to installation



You can see in the image below that I have selected TLXOS as the OS to install which then presented me with three different TLXOS versions to choose from. Click on the version to install and a few minutes later the TLXOS installation is complete.



If instead of using the new Raspberry Pi Imager you have installed TLXOS using NOOBS over a WiFi Network and you wish to continue using WiFi once TLXOS has booted for the first time, you will need to configure the WiFi using the local Tlxconfig configuration menu changing the default WPA / WPA2 personal to DIY (use wpa_supplicant.conf)

The TLXOS installers include a built in 30 Day Free Trial which is activated on first boot. You must be connected to the Internet with a DHCP Server on your Network to provide TLXOS with an IP Address, default gateway and DNS information. TLXOS will then automatically connect to our License Server at https://tls.thinlinx.com to obtain a 30 Day Free trial License, this encrypted License key is downloaded by TLXOS where it is stored locally on the device.

TLXOS will be unable to automatically obtain the 30 Day Free Trial License if any of the below applies,

(1) There is not a DHCP Server on the Network
(2) A Proxy Server is blocking the connection to https://tls.thinlinx.com
(3) A firewall is blocking the connection to https://tls.thinlinx.com

If this is the case you can still manually install the 30 Day Free Trial License by using either the ThinLinX Management Software (TMS) or the local Tlxconfig configuration menu. How to do this is covered further below in this document and also in the TMS user manual. If the problem is caused by a local Proxy Server you can configure this using Tlxconfig, click on the Application Tab and change to Web mode, enter the Proxy Server information, click on save. TLXOS will now use that Proxy Server information to connect to https://tls.thinlinx.com

TLXOS devices can be Licensed with a permanent License at any time during the trial using TMS or the local configuration menu.

After the trial expires the device can be Licensed using TMS while in ThinLinX Firmware Maintenance (TFM) mode where the local configuration menu is not available, OR you can exit TFM mode by pressing Enter to return to Normal mode where you have four minutes to use Tlxconfig to License a Trial or Paid License. After the four minute countdown completes if you have not licensed the device it will boot back into TFM mode again. While in TFM mode you can use TMS -> Device -> Commands -> Exit Maintenance Mode or press Enter to exit Maintenance mode

If you have downloaded the ThinLinX .exe installer for the RPi, the downloadable .exe file is used to create a bootable SD Card for the RPi. You will need a SD Card Reader / Writer to write the SD Card image (you will also need a SD Card Reader / Writer to use the new RPi Imager program) Many Laptops have these integrated or alternatively you will need to purchase a USB connected Card Reader / Writer, these are readily available at online stores.

Insert the Micro SD Card into the card Reader / Writer, double click on the downloaded .exe installer, this will decompress the TLXOS installer and write the image to the SD Card. Insert

the SD Card into the RPi and boot up, the initial boot will take just over a minute, subsequent boots are around 30 seconds.

If you are not a Windows user you can still carry out an installation by extracting the TLXOS installation image from the Windows .exe installer. To extract the image you will need to install "7z", then run the following command to extract the files in the .exe image

7z x name-of-the-image.exe

The lower case "x" instructs 7z to extract the image. You can then use the Linux "dd" command or BalenaEtcher to write the extracted .img file to the SD Card

https://www.balena.io/etcher/

If you do not have a SD Card Reader / Writer you can choose to install our NOOBS version of TLXOS, just boot an RPi from a standard NOOBS SD Card, tapping Shift during boot, this will load the installation menu, select TLXOS from the OS list. TLXOS is a 300 MB download which will be automatically downloaded and installed in about 10 minutes

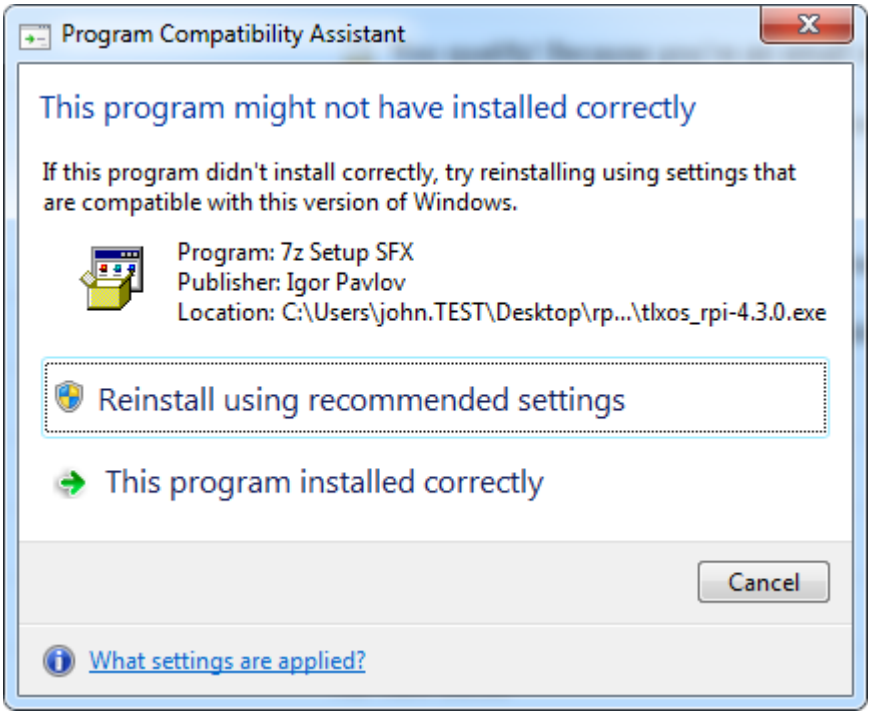
All three installation methods have advantages and disadvantages, our standard .exe installer is downloaded once and can then be used as many times as you wish to create TLXOS SD Cards, but you need a SD Card Reader / Writer.

The NOOBS method is the only option if you do not have a SD Card Reader / Writer as all RPi NOOBS SD Cards can download and install our NOOBS version of TLXOS. The disadvantage is for every NOOBS installation a 300 MB file is downloaded during the installation for each RPi

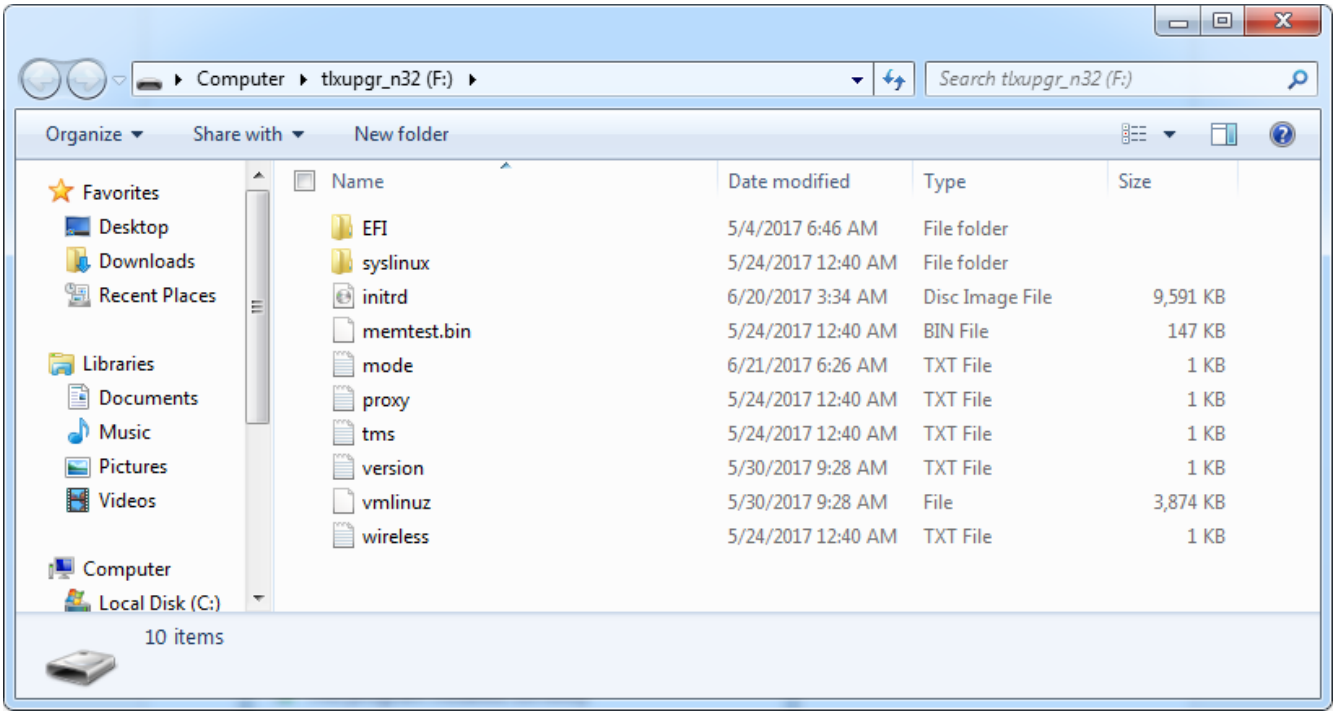
The new Raspberry Pi Imager is well worth trying as it is easy to use, fast, caches the downloaded image and provides a number of OS choices

The two downloadable .exe installers for X86 Architecture TLXOS SFF or TLXOS RePC are used to create a USB stick TLXOS installer. An ISO image is also available for RePC installation allowing a CD Rom to be used for the installation on older devices which do not support boot from USB.

If using the USB stick installation method, insert a 2GB or larger USB stick into the PC or Laptop that you downloaded the .exe file to, then double click on the .exe installer this will decompress the TLXOS installer image and then write the image to the USB stick. If the message below appears after creating either the RPI SD Card Image or after creating the USB stick image, just ignore it and click on the close button or Cancel



The newly created USB stick image also contains 4 text files which can be edited before using the USB stick to install TLXOS. The text files are mode.txt, proxy.txt, tms.txt & wireless.txt. These text files can be used to pre-configure the installer. See the self-explanatory information in each file.



The installation procedure is almost identical for TLXOS SFF and TLXOS RePC, insert the SFF USB stick into the Intel / AMD device or the RePC USB stick or CD Rom into the PC or Laptop to be Re-Purposed, boot up while tapping F10 to bring up the Boot menu, select boot from USB or CD Rom in the case of the ISO installer

A few seconds later the Blue ThinLinX Firmware Maintenance screen appears, scroll down to the second choice “Wipe Everything and (Re) Install TLXOS”, press Enter

The installer will automatically detect the device’s storage and install TLXOS. (Note; if the device storage is a SD Card you must still use the USB stick installer, do NOT write the .exe installer image to a SD Card for either SFF or RePC as it will not work.) You can only write the TLXOS installer direct to a SD Card in the case of a Raspberry Pi installation

When installing the Intel Small Form Factor version of TLXOS on the new NUC7 series the installer may hang at the message “Loading initrd”. The workaround for this issue which we suspect is related to the BIOS is

(a) On power up, do not press F10 to select USB as the boot device, press F2 instead to enter the Intel BIOS.
(b) Change the default Boot order to boot from USB storage first, disable PXE boot, press F10 to save your changes
(c) Boot the Intel NUC, do not press any keys, the USB stick installer will run and when the Blue ThinLinX Firmware Maintenance screen appears scroll down to the second choice “Wipe Everything and (Re) Install TLXOS”, press Enter. In some cases the installation will hang at the “Loading initrd” again if this is the case, repeat the procedure above but do not touch any Keys, just let the 10 second countdown complete and the boot up will proceed normally.

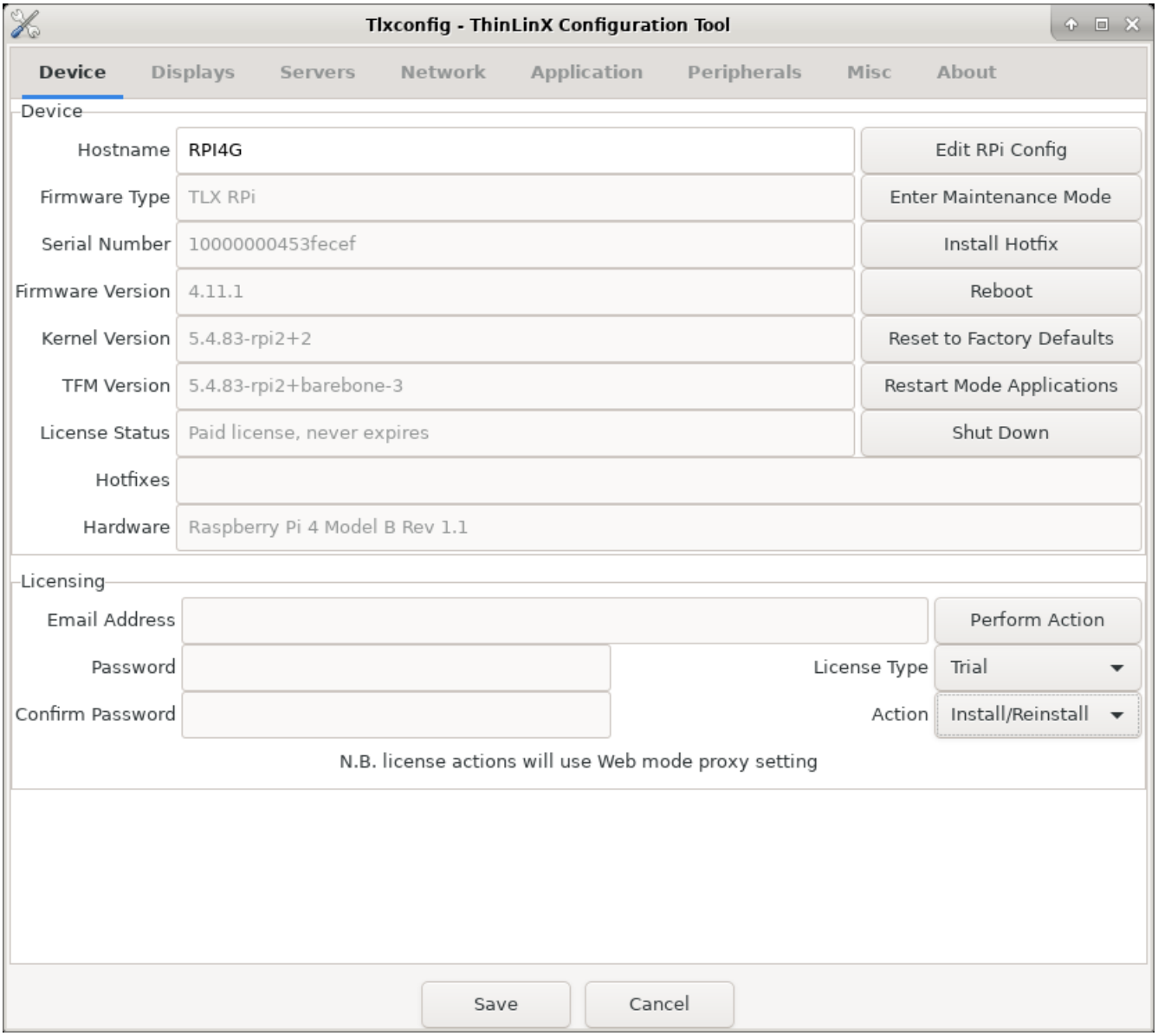
During TLXOS installation, the installer will automatically connect to the ThinLinX License Server at https://tls.thinlinx.com to register the 30 Day Free Trial if the following conditions are met,

(a) A DHCP server which also supplies DNS information is on the Network
(b) The Network must be connected to the Internet
(c) If the Network uses a Web proxy server, the proxy.txt file on the installer must be edited before the installation with the Web proxy details.

If the Free trial fails to register, after a delay of Four minutes the device will boot into ThinLinX Firmware Maintenance mode. If this occurs you can either press Enter to boot up in Normal mode again with the 4 minute Countdown which gives you time to use Tlxconfig to License the device as described below OR use TMS -> Device -> Update -> Update License to License the Free Trial, but first ensure that you have configured the TMS Web Proxy Server connection information under TMS -> Tools -> Options

Change the License Type to Free Trial, change the License Action to Install/Reinstall, note that the Email and Password are grayed out in the Licensing Credentials dialog box as they are not required for the Free Trial, then press OK to activate the Free Trial

During the Four minute countdown you also have the option to use the local Tlxconfig configuration tool menu to License the device before it boots into ThinLinX Firmware Maintenance mode. Select the Device Tab, change the License Type to Trial, click on Perform Action to install the 30 Day Free Trial. If the Tlxconfig tool menu is not visible for some reason you can try pressing Alt-Tab to see if it was minimized or relaunch it by pressing Ctrl-Alt-c

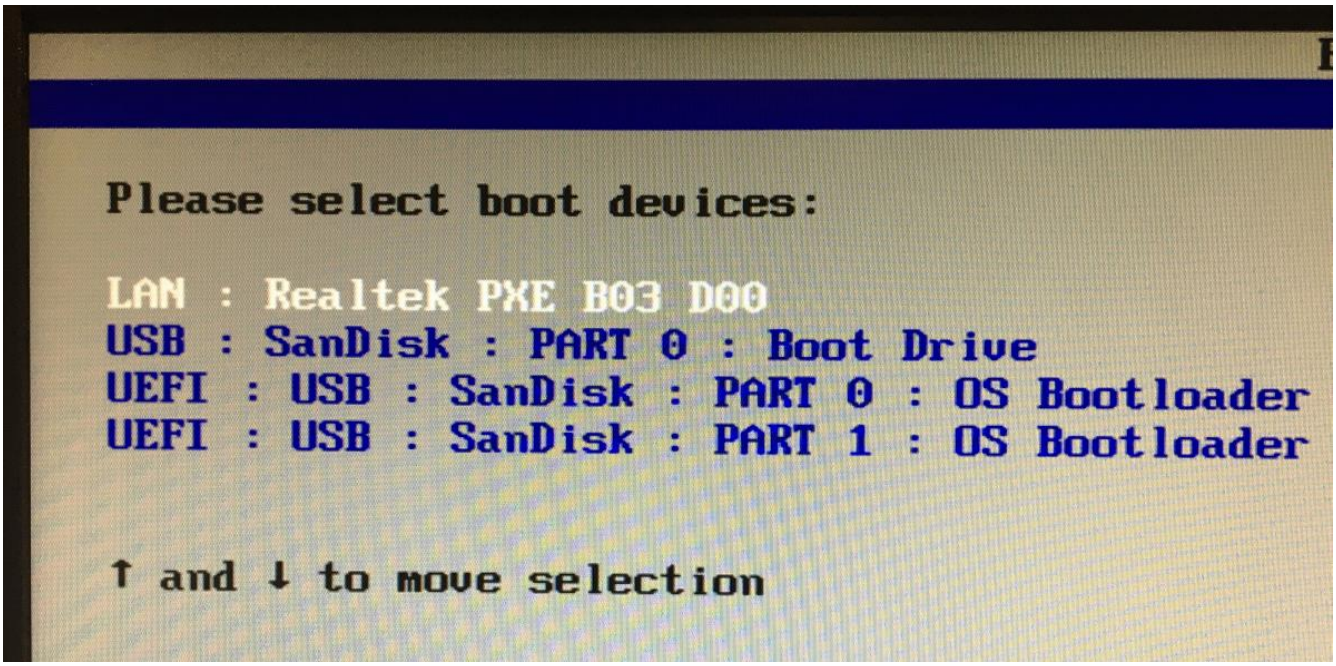


3 NEW RePC Mobile LIVE image

ThinLinX has just released a LIVE version of RePC 4.11.0, this version is not installed on a Laptop or PC but instead runs entirely from a USB stick enabling a user to carry a TLXOS-RePC-4.11.0 Mobile LIVE USB stick with them.

To boot TLXOS RePC LIVE, first ensure that the Laptop or PC is switched off, then insert the TLXOS RePC LIVE USB stick, and power on while pressing F10 (or whatever Key needs to be pressed on your device to bring up the Boot menu)

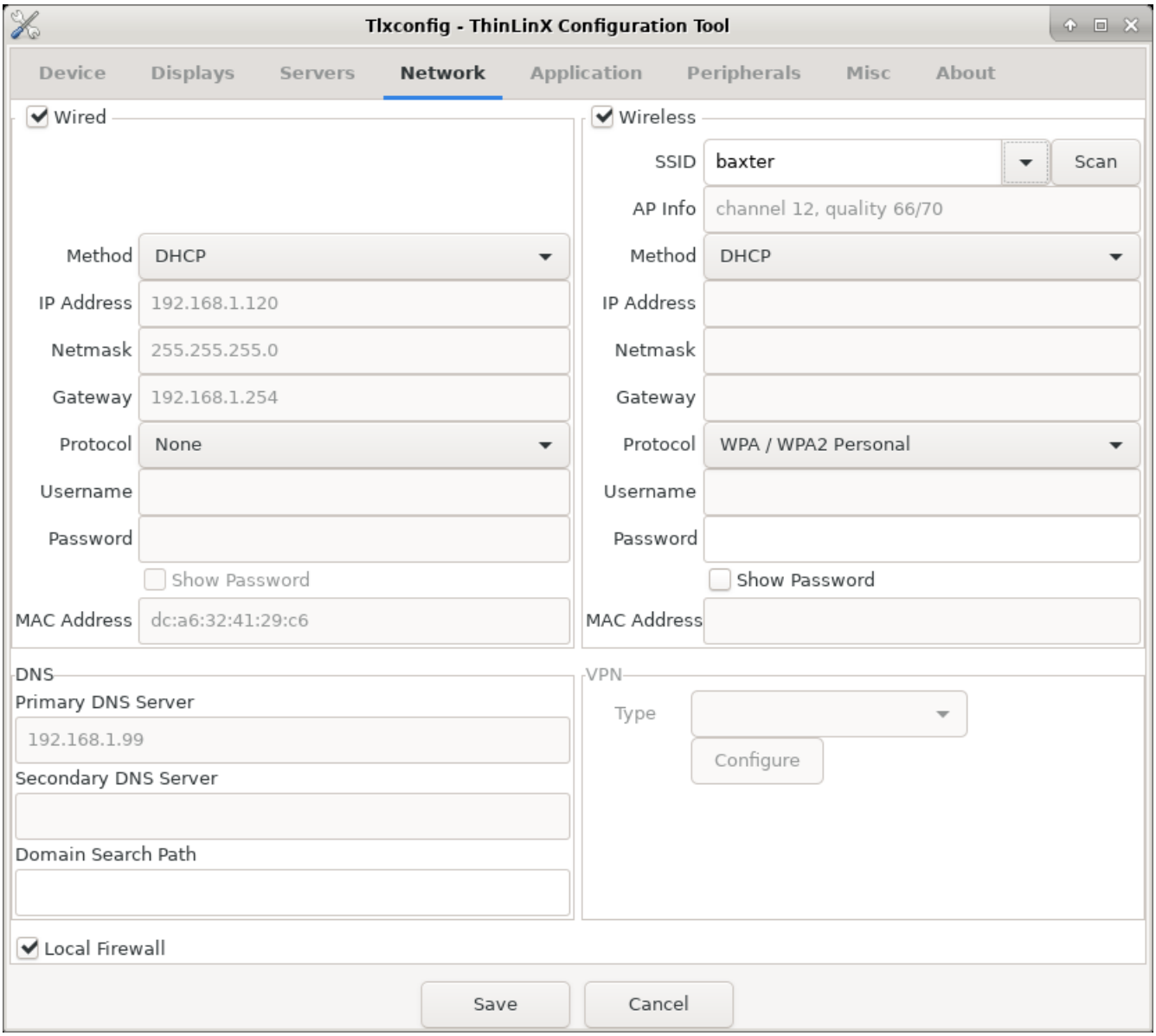
You will see the USB stick as one of the Boot options, select it and press Enter. You may see USB and UEFI : USB, either choice should work. On more modern hardware you will see UEFI : USB and may not see a USB choice. If one choice does not work, power off and retry using the other choice. See image below showing the Boot menu from an Intel NUC 5PPYH



Boot up will take around 40 seconds, you should see the Tlxconfig menu, perhaps hidden by the Four Minute Trial License countdown. Click on the Device Tab to check that there is an IP Address in the IP Address window. You should see this if you have an Ethernet Network Cable connected to your Device. If you are using WiFi, click on the Network Tab, click on the Wireless choice to turn on WiFi. Click on the Scan button to search for WiFi Access Points, choose the SSID of your access point and enter the Password. Click on Save Settings, the dialog box will close, click on the Configure button, click on the Device Tab, you should now see an IP Address. If you don’t see it, click on the Network Tab and double check that the WiFi Password is correct.

You must be connected to the Internet for the 30 Day Free trial to activate, you can check the

License Status by clicking on the Device Tab. In some cases you may need to close and reopen the Tlxconfig dialog for the License Status to be updated. If you still don't see the License Status as Trial or permanent, reboot the device



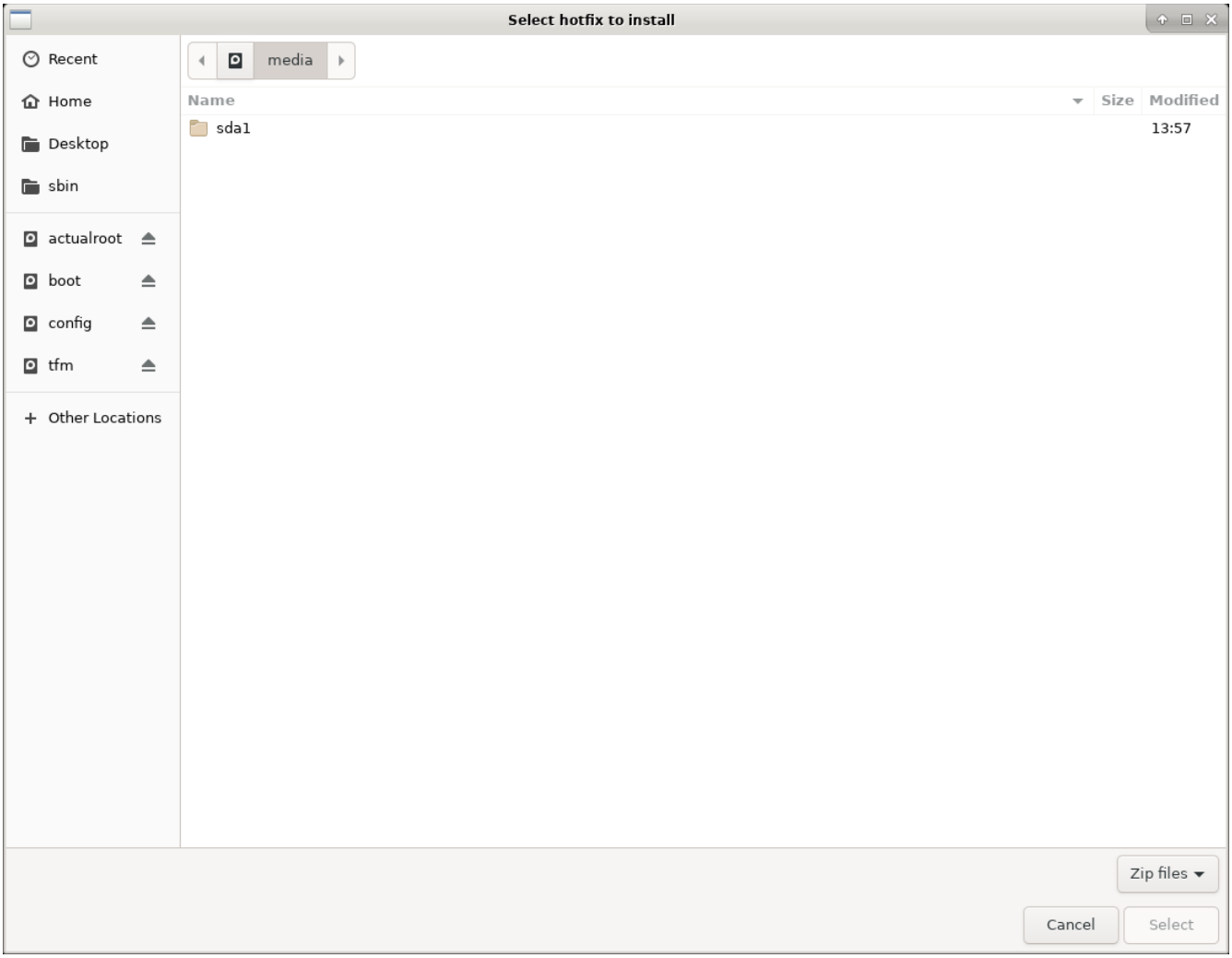
Assuming that you are using TLXOS RePC Live on the same hardware, after the 30 Day Free Trial expires you will have to License the device to continue to use it. If you boot TLXOS RePC on different hardware, a new 30 Day free trial will commence but after 30 Days you will have to License the new device to keep using TLXOS. In the case that you have licensed a device and you no longer wish to ever boot TLXOS on that device again you can "Revoke" the License then reuse it on another device. Just bear in mind that once a device License is Revoked you cannot run TLXOS on that device ever again.

4 TLXOS management

TLXOS is normally remotely managed with the ThinLinX Management Software (TMS) which is Free when used with any device running TLXOS. TMS may be used for a variety of tasks, ranging from something as simple as rebooting a TLXOS device, to upgrading the device with the latest TLXOS software. TMS runs on Windows and Linux and supports all TLXOS devices. You can read more about TMS at the link listed here https://thinlinx.com/tms-user-manual.pdf

In the latest versions 4.8.3 (LTS) & 4.11.1 (Latest and recommended) of TLXOS we have added some management capability allowing customers to License, install Hotfixes and files using the local Tlxconfig menu which is useful if you plan to be on a location without Internet access. The Hotfixes & files must be copied to a USB stick, the Hotfixes in .zip format can be downloaded from the ThinLinX Website here http://mirrors.thinlinx.com/downloads/

Insert the USB stick into the device running TLXOS, install the Hotfix via the Tlxconfig menu -> Device Tab -> Install Hotfix. Click on sda1 which is the USB stick directory



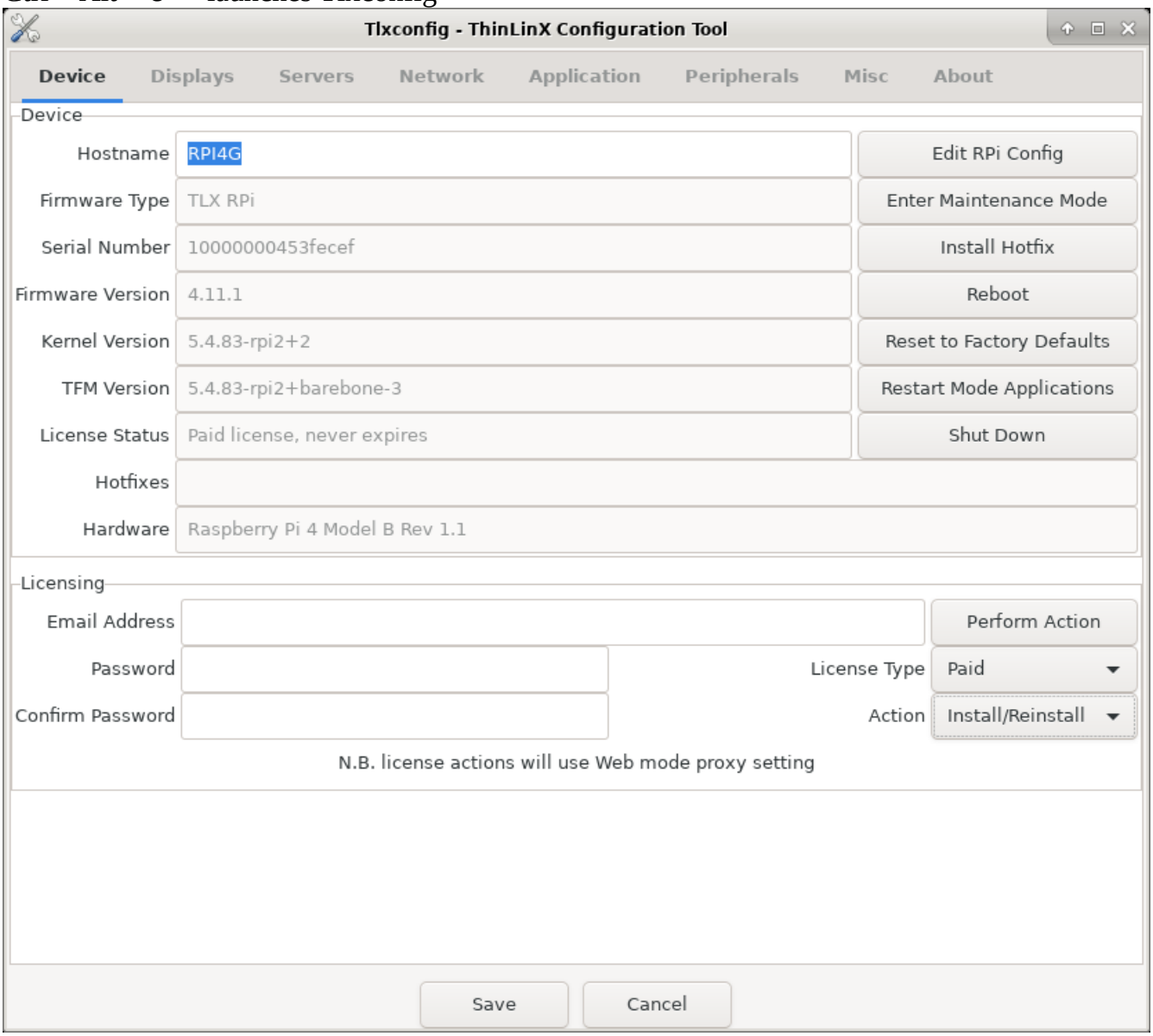
All other files are installed via Tlxconfig menu -> Misc Tab -> Install File dialog section
Insert the USB stick into the TLXOS device, select the File Type from the drop down menu, click on Browse, select sda1, select the file to install, click on the Install button

5 TLXOS first boot up & quick start

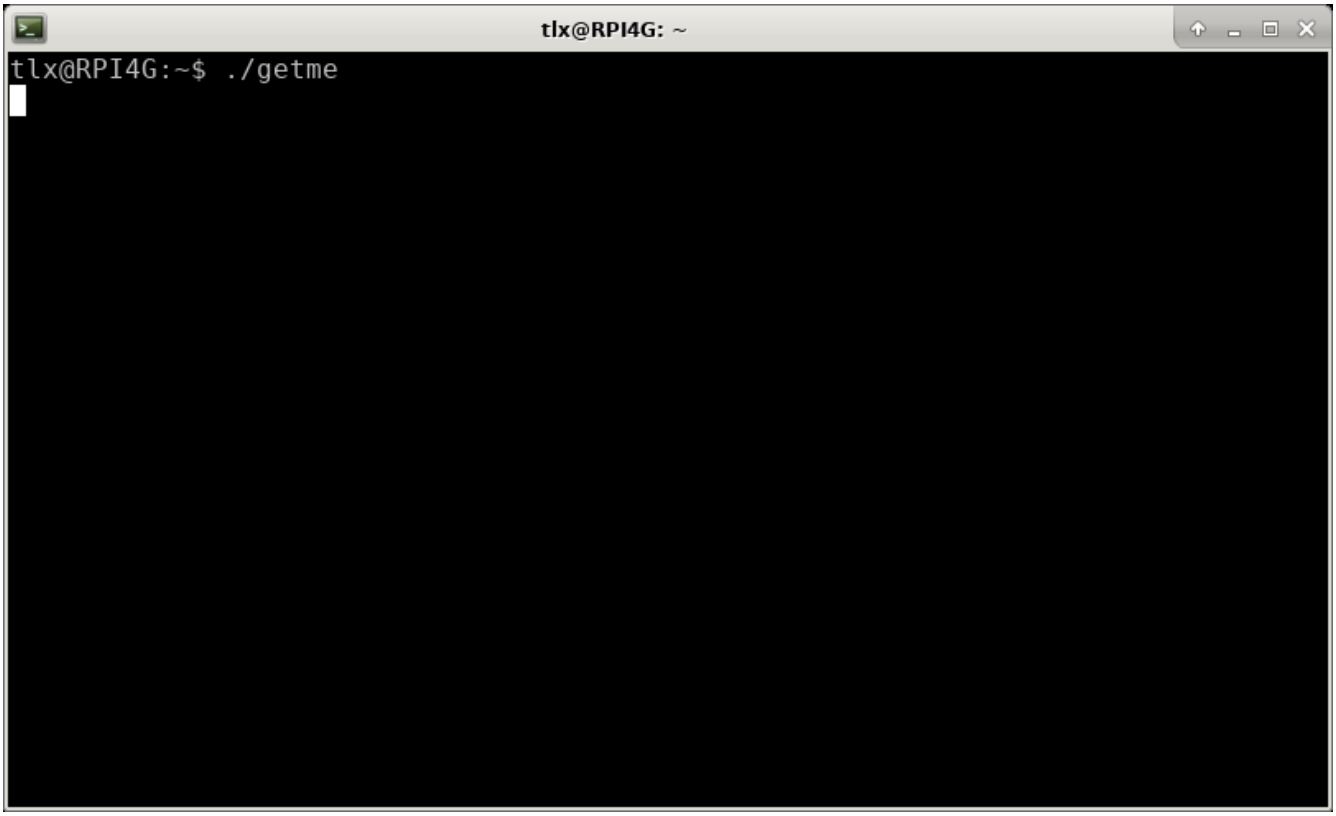
TLXOS has the same look and feel regardless of the device that it is running on, configuration may be carried out using TMS or the local Configuration menu which is selected by clicking on the Configure Tab. The local Configuration menu can be disabled by the Administrator setting a Password from the TMS console or a password can be set on Tlxconfig -> Misc Tab, click on the Restricted Feature Password check box, enter the password. Once set an end user can not open the Tlxconfig Tool menu without first entering the correct password.

6 Local Keyboard Short Cuts

Ctrl + Alt + c — launches Tlxconfig

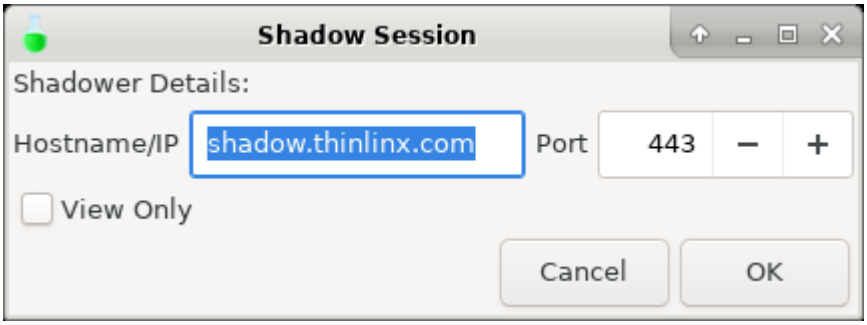


- Ctrl + Alt + t — launches a terminal console



- Ctrl + Alt + d — switches desktop workspace

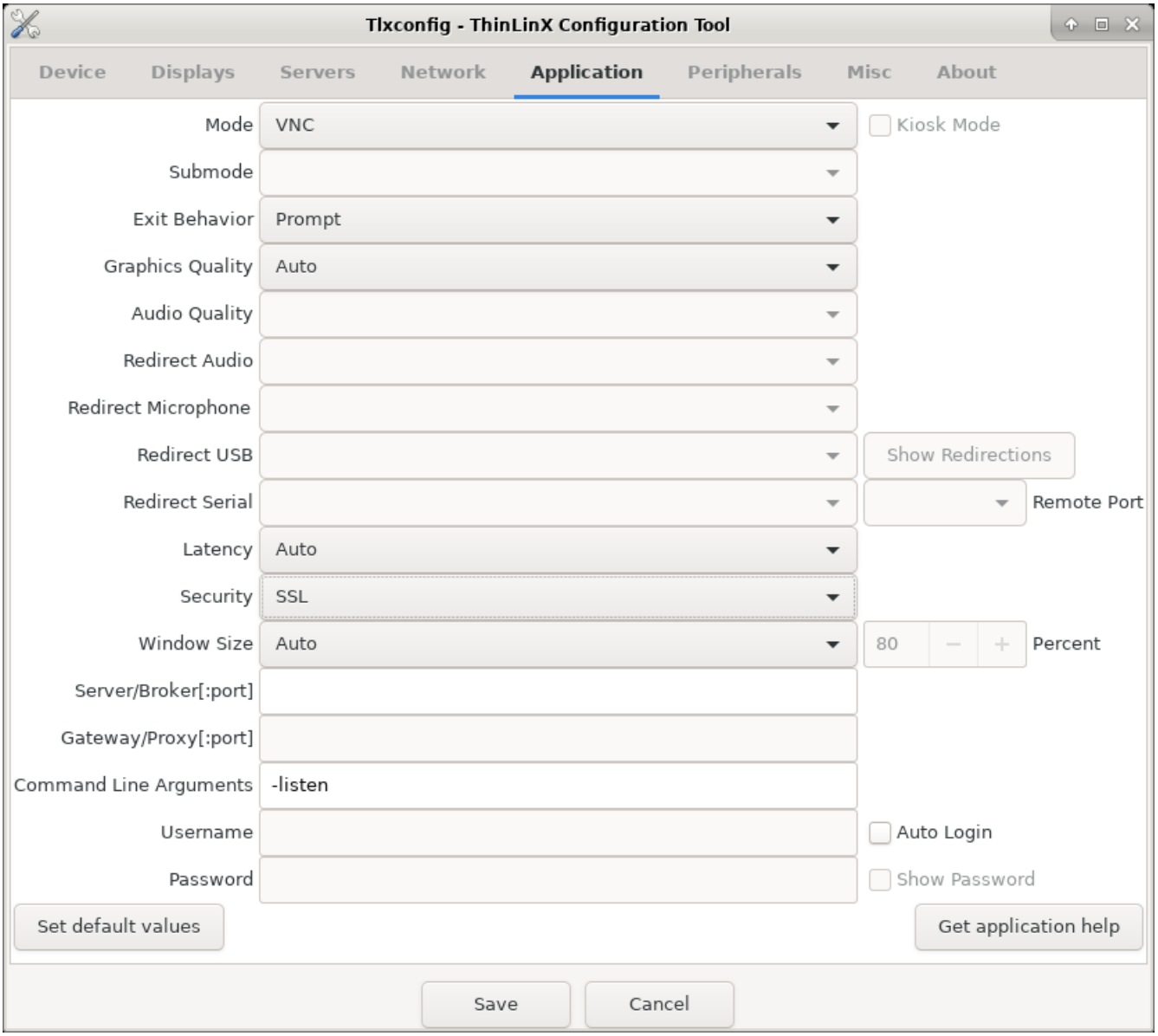
- Ctrl + Alt + s — enables shadowing mode using VNC



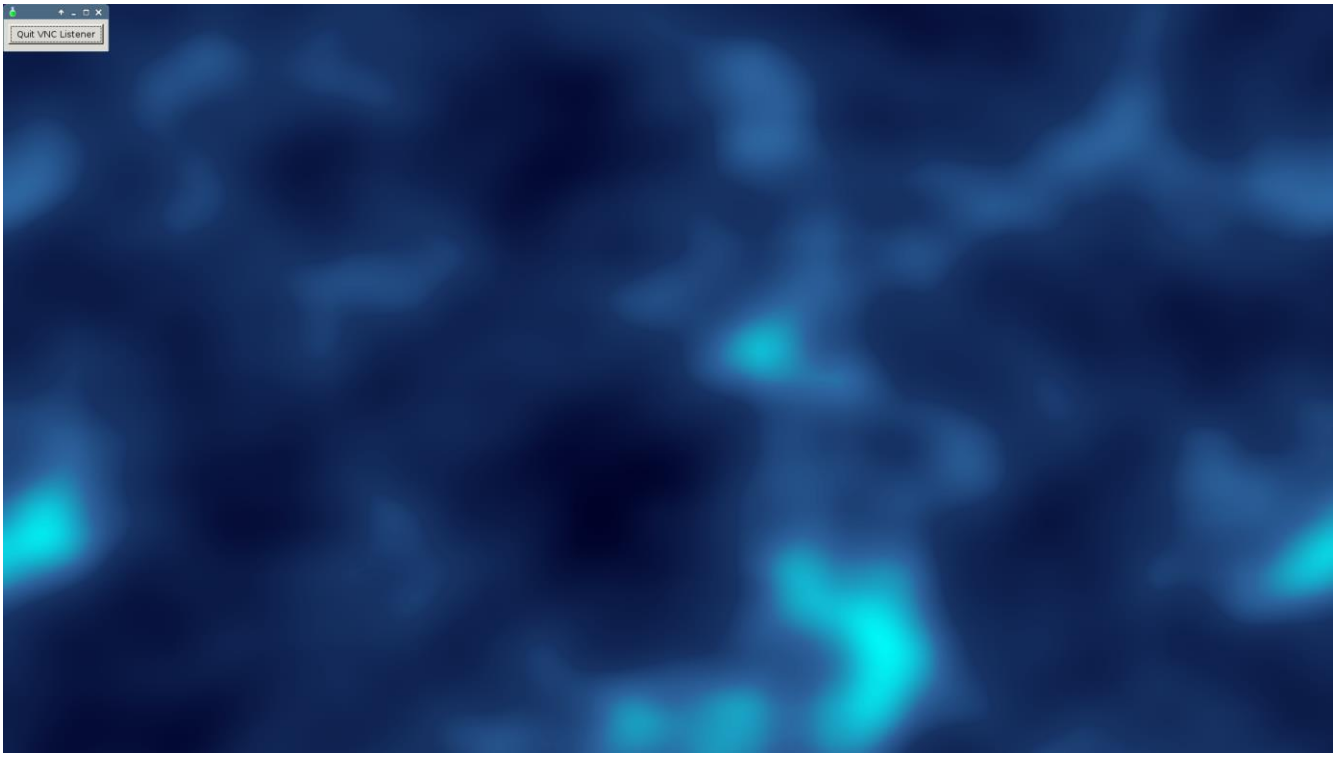
If you need to access a remote session desktop and see the screen you can ask the user to exit their remote desktop session and return to the TLXOS desktop. They then need to press Ctrl + Alt + s which will open the dialog box above. See further details on the next steps in section 1) below

A VNC session shadowing feature exists in TLXOS, but we have taken extra steps to secure it using SSL and ensure that it works through firewalls and NAT, many people have difficulty understanding how it works and how to set up a VNC shadowing target for this feature. For this reason, we have three canned solutions:

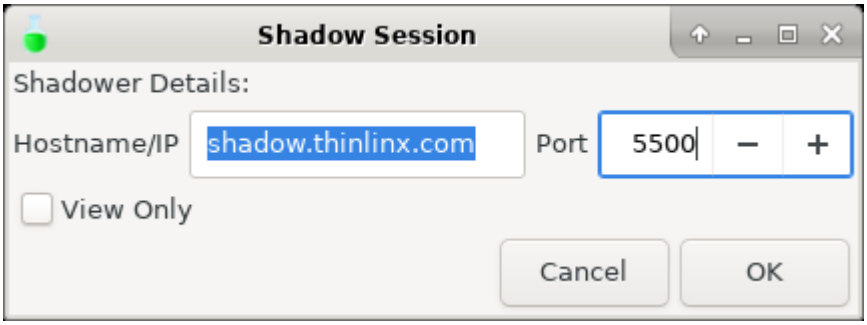
1) You can use any TLXOS device running the 4.8.3 or newer firmware to shadow any other TLXOS device. Set up your target (shadower) device to use Mode = VNC, Security = SSL, Command Line Arguments = "-listen" See image below where a TLXOS device is being set up using TMS -> Mode as a VNC Server to display a User's Remote Desktop. This TLXOS device will just wait indefinitely listening for the User to connect by Pressing Ctrl-Alt-s



The image below shows a TLXOS device set up as a VNC Listener (Shadower)



All you then need to do is give the user the Hostname or IP Address of the TLXOS device that you have set up this way and ask them to use the <ctrl><alt>s key sequence to bring up the shadowing dialog (see image below); set Hostname/IP to the address of your TLXOS VNC device as set up in the image above, change Port to 5500 and press OK. A few seconds later their Desktop will appear on the screen shown above. The users' background will turn an ochre color to indicate that they are being shadowed - to stop shadowing at the user end, either they have to reboot or power off the device, or you have to reboot the device remotely using TMS



2) We have a Linux CentOS-based virtual machine appliance called TLXADM that will run on most forms of virtualization (VMware Workstation/ESX, VirtualBox, KVM, Hyper-V, Xenserver/XCP) that is set up to work as an shadowing target in addition to its primary role as a TMS application platform.

For more information on downloading and installing TLXADM please read the TLXADM document available here TLXADM Howto

Our shadowing capability works in the reverse direction to conventional VNC for two reasons: (1) so that it can traverse a NAT boundary, e.g. a client using a DSL modem as a gateway, and (2) so that it is impossible for a session to be shadowed without the shadowee's knowledge and consent. Conventional VNC is not encrypted and is vulnerable to packet sniffing, so we use stunnel to encrypt all traffic.

Citrix has its own session shadowing feature, completely independent of ours and operating on ICA protocol events rather than X11 protocol events, which you may want to investigate.

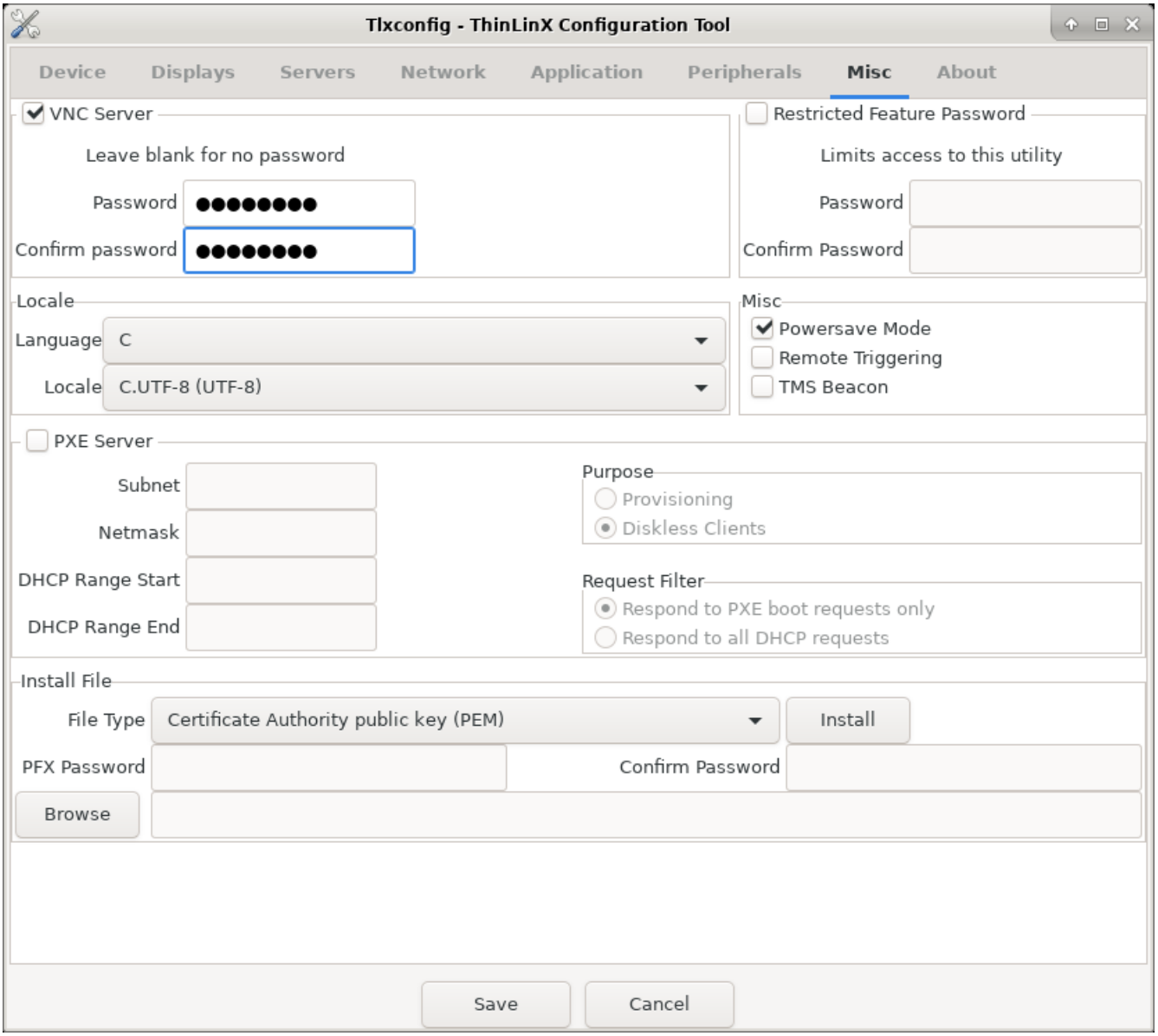
But speaking only of our X11/VNC shadowing it is possible to shadow a fullscreen Citrix session that has already been started.

The shadower device needs to set up in VNC mode and await a connection, but all that the shadowee has to do is initiate shadowing using <Ctrl><Alt>s. If you've already started Citrix you can do this by using <Ctrl>F2 to ungrab the keyboard followed immediately by <Ctrl><Alt>s. The session shadowing dialog will come up over the top of your Citrix session.

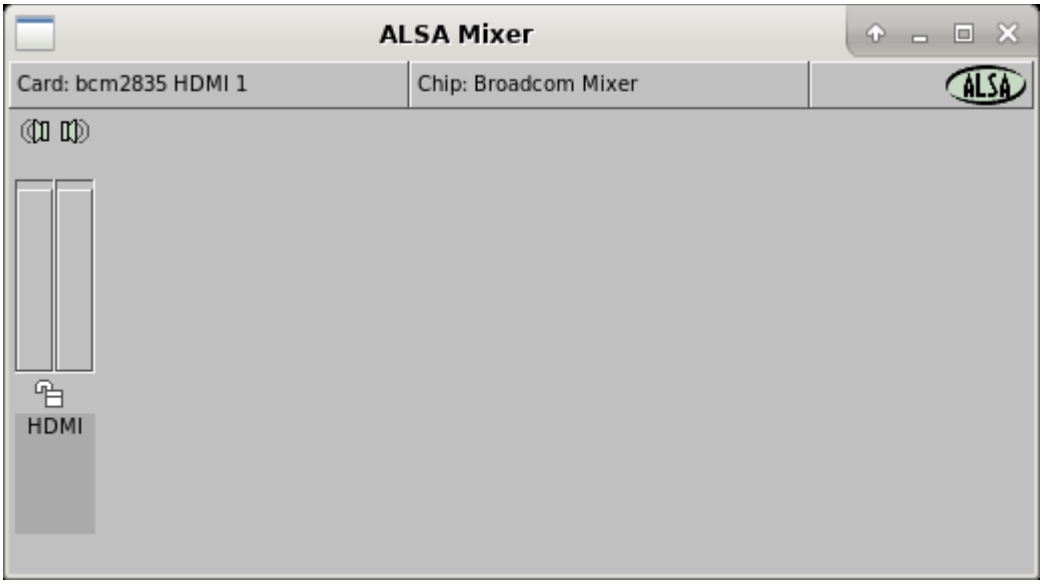
If you wish to use a Windows Desktop as the Shadower device, please download and unzip our Windows howto from https://thinlinx.com/windows_shadower_howto.zip

3) There are use cases where non-interactive shadowing is a legitimate and reasonable requirement (e.g. when the TLXOS device never runs anything like a remote desktop session and no passwords or personal information is ever entered, such as digital signage and some kiosk uses

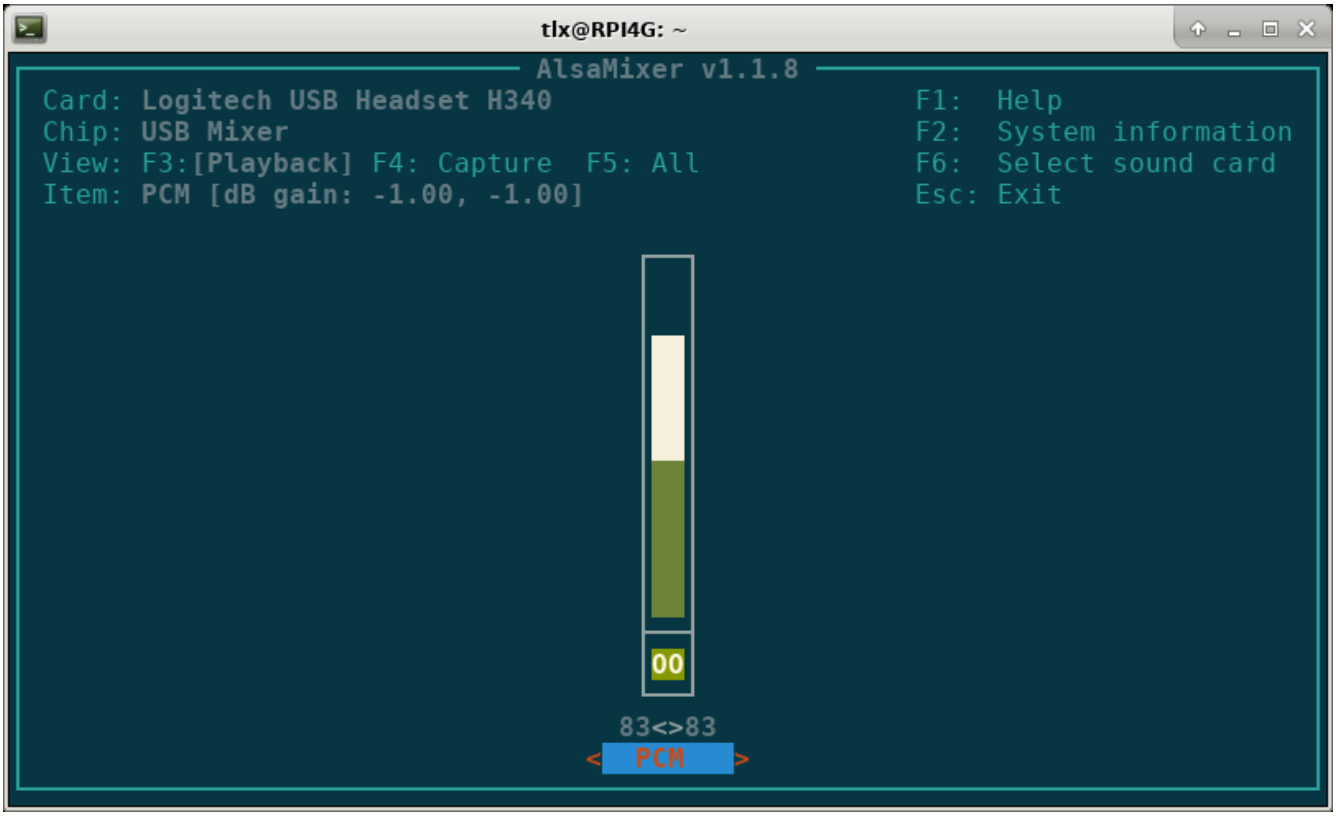
For such cases we have provided a simple (unencrypted, consent less, forward VNC) alternative. Use this feature at your own risk, adding an access password doesn't improve security much - the encryption used is weak, and is only used for authentication purposes; for session encryption you need SSL.



- Ctrl + Alt + v — launches the ALSA mixer for Audio adjustments

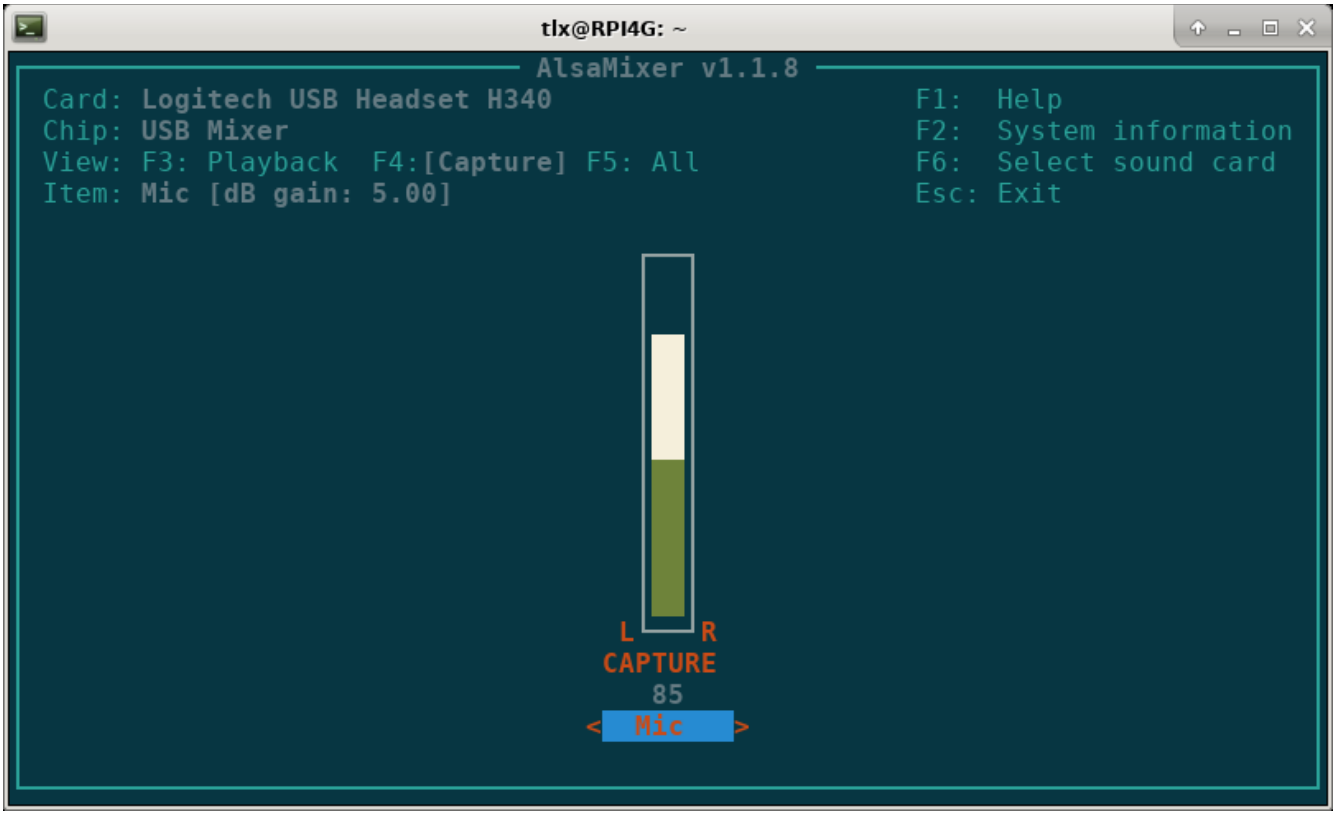


To configure a USB Headset's playback and recording volume, boot TLXOS, plug the Headset into a USB port, enter Ctrl-Alt-t to open an xterm, enter alsamixer which launches the alsamixer audio app, if the USB Headset is not shown as the Card: as another audio device has been detected press F6 to select the default Audio device as the USB Headset, then press F3 to select the Playback volume, use the up and down arrow keys to increase or reduce the Headphone volume.

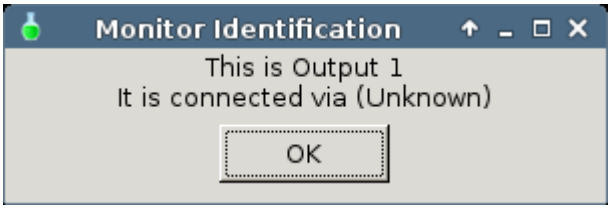


Press F4 to select the Microphone volume, use the arrow key to increase or decrease the Microphone volume.

Leave Alsamixer running, reboot the TLXOS device, this will save your audio settings, then log into your Desktop, use the remote Desktop volume controls to increase or decrease the default volume that you configured

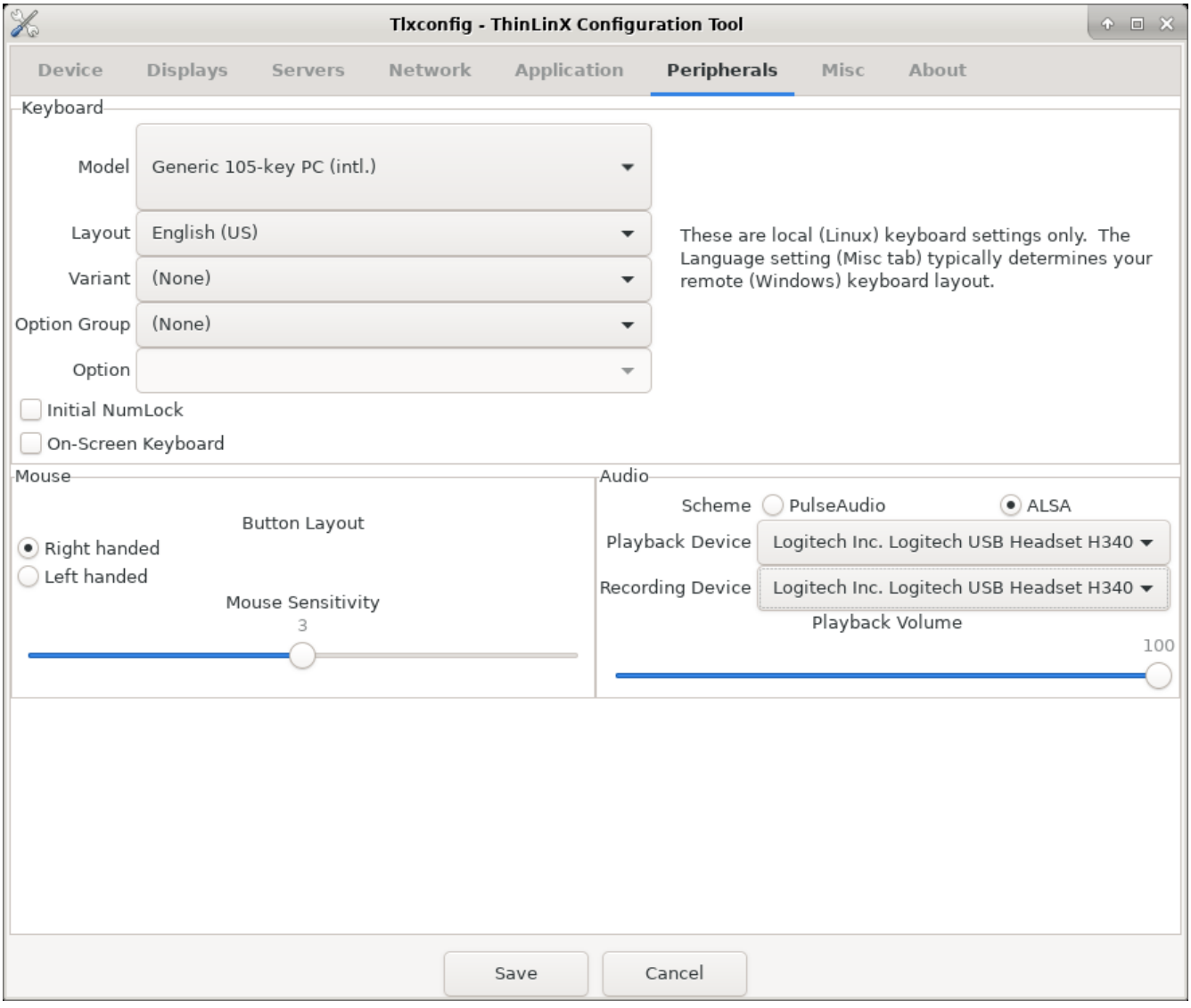


- Ctrl + Alt + r — invoked twice in 2 seconds to reset image to factory default
- Ctrl + Alt + i — launches the Monitor identification, useful for 2 or 3 Monitors



7 Audio configuration selecting the default device

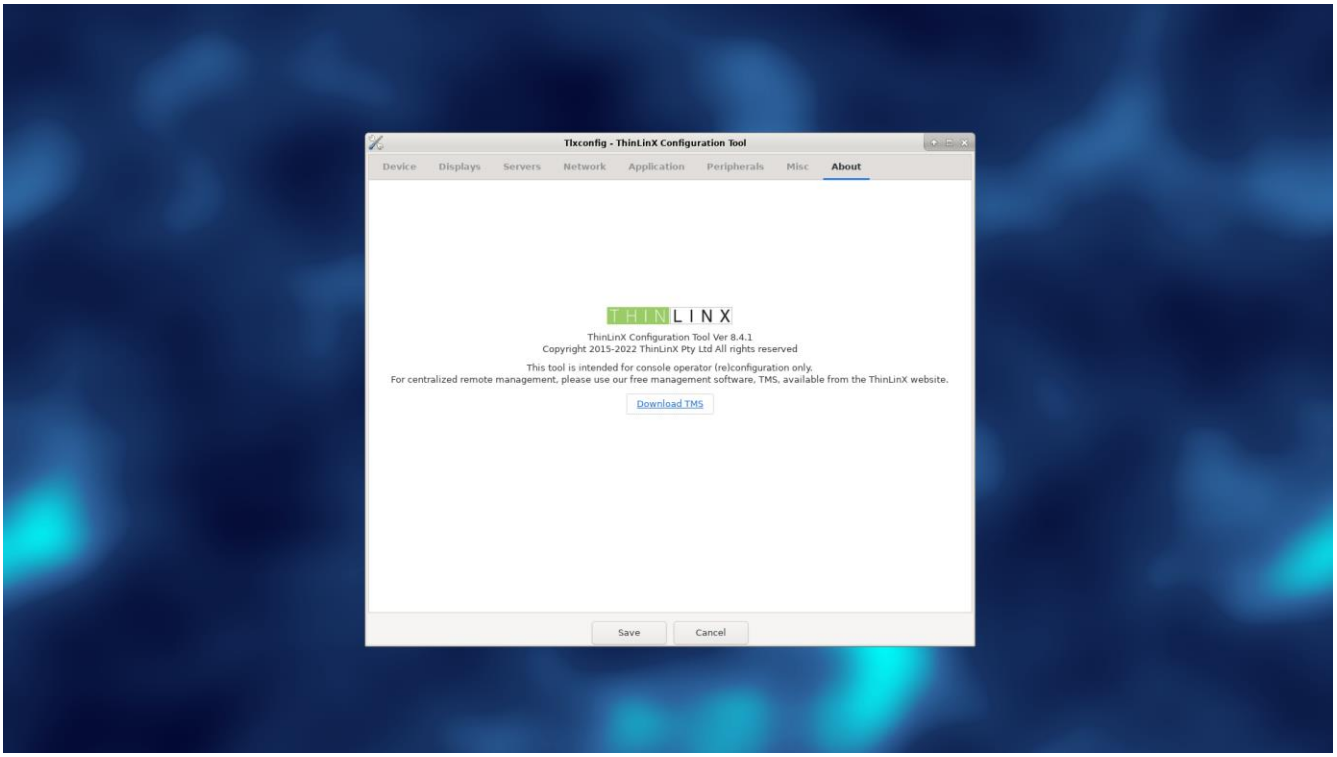
You can change the audio Scheme to use either PulseAudio or ALSA, we default this to ALSA on the RPi as ALSA uses less CPU than PulseAudio, and we recommend that you leave this set to ALSA on the RPi. You can see in the image below that I have manually selected my USB Headset as the default audio device for Playback and Recording. The default selection is Auto which will choose the best default option. In my case I have the RPi connected to an Audio capable HDMI monitor which in the Auto selection would become the default choice. If I did not have an Audio capable HDMI monitor the bcm2835 Headphones would be the default choice (this is the audio output jack on the RPi) in which case if you wanted to use your USB Headset you would need to manually select it. If you needed to use a Microphone the only option would be a USB Headset or a USB connected Microphone which you need to manually select. The Audio output jack on the RPi only supports audio out it does not support a Microphone and neither does HDMI Audio.
On other more powerful X86 based devices such as RePurposed PC's, Laptops and Small Form Factor devices PulseAudio may be a better option.



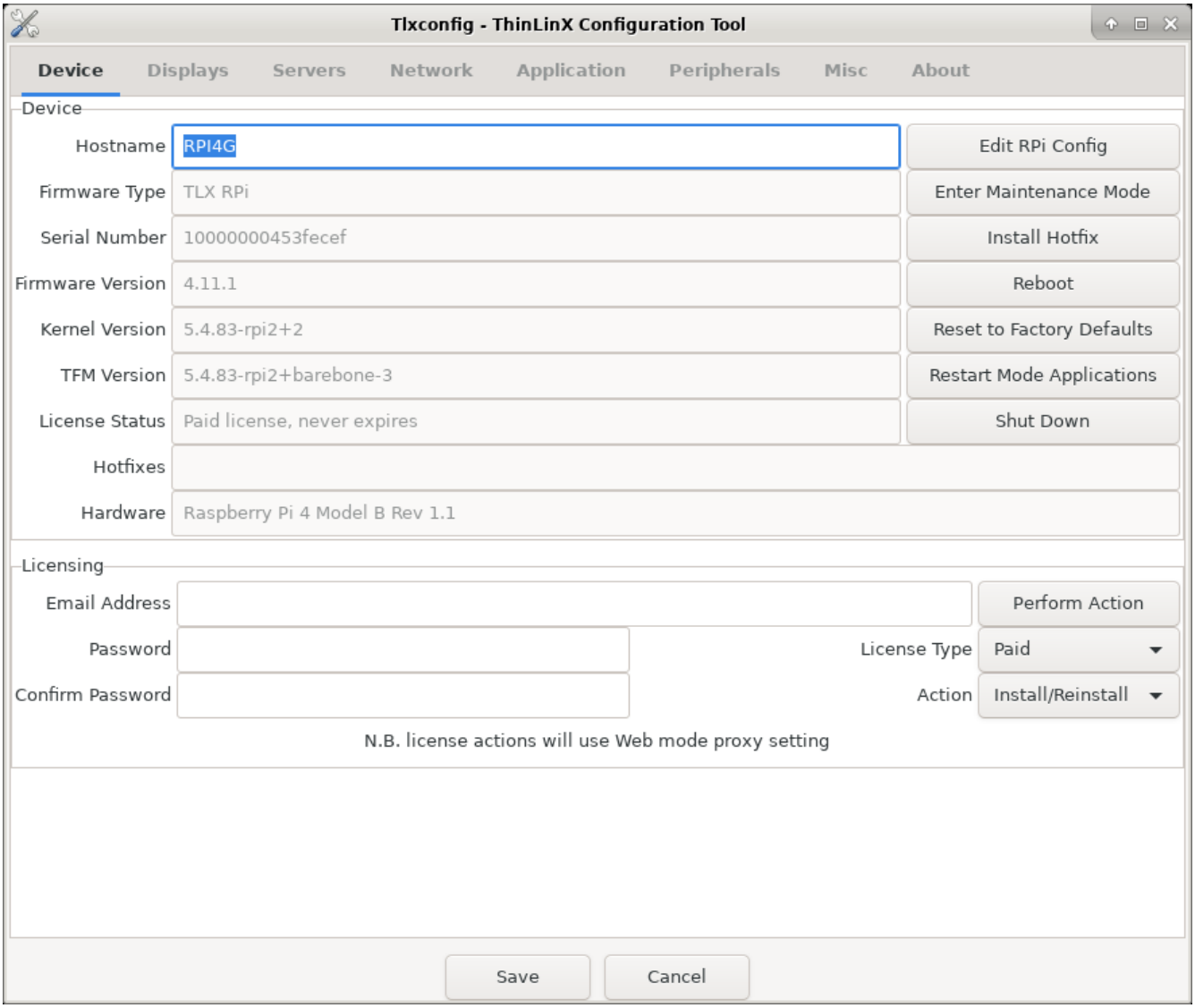
8 First Boot

On first boot up after installation the default screen looks like the image below, the Blue background Wallpaper can be changed to your own preference by uploading a Wallpaper.png or jpeg file using TMS -> Upload -> Wallpaper.png or Wallpaper.jpeg Image.

Alternatively you can use the local Tlxconfig menu by pressing the Configure button, select the Misc Tab, insert a USB stick with your PNG image, change the File Type to Wallpaper, click on the Browse button, select sda1, select your Wallpaper PNG file, click on the Install button



To configure the TLXOS device using the local configuration menu, click on the Device Tab which opens the Device dialog box shown below. You will notice Eight Tabs, Device, Displays, Servers, Network, Application, Peripherals, Misc and About. The Administrator is able to set a Tlxconfig password using TMS to lock out any local configuration changes by disabling access to Tlxconfig without the correct Password



9 Device Tab

Hostname, displays the current Hostname which you can easily edit

Firmware Type is auto detected and is currently one of four different variations for different

devices.

TLX RPi is our RPi release, TLX RPi IoT is our release for the RPi 1 and RPi Zero1, TLX NUC64 has a 64-bit Kernel and 64-bit OS for Small Form Factor devices optimized for the Intel & AMD series, Phoenix PC is our generic 32-bit X86 release for the Re-Purpose PC & Laptop Market

Serial Number is the device's Hardware Serial number

Firmware Version, in this example the Firmware release is version 4.11.1

Kernel Version, in this example the Linux Kernel is 5.4.83-rpi2+2

TFM Version, in this example the ThinLinX Firmware Maintenance version is Linux Kernel 5.4.83-rpi2+barebone-3

License status, this may be trial or paid, in the case of a paid License the License is Perpetual and Never Expires

Hotfixes, displays the names of any Hotfixes that have been installed

Hardware Displays the auto detected hardware model

On the right hand side of the Device Tab you will see the seven buttons listed below

Edit RPi Config Allows you to edit the /boot/config.txt file using our built in text editor. Do not attempt to edit this file unless you know what you a doing as any mistakes may make the RPi unbootable, in which case you will need to carry out a new install of TLXOS.

Enter Maintenance Mode will reboot into TLXOS firmware maintenance mode, this is useful for fixing a damaged SD Card or filesystem. After the SD Card is repaired automatically using the Linux fsck program, you need to use press enter to return to normal mode

Install Hotfix is used to install a Hotfix which is a .zip file which must be loaded from a USB stick inserted into the TLXOS device to be upgraded. Hotfixes can be downloaded from the ThinLinX Website or you may find it useful to copy Hotfixes downloaded using TMS to a USB stick which can then be inserted into any TLXOS device and installed using the Install Hotfix tab. This is useful at sites which do not have Internet access

Reboot will reboot the Device

Reset to factory defaults will erase any configuration changes and reset TLXOS to the installation factory default.

Restart Mode Applications will restart (relaunch) the Application that you have selected in the Application Tab

Shut Down will shut down the RPi

The Licensing section at the bottom of the screen area of the Device tab is used to install a Free or Paid License

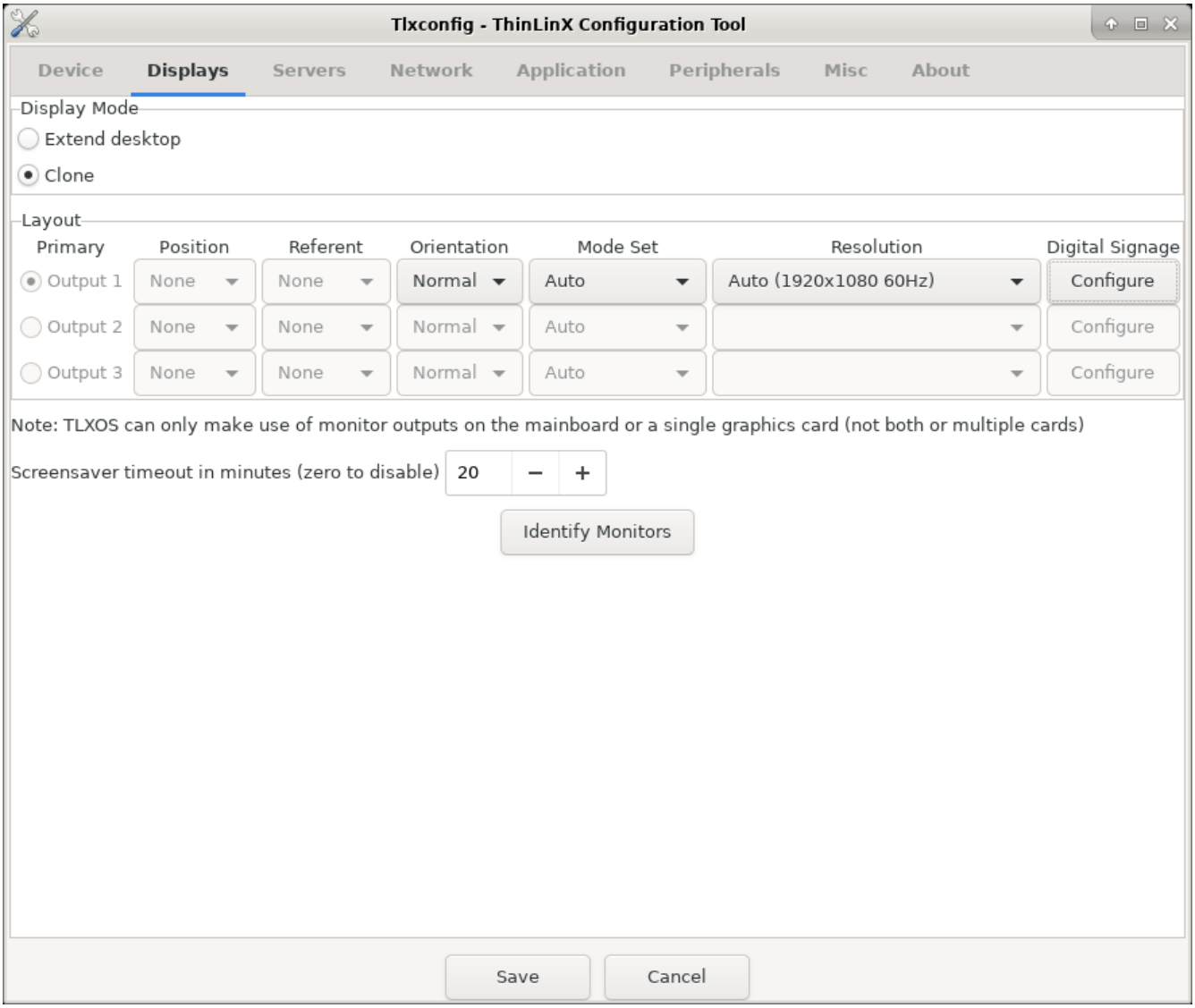
10 Displays Tab

The Displays Tab is shown below, in this example a Single display has been configured, the default is to auto detect and auto configure the display which normally results in a display configured for the native resolution of the attached monitor.

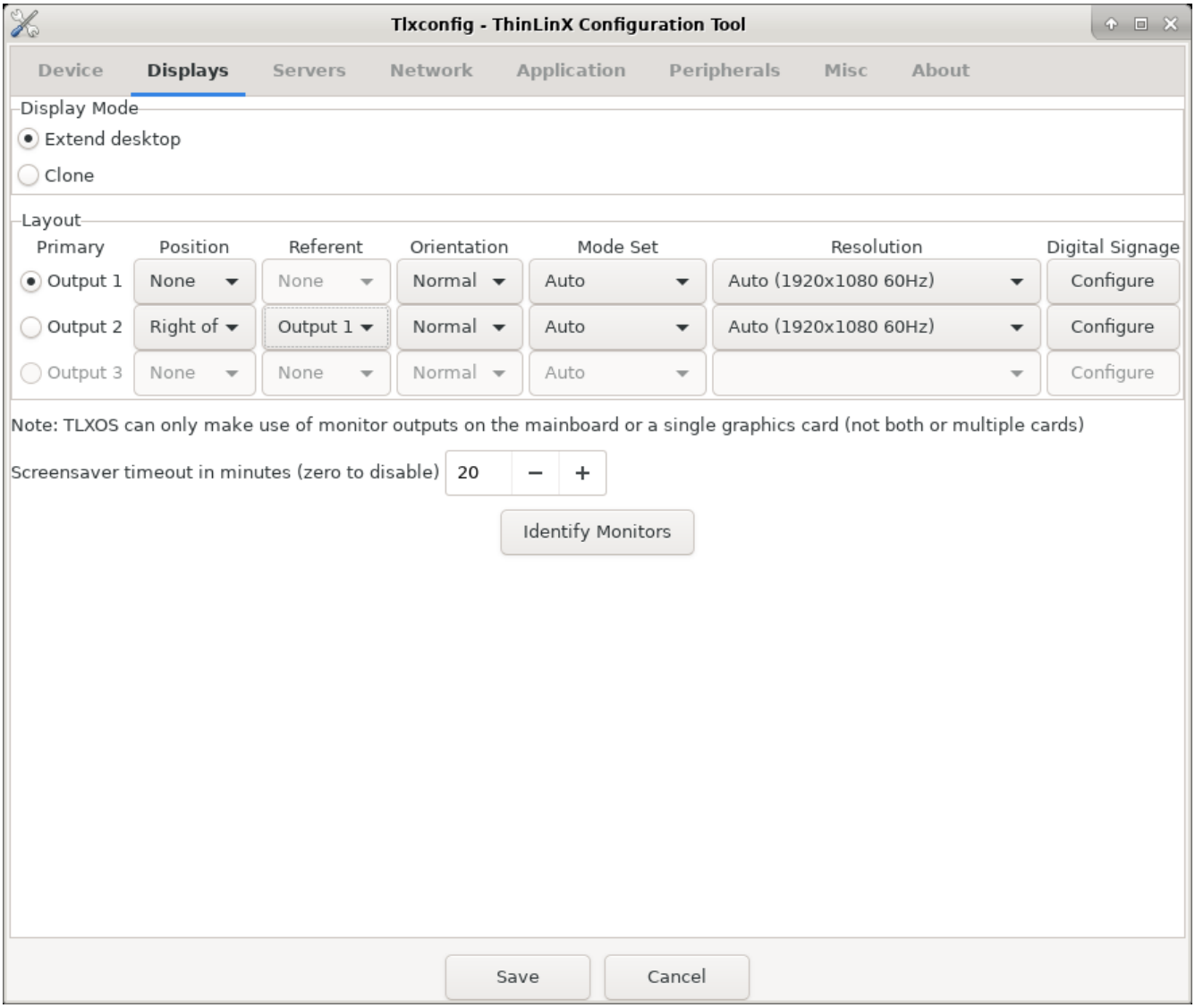
The Display Mode default is Clone which results in a Mirror Image on the second and or third displays

The Orientation defaults to Normal but may be switched to “Right” which rotates the display 90 degrees to the right, or “Left” which rotates the display 90 degrees to the Left or “Inverted which rotates the display 180 from the “Normal” position

The RPi only supports a limited number of resolutions, the default Auto selection would normally result in a 1920 x 1080 Display, the default Screensaver timeout is 20 minutes, and you can change this to a time of your choice. Setting the timeout to “0” will disable the Screensaver, be careful with this choice as it could result in Screen “Burn in”



In the example shown below Dual Displays have been configured, the Video mode is set to Extend Desktop, Output 1 is set to None and Output 2 is set to Right of Output 1, Output 3 is set to None as any unused or non-existent Displays are automatically set to None. The choices are Right of, Left of, Above, Below or None. The Referent value can be any of the other two Outputs, this choice will not appear until you set the Position. The Position option for Output 2 & 3 will not appear until Extend Desktop is selected. The Orientation is either the default “Normal”, “Right”, “Left”, or Inverted. The resolution can be selected from the drop down Resolution Tab. When configuring multiple Monitors the Identify Monitors Tab can be a useful tool, especially when configuring three Monitors



After making any changes click on **Save settings**, you must also do this before pressing the Identify Monitors Tab. In the case of the RPi you will need to reboot before any changes take effect

11 Servers Tab

TMS Server Discovery, there are three methods for a TLXOS device to discover the location of the PC or Virtual Machine running TMS. The default Auto setting, can use all three methods, discovery order is DHCP Option flags, Static Assignment, or UDP Broadcast.

(1) DHCP – Tick this check box to select DHCP only discovery, see the TMS user guide at the link below for more details on this discovery method
(2) Static - Tick this check box to select Static only discovery. For Static discovery a default Hostname of "tms" has already been entered in the default Hostname dialog box by ThinLinX. The advantage of this method of discovery is the System Administrator can set a DNS CNAME by assigning "tms" to the Hostname of the system running TMS. No configuration is required at the client end as TLXOS will be able to use DNS to resolve the "tms" Hostname and the default Auto choice will use Static Discovery if DHCP options have not been configured.

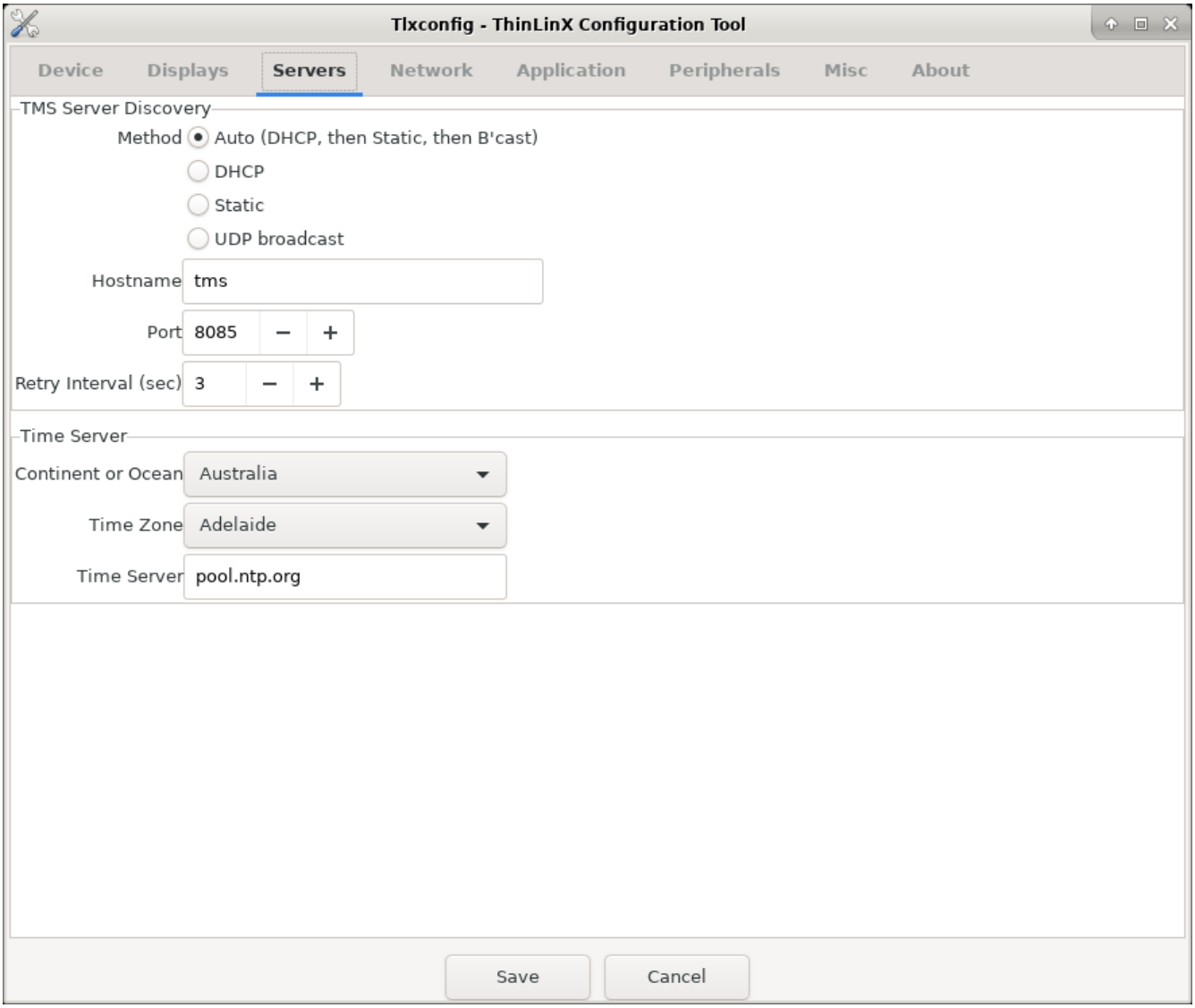
If you change the default 8085 Port number here you must also change the port number on TMS under Edit Settings.

(3) UDP Broadcast – Tick this check box to select UDP only discovery

Be aware that if you set any DHCP options flags which are used by ThinLinX on your DHCP Server these will always override Static or UDP settings if Server discovery is set to Auto. We have had a number of customers report that Static or UDP discovery does not work, further investigation has always shown that the reason they do not work is DHCP option flags have been set by them earlier and then forgotten. These forgotten settings will always override Static or UDP Discovery due to the Discovery order when Auto is set being DHCP FIRST, then Static, then UDP

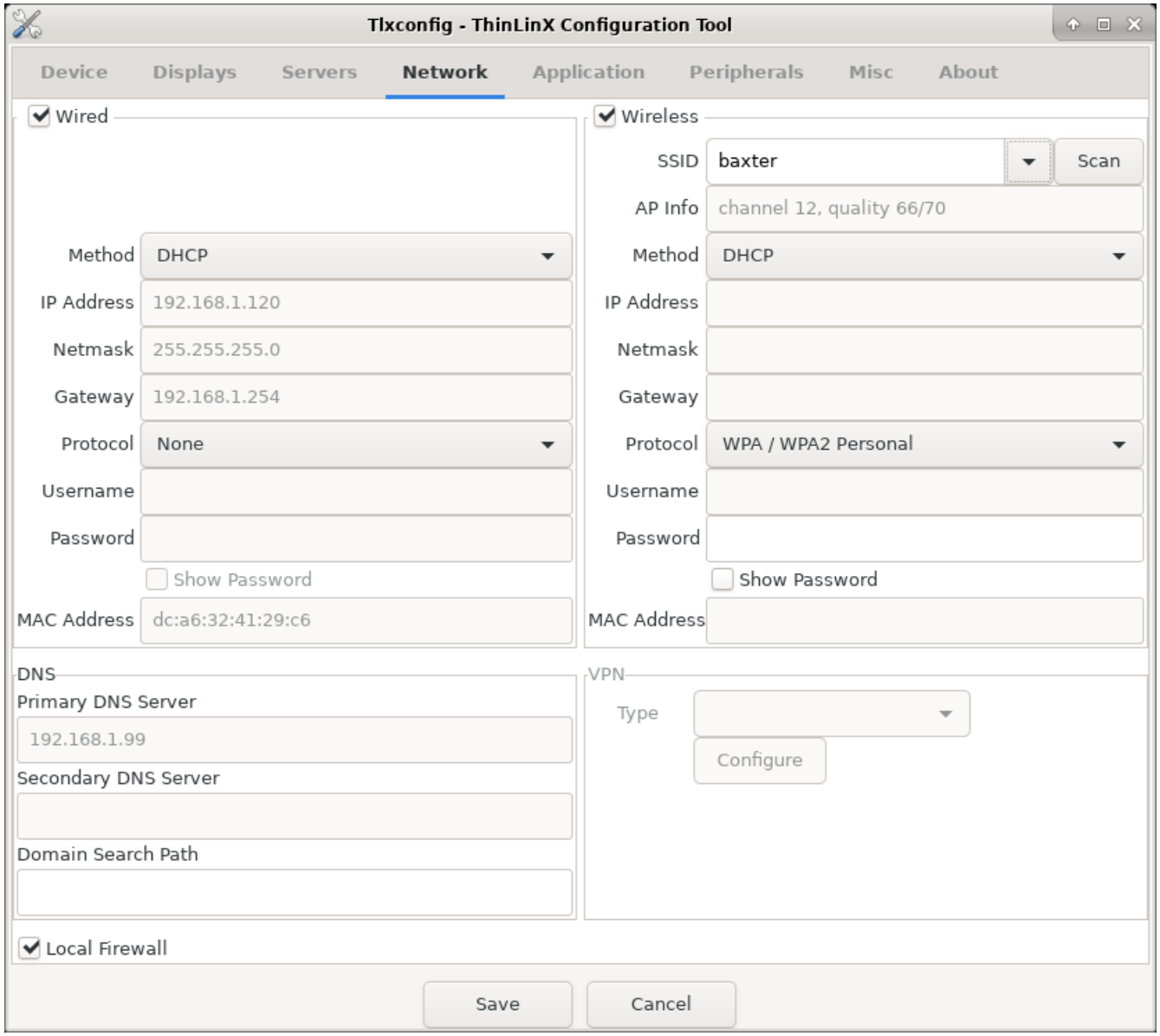
More details on these discovery methods are provided in the TMS User guide available at this link https:/thinlinx.com/tms-user-manual.pdf

Time Server, Set the Timezone and Time Server name, in many circumstances you will need to use your local Company Time Server



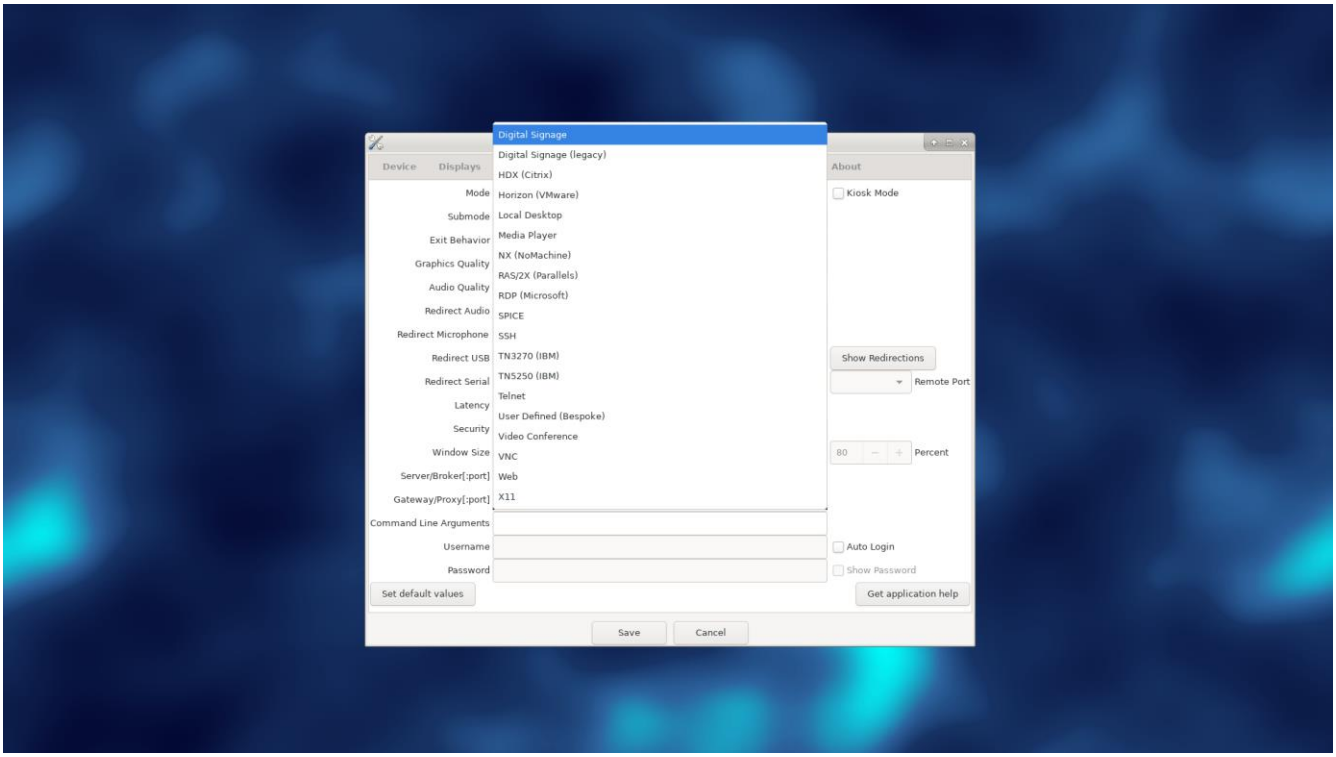
12 Network Tab

The Network Tab is used to configure the Wired and or Wireless interfaces. The default TLXOS setting is Wired DHCP, in some cases the DHCP server does not provide the DNS information. In this situation you should set DHCP with DNS Override from the drop down box, then manually enter the DNS information in DNS 1 and or DNS 2. A Static IP and DNS can also be entered. If you are using Wireless, leave Wired checked, Check Wireless, click on Scan to detect the wireless networks, select your required SSD, then select the Protocol from the dropdown list.

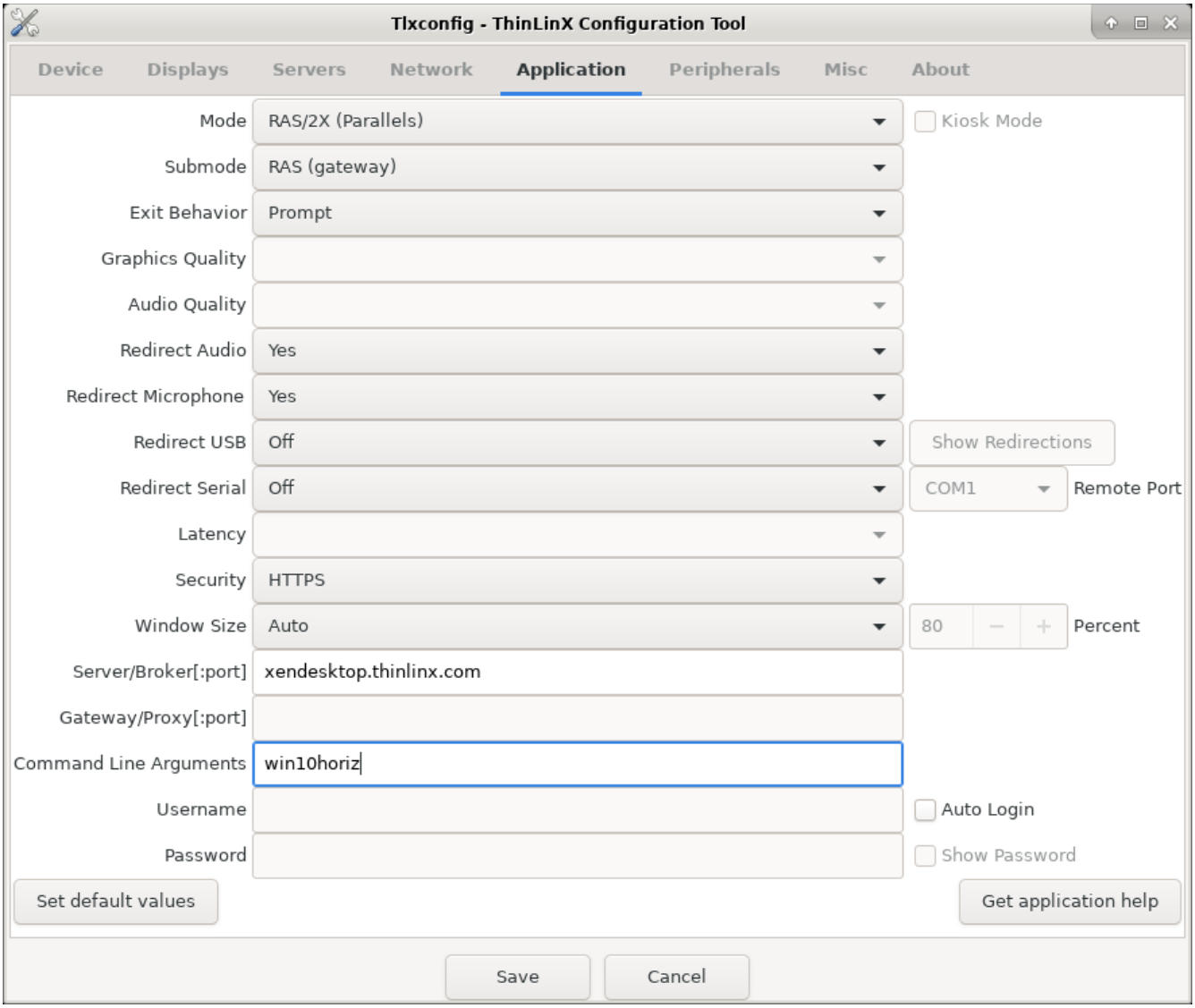

Tlxconfig - ThinLinX Configuration Tool
Device
Displays
Servers
Network
Application
Peripherals
Misc
About
Wired
Method
DHCP
IP Address
192.168.1.120
Netmask
255.255.255.0
Gateway
192.168.1.254
Protocol
None
Username
Password
Show Password
MAC Address
dc:a6:32:41:29:c6
Wireless
SSID
baxter
Scan
AP Info
channel 12, quality 66/70
Method
DHCP
IP Address
Netmask
Gateway
Protocol
WPA / WPA2 Personal
Username
Password
Show Password
MAC Address
DNS
Primary DNS Server
192.168.1.99
Secondary DNS Server
Domain Search Path
VPN
Type
Configure
Local Firewall
Save
Cancel

13 Application Tab

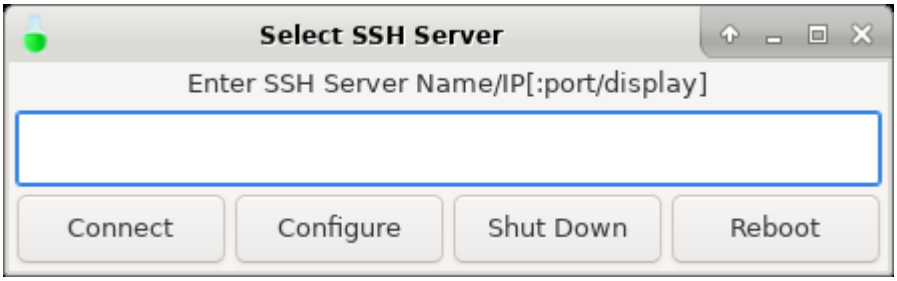
The Application Tab is used to select a Mode for the Remote Desktop connection and is also used to select other modes. See the list of the available modes in the image below



Depending on the Mode selected in the Application dialog box, the other selections will change to the defaults for the selected Mode or will be grayed out. In most situations you should accept the defaults, then enter your connection details. In the RAS (Parallels) example below I have selected my Windows 10 VM named win10horiz as the Desktop to launch. I could also launch a single app this way



SSH Mode; this mode may be used to open an ssh session to a remote system



RDP Mode; launch the FreeRDP 2.9.0 client in RemoteFX or RDP mode (auto detected)

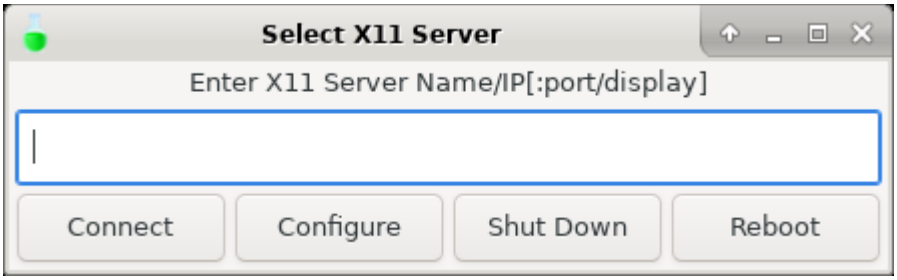
RDP & RemoteFX can be configured for either Auto Login or to simply connect to the Server but not Log in. The last five Servers / Desktops connected to are available in the drop down list

VNC mode; launches the TurboVNC client, see more information on TurboVNC at the link below

http://www.turbovnc.org/About/Introduction

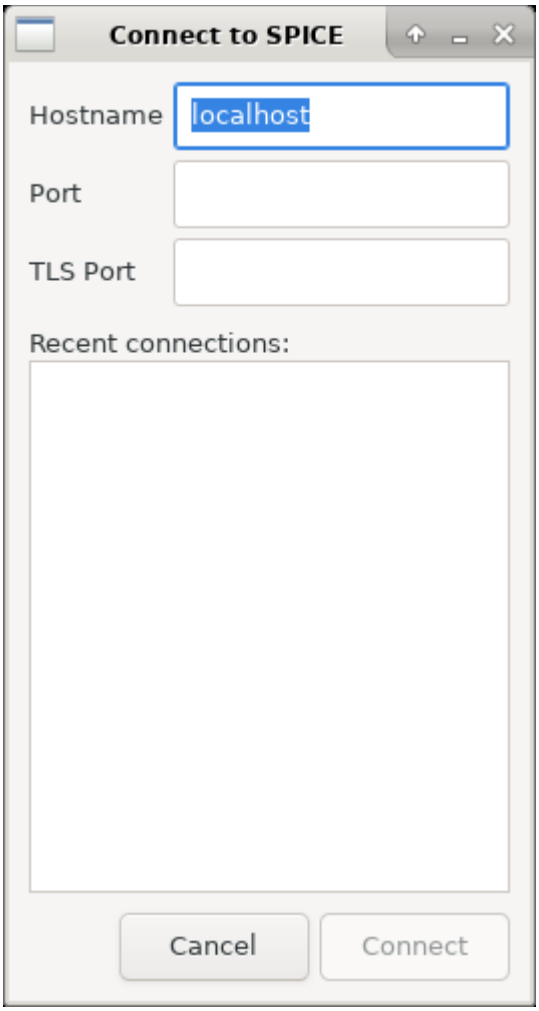
The default connection Dialog Box is shown below

X11 Mode; this mode allows the user to connect to a Linux Desktop using XDMCP which delivers excellent performance on a LAN but is inherently insecure as it does not encrypt the traffic.



Spice Mode; use this mode to connect to a Redhat Linux session

https://en.wikipedia.org/wiki/SPICE_(protocol)



NoMachine NX; use this mode to connect to a NoMachine Server

https://www.nomachine.com/

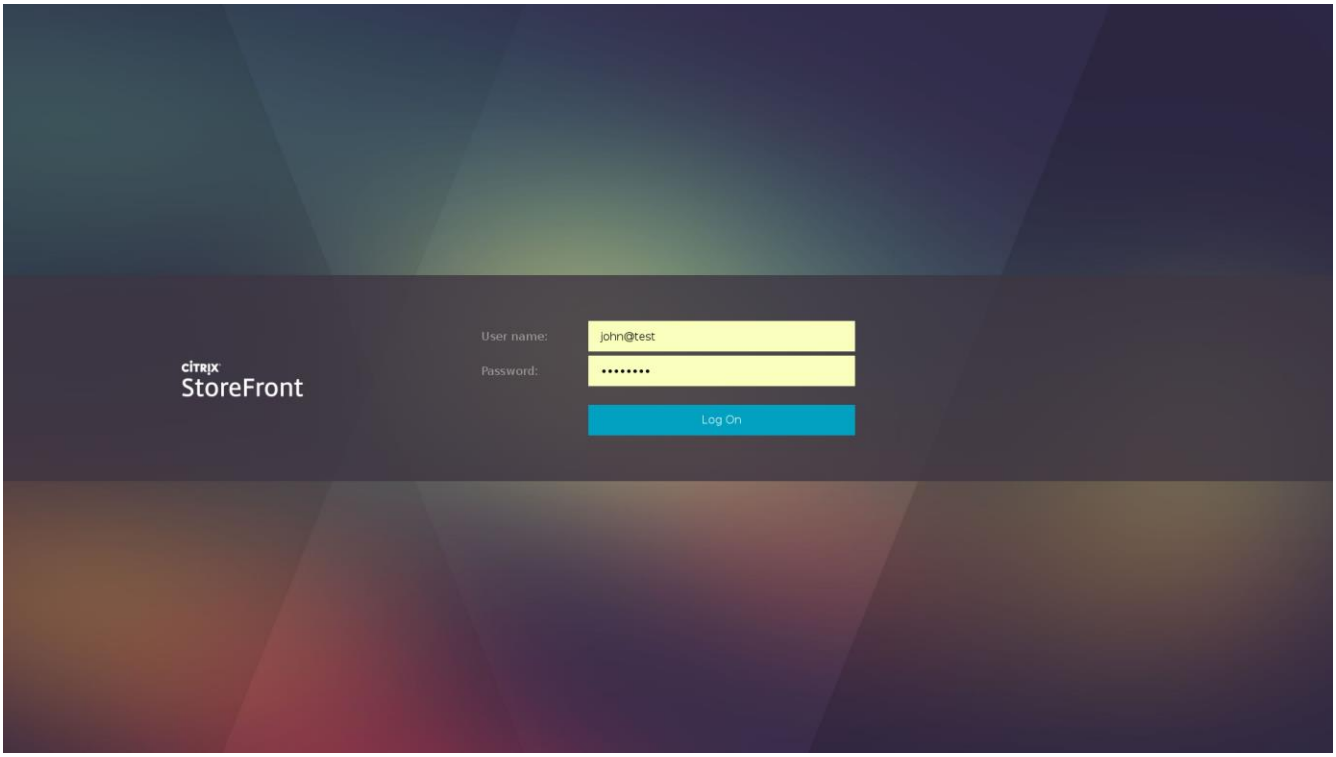
Web Mode; In the image below the Chrome Web Browser has been configured in Kiosk mode to connect to a Citrix Storefront Server via Citrix Receiver, the Storefront address is defined in the Server[:port] Dialog and the Kiosk mode checkbox has been selected

A Web Browser connection to a Citrix Storefront supports both http and https connections whereas Citrix HDX native mode only allows for an https connection which requires the upload of a SSL Certificate via the TMS Upload Icon. See FAQ further below for more details.

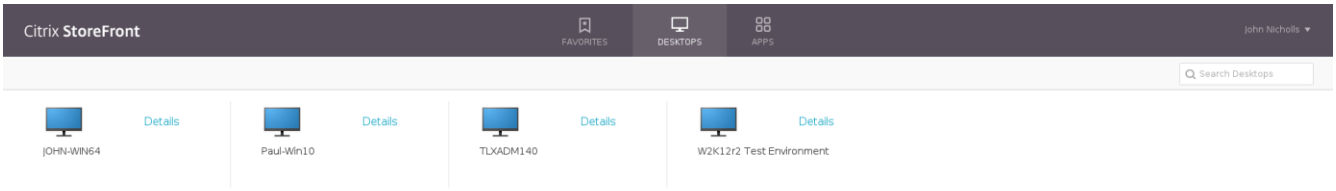
The Web Browser will prompt to save the Login and Password details on first connection to the Storefront but only when the connection is an Encrypted SSL connection (https)

After logging out of the Citrix HDX session you can Log on again by pressing the Log On button.

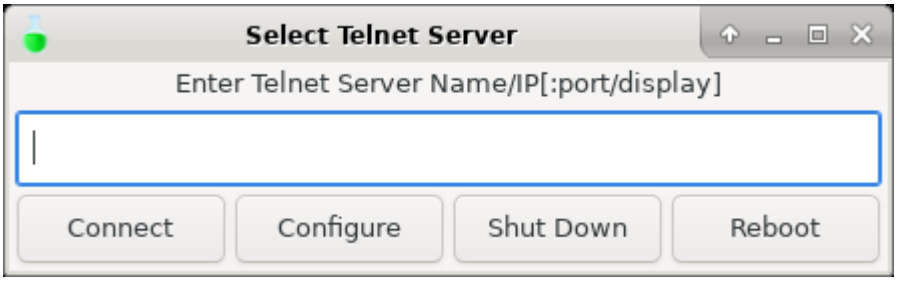
If you wish to close the Web Browser press Alt-F4, then New session to restart it



If you wish to force a close of the Citrix Storefront session press Alt-F4, then New session to restart it

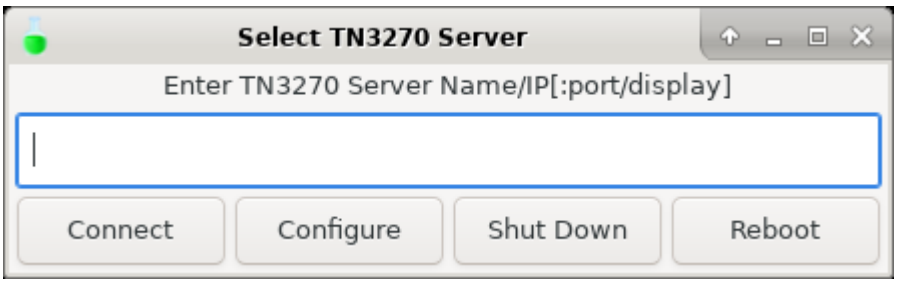


Telnet Mode; an older Protocol but still useful on some networks even today

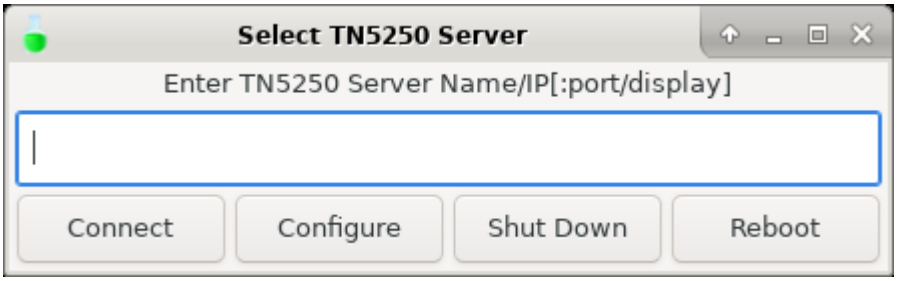


TN3270 Mode; allows a connection to a IBM Mainframe 3270 Series

http://x3270.bgp.nu/screenshots.html



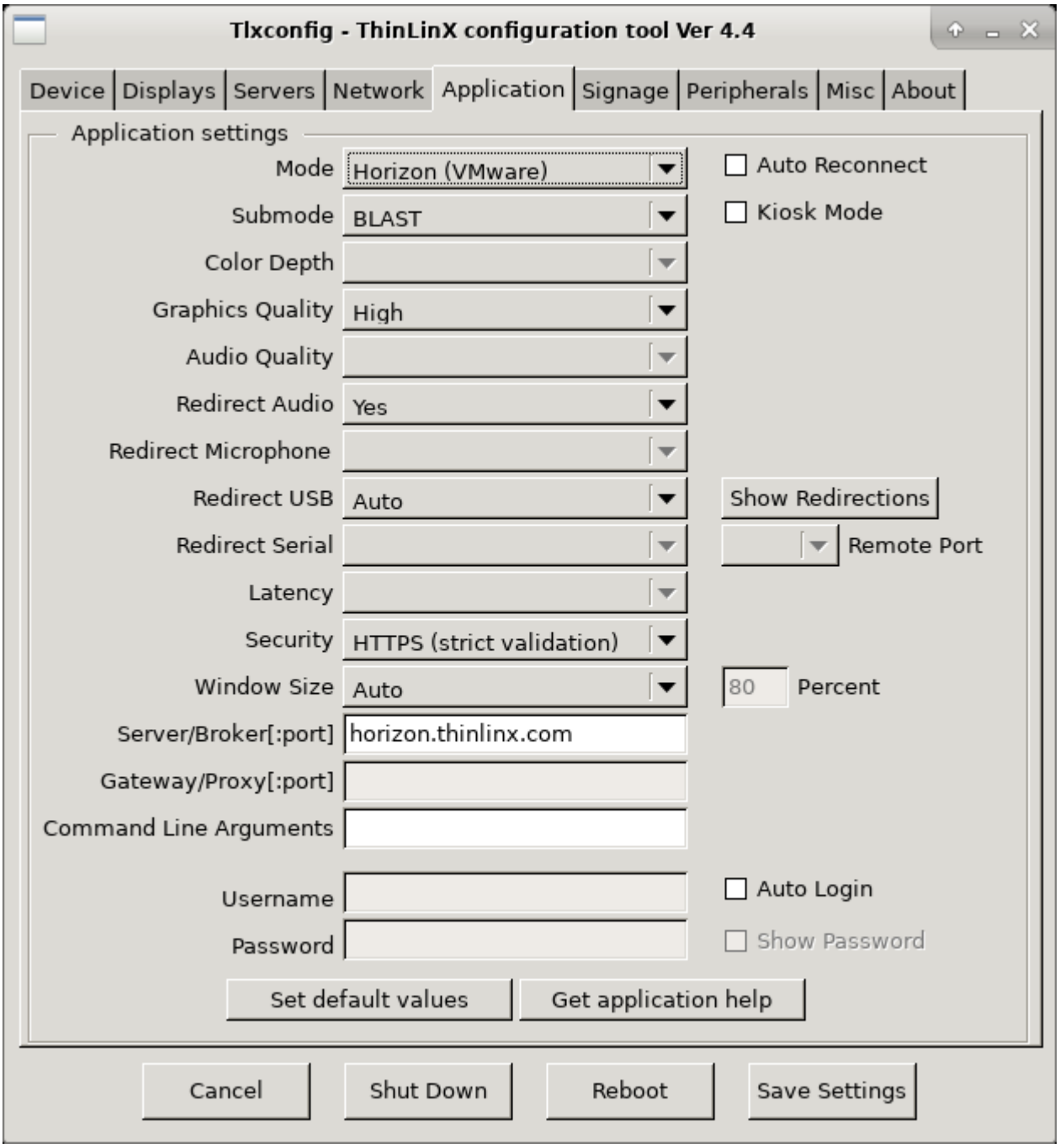
TN5250 Mode; emulates IBM's 5250 compatible terminals to connect over TCP/IP to an IBM AS/400.



Horizon (VMware) The VMware Horizon Blast Extreme client for the RPi3 & RPi4 delivers exceptional performance by using the RPi's built in H.264 hardware decoder.

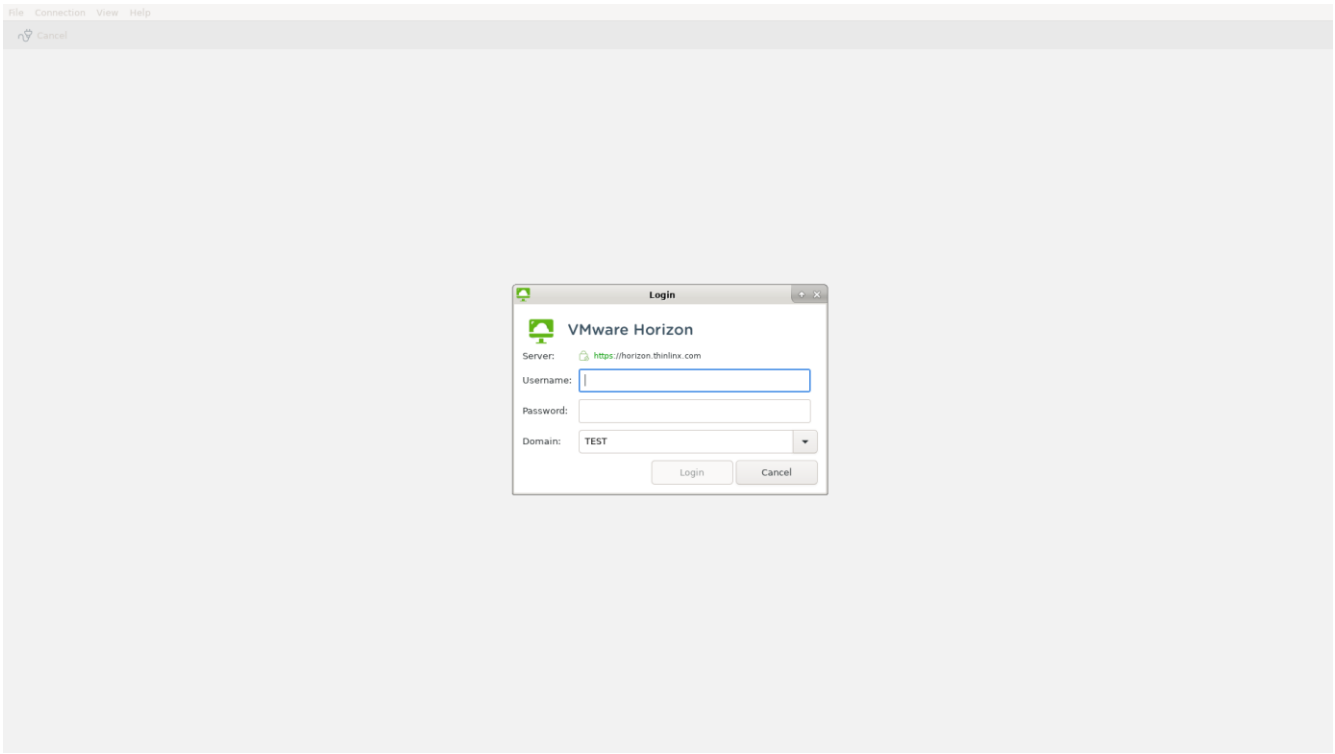
On the first run of the RPi Horizon Client you will need to accept the VMware Horizon Client for Linux Agreement by clicking "Accept"

To configure Horizon mode, leave the default Submode as "Blast", set Security to HTTPS (Strict Validation), enter your Horizon Server name into the Server Name [:Port] Dialog box, press OK, see image below. Try changing the Security to HTTPS if you have any Login issues

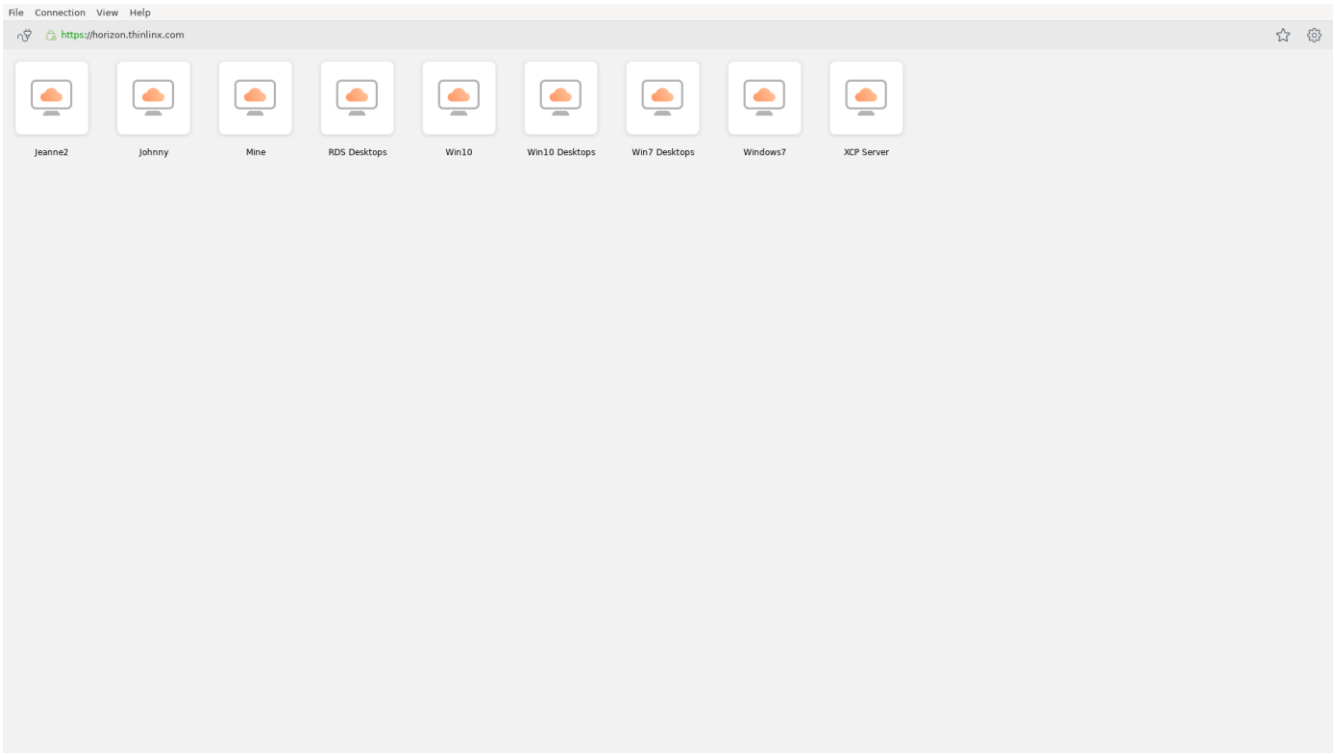


The RPi version of TLXOS only supports Blast (H264) mode as it needs to use the H264 Hardware decoder to display high performance Desktops.

The Small Form Factor and Re-Purpose PC versions of TLXOS also support PCoIP mode



When you press OK you will see the image below appear



Click on the Desktop or App Icon to launch them or click in top right to change Settings

You can use the Tlxconfig Application dialog or the TMS Mode Dialog to configure Auto Launch and Auto Login.

If Auto login is selected, enter in the Command Line arguments box, the name of the Windows Desktop or App to launch

Precede the name of Desktops with –q -n ‘Desktop Name’ with single quotes around the Desktop name. The –q is used to switch the no interactive mode to on, which is required for auto login

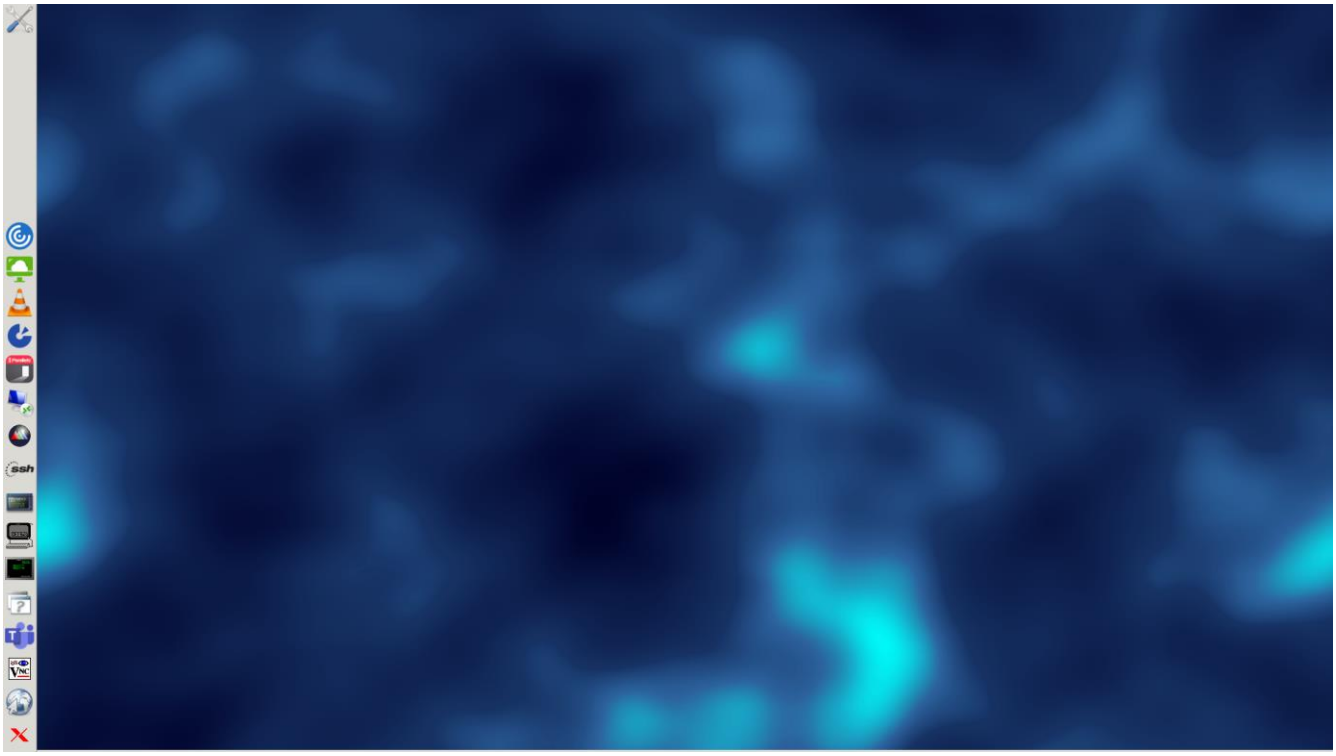
Precede the name of Apps with –q –a ‘Application Name’

The Desktop or Application name is the name as shown on the VMware Login screen (see image above)

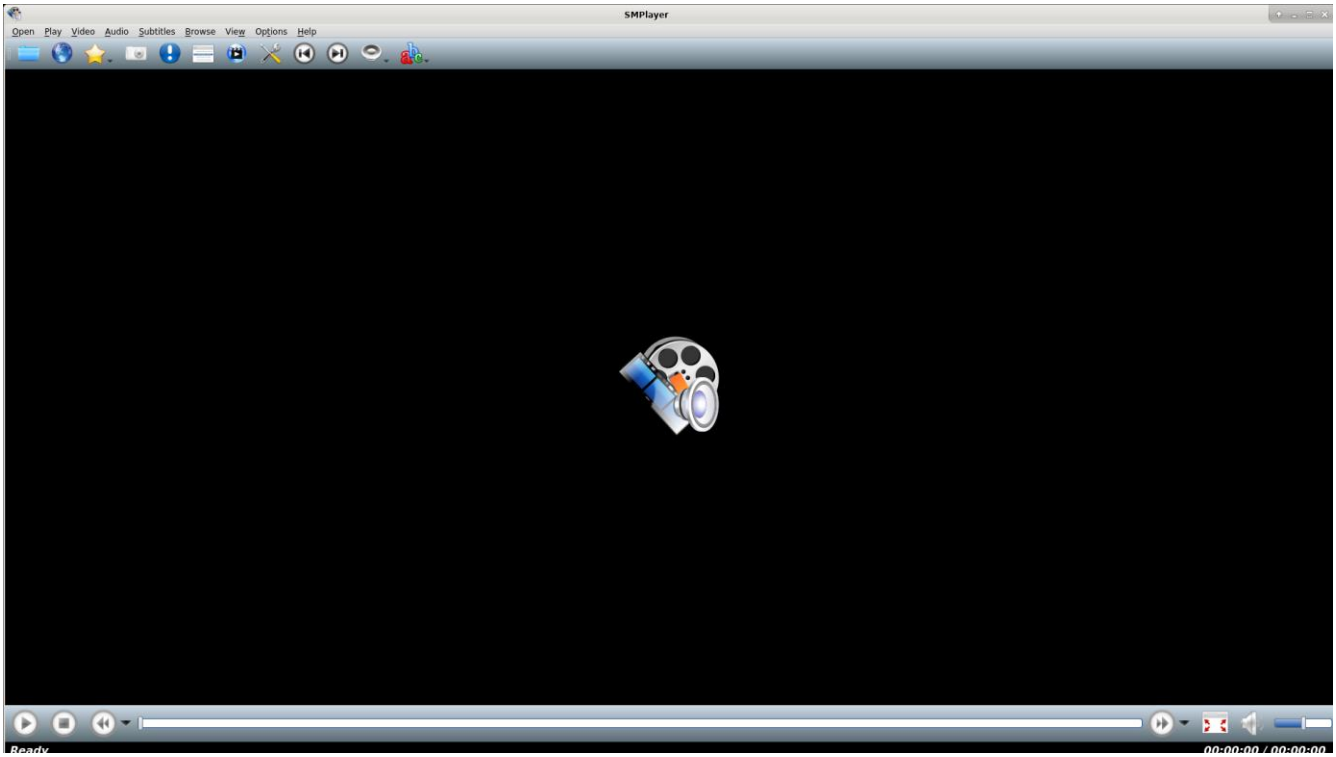
You may also add --once if you only want a one-time auto login for that user

In the example above if I entered -q –n ‘Johnny’, the Desktop Johnny would be launched

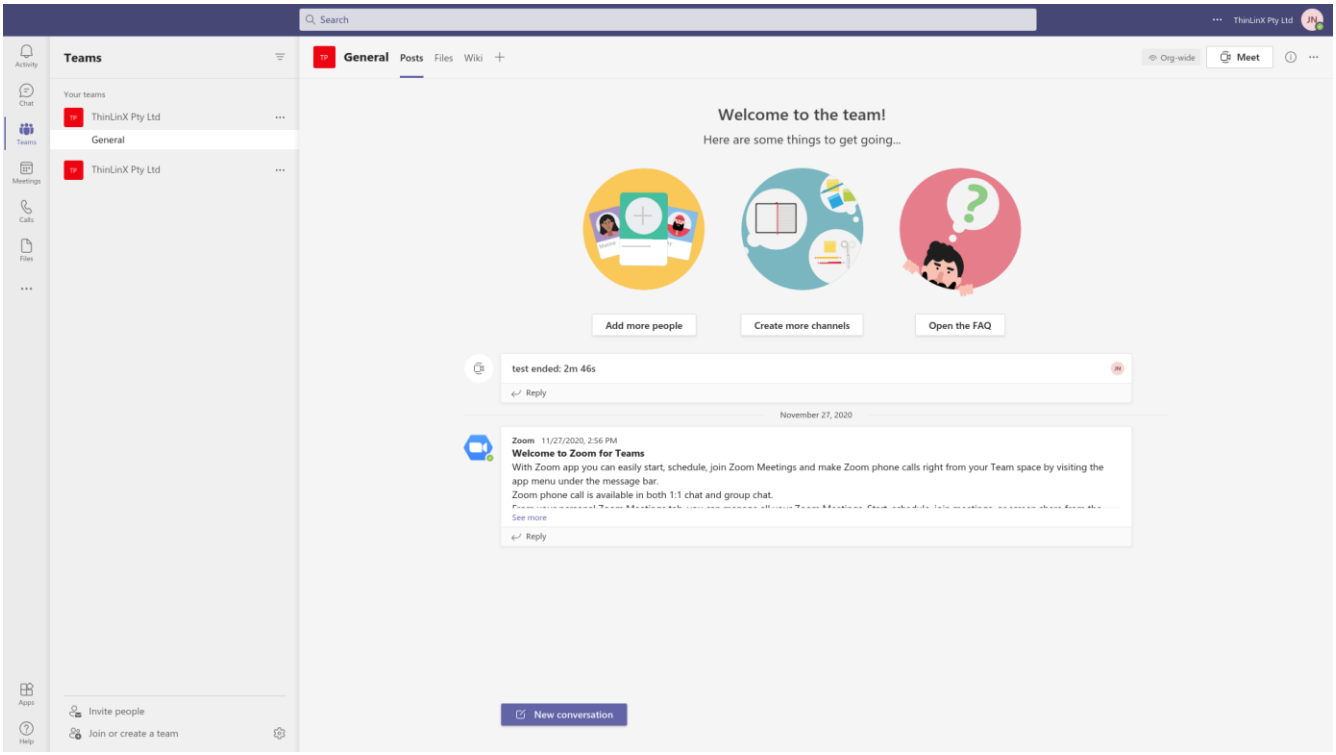
Local Desktop Mode, you can use this mode to launch multiple applications or Desktops. Step one is to use the Tlxconfig Application drop down menu to configure the applications that you wish to launch in Local Desktop mode. You can then switch to Local Desktop Mode using Tlxconfig and launch any pre-configured Application by clicking on the Application Icons on the left side of the screen



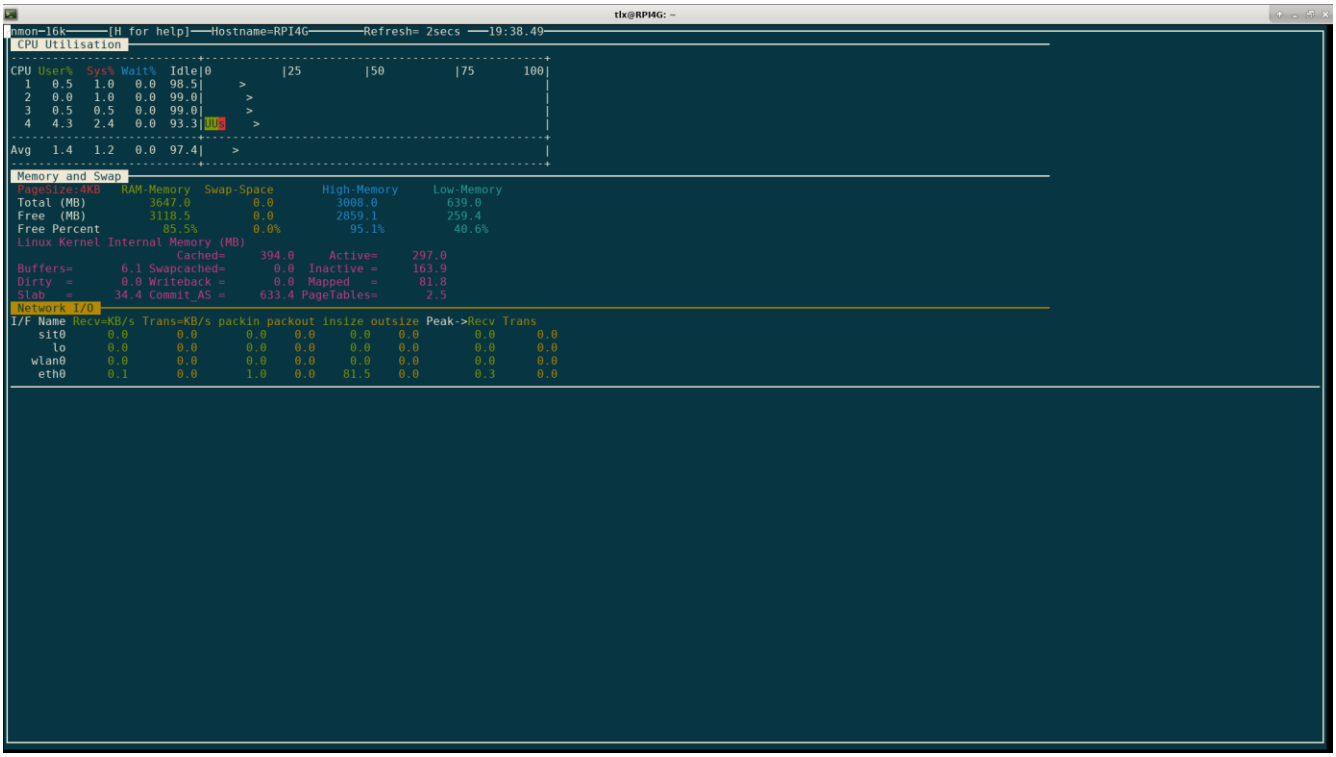
Media Player, launches VLC media player on the RPi and SMPlayer on RePC and SFF



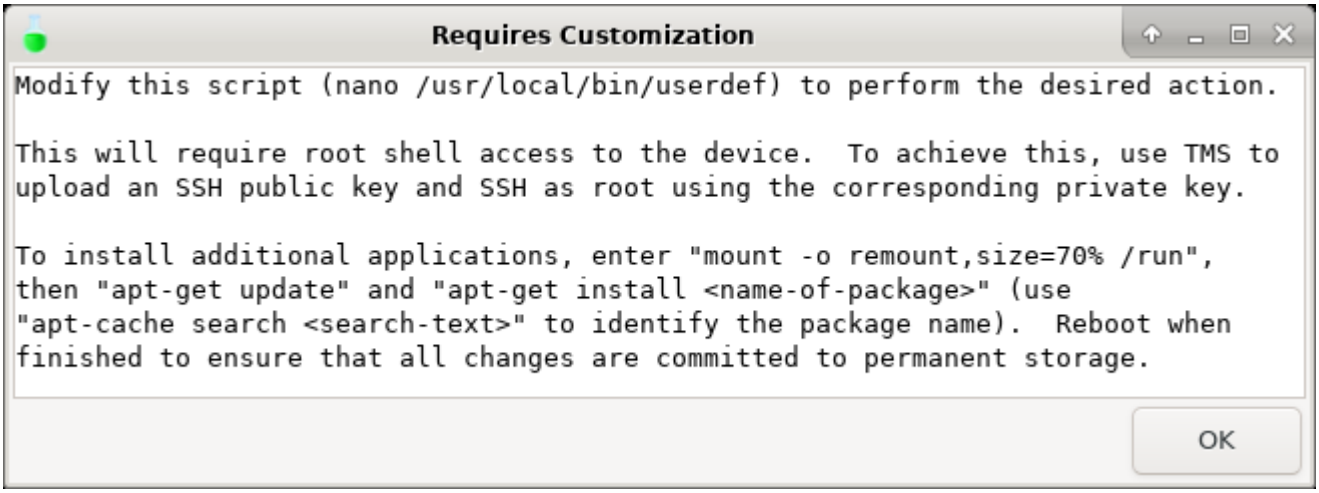
Video Conference, launches Microsoft Teams for Linux



Nmon performance monitor is integrated into TLXOS; nmon is a CPU / Network / Memory usage Monitor, nmon can be run on a local xterm or in a ssh session to remotely monitor the parameters below. More information can be found here http://nmon.sourceforge.net/pmwiki.php



User defined (Bespoke);



See the default /usr/local/bin/userdef script below

192.168.1.6 - PuTTY

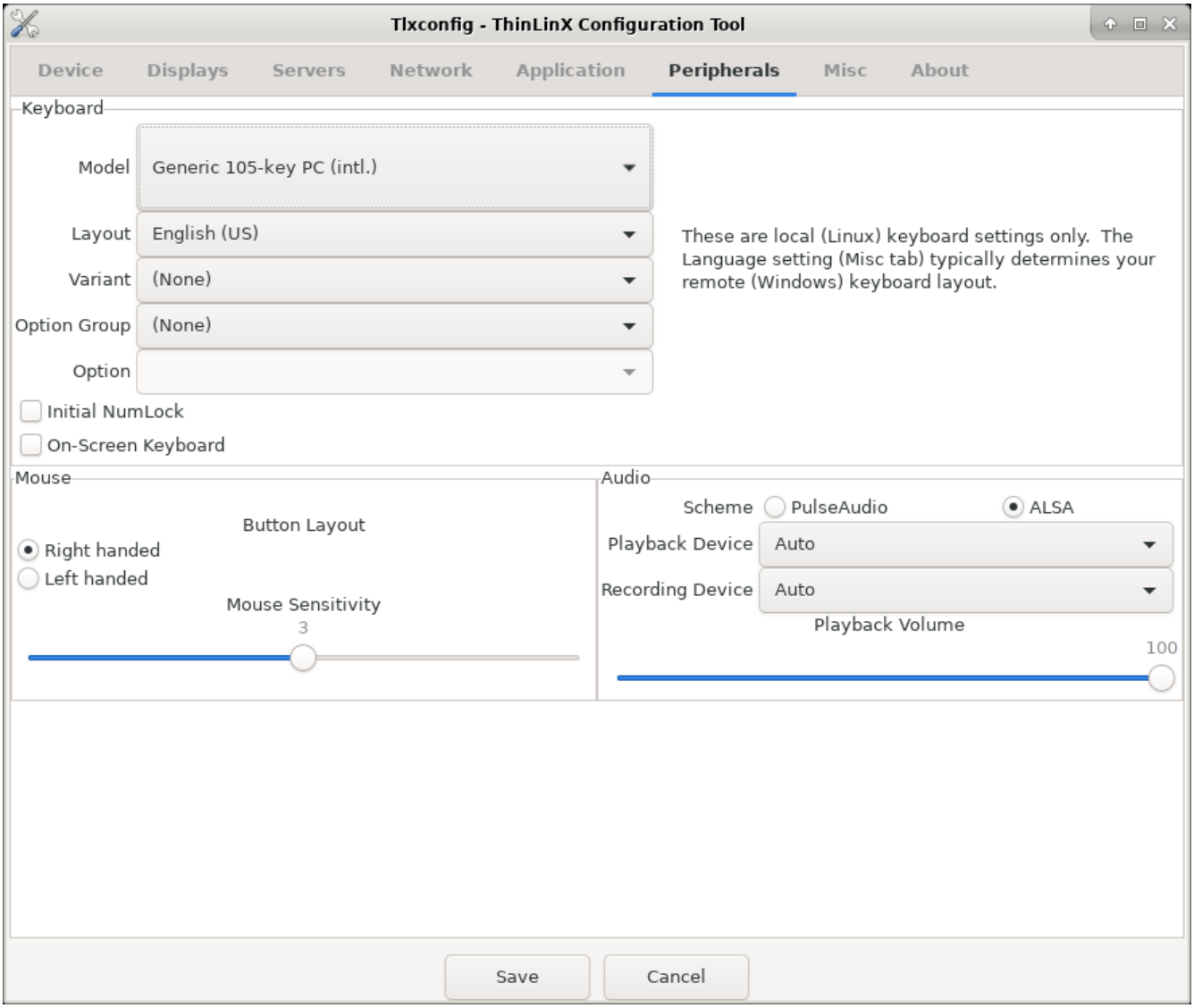
```
#! /bin/sh

PATH='/bin:/usr/bin:/usr/local/bin'
DISPLAY=${DISPLAY:-:0.0}
export PATH DISPLAY

TMPFILE=$(mktemp)

cat >$TMPFILE << EOF
Modify this script (nano $(readlink -f $0)) to perform the desired action.

This will require root shell access to the device.  To achieve this, use TMS to
upload an SSH public key and SSH as root using the corresponding private key.

To install additional applications, enter "mount -o remount,size=70% /run",
then "apt-get update" and "apt-get install <name-of-package>" (use
"apt-cache search <search-text>" to identify the package name).  Reboot when
finished to ensure that all changes are committed to permanent storage.
EOF

if [ "$1" = '--help' ]; then
    cat $TMPFILE
else
    eval $(get_mon_size)
    set -x
    yad --geometry 650x210+$(($WIDTH/2-325))+$(($HEIGHT/2-105)) --title \
            'Requires Customization' --text-info --button 'OK' < $TMPFILE
fi
rm $TMPFILE

# Options that are passed to this script as environment variables are as
# follows:
#
# $userdef_autologin_enabled
# $userdef_autologin_userid
# $userdef_autologin_password (N.B. base64 encoded)
# $userdef_autologin_domain
#
# Command line arguments will consist of whatever was specified in
# "Command Line Args" followed by whatever was specified in
# "Server Name[:Port]"
#
# See other scripts in /usr/local/bin for examples of how to make use of these
# variables when lauching your app.

#exec your-app-here "$@"
root@Johnrpi4:/usr/local/bin#
```

Digital Signage and Digital Signage (legacy) Please refer to the https://thinlinx.com/dsi-quick-start-guide.pdf

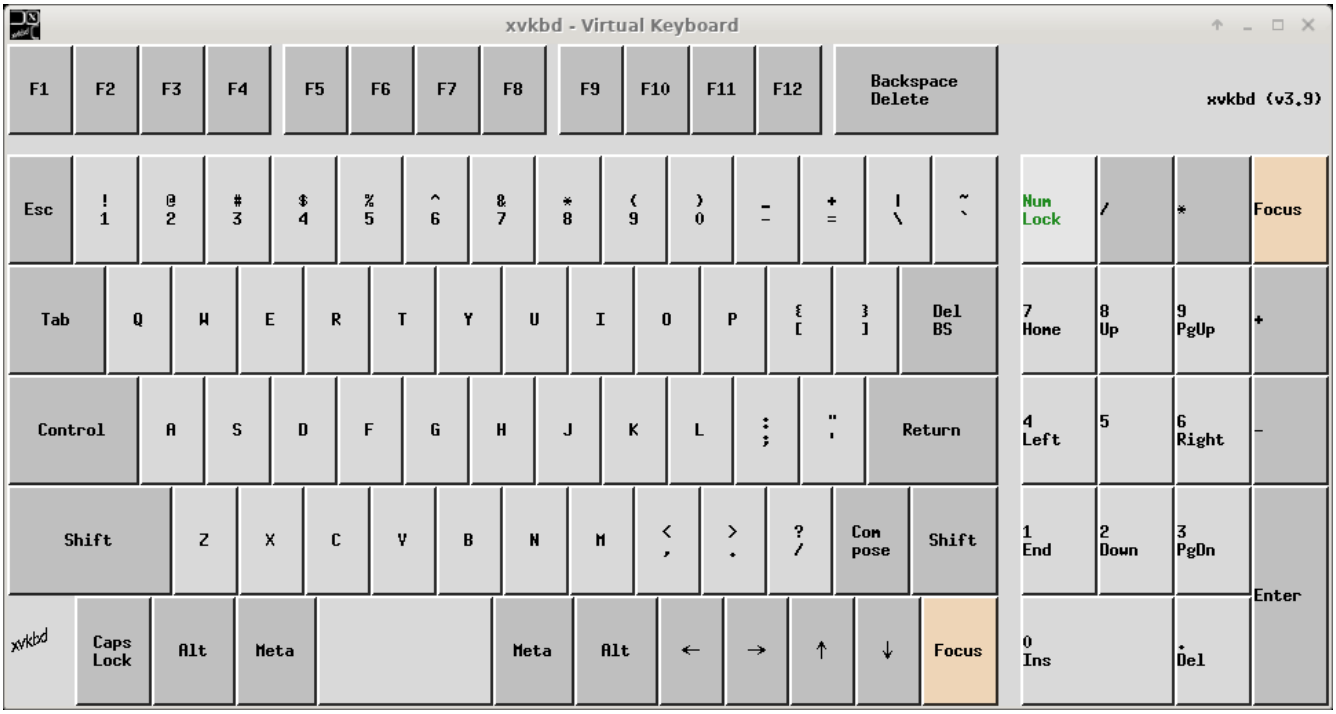
We do NOT recommend trying to set up Digital Signage using Tlxconfig, we will remove this selection under the Tlxconfig “Application Tab” in the next release.

14 Peripherals Tab

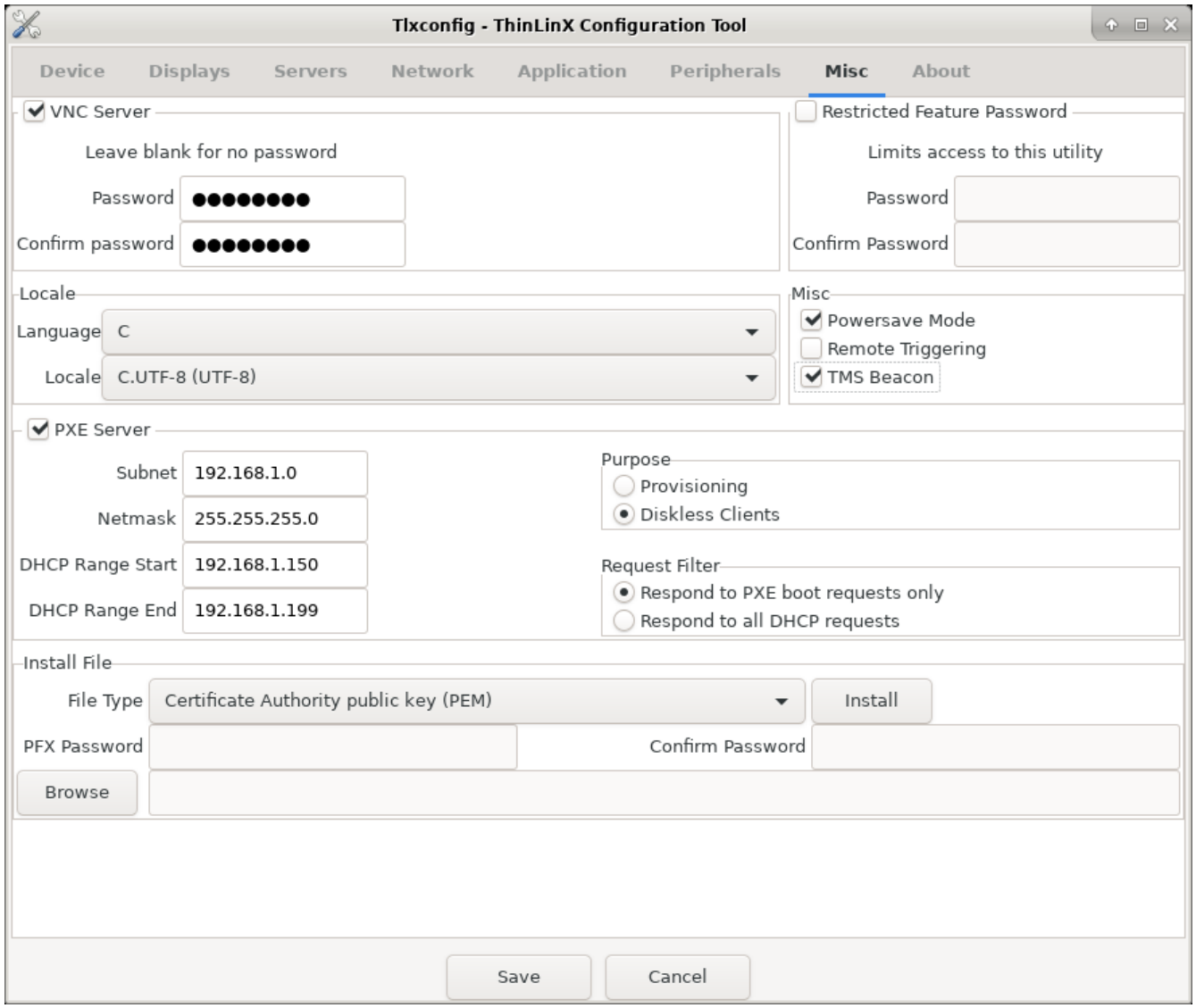
You can configure Keyboard Settings, Mouse Orientation, Audio Scheme either Pulse Audio or ALSA, Audio Volume and Mouse Sensitivity, Initial Numlock and On-Screen Keyboard here



The Onscreen Keyboard is shown below



15 Misc Tab



The Misc Tab is used to configure the following,

Change Restricted Feature password, the Tlxconfig password can be set here, this will then only allow access to the Tlxconfig menu if the correct password is entered. The TMS Administrator can change this password remotely

VNC Server, this option runs a VNC Server as described on page 19 of this user guide

Language, set the Language required

Locale set Locale

Enable PXE Server, this is a very powerful feature as it allows even a RPi to become a PXE Server allowing for Diskless Boots of RPi 3B+, RPi4 and RPi400. The RPi4 & RPi400 requires an EEPROM upgrade before they will PXE Boot.

Small Form Factor or Re-purpose PC devices can also PXE boot from a device of the same class

See the example image above which shows how to configure a TLXOS device as a PXE Server, once configured any device PXE booted on the same subnet will load TLXOS from the remote PXE Server device using ATA over Ethernet

This is very efficient but only works with devices on the same Subnet, so would be very useful in Schools, Call Centers, Offices, Banks etc

Each PXE booted device is allocated a 500MB slice of the Disk on the PXE Boot Server, so in theory an RPi 4 with a 16GB SD Card could support up to 30 Diskless RPi3B+ models

We recommend that the PXE Server is not used for anything else but as a PXE Boot Server, we do not recommend that you use it for a Remote Desktop client at the same time that it is being used as a PXE Server

A X86 Virtual Machine or a X86 Physical machine can be configured as a RPi PXE Boot Server https://help.thinlinx.com/knowledgebase.php?article=42

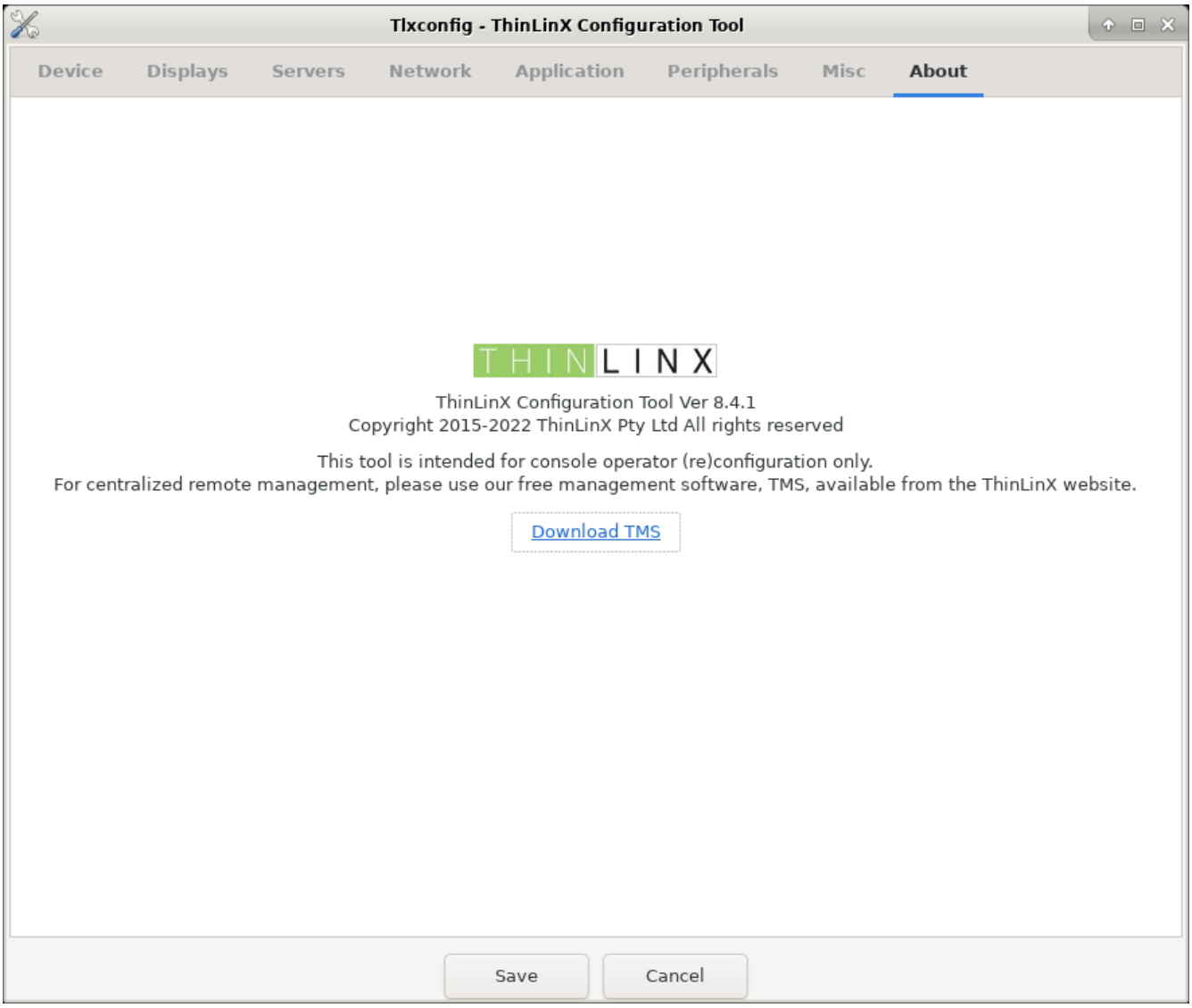
There are a number of other checkboxes which can be selected

(1) **Remote triggering** – Runs a RSH listener to launch apps from a remote location
(2) Powersave mode
(3) **TMS Beacon**, TMS Beacon mode can be switched on or off for any TLXOS device by selecting the TMS Beacon checkbox. Starting from TLXOS 4.10.0 and 4.8.2 LTS, we added the TMS beacon as a TMS discovery aid. This is a TMS broadcast repeater, which a nominated TLXOS client on a different subnet than the TMS server can be configured to start. Clients on the same IP subnet as the beacon that use (or fall through to) the broadcast discovery method will detect this signal and connect to the TMS server that it names. This will of course stop working if the client that runs the beacon is shut down or put into Maintenance Mode. Once a client is connected to a TMS server, it will

keep the connection open and talk to that server exclusively until it is rebooted (sending keepalives every few minutes to prevent intervening firewalls from closing the connection). If clients can fall through to UDP discovery, it is therefore important that you do not run multiple copies of TMS in the same IP subnet, or else clients will connect to whichever TMS instance they detect first and will not appear in the other.

Install File, insert a USB stick containing the files that you wish to install, select file type from the drop down menu, click on the browse button, the USB stick will appear under media as sda1, double click on sda1, click on the file to install, click on Install
More information on installing files is available in the knowledgebase here
http://help.thinlinx.com/admin/knowledgebase_private.php

16 About Tab



Wireguard a second VPN option for TLXOS – ThinLinX has integrated the Wireguard Kernel module into TLXOS 4.10.0 and TLXOS 4.8.2 and all newer versions

We did not have time for this latest release to update TMS and the local Tlxconfig menu to add Wireguard configuration graphical controls, but you can easily edit the /etc/wireguard/wg0.conf file yourself

Please follow the guide here

How do I obtain root access on a device running TLXOS?

http://help.thinlinx.com/knowledgebase.php?article=7

Once you are logged in as the root user run the commands below

You need to create the Wireguard client end Private and Public Keys

cd /etc/wireguard

umask 077

wg genkey | tee client_privatekey | wg pubkey > client_publickey

You then need to create a wg0.conf file in /etc/wireguard

Run touch wg0 to create a blank wg0 file, then use the built in nano or vi editor to create your wg0.conf file

My /etc/wireguard/wg0.conf is pasted below with some comments with what I did

[Interface]
This Desktop/clients's private Key
PrivateKey = enter your private key as generated above

My Wireguard Client ip address
Address = 192.168.10.3/24

[Peer]
Your Server public key
PublicKey = Your Server public key goes here

set ACL ## My client end Network is 192.168.1.0/24 and the Remote
Wireguard Server Network is 192.168.0.0/24
My Wireguard VPN uses Client wg0 IP 192.168.10.3 and server IP 192.168.10.1

Allowed IP's are my wg0 tunnel 192.168.10.0/24 and my remote network 192.168.0.0/24

The settings below allow me to access any device on my remote 192.168.0.0/24 network

AllowedIPs = 192.168.10.0/24, 192.168.0.0/24

Your server's public IPv4/IPv6 address and port
Endpoint = yourserverdomain:51820

Key connection alive
PersistentKeepalive = 15

After you create the /etc/wireguard/wg0.conf file run the command below and then reboot

systemctl enable wg-quick@wg0

For more information on wireguard https://www.wireguard.com/

17 Helpful information and links

Please take the time to read the following additional user guides

https://thinlinx.com/tms-user-manual.pdf
https://thinlinx.com/faq/
http://help.thinlinx.com/knowledgebase.php

Changelog for TLXOS 4.11.1, TLXOS 4.8.3, Tlxconfig 8.4.1 / TMS Client and TMS 8.4.1

https://help.thinlinx.com/knowledgebase.php?article=87
https://help.thinlinx.com/knowledgebase.php?article=88
https://help.thinlinx.com/knowledgebase.php?article=89

Top FAQ's listed below

How does TLXOS Licensing work?
http://help.thinlinx.com/knowledgebase.php?article=8

What hardware does TLXOS support? What is each TLXOS edition for?
http://help.thinlinx.com/knowledgebase.php?article=35

Is there a virtual appliance for managing TLXOS devices?
http://help.thinlinx.com/knowledgebase.php?article=64

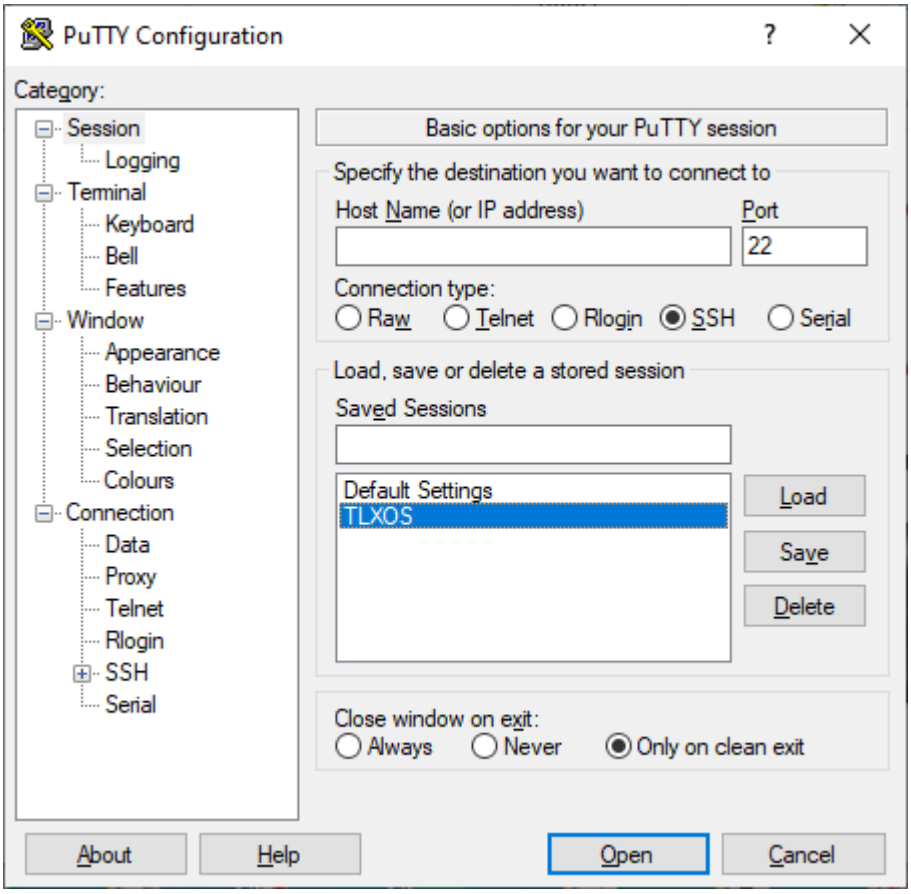
Is TLXOS 32-bit or 64-bit?
http://help.thinlinx.com/knowledgebase.php?article=29

How many gigabytes of RAM does my Pi need?
http://help.thinlinx.com/knowledgebase.php?article=46

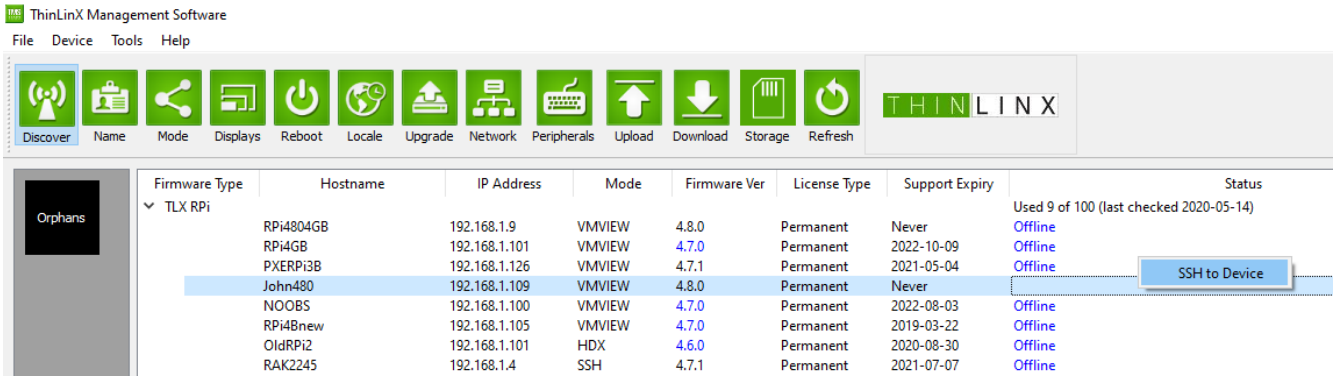
How can I protect clients from rogue/unauthorized TMS servers?
http://help.thinlinx.com/knowledgebase.php?article=73

How do I obtain root access on a device running TLXOS?
http://help.thinlinx.com/knowledgebase.php?article=7

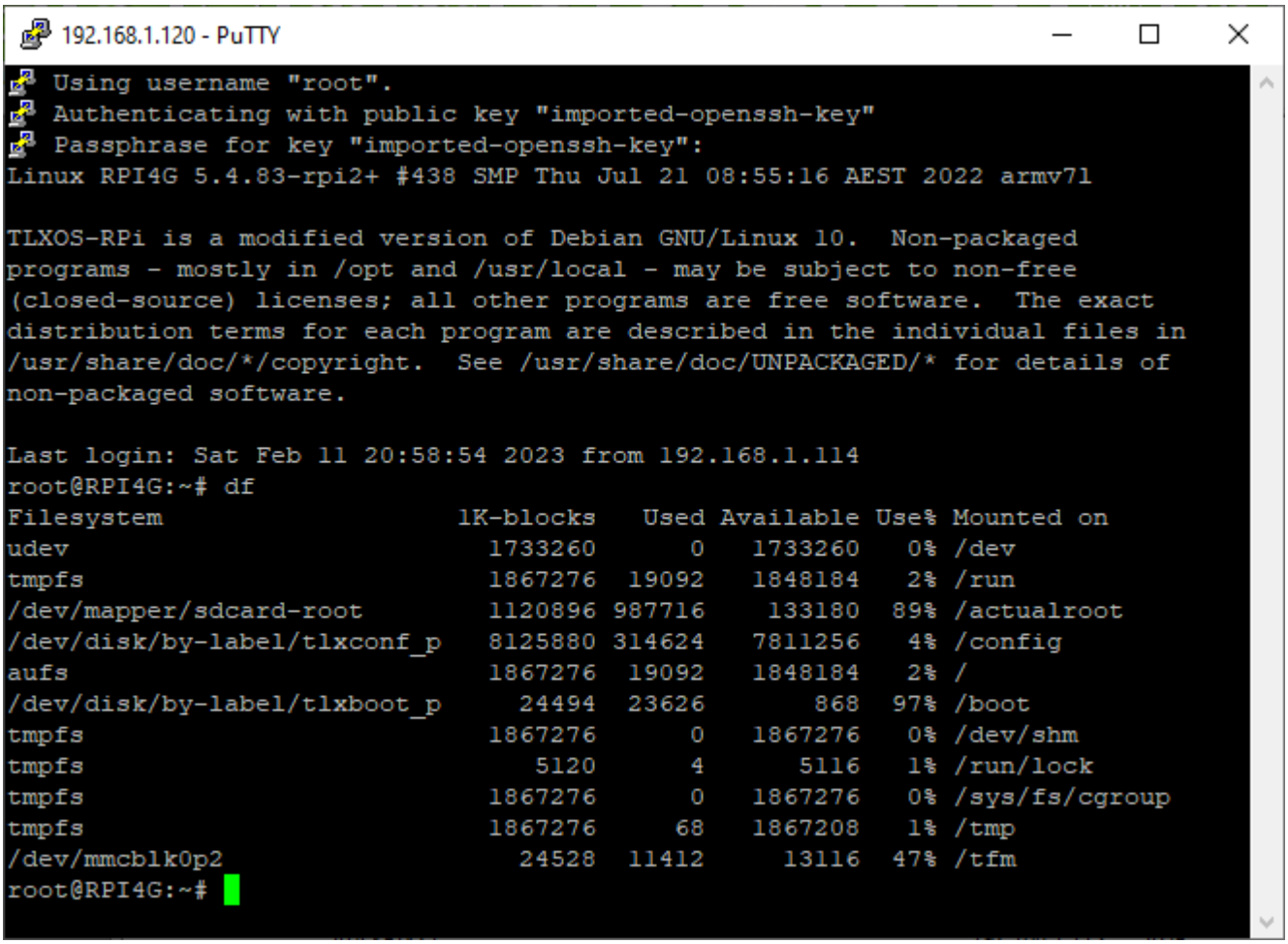
You can also use TMS to launch a ssh session using Putty if you save the session information as you configured it above with the name “TLXOS”



To ssh to a TLXOS using TMS, highlight the device by clicking on it, then right click to launch the SSH to Device option and then press Enter



Press Enter or Click on “SSH to Device” to launch the SSH Session, enter your Passcode when the Xterm SSH Window appears, you are now logged in as root.



Some of our users want to install additional software of their choice, of course they are free to do this if they wish, at their own risk

Any Software that is installed may be deleted / completely erased at any time by simply carrying out a Factory reset using TMS or the Local Desktop

You can see in the above Putty xterm window that I have typed df to see the file system disk space usage on a 4 GB RAM RPi4B. Note that tmpfs is mounted on /run, this is the directory that is used to temporarily store any software that you install before storing it permanently to the SD Card or Disk drive on Shut down or Reboot of a TLXOS device

In the example above you can see there is only a total of 1848184 1K-Blocks available, if you are planning on installing some large software packages you may run out of space unless you run the following command to allocate more system memory to /run

“mount –o remount,size=85% /run” You can adjust the 85% to larger or smaller

The next step is to run “apt-get update”
Then apt-get install “your package name”
If you are installing a number of packages it is still possible to run out of Ram in which case you should run the “df” command between packages to see if the /run directory is nearly full
If so, simply reboot TLXOS, the shutdown / reboot will take longer than usual as the system is writing the installed packages to the SD Card / Hard Disk during the shutdown phase.
To continue installing new packages repeat the process above

How do I pair a Bluetooth Device?

We are planning on adding graphical controls to configure Bluetooth in a future TMS release, however this is not a priority due to lack of interest in Bluetooth on TLXOS

ThinLinX will add a GUI to make this easy but for now you have to ssh as root and then run the commands below, this example is for pairing a Bluetooth Keyboard (modify for your detected Hardware)

bluetoothctl

[CHG] Controller 00:10:20:30:40:50 Pairable: yes

[bluetooth]#default-agent
Default agentrequest successful

```
[bluetooth]# scan on
Discovery started
[CHG] Controller 00:10:20:30:40:50 Discovering: yes
[NEW] Device 00:12:34:56:78:90 myLino
[CHG] Device 00:12:34:56:78:90 LegacyPairing: yes

[bluetooth]# pair 00:12:34:56:78:90
Attempting to pair with 00:12:34:56:78:90
[CHG] Device 00:12:34:56:78:90 Connected: yes
[CHG] Device 00:12:34:56:78:90 Connected: no
[CHG] Device 00:12:34:56:78:90 Connected: yes
Request PIN code
[agent] Enter PIN code: 1234
[CHG] Device 00:12:34:56:78:90 Paired: yes
Pairing successful
[CHG] Device 00:12:34:56:78:90 Connected: no

[bluetooth]# connect device 00:12:34:56:78:90
```