PXES Universal Linux Thin Client

Community Edition

PREBUILT IMAGES

Quick Start Guide

February 2005

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PRE BUILT IMAGES

ISO 9660 IMAGE

> **IMPORTANT:**
>
> ***PXES Universal Linux Thin Client*** PREBUILT image is a live CD. Meaning that no software installation is required and all of the software will run from the CD.

Download the mentioned image from http://prdownloads.sourceforge.net/pxes/pxes-0.9-1PB.iso?download

This is a 17MB bootable ISO 9660 image that you need to burn using the appropriate tool depending on the operating system you are using. A common mistake in Microsoft Windows is to burn this image as the only file inside the CD filesystem, so be careful to select the right options to make a *bootable* CDROM from this image..

Burning the CDROM

Once you have downloaded the ISO image, proceed to burn it.

On a Linux box

On a Linux box you can use a variety of methods to accomplish the task.

If you are using Gnome desktop, just right-click on the ISO image icon inside a file manager window.

From the command line:

```
$ cdrecord dev=<dev> speed=8 –data –eject pxes-0.9-1PB.iso
```
You need to specify your device accordingly to your system settings. Check cdrecord documentation.

On a Microsoft Windows box

Use your favorite tool to burn the ISO image an get a bootable CDROM.

Hardware requirements

You can choose any PC for these test, and it will be turned into a thin client, at least while PXES is running. The minimum requirements are an x86 Pentium I compatible processor, 32 MB RAM, a supported or VESA compliant video graphic card, a

supported network card, although this test will not depend on the network, things will become more interesting if you are connected.

A CDROM unit will be used to boot but perhaps you want to use a network card supporting PXE to permit a network boot

Booting the thin client

The PXES PREBUILT image is very safe to use hence it will not try to discover nor use a hard disk present in the PC selected as a thin client test.

1. Check BIOS CDROM boot option.

2. Boot the CDROM.

Boot splash

Having burned the CDROM and booted the destined machine, the ISOLINUX boot splash and menu will appear.

This very simple menu to select some pre-configured boot options and a command line where you can add some advanced options.

Pressing F1 you will find a brief explanation of every pre-configured boot option, pressing F2 you will find some of the advanced options explained.

To conduct a very simple first test you can select you can just press <ENTER> at the boot prompt which select the default option, a LOCAL session (same as selecting 1).
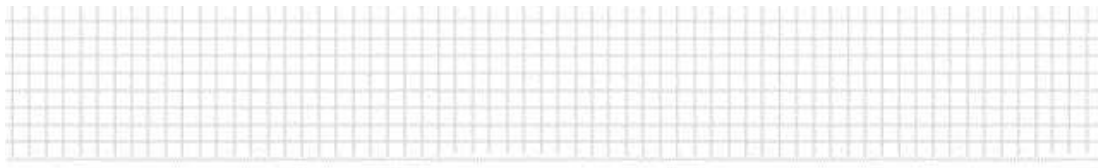
```
Press F1 for help
Options  1:PXES  2:XDM  3:RDP  4:UNC  5:ICA  6:local  7:ask  8:NX  9:boot
boot: _
```

From this menu you have access to the pre-configured sessions available on this CD.

Sessions

The list of available sessions and other boot options from this live CD is:

1		**LOCAL** X Windows session with local window manager and simple desktop.
2		**XDMCP** server (*X Display Manager*), mainly on Linux, Solaris and other Unices, presenting the graphical login screen.
3		**Microsoft Terminal Server** through RDP (*Remote Desktop Protocol*) on Microsoft Windows NT, 2000, 2003 and XP.
4		**VNC** (*Virtual Network Computer*) server.

5		**Citrix ICA** server supporting Citrix ICA Client Version 8.00.
6		**LOCAL** X Windows session with local window manager and simple desktop. Perhaps with a different configuration than session 1.
7		**ASK** Interactively prompts for all of the values that can be selected.
8		**Nomachine** NX session
9		**BOOT** boots according to BIOS setting.

Networking

DHCP server

If your network provides DHCP services, PXES will obtain its IP configuration automatically. This is the most practical and recommended way of configuring client.

On the other hand, if you boot and receive a message like this

```
Please wait a moment while the thin client is configured...
...usb.c: registered new driver usbdevfs
usb.c: registered new driver hub
usb-uhci.c: $Revision: 1.275 $ time 09:08:09 Apr 19 2004
usb-uhci.c: High bandwidth mode enabled
PCI: Found IRQ 9 for device 00:07.2
usb-uhci.c: USB UHCI at I/O 0x1060, IRQ 9
usb-uhci.c: Detected 2 ports
usb.c: new USB bus registered, assigned bus number 1
hub.c: USB hub found
hub.c: 2 ports detected
usb-uhci.c: v1.275:USB Universal Host Controller Interface driver
usb.c: registered new driver hid
hid-core.c: v1.8.1 Andreas Gal, Vojtech Pavlik <vojtech@suse.cz>
hid-core.c: USB HID support drivers
mice: PS/2 mouse device common for all mice
pcnet32.c:v1.27b 01.10.2002 tsbogend@alpha.franken.de
PCI: Found IRQ 11 for device 00:10.0
pcnet32: PCnet/PCI II 79C970A at 0x1080, 00 50 56 00 00 66 assigned IRQ 11.
eth0: registered as PCnet/PCI II 79C970A
pcnet32: 1 cards_found.
.
ERROR: DHCP failed. Network not initialized
........_
```

You will need to setup networking parameters manually. To do this, use the option
7:ASK.

Manual setup (ASK)

In this mode you will be prompted for the corresponding values. Some default values
are provided to guide you but your network parameters may differ.

The requested values are:

- IPADDR

- NETMASK

- GATEWAY

- HOSTNAME

- DOMAIN (dns domain name, don' t confuse this with a Microsoft Domain)

- NS1 (dns name server)

- NS2 (dns name server)

```
usb.c: new USB bus registered, assigned bus number 1
hub.c: USB hub found
hub.c: 2 ports detected
usb-uhci.c: v1.275:USB Universal Host Controller Interface driver
usb.c: registered new driver hid
hid-core.c: v1.8.1 Andreas Gal, Vojtech Pavlik <vojtech@suse.cz>
hid-core.c: USB HID support drivers
mice: PS/2 mouse device common for all mice
pcnet32.c:v1.27b 01.10.2002 tsbogend@alpha.franken.de
PCI: Found IRQ 11 for device 00:10.0
pcnet32: PCnet/PCI II 79C970A at 0x1080, 00 50 56 00 00 66 assigned IRQ 11.
eth0: registered as PCnet/PCI II 79C970A
pcnet32: 1 cards found.
.       Enter value for IPADDR [192.168.0.102]: 192.168.1.122
Please e Enter value for NETMASK [255.255.255.0]:
Enter va Enter value for GATEWAY [192.168.1.254]: 192.168.1.1
Enter va Enter value for HOSTNAME [P1921680011122]:
Enter va Enter value for DOMAIN: pxes.org
Enter va Enter value for NS1 or <Q> to quit [192.168.1.1]:
Enter va Enter value for NS2 or <Q> to quit [192.168.1.2]:
Enter value for NS2 or <Q> to quit [192.168.1.2]:
........
Default Session (local,xdm,rdp,vnc,ica,nx) [local]:
_
```

To verify that networking has been setup correctly, ping the PXES thin client from another host.

```
[diego@nemo diego]$ ping -c 3 192.168.1.122
PING 192.168.1.122 (192.168.1.122) 56(84) bytes of data.
64 bytes from 192.168.1.122: icmp_seq=0 ttl=64 time=3.20 ms
64 bytes from 192.168.1.122: icmp_seq=1 ttl=64 time=1.75 ms
64 bytes from 192.168.1.122: icmp_seq=2 ttl=64 time=1.67 ms

--- 192.168.1.122 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 1.678/2.211/3.201/0.700 ms, pipe 2
```

Manual setup (IP)

There's yet another possibility to setup networking.

You can use the boot: prompt to enter parameters and configuration options. In the specific case of IP you can enter the parameter definition.

```
ip=<clientip>:<serverip>:<gwip>:<netmask>:<hostname>:<device>:<autoconf>:<ns1>:<ns2>
```

For example (all in the same line):

```
boot: 1
ip=192.168.1.122:0.0.0.0:192.168.1.1:255.255.255.0:P192168001122:eth0:1:192.168.1.1:
```

Alternatively you can use this command line to be prompted for the IP parameters:

```
boot: 1 ip=ask
```

Display Modes

Default settings

PREBUILT images are intended as demonstration only images and its intention is to support the broadest range of hardware possible. Thus, most parameters are setting in a extremely conservative manner.

This table shows the values selected at build time.

Description	Value
Video modes	800x600
	640x480
Horizontal sync.[1]	31.5-35.5
Vertical refresh	50-61
Color depth	16

If your hardware supports better video mode, resolution, color depth or frequencies, one way to override the PREBUILT image settings is adding some command line options to the boot prompt. Video parameters settings affect every graphical session.

For example, suppose your hardware supports 1024x768 @ 72 Hz. and 24 bit color (16M colors)

From your monitor manual you obtained that

	Min	Max
Horizontal	31.5	58
Vertical	50	100

PXES abbreviated command line parameters for these values are

Description	Type	Variable
Video modes	array	xvm
Horizontal sync.	string	xh
Vertical refresh	string	xv
Color depth	string	xcd

So, your boot command line will be:

```
boot: 1 xvm="1024x768" xh=31.5-58 xv=50-100 xcd=24
```

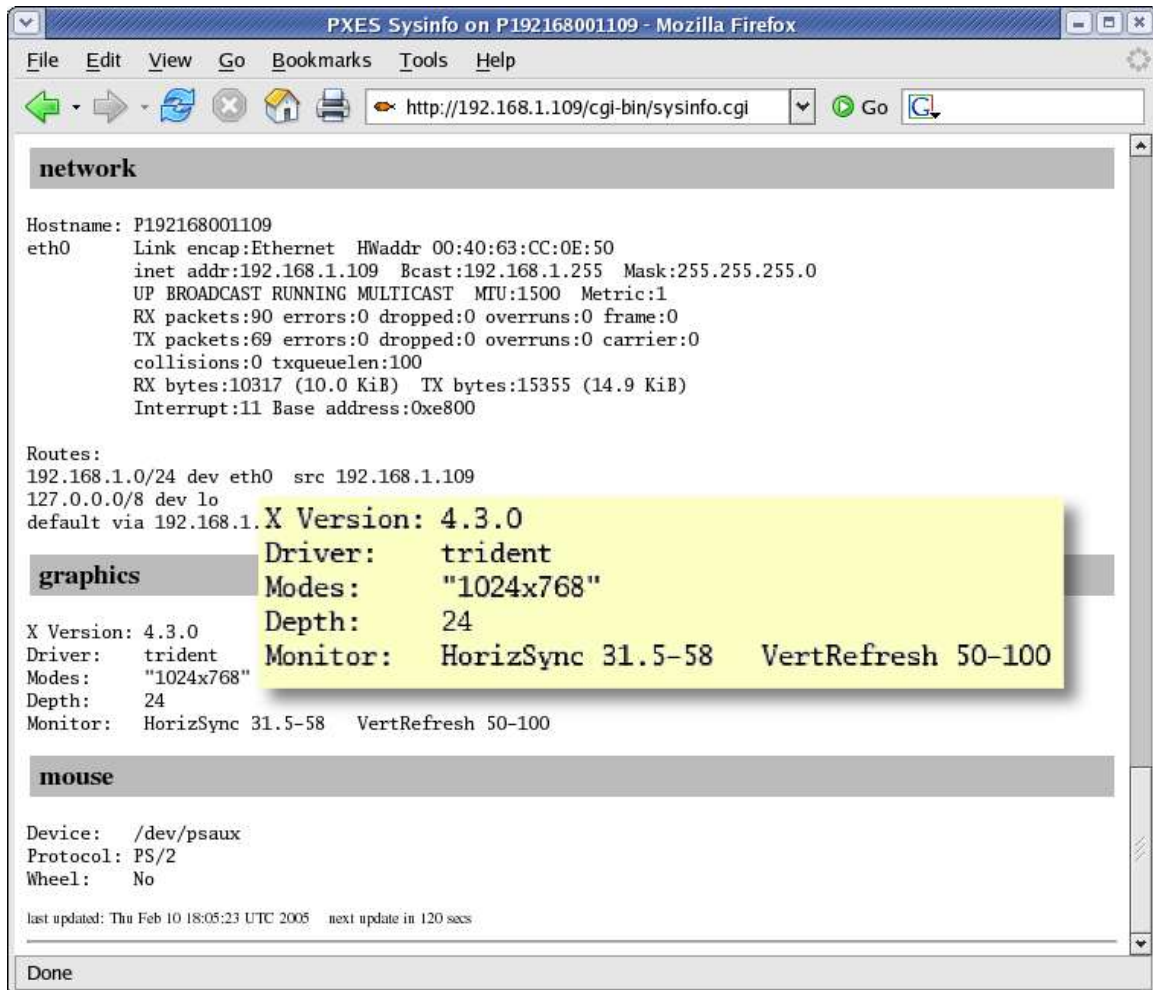1   These values correspond to a Generic 800x600 monitor.

After booting, you can access PXES web interface and verify that your parameters were correctly specified.

sysinfo

Point your browser to http://your.thin.client.ip/cgi-bin/sysinfo.cgi

The relevant parts are highlighted.

Bootmsg

Boot messages are logged and can also be checked accessing http://your.thin.client.ip/cgi-bin/bootmsg.cgi
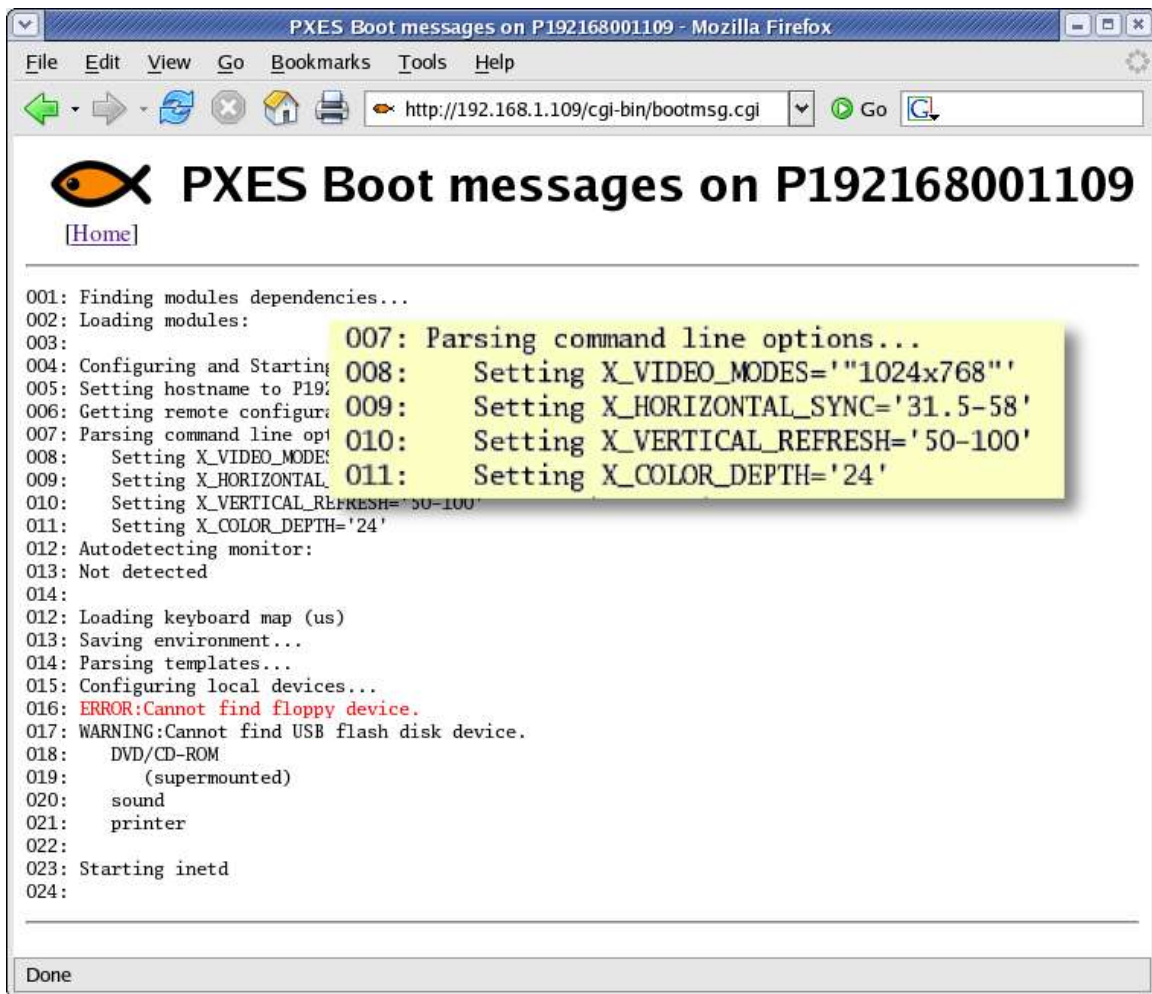
Local desktop

If everything went well, you will be presented with a local desktop featuring some icons to access some local configuration options or servers through different protocols.

You can open a local terminal (Terminal icon) and test the network. Just ping other host in your network.

If you have some Unix or Linux server on your network reachable by XDMCP, the X display manager control protocol through a broadcast request, just click on the XDM client and server login will soon appear. In the case that your servers could not be reachable by the broadcast, select the 'configure' icon at the bottom and selecting the XDM option in the menu, configure the suitable parameters for your environment. Normally, you need to change only the XDM_METHOD to 'query' and set the XDM_SERVER_NAME to the name of your server name or IP address (i.e:

192.168.1.100).

Other sessions can be tested in the same way, clicking the icons and configuring some parameters if necessary. To minimize required configuration some parameters have been set at build time, which are described in the next table.

Parameter	Value
XDM session	
XDM method	broadcast
XDM port	177
XDM server name	
VNC session	
VNC server name	vnc
VNC display	1
VNC password	pxes123 (you need to configure this password in your vncserver)
RDP session	
RDP server name	rdp
RDP port	3389
RDP color depth	8 (to permit connections to W2K servers)

Configuring an XDM session

If your servers and network are configured to support the broadcast method you may have nothing to setup. Otherwise, you should use any of the configuration modes.

Using boot command line parameters

The simpler way to configure an PXES XDM session is using boot command line parameters.

```
boot: 2 xdm=192.168.0.100 xm=query
```

replacing the command line with the IP address of your Unix/Linux server supporting XDMCP.

Alternatively you can use `indirect` method instead of `query`.

Using ASK boot option

Selecting 7:ASK at the boot prompt and selecting an xdm session the main set of parameters will be requested. This parameters are:

• XDM server name or IP address

• XDM method

Configuring a Microsoft RDP session

As usual, the set of parameters selected in the PREBUILT images are the most conservative ones. This ensures a maximum probability of workability, although you may obtain better results using a customized set of parameters.

Using boot command line parameters

The simpler way to configure an PXES RDP session is using boot command line parameters.

```
boot: 3 rdp=192.168.0.100
```

replacing the command line with the IP address of your Microsoft Terminal Server.

Using ASK boot option

Selecting 7:ASK at the boot prompt and selecting an rdp session the main set of parameters will be requested. This parameters are:

• Microsoft Terminal Server name or IP address

• RDP protocol version

• Color depth

• Other options

Configuring a Citrix ICA session

Citrix ICA inside a LOCAL SESSION

The easiest way to start testing a Citrix ICA session is within a PXES LOCAL session.

PXES LOCAL session presents you a desktop with icons launchers to access client sessions and also some configuration options.

PXES LOCAL session is the default session in the PREBUILT image. Just press <ENTER> at the boot: prompt or 1 (one) followed by the command line parameters you want to add, as showed in previous sections.

The local desktop will be like this.

Clicking on the **ICA Configuration** icon you will be able to access the ICA Configuration utility `wfcmgr`.

This PREBUILT image is configured with conservative and fictitious parameters that you can change to suit your needs and environment.

Parameter	Description	Value
Server	ICA Test Server	ica.example.org

All other parameters have their default values.

To be able to connect to your server you need to change at least this parameter.

Then you can check the values in:

- Preferences

- Window

- Server Location

- HotKeys

- Disk Cache

- Drive Mapping
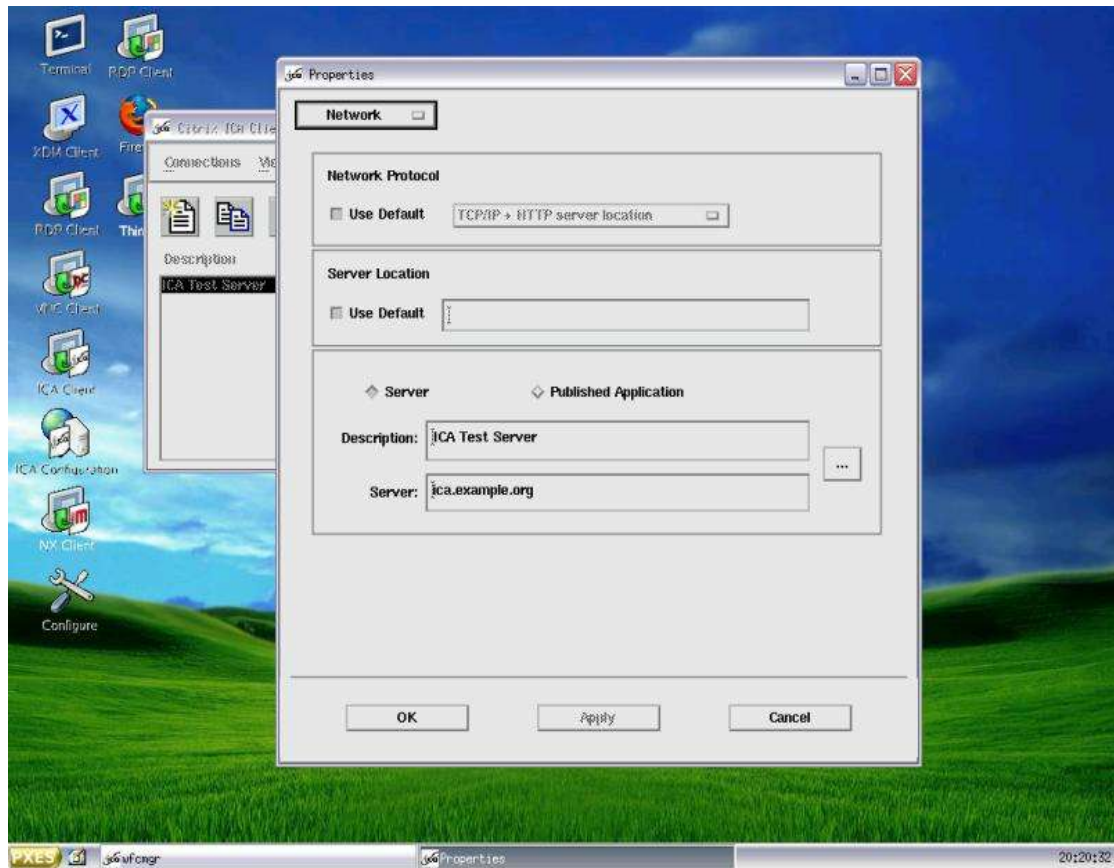
Using boot command line parameters

An alternative way of configuring a PXES ICA session is using boot command line parameters.

```
boot: 5 ica=192.168.0.101
```

replacing the command line with the IP address of your Citrix Metaframe Server.

Advanced configuration

Using TFTP to set parameters

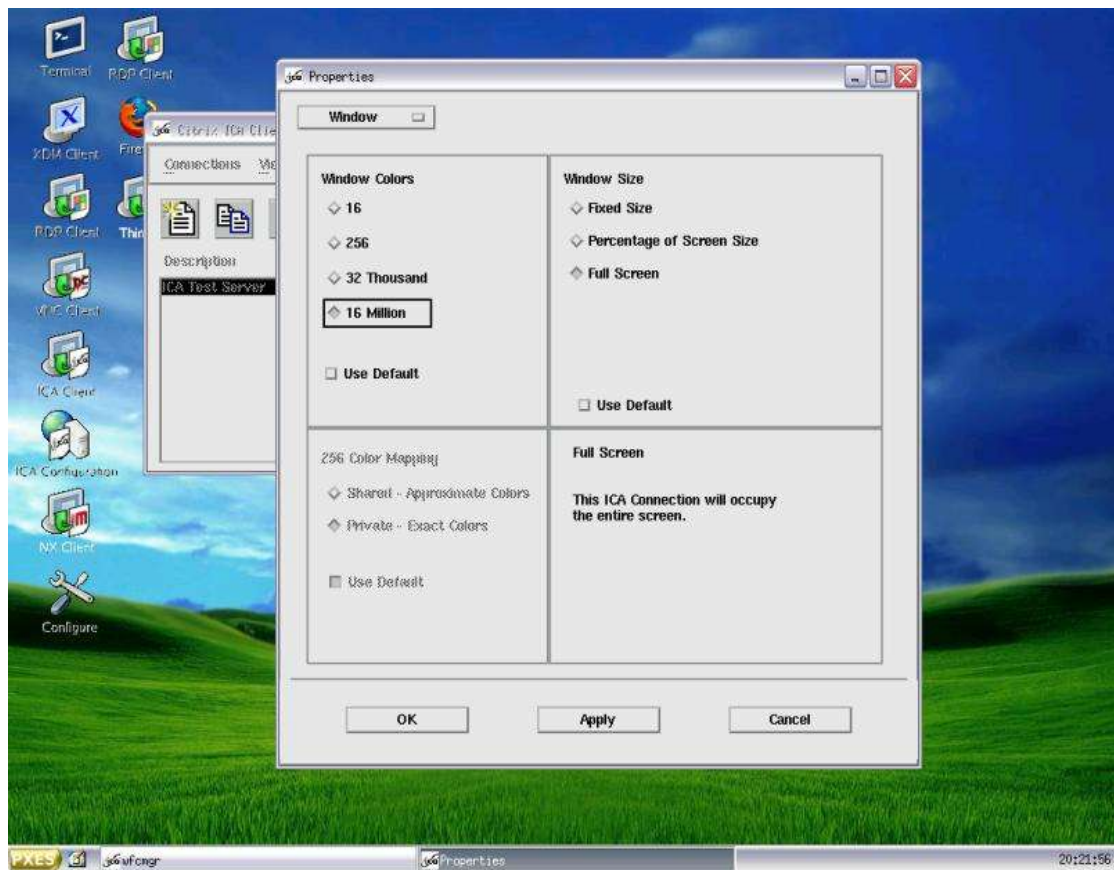To allow remote configuration, PXES images have the ability to use a preconfigured

TFTP server to obtain parameters and personalization.

As we previously mentioned, one of the PXES strengths is the autodetection and configuration of a wide range of hardware, but perhaps some options fall out of this category because, for example, a keyboard layout is not autodetectable.

In those cases, a remote TFTP server is used to store the corresponding configuration and personalization files.

Setting up the TFTP server

The default location, as configured in the PXES PREBUILT images is /pxes/config.

In most setups, the TFTP is chrooted to some directory for security reasons, a common place is /tftpboot. As the service runs inside this directory is must be stripped out from file' path.

In your filesystem, the real location for the configuration files will be the /tftpboot/pxes/config directory.

Inside this directory we need to place some configuration files that will be read taking some precedence from the most generic to most particular: default.conf, <network>.conf, <MAC>.conf and <hostname>.conf. You should replace <network>, <MAC> and <hostname> by the actual values matching your set up.

In our example, we need to overwrite the XDM method and host used in the PXES PREBUILT image, and for brevity we will use default.conf.

```
# default.conf
SESSION_DEFAULT=xdm
XDM_METHOD=query
XDM_SERVER_NAME=192.168.1.100
```

We introduced a new variable, SESSION_DEFAULT, which indicates a default session of XDM instead of the local desktop that we run before.

Now, we need to indicate our thin client where is the TFTP server.

With a DHCP service on the newtork

You DHCP could help to set the options that we manually set in previous example, in a more persistent way.

Using DHCP option 66 (RFC 2132) a TFTP server could be specified.

If you are using ISC DHCP

```
[...]
option tftp-server-name "192.168.1.100";
[...]
```

With a DNS services

Another alternative to let the PXES thin client find the TFTP server is to enter an alias in the DNS server and provinding that the DHCP response include the DNS servers information.

In your DNS configuration add an alias to your tftp server.

```
confserver   IN CNAME   your-tftp-server
```

Test your configuration

Reboot your test machine and after a few seconds you should see the graphical login as the figure [figure-pxes-xdm-login.png]shows.

Congratulations! You have just built your first PXES thin client based on a PREBUILT image.

Using DHCP to set parameters **this is supported on PXES 1.0**

If your network has a DHCP service and it is assigning IP addresses, you can use it too to set some parameters that depend on your environment.

Suppose that, like in the previous example you need to change XDM_METHOD to 'query' and XDM_SERVER_NAME to '192.168.1.100', instead of providing them on the kernel command line which is a volatile setting, you can configure your DHCP to provide options 128 and 129 in the response.

If you are using ISC DHCP, your configuration file will look like this:

```
[...]
option option-128 code 128 = string;
option option-129 code 129 = text;
[...]
host pxes {
    hardware ethernet xx:xx:xx:xx:xx:xx;
    fixed-address 192.168.1.101;
    option option-128 50:58:45:53:4f:50:54:00;
    option option-129 "xm=query xdm=192.168.1.100";
    }
```

As you may have already discovered, 'xm' and 'xdm' are the corresponding abbreviations of XDM_METHOD and XDM_SERVER_NAME. There are more abbreviations to keep the kernel command line or this options in a reasonable size, you can check the documentation for a full listing.

Remote administration

Now that we have successfully configured out PXES thin client, we are going to experiment with some of the remote administration alternatives that are present in the image.

To test this we need to be logged in into another machine an access the PXES thin client remotely.

Web server

A tiny web server is present in the PXES PREBUILT image. Just point your browser to http://<your-thin-client-ip>

[figure-pxes-web-admin]

Some administrative information is presented through the web pages, like hardware inventory, state information and basic administrative commands.

Secure shell (ssh)

For a more powerful administration you can log into the thin client and experiment a full command line.

Using a ssh client you can access your thin client with a preconfigured password 'pxes' :

```
$ ssh root@<your-thin-client-ip>
root@<your-thin-client-ip>'s password: pxes
Executing root's profile...
#_
```

Telnet

Telent is yet another alternative to access the thin client.

Just telnet into it:

```
$ telnet <your-thin-client-ip>
```

Session shadowing

The last remote administration option we are going to see is the remote session shadowing, where you can take full control of the remote graphical session using a VNC viewer.

This PXES PREBUILT image is configured not to request a password to permit the

VNC access, so be careful of not forget to disable this option if you use this image for more than demonstration purposes.

```
$ vncviewer <your-thin-client-ip>
```