Running trixbox in XEN

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February 1, 2009

Preface:

This document will describe the techniques needed to run trixbox CE inside of a XEN DomU. This will include;

Setting up a install server

Kickstart configuration

DomU setup

Install trixbox CE

Install zaptel to work with XEN

Fix GUI related issues

This document makes use of several technologies to do this install. The requirements are.

Web server for serving the install files.

Ability to mount a iso image on the web server.

Command line editor, vi or nano will work.

DHCP server on the network to serve IP addresses to the DomU

This document will make use of text constructs to signal important information. The following constructs will be use.

`Code` This font will be used to emphasize code that will need to be typed.

Bold This will be used to emphasize important information.

Italics This will be used to emphasize tips and links.

1. Install Base Operating System.

This document will use CentOS 5.2 for the base operating system.

For the package selection I have chosen the following.

Base

web-server

Virtualization

If you choose to add additional packages it should be fine.

Once the install is completed, but sure to boot from the XEN kernel.

Login and ensure that networking is working and that your IP is static and not DHCP. This will make sure that it does not change during a XEN DomU install. We will be using the base OS to serve the install files.

Perform a update to ensure the latest xen and kernel-xen are install. On CentOS to update the system.

```
yum update
```

If a newer kernel is install be sure to reboot the system and choose the latest kernel.

2. Setup Install Server

We will be using apache on the main operating system to serve DomU the install files. To do this we need to have the trixbox iso image on our system somewhere.

I will be using trixbox-2.6.2.1.iso MD5SUM 4b71156885733abe0c6cdc531577657f for these examples. This iso includes the Xen components that are needed to be able to boot the DomU.

Once the iso image is copied to the system, we need to mount it where apache can serve the contents. CentOS defaults DocumentRoot is /var/www/html , so we create a new folder in this directory to serve the iso contents.

```
mkdir /var/www/html/trixbox
```

```
mount –oloop ./trixbox-2.6.2.1.iso /var/www/html/trixbox
```

We need to copy the kickstart file from the iso so we can edit it and serve it to the DomU. This is called a kickstart install and we will make extensive use of this.

```
cp /var/www/html/trixbox/isolinux/ks.cfg /var/www/html/
```

We need to edit this ks.cfg file. I use vi, feel free to use whatever you want on the command line.

```
vi /var/www/html/ks.cfg
```

We will be adding the following. (See the end of this document for a complete kickstart file.)

We need to add the url directive to let kickstart know where to get the iso files. This goes directly after the legal notice and before the language setting.

```
url --url http://192.168.1.219/trixbox/
```

Replace the ip above (192.168.1.219) with the correct ip of your install server. This is the one that is serving the trixbox iso over http.

Under kernel in the %packages section we need to add the kernel-xen. We want to install them both, don't remove the kernel one.

```
%packages

@Core

@Trixboxcore

kernel

kernel-xen

postfix

-sendmail
```

I found that I needed to comment out the following lines to ensure that pygrub worked correctly in the DomU. (We will cover pygrub later)

```
#cp -f /var/trixbox_load/splash.xpm.gz /boot/grub

#cp -f /boot/grub/grub.conf /boot/grub/grub.conf.old

#sed -e "s/hiddenmenu/#hiddenmenu/"
/boot/grub/grub.conf.old > /boot/grub/grub.conf
```

Using a browser make sure you can see the contents of your new trixbox folder. If you get a error or are unable to see the contents, examine the logs and make sure httpd is running. Do not proceed until you can see the contents of this folder.

3. Setup Xen

You now need to copy some files off the iso image to serve to the DomU during install. Watch the line-wraps, this should all be on one line.

```
cp /var/www/html/trixbox/images/xen/initrd.img
/boot/initrd-xen-install-trixbox

cp /var/www/html/trixbox/images/xen/vmlinuz /boot/vmlinuz-
xen-install-trixbox
```

Create the disk image

From this link, http://wiki.centos.org/HowTos/Xen/InstallingCentOSDomU we need to create a disk image for our DomU. I like to pace my images in /srv/xen , although any directory will work.

```
mkdir –p /srv/xen
```

Now we need to create the empty disk image. The following will create a empty disk image /srv/xen/trixbox.img of 4096MB, although the actual data blocks are created in lazy fashion.

```
dd if=/dev/zero of=/srv/xen/trixbox.img oflag=direct bs=1M
seek=4096 count=1
```

If you want to reserve all the data blocks right away, you can also do that:

```
dd if=/dev/zero of=/srv/xen/trixbox.img oflag=direct bs=1M
count=4096
```

This will avoid data block allocation problems if the volume that holds the image is full.

Create Xen Install Configuration File

Create the following file called /etc/xen/trixbox

```
kernel = "/boot/vmlinuz-xen-install-trixbox"

ramdisk = "/boot/initrd-xen-install-trixbox"

extra = "text ks=http://192.168.1.219/ks.cfg"

name = "trixbox"

memory = "512"

disk = [ 'tap:aio:/srv/xen/trixbox.img,xvda,w', ]

vif = [ 'bridge=xenbr0', ]

vcpus=1

on_reboot = 'destroy'

on_crash = 'destroy'
```

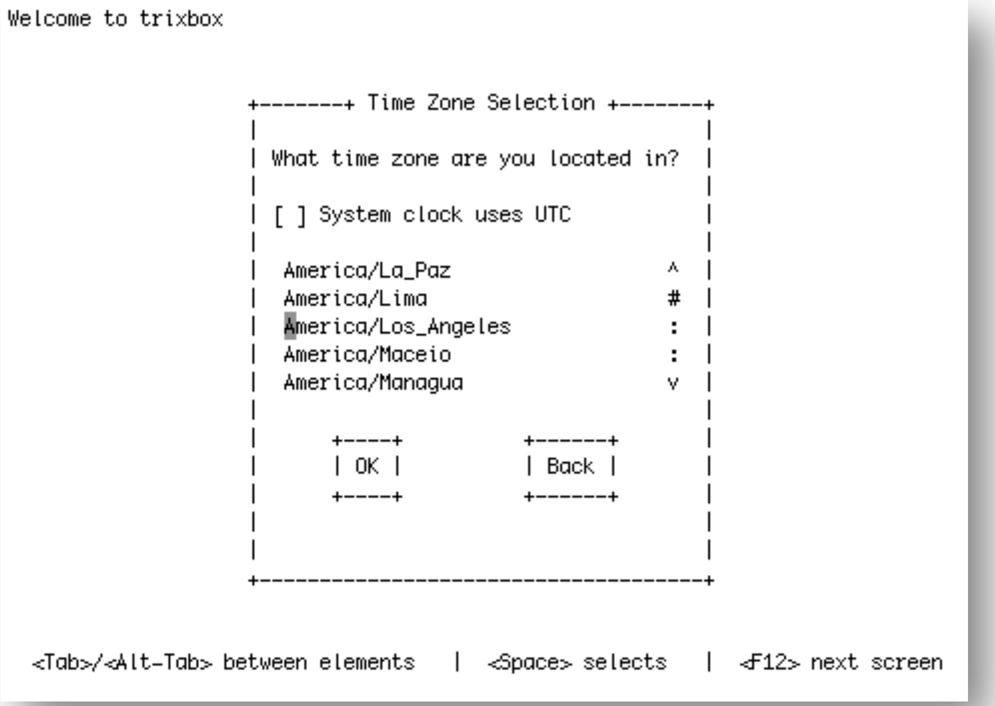
The part to watch here is the extra line. The ***ks=http://192.168.1.219/ks.cfg*** has to point to the IP address and kickstart file from you install server. This will allow our Xen DomU to use http to get the kickstart file allowing us to customize the install to our needs. Make sure that the ***disk*** also points to the correct disk image we just created. Tweak the ***memory*** setting to meet your needs.

Starting the installation

We now need to start the installation of our trixbox in Xen. From the command line we do:

```
xm create –c trixbox
```

If all goes well, you should be presented with the all familiar time zone selection screen (Pic 1).

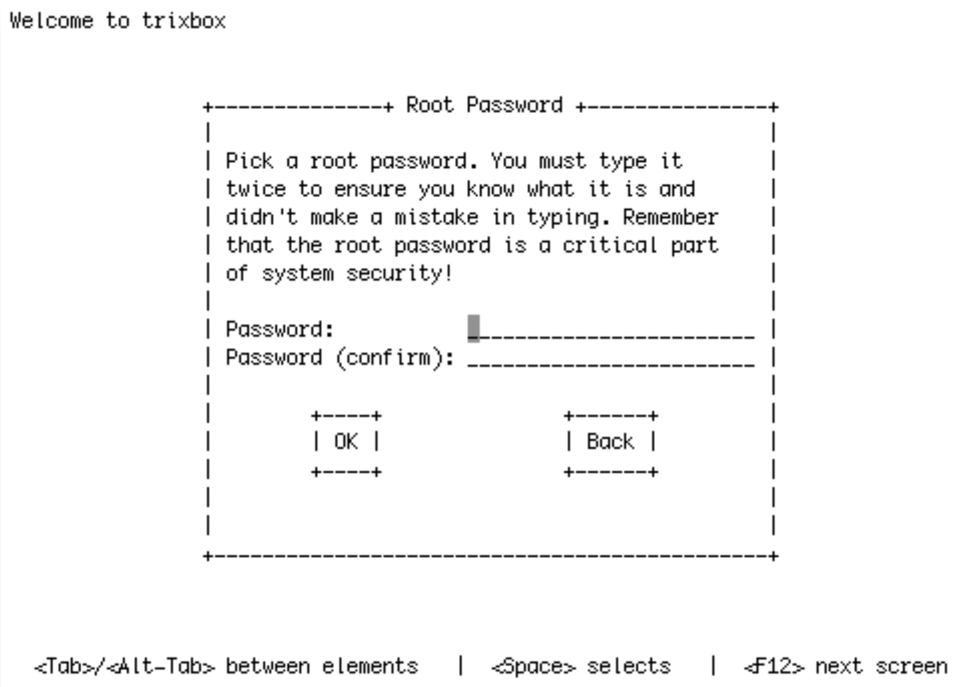


```
Welcome to trixbox

                   +-------+ Time Zone Selection +-------+
                   |                                     |
                   | What time zone are you located in?  |
                   |                                     |
                   | [ ] System clock uses UTC           |
                   |                                     |
                   |  America/La_Paz                  ^  |
                   |  America/Lima                    #  |
                   |  America/Los_Angeles             :  |
                   |  America/Maceio                  :  |
                   |  America/Managua                 v  |
                   |                                     |
                   |      +----+          +------+       |
                   |      | OK |          | Back |       |
                   |      +----+          +------+       |
                   |                                     |
                   |                                     |
                   +-------------------------------------+

  <Tab>/<Alt-Tab> between elements   |  <Space> selects   |  <F12> next screen
```

Pic. 1 (Time Zone Selection screen in Xen DomU)

Using the **Space Bar** and **Tab** key, make your selections.

You should now see the password screen for root. (Pic 2.)

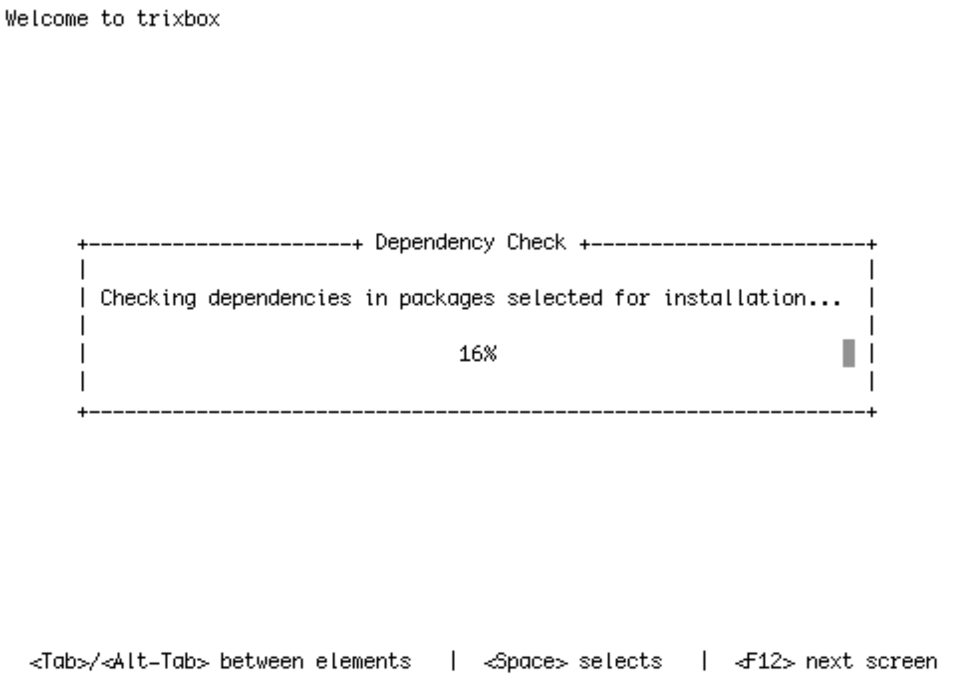


```
Welcome to trixbox

                +---------------+ Root Password +---------------+
                |                                               |
                | Pick a root password. You must type it        |
                | twice to ensure you know what it is and       |
                | didn't make a mistake in typing. Remember     |
                | that the root password is a critical part     |
                | of system security!                           |
                |                                               |
                | Password:           ________________________  |
                | Password (confirm): ________________________  |
                |                                               |
                |        +----+              +------+           |
                |        | OK |              | Back |           |
                |        +----+              +------+           |
                |                                               |
                |                                               |
                +-----------------------------------------------+

  <Tab>/<Alt-Tab> between elements   |  <Space> selects   |  <F12> next screen
```

Pic. 2 (Password confirmation for root)

Be sure to use a strong root password.

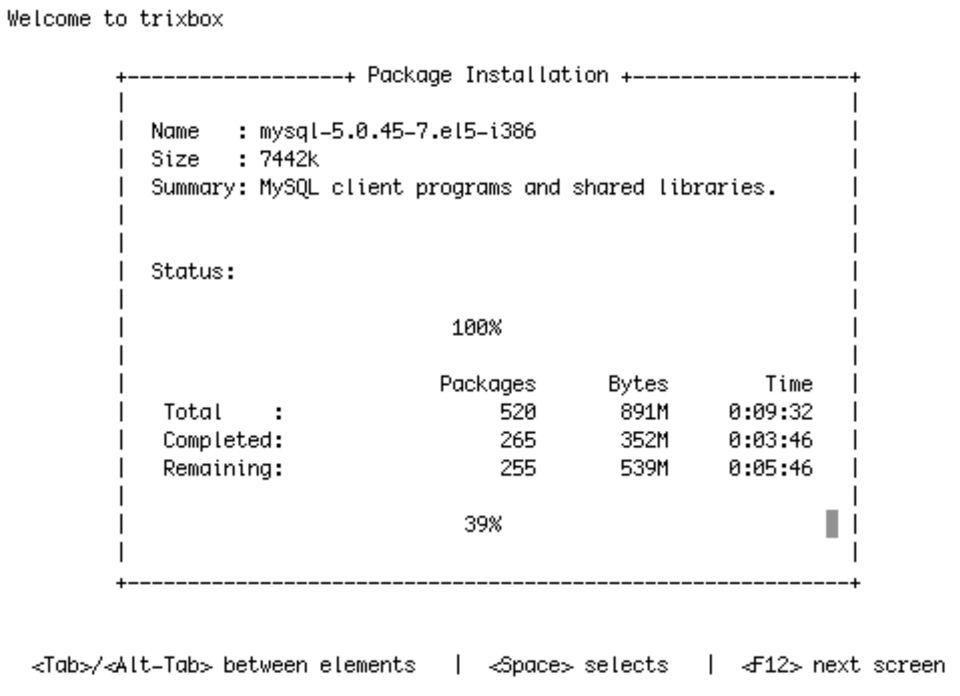
Next comes the **Package Dependency Check** (Pic 3.)



```
Welcome to trixbox




     +----------------------+ Dependency Check +-----------------------+
     |                                                                 |
     | Checking dependencies in packages selected for installation...  |
     |                                                                 |
     |                            16%                                 ||
     |                                                                 |
     +-----------------------------------------------------------------+




  <Tab>/<Alt-Tab> between elements   |  <Space> selects   |  <F12> next screen
```

Pic 3. (Package Dependancy Check)

If the checks pass then the installation of the packages begin (Pic 4.)



```
Welcome to trixbox

        +-------------------+ Package Installation +-------------------+
        |                                                              |
        |  Name    : mysql-5.0.45-7.el5-i386                           |
        |  Size    : 7442k                                             |
        |  Summary: MySQL client programs and shared libraries.        |
        |                                                              |
        |                                                              |
        |  Status:                                                     |
        |                                                              |
        |                        100%                                  |
        |                                                              |
        |                       Packages      Bytes         Time       |
        |   Total    :               520       891M      0:09:32       |
        |   Completed:               265       352M      0:03:46       |
        |   Remaining:               255       539M      0:05:46       |
        |                                                              |
        |                         39%                                 ||
        |                                                              |
        +--------------------------------------------------------------+


  <Tab>/<Alt-Tab> between elements   |  <Space> selects   |  <F12> next screen
```

Pic 4. (Package Installation)

Booting for the first time

Once the install is complete, the Xen DomU will shutdown and not boot back up. This is normal. We have specifically told Xen to **on_reboot = 'destroy'** in the /etc/xen/trixbox config file. We now have to create a running configuration file for the Xen DomU. This file will replace the /etc/xen/trixbox file we created before. We do want to keep the original file for future installs.

```
cp /etc/xen/trixbox /etc/xen/trixbox.install
```

The new contents of the Xen trixbox file is listed below. Using vi or other editor edit the file with the new contents.

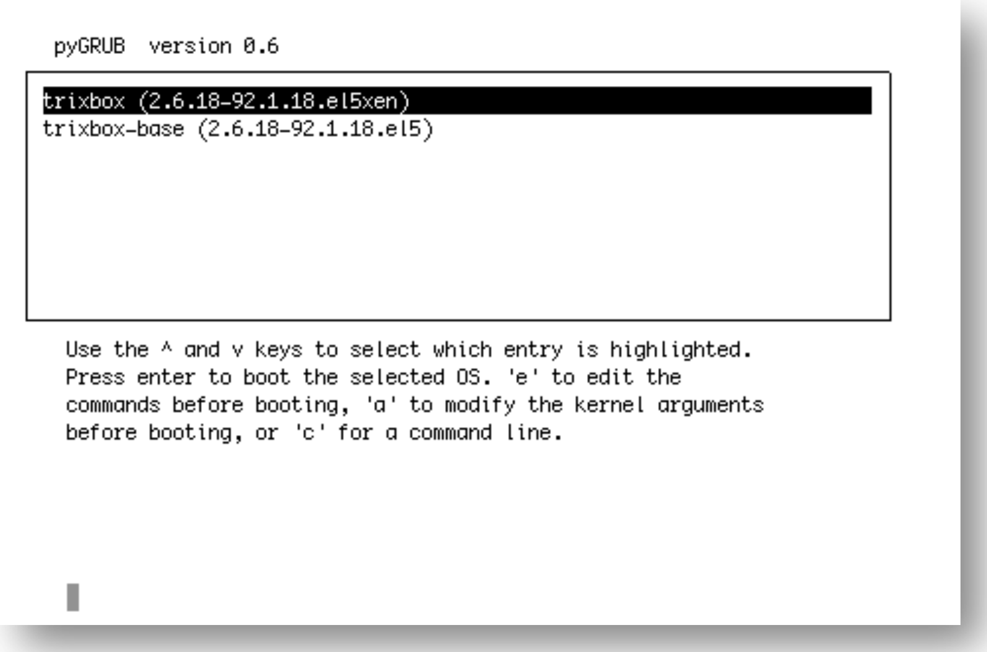
```
name = "trixbox"

memory = "512"

disk = [ 'tap:aio:/srv/xen/trixbox.img,xvda,w', ]

vif = [ 'bridge=xenbr0', ]

bootloader="/usr/bin/pygrub"

vcpus=1

on_reboot = 'restart'

on_crash = 'restart'
```

Again, tweak the settings to fit your environment. The `name = "trixbox" ,` setting is going to be a unique name for your Xen DomU. Make sure `disk = [ 'tap:aio:/srv/xen/trixbox.img,xvda,w', ]` points to the disk image we created from a previous step.

With this new /etc/xen/trixbox Xen configuration file in place, it is time to boot the Xen DomU again. This will be the first boot and will fire off all the firstboot scripts that trixbox uses to configure itself.

```
xm create –c trixbox
```

When you boot up the Xen DomU for trixbox, you will want to make sure you choose, if not already the default, xen kernel (Pic 5). This will definitely generate some various errors related to Zaptel. These are fine for now and are expected. Since Zaptel is a kernel specific package, it is not correct for the Xen kernel. We will be resolving this shortly.



```
pyGRUB  version 0.6

trixbox (2.6.18-92.1.18.el5xen)
trixbox-base (2.6.18-92.1.18.el5)

 Use the ^ and v keys to select which entry is highlighted.
 Press enter to boot the selected OS. 'e' to edit the
 commands before booting, 'a' to modify the kernel arguments
 before booting, or 'c' for a command line.
```

Pic 5. (Be sure to choose the Xen kernel on first boot)

It is now time to prepare the system for a new Zaptel RPM based on our running kernel. You can either use the `xm console trixbox` or if you know the IP address of the DomU, you can use ssh. I prefer to ssh into the system. I have prepared Xen based RPMS for oslec and zaptel on the engineertim.com website.

We first need to uninstall the old rpms.

```
rpm —e --nodeps zaptel zaptel-modules
rpm —e --nodeps oslec oslec-modules
```

We now grab the new rpms so we can install them.

```
wget -nd -r -l1 -np -A.rpm http://engineertim.com/rpms-xen/
```

This will grab all the RPMS available on the server. The src rpms are located at http://engineertim.com/rpms-xen/srpms

We need to install the oslec rpms, then install the zaptel rpms.

```
rpm -ivh oslec-xen*
```

```
rpm -ivh zaptel-xen*
```

You will see a error with the zaptel-xen rpm, it is safe to ignore. The error message is

```
error reading information on service zaptel-xen: No such
file or directory
```

You should now be able to restart zpatel and check for ztdummy.

```
service zaptel restart
```

```
lsmod | grep ztdummy
```

The resulting command should output something like the following.

```
[trixbox1.localdomain ~]# lsmod | grep ztdummy

ztdummy                  7968  0

zaptel                 186756  13
ztdummy,xpp,wcusb,wctdm,wcfxo,wctdm24xxp,wcte11xp,wct1xxp,w
cte12xp,wct4xxp,tor2
```

The system should be ready for use. You can even update the kernel-xen to the latest version and zaptel should continue to work without issue. You will have to edit /etc/yum.repos.d/CentOS-Base.repo and put a comment in front of all the exclude=kernel* so they look like #exclude=kernel*

4. Fixing the GUI for Xen sysinfo

Unfortunately there is a bug in the GUI of trixbox when using Xen. You will get a few unsightly errors when you first login. This is easy to fix with a few new files that will fix them right up.

Grab the files from http://engineertim.com/guifix

```
wget -nd -r -l1 -np -A.tar.gz http://engineertim.com/guifix
```

This will give you two files.
class.Linux.inc.php.tar.gz
common_functions.php.tar.gz
These files need to be uncompressed for use.

```
tar -zxvf class.Linux.inc.php.tar.gz
tar -zxvf common_functions.php.tar.gz
```

We now need to replace a few files with these new ones. Watch line-endings.

```
cp class.Linux.inc.php
/var/www/html/maint/modules/home/includes/os/class.Linux.in
c.php

cp common_functions.php
/var/www/html/maint/modules/home/includes/common_functions.
php
```

We now need to fix any permission problems from the copy. Watch line-endings.

```
chown asterisk:asterisk
/var/www/html/maint/modules/home/includes/os/class.Linux.in
c.php
chown asterisk:asterisk
/var/www/html/maint/modules/home/includes/common_functions.
php
```

5. Finalization

Your system should now be running under Xen as a DomU. A quick reboot should be performed to ensure there are no lingering issues. If you experience issues go back and try to figure out what went wrong.

At this point you can create multiple copies of the same DomU. You will have to give the image name a unique name. This name will also have to match in your configuration file. Each configuration file must also have a unique name as well as the name variable in the configuration file itself.

6. Reference Files

Included here are sample configuration files and the ks.cfg file I used. Please watch line-endings.

ks.cfg located at /var/www/html/ks.cfg

```
#trixbox Kickstart file - 12/05/07
#
# Copyright (C) 2007 Fonality Inc. (fonality.com)
#
# This program is free software; you can redistribute it and/or
# modify it under the terms of the GNU General Public License
# as published by the Free Software Foundation; either version 2
# of the License, or (at your option) any later version.
#
# This program is distributed in the hope that it will be useful,
# but WITHOUT ANY WARRANTY; without even the implied warranty of
# MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
# GNU General Public License for more details.

url --url http://192.168.1.219/trixbox/

#System  language
lang en_US

#Language modules to install
langsupport en_US

# System authorization information
auth  --useshadow  --enablemd5

#System bootloader configuration
bootloader --location=mbr

#Clear the Master Boot Record
zerombr

#Partition clearing information
clearpart --all --initlabel
part /boot --fstype ext3 --size=100
part / --fstype ext3 --size=1024 --grow
part swap --size=256 --grow --maxsize=768

# Firewall configuration
firewall --disabled

# Run the Setup Agent on first boot
firstboot --disable

# Installation logging level
logging --level=info

# CDROM Based Installation
```

```
    cdrom

    # Install in text mode
    text

    # Network information
    network --bootproto=dhcp --device=eth0 --onboot=on

    # Reboot after installation
    reboot

    # SELinux configuration
    selinux --disabled

    # Do not configure the X Window System
    skipx

    # Install OS instead of upgrade
    install

    %packages
    @Core
    @Trixboxcore
    kernel
    kernel-xen
    postfix
    -sendmail

    %post

    echo "NETWORKING=yes" > /etc/sysconfig/network
    echo "HOSTNAME=trixbox1.localdomain" >> /etc/sysconfig/network
    echo "DHCP_HOSTNAME=TRIXBOX1" >> /etc/sysconfig/network

    echo "# Do not remove the following line, or various programs" > /etc/hosts
    echo "# that require network functionality will fail." >> /etc/hosts
    echo "127.0.0.1            trixbox1.localdomain     trixbox1
localhost.localdomain   localhost" >> /etc/hosts

    #cp -f /var/trixbox_load/splash.xpm.gz /boot/grub
    #cp -f /boot/grub/grub.conf /boot/grub/grub.conf.old
    #sed -e "s/hiddenmenu/#hiddenmenu/" /boot/grub/grub.conf.old >
/boot/grub/grub.conf

    echo "trixbox.org" > /etc/trixbox/trixbox-source

    eject
    %end
```

trixbox - Xen install Configuration file. Located /etc/xen/trixbox

```
kernel = "/boot/vmlinuz-xen-install-trixbox"
ramdisk = "/boot/initrd-xen-install-trixbox"
extra = "text ks=http://192.168.1.219/ks.cfg"
name = "trixbox"
memory = "512"
disk = [ 'tap:aio:/srv/xen/trixbox.img,xvda,w', ]
vif = [ 'bridge=xenbr0', ]
vcpus=1
on_reboot = 'destroy'
on_crash = 'destroy'
```

trixbox - Xen boot configuration file. Locate /etc/xen/trixbox
Be sure to copy /etc/xen/trixbox /etc/xen/trixbox.install first

```
name = "trixbox"
memory = "512"
disk = [ 'tap:aio:/srv/xen/trixbox.img,xvda,w', ]
vif = [ 'bridge=xenbr0', ]
bootloader="/usr/bin/pygrub"
vcpus=1
on_reboot = 'restart'
on_crash = 'restart'
```

7. Test environment while writing documentation.

My test environment consisted of.

Intel D945GCLF Mini-ITX Atom 230
2 Gigs RAM
320 Gig Seagate disk drive
pico PSU-90 power supply
engineertim.com Acrylic System Case (shameless plug and coming soon!)

Each Xen DomU had 256MB Ram allocated. I was able to go to 4 DomUs on this setup. Tests were done using one DomU with all of them started.

Tests done.
register 2 phones with Xen DomU.
Dial each extension and leave voicemail.
Check voicemail from each phone and test for voice issues.
Dial *65 from each phone to read back extension number.

Additional things to try.

Share your Xen images over NFS to multiple Xen servers. This will allow you to live migrate the images over the network. On a gigabit network, this image transfer will result in one packet losed and connections will stay active. This is great for clustering a failover server and for maintenance. There are several special configuration options that have to be done with Xen to get this to work. This will also work with GFS and drbd. Google to the rescue!!

Use LVS (http://www.linuxvirtualserver.org/) to create a load balance of trixbox systems.

Throw in systemimager (http://wiki.systemimager.org/) with all of the above, and you have one hell of a setup for a large failover system.

Use lcdproc with your USB or serial LCD on the head Dom0. Have your Xen DomU report information about them back to the Dom0.

Special Thanks to:

Canvas Dreams - www.canvasdreams.com - Oregon’s first 100% renewable energy web host. They kept me going when the chips were down. If you need a excellent host they are the ones to use!!

Aric and Andrew of trixbox. I bet you did not see that one coming!!

Kerry Garrison - He continues to help me learn more and more about trixbox.

Finally, don’t forget to donate to my favorite charity. www.unicef.org