Building and Installing Xen 4.x and Linux Kernel 3.x on Ubuntu and Debian Linux

Version 1.4

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1   Linux Kernel 3.x with Xen Virtualization Support (Dom0 and DomU)

In this installation document, we will build/compile Xen 4.1.3-rc1-pre and Linux kernel 3.3.0-rc7 from sources.

```
sudo apt-get install aria2
```

```
aria2c -x 5 http://www.kernel.org/pub/linux/kernel/v3.0/testing/linux-3.3-rc7.tar.bz2
tar xfvj linux-3.3-rc7.tar.bz2
cd linux-3.3-rc7
```

2   Configuring the Linux kernel

```
cp /boot/config-3.0.0-12-generic .config
make oldconfig
```

Accept the defaults for new kernel configuration options by pressing enter.

```
nano .config
```

3   Configuring the kernel for dom0 support

NOTE: Xen dom0 support depends on ACPI support. Make sure you enable ACPI support or you won't see Dom0 options at all.
In addition to the config options above you also need to enable:

```
CONFIG_X86_IO_APIC=y
CONFIG_ACPI=y
CONFIG_ACPI_PROCFS=y (optional)
CONFIG_XEN_DOM0=y
```

CONFIG_PCI_XEN=y
CONFIG_XEN_DEV_EVTCHN=y
CONFIG_XENFS=y
CONFIG_XEN_COMPAT_XENFS=y
CONFIG_XEN_SYS_HYPERVISOR=y
CONFIG_XEN_GNTDEV=y
CONFIG_XEN_BACKEND=y
CONFIG_XEN_NETDEV_BACKEND=m
CONFIG_XEN_BLKDEV_BACKEND=m
CONFIG_XEN_PCIDEV_BACKEND=y
CONFIG_XEN_PRIVILEGED_GUEST=y
CONFIG_XEN_BALLOON=y
CONFIG_XEN_SCRUB_PAGES=y
CONFIG_XEN_DEV_EVTCHN=y
CONFIG_XEN_GNTDEV=y

4   Configuring the kernel for domU support

1. If building 32 bit kernel make sure you have CONFIG_X86_PAE enabled (which is set by selecting CONFIG_HIGHMEM64G)
non-PAE mode doesn't work in 2.6.25, and has been dropped altogether from 2.6.26 and newer kernel versions.
2. Enable these core options (Processor type and features| Paravirtualized guest support]
CONFIG_PARAVIRT=y
CONFIG_XEN=y
CONFIG_PARAVIRT_GUEST=y
CONFIG_PARAVIRT_SPINLOCKS=y
3. And Xen pv console device support (Device Drivers|Character devices
CONFIG_HVC_DRIVER=y
CONFIG_HVC_XEN=y
4. And Xen disk and network support (Device Drivers|Block devices and Device Drivers|Network device support)
CONFIG_XEN_FBDEV_FRONTEND=y
CONFIG_XEN_BLKDEV_FRONTEND=y
CONFIG_XEN_NETDEV_FRONTEND=y
5. And the rest (Device Drivers|Xen driver support)
CONFIG_XEN_PCIDEV_FRONTEND=y
CONFIG_INPUT_XEN_KBDDEV_FRONTEND=y
CONFIG_XEN_FBDEV_FRONTEND=y
CONFIG_XEN_XENBUS_FRONTEND=y
CONFIG_XEN_SAVE_RESTORE=y
CONFIG_XEN_GRANT_DEV_ALLOC=m
6. And for tmem support:
CONFIG_XEN_TMEM=y
CONFIG_CLEANCACHE=y
CONFIG_FRONTSWAP=y
CONFIG_XEN_SELFBALLOONING=y

5   Building the Linux Kernel

```
sudo apt-get install git-core kernel-package fakeroot build-essential libncurses5-dev
```

```
sed -rie 's/echo "\+"/#echo "\+"/' scripts/setlocalversion
```

```
make-kpkg clean
CONCURRENCY_LEVEL=3 fakeroot make-kpkg --initrd \
--append-to-version=-xen-teo.en.ming-sgp --revision=17.mar.2012 kernel_image kernel_headers
cd ..
sudo dpkg -i linux-image-3.3.0-rc7-xen-teo.en.ming-sgp_14.mar.2012_amd64.deb
sudo dpkg -i linux-headers-3.3.0-rc7-xen-teo.en.ming-sgp_14.mar.2012_amd64.deb
```

```
cd /lib/modules
ls
sudo update-initramfs -ck 3.3.0-rc7-xen-teo.en.ming-sgp
sudo update-grub
```

```
sudo nano /etc/modules
```

```
# /etc/modules: kernel modules to load at boot time.
#
# This file contains the names of kernel modules that should be loaded
# at boot time, one per line. Lines beginning with "#" are ignored.
lp
rtc
# Added these lines
xen-evtchn
xen-gntdev
xen-netback
xen-blkback
xenfs
blktap
```

6   Building Xen 4.1.3-rc1-pre

```
sudo apt-get install ocaml-findlib
```

```
sudo apt-get install bcc bin86 gawk bridge-utils iproute libcurl3 libcurl4-openssl-dev bzip2
module-init-tools transfig tgif texinfo texlive-latex-base texlive-latex-recommended
texlive-fonts-extra texlive-fonts-recommended pciutils-dev mercurial build-essential make
gcc libc6-dev zlib1g-dev python python-dev python-twisted libncurses5-dev patch
libvncserver-dev libsdl-dev libjpeg62-dev iasl libbz2-dev e2fslibs-dev git-core uuid-dev
ocaml libx11-dev bison flex
```

```
sudo apt-get install gcc-multilib
```

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```
sudo apt-get install xz-utils
```

```
cd
hg clone http://xenbits.xen.org/xen-4.1-testing.hg
cd xen-4.1-testing.hg
make xen
make tools
make stubdom
sudo make install-xen
sudo make install-tools PYTHON_PREFIX_ARG=
sudo make install-stubdom
```

```
sudo update-rc.d xencommons defaults
sudo update-rc.d xend defaults
sudo update-rc.d xendomains defaults
sudo update-rc.d xen-watchdog defaults
```

7   Building Xen-4.2-unstable (currently changeset 25070)

If you wish to build and install from xen-unstable.hg instead,

```
cd
git clone git://github.com/lloyd/yajl
cd yajl
sudo apt-get install ruby cmake
./configure
make
sudo make install
```

```
cd
hg clone http://xenbits.xensource.com/xen-unstable.hg
cd xen-unstable.hg
./configure
make world
sudo make install
```

8   GRUB2

sudo nano /etc/grub.d/40_custom

```
#!/bin/sh
exec tail -n +3 $0
# This file provides an easy way to add custom menu entries.  Simply type the
# menu entries you want to add after this comment.  Be careful not to change
# the 'exec tail' line above.
menuentry 'Ubuntu 11.10 Release with Xen 4.1.3-rc1-pre and Kernel 3.3.0-rc7-xen-teo.en.ming-
sgp' --class gnu-linux --class gnu --class os {
        recordfail
        insmod part_msdos
        insmod ext2
        search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
        set root='(/dev/sda,msdos1)'
        search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
        multiboot /boot/xen.gz
        module /boot/vmlinuz-3.3.0-rc7-xen-teo.en.ming-sgp placeholder root=UUID=fd1ee157-
7822-4a08-8549-56f4ae96f0dc dom0_mem=1024 console=tty  quiet splash vt.handoff=7
        module /boot/initrd.img-3.3.0-rc7-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 11.10 Release with Xen 4.1.3-rc1-pre and Kernel 3.2.11-xen-teo.en.ming-sgp'
--class gnu-linux --class gnu --class os {
        recordfail
        insmod part_msdos
        insmod ext2
        search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
        set root='(/dev/sda,msdos1)'
        search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
        multiboot /boot/xen.gz
        module /boot/vmlinuz-3.2.11-xen-teo.en.ming-sgp placeholder root=UUID=fd1ee157-7822-
4a08-8549-56f4ae96f0dc dom0_mem=1024 console=tty  quiet splash vt.handoff=7
        module /boot/initrd.img-3.2.11-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 11.10 Release with Xen 4.1.3-rc1-pre and Kernel 3.3.0-xen-teo.en.ming-sgp'
--class gnu-linux --class gnu --class os {
        recordfail
        insmod part_msdos
        insmod ext2
        search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
        set root='(/dev/sda,msdos1)'
        search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
        multiboot /boot/xen.gz
        module /boot/vmlinuz-3.3.0-xen-teo.en.ming-sgp placeholder root=UUID=fd1ee157-7822-
4a08-8549-56f4ae96f0dc dom0_mem=1024 console=tty  quiet splash vt.handoff=7
        module /boot/initrd.img-3.3.0-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 11.10 Release with Xen 4.1.3-rc1-pre and Kernel 3.2.12-xen-teo.en.ming-sgp'
```

```
--class gnu-linux --class gnu --class os {
    recordfail
    insmod part_msdos
    insmod ext2
    search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
    set root='(/dev/sda,msdos1)'
    search --no-floppy --fs-uuid --set=root fd1ee157-7822-4a08-8549-56f4ae96f0dc
    multiboot /boot/xen.gz
    module /boot/vmlinuz-3.2.12-xen-teo.en.ming-sgp placeholder root=UUID=fd1ee157-7822-
4a08-8549-56f4ae96f0dc dom0_mem=1024 console=tty  quiet splash vt.handoff=7
    module /boot/initrd.img-3.2.12-xen-teo.en.ming-sgp
}
```

```
sudo nano /etc/default/grub
```

```
#GRUB_HIDDEN_TIMEOUT=0
```

```
sudo update-grub
```

```
sudo nano /etc/ld.so.conf
```

```
/usr/lib64
```

```
sudo ldconfig -v
```

```
sudo nano /etc/xen/xend-config.sxp
```

```
(xend-http-server yes)
```

```
sudo service xend restart
```

9   Installing Virtual Machine Manager

On the taskbar on the extreme left of the screen, click on "Ubuntu Software Center". In the search bar, type "Virtual Machine Manager". Click Install.

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10   Shorewall Firewall Configuration Files

10.1   /etc/shorewall/zones

```
#
# Shorewall version 4.0 - Sample Zones File for two-interface configuration.
# Copyright (C) 2006 by the Shorewall Team
#
# This library is free software; you can redistribute it and/or
# modify it under the terms of the GNU Lesser General Public
# License as published by the Free Software Foundation; either
# version 2.1 of the License, or (at your option) any later version.
#
# See the file README.txt for further details.
#-----------------------------------------------------------------------------
# For information about entries in this file, type "man shorewall-zones"
###############################################################################
#ZONE TYPE   OPTIONS                            IN                OUT
#                                               OPTIONS           OPTIONS
fw      firewall
net     ipv4
loc     ipv4
```

10.2   /etc/shorewall/interfaces

```
#
# Shorewall version 4.0 - Sample Interfaces File for two-interface configuration.
# Copyright (C) 2006 by the Shorewall Team
#
# This library is free software; you can redistribute it and/or
# modify it under the terms of the GNU Lesser General Public
# License as published by the Free Software Foundation; either
# version 2.1 of the License, or (at your option) any later version.
#
# See the file README.txt for further details.
#-----------------------------------------------------------------------------
# For information about entries in this file, type "man shorewall-interfaces"
###############################################################################
#ZONE INTERFACE     BROADCAST   OPTIONS
net   eth0      detect       dhcp,tcpflags,nosmurfs,routefilter,logmartians
loc   virbr0      detect       tcpflags,nosmurfs,routefilter,logmartians,routeback
```

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10.3 /etc/shorewall/policy

```
#
# Shorewall version 4.0 - Sample Policy File for two-interface configuration.
# Copyright (C) 2006 by the Shorewall Team
#
# This library is free software; you can redistribute it and/or
# modify it under the terms of the GNU Lesser General Public
# License as published by the Free Software Foundation; either
# version 2.1 of the License, or (at your option) any later version.
#
# See the file README.txt for further details.
#-----------------------------------------------------------------------------
# For information about entries in this file, type "man shorewall-policy"
##############################################################################
#SOURCE                 DEST            POLICY                  LOG LEVEL       LIMIT:BURST

net             all             DROP            info
loc             net             ACCEPT
$FW             net             ACCEPT
# THE FOLLOWING POLICY MUST BE LAST
all             all             REJECT                  info
```

10.4 /etc/shorewall/rules

```
#
# Shorewall version 4.0 - Sample Rules File for two-interface configuration.
# Copyright (C) 2006,2007 by the Shorewall Team
#
# This library is free software; you can redistribute it and/or
# modify it under the terms of the GNU Lesser General Public
# License as published by the Free Software Foundation; either
# version 2.1 of the License, or (at your option) any later version.
#
# See the file README.txt for further details.
#-----------------------------------------------------------------------------
# For information about entries in this file, type "man shorewall-rules"
######################################################################################################
###############
#ACTION                 SOURCE                  DEST            PROTO DEST      SOURCE
        ORIGINAL        RATE            USER/  MARK
#                                                               PORT   PORT(S)                 DEST
        LIMIT           GROUP
# Allow DHCP requests from the local network to the firewall
ACCEPT:info     loc             $FW             udp     67
ACCEPT:info     $FW             loc             udp     68
# Allow DNS lookups from the local network to the firewall
DNS(ACCEPT)  loc             $FW
# Allows VNC viewer connection to VNC Server in dom0 for Xen VGA Passthrough (QEMU monitor only)
ACCEPT                  net             $FW             tcp     5900
```

10.5   /etc/shorewall/masq

```
#
# Shorewall version 4.0 - Sample Masq file for two-interface configuration.
# Copyright (C) 2006 by the Shorewall Team
#
# This library is free software; you can redistribute it and/or
# modify it under the terms of the GNU Lesser General Public
# License as published by the Free Software Foundation; either
# version 2.1 of the License, or (at your option) any later version.
#
# See the file README.txt for further details.
#------------------------------------------------------------------------------
# For information about entries in this file, type "man shorewall-masq"
##############################################################################
#INTERFACE              SOURCE              ADDRESS              PROTO PORT(S)        IPSEC
        MARK
eth0                    virbr0
```

10.6   /etc/shorewall/shorewall.conf

```
STARTUP_ENABLED=Yes
```

10.7   /etc/default/shorewall

```
startup=1
```

11   XL Domain Configuration File for Windows 8 Consumer Preview 64-bit English HVM domU

The following commands create a 20 GB disk image file named *windows8consumerpreview64-bitenglish.img*.

```
cd /etc/xen
sudo mkdir images
cd images
sudo dd if=/dev/zero of=windows8consumerpreview64-bitenglish.img bs=1024k seek=20000 \
count=0
```

```
cd /etc/xen
sudo nano Windows8ConsumerPreview64bitEnglish
```

```
# XL domain configuration file for Windows 8 Consumer Preview 64-bit English HVM domU
# Please refer to "man xl.cfg" for further explanations.
# See also docs/misc/xl-network-configuration.markdown and
# docs/misc/xl-disk-configuration.txt

# Written by Teo En Ming (Zhang Enming)
# Email: teo.en.ming@gmail.com
# Mobile Phone: +65-8369-2618
# Country: Singapore
```

```
# Date: 18 Mar 2012 Sun

name="Windows8ConsumerPreview64bitEnglish"
# Product Key:   DNJXJ-7XBW8-2378T-X22TX-BKG7J

builder="hvm"

vcpus=2

memory=1024

on_poweroff="destroy"
on_reboot="restart"
on_crash="destroy"

disk=[ 'format=raw, vdev=hda, access=rw, target=/etc/xen/images/windows8consumerpreview64-
bitenglish.img', 'format=raw, vdev=hdc, access=ro, devtype=cdrom, target=/home/teo-en-
ming/Downloads/Windows8-ConsumerPreview-64bit-English.iso' ]

vif=[ 'bridge=virbr0,type=ioemu,model=e1000' ]

#boot=[c|d|n]
#       Selects the emulated virtual device to boot from. Options are hard disk (c), cd-rom (d) or
network/PXE (n).
#       Multiple options can be given and will be attempted in the order they are given. e.g. to
boot from cd-rom
#       but fallback to the hard disk you can give dc. The default is cd.

boot="dc"

acpi=1

xen_platform_pci=1

viridian=1

stdvga=1

vnc=1
vnclisten="localhost"
vncdisplay=0
vncunused=1
vncpasswd=""
sdl=0

usb=1
usbdevice="tablet"

gfx_passthru=0
```

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```
sudo xl create -c Windows8ConsumerPreview64bitEnglish
```

```
sudo apt-get install xtightvncviewer
xtightvncviewer localhost
```

12 XL Domain Configuration File for Windows XP Home Edition SP3 HVM domU

```
# XL domain configuration file for Windows XP Home Edition SP3 HVM domU
# Please refer to "man xl.cfg" for further explanations.
# See also docs/misc/xl-network-configuration.markdown and
# docs/misc/xl-disk-configuration.txt

# Written by Teo En Ming (Zhang Enming)
# Email: teo.en.ming@gmail.com
# Mobile Phone: +65-8369-2618
# Country: Singapore
# Date: 18 Mar 2012 Sun

name="WindowsXPHomeEditionSP3"

builder="hvm"

vcpus=2

memory=1024

on_poweroff="destroy"
on_reboot="restart"
on_crash="destroy"

disk=[ 'format=raw, vdev=hda, access=rw, target=/var/lib/libvirt/images/Windows-XP-Home-
Edition.img' ]

vif=[ 'bridge=virbr0,type=ioemu,model=rtl8139' ]

#boot=[c|d|n]
#       Selects the emulated virtual device to boot from. Options are hard disk (c), cd-rom (d) or
network/PXE (n).
#       Multiple options can be given and will be attempted in the order they are given. e.g. to
boot from cd-rom
#       but fallback to the hard disk you can give dc. The default is cd.

boot="dc"

acpi=1

xen_platform_pci=1
```

```
viridian=1

stdvga=1

vnc=1
vnclisten="localhost"
vncdisplay=1
vncunused=1
vncpasswd=""
sdl=0

usb=1
usbdevice="tablet"

gfx_passthru=0
```

13   XL Domain Configuration File for Fedora 16 x86_64 PV domU

NOTE: Paravirtualized (PV) guests will only work with Xen 4.1.3-rc1-pre and NOT Xen 4.2-unstable changeset 25070.

NOT REQUIRED: You will need to install apache2 and create a local http mirror.

```
NOT REQUIRED:
sudo apt-get install apache2
sudo service apache2 start
cd /var/www
sudo ln -s /media/fedora/ .
```

NOT REQUIRED: HTTP Installation URL: http://192.168.122.1/fedora/

```
cd /media
sudo mkdir fedora
cd ~/Downloads
sudo mount -o loop Fedora-16-x86_64-DVD.iso /media/fedora
cd
mkdir -p vms/f16
cd /media/fedora/images/pxeboot
cp vmlinuz initrd.img ~/vms/f16/
```

```
sudo nano /etc/xen/Fedora16x86_64
```

```
# Kernel image to boot
kernel = "/home/teo-en-ming/vms/f16/vmlinuz"

# Ramdisk (optional)
ramdisk = "/home/teo-en-ming/vms/f16/initrd.img"

#bootloader="pygrub"
```

```
cd /etc/xen/images/
sudo dd if=/dev/zero of=fedora16x86_64.img bs=1024k seek=10000 count=0
```

To install Fedora 16 x86_64 as a paravirtualized guest domain,

```
sudo xl create -c Fedora16x86_64
```

After installing Fedora 16 x86_64 PV domU,

```
sudo nano /etc/xen/Fedora16x86_64
```

```
# Kernel image to boot
#kernel = "/home/teo-en-ming/vms/f16/vmlinuz"

# Ramdisk (optional)
#ramdisk = "/home/teo-en-ming/vms/f16/initrd.img"

bootloader="pygrub"
```

```
# NOTE: Paravirtualized guests will only work with Xen 4.1.3-rc1-pre
# and NOT Xen 4.2-unstable changeset 25070.
#
# XL domain configuration file for Fedora 16 x86_64 PV domU
# Please refer to "man xl.cfg" for further explanations.
# See also docs/misc/xl-network-configuration.markdown and
# docs/misc/xl-disk-configuration.txt

# Written by Teo En Ming (Zhang Enming)
# Email #1: teo.en.ming@gmail.com
# Email #2: teo-en-ming@teo-en-ming.com
# Mobile Phone: +65-8369-2618
# Country: Singapore
# Date: 19 Mar 2012 Mon

name="Fedora16x86_64"

builder="generic"

vcpus=2
```

```
# Minimum memory of 768 MB is required to install Fedora 16 x86_64
#memory=768
memory=512

on_poweroff="destroy"
on_reboot="restart"
on_crash="destroy"

# Format compatible with Xen 4.2-unstable
#disk=[ 'format=raw, vdev=hda, access=rw, target=/etc/xen/images/fedora16x86_64.img' ]
# Format compatible with Xen 4.1.3-rc1-pre
disk=[ 'file:/etc/xen/images/fedora16x86_64.img,hda,w' ]

# Keywords type and model are reserved for HVM guests and NOT valid for PV guests
vif=[ 'bridge=virbr0' ]

# Virtual frame buffer parameter is for paravirtualized guests only.
vfb=[ 'vnc=1,vnclisten=localhost,vncdisplay=2,vncunused=1,vncpasswd=,sdl=0' ]

gfx_passthru=0

# Step 1
# To install Fedora 16 x86_64 PV domU, configure the kernel, ramdisk, and extra keys below and
comment out bootloader.

 # Kernel image to boot
#kernel = "/home/teo-en-ming/vms/f16/vmlinuz"

# Ramdisk (optional)
#ramdisk = "/home/teo-en-ming/vms/f16/initrd.img"

# Kernel command line options
#extra = "root=/dev/xvda1"

# Step 2
# To boot the already installed Fedora 16 x86_64 PV domU, comment out the parameters in Step 1
and uncomment bootloader below.

bootloader="pygrub"
```

After you login to Fedora 16 x86_64 PV domU in the text console, execute "startx" to start
GNOME. Please note that GNOME3 cannot start due to poor graphics performance. Then

```
xtightvncviewer localhost:2
```

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14 XL Domain Configuration File for Ubuntu 12.04 Precise Pangolin Beta 1 amd64 HVM domU

NOTE: Ubuntu 12.04 Beta 1 amd 64 HVM domU installation hanged while copying files.

```
# This configuration file will only work with Xen 4.1.3-rc1-pre and NOT
# Xen 4.2-unstable due to the disk parameter.
#
# XL domain configuration file for Ubuntu 12.04 Precise Pangolin Beta 1 amd64 HVM domU
# Please refer to "man xl.cfg" for further explanations.
# See also docs/misc/xl-network-configuration.markdown and
# docs/misc/xl-disk-configuration.txt

# Written by Teo En Ming (Zhang Enming)
# Email #1: teo.en.ming@gmail.com
# Email #2: teo-en-ming@teo-en-ming.com
# Mobile Phone: +65-8369-2618
# Country: Singapore
# Date: 20 Mar 2012 Tue

name="Ubuntu12.04Beta1amd64"

builder="hvm"

vcpus=2

memory=768

on_poweroff="destroy"
on_reboot="restart"
on_crash="destroy"

# Format compatible with Xen 4.2-unstable changeset 25070 only.
#disk=[ 'format=raw, vdev=hda, access=rw, target=/var/lib/libvirt/images/Ubuntu-12.04-beta1-
amd64.img', 'format=raw, vdev=hdc, access=ro, devtype=cdrom, target=/home/teo-en-
ming/Downloads/ubuntu-12.04-beta1-dvd-amd64.iso' ]
# Format compatible with Xen 4.1.3-rc1-pre only.
disk=[ 'file:/var/lib/libvirt/images/Ubuntu-12.04-beta1-amd64.img,hda,w', 'file:/home/teo-en-
ming/Downloads/ubuntu-12.04-beta1-dvd-amd64.iso,hdc:cdrom,r' ]

vif=[ 'bridge=virbr0,type=ioemu,model=e1000' ]

#boot=[c|d|n]
#       Selects the emulated virtual device to boot from. Options are hard disk (c), cd-rom (d) or
network/PXE (n).
#       Multiple options can be given and will be attempted in the order they are given. e.g. to
boot from cd-rom
#       but fallback to the hard disk you can give dc. The default is cd.

boot="dc"
```

```
#boot="c"

acpi=0

#xen_platform_pci=1

#viridian=1

stdvga=0

vnc=1
vnclisten="localhost"
vncdisplay=3
vncunused=1
vncpasswd=""
sdl=0

usb=1
#usbdevice="tablet"

gfx_passthru=0
```

15   Xen VGA Passthrough to HVM Guest Operating Systems

Please refer to David Techer's blog for his excellent How To/tutorial/documentation on patching Xen 4.2-unstable to support Xen VGA passthrough to HVM domU/virtual machines.

Hardware Requirements

NVIDIA PCI-Express x16 graphics card

Article: Xen 4.2.unstable: Patches/Notes for VGA Pass Through and NVIDIA
URL: http://www.davidgis.fr/blog/index.php?2011/12/07/860-xen-42unstable-patches-for-vga-pass-through

16   Opening Firewall Port for VNC Server in dom0 for Xen VGA Passthrough

/etc/shorewall/rules

```
# Allows VNC viewer connection to VNC Server in dom0 for Xen VGA Passthrough (QEMU
monitor only)
ACCEPT            net            $FW        tcp    5900
```

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