

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

Version 2.2

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1 Installing Prerequisite Software

```
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
```

```
sudo apt-get install xz-utils libyajl-dev gettext
```

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

2 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
```

3 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.

*****Starting with Linux kernel 3.10.0, you have to make sure that the following options are compiled in before Xen options will appear.**

Processor type and features --->
[*] Linux guest support --->
[*] Enable paravirtualization code
[*] Xen guest support

```
nano .config
```

4 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
```

5 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_HYPERVISOR_GUEST=y (3.10+ only)
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

6 Building/Compiling the Linux Kernel

```
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
```

7 Building Xen 4.1.3-rc1-pre

```
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
```

8 Building Xen-4.2-unstable (currently changesets 25070 and 25099)

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 -r 25099 http://xenbits.xensource.com/xen-unstable.hg xen-unstable.hg-cs25099
cd xen-unstable.hg-cs25099
./configure
make world
sudo make install
```

9 Building Xen-4.4-unstable (currently changesets 27214 and 27238)

```
cd
hg clone -r 27238 http://xenbits.xensource.com/xen-unstable.hg xen-unstable.hg-cs27238
cd xen-unstable.hg-cs27238
sudo -s
./configure
make world
make install
```

10 Automatically Start Xen Services

```
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
```

11 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 amd64 Release with Xen 4.2-unstable and Linux 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 amd64 Release with Xen 4.2-unstable and Linux 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 amd64 Release with Xen 4.2-unstable and Linux 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 amd64 Release with Xen 4.2-unstable and Linux 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
}
menuentry 'Ubuntu 11.10 amd64 Release with Xen 4.2-unstable and Linux Kernel 3.2.13-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-3.2.13-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-3.2.13-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 11.10 amd64 Release with Xen 4.2-unstable and Linux Kernel 3.5.4-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-3.5.4-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-3.5.4-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.1 LTS amd64 Release with Xen 4.2-unstable and Linux Kernel 3.6.0-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 5babc9f0-df8a-41e6-8488-b6fa967ecaf5
set root='(/dev/sda,msdos1)'
search --no-floppy --fs-uuid --set=root 5babc9f0-df8a-41e6-8488-b6fa967ecaf5
multiboot /boot/xen.gz
module /boot/vmlinuz-3.6.0-rc7-xen-teo.en.ming-sgp placeholder root=UUID=5babc9f0-df8a-41e6-8488-b6fa967ecaf5 dom0_mem=1024 console=tty quiet splash vt.handoff=7
module /boot/initrd.img-3.6.0-rc7-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.1 LTS amd64 Release with Xen 4.2-unstable and Linux Kernel 3.6.1-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 5babc9f0-df8a-41e6-8488-b6fa967ecaf5
set root='(/dev/sda,msdos1)'
search --no-floppy --fs-uuid --set=root 5babc9f0-df8a-41e6-8488-b6fa967ecaf5
multiboot /boot/xen.gz
module /boot/vmlinuz-3.6.1-xen-teo.en.ming-sgp placeholder root=UUID=5babc9f0-df8a-41e6-8488-b6fa967ecaf5 dom0_mem=1024 console=tty quiet splash vt.handoff=7
module /boot/initrd.img-3.6.1-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 11.10 amd64 Release with Xen 4.3-unstable and Linux Kernel 3.6.5-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 77adae59-e3b2-410e-baba-371ddf74d160
set root='(/dev/sda,msdos1)'
search --no-floppy --fs-uuid --set=root 77adae59-e3b2-410e-baba-371ddf74d160
multiboot /boot/xen.gz
module /boot/vmlinuz-3.6.5-xen-teo.en.ming-sgp placeholder root=UUID=77adae59-e3b2-410e-baba-371ddf74d160 dom0_mem=1024 console=tty quiet splash vt.handoff=7 xen-pciback.hide=(01:00.0)(01:00.1)(00:1b.0)(00:1a.0)(00:1a.1)(00:1a.2)(00:1a.7)(00:1d.0)(00:1d.1)(00:1d.2)(00:1d.7) xen-pciback.permissive
module /boot/initrd.img-3.6.5-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 11.10 amd64 Release with Xen 4.3-unstable and Linux Kernel 3.7.9-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 77adae59-e3b2-410e-baba-371ddf74d160
set root='(/dev/sda,msdos1)'
search --no-floppy --fs-uuid --set=root 77adae59-e3b2-410e-baba-371ddf74d160
multiboot /boot/xen.gz
module /boot/vmlinuz-3.7.9-xen-teo.en.ming-sgp placeholder root=UUID=77adae59-e3b2-410e-
baba-371ddf74d160 dom0_mem=1024 console=tty quiet splash vt.handoff=7 xen-
pciback.hide=(01:00.0)(01:00.1)(00:1b.0)(00:1a.0)(00:1a.1)(00:1a.2)(00:1a.7)(00:1d.0)(00:1d.1)
(00:1d.2)(00:1d.7) xen-pciback.permissive
module /boot/initrd.img-3.7.9-xen-teo.en.ming-sgp
}
```

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

```
GRUB_DEFAULT=0
#GRUB_HIDDEN_TIMEOUT=0
GRUB_TIMEOUT=100
```

```
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
```

12 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.

13 Shorewall Firewall Configuration Files

13.1 /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           OPTIONS
fw        firewall
net       ipv4
loc       ipv4
```

13.2 /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
```

13.3 /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
```

13.4 /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
#                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:192.168.1.0/24  $FW        tcp     5900
```

13.5 /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
```

13.6 /etc/shorewall/shorewall.conf

```
STARTUP_ENABLED=Yes
```

13.7 /etc/default/shorewall

```
startup=1
```

14 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
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# Country: Singapore
# Date: 18 Mar 2012 Sun

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

builder="hvm"

vcpus=2

memory=2048

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="192.168.1.2"
vncdisplay=0
vncunused=1
vncpasswd=""
sdl=0

usb=1
usbdevice="tablet"

# Enable Xen VGA Passthrough
gfx_passthru=1

# VGA Passthrough Palit NVIDIA Geforce 8400 GS PCI Express x16 VGA card.
pci = [ '01:00.0','00:1b.0' ]

# PCI Passthrough Intel HD Audio Controller.
#pci = [ '00:1b.0' ]

# PCI Passthrough all the USB Controllers.
# pci = [ '00:1a.0','00:1a.1','00:1a.2','00:1a.7','00:1d.0','00:1d.1','00:1d.2','00:1d.7' ]
```

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

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

15 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', 'format=raw, vdev=hdc, access=ro, devtype=cdrom, target=/dev/sr1' ]

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="192.168.1.2"
```

```
vncdisplay=0
vncunused=1
vncpasswd=""
sdl=0

usb=1
usbdevice="tablet"

# Enable Xen VGA Passthrough
gfx_passthru=1

# VGA Passthrough Palit NVIDIA Geforce 8400 GS PCI Express x16 VGA card.
pci = [ '01:00.0','00:1b.0' ]

# PCI Passthrough Intel HD Audio Controller.
#pci = [ '00:1b.0' ]

# PCI Passthrough all the USB Controllers.
# pci = [ '00:1a.0','00:1a.1','00:1a.2','00:1a.7','00:1d.0','00:1d.1','00:1d.2','00:1d.7' ]
```

16 XL Domain Configuration File for Fedora 16 x86_64 PV domU

NOTE: Fedora 16 x86_64 paravirtualized (PV) guests will only work with Xen 4.1.3-rc1-pre and NOT Xen 4.2-unstable changesets 25070 and 25099.

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
```

```
# 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"

# 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"
```

```
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
```

```
# 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"

# 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"
```



```
# 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

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# 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
```

17 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

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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

```

18 Xen VGA Passthrough to HVM Guest Operating Systems

Please refer to Frenchman Jean 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.](#)

Computer Hardware Requirements

- Intel Processor with Virtualization Technology (VT)
- Motherboard Chipset with Intel Virtualization Technology for Directed I/O (VT-d)
- Motherboard BIOS with VT-d option to enable
- NVIDIA PCI-Express x16 VGA 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>

19 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:192.168.1.0/24  $FW  tcp  5900
```

20 XL Domain Configuration File for Debian Wheezy amd64 PV domU

Reference documentation URL:

http://wiki.xen.org/wiki/Debian_Guest_Installation_Using_Debian_Installer

You may download Debian Testing amd64 DVD ISO file but it is **not necessary** to do so.

```
aria2c -x 5 http://cdimage.debian.org/cdimage/weekly-builds/amd64/iso-dvd/debian-testing-amd64-DVD-1.iso
```

Create a 10 GB virtual raw hard disk image for Debian Wheezy amd64 PV domU.

```
cd /etc/xen/images
sudo dd if=/dev/zero of=debian-wheezy-amd64.img bs=1024k seek=10000 count=0
```

After downloading Debian Testing amd64 DVD ISO file, you may want to mount the DVD ISO image to list its contents.

```
cd /media/
sudo mkdir debian
cd ~/Downloads/
md5sum debian-testing-amd64-DVD-1.iso
mv debian-testing-amd64-DVD-1.iso debian-testing-26mar2012-amd64-DVD-1.iso
sudo mount -o loop debian-testing-26mar2012-amd64-DVD-1.iso /media/debian/
cd /media/debian/
ls
```

Begin installation of Debian Wheezy amd64 PV domU. **Please note that it is Debian 6.0 Squeeze amd64 PV domU that we are installing, but I will still keep mentioning Debian Wheezy amd64 PV domU in this document.**

```
cd
mkdir -p vms/debian
cd vms/debian
aria2c -x 5 http://ftp.nl.debian.org/debian/dists/squeeze/main/installer-amd64/current/images/netboot/xen/vmlinuz
aria2c -x 5 http://ftp.nl.debian.org/debian/dists/squeeze/main/installer-amd64/current/images/netboot/xen/initrd.gz
cd /etc/xen
sudo nano DebianWheezyamd64
```

```
# Step 1
# To install Debian Wheezy amd64 PV domU, configure the kernel, ramdisk, and extra keys below
and comment out bootloader.

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

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

# Kernel command line options
extra = "debian-installer/exit/always_halt=true -- console=hvc0"

# Step 2
# To boot the already installed Debian Wheezy amd64 PV domU, comment out the parameters in
Step 1 and uncomment bootloader below.

#bootloader="pygrub"
```

Start Debian Wheezy amd64 PV domU for installation.

```
sudo xl create -c DebianWheezyamd64
```

Please note that you may need to choose manual network configuration for the virtual network adapter in Debian Wheezy amd64 PV domU. DHCP autoconfiguration may not work. In which case, you may need to manually configure IP address, netmask, gateway/default router, and DNS server address(es). It should be very simple if you have some basic networking knowledge.

Please also note that the installation of Debian Wheezy amd64 PV domU is in text mode.

Netboot installation of Debian Wheezy amd64 PV domU may take a very long time, depending on the speed of your internet connection and disk I/O performance, and may possibly take more than 24 hours.

Execute the following steps after the installation of Debian Wheezy amd64 PV domU is completed.

```
cd /etc/xen
sudo nano DebianWheezyamd64
```

```

# Step 1
# To install Debian Wheezy amd64 PV domU, configure the kernel, ramdisk, and extra keys below
and comment out bootloader.

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

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

# Kernel command line options
#extra = "debian-installer/exit/always_halt=true -- console=hvc0"

# Step 2
# To boot the already installed Debian Wheezy amd64 PV domU, comment out the parameters in
Step 1 and uncomment bootloader below.

bootloader="pygrub"

```

Boot the newly installed Debian Wheezy amd64 PV domU.

```
sudo xl create -c DebianWheezyamd64
```

pyGRUB version 0.6

```

Debian GNU/Linux, with Linux 2.6.32-5-amd64 |
Debian GNU/Linux, with Linux 2.6.32-5-amd64 (recovery mode) |

```

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.

Will boot selected entry in 1 seconds

```

Daemon running with PID 10067
[ 0.012051] PCI: Fatal: No config space access function found
[ 0.088626] i8042.c: No controller found.
Loading, please wait...
INIT: version 2.88 booting
Using makefile-style concurrent boot in runlevel S.
Starting the hotplug events dispatcher: udevd.
Synthesizing the initial hotplug events...done.
Waiting for /dev to be fully populated...done.
Setting parameters of disc: (none).
Setting preliminary keymap...done.
Activating swap...done.
Checking root file system...fsck from util-linux-ng 2.17.2
/dev/xvda1: clean, 129498/610800 files, 862755/2442496 blocks
done.

```

```
Loading kernel modules...done.
Cleaning up ifupdown....
Setting up networking....
Activating lvm and md swap...done.
Checking file systems...fsck from util-linux-ng 2.17.2
done.
Mounting local filesystems...done.
Activating swapfile swap...done.
Cleaning up temporary files....
Configuring network interfaces...done.
Starting portmap daemon....
Starting NFS common utilities: statdSetting kernel variables ...done.
.
Cleaning up temporary files....
Setting up ALSA...done (none loaded).
Setting console screen modes.
#]Rcannot (un)set powersave mode
#[9;30]#[14;30]Skipping font and keymap setup (handled by console-setup).
Setting up console font and keymap...done.
Setting sensors limits.
INIT: Entering runlevel: 2
Using makefile-style concurrent boot in runlevel 2.
Starting portmap daemon...Already running..
Starting NFS common utilities: statd.
Enabling additional executable binary formats: binfmt-support.
Starting enhanced syslogd: rsyslogd.
Starting deferred execution scheduler: atd.
Starting system message bus: dbus.
Starting anac(h)ronistic cron: anacron.
Starting periodic command scheduler: cron.
Starting kerneloops:
Starting network connection manager: NetworkManager.
Loading cpufreq kernel modules...failed.
Starting GNOME Display Manager: gdm3.
Starting Avahi mDNS/DNS-SD Daemon: avahi-daemon.
Starting MTA: exim4.
Starting bluetooth: bluetoothd.
CPUFreq Utilities: Setting ondemand CPUFreq governor...disabled, governor not available...done.
Starting Common Unix Printing System: cupsdсанed disabled; edit /etc/default/saned
.

Debian GNU/Linux 6.0 debian-wheezy-amd64 hvc0

debian-wheezy-amd64 login:
```

Login success! This implies that the installation of Debian Wheezy amd64 PV domU is successful.

```
# Debian Wheezy amd64 PV domU will work with Xen 4.2-unstable changeset 25099.
#
# XL domain configuration file for Debian Wheezy amd64 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

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# Country: Singapore
# Date: 28 Mar 2012 Wed

name="DebianWheezyamd64PVdomU"

# generic means PV.
builder="generic"

vcpus=2

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/debian-wheezy-amd64.img' ]
# Format compatible with Xen 4.1.3-rc1-pre
disk=[ 'file:/etc/xen/images/debian-wheezy-amd64.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=0,vncunused=1,vncpasswd=,sdl=0' ]

gfx_passthru=0

# Step 1
# To install Debian Wheezy amd64 PV domU, configure the kernel, ramdisk, and extra keys below
and comment out bootloader.

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

# Ramdisk (optional)
#ramdisk = "/home/teo-en-ming/vms/debian/initrd.gz"
```



```
# Kernel command line options
#extra = "debian-installer/exit/always_halt=true -- console=hvc0"
```

```
# Step 2
```

```
# To boot the already installed Debian Wheezy amd64 PV domU, comment out the parameters in
Step 1 and uncomment bootloader below.
```

```
bootloader="pygrub"
```

Please note that it is Debian 6.0 Squeeze amd64 PV domU that we have installed, not Debian Wheezy amd64 PV domU. Although this is the case, I will still continue to mention Debian Wheezy amd64 PV domU in the rest of this document.

To login to the GNOME GUI Desktop Environment after the installation of Debian Wheezy amd64 PV domU, execute the following step.

```
xtightvncviewer localhost:0
```

Please note that the performance of Debian Wheezy amd64 PV domU is very poor. The paravirtualized (PV) virtual machine in Xen 4.2-unstable changeset 25099 is very unresponsive.