

Building and Installing Xen 4.x and Linux Kernel 3.x on Fedora 19 Linux

Version 1.4

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1 Downloading the Linux Kernel

```
wget https://www.kernel.org/pub/linux/kernel/v3.x/linux-3.10.5.tar.xz
tar xfvJ linux-3.10.5.tar.xz
cd linux-3.10.5
```

2 Configuring the Linux Kernel

```
cp /boot/config-3.9.5-301.fc19.x86_64 .config
make oldconfig
```

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

```
make menuconfig
```

*****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
```

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=m
- CONFIG_XEN_PRIVILEGED_GUEST=y
- CONFIG_XEN_BALLOON=y
- CONFIG_XEN_SCRUB_PAGES=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_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

```
grep -i xen .config
```

5 Compiling the Linux Kernel

```
make all -j <2*number_of_cores>
```

6 Installing the Linux Kernel

```
make binrpm-pkg
cd /home/teo-en-ming/rpmbuild/RPMS/x86_64
sudo rpm -ivh kernel-3.10.5-2.x86_64.rpm
sudo mkinitrd -f /boot/initrd-3.10.5.img 3.10.5
sudo dracut -f /boot/initrd-3.10.5.img 3.10.5
```

7 Installing mercurial

```
sudo yum install mercurial
```

8 Downloading Xen 4.4-unstable

```
cd
hg clone -r 27305 http://xenbits.xen.org/hg/xen-unstable.hg xen-unstable.hg-cs27305
```

9 Installing Prerequisite Software

```
sudo yum groupinstall "Development Libraries" "Development Tools"
sudo yum install transfig wget tar less texi2html libaio-devel dev86 glibc-devel e2fsprogs-devel
gitk mkinitrd iasl xz-devel bzip2-devel
sudo yum install pciutils-libs pciutils-devel SDL-devel libX11-devel gtk2-devel bridge-utils PyXML
qemu-common qemu-img mercurial texinfo
sudo yum install libidn-devel yajl yajl-devel ocaml ocaml-findlib ocaml-findlib-devel python-devel
uuid-devel libuuid-devel openssl-devel
sudo yum install glibc-devel.i686
```

10 Building and Installing Xen 4.4-unstable

```
cd xen-unstable.hg-cs27305
./configure --prefix=/usr
make dist
sudo make install
```

11 Turning On Xen Services

```
sudo chkconfig xencommons on
sudo chkconfig xendomains on
sudo chkconfig xen-watchdog on
```

12 /etc/grub.d/40_custom

```
sudo nano /etc/grub.d/40_custom
```

```
menuentry 'Fedora 19 with Xen 4.4-unstable and 3.10.5' --class gnu-linux --class gnu --class os {
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 7f255d3c-6d45-4401-bd83-b2f5a5b8949b
multiboot /xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all
unrestricted_guest=1 msi=1
module /vmlinuz-3.10.5 placeholder root=/dev/mapper/fedora-root ro quiet xen-
pciback.hide=(00:02.0)(00:03.0)(00:14.0)(00:1a.0)(00:1b.0)(00:1d.0) xen-pciback.permissive
module /initrd-3.10.5.img
}
```

```
su -c 'grub2-mkconfig -o /boot/grub2/grub.cfg'
```

13 Executing ldconfig

```
sudo ldconfig
```

14 Starting Xen Services

```
sudo service xencommons start
sudo service xendomains start
sudo service xen-watchdog start
```

15 Installing Virtual Machine Manager

```
sudo yum install virt-manager
```

To start the libvirtd service,

```
sudo systemctl start libvirtd.service
```

To start the libvirtd service automatically at boot time,

```
sudo systemctl enable libvirtd.service
```

Installing libvirt will create a network bridge virbr0.

```
sudo yum install libvirt
```

16 Blacklist Kernel Modules

```
sudo nano /lib/modprobe.d/dist-blacklist.conf
```

```
blacklist i915  
blacklist nouveau  
blacklist snd_hda_intel
```

Rebuild the initial ramdisk.

```
cd /boot  
sudo mv initrd-3.10.5.img initrd-3.10.5.img.backup  
sudo dracut -f /boot/initrd-3.10.5.img 3.10.5
```

Turn off gdm.

```
sudo systemctl disable gdm.service
```

```
systemctl list-unit-files | grep gdm
```

```
gdm.service                                disabled
```

17 XL Domain Configuration File for Windows 7 Ultimate 64-bit HVM domU

```
# XL domain configuration file for Windows 7 Ultimate 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: +65-9117-5902
# Country: Singapore
# Date: 18 July 2013 Sun
device_model_override= '/usr/lib/xen/bin/qemu-dm'
device_model_version="qemu-xen-traditional"
name="Windows7"
builder="hvm"
vcpus=4
memory=1024
on_poweroff="destroy"
on_reboot="restart"
on_crash="destroy"
disk=[ 'format=raw, vdev=hda, access=rw, target=/etc/xen/images/windows7.img', 'format=raw, vdev=hdc, access=ro, devtype=cdrom,
target=/home/teo-en-ming/windows7ultimate.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
apic=1
xen_platform_pci=1
viridian=1
#stdvga=0
vnc=1
vnclisten="0.0.0.0"
vncdisplay=0
vncunused=1
vncpasswd=""
sdl=0
usb=1
usbdevice="tablet"
# Enable Xen VGA Passthrough
gfx_passthru=1
# VGA Passthrough Gigabyte Geforce GTX 560 1 GB GDDR5 PCI Express x16 VGA card.
#pci = [ '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' ]
# 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' ]
# Passthrough Intel HD Graphics 4600, audio controllers and USB controllers
pci = [ '00:02.0','00:03.0','00:14.0','00:1a.0','00:1b.0','00:1d.0' ]
#pci = [ '00:02.0' ]
# Passthrough Gigabyte Geforce GTX 560, audio controllers and USB controllers on Asrock B85M Pro4 LGA1150 Motherboard
#pci = [ '01:00.0','01:00.1','00:1b.0','00:14.0','00:1a.0','00:1d.0' ]
```

18 XL Domain Configuration File for Windows 8 Enterprise HVM domU

```
# XL domain configuration file for Windows 8 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: +65-9117-5902
# Country: Singapore
# Date: 14 July 2013 Sun
device_model_version="qemu-xen-traditional"
name="Windows8"
builder="hvm"
vcpus=4
memory=1024
on_poweroff="destroy"
on_reboot="restart"
on_crash="destroy"
disk=[ 'format=raw, vdev=hda, access=rw, target=/etc/xen/images/windows8.img', 'format=raw, vdev=hdc, access=ro, devtype=cdrom,
target=/home/teo-en-ming/WIN8_RTM.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
apic=1
xen_platform_pci=1
viridian=1
#stdvga=1
vnc=1
vnclisten="0.0.0.0"
vncdisplay=0
vncunused=1
vncpasswd=""
sdl=0
usb=1
usbdevice="tablet"
# Enable Xen VGA Passthrough
#gfx_passthru=1
# VGA Passthrough Gigabyte Geforce GTX 560 1 GB GDDR5 PCI Express x16 VGA card.
#pci = [ '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' ]
# 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' ]
# Passthrough Intel HD Graphics 4600, audio controllers and USB controllers
pci = [ '00:02.0','00:03.0','00:14.0','00:1a.0','00:1b.0','00:1d.0' ]
#pci = [ '00:02.0' ]
# Passthrough Gigabyte Geforce GTX 560, audio controllers and USB controllers on Asrock B85M Pro4 LGA1150 Motherboard
#pci = [ '01:00.0','01:00.1','00:1b.0','00:14.0','00:1a.0','00:1d.0' ]
```

19 /etc/default/grub

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

```
GRUB_TIMEOUT=100
```

```
sudo grub2-mkconfig -o /boot/grub2/grub.cfg
```

20 Opening Firewall Port for VNC Server

```
sudo firewall-config
```

- In Current View:, select Permanent Configuration.
- Click on the public zone.
- Click on the Ports tab.
- Click Add.
- Port / Port Range: 5900
- Protocol: tcp
- Then click on the Options menu.
- Click on Reload Firewall.

21 Creating a Virtual Harddisk for domU

To create a 20 GB virtual harddisk for Windows 7 HVM domU, execute the following command.

```
sudo dd if=/dev/zero of=windows7.img bs=1024k seek=20480 count=0
```

22 Installing a VNC Viewer

```
sudo yum install tigervnc  
vncviewer localhost
```

23 Creating an ISO File from Windows 8 Enterprise 90-day Evaluation DVD

```
dd if=/dev/sr0 of=WIN8_RTM.ISO
```