Xen VGA Passthrough with NVIDIA and Intel IGD Display Adapters

Version 2.4

Author: Teo En Ming (Zhang Enming)
Website #1: http://www.teo-en-ming.com
Website #2: http://www.zhang-enming.com
Email #1: teo.en.ming@gmail.com
Email #2: teo-en-ming@teo-en-ming.com
Email #3: teo-en-ming@zhang-enming.com
Mobile Phone(s): +65-8369-2618 / +65-9117-5902 / +65-9465-2119
Country: Singapore
Date: 1 August 2013 Thursday 5:32 P.M. Singapore Time

A. Xen VGA Passthrough with NVIDIA Display Adapters

1 Preparing the USB Flash Drive to Extract VGA Card EEPROM

Reference Documentation URL #1: http://www.davidgis.fr/blog/index.php?2011/12/07/860-xen-42unstable-patches-for-vga-pass-through

Reference Documentation URL #2: http://wiki.xen.org/xenwiki/XenVGAPassthrough

```
wget http://www.davidgis.fr/download/nvflash_5.100.1_usb.iso.tar.bz2

tar xfvj nvflash_5.100.1_usb.iso.tar.bz2
```

Plug in your USB flash drive.

```
dmesg
```

In my case, the USB flash drive is detected as /dev/sdb.

```
mount | grep sdb
```

```
/dev/sdb1 on /media/C06F-905B type vfat (rw,nosuid,nodev,uid=1000,gid=1000,shortname=mixed,dmask=0077,utf8=1,showexec,flush,uhelper=udisks)
```

```
sudo umount /media/C06F-905B/
```

```
sudo dd if=nvflash_5.100.1_usb.iso of=/dev/sdb
```

Reboot your computer with the USB flash drive plugged in.


```
nvflash.exe --list (OPTIONAL)
nvflash.exe --save vgabios.rom
```

Unplug your USB flash drive. Reboot your computer back into Linux Xen Dom0. Plug in your USB flash drive again.

```
cp /media/LEXAR/VGABIOS.ROM /home/teo-en-ming/2nd-palit-nvidia-geforce-8400gs-vgabios.rom
```

2 Patching Xen 4.2-unstable Changeset 25099 for Xen VGA Passthrough

```
cd
hg clone -r 25099 http://xenbits.xen.org/xen-unstable.hg xen-unstable.hg-cs25099-vga-passthrough
cd xen-unstable.hg-cs25099-vga-passthrough
./configure
make world
make clean
```

Download Xen VGA Passthrough patches from David Techer's (Frenchman) website.

```
wget http://www.davidgis.fr/download/xen-4.2_rev24798_gfx-passthrough-patchs.tar.bz2
tar xfvj xen-4.2_rev24798_gfx-passthrough-patchs.tar.bz2
```

Patching Xen 4.2-unstable changeset 25099 source tree.

```
patch -p1 < xen-4.2_rev24798_gfx-passthrough-patchs/patch_Makefile
patch -p1 < xen-4.2_rev24798_gfx-passthrough-patchs/patch_dsdt.asl
patch -p1 < xen-4.2_rev24798_gfx-passthrough-patchs/patch_hvmloader.c
patch -p1 < xen-4.2_rev24798_gfx-passthrough-patchs/patch_rombios.c
patch -p1 < xen-4.2_rev24798_gfx-passthrough-patchs/patch_pci.c
patch -p1 < xen-4.2_rev24798_gfx-passthrough-patchs/patch_pass-through.c
```

UPDATE 6 OCTOBER 2012 SATURDAY:

Apply the following patch set 25240 from David Techer's personal website to Xen 4.2.1-pre (changeset 25862).

```
cd
hg clone http://xenbits.xen.org/hg/xen-4.2-testing.hg xen-4.2.1-pre
cd xen-4.2.1-pre
./configure
make world
make clean
```

Download Xen VGA Passthrough patches (revision 25240) from David Techer's (Frenchman) website.

```
wget http://www.davidgis.fr/download/xen-4.2_rev25240_gfx-passthrough-patchs.tar.bz2
tar xfvj xen-4.2_rev25240_gfx-passthrough-patchs.tar.bz2
```

Patching Xen 4.2.1-pre (changeset 25862) source tree.

```
patch -p1 < xen-4.2_rev25240_gfx-passthrough-patchs/dsdt.asl.patch
patch -p1 < xen-4.2_rev25240_gfx-passthrough-patchs/hvmloader.c.patch
patch -p1 < xen-4.2_rev25240_gfx-passthrough-patchs/libxl_pci.c.patch
patch -p1 < xen-4.2_rev25240_gfx-passthrough-patchs/Makefile.patch
patch -p1 < xen-4.2_rev25240_gfx-passthrough-patchs/pass-through.c.patch
patch -p1 < xen-4.2_rev25240_gfx-passthrough-patchs/pci.c.patch
patch -p1 < xen-4.2_rev25240_gfx-passthrough-patchs/rombios.c.patch
```

UPDATE 11 OCTOBER 2012 THURSDAY:

You can apply Jean David Techer's patch set 25240 to Xen 4.3-unstable changesets 25993 and 26004.

UPDATE 25 FEBRUARY 2013 MONDAY:

You can apply Jean David Techer's patch set 26458 to Xen 4.3-unstable changeset 26458.

```
cd
hg clone -r 26458 http://xenbits.xen.org/xen-unstable.hg xen-unstable.hg-cs26458-vga-passthrough
cd xen-unstable.hg-cs26458-vga-passthrough
./configure
sudo apt-get install libpixman-1-dev
make world
make clean
```

Download Xen VGA Passthrough patches (revision 26458) from David Techer's (Frenchman) website.

```
wget http://www.davidgis.fr/download/xen-4.3_rev26458_gfx-passthrough-patchs.tar.bz2
tar xfvj xen-4.3_rev26458_gfx-passthrough-patchs.tar.bz2
```

Patching Xen 4.3-unstable (changeset 26458) source tree.

```
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/Makefile.patch
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/pass-through.c.patch
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/dsdt.asl.patch
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/rtc.c.patch
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/libxl_pci.c.patch
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/hvmloader.c.patch
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/rombios.c.patch
patch -p1 < xen-4.3_rev26458_gfx-passthrough-patchs/pci.c.patch
```

---

3 Configuring MMIO BARS

```
lspci | grep VGA
```

```
01:00.0 VGA compatible controller: nVidia Corporation GT218 [GeForce 8400 GS] (rev a2)
```

```
dmesg | grep 01:00.0 | grep "pci.*mem"
```

```
[    0.120488] pci 0000:01:00.0: reg 10: [mem 0xd2000000-0xd2ffffff]
[    0.120508] pci 0000:01:00.0: reg 14: [mem 0xc0000000-0xcfffffff 64bit pref]
[    0.120528] pci 0000:01:00.0: reg 1c: [mem 0xd0000000-0xd1ffffff 64bit pref]
[    0.120556] pci 0000:01:00.0: reg 30: [mem 0xd3000000-0xd307ffff pref]
```

4 Calculating Differences for the Four Memory Ranges

4.1 First Memory Range

Maximum = 0xd2ffffff = 3539992575
Minimum = 0xd2000000 = 3523215360
Difference = Max – Min + 1 = 3539992575 – 3523215360 + 1 = 16777216 = 0x01000000

Hence,

Max = 0xD2FFFFFF
Min = 0xD2000000
Diff = 0x01000000

4.2 Second Memory Range

Maximum = 0xcfffffff = 3489660927
Minimum = 0xc0000000 = 3221225472
Difference = Max – Min + 1 = 3489660927 – 3221225472 + 1 = 268435456 = 0x10000000

Hence,

Max = 0xCFFFFFFF
Min = 0xC0000000
Diff = 0x10000000

4.3 Third Memory Range

Maximum = 0xd1ffffff = 3523215359
Minimum = 0xd0000000 = 3489660928
Difference = Max – Min + 1 = 3523215359 – 3489660928 + 1 = 33554432 = 0x02000000

Hence,

Max = 0xD1FFFFFF
Min = 0xD0000000
Diff = 0x02000000

4.4 Fourth Memory Range

Maximum = 0xD307FFFF = 3540516863
Minimum = 0xD3000000 = 3539992576
Difference = Max – Min + 1 = 3540516863 – 3539992576 + 1 = 524288 = 0x00080000

Hence,

Max = 0xD307FFFF
Min = 0xD3000000
Diff = 0x00080000

5 Important Mathematical Tool for Hex-Dec and Dec-Hex Conversion (Online)

Link #1: http://easycalculation.com/hex-converter.php
Link #2: http://www.binaryhexconverter.com/decimal-to-hex-converter

6 Modifying tools/firmware/hvmloader/acpi/dsdt.asl

```
vi tools/firmware/hvmloader/acpi/dsdt.asl
```

```
            /* reserve MMIO BARs of gfx for 1:1 mapping */
            DWordMemory(
               ResourceProducer, PosDecode, MinFixed, MaxFixed,
               Cacheable, ReadWrite,
               0x00000000,
               0xD2000000,
               0xD2FFFFFF,
               0x00000000,
               0x01000000)

            DWordMemory(
               ResourceProducer, PosDecode, MinFixed, MaxFixed,
               NonCacheable, ReadWrite,
               0x00000000,
               0xC0000000,
               0xCFFFFFFF,
               0x00000000,
               0x10000000)

            DWordMemory(
               ResourceProducer, PosDecode, MinFixed, MaxFixed,
               Cacheable, ReadWrite,
               0x00000000,
               0xD0000000,
               0xD1FFFFFF,
               0x00000000,
               0x02000000)

            DWordMemory(
               ResourceProducer, PosDecode, MinFixed, MaxFixed,
               Cacheable, ReadWrite,
               0x00000000,
               0xD3000000,
               0xD307FFFF,
               0x00000000,
               0x00080000,
               ,, _Y01)
```


7 Copying the VGA BIOS of Palit NVIDIA Geforce 8400 GS PCI-e x16

```
cp /home/teo-en-ming/2nd-palit-nvidia-geforce-8400gs-vgabios.rom
tools/firmware/vgabios/vgabios-pt.bin
hexdump -C tools/firmware/vgabios/vgabios-pt.bin | less
```

```
00000000  55 aa 78 eb 4b 37 34 30  30 e9 4c 19 77 cc 56 49  |U.x.K7400.L.w.VI|
00000010  44 45 4f 20 0d 00 00 00  88 01 1d 19 00 00 49 42  |DEO .........IB|
00000020  4d 20 56 47 41 20 43 6f  6d 70 61 74 69 62 6c 65  |M VGA Compatible|
00000030  01 00 00 00 80 00 de 4e  30 35 2f 30 36 2f 31 31  |.......N05/06/11|
00000040  00 00 00 00 00 00 00 00  00 10 00 00 51 ee c4 ed  |............Q...|
00000050  e9 61 2a 00 00 00 00 00  c3 e3 ff 7f 08 0c 00 00  |.a*.............|
00000060  ff ff fe 7f 00 00 01 80  71 3b a5 7b e9 50 45 e9  |........q;.{.PE.|
00000070  57 45 50 4d 49 44 6c 00  6f 00 00 00 00 a0 00 b0  |WEPMIDl.o.......|
00000080  00 b8 00 c0 00 33 47 65  46 6f 72 63 65 20 38 34  |.....3GeForce 84|
00000090  30 30 20 47 53 20 56 47  41 20 42 49 4f 53 0d 0a  |00 GS VGA BIOS..|
000000a0  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00  |................|
*
000000d0  00 00 00 00 00 00 00 56  65 72 73 69 6f 6e 20 37  |.......Version 7|
000000e0  30 2e 31 38 2e 36 46 2e  30 30 2e 30 30 20 0d 0a  |0.18.6F.00.00 ..|
000000f0  00 43 6f 70 79 72 69 67  68 74 20 28 43 29 20 31  |.Copyright (C) 1|
00000100  39 39 36 2d 32 30 31 30  20 4e 56 49 44 49 41 20  |996-2010 NVIDIA |
00000110  43 6f 72 70 2e 0d 0a 00  00 00 ff ff 00 00 00 00  |Corp............|
00000120  ff ff 42 49 4f 53 2d 50  2f 4e 40 4e 38 35 34 35  |..BIOS-P/N@N8545|
00000130  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00  |................|
00000140  00 00 00 00 00 43 68 69  70 20 52 65 76 20 20 20  |.....Chip Rev   |
00000150  00 00 00 00 00 00 00 00  00 ba 91 98 96 91 9a 9a  |................|
00000160  8d 96 91 98 df ad 9a 93  9a 9e 8c 9a df d2 df b1  |................|
00000170  90 8b df b9 90 8d df af  8d 90 9b 8a 9c 8b 96 90  |................|
00000180  91 df aa 8c 9a f2 f5 ff  50 43 49 52 de 10 c3 10  |........PCIR....|
00000190  00 00 18 00 00 00 00 03  78 00 01 00 00 80 00 00  |........x.......|
000001a0  48 59 42 24 ff b8 42 49  54 00 00 01 0c 06 12 45  |HYB$..BIT......E|
000001b0  32 01 04 00 2c 02 42 02  20 00 38 02 43 01 0e 00  |2...,.B. .8.C...|
000001c0  58 02 44 01 04 00 66 02  41 01 03 00 6a 02 49 01  |X.D...f.A...j.I.|
000001d0  12 00 6d 02 4c 01 02 00  7f 02 4d 02 0d 00 81 02  |..m.L.....M.....|
000001e0  4e 00 00 00 00 00 50 02  28 00 8e 02 53 02 15 00  |N.....P.(...S...|
000001f0  b6 02 54 01 02 00 cb 02  55 01 03 00 cd 02 56 01  |..T.....U.....V.|
00000200  06 00 d0 02 78 01 08 00  d6 02 64 01 02 00 de 02  |....x.....d.....|
00000210  70 01 06 00 e0 02 69 02  41 00 e8 02 00 00 29 03  |p.....i.A.....).|
00000220  d9 49 b8 5d c3 63 0e 80  00 00 00 00 00 00 00 00  |.I.].c..........|
00000230  00 00 00 00 00 00 00 00  00 6f 18 70 00 00 00 00  |.........o.p....|
00000240  00 00 a8 07 00 00 00 00  00 00 00 00 02 0a 5c 5c  |..............\\|
00000250  1c 02 00 00 30 02 04 00  00 00 00 00 00 00 00 00  |....0...........|
00000260  bd 4a fc 9f 00 00 18 4d  1a 41 00 00 00 b1 4b bd  |.J.....M.A....K.|
00000270  4b c3 4b db 4b cb 4c 16  4d bd 4b f1 7f 16 4d a4  |K.K.K.L.M.K...M.|
00000280  51 08 a6 4a 4a 4b 56 68  00 00 67 68 00 00 c4 63  |Q..JJKVh..gh...c|
00000290  00 00 b3 64 00 00 b3 66  00 00 f2 67 00 00 0a 68  |...d...f...g...h|
000002a0  00 00 00 00 00 00 42 68  00 00 00 00 00 00 00 00  |......Bh........|
000002b0  00 00 e5 67 00 00 86 00  50 d7 00 19 f1 00 28 d9  |...g....P.....(.|
```



```
000002c0  49 14 ed 49 23 22 01 23  45 01 14 cc 4d 10 4a 00  |I..I#".#E...M.J.|
000002d0  8b 4a 47 4a 00 00 00 00  01 01 00 00 00 00 1f 43  |.JGJ...........C|
000002e0  00 00 00 00 00 00 8b c0  00 6f 18 70 00 00 00 ca  |.........o.p....|
000002f0  37 61 00 7c c8 00 00 30  36 2f 32 34 2f 31 30 00  |7a.|...06/24/10.|
00000300  00 00 00 00 00 00 00 00  00 f5 7f 01 01 00 00 00  |................|
00000310  00 00 00 00 00 00 00 00  32 30 30 00 30 38 37 32  |........200.0872|
00000320  30 30 30 30 00 00 00 00  00 00 10 00 77 06 b6 06  |0000........w...|
00000330  d3 06 d3 06 45 08 3e 08  81 09 78 09 72 08 72 08  |....E.>...x.r.r.|
00000340  87 07 93 08 73 0f a8 08  a8 5d 20 00 77 06 b6 06  |....s....] .w...|
00000350  d3 06 d3 06 45 08 3e 08  81 09 78 09 72 08 72 08  |....E.>...x.r.r.|
00000360  2c 00 9e 06 79 08 a8 5d  31 00 65 05 65 05 b5 0b  |,...y..]1.e.e...|
```

8 Building and Installing Xen 4.2-unstable Changeset 25099

```
make xen
make tools
make stubdom
sudo make install-xen
sudo make install-tools PYTHON_PREFIX_ARG=
sudo make install-stubdom
```

9 Using pciback

```
lspci -tv
```

```
-[0000:00]-+-00.0  Intel Corporation 4 Series Chipset DRAM Controller
           +-01.0-[01]--+-00.0  NVIDIA Corporation GF114 [GeForce GTX 560]
           |            \-00.1  NVIDIA Corporation GF110 High Definition Audio Controller
           +-03.0  Intel Corporation 4 Series Chipset HECI Controller
           +-03.2  Intel Corporation 4 Series Chipset PT IDER Controller
           +-03.3  Intel Corporation 4 Series Chipset Serial KT Controller
           +-19.0  Intel Corporation 82567LM-3 Gigabit Network Connection
           +-1a.0  Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #4
           +-1a.1  Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #5
           +-1a.2  Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #6
           +-1a.7  Intel Corporation 82801JD/DO (ICH10 Family) USB2 EHCI Controller #2
           +-1b.0  Intel Corporation 82801JD/DO (ICH10 Family) HD Audio Controller
           +-1d.0  Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #1
           +-1d.1  Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #2
           +-1d.2  Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #3
           +-1d.7  Intel Corporation 82801JD/DO (ICH10 Family) USB2 EHCI Controller #1
           +-1e.0-[02]----01.0  LSI Corporation FW322/323
           +-1f.0  Intel Corporation 82801JDO (ICH10DO) LPC Interface Controller
           +-1f.2  Intel Corporation 82801JD/DO (ICH10 Family) 4-port SATA IDE Controller
           +-1f.3  Intel Corporation 82801JD/DO (ICH10 Family) SMBus Controller
           \-1f.5  Intel Corporation 82801JD/DO (ICH10 Family) 2-port SATA IDE Controller
```

```
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 12.04.1 LTS amd64 Release with Xen 4.3-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 03ad7cb6-58bc-48ca-8b3b-25b27d0a165d
set root='(/dev/sda,msdos1)'
search --no-floppy --fs-uuid --set=root 03ad7cb6-58bc-48ca-8b3b-25b27d0a165d
multiboot /boot/xen.gz
module /boot/vmlinuz-3.6.1-xen-teo.en.ming-sgp placeholder root=UUID=03ad7cb6-58bc-48ca-8b3b-25b27d0a165d dom0_mem=1024 console=tty quiet splash vt.handoff=7 nomodeset 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-3.6.1-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.10.0-xen-teo.en.ming-sgp' --class gnu-linux --class gnu --class os {
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all unrestricted_guest=1 msi=1
module /boot/vmlinuz-3.10.0-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-a624-0bbaa5df9758 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 /boot/initrd.img-3.10.0-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.11.0-rc1-xen-teo.en.ming-sgp' --class gnu-linux --class gnu --class os {
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all unrestricted_guest=1 msi=1
module /boot/vmlinuz-3.11.0-rc1-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-a624-0bbaa5df9758 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 /boot/initrd.img-3.11.0-rc1-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.8.1-xen-teo.en.ming-sgp' --class gnu-linux --class gnu --class os {
```



```
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all
unrestricted_guest=1 msi=1
module /boot/vmlinuz-3.8.1-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-
a624-0bbaa5df9758 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 /boot/initrd.img-3.8.1-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.10.3-xen-teo.en.ming-sgp' --class gnu-
linux --class gnu --class os {
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all
unrestricted_guest=1 msi=1
module /boot/vmlinuz-3.10.3-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-
a624-0bbaa5df9758 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 /boot/initrd.img-3.10.3-xen-teo.en.ming-sgp
}
```

```
sudo update-grub
```


9.1 /etc/xen/windows7

```
# 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="Windows7ultimate"
# 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/windows7.img', 'format=raw, vdev=hdc, access=ro,
devtype=cdrom, target=/home/teo-en-ming/windows7ultimate.iso' ]
vif=[ 'bridge=eth0,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 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' ]
```

9.2 /etc/xen/windows8

```
# 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="Windows8"
# 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/windows8.img', 'format=raw, vdev=hdc, access=ro,
devtype=cdrom, target=/home/teo-en-ming/Windows8-ReleasePreview-64bit-English.iso' ]
vif=[ 'bridge=eth0,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 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' ]
```

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

```
# 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=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' ]
```


11 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' ]
```

12 Using pci-stub

Prevents nouveau and snd_hda_intel kernel modules from loading.

```
sudo nano /etc/modprobe.d/blacklist.conf
```

```
# blacklist nouveau kernel module
blacklist nouveau
# blacklist snd_hda_intel kernel module
blacklist snd_hda_intel
```

Uninstall the lightdm display manager. Previous versions of Ubuntu uses gdm.

```
sudo apt-get remove lightdm
```

Reboot your computer.

```
sudo reboot
```

```
ps -ef | grep lightdm
ps -ef | grep X
lsmod | grep nouveau
lsmod | grep snd_hda_intel
```

Starts the Shorewall Firewall.

```
sudo service shorewall restart
```

Load the pci_stub module.

```
sudo modprobe pci-stub
```

```
lsmod | grep pci_stub
```

Palit NVIDIA Geforce 8400 GS PCI Express x16 VGA card

```
lspci | grep VGA
```

```
lspci -n | grep "01:00.0"
```

```
01:00.0 0300: 10de:10c3 (rev a2)
```

Create a shell script to start Windows HVM domU.

```
cd
nano start-windows
```



```
#!/bin/sh
set -x
#
# Starts Shorewall Firewall
sudo service shorewall restart
#
# Loads pci-stub kernel module
sudo modprobe pci-stub
#
# Passthrough Palit NVIDIA Geforce 8400 GS PCIe x16 VGA card
#
echo "Passthrough Palit NVIDIA Geforce 8400 GS VGA card."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:01:00.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "10de 10c3" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:01:00.0" > /sys/bus/pci/devices/0000:01:00.0/driver/unbind
echo "0000:01:00.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough Intel HD Audio Controller
#
echo "Passthrough Intel HD Audio Controller."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1b.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a6e" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1b.0" > /sys/bus/pci/devices/0000:00:1b.0/driver/unbind
echo "0000:00:1b.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Wait for 10 seconds
#
sleep 10
#
# Start Windows HVM domU with VGA Passthrough
#
#sudo xl create /etc/xen/WindowsXPHomeEditionSP3
sudo xl create /etc/xen/Windows8ConsumerPreview64bitEnglish
```

```
sudo chmod +x start-windows
```

Execute the following start-windows shell script. You may need to execute it twice. Why?

```
./start-windows
```

If you see “Permission denied” errors, press CTRL+C. Then execute the shell script start-windows again.

```
./start-windows
```


13 Checking Whether Intel VT-d is Enabled

```
sudo xl dmesg | grep 'I/O virtualisation'
```

```
(XEN) I/O virtualisation enabled
```


14 Xen Logs in /var/log/xen

14.1 qemu-dm-Windows8ConsumerPreview64bitEnglish.log

```
domid: 1
Strip off blktap sub-type prefix to /etc/xen/images/windows8consumerpreview64-bitenglish.img (drv 'aio')
Using file /etc/xen/images/windows8consumerpreview64-bitenglish.img in read-write mode
Strip off blktap sub-type prefix to /home/teo-en-ming/Downloads/Windows8-ConsumerPreview-64bit-English.iso (drv 'aio')
Using file /home/teo-en-ming/Downloads/Windows8-ConsumerPreview-64bit-English.iso in read-only mode
Watching /local/domain/0/device-model/1/logdirty/cmd
Watching /local/domain/0/device-model/1/command
Watching /local/domain/1/cpu
qemu_map_cache_init nr_buckets = 10000 size 4194304
shared page at pfn feffd
buffered io page at pfn feffb
Guest uuid = eb9aa557-f2d4-473f-a01b-9b235399f235
Register xen platform.
Done register platform.
platform_fixed_ioport: changed ro/rw state of ROM memory area. now is rw state.
xs_read(/local/domain/0/device-model/1/xen_extended_power_mgmt): read error
medium change watch on `hdc' (index: 1): aio:/home/teo-en-ming/Downloads/Windows8-ConsumerPreview-64bit-English.iso
I/O request not ready: 0, ptr: 0, port: 0, data: 0, count: 0, size: 0
Log-dirty: no command yet.
I/O request not ready: 0, ptr: 0, port: 0, data: 0, count: 0, size: 0
vcpu-set: watch node error.
xs_read(/local/domain/1/log-throttling): read error
qemu: ignoring not-understood drive `/local/domain/1/log-throttling'
medium change watch on `/local/domain/1/log-throttling' - unknown device, ignored
dm-command: hot insert pass-through pci dev
register_real_device: Assigning real physical device 01:00.0 ...
pt_iomul_init: Error: pt_iomul_init can't open file /dev/xen/pci_iomul: No such file or directory: 0x1:0x0.0x0
pt_register_regions: IO region registered (size=0x01000000 base_addr=0xd2000000)
pt_register_regions: IO region registered (size=0x10000000 base_addr=0xc000000c)
pt_register_regions: IO region registered (size=0x02000000 base_addr=0xd000000c)
pt_register_regions: IO region registered (size=0x00000080 base_addr=0x0000d001)
pt_register_regions: Expansion ROM registered (size=0x00080000 base_addr=0xd3000002)
setup_vga_pt: vga bios checksum is adjusted!
pt_msi_setup: msi mapped with pirq 37
pci_intx: intx=1
register_real_device: Real physical device 01:00.0 registered successfuly!
IRQ type = MSI-INTx
pt_bar_reg_read: first read BARs of gfx
pt_iomem_map: e_phys=d2000000 maddr=d2000000 type=0 len=16777216 index=0 first_map=1
pt_bar_reg_read: first read BARs of gfx
```

```
pt_iomem_map: e_phys=c0000000 maddr=c0000000 type=8 len=268435456 index=1 first_map=1
pt_bar_reg_read: first read BARs of gfx
pt_bar_reg_read: first read BARs of gfx
pt_iomem_map: e_phys=d0000000 maddr=d0000000 type=8 len=33554432 index=3 first_map=1
pt_bar_reg_read: first read BARs of gfx
pt_bar_reg_read: first read BARs of gfx
pt_ioport_map: e_phys=d000 pio_base=d000 len=128 index=5 first_map=1
platform_fixed_ioport: changed ro/rw state of ROM memory area. now is rw state.
platform_fixed_ioport: changed ro/rw state of ROM memory area. now is ro state.
pt_pci_read_config: [00:05:0] Error: Failed to read register with invalid access size alignment.
[Offset:0eh][Length:4]
pt_pci_read_config: [00:05:0] Error: Failed to read register with invalid access size alignment.
[Offset:0eh][Length:4]
pt_pci_read_config: [00:05:0] Error: Failed to read register with invalid access size alignment.
[Offset:0eh][Length:4]
pt_pci_read_config: [00:05:0] Error: Failed to read register with invalid access size alignment.
[Offset:0eh][Length:4]
pt_pci_read_config: [00:05:0] Error: Failed to read register with invalid access size alignment.
[Offset:0eh][Length:4]
pt_pci_read_config: [00:05:0] Error: Failed to read register with invalid access size alignment.
[Offset:0eh][Length:4]
pt_pci_read_config: [00:05:0] Error: Failed to read register with invalid access size alignment.
[Offset:0eh][Length:4]
pt_iomem_map: e_phys=ffffffff maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=ffff pio_base=d000 len=128 index=5 first_map=0
pt_iomem_map: e_phys=d2000000 maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=c0000000 maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=d0000000 maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=d000 pio_base=d000 len=128 index=5 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=ffff pio_base=d000 len=128 index=5 first_map=0
pt_iomem_map: e_phys=d2000000 maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=c0000000 maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=d0000000 maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=d000 pio_base=d000 len=128 index=5 first_map=0
```


14.2 qemu-dm-WindowsXPHomeEditionSP3.log

```
domid: 1
Strip off blktap sub-type prefix to /var/lib/libvirt/images/Windows-XP-Home-Edition.img (drv 'aio')
Using file /var/lib/libvirt/images/Windows-XP-Home-Edition.img in read-write mode
Using file /dev/sr1 in read-only mode
Watching /local/domain/0/device-model/1/logdirty/cmd
Watching /local/domain/0/device-model/1/command
Watching /local/domain/1/cpu
qemu_map_cache_init nr_buckets = 10000 size 4194304
shared page at pfn feffd
buffered io page at pfn feffb
Guest uuid = 8cad4267-b556-4a49-8966-9dcf3d032f5a
Register xen platform.
Done register platform.
platform_fixed_ioport: changed ro/rw state of ROM memory area. now is rw state.
xs_read(/local/domain/0/device-model/1/xen_extended_power_mgmt): read error
medium change watch on `hdc' (index: 1): /dev/sr1
I/O request not ready: 0, ptr: 0, port: 0, data: 0, count: 0, size: 0
Log-dirty: no command yet.
I/O request not ready: 0, ptr: 0, port: 0, data: 0, count: 0, size: 0
vcpu-set: watch node error.
xs_read(/local/domain/1/log-throttling): read error
qemu: ignoring not-understood drive `/local/domain/1/log-throttling'
medium change watch on `/local/domain/1/log-throttling' - unknown device, ignored
dm-command: hot insert pass-through pci dev
register_real_device: Assigning real physical device 01:00.0 ...
pt_iomul_init: Error: pt_iomul_init can't open file /dev/xen/pci_iomul: No such file or directory:
0x1:0x0.0x0
pt_register_regions: IO region registered (size=0x01000000 base_addr=0xd2000000)
pt_register_regions: IO region registered (size=0x10000000 base_addr=0xc000000c)
pt_register_regions: IO region registered (size=0x02000000 base_addr=0xd000000c)
pt_register_regions: IO region registered (size=0x00000080 base_addr=0x0000d001)
pt_register_regions: Expansion ROM registered (size=0x00080000 base_addr=0xd3000002)
setup_vga_pt: vga bios checksum is adjusted!
pt_msi_setup: msi mapped with pirq 37
pci_intx: intx=1
register_real_device: Real physical device 01:00.0 registered successfuly!
IRQ type = MSI-INTx
dm-command: hot insert pass-through pci dev
register_real_device: Assigning real physical device 00:1b.0 ...
pt_iomul_init: Error: pt_iomul_init can't open file /dev/xen/pci_iomul: No such file or directory:
0x0:0x1b.0x0
pt_register_regions: IO region registered (size=0x00004000 base_addr=0xd3220004)
pt_msi_setup: msi mapped with pirq 36
pci_intx: intx=1
register_real_device: Real physical device 00:1b.0 registered successfuly!
IRQ type = MSI-INTx
pt_bar_reg_read: first read BARs of gfx
pt_iomem_map: e_phys=d2000000 maddr=d2000000 type=0 len=16777216 index=0 first_map=1
```



```
pt_bar_reg_read: first read BARs of gfx
pt_iomem_map: e_phys=c0000000 maddr=c0000000 type=8 len=268435456 index=1 first_map=1
pt_bar_reg_read: first read BARs of gfx
pt_bar_reg_read: first read BARs of gfx
pt_iomem_map: e_phys=d0000000 maddr=d0000000 type=8 len=33554432 index=3 first_map=1
pt_bar_reg_read: first read BARs of gfx
pt_bar_reg_read: first read BARs of gfx
pt_ioport_map: e_phys=d000 pio_base=d000 len=128 index=5 first_map=1
pt_iomem_map: e_phys=f1000000 maddr=d3220000 type=0 len=16384 index=0 first_map=1
platform_fixed_ioport: changed ro/rw state of ROM memory area. now is rw state.
platform_fixed_ioport: changed ro/rw state of ROM memory area. now is ro state.
pt_iomem_map: e_phys=ffffffff maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=ffff pio_base=d000 len=128 index=5 first_map=0
pt_iomem_map: e_phys=d2000000 maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=c0000000 maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=d0000000 maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=d000 pio_base=d000 len=128 index=5 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d3220000 type=0 len=16384 index=0 first_map=0
pt_pci_write_config: [00:06:0] Warning: Guest attempt to set address to unused Base Address
Register. [Offset:30h][Length:4]
pt_iomem_map: e_phys=f1000000 maddr=d3220000 type=0 len=16384 index=0 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d3220000 type=0 len=16384 index=0 first_map=0
pt_iomem_map: e_phys=f1000000 maddr=d3220000 type=0 len=16384 index=0 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=ffffffff maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=ffff pio_base=d000 len=128 index=5 first_map=0
pt_iomem_map: e_phys=d2000000 maddr=d2000000 type=0 len=16777216 index=0 first_map=0
pt_iomem_map: e_phys=c0000000 maddr=c0000000 type=8 len=268435456 index=1 first_map=0
pt_iomem_map: e_phys=d0000000 maddr=d0000000 type=8 len=33554432 index=3 first_map=0
pt_ioport_map: e_phys=d000 pio_base=d000 len=128 index=5 first_map=0
reset requested in cpu_handle_ioreq.
Issued domain 1 reboot
```


15 Passthrough USB Keyboard and USB Mouse to Windows HVM domU

List your USB devices.

```
lsusb
```

```
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 003 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 004 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 005 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 006 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 007 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 008 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 001 Device 002: ID 2040:2400 Hauppauge WinTV PVR USB2 (Model 24019)
Bus 001 Device 003: ID 0409:005a NEC Corp. HighSpeed Hub
Bus 006 Device 002: ID 0603:00f2 Novatek Microelectronics Corp.
Bus 008 Device 002: ID 15d9:0a41 Trust International B.V. MI-2540D [Optical mouse]
```

On the QEMU console, execute the following commands.

Passthrough USB Keyboard.

```
usb_add host:0603:00f2
```

Passthrough USB Mouse.

```
usb_add host:15d9:0a41
```

16 Reverting Back to lightdm Display Manager

```
sudo reboot
sudo apt-get install lightdm
sudo service lightdm start
```


17 PCI Passthrough the USB Controllers to Windows HVM domU

lspci

```
00:00.0 Host bridge: Intel Corporation 4 Series Chipset DRAM Controller (rev 03)
00:01.0 PCI bridge: Intel Corporation 4 Series Chipset PCI Express Root Port (rev 03)
00:03.0 Communication controller: Intel Corporation 4 Series Chipset HECI Controller (rev 03)
00:19.0 Ethernet controller: Intel Corporation 82567LM-3 Gigabit Network Connection (rev 02)
00:1a.0 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #4 (rev 02)
00:1a.1 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #5 (rev 02)
00:1a.2 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #6 (rev 02)
00:1a.7 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB2 EHCI Controller #2 (rev 02)
00:1b.0 Audio device: Intel Corporation 82801JD/DO (ICH10 Family) HD Audio Controller (rev 02)
00:1d.0 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #1 (rev 02)
00:1d.1 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #2 (rev 02)
00:1d.2 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB UHCI Controller #3 (rev 02)
00:1d.7 USB Controller: Intel Corporation 82801JD/DO (ICH10 Family) USB2 EHCI Controller #1 (rev 02)
00:1e.0 PCI bridge: Intel Corporation 82801 PCI Bridge (rev a2)
00:1f.0 ISA bridge: Intel Corporation 82801JDO (ICH10DO) LPC Interface Controller (rev 02)
00:1f.2 IDE interface: Intel Corporation 82801JD/DO (ICH10 Family) 4-port SATA IDE Controller (rev 02)
00:1f.3 SMBus: Intel Corporation 82801JD/DO (ICH10 Family) SMBus Controller (rev 02)
00:1f.5 IDE interface: Intel Corporation 82801JD/DO (ICH10 Family) 2-port SATA IDE Controller (rev 02)
01:00.0 VGA compatible controller: nVidia Corporation GT218 [GeForce 8400 GS] (rev a2)
01:00.1 Audio device: nVidia Corporation High Definition Audio Controller (rev a1)
02:01.0 FireWire (IEEE 1394): Agere Systems FW322/323 (rev 70)
```

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 12.04.1 LTS amd64 Release with Xen 4.3-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 03ad7cb6-58bc-48ca-8b3b-25b27d0a165d
set root='(/dev/sda,msdos1)'
search --no-floppy --fs-uuid --set=root 03ad7cb6-58bc-48ca-8b3b-25b27d0a165d
multiboot /boot/xen.gz
module /boot/vmlinuz-3.6.1-xen-teo.en.ming-sgp placeholder root=UUID=03ad7cb6-58bc-48ca-8b3b-25b27d0a165d
dom0_mem=1024 console=tty quiet splash vt.handoff=7 nomodeset 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)
module /boot/initrd.img-3.6.1-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.10.0-xen-teo.en.ming-sgp' --class gnu-linux --class
gnu --class os {
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all unrestricted_guest=1
msi=1
```



```
module /boot/vmlinuz-3.10.0-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-a624-0bbaa5df9758 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 /boot/initrd.img-3.10.0-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.11.0-rc1-xen-teo.en.ming-sgp' --class gnu-linux --class gnu --class os {
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all unrestricted_guest=1 msi=1
module /boot/vmlinuz-3.11.0-rc1-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-a624-0bbaa5df9758 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 /boot/initrd.img-3.11.0-rc1-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.8.1-xen-teo.en.ming-sgp' --class gnu-linux --class gnu --class os {
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all unrestricted_guest=1 msi=1
module /boot/vmlinuz-3.8.1-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-a624-0bbaa5df9758 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 /boot/initrd.img-3.8.1-xen-teo.en.ming-sgp
}
menuentry 'Ubuntu 12.04.2 LTS with Xen 4.3-unstable and 3.10.3-xen-teo.en.ming-sgp' --class gnu-linux --class gnu --class os {
recordfail
insmod part_msdos
insmod ext2
set root='hd0,msdos1'
search --no-floppy --fs-uuid --set=root 0add8c6e-9d0f-4407-a624-0bbaa5df9758
multiboot /boot/xen.gz placeholder dom0_mem=1024M iommu=1 loglvl=all guest_loglvl=all unrestricted_guest=1 msi=1
module /boot/vmlinuz-3.10.3-xen-teo.en.ming-sgp placeholder root=UUID=0add8c6e-9d0f-4407-a624-0bbaa5df9758 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 /boot/initrd.img-3.10.3-xen-teo.en.ming-sgp
}
```

```
sudo update-grub
```

```
sudo reboot
```

Please note that your USB keyboard and USB mouse will not work after rebooting. Hence it is not advisable to use this method to passthrough your USB controllers to Windows HVM domU because ALL the USB controllers have been hidden from domain 0 as shown above. Of course, you can choose not to hide all the USB controllers from dom0.

18 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
```

19 Tested Xen 4.2-unstable Changesets

Xen 4.2-unstable Changeset	Xen VGA Passthrough to Windows 8 Consumer Preview HVM Virtual Machine Successful?
25070	YES, BUT PARTIAL, LESS THAN 100%
25099	YES, BUT PARTIAL, LESS THAN 100%

20 PCI Passthrough Intel HD Audio Controller on Intel DQ45CB Desktop Board

Please refer to the start-windows linux bash shell script in Section 12 of this document.

21 Testing ---Outdated--- NVIDIA Display Drivers for Windows XP Home Edition SP3 32-bit HVM domU with Xen 4.2-unstable VGA Passthrough

NVIDIA Display Driver Version	Windows XP Home Edition SP3 32-bit HVM domU	Windows 8 Consumer Preview 64-bit English HVM domU	Ubuntu 11.10 amd64 Release Domain 0	NVIDIA Display Driver Download Location
275.33 WHQL	CRASHED	NOT TESTED, USING LATEST NVIDIA DRIVER VERSION INSTEAD	CRASHED	www.softpedia.com
275.50 BETA	CRASHED	NOT TESTED, USING LATEST NVIDIA DRIVER VERSION INSTEAD	CRASHED	www.softpedia.com

Please note that using the **very latest** NVIDIA Display Drivers, as of 29 March 2012, for Windows 8 Consumer Preview 64-bit English HVM domU and Windows XP Home Edition SP3 HVM domU **will not** cause the respective HVM virtual machines and dom0 to crash with Xen 4.2-unstable VGA Passthrough. However, the following errors **still exist** in Device Manager for NVIDIA Geforce 8400 GS:

1. Yellow exclamation mark besides NVIDIA Geforce 8400 GS in Device Manager
2. General tab: Windows has stopped this device because it has reported problems. (Code 43)
3. Resources tab: This device isn't using any resources because it has a problem.

With the above-mentioned errors, you can still play and watch Youtube videos and do internet browsing. But you will not be able to run 3D graphics benchmarks and play 3D games. I have tried to run Unigine Heaven DX11 and 3dmark11 3D graphics benchmarks without success. This is why I say that Xen 4.2-unstable VGA Passthrough to Windows 8 Consumer Preview and Windows XP Home Edition SP3 HVM virtual machines is only partially successful, i.e., less than 100% success.

22 Tested VGA Adapters

Display Adapter	Xen VGA Passthrough
NVIDIA Quadro 6000	100% Success
NVIDIA Geforce 8400 GS	Partial Success***
EVGA NVIDIA Geforce GTX 560	Partial Success***
Gigabyte NVIDIA Geforce GTX 560	Partial Success***

*** Yellow triangle with exclamation mark and error code 43 in Device Manager in Windows HVM domU.

23 EVGA Geforce GTX 560 1 GB GDDR5 PCI Express x16 VGA Card

23.1 The First Three PCI Memory Ranges

[0.128516] pci 0000:01:00.0: reg 10: [mem 0xdc000000-0xddffffff]
[0.128538] pci 0000:01:00.0: reg 14: [mem 0xd0000000-0xd7ffffff 64bit pref]
[0.128560] pci 0000:01:00.0: reg 1c: [mem 0xd8000000-0xdbffffff 64bit pref]

23.2 Calculating Differences for the Three Memory Ranges

23.2.1 First Memory Range

Maximum = 0xddffffff = 3724541951
Minimum = 0xdc000000 = 3690987520
Difference = Max – Min + 1 = 3724541951 - 3690987520 + 1 = 33554432 = 0x02000000

Hence,

Max = 0xDDFFFFFF
Min = 0xDC000000
Diff = 0x02000000

23.2.2 Second Memory Range

Maximum = 0xd7ffffff = 3623878655
Minimum = 0xd0000000 = 3489660928
Difference = Max – Min + 1 = 3623878655 - 3489660928 + 1 = 134217728 = 0x08000000

Hence,

Max = 0xD7FFFFFF
Min = 0xD0000000
Diff = 0x08000000

23.2.3 Third Memory Range

Maximum = 0xdbffffff = 3690987519
Minimum = 0xd8000000 = 3623878656
Difference = Max – Min + 1 = 3690987519 - 3623878656 + 1 = 67108864 = 0x04000000

Hence,

Max = 0xDBFFFFFF
Min = 0xD8000000
Diff = 0x04000000

23.3 Modifying tools/firmware/hvmloader/acpi/dsdt.asl

```
            /* reserve MMIO BARs of gfx for 1:1 mapping */
            DWordMemory(
                ResourceProducer, PosDecode, MinFixed, MaxFixed,
                Cacheable, ReadWrite,
                0x00000000,
                0xDC000000,
                0xDDFFFFFF,
                0x00000000,
                0x02000000)

            DWordMemory(
                ResourceProducer, PosDecode, MinFixed, MaxFixed,
                NonCacheable, ReadWrite,
                0x00000000,
                0xD0000000,
                0xD7FFFFFF,
                0x00000000,
                0x08000000)

            DWordMemory(
                ResourceProducer, PosDecode, MinFixed, MaxFixed,
                Cacheable, ReadWrite,
                0x00000000,
                0xD8000000,
                0xDBFFFFFF,
                0x00000000,
                0x04000000)
```


23.4 Linux Shell Script start-windows

```
#!/bin/sh
set -x
#
# Starts Shorewall Firewall
sudo service shorewall restart
#
# Loads pci-stub kernel module
sudo modprobe pci-stub
#
# Passthrough EVGA Geforce GTX 560 1 GB GDDR5
#
echo "Passthrough EVGA Geforce GTX 560 1 GB GDDR5"
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:01:00.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "10de 1201" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:01:00.0" > /sys/bus/pci/devices/0000:01:00.0/driver/unbind
echo "0000:01:00.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough Intel HD Audio Controller
#
echo "Passthrough Intel HD Audio Controller."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1b.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a6e" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1b.0" > /sys/bus/pci/devices/0000:00:1b.0/driver/unbind
echo "0000:00:1b.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Sleep for 10 secs
#
sleep 10
#
# Passthrough USB Controller #1
#
echo "Passthrough USB Controller #1."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a67" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.0" > /sys/bus/pci/devices/0000:00:1a.0/driver/unbind
echo "0000:00:1a.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #2
#
echo "Passthrough USB Controller #2."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.1/driver/unbind
```

```
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a68" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.1" > /sys/bus/pci/devices/0000:00:1a.1/driver/unbind
echo "0000:00:1a.1" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #3
#
echo "Passthrough USB Controller #3."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.2/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a69" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.2" > /sys/bus/pci/devices/0000:00:1a.2/driver/unbind
echo "0000:00:1a.2" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #4
#
echo "Passthrough USB Controller #4."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.7/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a6c" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.7" > /sys/bus/pci/devices/0000:00:1a.7/driver/unbind
echo "0000:00:1a.7" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #5
#
echo "Passthrough USB Controller #5."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a64" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.0" > /sys/bus/pci/devices/0000:00:1d.0/driver/unbind
echo "0000:00:1d.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #6
#
echo "Passthrough USB Controller #6."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.1/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a65" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.1" > /sys/bus/pci/devices/0000:00:1d.1/driver/unbind
echo "0000:00:1d.1" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #7
#
echo "Passthrough USB Controller #7."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.2/driver/unbind
```



```
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a66" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.2" > /sys/bus/pci/devices/0000:00:1d.2/driver/unbind
echo "0000:00:1d.2" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #8
#
echo "Passthrough USB Controller #8."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.7/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a6a" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.7" > /sys/bus/pci/devices/0000:00:1d.7/driver/unbind
echo "0000:00:1d.7" > /sys/bus/pci/drivers/pci-stub/bind
#
# Wait for 10 seconds
#
sleep 10
#
# Start Windows HVM domU with VGA Passthrough
#
#sudo xl create /etc/xen/WindowsXPHomeEditionSP3
sudo xl create /etc/xen/windows8
```


24 Gigabyte Geforce GTX 560 on Intel DQ45CB Desktop Motherboard

24.1 The First Three PCI Memory Ranges

[0.210333] pci 0000:01:00.0: reg 10: [mem 0xdc000000-0xddffffff]
[0.210343] pci 0000:01:00.0: reg 14: [mem 0xd0000000-0xd7ffffff 64bit pref]
[0.210352] pci 0000:01:00.0: reg 1c: [mem 0xd8000000-0xdbffffff 64bit pref]

24.2 Calculating Differences for the Three Memory Ranges

24.2.1 First Memory Range

Maximum = 0xddffffff = 3724541951
Minimum = 0xdc000000 = 3690987520
Difference = Max – Min + 1 = 3724541951 - 3690987520 + 1 = 33554432 = 0x02000000

Hence,

Max = 0xDDFFFFFF
Min = 0xDC000000
Diff = 0x02000000

24.2.2 Second Memory Range

Maximum = 0xd7ffffff = 3623878655
Minimum = 0xd0000000 = 3489660928
Difference = Max – Min + 1 = 3623878655 - 3489660928 + 1 = 134217728 = 0x08000000

Hence,

Max = 0xD7FFFFFF
Min = 0xD0000000
Diff = 0x08000000

24.2.3 Third Memory Range

Maximum = 0xdbffffff = 3690987519
Minimum = 0xd8000000 = 3623878656
Difference = Max – Min + 1 = 3690987519 - 3623878656 + 1 = 67108864 = 0x04000000

Hence,

Max = 0xDBFFFFFF
Min = 0xD8000000
Diff = 0x04000000

24.3 Modifying tools/firmware/hvmloader/acpi/dsdt.asl

```
/* reserve MMIO BARs of gfx for 1:1 mapping */
DWordMemory(
   ResourceProducer, PosDecode, MinFixed, MaxFixed,
   Cacheable, ReadWrite,
   0x00000000,
   0xDC000000,
   0xDDFFFFFF,
   0x00000000,
   0x02000000)

DWordMemory(
   ResourceProducer, PosDecode, MinFixed, MaxFixed,
   NonCacheable, ReadWrite,
   0x00000000,
   0xD0000000,
   0xD7FFFFFF,
   0x00000000,
   0x08000000)

DWordMemory(
   ResourceProducer, PosDecode, MinFixed, MaxFixed,
   Cacheable, ReadWrite,
   0x00000000,
   0xD8000000,
   0xDBFFFFFF,
   0x00000000,
   0x04000000)
```


24.4 Linux Shell Script start-windows

```
#!/bin/sh
set -x
#
# Starts Shorewall Firewall
sudo service shorewall restart
#
# Loads pci-stub kernel module
sudo modprobe pci-stub
#
# Passthrough Gigabyte Geforce GTX 560 1 GB GDDR5
#
echo "Passthrough Gigabyte Geforce GTX 560 1 GB GDDR5"
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:01:00.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "10de 1201" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:01:00.0" > /sys/bus/pci/devices/0000:01:00.0/driver/unbind
echo "0000:01:00.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough Intel HD Audio Controller
#
echo "Passthrough Intel HD Audio Controller."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1b.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a6e" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1b.0" > /sys/bus/pci/devices/0000:00:1b.0/driver/unbind
echo "0000:00:1b.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Sleep for 10 secs
#
sleep 10
#
# Passthrough USB Controller #1
#
echo "Passthrough USB Controller #1."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a67" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.0" > /sys/bus/pci/devices/0000:00:1a.0/driver/unbind
echo "0000:00:1a.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #2
#
echo "Passthrough USB Controller #2."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.1/driver/unbind
```



```
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a68" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.1" > /sys/bus/pci/devices/0000:00:1a.1/driver/unbind
echo "0000:00:1a.1" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #3
#
echo "Passthrough USB Controller #3."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.2/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a69" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.2" > /sys/bus/pci/devices/0000:00:1a.2/driver/unbind
echo "0000:00:1a.2" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #4
#
echo "Passthrough USB Controller #4."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1a.7/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a6c" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1a.7" > /sys/bus/pci/devices/0000:00:1a.7/driver/unbind
echo "0000:00:1a.7" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #5
#
echo "Passthrough USB Controller #5."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a64" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.0" > /sys/bus/pci/devices/0000:00:1d.0/driver/unbind
echo "0000:00:1d.0" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #6
#
echo "Passthrough USB Controller #6."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.1/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a65" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.1" > /sys/bus/pci/devices/0000:00:1d.1/driver/unbind
echo "0000:00:1d.1" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #7
#
echo "Passthrough USB Controller #7."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.2/driver/unbind
```



```
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a66" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.2" > /sys/bus/pci/devices/0000:00:1d.2/driver/unbind
echo "0000:00:1d.2" > /sys/bus/pci/drivers/pci-stub/bind
#
# Passthrough USB Controller #8
#
echo "Passthrough USB Controller #8."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.7/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a6a" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.7" > /sys/bus/pci/devices/0000:00:1d.7/driver/unbind
echo "0000:00:1d.7" > /sys/bus/pci/drivers/pci-stub/bind
#
# Wait for 10 seconds
#
sleep 10
#
# Start Windows HVM domU with VGA Passthrough
#
#sudo xl create /etc/xen/WindowsXPHomeEditionSP3
sudo xl create /etc/xen/windows8
```


25 Gigabyte Geforce GTX 560 on Asrock B85M Pro4 LGA1150 Motherboard

25.1 The First Three PCI Memory Ranges

[0.130984] pci 0000:01:00.0: reg 10: [mem 0xf4000000-0xf5ffffff]
[0.130993] pci 0000:01:00.0: reg 14: [mem 0xe8000000-0xefffffff 64bit pref]
[0.131001] pci 0000:01:00.0: reg 1c: [mem 0xf0000000-0xf3ffffff 64bit pref]

25.2 Calculating Differences for the Three Memory Ranges

25.2.1 First Memory Range

Maximum = 0xf5ffffff = 4127195135
Minimum = 0xf4000000 = 4093640704
Difference = Max – Min + 1 = 4127195135 – 4093640704 + 1 = 33554432 = 0x02000000

Hence,

Max = 0xF5FFFFFF
Min = 0xF4000000
Diff = 0x02000000

25.2.2 Second Memory Range

Maximum = 0xefffffff = 4026531839
Minimum = 0xe8000000 = 3892314112
Difference = Max – Min + 1 = 4026531839 - 3892314112+ 1 = 134217728 = 0x08000000

Hence,

Max = 0xEFFFFFFF
Min = 0xE8000000
Diff = 0x08000000

25.2.3 Third Memory Range

Maximum = 0xf3ffffff = 4093640703
Minimum = 0xf0000000 = 4026531840
Difference = Max – Min + 1 = 4093640703 – 4026531840 + 1 = 67108864 = 0x04000000

Hence,

Max = 0xF3FFFFFF
Min = 0xF0000000
Diff = 0x04000000

25.3 Modifying tools/firmware/hvmloader/acpi/dsdt.asl

```
/* reserve MMIO BARs of gfx for 1:1 mapping */
DWordMemory(
   ResourceProducer, PosDecode, MinFixed, MaxFixed,
   Cacheable, ReadWrite,
   0x00000000,
   0xF4000000,
   0xF5FFFFFF,
   0x00000000,
   0x02000000)

DWordMemory(
   ResourceProducer, PosDecode, MinFixed, MaxFixed,
   NonCacheable, ReadWrite,
   0x00000000,
   0xE8000000,
   0xEFFFFFFF,
   0x00000000,
   0x08000000)

DWordMemory(
   ResourceProducer, PosDecode, MinFixed, MaxFixed,
   Cacheable, ReadWrite,
   0x00000000,
   0xF0000000,
   0xF3FFFFFF,
   0x00000000,
   0x04000000)
```


26 Frank Lyon's 100% Successful Example with NVIDIA Quadro 6000

Frank Lyon (Singapore) had engaged me to work on Xen VGA Passthrough on his server. Using this manual, there is 100% success in Xen VGA Passthrough with his NVIDIA Quadro 6000 and there is no yellow triangle with exclamation mark and error code 43 in Device Manager in Windows 8 HVM domU. But he had subsequently hired a software consultancy firm in Ukraine to install Xen Cloud Platform (XCP) on his server and perform Xen VGA Passthrough using XCP, thereby dropping my method of Xen VGA Passthrough.

Here are **Frank** **Lyon**'s hardware specifications:

Server: HP ProLiant DL370G6
Processors: 2x Intel Xeon CPU X5650 @ 2.67 GHz (2 Processors detected,
12 total cores detected per processor)
Harddisks: 4X 1TB SAS MDL 6G DP 7.2K Harddisks
Memory: 48GB of memory
Display adapter: NVIDIA Quadro 6000

Here are **Frank** **Lyon**'s software configuration:

Host Operating System: Ubuntu 12.04.1 LTS Server CD
HVM domU: Windows 7 64-bit and Windows 8 Pro 64-bit
Xen Hypervisor version: 4.2-unstable Changeset 25099 (I compiled and installed it from sources)
Linux Dom0 Kernel: 3.5.4 (I compiled and installed it from sources)

26.1 /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 12.04 amd64 Release with Xen 4.3-unstable and Linux Kernel 3.5.4-xen-frank.lyon-sgp' --class gnu-linux --class gnu --class os {
recordfail
insmod part_msdos
insmod ext2
search --no-floppy --fs-uuid --set=root d5ec6b7f-e1db-4b46-b050-d0bd46403f59
set root='(hd0,msdos1)'
search --no-floppy --fs-uuid --set=root d5ec6b7f-e1db-4b46-b050-d0bd46403f59
multiboot /xen.gz
module /vmlinuz-3.5.4-xen-frank.lyon-sgp placeholder root=/dev/mapper/snow-root dom0_mem=1024 console=tty quiet splash vt.handoff=7 nomodeset
module /initrd.img-3.5.4-xen-frank.lyon-sgp
}
```


26.2 tools/firmware/hvmloader/acpi/dsdt.asl

```
            /* reserve MMIO BARs of gfx for 1:1 mapping */
            DWordMemory(
                ResourceProducer, PosDecode, MinFixed, MaxFixed,
                Cacheable, ReadWrite,
                0x00000000,
                0xF8000000,
                0xF9FFFFFF,
                0x00000000,
                0x02000000)

            DWordMemory(
                ResourceProducer, PosDecode, MinFixed, MaxFixed,
                NonCacheable, ReadWrite,
                0x00000000,
                0xD8000000,
                0xDFFFFFFF,
                0x00000000,
                0x08000000)

            DWordMemory(
                ResourceProducer, PosDecode, MinFixed, MaxFixed,
                Cacheable, ReadWrite,
                0x00000000,
                0xD4000000,
                0xD7FFFFFF,
                0x00000000,
                0x04000000)
```


26.3 /etc/default/grub

```
# If you change this file, run 'update-grub' afterwards to update
# /boot/grub/grub.cfg.
# For full documentation of the options in this file, see:
#   info -f grub -n 'Simple configuration'

GRUB_DEFAULT=13
#GRUB_HIDDEN_TIMEOUT=0
GRUB_HIDDEN_TIMEOUT_QUIET=true
GRUB_TIMEOUT=50
GRUB_DISTRIBUTOR=`lsb_release -i -s 2> /dev/null || echo Debian`
GRUB_CMDLINE_LINUX_DEFAULT=""
GRUB_CMDLINE_LINUX="nomodeset"

# Uncomment to enable BadRAM filtering, modify to suit your needs
# This works with Linux (no patch required) and with any kernel that obtains
# the memory map information from GRUB (GNU Mach, kernel of FreeBSD ...)
#GRUB_BADRAM="0x01234567,0xfefefefe,0x89abcdef,0xefefefef"

# Uncomment to disable graphical terminal (grub-pc only)
#GRUB_TERMINAL=console

# The resolution used on graphical terminal
# note that you can use only modes which your graphic card supports via VBE
# you can see them in real GRUB with the command `vbeinfo'
#GRUB_GFXMODE=640x480

# Uncomment if you don't want GRUB to pass "root=UUID=xxx" parameter to Linux
#GRUB_DISABLE_LINUX_UUID=true

# Uncomment to disable generation of recovery mode menu entries
#GRUB_DISABLE_RECOVERY="true"

# Uncomment to get a beep at grub start
#GRUB_INIT_TUNE="480 440 1"
```


26.4 /etc/rc.local

```
#!/bin/sh -e
#
# rc.local
#
# This script is executed at the end of each multiuser runlevel.
# Make sure that the script will "exit 0" on success or any other
# value on error.
#
# In order to enable or disable this script just change the execution
# bits.
#
# By default this script does nothing.

sudo ifconfig eth0 up
sudo route add default gw 192.168.25.1
sudo echo "nameserver 192.168.50.15" >> /etc/resolv.conf
sudo echo "nameserver 192.168.50.30" >> /etc/resolv.conf
exit 0
```


26.5 Linux Shell Script start-windows

```
#!/bin/sh
set -x
#
#Loads pci-stub kernel module
sudo modprobe pci-stub
#
#Passthrough NVIDIA Quadro 6000
#
echo "Passthrough NVIDIA Quadro 6000 VGA card."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:0d:00.0/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "10de 06d8" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:0d:00.0" > /sys/bus/pci/devices/0000:0d:00.0/driver/unbind
echo "0000:0d:00.0" > /sys/bus/pci/drivers/pci-stub/bind
#
#Passthrough NVIDIA HD Audio Controller
#
echo "Passthrough NVIDIA HD Audio Controller."
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:0d:00.1/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "10de 0be5" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:0d:00.1" > /sys/bus/pci/devices/0000:0d:00.1/driver/unbind
echo "0000:0d:00.1" > /sys/bus/pci/drivers/pci-stub/bind
#
#Passthrough 2nd NVIDIA Quadro 6000
#
#echo "Passthrough 2nd NVIDIA Quadro 6000 VGA card."
#sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
#sudo chmod o+w /sys/bus/pci/devices/0000:1b:00.0/driver/unbind
#sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
#echo "10de 06d8" > /sys/bus/pci/drivers/pci-stub/new_id
#echo "0000:1b:00.0" > /sys/bus/pci/devices/0000:1b:00.0/driver/unbind
#echo "0000:1b:00.0" > /sys/bus/pci/drivers/pci-stub/bind
#
#Passthrough 2nd NVIDIA HD Audio Controller
#
#echo "Passthrough 2nd NVIDIA HD Audio Controller."
#sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
#sudo chmod o+w /sys/bus/pci/devices/0000:1b:00.1/driver/unbind
#sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
#echo "10de 0be5" > /sys/bus/pci/drivers/pci-stub/new_id
#echo "0000:1b:00.1" > /sys/bus/pci/devices/0000:1b:00.1/driver/unbind
#echo "0000:1b:00.1" > /sys/bus/pci/drivers/pci-stub/bind
#
#Passthrough USB 1.1 Controller #3
#
```



```
echo "Passthrough USB 1.1 Controller #3"
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.2/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a36" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.2" > /sys/bus/pci/devices/0000:00:1d.2/driver/unbind
echo "0000:00:1d.2" > /sys/bus/pci/drivers/pci-stub/bind
#
#Passthrough USB 1.1 Controller #4
#
echo "Passthrough USB 1.1 Controller #4"
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/new_id
sudo chmod o+w /sys/bus/pci/devices/0000:00:1d.3/driver/unbind
sudo chmod o+w /sys/bus/pci/drivers/pci-stub/bind
echo "8086 3a39" > /sys/bus/pci/drivers/pci-stub/new_id
echo "0000:00:1d.3" > /sys/bus/pci/devices/0000:00:1d.3/driver/unbind
echo "0000:00:1d.3" > /sys/bus/pci/drivers/pci-stub/bind

#
#Wait for 10 seconds
#
sleep 10
#
#Start Windows HVM domU with VGA Passthrough
#
sudo xl create /etc/xen/Windows7
#sudo xl create /etc/xen/Windows8
```


26.6 /etc/xen/Windows7

```
# 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="Windows8"
# Product Key: WJBRX-2N7B2-CCBF6-VPP97-R88XV
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/windows7.img', 'format=raw,
vdev=hdc, access=ro, devtype=cdrom, target=/home/flyon/windows7.iso' ]
vif=[ 'bridge=eth0,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="192.168.25.50"
vncdisplay=0
vncunused=1
vncpasswd=""
sdl=0
usb=1
# Passthrough the USB Keyboard
usbdevice = "host:04f2:0110"
# Passthrough the USB Optical Mouse
usbdevice = "host:046d:c03d"
# Enable Xen VGA Passthrough
gfx_passthru=1
# VGA Passthrough NVIDIA Quadro 6000 and PCI Passthrough NVIDIA HD Audio Controller,
then 2nd NVIDIA Quadro 6000 and 2nd NVIDIA HD Audio Controller
#pci = [ '0d:00.0','0d:00.1','1b:00.0','1b:00.1' ]
```

```
# The last 2 entries are USB 1.1 controllers.
pci = [ '0d:00.0','0d:00.1','00:1d.2','00:1d.3' ]

# 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' ]
```


26.7 /etc/xen/Windows8

```
# 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="Windows8"
# Product Key: WJBRX-2N7B2-CCBF6-VPP97-R88XV
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/windows8.img', 'format=raw,
vdev=hdc, access=ro, devtype=cdrom, target=/home/flyon/windows8.iso' ]
vif=[ 'bridge=eth0,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="192.168.25.50"
vncdisplay=0
vncunused=1
vncpasswd=""
sdl=0
usb=1
# Passthrough the USB Keyboard
usbdevice = "host:04f2:0110"
# Passthrough the USB Optical Mouse
usbdevice = "host:046d:c03d"
# Enable Xen VGA Passthrough
gfx_passthru=1
# VGA Passthrough NVIDIA Quadro 6000 and PCI Passthrough NVIDIA HD Audio Controller,
then 2nd NVIDIA Quadro 6000 and 2nd NVIDIA HD Audio Controller
#pci = [ '0d:00.0','0d:00.1','1b:00.0','1b:00.1' ]
```

```
pci = [ '0d:00.0','0d:00.1' ]

# 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' ]
```


B. Xen VGA Passthrough with Intel IGD Display Adapters

1.1 Patching, Building and Installing

```
cd
hg clone -r 26666 http://xenbits.xensource.com/xen-unstable.hg xen-unstable.hg-cs26666
cd xen-unstable.hg-cs26666
sudo -s
./configure
make world
nano  tools/qemu-xen-traditional-dir-remote/i386-dm/Makefile
```

Apply the following patch **timer-add-lrt-lm.patch**.

```
--- tools/qemu-xen-traditional-dir-remote/i386-dm/Makefile.orig
+++ tools/qemu-xen-traditional-dir-remote/i386-dm/Makefile
@@ -520,7 +520,7 @@
 OBJS+=block-raw-posix.o
 endif

-LIBS+=-lz
+LIBS+=-lz -lm -lrt
 ifdef CONFIG_ALSA
 LIBS += -lasound
 endif
```

```
make world
make install
```


Error	Solution
configure: error: C compiler cannot create executables	sudo -s
LINK i386-dm/qemu-dm /usr/bin/ld: vl.o: undefined reference to symbol 'timer_settime@@GLIBC_2.3.3' /usr/bin/ld: note: 'timer_settime@@GLIBC_2.3.3' is defined in DSO /lib/x86_64-linux-gnu/librt.so.1 so try adding it to the linker command line /lib/x86_64-linux-gnu/librt.so.1: could not read symbols: Invalid operation collect2: error: ld returned 1 exit status make[5]: *** [qemu-dm] Error 1 make[5]: Leaving directory `/home/teo-en-ming/xen-unstable.hg-cs26666/tools/qemu-xen-traditional-dir-remote/i386-dm' make[4]: *** [subdir-i386-dm] Error 2 make[4]: Leaving directory `/home/teo-en-ming/xen-unstable.hg-cs26666/tools/qemu-xen-traditional-dir-remote' make[3]: *** [subdir-install-qemu-xen-traditional-dir] Error 2 make[3]: Leaving directory `/home/teo-en-ming/xen-unstable.hg-cs26666/tools' make[2]: *** [subdirs-install] Error 2 make[2]: Leaving directory `/home/teo-en-ming/xen-unstable.hg-cs26666/tools' make[1]: *** [install-tools] Error 2 make[1]: Leaving directory `/home/teo-en-ming/xen-unstable.hg-cs26666' make: *** [world] Error 2	--- tools/qemu-xen-traditional-dir-remote/i386-dm/Makefile.orig +++ tools/qemu-xen-traditional-dir-remote/i386-dm/Makefile @@ -520,7 +520,7 @@ OBJS+=block-raw-posix.o endif -LIBS+=-lz +LIBS+=-lz -lm -lrt ifdef CONFIG_ALSA LIBS += -lasound endif

