

## VMKnoppix for x86 (20080213)

VMKnoppix is a CD Linux(KNOPPIX) which includes a lot of virtual machine software.

### Special Features

- Xen3.2, KVM60, and QEMU091 are upgraded.
- Xen3.2 has a vTPM (TPM Emulator) and offers *Trusted Computing* environment.
  - Physical TPM&TCG-BIOS aren't required. *KNOPPIX for Trusted Computing Geeks*(Trusted Boot+Remote Attestation) boots on Xen3.2+vTPM.
- *OS Circular* enables to boot some Linux Distributions {CentOS5|Debian Etch|Ubuntu606|Ubuntu610|Ubuntu704} on a virtual machine {Xen|QEMU|KQEMU|KVM} with *Internet Virtual Disk "Trusted HTTP-FUSE CLOOP"*
- QEMU091(x86\_64) offers ADM-V instruction set for virtual machine.
  - KVM boots on it but Xen-HVM doesn't.

### Included virtual machine software on KNOPPIX 5.1.1 (kernel 2.6.19)

- Xen3.2.0 <http://www.cl.cam.ac.uk/research/srg/netos/xen/>
- KVM60 <http://sourceforge.net/projects/kvm>
- QEMU091 <http://fabrice.bellard.free.fr/qemu/>
- KQEMU <http://fabrice.bellard.free.fr/qemu/kqemu-doc.html>
- UML <http://user-mode-linux.sourceforge.net/>
- Virtual Box <http://www.virtualbox.org/>

### Boot Options on GRUB boot loader

```
GNU GRUB version 0.97
KNOPPIX (normal kernel)
KNOPPIX/Xen3.2.0
```

- Select "KNOPPIX(normal kernel)" for KVM, QEMU, KQEMU.
- Select "KNOPPIX/Xen3.2" for Xen.
  - ✧ Confirm the "eth0". Please run the following command to get an IP address form DHCP.  
**# pump -i eth0**
  - ✧ If your PC includes IEEE1394 (for example: Intel Mac), please add "**nofirewire**" kernel option (at the second line of GRUB).

### Easy Commands for Virtual Machine

- *Xen 3.2.0 (normal use)*
  - ✧ The following command runs "DomainU" with the image of VMKnoppix CD.



- **QEMU x86\_64 (AMD-V)**

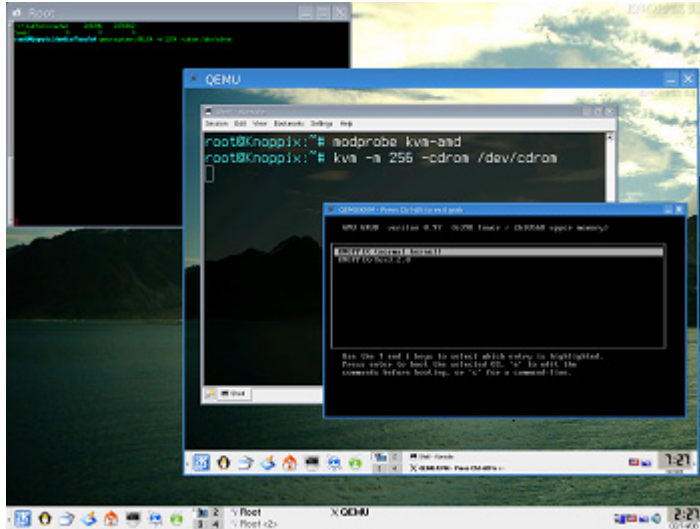
QEMU x86\_64 emulates AMD-V Instruction Set and runs KVM on it. Unfortunately Xen can't work well.

**# qemu-system-x86\_64 -m 512 -cdrom /dev/cdrom**

On the virtual machine KVM launches a virtual machine with AMD-V Instruction.

**# kvm -m 512 -cdrom /dev/cdrom**

Select normal kernel and add **“nolapic”** kernel option at GRUB Menu.



- **VirtualBox**

Following commands set up VirtualBox.

**# modprobe vboxdrv**

**# VBoxSVC &**

**# VirtualBox**

- **UML (UserMode Linux)**

Following command boots KNOPPIX on UML with VNC

**# umlknx.sh**

## OS Circular

OS Circular is a framework of Internet Disk Image Distributor for Virtual Machine. VMKnoppix includes the easy-to-use environment for OS Circular.

- **On a normal kernel (KNOPPIX)**

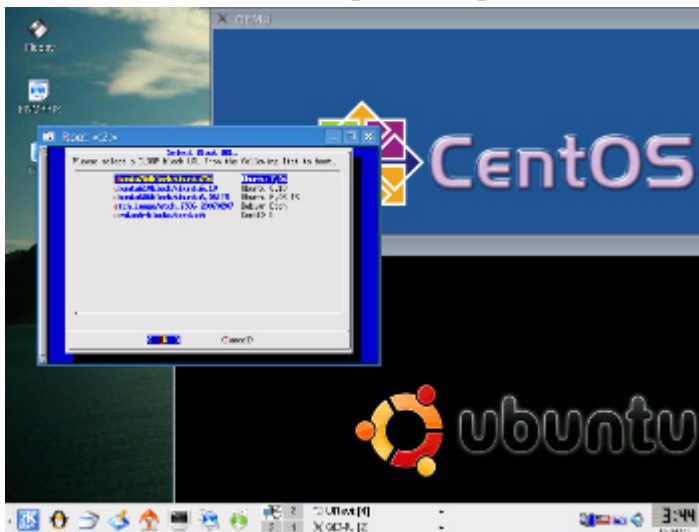
KVM/KQEMU/QEMU boots an OS with Internet Virtual Disk (Trusted HTTP-FUSE CLOOP). The following commands are used to boot an OS.

```
#httpfuse-kvm
```

```
#httpfuse-kqemu
```

```
#httpfuse-qemu
```

Selection Menu of OS will appear. Select a desired one. When you are required login, "Account/Password" is "http-fuse/http-fuse"



- **On Xen3.2.0**

Xen-HVM can use Internet Virtual Disk (Trusted HTTP-FUSE CLOOP).

Setup the network and Xen.

```
# pump -i eth0
```

```
# /etc/init.d/xend start
```

The following command runs Xen-HVM with Internet Virtual Disk (Trusted HTTP-FUSE CLOOP).

```
#httpfuse-hvm
```

Selection Menu of OS will appear. Select a desired one. When you are required login, "Account/Password" is "http-fuse/http-fuse"

- **(Option) Mount a Trusted HTTP-FUSE CLOOP without virtual machine**

Setup up mount points for Internet Virtual disk.

```
# mkdir /var/tmp/blocks
```

The following mount points can use any name.

```
# mkdir /media/thfc
# mkdir /media/guestos
```

A “Mapping Table” file is download from the following URL.

```
http://vmimage.inetboot.net/archives/linux/oscircular/pc/centos5-blocks/centos5.idx
http://vmimage.inetboot.net/archives/linux/oscircular/pc/etch\_image/etch\_i386-20070207.idx
http://vmimage.inetboot.net/archives/linux/oscircular/pc/etch\_image/etch\_i386-20061221.idx
http://vmimage.inetboot.net/archives/linux/oscircular/pc/ubuntu606block/ubuntu6.06LTS.idx
http://vmimage.inetboot.net/archives/linux/oscircular/pc/ubuntu610block/ubuntu6.10.idx
http://vmimage.inetboot.net/archives/linux/oscircular/pc/ubuntu704block/ubuntu704.idx
```

The flowing commands are an example to mount the root file system of CentOS5.

```
# cd /var/tmp/blocks/
# wget http://vmimage.inetboot.net/archives/linux/oscircular/pc/centos5-blocks/centos5.idx
# httpstored -f
  /media/htfs http://vmimage.inetboot.net/archives/linux/oscircular/pc/centos5-blocks/centos5.idx
```

A virtual disk file “/media/thfc/centos5” will appear.

The virtual disk use LVM. Run the following commands.

```
# losetup /dev/loop0 /mountpoint/centos5
# kpartx -a /dev/loop0
```

After that “loop0p1”, “loop0p2” will appear under “/dev/mapper/”. loop0p2 is a LVM partition.

```
# lvmdiskscan
# vgchange -a y
```

A device node /dev/VolGroup00/LogVol00 will be created. Mount the device and find the root file system of CentOS5.

```
#mount /dev/VolGroup00/LogVol00 /media/guestos
```

- **(Current Status) Load-balancing of Internet Virtual Disk**

Trusted HTTP-FUSE CLOOP re-constructs a virtual disk with small block files. The block files are downloaded form HTTP servers. It is weak for network latency and the access speed become low when the network latency is long. To solve the network latency we deploy the servers worldwide. Current implementation offers 3 sites in US, 3 site in Europe, and some site offered by RING-Project in Japan. The nearest site is guided by the DNS-Balance. If you are interesting in the load-balancing, check your download and the reference paper.

**Reference:** USENIX LISA 2007 (21st Large Installation System Administration conference) Dallas, USA, Nov. 14–17

“OS Circular: Internet Client for Reference”, Kuniyasu Suzaki, Toshiki Yagi, Kengo Iijima, and Nguyen Anh Quynh

Paper <http://www.usenix.org/events/lisa07/tech/suzaki.html>

Silde PDF <http://openlab.ring.gr.jp/oscircular/LISA07-Slide-suzaki.pdf>

## Download

- File name: knoppix\_v5.1.1CD\_20070104\_xen3.2.0\_vbox-20080213.iso
- MD5: 0d3832fd243f573efe4f23d59c1657c0
- FTP: [ftp://unit.aist.go.jp/itri/knoppix/iso/knoppix\\_v5.1.1CD\\_20070104\\_xen3.2.0\\_vbox-20080213.iso](ftp://unit.aist.go.jp/itri/knoppix/iso/knoppix_v5.1.1CD_20070104_xen3.2.0_vbox-20080213.iso)
- HTTP (Ring Servers): <http://www.ring.gr.jp/archives/linux/knoppix/iso/>
- Bittorrent: [http://unit.aist.go.jp/itri/knoppix/vmknoppix/knoppix\\_v5.1.1CD\\_20070104\\_xen3.2.0\\_vbox-20080213.iso.torrent](http://unit.aist.go.jp/itri/knoppix/vmknoppix/knoppix_v5.1.1CD_20070104_xen3.2.0_vbox-20080213.iso.torrent)