



Asterisk Xenified

Saúl Ibarra Corretgé <saghul@gmail.com>



<http://www.saghul.net>



<http://www.sipdoc.net>



saghul

ironotec

Internet y Sistemas sobre GNU/Linux

<http://www.ironotec.com>

- saghul
 - VoIP enthusiast, playing around with Asterisk since 2k5
 - GNU/Linux lover likes everything “Software Libre”
 - Co-founder of <http://sipdoc.net>
 - Highly involved in spanish VoIP communities



<http://www.saghul.net/blog/downloads/astricon2k9/>

<http://www.slideshare.net/saghul/>



1. Introduction to virtualization
2. Xen
3. Why use virtualization?
4. Xenifying Asterisk
5. Tips and tricks



Introduction to virtualization

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- Virtualization
 - The ability to use a single physical computer to run several “simulated” computers
- Why would we use it?
 - Testing / production environments
 - Cost reduction
 - Different testing scenarios



Performance is virtualization's *Achilles Heel* and depends mainly in the type of virtualization used.

Isolation between host and guests its also very important, usually: +isolation → -performance

- Emulation
- Full virtualization
- Paravirtualization
- OS level virtualization



Emulation

- Entire hardware is simulated (no access to real hardware)
- Guests are unmodified
- Different architectures can be virtualized
- Poor performance
- Ex. Bochs.

Full virtualization

- Similar to emulation
- Some instructions are run on the raw hardware (Intel VT or AMD V is needed)
- Host and guests have to be the same architecture
- Guest OS runs unmodified
- Often used instead of paravirtualization, when guest OS is distributed in binary form (e.g. Windows)
- Better performance than emulation
- Ex. KVM, VirtualBox.

Paravirtualization

- Guest OS is modified so that it communicates with the real hardware
- Applications run unmodified
- Host and guests have to be the same architecture
- Better performance than Full virtualization
- Ex. Xen.

OS level virtualization

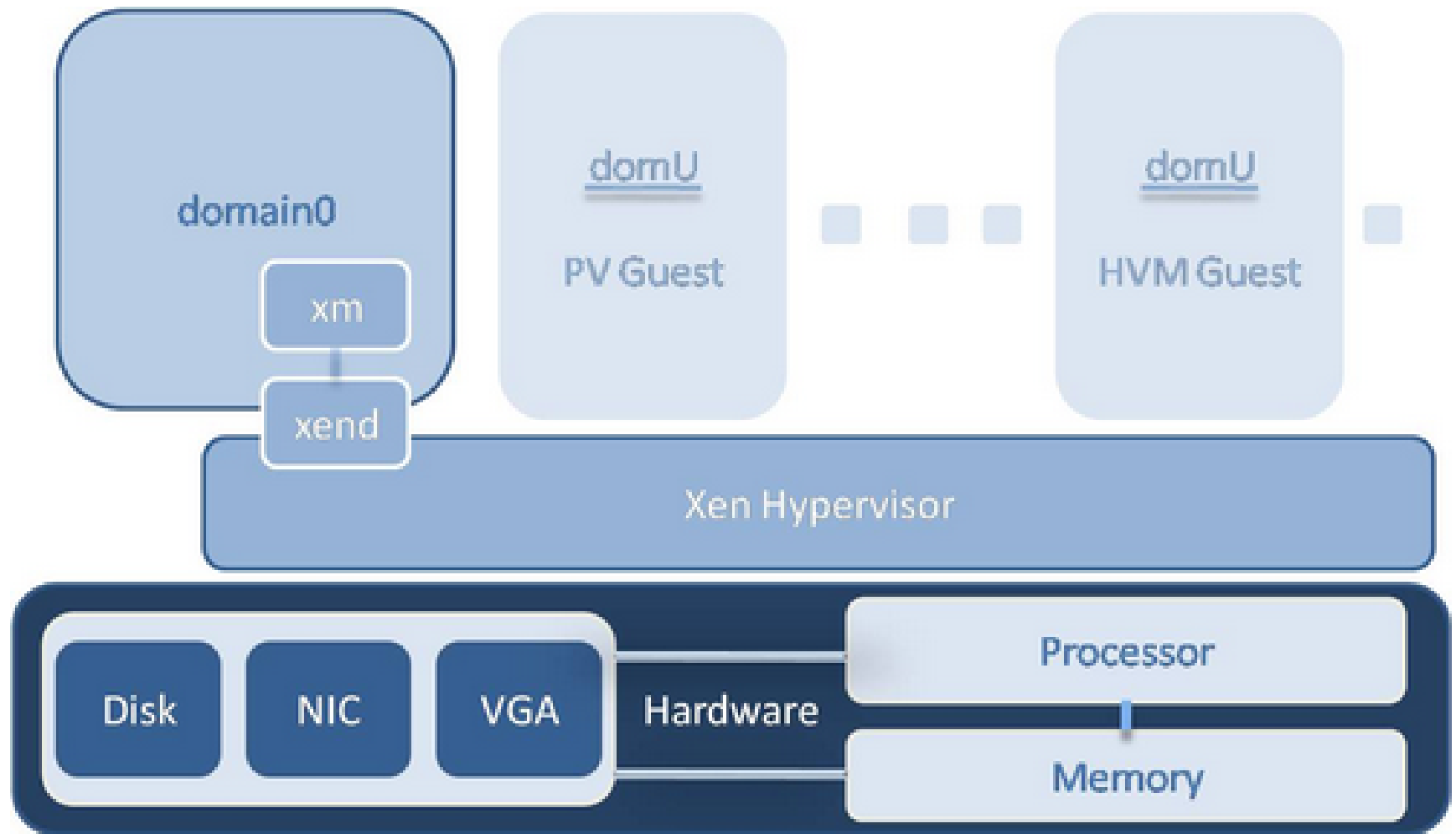
- Guests share resources with the host system
- Weak isolation
- Host performance can be compromised by guests
- Guests are not really full-featured systems
- Ex. OpenVZ.



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-
- neXt gENeration virtualization.
 - **Open Source**
 - Supports Paravirtualization **AND** Full Virtualization.
 - Runs on commodity hardware.
 - Packaged for many distros.
 - Cool features:
 - PV and Full Virtualization support.
 - PCI passthrough
 - Live migration

Xen Architecture

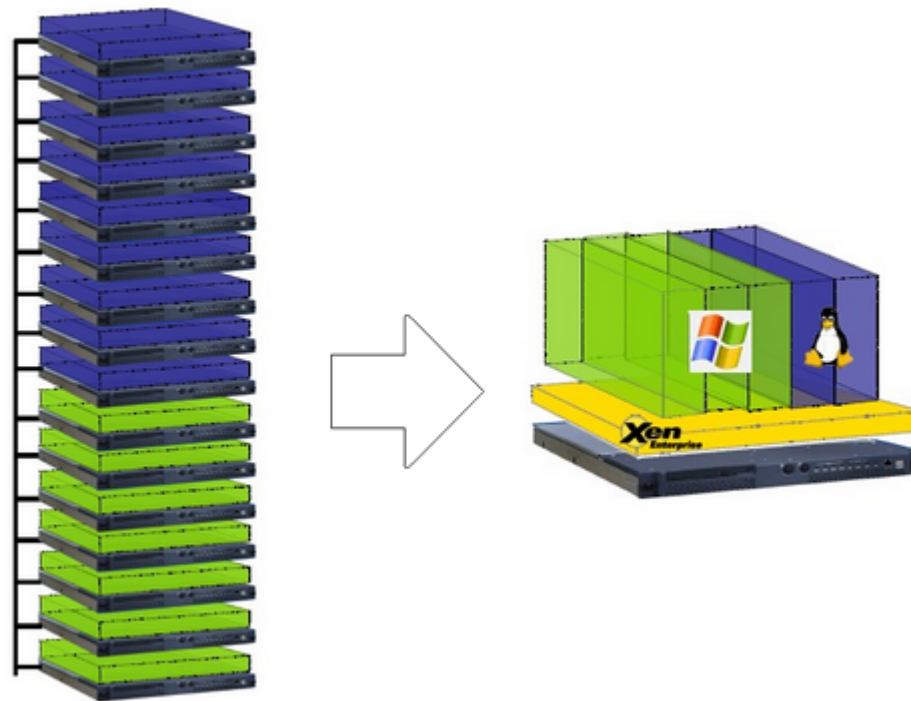


Why use virtualization?

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Why use virtualization?

- Exploitation of multiple core CPU systems.
- Support for multiple OSes including legacy.
- Rapid deployment and provisioning.
- Full utilization of hardware resources.

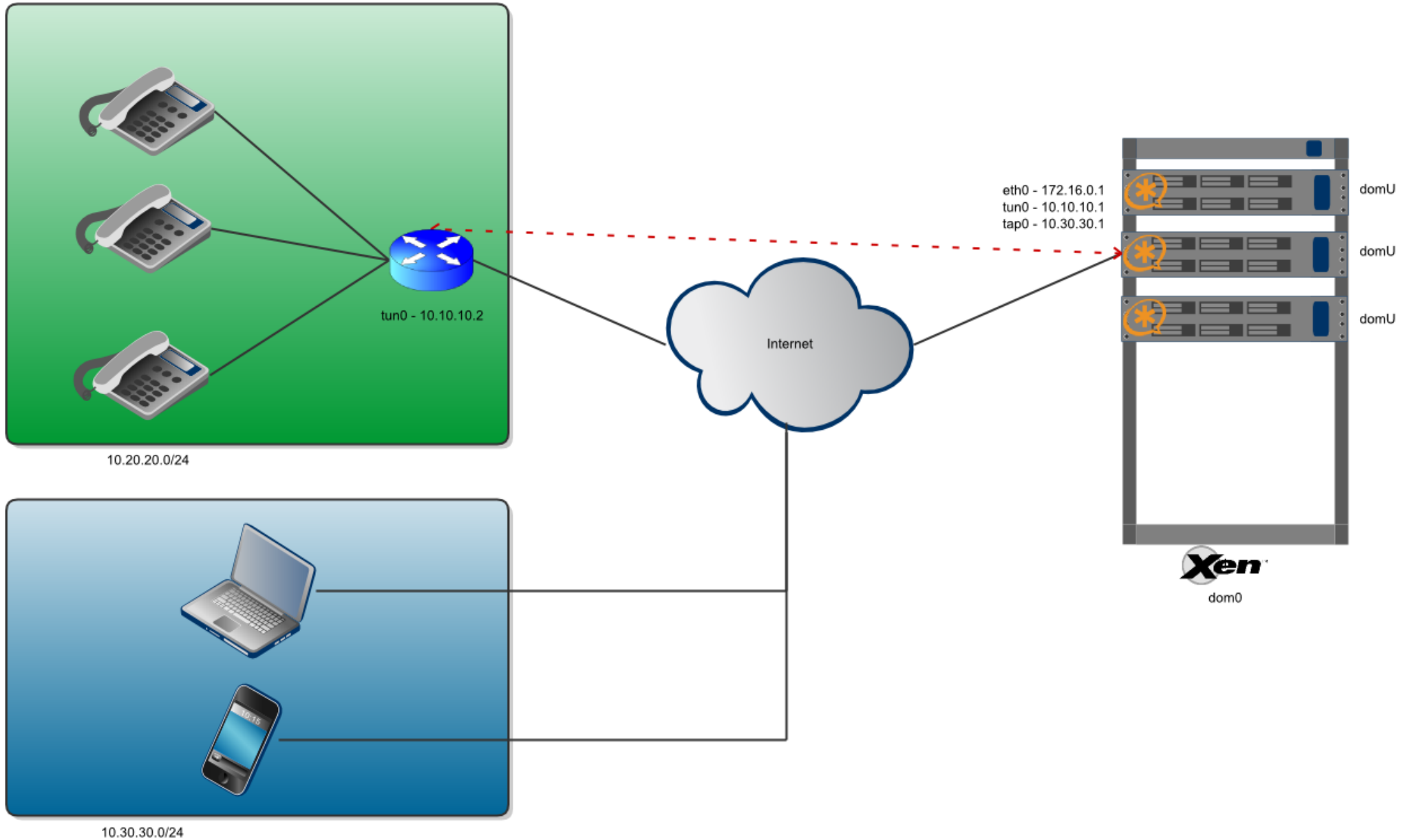


Why virtualize Asterisk?

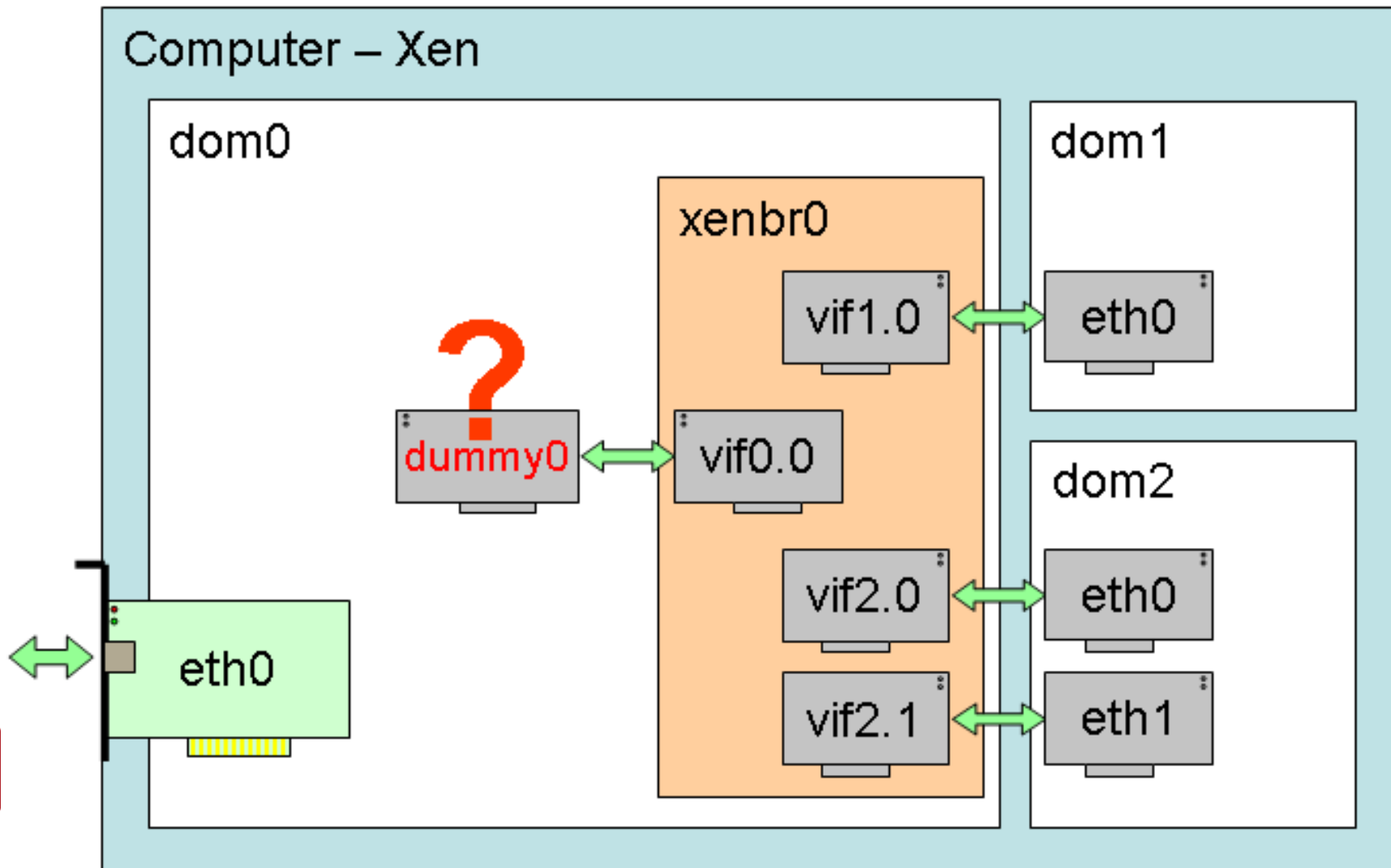
- #include <Why use virtualization?>
- Reduce Asterisk servers load
- Provide 'virtual PBX' solutions to clients
 - We can even give them the root shell!
- Different clients → different needs → different configuration
 - Isolated environments
 - Easier to 'control'



Desired virtualization scenario



- Dummy device to keep the network isolated.



Xenifying Asterisk

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- Debian Lenny as dom0.
- Debianized Xen Kernel: 2.6.26
- Custom compiled Xen hypervisor and tools: 3.3.x

```
apt-get install linux-image-2.6-xen-686  
linux-headers-2.6-xen-686 linux-modules-  
2.6-xen-686
```

- Compiling Xen

```
apt-get install iproute bridge-utils python-twisted  
binutils zlib1g-dev python-dev transfig bzip2 screen  
libcurl3-dev libncurses5-dev x-dev build-essential  
gettext gawk bcc libsdl1.2debian-all libsdl1.2-dev  
libx86-dev libvncserver-dev
```

```
wget http://bits.xensource.com/oss-  
xen/release/3.3.2/xen-3.3.2.tar.gz
```

```
tar zxvf xen-3.3.2.tar.gz && cd xen-3.3.2
```

```
make xen && make install-xen  
make tools && make install-tools
```

```
update-rc.d xend defaults 20 21  
update-rc.d xendomains defaults 21 20  
Update-grub && reboot
```

-
- **Nothing special needed!**
 - Since DAHDI 2.2 dahdi_dummy uses kernel internal timming instead of RTC. (before we needed to patch dahdi_dummy.c)
 - Compile Asterisk and DAHDI as usual (I tested latest 1.6.0.x version)

Tips and Tricks

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- Performance is significantly higher with partitions than with block-files.
- HDD as fast as possible → 15k SAS
- Each domU in a separate LVM volume.
 - 2 volumes, / and swap
- LVM snapshots for fast provisioning.
 - `lvcreate -L 80G -s -n newclient /dev/xenvol/baseclient`

-
- The dom0's network card traffic will be REALLY high.
 - His own traffic + the domUs
 - Little tweak on the network card
 - On the domU
 - `ethtool -K eth0 tx off`
 - Choose a good network card!

Giving access to the clients

- Instead of giving the clients SSH access, we can give them total control over their Virtual Machine.
 - They can even shut it down!
- How? → **xen-shell**
- Access to a special shell through the dom0.

Install necessary tools.

```
apt-get install xen-shell sudo
```

Create groups and users

```
groupadd xenclients
```

```
useradd -d /dev/null -g xenclients -s /usr/bin/xen-  
login-shell client1
```

```
passwd client1
```

Giving access to the clients (II)

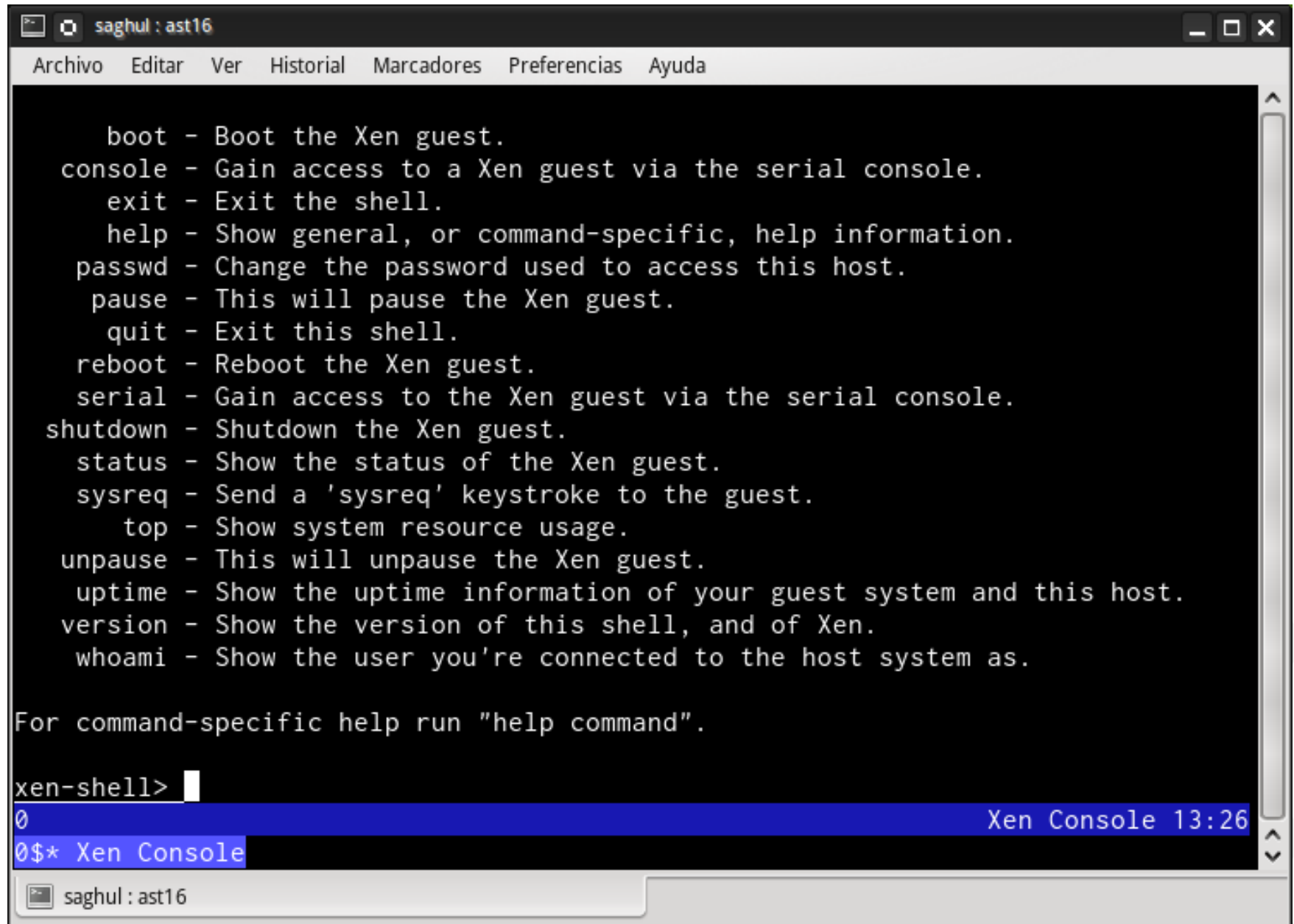
Allow access the special shell

visudo

→ %xenclients ALL=NOPASSWD: /usr/sbin/xm

- Username and VM name have to be *the same*.

Giving access to the clients (III)



The image shows a terminal window titled "saghul : ast16". The window contains a list of commands and their descriptions for the Xen shell. The commands listed are: boot, console, exit, help, passwd, pause, quit, reboot, serial, shutdown, status, sysreq, top, unpause, uptime, version, and whoami. Below the list, there is a note: "For command-specific help run 'help command'". The prompt "xen-shell>" is followed by a cursor. At the bottom of the terminal, there is a blue bar with the text "0 Xen Console 13:26" and "0\$* Xen Console".

```
saghul : ast16
Archivo  Editar  Ver  Historial  Marcadores  Preferencias  Ayuda

boot - Boot the Xen guest.
console - Gain access to a Xen guest via the serial console.
exit - Exit the shell.
help - Show general, or command-specific, help information.
passwd - Change the password used to access this host.
pause - This will pause the Xen guest.
quit - Exit this shell.
reboot - Reboot the Xen guest.
serial - Gain access to the Xen guest via the serial console.
shutdown - Shutdown the Xen guest.
status - Show the status of the Xen guest.
sysreq - Send a 'sysreq' keystroke to the guest.
top - Show system resource usage.
unpause - This will unpause the Xen guest.
uptime - Show the uptime information of your guest system and this host.
version - Show the version of this shell, and of Xen.
whoami - Show the user you're connected to the host system as.

For command-specific help run "help command".

xen-shell>
0 Xen Console 13:26
0$* Xen Console
```

Saving, restoring and migrating a domU

- Save the state of a domU
 - Like the hibernate function.
 - Fast booting.
 - xm save
- Restore the status of a domU
 - xm restore
- Migration
 - Static
 - Suspend -> Migrate -> Restore
 - Live
 - DomU keeps running!
 - xm migrate

- 2 Xen servers with xend running and listening for relocation requests:

```
/etc/xen/xend-config.sxp
(xend-relocation-server yes)
(xend-relocation-port 8002)
(xend-relocation-address '')
(xend-relocation-hosts-allow '')
```

- Shared storage system among the two servers. Both of them have to be able to access domU files.
- Servers need to have *the same* Xen version.
- domU configuration file in both hosts.

- Real hardware on our domU!
- Hide the PCI device to the dom0 and give it to the domU → PCI passthrough.
- Hide a PCI id
 - lspci
- GRUB configuration (dom0):
`pciback.permisive pciback.hide=(02:03.0)(0000:02:03.1)`
- DomU configuration file:
`pci=['02:03.0', '02:03.1']`



- Better use of available resources.
- Scalable Asterisk solutions.
- Fast-provisioning.
- Fail-proof system.



Xen

Thanks!

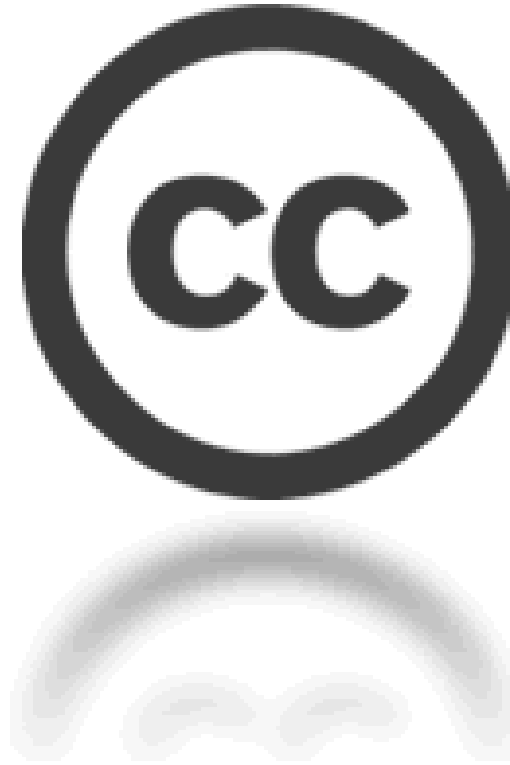
```
BYE sip:astricon@astricon.net SIP/2.0
Via: SIP/2.0/UDP guest.astricon.net:5060;branch=z9hG4bKnashds7
Max-Forwards: 70
From: saghul <sip:saghul@sipdoc.net>;tag=8321234356
To: AstriCon <sip:astricon@astricon.net>;tag=9fxced76sl
Call-ID: 3848276298220188511@astricon.net
CSeq: 1 BYE
Content-Length: 0
```

Thanks for watching!



Any questions?

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