

# Virtualization

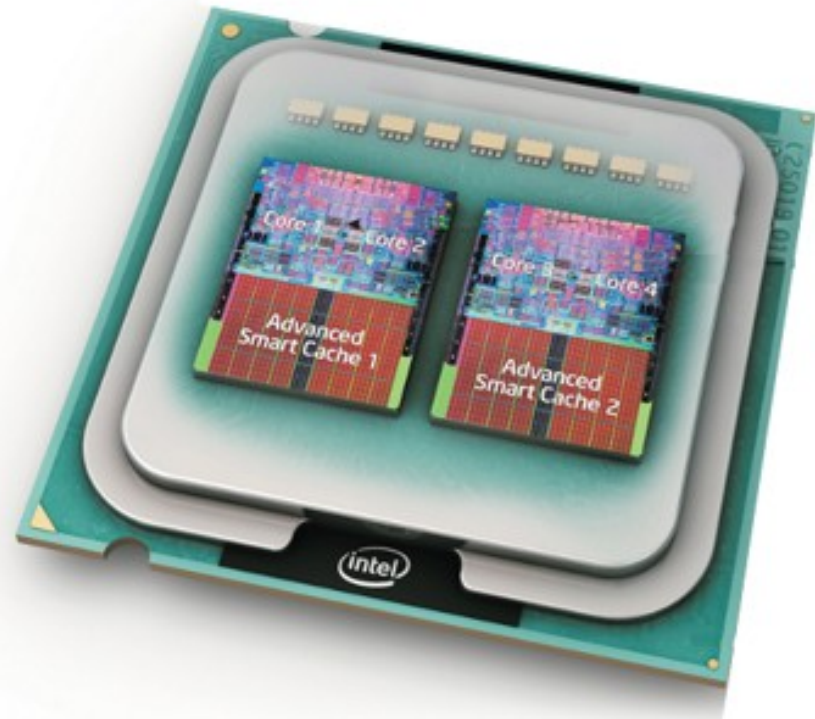
---

Based on the Xen Hypervisor

# Overview

- Construction of an CPU
- Reasons for Virtualization
- Different kinds of Virtualization Software
- The advantages of Xen
- How we use Xen
- Demo
- Outlook

# Construction of an CPU - Hardware -



<http://www.itwissen.info/bilder/quad-core-prozessor-qx6700-foto-intel.png>

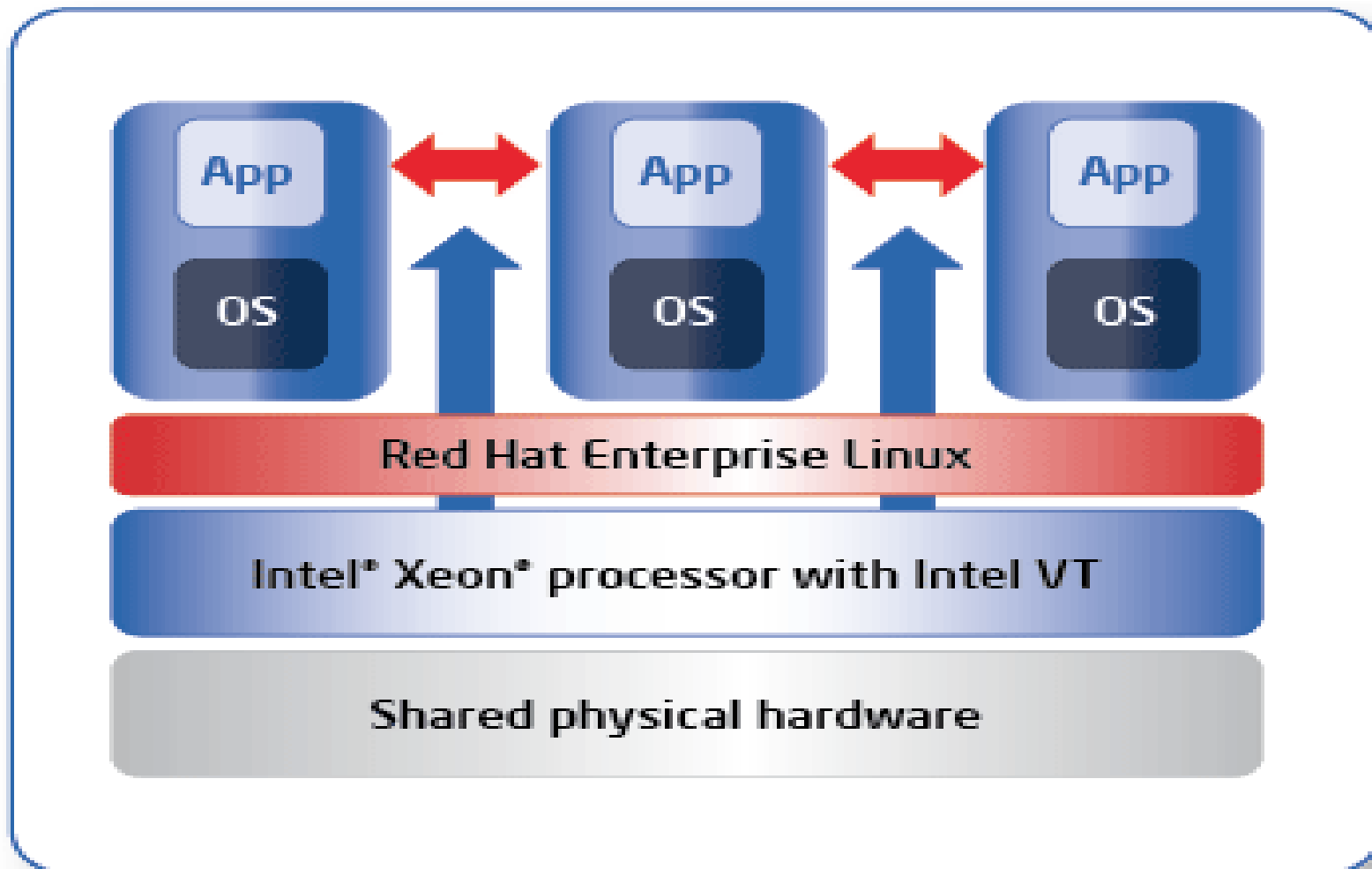
## Parts of a CPU

- Cores
- Cache

Supported Instruction sets:

MMX, SSE, SSE2, SSE3, Intel 64, **Intel VT**

# How Intel VT works



# Hardware Abstraction Layer

Hildon UI Framework

GNOME/GTK+ Application Framework

gStreamer  
Multimedia  
Framework

GNOME  
VFS File  
Access

GNOME  
Structured  
File Library

GNOME  
Configuration  
Management

E-D-S  
Calendar/  
Contacts

Telepathy  
Communication  
Framework

System services such as D-Bus, DSM, MCE, BME, and SQLite DB

Debian Package Management

System Libraries incl. GNU C, STD C++, OpenSSL, curl HTTP, etc

ARM/OMAP-based Linux kernel

# Reasons for Virtualization

- Standardized Hardware
- Portability
- Two or more operation systems
- Redundancy
- Snapshots

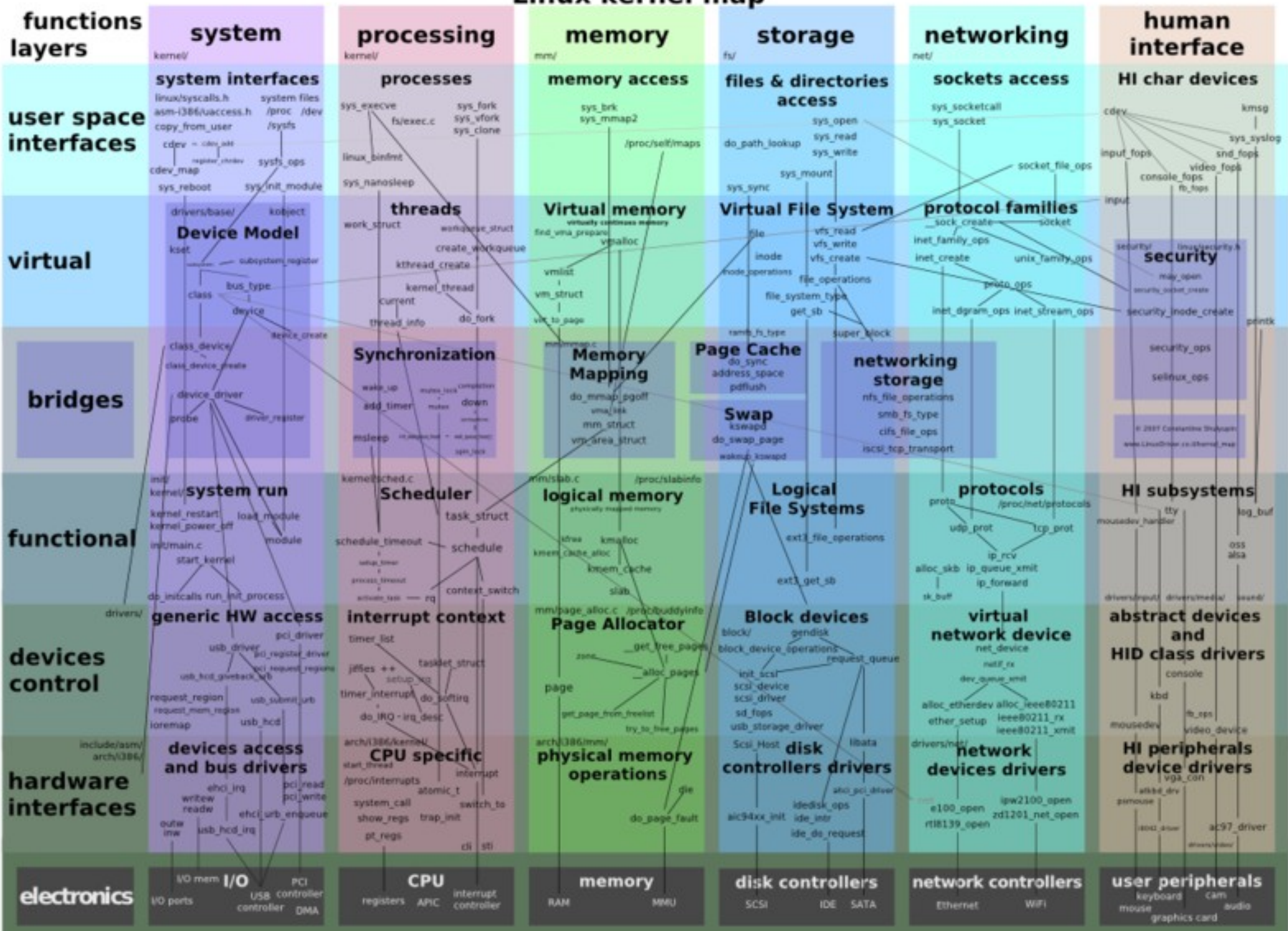
# Different kinds of Virtualization

- Operation system-level virtualization  
same Hardware, same Architecture (User Mode Linux)
- Paravirtualization  
same Hardware, different Architectures (Scheduler)
- Hardware virtualization  
different Hardware, different Architectures (Intel VT)

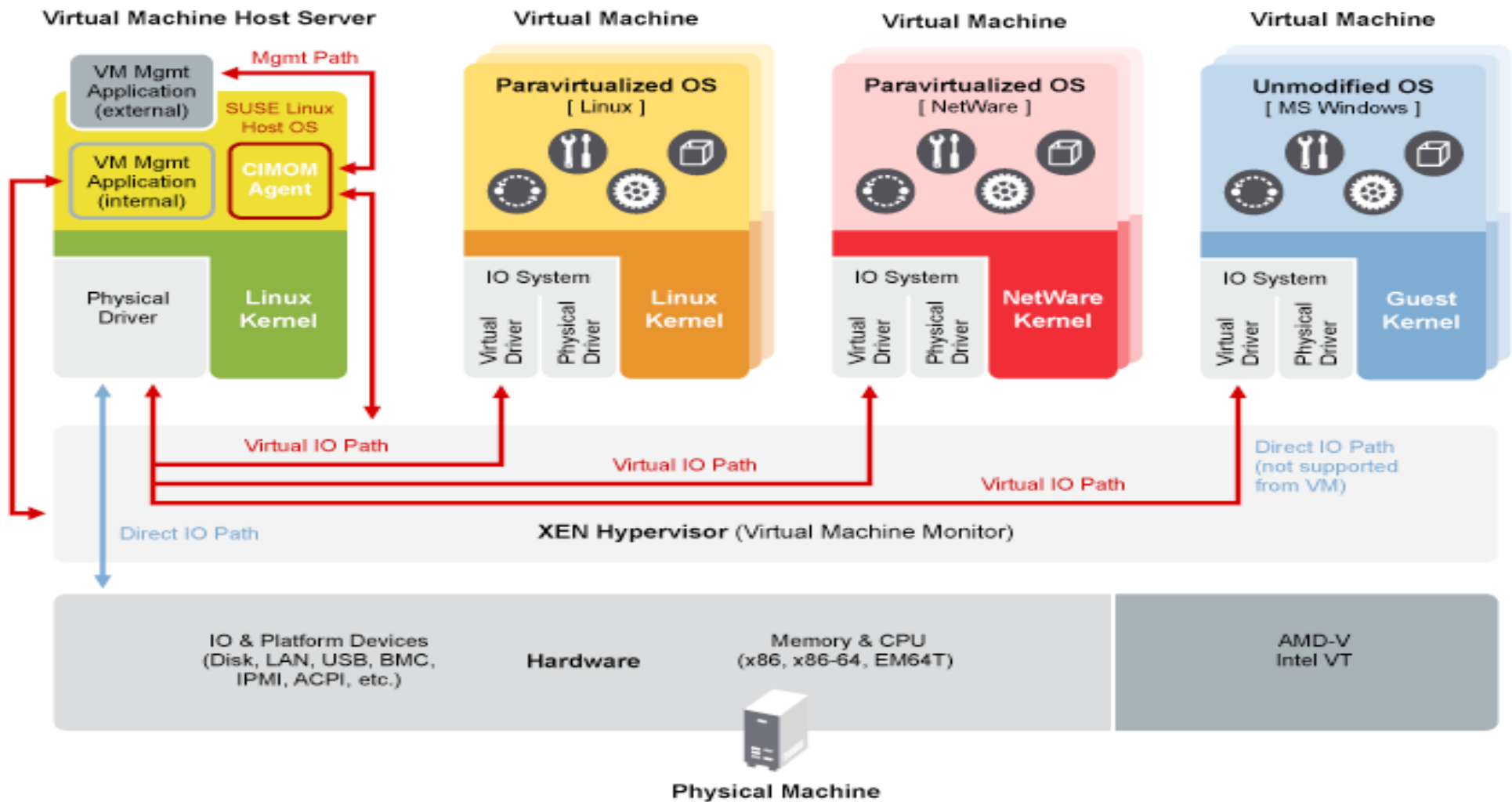
# Xen

- Developed at the University of Cambridge
- Open Source
  - Citrix XenServer (commercial)
- Host support Linux, NetBSD and Solaris
- Loaded as Kernel Module
- Guest support Unix-like (Linux), Windows, ...

# Linux kernel map



# Inside Xen



# The advantages of Xen

- Native Speed ( Intel VT )
- Fast Installation
- Offers different kinds of Virtualization
- Seamless Migration
- Scalability

# How we use Xen

- Firewalls
- Each part separated:
  - DHCP Server
  - Queue Server
  - Log Server
  - ...
- Clustered Xen Server

Demo

# A virtual machine

- Create it

```
xen-create-image --hostname=test --dhcp --dir=/xen/home  
--passwd --mirror http://ftp.uni-kl.de/debian --force
```

- Boot it

```
xm create test.cfg
```

- Fix the console (bug)

```
ssh root@test apt-get -y install udev
```

- Migrate a virtual machine

```
xm migrate 1 10.0.0.1 -l
```

# Outlook

- **Wine Is Not an Emulator**
- Cluster Virtualization
- Use a Virtual Instance as Main OS

Thank You !