Virtualization

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What?

- Computing resource
- Storage access
  - hide the difference between SAN systems
- I/O or Interconnect
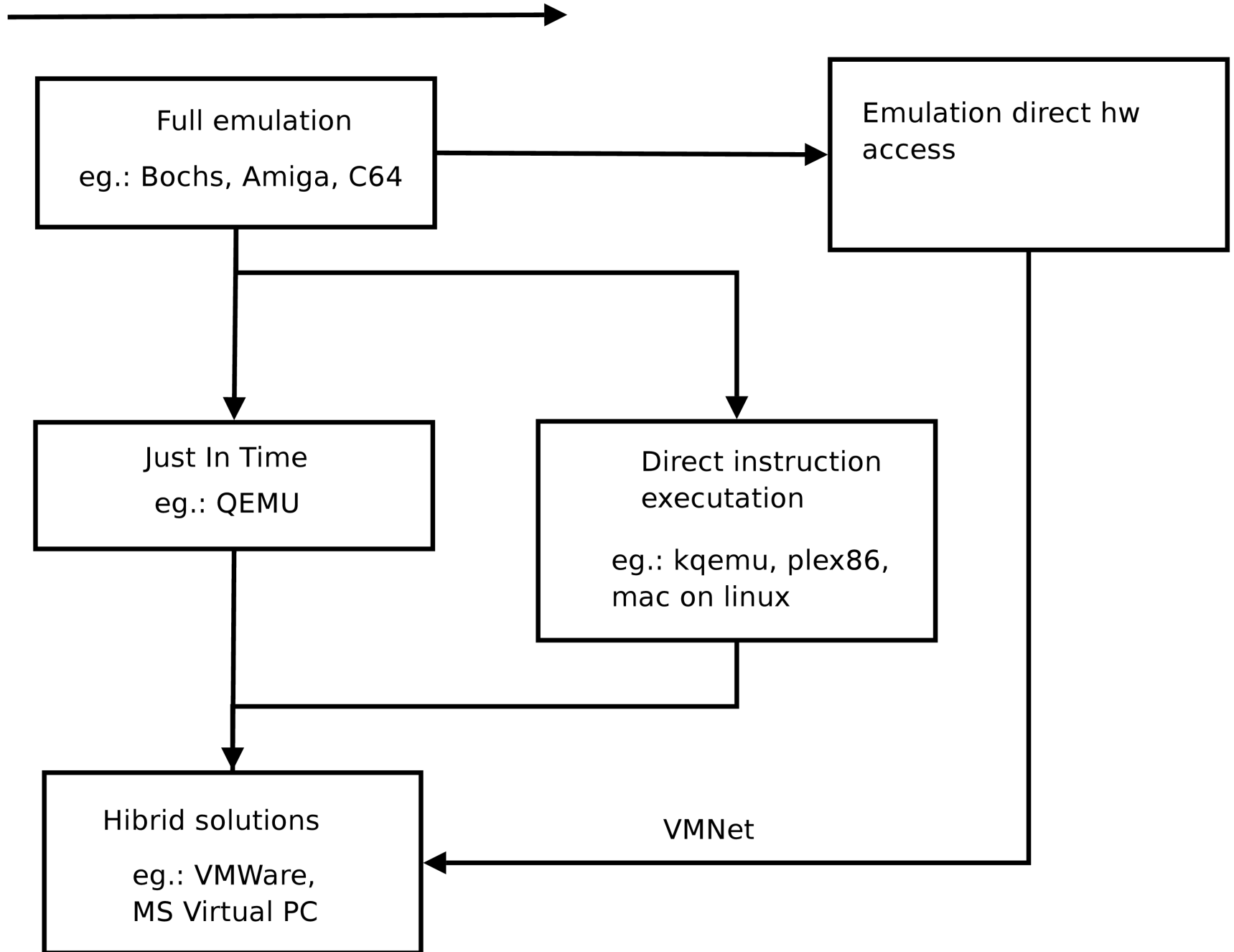 - Infiniband
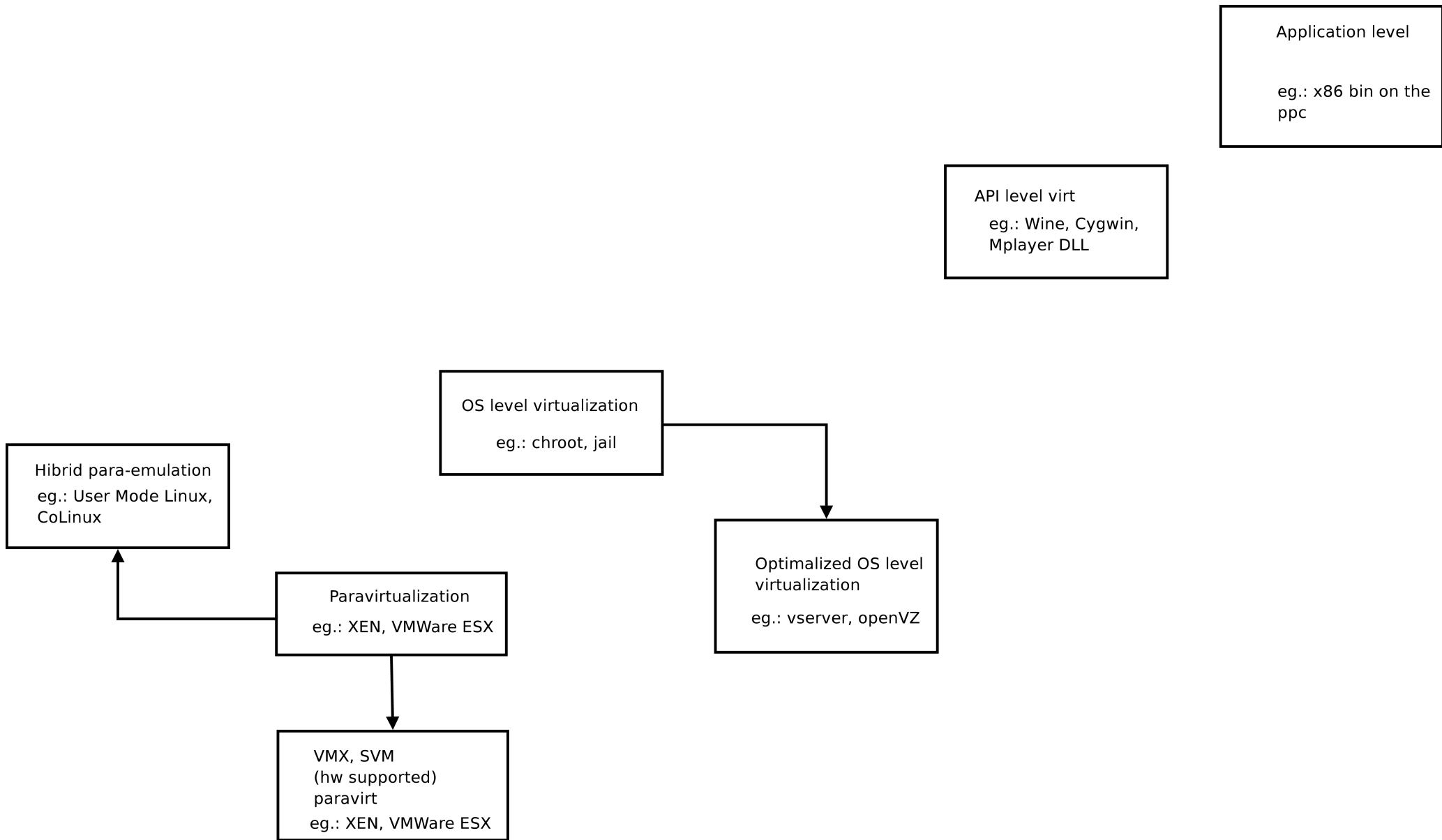
How?

- Emulation: Qemu
- Paravirtualization: XEN
- Operation system level: OpenVZ, jail (chroot)
- API level: WINE, Cygwin
- Application level

Absztraction level →

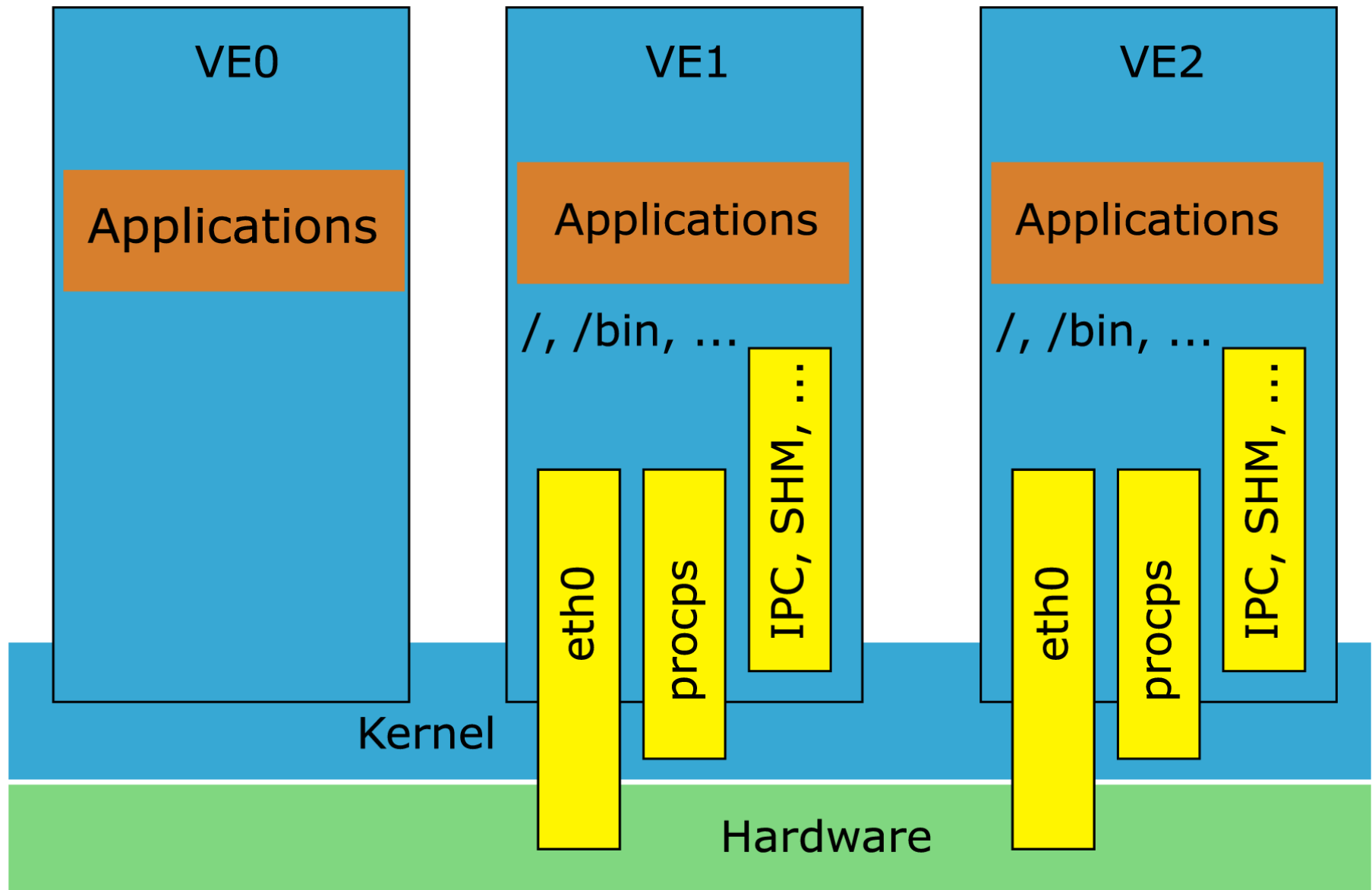Optimalization lvel

Full emulation

eg.: Bochs, Amiga, C64

Emulation direct hw access

Just In Time

eg.: QEMU

Direct instruction executation

eg.: kqemu, plex86, mac on linux

Hibrid solutions

eg.: VMWare, MS Virtual PC

VMNet

Application level

eg.: x86 bin on the ppc

API level virt

eg.: Wine, Cygwin, Mplayer DLL

OS level virtualization

eg.: chroot, jail

Hibrid para-emulation
eg.: User Mode Linux, CoLinux

Optimalized OS level virtualization

eg.: vserver, openVZ

Paravirtualization

eg.: XEN, VMWare ESX

VMX, SVM
(hw supported)
paravirt

eg.: XEN, VMWare ESX

OS Level virt. example: vserver

XEN

Domain0	Domain1	Domain2

Domain0
- Device Maneger Controller
- Backend
- XenLinux
- Physical device interface

Domain1
- Unmodified applications
- XenLinux
- Front-end driver

Domain2
- Unmodified operating system (Windows)

XEN Vistual Machine Monitor (VMM)
- Controll interface
- Secure hardware access
- Virtual CPU
- Virtual MMU

Hardware (CPU, RAM, network, storage)
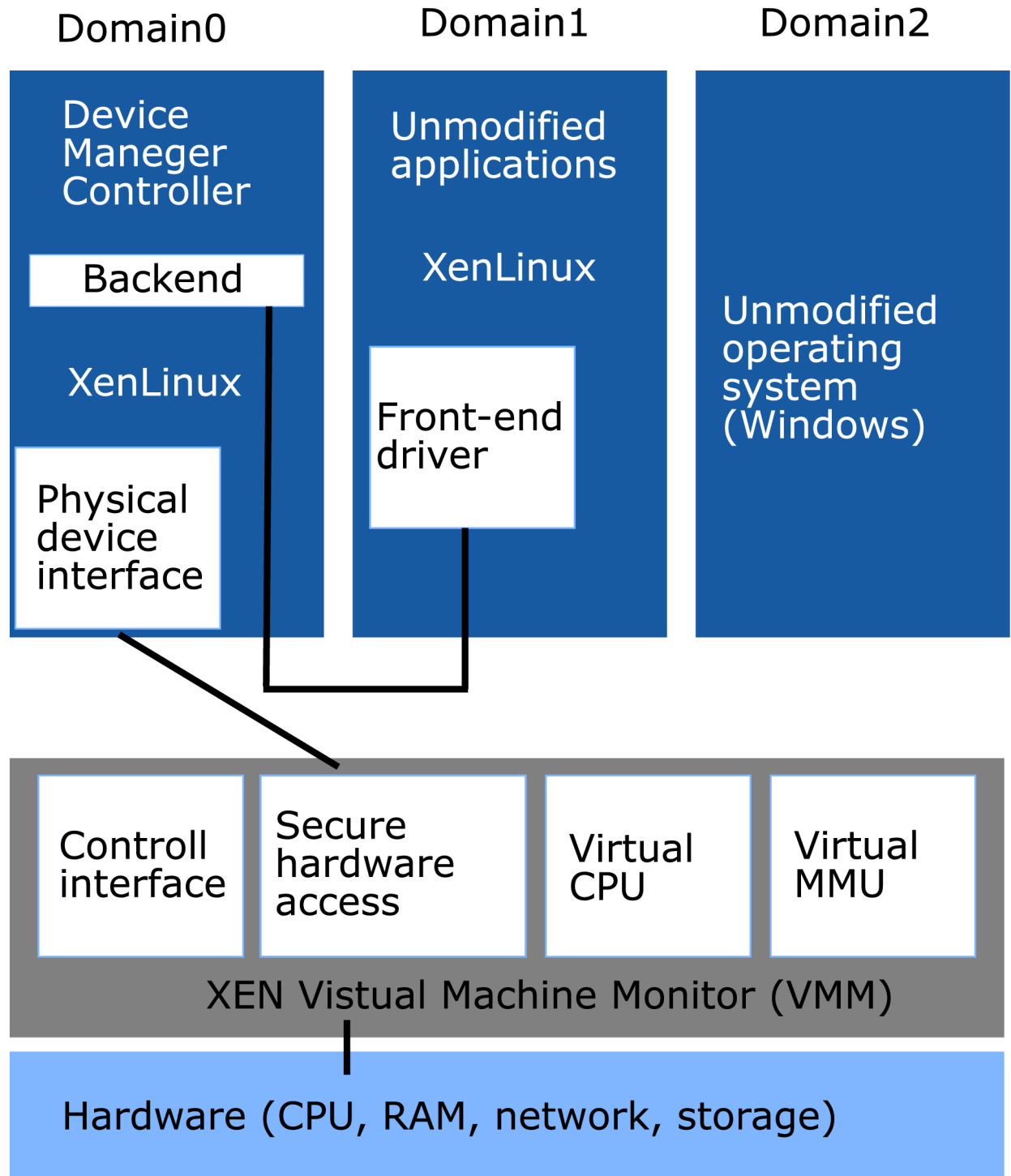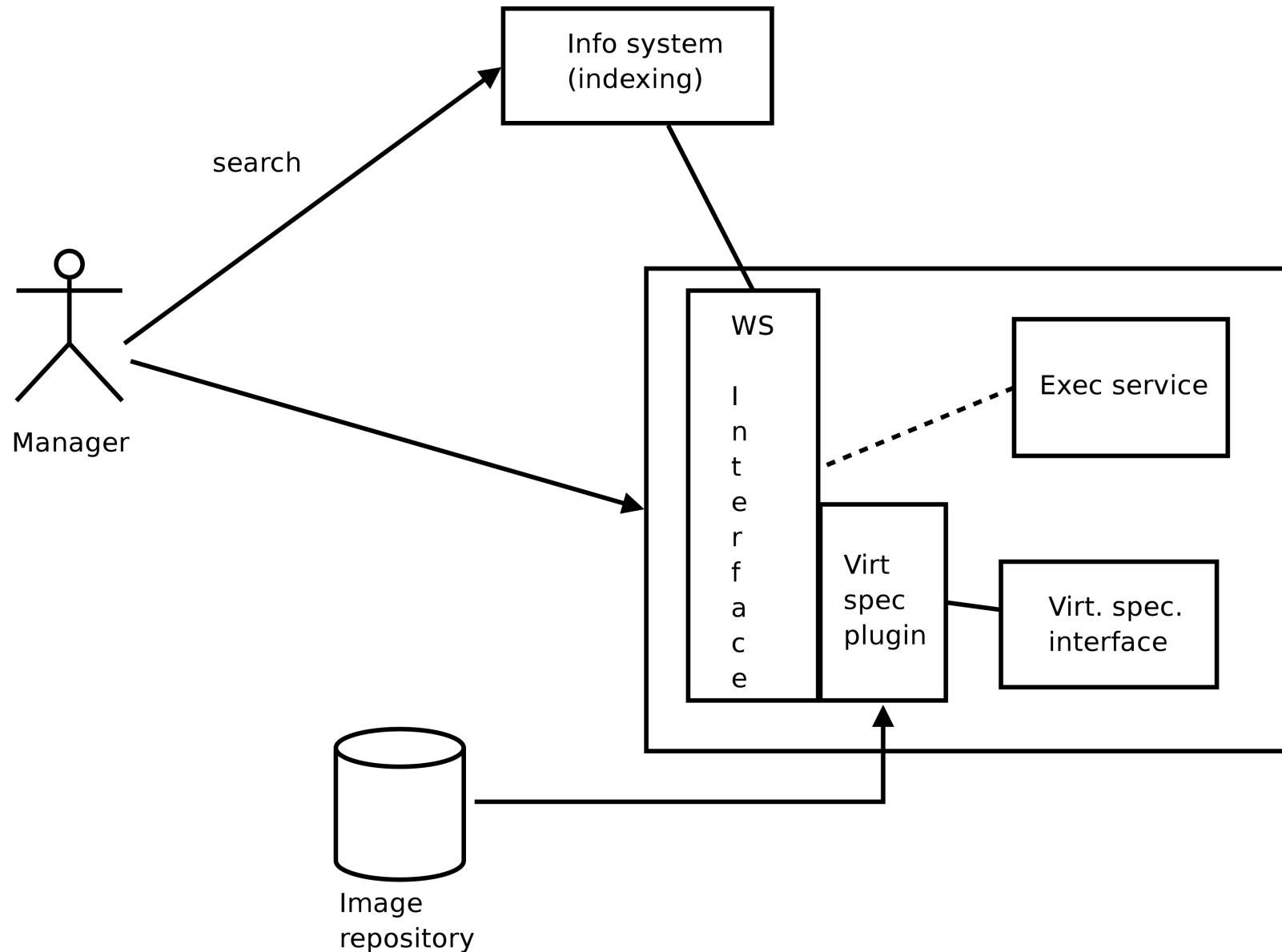
Management

- Manage lot of virtual machine instances
  - players: IBM, VMWare, XenSource, Novell, MS, Amazon
- Operations: start, stop, migrate, configure, get status etc.
- CIM, WBEM: Problematic!

Management using web services

Info system (indexing)

Manager

search

WS Interface

Exec service

Virt spec plugin

Virt. spec. interface

Image repository

Relation to grid

- Run time environment
- security