

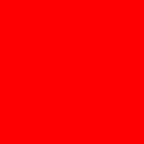
ORACLE®



ORACLE®

**Virtualisierung mit
Oracle VirtualBox und Oracle Solaris Containern**

Detlef Drewanz
Principal Sales Consultant



The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

In addition, the following is intended to provide information for Oracle and Sun as we continue to combine the operations worldwide. Each country will complete its integration in accordance with local laws and requirements. In the EU and other non-EU countries with similar requirements, the combinations of local Oracle and Sun entities as well as other relevant changes during the transition phase will be conducted in accordance with and subject to the information and consultation requirements of applicable local laws, EU Directives and their implementation in the individual members states. Sun customers and partners should continue to engage with their Sun contacts for assistance for Sun products and their Oracle contacts for Oracle products.

So Server-Virtualization is just reducing the number of boxes ?

- Physical systems

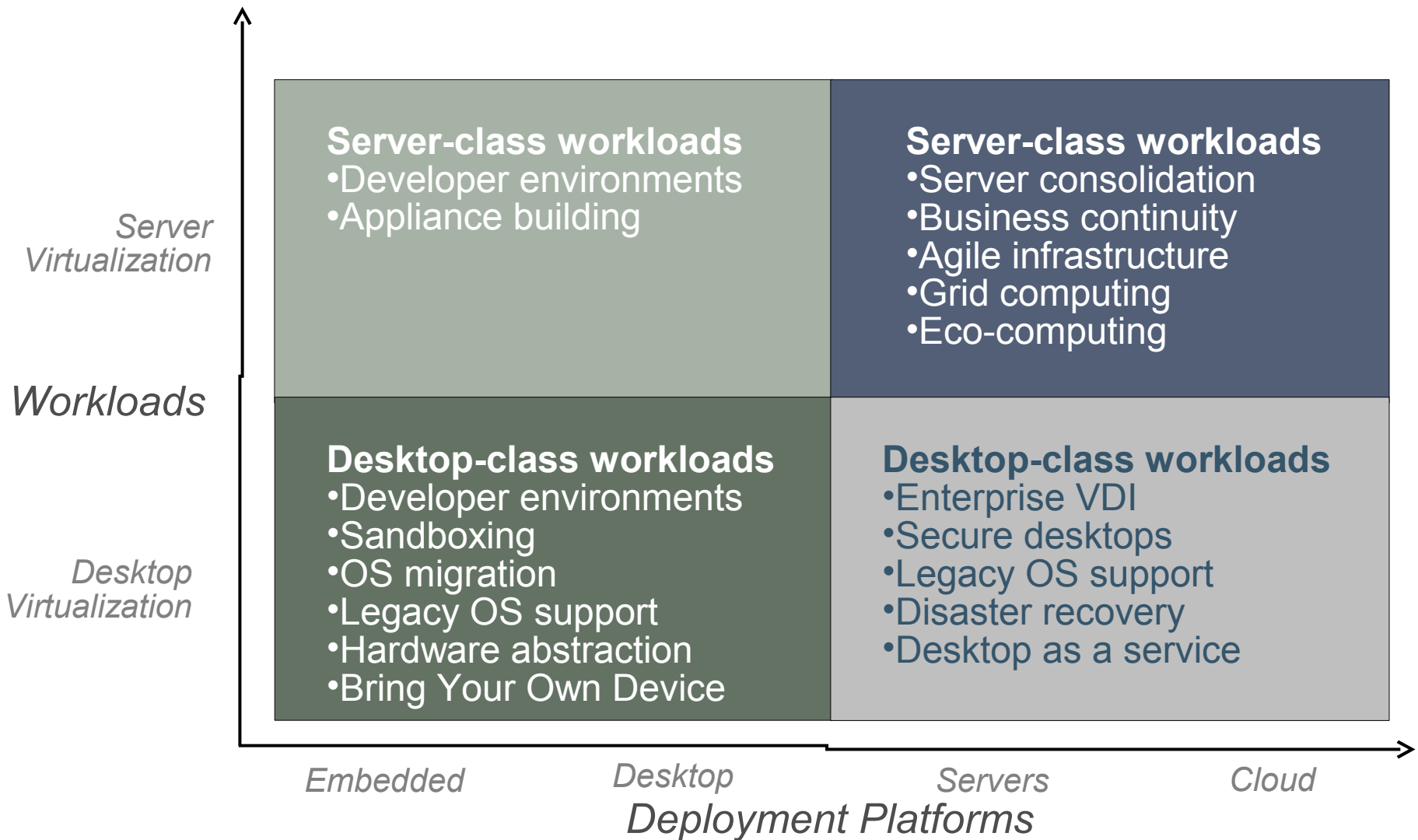


- Virtual Machines



Virtualization Use

Workloads and Deployment Platforms



Use cases for server virtualization

- Consolidation
 - Increase server load
 - Consolidate test systems
 - Reorganize and consolidate networks
- Isolation
 - Cloud Computing
 - Classroom environments
- Architectures
 - Mobility and Agility
 - Modularization and Restructuring
 - Backup for application and data
 - Run old applications on new hardware

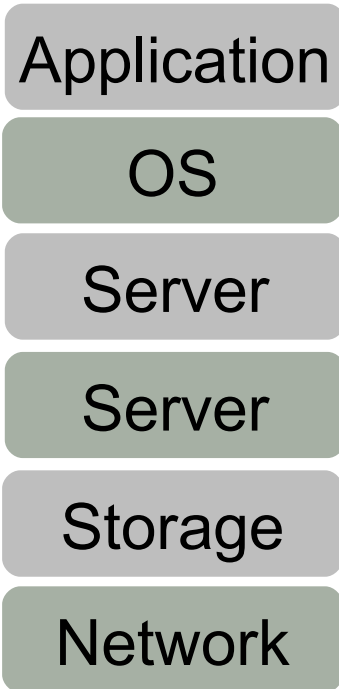
Challenges of virtualization

- Flexible and efficient use of servers
- Limit the uncontrolled grow of virtual machines
- Features, licensing, support of software in virtualized environments
- Changed operational concepts
 - Increased management complexity
 - Avoid proprietary solutions and lock-in
 - Changed security requirements
 - Changed Backup- and Disaster Recovery concepts
 - Internal charge-back processes ?
- Performance Overhead through virtualization
 - Impacts on real world application performance (CPU/MEM/IO)

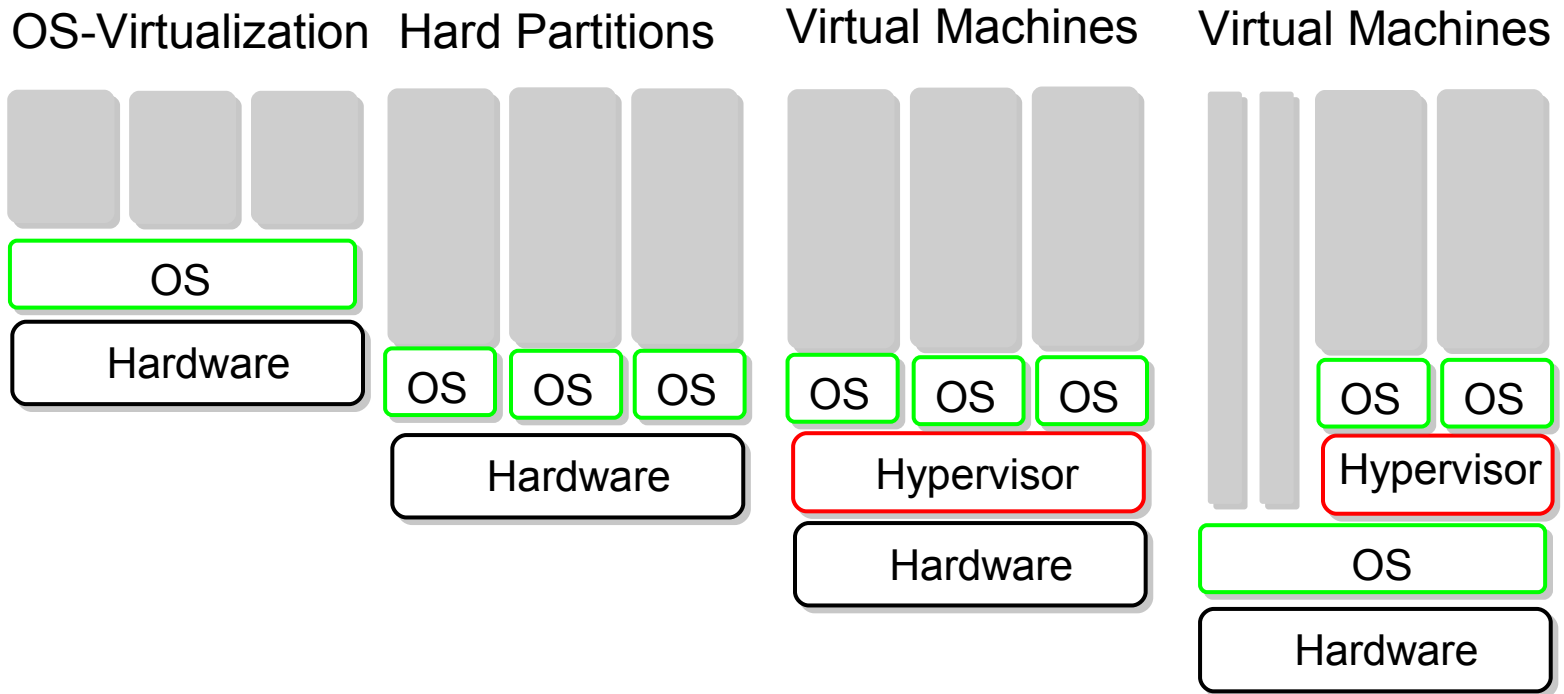
Virtualization and Performance

- CPU-Power
 - Often more than enough available
 - Assign CPU/Cores to VM/Domains/Apps
- Memory
 - Today >> 64 GB possible
 - Assign direct or capping of memory
- I/O
 - Hypervisor add I/O-latency
 - Direct I/O bound to Slots or cards

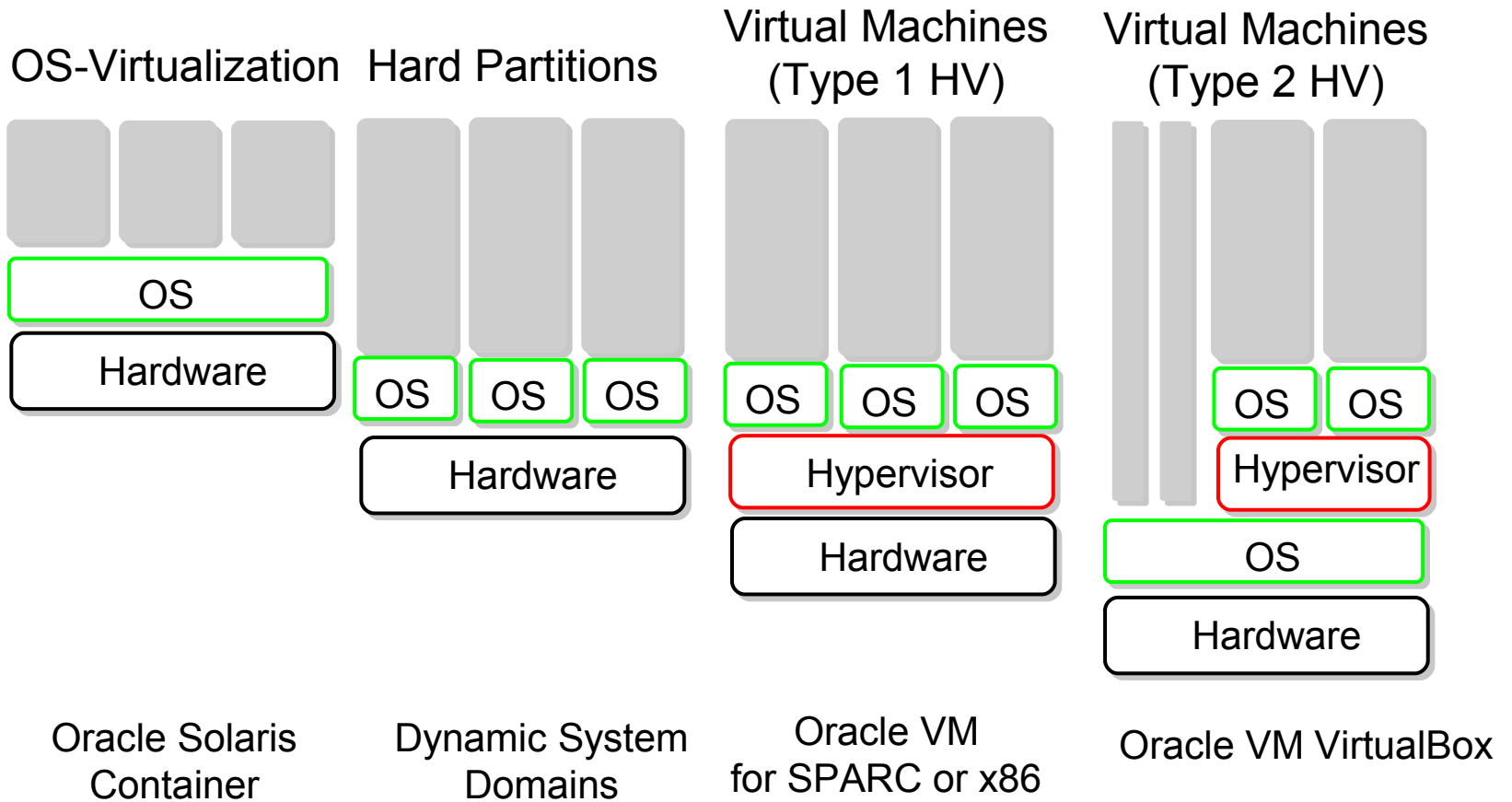
Where and What to virtualize ?



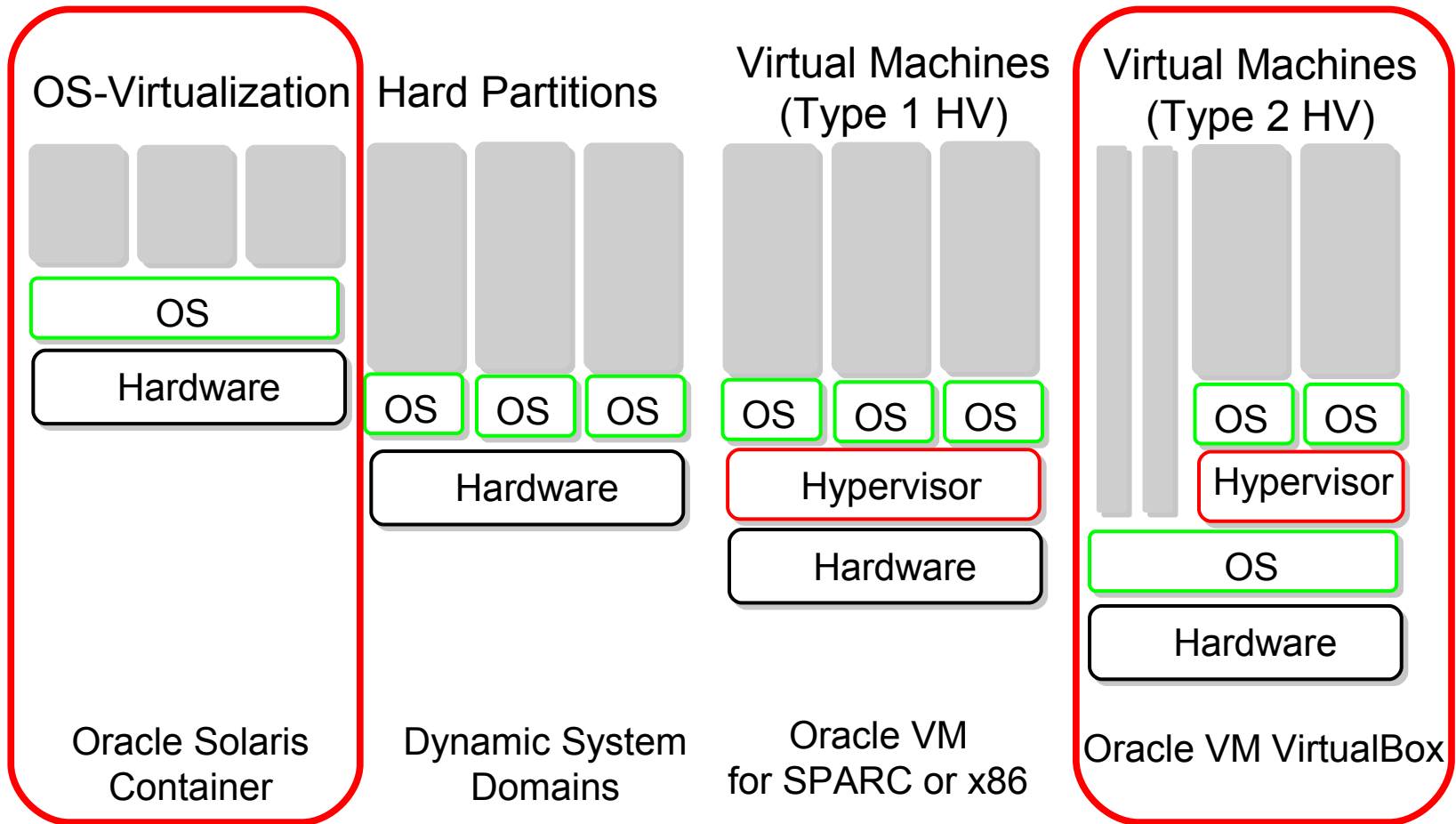
Server Virtualization concepts



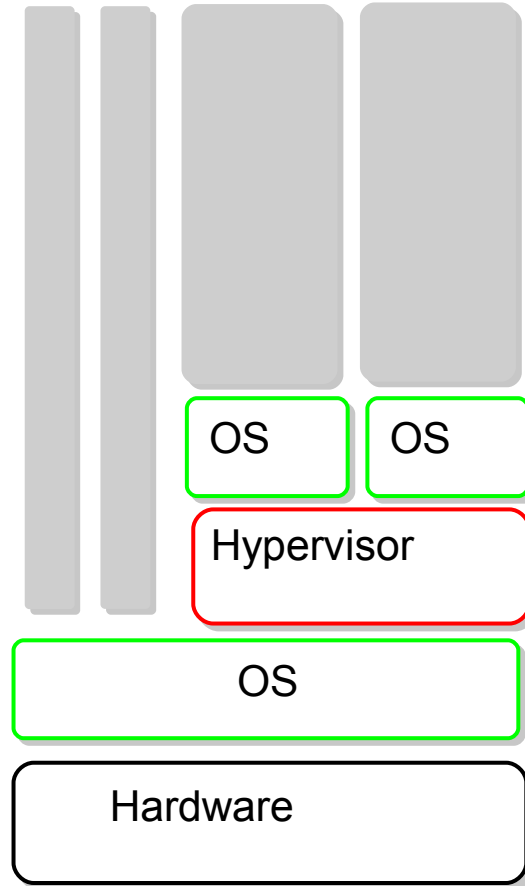
Server Virtualization with Oracle



Today we talk about ...

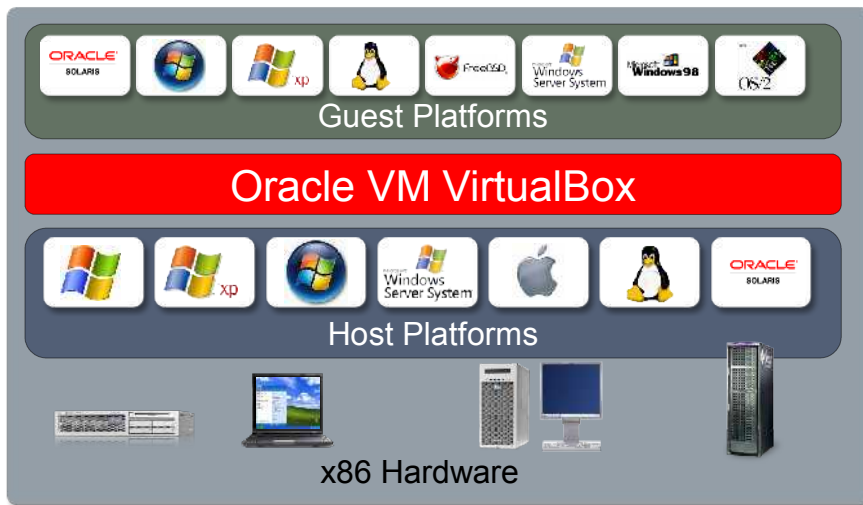


Oracle VM VirtualBox



Oracle VM VirtualBox

Cross-platform Virtualization Software



- For Windows, Linux, Solaris and Mac Hosts
- Leverage existing hardware and skillsets
- Huge Guest Coverage
- Easy to install and use
- Fast and powerful
- Free for Personal Use

Performance

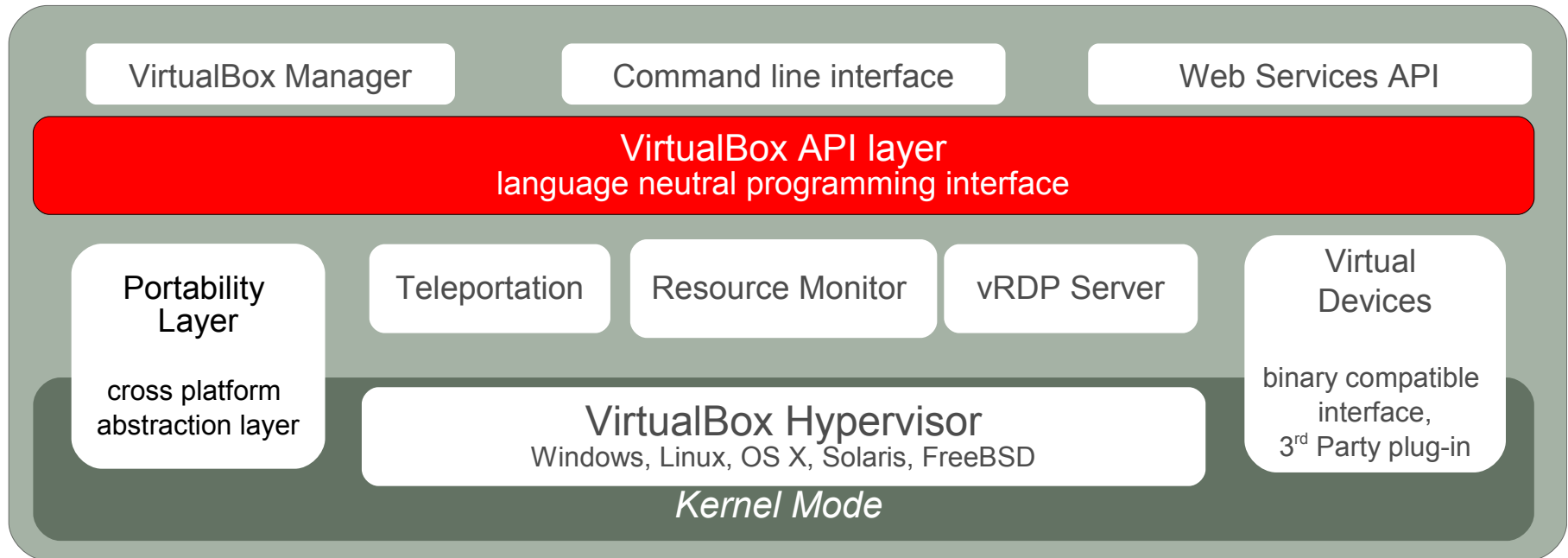
High Performance Virtual Hardware

- **Processor:** 1-32 vCPUs per guest; 32-bit and 64-bit guests; PAE support; with or without VT-x/AMD-V (EPT/Nested Paging, VPID supported)
- **RAM:** up to 16Gb per guest
- **Storage:** SATA, SAS, SCSI or IDE controllers; >100 disks; integrated iSCSI initiator
- **Network:** up to 8 NICs per guest; Intel gigabit; virt-io; PCnet
- **Virtual USB Controller:** USB 1.1 and 2.0; pass-through and virtual devices
- **Audio:** Intel High Definition Audio
- **Full ACPI Support:** guests show real power status
- **Virtual CD/DVD:** pass-through for CD/DVD writing, multiple concurrent
- **Display Adaptor:** multi-monitor capable with graphics acceleration: OpenGL for Windows, Linux, Solaris Guests; Direct3D for Windows; 2D Video acceleration, built-in RDP Server



Driving VirtualBox

Alternative Interfaces to VirtualBox



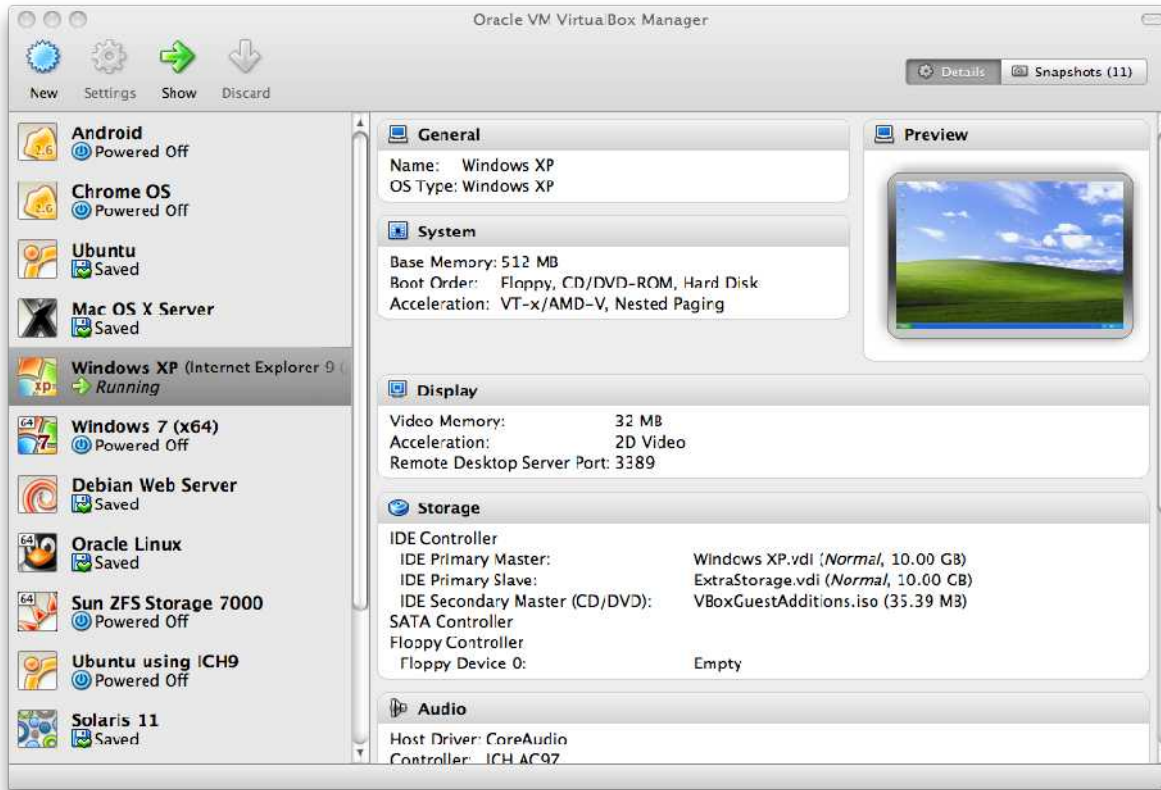
- Command-line interface
 - VBoxManage ...
- Python interface
 - vboxshell.py
- Web-services API
 - phpvirtualbox
- VBoxManage guestcontrol ...

VirtualBox Simplicity



VirtualBox Simplicity

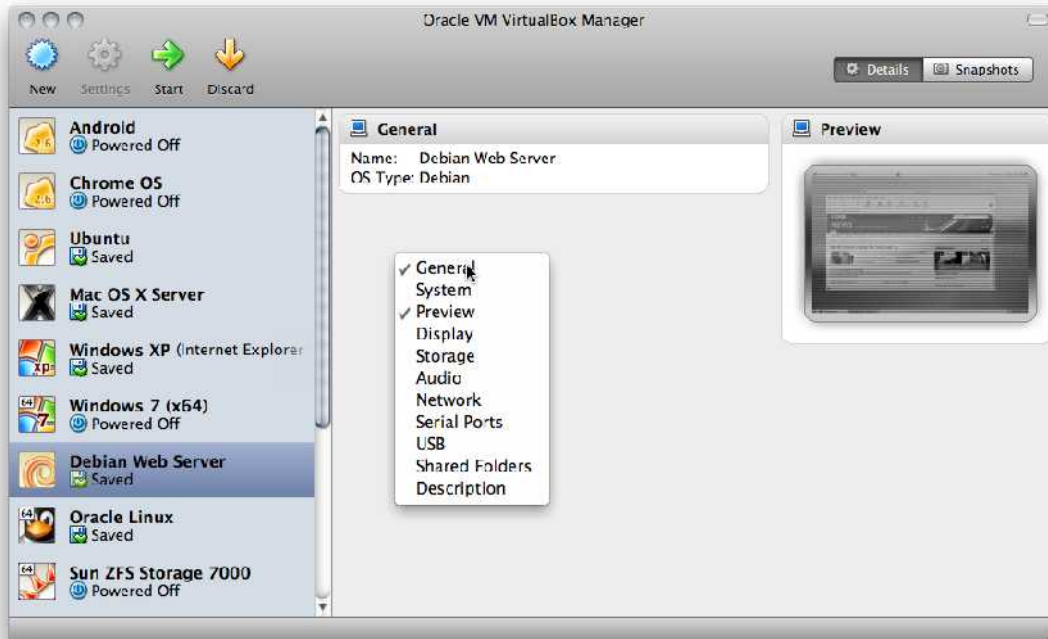
VirtualBox Manager



- Live Preview Pane
- Orderable VM List

VirtualBox Simplicity

VirtualBox Manager



- Live Preview Pane
- Orderable VM List
- Optional panes to simplify presentation



VirtualBox Power Command Line Interface

```
Terminal — bash — 96x67
dhep-1eads-10~ 67-11f-227 ~ ahal13 VBoxManage
Oracle VM VirtualBox Command Line Management Interface Version 4.0.7
(©) 2005-2011 Oracle Corporation
All rights reserved.

Usage:
VBoxManage [-v --version] print: version number and exit
VBoxManage [-q --nologo] ... suppress the logo

VBoxManage list [--long] [-h]
vms|runningvms|ostypes|hostdvs|hostfilesystems|
bridgedifs|hostonlyifs|dnpcapvms|hostifs|
hostpuids|hdbackends|hdds|vuds|floppies|
usbroot|usbfilters|systemproperties|extpacks

VBoxManage showvminfo <uid>|<name> [--details]
[ --machine-readable]
VBoxManage showvminfo <uid>|<name> --log <id>
VBoxManage registervm <filename>
VBoxManage unregistervm <uid>|<name> [--delete]
VBoxManage createvm
--name <name>
[ --ostype <ostype>]
[ --register]
[ --basefolder <path> | --settingsfile <path>]
[ --uid <uid>]
VBoxManage modifyvm
<uid>|<name>
[ --name <name>]
[ --ostype <ostype>]
[ --memory <memorysize in MB>]
[ --pagefusion on|off]
[ --uram <uramsize in MB>]
[ --acpi on|off]
[ --ioapic on|off]
[ --hpet on|off]
[ --hwvirtlx on|off]
[ --hwvirtmexml on|off]
[ --nestedpaging on|off]
[ --largepages on|off]
[ --urxpt on|off]
[ --synthcpu on|off]
[ --cpuidat <leaf> <eax> <ecx> <edx>]
[ --cpuidsmova <leaf>]
[ --cpuidrsmovsall]
[ --hardwareuuid <uid>]
[ --cpu <number>]
[ --pnpbortplug on|off]
[ --plugcpa <id>]
[ --unplugcpu <id>]
[ --cpuxmlload <file>]
[ --stusate on|off]
[ --multitorusall <number>]
[ --coolectorste on|off]
[ --zmmleaste2vindex on|off]
[ --firmware bios|efi|efi32|efi64]
[ --chipset i86x|piix3]
[ --bioslogofadein on|off]
[ --bioslogofadeout on|off]
[ --l10ul0udis|laylate <name>]
[ --bioslogoinagepath <imagepath>]
[ --biosbootmenu disabled|menuonly|messageandmenu]
[ --biossystemclockoffset <msc>]
[ --biosupdate on|off]
```

- Powerful command line tools

VBoxManage ...

- Python shell

python vboxshell.py

VirtualBox Power

Controllable Power

- CPU throttle

```
VBoxManage controlvm "Windows 7 (x64)" cpuexecutioncap 50
```

- Disk I/O limiter

```
VBoxManage bandwidthctl "VM name" --name Limit --add disk  
--limit 20
```

```
VBoxManage storageattach "VM name" --controller "SATA"  
--port 0 --device 0 --type hdd --medium disk1.vdi  
--bandwidthgroup Limit
```

- Dynamic adjustments

VirtualBox Power

Guest Automation

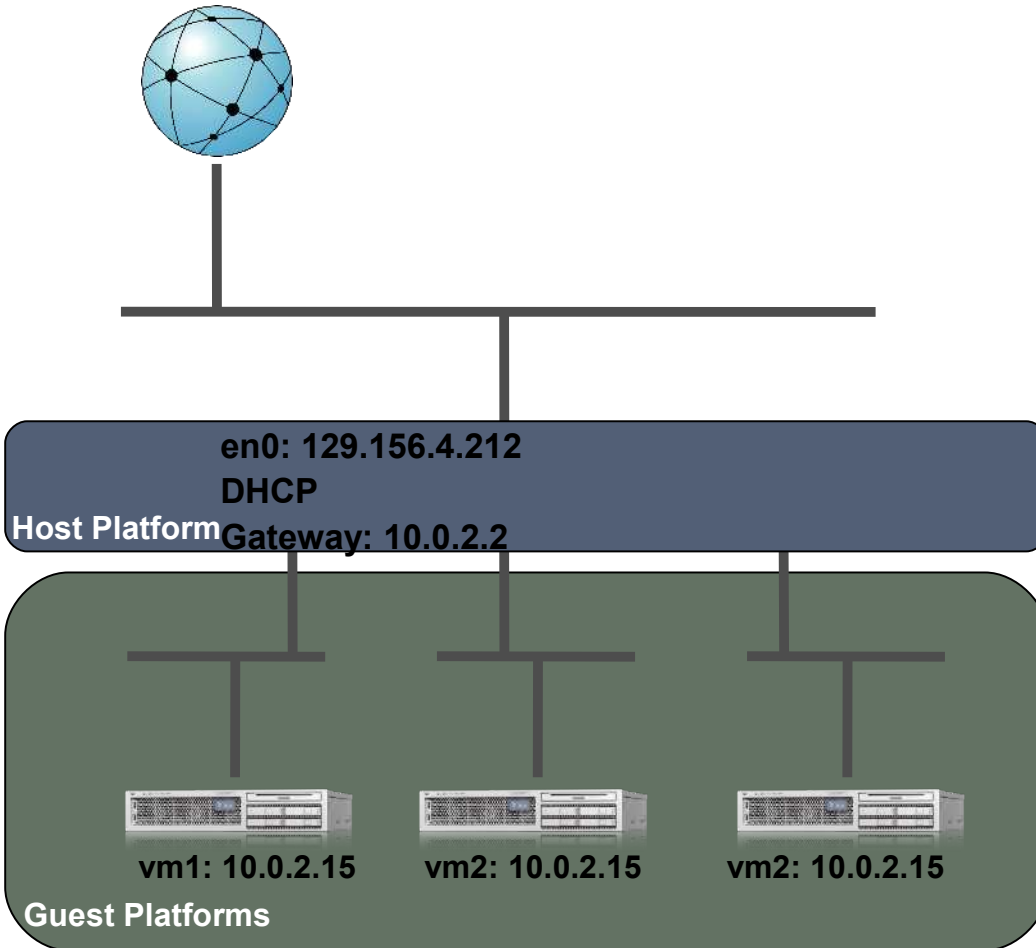
- Execute commands inside the guest from the host

```
VBoxManage guestcontrol exec[ute] <vmname>|<uuid> <path to program> --username <name> --password <password> [--arguments "<arguments>"] [--environment "<NAME>=<VALUE> [<NAME>=<VALUE>"]] [--flags <flags>] [--timeout <msec>] [--verbose] [--wait-for exit,stdout,stderr|]
```

- Create folders and copy files into the guest filesystem

```
VBoxManage copyto|cp <vmname>|<uuid> <source on host> <destination on guest> --username <name> --password <password> [--dryrun] [--follow] [--recursive] [--verbose]
```

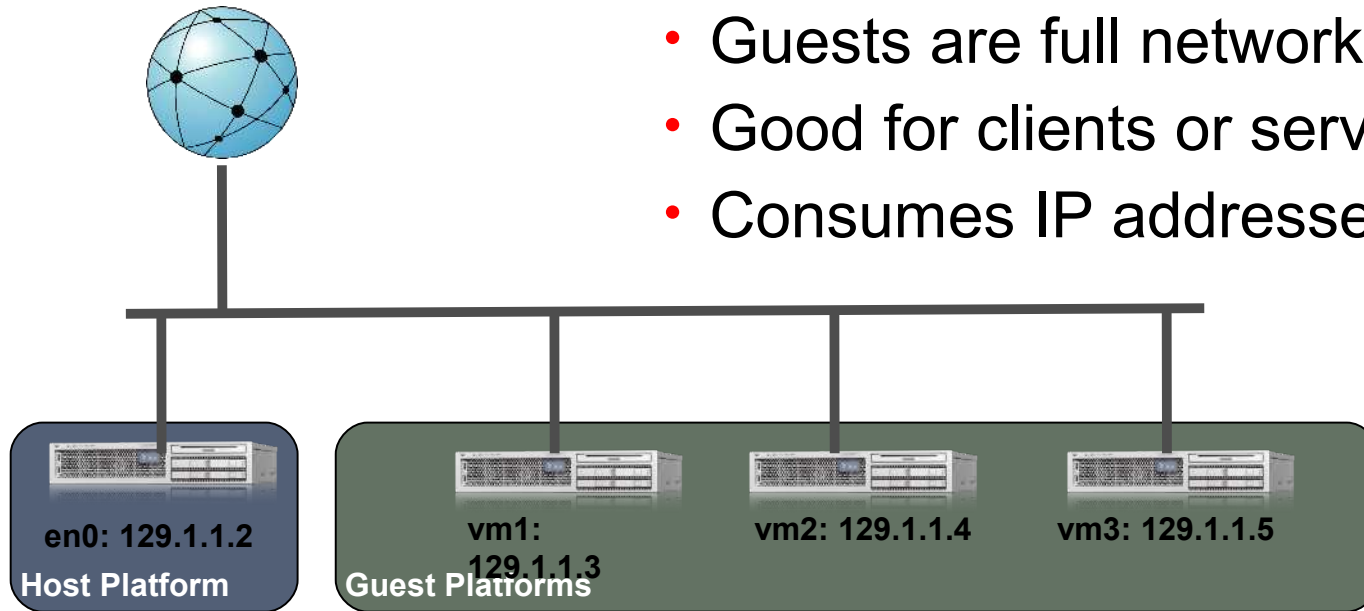
VirtualBox NAT Networking



- Guests sit on own private LAN
- VirtualBox acts as a DHCP Server
- VirtualBox NAT engine translates addresses
- Destination servers see traffic originating from VirtualBox host
- No configuration needed on Host or Guest
- Great when guests are clients
- Not good for guests as servers

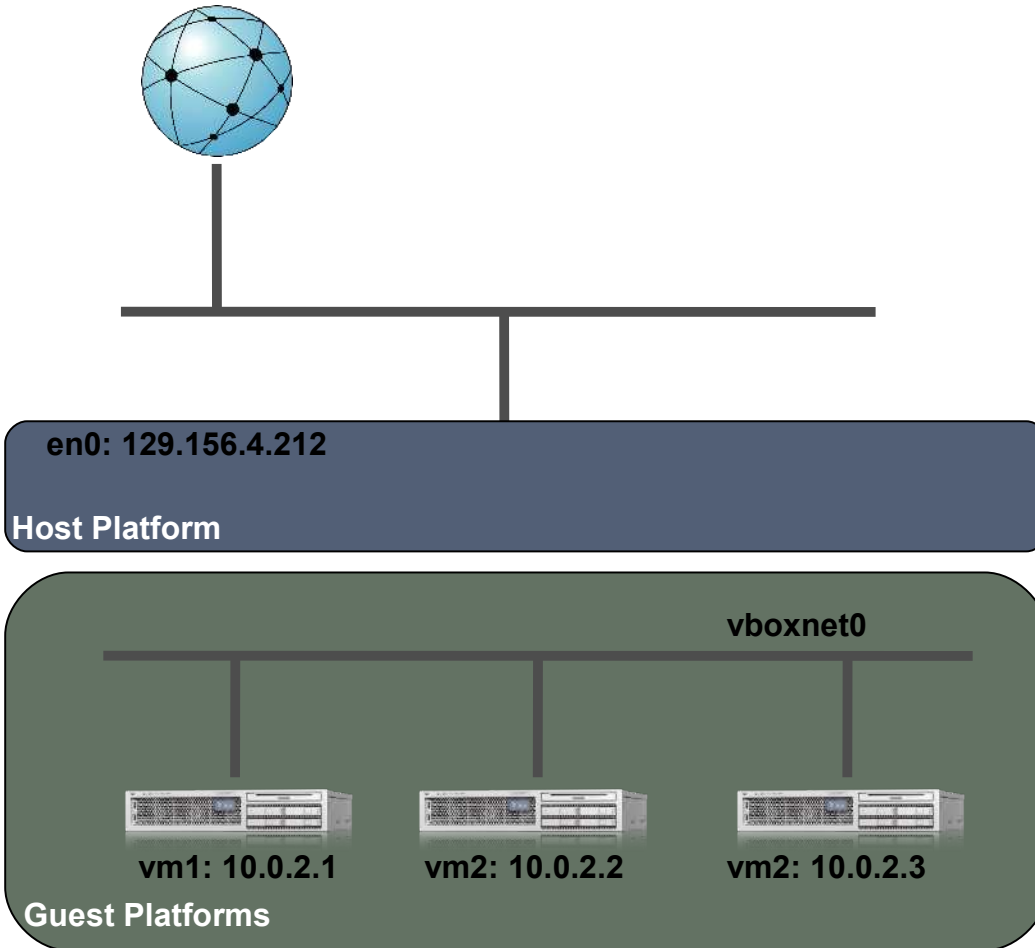
VirtualBox Bridged Networking

- VirtualBox bridges to Host Network
- Guests are full network citizens
- Good for clients or server guests
- Consumes IP addresses



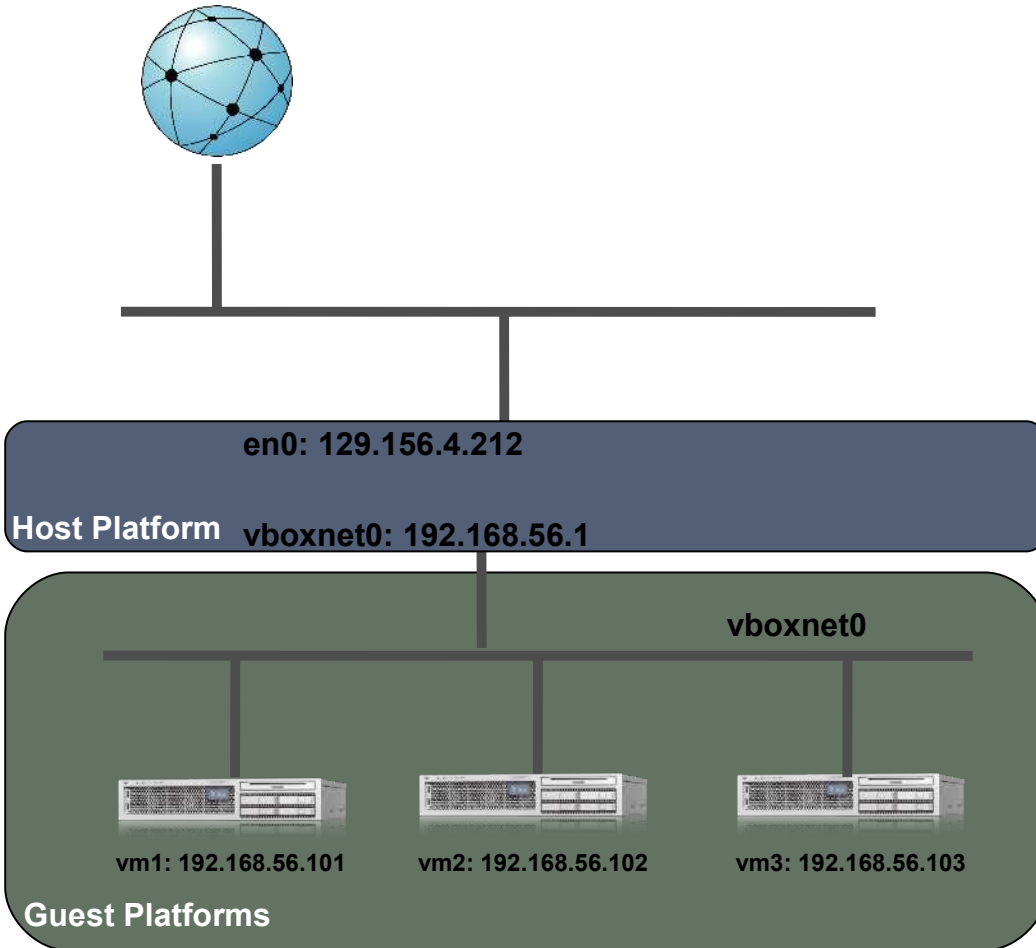
- May involve configuration of guest
- Best for production environments

VirtualBox Internal Networking



- Totally isolated network
- Guests can see other guests on same internal network
- Host cannot see internal network
- Network configuration needed
- Functions even when Host disconnected.
- Can be used in conjunction with Bridged
- Good for multi-tier solutions

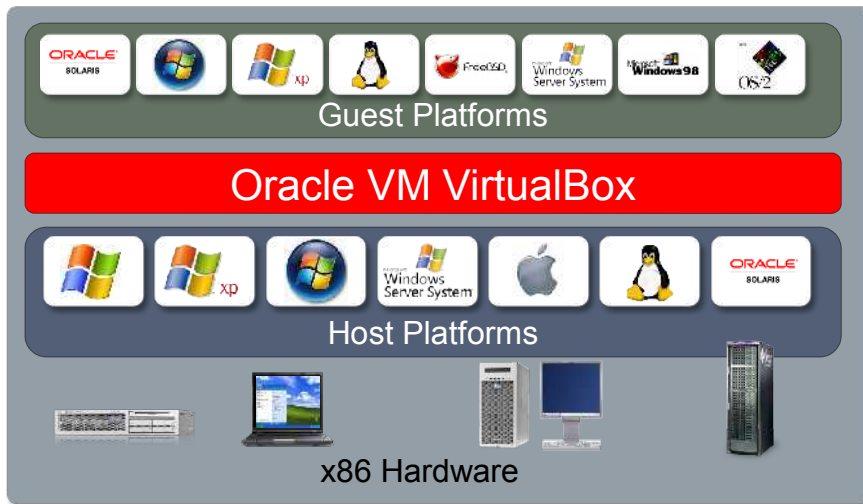
VirtualBox Host-only Networking



- Hybrid between Bridged and internal
- VirtualBox creates a private network for guests and host
- Host sees a new software NIC
- VirtualBox provides a DHCP server
- Guests cannot see outside world
- Guests function even when host disconnected
- Good for development

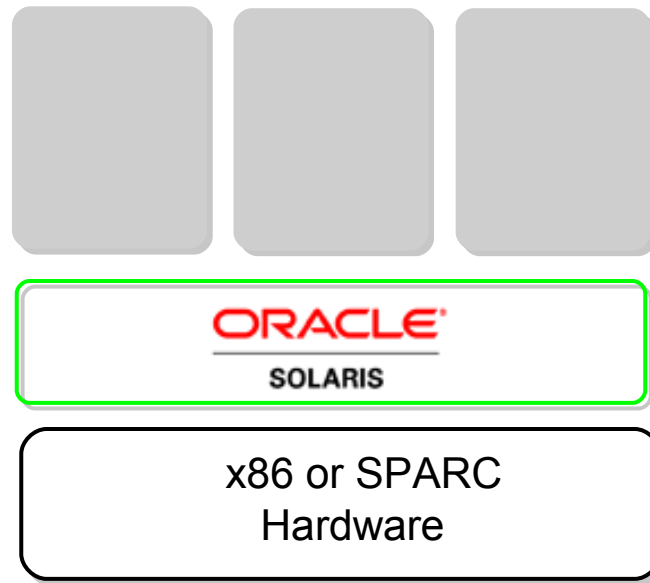
Oracle VM VirtualBox

Cross-platform Virtualization Software



- For Windows, Linux, Solaris and Mac Hosts
- Leverage existing hardware and skillsets
- Huge Guest Coverage
- Easy to install and use
- Fast and powerful
- Free for Personal Use

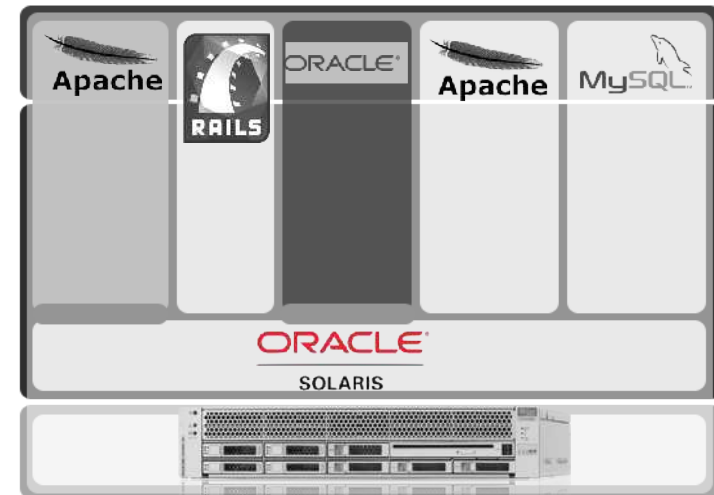
Oracle Solaris Container



Oracle Solaris Zones

OS-Virtualization – included at no additional costs

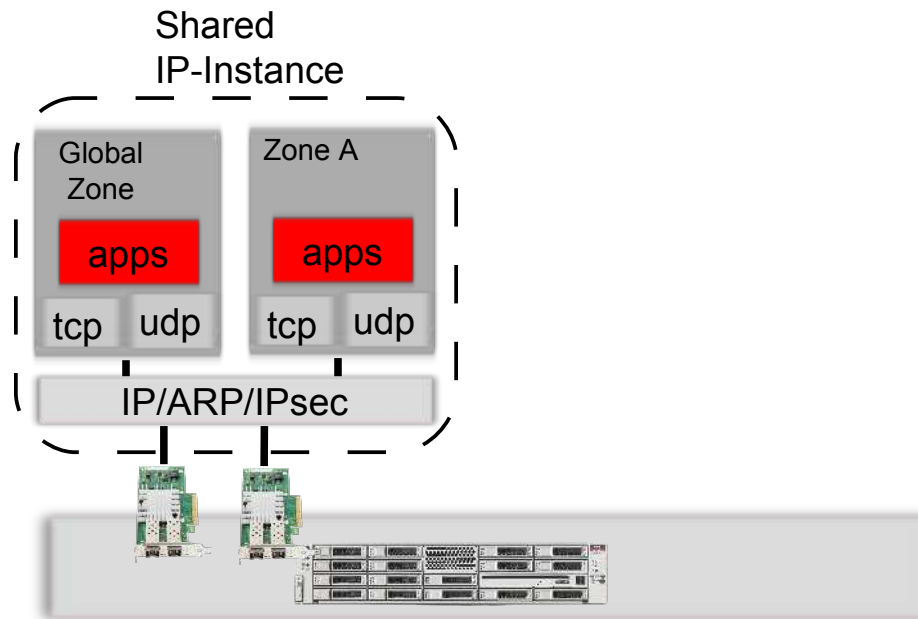
- High-efficient, high-performance OS-Virtualization
 - 1000's of applications, independent on one system
 - Available on all Oracle Solaris platforms
 - Very scalable
- Virtualized “runtime environments”
 - Shared Kernel
 - Isolated namespace and resources
 - Shared and separated filesystems
 - Shared and separated Devices
 - Dedicated Ressourcemanagement
 - Shared or separated TCP/IP-stacks and interfaces



Networks and Zones

Shared-IP Instances

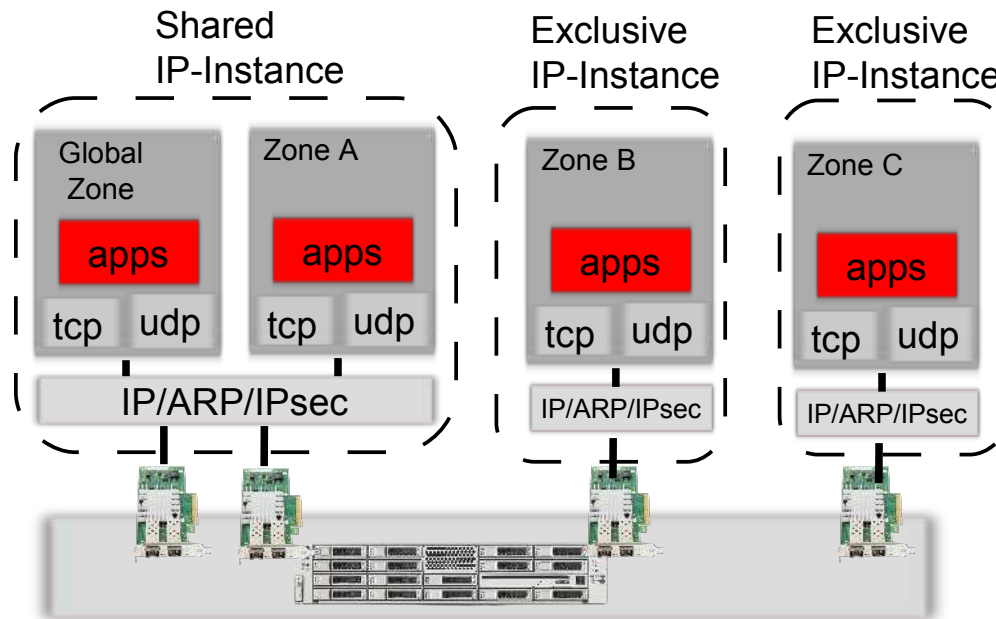
- Shared IP-Instances
 - Separated Communication
 - Shared IP-Stack
 - Shared Interfaces



Networks and Zones

Shared-IP and Exclusive-IP Instances

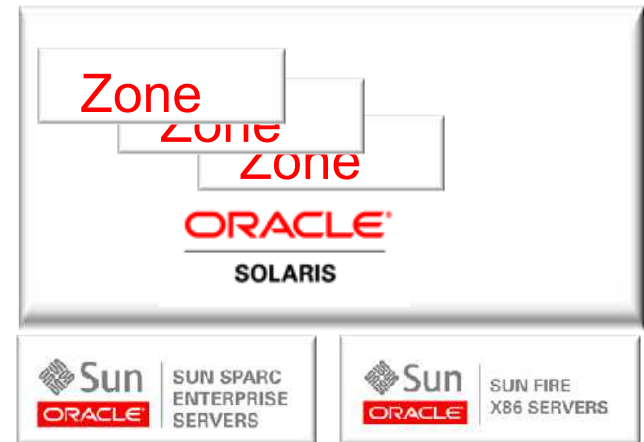
- Shared IP-Instances
 - Separated Communication
 - Shared IP-Stack
 - Shared Interfaces
- Exclusive IP-Instances
 - Separated IP-Stack
 - Separated IP-Parameters
 - Exclusive Interfaces



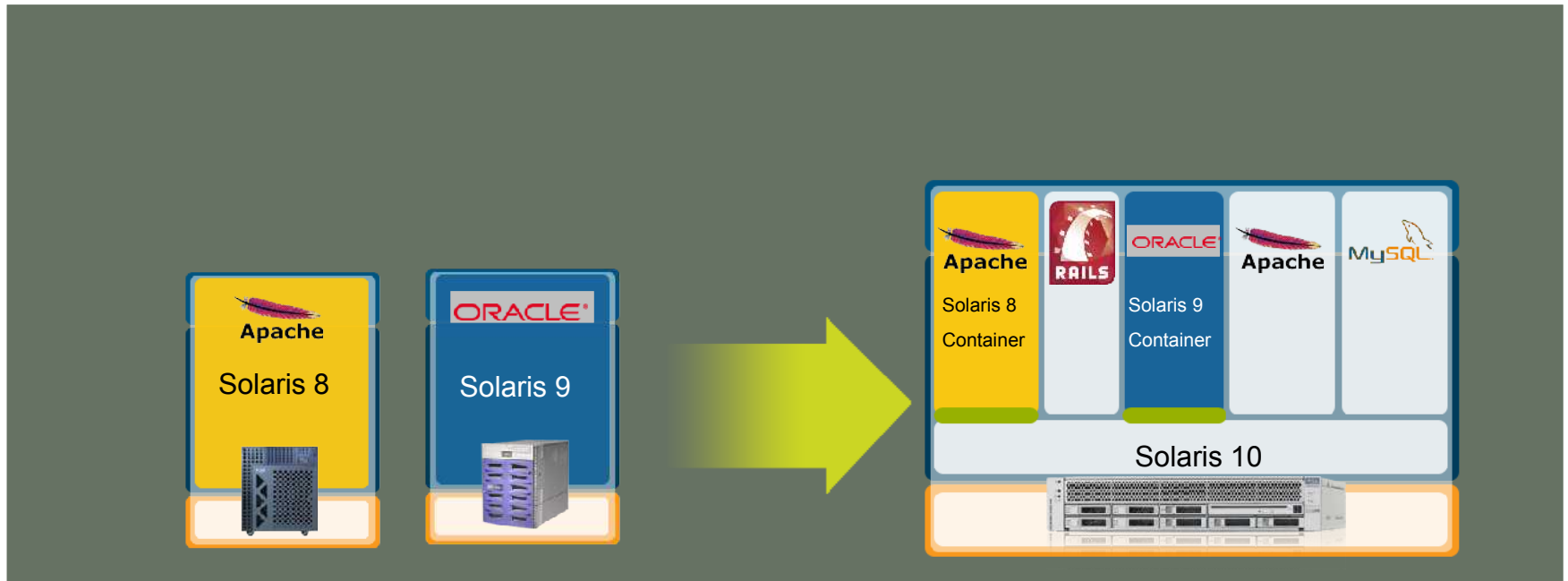
Solaris Containers

Built-in Virtualization on each Solaris-System

- OS-Virtualization, Isolation and Ressourcelimitation
- Cloning and Migration of Containers
- Instant restart
- Ideal for many use cases
 - Highly secure isolation
 - Partitioning of applications
 - Create very easy many test environments
 - High performance virtualization of applications
 - Server consolidation



Solaris 8 and Solaris 9 Containers



- Fast migration of old OS-Environments
- Easy upgrade to new, more efficient SPARC-systems
- Reduce costs for power/cooling/space/support
- Physical-to-Virtual (P2V) Consolidation

Technical evaluation of server virtualization concepts

- Virtualisierung
 - What is being virtualized ? (CPU/Disk/Network)
- Isolation
 - Where does isolation happen ? (Hardware/OS/App)
- Resource limitation
 - What can be limited ? (CPU/Memory/Disk/Network)
 - Dedication or Capping ?
- Operational aspects
 - Complexity (New Limits/Different Setups)
 - Performance
 - Lifecycle Management (Installation/Patch/Upgrade)
 - Available applications

The path to virtualization

- What's the goal ?
 - How will it help ?
 - Which disadvantages ?
- Check the application
 - Specialities
 - Costs/licensing/support
- Experience others ?
 - Changed operational concepts
 - Performance
 - CPU, memory, I/O

Q & A





Hardware and Software

ORACLE®

Engineered to Work Together

ORACLE®