Sistemas Operacionais

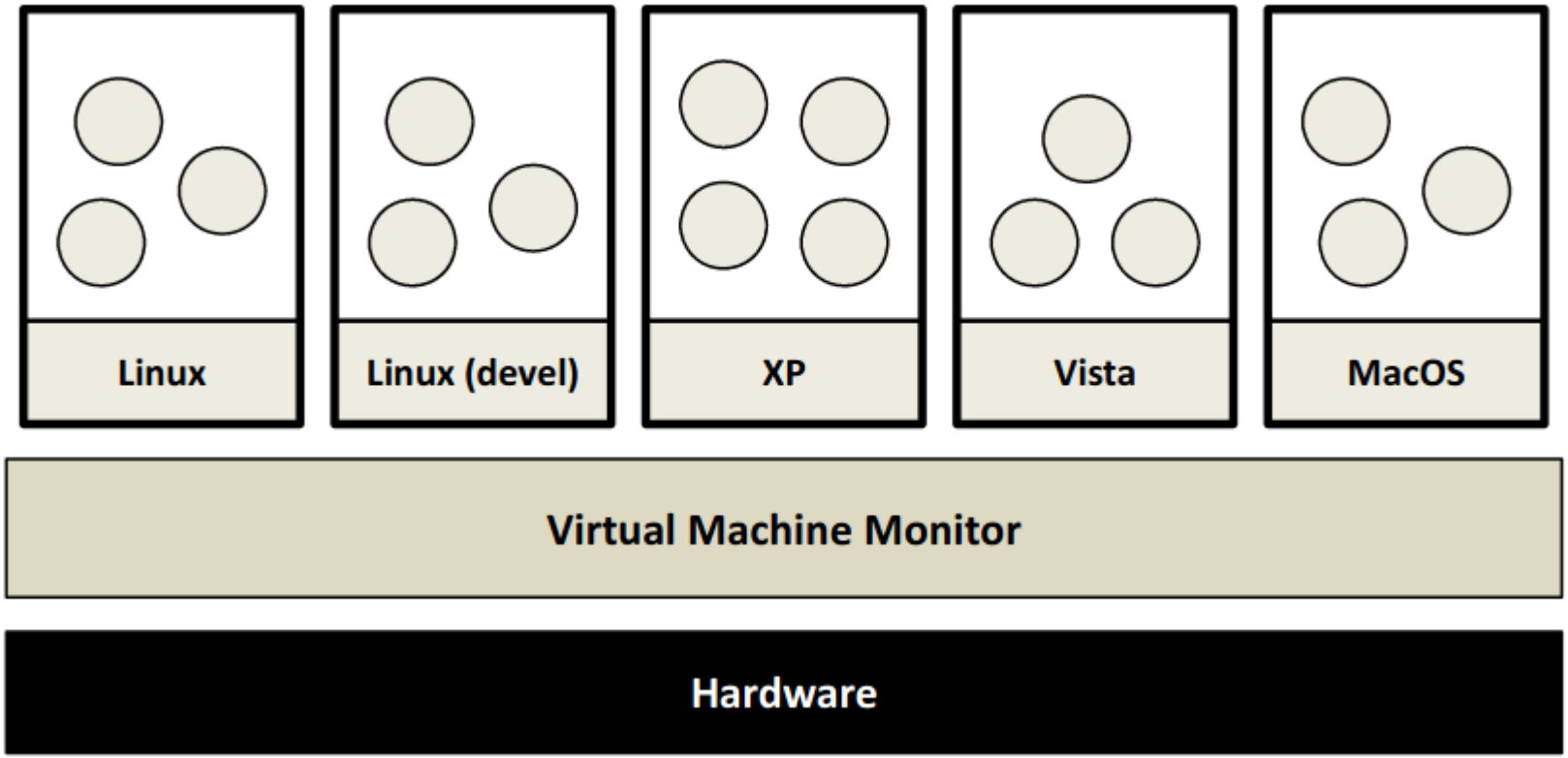
Tipos de Serviços

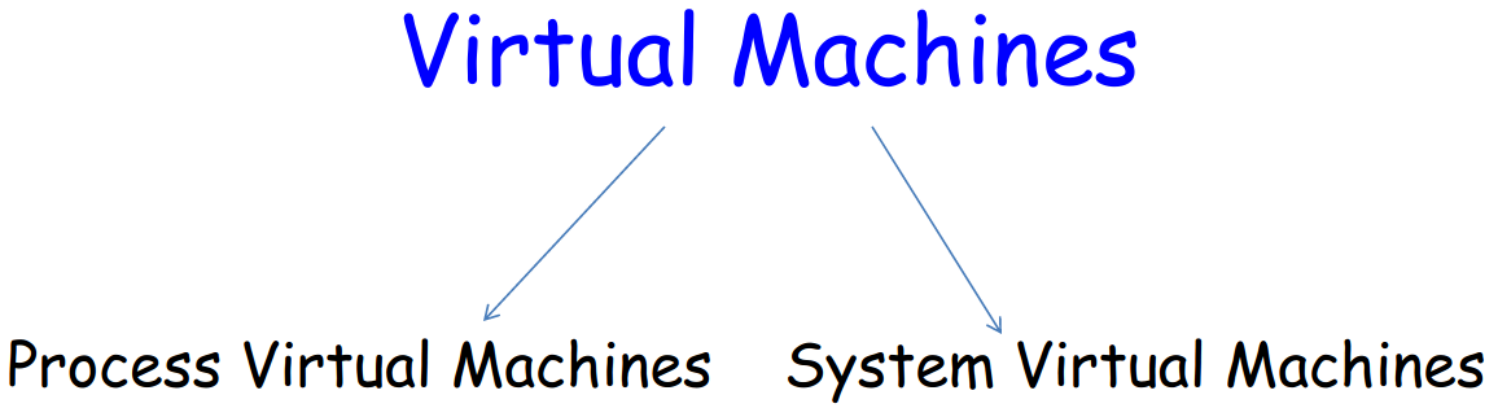
Prof. Herbert Rocha
herbert.rocha@ufrr.br

Install Virtual Box

https://www.virtualbox.org/

Virtualization



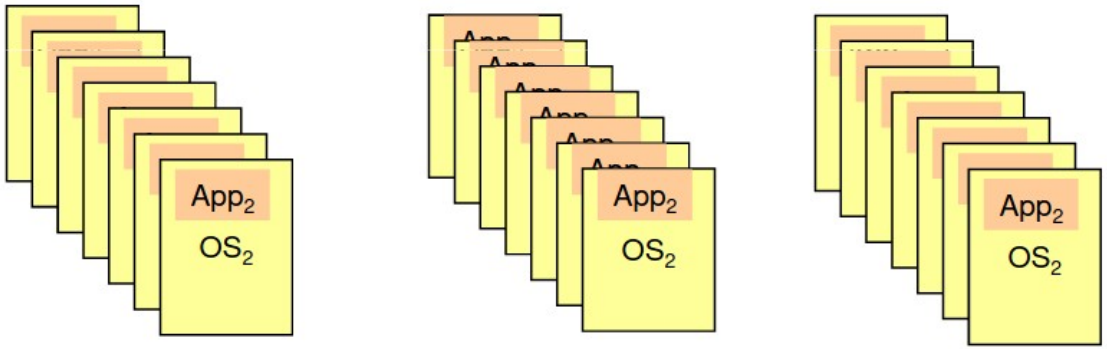


O processo de virtualização envolve duas etapas:

1) Mapeamento de recursos virtuais ou estado para recursos reais da máquina subjacente.
2) Usando instruções de máquina reais e/ou chamadas de sistema para realizar as ações especificadas pelas instruções VM.

https://www.csie.ntu.edu.tw/~d00922011/ics/253/lecture1.pdf

Virtualization Data Center

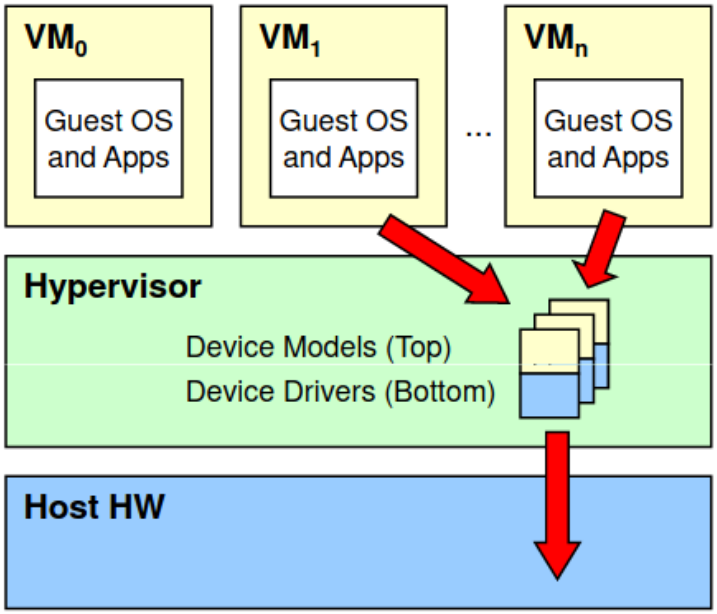


Distributed Virtualization Layer – Map virtual machines to hardware

http://www.csit-sun.pub.ro/~cpop/Sisteme_cu_Microprocesoare_Avansate_SMPA/SMPA_curs_master5AAC/SMPA_curs9/EE282A/L13-VM.pdf

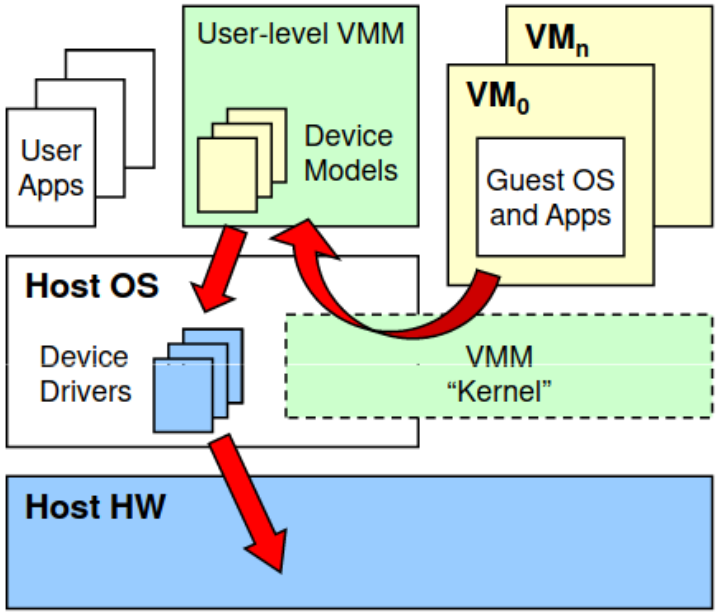
Arquiteturas de Virtual Machine Monitor (VMM)

Hypervisor Architecture



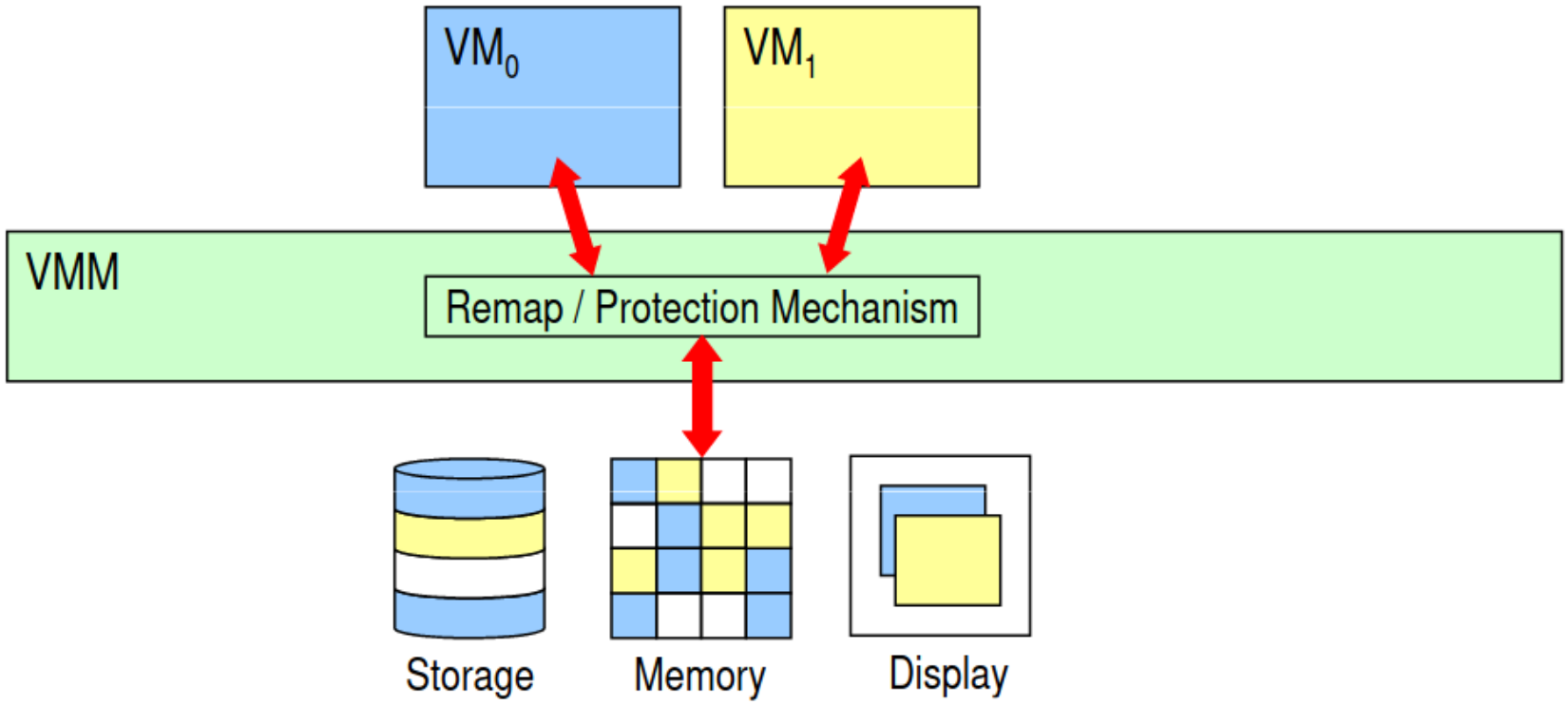
A arquitetura do hipervisor fornece seus próprios drivers de dispositivo e serviços

Hosted Architecture



A arquitetura Hosted aproveita drivers de dispositivo e serviços de um "sistema operacional host"

http://www.csit-sun.pub.ro/~cpop/Sisteme_cu_Microprocesoare_Avansate_SMPA/SMPA_curs_master5AAC/SMPA_curs9/EE282A/L13-VM.pdf

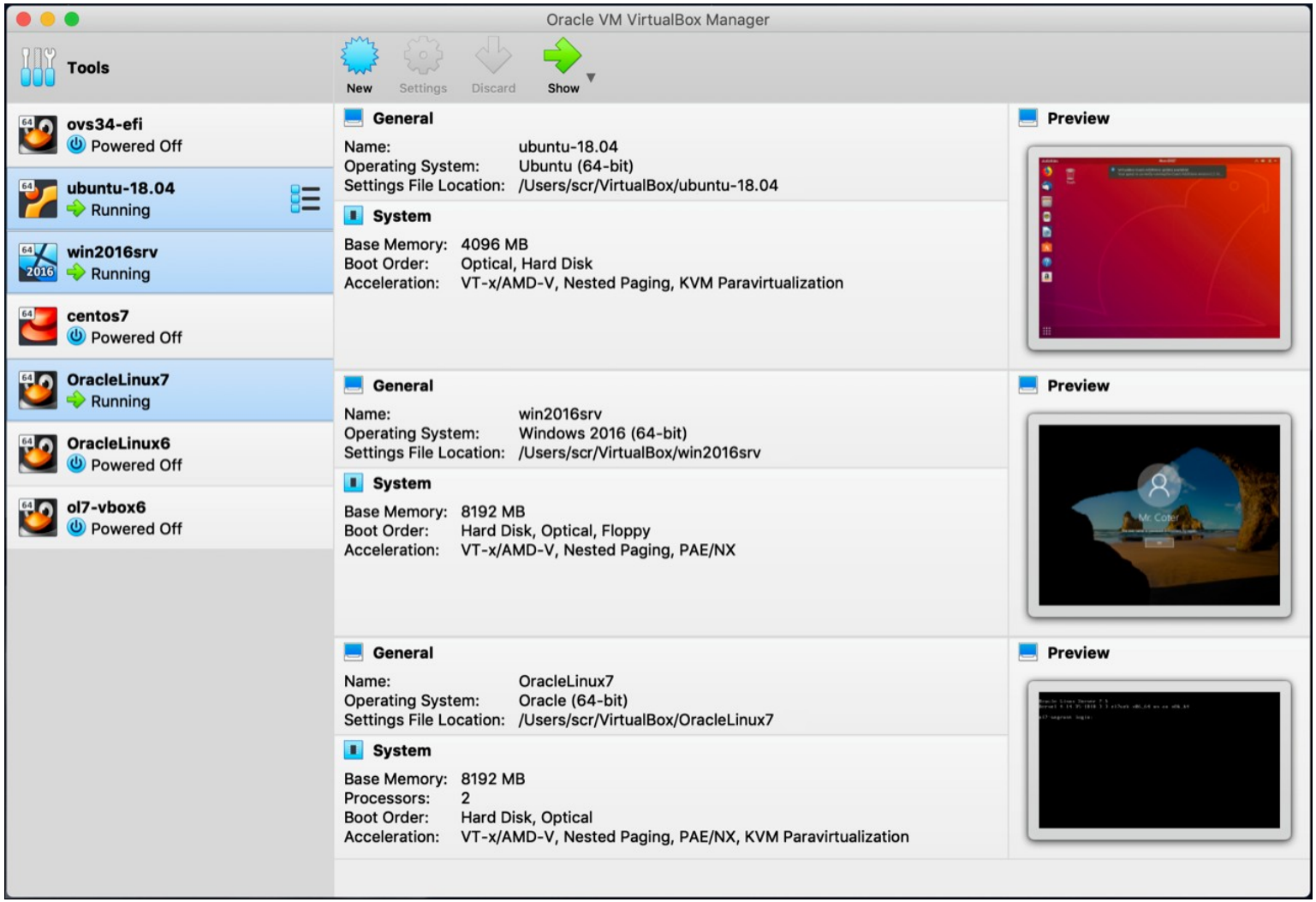


VMM aloca “propriedade” de recursos físicos para VMs

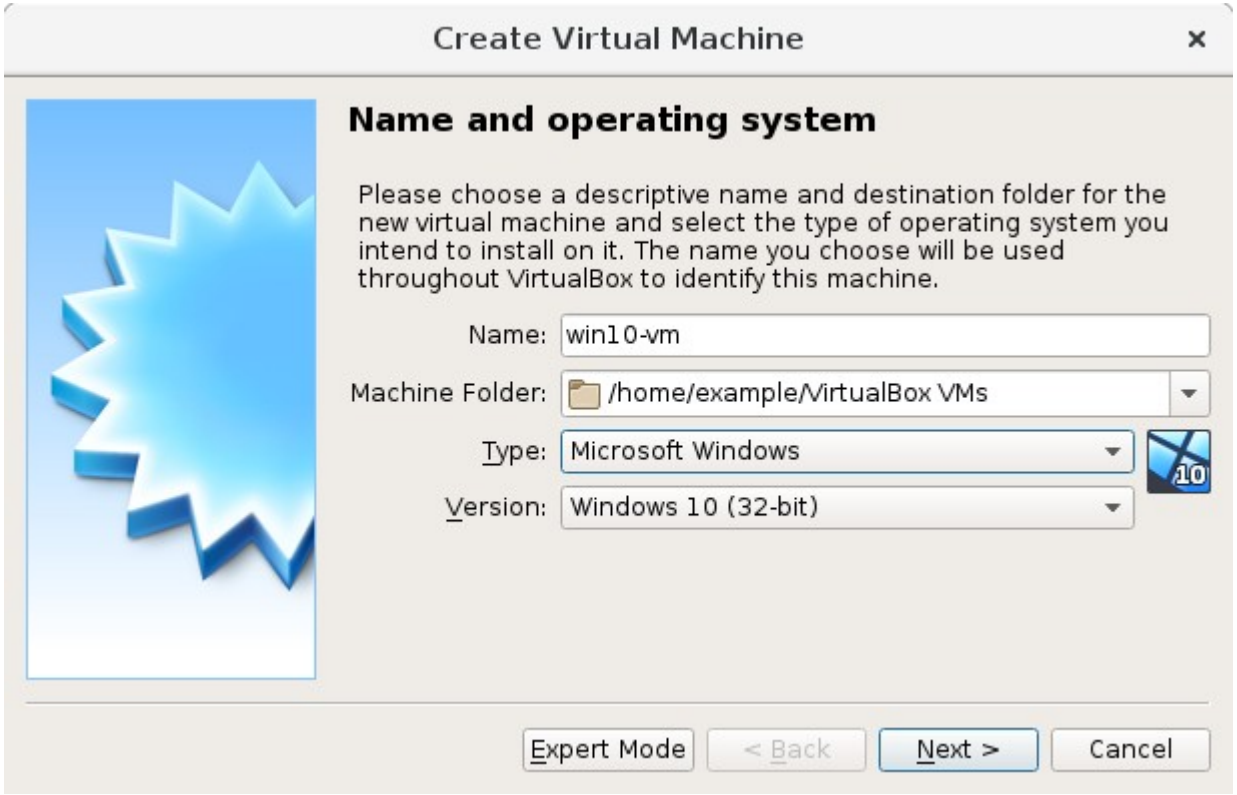
- Normalmente envolve algum mecanismo de remapeamento e proteção
- Exemplos: memória física, partições de disco, interface gráfica

http://www.csit-sun.pub.ro/~cpop/Sisteme_cu_Microprocesoare_Avansate_SMPA/SMPA_curs_master5AAC/SMPA_curs9/EE282A/L13-VM.pdf

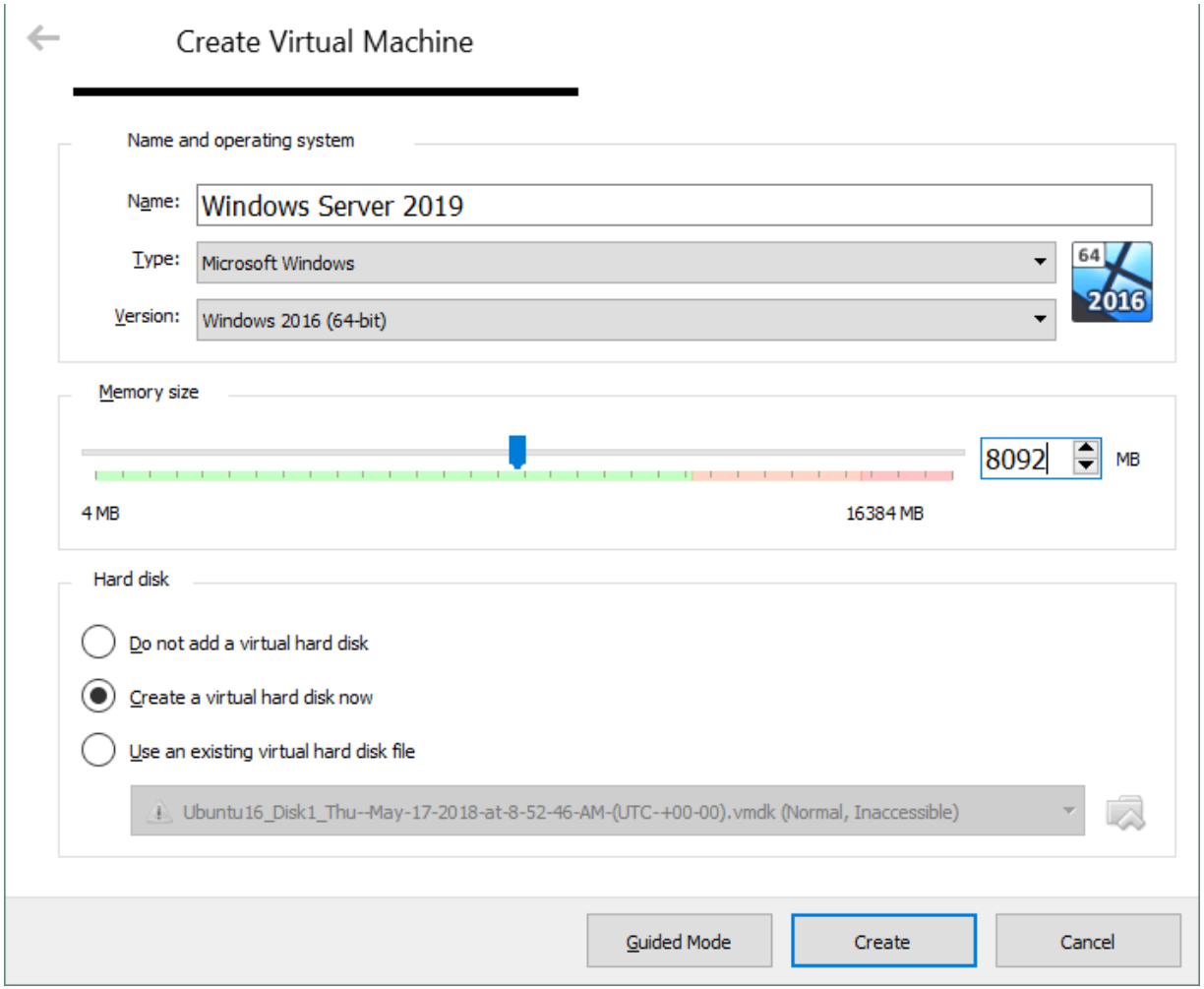
Deploy OS


Oracle VM VirtualBox Manager
Tools
New
Settings
Discard
Show
ovs34-efi
Powered Off
ubuntu-18.04
Running
win2016srv
Running
centos7
Powered Off
OracleLinux7
Running
OracleLinux6
Powered Off
ol7-vbox6
Powered Off
General
Name: ubuntu-18.04
Operating System: Ubuntu (64-bit)
Settings File Location: /Users/scr/VirtualBox/ubuntu-18.04
System
Base Memory: 4096 MB
Boot Order: Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization
Preview
General
Name: win2016srv
Operating System: Windows 2016 (64-bit)
Settings File Location: /Users/scr/VirtualBox/win2016srv
System
Base Memory: 8192 MB
Boot Order: Hard Disk, Optical, Floppy
Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX
Preview
General
Name: OracleLinux7
Operating System: Oracle (64-bit)
Settings File Location: /Users/scr/VirtualBox/OracleLinux7
System
Base Memory: 8192 MB
Processors: 2
Boot Order: Hard Disk, Optical
Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX, KVM Paravirtualization
Preview

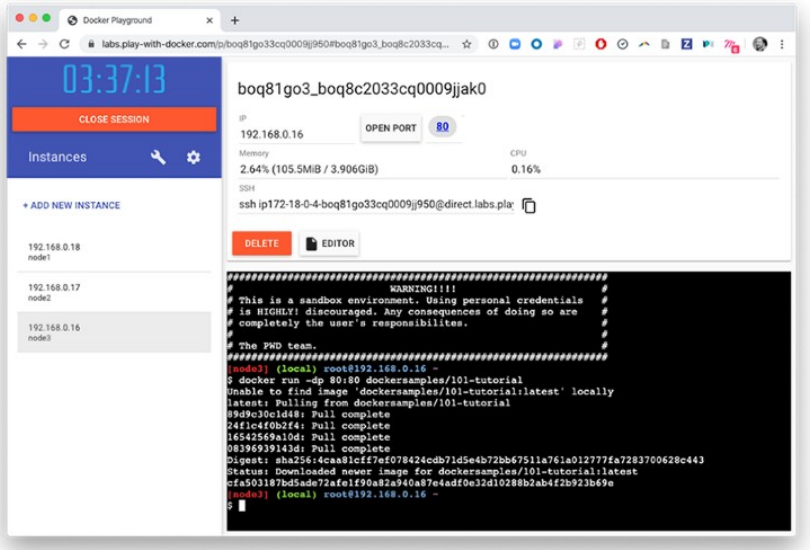
Deploy OS


Create Virtual Machine
Name and operating system
Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.
Name: win10-vm
Machine Folder: /home/example/VirtualBox VMs
Type: Microsoft Windows
Version: Windows 10 (32-bit)
Expert Mode
< Back
Next >
Cancel

Deploy OS


Create Virtual Machine
Name and operating system
Name:
Windows Server 2019
Type:
Microsoft Windows
Version:
Windows 2016 (64-bit)
64
2016
Memory size
8092
MB
4 MB
16384 MB
Hard disk
Do not add a virtual hard disk
Create a virtual hard disk now
Use an existing virtual hard disk file
Ubuntu16_Disk1_Thu--May-17-2018-at-8-52-46-AM-(UTC-+00-00).vmdk (Normal, Inaccessible)
Guided Mode
Create
Cancel

Docker



https://www.docker.com/101-tutorial

Docker

- Docker é um software de virtualização popular que ajuda seus usuários a desenvolver, implantar, monitorar e executar aplicativos em um Docker Container com todas as suas dependências.

- Os contêineres do Docker incluem todas as dependências (frameworks, bibliotecas, etc.) para executar um aplicativo de maneira eficiente e sem bugs.

Problemas em usar VB:

- Cada VM requer um sistema operacional (SO)
- Cada SO requer uma licença
- Cada sistema operacional tem sua própria sobrecarga de computação e armazenamento
- Necessita de manutenção, atualizações

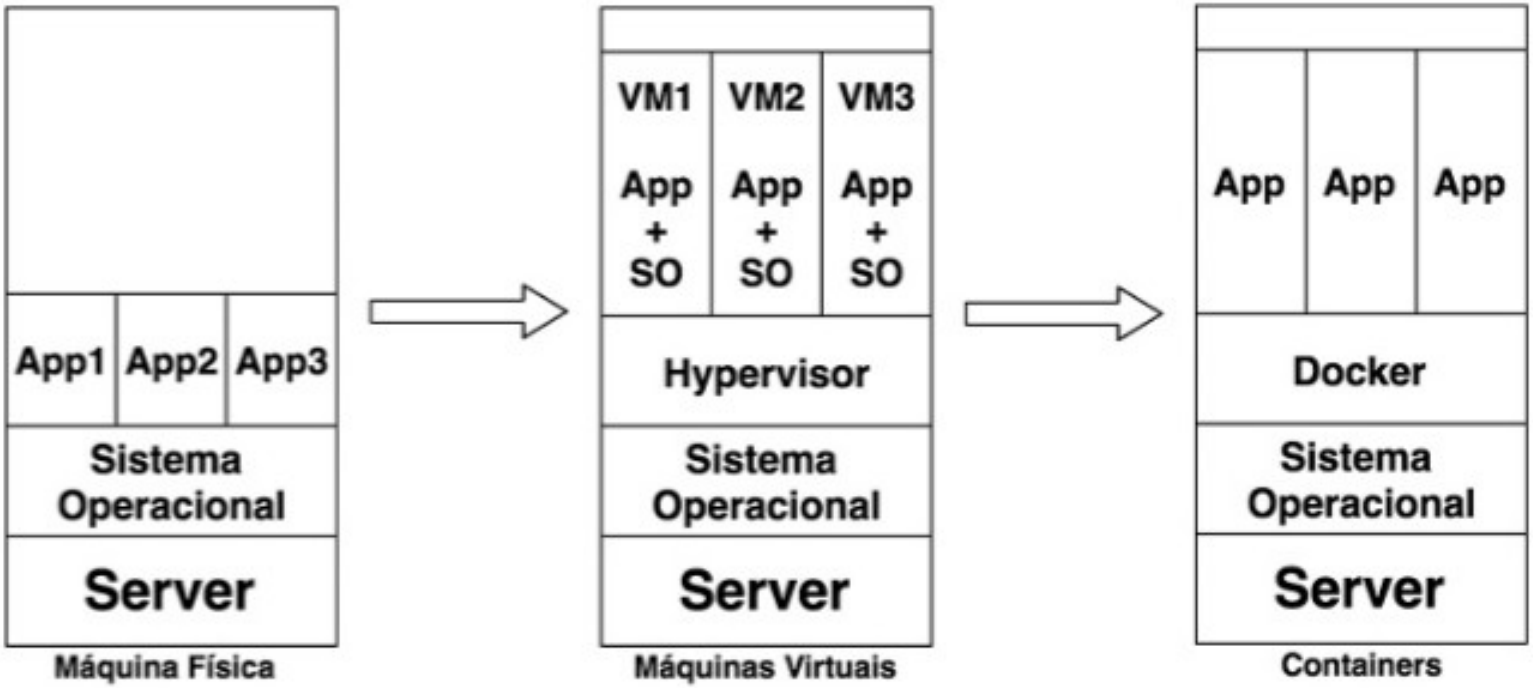
Docker

VM vs. Containers

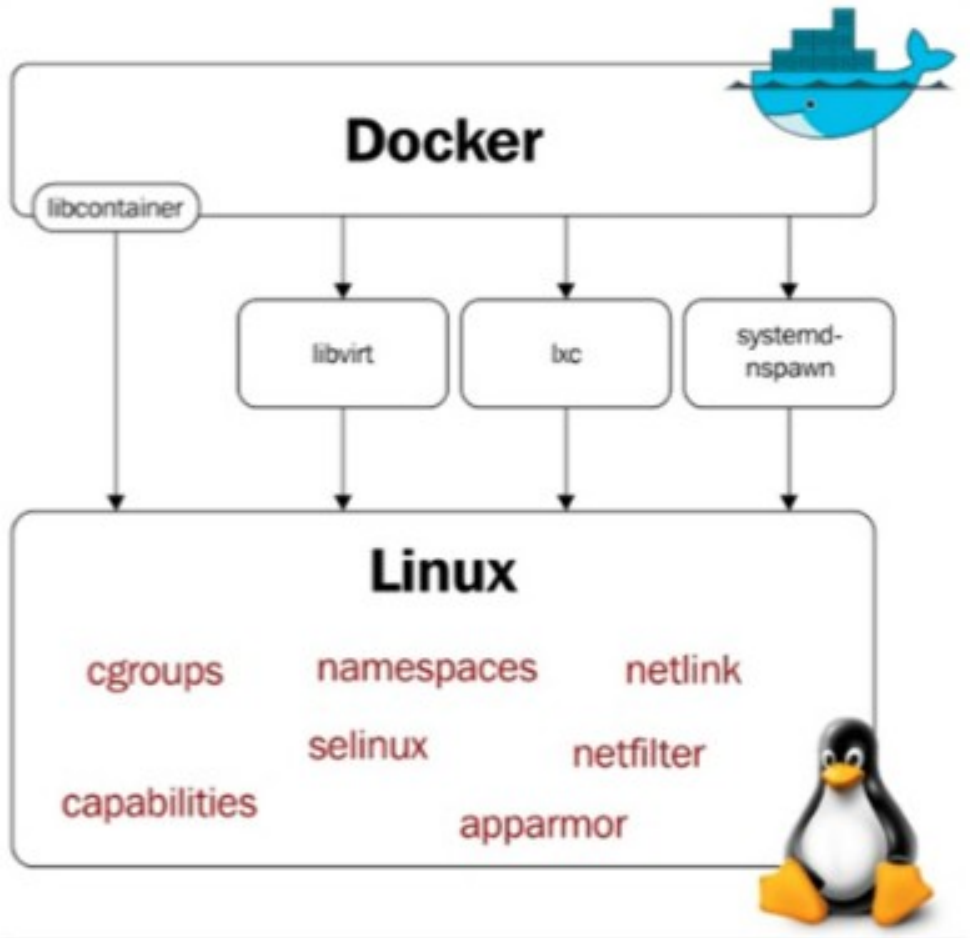
Criteria	VM	Containers
Image Size	3X	X
Boot Time	>10s	~1s
Computer Overhead	>10%	<5%
Disk I/O Overhead	>50%	Negligible
Isolation	Good	Fair
Security	Low-Medium	Medium-High
OS Flexibility	Excellent	Poor
Management	Excellent	Evolving
Impact on Legacy application	Low-Medium	High

https://www.cse.wustl.edu/~jain/cse570-18/ftp/m_21cdk.pdf

Docker


App1
App2
App3
Sistema Operacional
Server
Máquina Física
VM1
VM2
VM3
App + SO
App + SO
App + SO
Hypervisor
Sistema Operacional
Server
Máquinas Virtuais
App
App
App
Docker
Sistema Operacional
Server
Containers

Docker


Docker
libcontainer
libvirt
lxc
systemd-
nspawn
Linux
cgroups
namespaces
netlink
selinux
netfilter
capabilities
apparmor

Docker

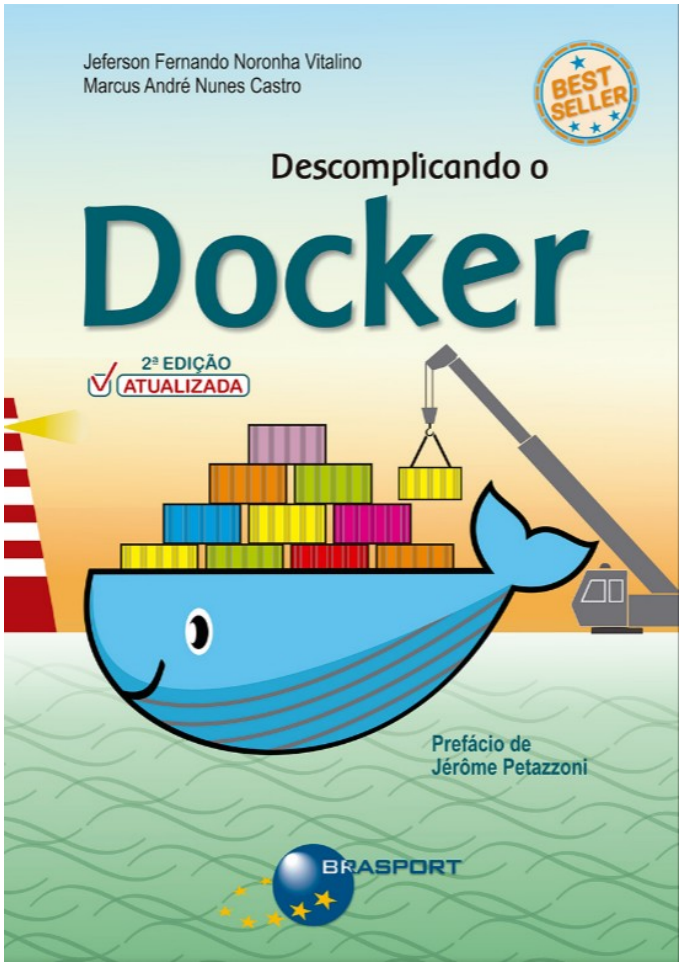
Para ver todos os subcomandos disponíveis, digite:

```
$ docker
```

No Docker 19, a lista completa de subcomandos disponíveis inclui:

```
Output
  attach      Attach local standard input, output, and error streams to a running conta
  build       Build an image from a Dockerfile
  commit      Create a new image from a container's changes
  cp          Copy files/folders between a container and the local filesystem
  create      Create a new container
  diff        Inspect changes to files or directories on a container's filesystem
  events      Get real time events from the server
  exec        Run a command in a running container
  export      Export a container's filesystem as a tar archive
  history     Show the history of an image
  images      List images
  import      Import the contents from a tarball to create a filesystem image
  info        Display system-wide information
  inspect     Return low-level information on Docker objects
  kill        Kill one or more running containers
  load        Load an image from a tar archive or STDIN
```

Docker


Jeferson Fernando Noronha Vitalino
Marcus André Nunes Castro
BEST SELLER
Descomplicando o
Docker
2ª EDIÇÃO
ATUALIZADA
Prefácio de
Jérôme Petazzoni
BRASPORT