

Ricardo  
Cabral

Hyper-V with Windows 10

  
IT PRO  
PORTUGAL

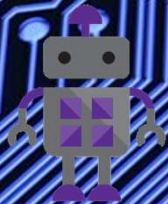
  
16°  
Encontro

Microsoft  
Portugal  
(Lisboa)



  
2018-01-31

  
18:30



# About Ricardo Cabral

- ➔ Ricardo Cabral is a Technical Engineer who works in Globaltemp as an IT Manager.
- ➔ Ricardo is also Microsoft Certified Trainer (MCT). In his free time, he is actively participating, volunteering and/or speaking Portuguese community meetings. He is one of the founders/organizers of IT Pro Portugal and PowerShell Portugal user group.
- ➔ Ricardo is interested in technology with over 14 years of experience in IT management, development and projects. He is an authentic self-taught man.
- ➔ Ricardo holds a Degree in Computer Engineering from Universidade Autónoma de Lisboa.



**Microsoft**  
**CERTIFIED**  
Trainer



# Agenda

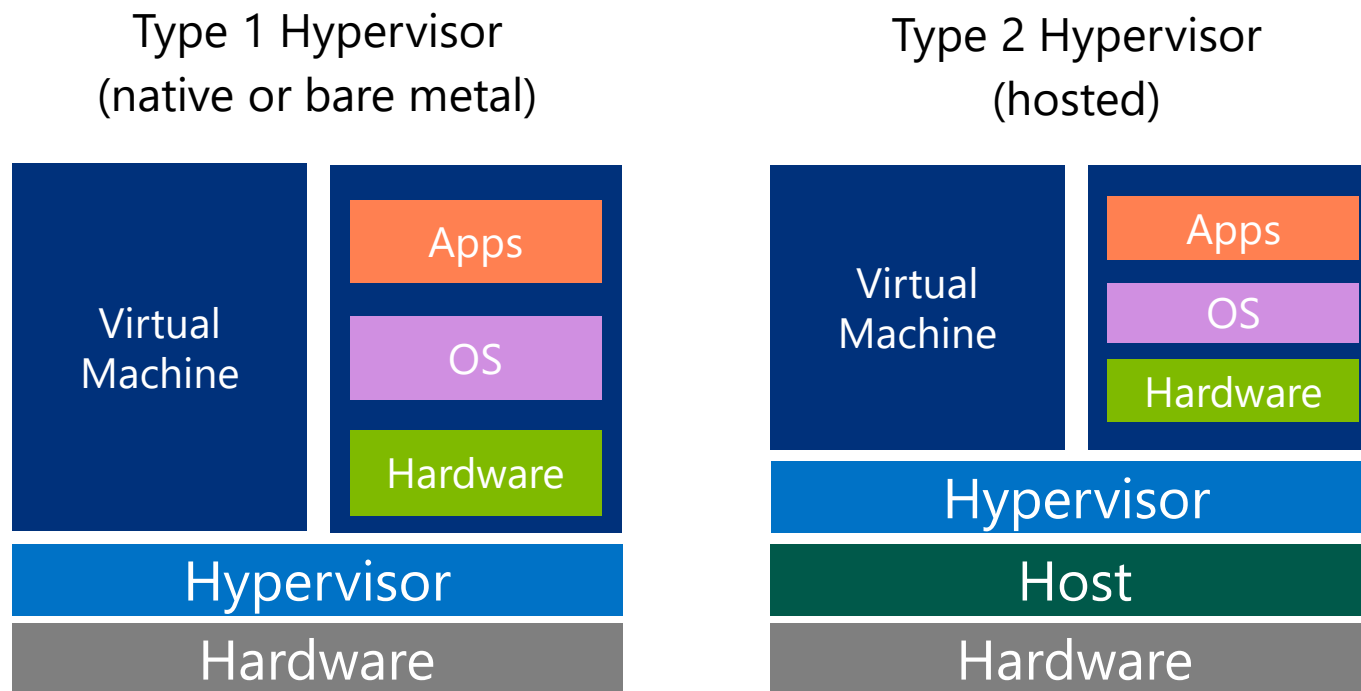
- Hyper-V
- Install Hyper-V
- Managing Hyper-V
- Nested Virtualization
- Hypervisors fear



Image source: <http://dilbert.com/stip/2010-11-19>

# Hyper-V

➔ Is the Microsoft primary platform for infrastructure virtualization.



➔ Windows 10 included the same core features as Windows Server 2012 R2 Hyper-V.

# Requirements

→ Only Educ

→ 64-bit virtual Address (DEP)

→ core

→ + 2 G

Security	
Virtualization	Item Specific Help
Intel (R) Virtualization Technology [Enabled] Intel (R) VT-d Feature [Enabled]	Intel(R) VT-d is Intel(R) Virtualization Technology for Directed I/O.
Memory Protection	Item Specific Help
Execution Prevention [Enabled]	Enabled: If your OS supports Data Execution Prevention, this setting can prevent virus/worm attacks that create memory buffer overflows by running code where only data is allowed. Disabled: Normal state Note: reset to disabled if your required applications can't run.

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# Hyper-V features in Windows 10

- ② Support 32bits and 64 Bits operations system
- ② The same managements tools from Windows Server
  - ② Hyper-V Manager
  - ② Virtual Machine Connection tools
  - ② Hyper-V module for Windows PowerShell
- ② Checkpoints
- ② Sleep and hibernate for the physical computer and its VMs
- ② Up to 64 terabytes (TB) per virtual disk
- ② Storage Migrations
  - ② Only can perform two storage migrations simultaneously.
- ② Microsoft RemoteFX graphics virtualization (Require Physical GPU)
- ② Non-Uniform Memory Access (NUMA) Spanning
- ② Nested Virtualization

# Hyper-V features in Windows 10

➔ Windows 10 Hyper-V doesn't support:

- ➔ Hyper-V Replicas
- ➔ Single-root I/O virtualization (SR- IOV)
- ➔ Virtual machine live migration
- ➔ Network virtualization

# Install Hyper-V

## → Windows feature

→ Turn Windows features on or off in Control Panel

## → Windows PowerShell

→ `Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Hyper-V -All`

## → Dism.exe

→ `dism /online /enable-feature /featurename:Microsoft-Hyper-V -All`

## → Restart is required!



# Managing Hyper-V

➔ The Hyper-V Manager Microsoft Management Console (MMC) snap-in

➔ Virtual Machine Connection tool

➔ vmconnect.exe

➔ To use dynamic resize must active 'Enhanced session mode' in Hyper-V host settings.

➔ Hyper-V module for Windows PowerShell

➔ Get-Command -Module hyper-v | Out-GridView

# Virtual Switches

- ② Hyper-V Virtual Switch is a software-based layer-2 network switch
- ② Private
  - ② Can create unlimited private virtual switches
- ② Internal
  - ② Can create unlimited Internal virtual switches
- ② External
  - ② Each external virtual switch is connected to Ethernet or wireless adapter.
- ② VLAN, DHCP Guard, Network Traffic mirroring



# Virtual Hard Disks

- ③ vhd up to 2,040 GB
- ③ vhdx up to 64 TB
  - ③ Protection against data corruption (important during power failures).
  - ③ Larger block sizes for dynamic and differential disk (improves performance).
  - ③ If is smaller than 2,040 GB can be converted to vhd.
- ③ Fixed size
- ③ Dynamically expanding
- ③ Differencing
- ③ vhds (VHD SET files) is a shared Virtual Disk model for guest clusters in Windows Server 2016.
  - ③ can only be fixed size or dynamically expanding.
  - ③ It is supported in Windows 10.
  - ③ Cannot convert vhds to vhdx.



# Virtual Machines

## ➔ Generation 1

- ➔ Use BIOS
- ➔ Use IDE Drives Controller and SCSI Disk Drive
- ➔ Can use virtual COM
- ➔ Can use Network Adapter, Legacy Network Adapter and Fibre Channel Adapter
- ➔ Can use Diskete Drive
- ➔ Only use vhd

## ➔ Generation 2

- ➔ Use UEFI firmware
- ➔ Use SCSI Drives Controller (each controller Support 64 devices)
- ➔ Can use Network Adapter and Fibre Channel Adapter
- ➔ Can use vhd or vhdx
- ➔ Fast startup
- ➔ All emulated devices are removed (Legacy network adapter ) replaced by virtual machine bus (VMBus)

# Demo Create VM

# Virtual Machines

## ➔ Windows PowerShell

```
New-VM -Name "Windows 10" -Generation 2 -MemoryStartupBytes 4GB -  
Path "C:\Demos" -NewVHDPATH "C:\Disk1.vhdx" -NewVHDSIZEBytes 20GB -  
SwitchName "Private" |
```

```
Add-VM DVD Drive -VMName "Windows 10" -Path "C:\windows10.iso" |
```

```
C:\windows\System32\vmconnect.exe localhost "Windows 10"
```



# Checkpoints

## ➔ Point-in-time snapshot of a Virtual Machine

- ➔ Only on running Virtual Machine. Doesn't work in paused.
- ➔ Apply, export, rename, delete.
- ➔ It can slow down the host (duplication data and compression by differencing file AVHDX).

## ➔ Standard Checkpoints

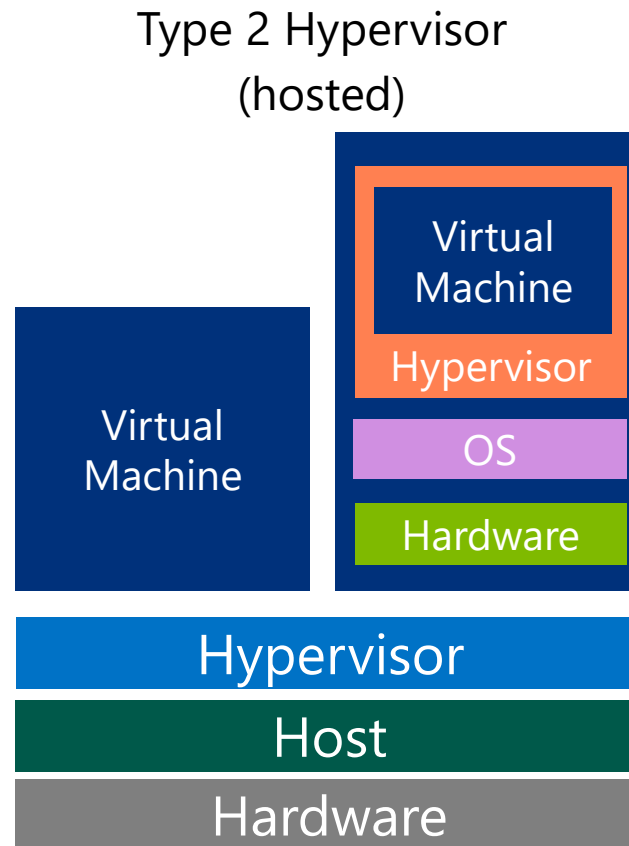
- ➔ Is for revert an earlier state, **IS NOT A FULL BACKUP!!!**
- ➔ By Default.

## ➔ Production Checkpoints

- ➔ Volume Shadow Copy Services
- ➔ Is point-in-time image similar to a backup but is not a backup.
- ➔ Memory and hardware configuration are not captured.

# Nested Virtualization

- ➔ Nested virtualization allows you to deploy Hyper-V on a supported VM.







M



Recycle Bin

Programs and Features

Control Panel > Programs > Programs and Features

Search Programs and Features

Control Panel Home

View installed updates

Turn Windows features on or off

Uninstall or change a program

Windows Features

Turn Windows features on or off

To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.

- .NET Framework 3.5 (includes .NET 2.0 and 3.0)
- .NET Framework 4.7 Advanced Services
- Active Directory Lightweight Directory Services
- Containers
- Data Center Bridging
- Device Lockdown
- Hyper-V
  - Hyper-V Management Tools
  - Hyper-V Platform
- Internet Explorer 11
- Internet Information Services (IIS)
- Internet Information Services (IIS) Web Core

Hyper-V cannot be installed: The processor does not have required virtualization capabilities.

OK Cancel

Currently installed programs Total size: 84.8 MB  
1 programs installed

ast.

→ Windows

→ Micro

→ VM

→ Enab

VMF

Exp

→ Set

→ MAC

mus

\$true

Windows taskbar with icons for Start, Search, Task View, Edge, File Explorer, Mail, Photos, and a notification area showing system tray icons, language (ENG), and date/time (12:57 PM 1/23/2018).



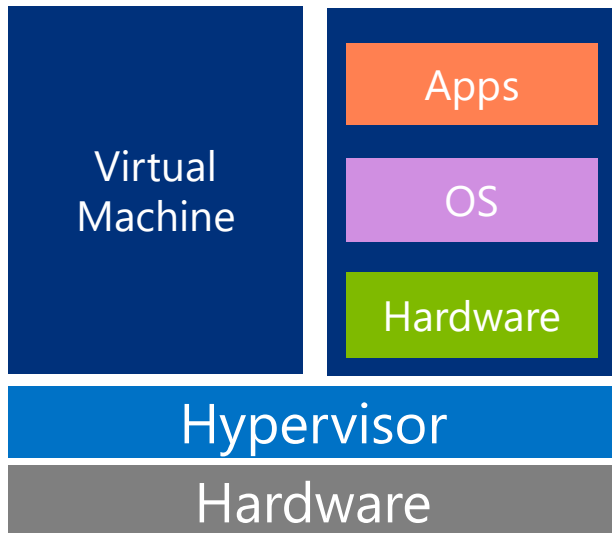
# Demo Nested Virtualization

# Hypervisors fear

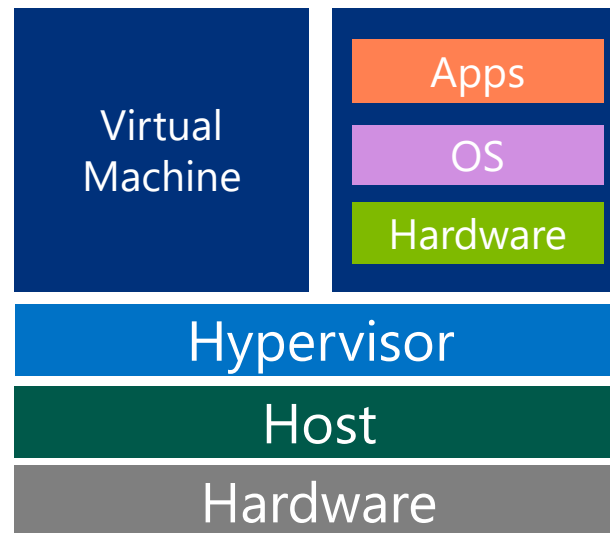
## ➔ Containers

➔ The new battle?

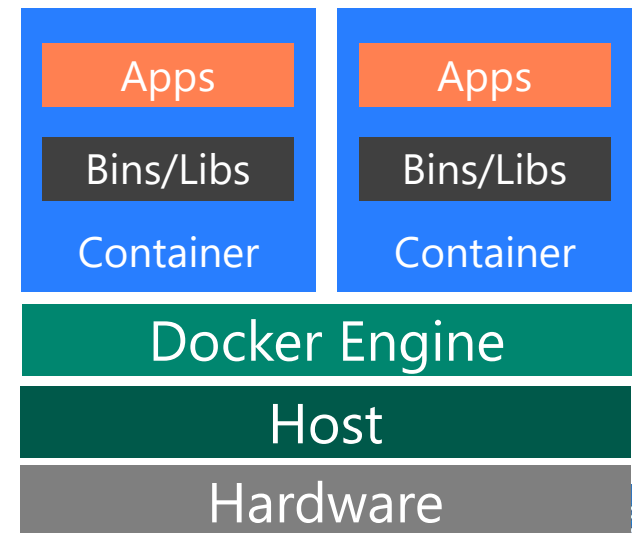
Type 1 Hypervisor  
(native or bare metal)



Type 2 Hypervisor  
(hosted)



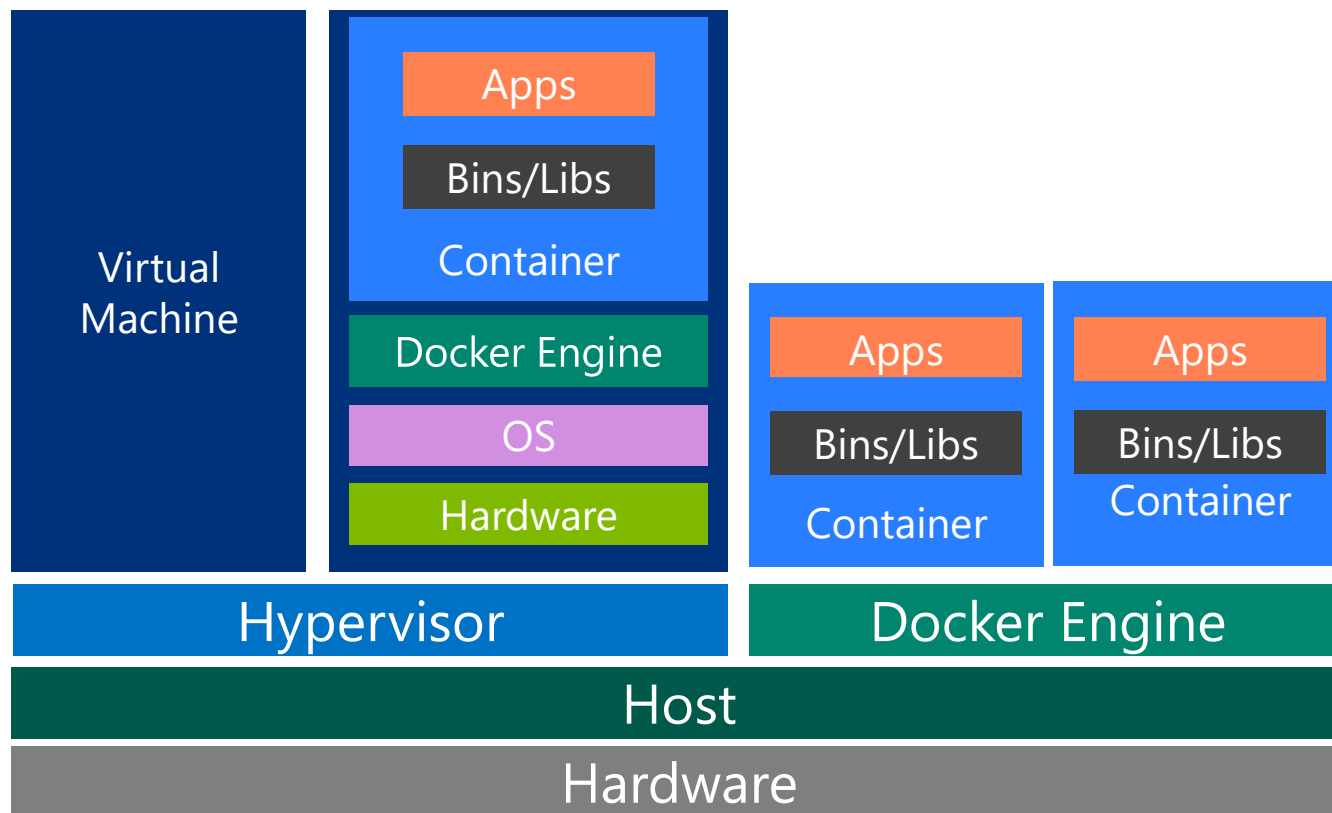
Containers



# Hypervisors fear

→ Hypervisor's and containers will coexist together?

→ YES!!!



# Security

→ Device Guard

→ Credential Guard

→ Virtual Machine Secure Boot

→ Trusted Platform Module (TPM)

→ Shielding

# Security bonus: Spectre and Meltdown

- ③ Hyper-V VM are affected by Kernel memory issue affecting multiple OS (aka F\*\*CKWIT, KAISER, KPTI, Meltdown and Spectre)
- ③ Recommended actions from Microsoft
  - ③ Apply all available Windows operating system updates
  - ③ Apply an applicable firmware update from the OEM device manufacturer.
- ③ Intel say “Don't install Intel's patches for Spectre and Meltdown chip vulnerabilities.”
  - ③ spontaneous reboots and other 'unpredictable' system behavior,
- ③ Bonus “This issue also affects other systems, such as Android, Chrome, iOS, and MacOS. Therefore, we advise customers to see guidance from those vendors.”
  - ③ Source [Microsoft](#)

# Questions?



# OS NOSSOS PATROCINADORES / PARCEIROS





# Thank You!

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