FUTURE DECODED

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#FutureDecoded

Windows Server 2016: le novità di Hyper-V

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Agenda

Shielded VM

Virtual TPM

Key Storage Drive su Generation 1

VM Isolation

Linux Secure Boot

Discrete Device Assignment

Supporto a ReFS

Virutal Machine groups

Nested Virtualization

Custer Update

Cluster Node Quarantine

Cluster Compute Resiliency

Aggiunta NIC a caldo

Production Checkpoint

Memory Resize

Direct Device Assignment

Hyper-V Container

File VMCX

VHDS e Backup

Nano Server

A new headless, 64-bit only, deployment option for Windows Server

Deep refactoring with cloud emphasis

Cloud fabric & infrastructure (clustering, storage, networking)

Born-in-the-cloud applications (PaaS v2, ASP.NET v5)

VMs & Containers (Hyper-V & Docker)
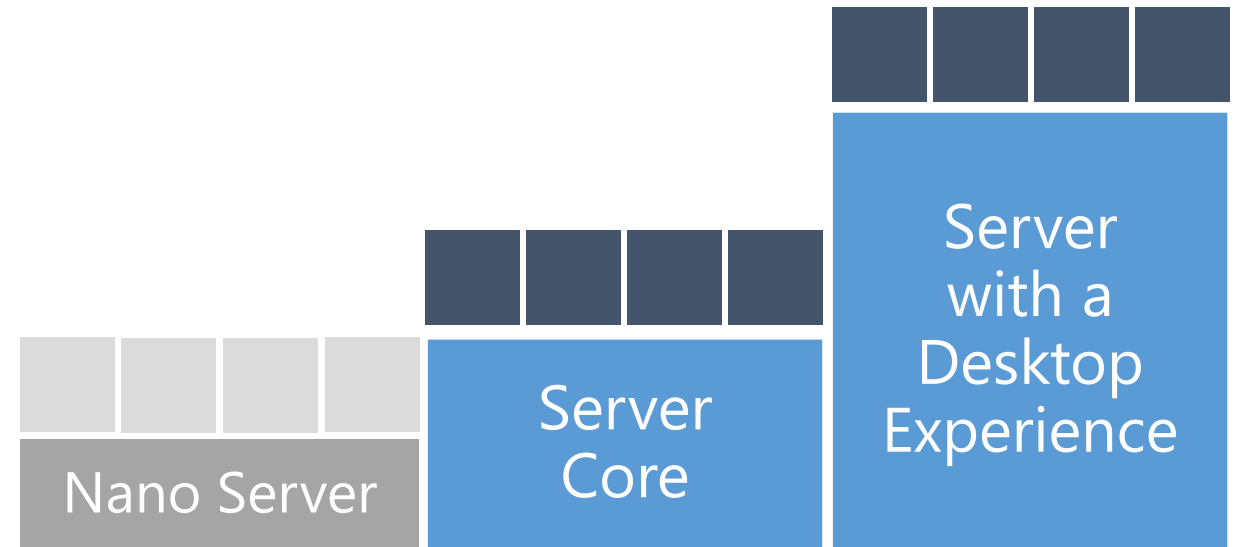
Extend the Server Core pattern

Roles & features live outside of Nano Server

No Binaries or metadata in OS image

Standalone packages install like apps

Full driver support

Antimalware

Nano Server

Server Core

Server with a Desktop Experience

Component	Maximum	Notes
Logical processors	512	Both of these must be enabled in the firmware: - Hardware-assisted virtualization - Hardware-enforced Data Execution Prevention (DEP)
Memory	24 TB	None.
Network adapter teams (NIC Teaming)	No limits imposed by Hyper-V.	For details, see NIC Teaming.
Physical network adapters	No limits imposed by Hyper-V.	None.
Running virtual machines per server	1024	None.
Storage	Limited by what is supported by the host operating system. No limits imposed by Hyper-V.	Note: Microsoft supports network-attached storage (NAS) when using SMB 3.0. NFS-based storage is not supported.
Virtual network switch ports per server	Varies; no limits imposed by Hyper-V.	The practical limit depends on the available computing resources.
Virtual processors per logical processor	No ratio imposed by Hyper-V.	None.
Virtual processors per server	2048	None.
Virtual storage area networks (SANs)	No limits imposed by Hyper-V.	None.
Virtual switches	Varies; no limits imposed by Hyper-V.	The practical limit depends on the available computing resources.

https://technet.microsoft.com/en-us/windows-server-docs/compute/hyper-v/plan/plan-for-hyper-v-scalability-in-windows-server-2016
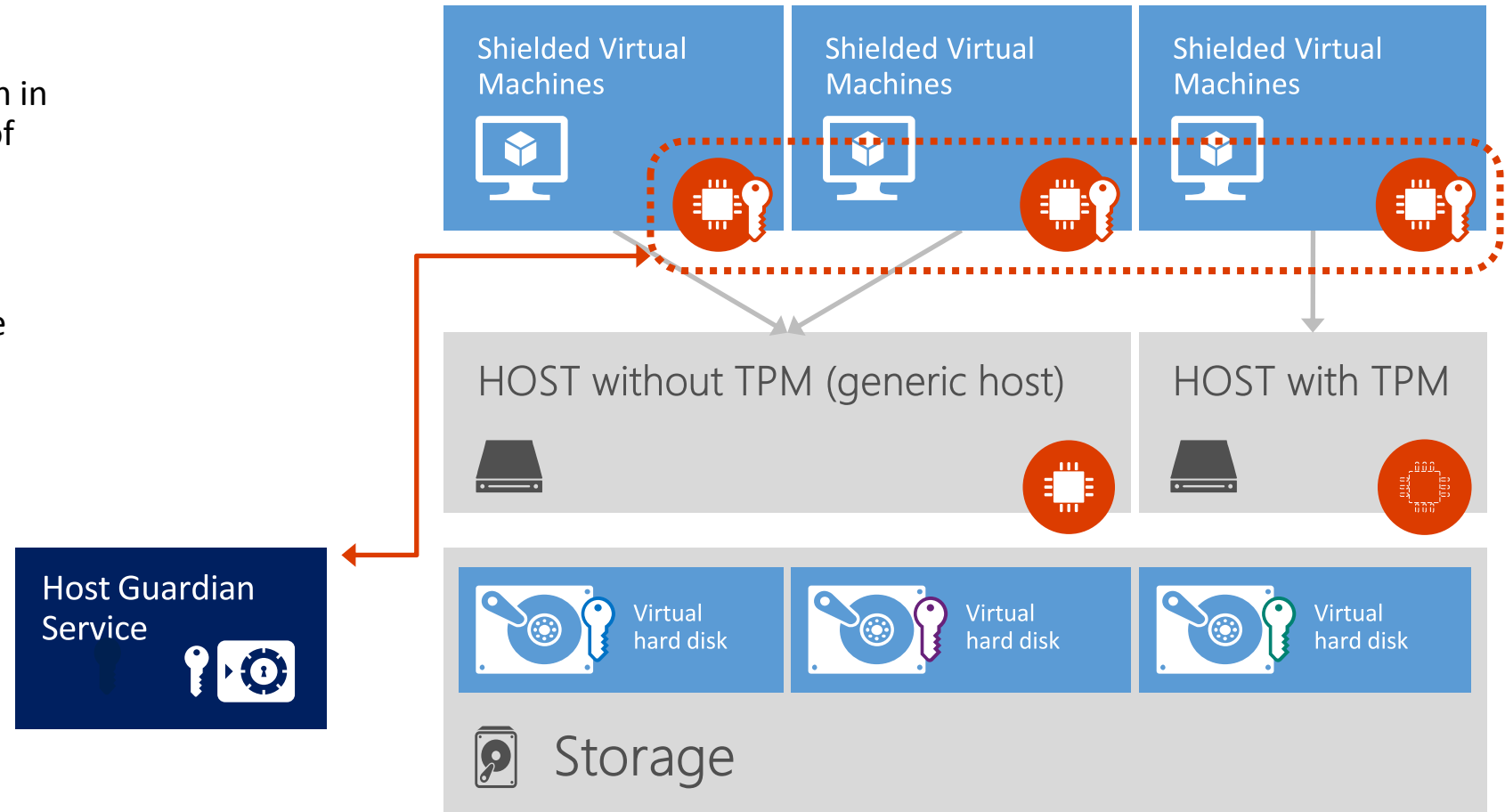
Component	Maximum	Notes
Checkpoints	**50**	The actual number may be lower, depending on the available storage. Each checkpoint is stored as an .avhd file that uses physical storage.
Memory	**12 TB for generation 2; 1 TB for generation 1**	Review the requirements for the specific operating system to determine the minimum and recommended amounts.
Serial (COM) ports	2	None.
Size of physical disks attached directly to a virtual machine	Varies	Maximum size is determined by the guest operating system.
Virtual Fibre Channel adapters	4	As a best practice, we recommended that you connect each virtual Fibre Channel Adapter to a different virtual SAN.
Virtual floppy devices	1 virtual floppy drive	None.
Virtual hard disk capacity	64 TB for VHDX format; 2040 GB for VHD format	Each virtual hard disk is stored on physical media as either a .vhdx or a .vhd file, depending on the format used by the virtual hard disk.
Virtual IDE disks	4	The startup disk (sometimes called the boot disk) must be attached to one of the IDE devices. The startup disk can be either a virtual hard disk or a physical disk attached directly to a virtual machine.
Virtual processors	**240 for generation 2; 64 for generation 1**	The number of virtual processors supported by a guest operating system might be lower. For details, see the information published for the specific operating system.
Virtual SCSI controllers	4	Use of virtual SCSI devices requires integration services, which are available for supported guest operating systems. For details on which operating systems are supported, see Supported Linux and FreeBSD virtual machines and Supported Windows guest operating systems.
Virtual SCSI disks	256	Each SCSI controller supports up to 64 disks, which means that each virtual machine can be configured with as many as 256 virtual SCSI disks. (4 controllers x 64 disks per controller)
Virtual network adapters	12 total: - **8 Hyper-V specific network adapters** - 4 legacy network adapters	The Hyper-V specific network adapter provides better performance and requires a driver included in integration services. For more information, see Plan for Hyper-V networking in Windows Server 2016.

Shielded VMs

Shielded Virtual Machines can only run in fabrics that are designated as owners of that virtual machine

Shielded Virtual Machines will need to be **encrypted** (by **BitLocker** or other means) in order to ensure that only the designated owners can run this virtual machine
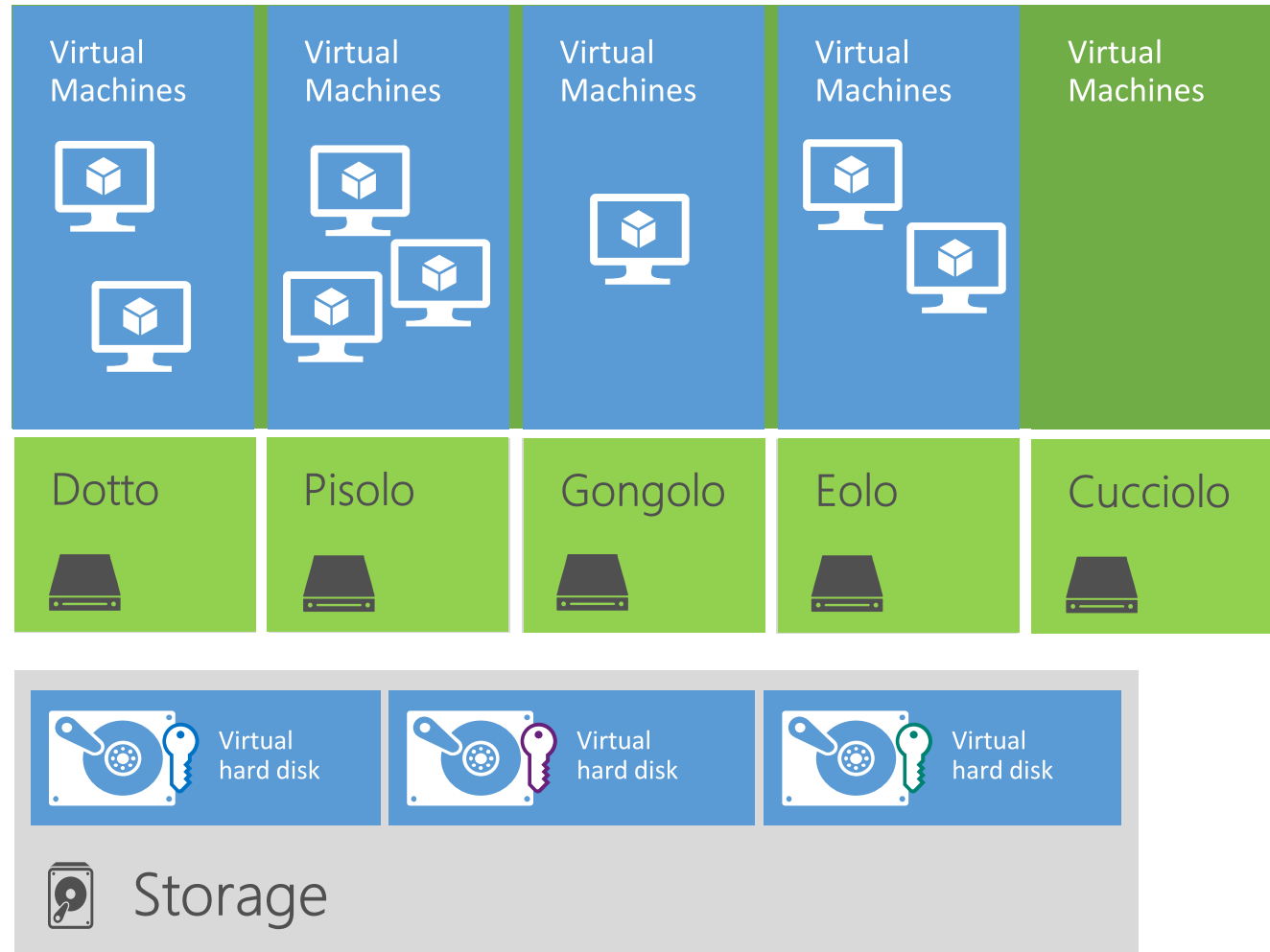
You can **convert** a **running virtual machine** into a Shielded Virtual Machine

Shielded Virtual Machines

Shielded Virtual Machines

Shielded Virtual Machines

HOST without TPM (generic host)

HOST with TPM

Host Guardian Service

Virtual hard disk

Virtual hard disk

Virtual hard disk

Storage

Upgrade

Road to Windows Server 2016 Cluster

- Install a new node of migrate an old one

- Migrate VMs to the other nodes

- Upgrade or reinstal it as 2016

- Keep going

- You're done and happy! ☺

Virtual Machines	Virtual Machines	Virtual Machines	Virtual Machines	Virtual Machines
Dotto	Pisolo	Gongolo	Eolo	Cucciolo

Virtual hard disk   Virtual hard disk   Virtual hard disk

Storage

Virtual Machine Upgrade

Compatibility mode: When a VM is migrated to a Windows Server 2016 host, it will remain in Windows Server 2012 R2 compatibility mode.

Upgrading a VM is separate from upgrading host.

VMs can be moved back to earlier versions until they have been manually upgraded.

`Update-VMVersion vmname`

Once upgraded, VMs can take advantage of new features of the underlying Hyper-V host.

Servicing model: VM drivers (integration services) updated as necessary.

Updated VM drivers will be pushed directly to guest operating system via Windows Update.

By running `Update-VMVersion`,
VM will be upgraded to newest hardware version
and can use the new Hyper-V features

v5 v5 v5 v5   v6 v6 v6 v6
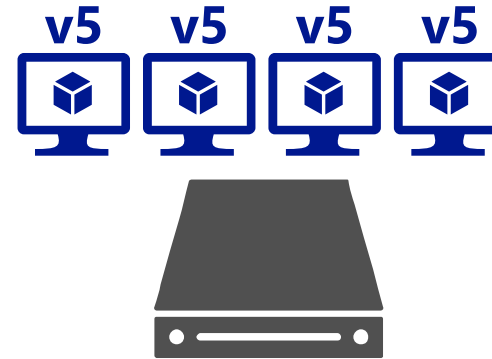
Windows Server 2012 R2 Hyper-V
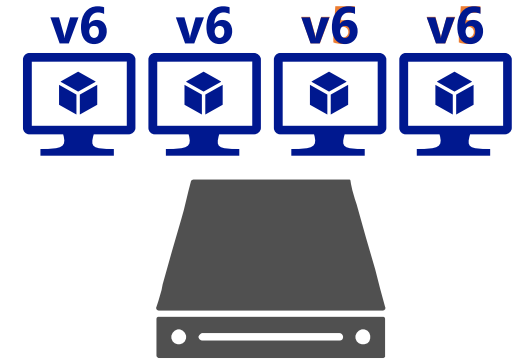
Windows Server 2016 Hyper-V

VM Storage Resiliency

Resiliency	Designing for cloud scale with commodity hardware Preserve tenant VM session state in the event of transient storage disruption
Visibility	VM stack quickly notified on failure Intelligent and quick VM response to block or file based storage infrastructure issues
Reliability	VM moved to PausedCritical state and will wait for storage to recover Session state retained on recovery
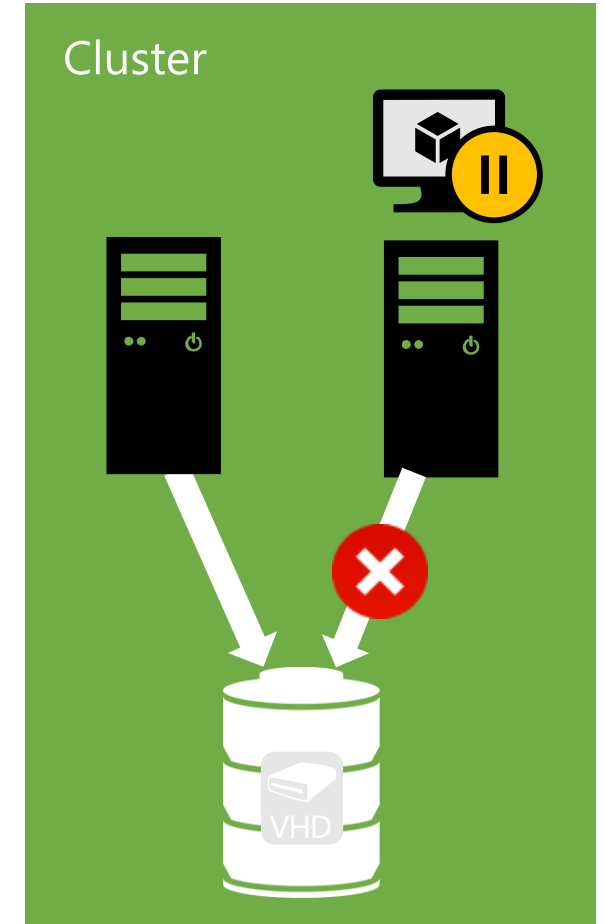
Cluster

New Backup for Hyper-V

No VSS in Host

Avoids creation of SAN snapshot for each virtual machine in a cluster when backing up.

Native Change Block API

Efficient, guaranteed by Microsoft, no more kernel mode drivers needed for backup.

Ecosystem Supported

All backup partners working to support now that reached GA. Key for backup on Nano.
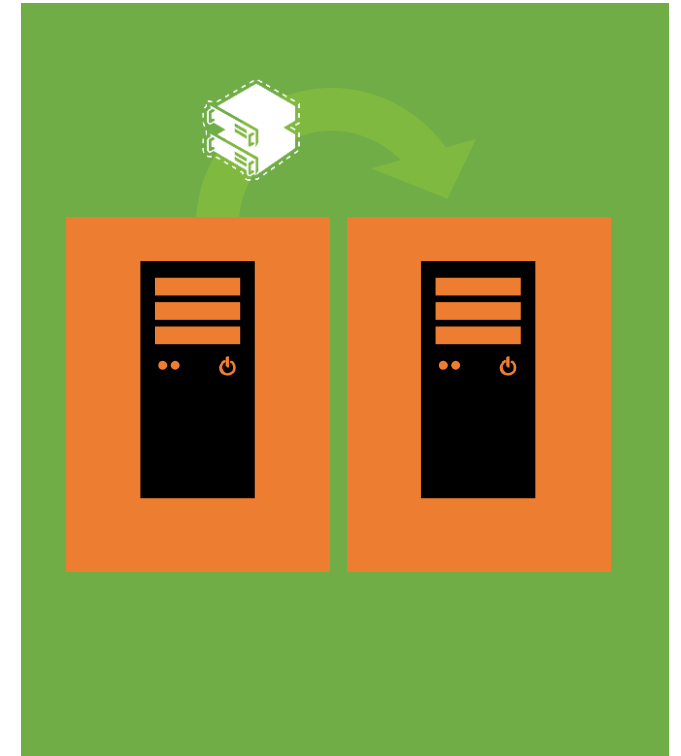
Shared VHDX Integration

VHDX Resize

Guest Clusters can now resize Shared VHDX without downtime

Hyper-V Replica

Guest Clusters can now have Shared VHDX protected by Hyper-V Replica for disaster recovery

Host Level Backup

Guest Clusters can now have host level backups in addition to guest level backups of Shared VHDX

Guest Cluster

Shared VHDX
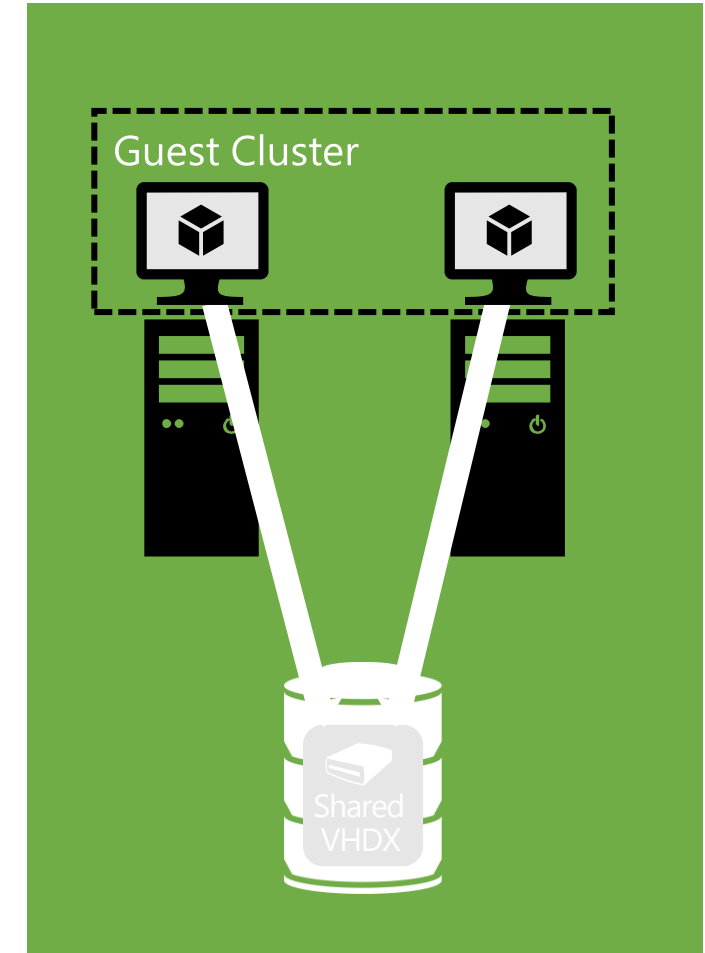
Online VM Configuration Changes

Network

Network adapters can be added and removed from Generation 2 virtual machines while they are running

Memory

For Windows Server 2016 / Windows 10 guests, you can now increase and decrease the memory assigned to virtual machines while they are running.

Replicated Disks

When you add a new virtual hard disk to a virtual machine that is being replicated – it is automatically added to the not-replicated set. This set can be updated online.
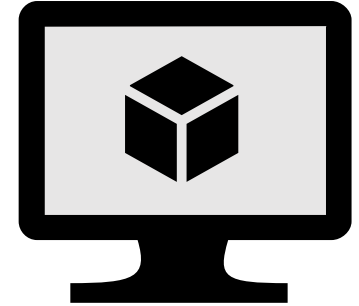
Production checkpoints
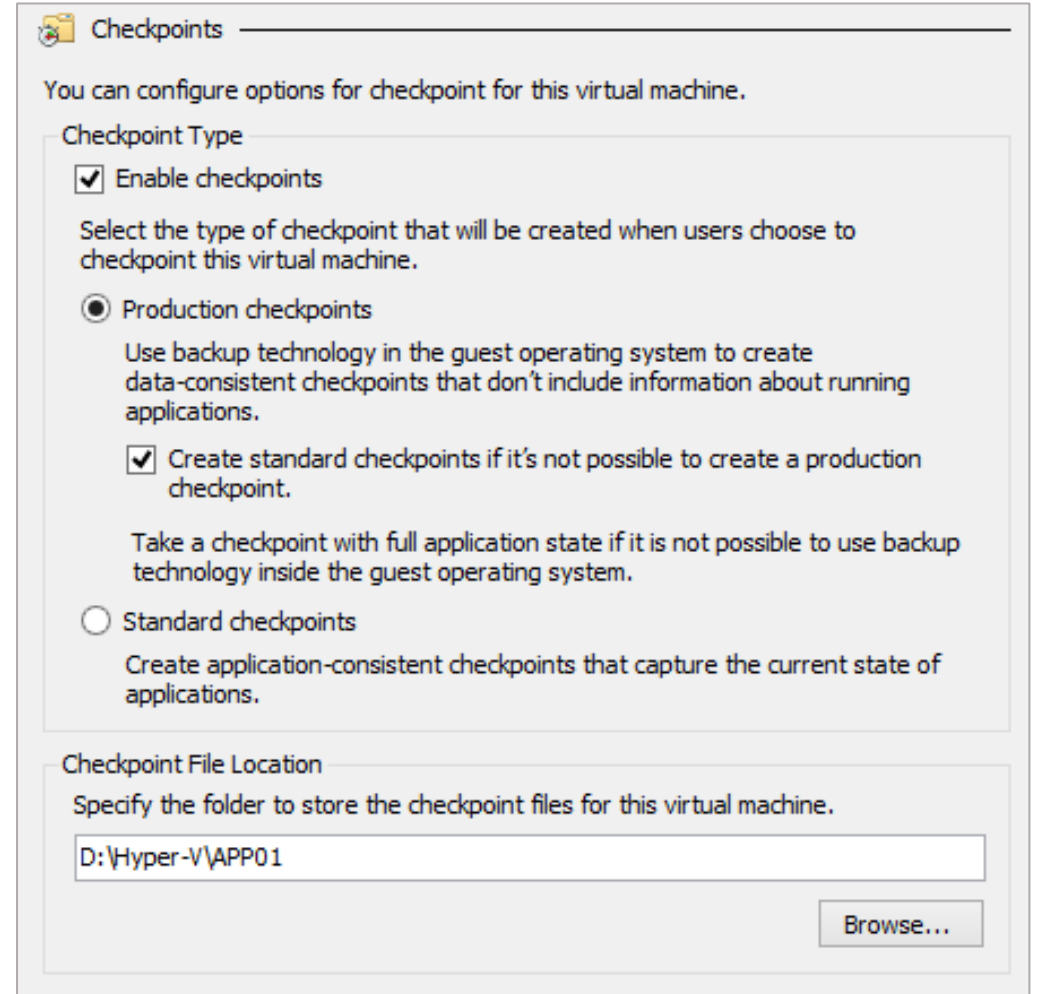
Full support for key workloads: Easily create "point in time" images of a virtual machine, which can be restored later on in a way that is completely supported for all production workloads.

VSS: Volume Snapshot Service (VSS) is used inside Windows virtual machines to create the production checkpoint instead of using saved state technology.

Familiar: No change to user experience for taking/restoring a checkpoint. Restoring a checkpoint is like restoring a clean backup of the server.

Linux: Linux virtual machines flush their file system buffers to create a file system consistent checkpoint.

Production as default: New virtual machines will use production checkpoints with a fallback to standard checkpoints.

PowerShell Direct

- `Enter-PSSession -VMName VMName`

- `Invoke-Command -VMName VMName`
  `-ScriptBlock {Get-Blablabla}`

Domande?

Materiale su
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