

VHDX Storage Explained

Fixed, dynamic and differencing disks, resizing, converting and mounting.

01 What it is

A VHDX is the file Hyper-V uses as a virtual hard disk. It supports up to 64 TB, protects against power-failure corruption and aligns well with modern disks. The older VHD format is limited to 2040 GB.

02 Why it matters in a UAE IT job

Disk space and performance are two of the biggest causes of VM problems. Understanding disk types lets you plan capacity and fix full disks.

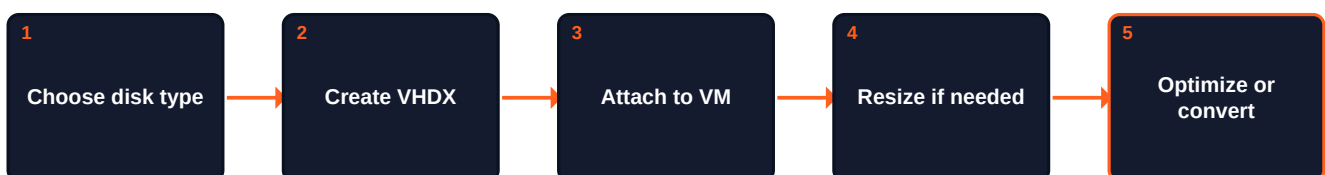
Growing a disk, converting formats and mounting a VHDX to recover files are common sysadmin jobs.

03 Key terms

Term	Meaning
Fixed	Allocates the full size at once. Predictable performance.
Dynamically expanding	Starts small and grows as data is written. Saves space but can be overcommitted.
Differencing	A child disk that stores only changes from a parent. Checkpoints use this idea.
VHD vs VHDX	VHDX is newer, larger (64 TB) and more resilient than VHD (2040 GB).
Compact / Optimize	Reclaims unused space in a dynamic disk after the VM is off.
Pass-through disk	A physical disk given directly to a VM. Less common now.
Mount	Attach a VHDX to the host as a drive to read or change its files.

04 How it works

Use fixed disks for heavy workloads like databases where steady speed matters, and dynamic disks for labs and general servers. To grow a disk, resize the VHDX and then extend the volume inside the guest. To shrink, first shrink the volume inside the guest, then resize the VHDX. Always make sure the VM is off or the disk is not in use when optimising or converting.



Resizing is a two-step job: the file, then the volume inside.

05 Hands-on lab

Goal: practise creating, resizing, converting and mounting disks with PowerShell. Use a folder such as D:\VMs and fictional file names. Run PowerShell as administrator.

Step 1. Create a 20 GB dynamic VHDX.

```
New-VHD -Path D:\VMs\data01.vhdx -SizeBytes 20GB -Dynamic
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> New-VHD -Path D:\VMs\data01.vhdx -SizeBytes 20GB -Dynamic
ComputerName      : LAB-HOST01
Path              : D:\VMs\data01.vhdx
VhdFormat         : VHDX
VhdType           : Dynamic
FileSize          : 4194304
Size              : 21474836480
MinimumSize       :
LogicalSectorSize : 512
PhysicalSectorSize : 4096
BlockSize         : 33554432
ParentPath        :
DiskIdentifier     : 7C1E4A52-98B3-4D06-B2F1-5A3E8D90C417
FragmentationPercentage : 0
Alignment         : 1
Attached          : False
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 2. Attach it to a VM.

```
Add-VMHardDiskDrive -VMName LAB-SRV01 -Path D:\VMs\data01.vhdx
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> Add-VMHardDiskDrive -VMName LAB-SRV01 -Path D:\VMs\data01.vhdx
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 3. Increase it to 30 GB while the VM is off or the disk is online if supported.

```
Resize-VHD -Path D:\VMs\data01.vhdx -SizeBytes 30GB
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> Resize-VHD -Path D:\VMs\data01.vhdx -SizeBytes 30GB
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 4. Stop the VM first, because Convert-VHD, Mount-VHD and Optimize-VHD need a disk that is not in use.

```
Stop-VM LAB-SRV01
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> Stop-VM LAB-SRV01
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 5. Convert it to a fixed disk copy.

```
Convert-VHD -Path D:\VMs\data01.vhdx -DestinationPath D:\VMs\data01-fixed.vhdx
-VHDType Fixed
```

```
Administrator: Windows PowerShell - [ ] x
PS C:\Users\LabAdmin> Convert-VHD -Path D:\VMs\data01.vhdx -DestinationPath D:\VMs\data01-fixed.vhdx -VHDType Fixed
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 6. Mount it on the host to view files, then dismount.

```
Mount-VHD D:\VMs\data01.vhdx -ReadOnly; Dismount-VHD D:\VMs\data01.vhdx
```

```
Administrator: Windows PowerShell - [ ] x
PS C:\Users\LabAdmin> Mount-VHD D:\VMs\data01.vhdx -ReadOnly; Dismount-VHD D:\VMs\data01.vhdx
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 7. Compact a dynamic disk after deleting files inside (VM off).

```
Optimize-VHD -Path D:\VMs\data01.vhdx -Mode Full
```

```
Administrator: Windows PowerShell - [ ] x
PS C:\Users\LabAdmin> Optimize-VHD -Path D:\VMs\data01.vhdx -Mode Full
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

06 Common mistakes

- Resizing the VHDX but forgetting to extend the volume inside the guest.
- Running out of host space because dynamic disks grew.
- Deleting an AVHDX file manually and breaking the VM.
- Using a pass-through disk where a VHDX would do.
- Converting a disk while the VM is running.

07 Five interview questions

1. VHD or VHDX?

VHDX. It supports up to 64 TB and has better resilience and performance than VHD, which is limited to 2040 GB.

2. Fixed or dynamic?

Fixed for steady-performance workloads. Dynamic to save space in labs and general use, with care for overcommitment.

3. How do you expand a VM's disk?

Resize the VHDX with Resize-VHD or the console, then extend the volume in Disk Management inside the guest.

4. What is a differencing disk?

A child disk that stores only changes from a parent disk. Checkpoints rely on the same idea.

5. How can you recover a file from a VM disk without starting the VM?

Mount the VHDX on the host with Mount-VHD or Disk Management and copy the file out.

08 Check yourself

1. Which format supports 64 TB?

- a) VHD
- b) VHDX
- c) ISO

2. Which disk grows as data is written?

- a) Fixed
- b) Optical
- c) Dynamic

3. After resizing the VHDX you must?

- a) Extend the volume in the guest
- b) Reboot the router
- c) Reinstall Windows

4. Which cmdlet resizes?

- a) Grow-Disk
- b) Stretch-VM
- c) Resize-VHD

5. A checkpoint creates which file?

- a) PDF
- b) AVHDX
- c) EXE

Answer key: 1-b, 2-c, 3-a, 4-c, 5-b

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