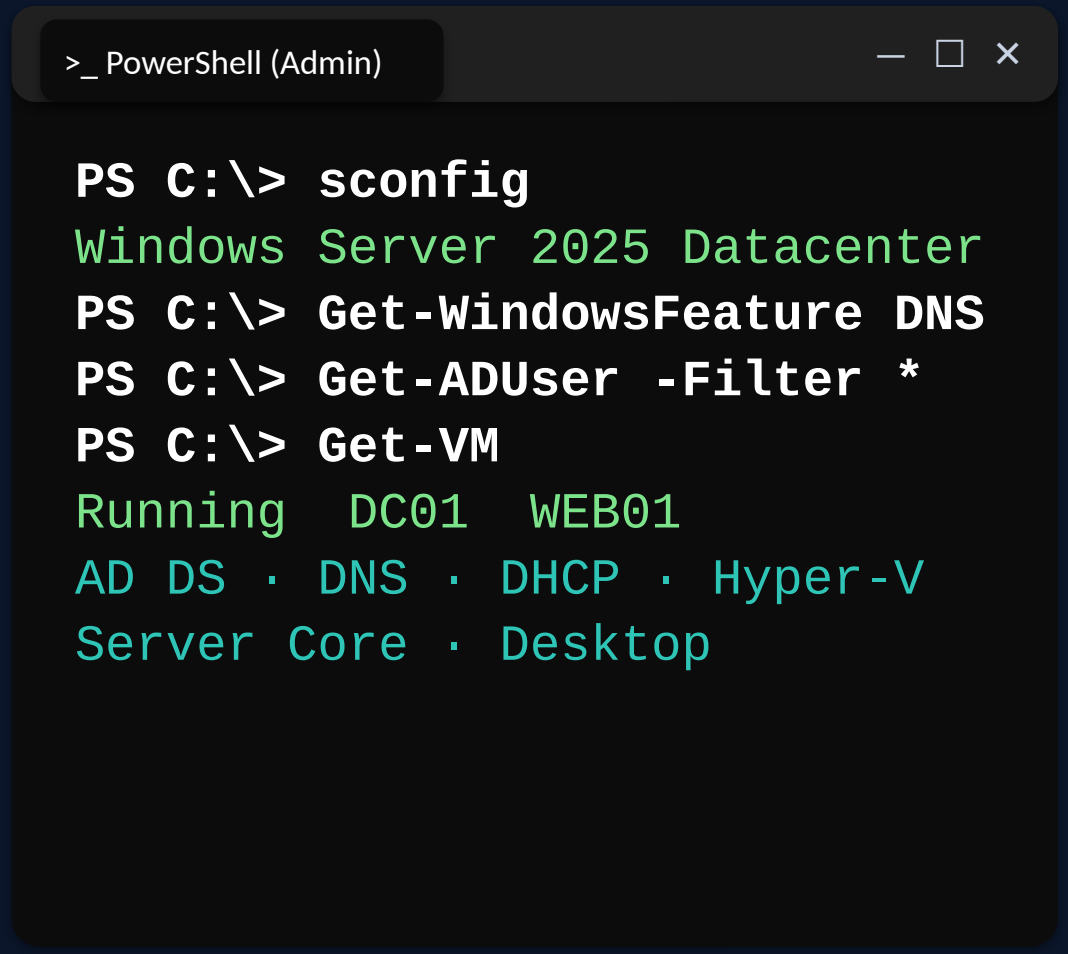


LESSON 8 OF 12

Windows Server 2025

Install · AD · Hyper-V · Admin

File Services and Storage: SMB, DFS, Storage Spaces & ReFS

Full Course · Windows Server 2025 (build 26100)

What You Will Learn in Lesson 8

- File server roles and features
- Creating SMB shares, and the share + NTFS permission model
- SMB security in Windows Server 2025
- DFS Namespaces and DFS Replication
- File Server Resource Manager: quotas and file screens
- Shadow copies (Previous Versions)
- Storage Spaces, ReFS and data deduplication

File Server Roles and Features

Feature	Name for Install-WindowsFeature	Purpose
File Server	FS-FileServer	SMB shares
DFS Namespaces	FS-DFS-Namespace	One path for shares on many servers
DFS Replication	FS-DFS-Replication	Keep folders in sync between servers
File Server Resource Manager	FS-Resource-Manager	Quotas, file screens, reports
Data Deduplication	FS-Data-Deduplication	Store repeated data only once
iSCSI Target Server	FS-iSCSITarget-Server	Offer disks over the network

Create the Teachers and Students Shares

```
# On SRV01 (a second data disk D: is recommended)
PS C:\> Install-WindowsFeature FS-FileServer, FS-Resource-Manager, FS-DFS-Namespace `
            -IncludeManagementTools
PS C:\> New-Item D:\Shares\Teachers, D:\Shares\Students -ItemType Directory

PS C:\> New-SmbShare -Name Teachers -Path D:\Shares\Teachers `
            -FullAccess 'LAB\Domain Admins' -ChangeAccess 'LAB\Domain Users' `
            -FolderEnumerationMode AccessBased
PS C:\> New-SmbShare -Name Students -Path D:\Shares\Students `
            -FullAccess 'LAB\Domain Admins' -ChangeAccess 'LAB\Domain Users' -FolderEnumerationMode
AccessBased
PS C:\> Get-SmbShare | Where-Object Special -eq $false
```

NTFS Permissions with AGDLP

```
PS C:\> icacls D:\Shares\Teachers /inheritance:r                    # stop inheriting
PS C:\> icacls D:\Shares\Teachers /grant 'SYSTEM:(OI)(CI)F' 'LAB\Domain Admins:(OI)(CI)F'
PS C:\> icacls D:\Shares\Teachers /grant 'LAB\DL_Share_Teachers_Modify:(OI)(CI)M'
PS C:\> icacls D:\Shares\Teachers

PS C:\> Get-SmbShareAccess Teachers
# Effective access = the MORE RESTRICTIVE of share and NTFS permissions
# Check one user: folder Properties > Security > Advanced > Effective Access
```

SMB Security in Windows Server 2025

Feature	What it does
SMB signing required	On by default: protects against tampering and relay attacks
SMB encryption	Encrypt a share or the whole server (SMB 3)
SMB over QUIC	Secure file access over the internet without a VPN — in all editions
SMB1	Removed — never reinstall it
Access-based enumeration	Users see only folders they can open
Auditing	Track who opened, changed or deleted files

Inspect and Harden SMB

```
PS C:\> Get-SmbServerConfiguration |
          Select-Object RequireSecuritySignature, EncryptData, EnableSMB1Protocol
PS C:\> Set-SmbShare -Name Teachers -EncryptData $true -Force

PS C:\> Get-SmbSession | Select-Object ClientComputerName, ClientUserName, NumOpens
PS C:\> Get-SmbOpenFile | Select-Object ClientUserName, Path
PS C:\> Get-SmbOpenFile | Where-Object Path -like '*report.docx' | Close-SmbOpenFile -Force

# On CL01 as a teacher:  net use S: \\SRV01\Teachers   (or the GPO drive map from Lesson 6)
```

DFS Namespaces: One Path for Everything

```
PS C:\> New-Item C:\DFSRoots\Shares -ItemType Directory
PS C:\> New-SmbShare -Name Shares -Path C:\DFSRoots\Shares -ReadAccess 'LAB\Domain Users'
PS C:\> New-DfsnRoot -Path \\lab.mywebuniversity.local\Shares `
           -TargetPath \\SRV01\Shares -Type DomainV2
PS C:\> New-DfsnFolder -Path \\lab.mywebuniversity.local\Shares\Teachers -TargetPath \\SRV01\Teachers
PS C:\> New-DfsnFolder -Path \\lab.mywebuniversity.local\Shares\Students -TargetPath \\SRV01\Students
PS C:\> Get-DfsnFolder -Path '\\lab.mywebuniversity.local\Shares\*'

# Users map \\lab.mywebuniversity.local\Shares — move data to new servers without changing paths
# DFS Replication (FS-DFS-Replication) keeps copies in sync for branch offices
```

FSRM Quotas, File Screens and Shadow Copies

```
PS C:\> New-FsrmQuota -Path D:\Shares\Students -Size 5GB -Description 'Student share limit'
PS C:\> New-FsrmAutoQuota -Path D:\Shares\Students\Home -Template '200 MB Limit Reports to User'
PS C:\> New-FsrmFileScreen -Path D:\Shares\Students -Template 'Block Executable Files'
PS C:\> Get-FsrmQuota | Select-Object Path, Size, Usage

# Shadow copies (Previous Versions) on the data volume:
C:\> vssadmin add shadowstorage /for=D: /on=D: /maxsize=10%
C:\> vssadmin create shadow /for=D:
# GUI: D: Properties > Shadow Copies > Enable (twice a day by default)
# Users: right-click a file > Restore previous versions
```

Storage Spaces, ReFS and Deduplication

Feature	What it gives you
Storage pool	Combine many physical disks into one pool
Virtual disk resiliency	Simple (no protection), Mirror (copies), Parity (space-efficient)
ReFS	Resilient File System: integrity checks, great for Hyper-V and backup data
Data Deduplication	Saves 30-90% on file shares, VDI and backups
Storage Spaces Direct	Datacenter: pool local disks of a cluster (hyper-converged)
NVMe	Faster NVMe storage performance in 2025

Lab: A Mirrored ReFS Volume with Deduplication

```
# On the Hyper-V host: give SRV01 two extra disks
PS C:\> 1..2 | ForEach-Object { New-VHD C:\VMs\SRV01-Data$_.vhdx -SizeBytes 40GB -Dynamic |
           Out-Null; Add-VMHardDiskDrive SRV01 -Path C:\VMs\SRV01-Data$_.vhdx }

# On SRV01:
PS C:\> New-StoragePool -FriendlyName Pool1 -StorageSubSystemFriendlyName 'Windows Storage*' `
           -PhysicalDisks (Get-PhysicalDisk -CanPool $true)
PS C:\> New-VirtualDisk -StoragePoolFriendlyName Pool1 -FriendlyName Data `
           -ResiliencySettingName Mirror -UseMaximumSize |
         Get-Disk | Initialize-Disk -PassThru | New-Partition -DriveLetter E -UseMaximumSize |
         Format-Volume -FileSystem ReFS -NewFileSystemLabel Data
PS C:\> Install-WindowsFeature FS-Data-Deduplication ; Enable-DedupVolume E: -UsageType Default
```

Summary & Homework

- Share permissions broad; real control with NTFS and AGDLP groups
- SMB signing on by default; encrypt sensitive shares; SMB1 never
- DFS Namespaces: one domain path; servers can change behind it
- FSRM quotas and file screens; shadow copies for self-service restore
- Storage Spaces mirror + ReFS + deduplication for resilient storage
- Homework: build the Teachers/Students shares, DFS and a quota

Thank You! 🙏

Free videos & PDFs: www.MyWebUniversity.com

Slides for this lesson: MyWebUniversity.com/presentations

YouTube: @MyWebUniversity · @MyWebUniversity-Dari

Wahidullah Lutfy — Founder and Director of IT of MyWebUniversity, and CS teacher

Book: The Direct Path to Linux Ubuntu (Amazon · Barnes & Noble)

Learn it, then pass it on.