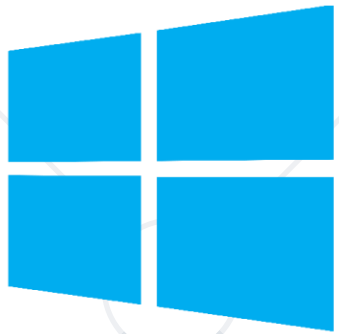


Additional Services

File and Storage Services. Remote Access and Management

Print and Document Services



Windows Server

SoftUni Team
Technical Trainers



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Software University

<https://softuni.bg>

Have a Question?

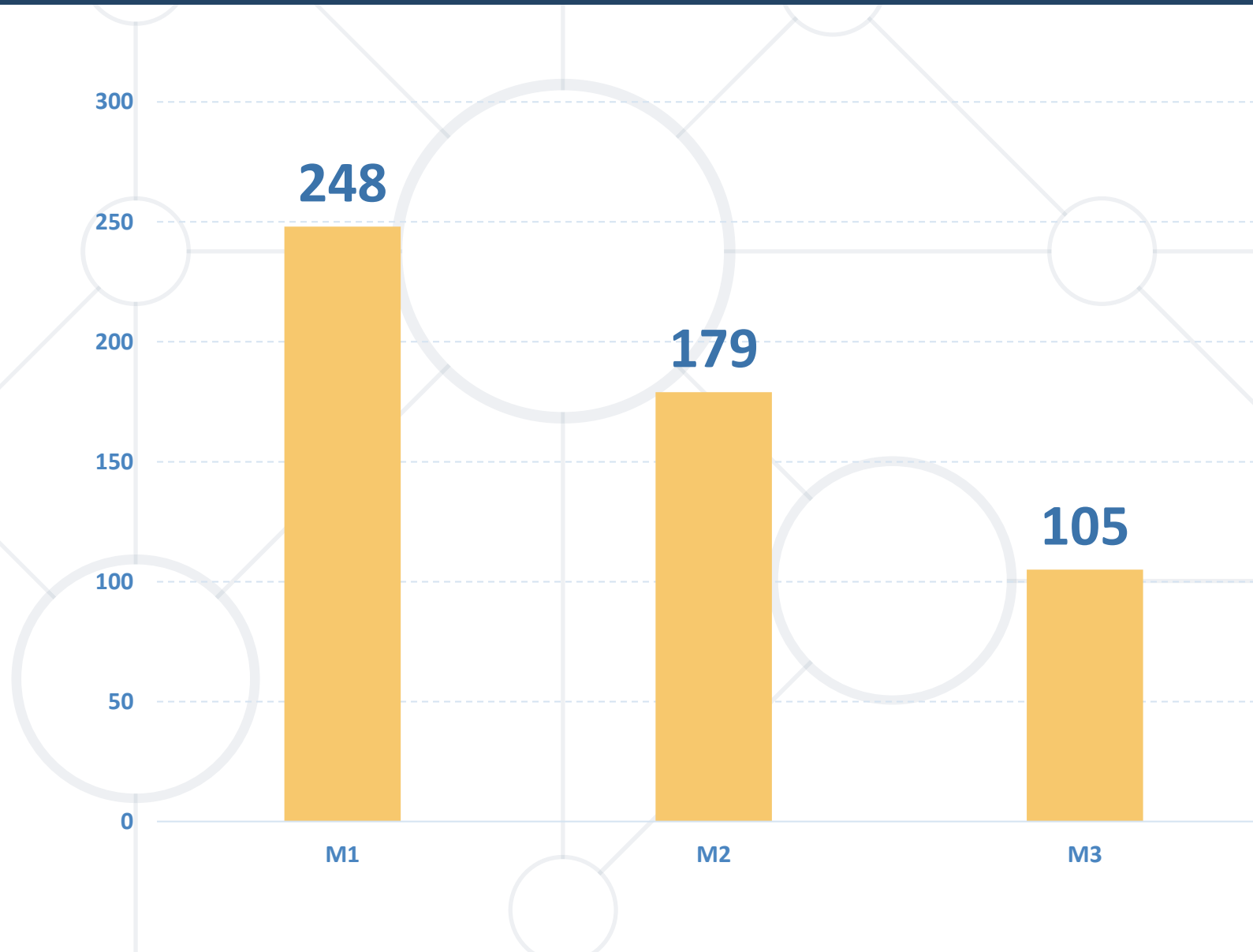
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WindowsSystemAdministrationMarch2023/

Homework Progress



Submit M3
until 23:59:59
on 21.04.2023

Submit M4
until 23:59:59
on 28.04.2023



Previous Module (M3)

Quick overview

What We Covered

- Active Directory Fundamentals
- Configuring Active Directory
- Managing Active Directory



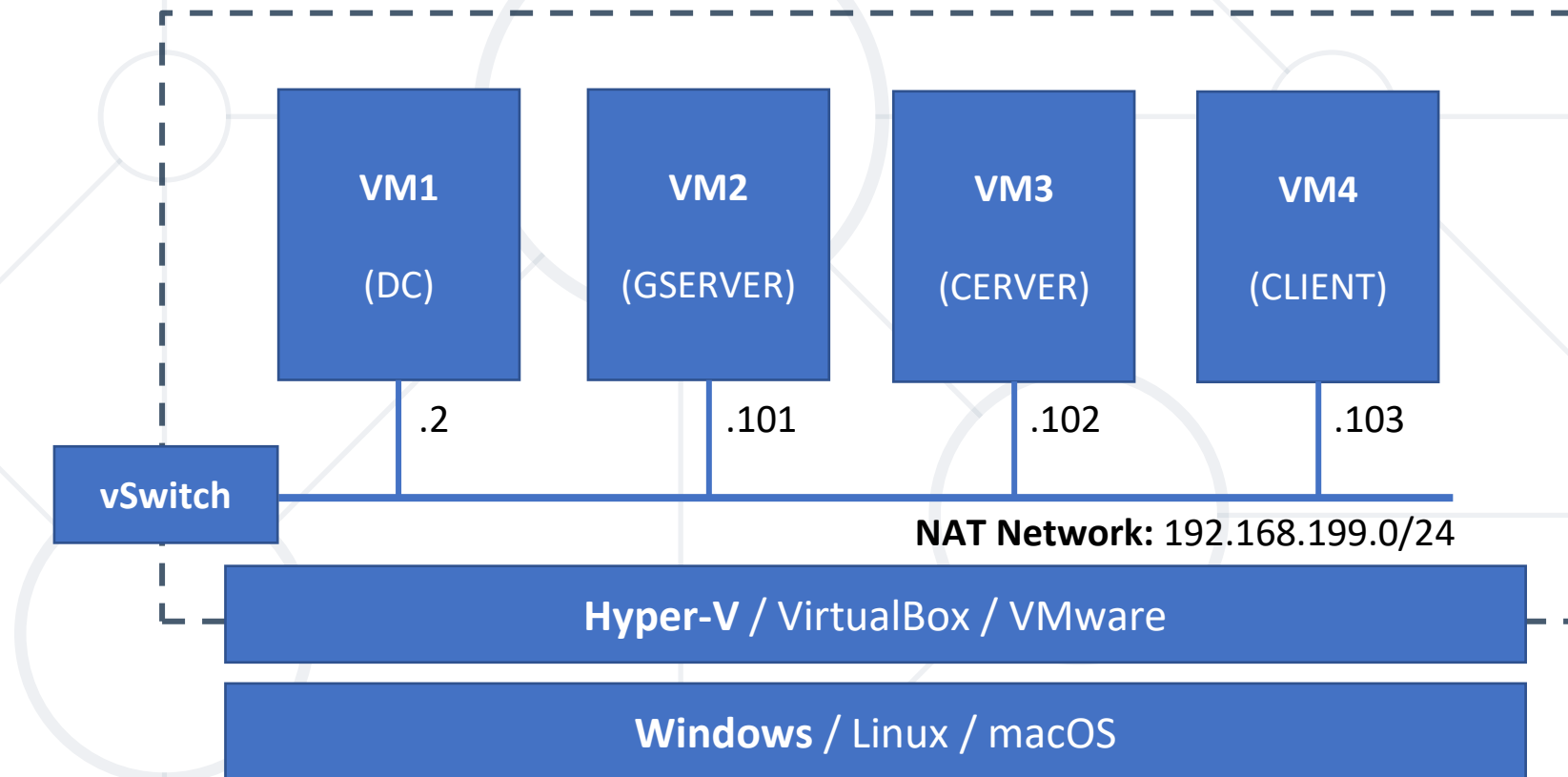
This Module (M4)

Topics

Table of Contents

1. File and Storage Services
2. Remote Access and Management
3. Print and Document Services







File and Storage Services

Permissions. Configuration. Management

It's All About Resource Sharing

- Servers provide services and **resources**
- Servers maintain
 - **Availability** of shared resources
 - **Rights to** use shared resources
- Shared resources include
 - Data - Files and folders
 - Devices - Printers and scanners

- Installed by default (in its basic form)
- Provides many services
 - Disks and Volume management
 - **SMB (Server Message Block)** and **NFS (Network File System)** file sharing
 - Distributed File System (DFS)
 - iSCSI targets
 - Data Deduplication

- Network users can remotely access **shared** folders
- **Right click** and **File and Storage Services** page in Server Manager are the two methods for creating a share
- **Server Message Block (SMB)** is a protocol for file and printer sharing under Windows
- **Network File System (NFS)** is a cross-platform sharing protocol typically used in UNIX and Linux systems

- **Storage Services** role service is automatically installed
- For **SMB** shares **File Server** role service is required
- It is installed automatically during the creation of the first share
- Can be installed manually via the **Server Manager** or **PowerShell**

```
Install-WindowsFeature -Name FS-FileServer
```

- For **NFS** shares **Server for NFS** role service is required
- Can be installed manually via the **Server Manager** or **PowerShell**

```
Install-WindowsFeature -Name FS-NFS-Service
```

- Three profiles when creating a share
- **SMB Share – Quick**
 - Full share and NTFS permissions. General purpose share
- **SMB Share – Advanced**
 - Full share and NTFS permissions with access to additional services like quotas and file classification. Requires **File Server Resource Manager**
- **SMB Share – Applications**
 - Accounts specific application requirements for Hyper-V, databases, etc.

- **Enable Access-based Enumeration**
 - Prevents users from searching through files and folders they cannot access
- **Allow Caching Of Share**
 - Enables client systems to maintain local copies of files they access from server shares
- **Enable BranchCache On The File Share**
 - Enables computers at remote locations to cache files accessed from a share
- **Encrypt Data Access**
 - Server encrypts files in the share before transmitting them to the client

- **NFS Share – Quick**
 - Basic sharing with authentication and permissions
- **NFS Share – Advanced**
 - Full share and NTFS permissions with access to additional services like quotas and file classification. Requires **File Server Resource Manager**

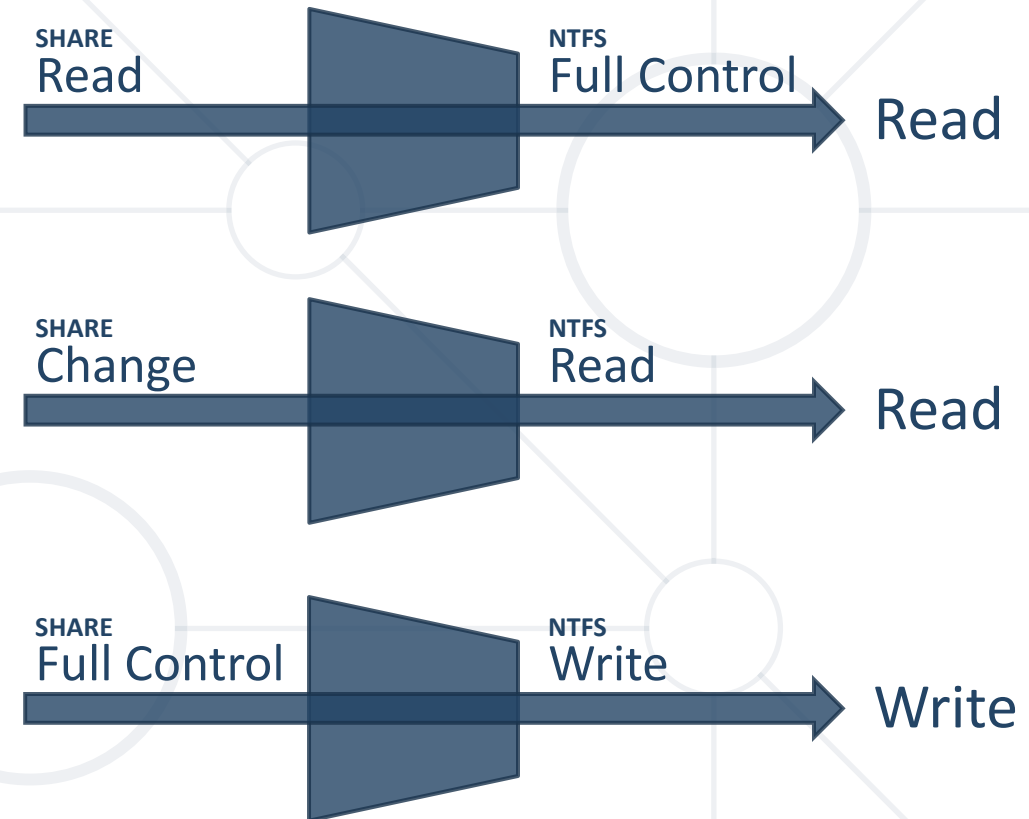
- Two additional configuration steps
- First is to specify folder **Management Properties**
 - Select **Folder Usage Property** for the share
 - Set owner notification for events like denied access
- Second is to apply a **Quota** to a folder or volume
 - Select from list of predefined quota templates
 - Granular control is possible as well
- Both require **File Server Resource Manager (FSRM)** role

- Shared folders have their own permissions
 - **Read** – display names and attributes, execute program files
 - **Change** – read + create files and folders and change their content
 - **Full Control** – change + permission and ownership change
- Depending on the approach the **Everyone** special identity
 - Has the **Allow Read** permission when share created with **Explorer**
 - And **Full Control** when created with **Server Manager**
- Independent from the NTFS permissions and folder structure

- Share permissions
 - **Read, Change, Full Control**
 - Controls access to the share over the network
- NTFS permissions
 - **Read, Write, Read&Execute, List Folder Contents, Modify, Full Control, and Special (advanced) permissions**
 - Controls access to files and folders on NTFS volume
- Both can be **Allowed** or **Denied** (overrides allow)

Share vs NTFS Permissions (2)

- Share permissions
 - Set the maximum access level
- NTFS permissions
 - Further restrict the access up to the level set by the share permissions



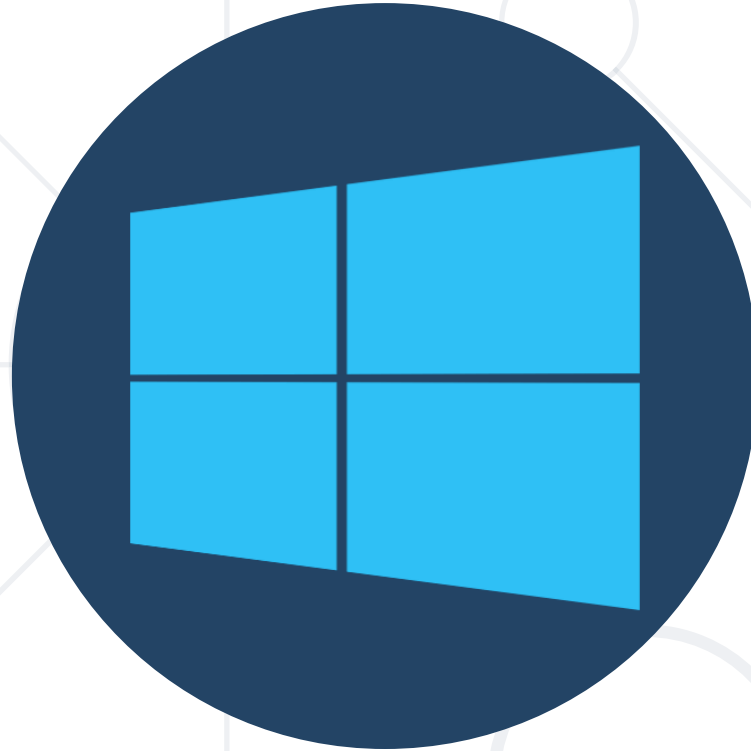
- Permissions are inherited
 - An object inherits permissions from its parent object
 - Could be disabled – existing permissions are converted to explicit or removed
- They change when copying or moving
 - Same volume COPY – **inherited** from the parent
 - Same volume MOVE – original permissions are **retained**
 - Different volume – **lost** (**inherited** from the new location)

- Two approaches for permissions management
 - **Additive** – start with *no permissions* and **grant allow** permissions
 - **Subtractive** – start with *full control* and **grant deny** permissions
- The **additive approach** is the **preferred one**
- **Allow** permissions **are cumulative** (Read + Write = ReadWrite)
- **Deny** permissions **override allow** permissions
- **Explicit** permissions **take precedence over inherited** permissions

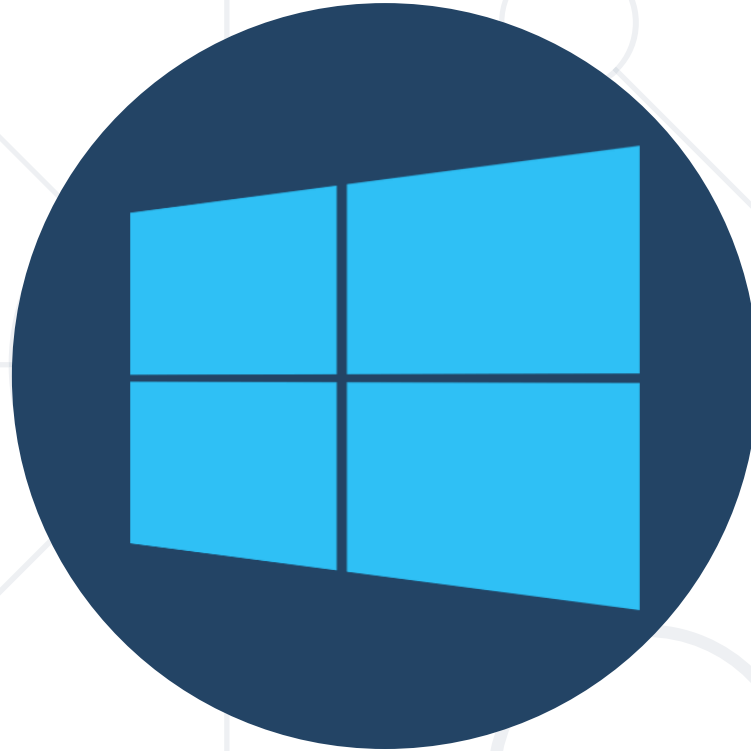
- Share manipulation
 - **New-/Remove-SMBShare**
- Session and file management
 - **Get-/Close-SMBSession & Get-/Close-SMBOpenFile**
- Access management
 - **Get-/Grant-/Revoke-/Block-/Ublock-SMBShareAccess**
- Client and server configuration
 - **Get-/Set-SMBServerConfiguration & Get-/Set-SMBClientConfiguration**

- Simplest form of control
- High level restriction
- Two kinds of limits – **warning** and **limit**
- When breaching a limit event can be **logged**
- Further writes can be **denied**
- Quotas can be further **refined** per user

- Additional server role component
- Allows better files and folders management
- Provides
 - Fine-grained quota management
 - File and folder classification
 - File screening policies
 - Management tasks
 - Storage reports



Practice: Sharing Live Demonstration in Class



Remote Access and Management

Management and Access Options

- GUI Tools
 - mmc, Server Manager, RSAT, and Windows Admin Center
- Command-line Tools
 - CMD Shell and PowerShell
- Desktop Experience
 - Remote Desktop Connection
- Connectivity Tools
 - VPN, Direct Access

- **mmc.exe**
- Can work either locally or remotely
- Can be connected to many computers simultaneously
- Functionality is added with snap-ins
- Target machine firewall must be configured appropriately

- **ServerManager.exe**
- Modern look-and-feel
- Servers are grouped by their roles
- Custom groups can be created
- Target machine firewall must be configured appropriately

- All-in-one management solution for desktop
 - Contains MMC Snap-ins, Server Manager, cmdlets
- Should be aligned with the desktop OS version
- Can be installed only on full version (not RT)
- Available for download

<https://www.microsoft.com/en-us/download/details.aspx?id=45520>

- Web-based GUI platform for management
- It is not an alternative, but complementary tool
- Can be installed on Windows 10 and Windows Server 2016/9
- Supports Windows Server 2008 R2 – 2019 and Windows 10
- Supports Hyper-V Server 2012 R2, 2016, and 2019
- WMF 5.1+ required for Windows Server 2008 R2 – 2012 R2
- Several installation scenarios – Local, Gateway, Managed, and Failover
- Free – no additional cost beyond Windows
- Can be downloaded from <http://aka.ms/WACDownload>

- Windows Remote Management Command Line Tool (**winrm.exe**)
 - Used to manage/configure Windows Remote Management
- Windows Remote Shell (**winrs.exe**)
 - Used to execute commands on remote machines

:: Get WinRM configuration status

```
C:\> winrm get winrm/config
```

:: Initiate quick configuration of WinRM

```
C:\> winrm quickconfig
```

:: Execute remote command

```
C:\> winrs -r:fileserver dir c:\
```

Special parameter

**Computer or
ComputerName**

Dedicated cmdlet

Invoke-Command

Remote session

**Enter-PSSession
Exit-PSSession**

Executed on the target computer to enable remoting

```
PS C:\> Enable-PSRemoting -Force
```

Executed against a remote computer to check its readiness

```
PS C:\> Test-WsMan COMPUTER
```

Execute single (set of) command on a remote computer

```
PS C:\> Invoke-Command -ComputerName dc -ScriptBlock { Get-ChildItem C:\ }
```

Initiate PowerShell session

```
PS C:\> Enter-PSSession DC -Credential User
```

Execute remote command

```
[DC] PS C:\> Get-Service bits
```

End remote session

```
[DC] PS C:\> Exit-PSSession
```

- One-time troubleshooting session
 - Remote Assistance
- Full desktop experience for administrative purposes
 - Remote Desktop for Administration
- Client oriented long-term access
 - Session-based
 - Virtual machine-based

- Activated on the Remote tab of System Properties
- Installed by default on desktop machines
- Must install Remote Assistance feature on server machines
- One-way session by default
 - Requestor is active operator
 - Helper is passive watcher
- Could become two-way session – shared control

- Available by default, but must be enabled
 - For desktop – Remote tab in System properties
 - For servers – Remote Desktop in Server Manager
- Allowed users are specified
- Administrators are granted access by default
- Allows up to two sessions (used to be up to 3)
- No licenses required
- NOT intended for continuous usage

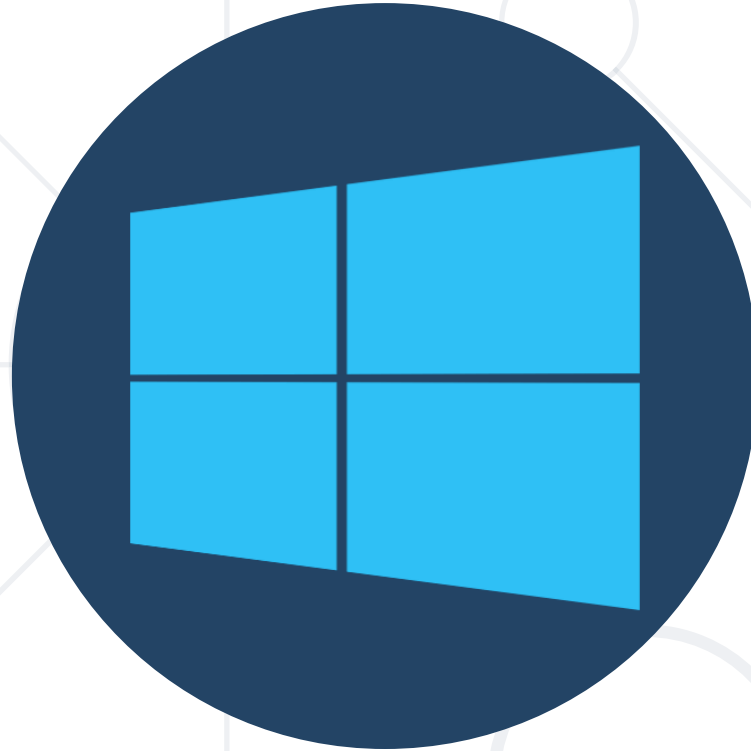
- Former Terminal Services (TS)
- Requires additional licenses
- Offers session level isolation
- Not compatible with all applications*

* Applications must be installed after the feature activation

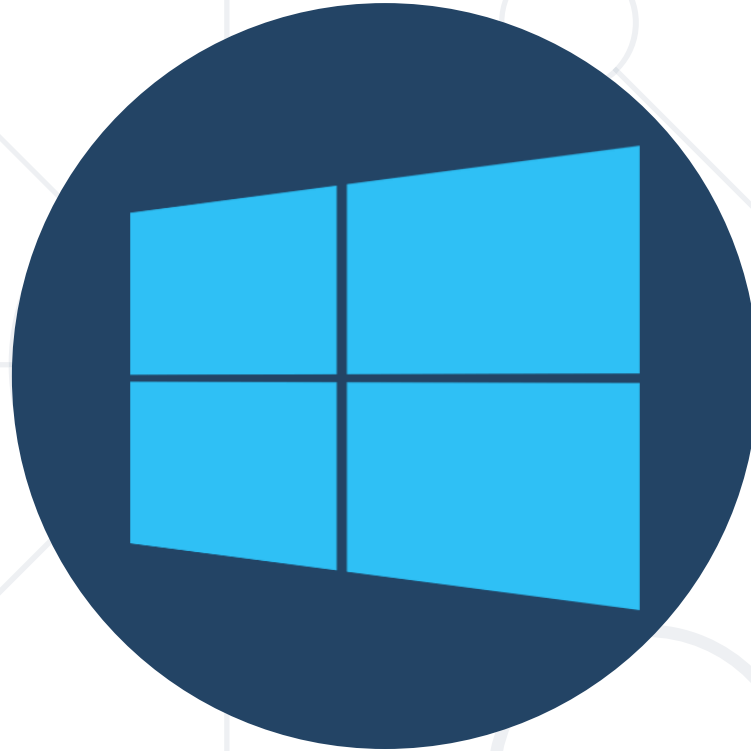
VM-based Remote Desktop Services

- Complete isolation
- Requires additional licenses
- Requires Hyper-V role additionally
- Compatible with all applications

- Complex server role
- Covers the needs of on-premise and distant clients
- Offers services like
 - Virtual Private Networking (VPN)
 - Network Address Translation (NAT)
 - Direct Access



Practice
Live Demonstration in Class



Print and Document Services

- **Print Server**

- Managing multiple printers and print servers

- ~~**Distributed Scan Server**~~

Removed in Windows Server 2019

- Receives scanned documents from network scanners and routes them to the correct destinations

- **Internet Printing**

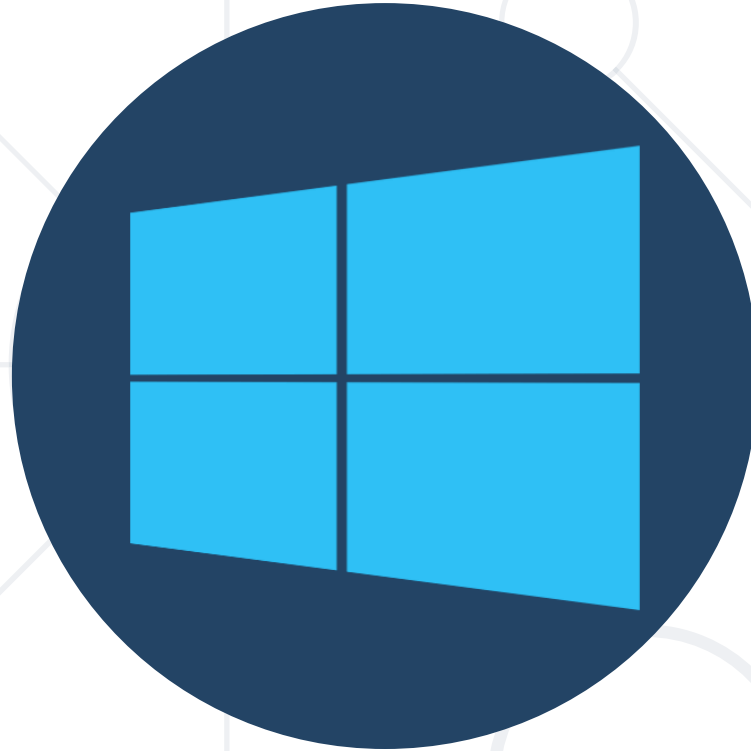
- Allows users to manage their print jobs on the server. It also allows users to connect and print to shared printers on the server by using the Internet Printing Protocol (IPP)

- **Linux Printer Daemon (LPD) Service**

- Enables UNIX-based computers or other computers using the Line Printer Remote (LPR) service to print to shared printers on this server

- Can manage locally attached or network **print devices**
- Print devices are introduced to others as **printers**
- Printers can be **shared** and **published** to Active Directory
- Provides **printer drivers** for the installed printer devices
- Access to printers is controlled via **permissions**
- Two or more print devices can be included in a **printer pool**
- **Print priorities** control job printing order

- **x86 vs x64 vs ARM64**
 - More than one architecture version can be installed simultaneously
- **Type 3 vs Type 4**
 - Type 4 are universal Class Drivers. They are newer and provided with the OS or via Windows Update. Type 3 are provided by the manufacturer
- **PCL (Printer Control Language) vs PostScript (PS)**
 - Both are PDLs (Page Description Languages). PCL is hardware dependent and is faster while PostScript is hardware independent and achieves better print quality at lower speed



Practice
Live Demonstration in Class

- Plenty of options for remote administration
 - Command-line tools, Applications, Remote Desktop
- Servers can provide remote access for regular users
 - Either session- or VM-based desktop
 - Or RemoteApps
- Servers can provide shared resources like files, folders, and printers
- Access to shared resources is driven by share and NTFS permissions



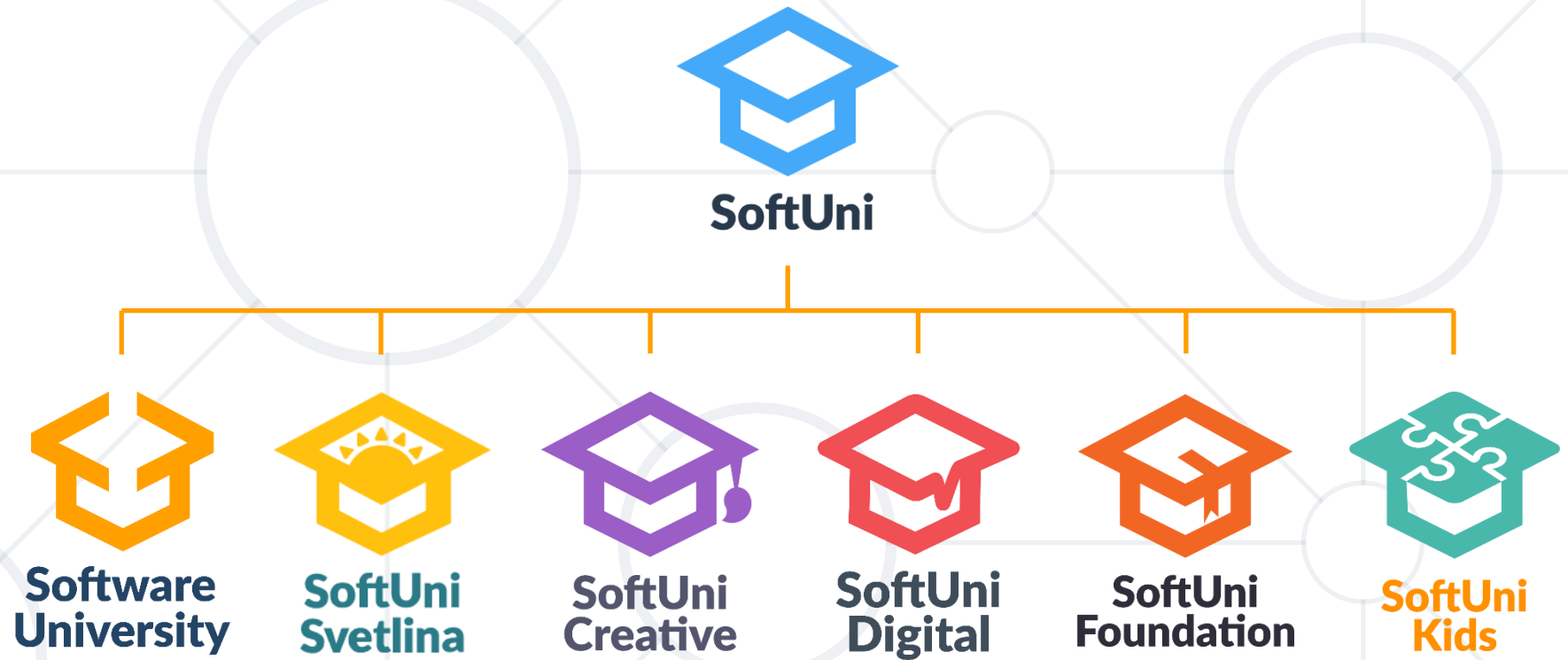
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- RemoteAccess Module
<https://docs.microsoft.com/en-us/powershell/module/remotaccess>
- RemoteDesktop Module
<https://docs.microsoft.com/en-us/powershell/module/remotedesktop>
- SmbShare Module
<https://docs.microsoft.com/en-us/powershell/module/smbshare>
- FileServerResourceManager Module
<https://docs.microsoft.com/en-us/powershell/module/fileserverresourcemanager>
- Windows Admin Center
<https://docs.microsoft.com/en-us/windows-server/manage/windows-admin-center/overview>



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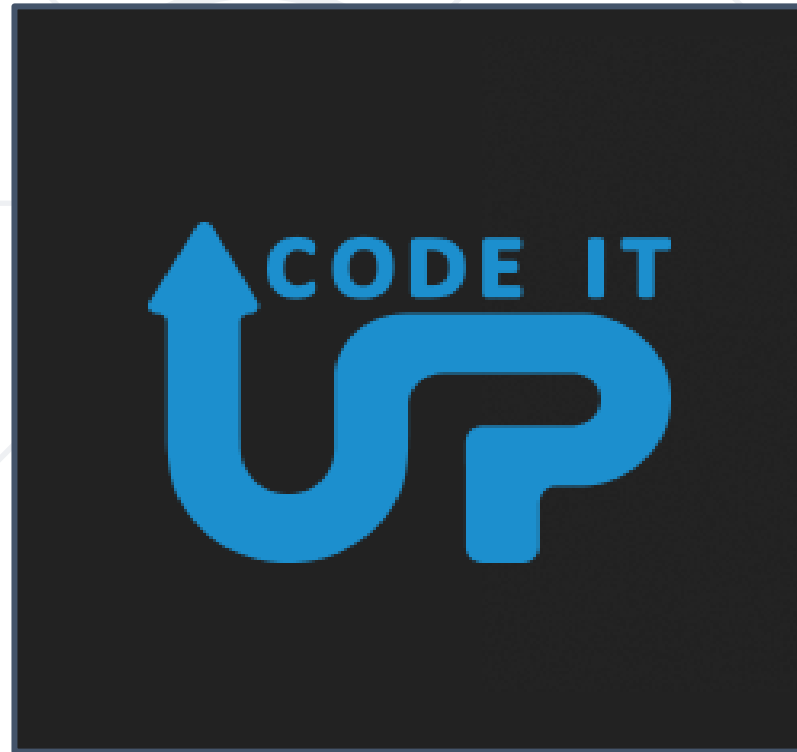
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