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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded

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1. Introduction

Active Directory (AD) is a directory service developed by Microsoft for Windows domain networks. It serves as a centralized database that stores information about users, computers, groups, and other objects within a network. This centralized management facilitates efficient administration, enhanced security, and streamlined resource management across the organization. (Microsoft, 2024)

Active Directory provides authentication and authorization services, ensuring that only authorized users can access specific resources. It employs a hierarchical structure, organizing resources into domains, trees, and forests, which reflects an organization's logical structure and simplifies resource management. (Microsoft, 2024)

Key components of Active Directory include:

- **Domain Controllers (DCs):** Servers that host the AD DS role, responsible for authenticating and authorizing users and computers within a domain.
- **Organizational Units (OUs):** Containers used to organize users, groups, computers, and other OUs, allowing administrators to manage and delegate permissions effectively.
- **Group Policies:** A set of rules and settings that administrators can apply to users and computers within the network to enforce security settings and configure operating environments.

Active Directory also integrates with other directory services and supports various protocols, enhancing its versatility in diverse network environments. Its robust design and comprehensive features make it a cornerstone of network management in many organizations. (Microsoft, 2024)

2. Objective

The objective of this lab is to install and configure Active Directory Domain Services (AD DS) on Windows Server 2022, setting up a Domain Controller to manage network resources centrally.

- Install Active Directory Domain Services (AD DS)
- Configure a New Active Directory Forest
- Create and Manage Active Directory Objects
- Implement Group Policies
- Join Client machines to the Domain
- Verify and Troubleshoot Active Directory Services

3. Required Tools and Concepts

a. Hardware/Software

- A virtual or Physical machine running Windows Server 2022.
- Administrative access to the server.

b. Key Concepts

- Familiarity with Windows Server interface and management tools.
- Understanding of network concepts such as domains, DNS, and IP addressing.

4. Tasks and Steps

i. Launch Server Manager

Action: Log in to Windows Server 2022 as an administrator and open the Server Manager.

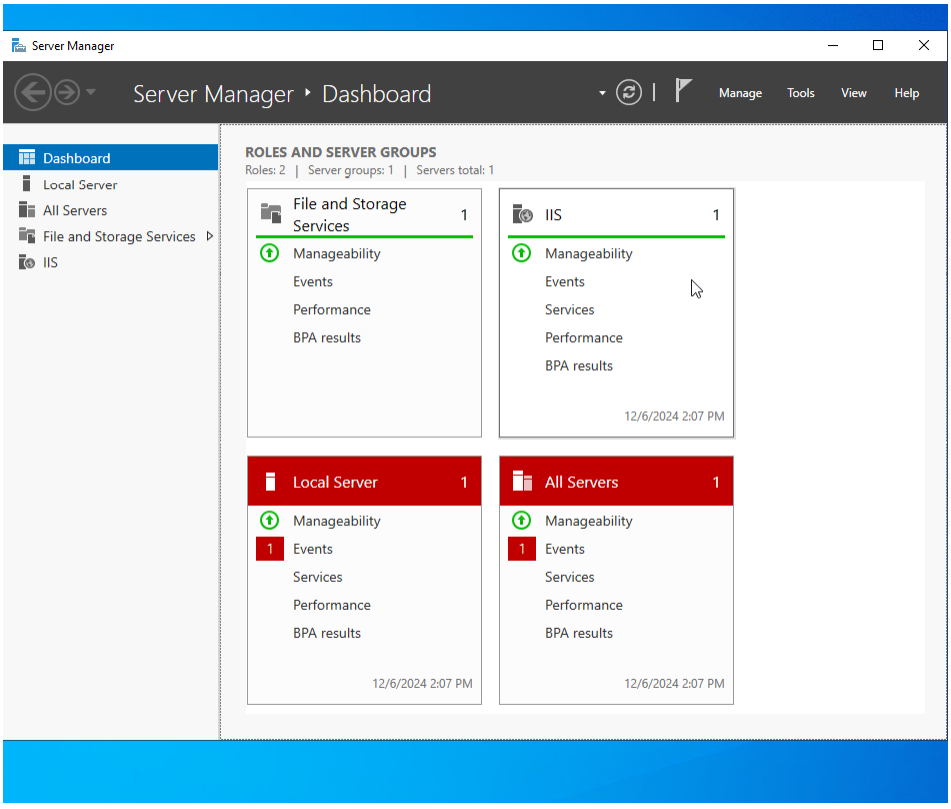

Figure 1: Loggin into Windows Server 2022 as an administrator

ii. Add Roles and Features

Action: In Server Manager, click on “Manage” and select “Add Roles and Features” to open the wizard.

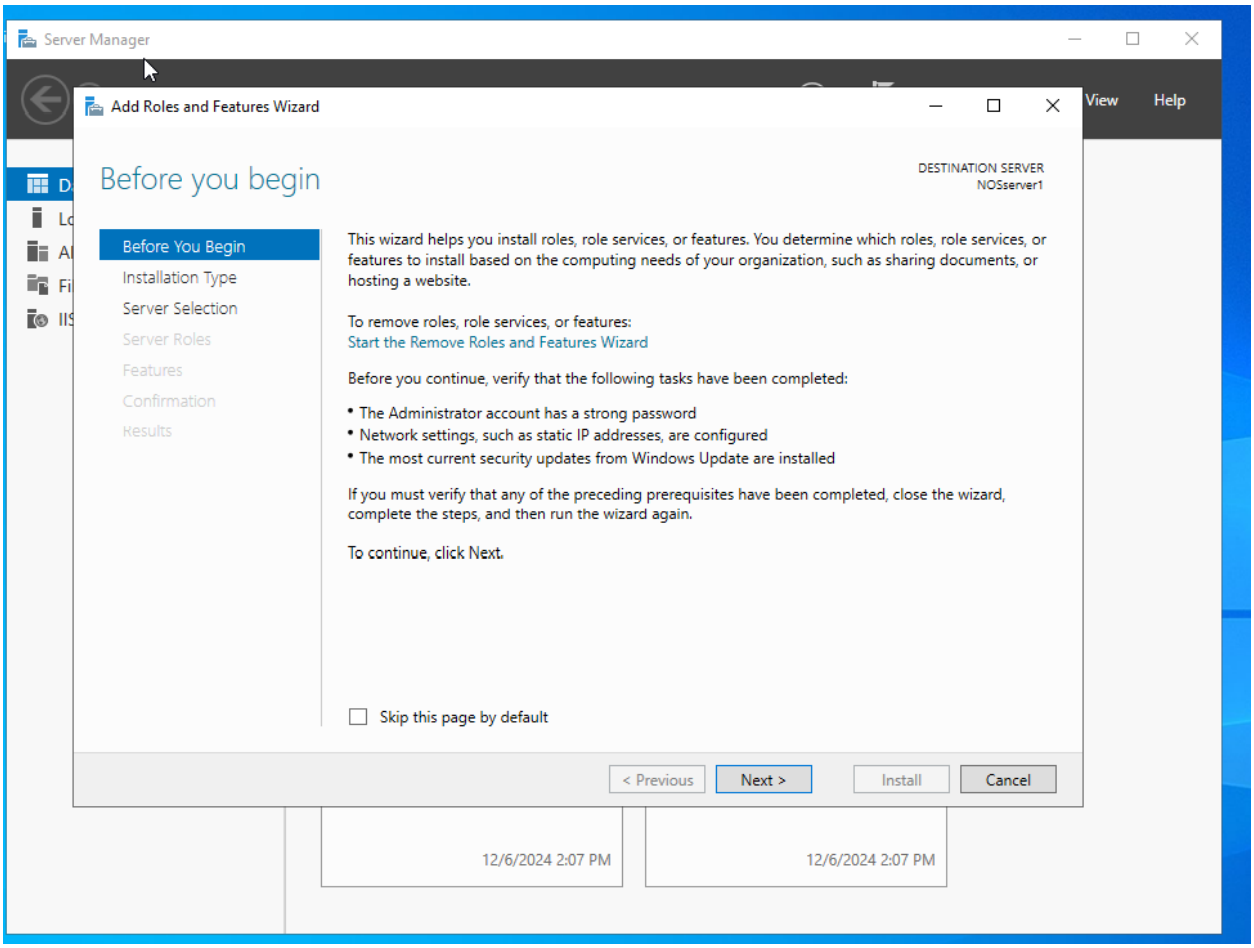

Figure 2: Add Roles and Features Wizard

iii. Select Installation Type

Action: Choose “Role-based or feature-based installation” and click “Next”.

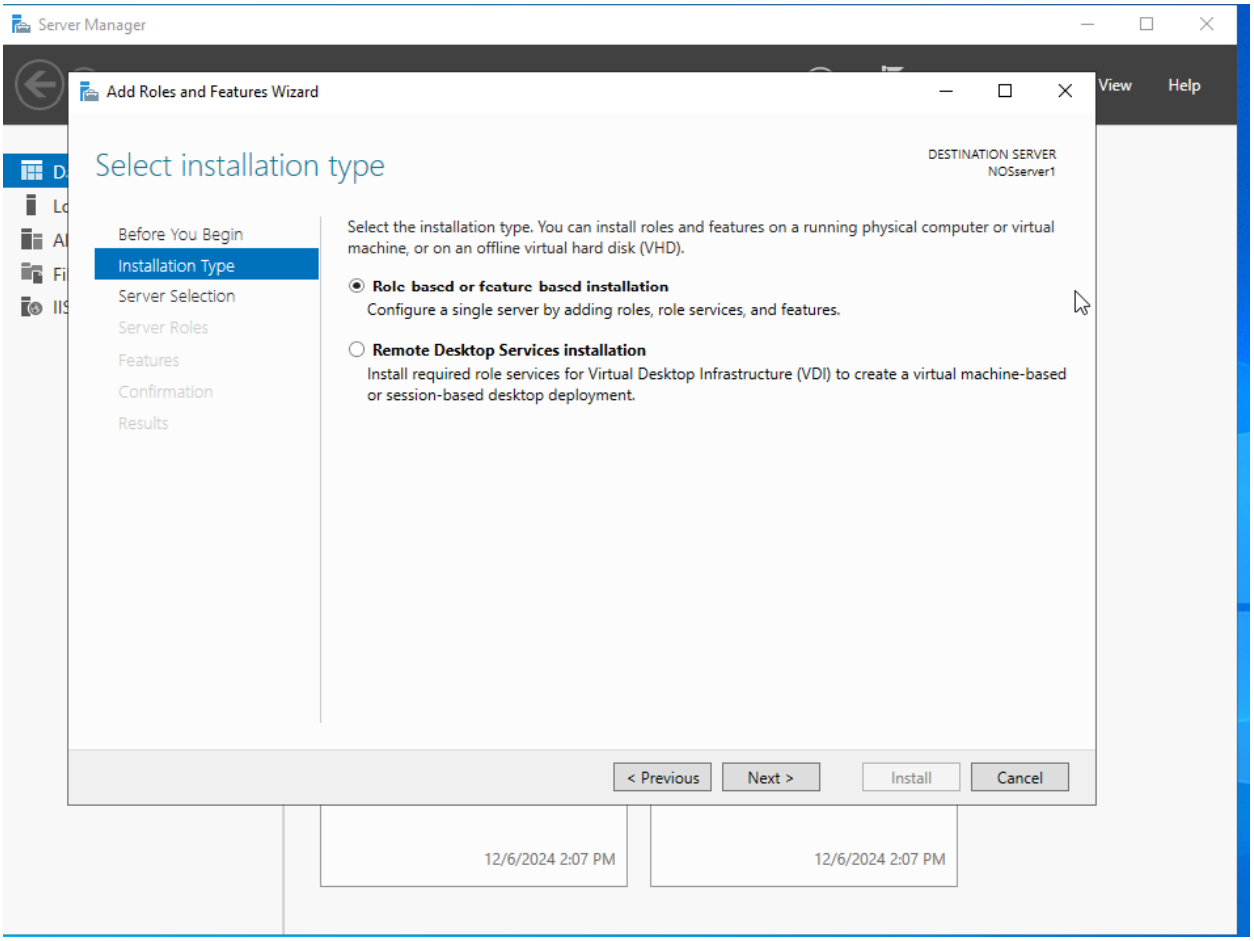

Figure 3: Selecting the Installation Type

iv. Select Destination Server

Action: Ensure “Select a server from the server pool” is chosen, select the local server, and click “Next”.

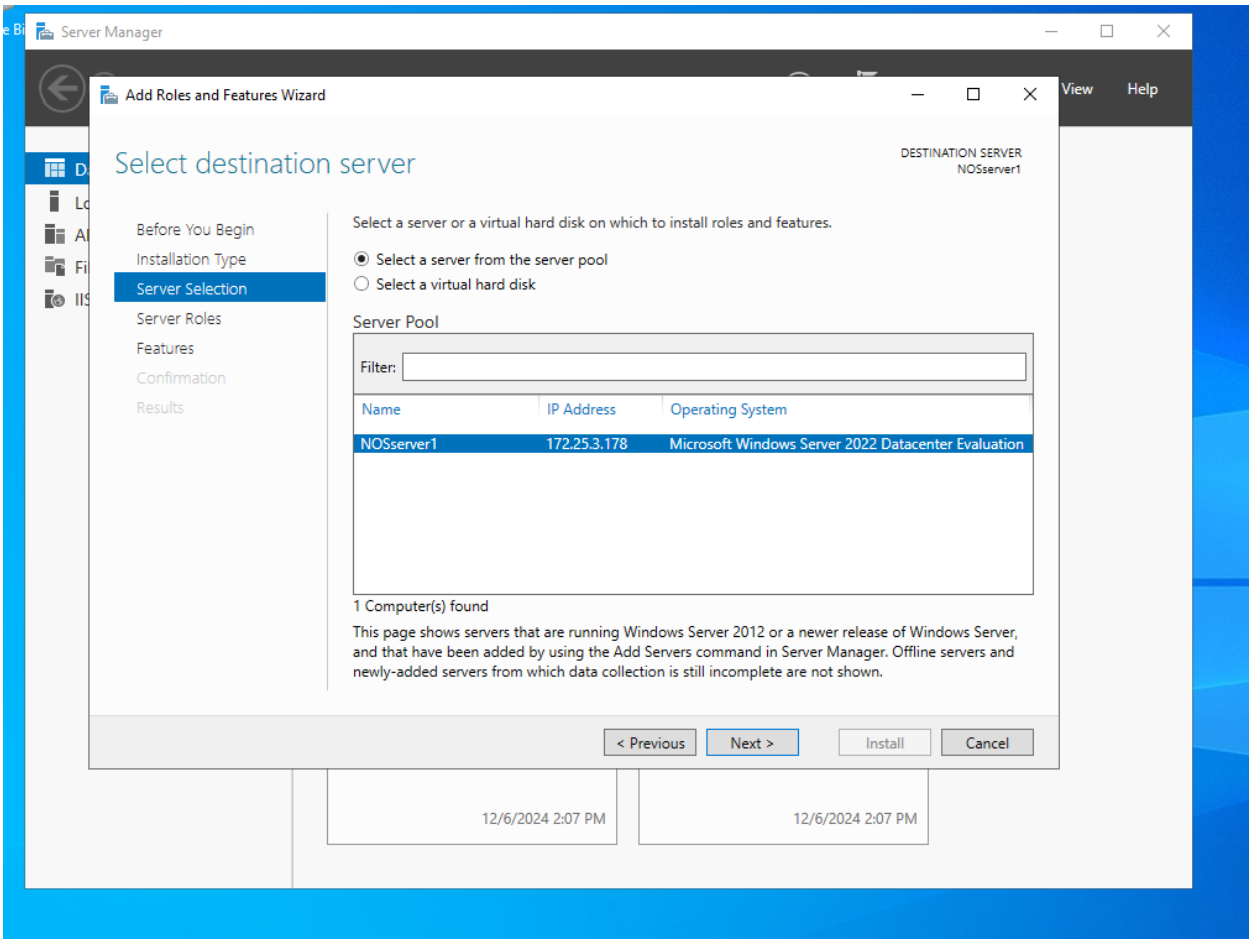

Figure 4: Selecting Destination Server

v. Select Server Roles

Action: Check “Active Directory Domain Services” and click “Next”.

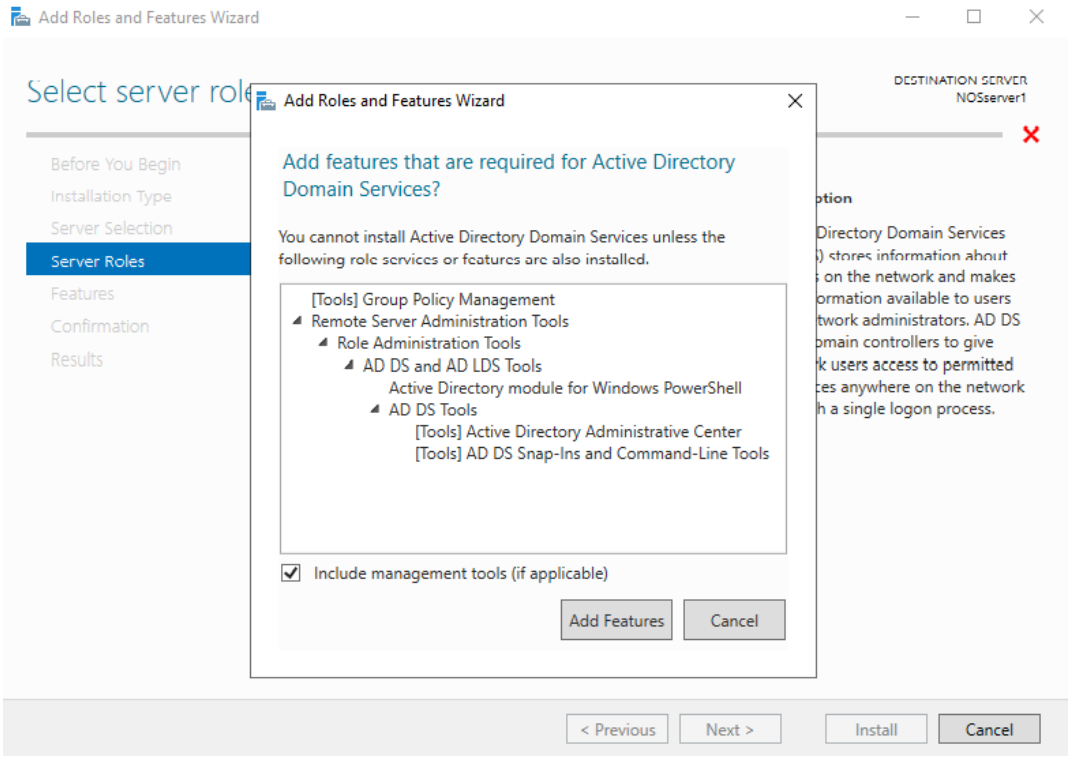

Figure 5: Adding AD DS features

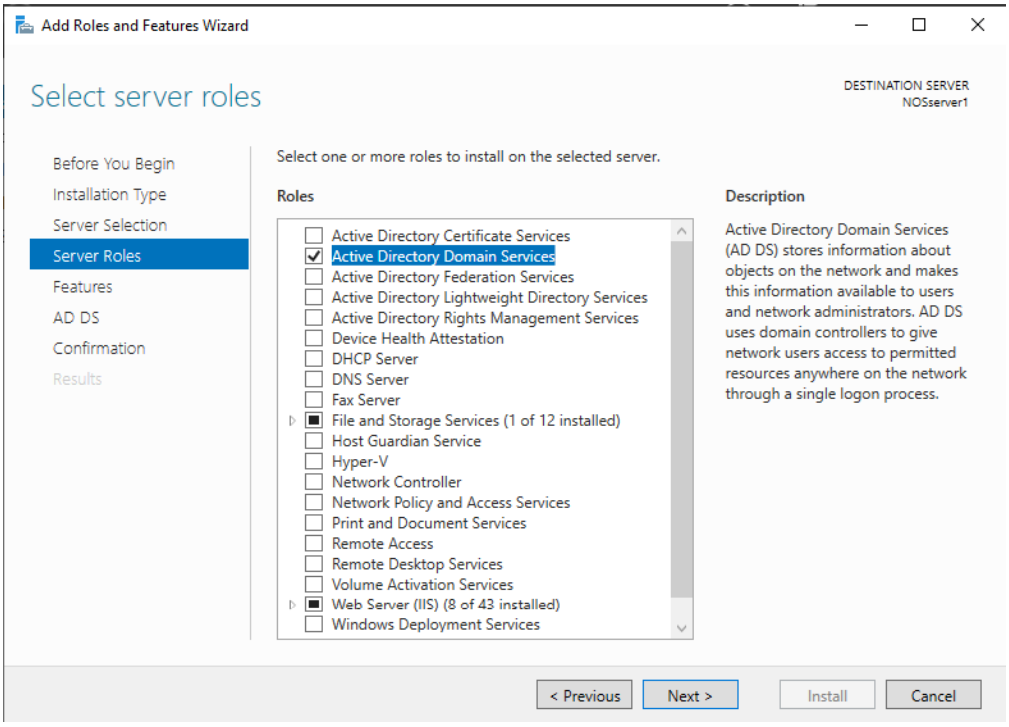

Figure 6: Selecting Active Domain Services

vi. Add Features

Action: Leave the default features selected and click “Next”.

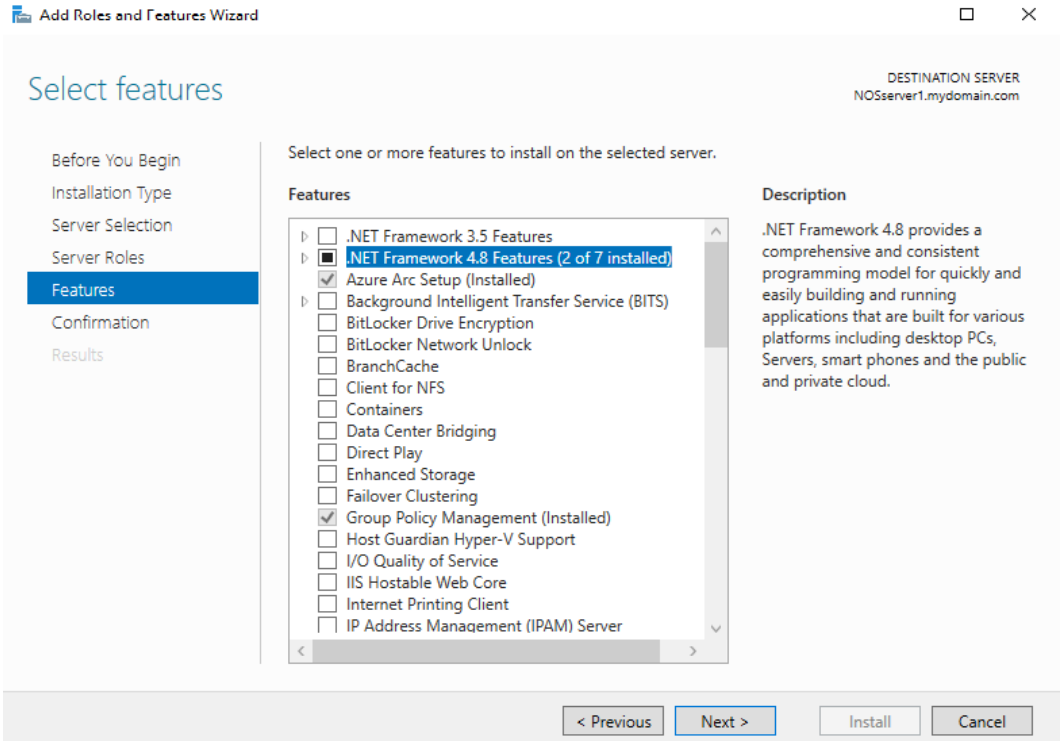

Figure 7: Selecting Features

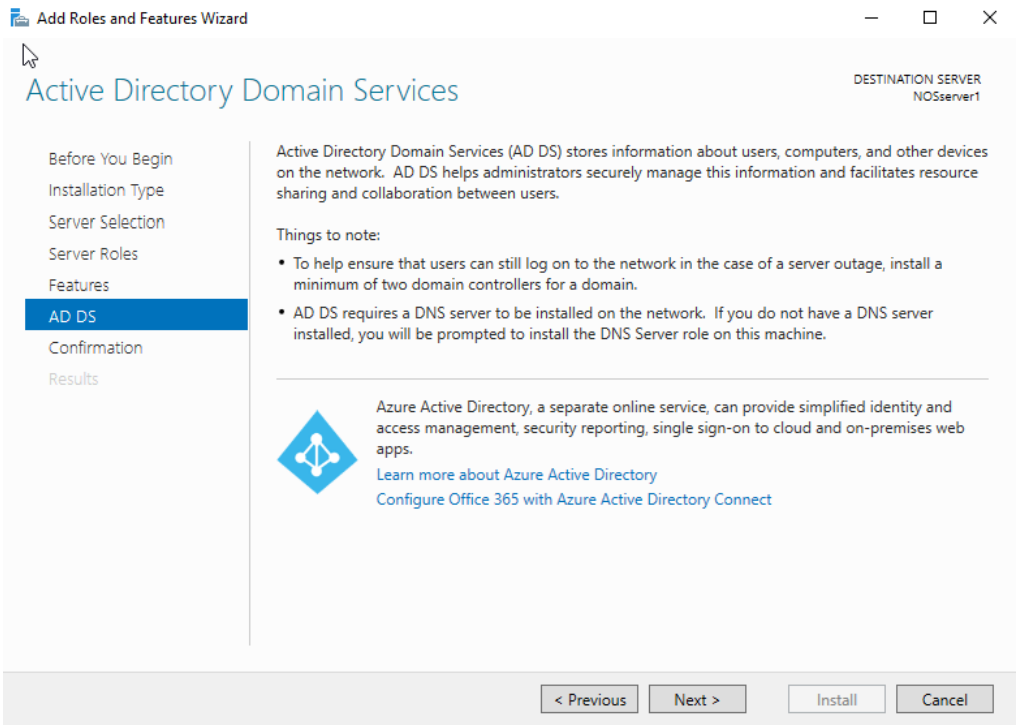

Figure 8: AD DS

vii. Confirm Installation Selections

Action: Review the selections and click “Install”.

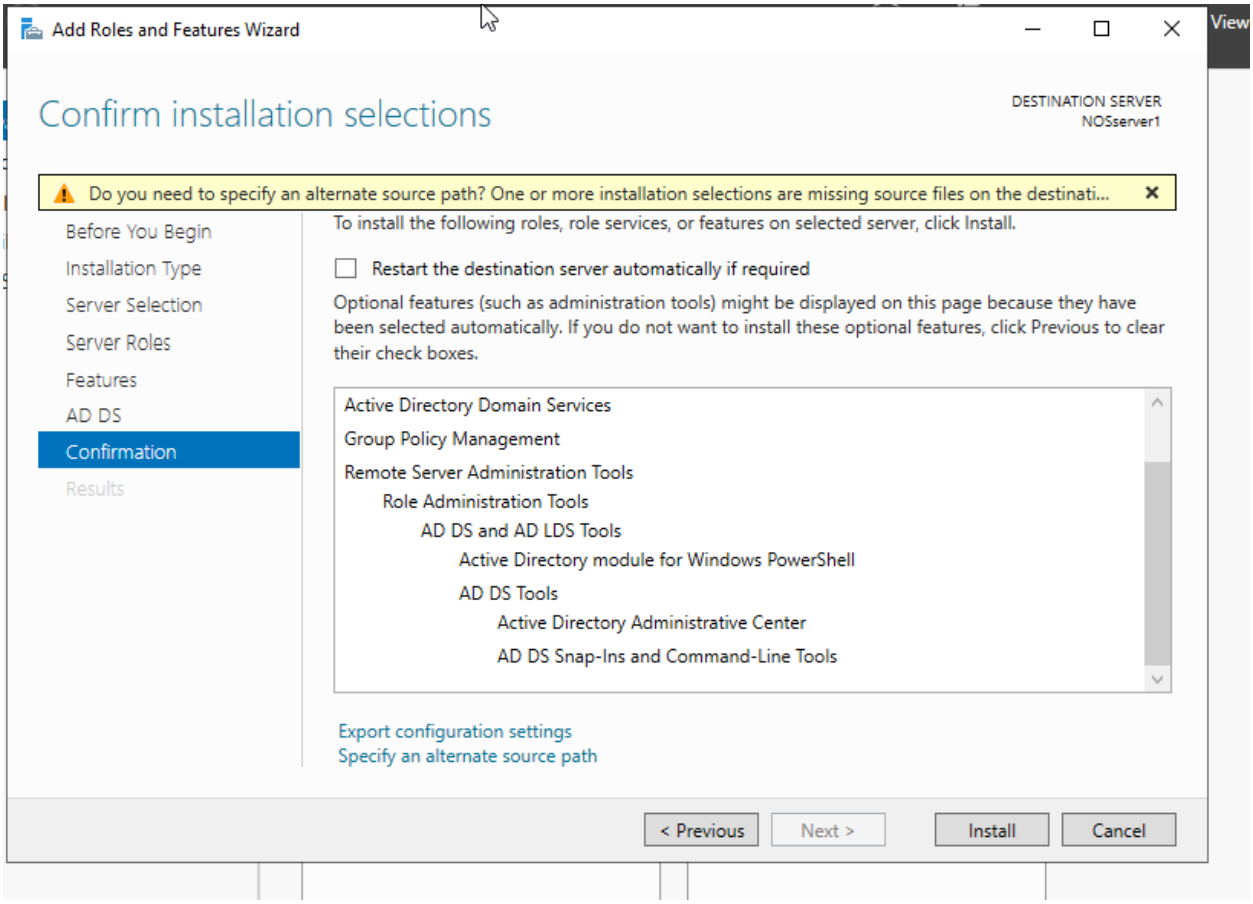

Figure 9: Confirming installation selections

viii. Complete Installation

Action: Once the installation is complete, click “Close”.

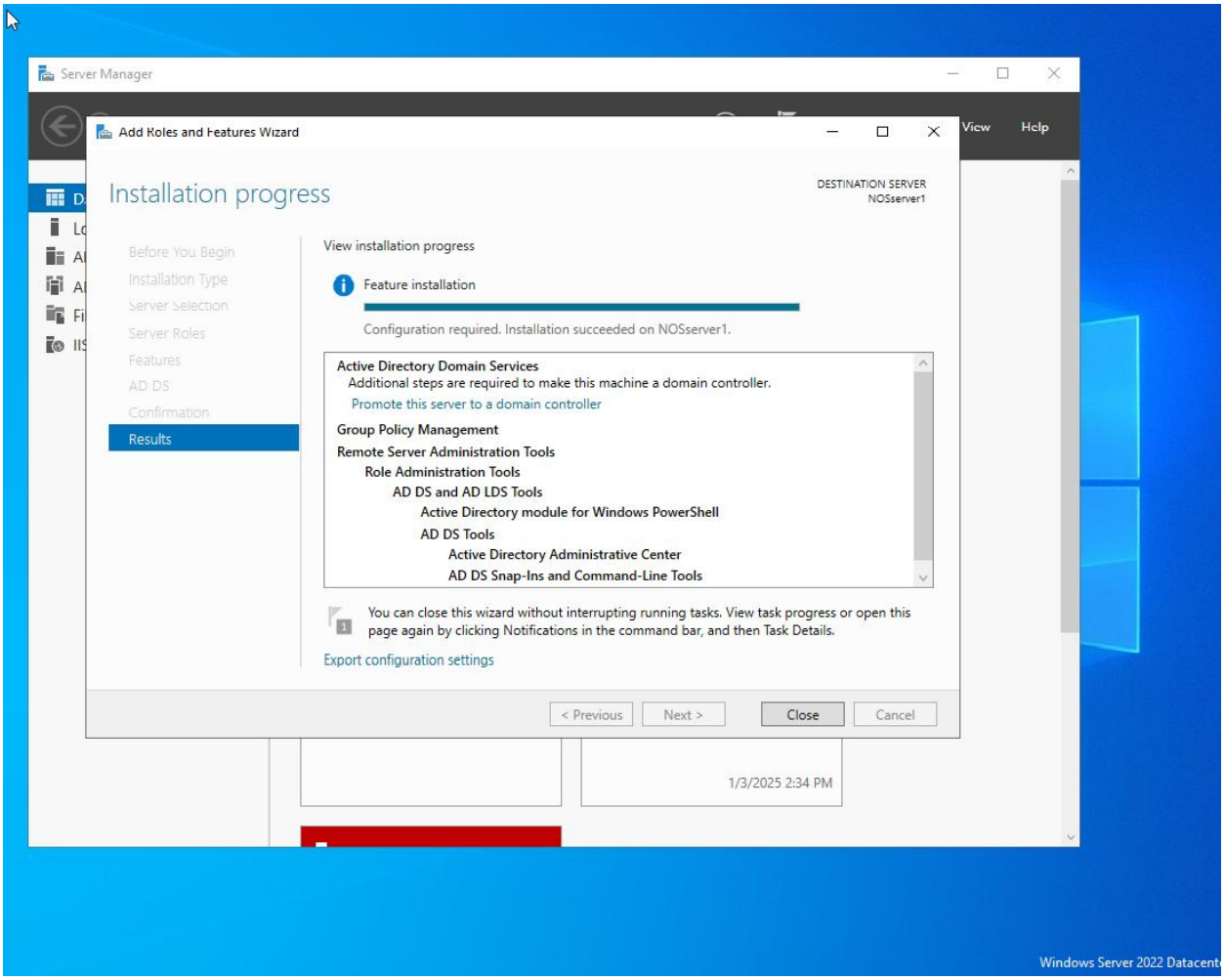

Figure 10: Installing Features

ix. Promote Server to Domain Controller

Action: In Server Manager, click on the notification flag and select “Promote this server to a domain controller”.

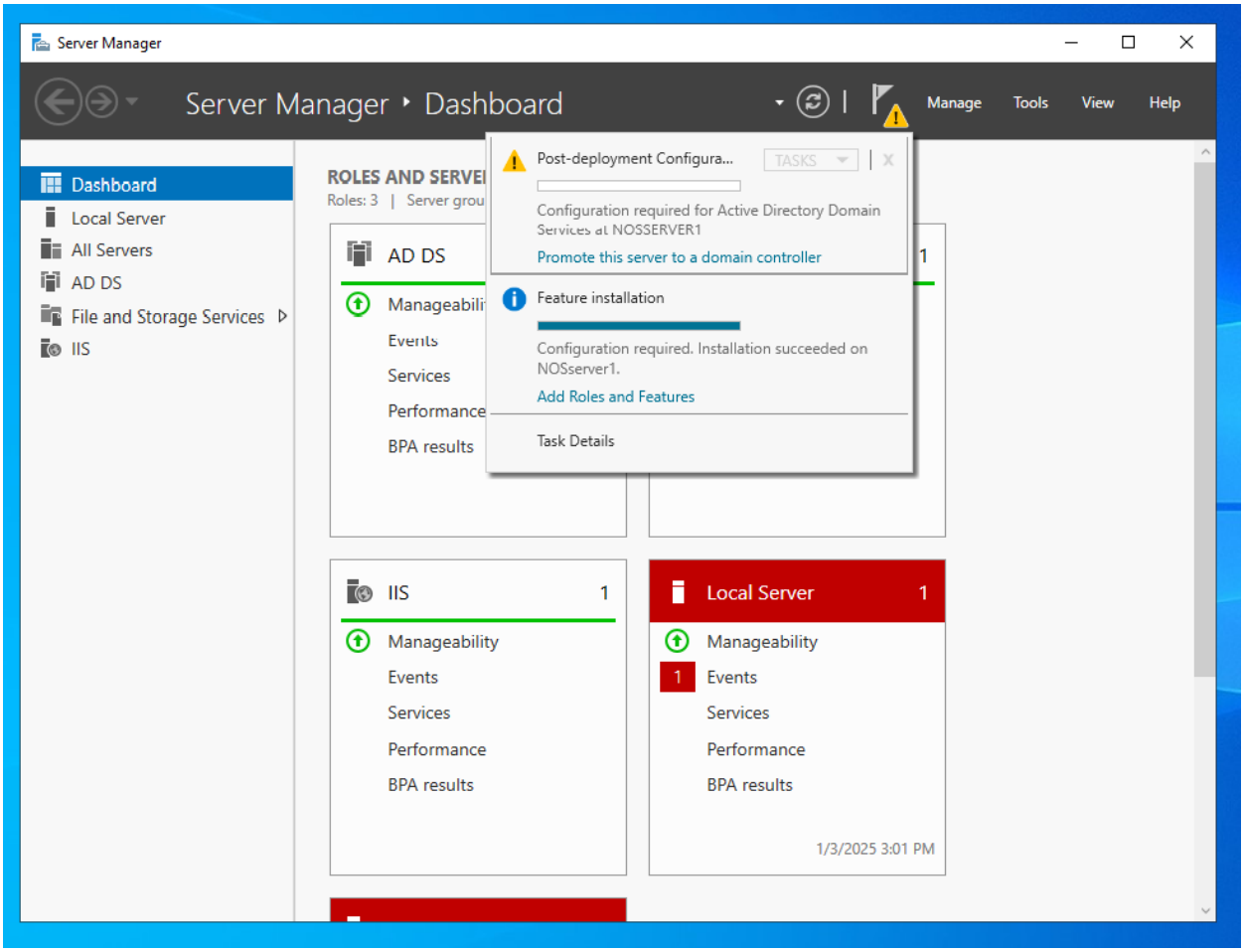

Figure 11: Clicking Post-deployment Configuration

x. Configure Deployment

Action: Select “Add a new forest”, enter a root domain name, and click “Next”.

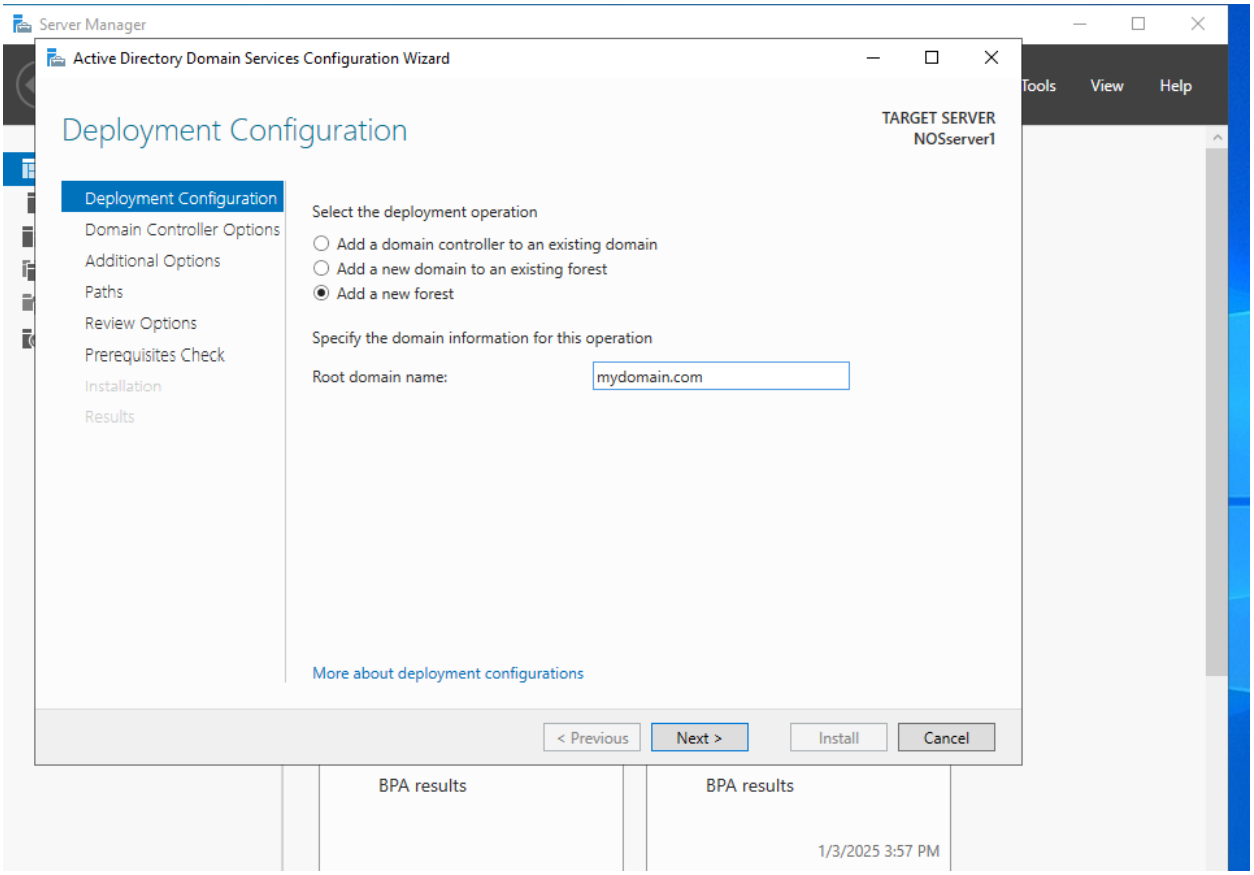

Figure 12: Adding a new forest “mydomain.com”

xi. Set Domain Controller Options

Action: Choose the appropriate Forest and Domain functional levels, ensure DNS server is check, set a Directory Services Restore Mode (DSRM) password, and click “Next”.

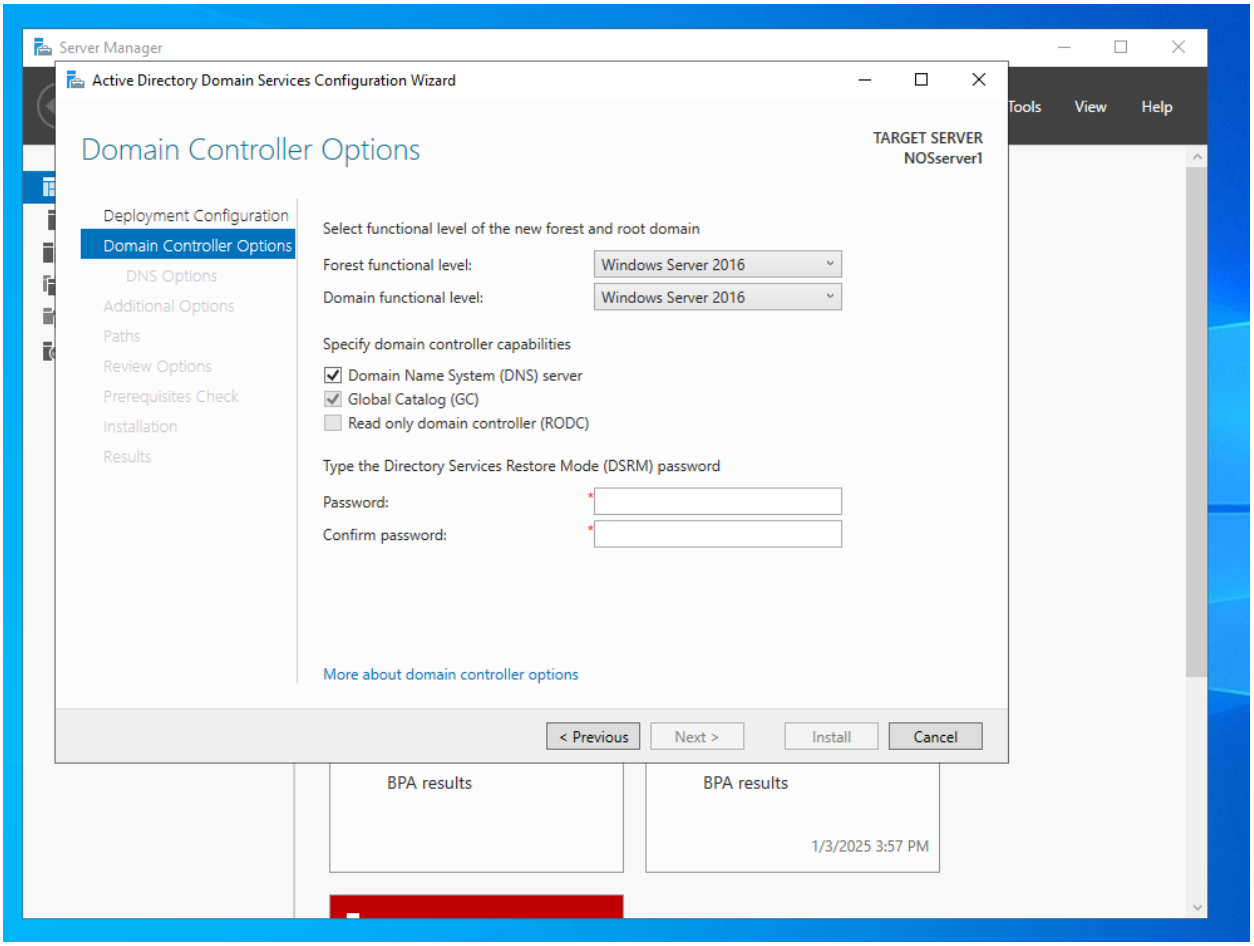

Figure 13: Setting DSRM password, in Domain Controller

xii. Configure DNS Options

Action: Review the DNS options and click “Next”.

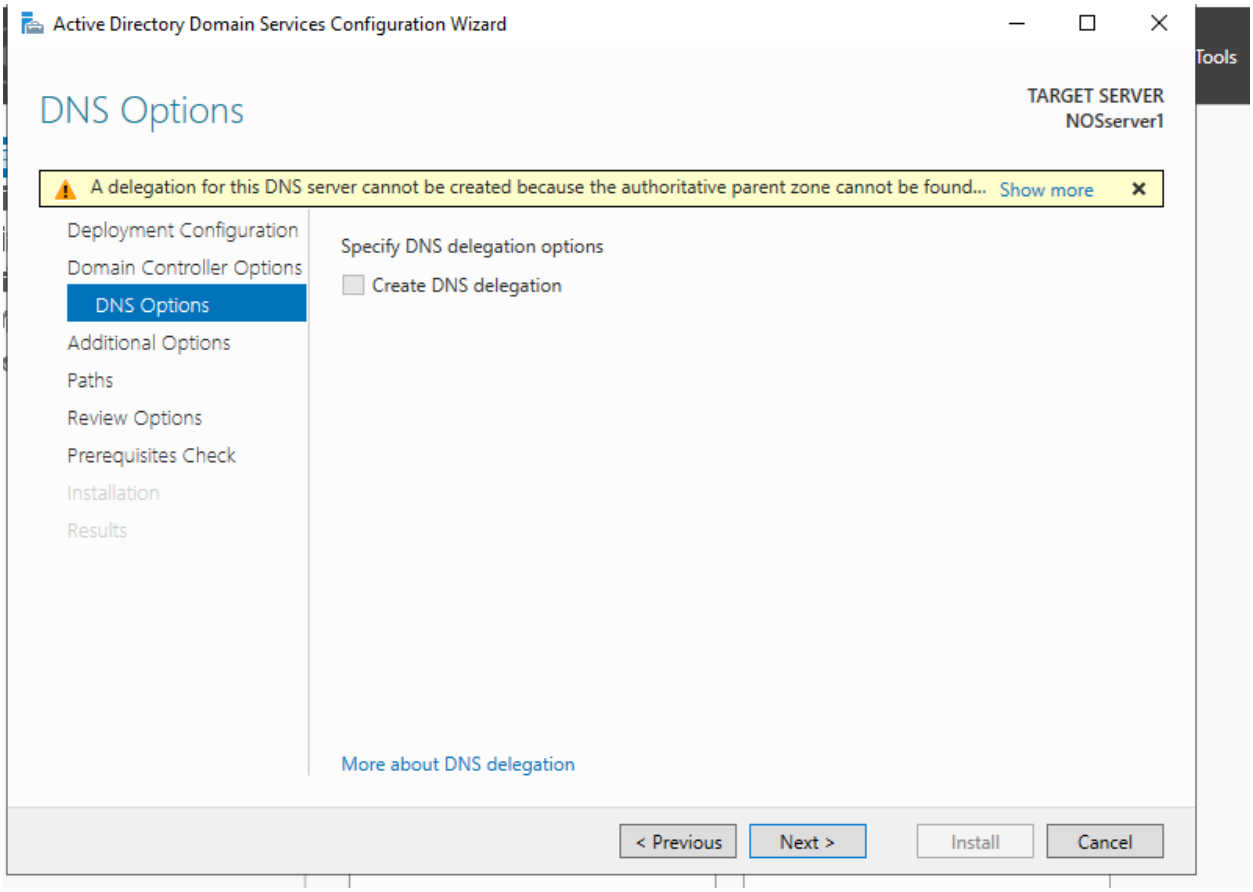

Figure 14: DNS Options

xiii. Set NetBIOS Domain Name

Action: Verify the NetBIOS name and click “Next”.

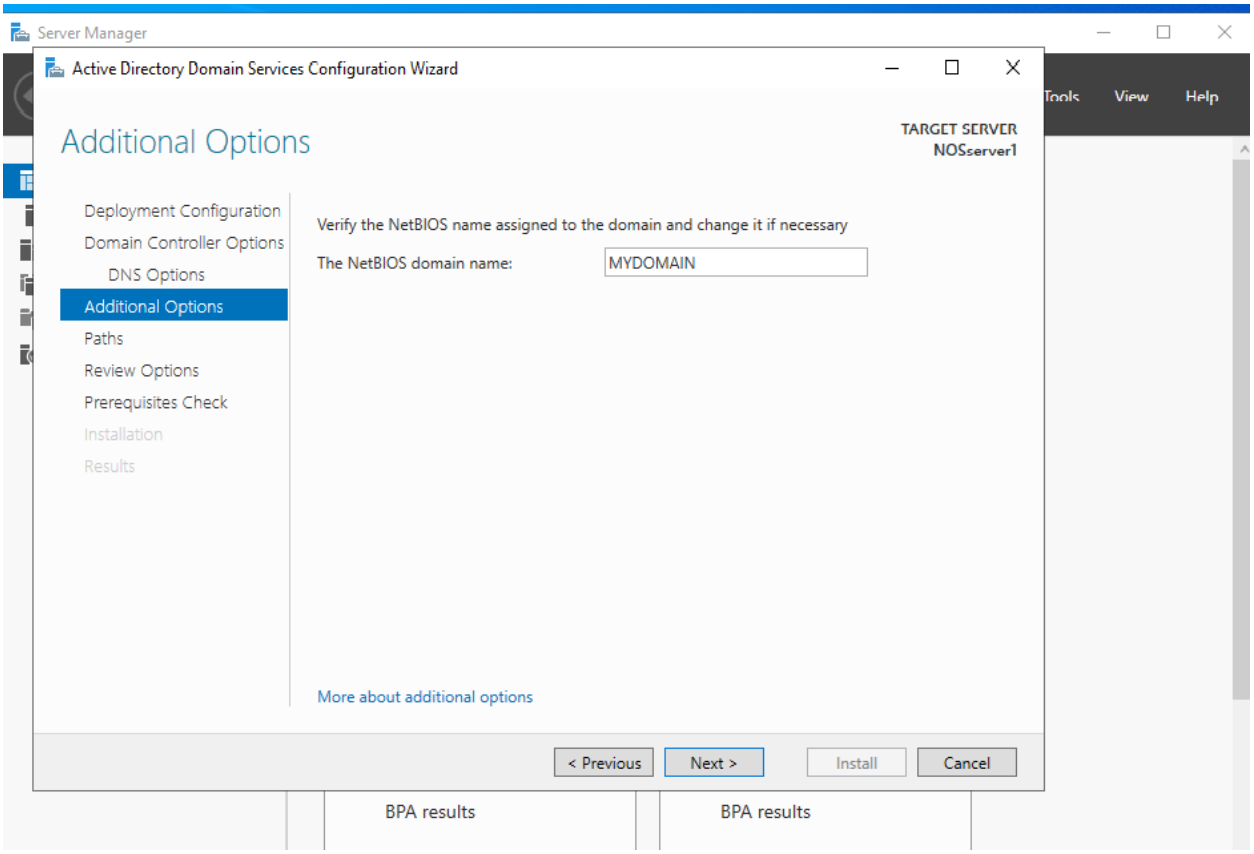

Figure 15: Verifying NetBIOS

xiv. Specify Paths

Action: Accept the default paths for the database, log files, and SYSVOL, then click “Next”.

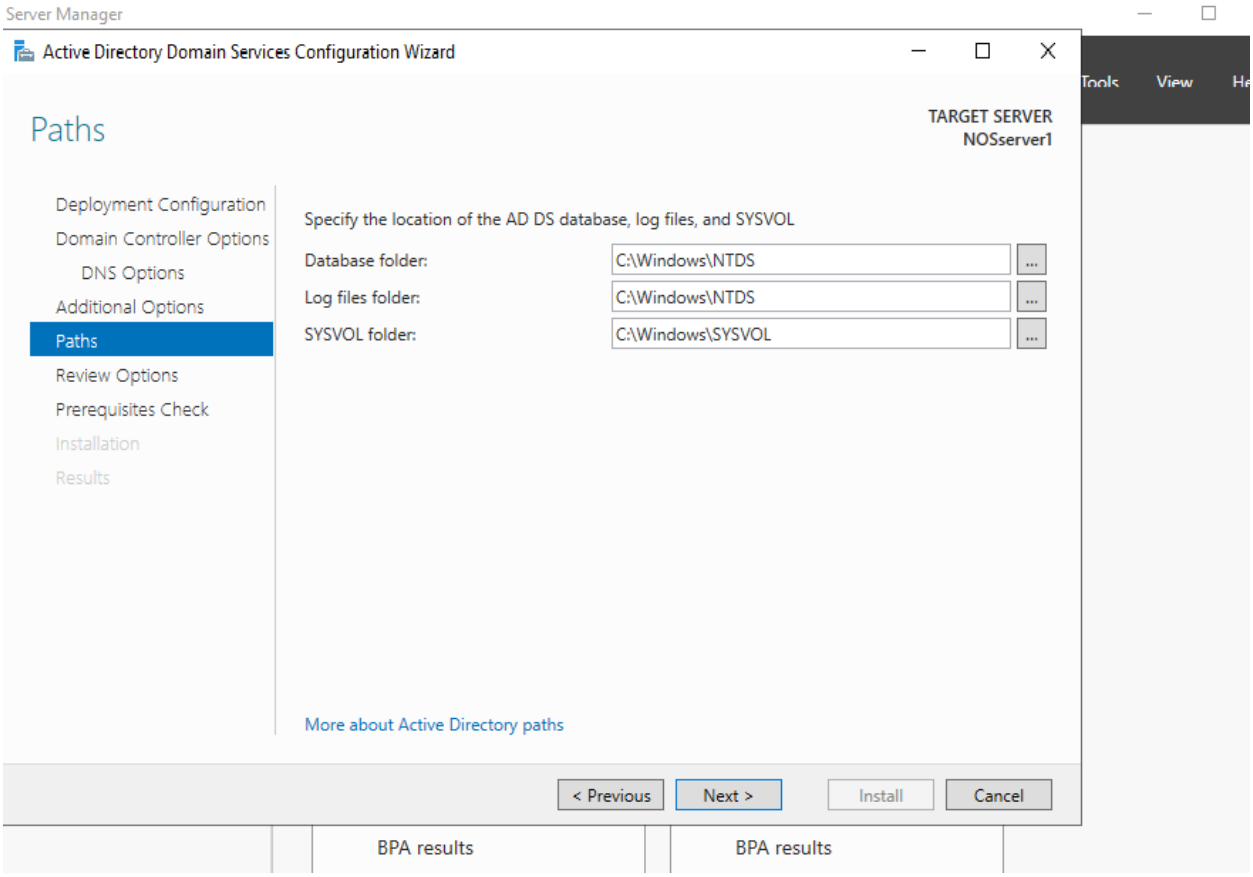

Figure 16: Specifying the location of the AD DS

xv. Review Options

Action: Review all configurations and click “Next”.

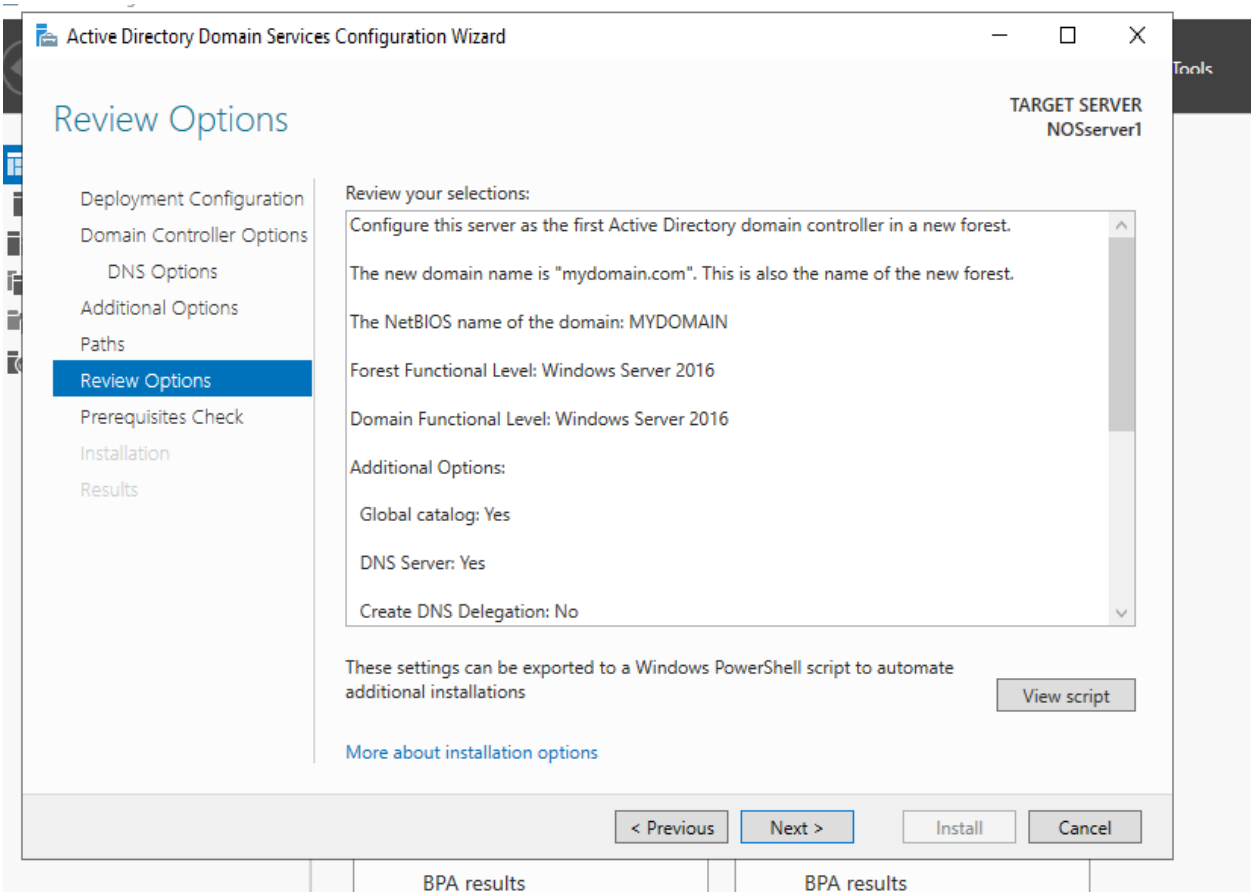

Figure 17: Reviewing all Confirmations

xvi. Check Prerequisites

Action: Allow the system to check prerequisites, ensure all checks are passed, and click “Install”.

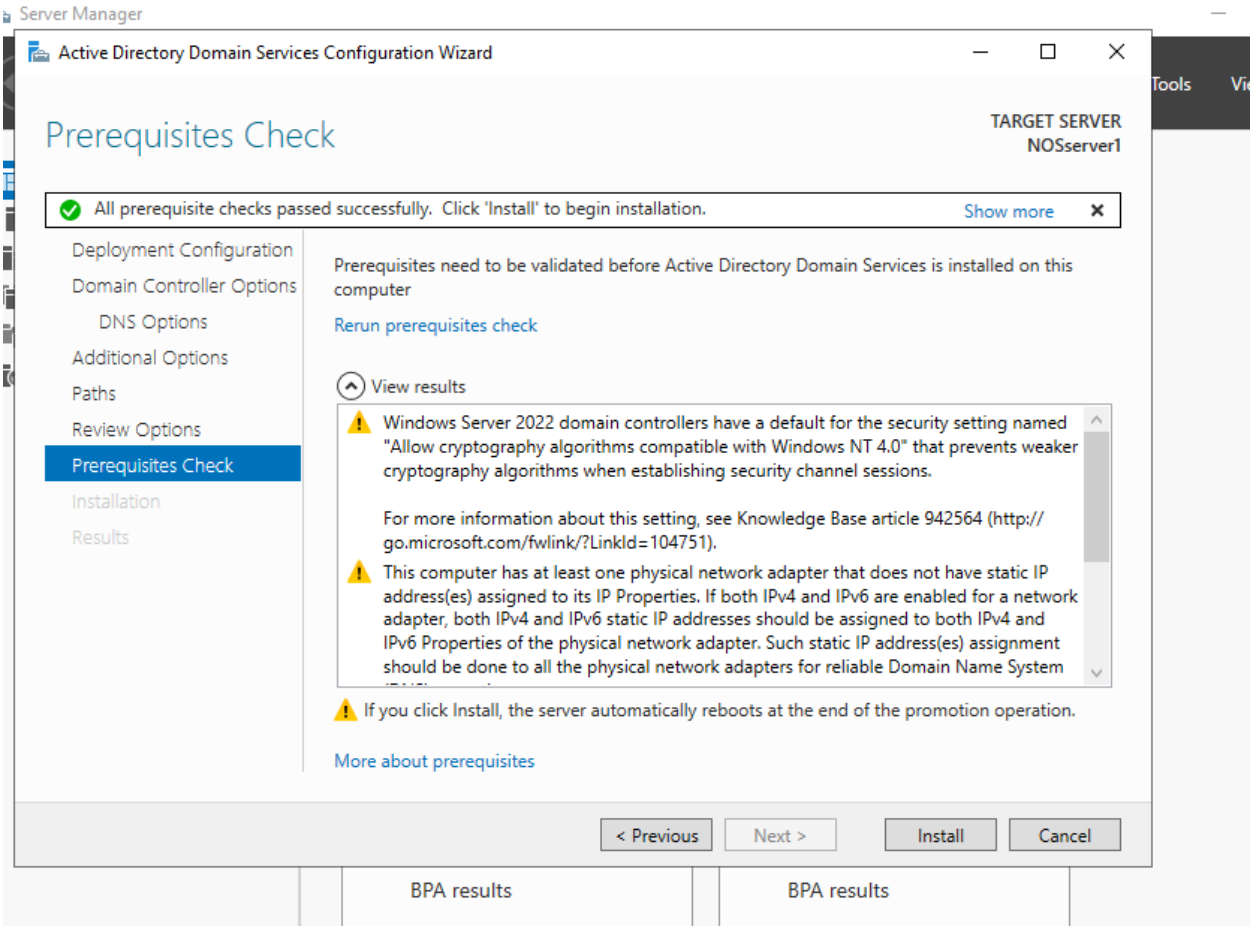

Figure 18: Checking passed Prerequisites

xvii. Complete Configuration

Action: After installation, the server will restart automatically to apply changes.

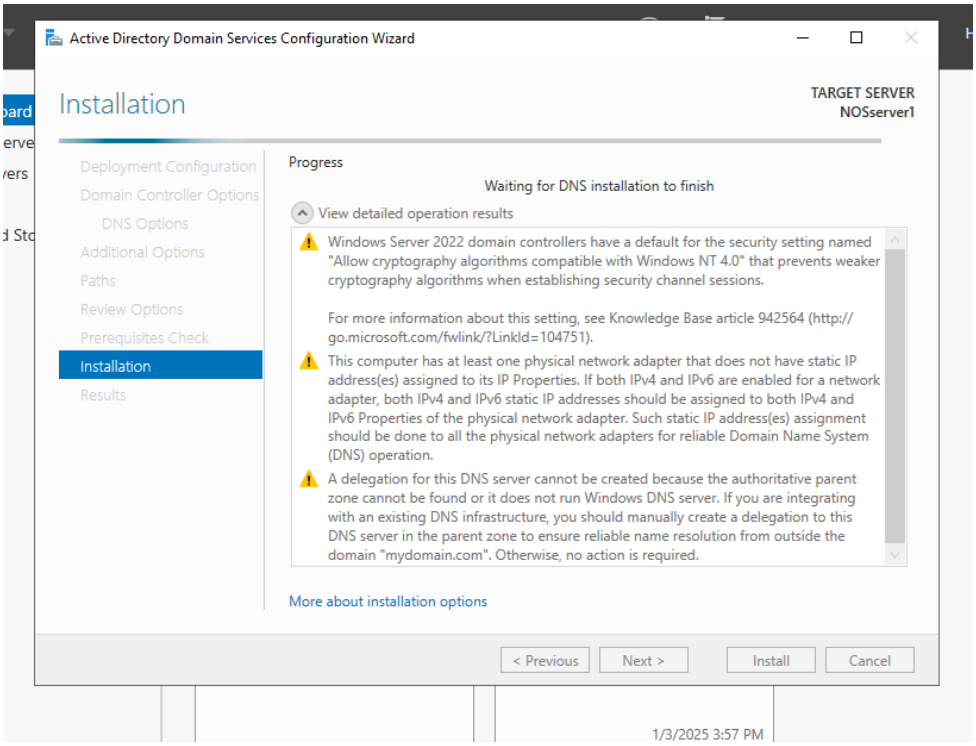

Figure 19: Waiting for DNS installation

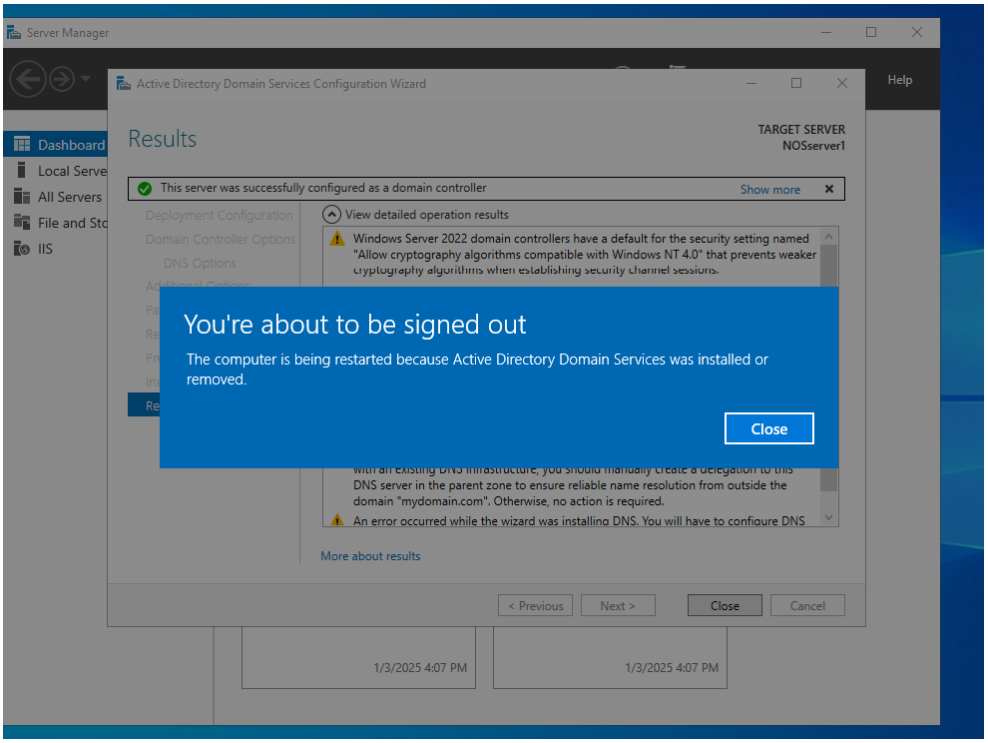

Figure 20: Wating for the Computer to restart

xviii. Verify Domain Controller Installation

Action: After reboot, log in and open PowerShell to verify the installation by running the following commands:

- Get-Service adws,kdc,netlogon,dns
    - This command checks the status of AD-related services

```
PS C:\Users\Administrator> get-service adws,kdc,netlogon,dns

Status   Name               DisplayName
------   ----               -----------
Running  adws               Active Directory Web Services
Running  dns                DNS Server
Running  kdc                Kerberos Key Distribution Center
Running  Netlogon           netlogon
```

Figure 21: Checking the status of AD-related services

- Get-ADDomainController
    - This command provides details about the domain controller.

```
PS C:\Users\Administrator> get-addomaincontroller


ComputerObjectDN           : CN=NOSSERVER1,OU=Domain Controllers,DC=mydomain,DC=com
DefaultPartition           : DC=mydomain,DC=com
Domain                     : mydomain.com
Enabled                    : True
Forest                     : mydomain.com
HostName                   : NOSserver1.mydomain.com
InvocationId               : 36c506be-0f4b-49bd-a92b-4f74dc6836dc
IPv4Address                : 192.168.1.92
IPv6Address                : 2400:1a00:5b21:50::2
IsGlobalCatalog            : True
IsReadOnly                 : False
LdapPort                   : 389
Name                       : NOSSERVER1
NTDSSettingsObjectDN       : CN=NTDS Settings,CN=NOSSERVER1,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configura
                             tion,DC=mydomain,DC=com
OperatingSystem            : Windows Server 2022 Datacenter Evaluation
OperatingSystemHotfix      :
OperatingSystemServicePack :
OperatingSystemVersion     : 10.0 (20348)
OperationMasterRoles       : {SchemaMaster, DomainNamingMaster, PDCEmulator, RIDMaster...}
Partitions                 : {DC=ForestDnsZones,DC=mydomain,DC=com, DC=DomainDnsZones,DC=mydomain,DC=com,
                             CN=Schema,CN=Configuration,DC=mydomain,DC=com, CN=Configuration,DC=mydomain,DC=com...}
ServerObjectDN             : CN=NOSSERVER1,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configuration,DC=mydomain,
                             DC=com
ServerObjectGuid           : c5c4b349-fcf3-45ec-a396-0cdebec1de7a
Site                       : Default-First-Site-Name
SslPort                    : 636
```

Figure 22: Getting the details about the domain controller

```
PS C:\Users\Administrator> get-addomain mydomain.com


AllowedDNSSuffixes                : {}
ChildDomains                      : {}
ComputersContainer                : CN=Computers,DC=mydomain,DC=com
DeletedObjectsContainer           : CN=Deleted Objects,DC=mydomain,DC=com
DistinguishedName                 : DC=mydomain,DC=com
DNSRoot                           : mydomain.com
DomainControllersContainer        : OU=Domain Controllers,DC=mydomain,DC=com
DomainMode                        : Windows2016Domain
DomainSID                         : S-1-5-21-1456028653-3827110079-1005805552
ForeignSecurityPrincipalsContainer : CN=ForeignSecurityPrincipals,DC=mydomain,DC=com
Forest                            : mydomain.com
InfrastructureMaster              : NOSserver1.mydomain.com
LastLogonReplicationInterval      :
LinkedGroupPolicyObjects          : {CN={31B2F340-016D-11D2-945F-00C04FB984F9},CN=Policies,CN=System,DC=mydomain,DC=com}
LostAndFoundContainer             : CN=LostAndFound,DC=mydomain,DC=com
ManagedBy                         :
Name                              : mydomain
NetBIOSName                       : MYDOMAIN
ObjectClass                       : domainDNS
ObjectGUID                        : eaab5c1d-55ac-48ab-92fe-2f11fa2ab21c
ParentDomain                      :
PDCEmulator                       : NOSserver1.mydomain.com
PublicKeyRequiredPasswordRolling  : True
QuotasContainer                   : CN=NTDS Quotas,DC=mydomain,DC=com
ReadOnlyReplicaDirectoryServers   : {}
ReplicaDirectoryServers           : {NOSserver1.mydomain.com}
RIDMaster                         : NOSserver1.mydomain.com
SubordinateReferences             : {DC=ForestDnsZones,DC=mydomain,DC=com, DC=DomainDnsZones,DC=mydomain,DC=com,
                                    CN=Configuration,DC=mydomain,DC=com}
SystemsContainer                  : CN=System,DC=mydomain,DC=com
UsersContainer                    : CN=Users,DC=mydomain,DC=com
```

Figure 23: Adding domain mydomain.com

- Get-ADForest mydomain.com
    - This command shows details about the Active Directory Forest.

```
PS C:\Users\Administrator> get-adforest mydomain.com


ApplicationPartitions : {DC=ForestDnsZones,DC=mydomain,DC=com, DC=DomainDnsZones,DC=mydomain,DC=com}
CrossForestReferences : {}
DomainNamingMaster    : NOSserver1.mydomain.com
Domains               : {mydomain.com}
ForestMode            : Windows2016Forest
GlobalCatalogs        : {NOSserver1.mydomain.com}
Name                  : mydomain.com
PartitionsContainer   : CN=Partitions,CN=Configuration,DC=mydomain,DC=com
RootDomain            : mydomain.com
SchemaMaster          : NOSserver1.mydomain.com
Sites                 : {Default-First-Site-Name}
SPNSuffixes           : {}
UPNSuffixes           : {}
```

Figure 24: Viewing the details about the Active Directory Forest

xix. Resolving errors

```
PS C:\Users\Administrator> Get-Service adws,kds,netlogon,dns
Get-Service : Cannot find any service with service name 'kds'.
At line:1 char:1
+ Get-Service adws,kds,netlogon,dns
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : ObjectNotFound: (kds:String) [Get-Service], ServiceCommandException
    + FullyQualifiedErrorId : NoServiceFoundForGivenName,Microsoft.PowerShell.Commands.GetServiceCommand

Get-Service : Cannot find any service with service name 'dns'.
At line:1 char:1
+ Get-Service adws,kds,netlogon,dns
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : ObjectNotFound: (dns:String) [Get-Service], ServiceCommandException
    + FullyQualifiedErrorId : NoServiceFoundForGivenName,Microsoft.PowerShell.Commands.GetServiceCommand

Status   Name               DisplayName
------   ----               -----------
Running  adws               Active Directory Web Services
Running  Netlogon           netlogon


PS C:\Users\Administrator> Get-Service -Name KdsSvc

Status   Name               DisplayName
------   ----               -----------
Stopped  KdsSvc             Microsoft Key Distribution Service
```

Figure 25: Error with dns and kds

```
PS C:\Users\Administrator> Install-WindowsFeature -Name "RSAT-AD-PowerShell" -IncludeAllSubFeatures
Install-WindowsFeature : A parameter cannot be found that matches parameter name 'IncludeAllSubFeatures'.
At line:1 char:51
+ ... tall-WindowsFeature -Name "RSAT-AD-PowerShell" -IncludeAllSubFeatures
+                                                    ~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : InvalidArgument: (:) [Install-WindowsFeature], ParameterBindingException
    + FullyQualifiedErrorId : NamedParameterNotFound,Microsoft.Windows.ServerManager.Commands.AddWindowsFeature

PS C:\Users\Administrator>
PS C:\Users\Administrator>
PS C:\Users\Administrator>
PS C:\Users\Administrator>
PS C:\Users\Administrator> Install-WindowsFeature -Name "RSAT-AD-PowerShell" -IncludeAllSubFeature

Success Restart Needed Exit Code      Feature Result
------- -------------- ---------      --------------
True    No             NoChangeNeeded {}


PS C:\Users\Administrator> Get-WindowsFeature -Name <Feature-Name>
At line:1 char:26
+ Get-WindowsFeature -Name <Feature-Name>
+                          ~
The '<' operator is reserved for future use.
    + CategoryInfo          : ParserError: (:) [], ParentContainsErrorRecordException
    + FullyQualifiedErrorId : RedirectionNotSupported

PS C:\Users\Administrator> Get-WindowsFeature -Name RSAT-AD-PowerShell

Display Name                                            Name                    Install State
------------                                            ----                    -------------
            [X] Active Directory module for Windows ... RSAT-AD-PowerShell          Installed


PS C:\Users\Administrator> install-windowsfeature -name RSAT-AD-PowerShell

Success Restart Needed Exit Code      Feature Result
------- -------------- ---------      --------------
True    No             NoChangeNeeded {}
```

Figure 26: Installing RSAT-AD-PowerShell Features

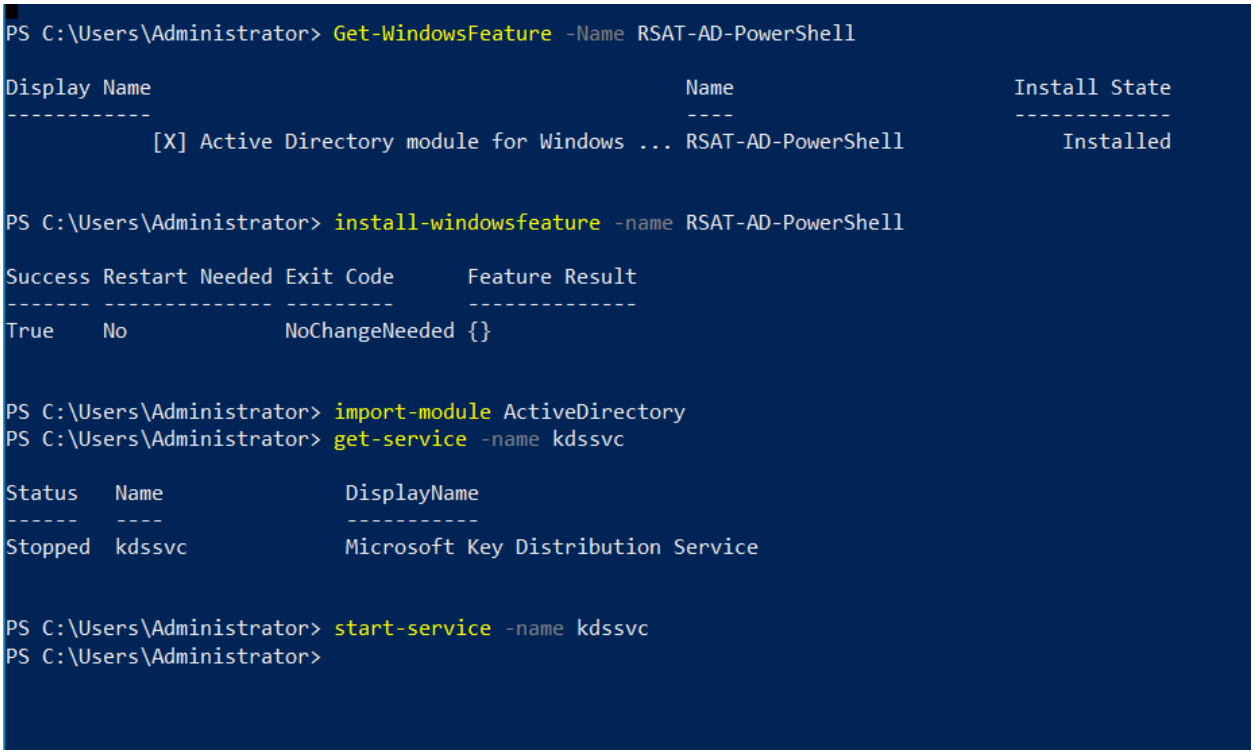

Figure 27: Importing module active directory-

5. Conclusion

This log provides hands-on experience in setting up Active Directory Domain Services on Windows Server 2022. And configuration of a new AD forest, creation and management of various AD objects, implementation of Group policies, integration of client machines into the domain, and verification of the overall setup.

References

Microsoft. (2024). *Microsoft Learn Challenge*. Retrieved from https://learn.microsoft.com/en-us/windows-server/identity/ad-ds/get-started/virtual-dc/active-directory-domain-services-overview?utm_source=chatgpt.com

Microsoft. (n.d.). *Windows Server documentation*. Retrieved November 06, 2024, from https://learn.microsoft.com/en-us/windows/win32/srvnodes/windows-server