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Declaration: I understand that I am required to submit my assignment under the appropriate module page prior to the specified deadline, in order for it to be considered for marking. I acknowledge that any assignment submitted after the deadline will be deemed as a non-submission and will not be marked, resulting in a score of zero.

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1. Introduction

This lab report focuses on the practical implementation of configuring a Windows Server 2022 system to set up an Active Directory Domain Controller (AD DC) and manage network resources efficiently. Active Directory (AD) is a Microsoft product that operates as a directory service, providing centralized access, management, and permissions for network resources.

We are using Windows Server 2022 (Desktop Experience) to demonstrate the process of configuring an Active Directory Domain Controller to manage network resources effectively. Also, Oracle VirtualBox is employed to create and manage the virtual machine (VM) for hosting the Windows Server. By using this setup, we can simulate a professional network environment, gaining hands-on experience without the need for dedicated hardware.

2. Objective

The main objective of this workshop is to install the active directory Domain Services in Windows Server 2022.

3. Required Tools

- a. Oracle VirtualBox: to create and manage virtual environments.
- b. Windows Server 2022 (Desktop Experience) installed in Oracle VirtualBox.

4. Steps to Replicate

To install the Active Directory Domain Services, we need to follow the following process.

Installing Active Directory Domain Services

First, Login to Windows server 2022 as an administrator and open the Server Manager as shown in picture below:

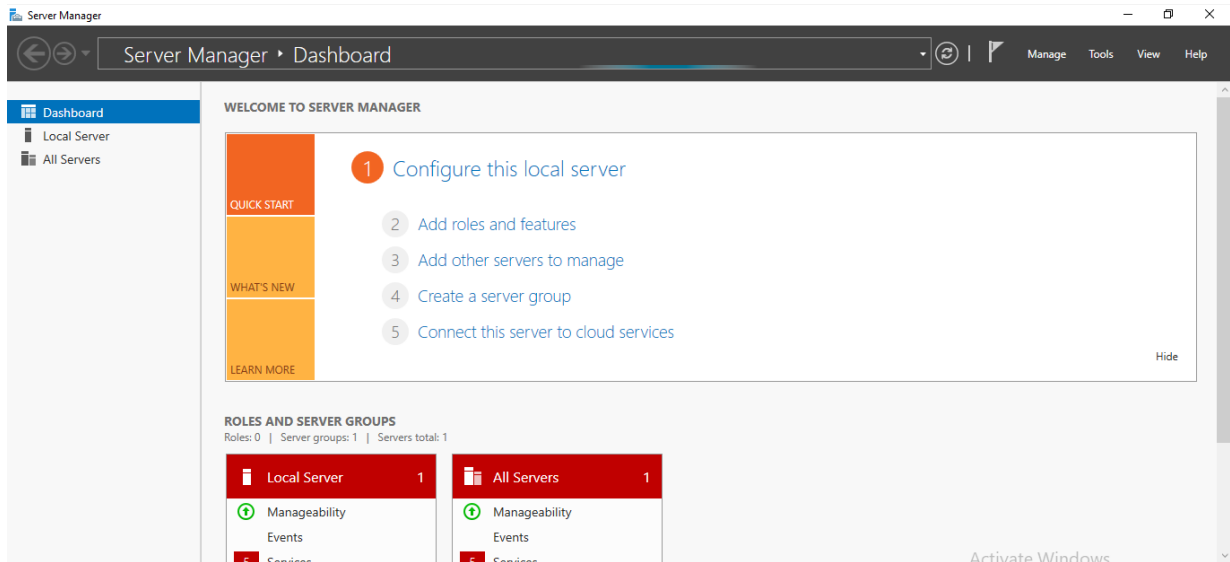


Figure 1: Server Manager Dashboard

Open Add Roles and Features Wizard by clicking on Add Roles and Features.

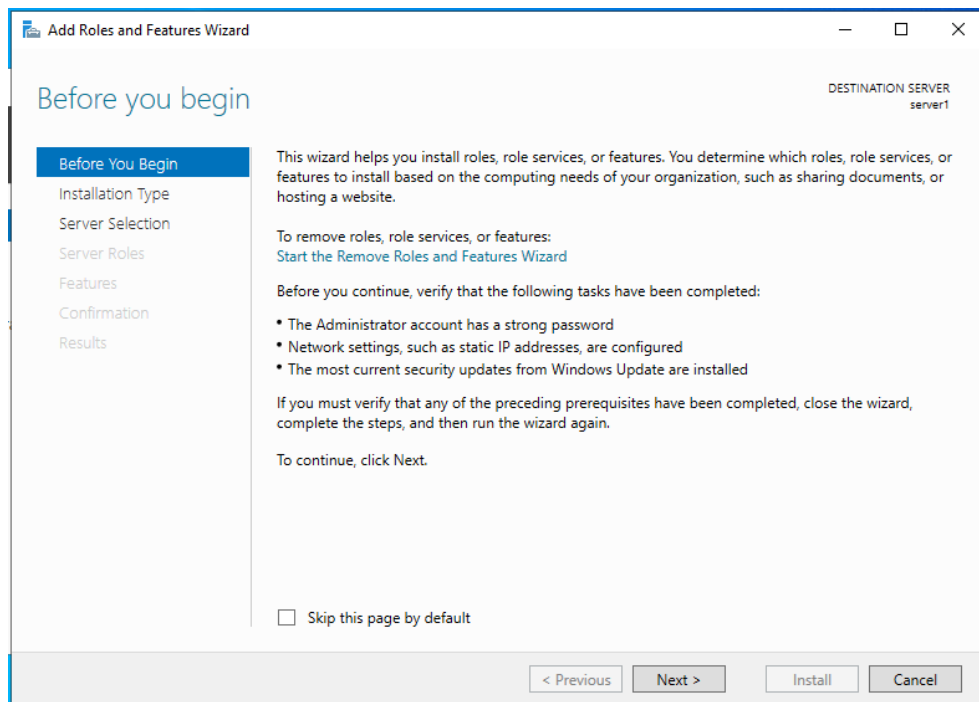


Figure 2: Add Roles and Features Wizard

After clicking on the Next button, we will be asked to select the installation type.

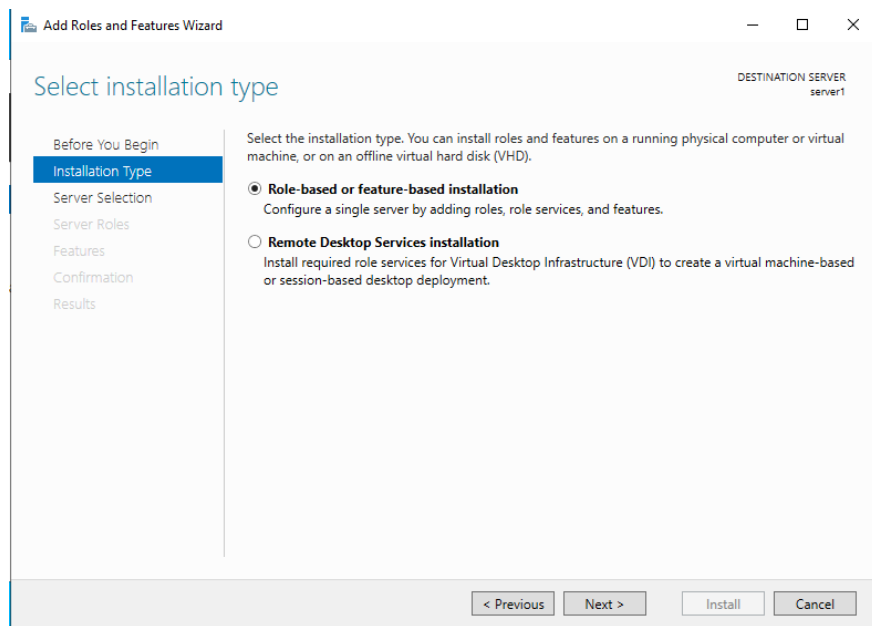


Figure 3: Installation Type

Click on the Next button, then a now dialog box will appear where we need to select the destination server as shown in picture below:

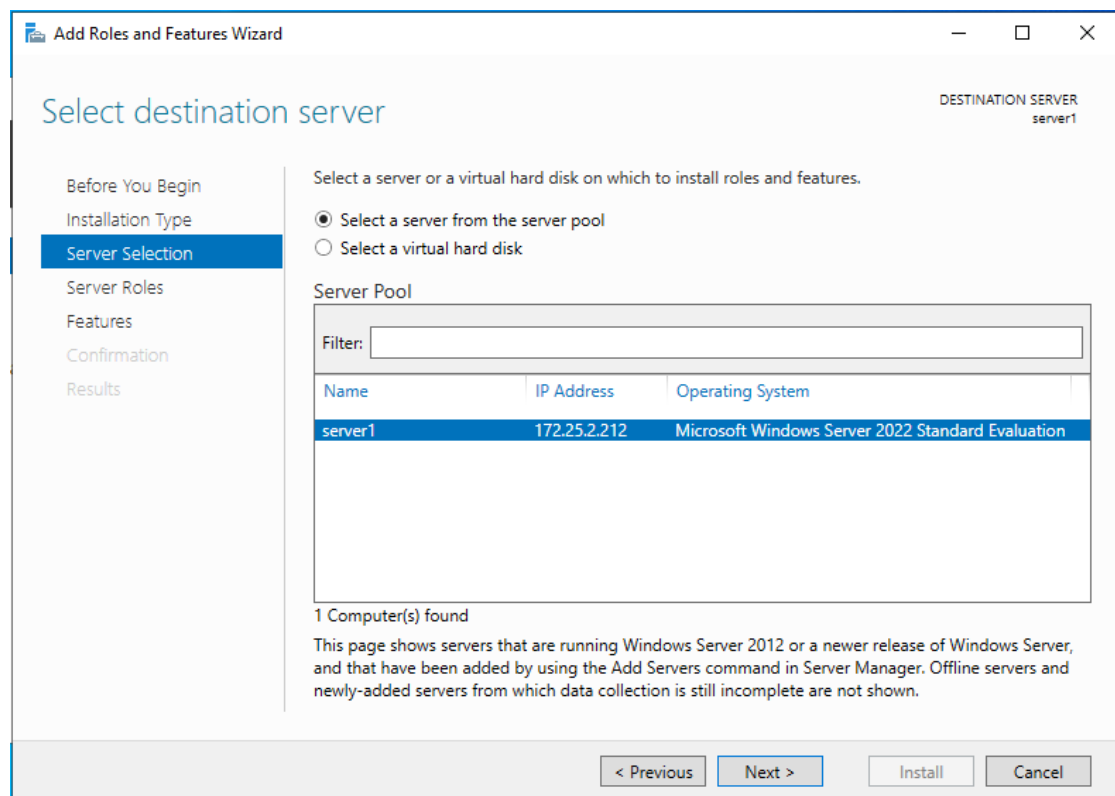


Figure 4: Selecting destination server

Now, select “Select a server from the server pool” and click on the Next button. Then, we need to select the server roles also.

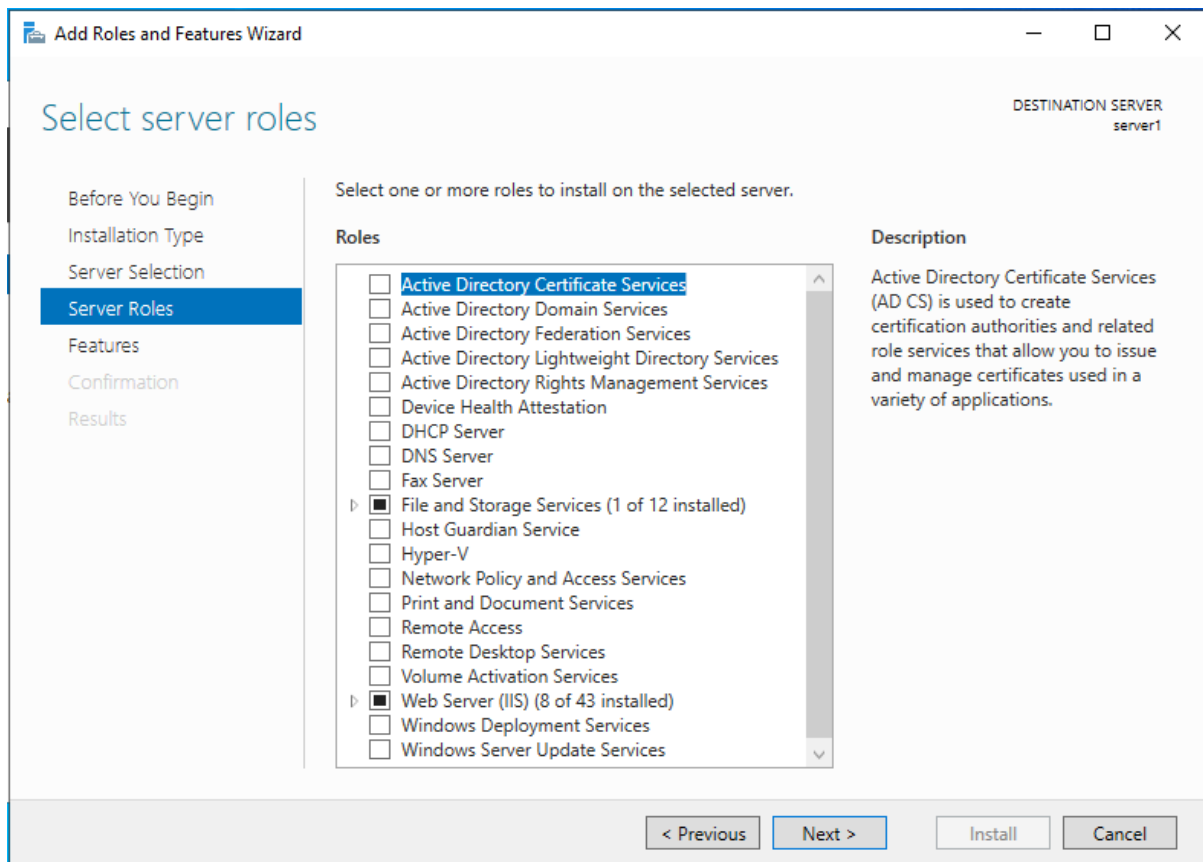


Figure 5: Selecting server roles

Select Active Directory Domain Services and click on Next button. Then we need to select the features as per our need as shown in the picture below.

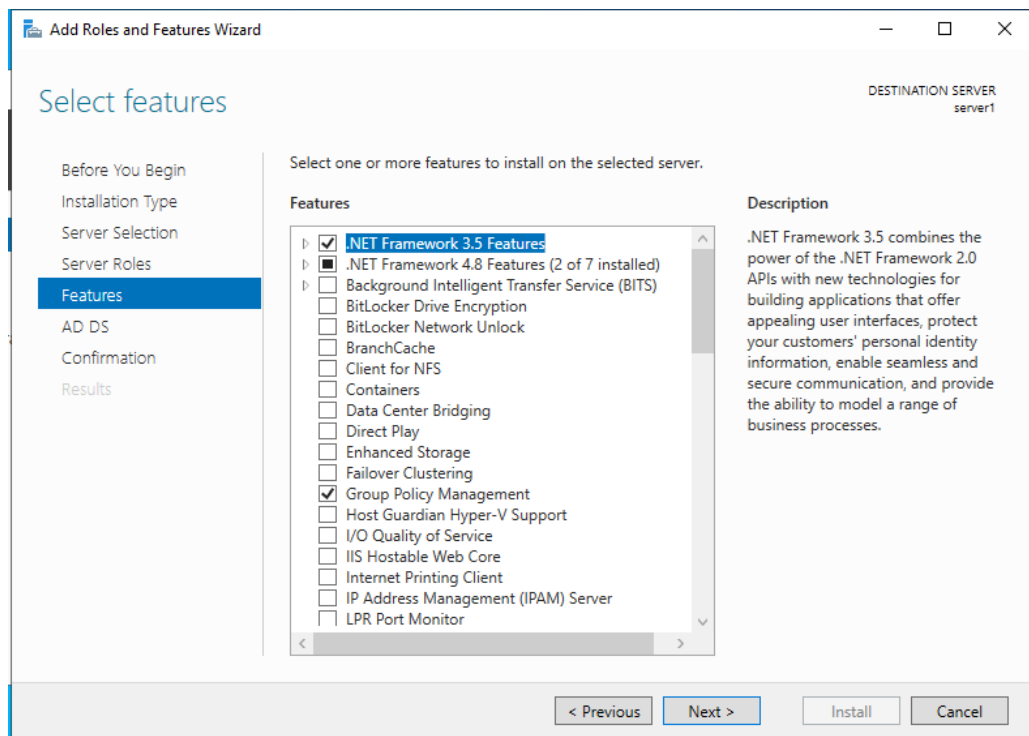


Figure 6: Selecting features to be installed

Click on Add Features button.

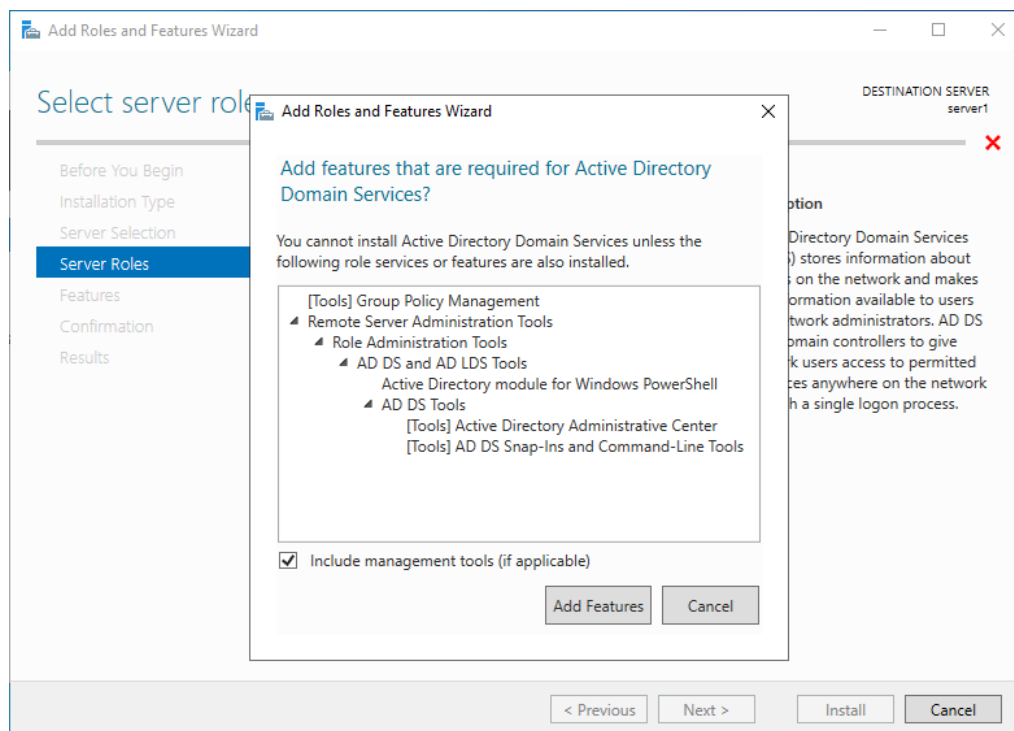


Figure 7: Adding necessary features

Click on Next button. Then, a dialog box will appear asking for confirmation to start installation.

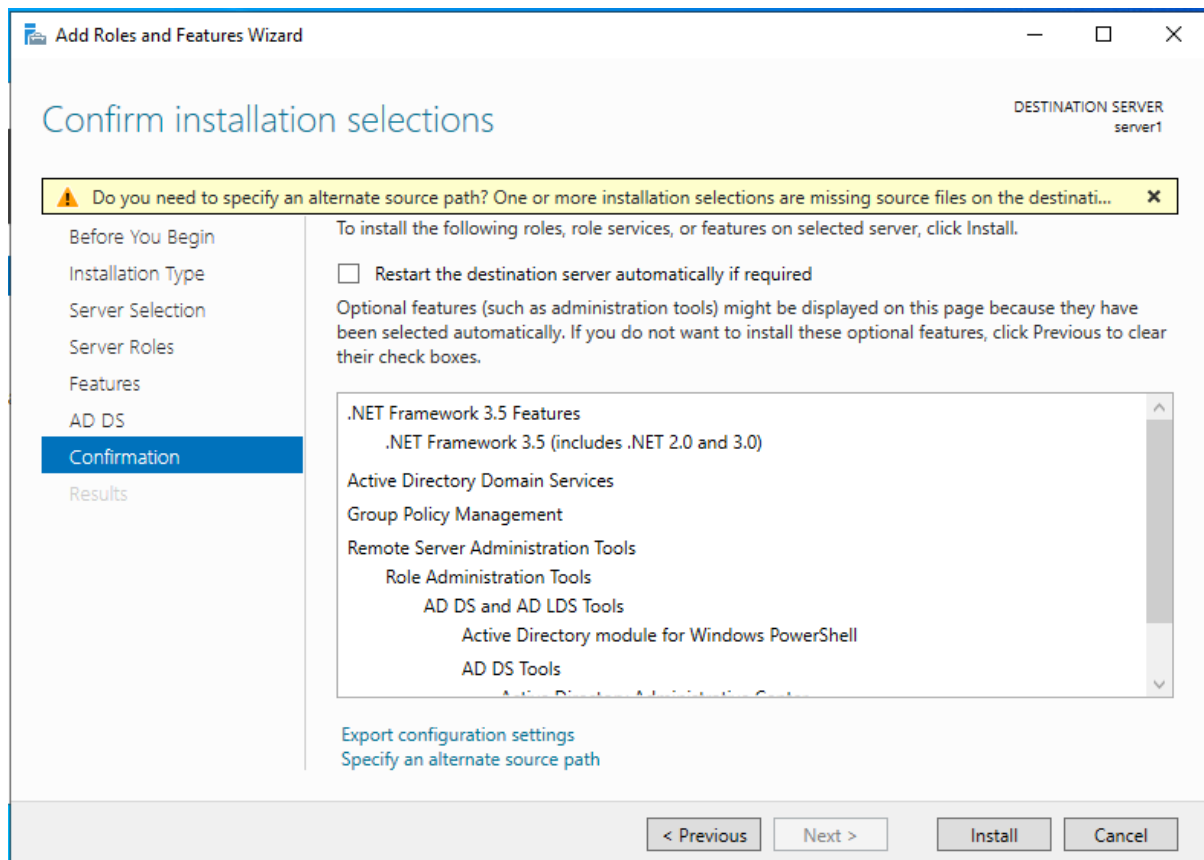


Figure 8: Confirming installation

We can click on the Install button to start installation which may take some time.

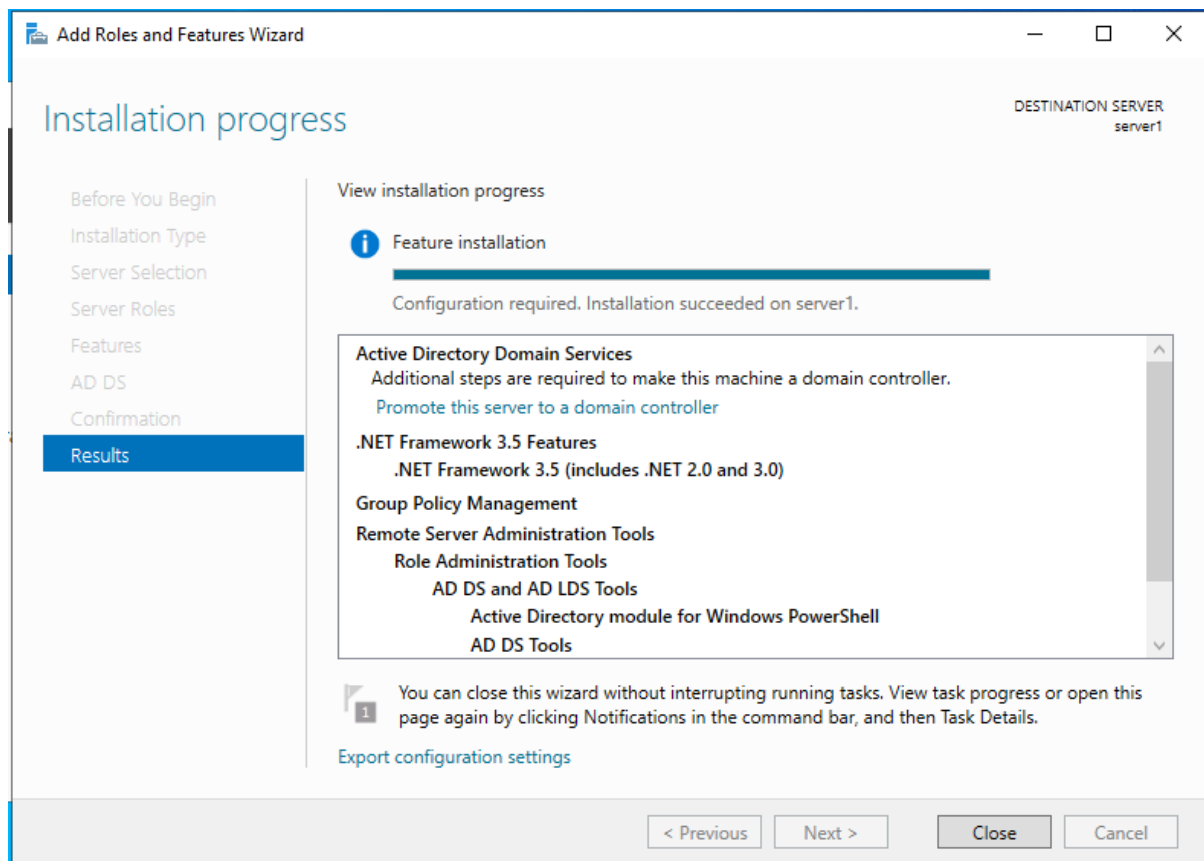


Figure 9: Installing the required and selected features

After the completion this installation, click on Close button and go to Server Manager Dashboard.

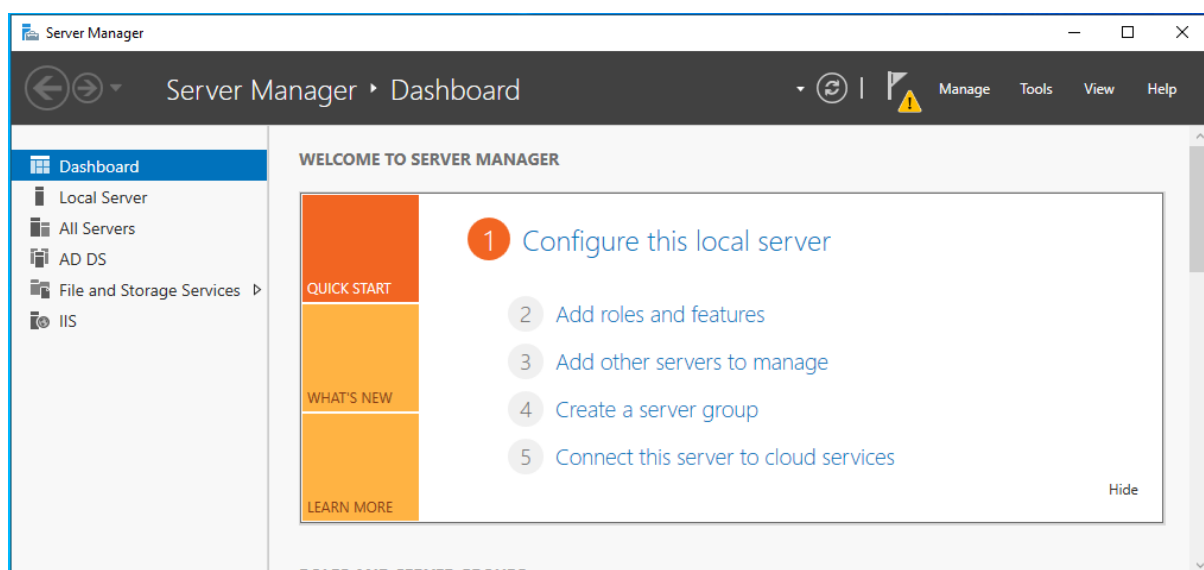


Figure 10: Server manager

Here, we can see the yellow notification icon. Click on it.

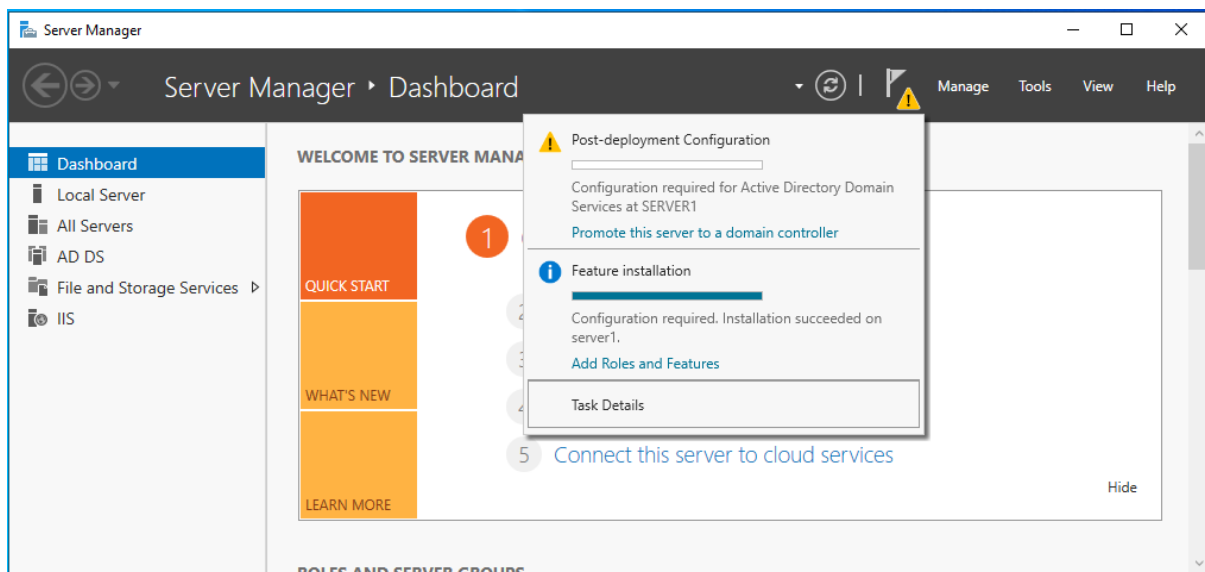


Figure 11: Checking notification for further action

Now, click on “Promote this server to a domain controller”. It will lead us to the deployment configuration page:

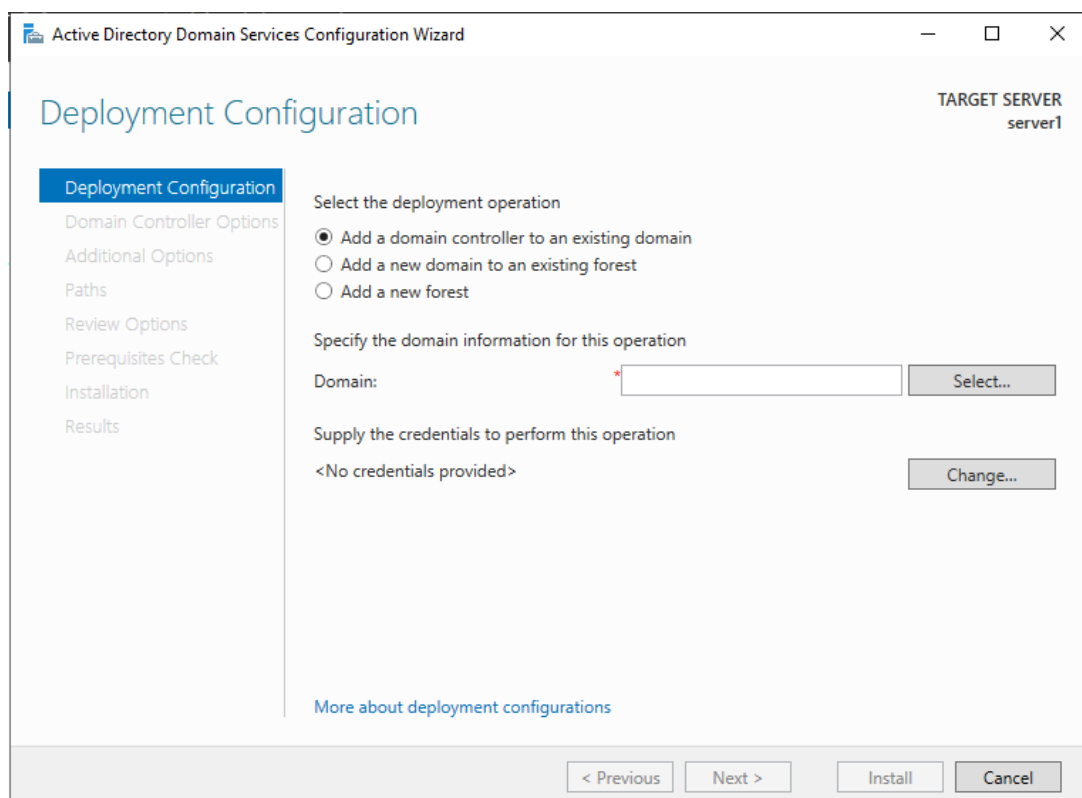


Figure 12: Specifying domain information

Now, select “Add a new forest” and enter the Root domain name as follows:

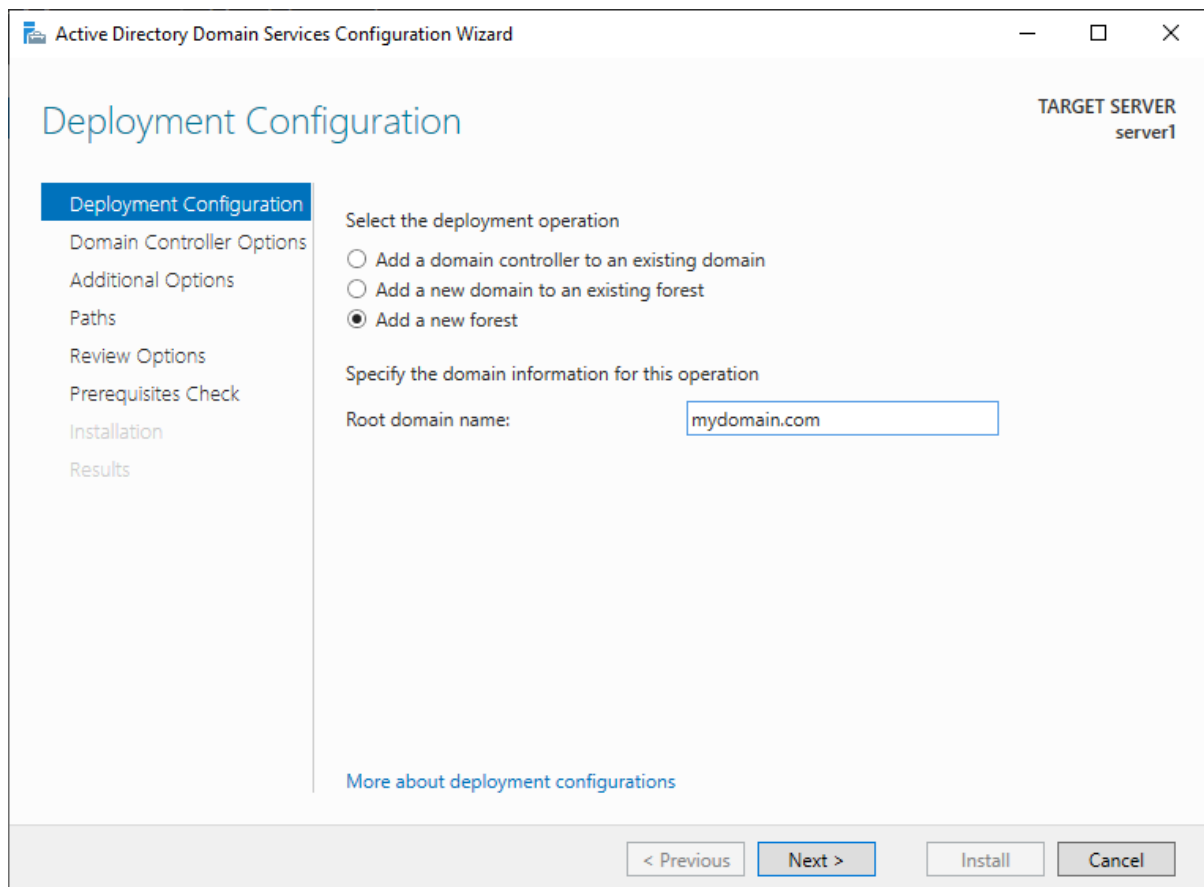
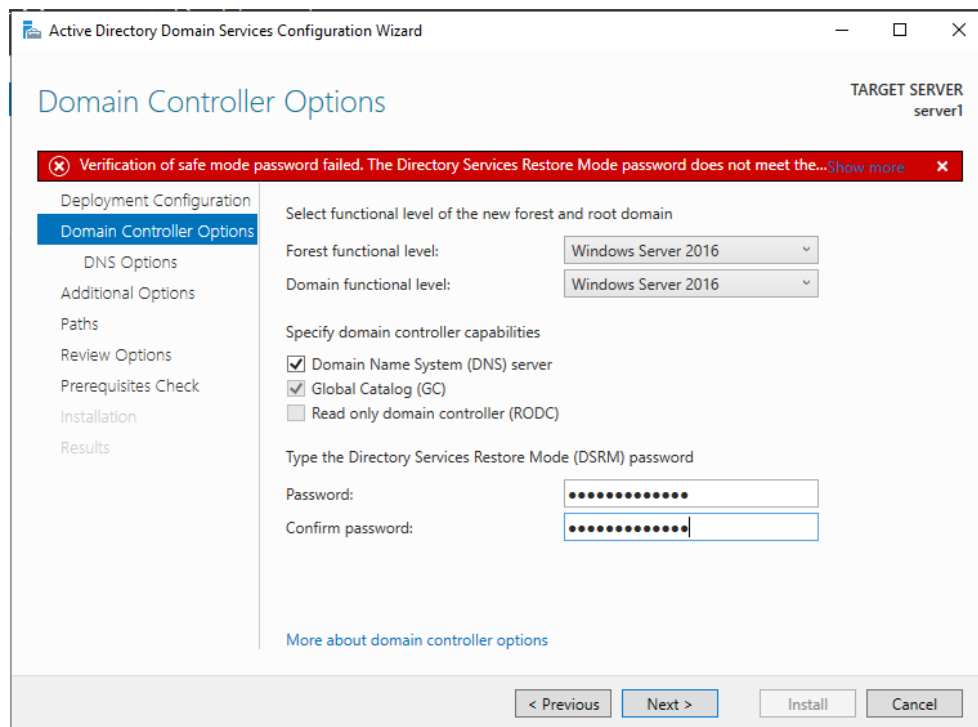


Figure 13: Adding new forest and root domain name

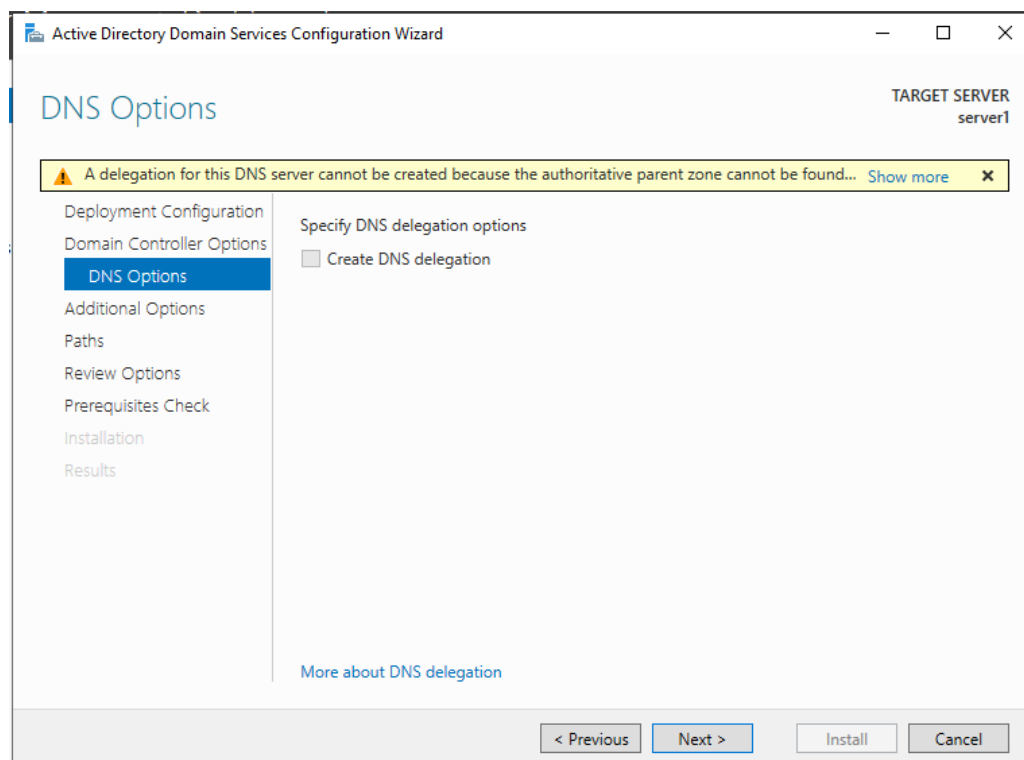
Click on the Next button, then we will see the domain controller page as in the picture below. We need to meet certain requirements for Directory Service Restore Mode Password, enter it.



The screenshot shows the 'Domain Controller Options' step of the Active Directory Domain Services Configuration Wizard. A red error banner at the top states: 'Verification of safe mode password failed. The Directory Services Restore Mode password does not meet the... Show more'. The left sidebar lists the steps: Deployment Configuration, Domain Controller Options (selected), DNS Options, Additional Options, Paths, Review Options, Prerequisites Check, Installation, and Results. The main area is titled 'Select functional level of the new forest and root domain' and contains two dropdown menus for 'Forest functional level' and 'Domain functional level', both set to 'Windows Server 2016'. Below this, under 'Specify domain controller capabilities', are three checkboxes: 'Domain Name System (DNS) server' (checked), 'Global Catalog (GC)' (checked), and 'Read only domain controller (RODC)' (unchecked). At the bottom, there are two password fields labeled 'Password:' and 'Confirm password:', both filled with dots. A link 'More about domain controller options' is at the bottom left. Navigation buttons at the bottom right include '< Previous', 'Next >', 'Install', and 'Cancel'.

Figure 14: Entering requirements for domain controller options

After clicking the Next button, DNS options page will open.



The screenshot shows the 'DNS Options' step of the Active Directory Domain Services Configuration Wizard. A yellow warning banner at the top states: 'A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found... Show more'. The left sidebar lists the steps: Deployment Configuration, Domain Controller Options, DNS Options (selected), Additional Options, Paths, Review Options, Prerequisites Check, Installation, and Results. The main area is titled 'Specify DNS delegation options' and contains a checkbox for 'Create DNS delegation', which is unchecked. A link 'More about DNS delegation' is at the bottom left. Navigation buttons at the bottom right include '< Previous', 'Next >', 'Install', and 'Cancel'.

Figure 15: DNS options

Leave the configuration as it is and click on Next button which will ask us to set a NetBIOS name as shown in picture below:

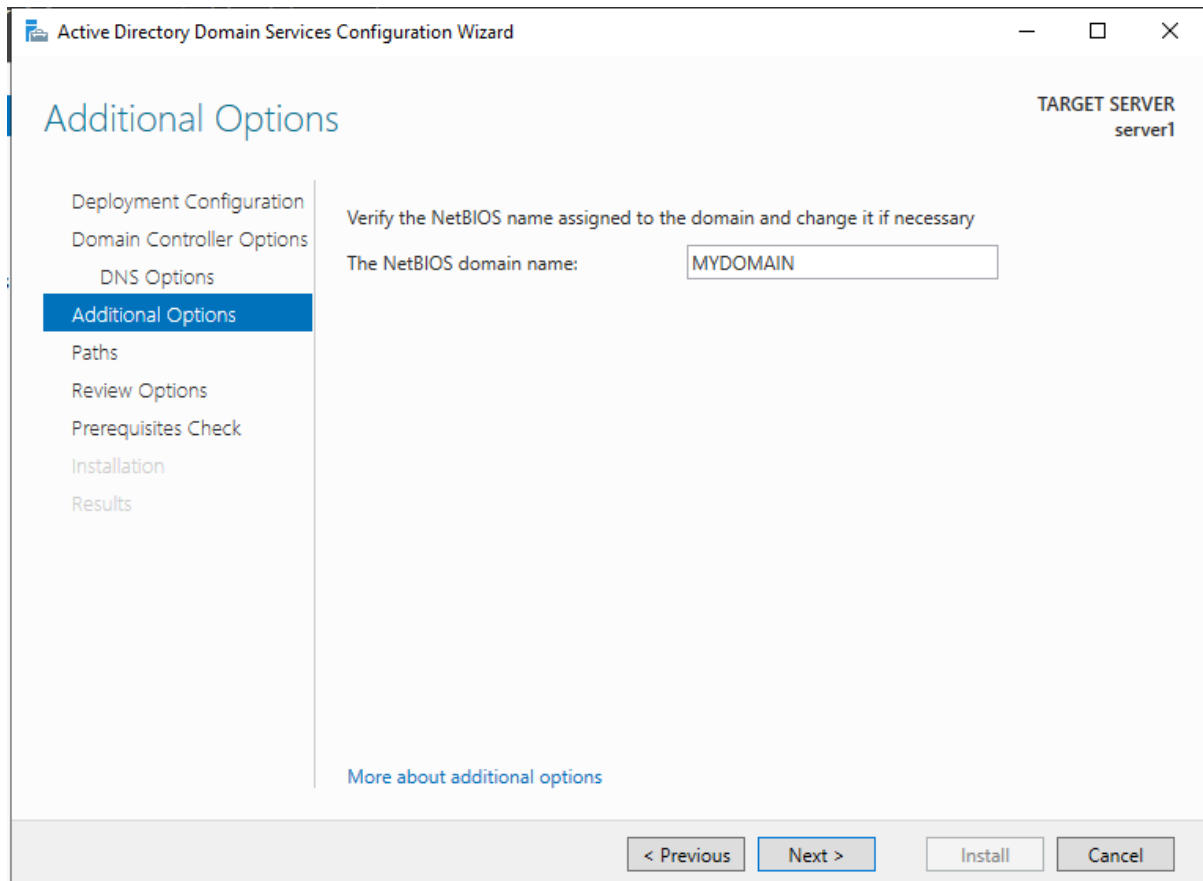


Figure 16: Verifying NetBIOS domain name

Enter NetBIOS name and click on the Next button. Here, we need to define the AD DS database path location:

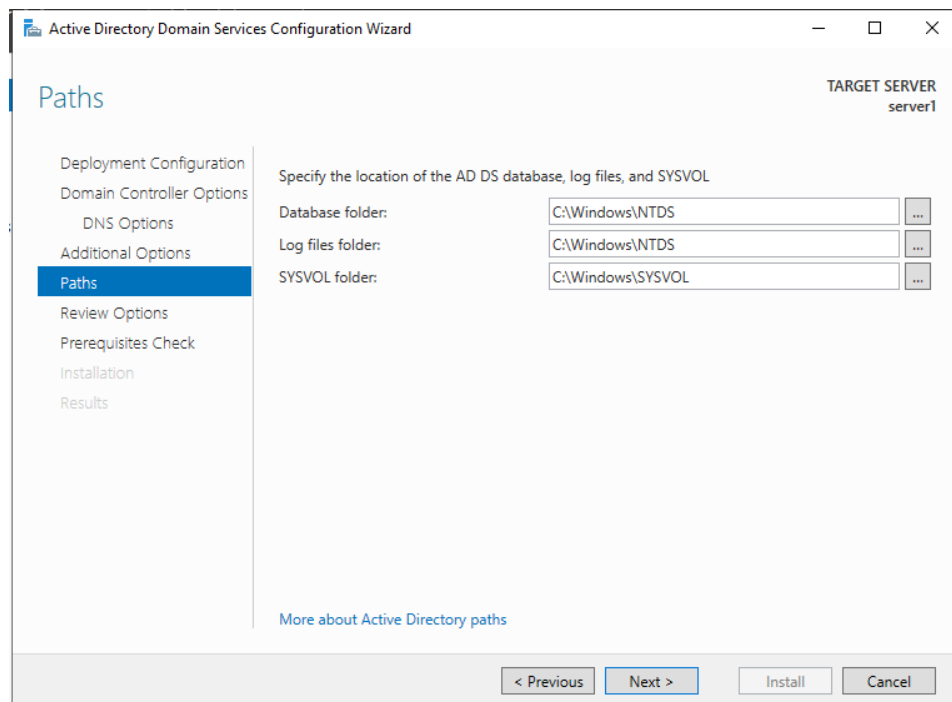


Figure 17: AD DS database path

It will show the default paths, but we can change them if necessary. Click on the Next button then, it will show the Review Options page as in picture below:

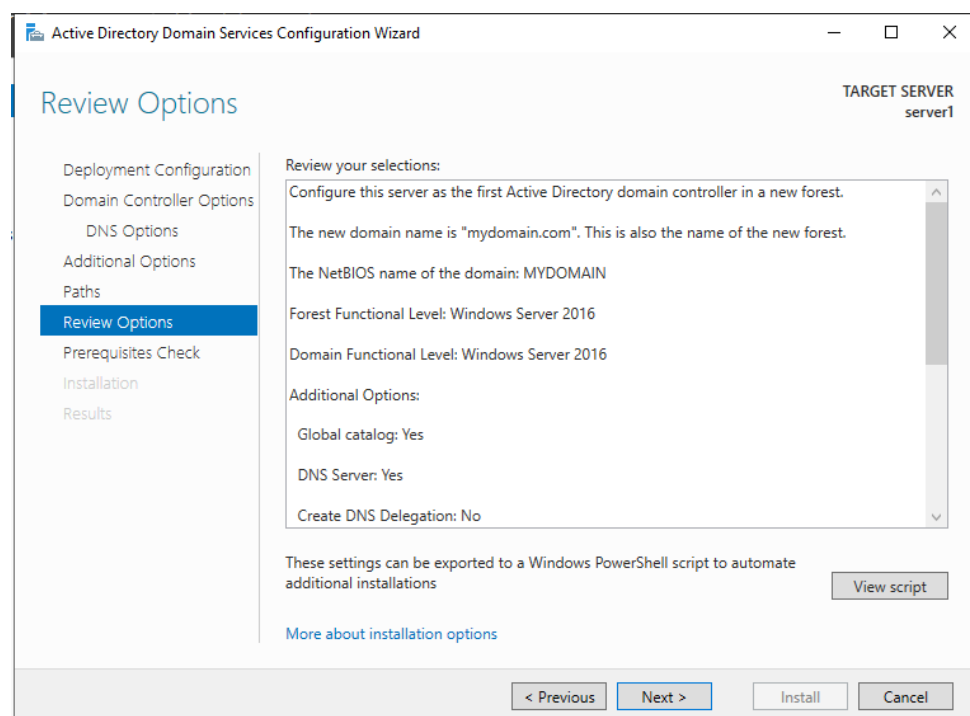


Figure 18: Reviewing overall options

After reviewing the confirmation, we shall see the prerequisites check page as in picture below:

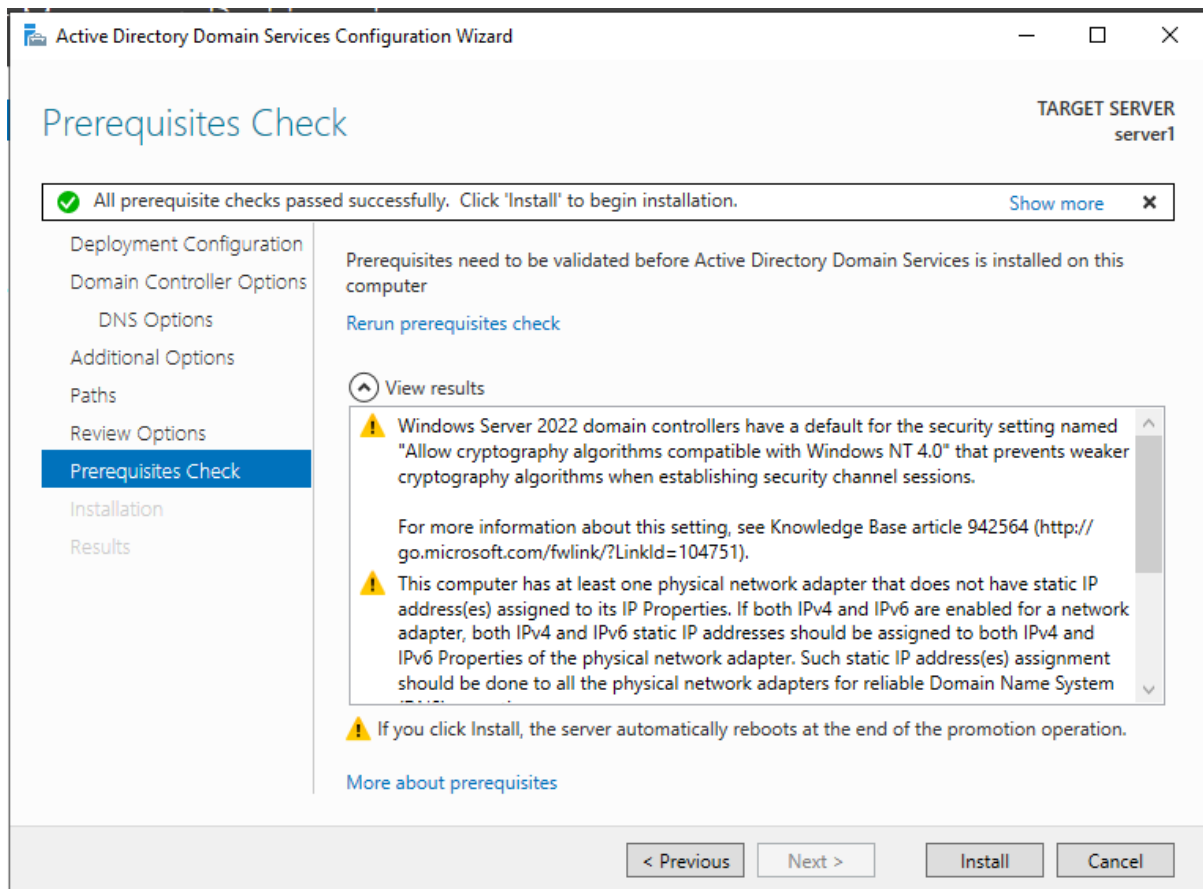


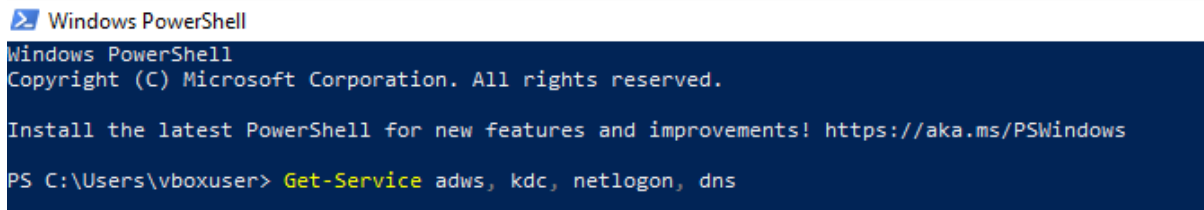
Figure 19: Checking prerequisites

Now, Click on the install button. Once, the installation is complete, the system will restart automatically.

Verification of Domain Controller

To be sure if the Domain Controller is properly set up or not, we can check by running the following commands in the Windows PowerShell.

To confirm the successful installation of the services, running the command 'Get-Service adws, kdc, netlogon, dns' will give the following output:

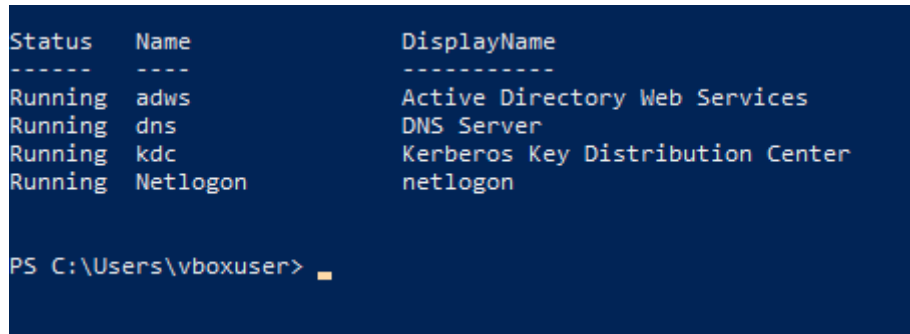


```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\vboxuser> Get-Service adws, kdc, netlogon, dns
```

Figure 20: Checking services

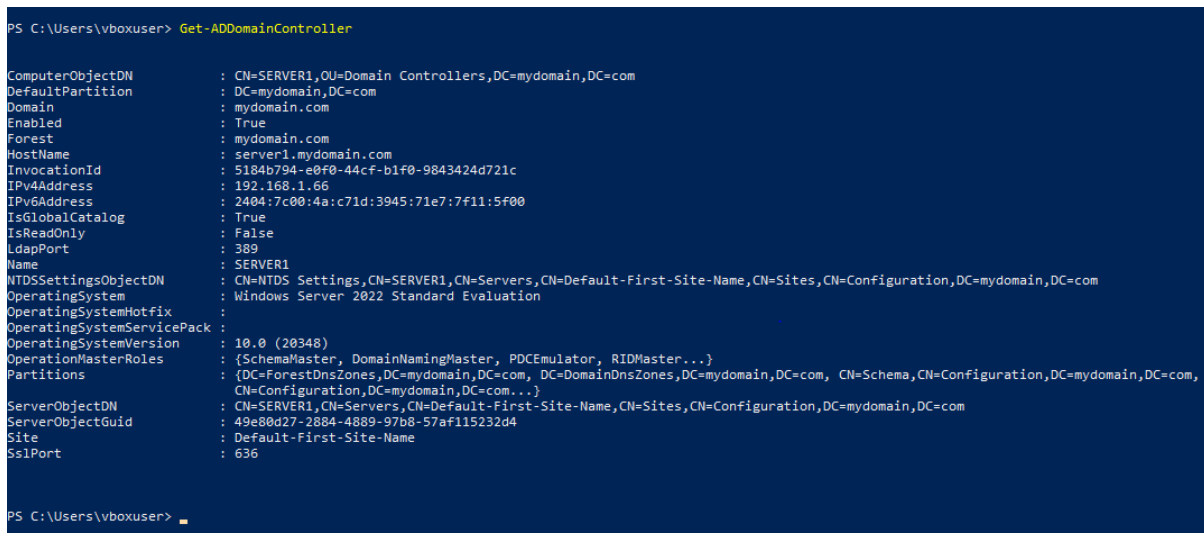


```
Status      Name      DisplayName
-----
Running     adws      Active Directory Web Services
Running     dns       DNS Server
Running     kdc       Kerberos Key Distribution Center
Running     Netlogon  netlogon

PS C:\Users\vboxuser>
```

Figure 21: Running services

To display all the configuration details of the domain controller, we can run the command “Get-ADDomainController”.



```
PS C:\Users\vboxuser> Get-ADDomainController

ComputerObjectDN      : CN=SERVER1,OU=Domain Controllers,DC=mydomain,DC=com
DefaultPartition      : DC=mydomain,DC=com
Domain                : mydomain.com
Enabled               : True
Forest                : mydomain.com
HostName              : server1.mydomain.com
InvocationId           : 5184b794-e0f0-44cf-b1f0-9843424d721c
IPv4Address            : 192.168.1.66
IPv6Address            : 2404:7c00:4a:c71d:3945:71e7:7f11:5f00
IsGlobalCatalog       : True
IsReadOnly             : False
LdapPort               : 389
Name                  : SERVER1
NTDSSettingsObjectDN  : CN=NTDS Settings,CN=SERVER1,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configuration,DC=mydomain,DC=com
OperatingSystem        : Windows Server 2022 Standard 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=SERVER1,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configuration,DC=mydomain,DC=com
ServerObjectGuid       : 49e80d27-2884-4889-97b8-57af115232d4
Site                   : Default-First-Site-Name
SslPort                : 636

PS C:\Users\vboxuser>
```

Figure 22: More information on Domain Controller

To get more detailed information, entering the command “Get-ADDomainController mydomain.com” will give the following information about the domain:

```

PS C:\Users\vboxuser> Get-ADDomainController server1.mydomain.com

ComputerObjectDN      : CN=SERVER1,OU=Domain Controllers,DC=mydomain,DC=com
DefaultPartition      : DC=mydomain,DC=com
Domain                : mydomain.com
Enabled               : True
Forest                : mydomain.com
HostName              : server1.mydomain.com
InvocationId          : 5184b794-e0f0-44cf-b1f0-9843424d721c
IPv4Address           : 192.168.1.66
IPv6Address           : 2404:7c00:4a:c71d:3945:71e7:7f11:5f00
IsGlobalCatalog       : True
IsReadOnly            : False
LdapPort              : 389
Name                  : SERVER1
NTDSSettingsObjectDN  : CN=NTDS Settings,CN=SERVER1,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configuration,DC=mydomain,DC=com
OperatingSystem        : Windows Server 2022 Standard 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=SERVER1,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configuration,DC=mydomain,DC=com
ServerObjectGuid       : 49e80d27-2884-4889-97b8-57af115232d4
Site                   : Default-First-Site-Name
SslPort                : 636

```

Figure 23: More information on the created domain

To know about the Active Directory Forest details, we can run the command “Get-ADForest mydomain.com”.

```

PS C:\Users\vboxuser> Get-ADForest mydomain.com

ApplicationPartitions : {DC=ForestDnsZones,DC=mydomain,DC=com, DC=DomainDnsZones,DC=mydomain,DC=com}
CrossForestReferences : {}
DomainNamingMaster    : server1.mydomain.com
Domains               : {mydomain.com}
ForestMode             : Windows2016Forest
GlobalCatalogs        : {server1.mydomain.com}
Name                  : mydomain.com
PartitionsContainer    : CN=Partitions,CN=Configuration,DC=mydomain,DC=com
RootDomain             : mydomain.com
SchemaMaster           : server1.mydomain.com
Sites                 : {Default-First-Site-Name}
SPNSuffixes           : {}
UPNSuffixes           : {}

```

Figure 24: Active directory forest details

Conclusion

This lab exercise successfully demonstrates the process of configuring an Active Directory Domain Controller using Windows Server 2022. Through a step-by-step approach, we were able to install and configure the necessary server roles and features, set up the Active Directory Domain Services, and verify the functionality of the domain controller in a virtualized environment. It includes understanding the role of Active Directory, configuring domain and DNS settings, and resolving potential issues such as verifying prerequisites and ensuring proper domain controller authentication.