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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, commonly referred to as AD, constitutes one such important Microsoft technology that is a critical part of Windows Server systems. This centralized system includes everything that may be required for user accounts, devices, and resources. In fact, it secures operations that take place in the network environment. Via Active Directory, an administrator on a network can apply permissions for access to resources, authenticate individual users, and enforce security policies all through one point. Data organized into domains, forests, and organizational units allows change and effective control of complex networks. It is highly scalable and is easily applied for use in both small businesses and large, conglomerated enterprises. The database contains the critical information, including user credentials, group memberships, and device details. It has all the features necessary for the definition of single sign-on, which access users through one set of credentials to many different resources. Active Directory is integrated with Domain Name System (DNS), which helps locate different resources with ease. By managing commonly shared resources such as printers and files, Active Directory also generates collaborative environments. It allows disaster recovery options through Directory Services Restore Mode (DSRM). Thus, Active Directory is the backbone of network administration and security.

## 2. Objective

The instructions contained in this guide shall be followed on creating Active Directory Domain Services (AD DS) in Windows Server 2022. This involves the installation and setting up of a domain controller that synchronizes and manages the entire network. AD DS further allows an administrator to define and enforce security policies, simplify authentication procedures, as well as regulate access to resources. The guide is also inclusive of steps needed to create a new forest, establish a domain name, and configure directory services restore mode. By following these procedures, one will be able to build a network structure that is highly secure and scalable. Additionally, this guide provides verification commands in PowerShell to check the health of a domain controller created. This is also intended to reduce complex tasks in a network, making resource sharing easier and increasing efficiency while minimizing management costs. It serves as the backbone for all authentication mechanisms, like Kerberos, to provide a clear understanding of an internal network. Furthermore, the guide focuses on how to maintain and troubleshoot problems regarding an AD environment.

### 3. Steps to install Active Directory Domain Services:

**Step 1:** – Accessing to Windows server 2022 as an administrator and start the Server Manager as described below:

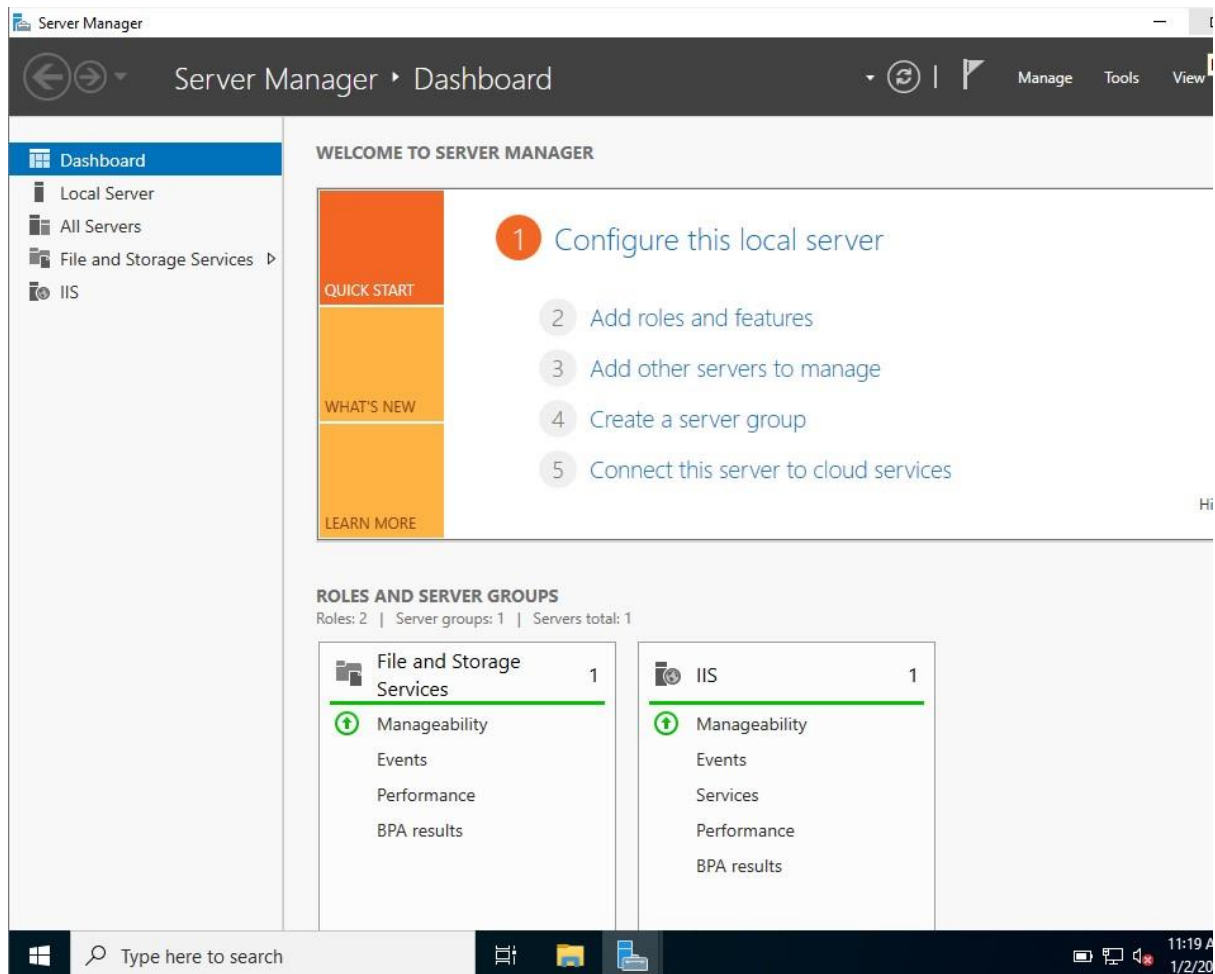


Figure 1: Sever Manager Dashboard

**Step 2:** Select "Add Roles and Features." Then, the Add Roles and Features Wizard will be opened as described below:

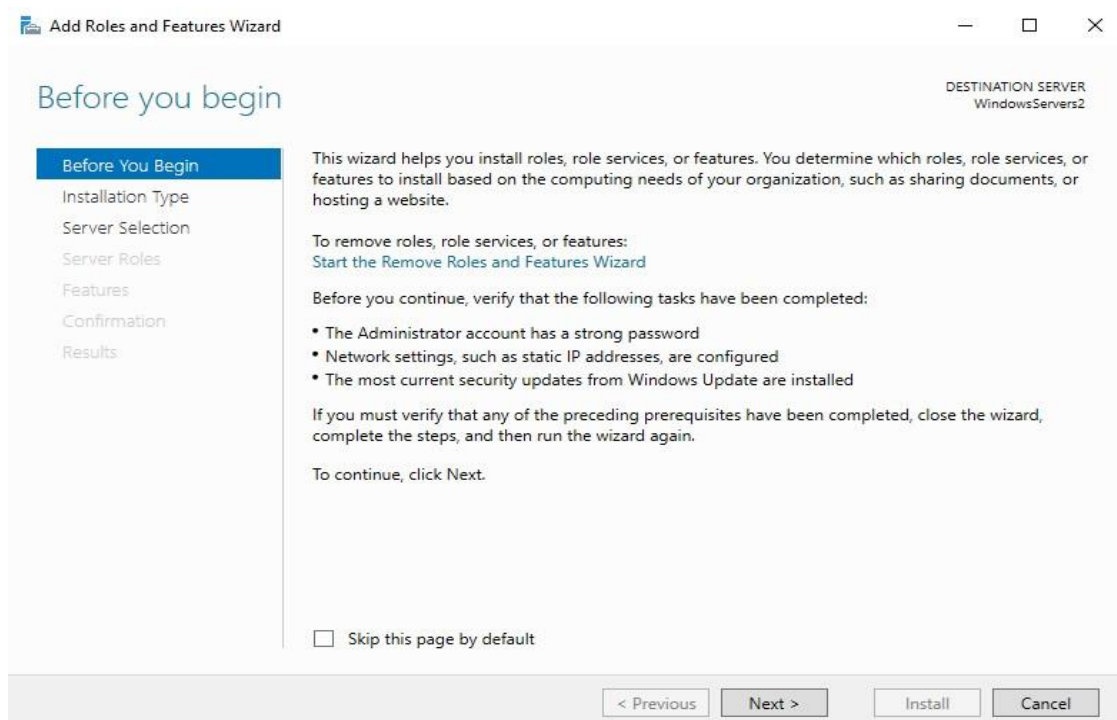


Figure 2: Add roles and feature Wizard

**Step 3:** Tap the “Next” button. You are going to be asked to pick the installation type as displayed below.

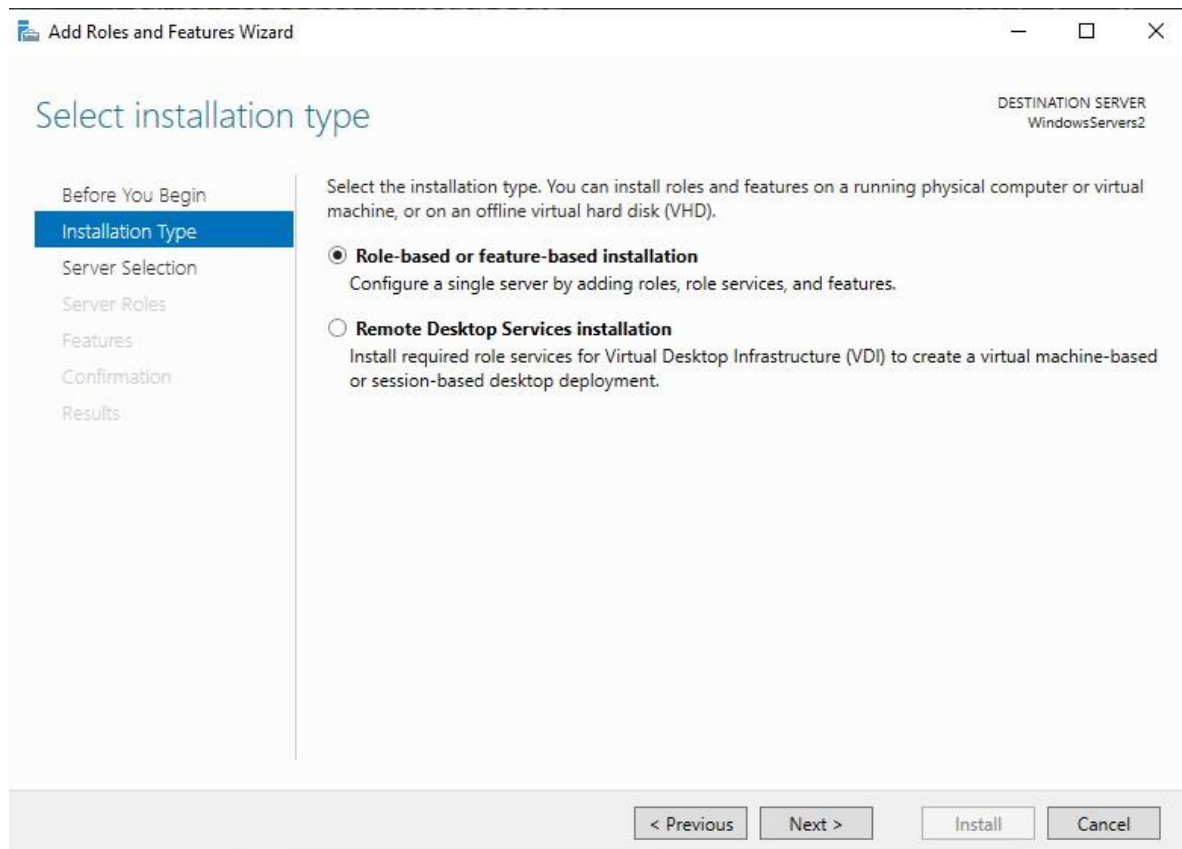


Figure 3 : Select installation type



**Step 4:** After choosing Add Roles and Features Wizard, press the Next button. Then, you are asked to choose a destination server, as displayed below.

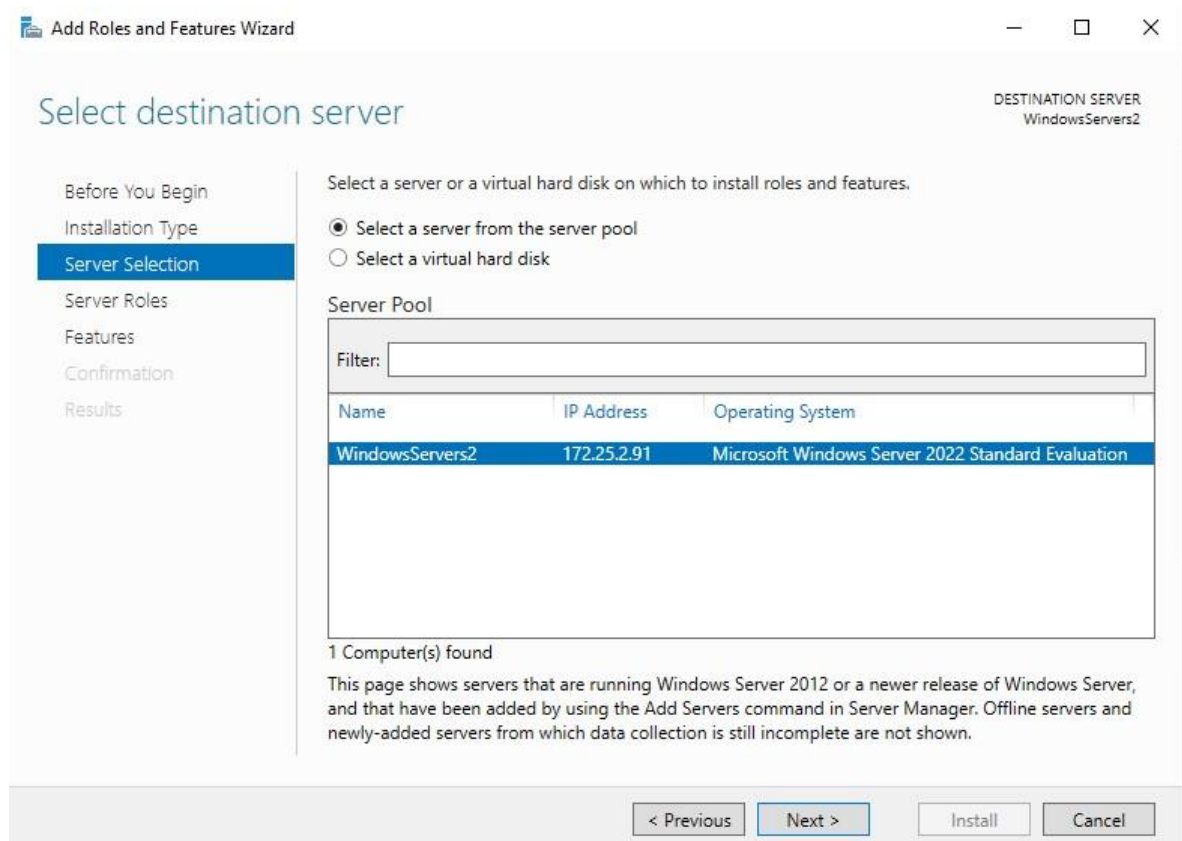


Figure 4 : Select destination server

**Step 5:** Hit the Next button after clicking “Select a server from the server pool”.  
Then, you will be asked to choose from server roles as displayed below:

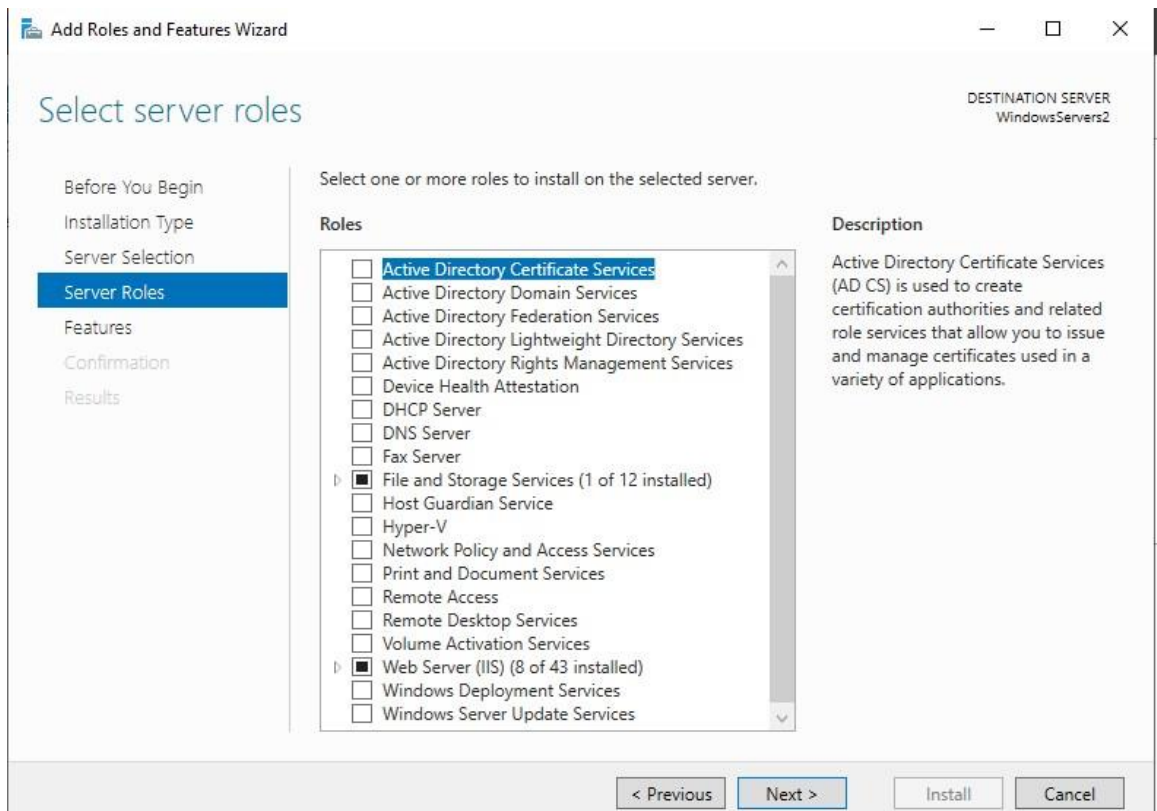


Figure 5 : Selecting a server from the server pool

**Step 6:** Press Next after selecting Active Directory Domain Services. You will be asked to choose the features listed below:

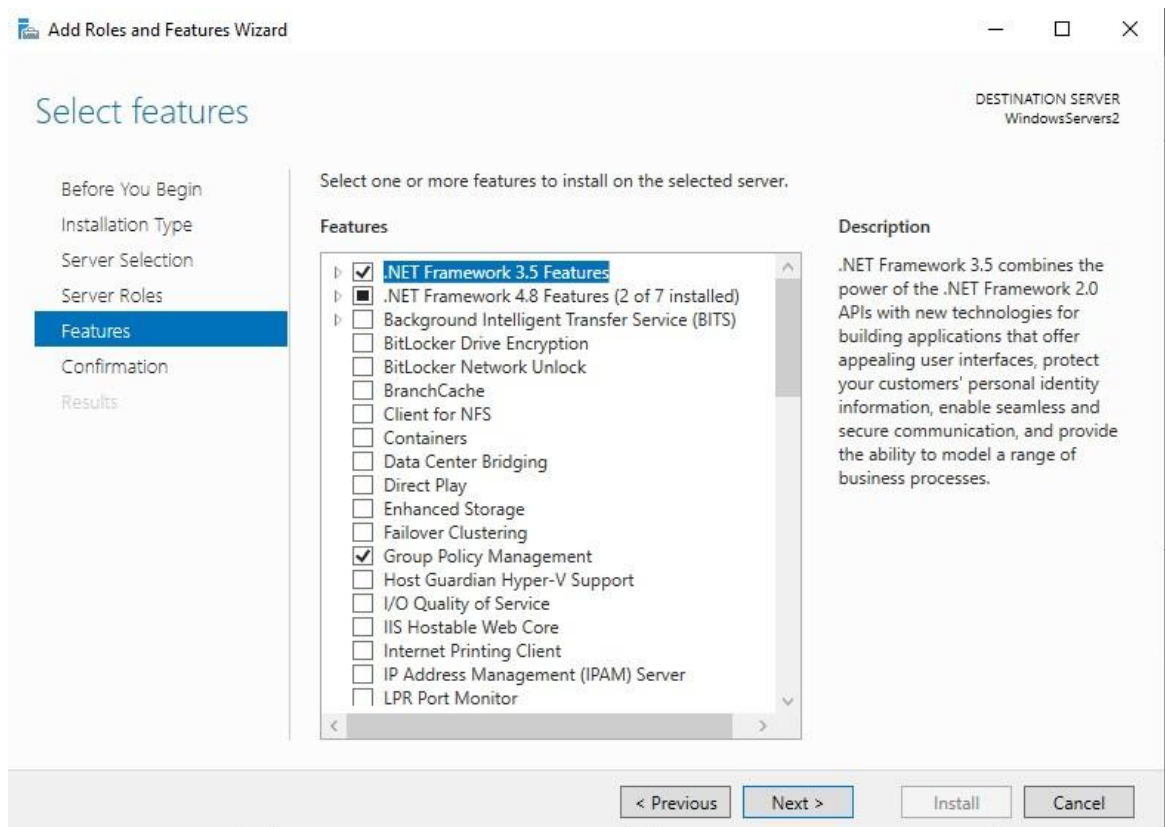


Figure 6 : Select Active Directory Domain Services

**Step 7:** Hit the Next button after leaving all default settings. Then, confirmation installations selections page should open.

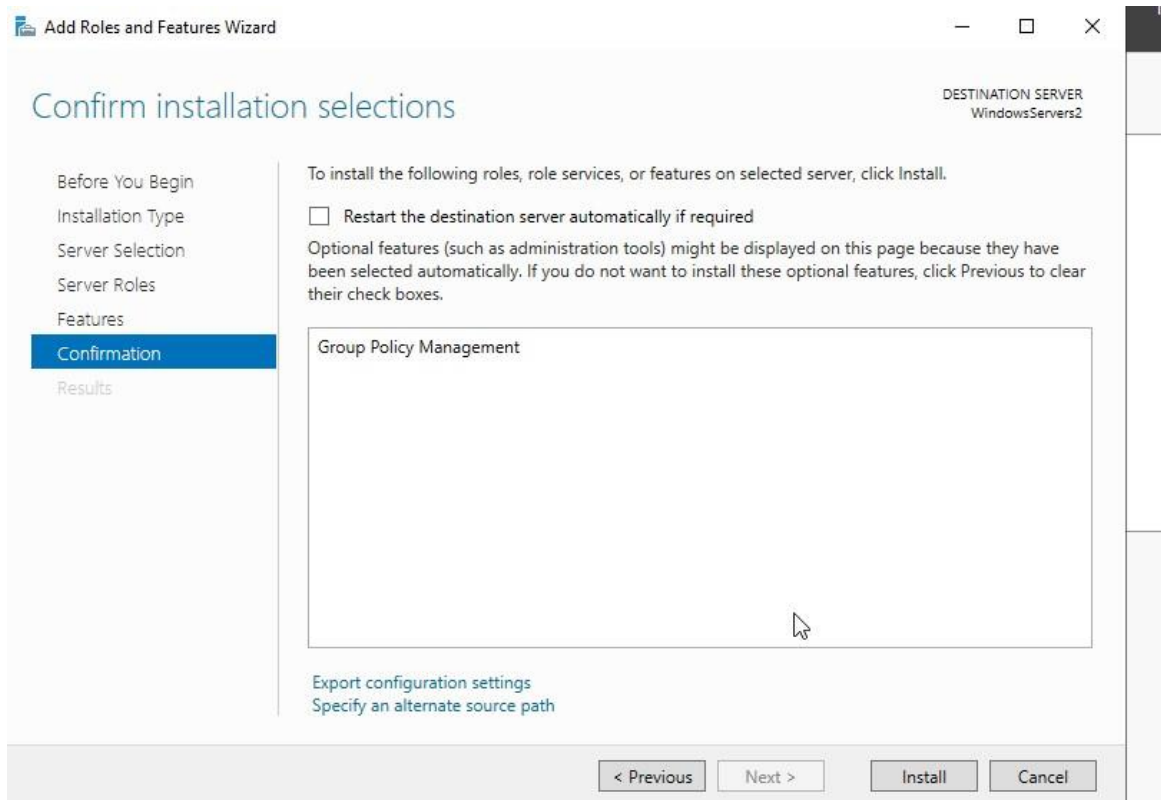


Figure 7 : Confirm installation selections

**Step 8:** Press the Install button and then begin with the installation process. After doing so. You will see this page.

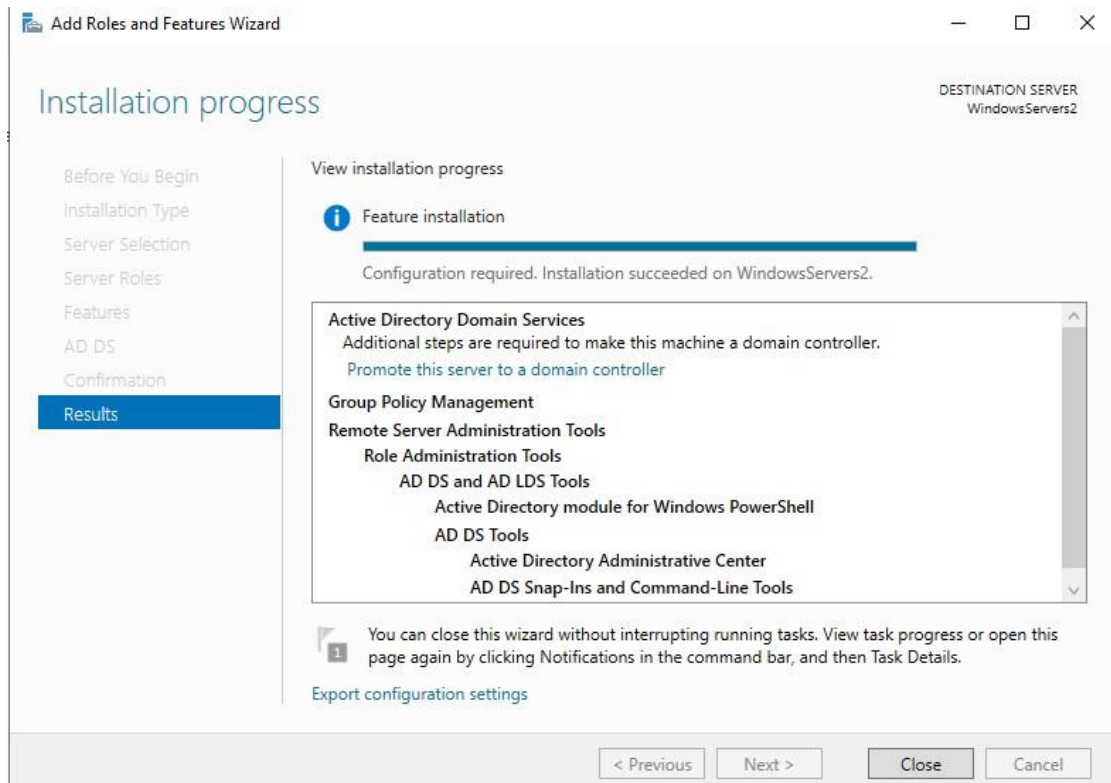


Figure 8 : Installation process

**Step 9:** After, Selecting on the Close button. You should end up on this page.

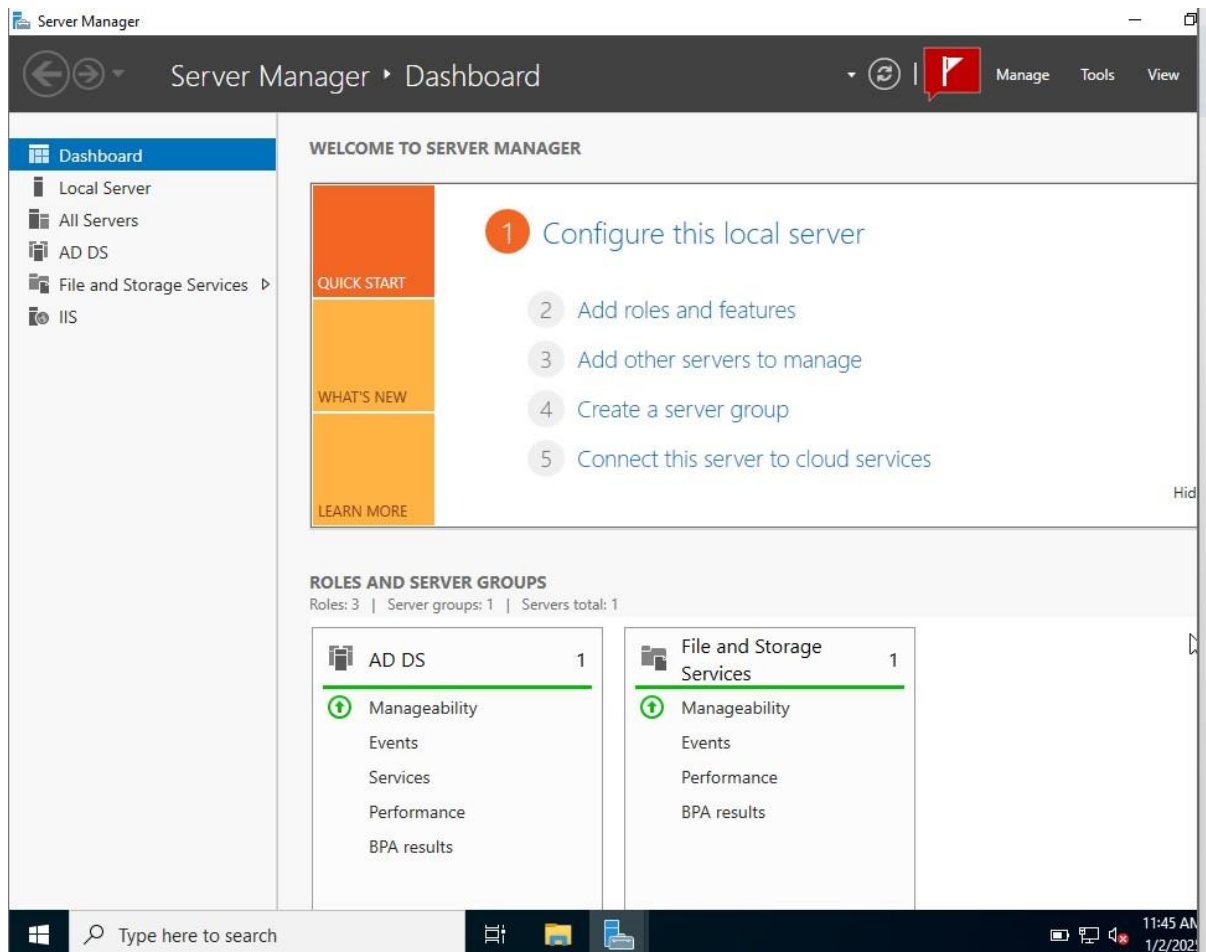


Figure 9 : Server Manager dashboard after installing

**Step 10:** In step 10, Select on the yellow notification symbol. You need to look at the page below:

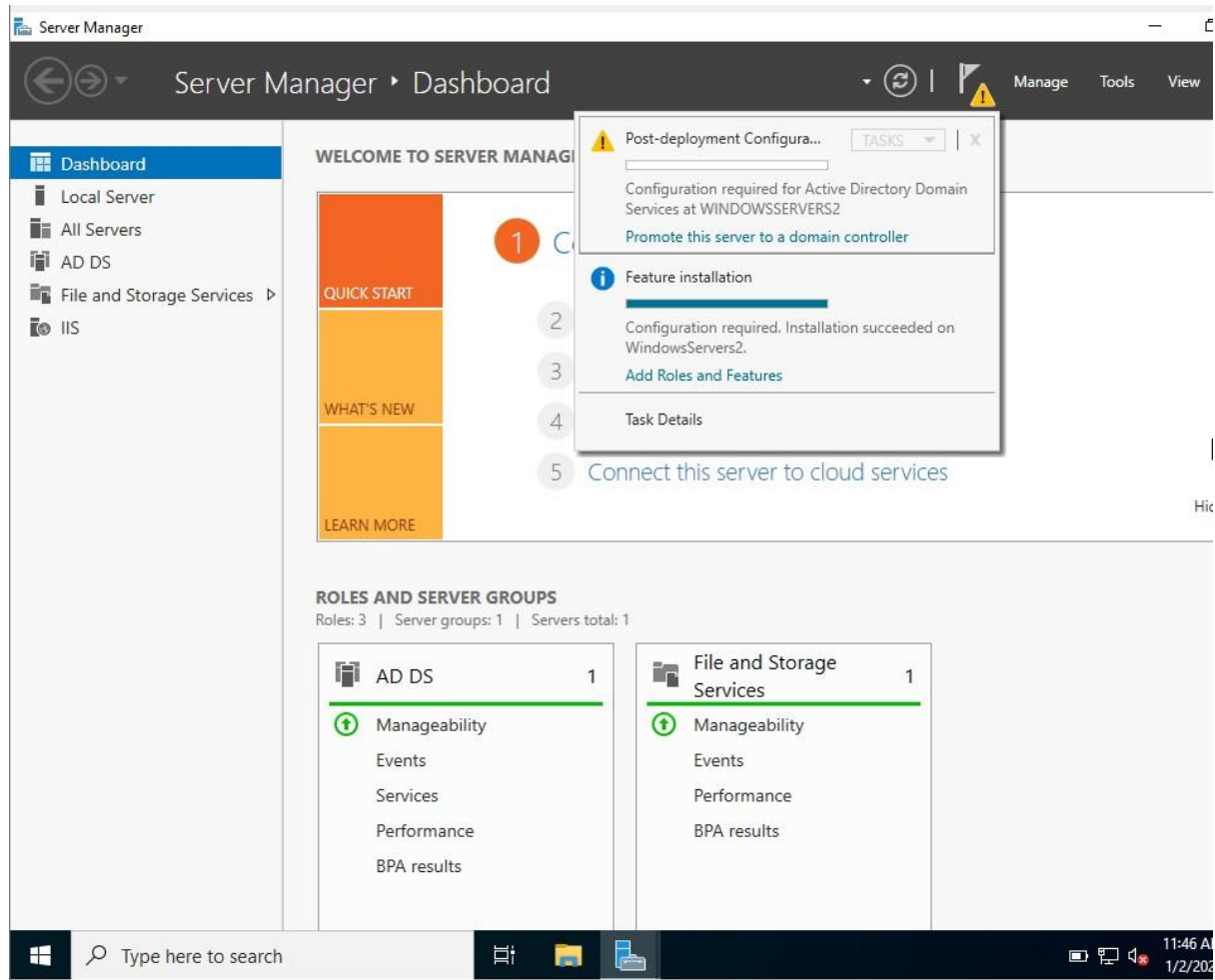


Figure 10 : Select on Yellow Notification icon

**Step 11:** Select on Promote this server to a domain controller in step 11. Then, The deployment configuration page will show up as described in below:

The screenshot shows the 'Active Directory Domain Services Configuration Wizard' window. The title bar reads 'Active Directory Domain Services Configuration Wizard'. The main window has a title 'Deployment Configuration' and a 'TARGET SERVER' label with the value 'WindowsServers2'. On the left is a navigation pane with the following items: 'Deployment Configuration' (highlighted), 'Domain Controller Options', 'Additional Options', 'Paths', 'Review Options', 'Prerequisites Check', 'Installation', and 'Results'. The main content area is titled 'Select the deployment operation' and contains three radio buttons: 'Add a domain controller to an existing domain', 'Add a new domain to an existing forest', and 'Add a new forest' (which is selected). Below this is a section titled 'Specify the domain information for this operation' with a label 'Root domain name:' and a text box containing 'mydomain.com'. At the bottom of the main content area is a link 'More about deployment configurations'. The bottom of the window features a navigation bar with four buttons: '< Previous', 'Next >', 'Install', and 'Cancel'.

Figure 11 : Deployment Configuration



**Step 12:** Hit the Next button after choosing to add a new forest and entering your domain name. Then, the domain controller options page will show up as displayed below:

The screenshot shows the 'Active Directory Domain Services Configuration Wizard' window. The title bar includes the Windows logo, the text 'Active Directory Domain Services Configuration Wizard', and standard window controls (minimize, maximize, close). The main content area is titled 'Domain Controller Options'. On the left, a navigation pane lists the following steps: 'Deployment Configuration', 'Domain Controller Options' (highlighted in blue), 'DNS Options', 'Additional Options', 'Paths', 'Review Options', 'Prerequisites Check', 'Installation', and 'Results'. The main area contains the following sections: 1. 'Select functional level of the new forest and root domain' with two dropdown menus: 'Forest functional level:' and 'Domain functional level:', both set to 'Windows Server 2016'. 2. 'Specify domain controller capabilities' with three checkboxes: 'Domain Name System (DNS) server' (checked), 'Global Catalog (GC)' (checked), and 'Read only domain controller (RODC)' (unchecked). 3. 'Type the Directory Services Restore Mode (DSRM) password' with two password fields: 'Password:' and 'Confirm password:', both containing masked characters (dots). 4. A link at the bottom: 'More about domain controller options'. In the top right corner, it says 'TARGET SERVER' and 'WindowsServers2'. At the bottom of the window, there are four buttons: '< Previous', 'Next >' (highlighted with a blue border), 'Install', and 'Cancel'.

Figure 12: Domain Controller Options

**Step 13:** Press on the Next button after entering your directory service restore mode password. Then, the DNS options page will show up as displayed below:

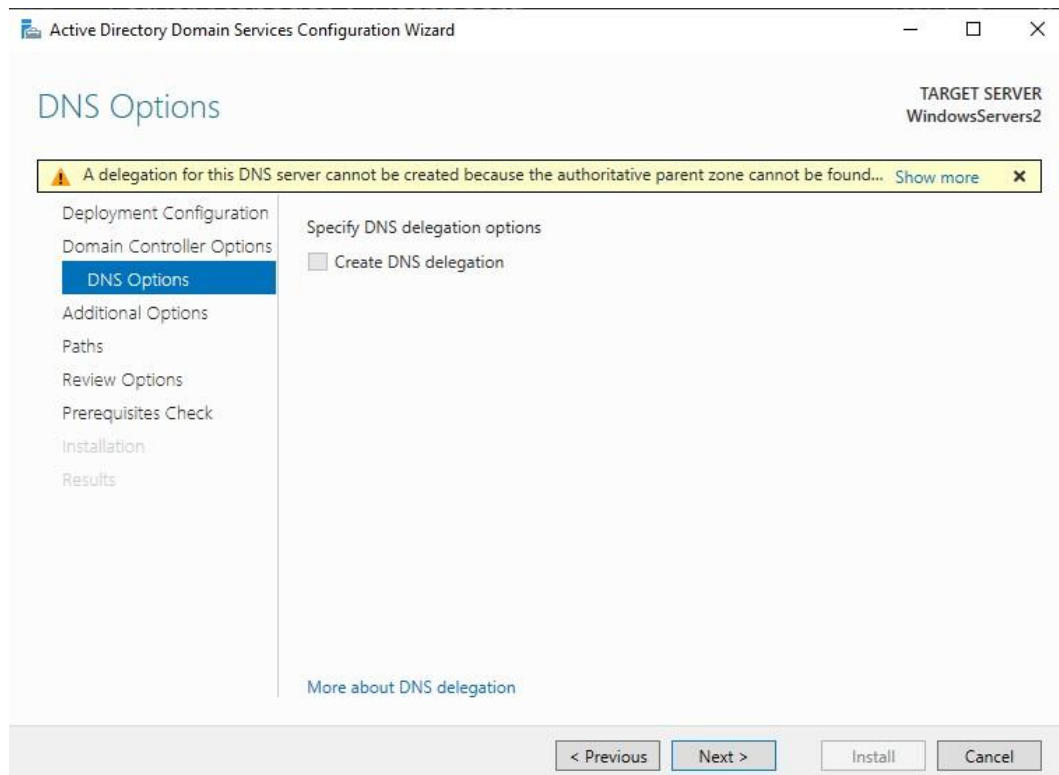


Figure 13 : DNS Options

**Step 14:** We select the Next button to leave from the default setup configuration. You will be asked to enter a NetBIOS name as described below:

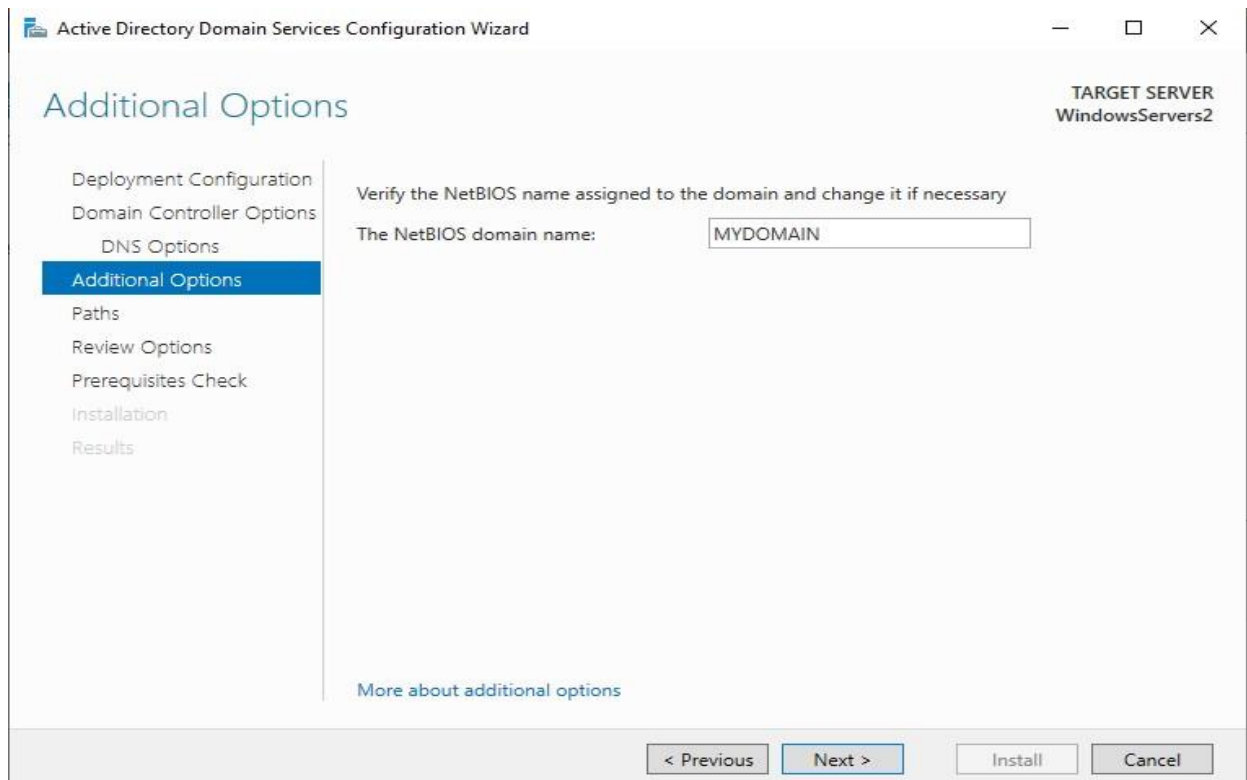


Figure 14 : DNS Options

**Step 15:** Select the Next button after choosing your NetBIOS name. You will be asked to enter the location of the AD DS database path as shown up below:

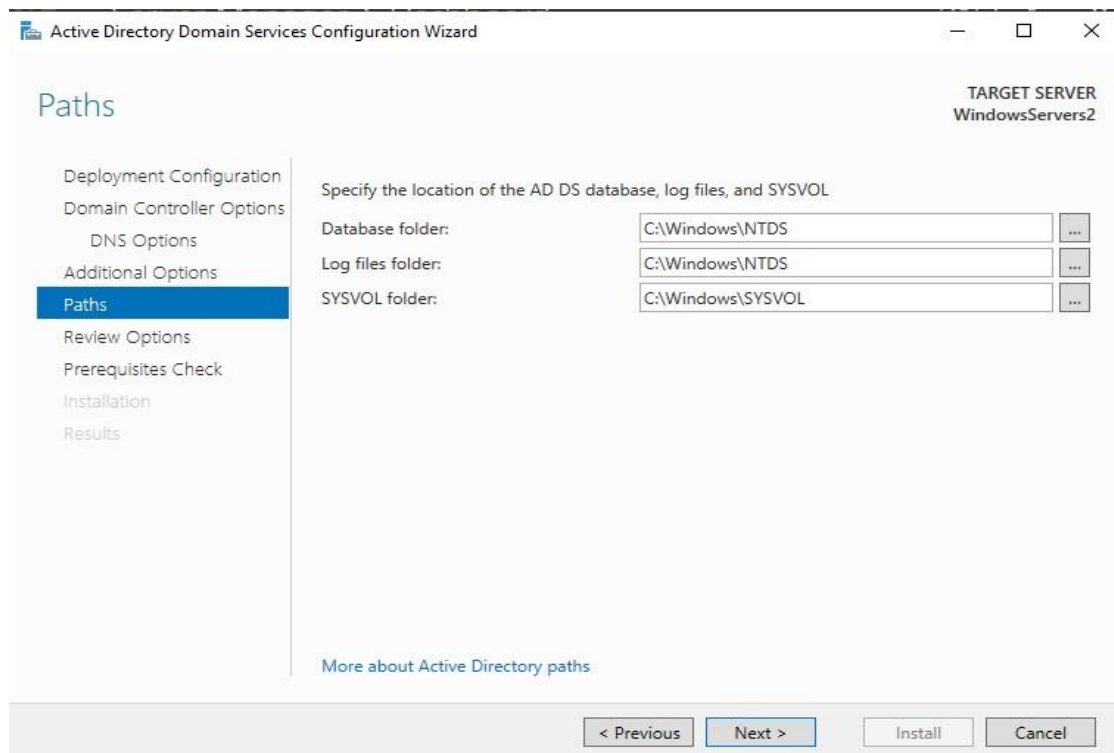


Figure 15 : Path location for AD DS database

**Step 16:** Select the Next button after leaving the default path unchanged. Then, you must look at the page that reviews every option as displayed below:

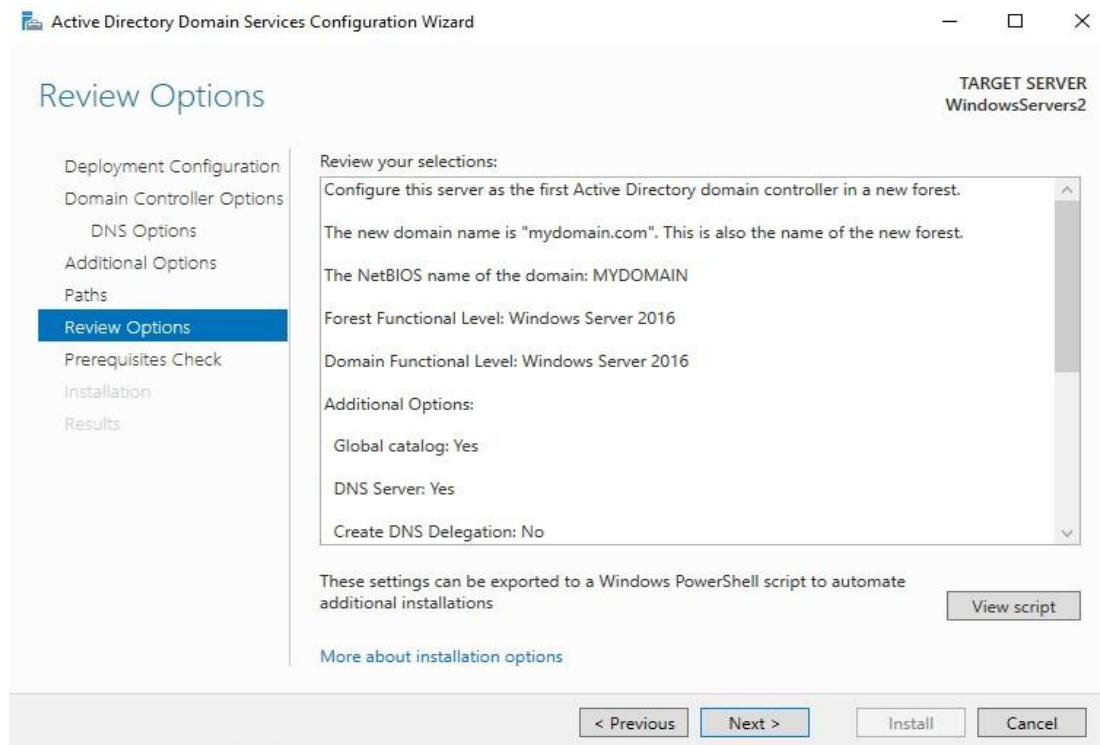


Figure 16 : Review Options

**Step 17:** Select on the Next button after reviewing every configuration. Then, the prerequisites check page will show up as displayed below:

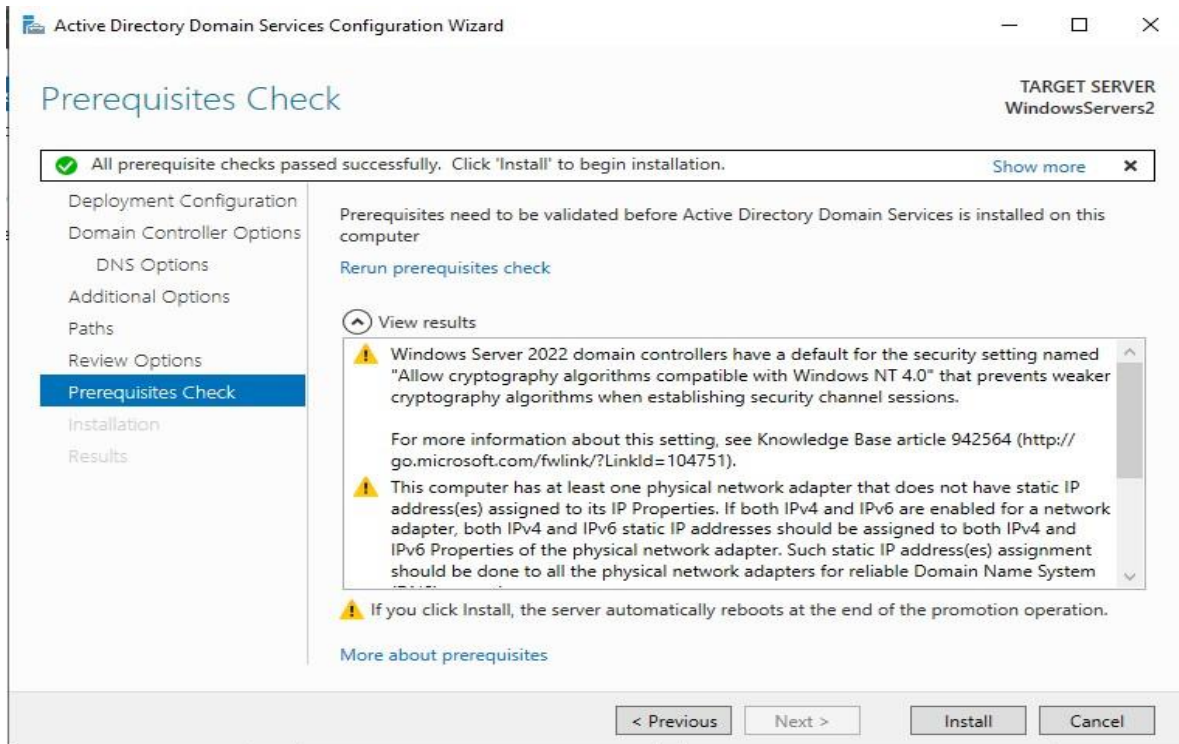


Figure 17 : Prerequisite Check

**Step 18:** Select the Install button after making sure that all prerequisite checks have been finished. Then, your computer will restart properly after the installation process is done successfully.

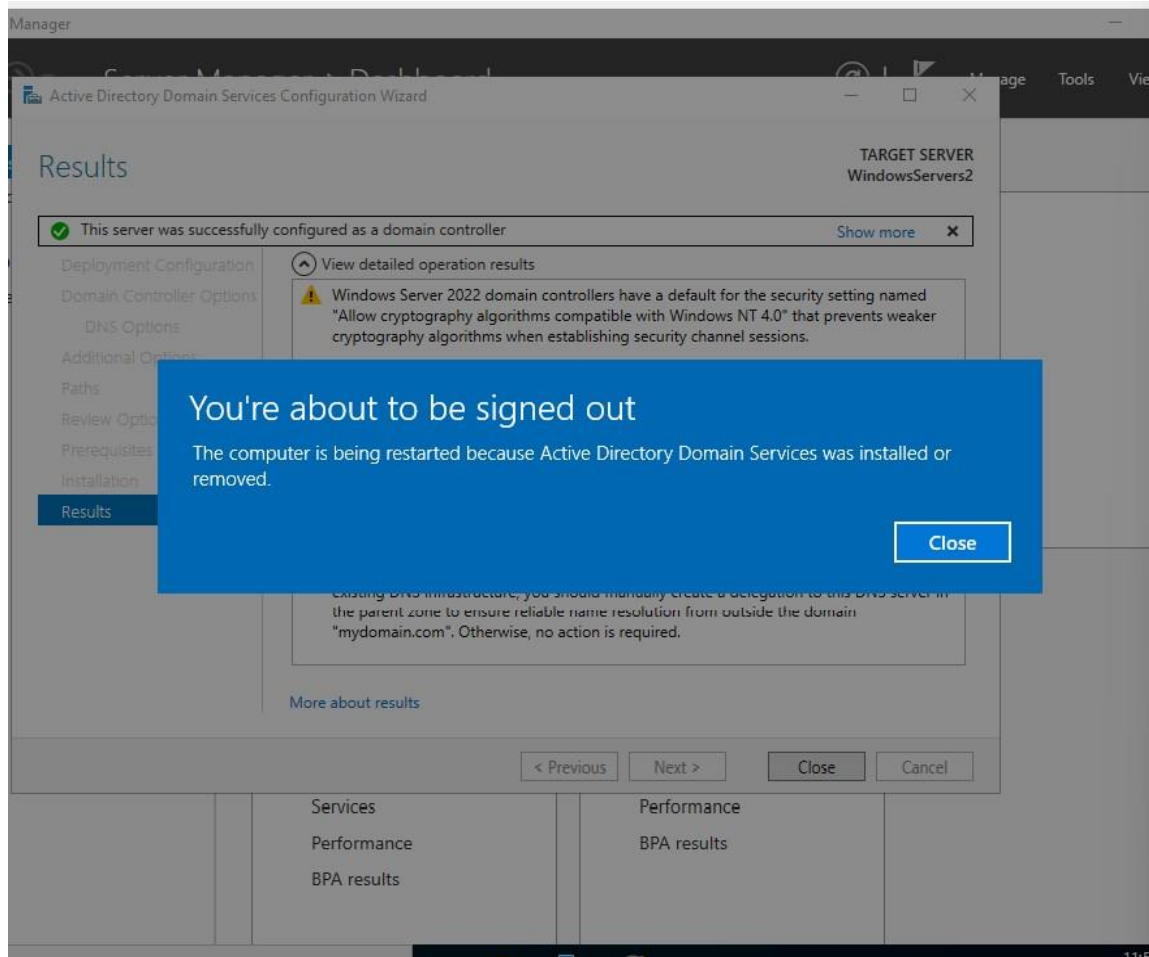


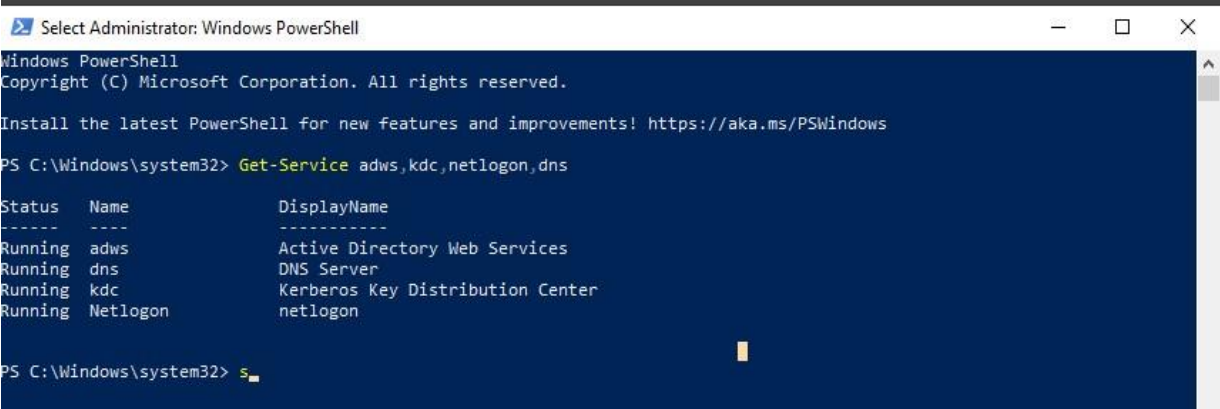
Figure 18 : Automatically being restart

## Verify Domain Controller

In, Verify Domain Controller you will have to make sure if the Domain Controller is properly set up or not. You can even show it from PowerShell again. If you get the confirmation that the services were installed successfully to run the following command in Windows PowerShell.

The command is: `Get-Service adws,kdc,netlogon,dns`.

This output of this command will be displayed on screen:

A screenshot of a Windows PowerShell window titled "Select Administrator: Windows PowerShell". The window has a dark blue background. The text inside shows the PowerShell prompt and the command `Get-Service adws,kdc,netlogon,dns` being executed. The output is a table with three columns: Status, Name, and DisplayName. The services listed are adws (Active Directory Web Services), dns (DNS Server), kdc (Kerberos Key Distribution Center), and Netlogon. All services are shown as "Running".

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

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

PS C:\Windows\system32> 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

PS C:\Windows\system32> s_
```

Figure 19 : The status, name and display name



Execute the command that is displayed below to access every information of the domain controller's configuration.

The command is: Get-ADDomainController

The output of this command will be displayed on screen:

```
PS C:\Windows\system32>
PS C:\Windows\system32> GET-ADDomainController

ComputerObjectDN      : CN=WINDOWSSERVERS2,OU=Domain Controllers,DC=mydomain,DC=com
DefaultPartition      : DC=mydomain,DC=com
Domain                : mydomain.com
Enabled               : True
Forest                : mydomain.com
HostName              : WindowsServers2.mydomain.com
InvocationId          : ca9eec4d-cbb2-41de-b5f2-d0d092a5df88
IPv4Address           : 192.168.1.152
IPv6Address           : 2400:1a00:bde0:4b67::4
IsGlobalCatalog       : True
IsReadOnly            : False
LdapPort              : 389
Name                  : WINDOWSSERVERS2
NTDSSettingsObjectDN  : CN=NTDS Settings,CN=WINDOWSSERVERS2,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Conf
                    : uration,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=WINDOWSSERVERS2,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configuration,DC=mydo
                    : main,DC=com
ServerObjectGuid       : 4a66f676-04b0-4e4b-9ad9-72b8d7299f04
Site                  : Default-First-Site-Name
SslPort               : 636
```

Figure 20 : Get-ADDomainController command

Execute the command that is displayed below to get complete domain information:

Get-ADDomain mydomain.com

The output of this command will show up on screen:

```
PS C:\Windows\system32> GET-ADDomain mydomain.com

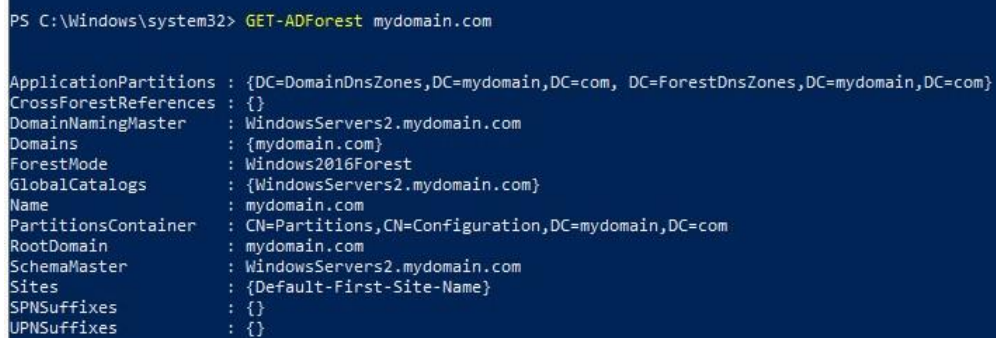
AllowedDNSSuffixes      : {}
ChildDomains            : {}
ComputersContainer      : CN=Computers,DC=mydomain,DC=com
DeletedObjectsContainer : CN=Deleted Objects,DC=mydomain,DC=com
DistinguishedName       : DC=mydomain,DC=com
DNSRoot                 : mydomain.com
DomainControllersContainer : OU=Domain Controllers,DC=mydomain,DC=com
DomainMode              : Windows2016Domain
DomainSID               : S-1-5-21-1668952987-1789396276-851616734
ForeignSecurityPrincipalsContainer : CN=ForeignSecurityPrincipals,DC=mydomain,DC=com
Forest                  : mydomain.com
InfrastructureMaster     : WindowsServers2.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               : 57b7d939-c8ee-40bc-b364-b60f053e33eb
ParentDomain             :
PDCEmulator              : WindowsServers2.mydomain.com
PublicKeyRequiredPasswordRolling : True
QuotasContainer          : CN=NTDS Quotas,DC=mydomain,DC=com
ReadOnlyReplicaDirectoryServers : {}
ReplicaDirectoryServers  : {WindowsServers2.mydomain.com}
RIDMaster                : WindowsServers2.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 21 : Get -ADDomain mydomain.com command

Execute the command that is described below to access your Active Directory Forest information:

The command is: `Get-ADForest mydomain.com`

The output of this command will show up on the screen:

A screenshot of a PowerShell terminal window with a dark blue background. The prompt is 'PS C:\Windows\system32>' followed by the command 'GET-ADForest mydomain.com'. The output is a list of Active Directory forest properties and their values.

```
PS C:\Windows\system32> GET-ADForest mydomain.com

ApplicationPartitions : {DC=DomainDnsZones,DC=mydomain,DC=com, DC=ForestDnsZones,DC=mydomain,DC=com}
CrossForestReferences : {}
DomainNamingMaster    : WindowsServers2.mydomain.com
Domains               : {mydomain.com}
ForestMode             : Windows2016Forest
GlobalCatalogs        : {WindowsServers2.mydomain.com}
Name                  : mydomain.com
PartitionsContainer    : CN=Partitions,CN=Configuration,DC=mydomain,DC=com
RootDomain             : mydomain.com
SchemaMaster           : WindowsServers2.mydomain.com
Sites                 : {Default-First-Site-Name}
SPNSuffixes           : {}
UPNSuffixes           : {}
```

Figure 22 : `Get-ADForest mydoaim.com`

## 4. Conclusion

Active Directory is so vital in today's networking that it is inevitable without it. User, device, and resource management are all centralized using AD tools. Deploying a domain controller on Windows Server 2022 assists organizations in improving security, simplifying administration, and enhancing scalability. By following the step-by-step, the administrator can easily configure a strong Active Directory Domain Services environment. Verification of working services, which includes authentication and DNS, is done by using PowerShell commands. Its operational efficiency benefits from AD capabilities such as SSO, group policy enforcement, and resource management. Flexibility in managing large and complex networks is offered by its hierarchical structure. Proper configurations of directory services and restore modes ensure that one can host against system failure risks. Active Directory encourages organizations to work together, yet in a very controlled manner in access. Overall, AD is going to intensify the entire IT fabric of an organization in terms of security and manageability and give reliable business applications against dynamic demand.