

Network Operating System and Security

Active Directory Worksheets

Submitted in the partial fulfilment for the award degree of
BSC CLOUD COMPUTING

to

University of Wales Trinity Saint David, London

Submitted by:

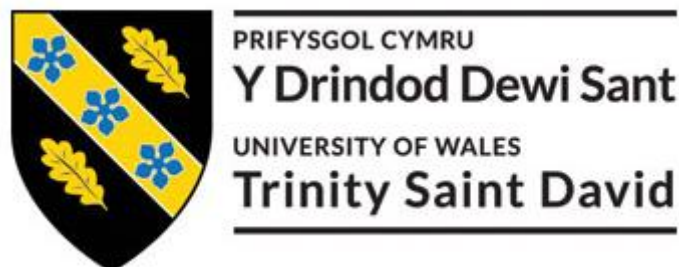
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Configuration details

Addressing scheme

Adp1 :
publicswitch (Publicnetwork)
IP: 192.168.1.100
SM: 255.255.255.0
DG: 192.168.1.100
DNS: 192.168.1.100

Adp2 :
privateswitch1 (privatenet1)
IP: 192.168.100.1
SM: 255.255.255.0
DG: 192.168.100.1
DNS: 192.168.1.100

Adp1
publicswitch1(Publicnetwork)
IP: 192.168.1.101
SM: 255.255.255.0
DG: 192.168.1.100
DNS: 192.168.1.101

Adp2
Privateswitch1 (privatenet1)
IP: 192.168.100.2
SM: 255.255.255.0
DG: 192.168.100.1
DNS: 192.168.1.101



Figure 1 Servers and client configuration adopted for the worksheets.

Operating Systems:

- Windows 10 OS has been used for both clients
- Windows server 2019 has been used for both servers

Worksheet 1: Building the NOS infrastructure using Active Directory

TASK 1 Configure Virtual Networking and upgrade a Member server to a Domain Controller

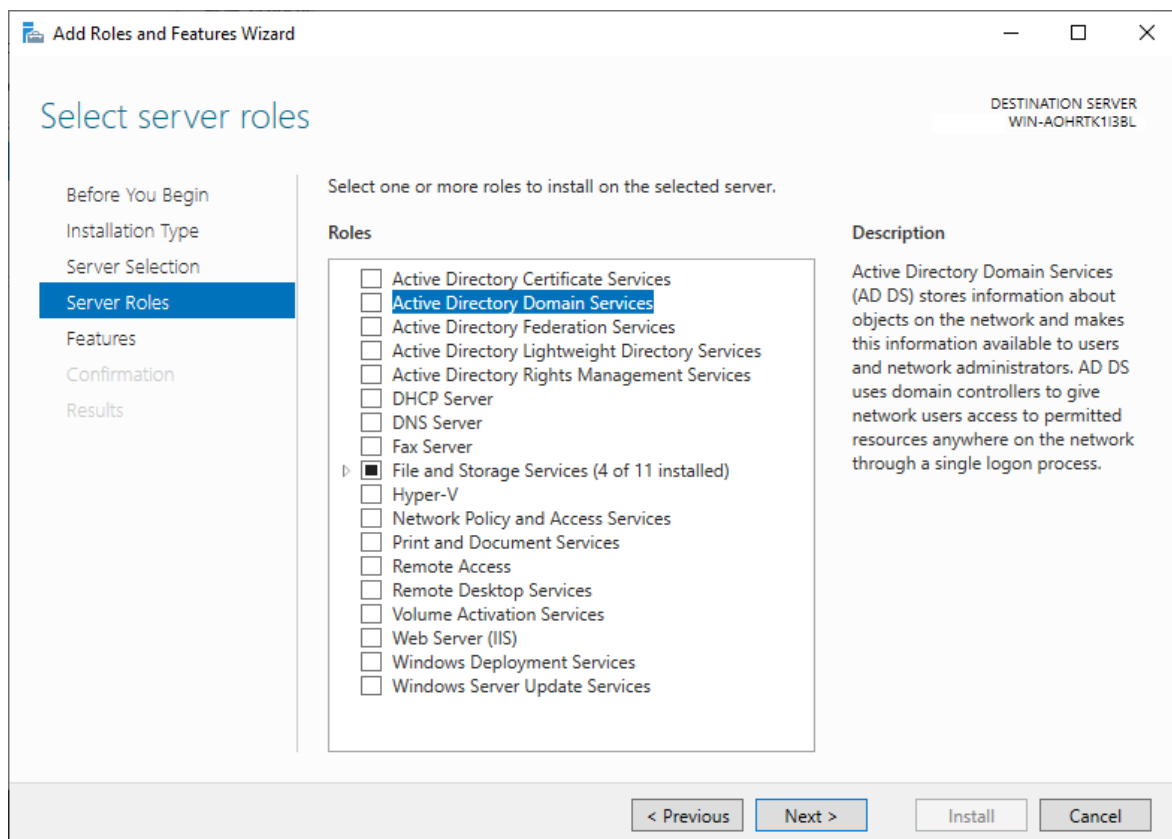


Figure 2 Installing AD DS (Active directory domain services) through the “Add roles and features” wizard.

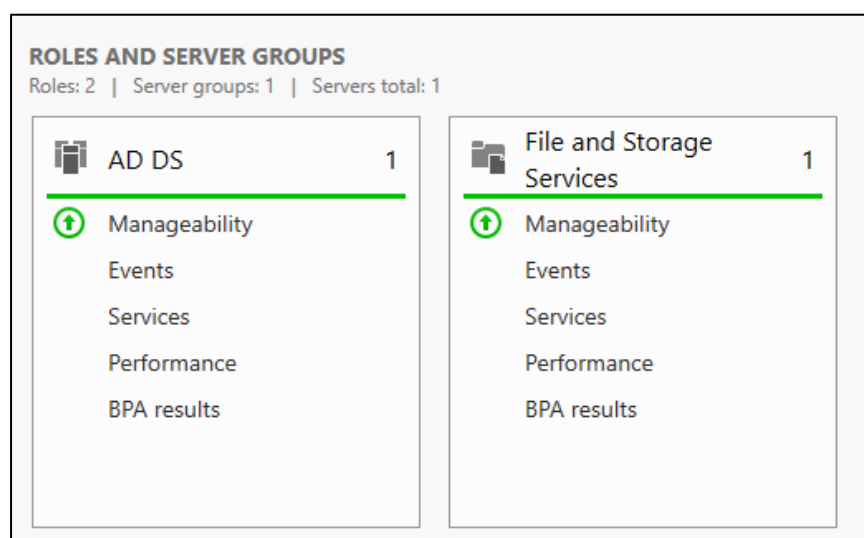


Figure 3 Installed AD Domain services

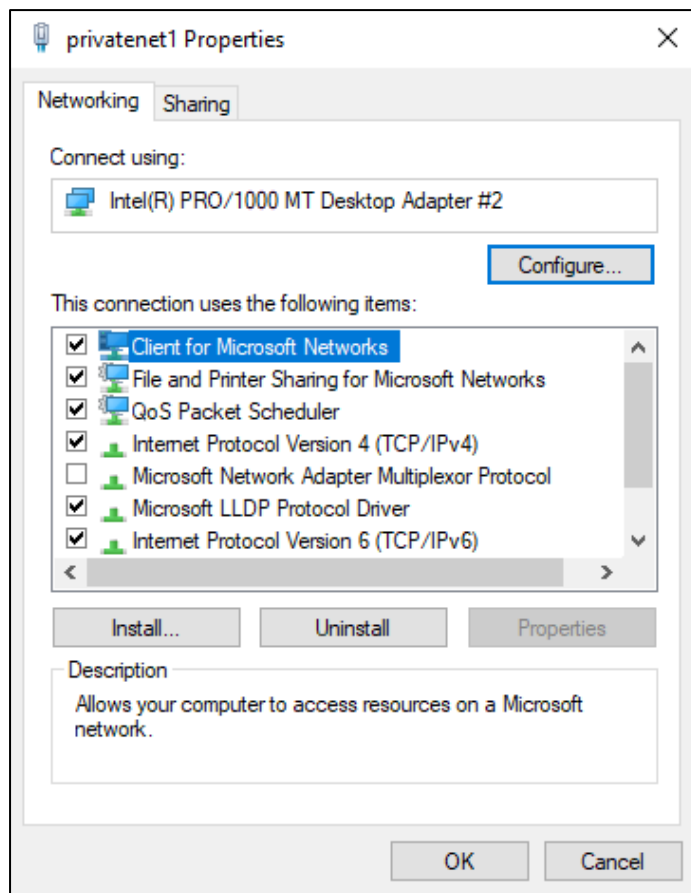


Figure 4 Changing network adapter settings

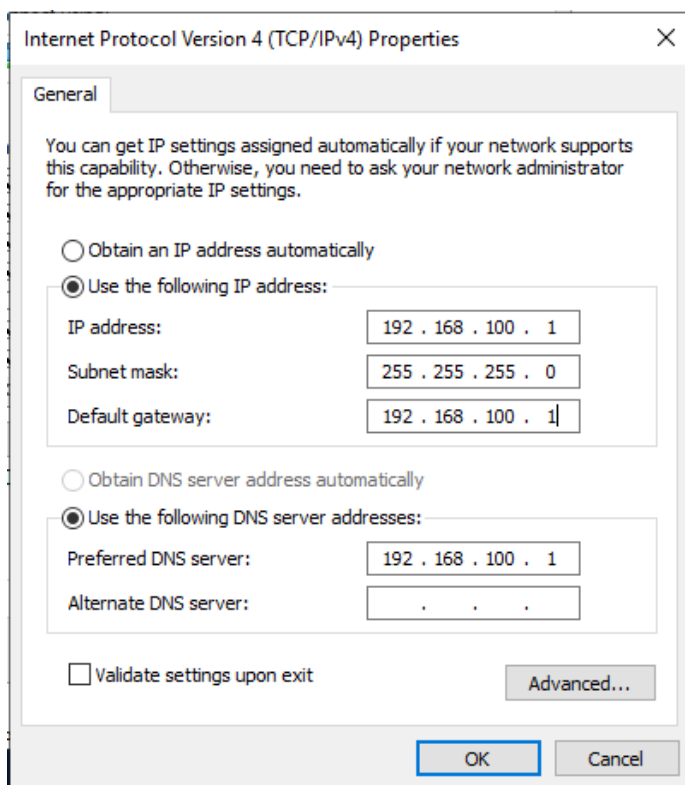


Figure 5 Set Preferred DNS server equal to adapter IP address

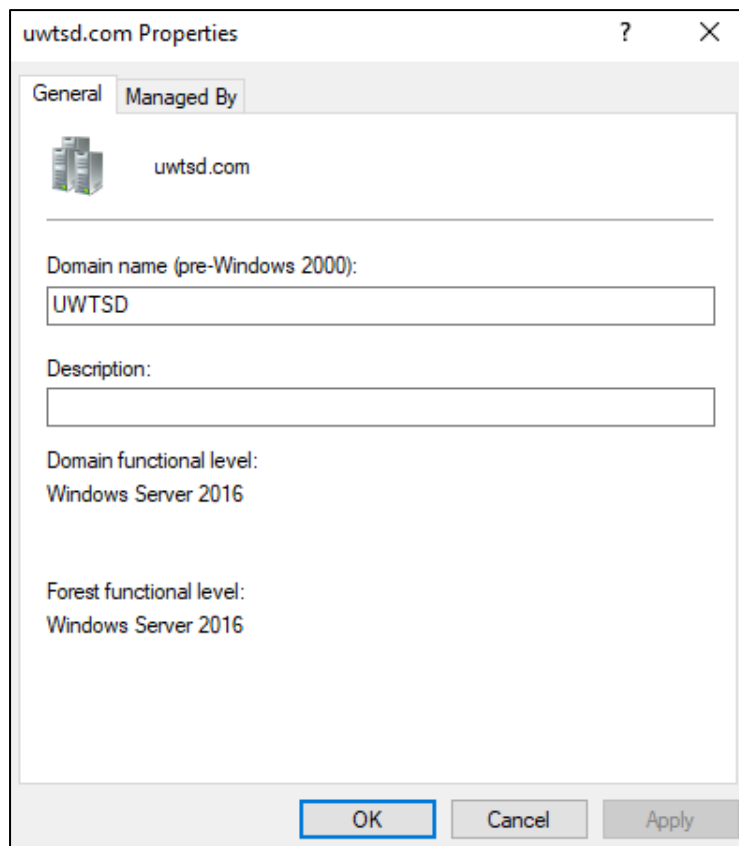


Figure 6 Setting up new Active Directory domain

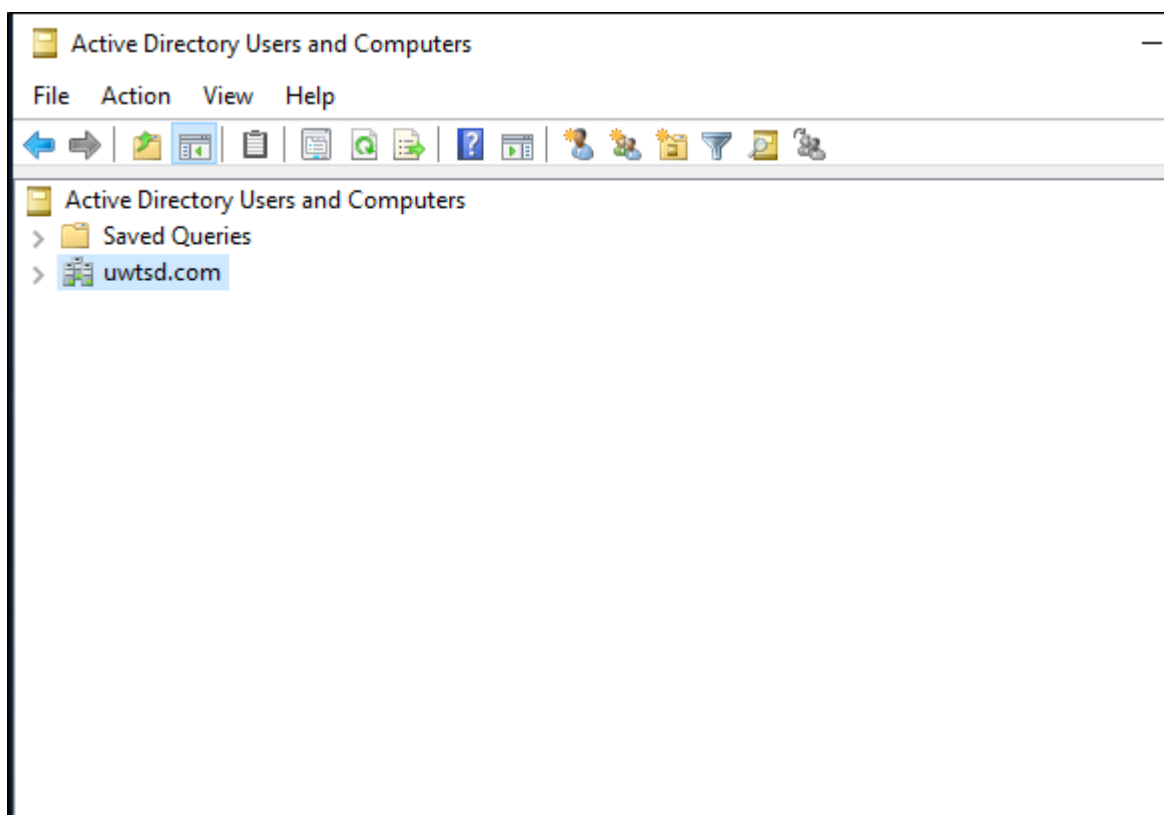


Figure 7 New domain uwtsd.com has been created

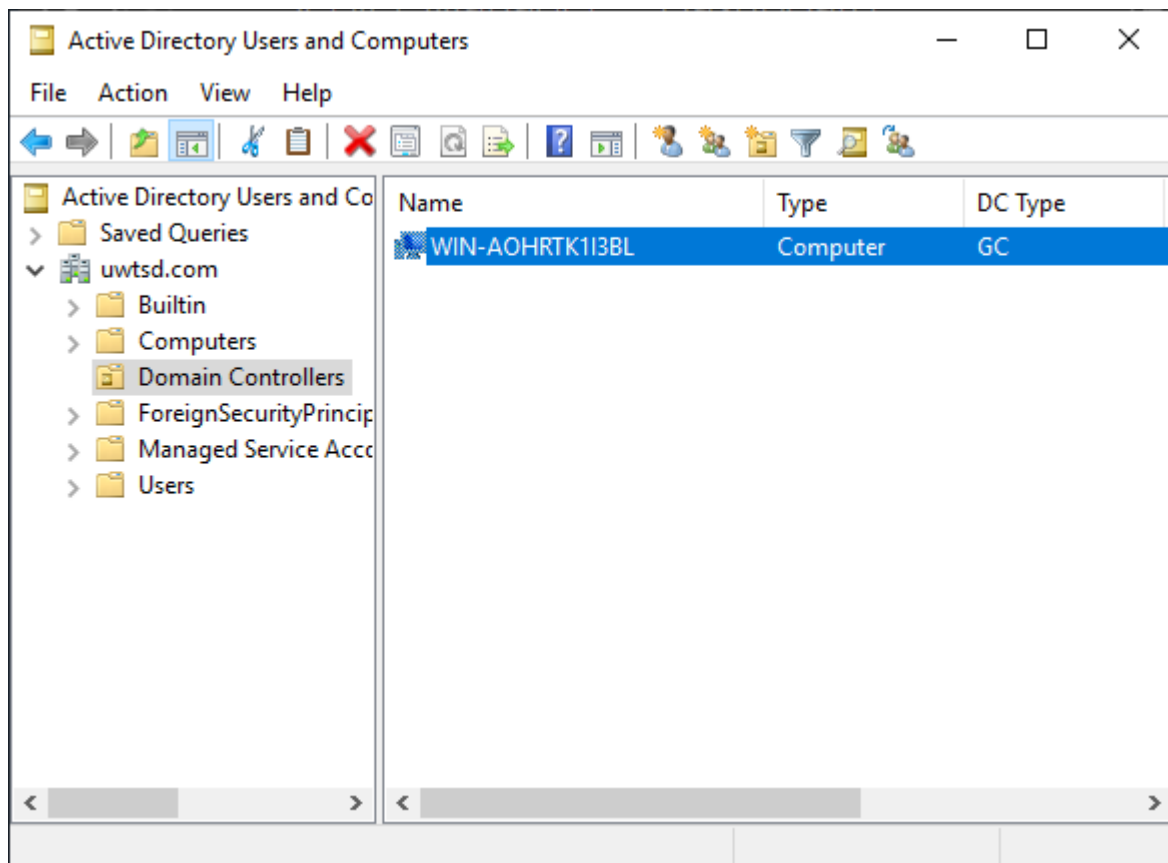


Figure 8 Computer has been configured as Domain controller

Task 2 Installing Client Computer and Basic Object creation in the AD

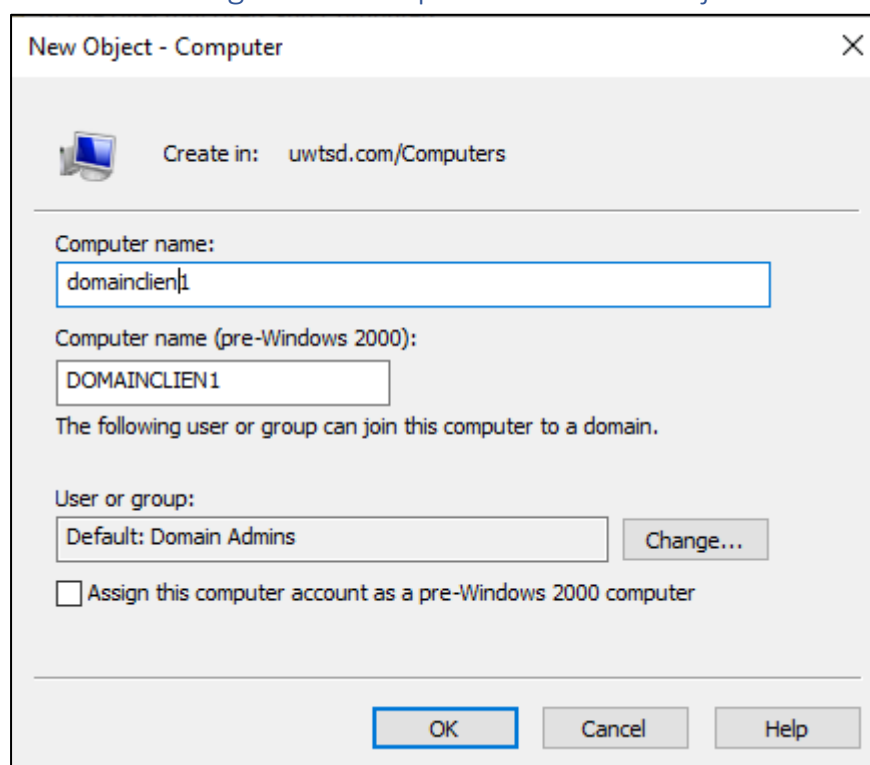


Figure 9 Creating a new computer in the domain named "Domainclien1"

Subtask 2 Installing/connecting Windows client to the domain

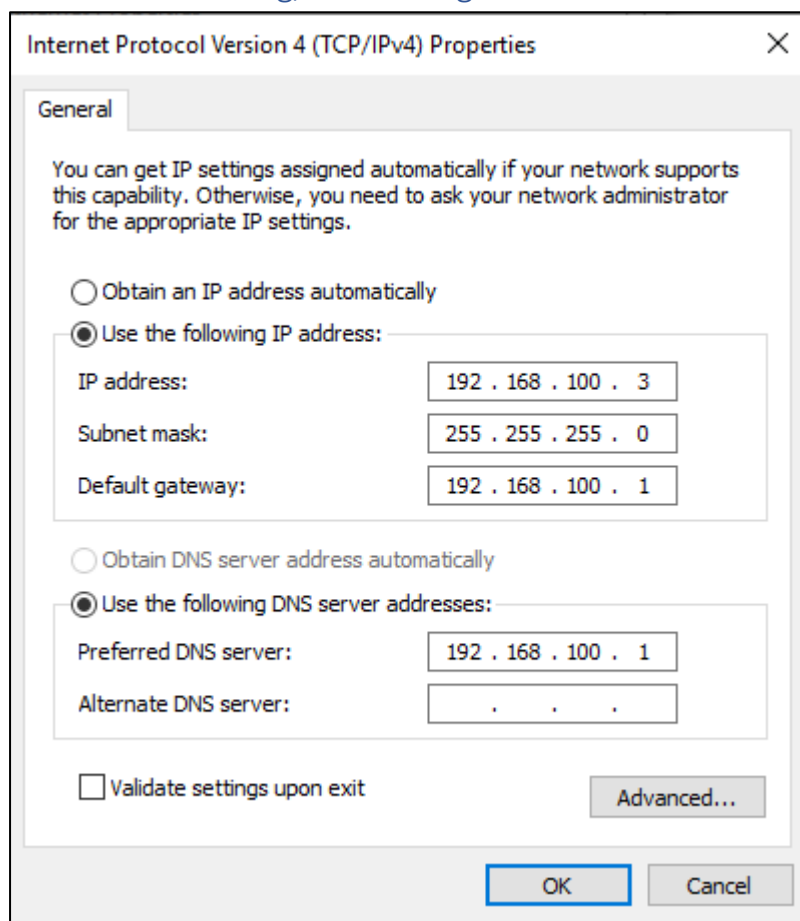


Figure 10 Having Installed the Windows Client machine, it has been configured with a static IP Address and primary DNS as 192.168.100.1 which corresponds to the server private adapter that is connected to.

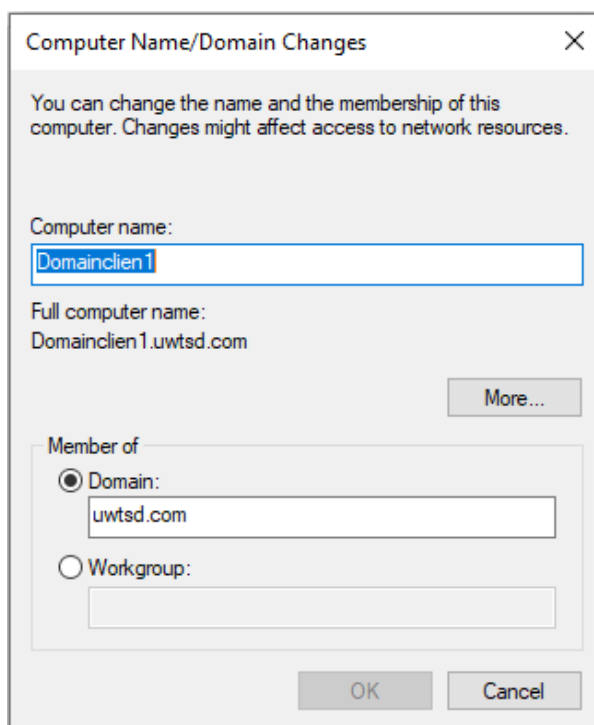


Figure 11 Adding the client to the domain

Worksheet 2: Resource Management in Active Directory: Users, Computers and Groups

Task 1: Creating an Organisational Unit Hierarchy.

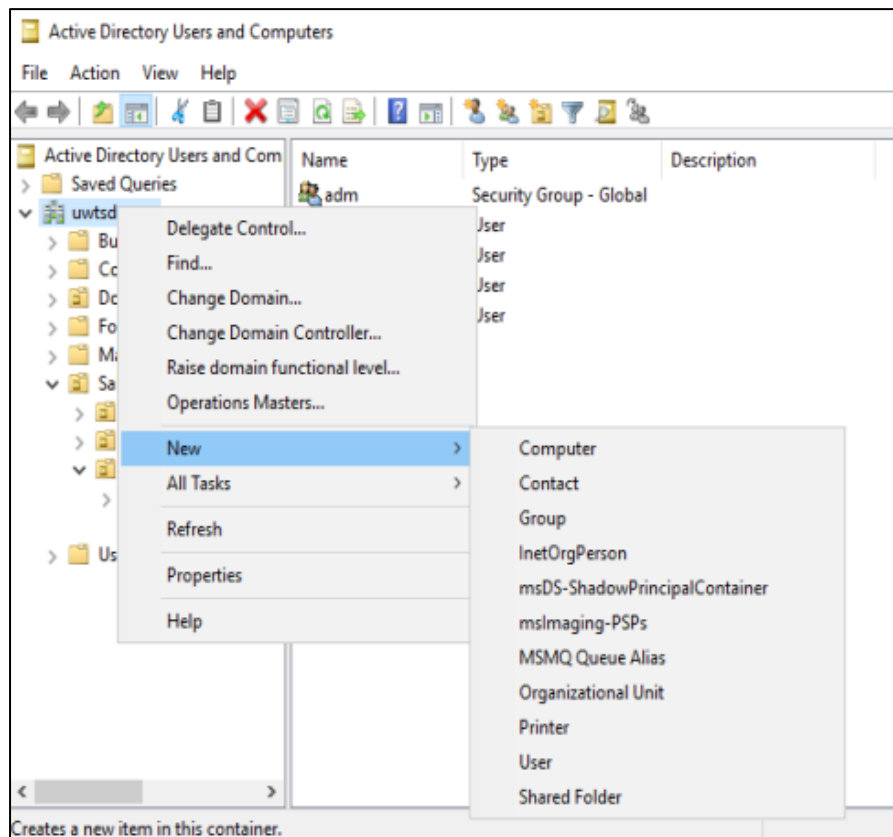


Figure 12 Creating a new Organizational Unit

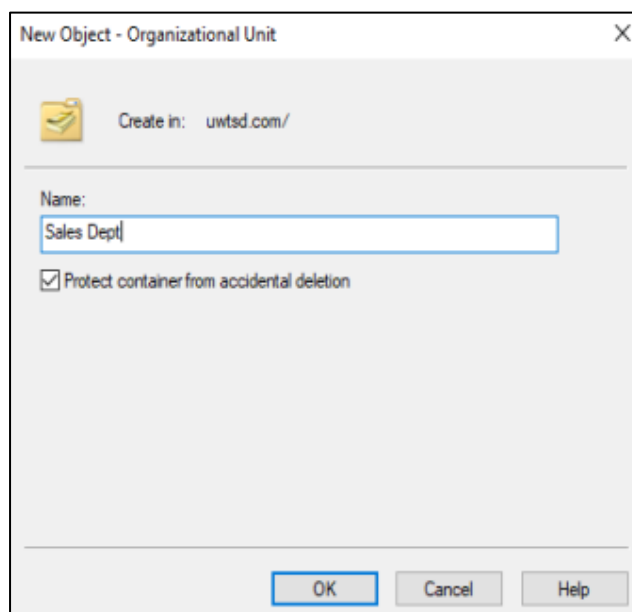


Figure 13 Naming the new OU

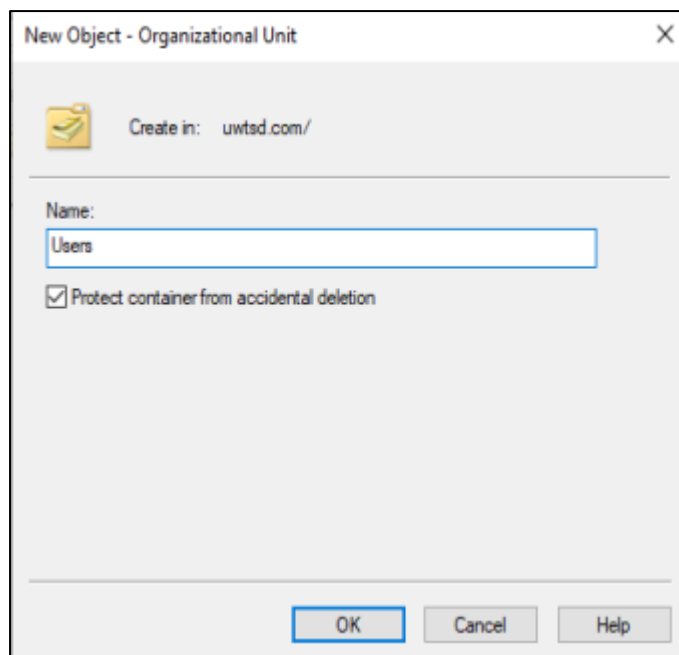


Figure 14 Creating a new OU within the Sales Dept OU

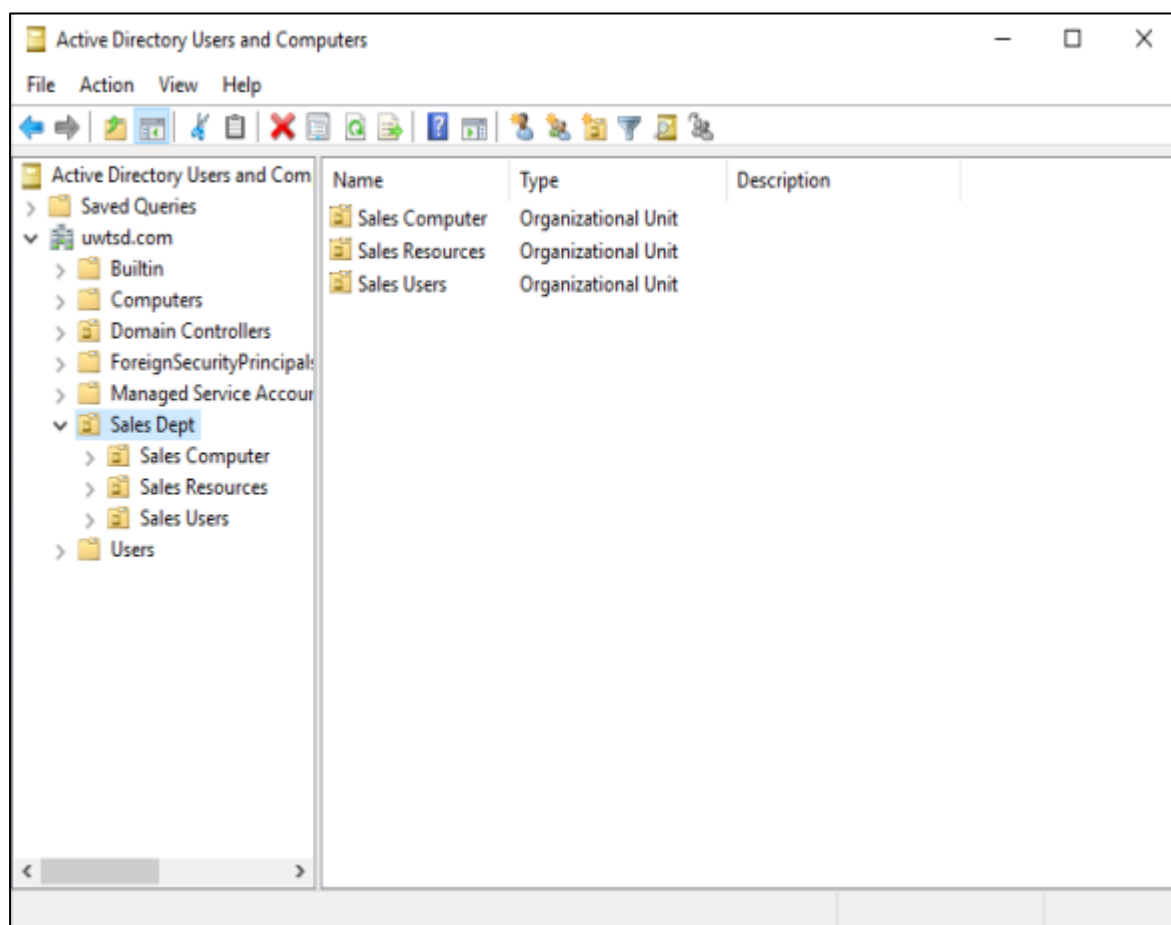


Figure 15 Creating other two OUs within the Sales Dept OU and renamed User to Sales Users

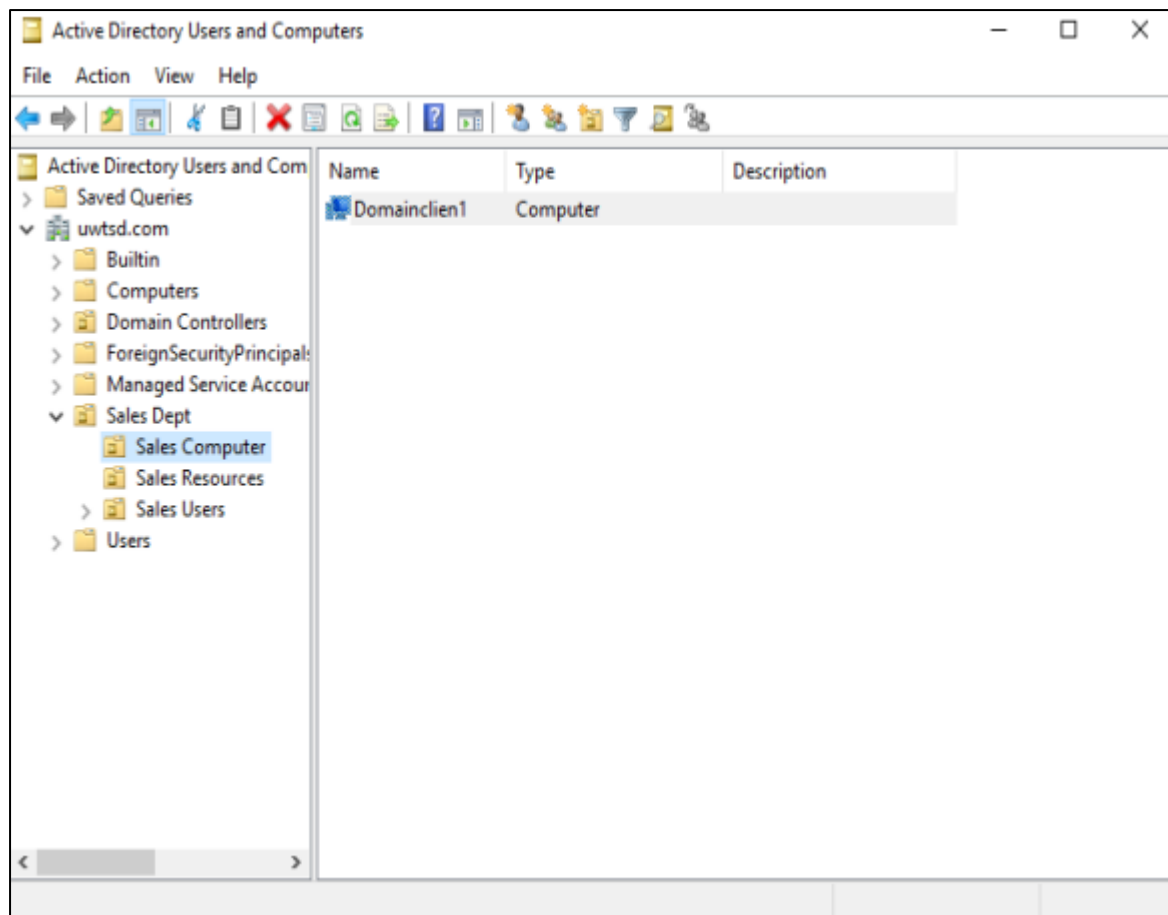


Figure 16 Dragged the computer object from the default Computer OU to Sales Computer OU

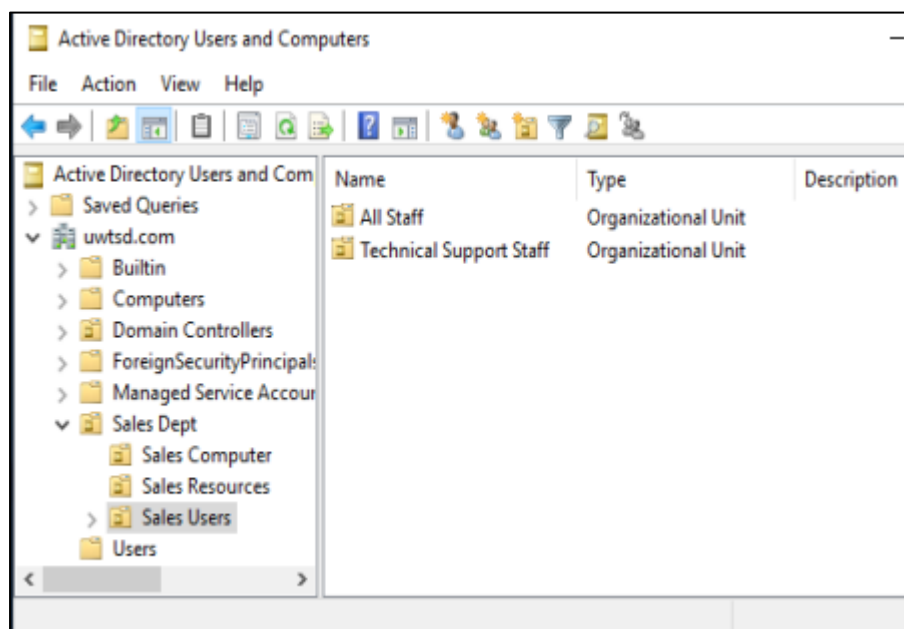


Figure 17 Created two further OUs within the Sales users OU

Task 2: Creating and Managing Active Directory User and Computer accounts

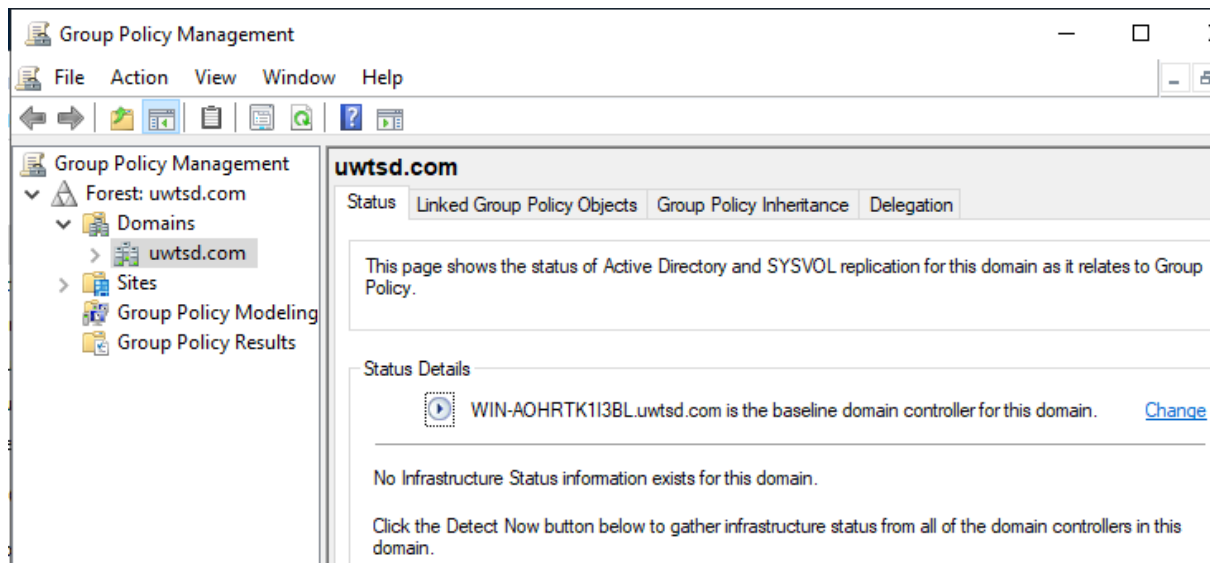


Figure 18 Opened Group Policy management

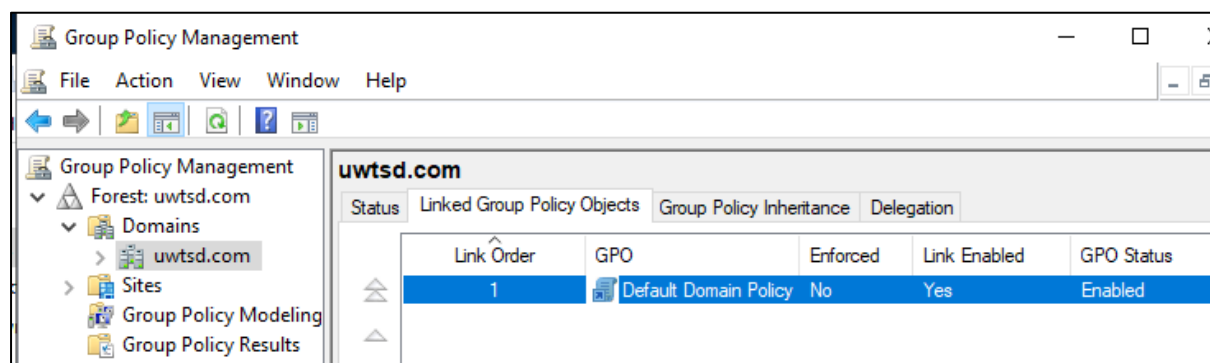


Figure 19 Selected Default Domain Policy, where the top level of hierarchy in the domain is located

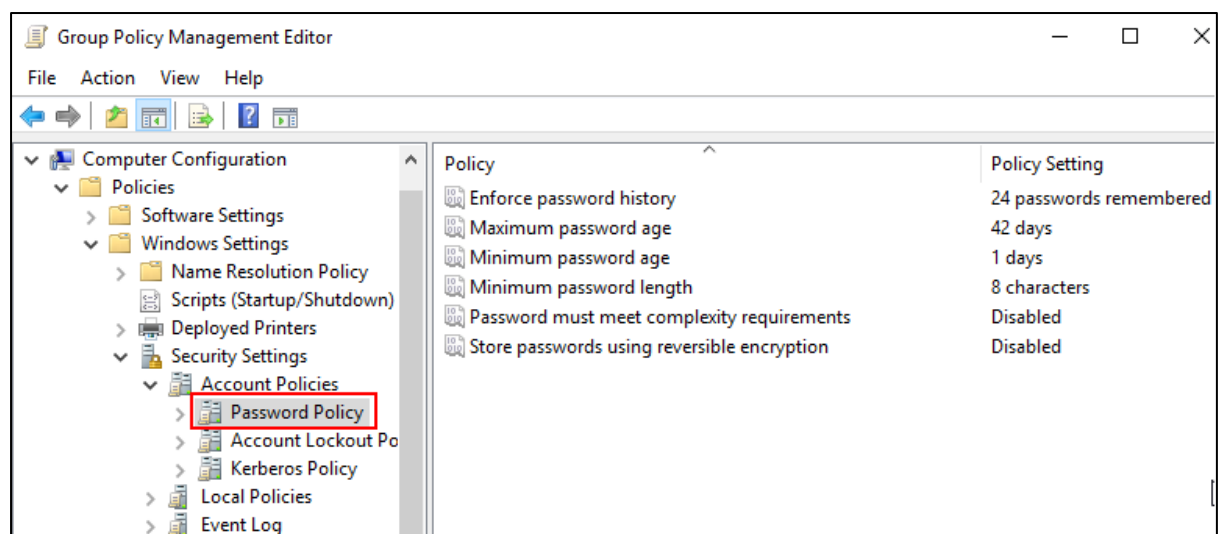


Figure 20 Selected password policy

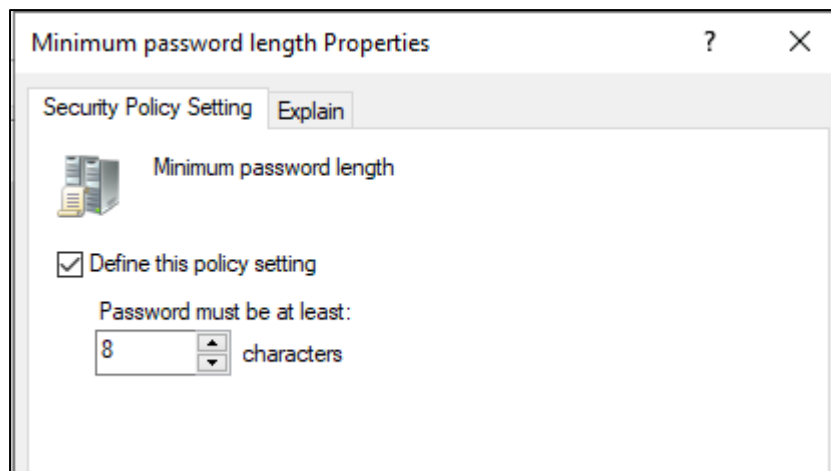


Figure 21 Setting up the minimum password length

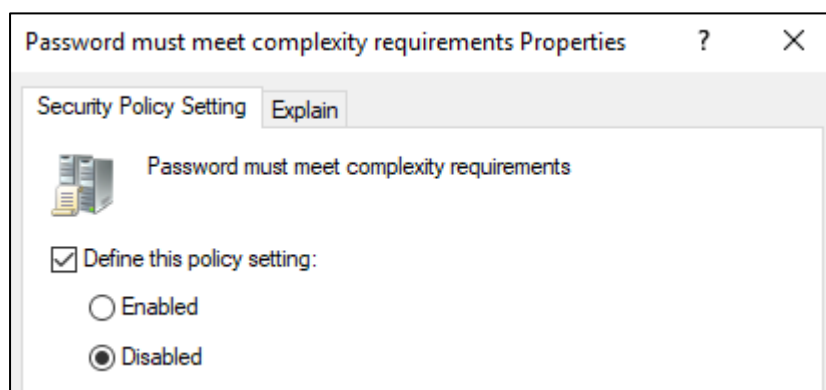


Figure 22 Disabling the Security setting

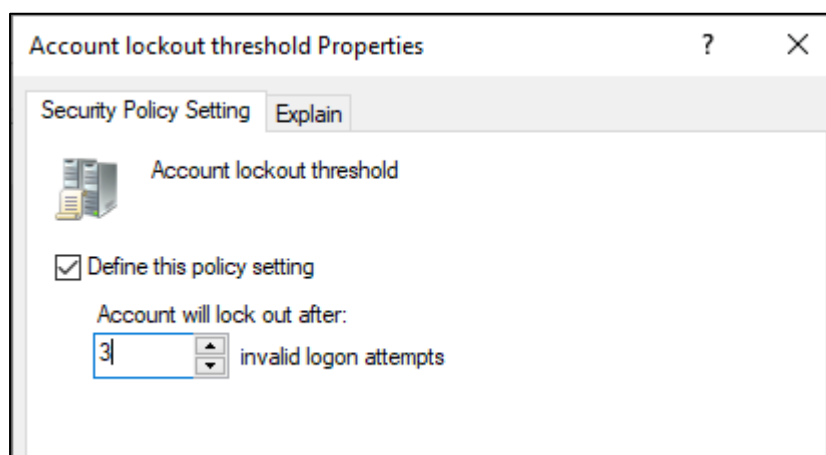


Figure 23 Setting up the Account Lockout Policy to 3 attempts

Creating User/Computer Accounts and Managing their properties

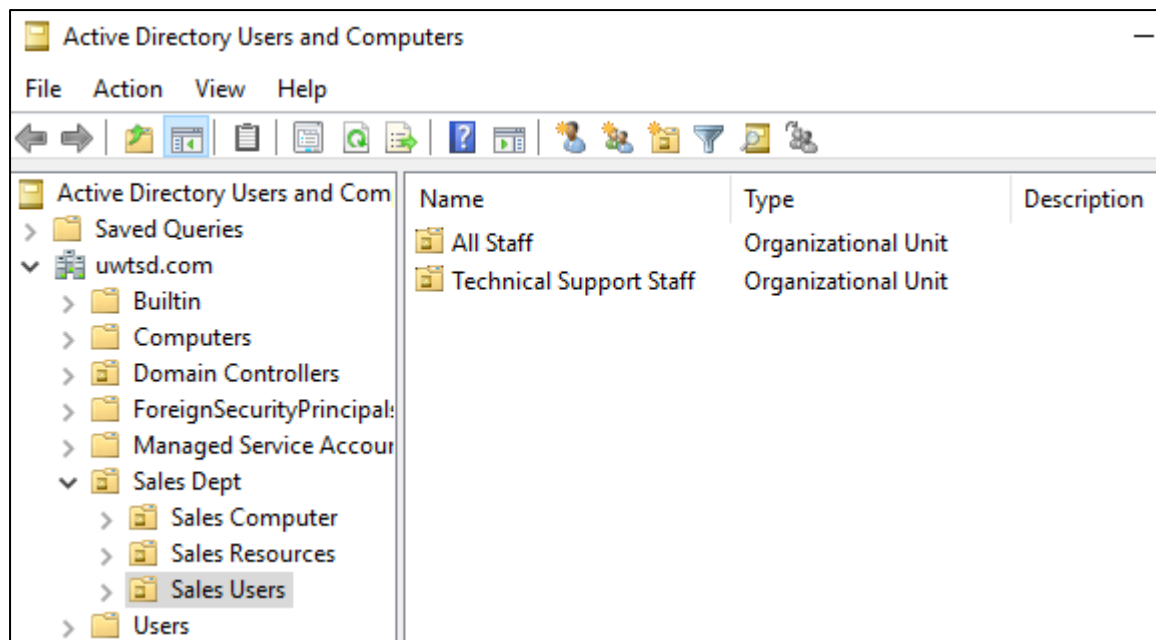


Figure 24 Opened the "AD users and computers" tools and located the "All staff" folder

The 'New Object - User' dialog box is shown. It contains the following fields and options:

- Create in:** uwtsd.com/Sales Dept/Sales Users/All Staff
- First name:** [Text box]
- Initials:** [Text box]
- Last name:** [Text box]
- Full name:** [Text box]
- User logon name:** [Text box] @uwtsd.com [Dropdown menu]
- User logon name (pre-Windows 2000):** UWTSD\ [Text box]
- Buttons:** < Back, Next >, Cancel

Figure 25 Creating two user accounts

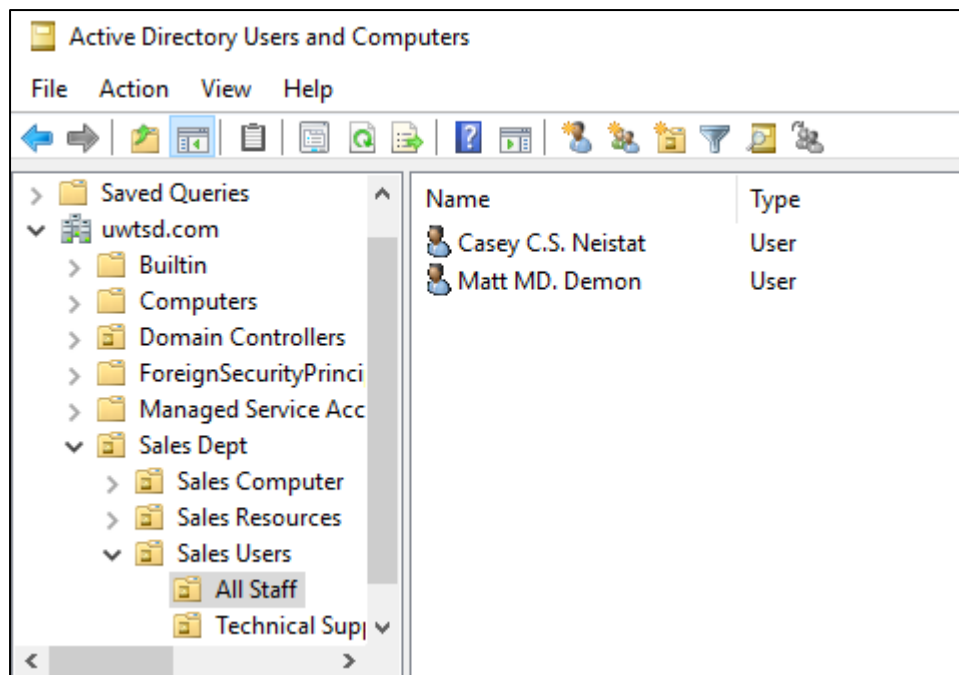


Figure 26 User accounts created

User logon name:

adm-chuck @uwtsd.com

User logon name (pre-Windows 2000):

UWTSD\ adm-chuck

Logon Hours... Log On To...

Figure 27 Created an admin account in the Technical support Staff OU

User logon name:

adm-heath @uwtsd.com

User logon name (pre-Windows 2000):

UWTSD\ adm-heath

Logon Hours... Log On To...

Figure 28 Created a second admin account

User logon name:
adm-zaid @uwtsd.com

User logon name (pre-Windows 2000):
UWTSD\ adm-zaid

Logon Hours... Log On To...

Figure 29 Created a third admin account

adm Properties

General Members Member Of Managed By

adm

Group name (pre-Windows 2000): adm

Description:

E-mail:

Group scope:
☐ Domain local
☒ Global
☐ Universal

Group type:
☒ Security
☐ Distribution

Notes:

OK Cancel Apply

Figure 30 Creating an admin group

adm Properties

General Members Member Of Managed By

Members:

Name	Active Directory Domain Services Folder
Chuck CK. Ke...	uwtsd.com/Sales Dept/Sales Users/Technical S...
Heath HA. Ad...	uwtsd.com/Sales Dept/Sales Users/Technical S...
Zaid ZA. Alqu...	uwtsd.com/Sales Dept/Sales Users/Technical S...

Figure 31 Adding the three admins to the group

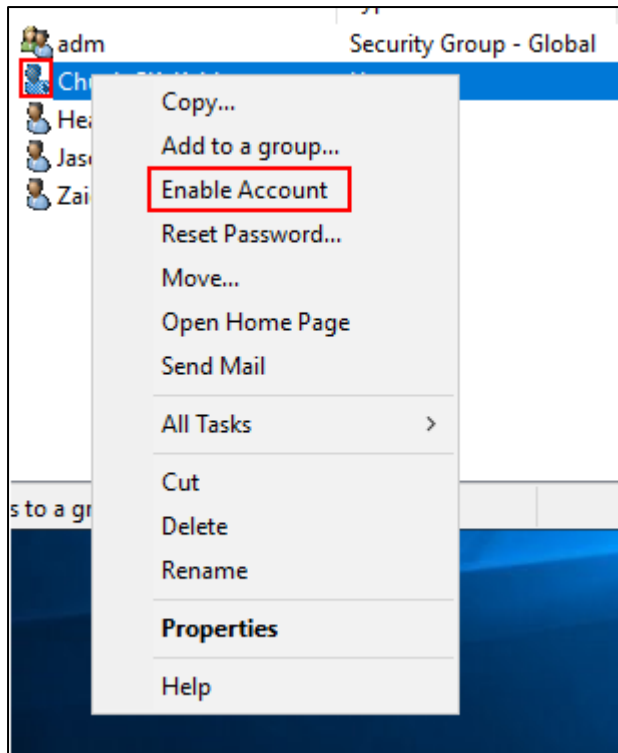


Figure 32 Disabled an admin account, by right clicking it shows the option to enable it.

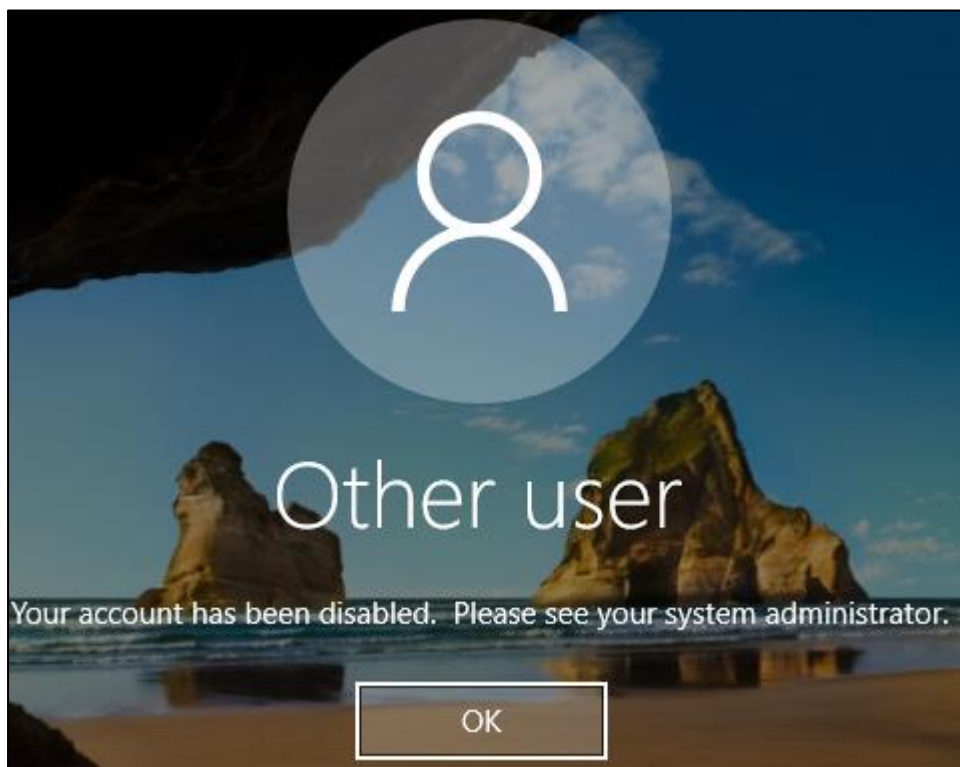


Figure 33 Tried to access with the disable account's credentials

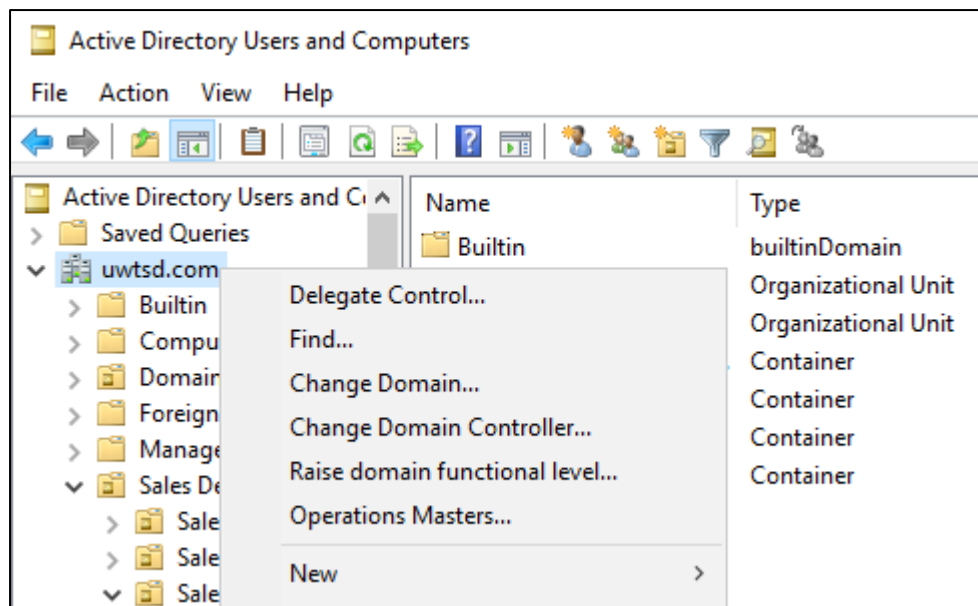


Figure 34 Accessed the domain name menu from AD Users and Computers

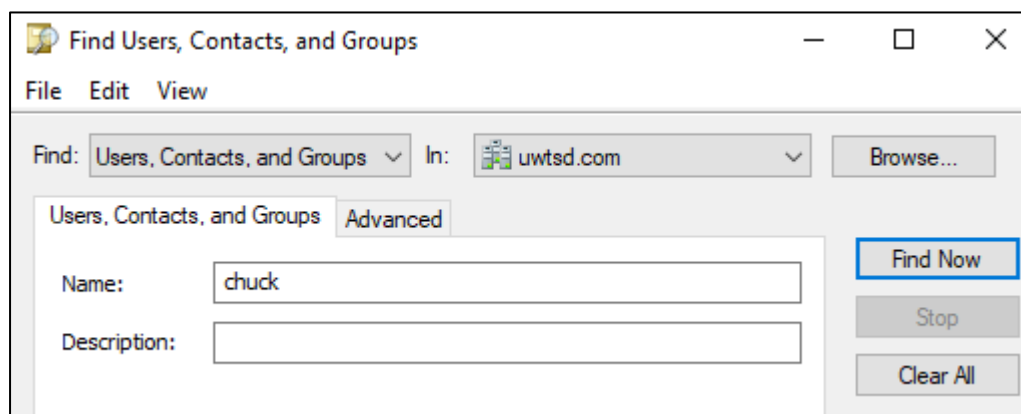


Figure 35 Using the "Find" option to find an account

Search results:		
Name	Type	Description
 Chuck CK. Keith	User	

Figure 36 Output of the research

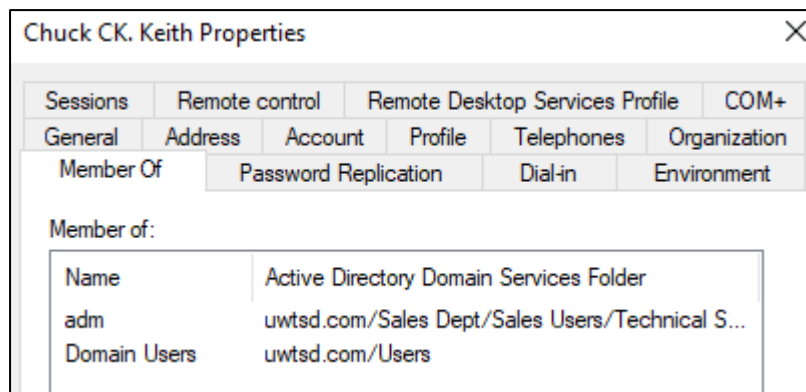


Figure 37 Checking the Properties of the record, in particular the group it belongs to.

Task 3: Investigating the use of Group Objects in Active Directory.

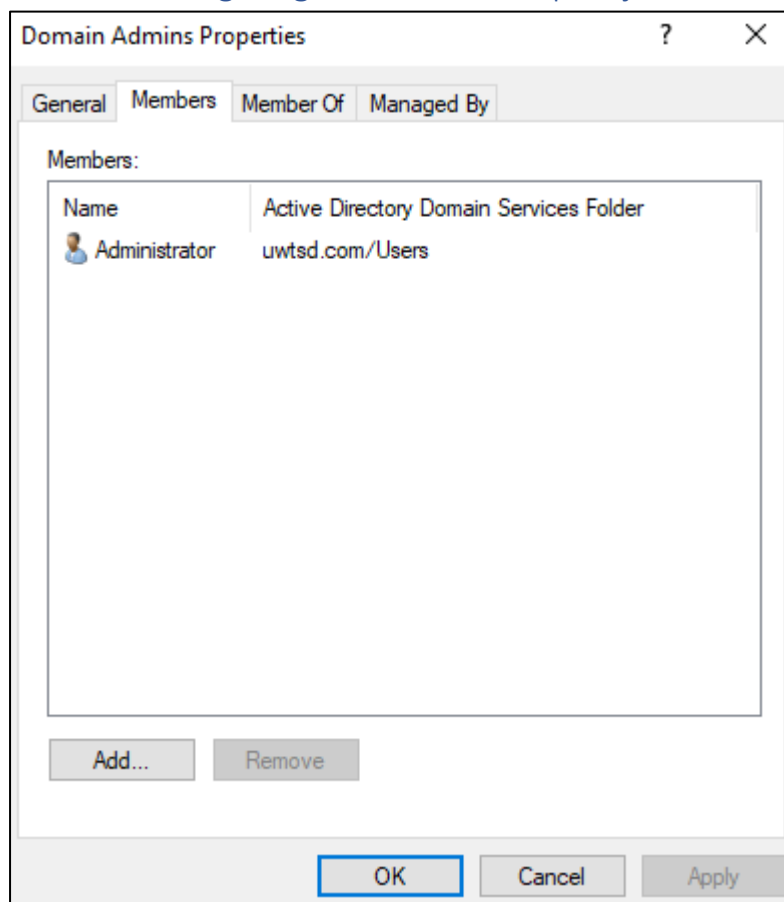
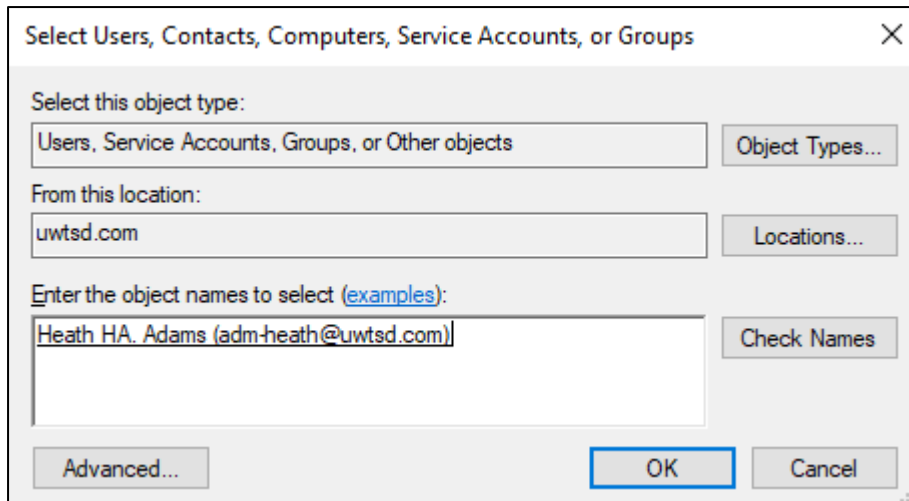


Figure 38 Accessing the properties of the Domain Admin groups to add a new member



Select Users, Contacts, Computers, Service Accounts, or Groups

Select this object type:
Users, Service Accounts, Groups, or Other objects

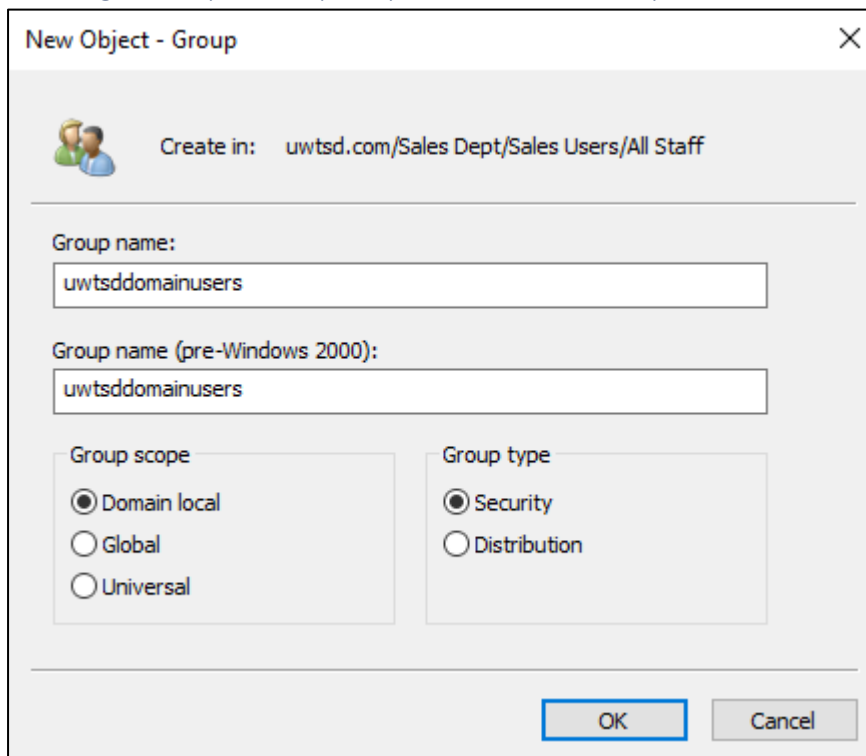
From this location:
uwtسد.com

Enter the object names to select (examples):
Heath HA. Adams (adm-heath@uwtسد.com)

Advanced... OK Cancel

Figure 39 Searching for a user of the Technical Support OU to add in the admin group

Creating a Group – Group Scope in Active Directory.



New Object - Group

Create in: uwtسد.com/Sales Dept/Sales Users/All Staff

Group name:
uwtسدdomainusers

Group name (pre-Windows 2000):
uwtسدdomainusers

Group scope:
☒ Domain local
☐ Global
☐ Universal

Group type:
☒ Security
☐ Distribution

OK Cancel

Figure 40 Creating a domain local group

uwtsddomainglobal Properties

General Members Member Of Managed By

Group name (pre-Windows 2000): uwtsddomainglobal

Description:

E-mail:

Group scope

- ☐ Domain local
- ☒ Global
- ☐ Universal

Group type

- ☒ Security
- ☐ Distribution

Notes:

OK Cancel Apply

Figure 41 Creating a global group within the Technical support staff OU

uwtsddomainglobal Properties

General Members Member Of Managed By

Members:

Name	Active Directory Domain Services Folder
Chuck CK. Ke...	uwtsd.com/Sales Dept/Sales Users/Technical S...
Heath HA. Ad...	uwtsd.com/Sales Dept/Sales Users/Technical S...
Jason JD. Dion	uwtsd.com/Sales Dept/Sales Users/Technical S...
Zaid ZA. Alqu...	uwtsd.com/Sales Dept/Sales Users/Technical S...

Add... Remove

OK Cancel Apply

Figure 42 Added in the users of the Technical Support staff OU

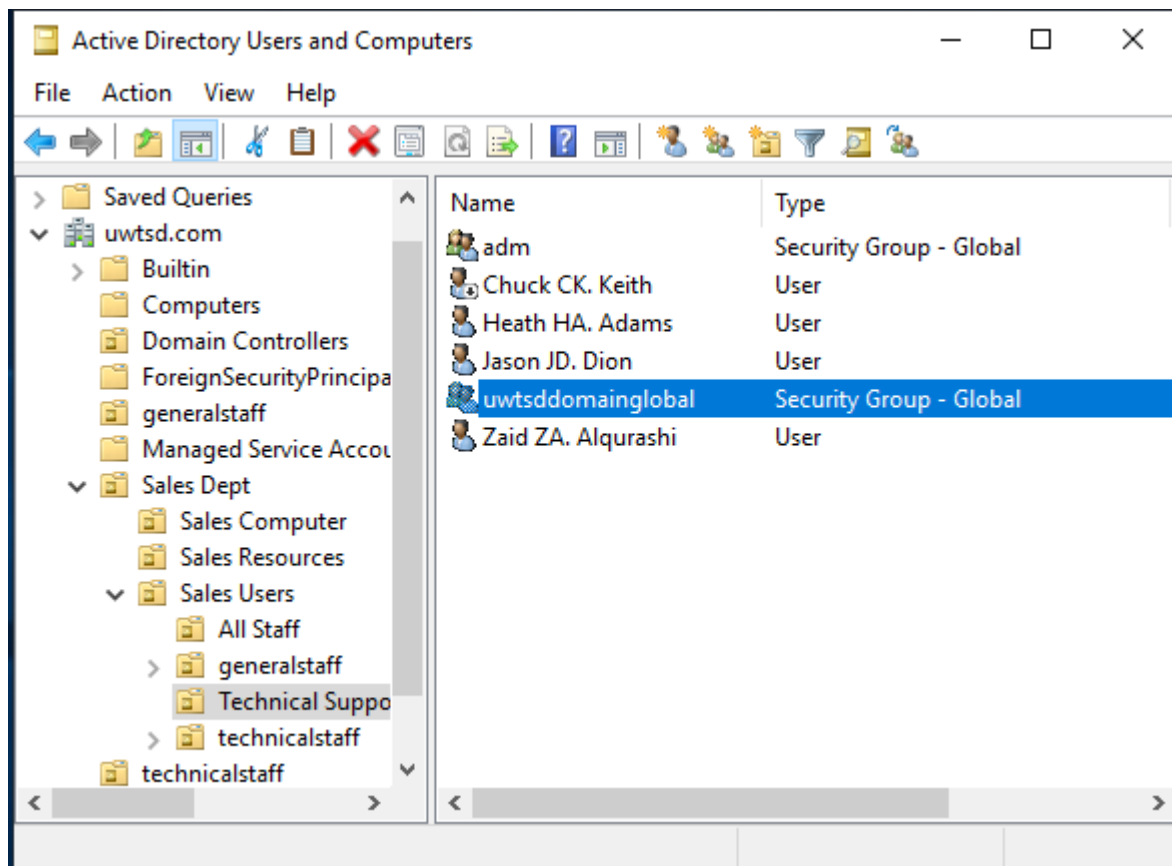


Figure 43 Nested global group into Domain Local Group

Worksheet 3: Resource Management in Active Directory – Managing Access to Files and Folders, and Controlling Domain User Environments

Task 1: Managing local access and Network Access to files and folder objects in Active Directory.

Select the server and path for this share

Select Profile
Share Location
Share Name
Other Settings
Permissions
Confirmation
Results

Server:

Server Name	Status	Cluster Role	Owner Node
WIN-AOHRK113BL	Online	Not Clustered	

Share location:

☐ Select by volume:

Volume	Free Space	Capacity	File System
C:	21.2 GB	30.5 GB	NTFS

The location of the file share will be a new folder in the \Shares directory on the selected volume.

☒ Type a custom path:

C:\Dept Database

Figure 44 Creating a shared folder within the Domain controller

Specify share name

Select Profile
Share Location
Share Name
Other Settings
Permissions
Confirmation
Results

Share name:

Share description:

Local path to share:

Remote path to share:

Figure 45 Specifying the share name and remote path to the share

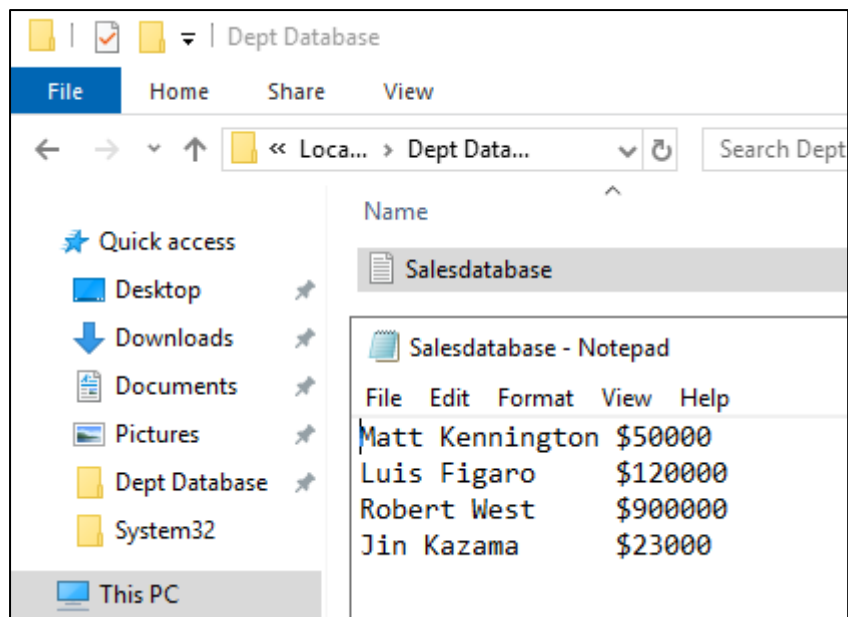


Figure 46 Creating a file with the shared folder

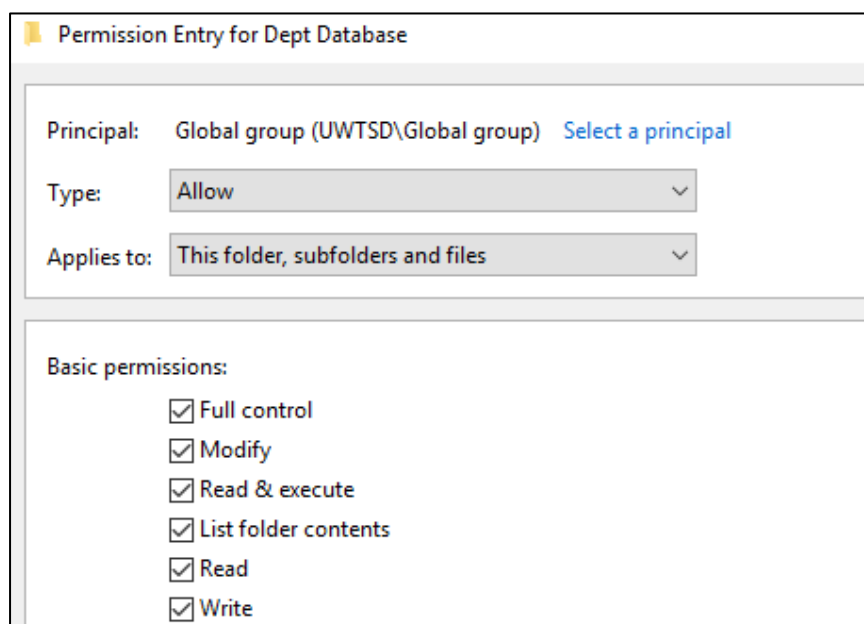


Figure 47 Giving the Global group, that includes the Technical staff group, all permissions

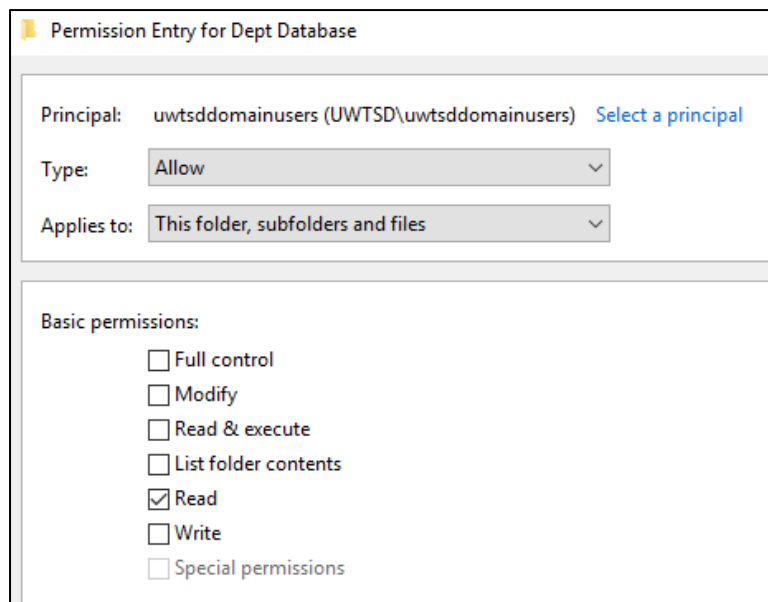


Figure 48 Granting the general group "uwtssdomainusers" only read permission

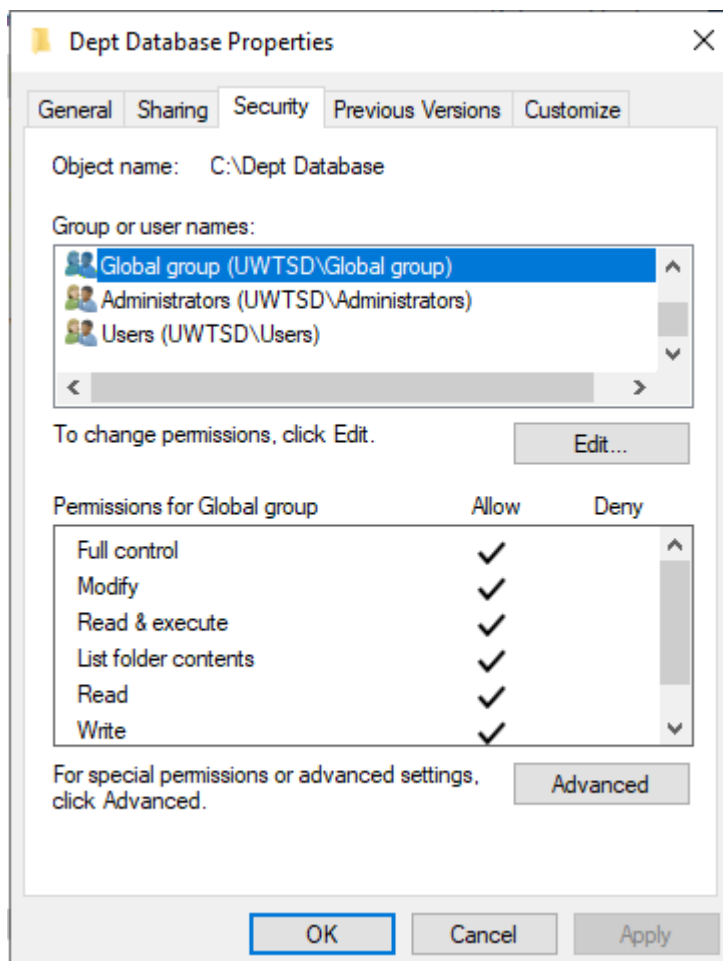


Figure 49 Configuring NTFS permission on the folder for the Technical support staff

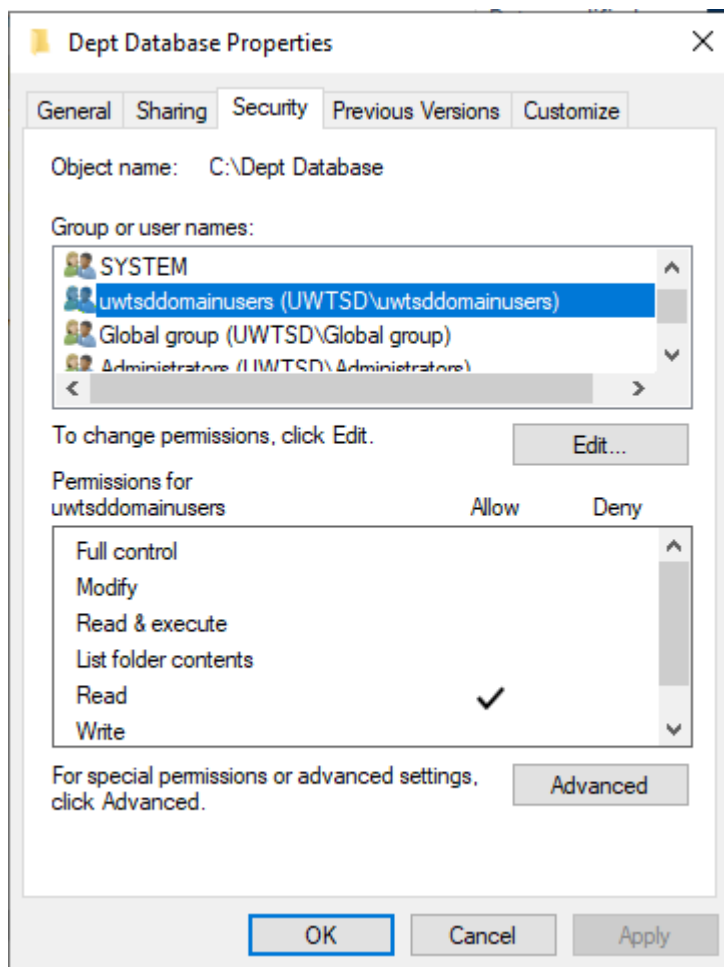


Figure 50 Configuring NTFS permission on the folder for the general group

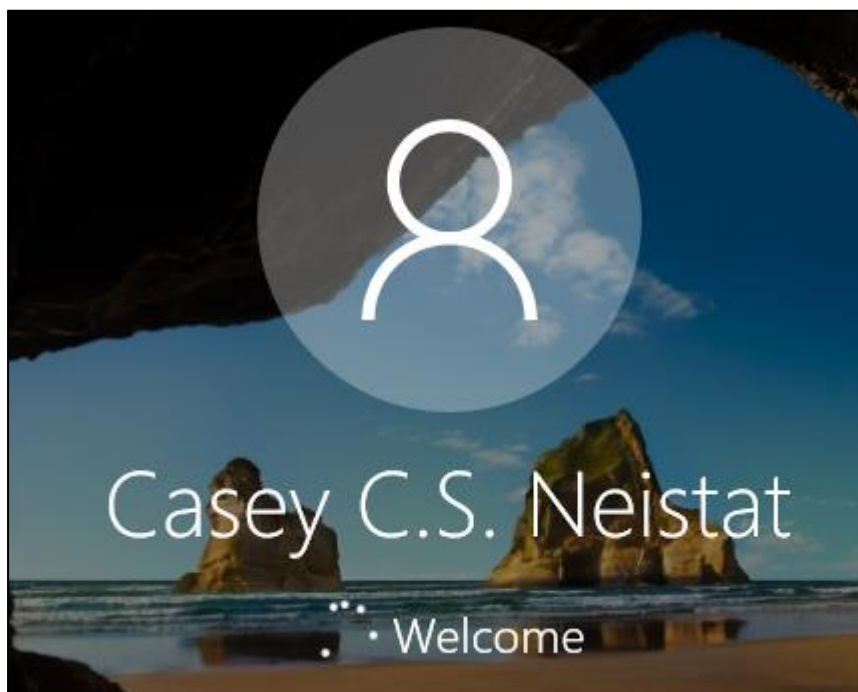


Figure 51 Logging onto the workstation with a general user member's account

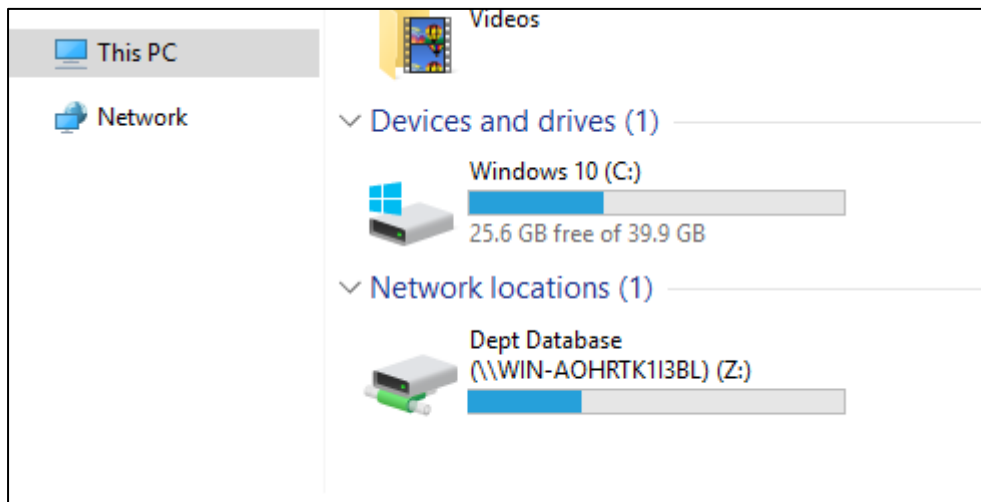


Figure 52 Mapped the drive

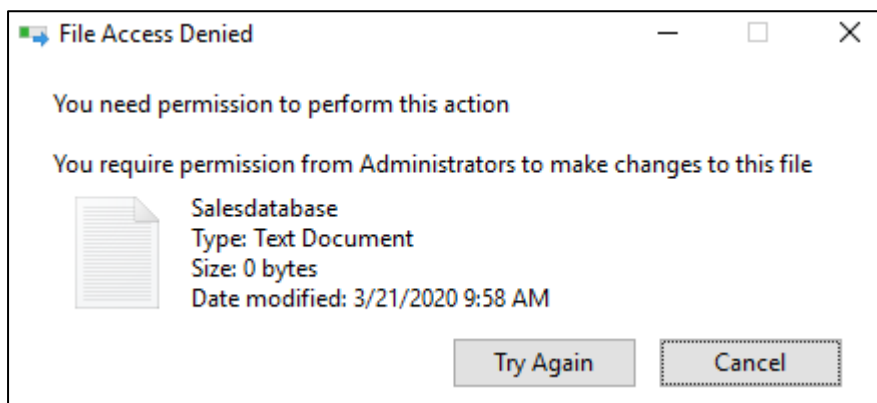


Figure 53 Tried to delete the file

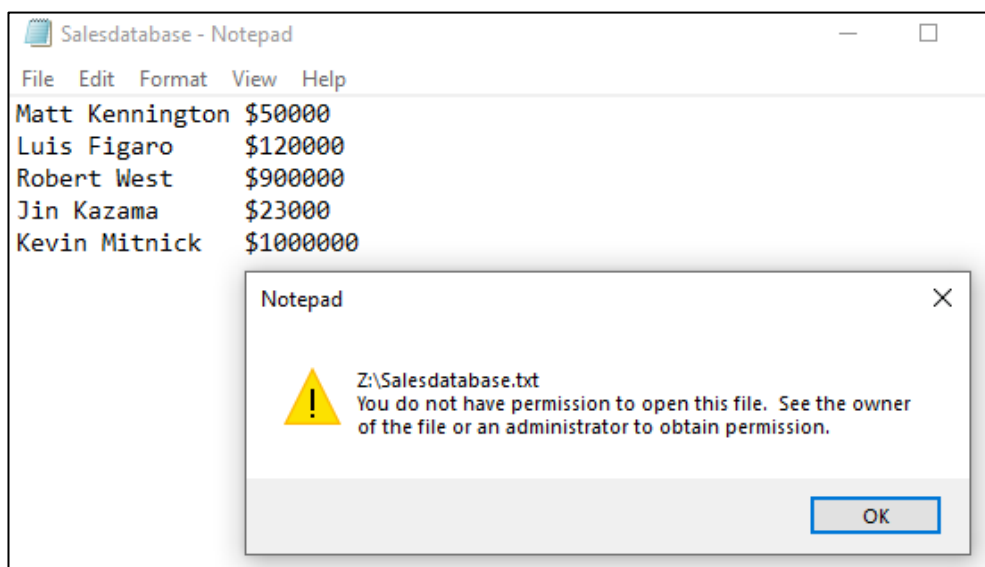


Figure 54 Tried to modify and save the file

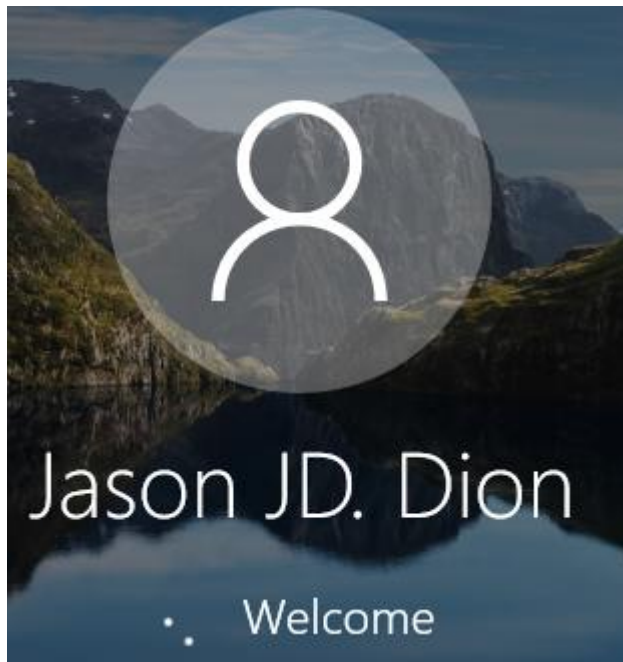


Figure 55 Logging onto the workstation with a higher privileged member of the Technical staff group

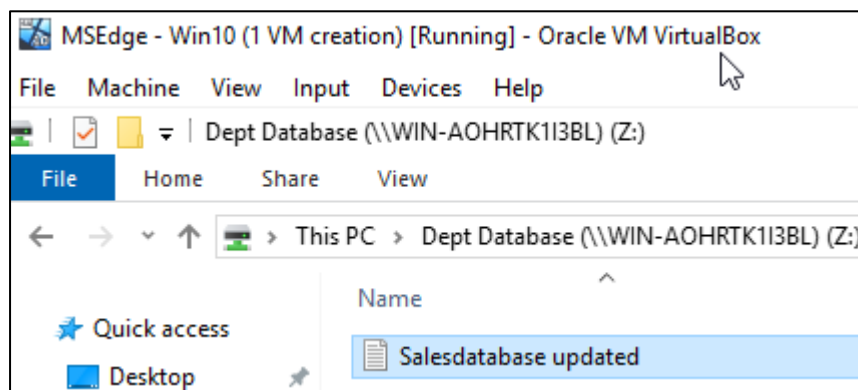


Figure 56 Renamed the file, permissions granted.

Task 2: Controlling 'domain resources' using Organisational Units and Group Policy.

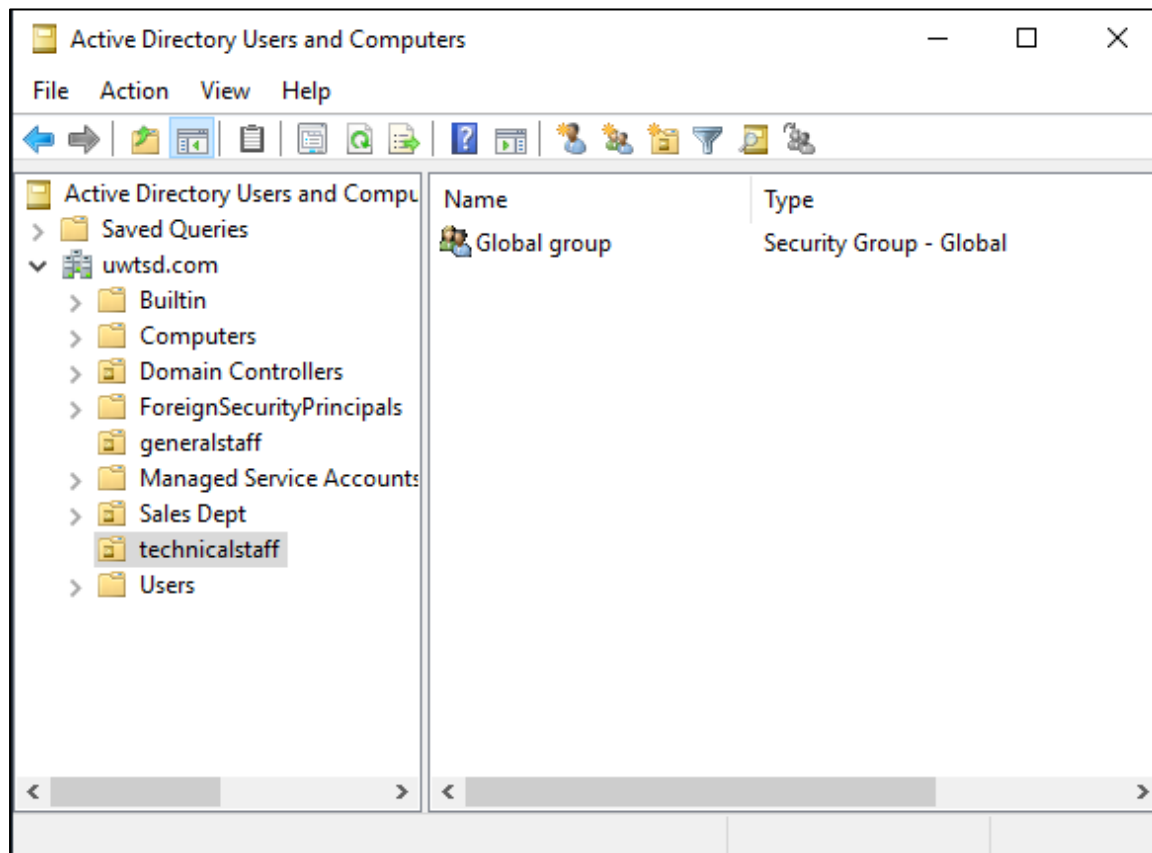


Figure 57 Created the "technicalstaff" OU and added the Technical staff group

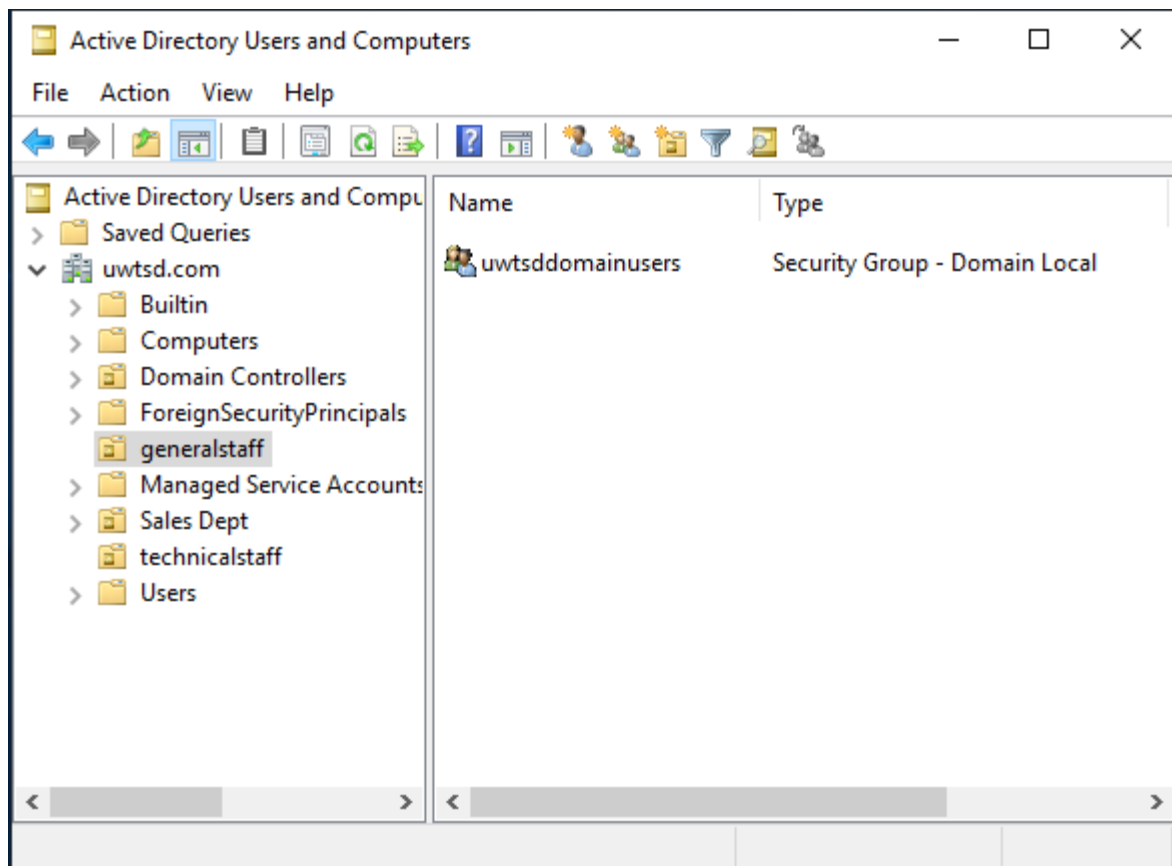


Figure 58 Created the "generalstaff" OU and added the general staff group

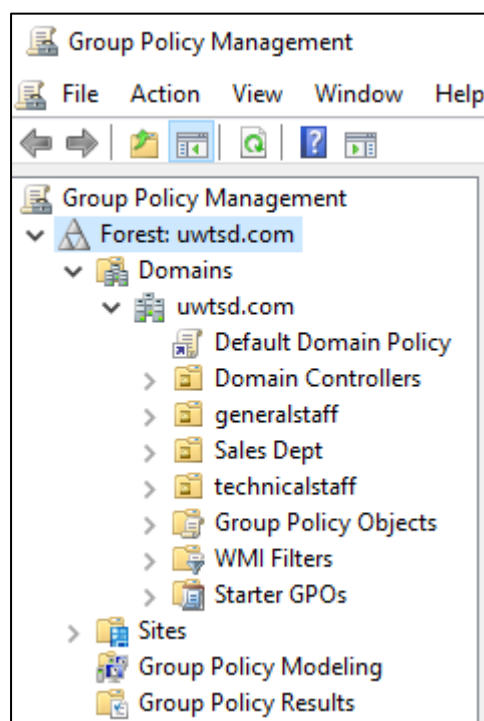


Figure 59 Accessed the Group Policy management tool

generalstaff					
Linked Group Policy Objects		Group Policy Inheritance	Delegation		
Link Order	GPO	Enforced	Link Enabled	GPO Status	
1	No Right Click Access	No	Yes	Enabled	

Figure 60 Created a new policy for the members of the "generalstaff" group

- Computer Configuration
 - Policies
 - Preferences
- User Configuration
 - Policies
 - Software Settings
 - Windows Settings
 - Administrative Templates: P
 - Control Panel
 - Desktop
 - Network
 - Shared Folders
 - Start Menu and Taskbar
 - System
 - Windows Components
 - All Settings
 - Preferences

Start Menu and Taskbar

Remove access to the context menus for the taskbar

Edit [policy setting](#)

Requirements:
At least Windows 2000

Description:
This policy setting allows you to remove access to the context menus for the taskbar.

If you enable this policy setting, the menus that appear when you right-click the taskbar and items on the taskbar are hidden, such as the Start button, the clock, and the taskbar buttons.

Figure 61 Configuring the new policy, removing user access to the context menus for the taskbar

☐ Not Configured
 ☒ Enabled
 ☐ Disabled

Comment:

Figure 62 Enabling the policy

```
C:\Users\Administrator>gpupdate/force
Updating policy...
Computer Policy update has completed successfully.
```

Figure 63 Forcing updates of the policy



Figure 64 Logging onto the workstation with a general staff user account

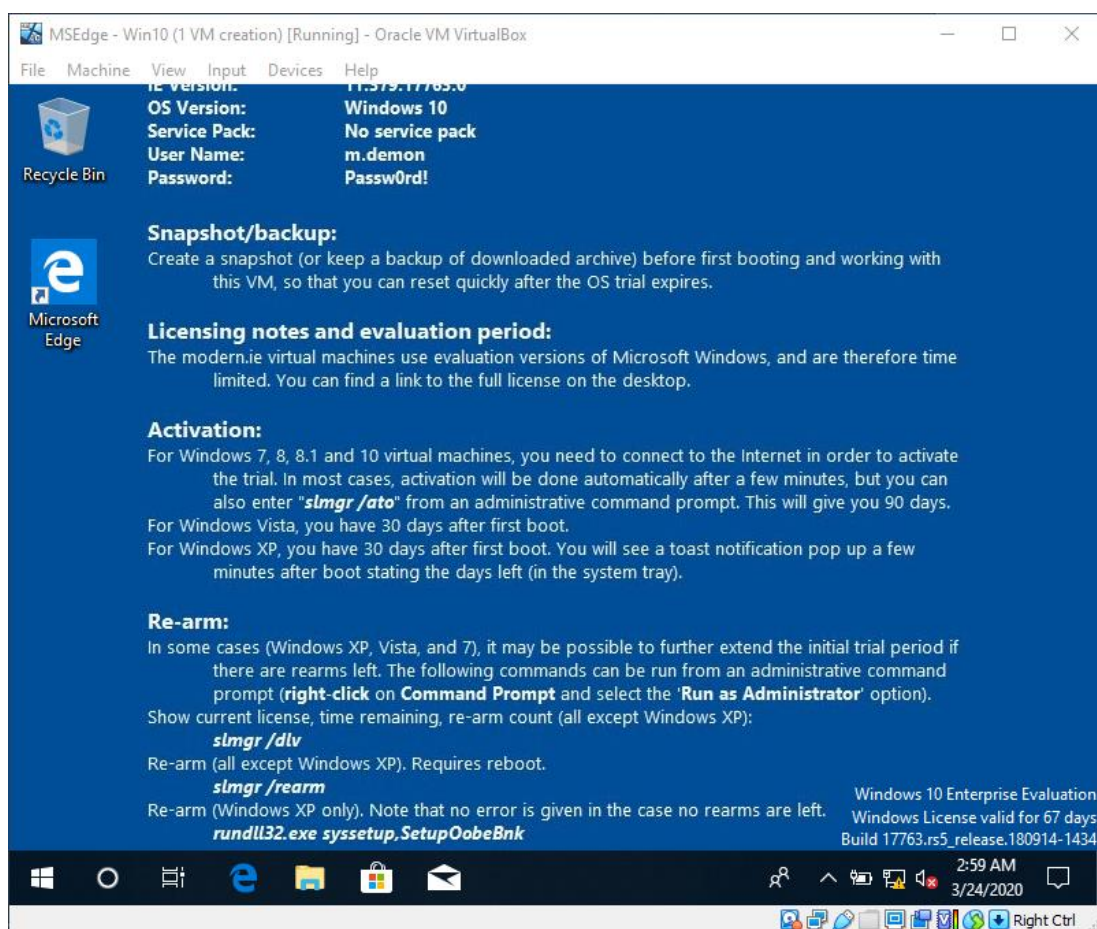


Figure 65 No output from the system whenever tried to click on desktop, start menu or windows explorer.

Setting	State
Active Directory	
Desktop	
Prohibit User from manually redirecting Profile Folders	Not configured
Hide and disable all items on the desktop	Not configured
Remove the Desktop Cleanup Wizard	Not configured
Hide Internet Explorer icon on desktop	Not configured
Remove Computer icon on the desktop	Not configured
Remove My Documents icon on the desktop	Not configured
Hide Network Locations icon on desktop	Not configured
Remove Properties from the Computer icon context menu	Not configured
Remove Properties from the Documents icon context menu	Not configured
Do not add shares of recently opened documents to Networ...	Not configured
Remove Recycle Bin icon from desktop	Enabled
Remove Properties from the Recycle Bin context menu	Not configured
Don't save settings at exit	Not configured
Turn off Aero Shake window minimizing mouse gesture	Not configured
Prevent adding, dragging, dropping and closing the Taskbar...	Not configured
Prohibit adjusting desktop toolbars	Not configured

Figure 66 Implemented a new policy on the server

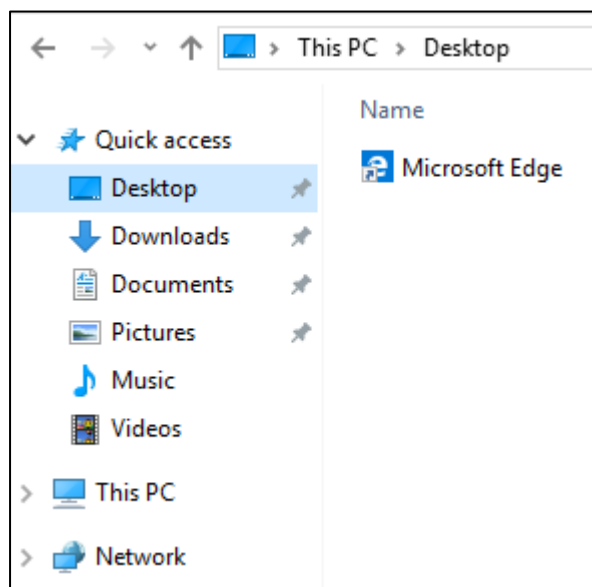


Figure 67 After force the policy and restarted the workstation, the policy has been applied removing the bin icon from desktop

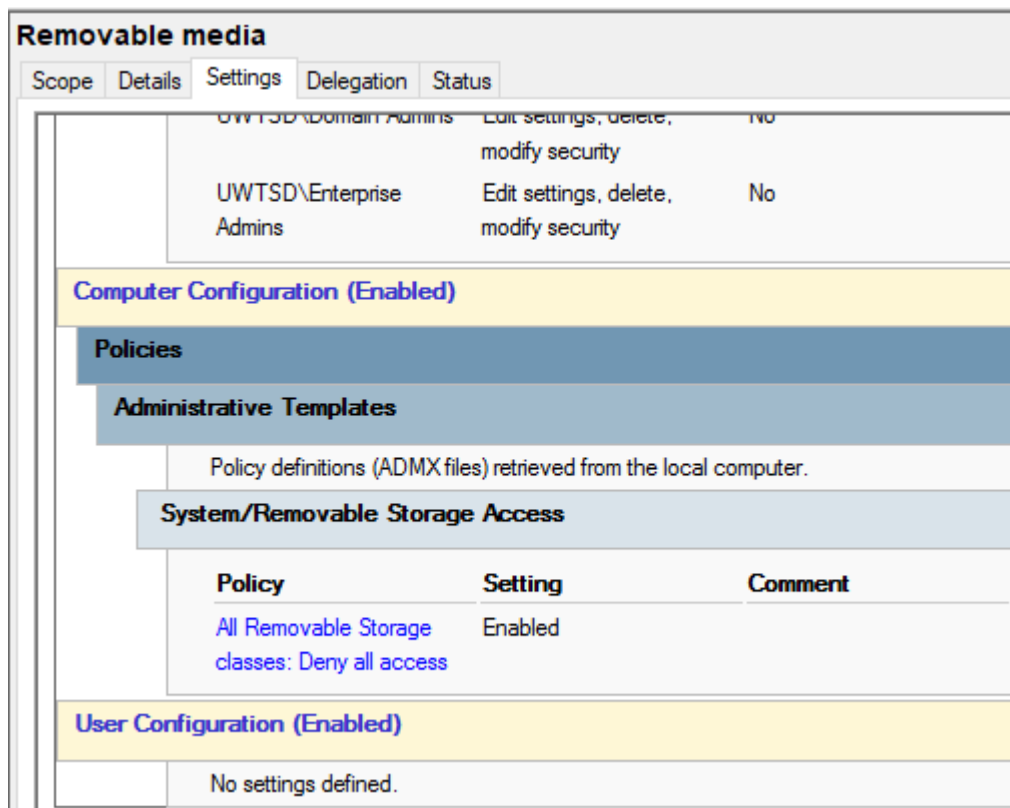


Figure 68 Implemented a new policy for removable storage devices

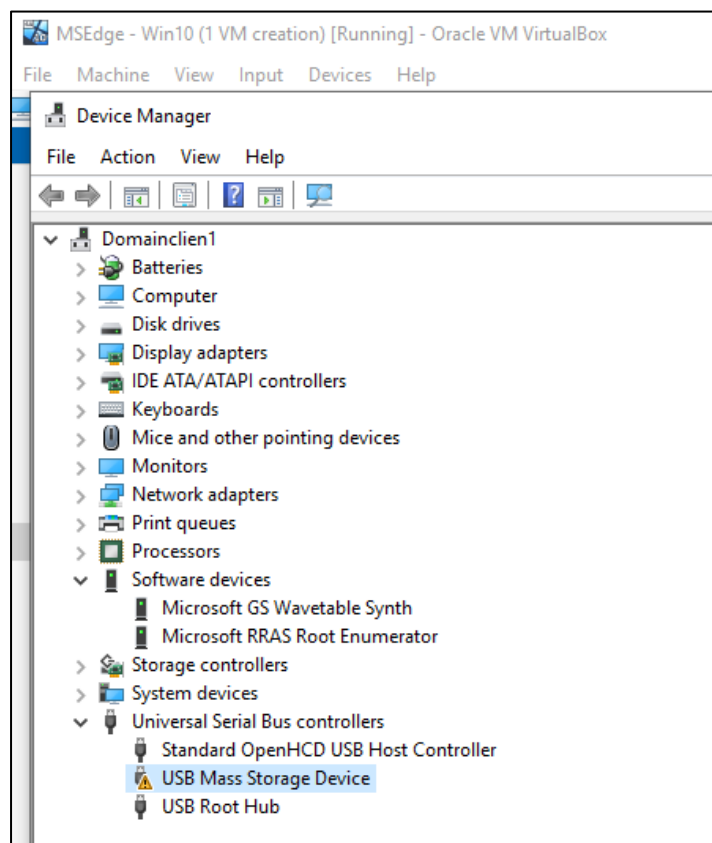


Figure 69 Tested by plugging in a USB stick. The system recognizes the device but does not allow access

Worksheet 4: Network Administration using DHCP

Task 1: Installing and configuring the DHCP Service.

Part A: INSTALL / AUTHORISE THE DHCP SERVICE.

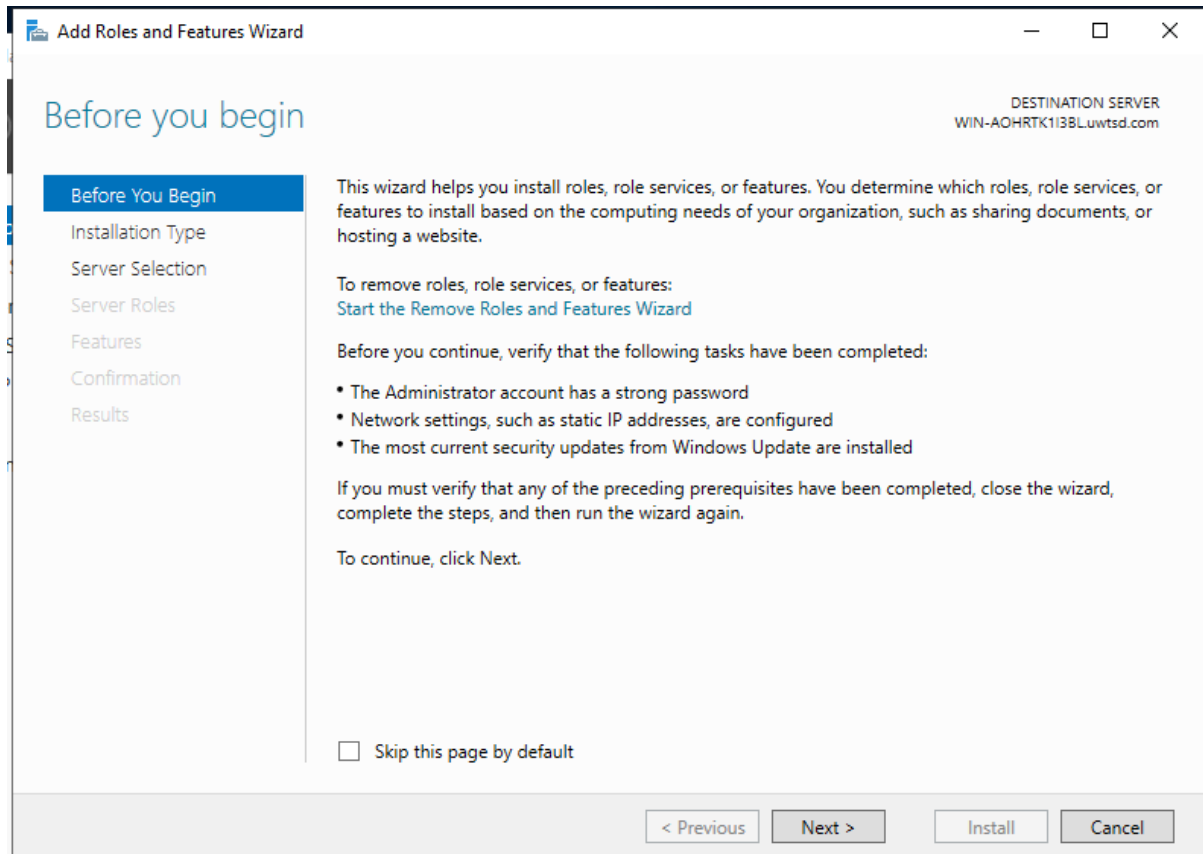


Figure 70 Adding a new role to the server

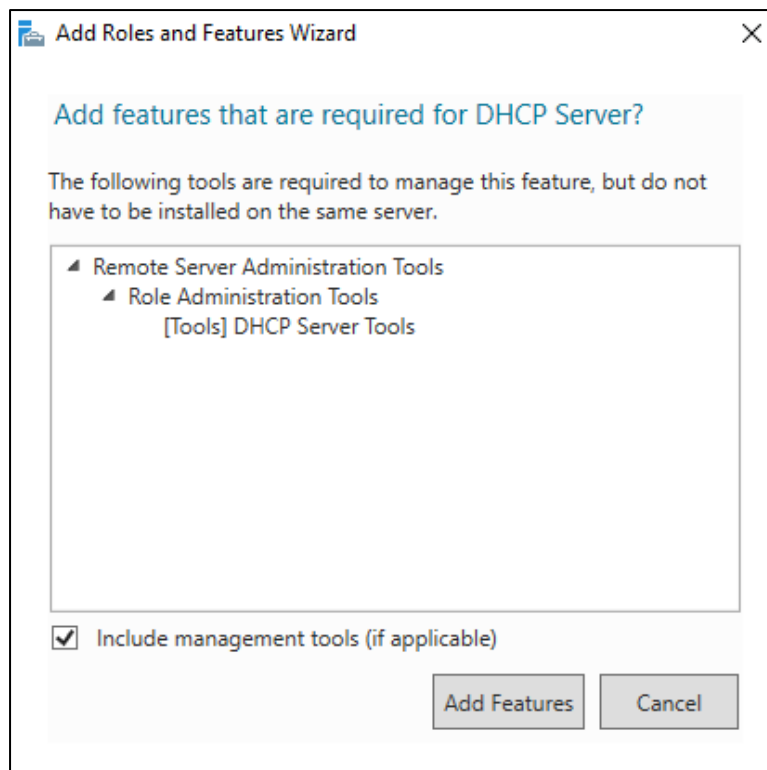


Figure 71 Adding DHCP Server features to the server

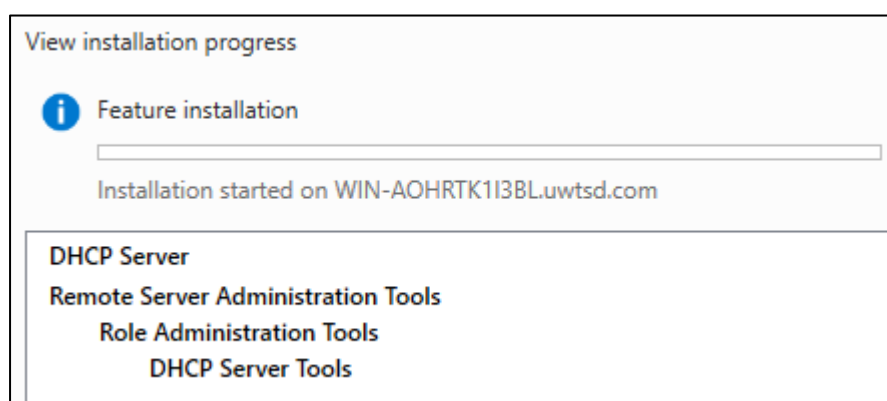


Figure 72 Installing DHCP features

Part B: Creating a DHCP scope for leasing Ip addresses to DHCP clients on the private network

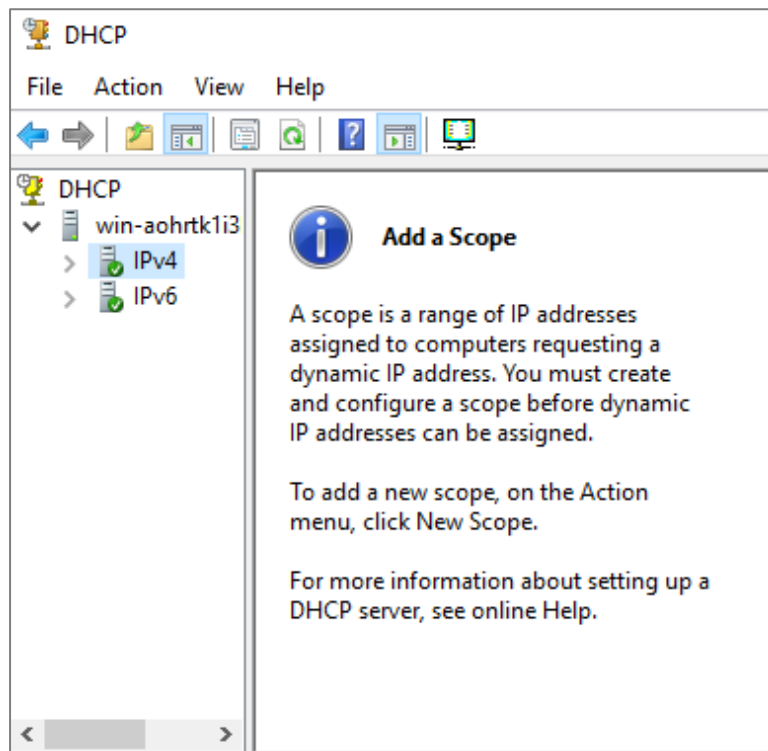


Figure 73 Opened the DHCP console to create a scope

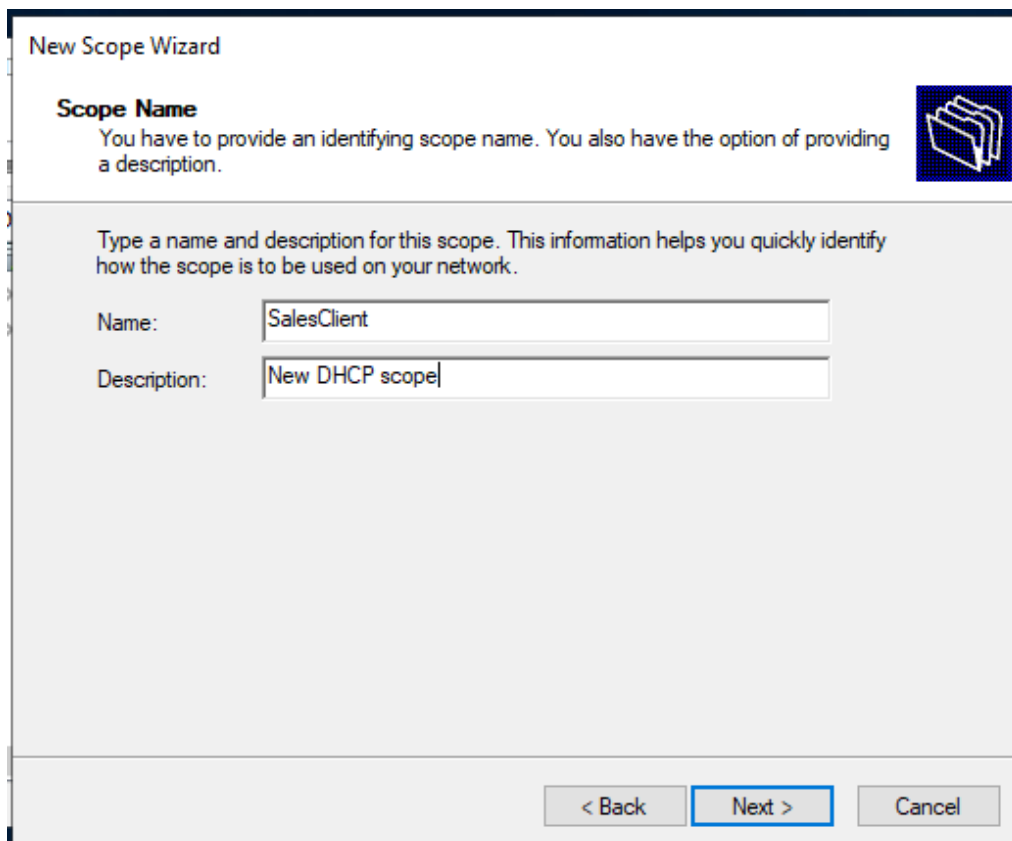


Figure 74 Creating a new scope named SalesClient

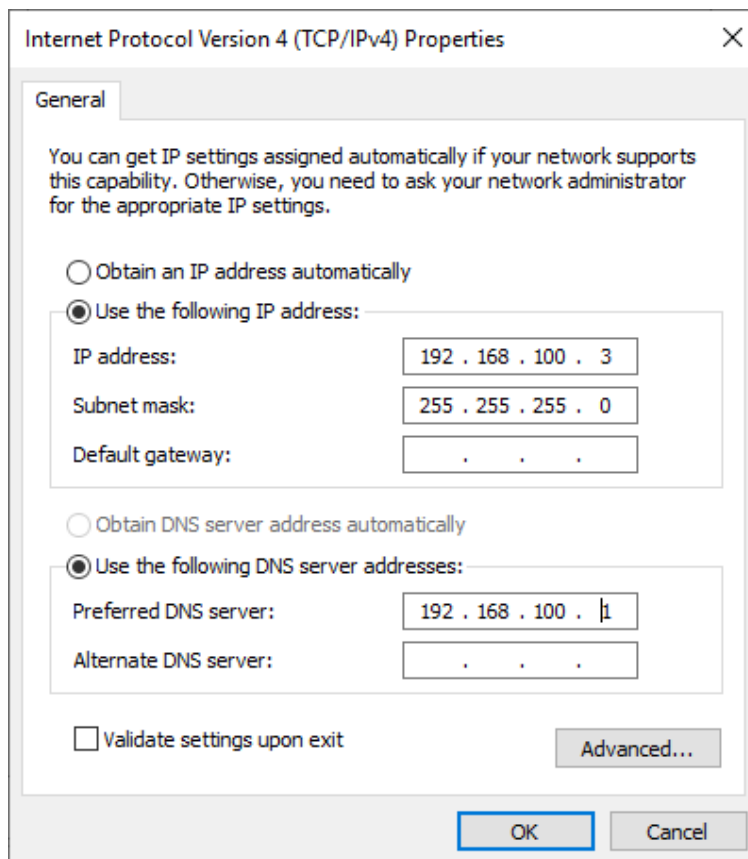


Figure 75 Checking client's IP address

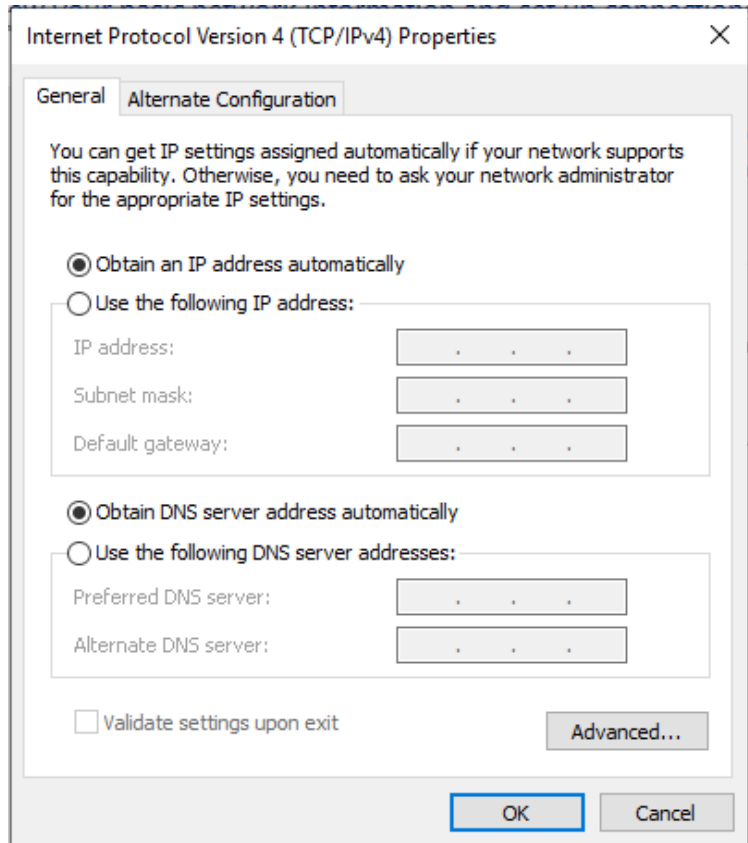
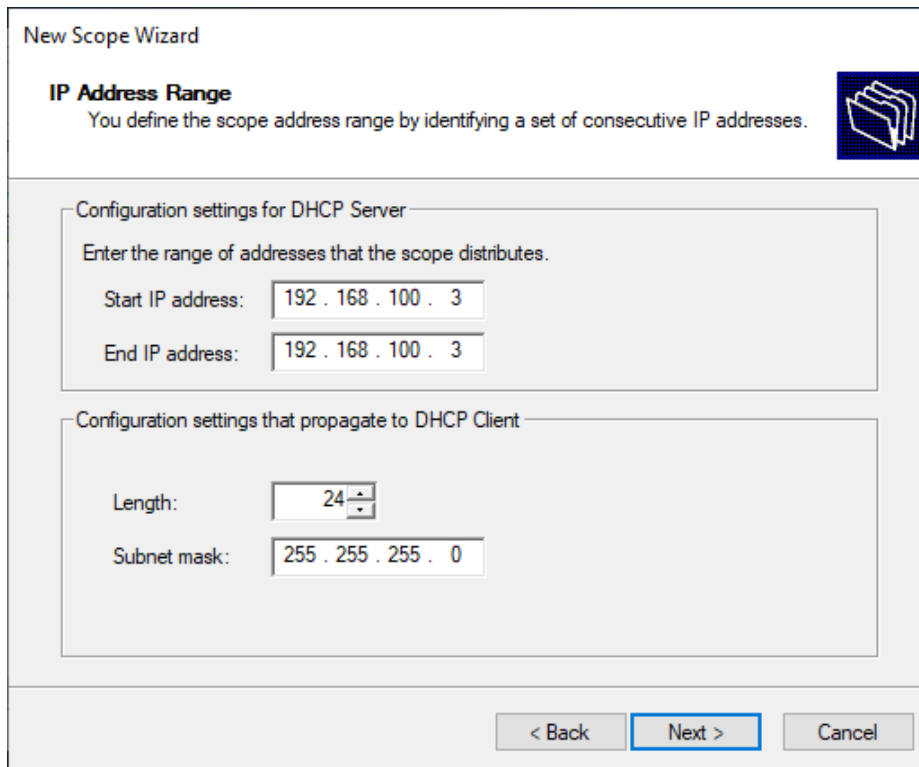


Figure 76 Setting automatic IP address and DNS for the client



New Scope Wizard

IP Address Range
You define the scope address range by identifying a set of consecutive IP addresses.

Configuration settings for DHCP Server

Enter the range of addresses that the scope distributes.

Start IP address: 192 . 168 . 100 . 3

End IP address: 192 . 168 . 100 . 3

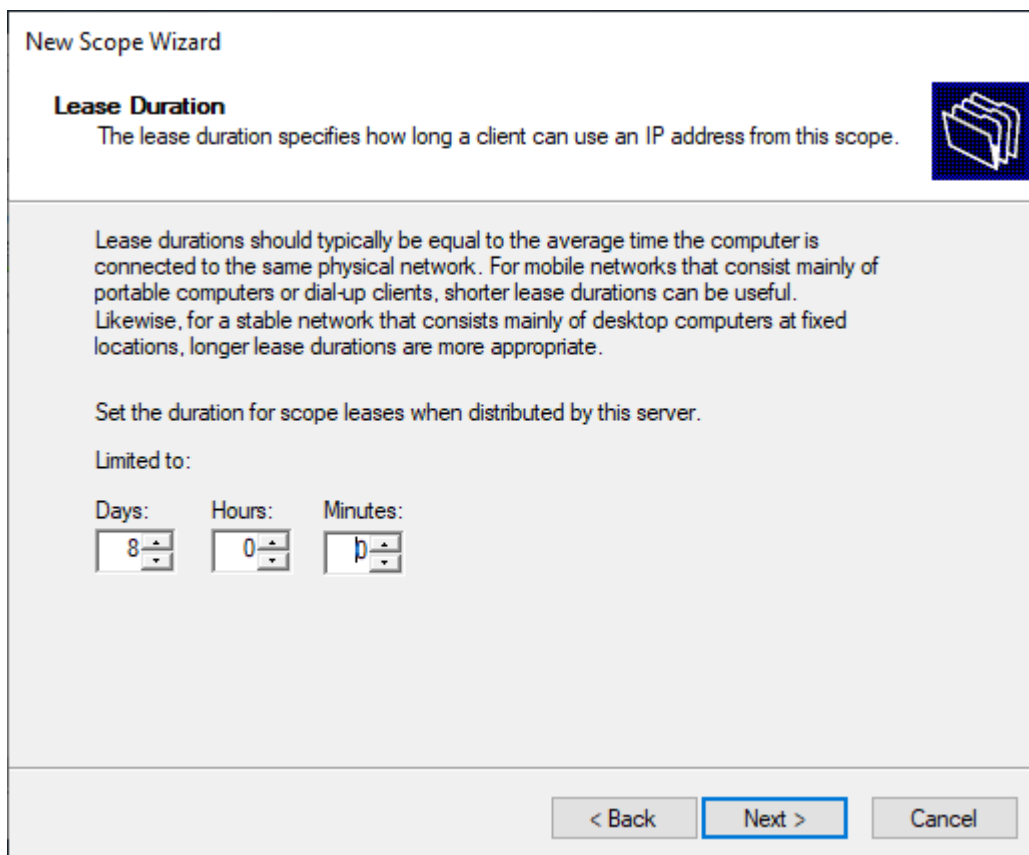
Configuration settings that propagate to DHCP Client

Length: 24

Subnet mask: 255 . 255 . 255 . 0

< Back Next > Cancel

Figure 77 Setting up Start and end Ip addresses equal to the client' one and determining the subnet mask length.



New Scope Wizard

Lease Duration
The lease duration specifies how long a client can use an IP address from this scope.

Lease durations should typically be equal to the average time the computer is connected to the same physical network. For mobile networks that consist mainly of portable computers or dial-up clients, shorter lease durations can be useful. Likewise, for a stable network that consists mainly of desktop computers at fixed locations, longer lease durations are more appropriate.

Set the duration for scope leases when distributed by this server.

Limited to:

Days: 8 Hours: 0 Minutes: 10

< Back Next > Cancel

Figure 78 Setting default lease duration.

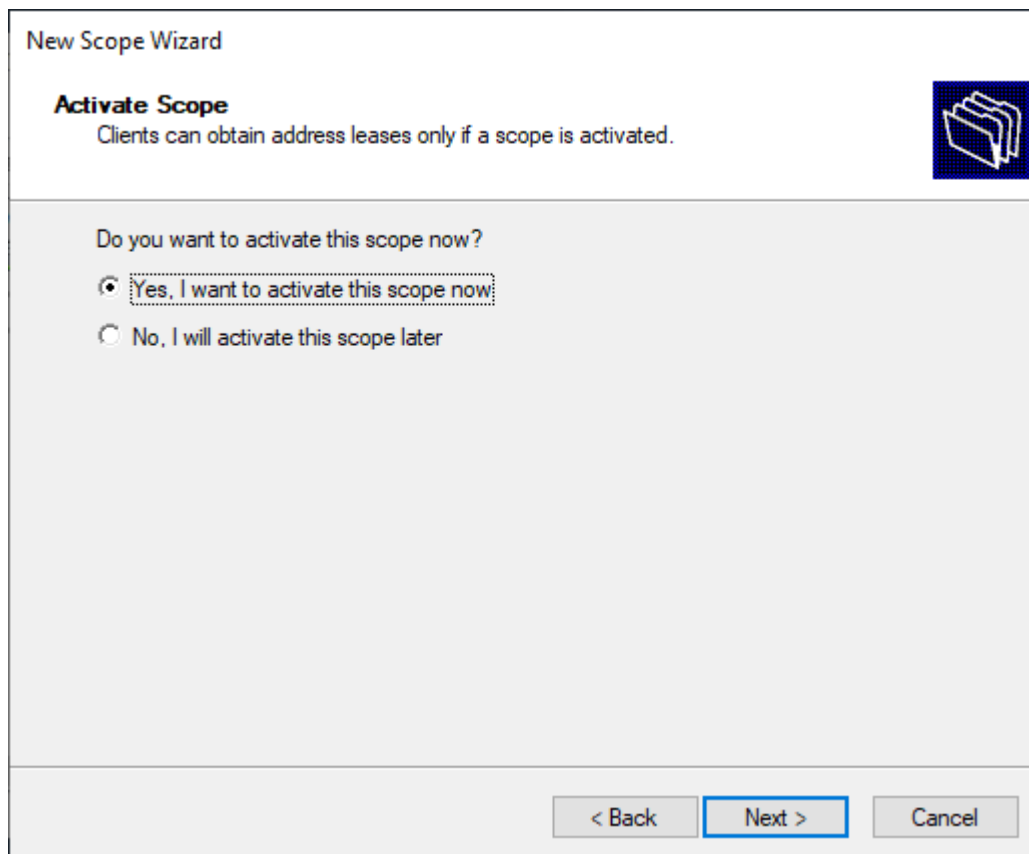


Figure 79 Activating scope

Part C Testing DHCP lease

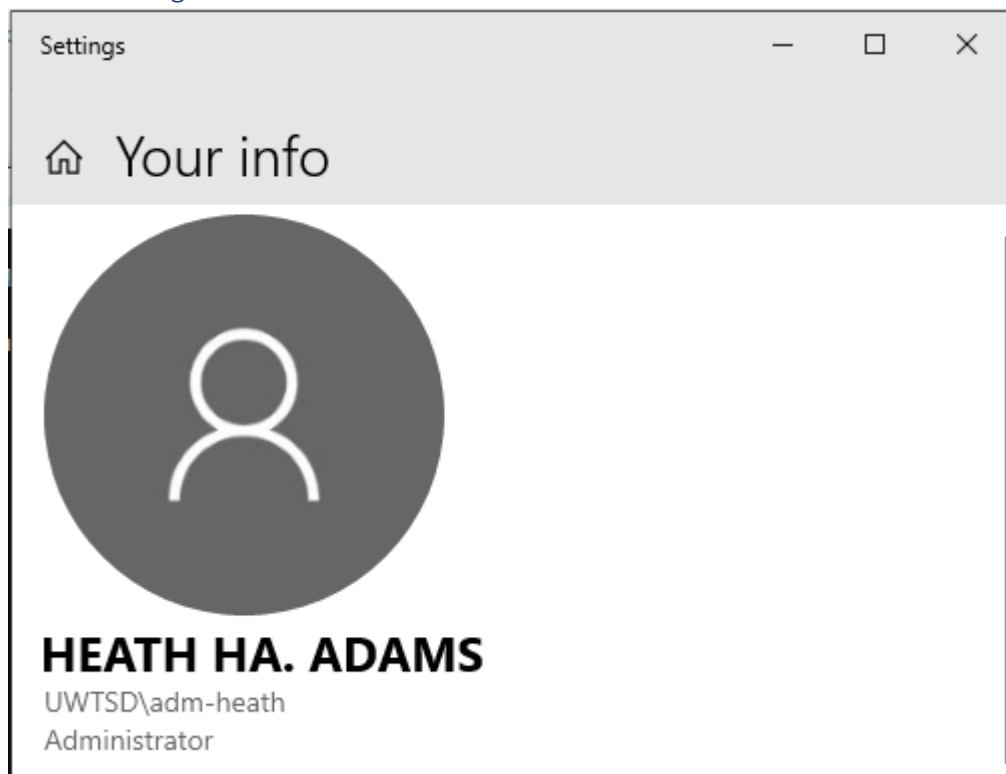


Figure 80 Logging in with Administrator account

```

C:\Users\adm-heath>ipconfig /release

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Default Gateway . . . . . : 

```

Figure 81 Typing `ipconfig /release` to releases the IP address from the network adapter

```

C:\Users\adm-heath>ipconfig /renew

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : uwtsd.com
    IPv4 Address. . . . . : 192.168.100.3
    Subnet Mask . . . . . : 255.255.255.0

```

Figure 82 Updating addresses with the `ipconfig /renew` command, showing the right domain and IP address/ subnet mask

```

C:\Users\adm-heath>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : Domainclient1
    Primary Dns Suffix . . . . . : uwtsd.com
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No
    DNS Suffix Search List. . . . . : uwtsd.com

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : uwtsd.com
    Description . . . . . : Intel(R) PRO/1000 MT Desktop Adapter
    Physical Address. . . . . : 08-00-27-E6-E5-59
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    IPv4 Address. . . . . : 192.168.100.3(Preferred)
    Subnet Mask . . . . . : 255.255.255.0
    Lease Obtained. . . . . : Sunday, March 22, 2020 8:15:45 AM
    Lease Expires . . . . . : Monday, March 30, 2020 8:15:44 AM
    DHCP Server . . . . . : 192.168.100.1
    NetBIOS over Tcpip. . . . . : Enabled

```

Figure 83 `IP config /all` shows more detailed information

Part D: configuring DHCP options

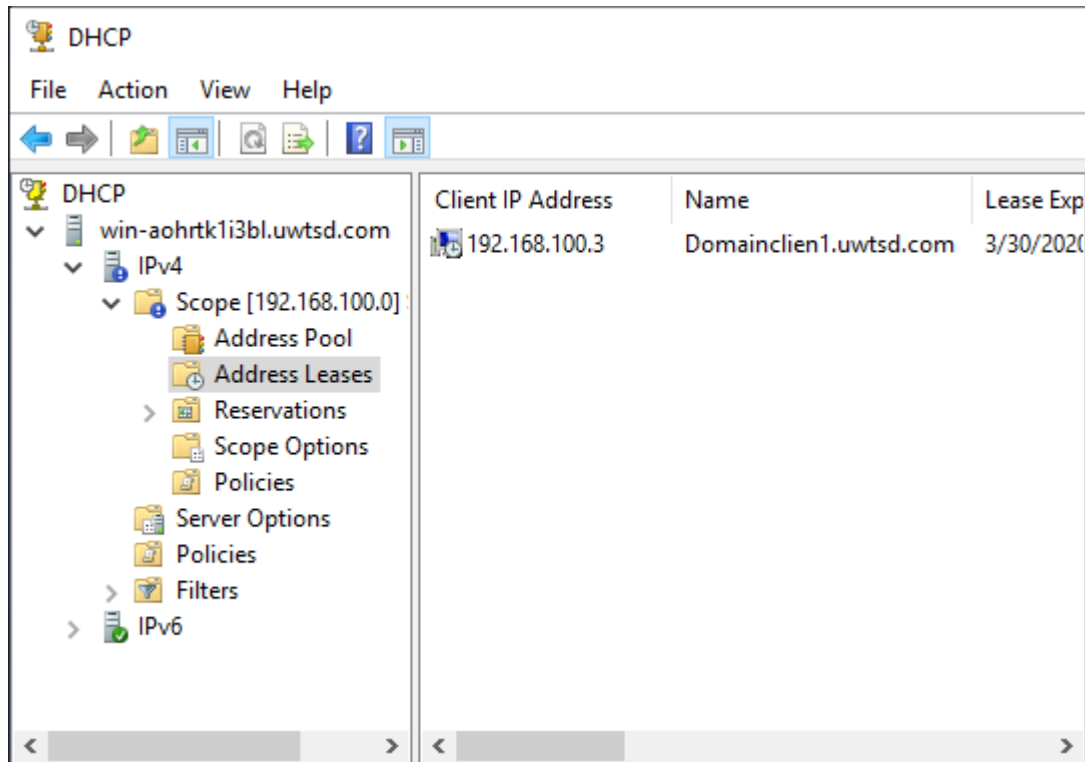


Figure 84 Verifying that in Address Leases is displayed the Client's Ip address

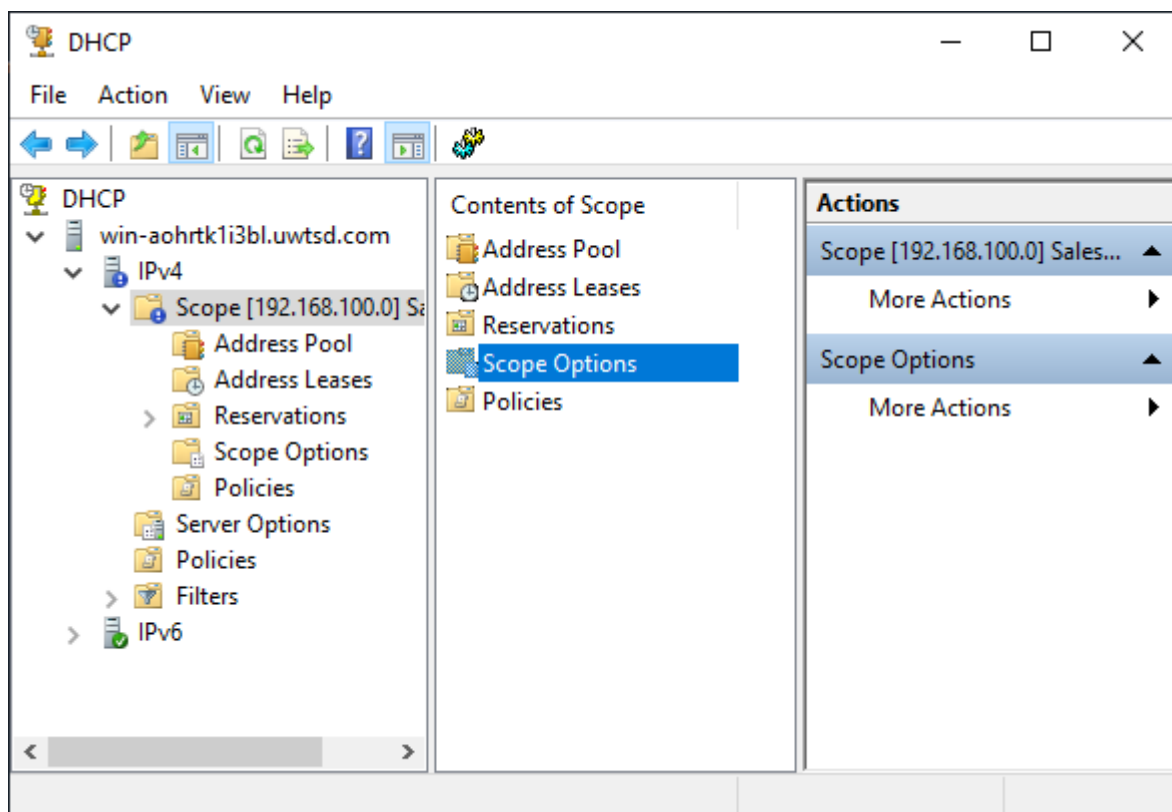


Figure 85 Configuring "Scope options" from the DHCP console

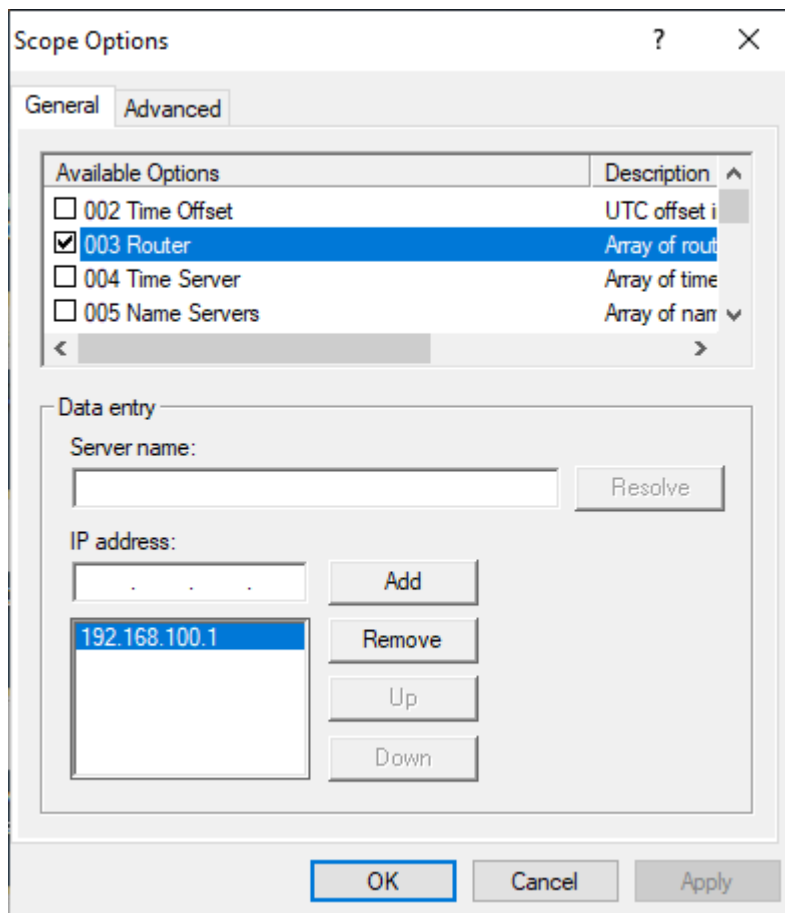


Figure 86 Enabling 003 Router option and adding IP address

```
C:\Users\adm-heath>ipconfig /renew

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : uwtzd.com
    IPv4 Address. . . . . : 192.168.100.3
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.100.1
```

Figure 87 Obtaining Ip addresses from DHCP server

```
C:\Users\adm-heath>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : Domainclien1
    Primary Dns Suffix . . . . . : uwtsd.com
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No
    DNS Suffix Search List. . . . . : uwtsd.com

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix . : uwtsd.com
    Description . . . . . : Intel(R) PRO/1000 MT Desktop Adapter
    Physical Address. . . . . : 08-00-27-E6-E5-59
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    IPv4 Address. . . . . : 192.168.100.3(Preferred)
    Subnet Mask . . . . . : 255.255.255.0
    Lease Obtained. . . . . : Sunday, March 22, 2020 8:15:45 AM
    Lease Expires . . . . . : Monday, March 30, 2020 8:15:44 AM
    Default Gateway . . . . . : 192.168.100.1
    DHCP Server . . . . . : 192.168.100.1
    NetBIOS over Tcpip. . . . . : Enabled
```

Figure 88 Verifying Default gateway Ip address

Worksheet 5: Planning and Deploying DNS in the Network Infrastructure

Task 1: Understanding DNS operation; Planning and deploying DNS

Task (A). Check the Host Name and Fully Qualified Domain Name of your Server.

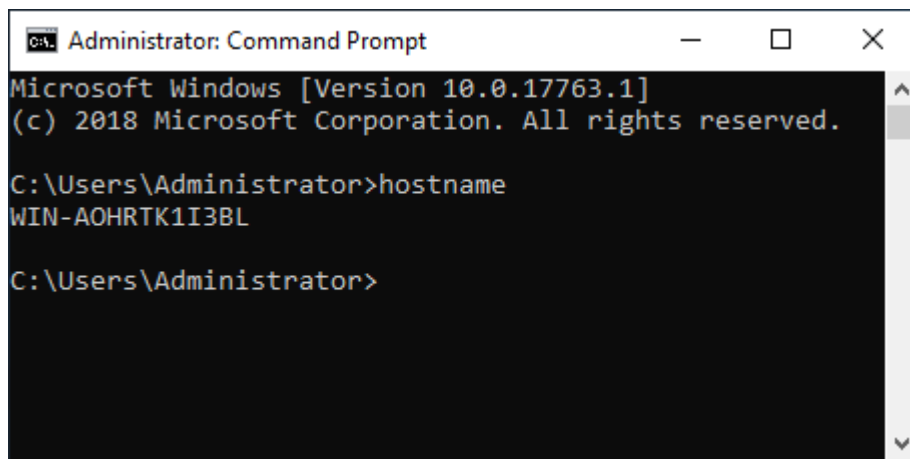


Figure 89 Checking Server 1 hostname.

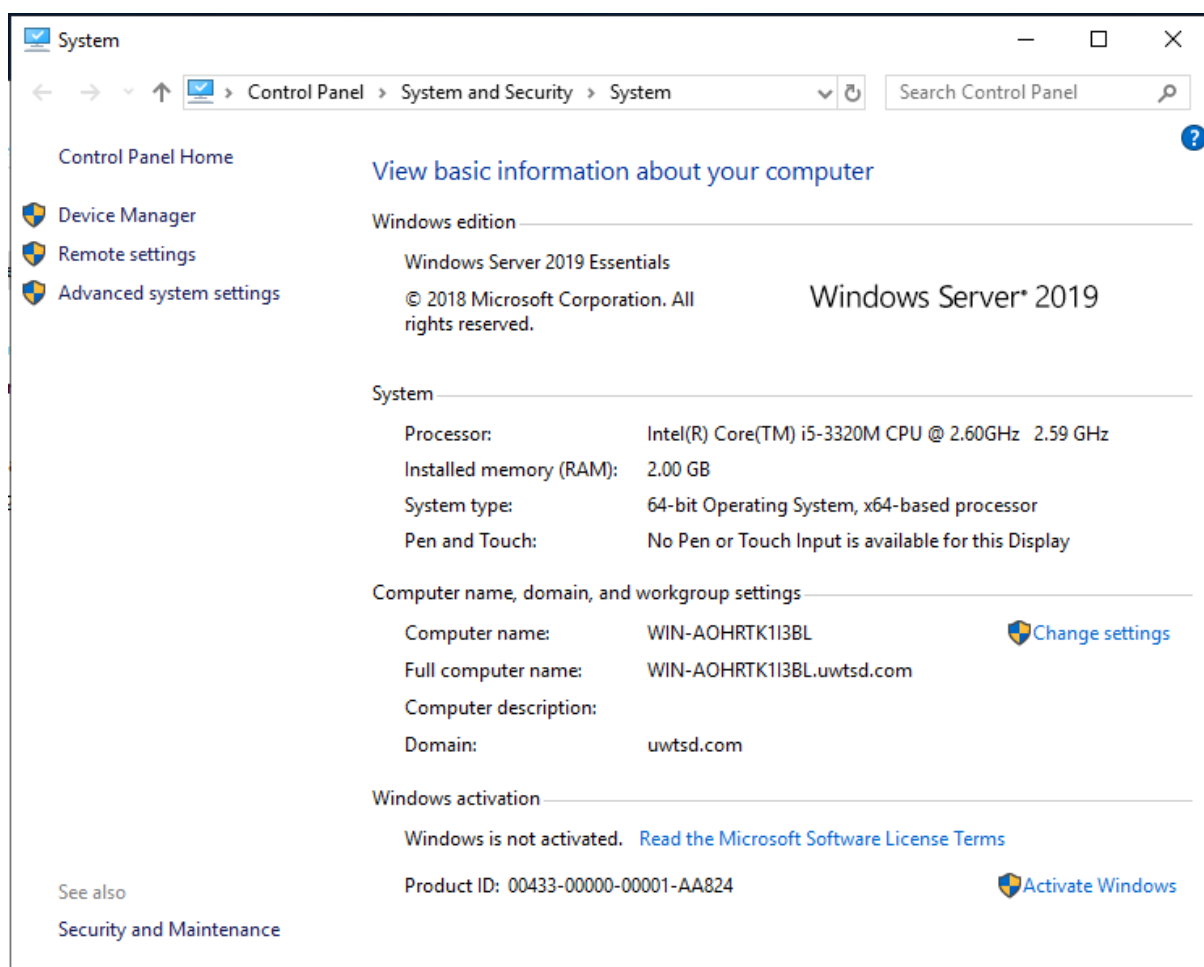


Figure 90 Checking specific information as "Full computer name".

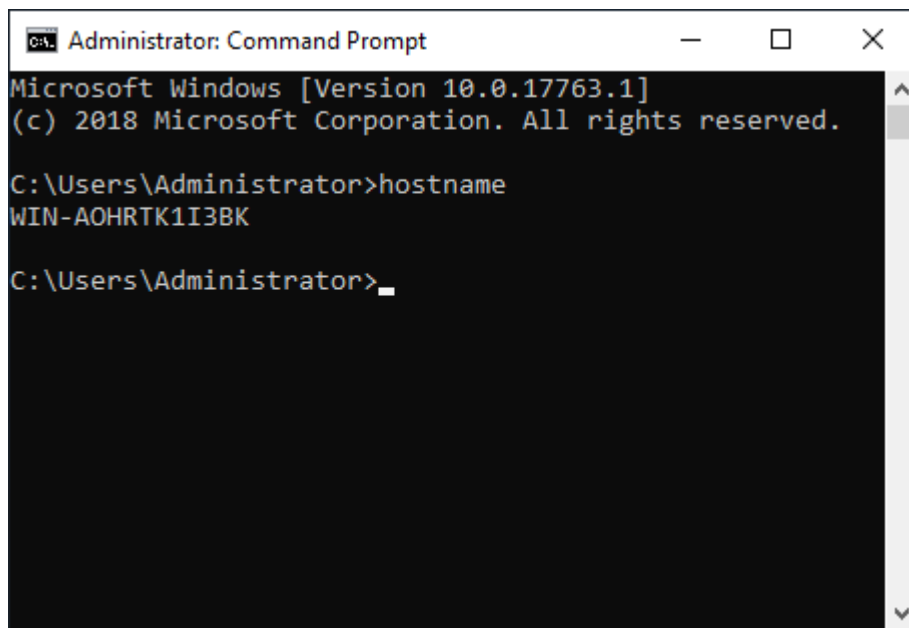


Figure 91 Checking Server 2 hostname.

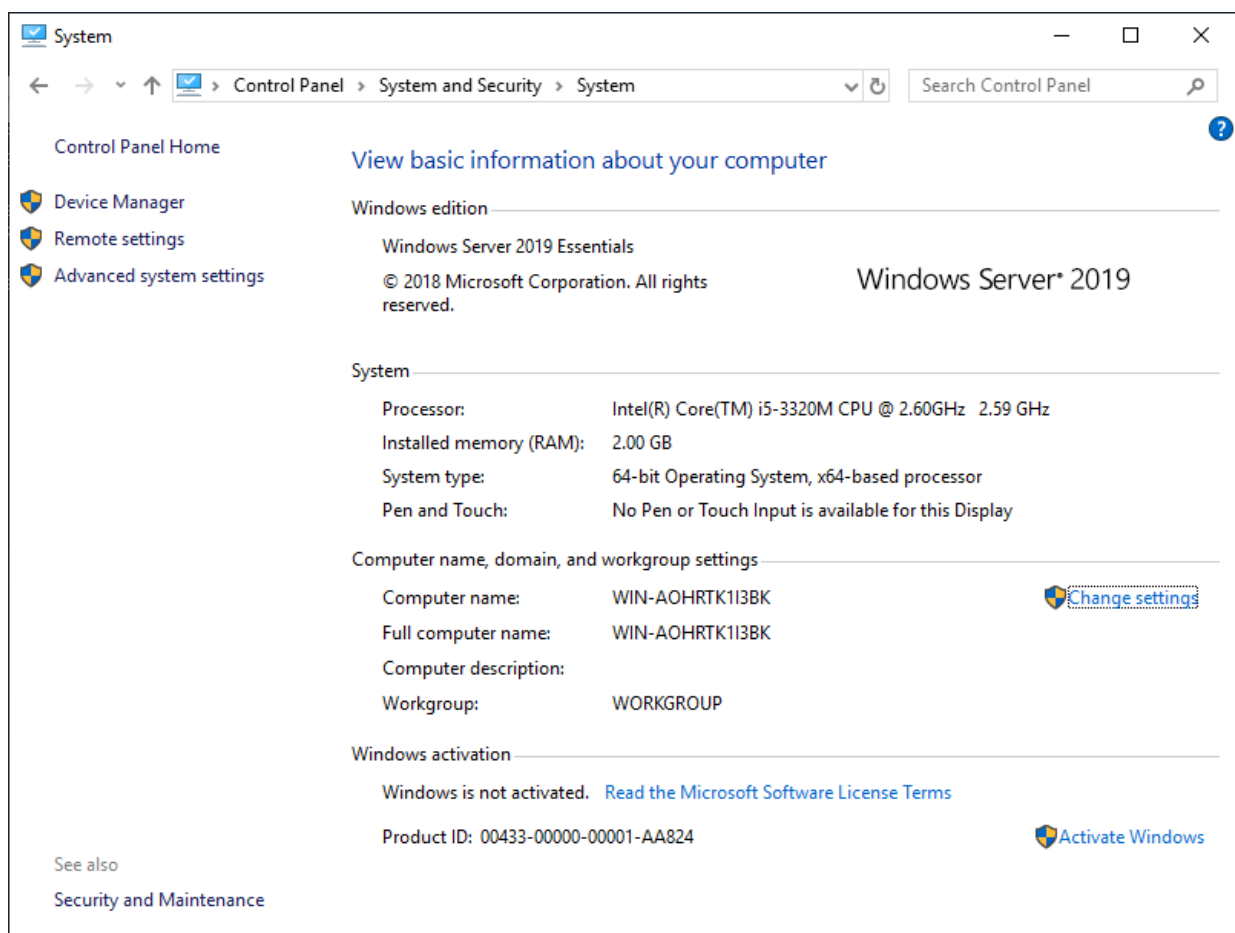


Figure 92 Checking server 2 specific details, to note that it is not part of the domain.

Task (B). Installing the DNS Server Service.

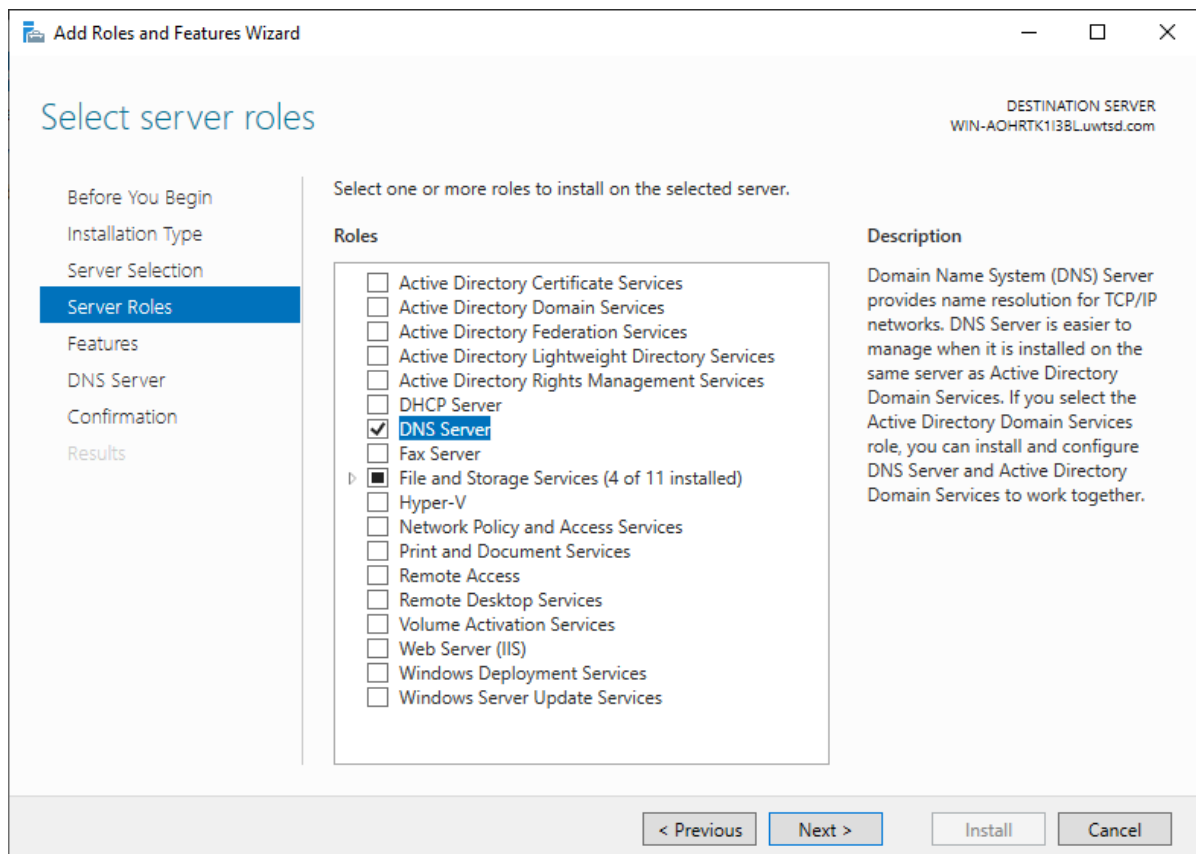


Figure 93 Installing DNS Server from the "Add roles and features" menu.

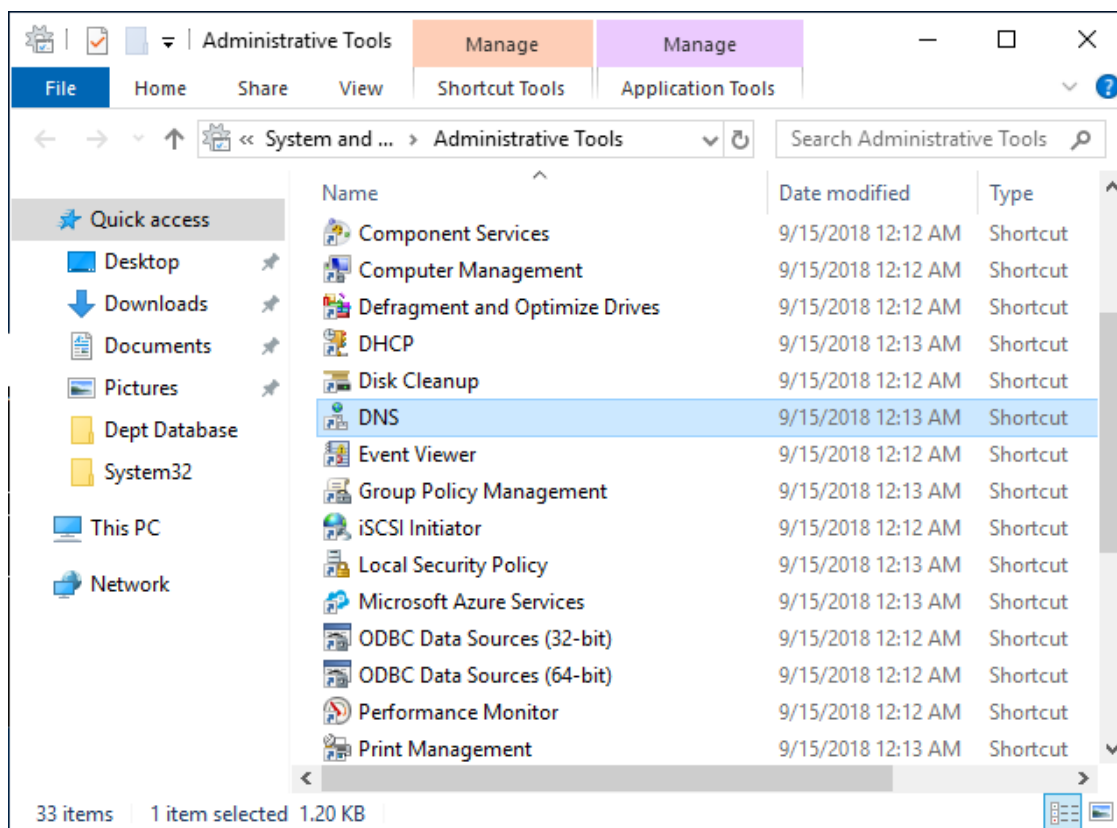


Figure 94 DNS installed, available to be configured from the "Administrative tool".

Task 2: Storing and Maintaining DNS Data.

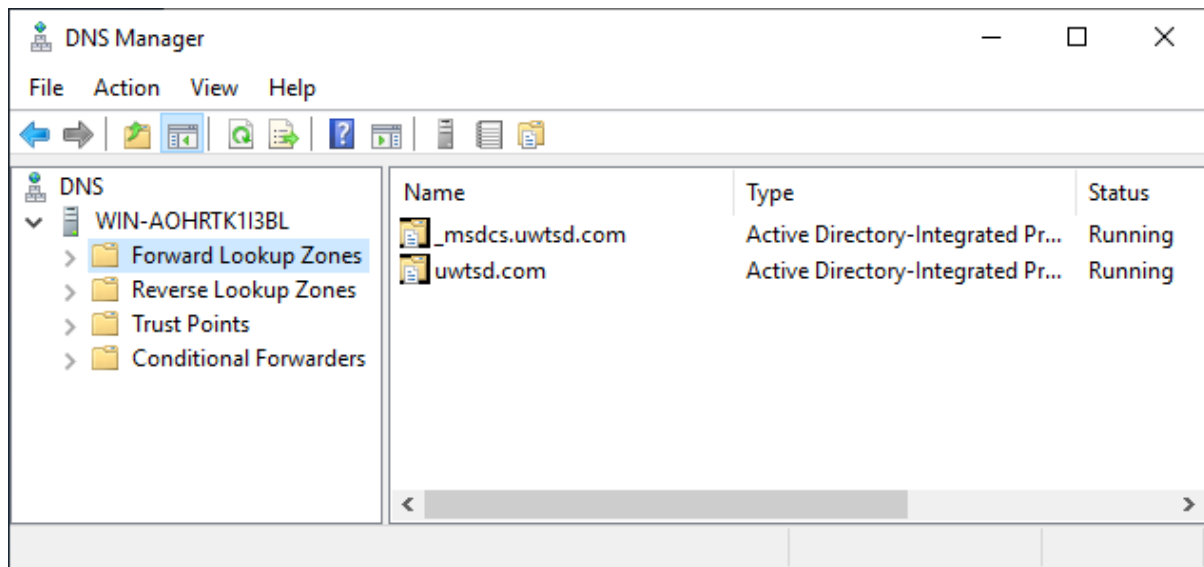


Figure 95 Selecting the Primary Zone (uwtsd.com) from the low number server (server 1).

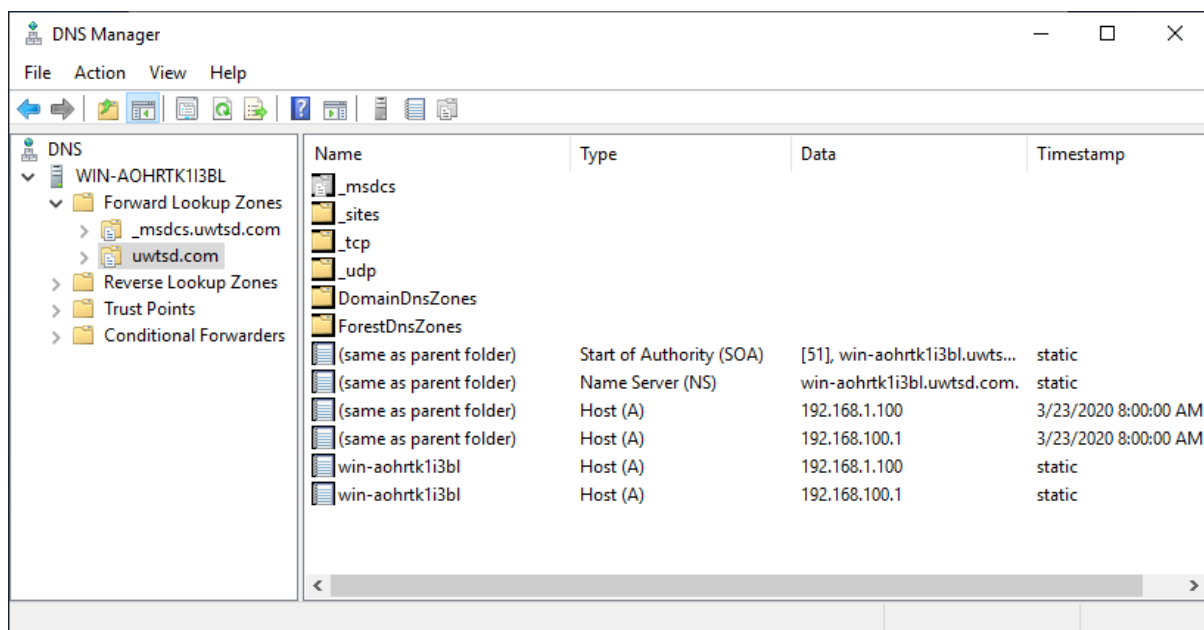


Figure 96 Verifying records for the hosts in the network.

Task 3 DNS Application.

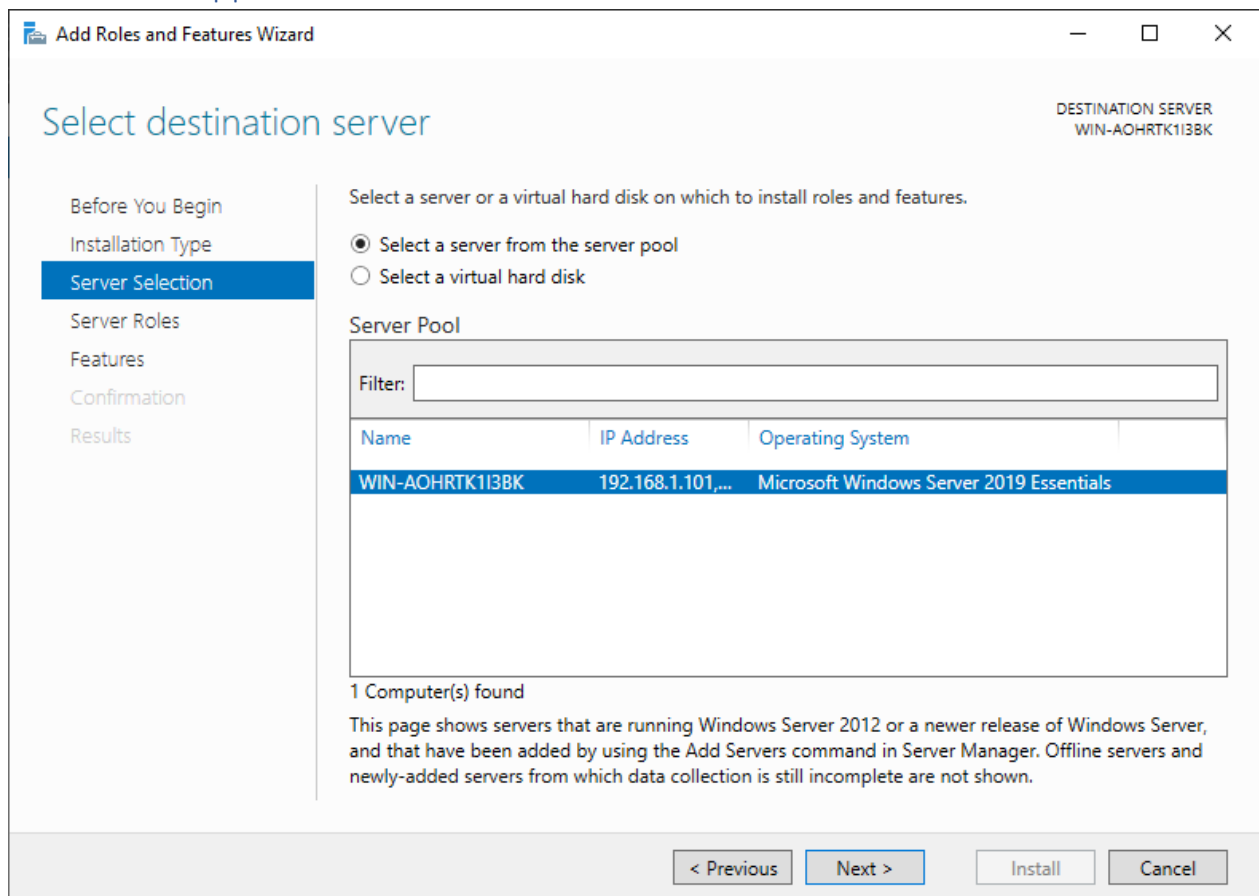


Figure 97 Started wizard for installing a Web Server (IIS) on Server 2.

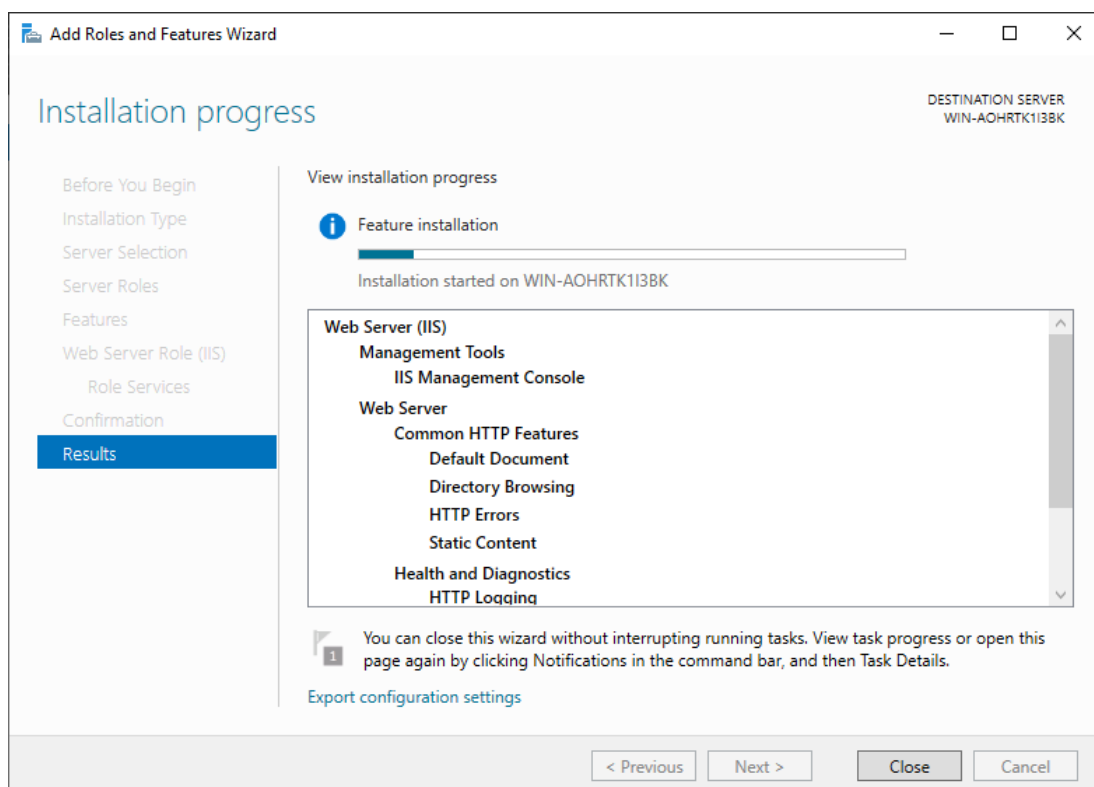
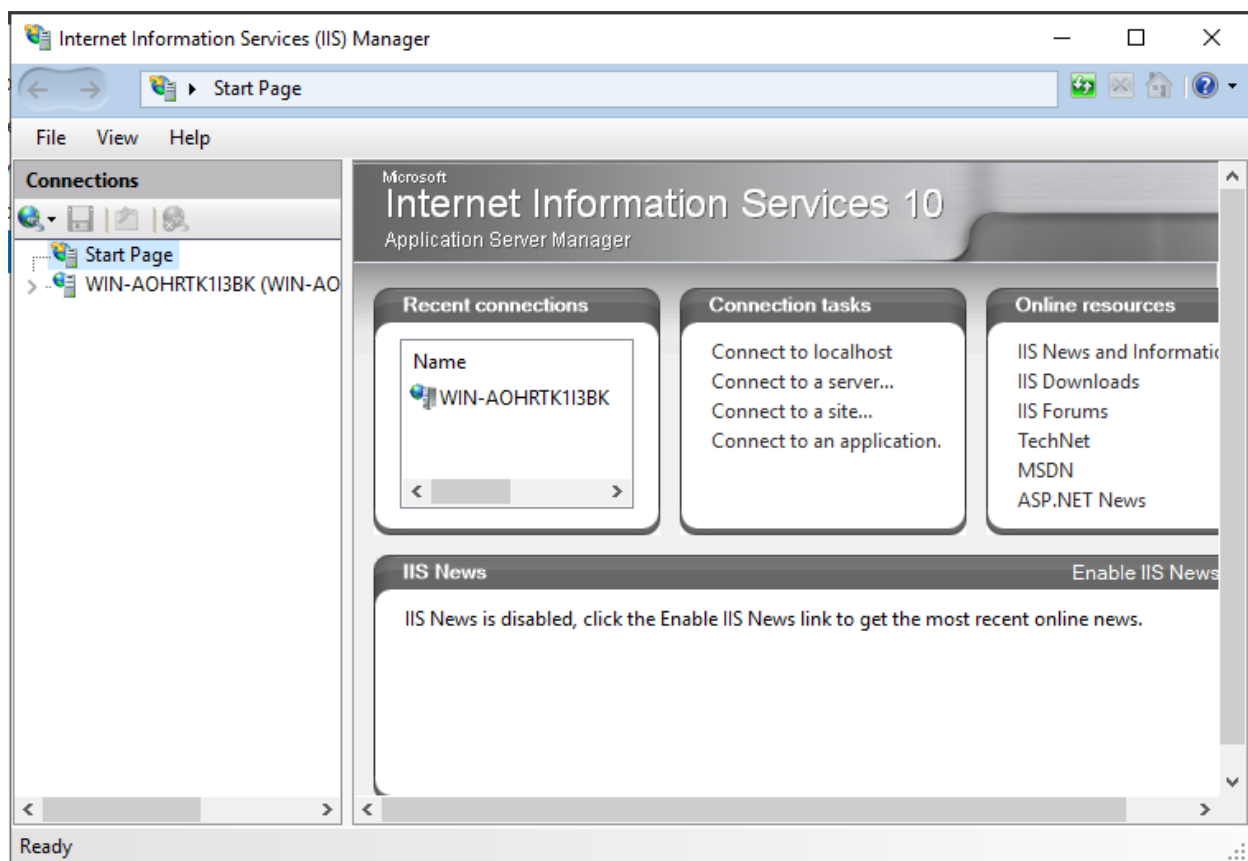


Figure 98 Installing the web server.*Figure 99 Accessed the Internet Information Services Administrative tool.*

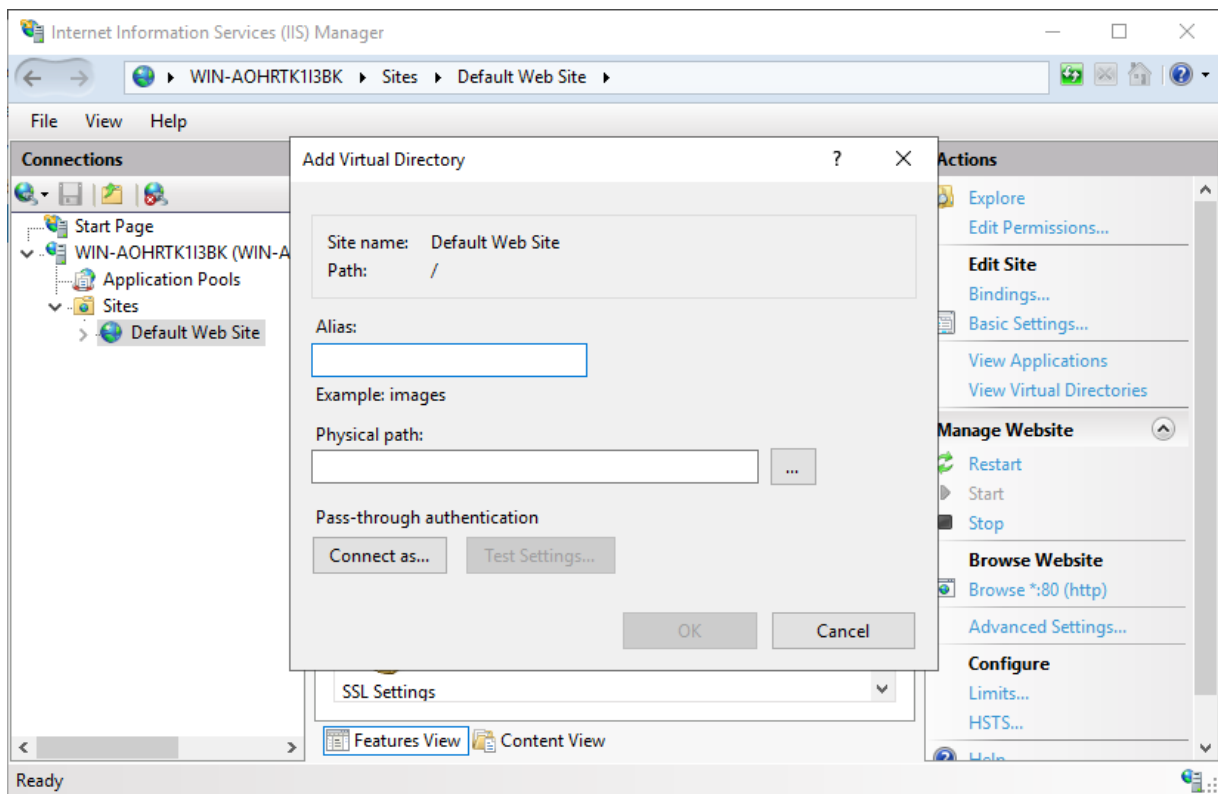


Figure 100 Creating a virtual directory for the server.

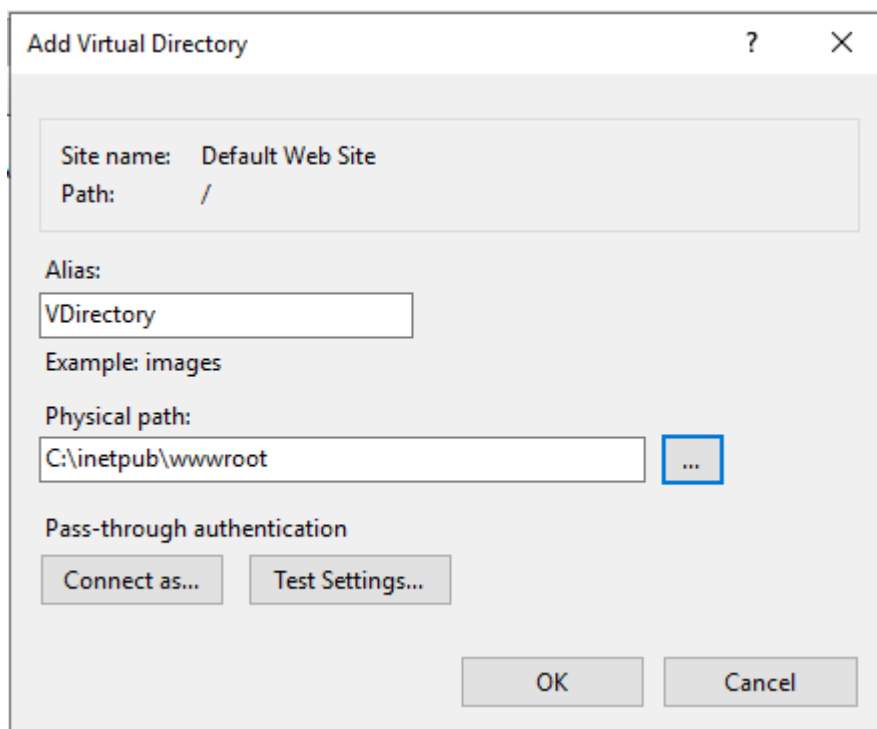


Figure 101 Specified alias and physical path for the virtual directory.

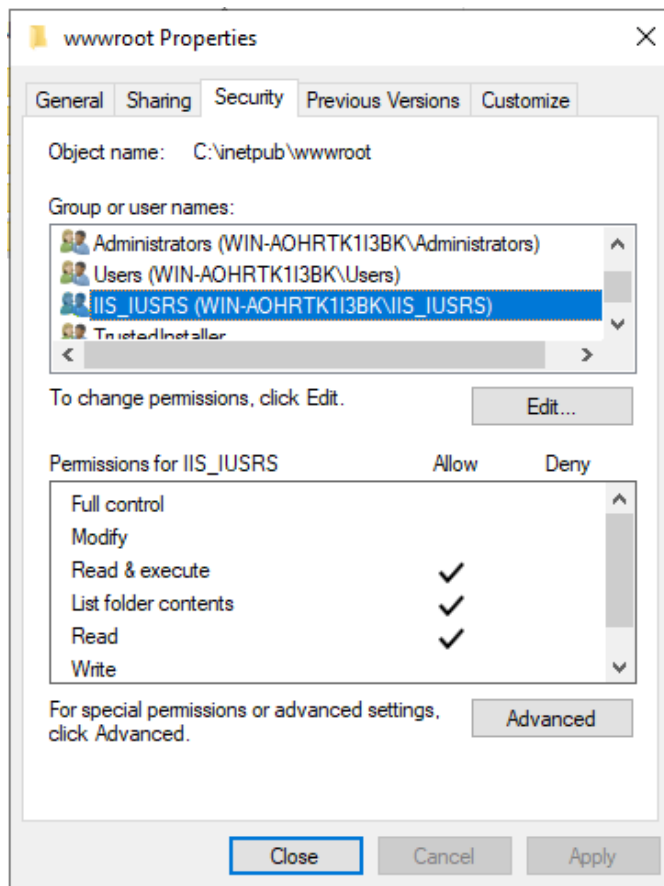


Figure 102 Ensuring IIS users have permission to read and execute scripts.

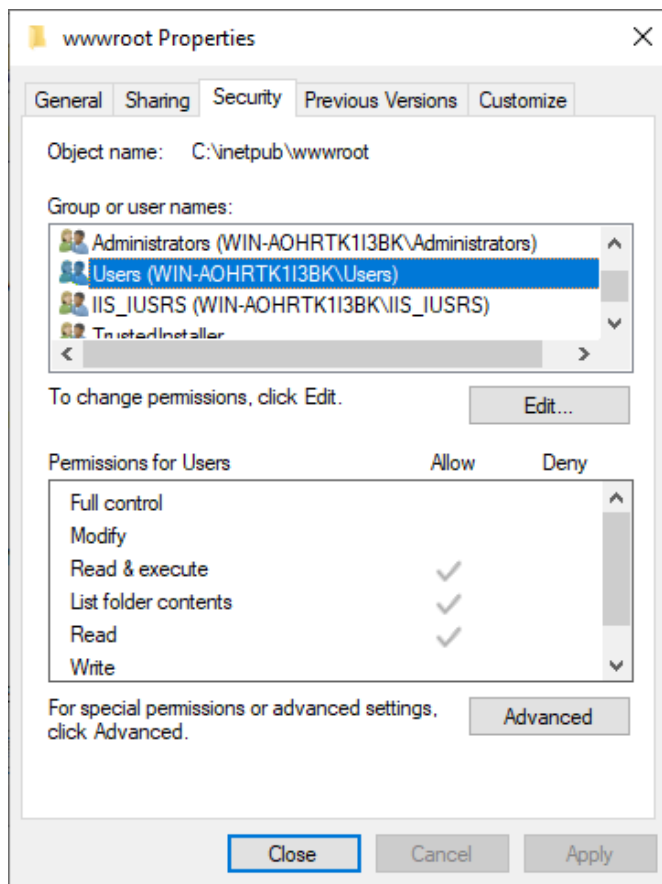


Figure 103 Ensuring that guest users have at least read permissions.

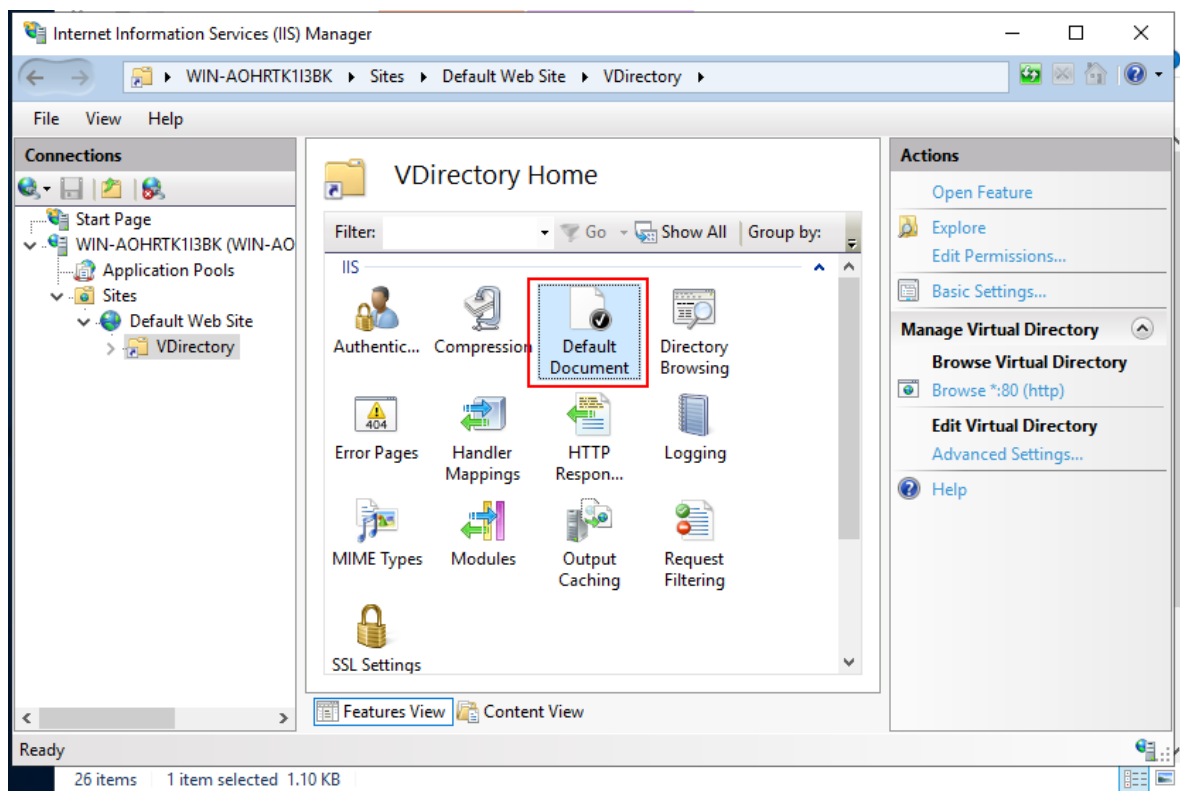


Figure 104 Accessed the IIS administrative tool to change the "Default document", webpage that will be displayed once the web server is accessed.

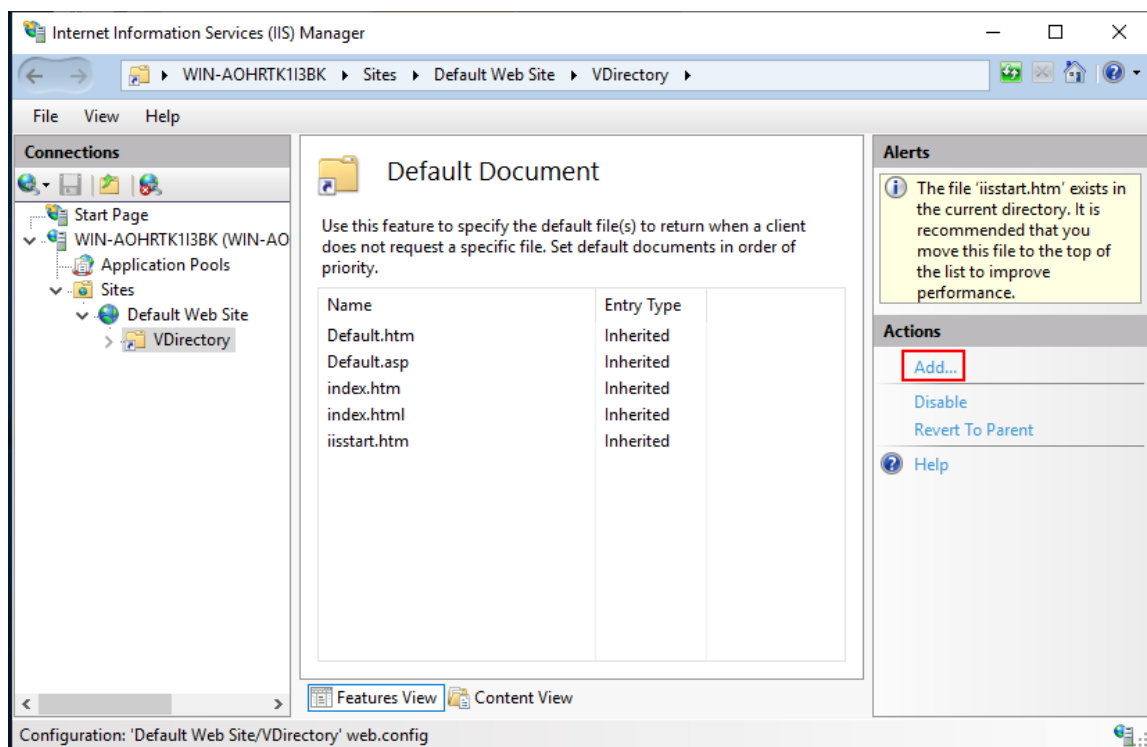


Figure 105 Adding a new personalized webpage.

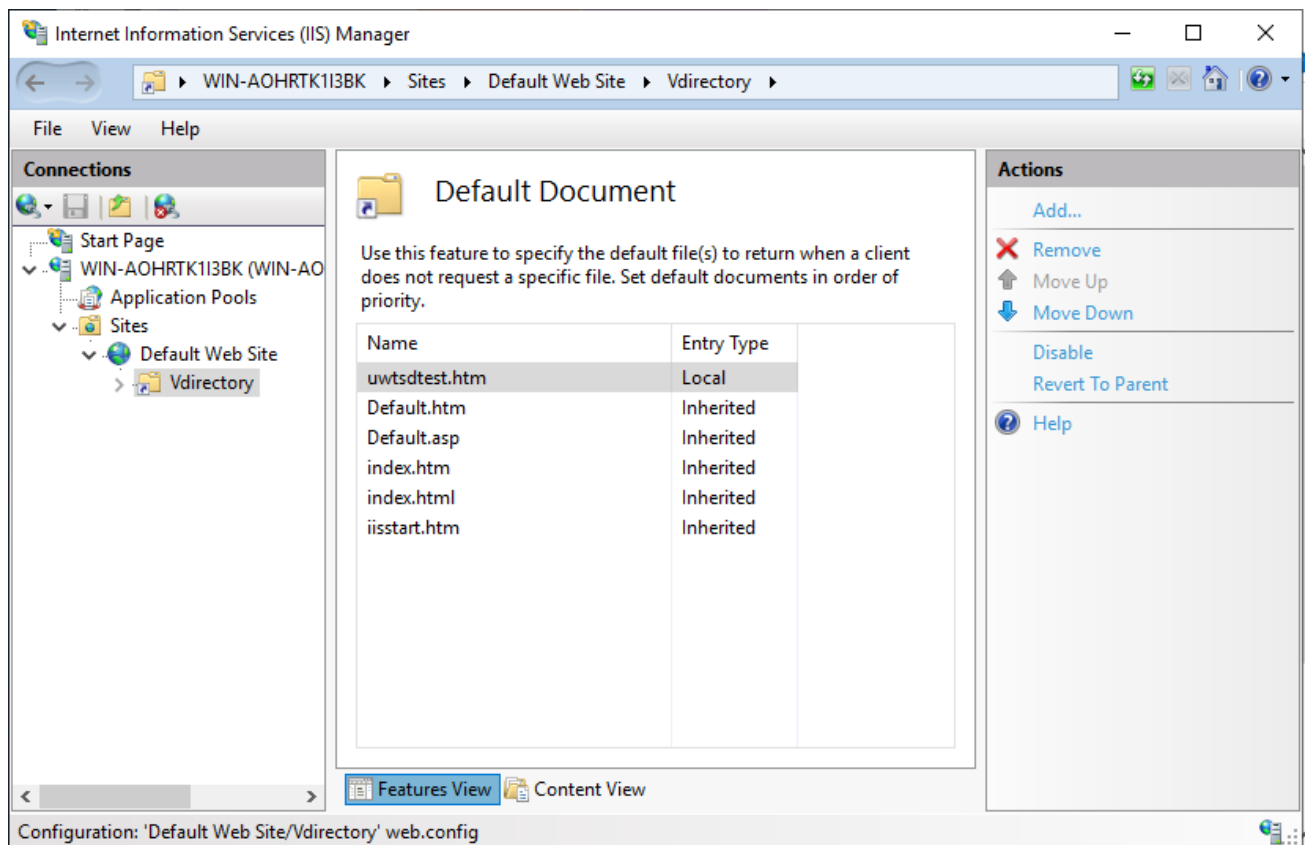
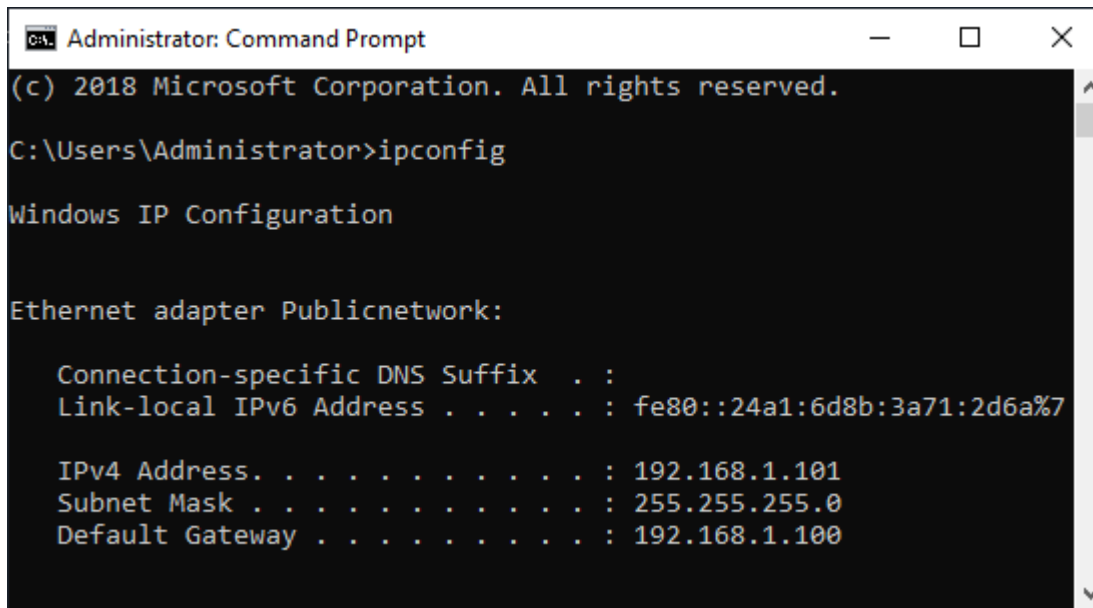


Figure 106 Positioning the new created webpage at the top of the list.



```
Administrator: Command Prompt
(c) 2018 Microsoft Corporation. All rights reserved.
C:\Users\Administrator>ipconfig

Windows IP Configuration

Ethernet adapter Publicnetwork:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::24a1:6d8b:3a71:2d6a%7
    IPv4 Address. . . . . : 192.168.1.101
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.100
```

Figure 107 In order to test locally the web server, it is necessary to verify the server's IP address.

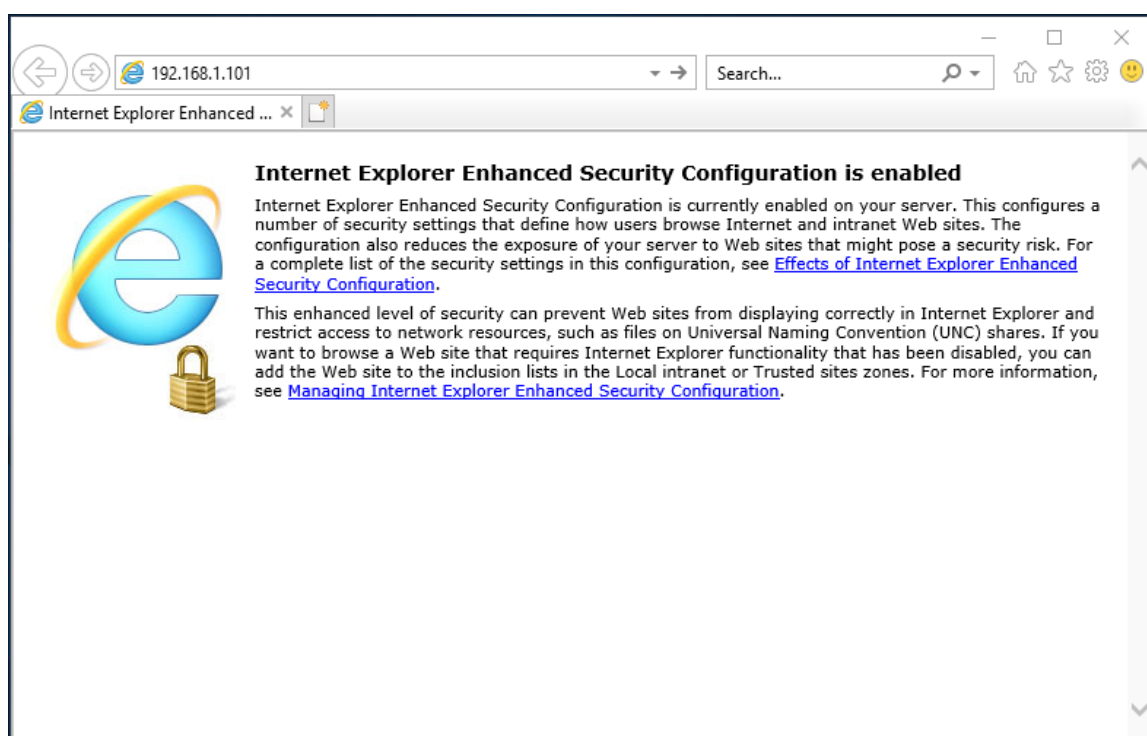


Figure 108 Connecting to the IP address.

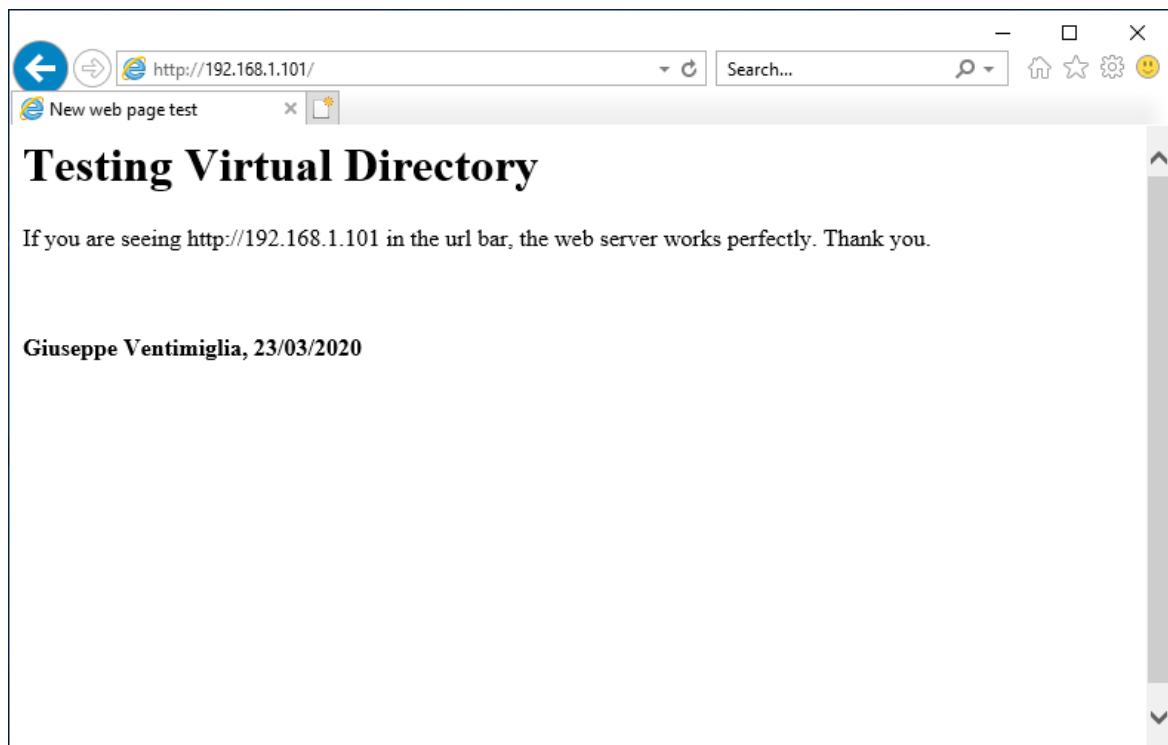


Figure 109 The customised web page is shown, the web server is locally accessible.

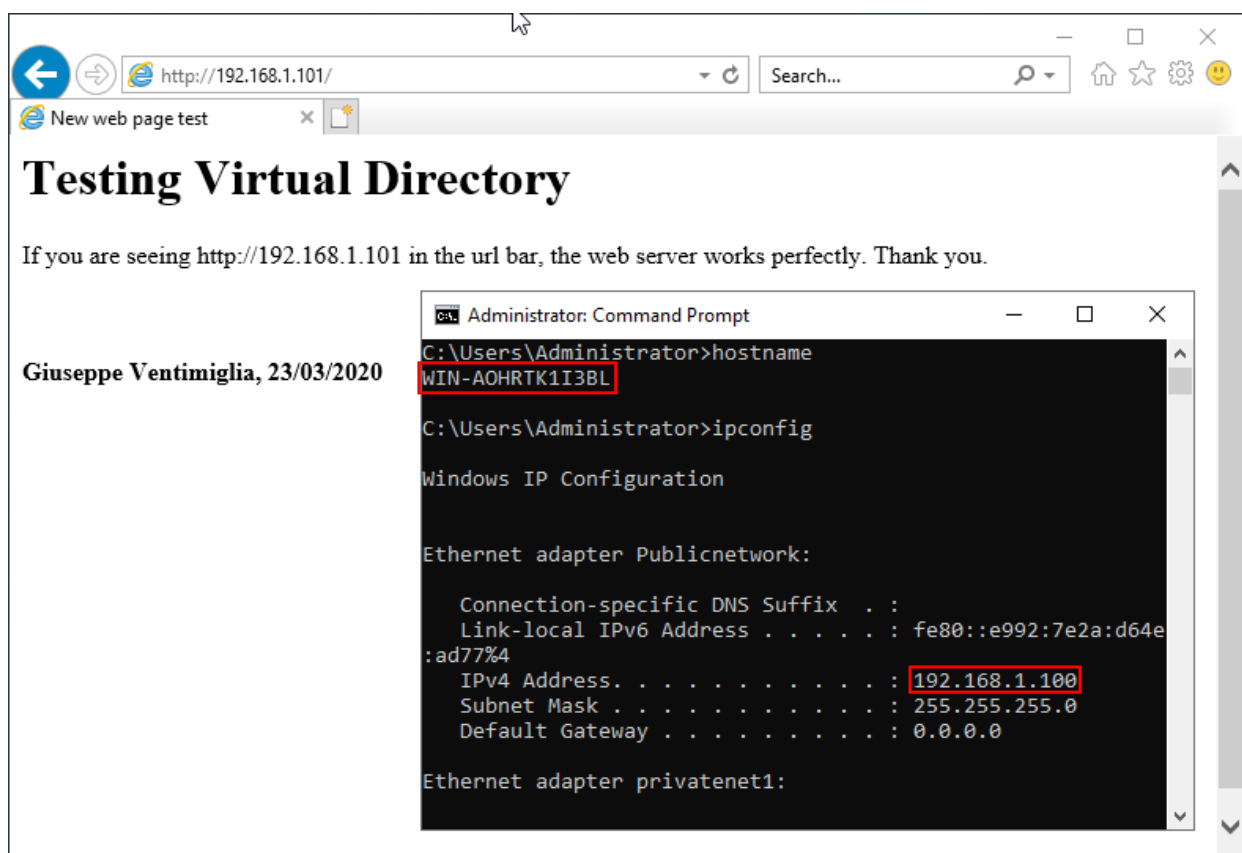


Figure 110 Web server accessible remotely from Server 1, IP address and name are highlighted.