المدرسة الوطنية للعلوم التطبيقية بتطوان
ⵜⵉⵎⵉⵔⵉ ⵜⴰⵏⴰⵎⵓⵔⵜ ⵏ ⵜⵙⴳⵎⵉⵔⵉⵏ ⵜⵓⵏⵉⵙⵉⵢⵉⵏ
ÉCOLE NATIONALE DES SCIENCES APPLIQUÉES DE TÉTOUAN

PROJECT REPORT

Active Directory & Windows Services : Lab Implementation & Attack Demo

Systems and Network Administration

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GCSE 2

2025–2026

Sommaire :

Introduction :

This project focuses on designing and deploying a complete Active Directory infrastructure as the foundation for understanding both system administration and enterprise security concepts. The environment includes the installation of a Domain Controller, the configuration of DNS, DHCP, and IIS services, and the creation of users, groups, and Organizational Units. Group Policy Objects (GPOs) are applied to enforce centralized configurations across domain clients.

This structured setup provides a realistic enterprise environment that will later be used to study and simulate security attacks such as Kerberoasting and AS-REP Roasting. By first implementing a clean and functional AD domain.

The project ensures a solid base for analyzing authentication mechanisms, identifying inherent vulnerabilities, and understanding how attackers exploit weak configurations in Windows networks and environment.

Objectives :

- Deploy a functional Active Directory domain (studio.lab).
- Create and organize users, groups, and OUs.
- Apply Group Policy Objects (GPOs) for centralized management.
- Configure vulnerable accounts for Kerberoasting and AS-REP Roasting.
- Configure essential network services: DNS, DHCP, IIS.
- Perform the attacks for educational and security-testing purposes.
- Document the full setup and results.

Materials Used :

- Virtualization : VMware WS Pro
- Operating Systems : Windows Server 2019, 2 Windows 11 Ent machines

References :

- Microsoft Docs – Active Directory & Group Policy

Active Directory Overview :

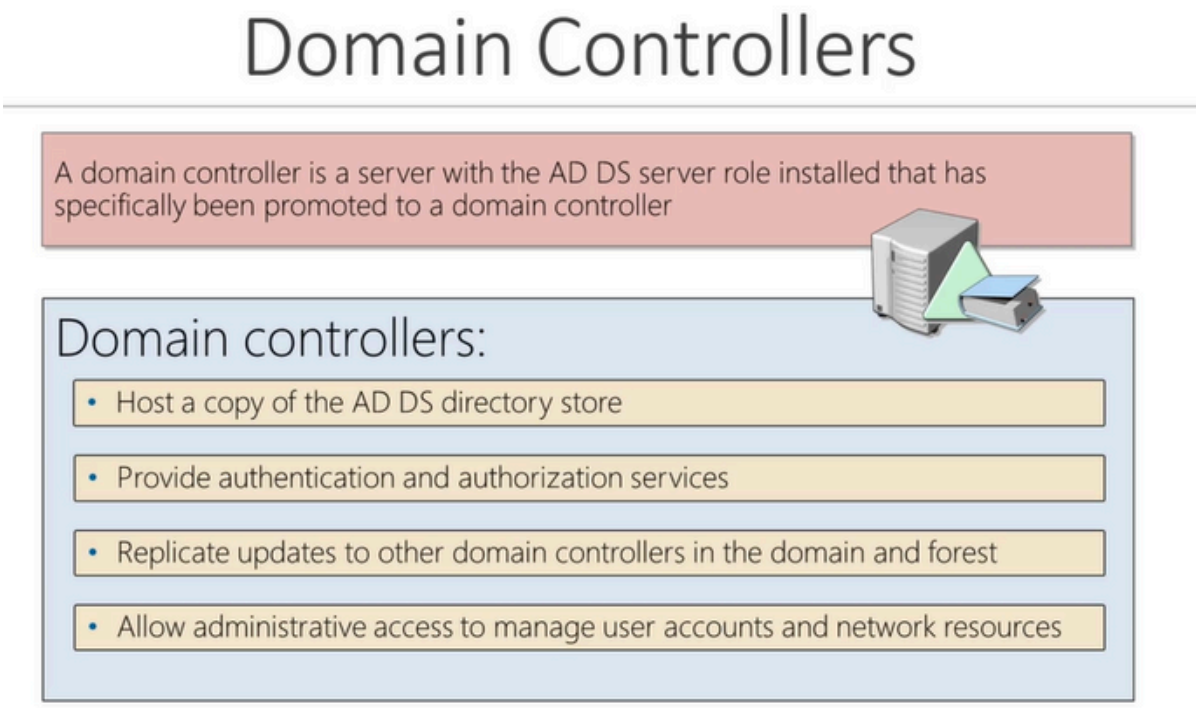
What is Active Directory ?

- Directory service developed by Microsoft to manage Windows domain networks
- Stores information related to objects, such as Computers, Users, Printers, etc.
  - Think about it as a phone book for Windows
- Authenticates using Kerberos tickets.
  - Non-Windows devices, such as Linux machines, firewalls, etc. can also authenticate to Active Directory via RADIUS or LDAP

Why Active Directory ?

- Active Directory is the most commonly used identity management service in the world
  - 95% of Fortune 1000 companies implement the service in their networks (https://techcommunity.microsoft.com/t5/Enterprise-Mobility-Security/Success-with-Enterprise-Mobility-Identity/ba-p/248613)
- Can be exploited without ever attacking patchable exploits.
  - Instead, we abuse features, trusts, components, and more.

Physical Active Directory Components ?



AD DS Data Store

The AD DS data store contains the database files and processes that store and manage directory information for users, services, and applications

The AD DS data store:

- Consists of the Ntds.dit file
- Is stored by default in the %SystemRoot%\NTDS folder on all domain controllers
- Is accessible only through the domain controller processes and protocols

Logical Active Directory Components ?

AD DS Schema

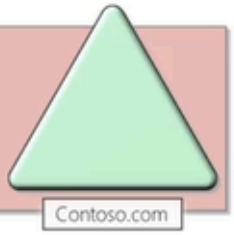
The AD DS Schema:

- Defines every type of object that can be stored in the directory
- Enforces rules regarding object creation and configuration

Object Types	Function	Examples
Class Object	What objects can be created in the directory	• User • Computer
Attribute Object	Information that can be attached to an object	• Display name

Domains

Domains are used to group and manage objects in an organization

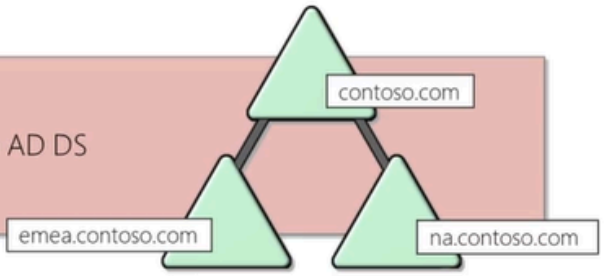


Domains:

- An administrative boundary for applying policies to groups of objects
- A replication boundary for replicating data between domain controllers
- An authentication and authorization boundary that provides a way to limit the scope of access to resources

Trees

A domain tree is a hierarchy of domains in AD DS

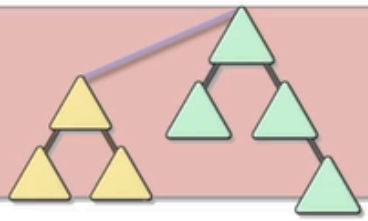


All domains in the tree:

- Share a contiguous namespace with the parent domain
- Can have additional child domains
- By default create a two-way transitive trust with other domains

Forests

A forest is a collection of one or more domain trees

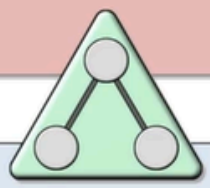


Forests:

- Share a common schema
- Share a common configuration partition
- Share a common global catalog to enable searching
- Enable trusts between all domains in the forest
- Share the Enterprise Admins and Schema Admins groups

Organizational Units (Ous)

OUs are Active Directory containers that can contain users, groups, computers, and other OUs



OUs are used to:

- Represent your organization hierarchically and logically
- Manage a collection of objects in a consistent way
- Delegate permissions to administer groups of objects
- Apply policies

Trusts

Trusts provide a mechanism for users to gain access to resources in another domain

Types of Trusts	Description	Diagram
Directional	The trust direction flows from trusting domain to the trusted domain	
Transitive	The trust relationship is extended beyond a two-domain trust to include other trusted domains	

- All domains in a forest trust all other domains in the forest
- Trusts can extend outside the forest

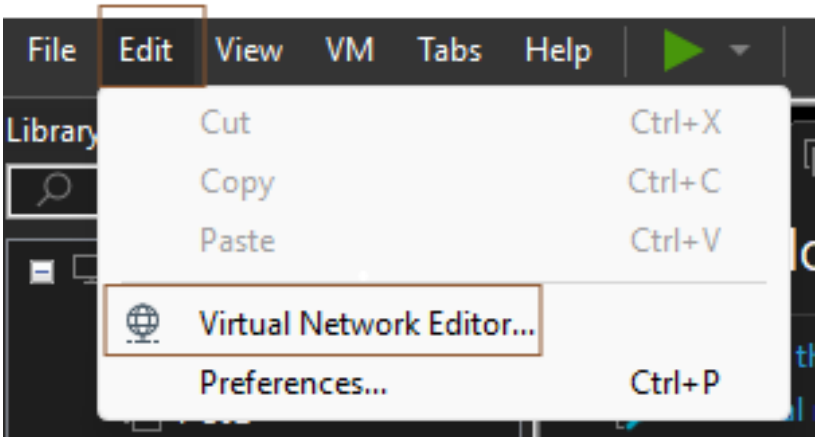
Objects

Object	Description
User	• Enables network resource access for a user
InetOrgPerson	• Similar to a user account • Used for compatibility with other directory services
Contacts	• Used primarily to assign e-mail addresses to external users • Does not enable network access
Groups	• Used to simplify the administration of access control
Computers	• Enables authentication and auditing of computer access to resources
Printers	• Used to simplify the process of locating and connecting to printers
Shared folders	• Enables users to search for shared folders based on properties

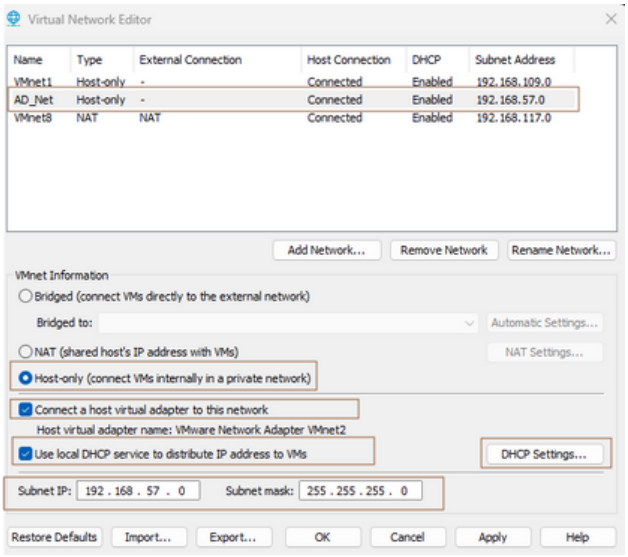
Technical Demonstration :

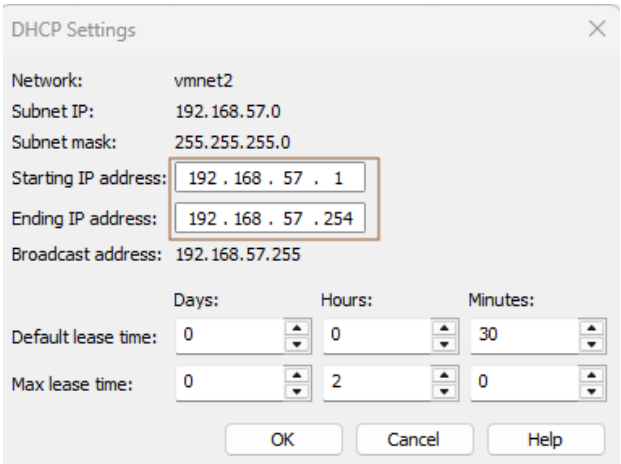
Create Nat Network :

Edit → Virtual Network Editor

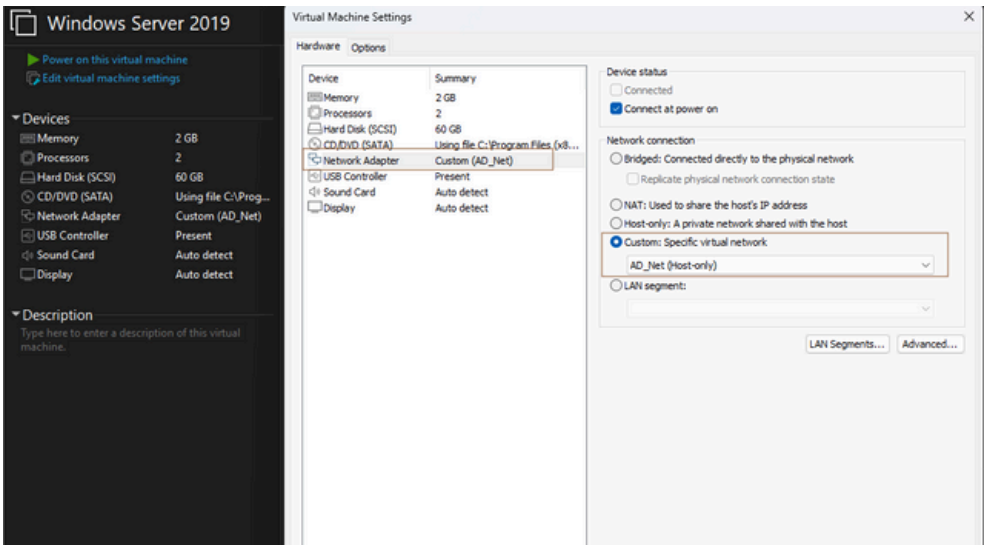


This is the configuration :





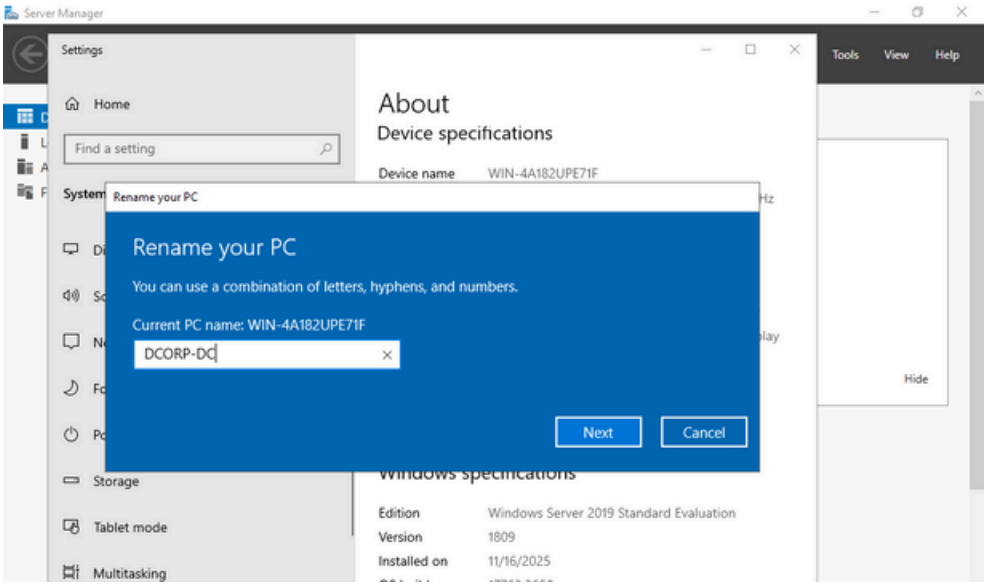
Set the nertwork interfaces of machines to NAT Network → AD_Net



On The Windows Server 2019 :

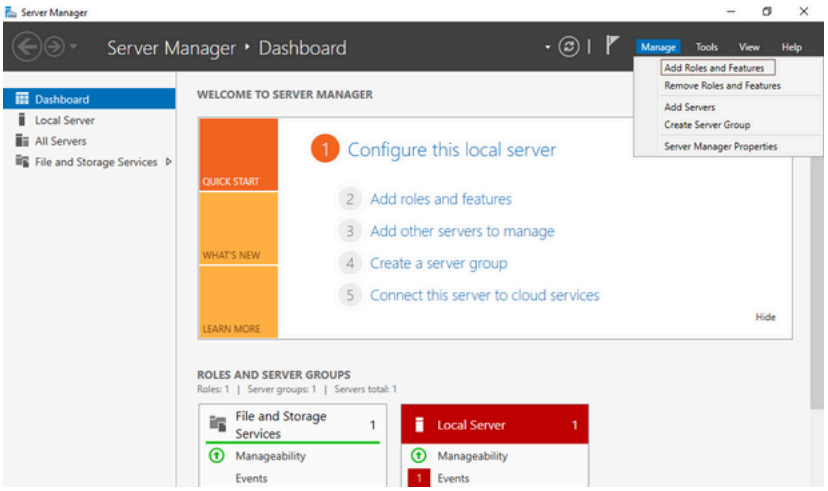
1– Rename the Server machine :

Settings → About → Next → Restart now

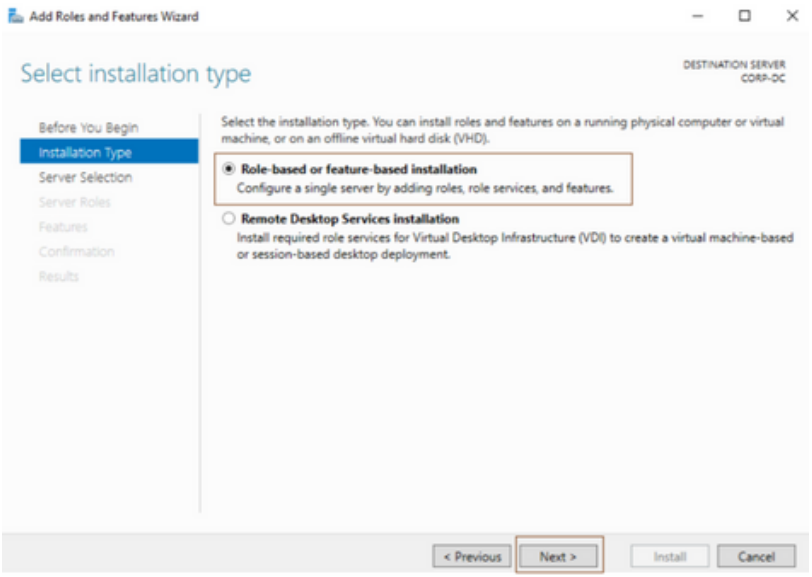


2- Add roles and features :

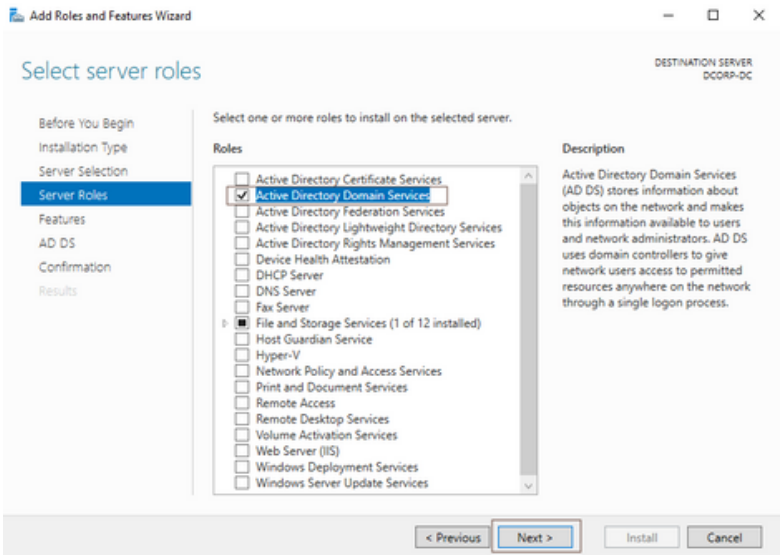
Manage → Add Roles and Features



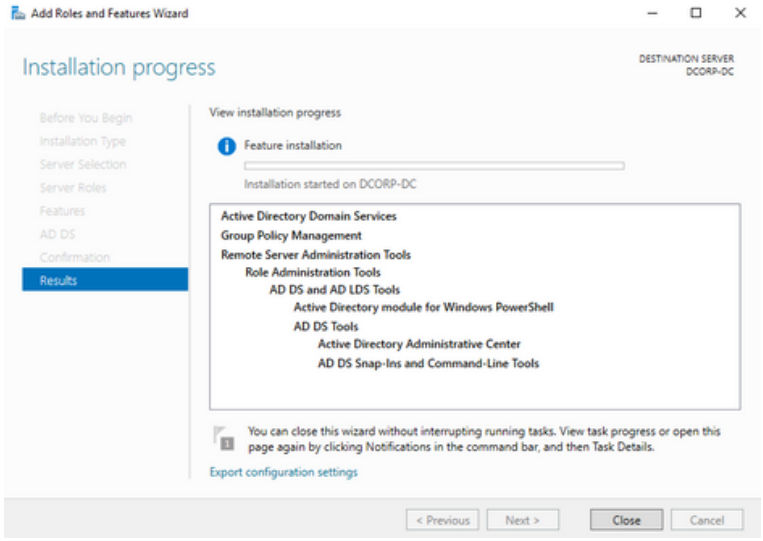
Click Next



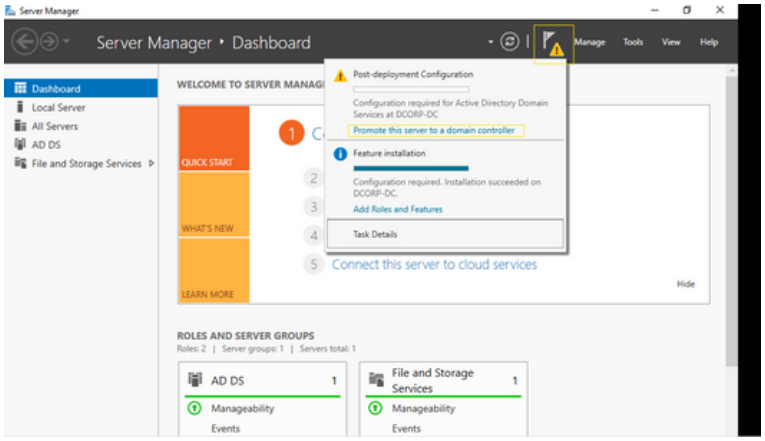
Click Next



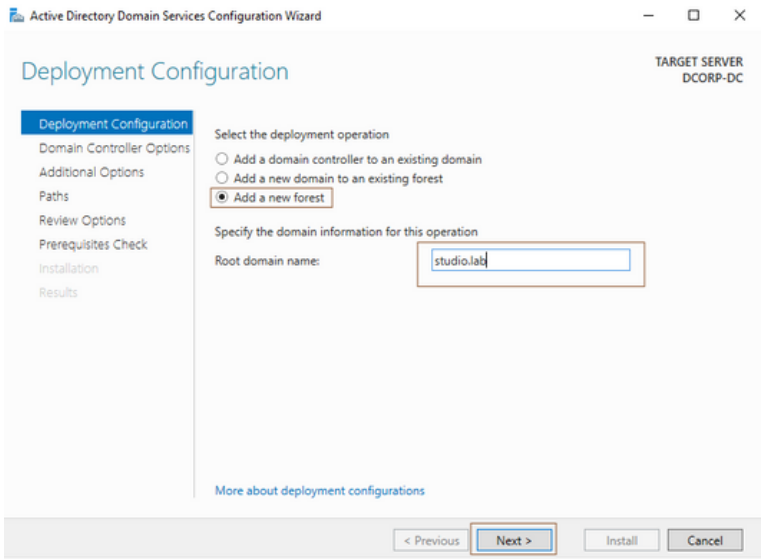
Next, next, install



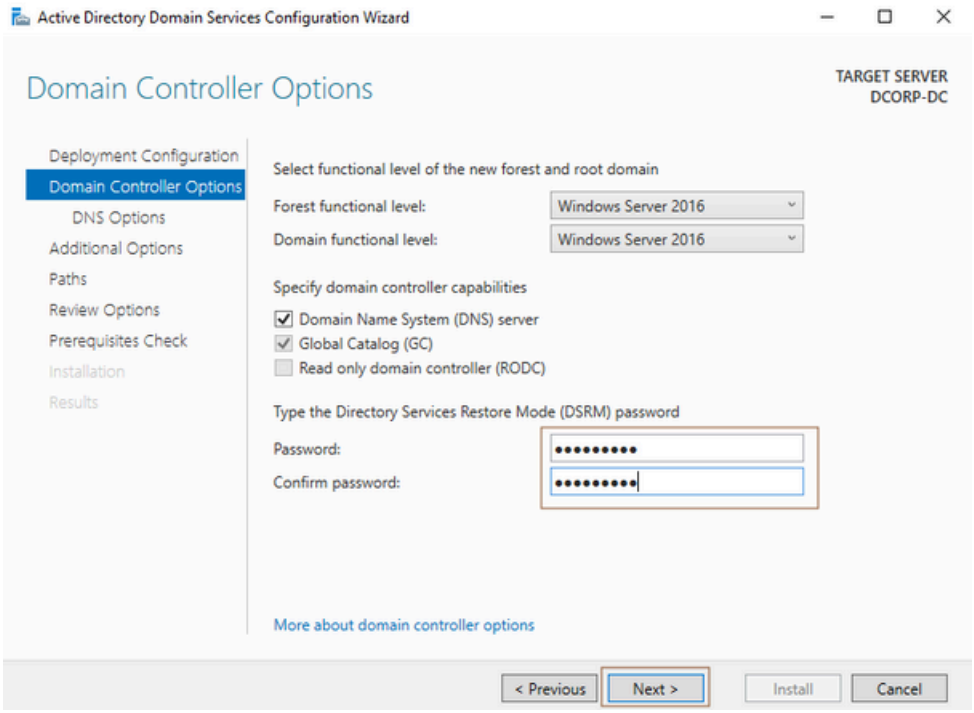
Click on the flag "Promote this server to a DC"



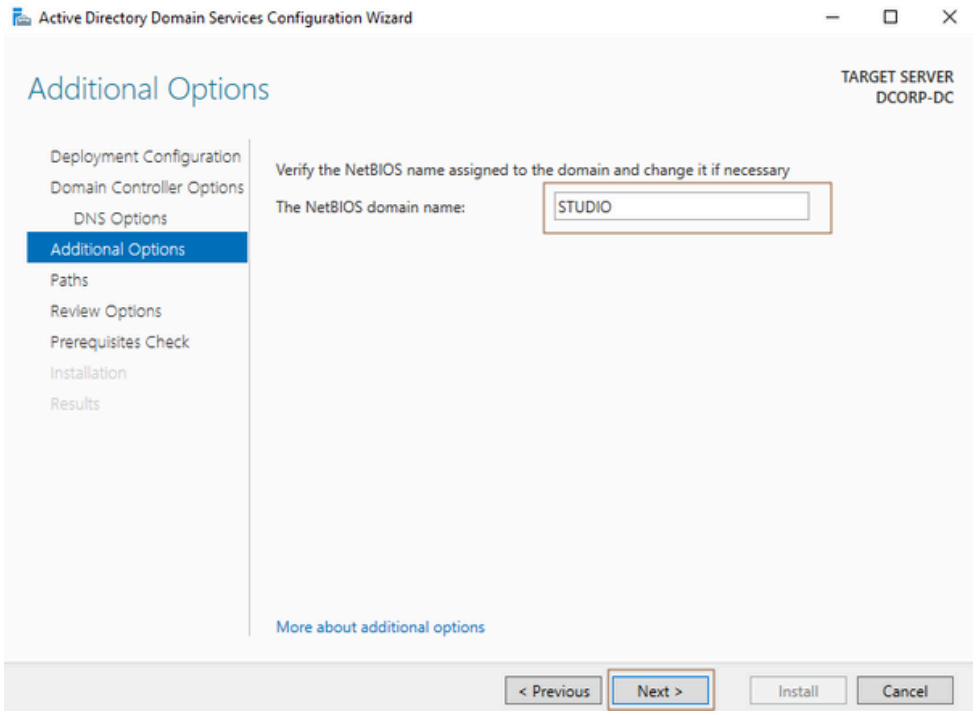
Add a new forest : studio.lab



Insert a password

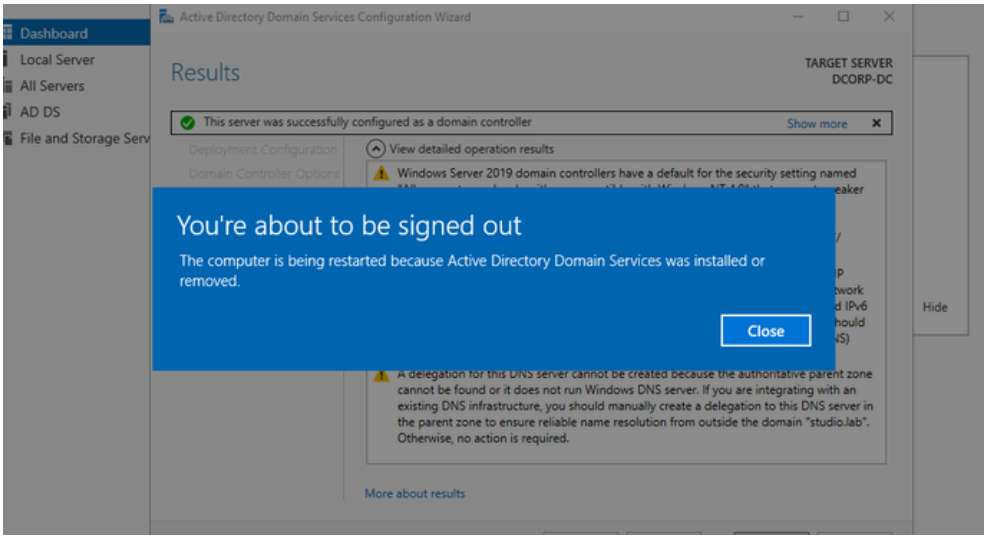


Next (no/unchecked create dns delegation), then



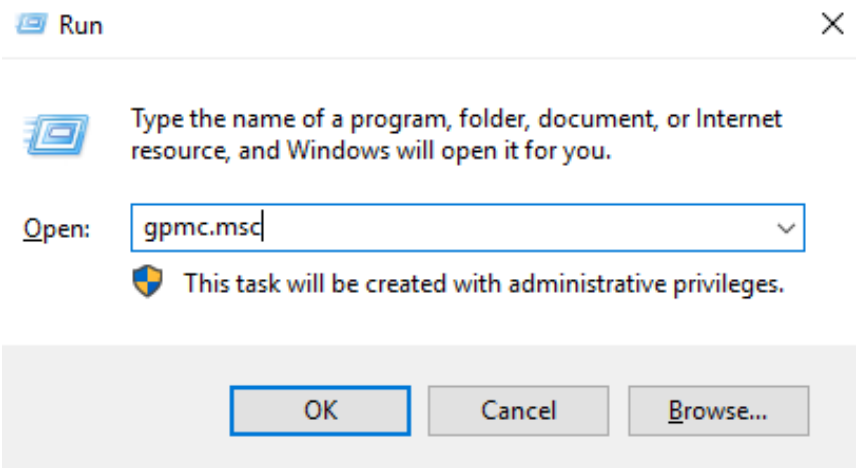
next, next, install.

After that we'll automatically sign-out and machine will restart (if this does not happen, you can do it manually).

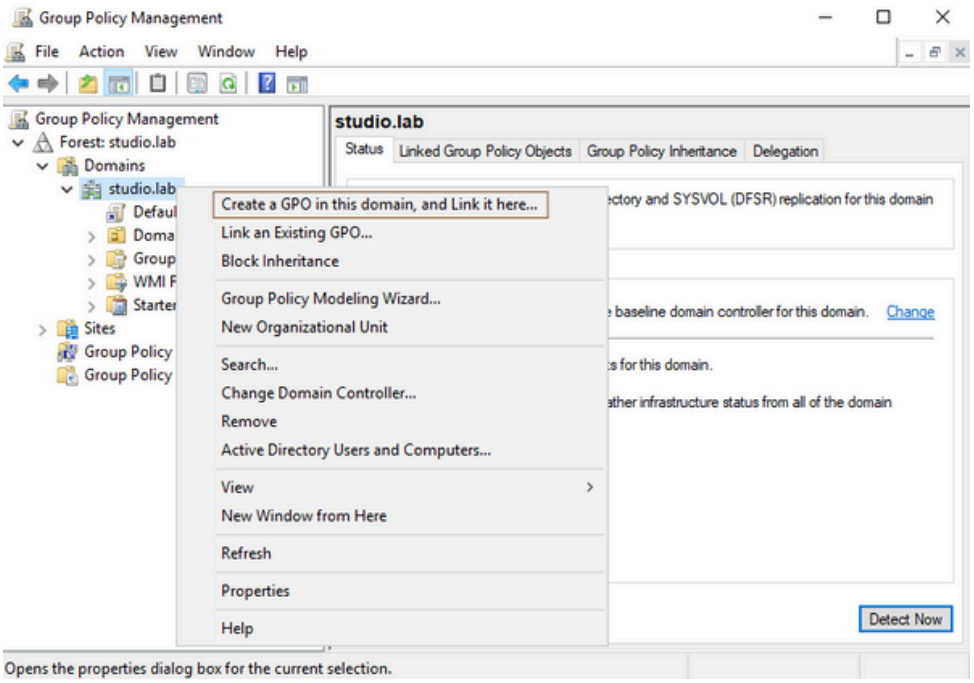


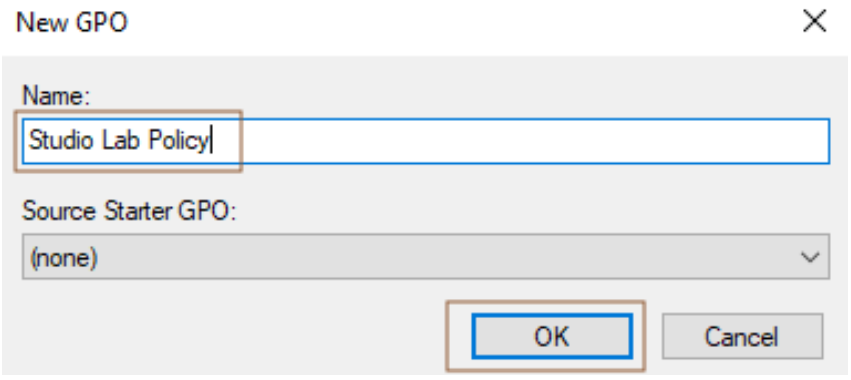
3- Add New GPO called "Studio Lab Policy"

Open Run (WIN + R) → gpmc.msc → OK

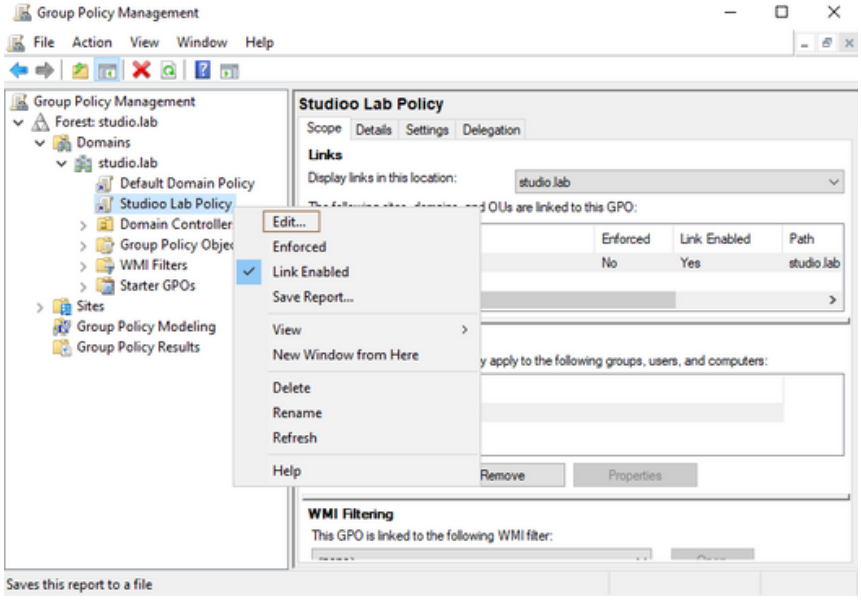


Click to : Create a GPO in this domain, and Link it here...



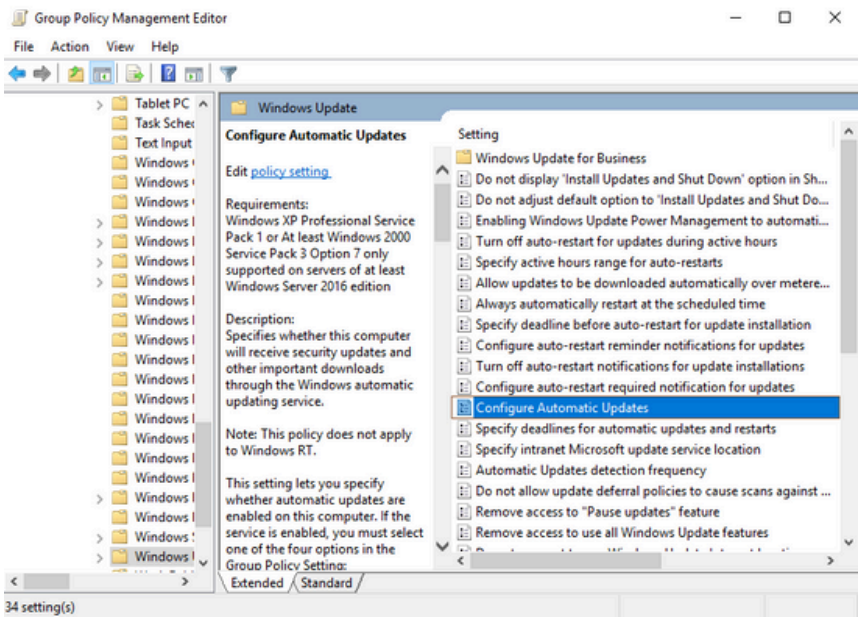


Edit our new GPO :

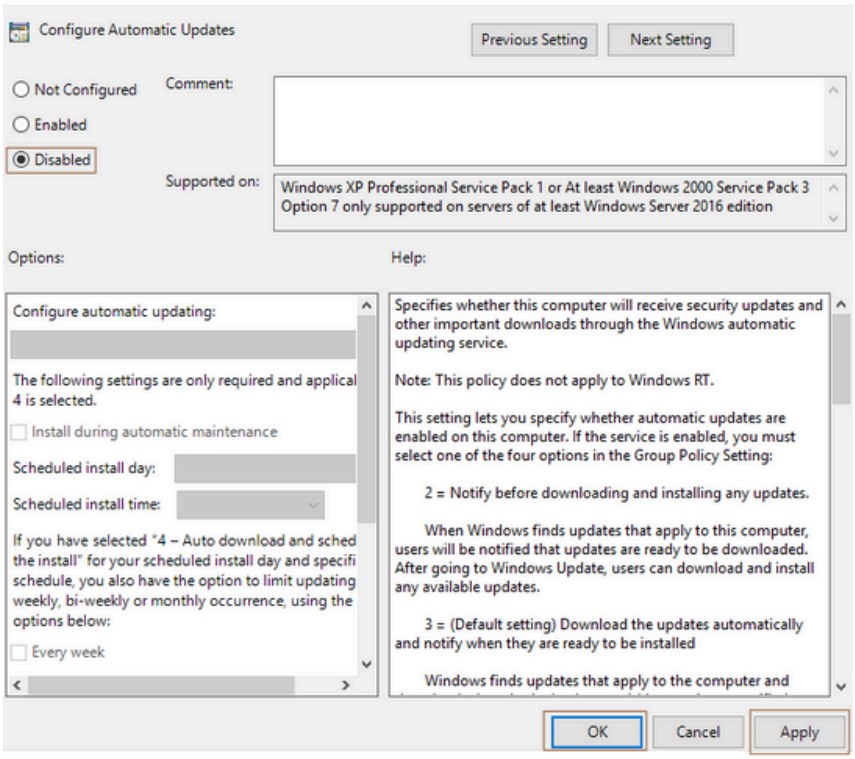


Disable Windows Updates :

Go to : Computer Configuration → Policies → Administrative Templates Policy definitions → Windows Components → Windows Update

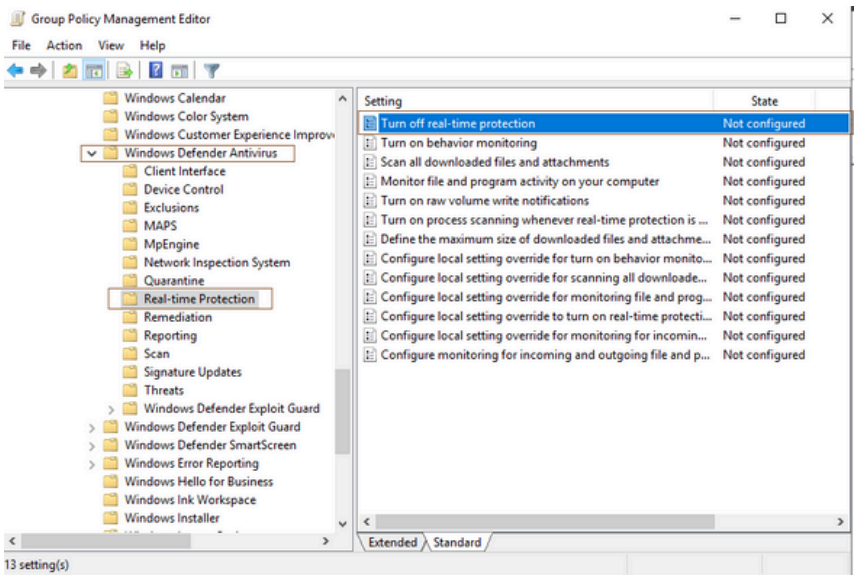


Double click on **"Configure Automatic Updates"** → Disabled → Apply → OK

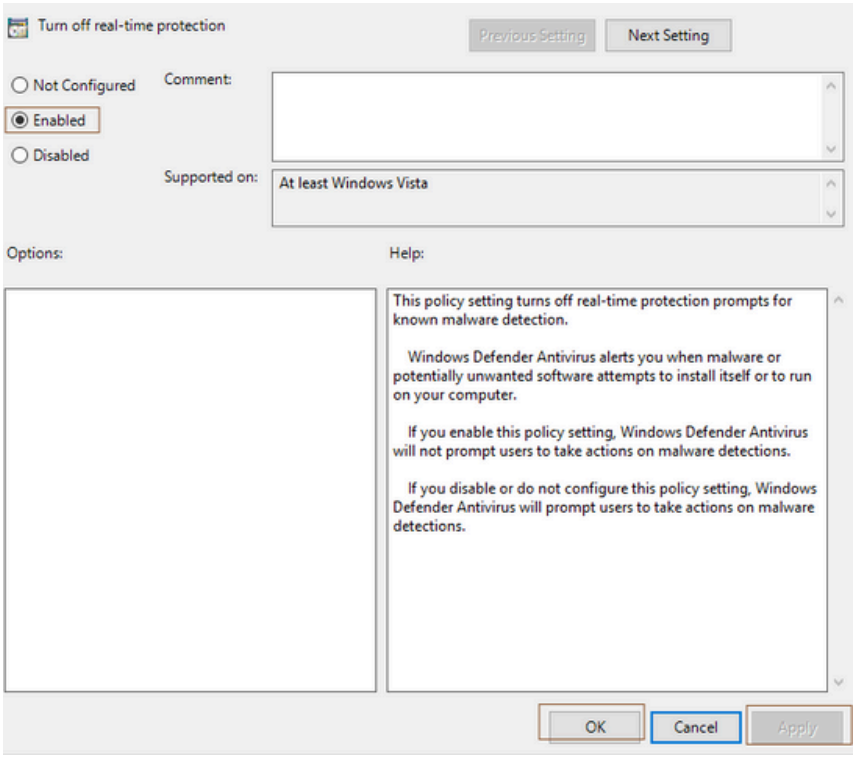


Disable Antivirus :

Go to: Computer Configuration → Policies → Administrative Templates Policy definitions → Windows Components → Windows Defender Antivirus → Real-time Protection

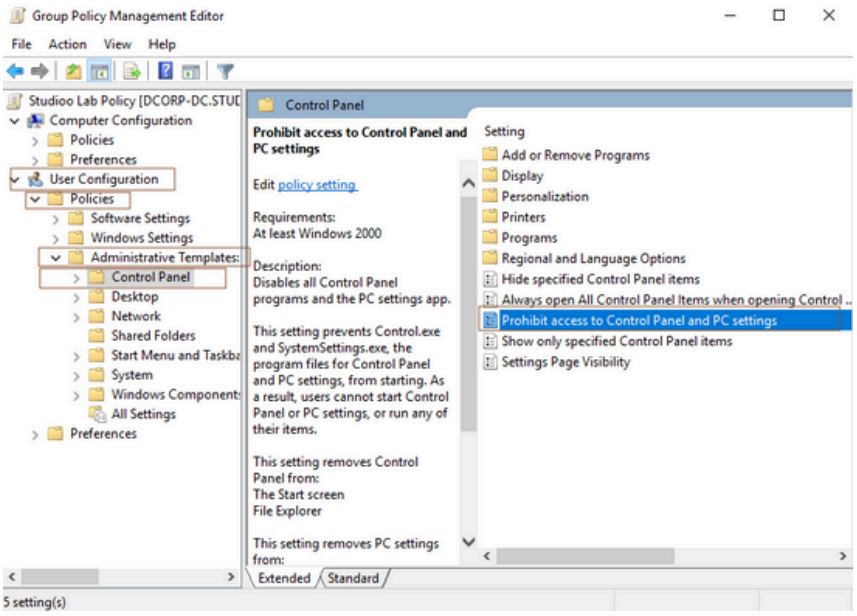


Double click on **"Turn off real-time protection"** → Enabled → Apply → OK

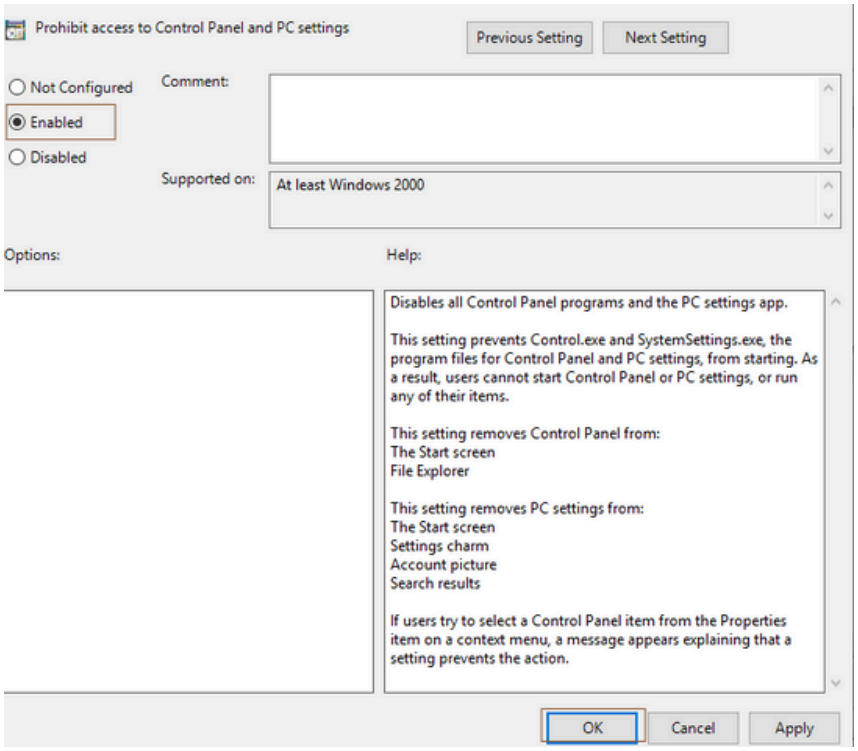


Disable Access to Control Panel :

Go to: User Configuration -> Policies -> Administrative Templates Policy definitions -> Control Panel

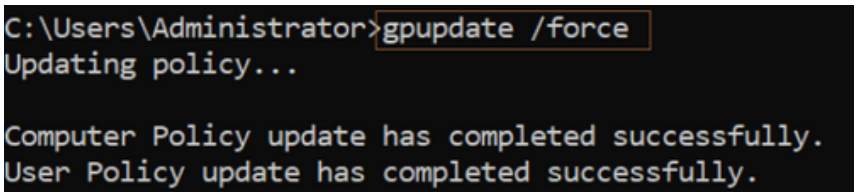


Double click on **"Prohibit acces to Conrol Panel and PC settings"** → Enabled → Apply → OK



Update GPO :

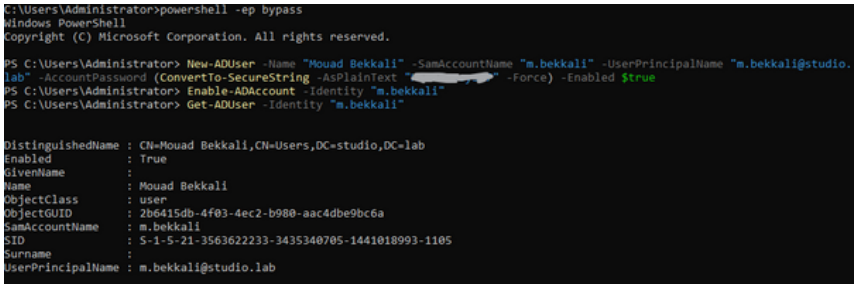
Now, open command prompt (cmd) and type **: gpupdate /force** to force GPO updates



4– Create new AD users :

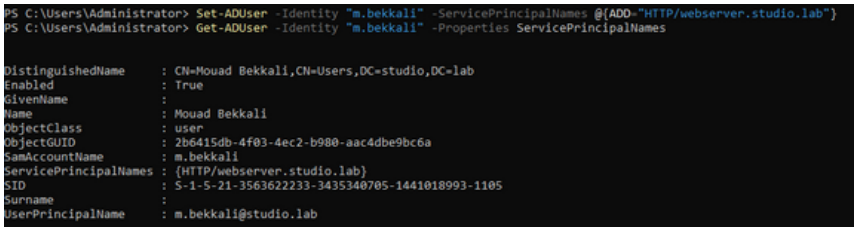
Open powershell

and create a new user with this credentials: m.bekkali::**********



5– Configuration for Kerberoasting :

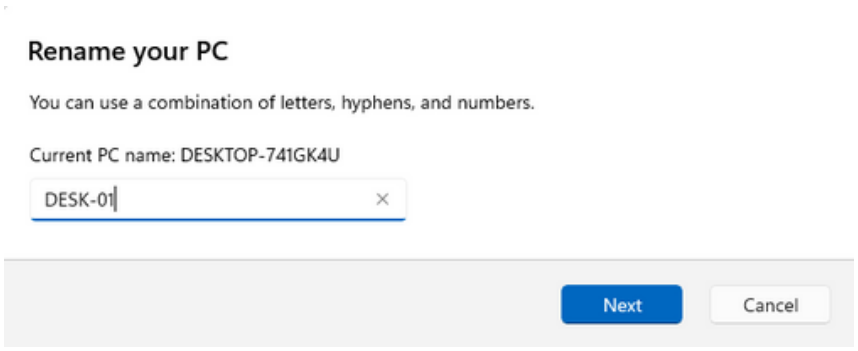
Make the new user a service account



On The first Windows 11 Enterprise machine :

1– Rename the machine :

Settings → About → Next → Restart now



2- Join Workstation to Domain :

Configure DNS :

Trying to resolve Domain Controller (dcorp-dc) DNS we can't obtain it:

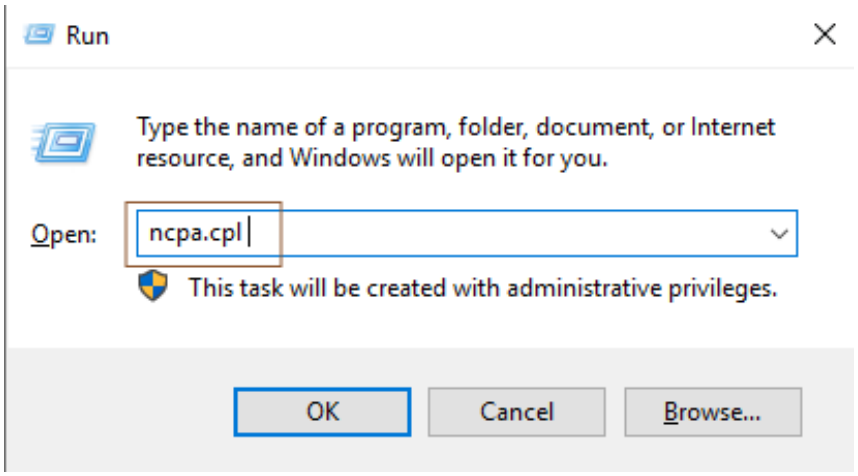
```
PS C:\Users\Lionel Messi> nslookup -type=SRV dcorp-dc.studio.lab
DNS request timed out.
    timeout was 2 seconds.
Server:  UnKnown
Address:  192.168.57.1

DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
    timeout was 2 seconds.
*** Request to UnKnown timed-out
```

so, we need to configure it now changing the network configuration

this is the IP of Domain Controller machine 192.168.57.2

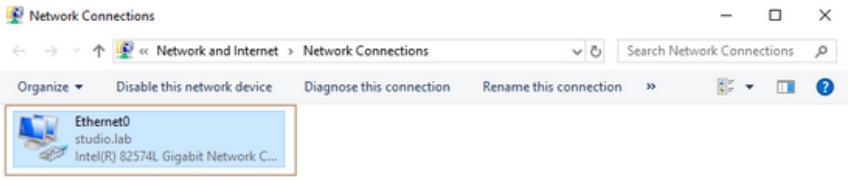
```
C:\Users\Administrator>hostname
DCORP-DC

C:\Users\Administrator>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet0:

   Connection-specific DNS Suffix  . : localdomain
   Link-local IPv6 Address . . . . . : fe80::9a05:2572:17f2:f8e0%5
   IPv4 Address. . . . . . . . . . . : 192.168.57.2
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :
```

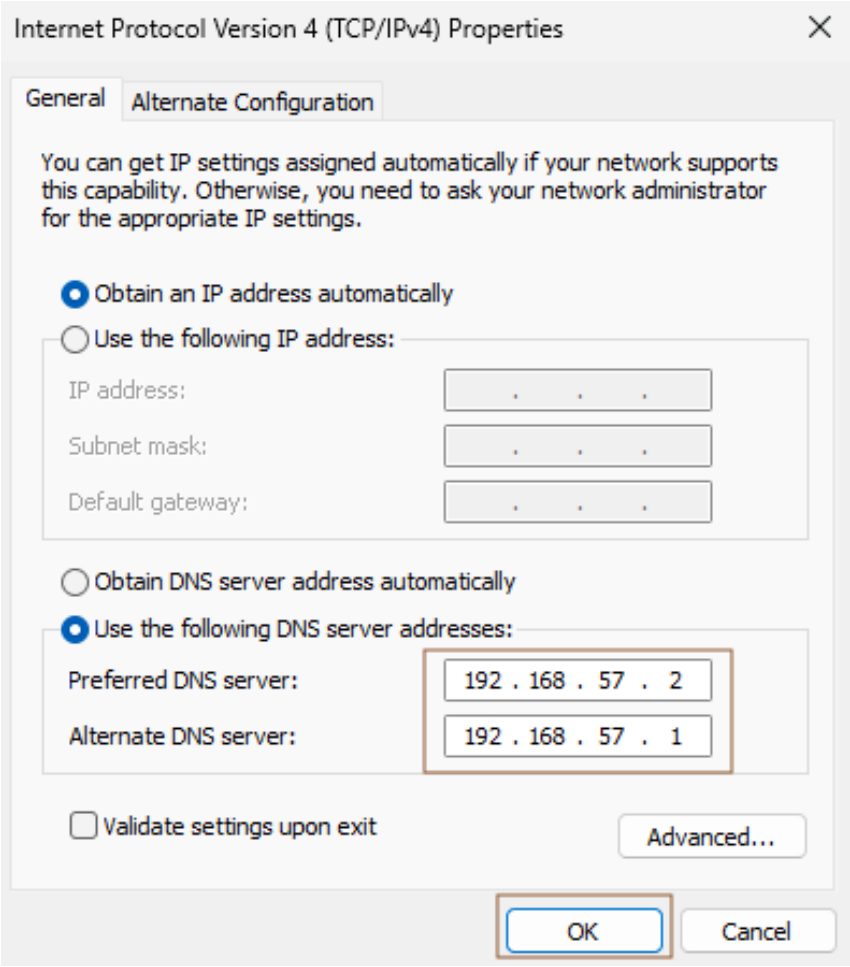
To change the DNS we need to opern network configuration interface using :
Open Run (WIN + R) → ncpa.cpl → OK (do it also on the DC machine)



Now select network interface of interest → properties → configure IPv4 settings (do it also on the DC machine)

Set DNS server to the AD DNS (192.168.57.2) and the default gateway as alternative DNS (192.168.57.1)





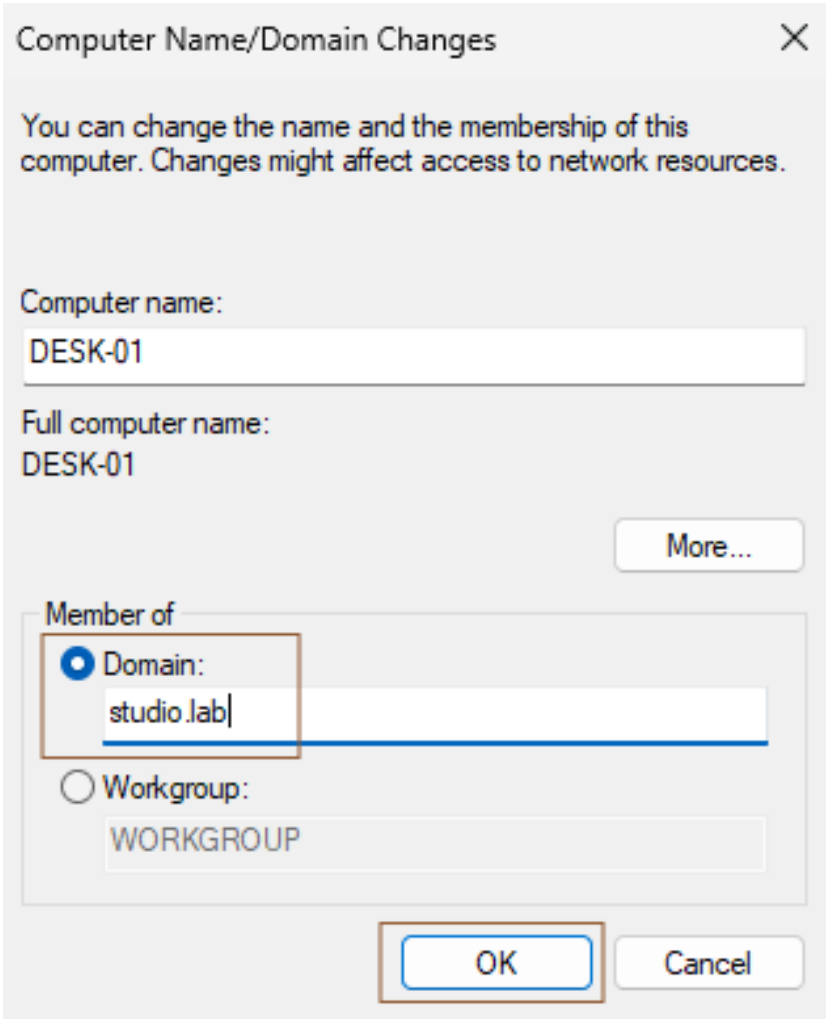
Trying again to resolve the DC DNS we can see that's correct now!

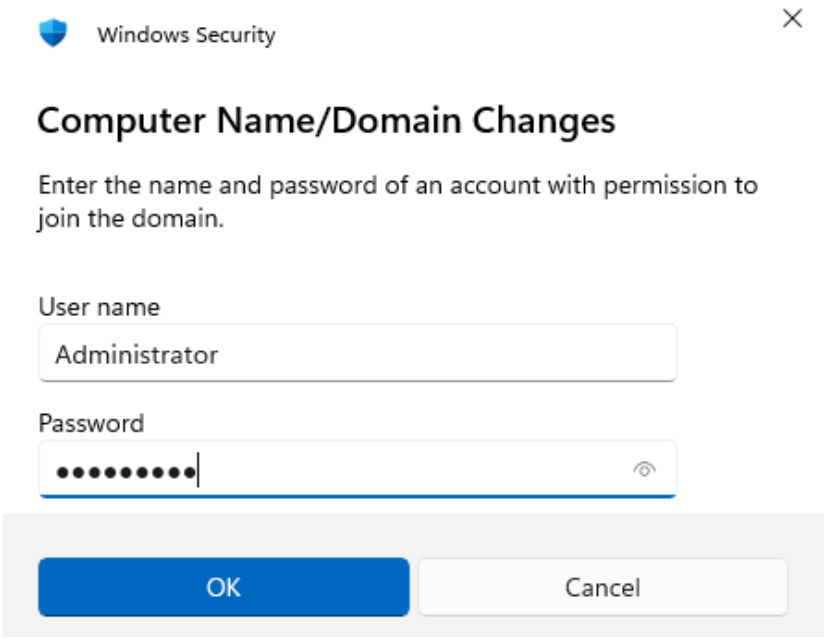
```
C:\Users\Lionel Messi>hostname
DESK-01

C:\Users\Lionel Messi>nslookup -type=SRV dcorp-dc.studio.lab
DNS request timed out.
    timeout was 2 seconds.
Server:  UnKnown
Address:  192.168.57.2

DNS request timed out.
    timeout was 2 seconds.
studio.lab
        primary name server = dcorp-dc.studio.lab
        responsible mail addr = hostmaster.studio.lab
        serial  = 36
        refresh = 900 (15 mins)
        retry   = 600 (10 mins)
        expire  = 86400 (1 day)
        default TTL = 3600 (1 hour)
```

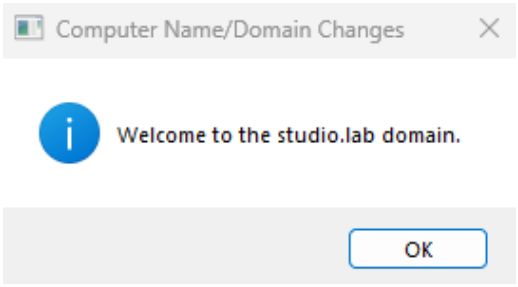
Now we can join the workstation to the domain.

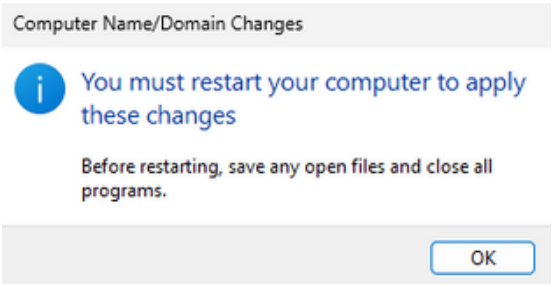
The last step is to insert the user credential of user who has the required permissions, such as a domain admin account: 'Administrator'

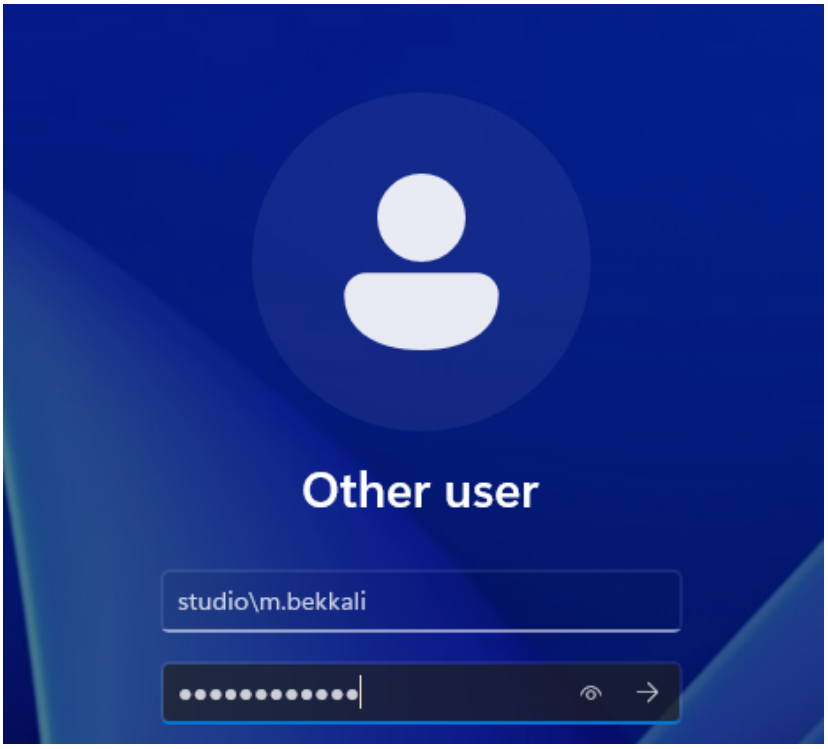
Then go to : Control Panel → System and Security → System → Advanced system settings → Computer Name → Change → **Domain : "studio.lab"**




Windows Security
Computer Name/Domain Changes
Enter the name and password of an account with permission to join the domain.
User name
Administrator
Password
OK
Cancel


Computer Name/Domain Changes
Welcome to the studio.lab domain.
OK


Computer Name/Domain Changes
You must restart your computer to apply these changes
Before restarting, save any open files and close all programs.
OK


Other user
studio\m.bekkali

We can verify it on DC machine using : **net user /domain**

```
C:\Users\m.bekkali>whoami
studio\m.bekkali

C:\Users\m.bekkali>systeminfo | findstr /B /C:"Domain"
Domain:                           studio.lab
```

N.B : Lionel Messsi is a **local user**
m.bekkali is **Doamin user**

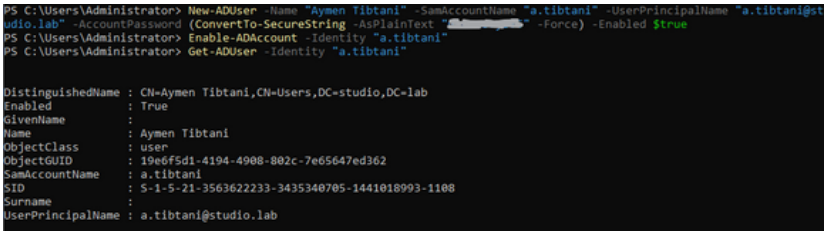
```
C:\Users>dir
 Volume in drive C has no label.
 Volume Serial Number is 380D-52DE

 Directory of C:\Users

11/19/2025  06:12 PM    <DIR>          .
11/19/2025  06:00 PM    <DIR>          Lionel Messi
11/19/2025  06:13 PM    <DIR>          m.bekkali
11/17/2025  03:40 AM    <DIR>          Public
               0 File(s)              0 bytes
               4 Dir(s)  50,654,855,168 bytes free
```

On The Windows Server 2019 :

1- Create another AD user :

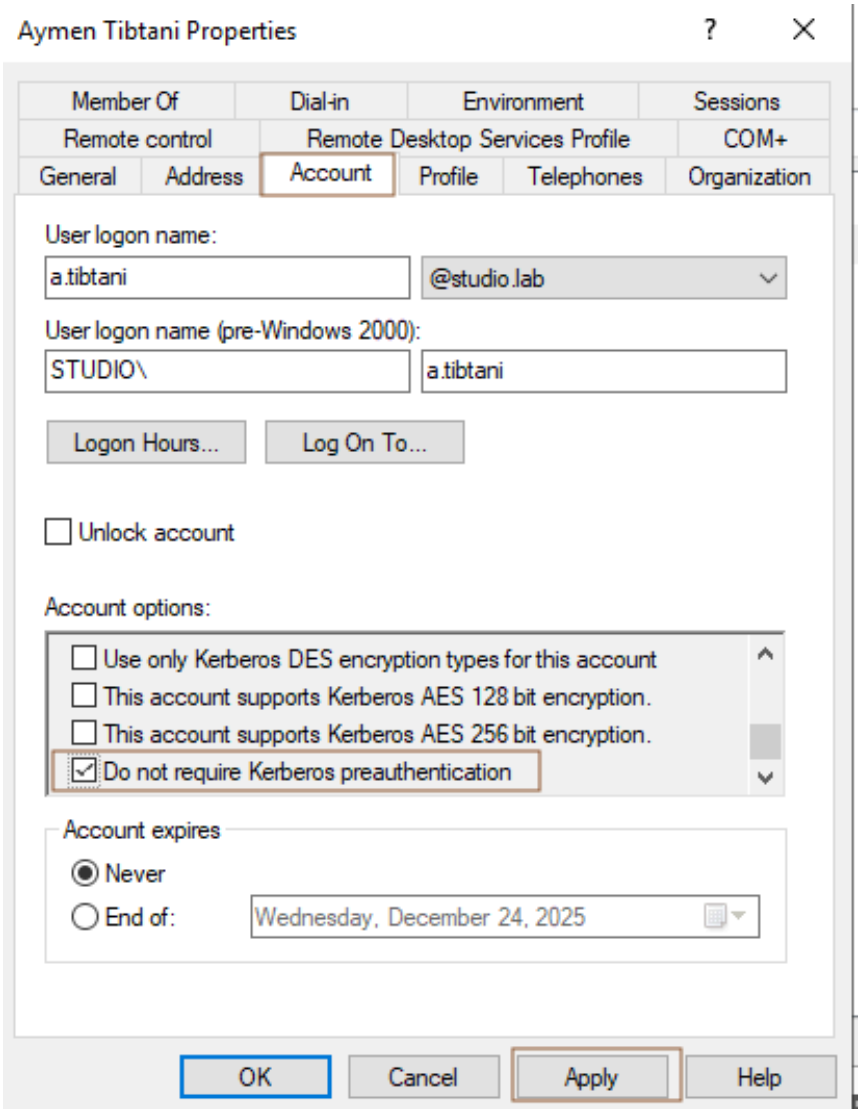
Open Powershell

and create a new user with this credentials: a.tibtani::**********



2- Configuration for AS-REP Roasting :

Tools → Active Directory Users and Computers → Users → Ahmed Tibtani → Properties



Check **"Do not require Kerberos preauthentication"** → OK

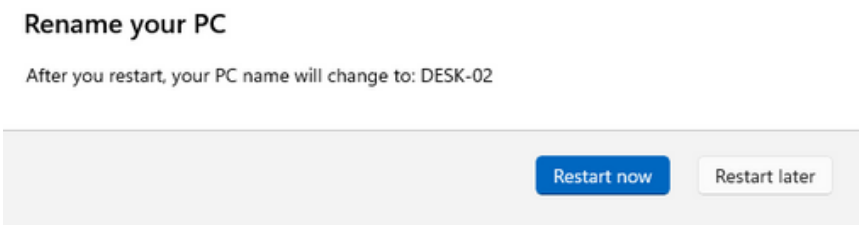
Verify that the user is vulnerable to **AS-REP Roasting** vulnerability

The user is vulnerable because **DoesNotRequirePreAuth** property = **True**

On The second Windows 11 Enterprise machine :

1- Rename the machine :

Settings → About → Next → Restart now

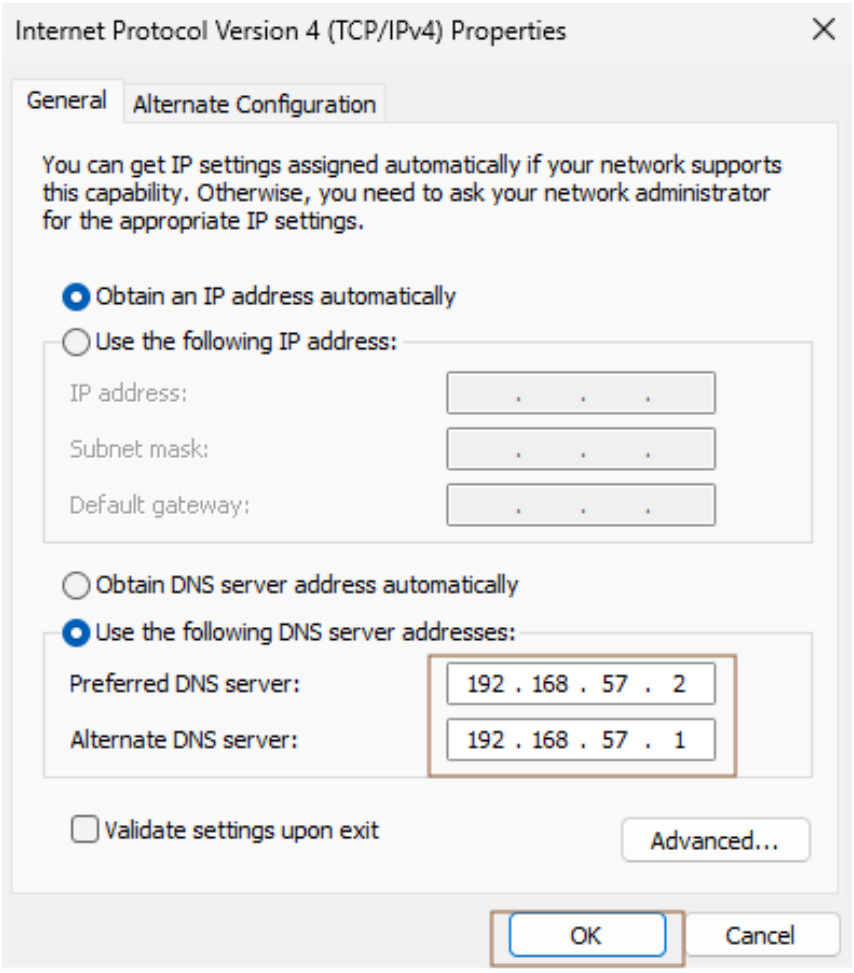


2- Join Workstation to Domain :

Configure DNS :

As we did before on the first machine we should set the DNS

Set DNS server to the AD DNS (192.168.57.2) and the default gateway as alternative DNS (192.168.57.1)



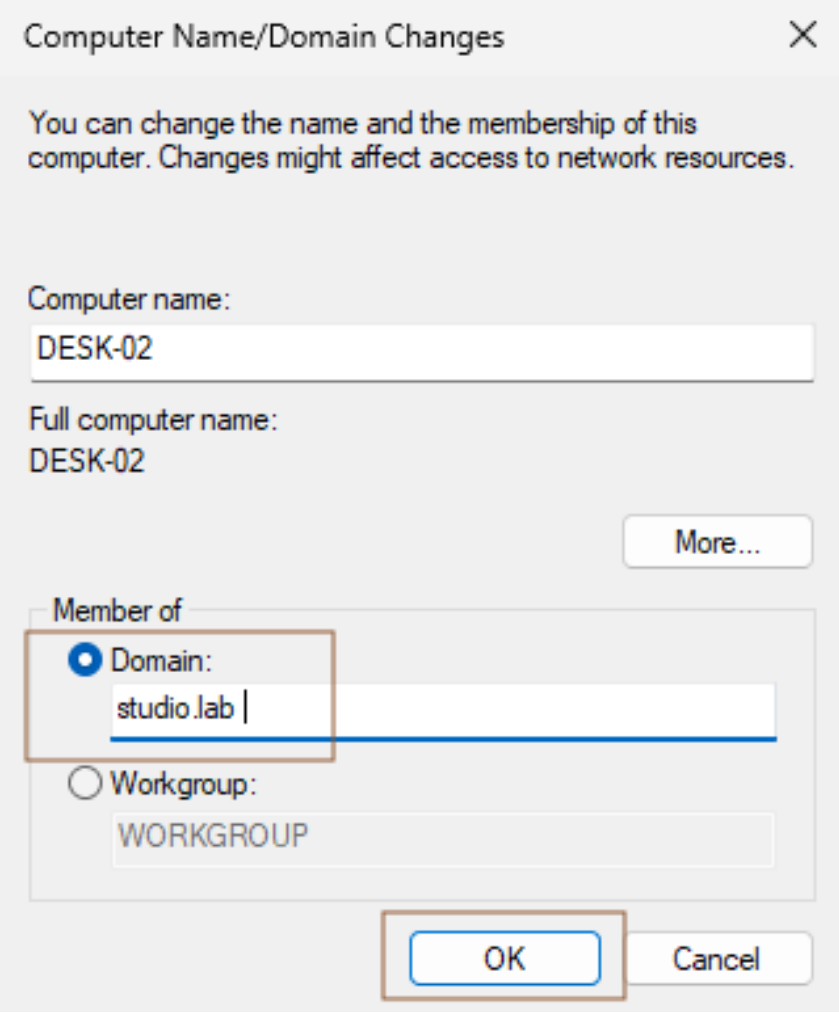
Trying to resolve the DC DNS

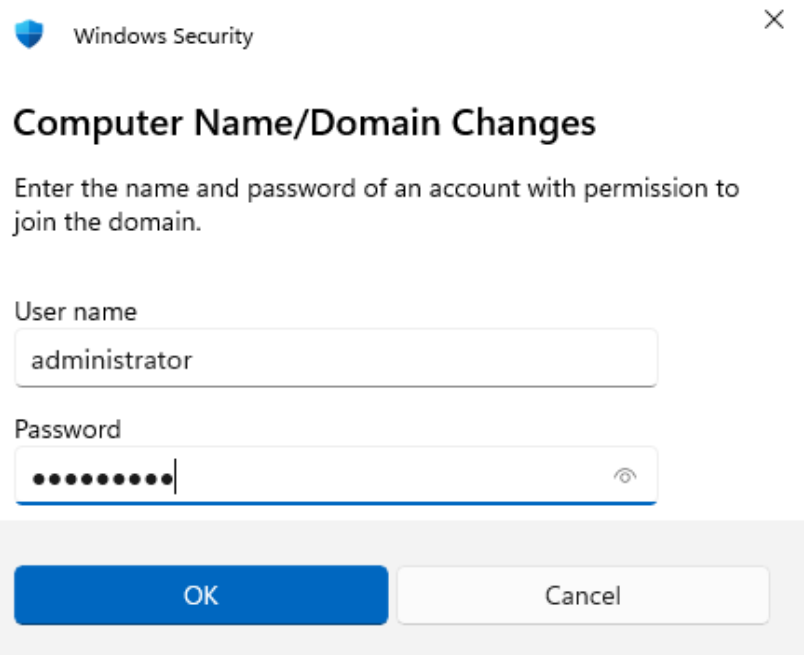
```
PS C:\Users\Neymar Jr> hostname
DESK-02
PS C:\Users\Neymar Jr> nslookup -type=SRV dcorp-dc.studio.lab
DNS request timed out.
    timeout was 2 seconds.
Server:  UnKnown
Address:  192.168.57.2

DNS request timed out.
    timeout was 2 seconds.
studio.lab
        primary name server = dcorp-dc.studio.lab
        responsible mail addr = hostmaster.studio.lab
        serial  = 46
        refresh = 900 (15 mins)
        retry   = 600 (10 mins)
        expire  = 86400 (1 day)
        default TTL = 3600 (1 hour)
```

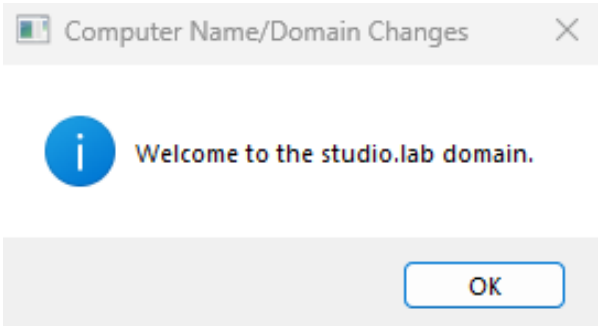
It works

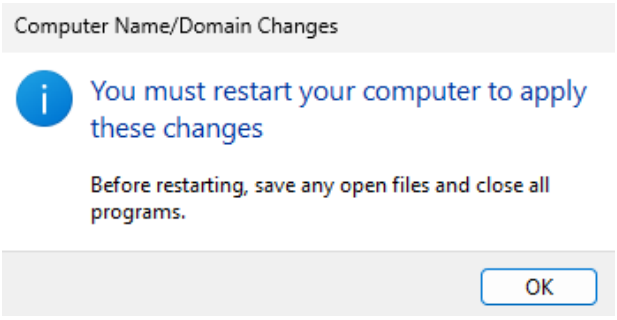
Now we can join the workstation to the domain.

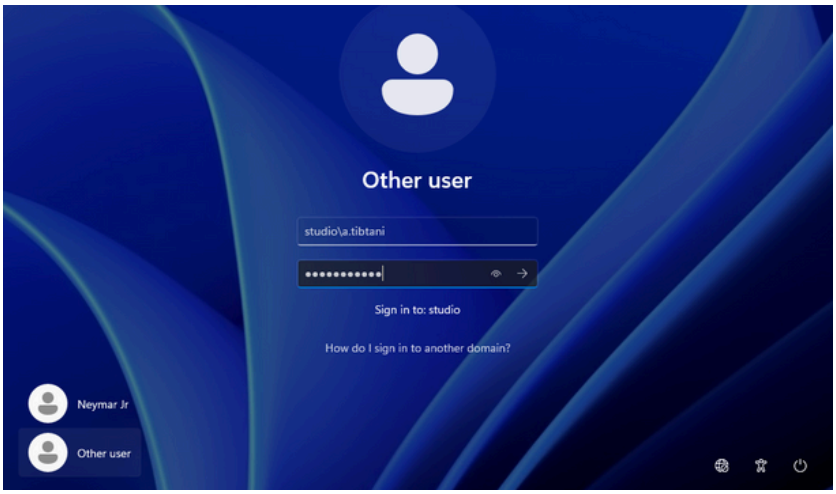
Go to : Control Panel → System and Security → System → Advanced system settings → Computer Name → Change → Domain : "studio.lab"



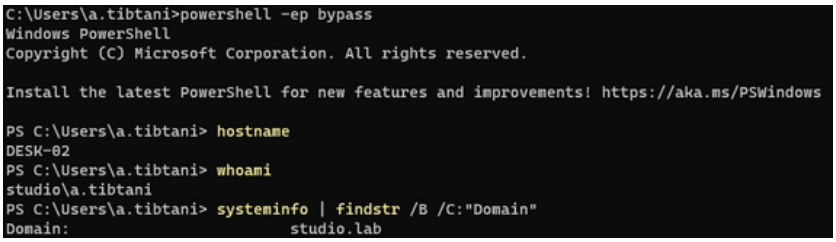








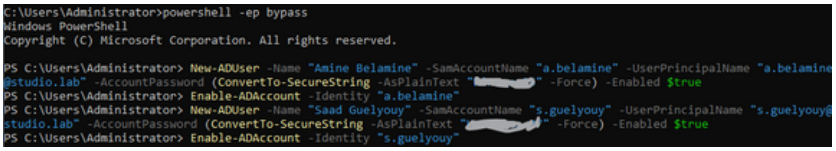
We can verify it on DC machine using : **net user /domain**



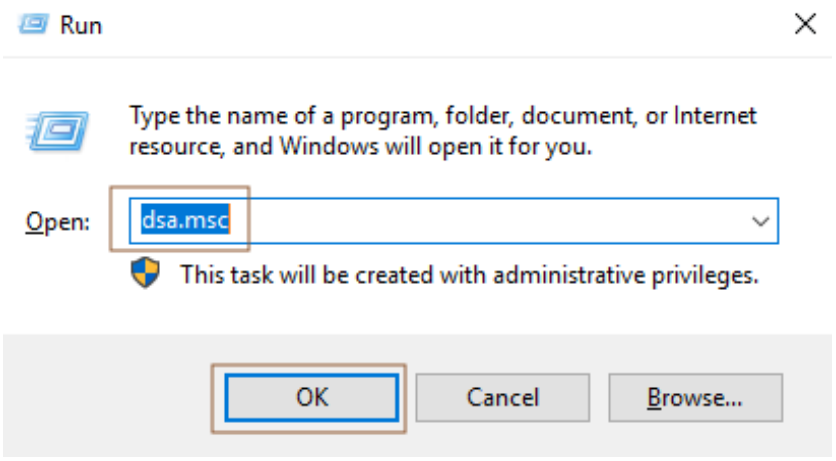
On The Windows Server 2019 :

1- Create and manage Organizational Units "OU" :

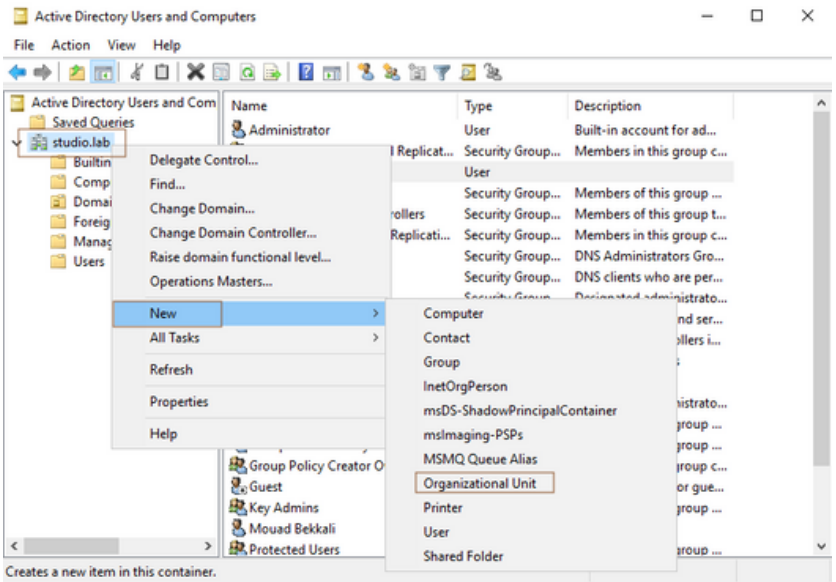
Opens Powershell and create two AD users : Amine Belamine and Saad Guelyouy



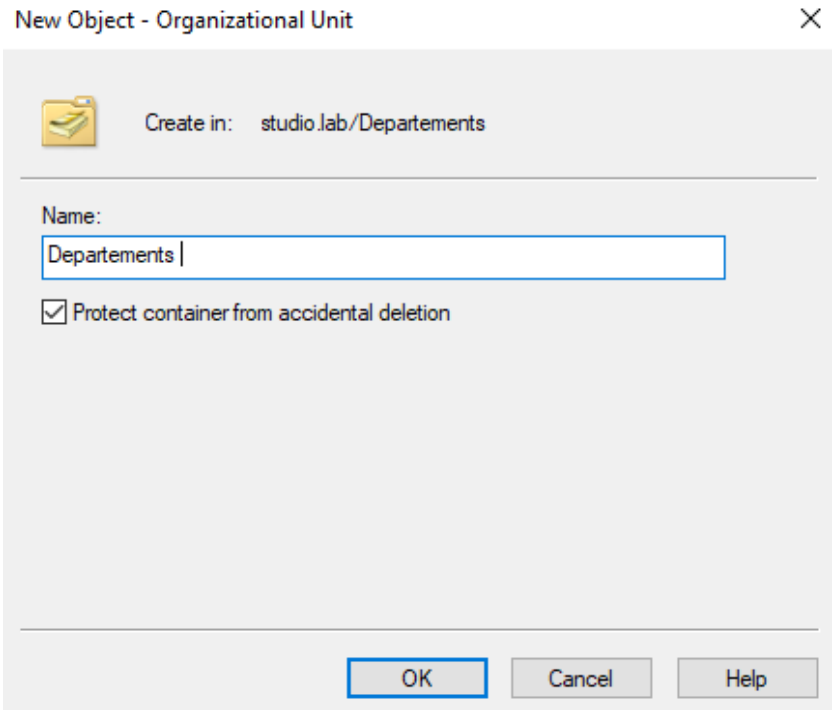
Open Run (WIN + R) → dsa.msc → OK



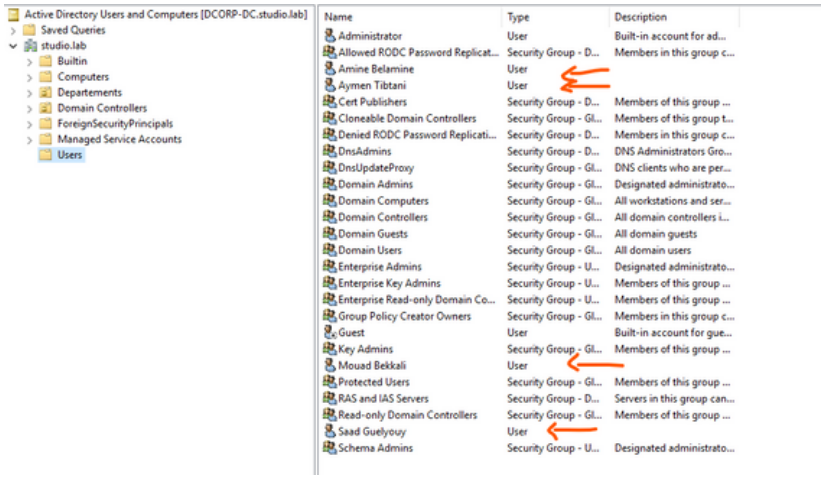
Studio.lab → New → Organizational Unit



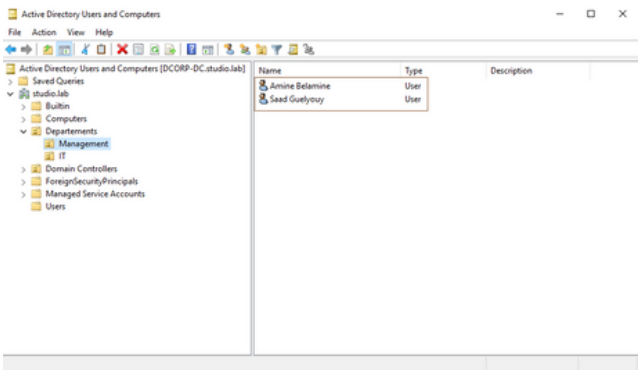
Create a OU named "Departements" an within this OU create two OU named "IT" and "Management"

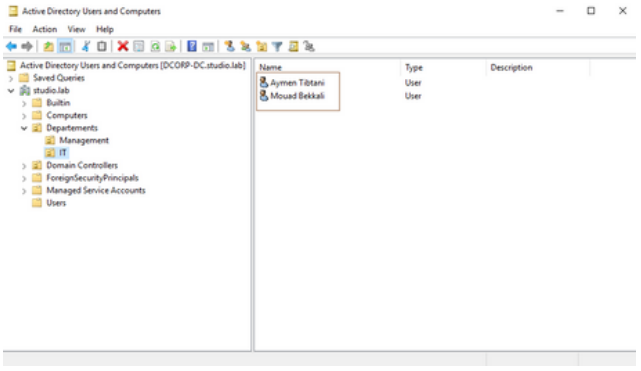


Go to Users , select a user → right-click on it → Move → choose the OU u want to join the user selected

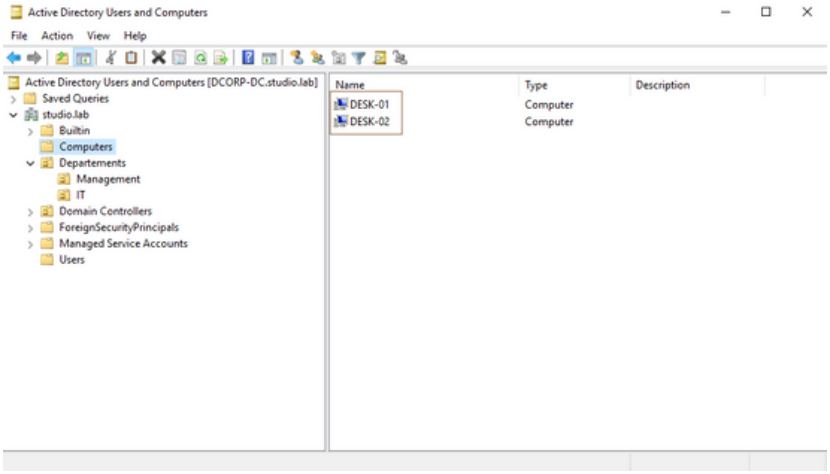


Th Users are organized :

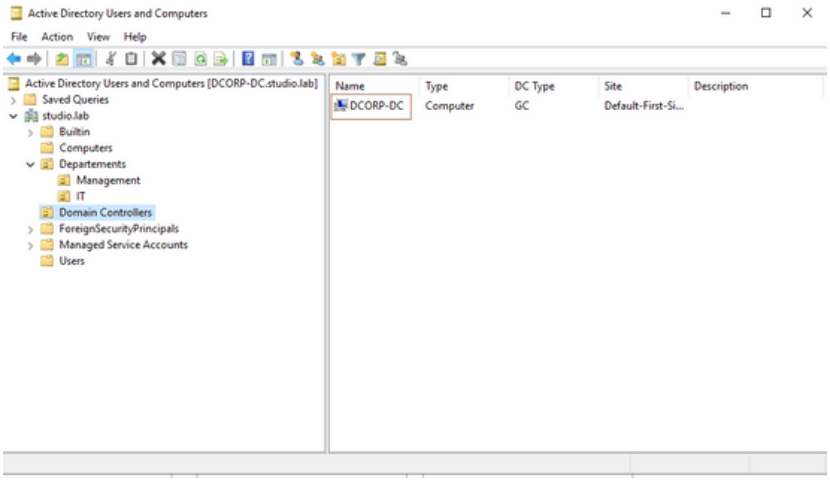




The Windows 11 Enterprise machines are in the **Computers :**

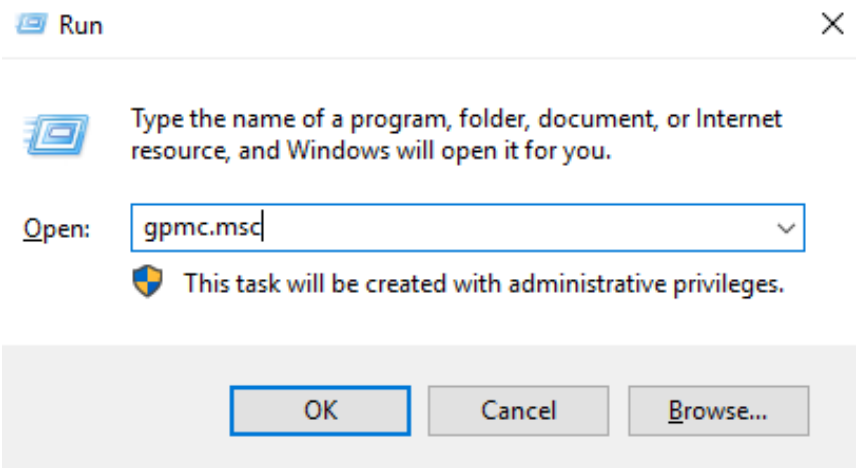


The Windows Server 2019 is in the **Domain Controllers :**



2- Applying the GPO "Studio Lab Policy" :

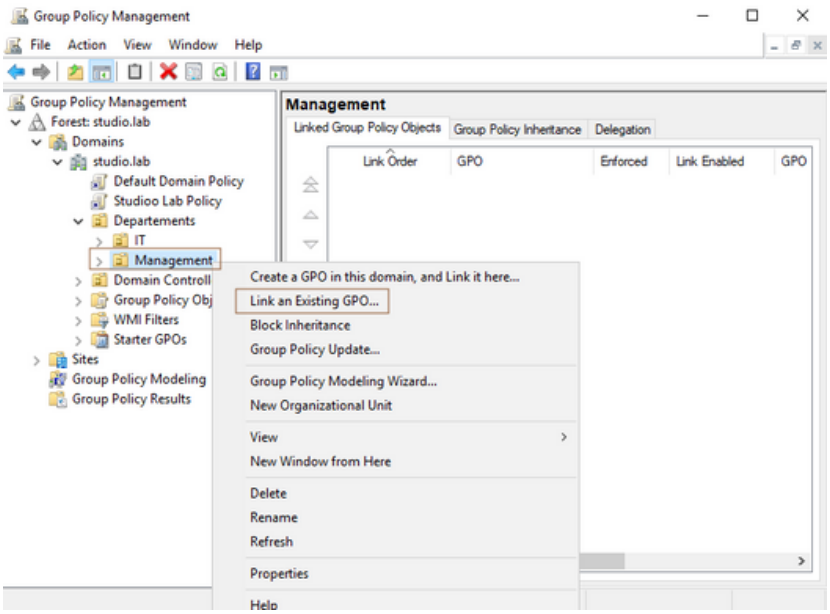
Open Run (WIN + R) → gpmc.msc → OK

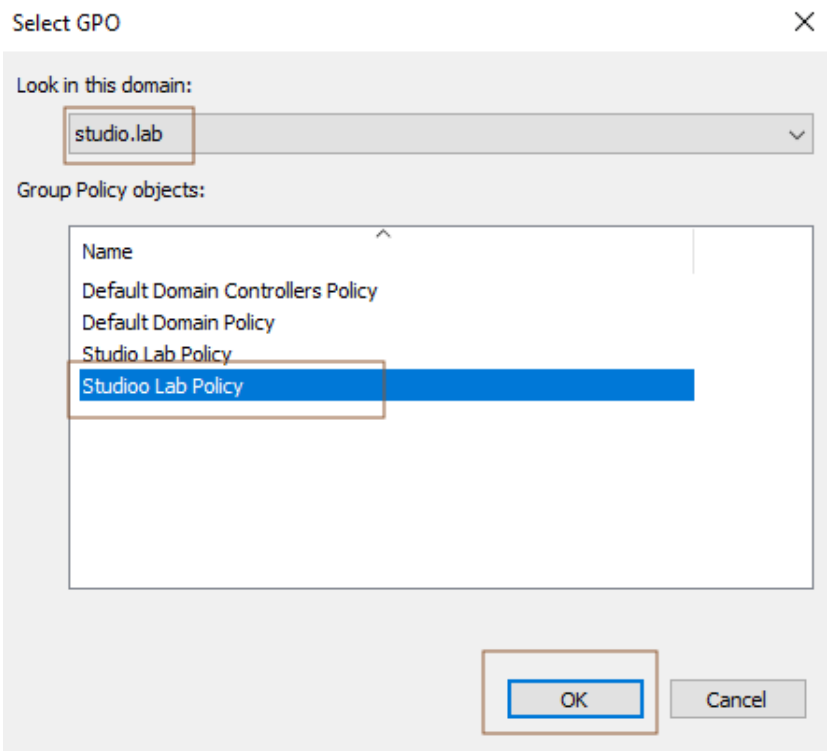


Apply the GPO on the Mnagement OU to restrict Mnagaement users from Accessing Control Panel and on the Computers OU to disable Windows Updates and Windows AntiVirus Detection

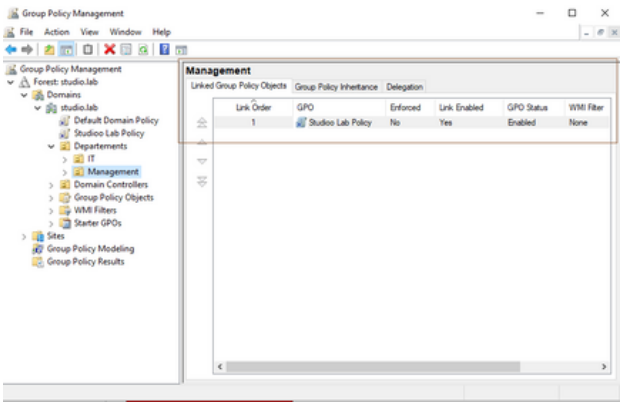
Management → Right-Click → Link Existing GPO → Studio Lab Policy → OK

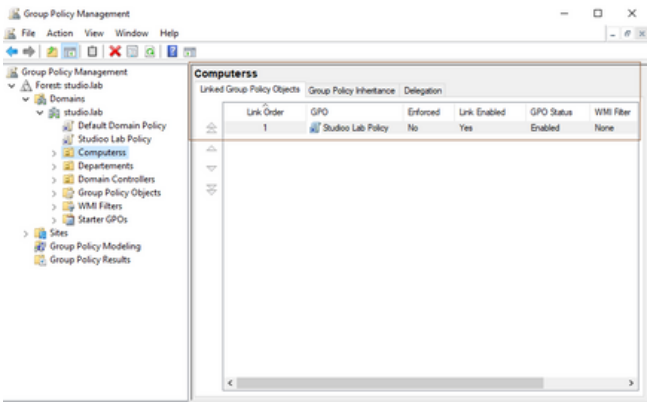
Computers → Rigjht-Click → Link an Existing GPO → Studio Lab Policy → OK





Verify that the GPO was applied





3- Implementation of an SMB File Sharing :

First, let's create the folder

```
PS C:\Users\Administrator> New-Item -ItemType Directory -Path "C:\Shares\Public" -Force


    Directory: C:\Shares

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        11/29/2025   3:23 PM                Public
```

Create the file of users with list of users

```
PS C:\Users\Administrator> "m.bekkali","a.tibtani","a.belamine","s.guelyouy","a.rahmouni","i.majdoubi" | Out-File "C:\Shares\Public\users.txt"
PS C:\Users\Administrator> type "C:\Shares\Public\users.txt"
m.bekkali
a.tibtani
a.belamine
s.guelyouy
a.rahmouni
i.majdoubi
```

Set the folder NTFS permissions **"Everyone = Read"**

```
PS C:\Users\Administrator> icacls "C:\Shares\Public" /grant "Everyone:(RX)" /t
processed file: C:\Shares\Public
processed file: C:\Shares\Public\users.txt
Successfully processed 2 files; Failed processing 0 files
```

Create the SMB share accessible to everyone

```
PS C:\Users\Administrator> New-SmbShare -Name "Public" -Path "C:\Shares\Public" -ReadAccess "Everyone"

Name   ScopeName Path            Description
----   --------- ----            -----------
Public *         C:\Shares\Public
```

Verify that's the folder was shared via SMB

```
PS C:\Users\Administrator> Get-SmbShare

Name     ScopeName Path                                    Description
----     --------- ----                                    -----------
ADMIN$   *         C:\Windows                              Remote Admin
C$       *         C:\                                     Default share
IPC$     *                                                 Remote IPC
NETLOGON *         C:\Windows\SYSVOL\sysvol\studio.lab\SCRIPTS Logon server share
Public   *         C:\Shares\Public
SYSVOL   *         C:\Windows\SYSVOL\sysvol                Logon server share
```

4- RDP configuration :

Enable the **Guest** account

```
PS C:\Users\Administrator> Enable-ADAccount -Identity "Guest"
```

Queries the registry to check whether **Remote Desktop connections** are currently allowed or denied

```
C:\Users\Administrator>reg query "HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server" /v fDenyTSConnections

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Terminal Server
    fDenyTSConnections    REG_DWORD    0x1
```

0x1 means that is denied

Modifies the registry value to set **fDenyTSConnections to 0**, thereby enabling Remote Desktop connections

```
C:\Users\Administrator>reg add "HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server" /v fDenyTSConnections /t REG_DWOR
D /d 0 /f
The operation completed successfully.
```

Queries the registry again to verify that Remote Desktop has been successfully enabled

```
C:\Users\Administrator>reg query "HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server" /v fDenyTSConnections

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Terminal Server
    fDenyTSConnections    REG_DWORD    0x0
```

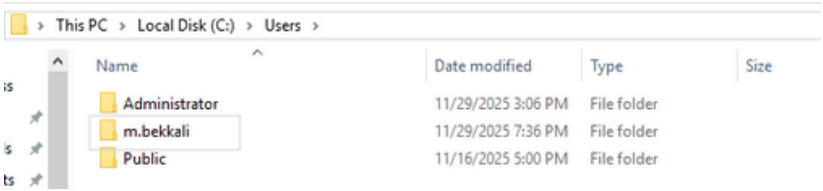
This command enables the Remote Desktop firewall rules so that port 3389 is not filtered and RDP connections can reach the machine.

```
C:\Users\Administrator>netsh advfirewall firewall set rule group="remote desktop" new enable=Yes

Updated 3 rule(s).
Ok.
```

Make the user m.bekkali a **Doamin Admin (DA)** by add him to the "**Domain Admins"** Group

```
PS C:\Users\Administrator> Add-ADGroupMember -Identity "Domain Admins" -Members "m.bekkali"
PS C:\Users\Administrator> Get-ADGroupMember -Identity "Domain Admins" | Select-Object Name, SamAccountName, Distinguish
edName

Name          SamAccountName DistinguishedName
----          -------------- -----------------
Administrator Administrator  CN=Administrator,CN=Users,DC=studio,DC=lab
Mouad Bekkali m.bekkali      CN=Mouad Bekkali,OU=IT,OU=Departements,DC=studio,DC=lab
```

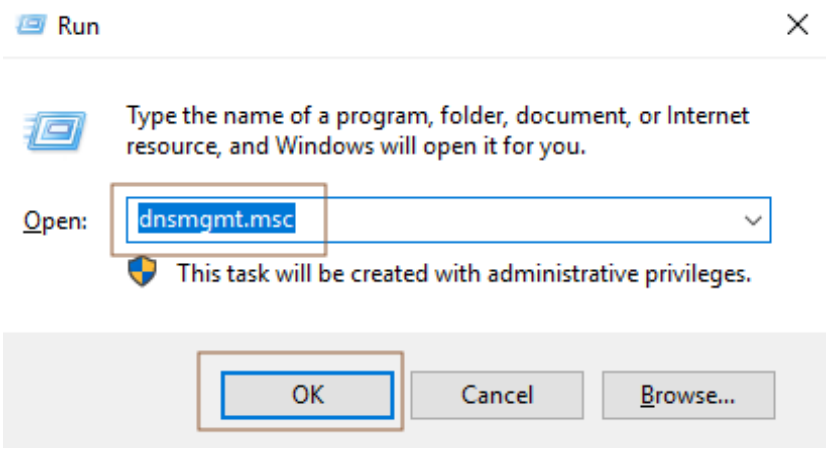
The user's home directory was generated and configured on the Domain Controller



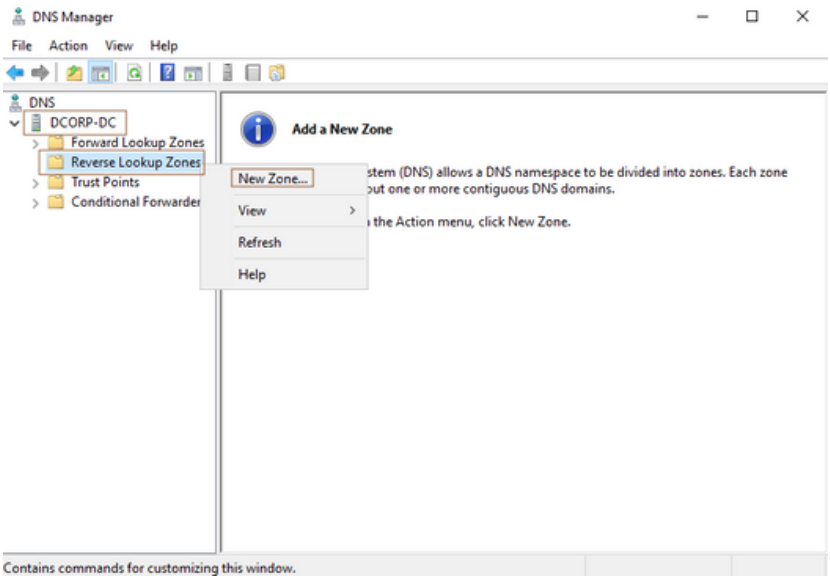
The user **m.bekkali** can now access the Domain Controller via **RDP**

5- DNS configuration :

Open Run (WIN + R) → dnsmgmt.msc → OK

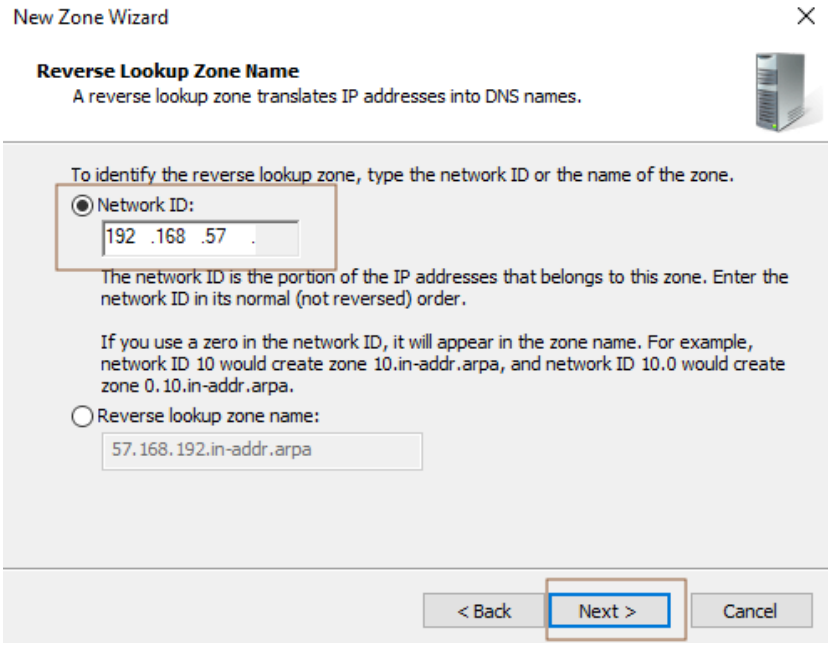


DCORP-DC → Reverse Lookup Zones —> New Zone...



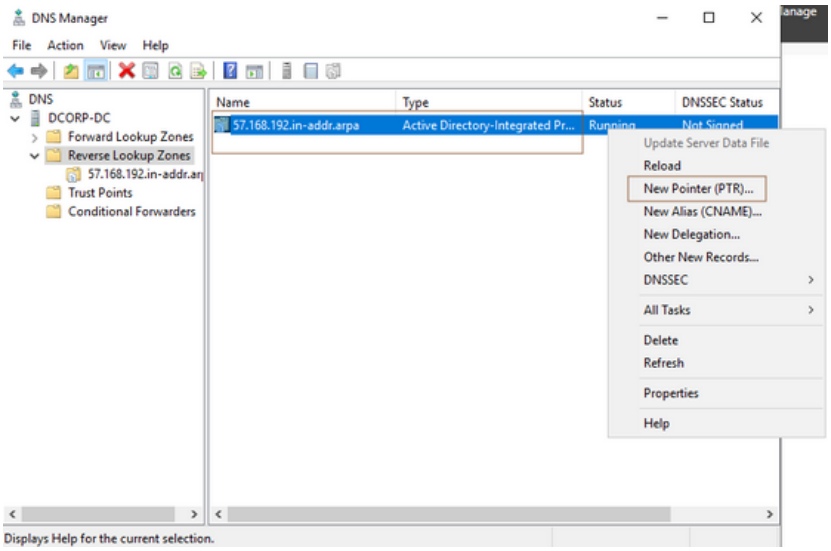
Check **"Primary Zone"** and Next → Check **"To all DNS servers running on domain controllers in this forest: studio.lab"** and Next → Check **"IPv4 Reverse Lookup Zone"** and Next

Enter the first three bytes of your network address and then Next

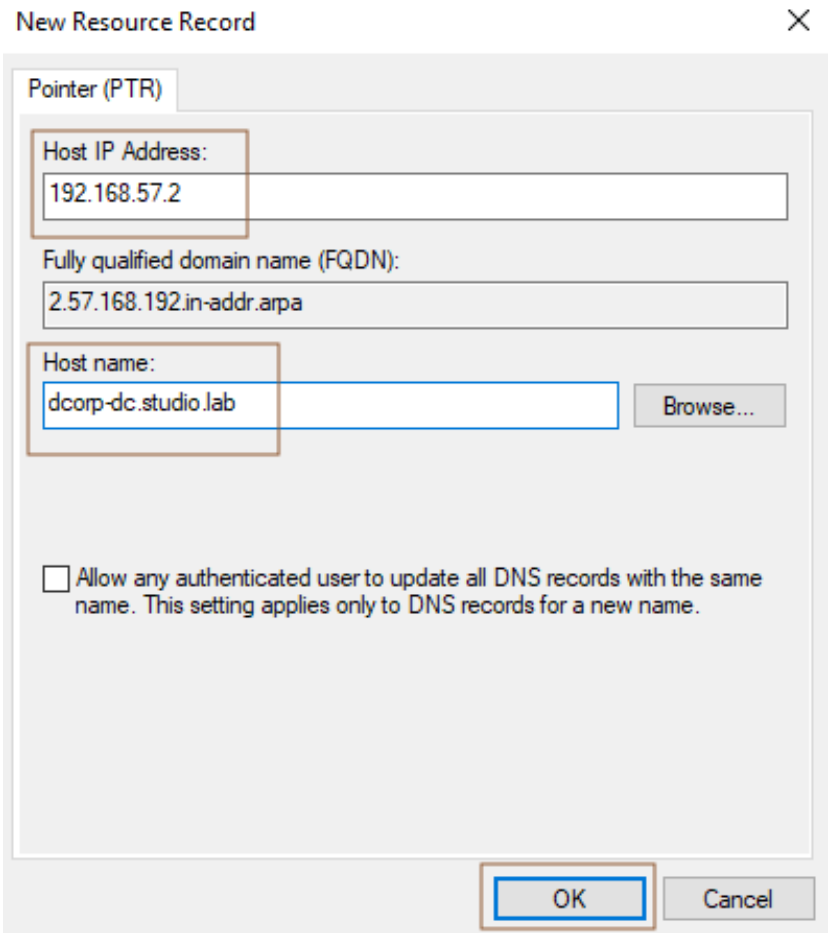


Check **"Allow only secure dynamic updates"** and thn Next → Finish

The Reverse Zone was created, right-clock on it and choose **"New Pointer (PTR)..."**



Set the **Host IP Address** to the DC IP and the **Host name** to the DC Name → OK



Test on both Windows machines

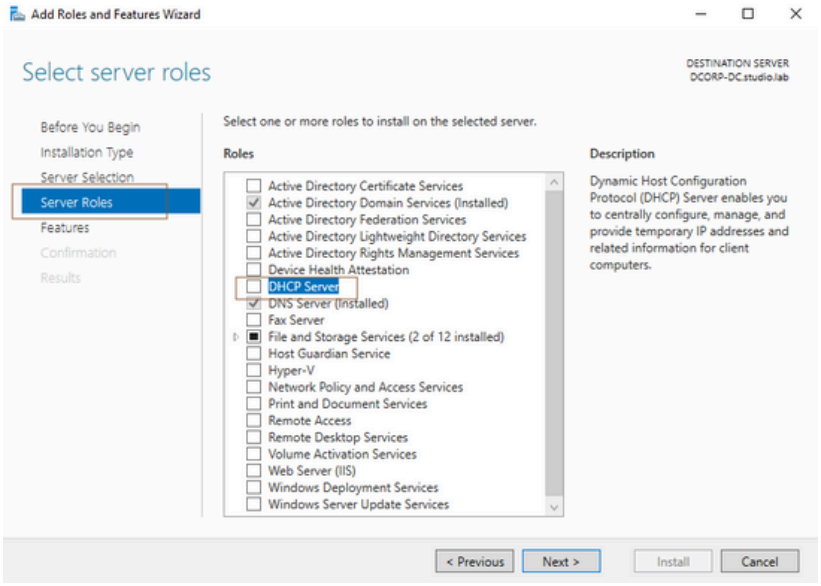
```
PS C:\Users\m.bekkali> hostname
DESK-01
PS C:\Users\m.bekkali> nslookup 192.168.57.2
Server:  dcorp-dc.studio.lab
Address:  192.168.57.2

Name:    dcorp-dc.studio.lab
Address:  192.168.57.2
```

```
PS C:\Users\a.tibtani> hostname
DESK-02
PS C:\Users\a.tibtani> nslookup dcorp-dc
Server:  dcorp-dc.studio.lab
Address:  192.168.57.2

Name:    dcorp-dc.studio.lab
Address:  192.168.57.2
```

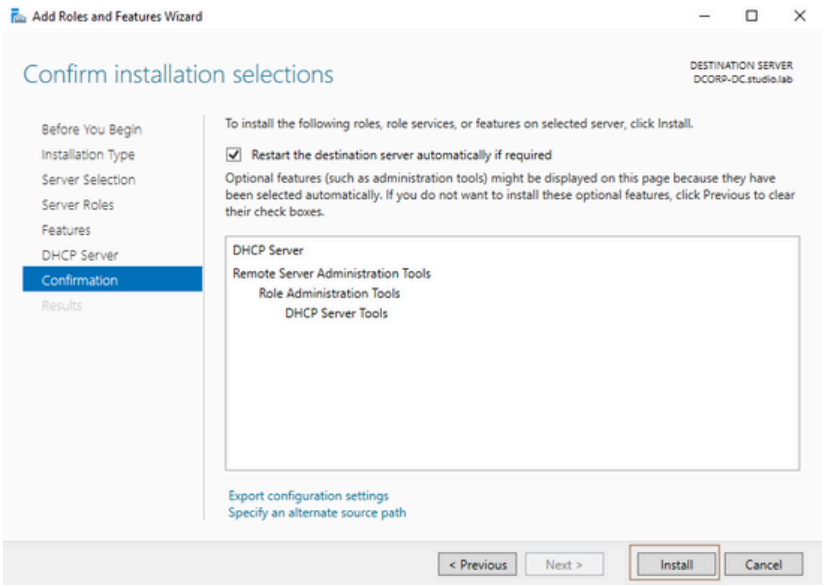
Well Done !!

6- DHCP configuration :

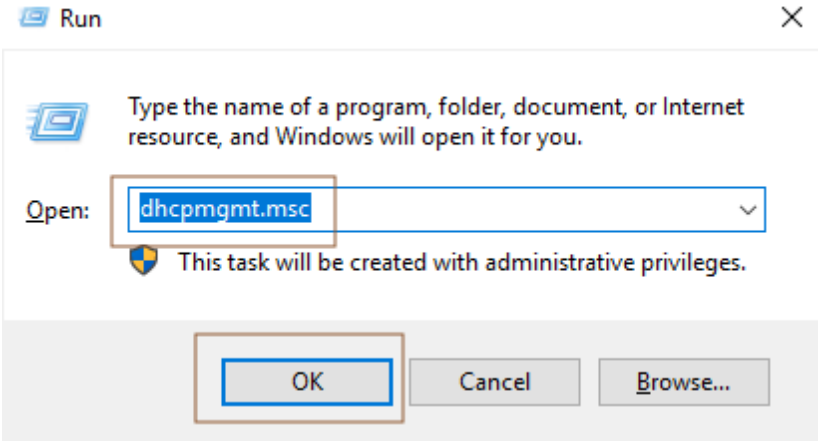
Go to : Server Manager → Manage → Add Roles and Features → Next → Check **"Rple-based or feature-based installation "** and then Next → Next



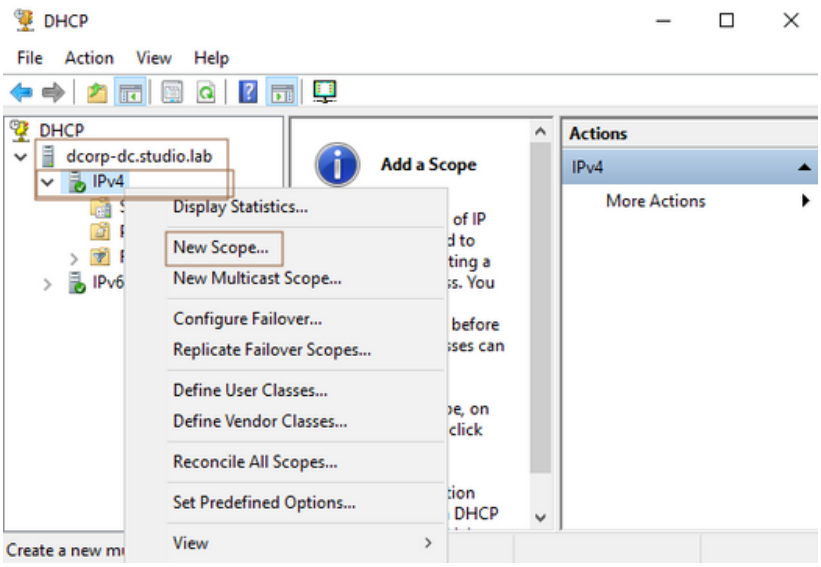
Check **"DHCP Server"** and then Next → Next → Next → Install



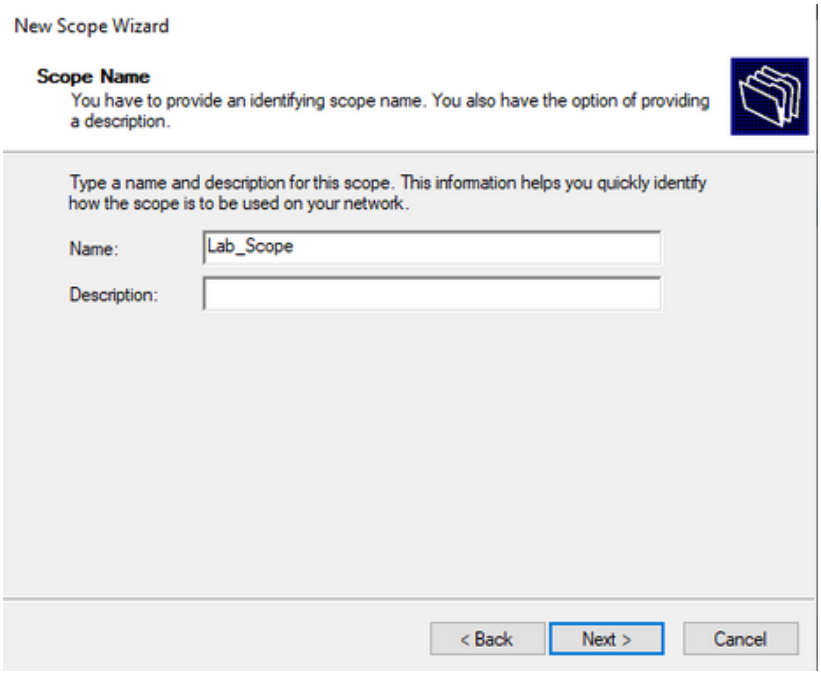
Open Run (WIN + R) → dhcpmgmt.msc → OK



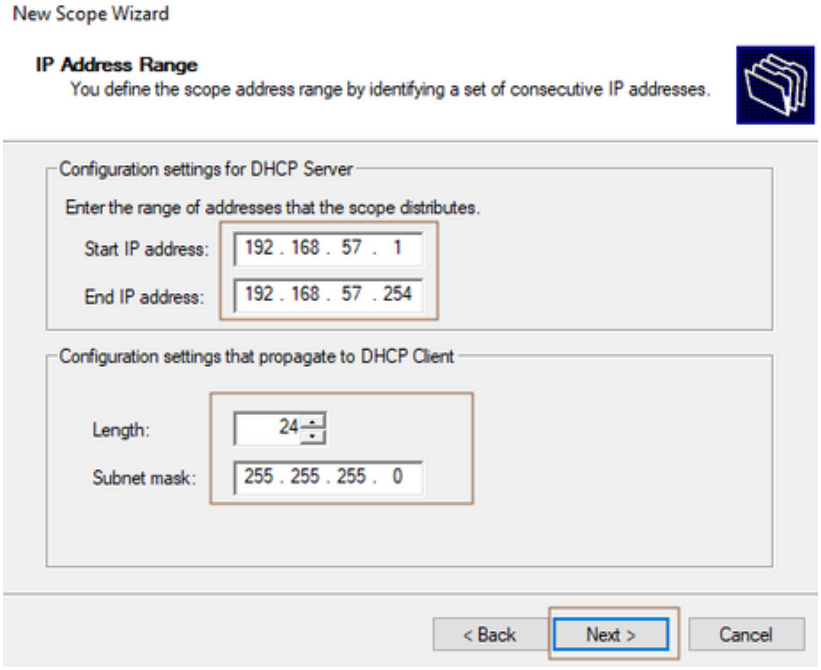
dcorp-dc.studio.lab → IPv4 → New SCope.. →



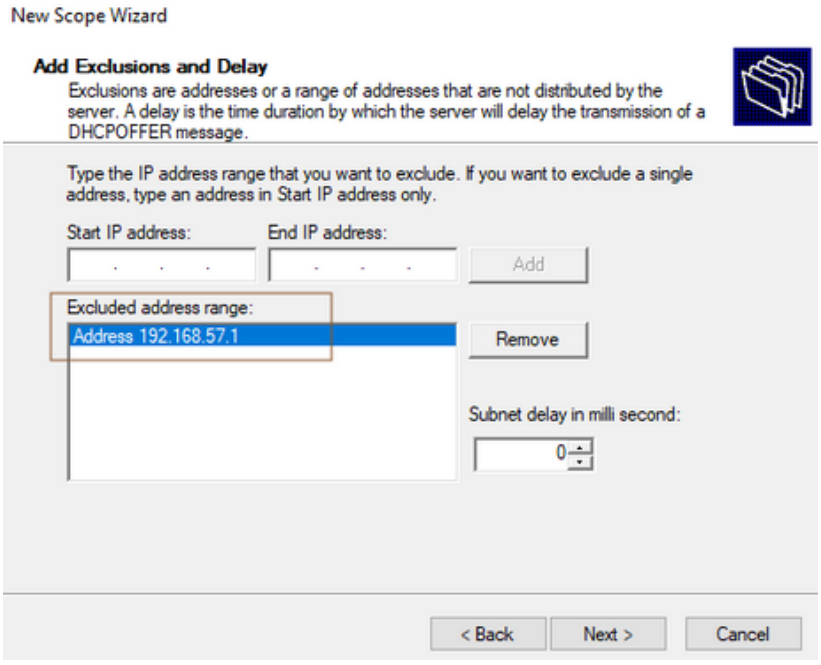
Next → set the **Name** field → Next



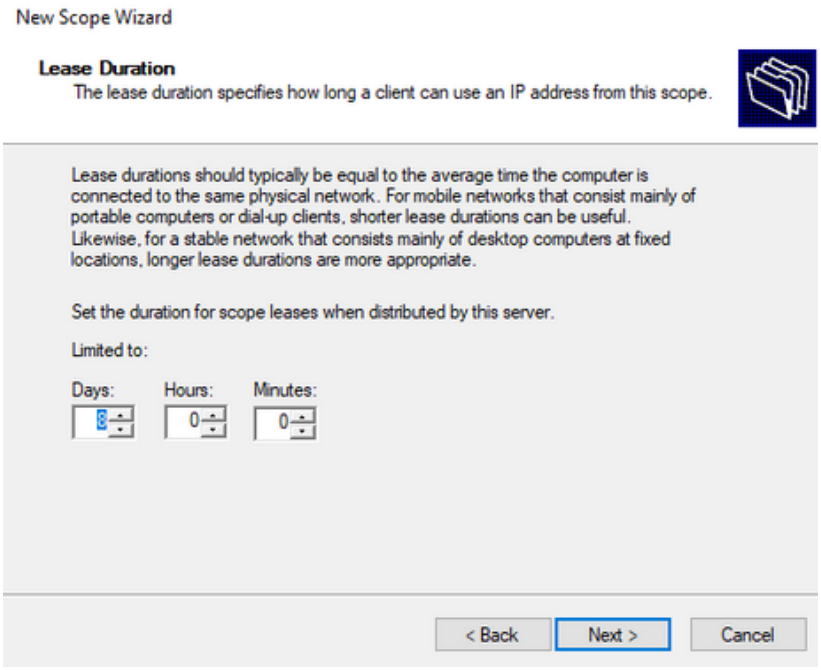
Set the **"Start IP address", "End IP adddress", "Length"** and **"Subnet mask"** → Next



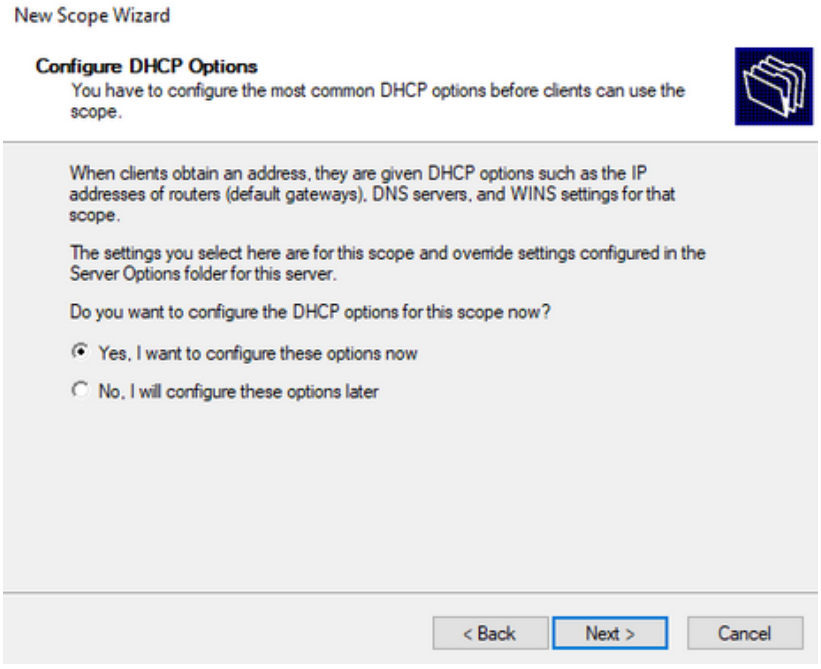
Add **Excluded IP addresses** → Next



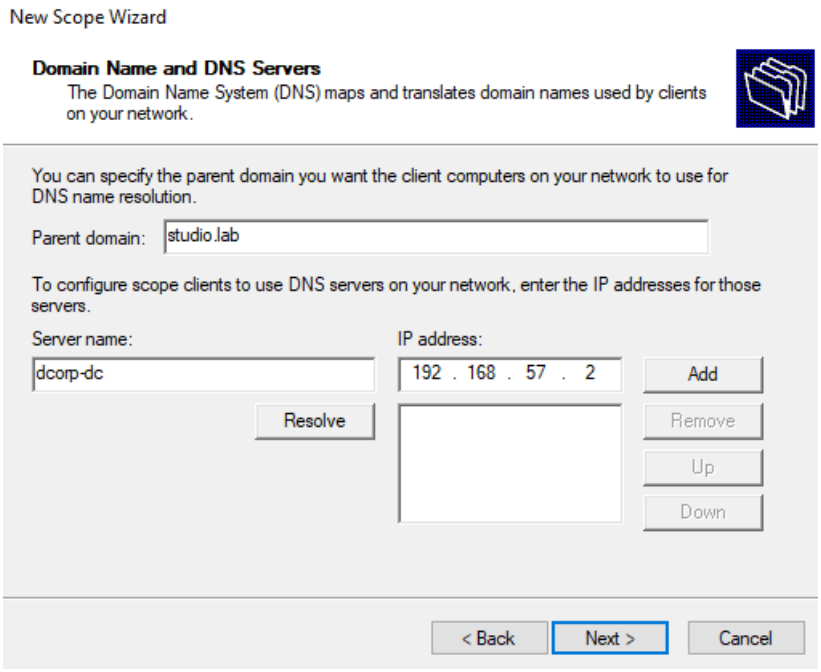
8 Days → Next



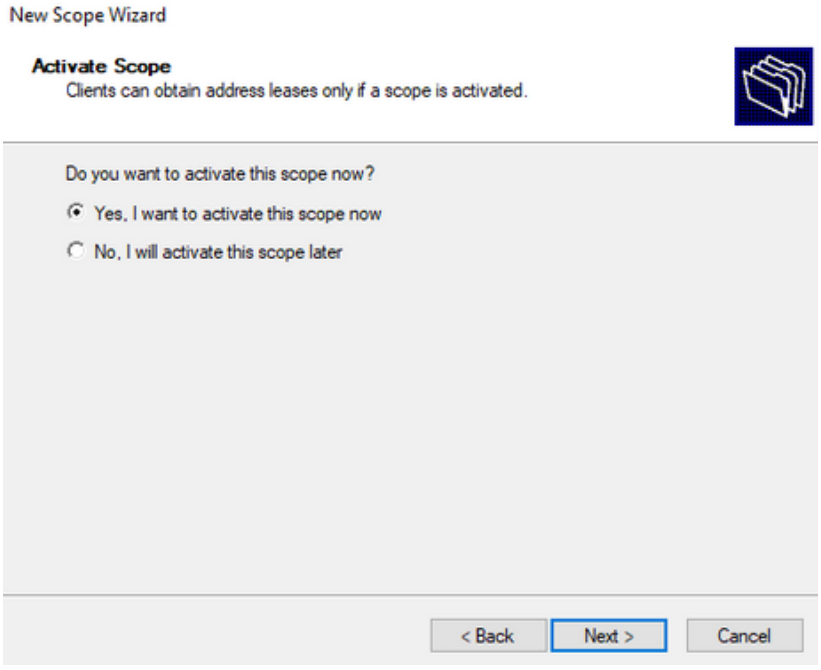
Check **"Yes, Iwant to configure these options now"** → Next



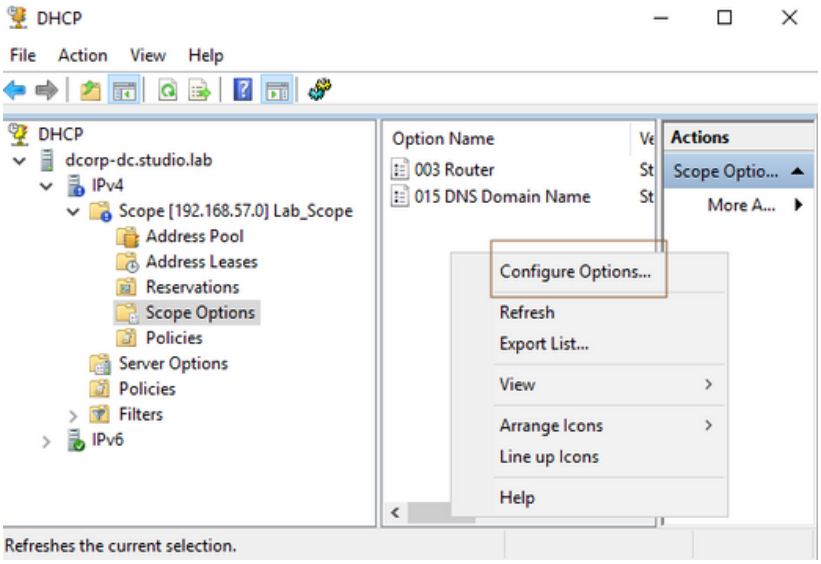
Next → set **"Parent domain", "Server name"** and **"IP address"** → Next



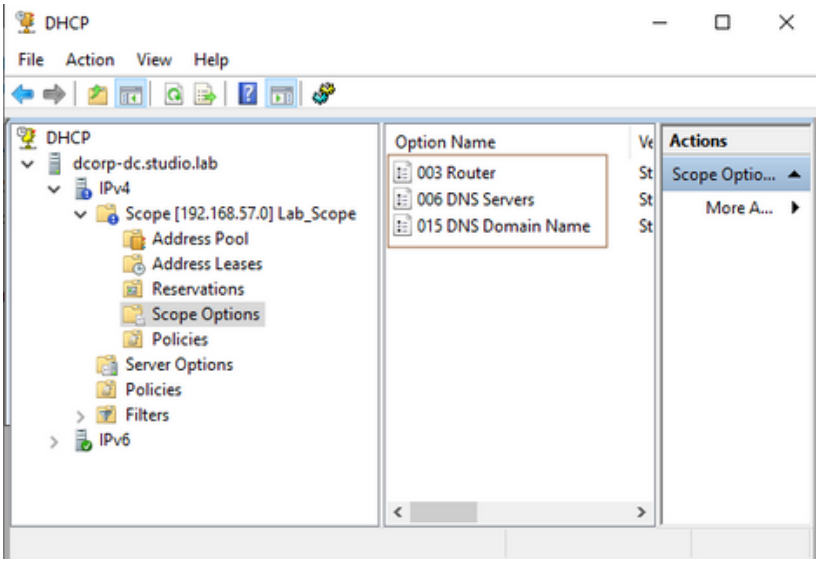
Check **"Yes, Iwant to activate this scopr now"** → Next



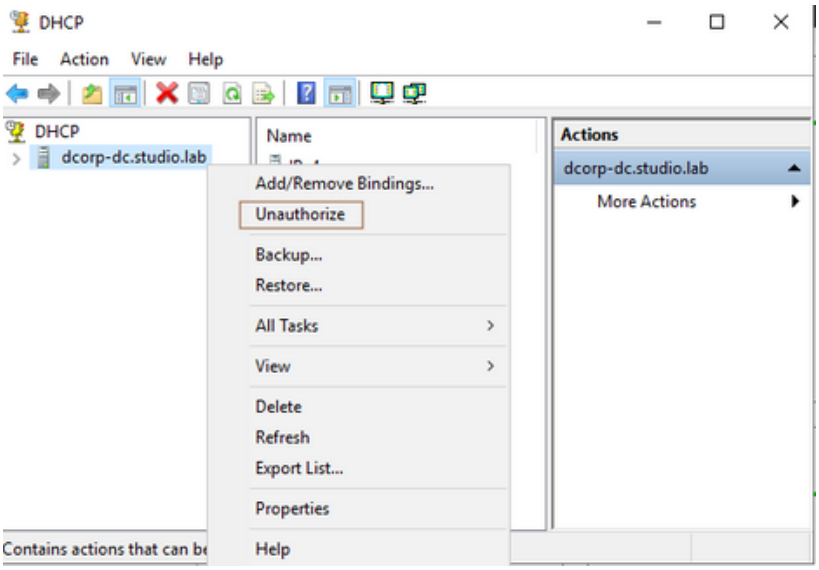
Select **"Scope Options"** → Right-Click and select **"Configure Options..."**



Add those ones :



Right-Click on dcorp-dc.studio.lab and you should see **"Unauthorize"**

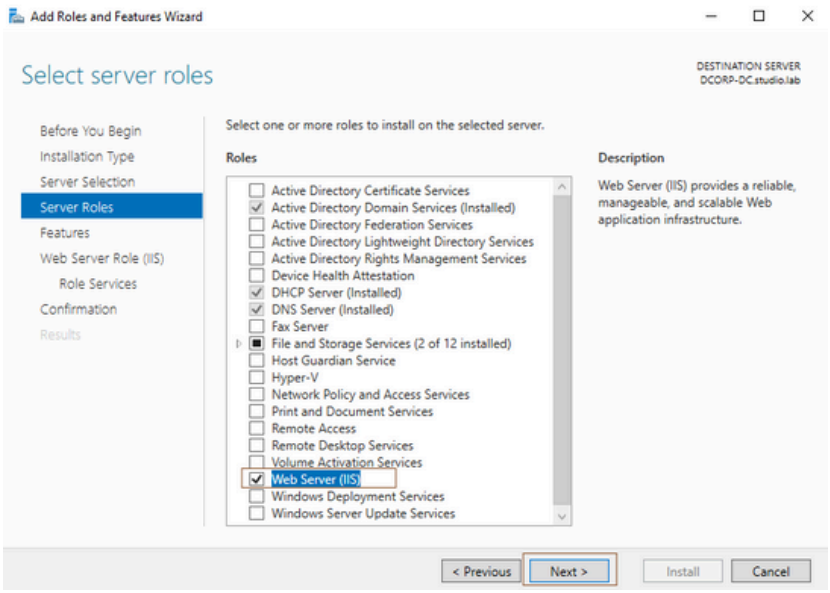


Verfy if the DCHP is enabled with : **ipconfig /all** (on Desk-01 or Desk-02)

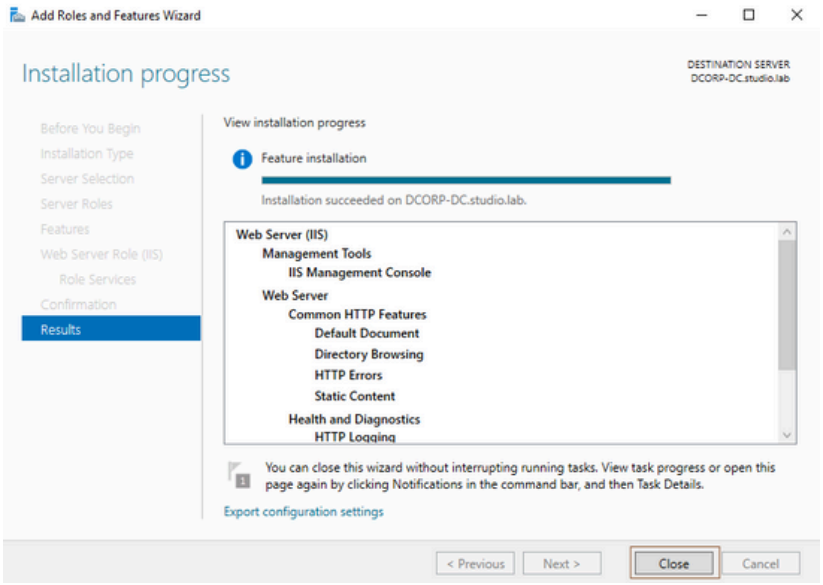
```
PS C:\Users\m.bekkali> ipconfig /all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DESK-01
   Primary Dns Suffix  . . . . . . . : studio.lab
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : studio.lab
                                       localdomain

Ethernet adapter Ethernet0:

   Connection-specific DNS Suffix  . : localdomain
   Description . . . . . . . . . . . : Intel(R) 82574L Gigabit Network Connection
   Physical Address. . . . . . . . . : 00-0C-29-A7-60-10
   DHCP Enabled. . . . . . . . . . . : Yes
```

7- IIS Server configuration :

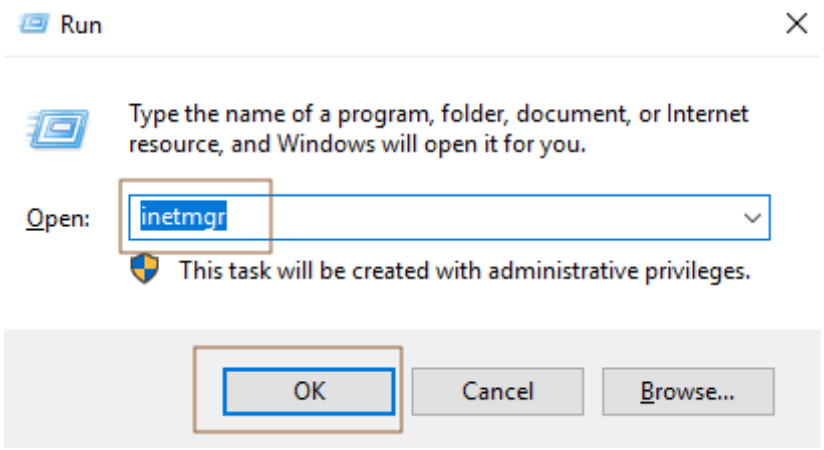
Go to : Server Manager → Manage → Add Roles and Features → Next → Check "Rple-based or feature-based installation " and then Next → Next



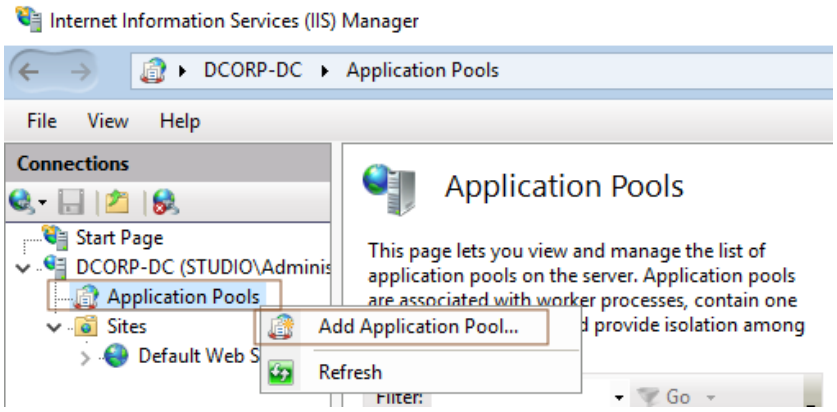
Check "DHCP Server" and then Next → Next → Next → Install → Close



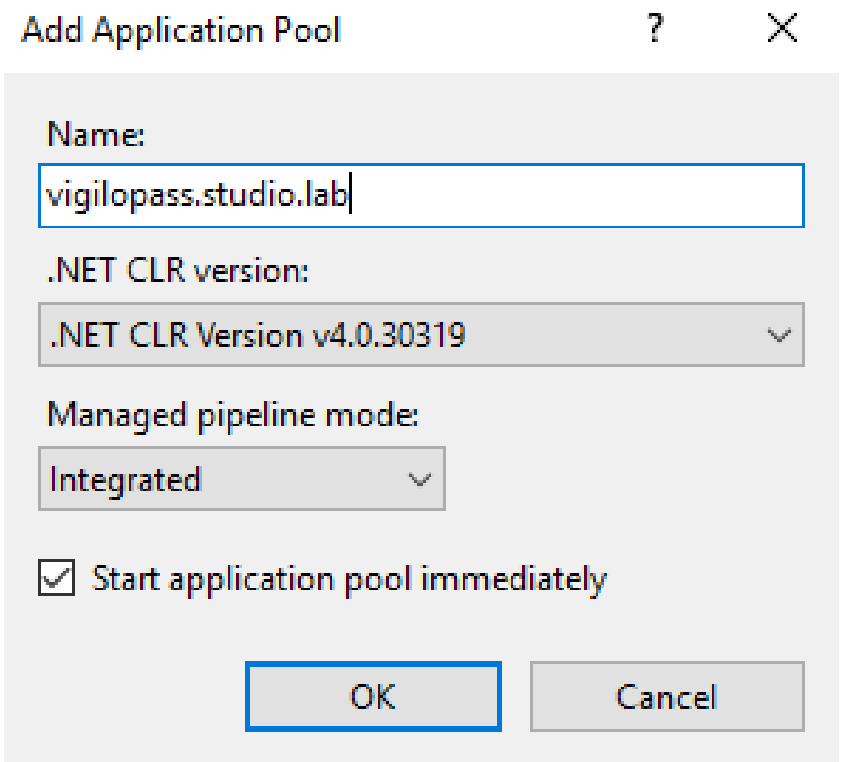
Open Run (WIN + R) → inetmgr → OK



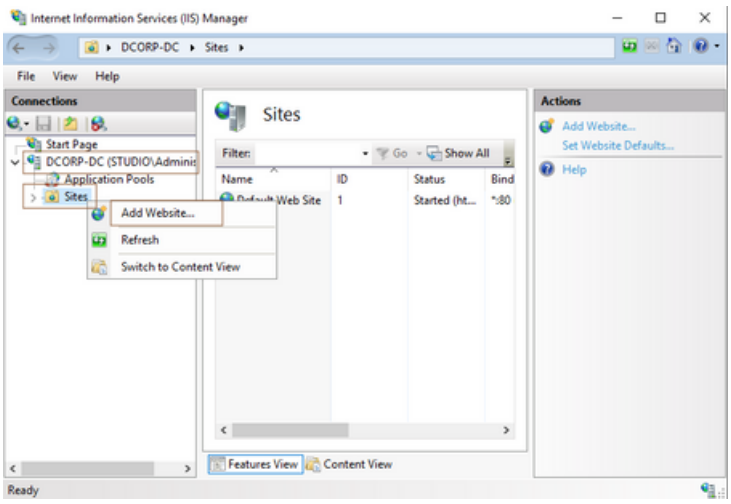
Right-Click on "**Application Pools**" → Add Application Pool...



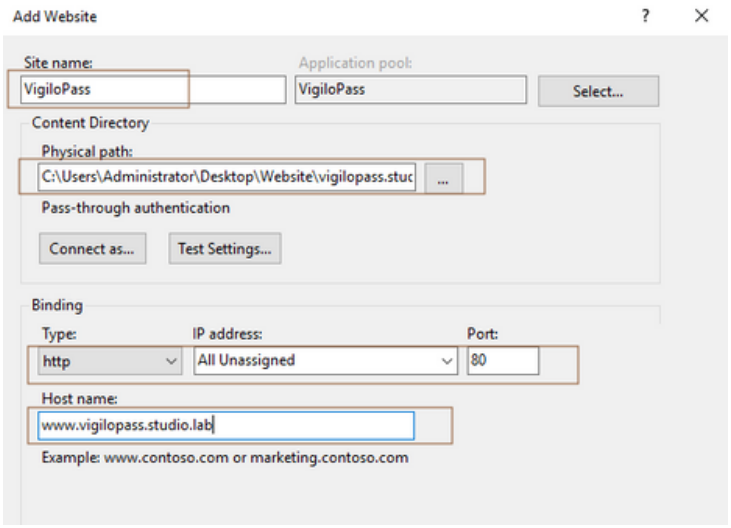
Set the name to "**vigilopass.studio.lab**" → OK



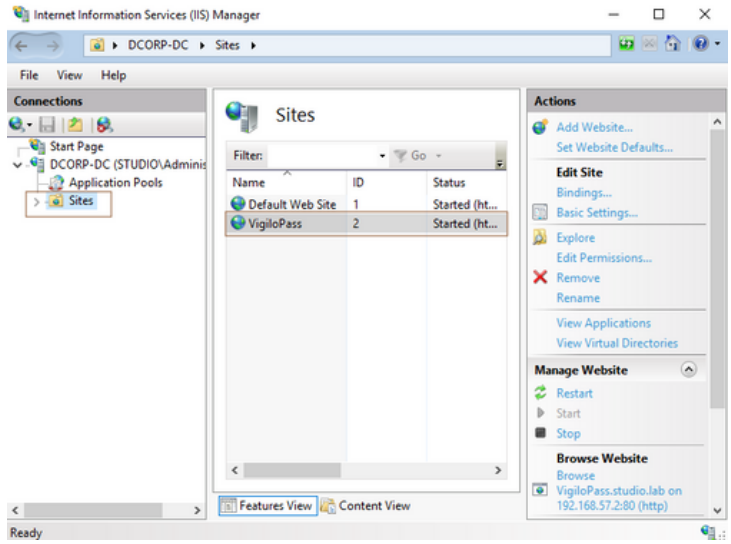
Right-Click on **"Sites"** → Add Website...



Set the Site name to "**vigilopass"** → Set the Physical path to **the path of index.html** → set Type to **http** → set IP address to **All Unassigned** → set Port to **80** → set Host name to **www.vigilopass.studio.lab**

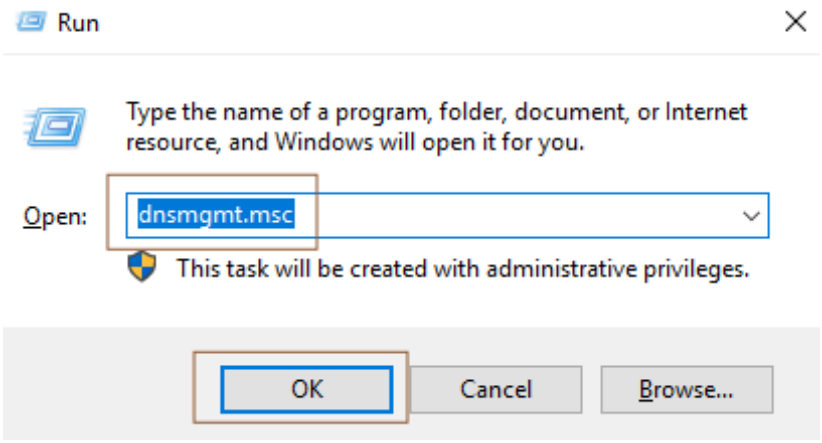


Look that the website was created

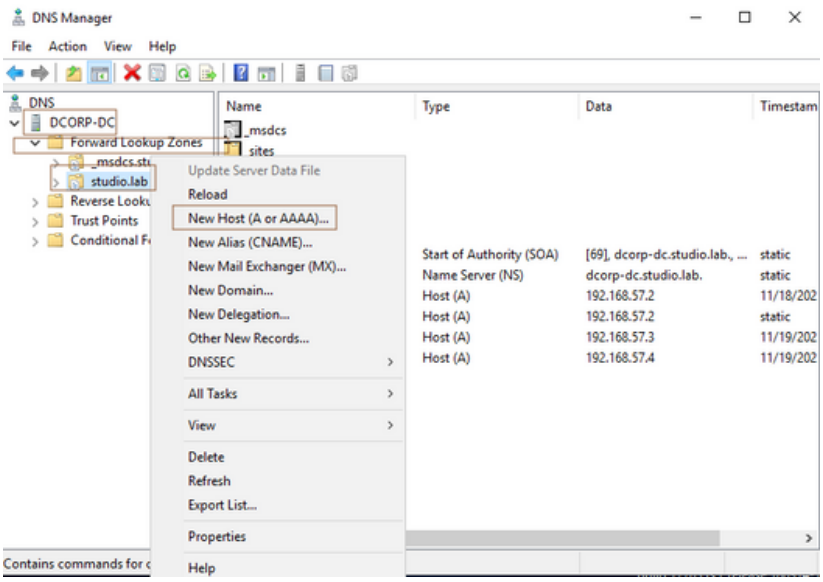


Lets do the DNS resolution for the website hostname

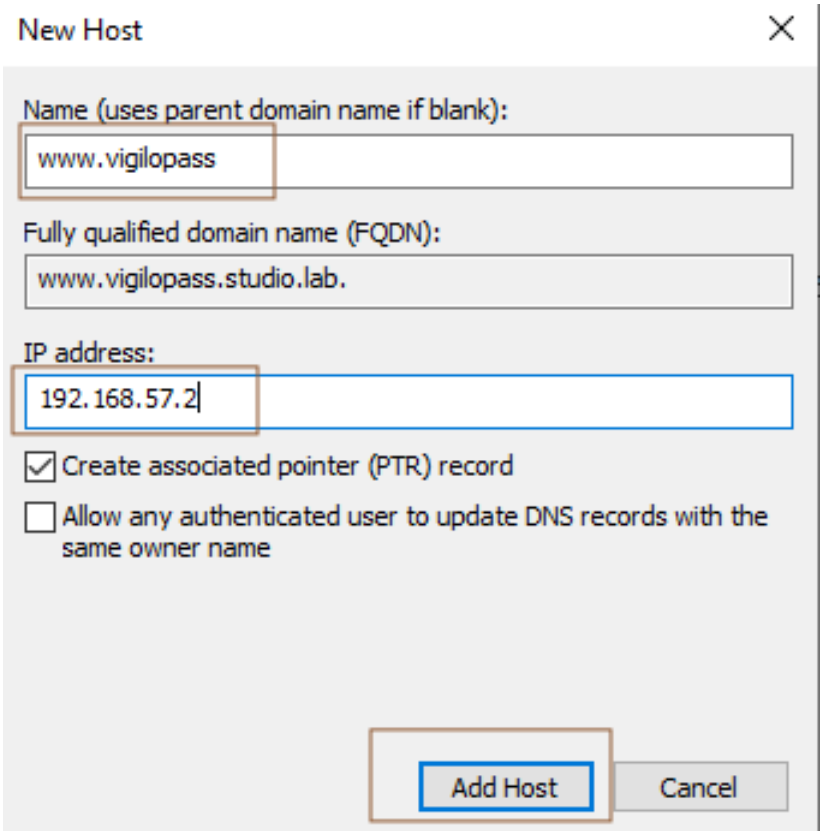
Open Run (WIN + R) → dnsmgmt.msc → OK



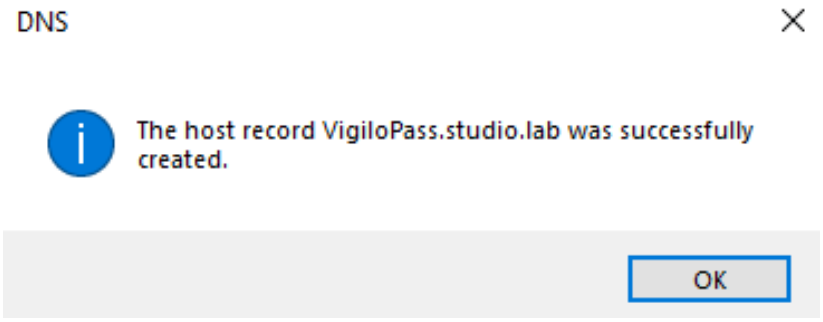
DCORP-DC → Forward Lookup Zones → Right-Click on studio.lab → New Host (A oe AAAA)....



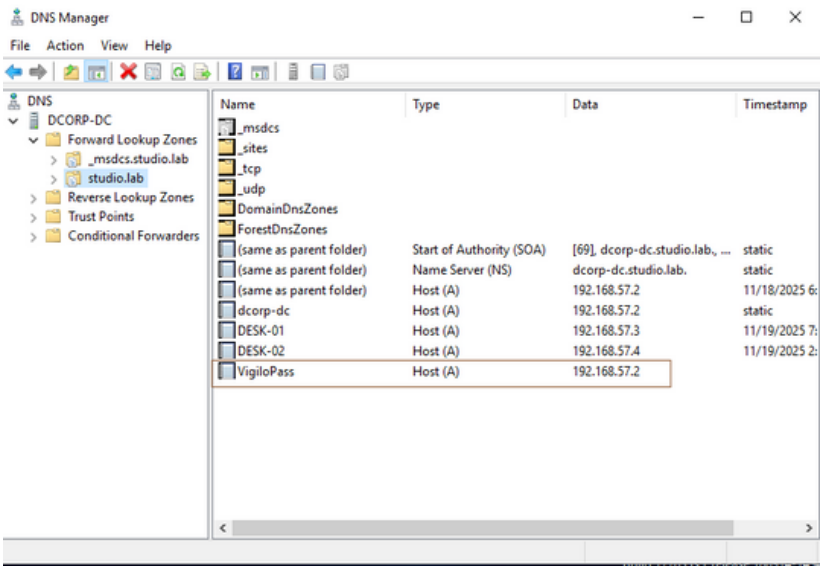
Set **Name** to **www.vigilopass** and set **IP adress** to **192.168.57.2** → Add Host



The host record was ceated. Click OK



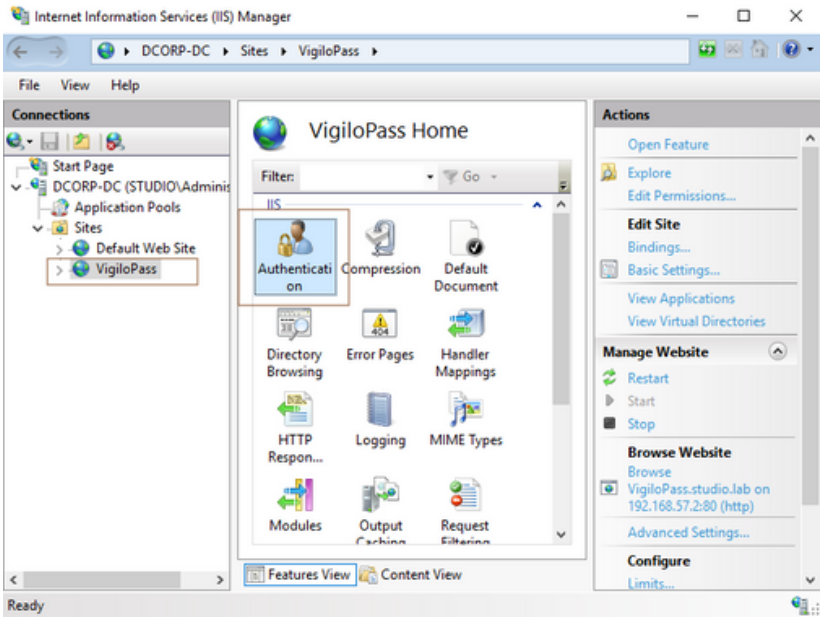
You can see the record



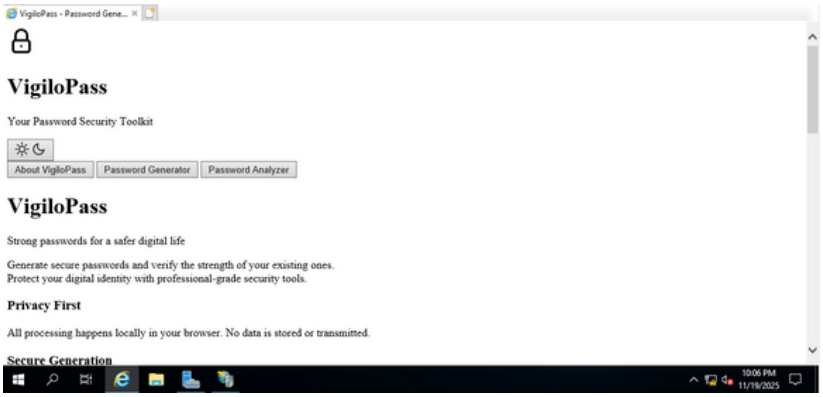
Verify that the dns record works successfully

```
PS C:\Users\a.tibtani> hostname
DESK-02
PS C:\Users\a.tibtani> nslookup vigilopass.studio.lab
Server:  VigiloPass.studio.lab
Address:  192.168.57.2

Name:    vigilopass.studio.lab
Address:  192.168.57.2
```

You can modify the authentication settings from **Authentication**



Open the web brower and type : **http://www.vigilopass.studio.lab**



Attack Demo from the attacker machine (Kali) :

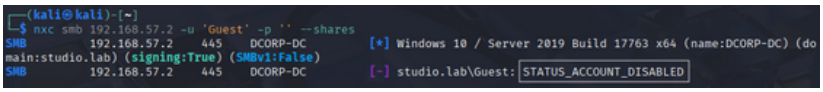
Get the IP address of the nvirtual network using **ifconfig**

```
┌──(kali㉿kali)-[~]
└─$ ifconfig
docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:6f:8c:4a:71  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 6 overruns 0  carrier 0  collisions 0

eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.57.5  netmask 255.255.255.0  broadcast 192.168.57.255
        inet6 fe80::3202:91af:8e85:3319  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:6c:e0:d7  txqueuelen 1000  (Ethernet)
        RX packets 97  bytes 6668 (6.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 53  bytes 6088 (5.9 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 8  bytes 480 (480.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8  bytes 480 (480.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Scanning the nvirtual network using **nmap**

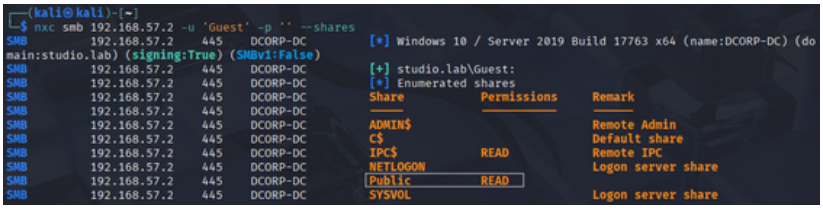
```
┌──(kali㉿kali)-[~]
└─$ nmap 192.168.57.0/24
Starting Nmap 7.95 ( https://nmap.org ) at 2025-11-29 20:46 EST
Nmap scan report for 192.168.57.1
Host is up (0.00071s latency).
All 1000 scanned ports on 192.168.57.1 are in ignored states.
Not shown: 1000 filtered tcp ports (no-response)
MAC Address: 00:50:56:C0:00:02 (VMware)

Nmap scan report for 192.168.57.2
Host is up (0.00068s latency).
Not shown: 987 filtered tcp ports (no-response)
PORT     STATE SERVICE
53/tcp   open  domain
80/tcp   open  http
88/tcp   open  kerberos-sec
135/tcp  open  msrpc
139/tcp  open  netbios-ssn
389/tcp  open  ldap
445/tcp  open  microsoft-ds
464/tcp  open  kpasswd5
593/tcp  open  http-rpc-epmap
636/tcp  open  ldapssl
3268/tcp open  globalcatLDAP
3269/tcp open  globalcatLDAPssl
5985/tcp open  wsman
MAC Address: 00:0C:29:2B:85:4C (VMware)

Nmap scan report for 192.168.57.3
Host is up (0.00076s latency).
Not shown: 999 filtered tcp ports (no-response)
PORT    STATE SERVICE
135/tcp open  msrpc
MAC Address: 00:0C:29:A7:60:10 (VMware)

Nmap scan report for 192.168.57.254
Host is up (0.00027s latency).
All 1000 scanned ports on 192.168.57.254 are in ignored states.
Not shown: 1000 filtered tcp ports (no-response)
MAC Address: 00:50:56:F9:61:AB (VMware)

Nmap scan report for 192.168.57.5
Host is up (0.0000090s latency).
Not shown: 999 closed tcp ports (reset)
PORT    STATE SERVICE
389/tcp open  ldap

Nmap done: 256 IP addresses (5 hosts up) scanned in 38.78 seconds
```

Listing shares unsing **netexec "nxc"** tool



If the Guest account wasn't enable we will get **STATUS_ACCOUNT_DISABLED**

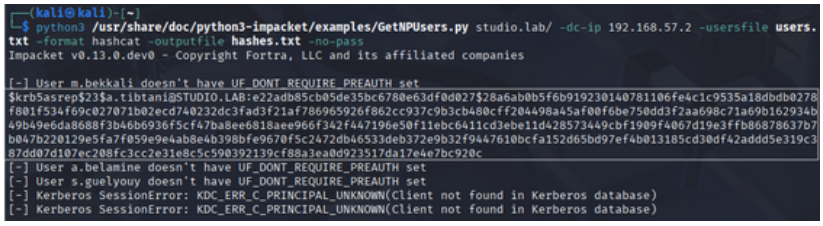
Look that we find an interesting share named **Public** with the **READ** permissions



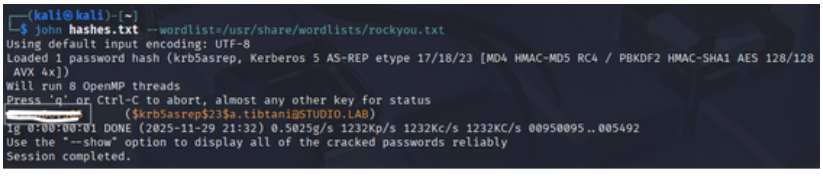
Accessing the share using **smbclient** tool, and download the file **users.txt**

The file contains a small list of users

Using the script **GetNPUsers.py** from **Impacket toolkit** to exploit the **AS-REP Roasting** accounts and save the output to **hashes.txt** file

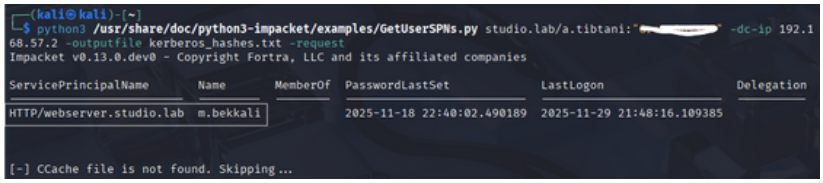


We get the hash of the user **a.tibtani,** let's crack it using **john the ripper** or **hachcat**

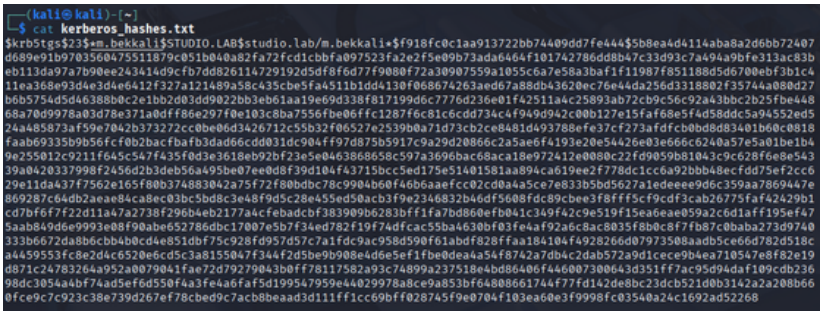


We get **a.tibtani password**, now we have the credentials of a **domain user**

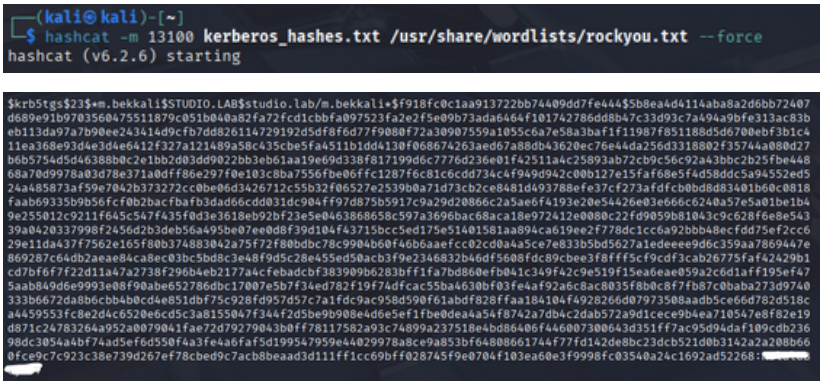
Let's use those credentials in the **kerberos attack** using **GetUserSPNs.py** script from **Impacket toolkit,** and save the output to **kerberos_hashes.txt** file



We get the hash of the user **m.bekkali**

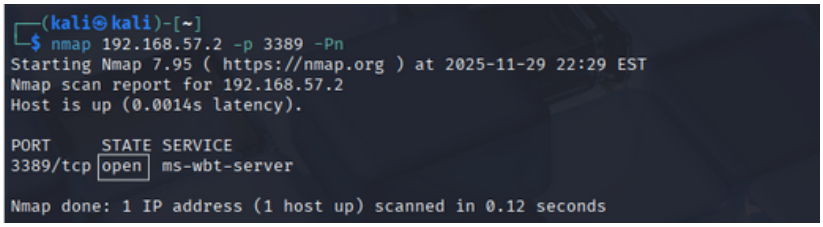


Let's crack it using **john the ripper** or **hachcat**

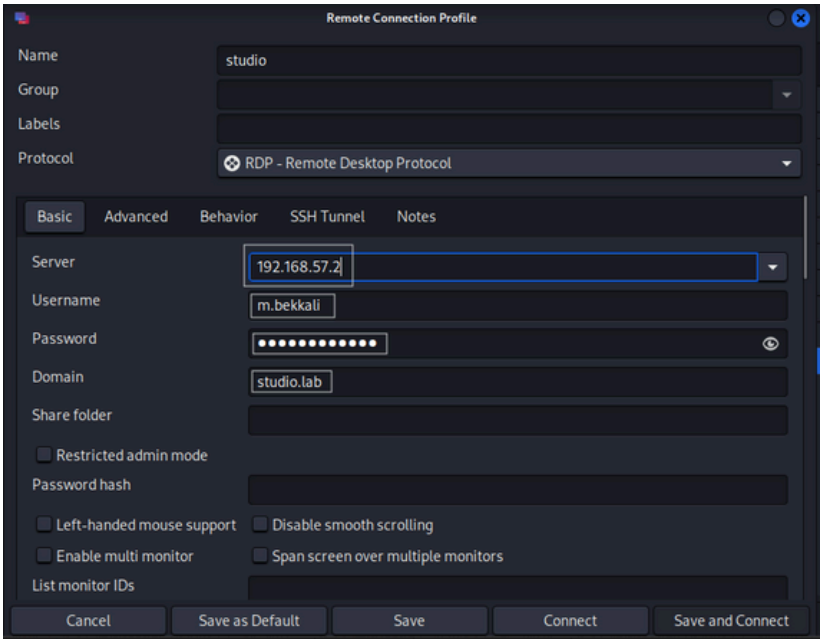


We get **m.bekkali password,** now we have the credentials of a **domain admin user**

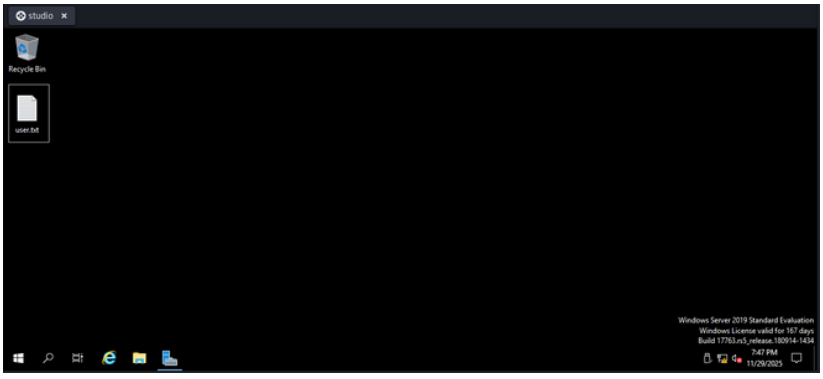
Scanning the **RDP port (3389)**, look that is opened

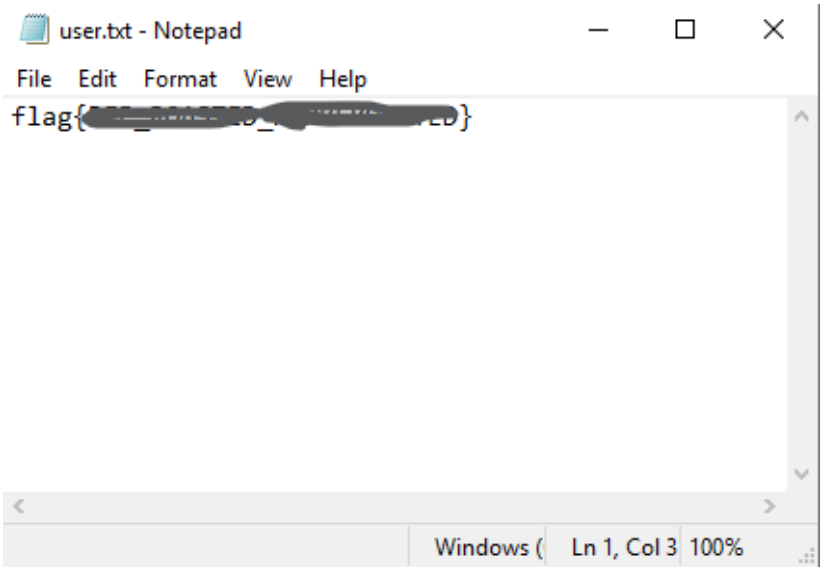


Using **remmina** and **the credentials of the domain admin user,** access the DC machine



Once the connection is established, retrieve the flag by opening the **user.txt** file.



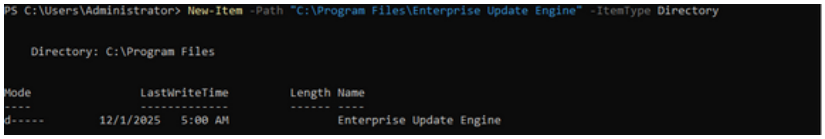


Well Done !!

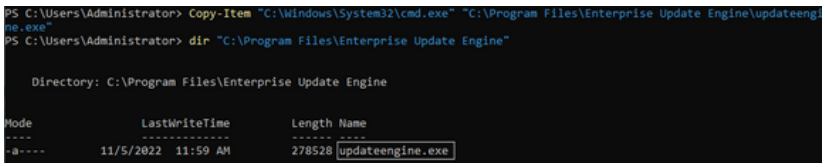
Additional Task : "Implementation of a Privilege Escalation Vulnerability"

The subsequent phase involves elevating privileges to gain administrative access, leveraging the unquoted service path vulnerability that was previously configured.

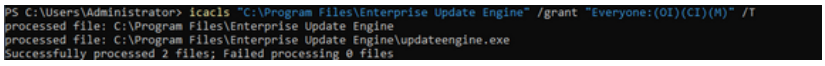
Create a folder with spaces using the **New-Item** cmdlet



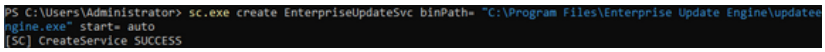
Create a fake executable



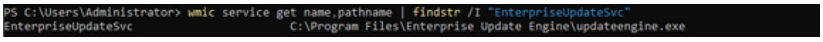
Set the folder permissions to "anyone can read, write, modify, and delete files/folders inside that directory and its subfolders" using **icalcs**



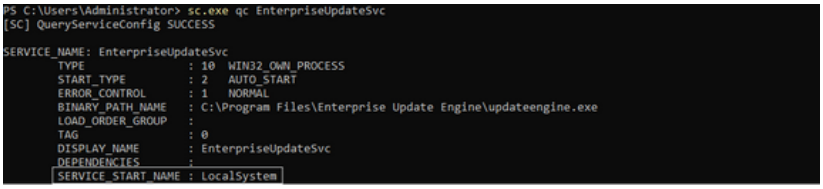
Create a service named **EnterpriseUpdateSvc** with an unquoted path, suing **sc.exe**



Verify That the Service is Vulnerable, using **wmic**



Ensure that the service runs with elevated privileges (**LocalSystem**) so that exploitation of the vulnerability results in **NT AUTHORITY\SYSTEM** access



- Leverage the identified vulnerability to **escalate privileges** and access the **root.txt** flag located in **C:\Users\Administrator\Desktop**

Conclusion :

This project allowed us to build and understand a complete AD environment from start to finish. We set up virtual machines, installed Windows Server, and configured essential services such as AD DS, DNS, DHCP, RDP and IIS to create the studio.lab domain. We then organized the directory by adding users, groups, and OUs, and applied GPOs to manage the environment centrally.

We also explored the security side of Active Directory by configuring a readable share and vulnerable accounts to performing AS-REP Roasting and Kerberoasting attacks. Using tools like NetExec and Impacket toolkit helped us understand how attackers exploit weak configurations and highlighted the importance of strong passwords and proper service account management.

Overall, this project provided us with valuable hands-on experience in system administration and cybersecurity. It strengthened our understanding of how an enterprise Windows environment works and how to protect it against common threats.


THE END