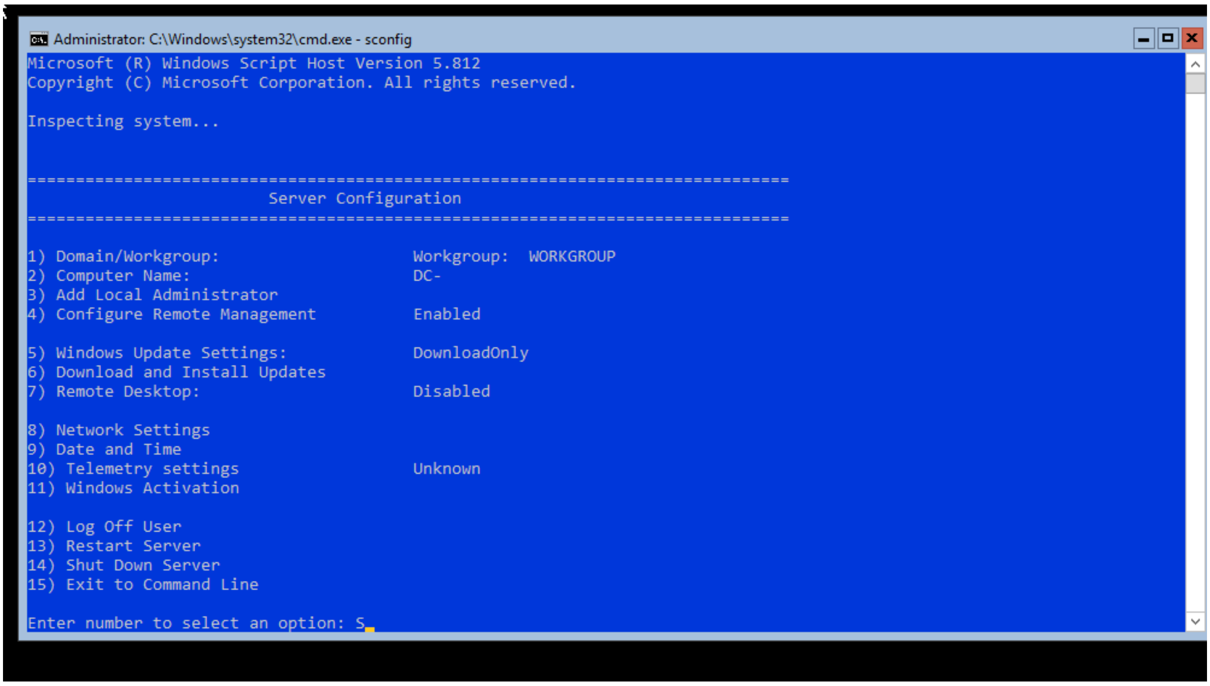
Windows Server From Nothing

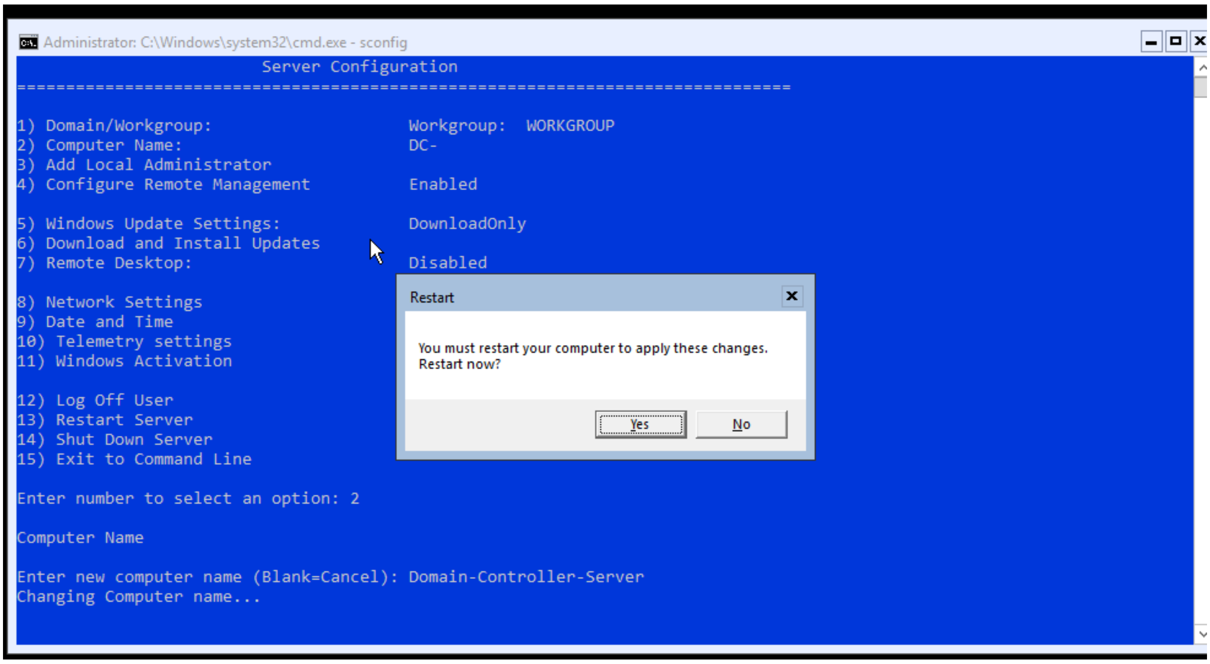
Edition 5

Upon installing the Windows Server 2019 ISO from Microsoft, I've used ***sconfig*** and opened the server configuration menu.



```
Microsoft (R) Windows Script Host Version 5.812
Copyright (C) Microsoft Corporation. All rights reserved.

Inspecting system...


===============================================================================
                         Server Configuration
===============================================================================

1) Domain/Workgroup:                    Workgroup:  WORKGROUP
2) Computer Name:                       DC-
3) Add Local Administrator
4) Configure Remote Management          Enabled

5) Windows Update Settings:             DownloadOnly
6) Download and Install Updates
7) Remote Desktop:                      Disabled

8) Network Settings
9) Date and Time
10) Telemetry settings                  Unknown
11) Windows Activation

12) Log Off User
13) Restart Server
14) Shut Down Server
15) Exit to Command Line

Enter number to select an option: S
```

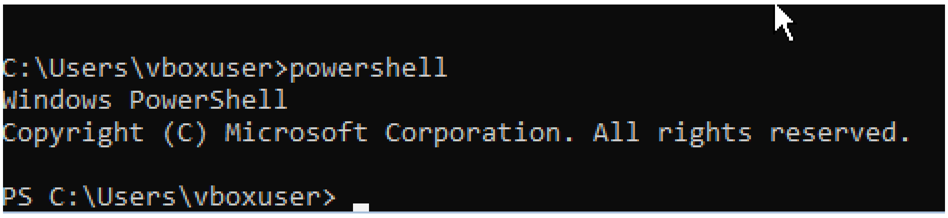
I have started tinkering with the settings and changed the computer name too.



```
                         Server Configuration
===============================================================================

1) Domain/Workgroup:                    Workgroup:  WORKGROUP
2) Computer Name:                       DC-
3) Add Local Administrator
4) Configure Remote Management          Enabled

5) Windows Update Settings:             DownloadOnly
6) Download and Install Updates
7) Remote Desktop:                      Disabled

8) Network Settings
9) Date and Time
10) Telemetry settings
11) Windows Activation

12) Log Off User
13) Restart Server
14) Shut Down Server
15) Exit to Command Line

Enter number to select an option: 2

Computer Name

Enter new computer name (Blank=Cancel): Domain-Controller-Server
Changing Computer name...
```

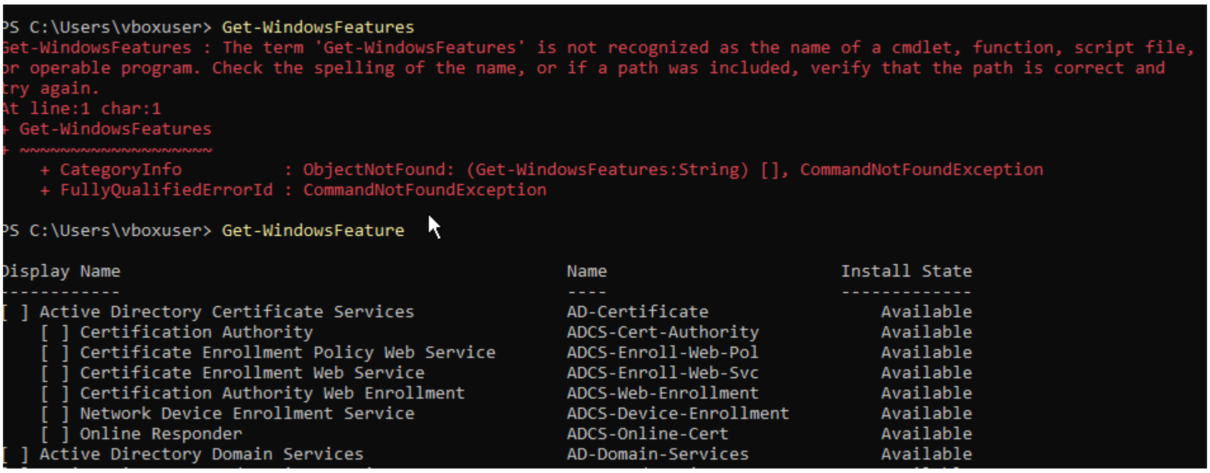
You must restart your computer to apply these changes.
Restart now?

I have gotten to the PowerShell interface by simply typing ***powershell*** into the command module, which makes it easy.



```
C:\Users\vboxuser>powershell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\vboxuser> _
```

AI suggests that I install Active Directory Domain Services now using some powershell command, but since I do not know how to use that command yet, I've used the ***Get*** command to understand what features I can actually add to the Windows Server. This'll make it handy since it is basically a catalogue of all windows features that I might ever need in administering or developing this Domain Controller.



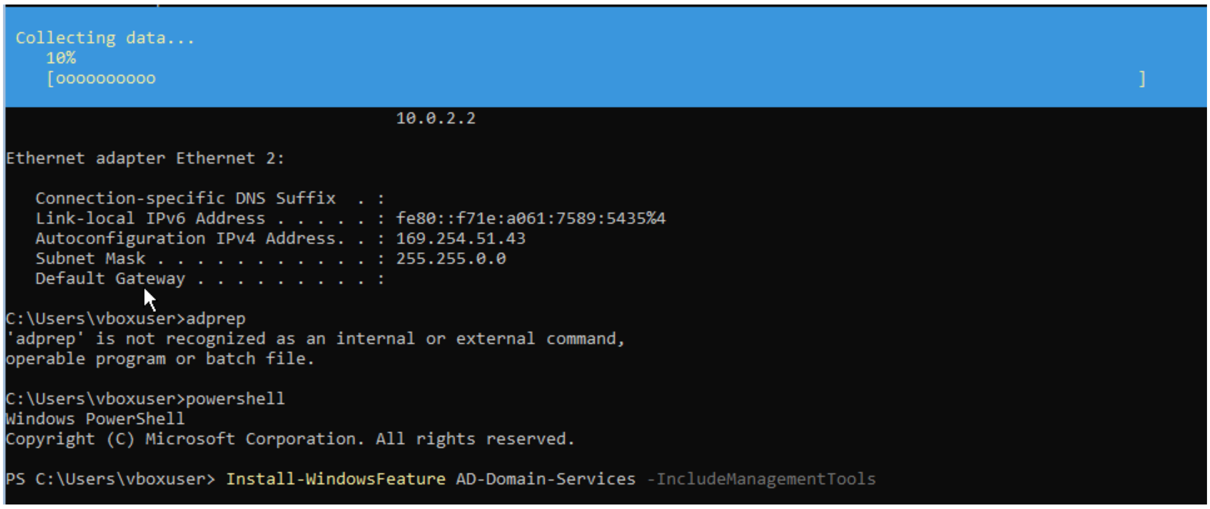
```
PS C:\Users\vboxuser> Get-WindowsFeatures
Get-WindowsFeatures : The term 'Get-WindowsFeatures' is not recognized as the name of a cmdlet, function, script file,
or operable program. Check the spelling of the name, or if a path was included, verify that the path is correct and
try again.
At line:1 char:1
+ Get-WindowsFeatures
+ ~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : ObjectNotFound: (Get-WindowsFeatures:String) [], CommandNotFoundException
    + FullyQualifiedErrorId : CommandNotFoundException

PS C:\Users\vboxuser> Get-WindowsFeature

Display Name                                            Name                       Install State
------------                                            ----                       -------------
[ ] Active Directory Certificate Services               AD-Certificate                 Available
    [ ] Certification Authority                         ADCS-Cert-Authority            Available
    [ ] Certificate Enrollment Policy Web Service       ADCS-Enroll-Web-Pol            Available
    [ ] Certificate Enrollment Web Service              ADCS-Enroll-Web-Svc            Available
    [ ] Certification Authority Web Enrollment          ADCS-Web-Enrollment            Available
    [ ] Network Device Enrollment Service               ADCS-Device-Enrollment         Available
    [ ] Online Responder                                ADCS-Online-Cert               Available
[ ] Active Directory Domain Services                    AD-Domain-Services             Available
```

By the way, what is a domain controller anyway? Here's a nice online source that talks about it: "*A domain controller is the server responsible for managing network and identity security requests. It acts as a gatekeeper and authenticates whether the user is authorized to access the IT resources in the domain*".

Now, I need to install active directory domain services on my Windows Server Core, Microsoft provides some documentation on how to do this, as well as the powershell lines themselves, which is handy.

https://learn.microsoft.com/en-us/windows-server/identity/ad-ds/deploy/install-active-directory-domain-services--level-100

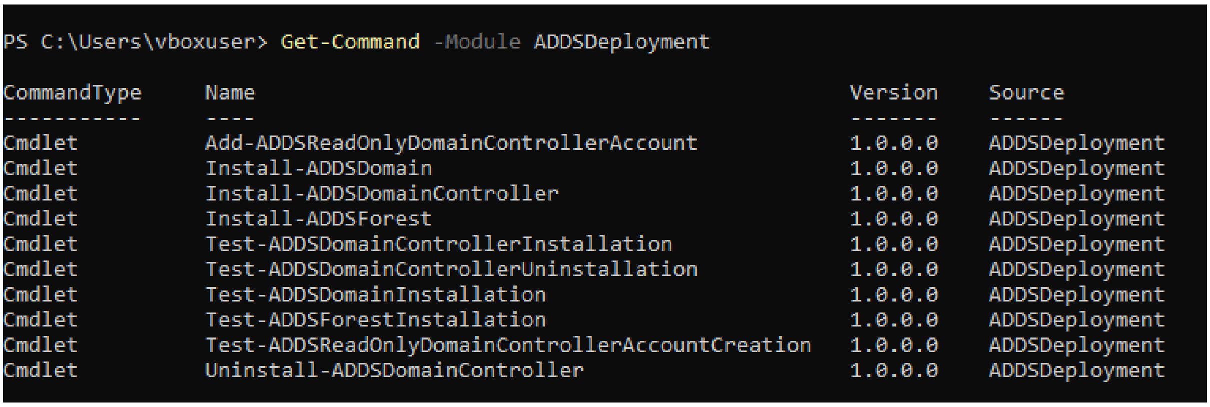
It’s amusing how easy that was, especially considering I didn’t have to craft the command myself. Microsoft describes this as “AD DS server role and installs the AD DS and Active Directory Lightweight Directory Services (AD LDS) server administration tools, including GUI-based tools such as Active Directory Users and Computers and command-line tools such as dcdia.exe”. They note how server administration tools are not installed by default, but I don’t understand the use case of installing ADDS, but not server admin tools.



```
 Collecting data...
    10%
    [oooooooooo                                                                              ]
                                       10.0.2.2

Ethernet adapter Ethernet 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::f71e:a061:7589:5435%4
   Autoconfiguration IPv4 Address. . : 169.254.51.43
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . :

C:\Users\vboxuser>adprep
'adprep' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\vboxuser>powershell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\vboxuser> Install-WindowsFeature AD-Domain-Services -IncludeManagementTools
```

The command used above was:

Install-WindowsFeature -name AD-Domain-Services -IncludeManagementTools

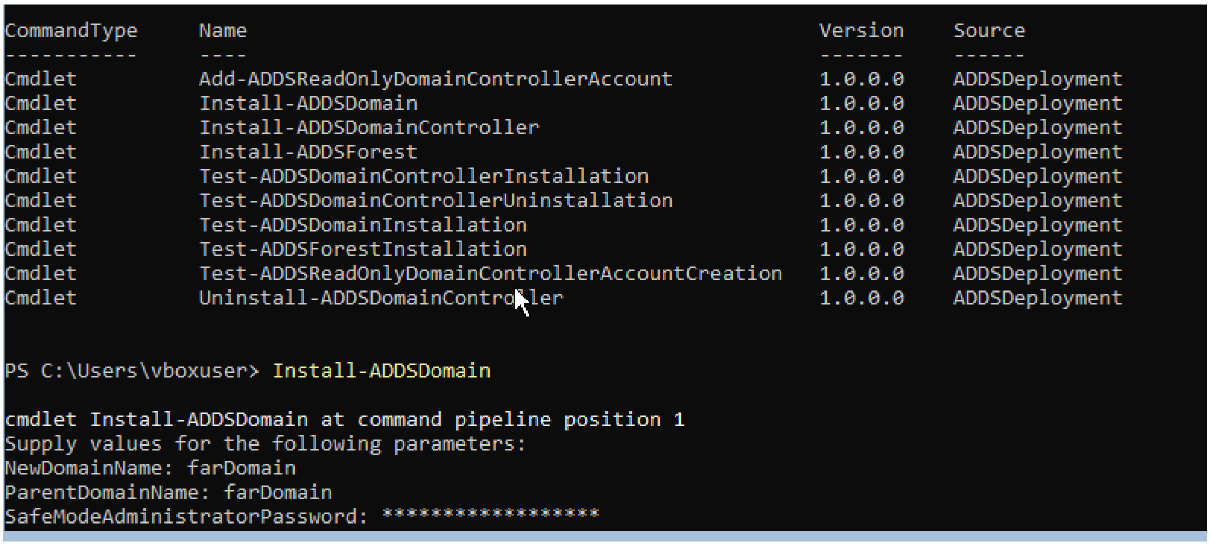


```
PS C:\Users\vboxuser> Get-Command -Module ADDSDeployment

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Cmdlet          Add-ADDSReadOnlyDomainControllerAccount            1.0.0.0    ADDSDeployment
Cmdlet          Install-ADDSDomain                                 1.0.0.0    ADDSDeployment
Cmdlet          Install-ADDSDomainController                       1.0.0.0    ADDSDeployment
Cmdlet          Install-ADDSForest                                 1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSDomainControllerInstallation              1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSDomainControllerUninstallation            1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSDomainInstallation                        1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSForestInstallation                        1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSReadOnlyDomainControllerAccountCreation   1.0.0.0    ADDSDeployment
Cmdlet          Uninstall-ADDSDomainController                     1.0.0.0    ADDSDeployment
```

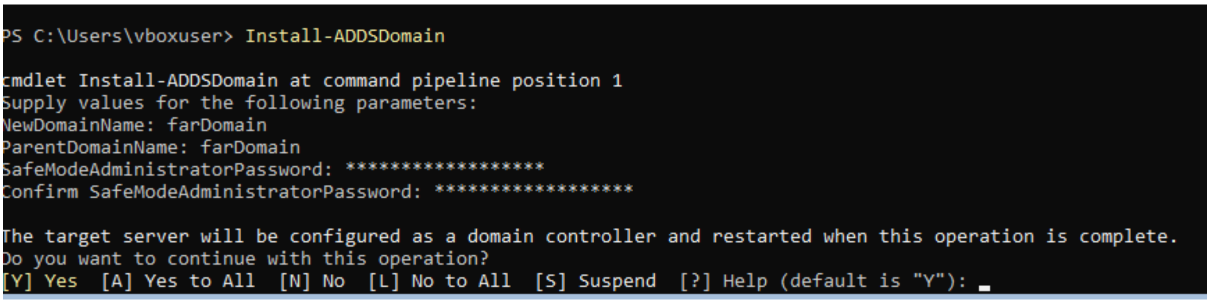
This command:

Get-Command -Module ADDSDeployment

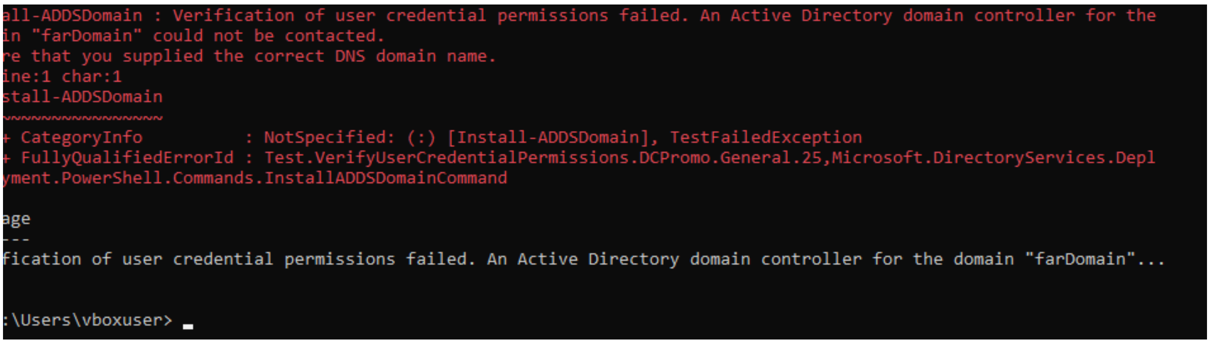
Which is listed by Microsoft, gets the available cmdlets in the ADDSDeployment module, which will be handy if I need them. Which they are, now that I need to setup a domain.



```
CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Cmdlet          Add-ADDSReadOnlyDomainControllerAccount            1.0.0.0    ADDSDeployment
Cmdlet          Install-ADDSDomain                                 1.0.0.0    ADDSDeployment
Cmdlet          Install-ADDSDomainController                       1.0.0.0    ADDSDeployment
Cmdlet          Install-ADDSForest                                 1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSDomainControllerInstallation              1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSDomainControllerUninstallation            1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSDomainInstallation                        1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSForestInstallation                        1.0.0.0    ADDSDeployment
Cmdlet          Test-ADDSReadOnlyDomainControllerAccountCreation   1.0.0.0    ADDSDeployment
Cmdlet          Uninstall-ADDSDomainController                     1.0.0.0    ADDSDeployment


PS C:\Users\vboxuser> Install-ADDSDomain

cmdlet Install-ADDSDomain at command pipeline position 1
Supply values for the following parameters:
NewDomainName: farDomain
ParentDomainName: farDomain
SafeModeAdministratorPassword: ******************
```



```
PS C:\Users\vboxuser> Install-ADDSDomain

cmdlet Install-ADDSDomain at command pipeline position 1
Supply values for the following parameters:
NewDomainName: farDomain
ParentDomainName: farDomain
SafeModeAdministratorPassword: ******************
Confirm SafeModeAdministratorPassword: ******************

The target server will be configured as a domain controller and restarted when this operation is complete.
Do you want to continue with this operation?
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): _
```

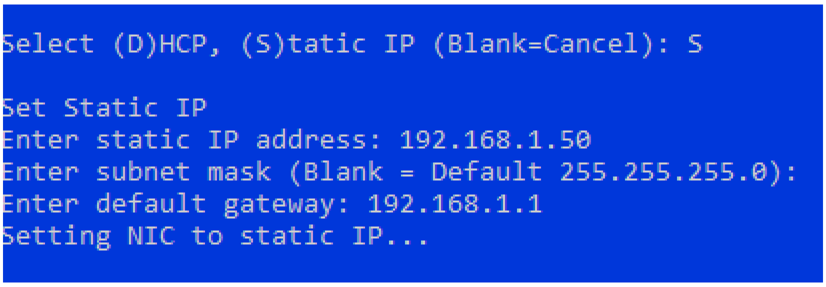


```
all-ADDSDomain : Verification of user credential permissions failed. An Active Directory domain controller for the
in "farDomain" could not be contacted.
re that you supplied the correct DNS domain name.
ine:1 char:1
stall-ADDSDomain
~~~~~~~~~~~~~~~~
+ CategoryInfo          : NotSpecified: (:) [Install-ADDSDomain], TestFailedException
+ FullyQualifiedErrorId : Test.VerifyUserCredentialPermissions.DCPromo.General.25,Microsoft.DirectoryServices.Depl
yment.PowerShell.Commands.InstallADDSDomainCommand

age
---
fication of user credential permissions failed. An Active Directory domain controller for the domain "farDomain"...


:\Users\vboxuser> _
```

Ah yes, big old red text. I really enjoy seeing this whenever I'm learning something, because it means I've hit my first roadblock. Clearly, whatever I did was wrong, or did not make sense, but in this case maybe I didn't do things in the right order. The error message describes that a domain controller for the domain 'farDomain' (which is what I wanted to name my domain), could not be contacted.

ChatGPT asks that I set my IP address on the machine to static first, and describes its reasoning as ADDS needing to rely on DNS to locate domain controllers and other services. Basically, if the IP of the DC changes, other machines and the DC itself wouldn't be able to resolve domain names in the domain, you'd think the DC could at least find itself, but I guess not.

But it makes sense for other services, DCs are the cornerstone of ADDS from what I've seen, they're needed for every directory-wide policy or anything such, and to authenticate users. It's clearly important, so it makes sense it should be easily found.



```
Select (D)HCP, (S)tatic IP (Blank=Cancel): S

Set Static IP
Enter static IP address: 192.168.1.50
Enter subnet mask (Blank = Default 255.255.255.0):
Enter default gateway: 192.168.1.1
Setting NIC to static IP...
```

Guess this means I've set it up correctly, at least I've done everything it's asked of me. I understand the need for a static IP address, and I understand the subnet too. The AI describes the use of the default gateway, which is used for handling traffic outside the local network. It needs it for things like software updates, time sync, and external DNS lookups (which I don't plan to make my server do much of). This is a pretty cool summary of those things:

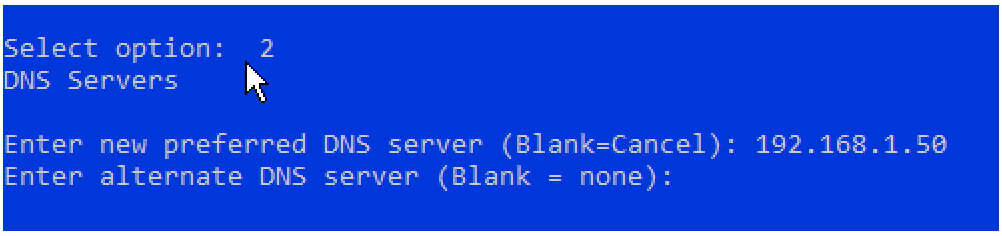
IP Address: "Where am I?"

Subnet Mask: "Who is local?"

Gateway: "Where do I send traffic outside?"

DNS: "Who answers name lookups for the domain?"

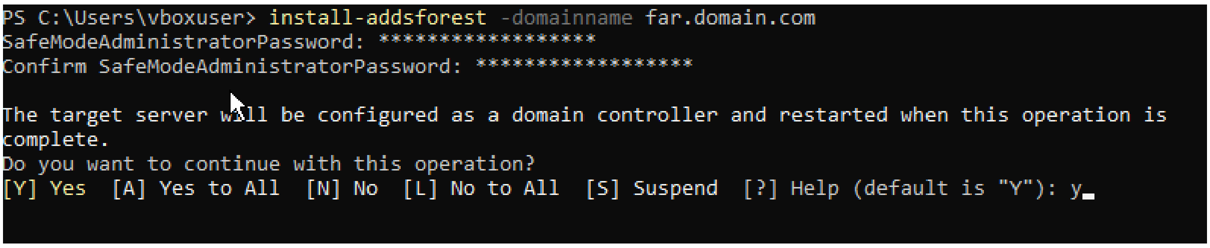
Also, since it needs to be able to find itself, I've set the DNS to itself.



```
Select option:  2
DNS Servers

Enter new preferred DNS server (Blank=Cancel): 192.168.1.50
Enter alternate DNS server (Blank = none):
```

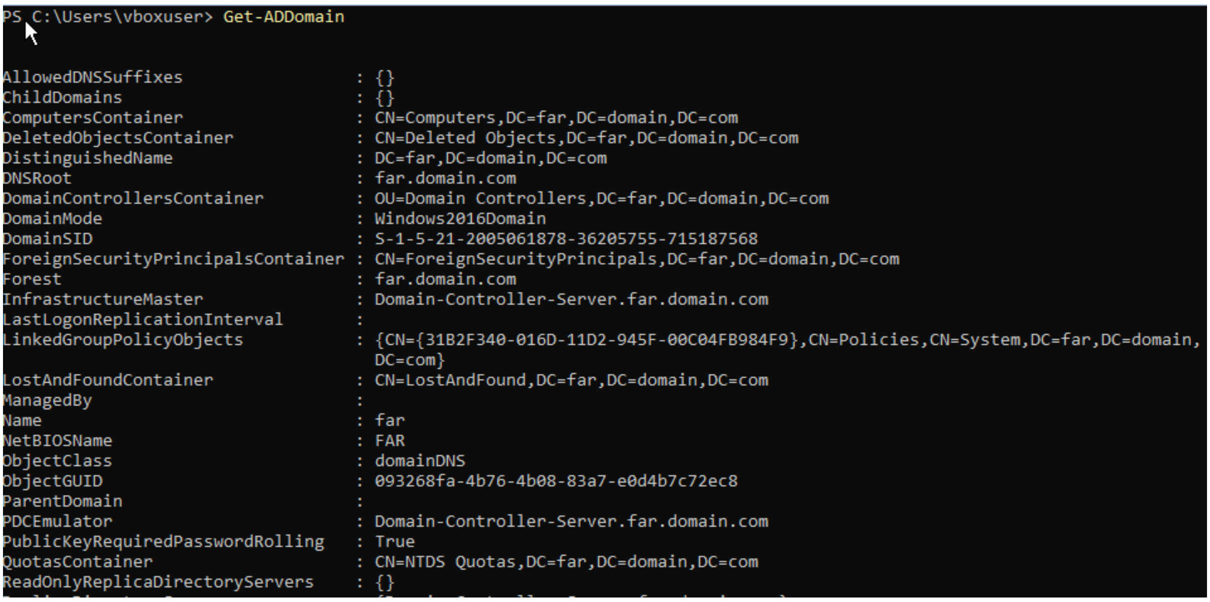
Sconfig is proving invaluable honestly, it's not really a wizard, but it is quite magical indeed.

Hopefully it works this time.

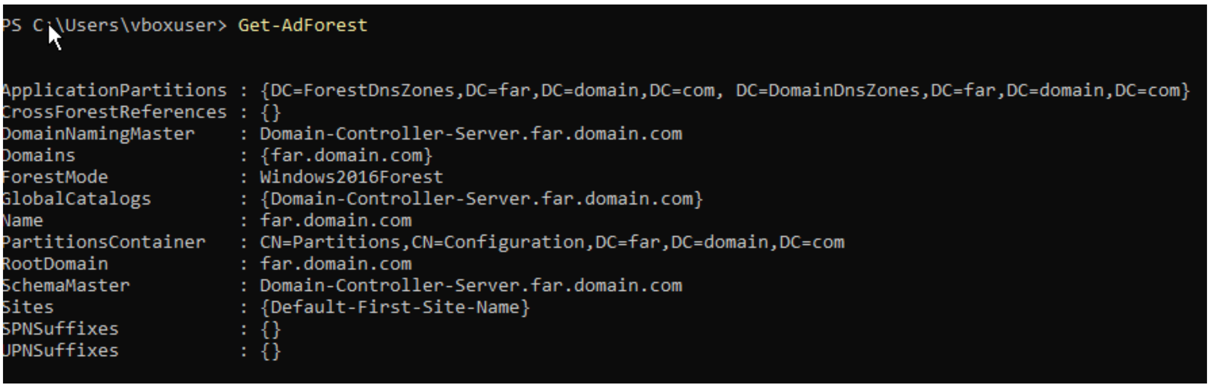


```
PS C:\Users\vboxuser> install-addsforest -domainname far.domain.com
SafeModeAdministratorPassword: ******************
Confirm SafeModeAdministratorPassword: ******************

The target server will be configured as a domain controller and restarted when this operation is
complete.
Do you want to continue with this operation?
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): y
```

It worked, I now have my very own forest, and domain.

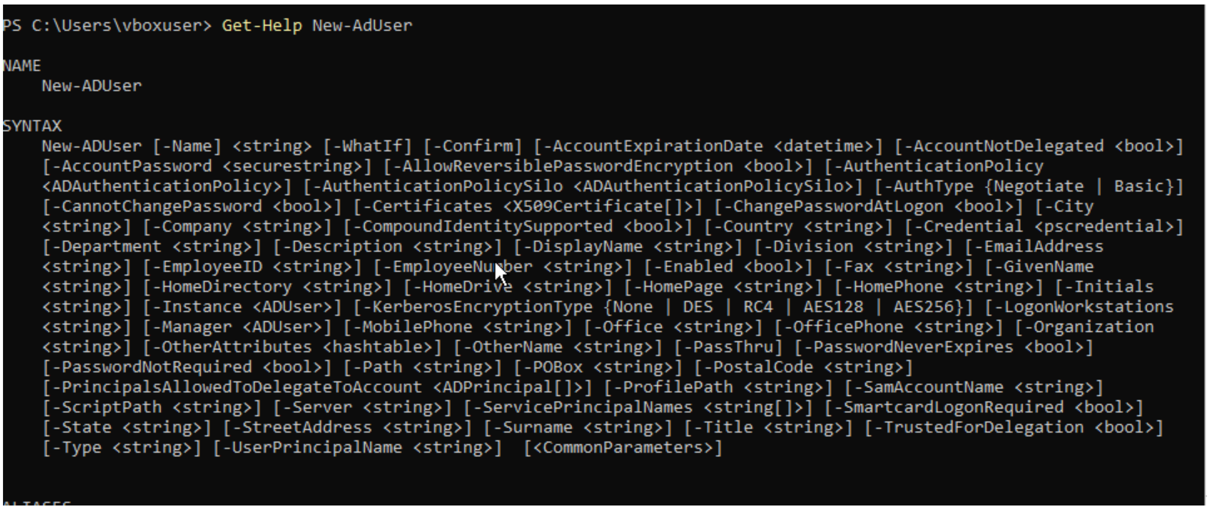


```
PS C:\Users\vboxuser> Get-ADDomain


AllowedDNSSuffixes                 : {}
ChildDomains                       : {}
ComputersContainer                 : CN=Computers,DC=far,DC=domain,DC=com
DeletedObjectsContainer            : CN=Deleted Objects,DC=far,DC=domain,DC=com
DistinguishedName                  : DC=far,DC=domain,DC=com
DNSRoot                            : far.domain.com
DomainControllersContainer         : OU=Domain Controllers,DC=far,DC=domain,DC=com
DomainMode                         : Windows2016Domain
DomainSID                          : S-1-5-21-2005061878-36205755-715187568
ForeignSecurityPrincipalsContainer : CN=ForeignSecurityPrincipals,DC=far,DC=domain,DC=com
Forest                             : far.domain.com
InfrastructureMaster               : Domain-Controller-Server.far.domain.com
LastLogonReplicationInterval       :
LinkedGroupPolicyObjects           : {CN={31B2F340-016D-11D2-945F-00C04FB984F9},CN=Policies,CN=System,DC=far,DC=domain,
                                     DC=com}
LostAndFoundContainer              : CN=LostAndFound,DC=far,DC=domain,DC=com
ManagedBy                          :
Name                               : far
NetBIOSName                        : FAR
ObjectClass                        : domainDNS
ObjectGUID                         : 093268fa-4b76-4b08-83a7-e0d4b7c72ec8
ParentDomain                       :
PDCEmulator                        : Domain-Controller-Server.far.domain.com
PublicKeyRequiredPasswordRolling   : True
QuotasContainer                    : CN=NTDS Quotas,DC=far,DC=domain,DC=com
ReadOnlyReplicaDirectoryServers    : {}
```



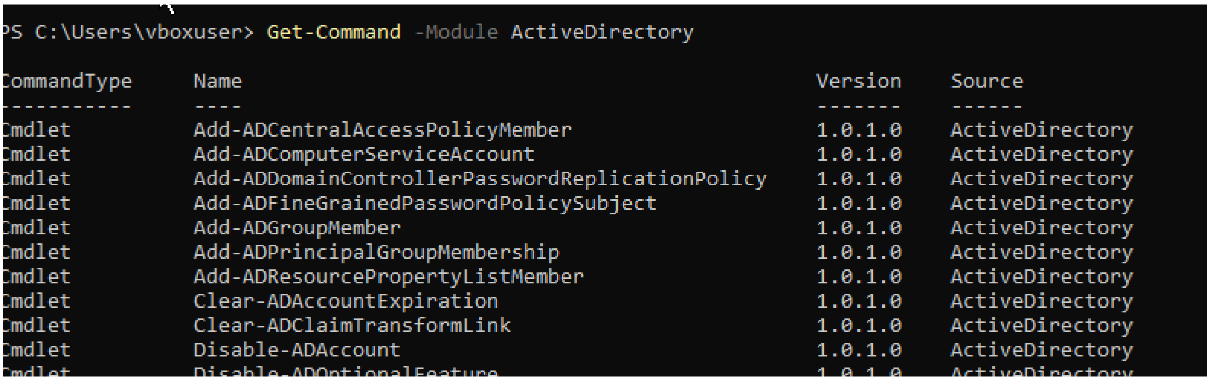
```
PS C:\Users\vboxuser> Get-AdForest


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

I found the syntax for creating users using the New-ADer cmdlet.



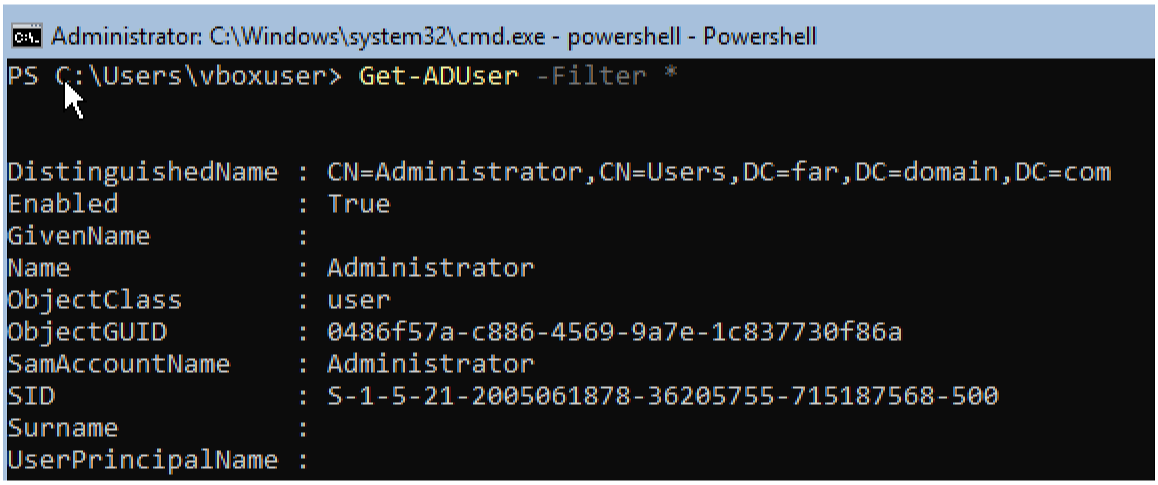
```
PS C:\Users\vboxuser> Get-Help New-AdUser

NAME
    New-ADUser

SYNTAX
    New-ADUser [-Name] <string> [-WhatIf] [-Confirm] [-AccountExpirationDate <datetime>] [-AccountNotDelegated <bool>]
    [-AccountPassword <securestring>] [-AllowReversiblePasswordEncryption <bool>] [-AuthenticationPolicy
    <ADAuthenticationPolicy>] [-AuthenticationPolicySilo <ADAuthenticationPolicySilo>] [-AuthType {Negotiate | Basic}]
    [-CannotChangePassword <bool>] [-Certificates <X509Certificate[]>] [-ChangePasswordAtLogon <bool>] [-City
    <string>] [-Company <string>] [-CompoundIdentitySupported <bool>] [-Country <string>] [-Credential <pscredential>]
    [-Department <string>] [-Description <string>] [-DisplayName <string>] [-Division <string>] [-EmailAddress
    <string>] [-EmployeeID <string>] [-EmployeeNumber <string>] [-Enabled <bool>] [-Fax <string>] [-GivenName
    <string>] [-HomeDirectory <string>] [-HomeDrive <string>] [-HomePage <string>] [-HomePhone <string>] [-Initials
    <string>] [-Instance <ADUser>] [-KerberosEncryptionType {None | DES | RC4 | AES128 | AES256}] [-LogonWorkstations
    <string>] [-Manager <ADUser>] [-MobilePhone <string>] [-Office <string>] [-OfficePhone <string>] [-Organization
    <string>] [-OtherAttributes <hashtable>] [-OtherName <string>] [-PassThru] [-PasswordNeverExpires <bool>]
    [-PasswordNotRequired <bool>] [-Path <string>] [-POBox <string>] [-PostalCode <string>]
    [-PrincipalsAllowedToDelegateToAccount <ADPrincipal[]>] [-ProfilePath <string>] [-SamAccountName <string>]
    [-ScriptPath <string>] [-Server <string>] [-ServicePrincipalNames <string[]>] [-SmartcardLogonRequired <bool>]
    [-State <string>] [-StreetAddress <string>] [-Surname <string>] [-Title <string>] [-TrustedForDelegation <bool>]
    [-Type <string>] [-UserPrincipalName <string>]  [<CommonParameters>]
```

This is an extremely important command, it basically informs me on everything I can do within AD, to my knowledge.



```
PS C:\Users\vboxuser> Get-Command -Module ActiveDirectory

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Cmdlet          Add-ADCentralAccessPolicyMember                    1.0.1.0    ActiveDirectory
Cmdlet          Add-ADComputerServiceAccount                       1.0.1.0    ActiveDirectory
Cmdlet          Add-ADDomainControllerPasswordReplicationPolicy    1.0.1.0    ActiveDirectory
Cmdlet          Add-ADFineGrainedPasswordPolicySubject             1.0.1.0    ActiveDirectory
Cmdlet          Add-ADGroupMember                                  1.0.1.0    ActiveDirectory
Cmdlet          Add-ADPrincipalGroupMembership                     1.0.1.0    ActiveDirectory
Cmdlet          Add-ADResourcePropertyListMember                   1.0.1.0    ActiveDirectory
Cmdlet          Clear-ADAccountExpiration                          1.0.1.0    ActiveDirectory
Cmdlet          Clear-ADClaimTransformLink                         1.0.1.0    ActiveDirectory
Cmdlet          Disable-ADAccount                                  1.0.1.0    ActiveDirectory
Cmdlet          Disable-ADOptionalFeature                          1.0.1.0    ActiveDirectory
```

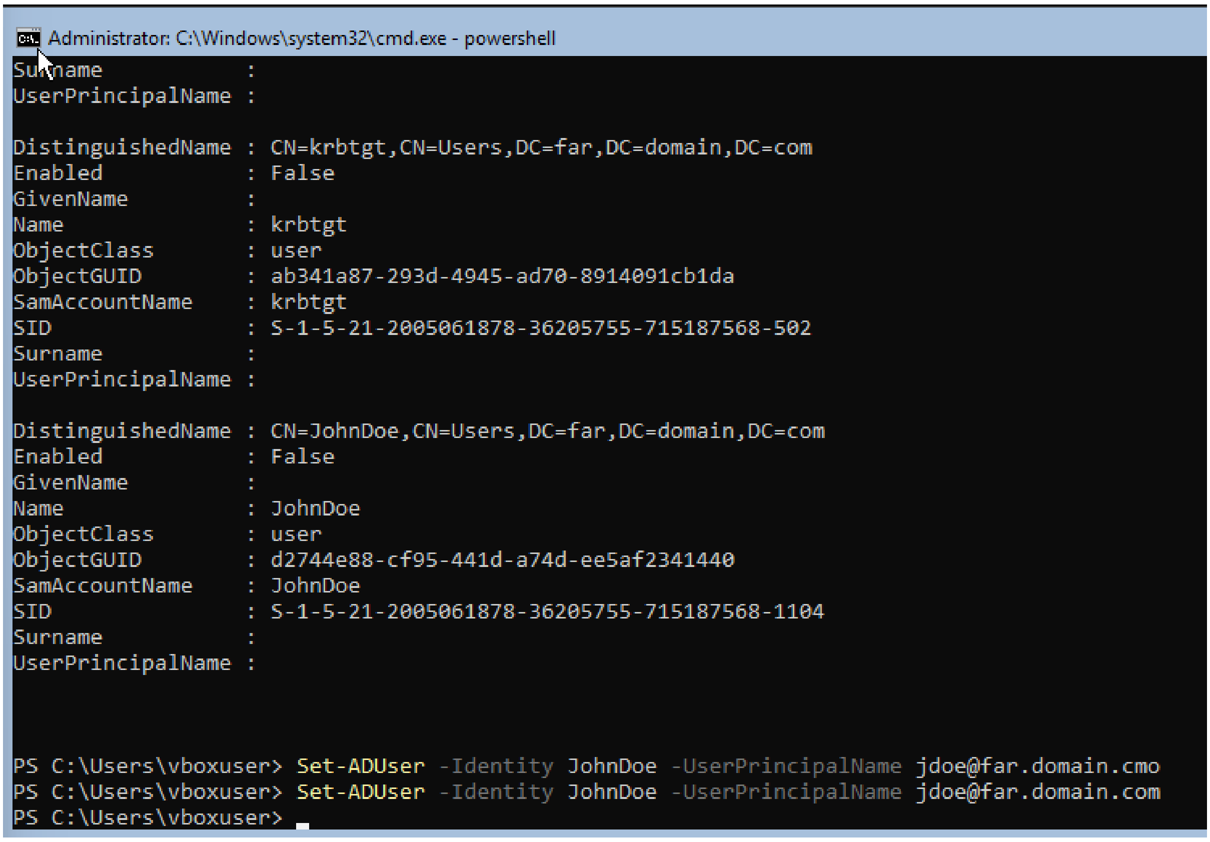
It is quite crucial that I am able to view all my users, and I can do this with the following:


Administrator: C:\Windows\system32\cmd.exe - powershell - Powershell

```
PS C:\Users\vboxuser> Get-ADUser -Filter *


DistinguishedName : CN=Administrator,CN=Users,DC=far,DC=domain,DC=com
Enabled           : True
GivenName         :
Name              : Administrator
ObjectClass       : user
ObjectGUID        : 0486f57a-c886-4569-9a7e-1c837730f86a
SamAccountName    : Administrator
SID               : S-1-5-21-2005061878-36205755-715187568-500
Surname           :
UserPrincipalName :
```

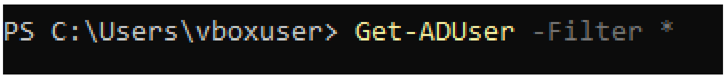
Edition 2

Today, I have started tinkering with the Active Directory users, and I’ve learned how to set userPrincipalNames and other ADUser properties using the Set-ADUser command.



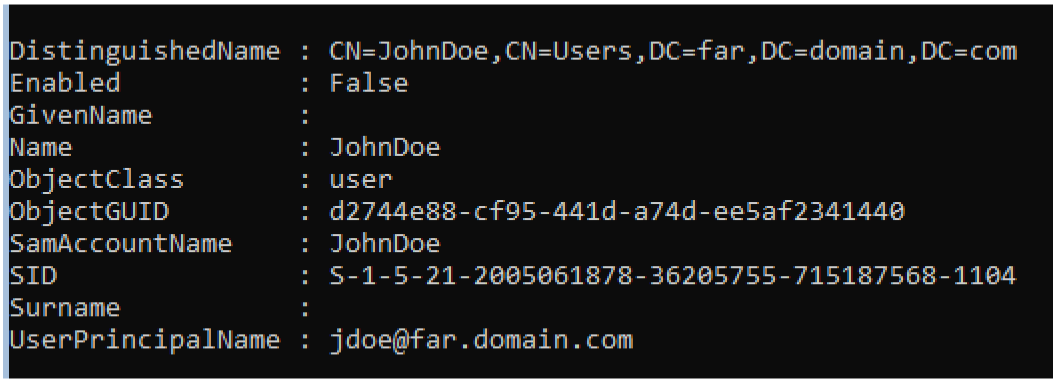
```
Surname           :
UserPrincipalName :

DistinguishedName : CN=krbtgt,CN=Users,DC=far,DC=domain,DC=com
Enabled           : False
GivenName         :
Name              : krbtgt
ObjectClass       : user
ObjectGUID        : ab341a87-293d-4945-ad70-8914091cb1da
SamAccountName    : krbtgt
SID               : S-1-5-21-2005061878-36205755-715187568-502
Surname           :
UserPrincipalName :

DistinguishedName : CN=JohnDoe,CN=Users,DC=far,DC=domain,DC=com
Enabled           : False
GivenName         :
Name              : JohnDoe
ObjectClass       : user
ObjectGUID        : d2744e88-cf95-441d-a74d-ee5af2341440
SamAccountName    : JohnDoe
SID               : S-1-5-21-2005061878-36205755-715187568-1104
Surname           :
UserPrincipalName :



PS C:\Users\vboxuser> Set-ADUser -Identity JohnDoe -UserPrincipalName jdoe@far.domain.cmo
PS C:\Users\vboxuser> Set-ADUser -Identity JohnDoe -UserPrincipalName jdoe@far.domain.com
PS C:\Users\vboxuser> _
```

We can check if the change was successful by doing the following:



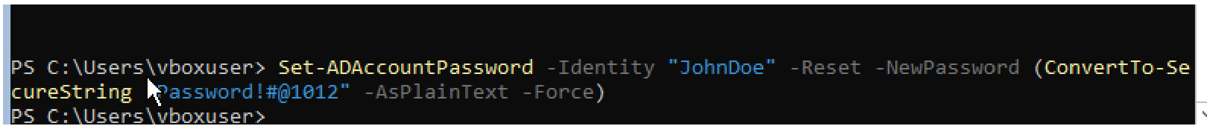
```
PS C:\Users\vboxuser> Get-ADUser -Filter *
```

Since we only have a few users, we can get away with doing this for now, but as the userbase expands, we will need to start using filters to locate particular users.



```
DistinguishedName : CN=JohnDoe,CN=Users,DC=far,DC=domain,DC=com
Enabled           : False
GivenName         :
Name              : JohnDoe
ObjectClass       : user
ObjectGUID        : d2744e88-cf95-441d-a74d-ee5af2341440
SamAccountName    : JohnDoe
SID               : S-1-5-21-2005061878-36205755-715187568-1104
Surname           :
UserPrincipalName : jdoe@far.domain.com
```

The change went through, and the userprincipalname has now been set. It is important to note that this user account is still disabled, because it doesn't have a password set, so as a system administrator I need to set this account password and enable it. I will attempt to do this using the following command:

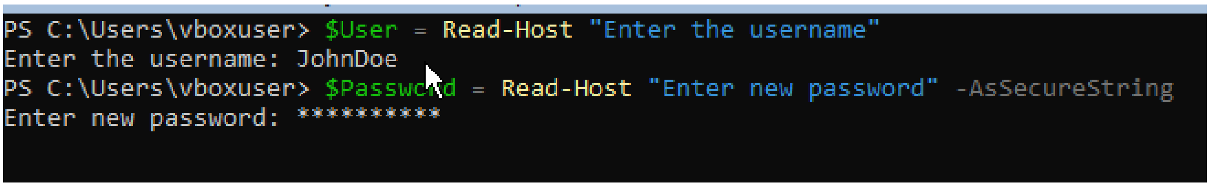


```
PS C:\Users\vboxuser> Set-ADAccountPassword -Identity "JohnDoe" -Reset -NewPassword (ConvertTo-Se
cureString "Password!#@1012" -AsPlainText -Force)
PS C:\Users\vboxuser>
```

Without the 'reset' parameter, PS assumes that we want to change the password, rather than set the password. Apparently, this is what admins normally do.

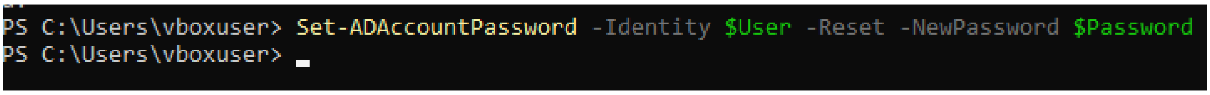
AD cmdlets enforce security, so passwords cannot be passed as plain text, in this case it is wrapped in ConvertTo-SecureString, and we force it to go through, since AD will warn us that using plain text is not secure. In a circumstance where we have an established key vault, Windows Credential Manager, SecretManagement modules, etc. For this test, this is okay for our fictional user.

There is another, more secure way to do it, where it doesn't show up in powershell history. It apparently doesn't even show up in powershell, which I'm going to test now. We can actually store things in memory securely, to use them in the powershell command later. In Java or Python, this would basically be using variables to accomplish this task. Not sure what it's called in PS.



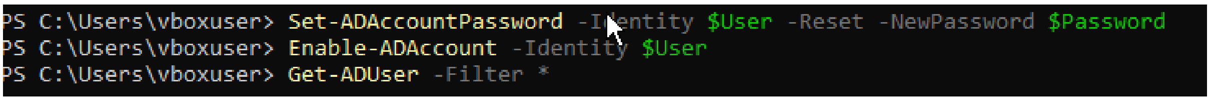
```
PS C:\Users\vboxuser> $User = Read-Host "Enter the username"
Enter the username: JohnDoe
PS C:\Users\vboxuser> $Password = Read-Host "Enter new password" -AsSecureString
Enter new password: **********
```

It looks like using 'variables', or whatever they're called in PS, has actually worked, not only was I able to type in the password securely, but I was also able to input those into the Set-ADAccountPassword fields.

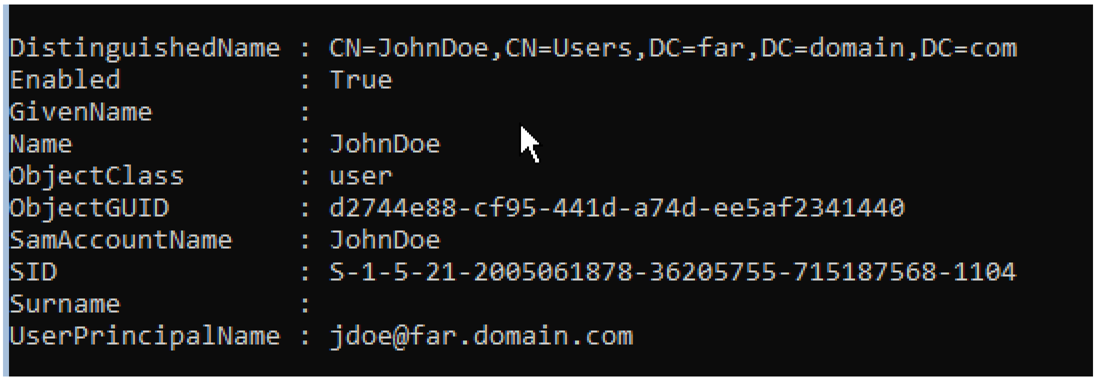


```
PS C:\Users\vboxuser> Set-ADAccountPassword -Identity $User -Reset -NewPassword $Password
PS C:\Users\vboxuser>
```

Now, we can go ahead and enable the ADAccount.

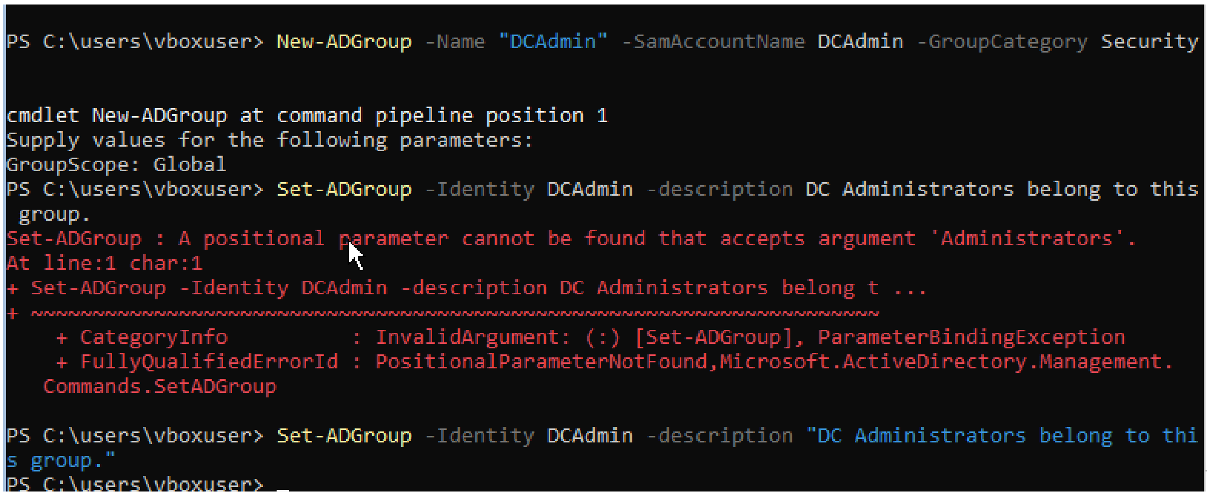


```
PS C:\Users\vboxuser> Set-ADAccountPassword -Identity $User -Reset -NewPassword $Password
PS C:\Users\vboxuser> Enable-ADAccount -Identity $User
PS C:\Users\vboxuser> Get-ADUser -Filter *
```



```
DistinguishedName : CN=JohnDoe,CN=Users,DC=far,DC=domain,DC=com
Enabled           : True
GivenName         :
Name              : JohnDoe
ObjectClass       : user
ObjectGUID        : d2744e88-cf95-441d-a74d-ee5af2341440
SamAccountName    : JohnDoe
SID               : S-1-5-21-2005061878-36205755-715187568-1104
Surname           :
UserPrincipalName : jdoe@far.domain.com
```

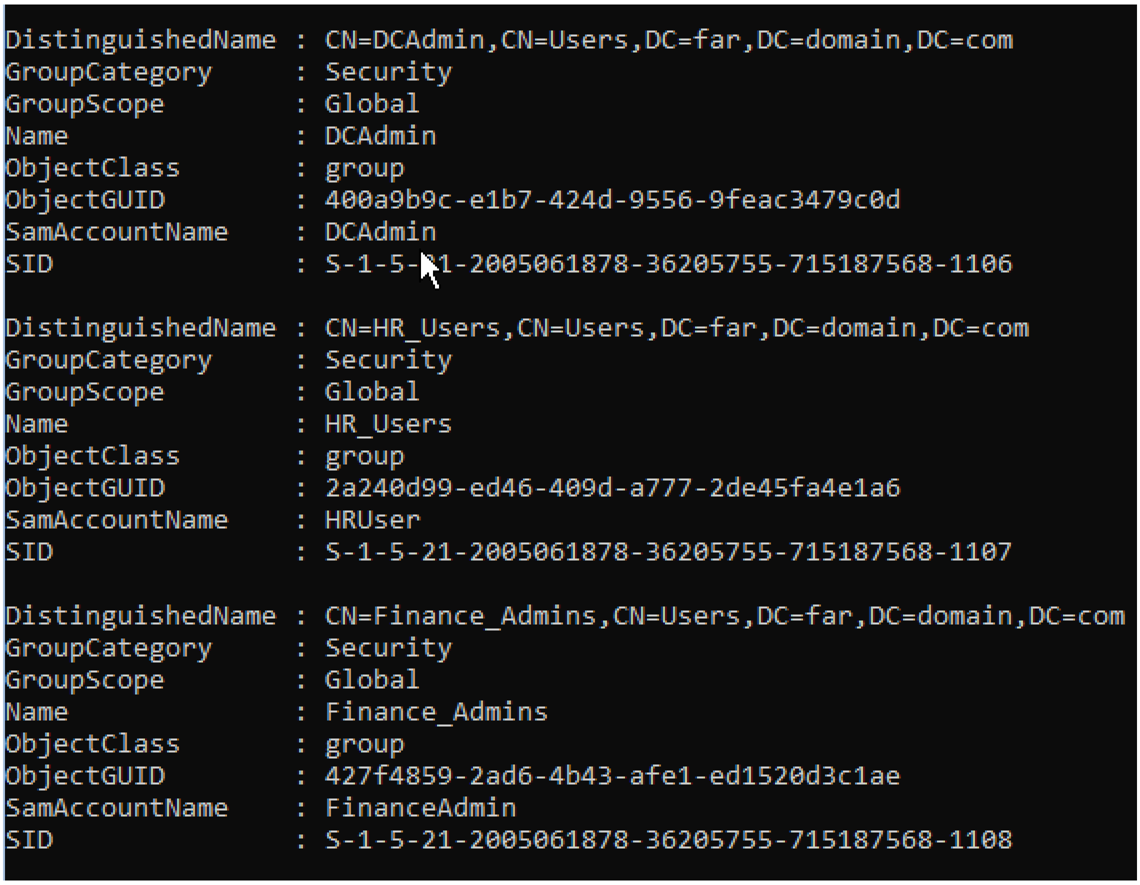
The next thing to do is create groups, using groups we can administer users as a group, rather than individually. This is simple to do, thanks to Microsoft’s documentation.



```
PS C:\users\vboxuser> New-ADGroup -Name "DCAdmin" -SamAccountName DCAdmin -GroupCategory Security

cmdlet New-ADGroup at command pipeline position 1
Supply values for the following parameters:
GroupScope: Global
PS C:\users\vboxuser> Set-ADGroup -Identity DCAdmin -description DC Administrators belong to this
 group.
Set-ADGroup : A positional parameter cannot be found that accepts argument 'Administrators'.
At line:1 char:1
+ Set-ADGroup -Identity DCAdmin -description DC Administrators belong t ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : InvalidArgument: (:) [Set-ADGroup], ParameterBindingException
    + FullyQualifiedErrorId : PositionalParameterNotFound,Microsoft.ActiveDirectory.Management.
   Commands.SetADGroup

PS C:\users\vboxuser> Set-ADGroup -Identity DCAdmin -description "DC Administrators belong to thi
s group."
PS C:\users\vboxuser> _
```

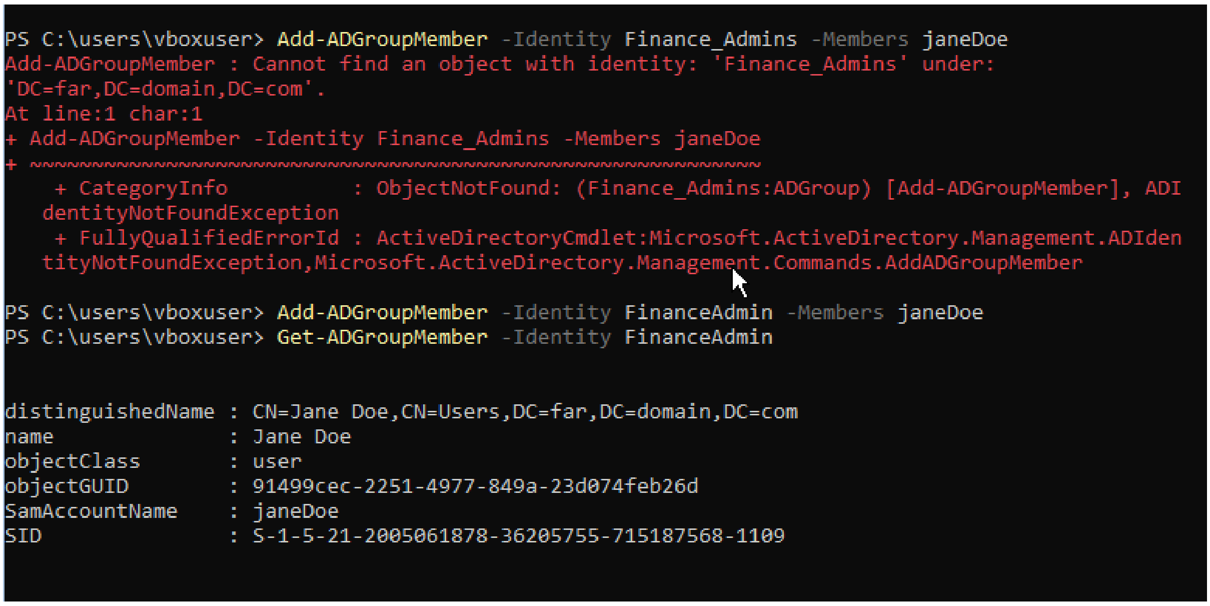
https://learn.microsoft.com/en-us/powershell/module/activedirectory/new-adgroup?view=windowsserver2025-ps

At this stage, we have a domain, domain controller, users, and a group. I have also gone ahead and replicated this and made multiple groups.



```
DistinguishedName : CN=DCAdmin,CN=Users,DC=far,DC=domain,DC=com
GroupCategory     : Security
GroupScope        : Global
Name              : DCAdmin
ObjectClass       : group
ObjectGUID        : 400a9b9c-e1b7-424d-9556-9feac3479c0d
SamAccountName    : DCAdmin
SID               : S-1-5-21-2005061878-36205755-715187568-1106

DistinguishedName : CN=HR_Users,CN=Users,DC=far,DC=domain,DC=com
GroupCategory     : Security
GroupScope        : Global
Name              : HR_Users
ObjectClass       : group
ObjectGUID        : 2a240d99-ed46-409d-a777-2de45fa4e1a6
SamAccountName    : HRUser
SID               : S-1-5-21-2005061878-36205755-715187568-1107

DistinguishedName : CN=Finance_Admins,CN=Users,DC=far,DC=domain,DC=com
GroupCategory     : Security
GroupScope        : Global
Name              : Finance_Admins
ObjectClass       : group
ObjectGUID        : 427f4859-2ad6-4b43-afe1-ed1520d3c1ae
SamAccountName    : FinanceAdmin
SID               : S-1-5-21-2005061878-36205755-715187568-1108
```

At this stage, we should add users to groups, which will make it easier to administer them together rather than must administer them individually. I've gone ahead and added a member to the Finance Admin group created.

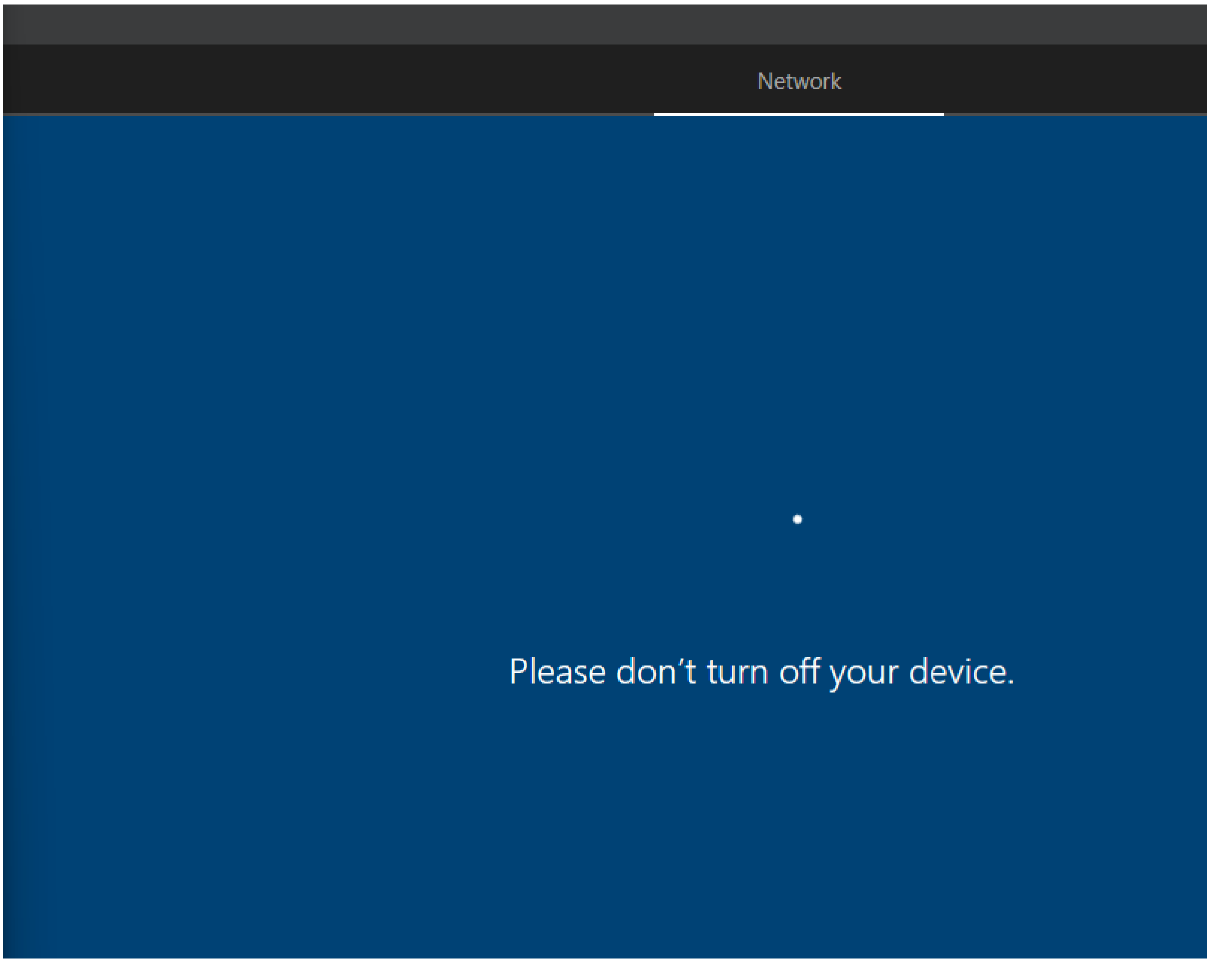


```
PS C:\users\vboxuser> Add-ADGroupMember -Identity Finance_Admins -Members janeDoe
Add-ADGroupMember : Cannot find an object with identity: 'Finance_Admins' under:
'DC=far,DC=domain,DC=com'.
At line:1 char:1
+ Add-ADGroupMember -Identity Finance_Admins -Members janeDoe
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : ObjectNotFound: (Finance_Admins:ADGroup) [Add-ADGroupMember], ADI
   dentityNotFoundException
    + FullyQualifiedErrorId : ActiveDirectoryCmdlet:Microsoft.ActiveDirectory.Management.ADIden
   tityNotFoundException,Microsoft.ActiveDirectory.Management.Commands.AddADGroupMember

PS C:\users\vboxuser> Add-ADGroupMember -Identity FinanceAdmin -Members janeDoe
PS C:\users\vboxuser> Get-ADGroupMember -Identity FinanceAdmin


distinguishedName : CN=Jane Doe,CN=Users,DC=far,DC=domain,DC=com
name              : Jane Doe
objectClass       : user
objectGUID        : 91499cec-2251-4977-849a-23d074feb26d
SamAccountName    : janeDoe
SID               : S-1-5-21-2005061878-36205755-715187568-1109
```

I realise now, through experimenting, that the SamAccountName is basically an object identifier, rather than the actual name, when dealing with putting users into groups and stuff like that. Something like the barcode of a product, as opposed to the actual name of the product.

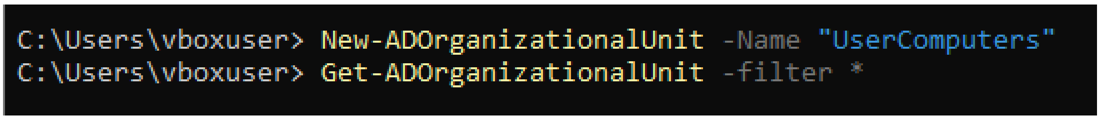
Edition 3

Now that we have the basic components of an active directory: domain, domain controller, groups, and users. We can start making it useful. The next step is to add some devices, like computers (which I can spin up virtually in VirtualBox), and connect them to the AD. Using the GPO's and AD, I (the administrator), can apply security policies, and other device policies that control the virtualized machines. For example, a standardized background screen, or app and access control.



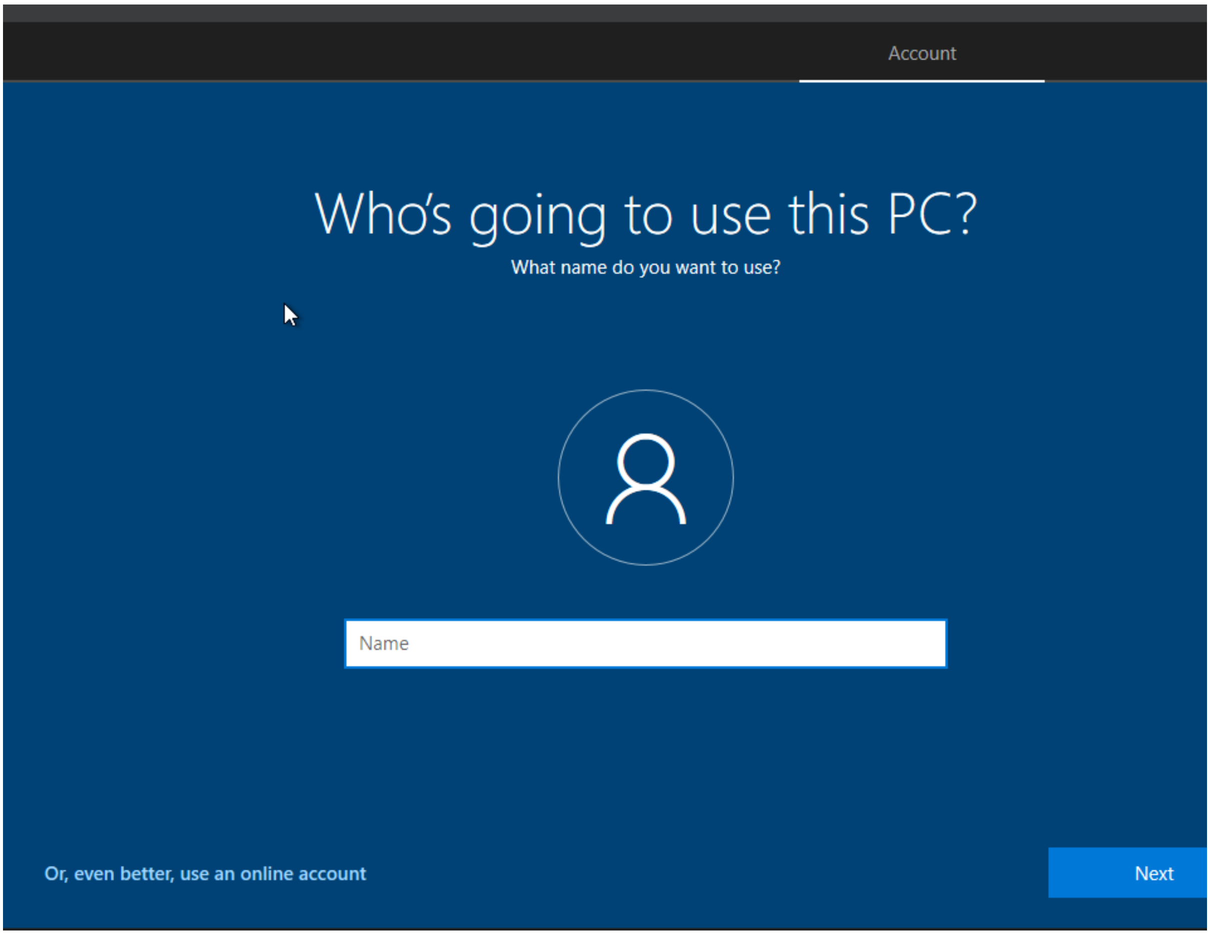
Please don't turn off your device.

Here, we are setting up a new computer to later add to the AD. In the meantime, we will make a new organizational unit called “UserComputers” to prepare for the new computer.



```
C:\Users\vboxuser> New-ADOrganizationalUnit -Name "UserComputers"
C:\Users\vboxuser> Get-ADOrganizationalUnit -filter *
```

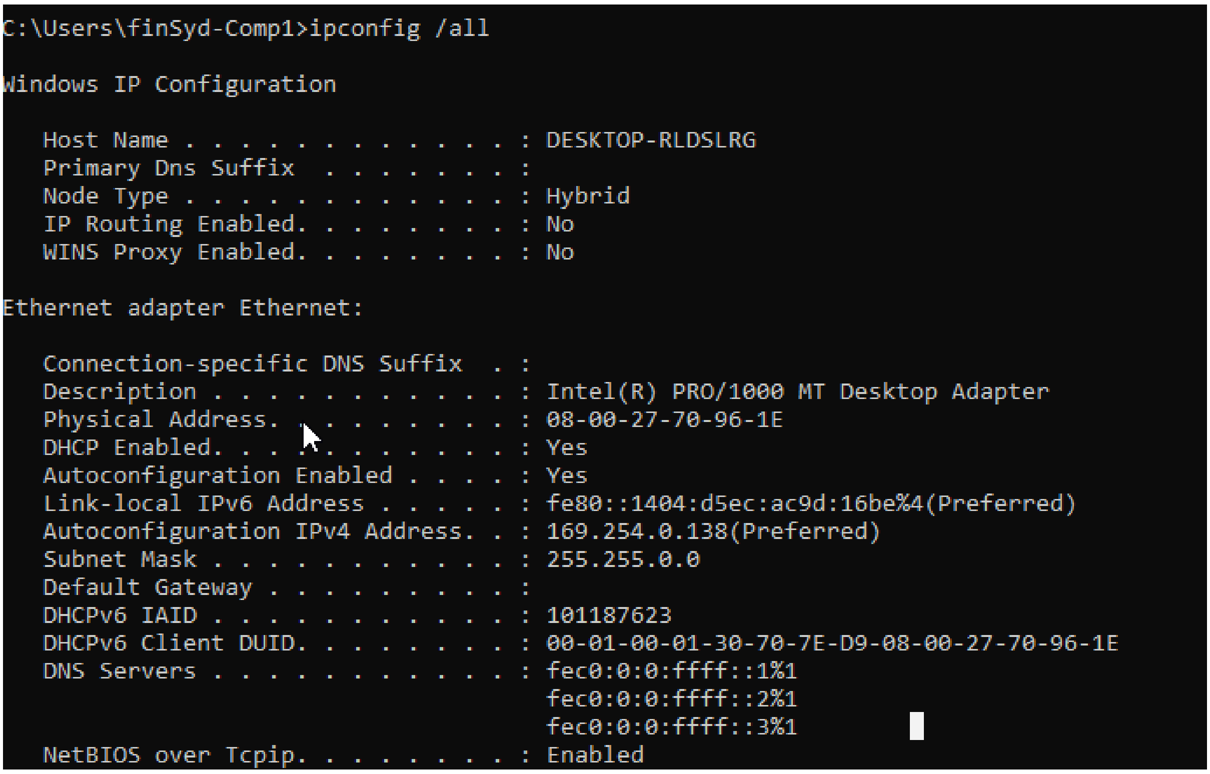
On the new windows 10 installation, we need to set it up, and wire its networking so it is able to connect to our AD.



Who’s going to use this PC?

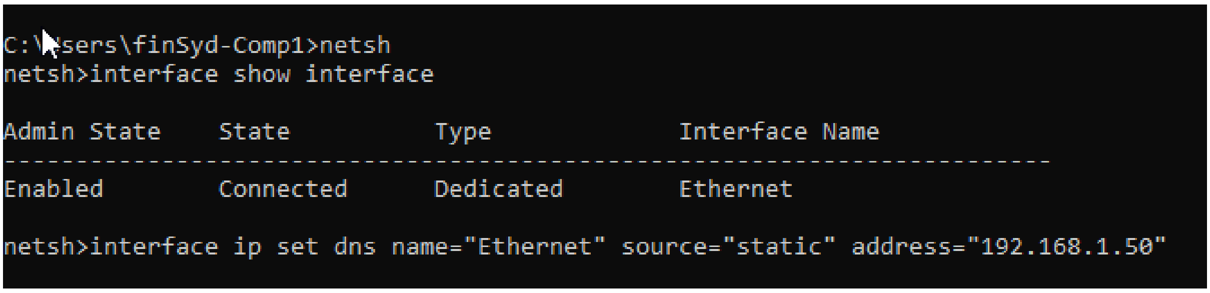
What name do you want to use?

To do this, we need to ensure they are on the same network, and in a virtual environment, they need to be on the same adapter. We can see the current, fresh networking configuration of the machine below.



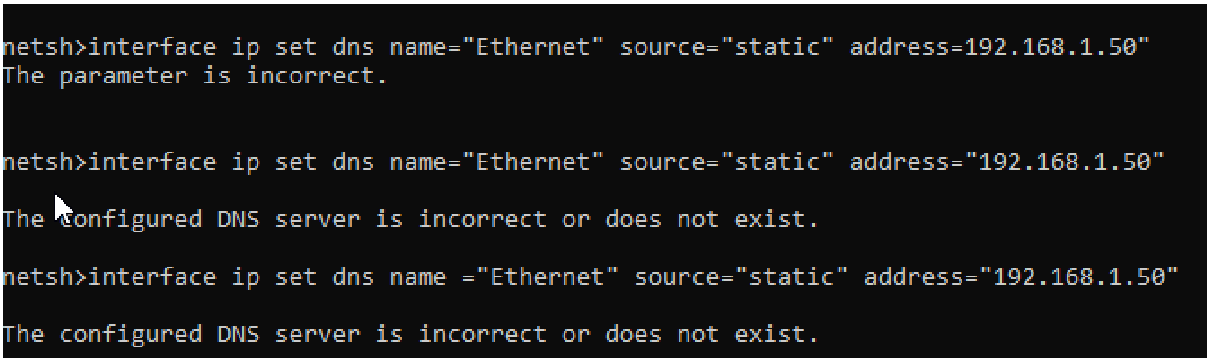
```
C:\Users\finSyd-Comp1>ipconfig /all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DESKTOP-RLDSLRG
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Intel(R) PRO/1000 MT Desktop Adapter
   Physical Address. . . . . . . . . : 08-00-27-70-96-1E
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::1404:d5ec:ac9d:16be%4(Preferred)
   Autoconfiguration IPv4 Address. . : 169.254.0.138(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . :
   DHCPv6 IAID . . . . . . . . . . . : 101187623
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-30-70-7E-D9-08-00-27-70-96-1E
   DNS Servers . . . . . . . . . . . : fec0:0:0:ffff::1%1
                                       fec0:0:0:ffff::2%1
                                       fec0:0:0:ffff::3%1
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

Now, we need to set the DNS to the DC. The following netsh commands will help us accomplish this.



```
C:\Users\finSyd-Comp1>netsh
netsh>interface show interface

Admin State    State          Type             Interface Name
-------------------------------------------------------------------------
Enabled        Connected      Dedicated        Ethernet

netsh>interface ip set dns name="Ethernet" source="static" address="192.168.1.50"
```

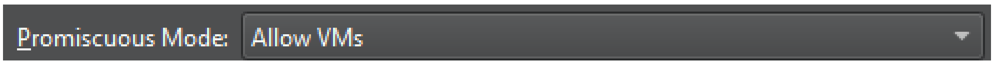
This is the first network error we’ve encountered.



```
netsh>interface ip set dns name="Ethernet" source="static" address=192.168.1.50"
The parameter is incorrect.

netsh>interface ip set dns name="Ethernet" source="static" address="192.168.1.50"

The configured DNS server is incorrect or does not exist.

netsh>interface ip set dns name ="Ethernet" source="static" address="192.168.1.50"

The configured DNS server is incorrect or does not exist.
```

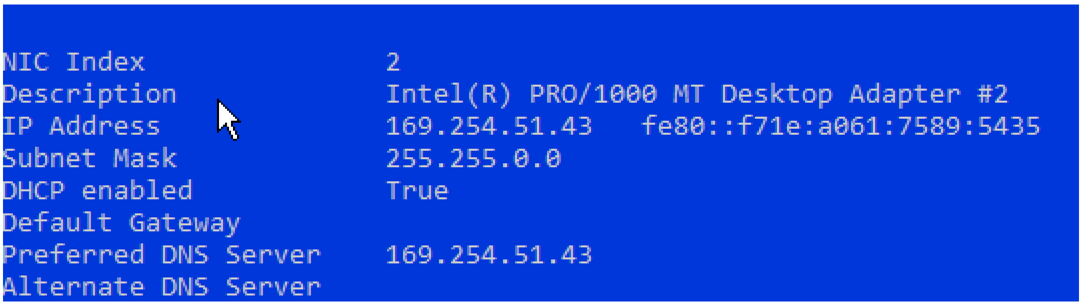
We need to figure out why our DNS server / DC is not being detected. One main problem is since we have set the computer to internal network, and the DC was on NAT, they cannot see each other. I have set both of them to internal network.

Still no luck, I have even set the IP of the w10 machine to a static IP. Perhaps it is the firewall on the DC. I have disabled the firewalls of both machines, but still no luck. I think it is the virtualbox network configuration. I will change the promiscuous mode setting on both VMs, which enables them to see each other's network traffic.



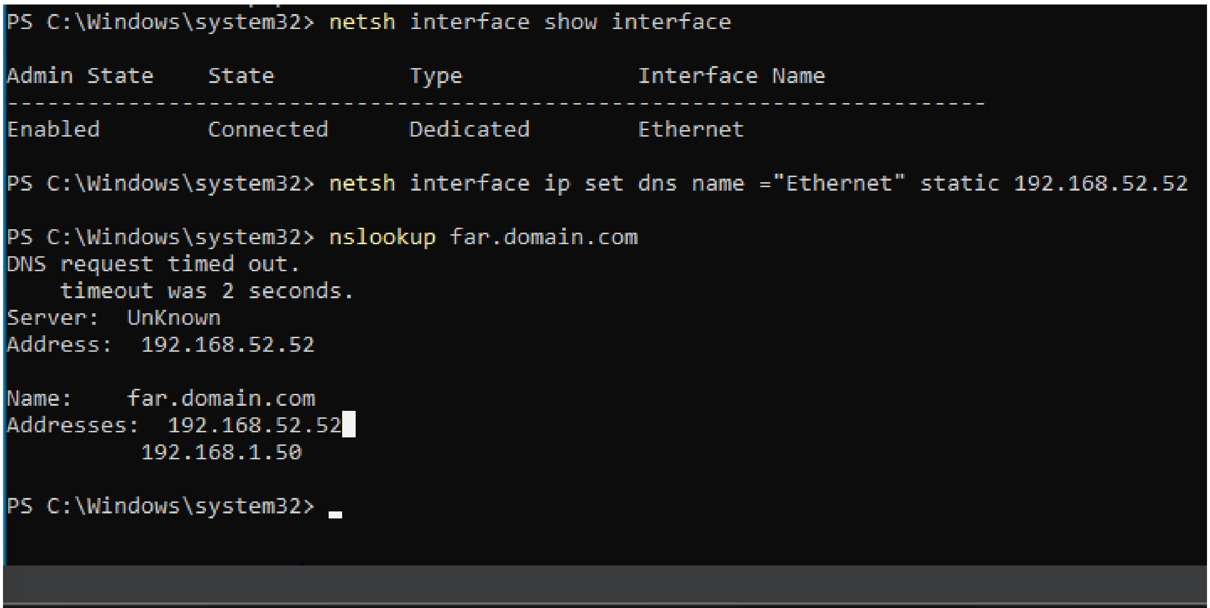
Promiscuous Mode: Allow VMs

I've decided to try and use the other NIC on the DC as the DNS server, this one has an APIPA range.

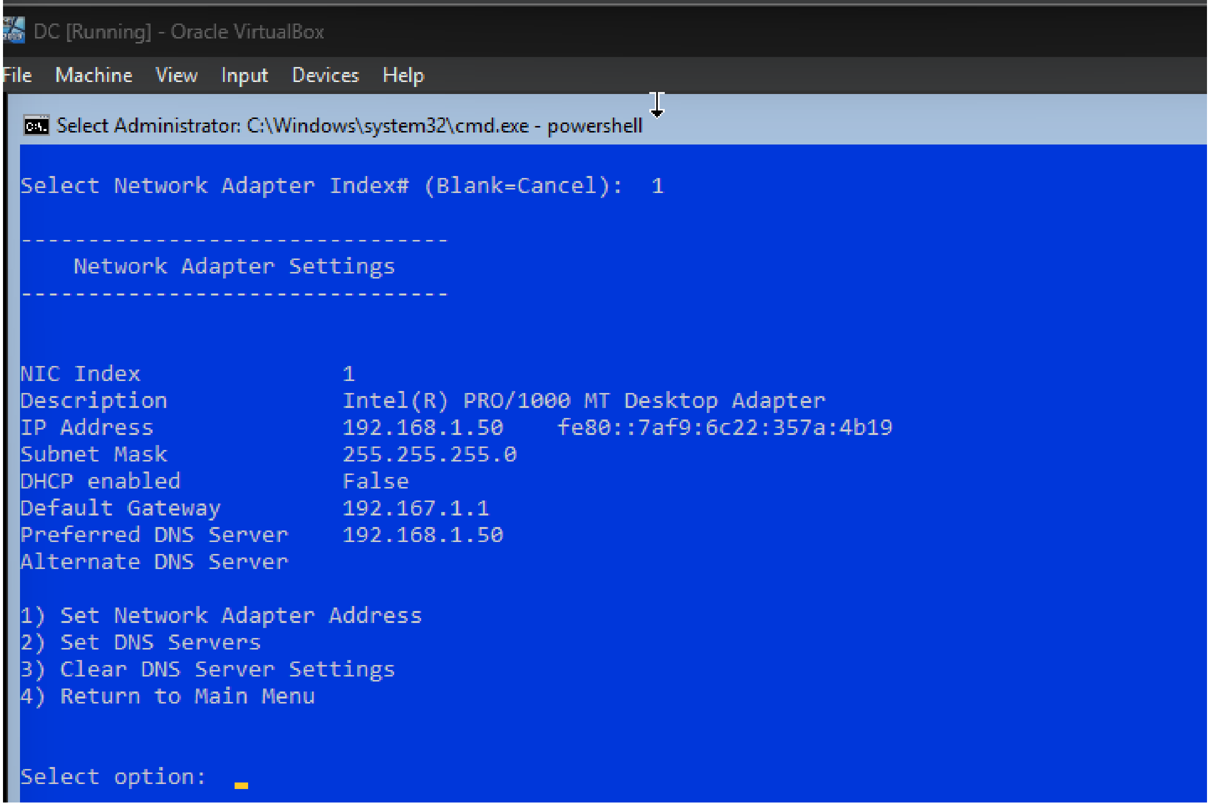


```
NIC Index                2
Description              Intel(R) PRO/1000 MT Desktop Adapter #2
IP Address               169.254.51.43   fe80::f71e:a061:7589:5435
Subnet Mask              255.255.0.0
DHCP enabled             True
Default Gateway
Preferred DNS Server     169.254.51.43
Alternate DNS Server
```

It worked, I've set the NIC IP that's on the internal network to a static IP, and the DC and Machine can now see each other.

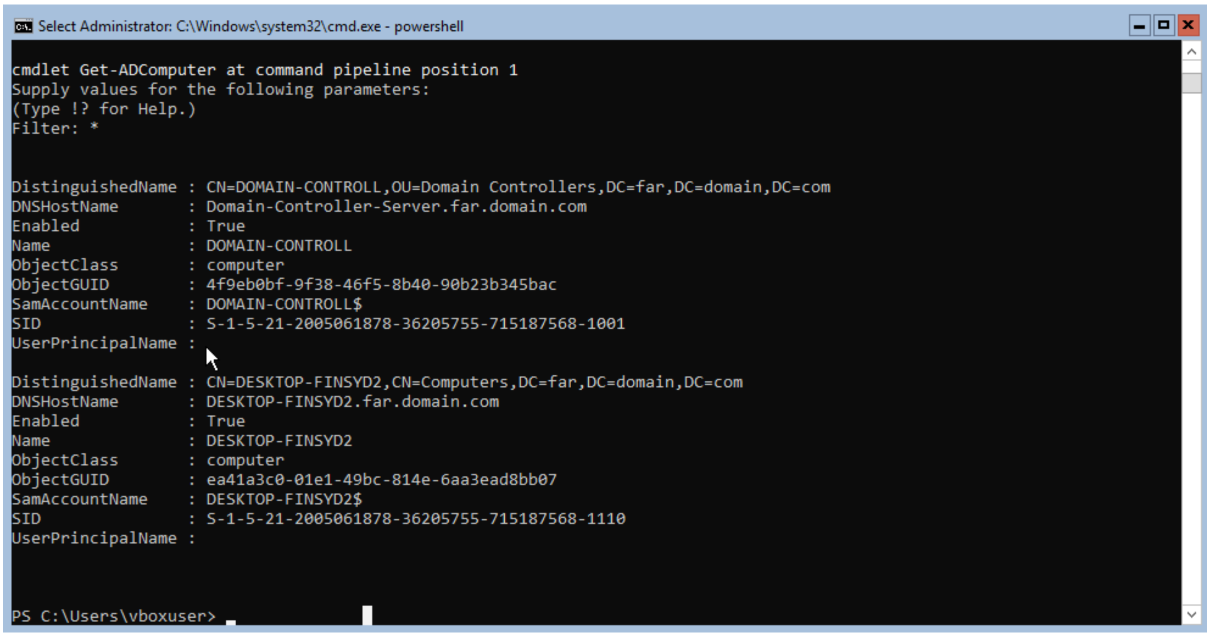


```
PS C:\Windows\system32> netsh interface show interface

Admin State    State          Type             Interface Name
-------------------------------------------------------------------------
Enabled        Connected      Dedicated        Ethernet

PS C:\Windows\system32> netsh interface ip set dns name ="Ethernet" static 192.168.52.52

PS C:\Windows\system32> nslookup far.domain.com
DNS request timed out.
    timeout was 2 seconds.
Server:  UnKnown
Address:  192.168.52.52

Name:    far.domain.com
Addresses:  192.168.52.52
          192.168.1.50

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


DC [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Select Administrator: C:\Windows\system32\cmd.exe - powershell

```
Select Network Adapter Index# (Blank=Cancel):  1

-------------------------------
    Network Adapter Settings
-------------------------------


NIC Index                 1
Description               Intel(R) PRO/1000 MT Desktop Adapter
IP Address                192.168.1.50     fe80::7af9:6c22:357a:4b19
Subnet Mask               255.255.255.0
DHCP enabled              False
Default Gateway           192.167.1.1
Preferred DNS Server      192.168.1.50
Alternate DNS Server

1) Set Network Adapter Address
2) Set DNS Servers
3) Clear DNS Server Settings
4) Return to Main Menu


Select option:  _
```

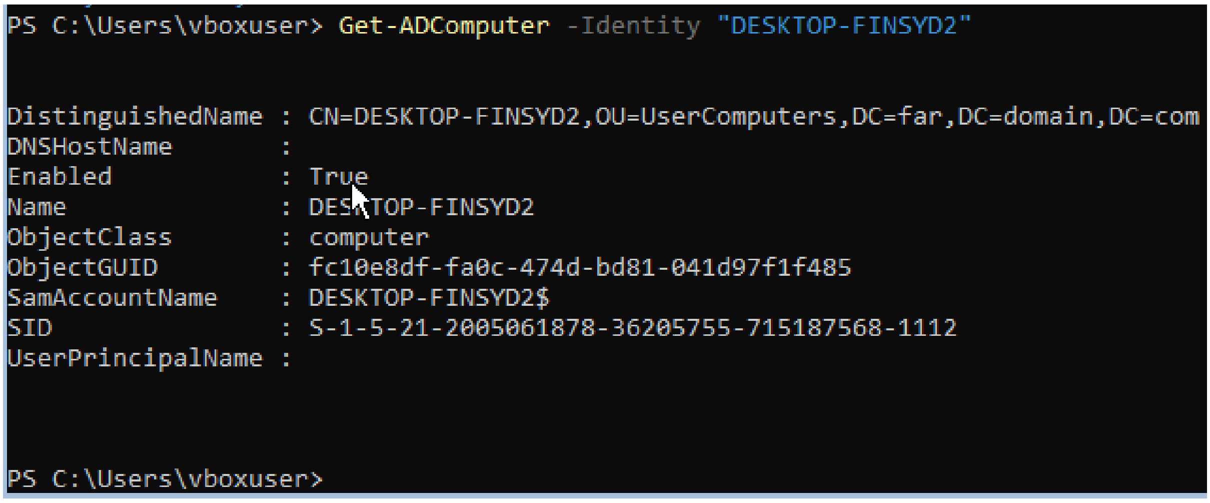
Succesfully added the first computer to the AD.



Select Administrator: C:\Windows\system32\cmd.exe - powershell

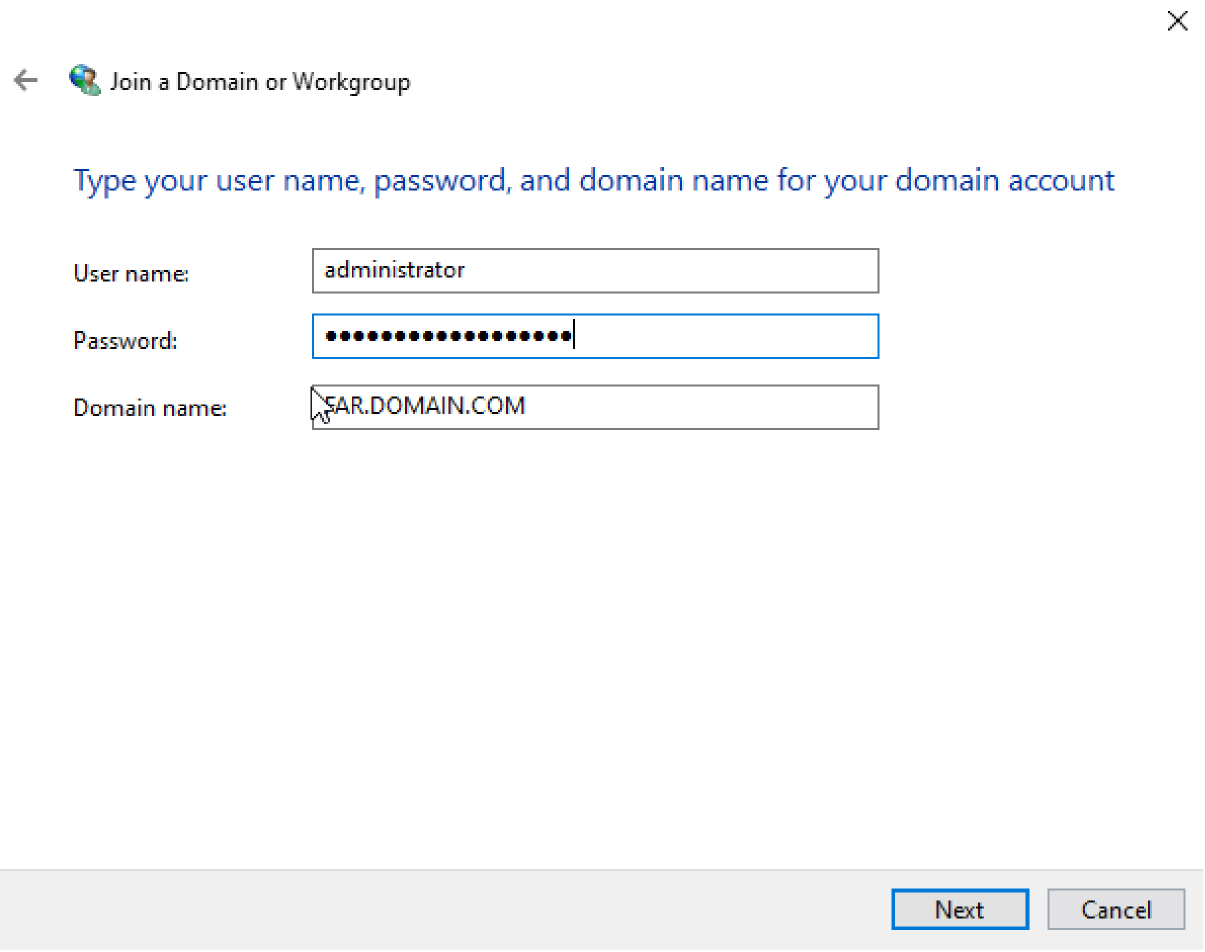
```
cmdlet Get-ADComputer at command pipeline position 1
Supply values for the following parameters:
(Type !? for Help.)
Filter: *


DistinguishedName : CN=DOMAIN-CONTROLL,OU=Domain Controllers,DC=far,DC=domain,DC=com
DNSHostName       : Domain-Controller-Server.far.domain.com
Enabled           : True
Name              : DOMAIN-CONTROLL
ObjectClass       : computer
ObjectGUID        : 4f9eb0bf-9f38-46f5-8b40-90b23b345bac
SamAccountName    : DOMAIN-CONTROLL$
SID               : S-1-5-21-2005061878-36205755-715187568-1001
UserPrincipalName :

DistinguishedName : CN=DESKTOP-FINSYD2,CN=Computers,DC=far,DC=domain,DC=com
DNSHostName       : DESKTOP-FINSYD2.far.domain.com
Enabled           : True
Name              : DESKTOP-FINSYD2
ObjectClass       : computer
ObjectGUID        : ea41a3c0-01e1-49bc-814e-6aa3ead8bb07
SamAccountName    : DESKTOP-FINSYD2$
SID               : S-1-5-21-2005061878-36205755-715187568-1110
UserPrincipalName :


PS C:\Users\vboxuser>
```

I added this computer to the AD from the W10 Wizard, now I will do the same but using the PS on Windows Server Core.



```
PS C:\Users\vboxuser> Get-ADComputer -Identity "DESKTOP-FINSYD2"


DistinguishedName : CN=DESKTOP-FINSYD2,OU=UserComputers,DC=far,DC=domain,DC=com
DNSHostName       :
Enabled           : True
Name              : DESKTOP-FINSYD2
ObjectClass       : computer
ObjectGUID        : fc10e8df-fa0c-474d-bd81-041d97f1f485
SamAccountName    : DESKTOP-FINSYD2$
SID               : S-1-5-21-2005061878-36205755-715187568-1112
UserPrincipalName :



PS C:\Users\vboxuser>
```

Now that this object has been added, I need to connect the computer to the AD.



Join a Domain or Workgroup

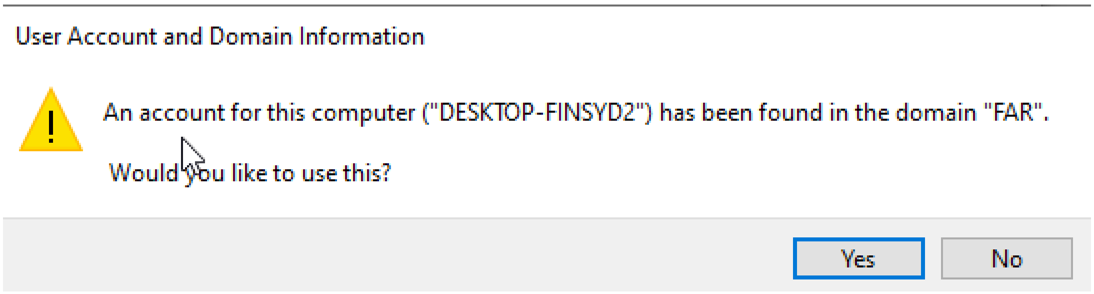
Type your user name, password, and domain name for your domain account

User name: administrator

Password: ••••••••••••••••••

Domain name: FAR.DOMAIN.COM

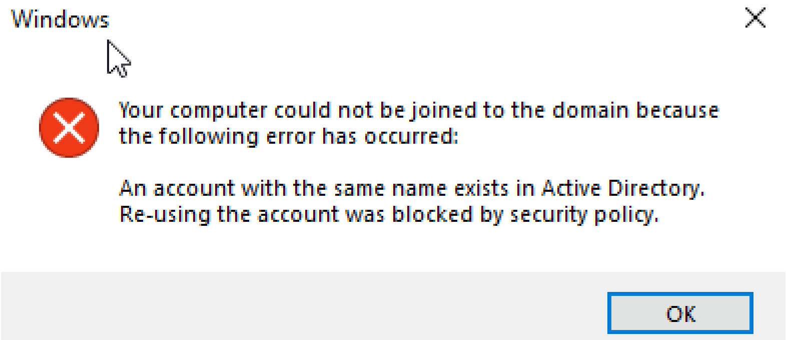
It should find that a computer object in the AD already exists. Which it has done so.



User Account and Domain Information

An account for this computer ("DESKTOP-FINSYD2") has been found in the domain "FAR".

Would you like to use this?

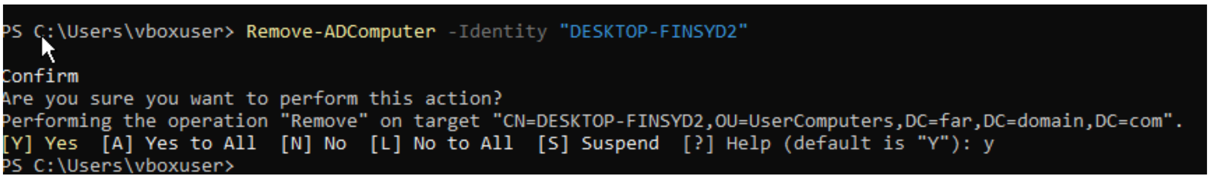


Windows

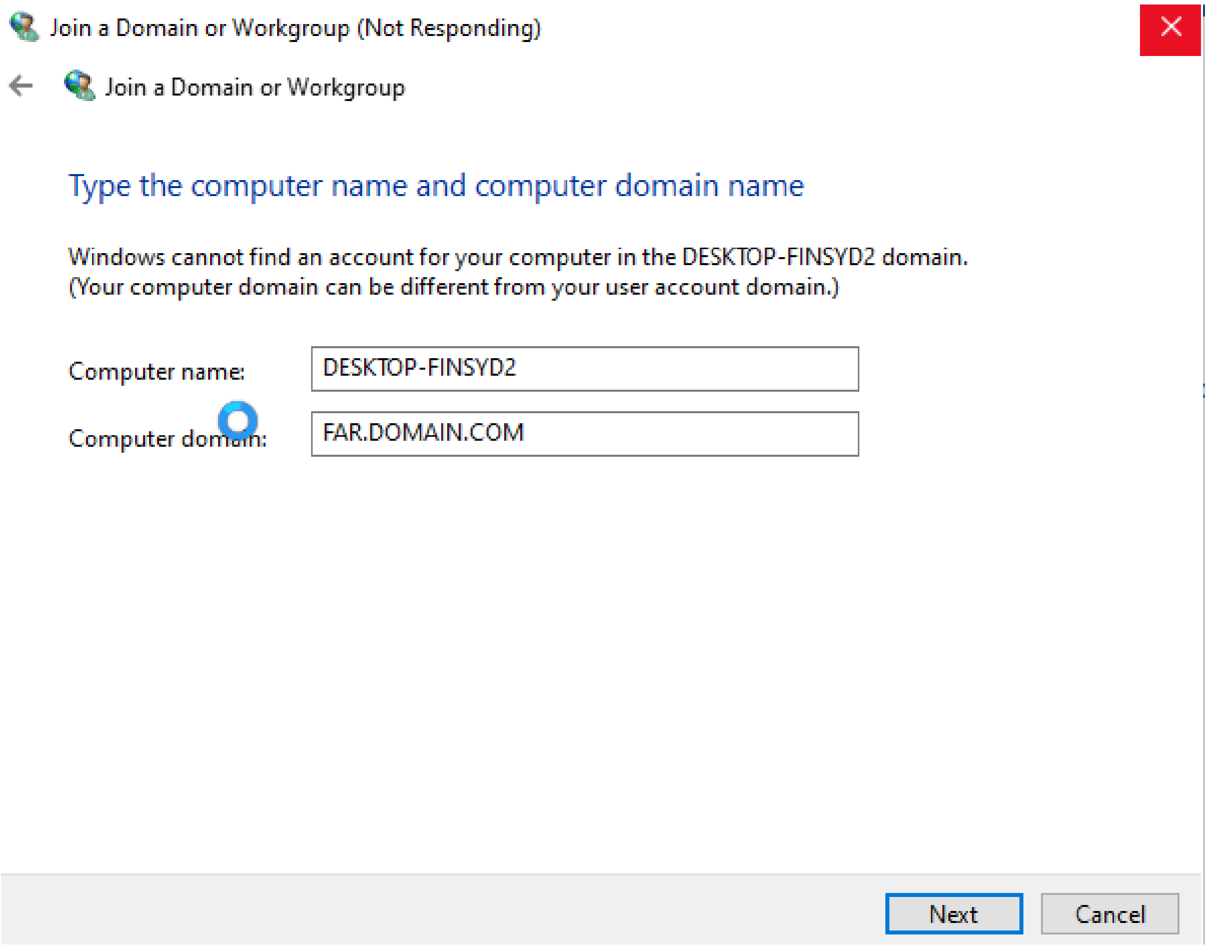
Your computer could not be joined to the domain because the following error has occurred:

An account with the same name exists in Active Directory. Re-using the account was blocked by security policy.

The computer is not using the existing computer object unfortunately, so I'm going to remove the existing computer object, and let the machine create a new one on its own.



```
PS C:\Users\vboxuser> Remove-ADComputer -Identity "DESKTOP-FINSYD2"

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove" on target "CN=DESKTOP-FINSYD2,OU=UserComputers,DC=far,DC=domain,DC=com".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): y
PS C:\Users\vboxuser>
```



Join a Domain or Workgroup (Not Responding)

Join a Domain or Workgroup

Type the computer name and computer domain name

Windows cannot find an account for your computer in the DESKTOP-FINSYD2 domain. (Your computer domain can be different from your user account domain.)

Computer name: DESKTOP-FINSYD2

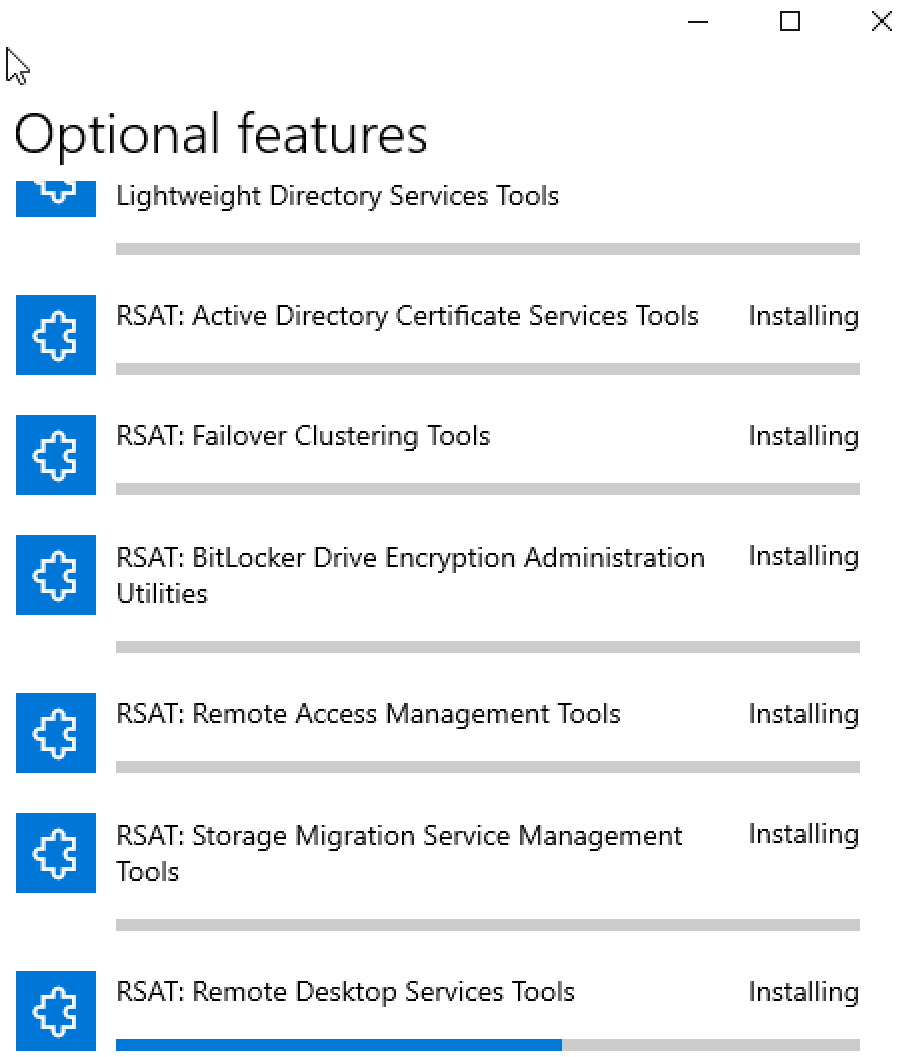
Computer domain: FAR.DOMAIN.COM

We are now able to login with AD users on the machine.

Edition 4

Now, we are going to install an ‘admin workstation’ to be able to work with the Active Directory using GUI tools, including RSAT. We follow a similar process in virtualizing a Windows 10 machine, except now we require the Pro version, a suitable KMS key has been used to activate this Windows virtual machine.

On this version of Windows, RSAT does not come with it, and needs to be installed from the ‘Optional Features’ section of the settings page.



Optional features

Lightweight Directory Services Tools

RSAT: Active Directory Certificate Services Tools — Installing

RSAT: Failover Clustering Tools — Installing

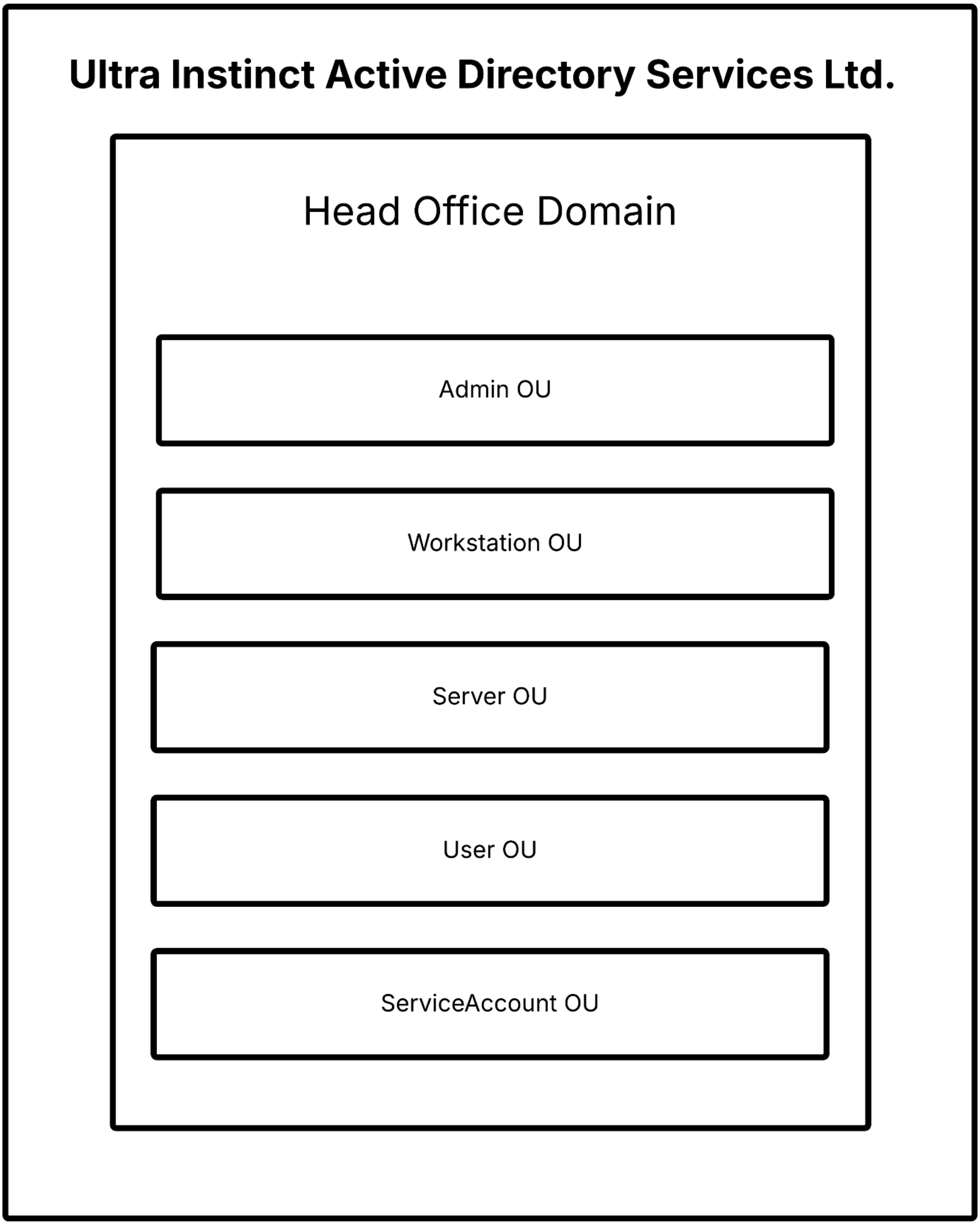
RSAT: BitLocker Drive Encryption Administration Utilities — Installing

RSAT: Remote Access Management Tools — Installing

RSAT: Storage Migration Service Management Tools — Installing

RSAT: Remote Desktop Services Tools — Installing

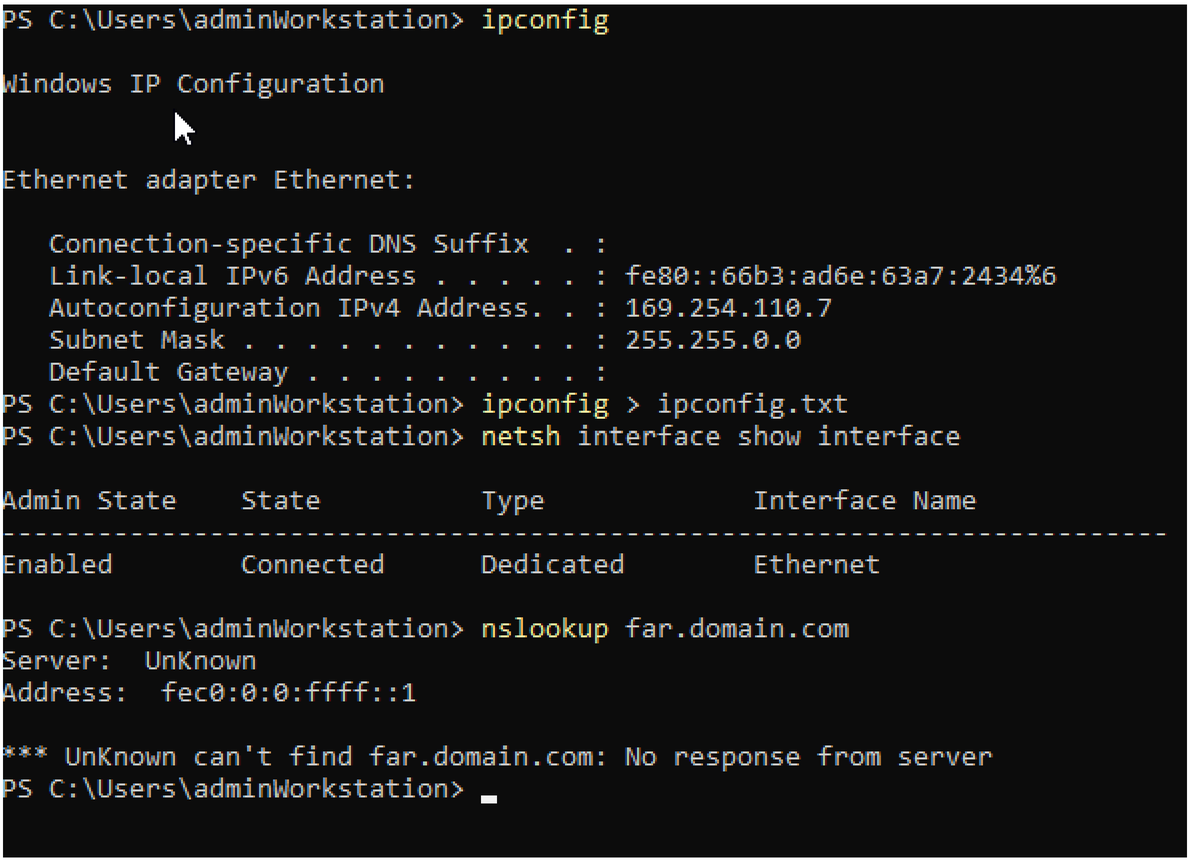
At this stage we have: a standard machine, an admin workstation, and a domain controller. The next step is to diagram it out, and for this I've designed various organizational units for a medium-sized business case. Below, you can find a high-level overview of what that might look like.



From this point onwards, we need to start considering what each organizational unit will HAVE, for example users, groups, computers, etc. From the diagram, computers will be in the workstations OU, and the admin OU will have users and an admin group, etc.

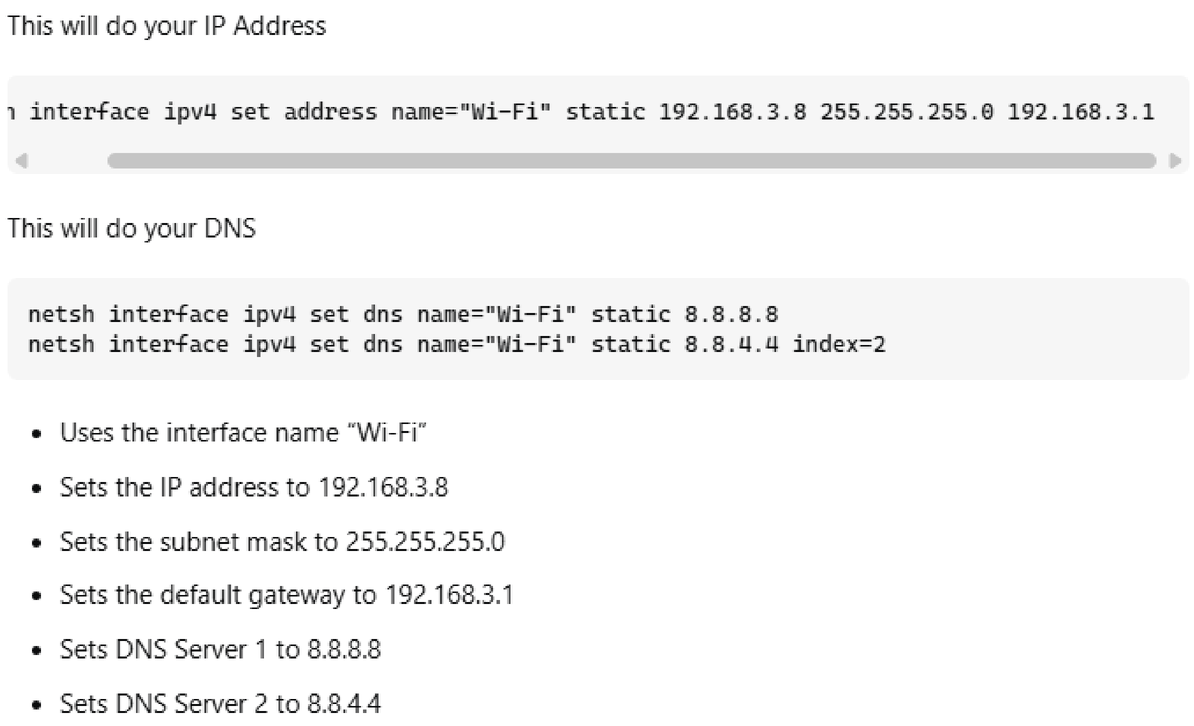
Let us now connect our admin workstation with RSAT tools to the active directory domain, we first need to connect our admin workstation to the domain.

Checking network config...



```
PS C:\Users\adminWorkstation> ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::66b3:ad6e:63a7:2434%6
   Autoconfiguration IPv4 Address. . : 169.254.110.7
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . :
PS C:\Users\adminWorkstation> ipconfig > ipconfig.txt
PS C:\Users\adminWorkstation> netsh interface show interface

Admin State    State          Type             Interface Name
-------------------------------------------------------------------------
Enabled        Connected      Dedicated        Ethernet

PS C:\Users\adminWorkstation> nslookup far.domain.com
Server:  UnKnown
Address:  fec0:0:0:ffff::1

*** UnKnown can't find far.domain.com: No response from server
PS C:\Users\adminWorkstation> _
```

We need to set the IP address to a static IP, currently everything is on an internal network, we will later open up access to the public internet once actual infrastructure has been built. I was too lazy to look up the commands in this document, and just got it from stack.



This will do your IP Address

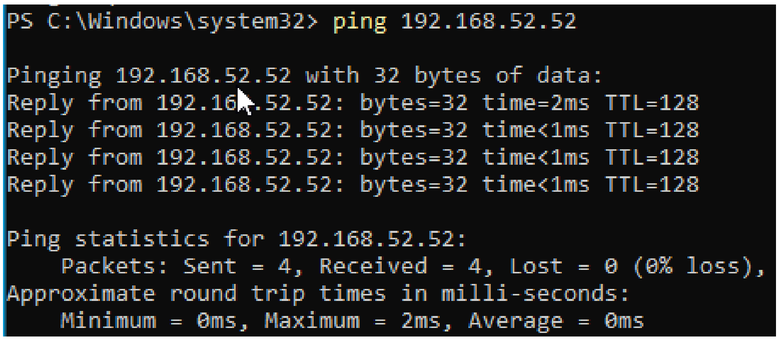
```
h interface ipv4 set address name="Wi-Fi" static 192.168.3.8 255.255.255.0 192.168.3.1
```

This will do your DNS

```
netsh interface ipv4 set dns name="Wi-Fi" static 8.8.8.8
netsh interface ipv4 set dns name="Wi-Fi" static 8.8.4.4 index=2
```

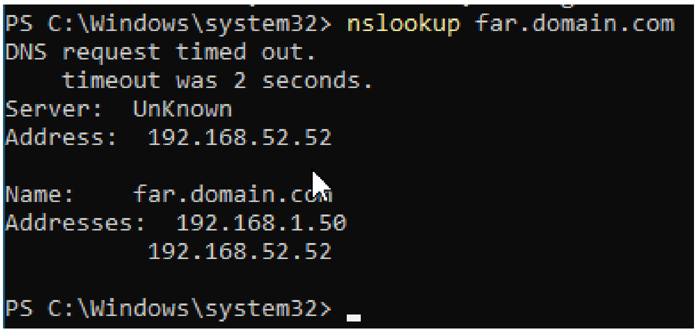
- Uses the interface name “Wi-Fi”
- Sets the IP address to 192.168.3.8
- Sets the subnet mask to 255.255.255.0
- Sets the default gateway to 192.168.3.1
- Sets DNS Server 1 to 8.8.8.8
- Sets DNS Server 2 to 8.8.4.4

After setting a static IP and pointing the DNS to the DNS server, we will now check if we can first ping the DNS server. Which we are able to do.



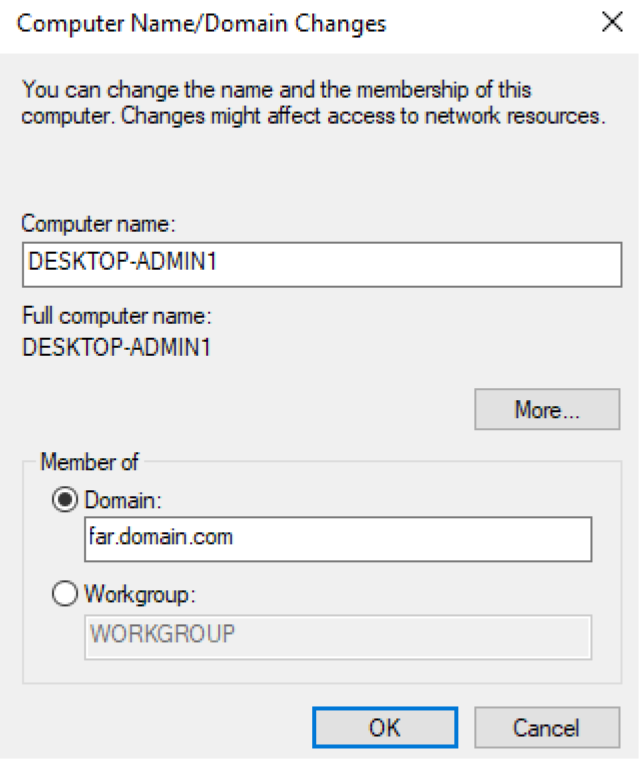
```
PS C:\Windows\system32> ping 192.168.52.52

Pinging 192.168.52.52 with 32 bytes of data:
Reply from 192.168.52.52: bytes=32 time=2ms TTL=128
Reply from 192.168.52.52: bytes=32 time<1ms TTL=128
Reply from 192.168.52.52: bytes=32 time<1ms TTL=128
Reply from 192.168.52.52: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.52.52:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms
```

Now we will check if the DNS server name is being resolved, which it is doing correctly.



```
PS C:\Windows\system32> nslookup far.domain.com
DNS request timed out.
    timeout was 2 seconds.
Server:  UnKnown
Address:  192.168.52.52

Name:    far.domain.com
Addresses:  192.168.1.50
          192.168.52.52

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

Now, it is able to perform the domain join.



Computer Name/Domain Changes

You can change the name and the membership of this computer. Changes might affect access to network resources.

Computer name:
DESKTOP-ADMIN1

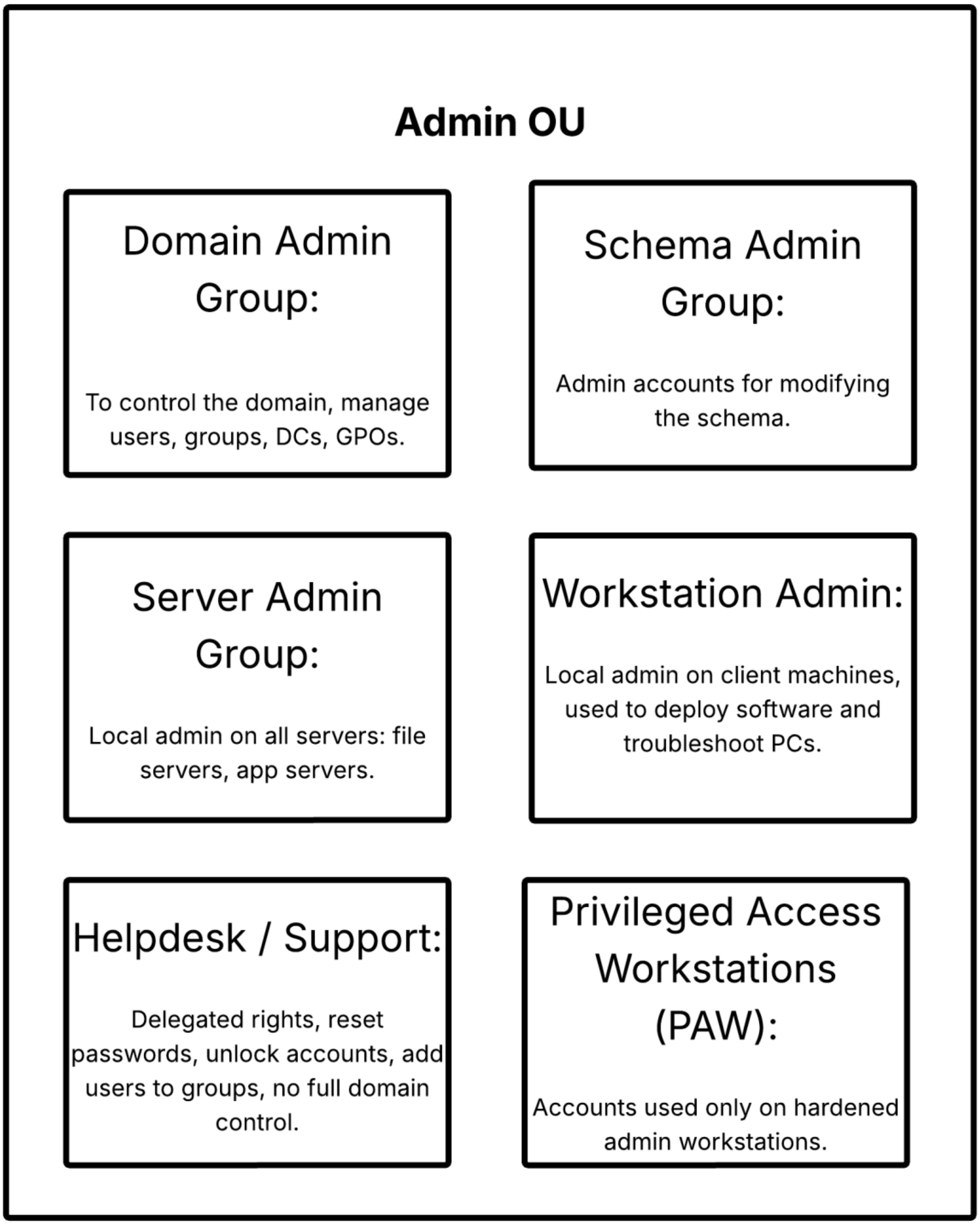
Full computer name:
DESKTOP-ADMIN1

Member of

● Domain:
far.domain.com

○ Workgroup:
WORKGROUP

We will first focus on constructing the Admin OU from the following schema:



Admin OU

Domain Admin Group:

To control the domain, manage users, groups, DCs, GPOs.

Schema Admin Group:

Admin accounts for modifying the schema.

Server Admin Group:

Local admin on all servers: file servers, app servers.

Workstation Admin:

Local admin on client machines, used to deploy software and troubleshoot PCs.

Helpdesk / Support:

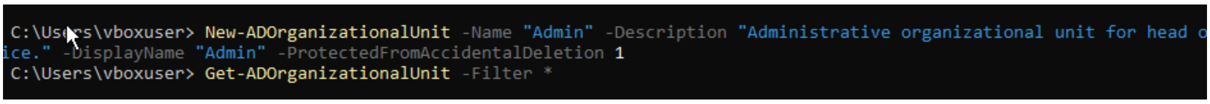
Delegated rights, reset passwords, unlock accounts, add users to groups, no full domain control.

Privileged Access Workstations (PAW):

Accounts used only on hardened admin workstations.

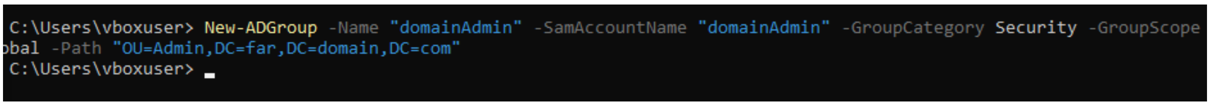
For now, let us construct the domain admin group; to use on the administrative workstation, we will set up the rest of the groups from the GUI.

1. Construct the AD OU



```
C:\Users\vboxuser> New-ADOrganizationalUnit -Name "Admin" -Description "Administrative organizational unit for head o
ice." -DisplayName "Admin" -ProtectedFromAccidentalDeletion 1
C:\Users\vboxuser> Get-ADOrganizationalUnit -Filter *
```

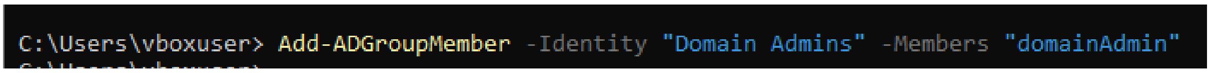
2. Construct the AD Group, within the OU.



```
C:\Users\vboxuser> New-ADGroup -Name "domainAdmin" -SamAccountName "domainAdmin" -GroupCategory Security -GroupScope
bal -Path "OU=Admin,DC=far,DC=domain,DC=com"
C:\Users\vboxuser>
```

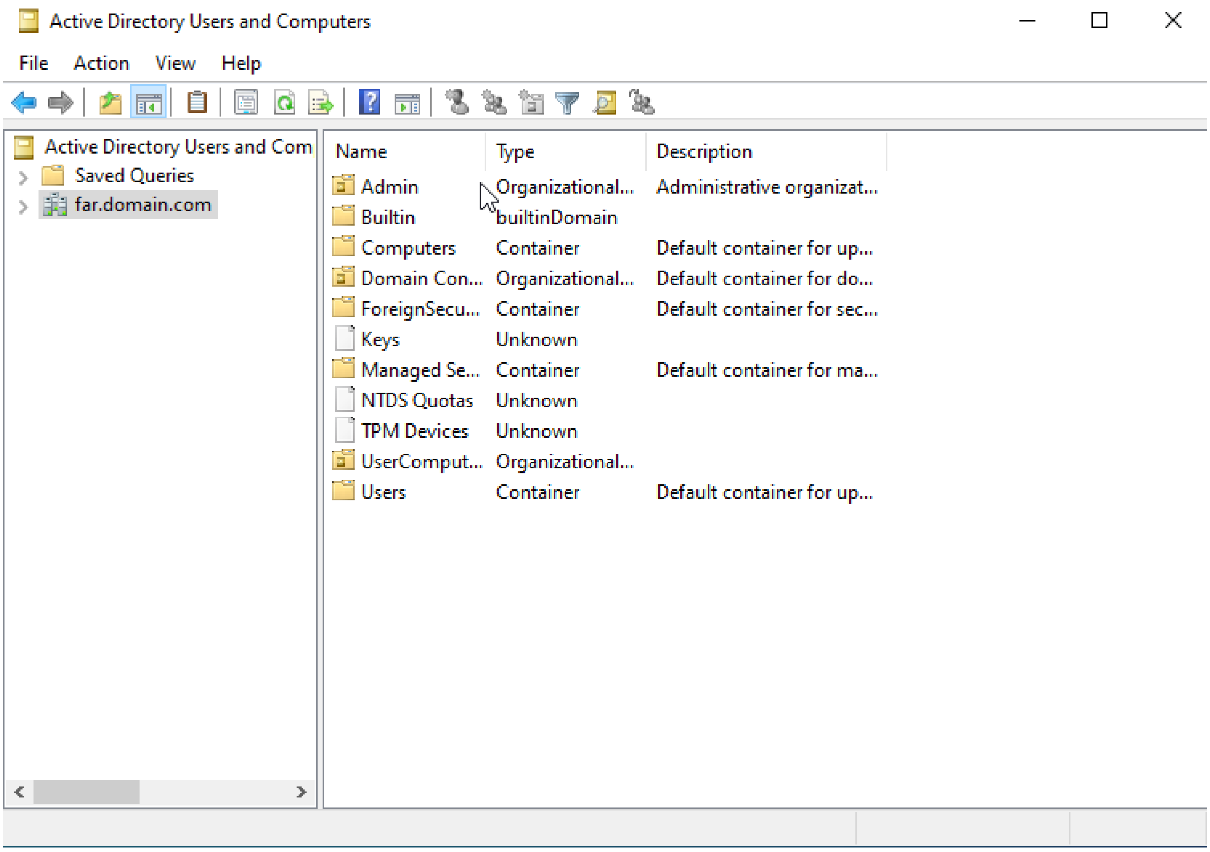
At this stage, we have the OU, and the first group within that OU. Now let us add a privileged user to this group, so we can configure the rest of the AD from the GUI, where required.

Nesting the current domainAdmin group inside the actual Domain Admins group which is built in to AD.



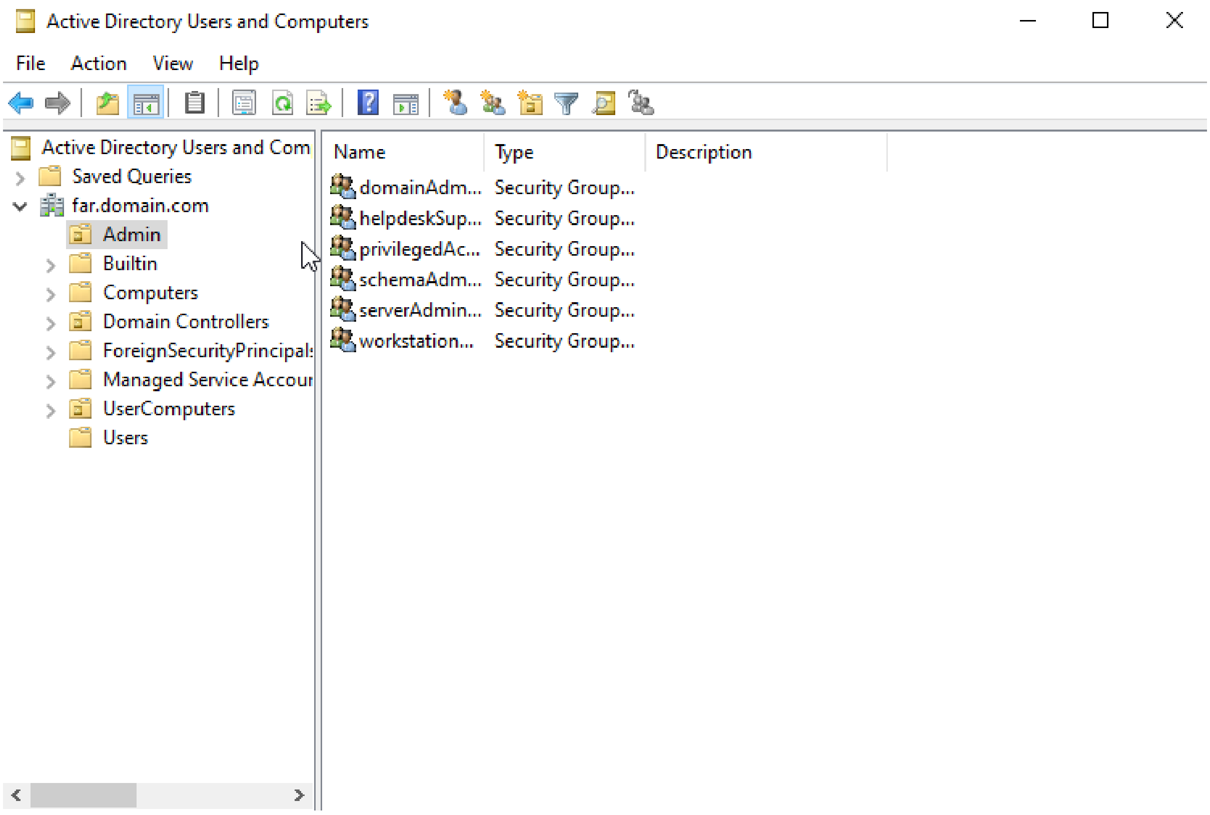
```
C:\Users\vboxuser> Add-ADGroupMember -Identity "Domain Admins" -Members "domainAdmin"
C:\Users\vboxuser>
```

We now have access to the AD GUI ‘dsa.msc’ from the admin workstation.


Active Directory Users and Computers
File
Action
View
Help
Active Directory Users and Com
Saved Queries
far.domain.com

Name	Type	Description
Admin	Organizational...	Administrative organizat...
Builtin	builtinDomain	
Computers	Container	Default container for up...
Domain Con...	Organizational...	Default container for do...
ForeignSecu...	Container	Default container for sec...
Keys	Unknown	
Managed Se...	Container	Default container for ma...
NTDS Quotas	Unknown	
TPM Devices	Unknown	
UserComput...	Organizational...	
Users	Container	Default container for up...

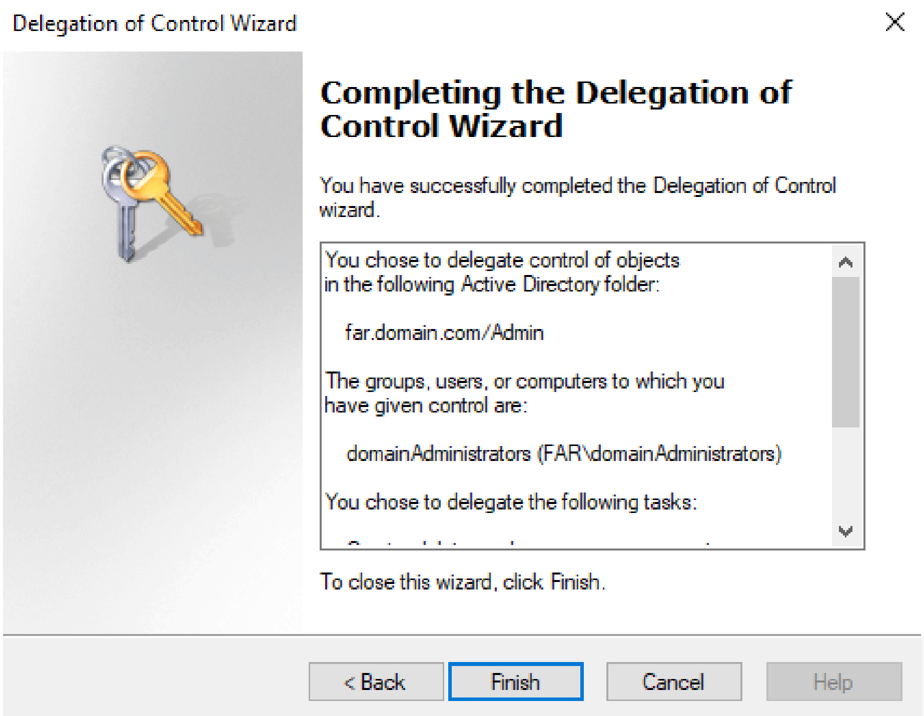
From this point, we can make all the groups for the Admin OU.



- Active Directory Users and Com
  - Saved Queries
  - far.domain.com
    - Admin
    - Builtin
    - Computers
    - Domain Controllers
    - ForeignSecurityPrincipal:
    - Managed Service Accour
    - UserComputers
    - Users

Name	Type	Description
domainAdm...	Security Group...	
helpdeskSup...	Security Group...	
privilegedAc...	Security Group...	
schemaAdm...	Security Group...	
serverAdmin...	Security Group...	
workstation...	Security Group...	

From here, we can set permission by delegating control, using the delegation of control wizard.



Completing the Delegation of Control Wizard

You have successfully completed the Delegation of Control wizard.

You chose to delegate control of objects in the following Active Directory folder:

far.domain.com/Admin

The groups, users, or computers to which you have given control are:

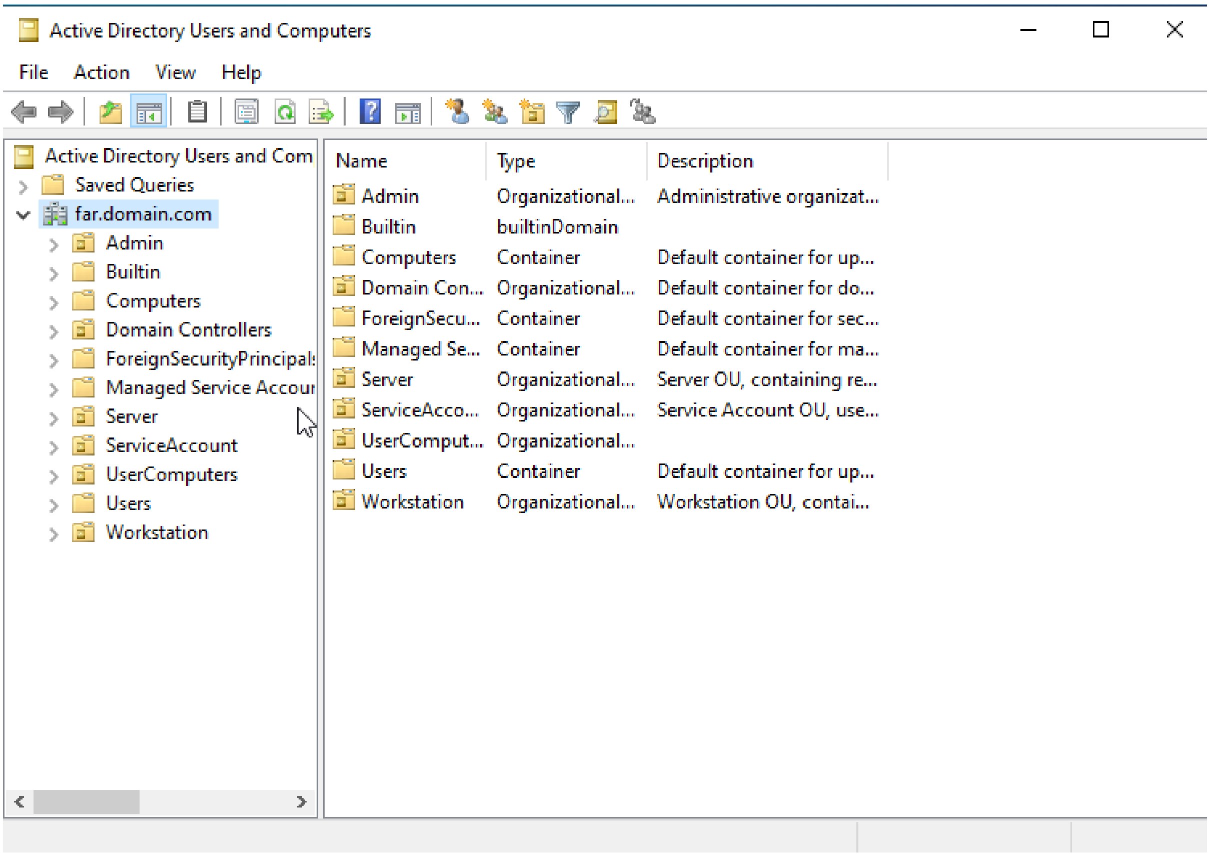
domainAdministrators (FAR\domainAdministrators)

You chose to delegate the following tasks:

To close this wizard, click Finish.

Edition 5

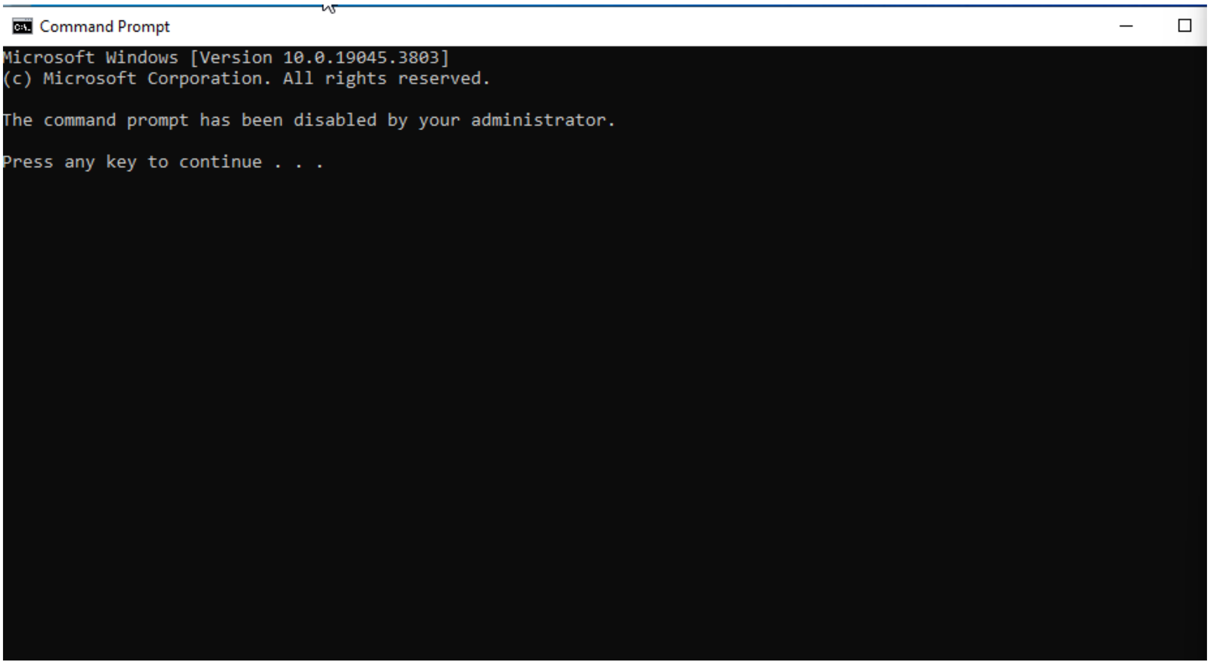
Let us now construct the rest of the Ous outlined in the earlier blueprint. We can see the Ous as outlined in the blueprint below.



Name	Type	Description
Admin	Organizational...	Administrative organizat...
Builtin	builtinDomain	
Computers	Container	Default container for up...
Domain Con...	Organizational...	Default container for do...
ForeignSecu...	Container	Default container for sec...
Managed Se...	Container	Default container for ma...
Server	Organizational...	Server OU, containing re...
ServiceAcco...	Organizational...	Service Account OU, use...
UserComput...	Organizational...	
Users	Container	Default container for up...
Workstation	Organizational...	Workstation OU, contai...

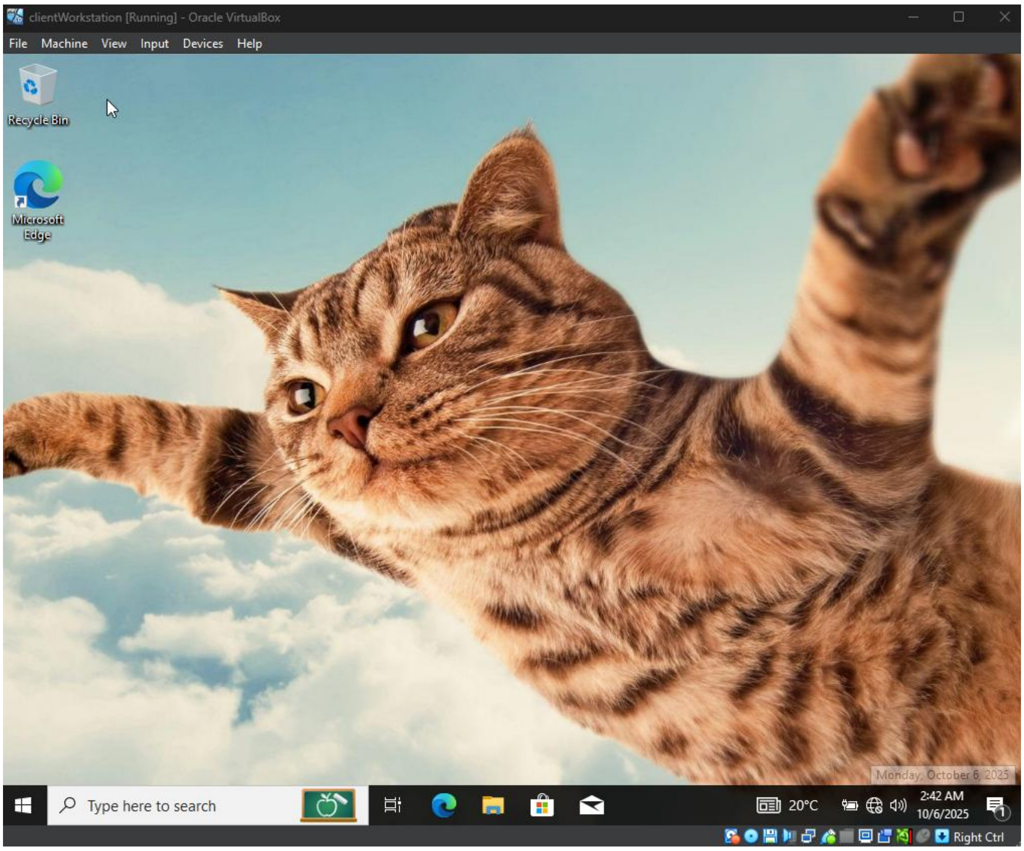
This below, is the Group Policy Management Console (GPMC), as opposed to the above Active Directory Administrative Console (ADAC). We can expand the domain in GPMC to see what linked group policy objects, group policy inheritance, and delegation exist for each OU.

After messing around quite a lot, I have managed to disable the CMD for a user in AD.



```
Microsoft Windows [Version 10.0.19045.3803]
(c) Microsoft Corporation. All rights reserved.

The command prompt has been disabled by your administrator.

Press any key to continue . . .
```

Now that we've implemented our first GPO, we can also implement other GPOs. This time, I will change the background of all machines in a particular security group.



We are able to change the background of the image by ensuring the client machine has read access to the image in an NTFS capacity. We used the administrative workstation to accomplish this, by accessing using ROBOCOPY to move the image from the workstation to the DC, then moving the image in the DC from the initial folder to the NTFS. Finally, the admin workstation was used to change permissions on the NTFS and set the image as a background. This works for users who are 'CS-Students' and under the IT OU. Where CS-Students is a group, and IT OU is an OrganizationalUnit.