



**FACULTAD DE INGENIERIA
ESCUELA DE COMPUTACION
ASIGNATURA: ASR104
CICLO ACADEMICO: 01-2022**

Título:

"Trabajo de Catedra"

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Soyapango, 15 de febrero de 2022

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I. Hyper-V

I.I Definición

Hyper-V es la solución de virtualización de hardware de Microsoft. Una herramienta capaz de crear y ejecutar una versión de software en una computadora virtualizada (ej. Ubuntu Linux). Cada máquina virtual actúa como una computadora completa, ejecutando por completo un sistema operativo y programas. Las máquinas virtuales brindan gran flexibilidad, ayudando a ahorrar tiempo y dinero, haciendo uso de una forma más eficiente del hardware disponible físicamente. Dicha herramienta se limita a los procesadores de 64 bits compatibles (AMD-V o Intel VT). Hyper-V fue incluido por primera vez en Windows server 2008 con el objetivo de poder desplegar máquinas virtuales con almacenamiento individual, **Live Migration** y mejoras sustanciales en el rendimiento.



II. Arquitectura

Hyper-v utiliza un tipo de hipervisor de arquitectura de virtualización que se proporciona como un componente extremadamente pequeño llamado hipervisor de Windows. En lugar de usar un hipervisor monolítico, usa un hipervisor basado en microkernel en el que el controlador del dispositivo (pila de controladores de Windows) está integrado en el sistema operativo de administración (partición principal) en lugar del propio hipervisor. Esto significa que los controladores que son compatibles con el sistema operativo de gestión se pueden integrar fácilmente en la plataforma de virtualización y se evita que los controladores afecten la calidad del hipervisor.

Los distintos sistemas operativos invitados dentro de Hyper-V son tratados como una unidad aislada, junto a la partición raíz por lo cual se puede hacer la analogía a que es una partición de un disco duro junto a otras.

Cada partición individual es orquestada por el hipervisor. Estas particiones subordinadas se crean y administran por medio de una interfaz en el sistema anfitrión denominada HyperCall Api. Toda partición siempre está aislada. Se le asigna a cada sistema invitado cierto recursos de hardware virtual, pero nunca acceden directamente al hardware físico del anfitrión. Se utiliza el llamado VMBus para solicitar recursos de hardware, dicho canal permite la comunicación entre particiones. Los sistemas invitados pueden solicitar recursos al anfitrión, pero teóricamente también poseen comunicación entre sí.

Las particiones ejecutan servicios de solicitudes y respuestas que corren en el VMBus. El sistema anfitrión ejecuta el VSP (Proveedor de servicios de virtualización) y las particiones subordinadas VSC (Clientes de servicios de virtualización).

III. Funcionamiento

Los sistemas operativos invitados de Hyper-V son tratados como una unidad aislada, localizada junto a la partición raíz por consiguiente se considera como una partición de disco duro junto a otras. Todas las particiones son controladas por el hipervisor, dichas particiones subordinadas se crean y administran por medio de una interfaz en el sistema anfitrión denominada HyperCall Api. Una regla inmutable es que toda partición siempre está aislada. A cada sistema virtual se le asigna una cierta cantidad de recursos, pero estos nunca acceden directamente al hardware físico del anfitrión. La solicitud de hardware se realiza a través de VMBus para, dicho canal permite la comunicación entre particiones. Los sistemas invitados pueden solicitar recursos al anfitrión. Las particiones ejecutan servicios de solicitudes y respuestas que corren en el VMBus. El sistema anfitrión ejecuta el VSP (Proveedor de servicios de virtualización) y las particiones subordinadas VSC (Clientes de servicios de virtualización).

Dentro de la versión de Hyper-V para Windows server se pueden enlistar algunas funcionalidades extras, propias del manejo en servidores.

- Migración en vivo de máquinas
- Replicación de Hyper-V
- Soporte para canal de fibra virtual
- Configuraciones de redes SR-IOV
- VHDX en modo compartido
- Gestión de memoria avanzada para las máquinas virtuales

Por otro lado, en Windows 11 Pro solo se cuentan con las siguientes funciones:

- Modo de creación rápido de máquinas virtuales y carpeta de galería de VM
- Modo de red compartida con host de tipo NAT.

IV. Ventajas y desventajas

Hyper-V a pesar de ser una herramienta robusta y de tener todo el apoyo de Microsoft tiene puntos fuertes y debilidades, las cuales se detallan en las siguientes listas:

Ventajas.

- Hyper-V como es exclusivo de Windows tiene una estrecha conexión con el sistema operativo lo que aumenta el rendimiento y compatibilidad.
- Dentro de los sistemas operativos de servidores casi siempre viene incluido gratuitamente.
- Administración sencilla
- Mayor compatibilidad y rendimiento con sistemas operativos Windows.

Desventajas

- Sistemas invitados limitados
- Pocas distribuciones Linux compatibles
- No es posible usar MacOS como sistema operativo invitado
- Si se ejecutan varios sistemas huéspedes de Linux se espera una gran pérdida del rendimiento.

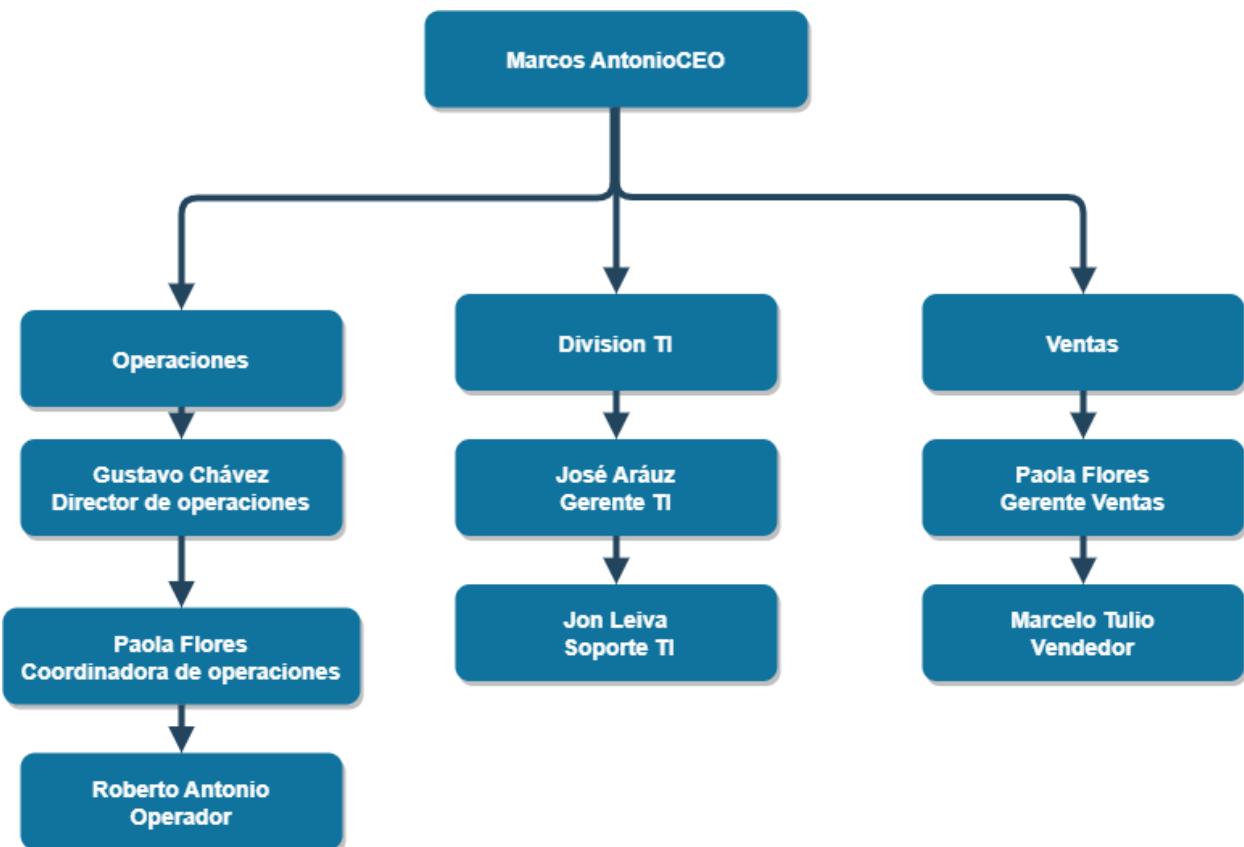
V. Empresa Merelic

Acerca de la empresa

Somos una empresa salvadoreña, líder en la comercialización regional de energía eléctrica. Nuestra misión es promover el crecimiento del sector eléctrico centroamericano y del comercio de la energía eléctrica entre los países de la región, mediante la comercialización de energía con Calidad, Eficiencia y Dinamismo.

Departamentos

Como toda gran organización corporativa Merelic cuenta con distintos departamentos para brindar a sus clientes la mejor calidad posible, dichos departamentos se pueden dividir en Operaciones, División de TI y Ventas.



Operaciones	
NOMBRE	CARGO
Gustavo Chávez	Directores de operaciones
Paola Flores	Coordinador de operaciones
Roberto Antonio	Operador

División TI	
NOMBRE	CARGO
José Arauz	Gerente TI
Jon Leiva	Soporte TI

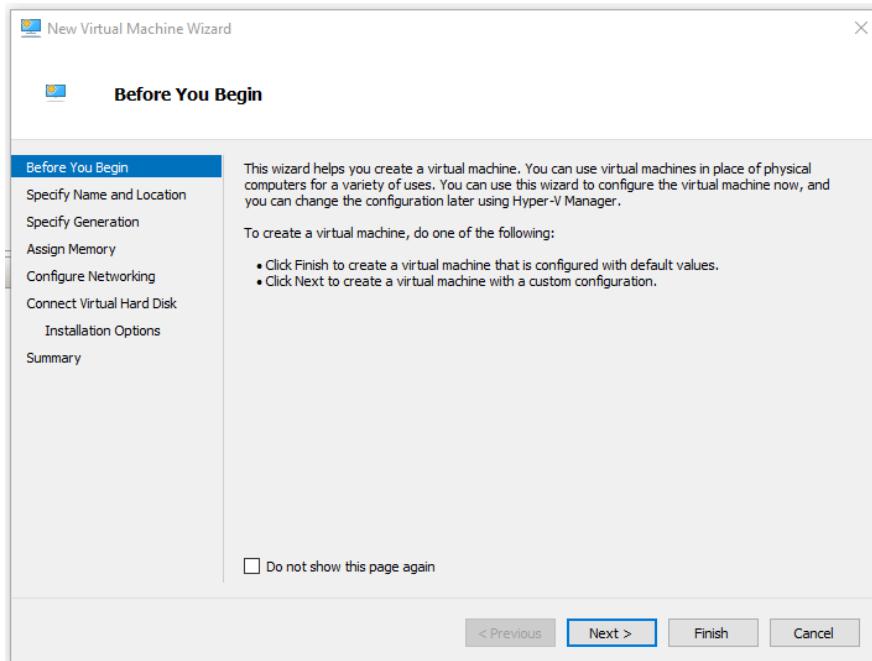
Ventas	
NOMBRE	CARGO
Paola Mejia	Gerente Ventas
Marcelo Túlio	Vendedor

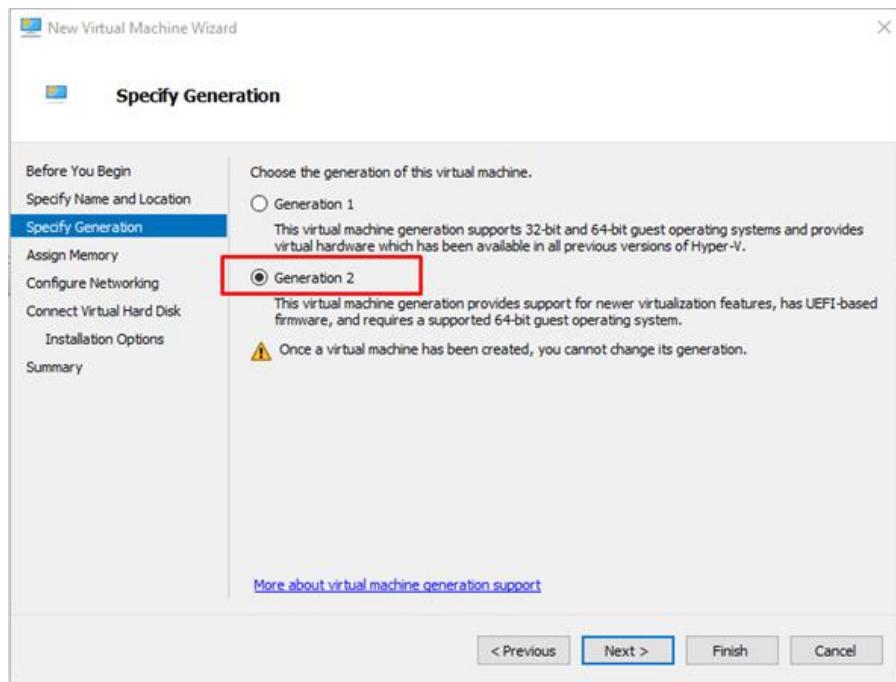
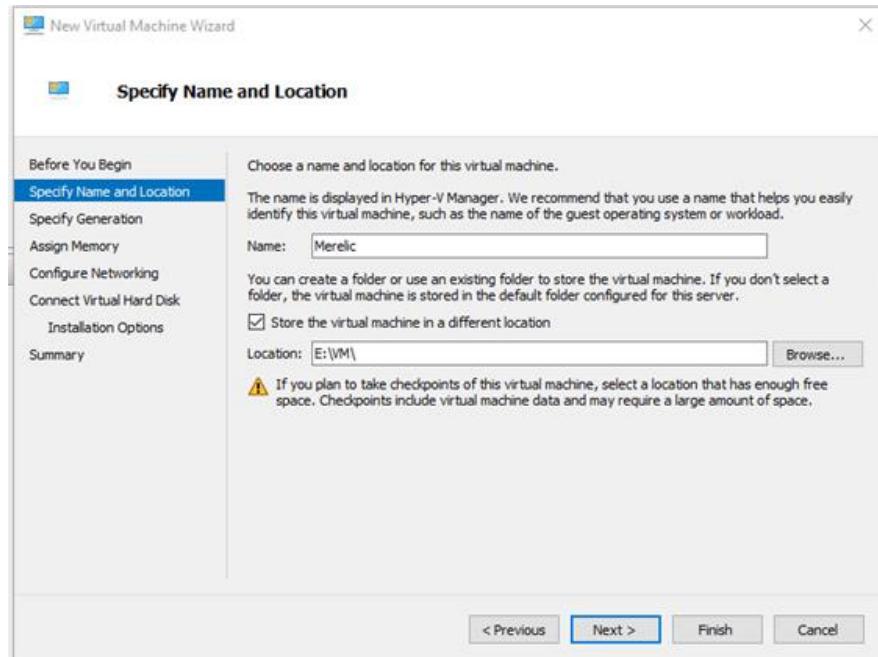
VI. Referencias

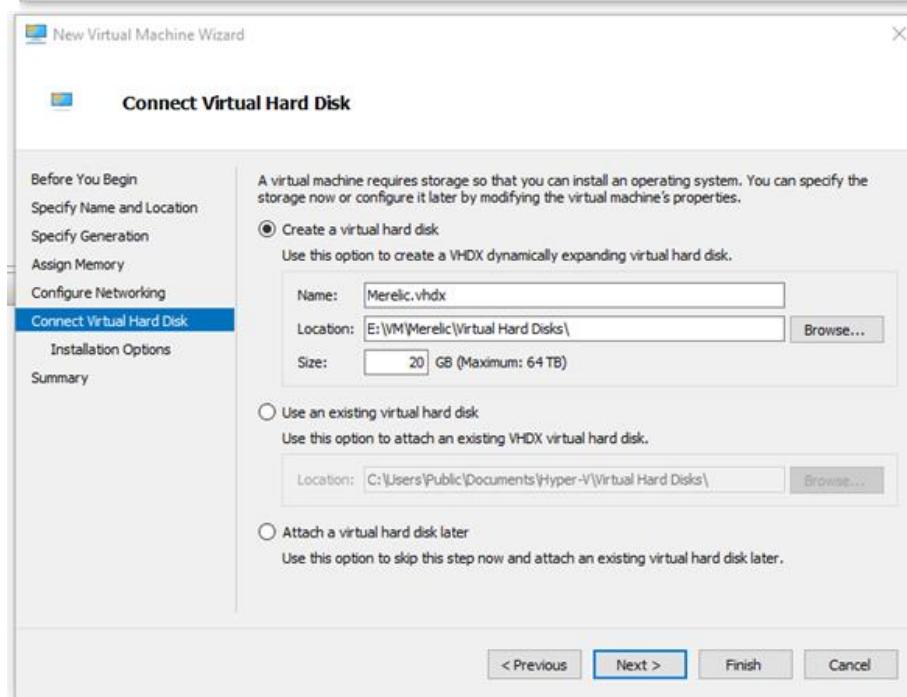
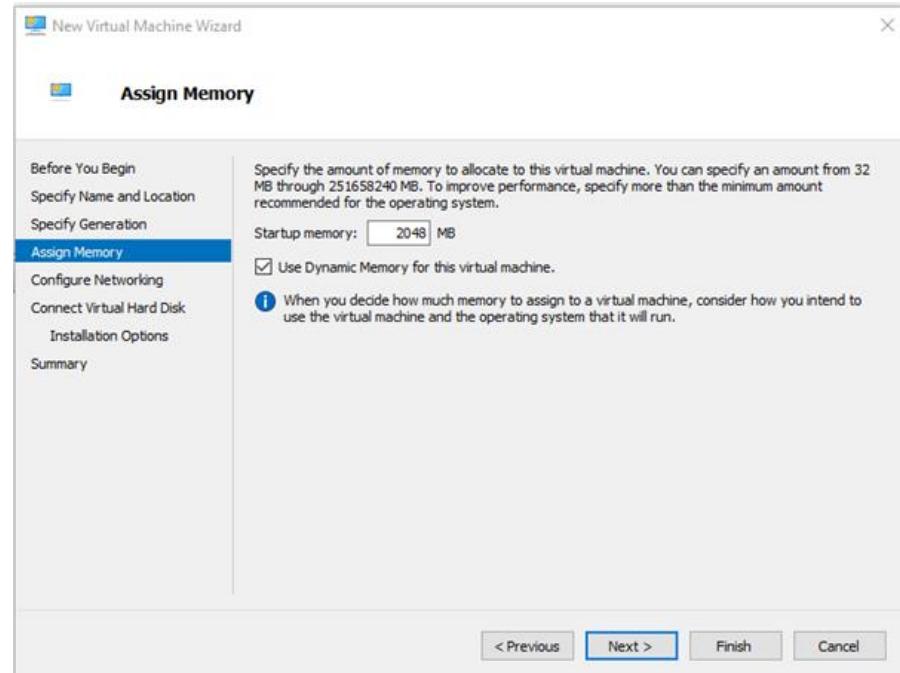
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- Microsoft. (28 de 05 de 2019). *Install Hyper-V on Windows 10.* Obtenido de <https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/quick-start/enable-hyper-v>
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- Haga, Y., Imaeda, K., & Jibu, M. (2011). Windows server 2008 R2 hyper-V server virtualization. *Fujitsu Sci. Tech. J.*, 47(3), 349-355

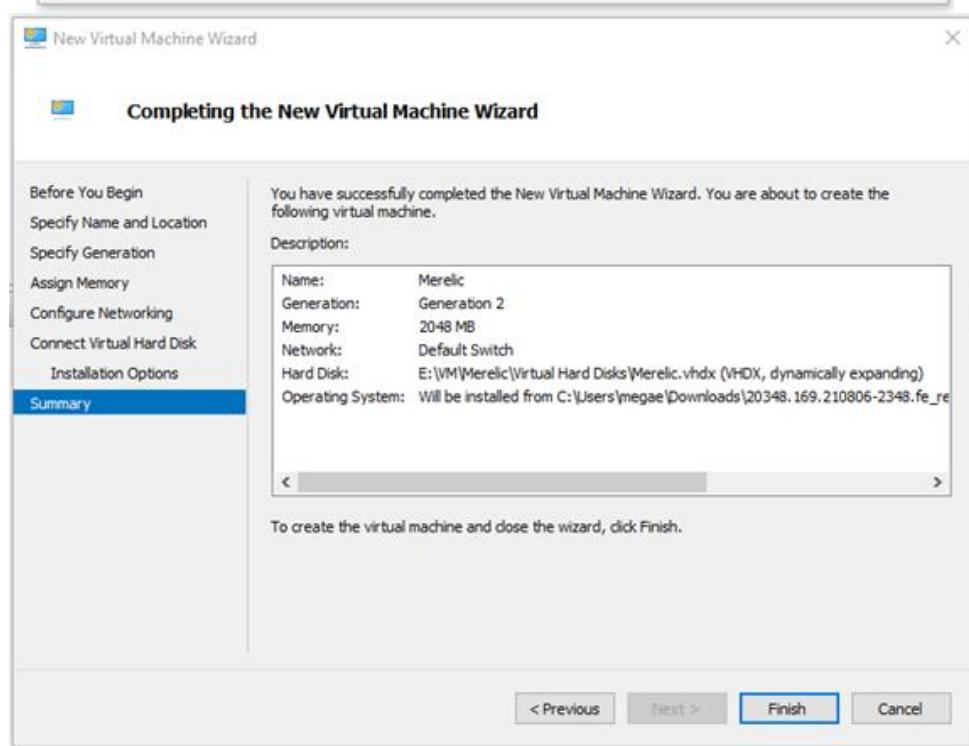
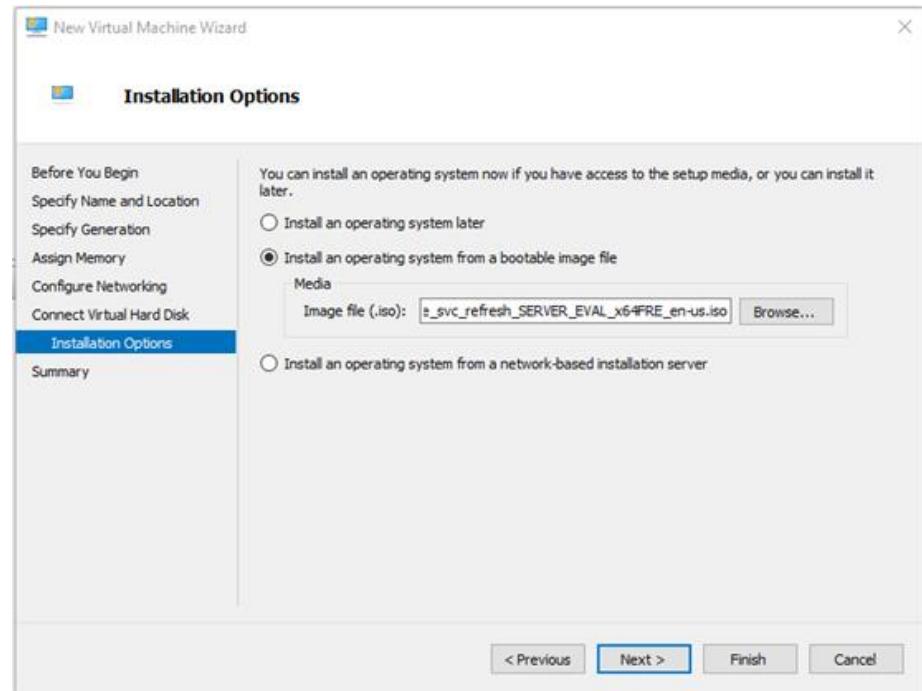
VII. Anexos

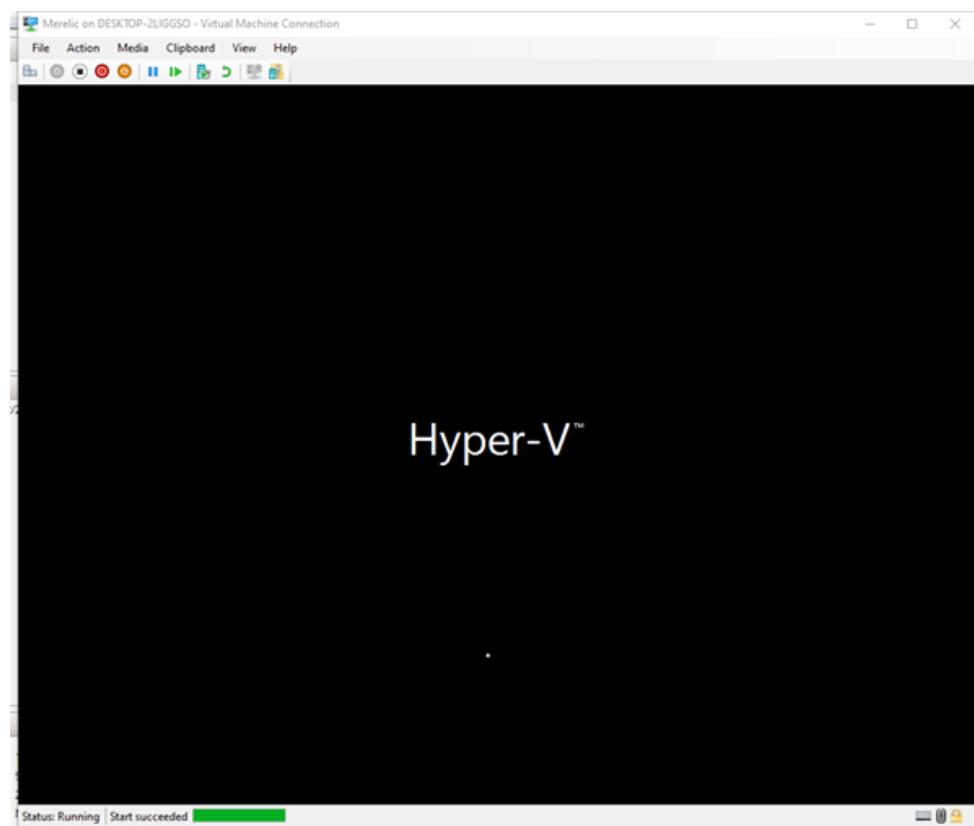
VII.I Creación de la máquina virtual.



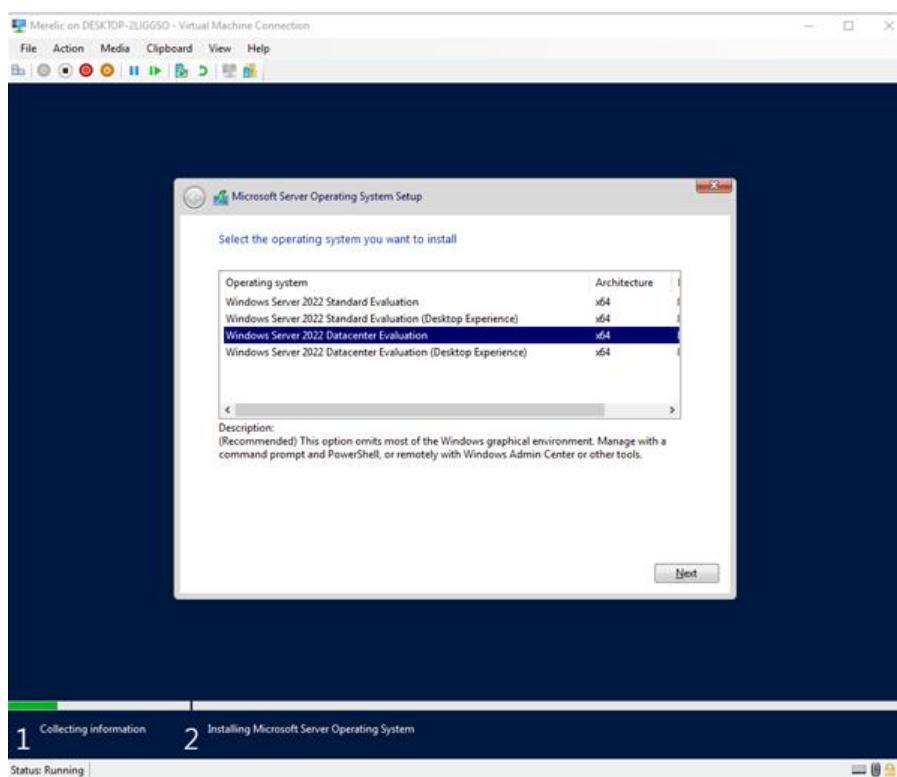
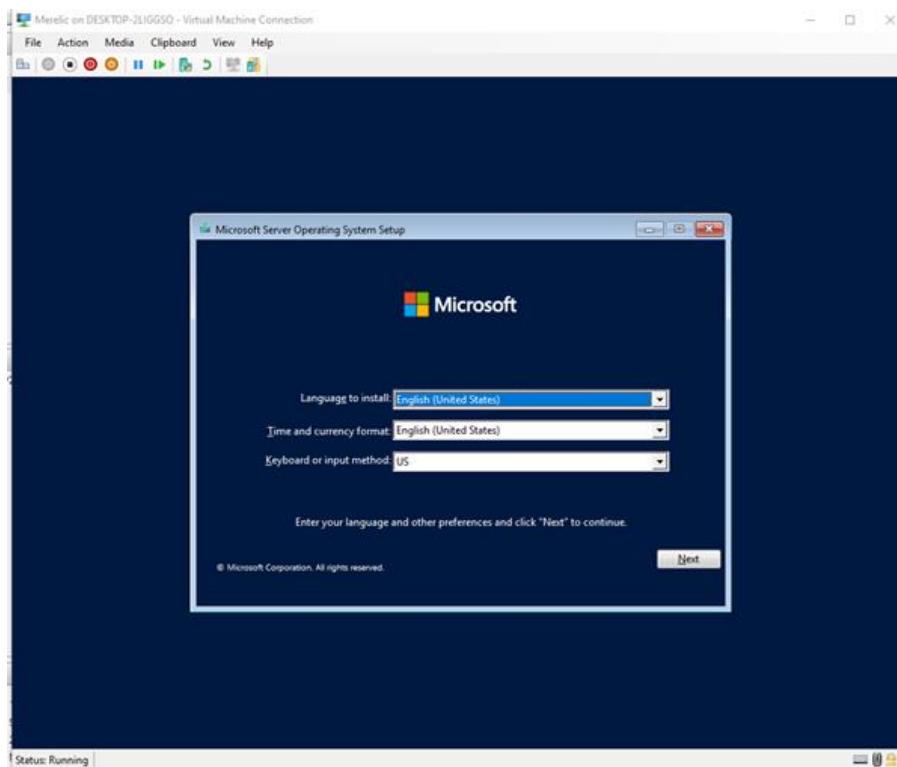


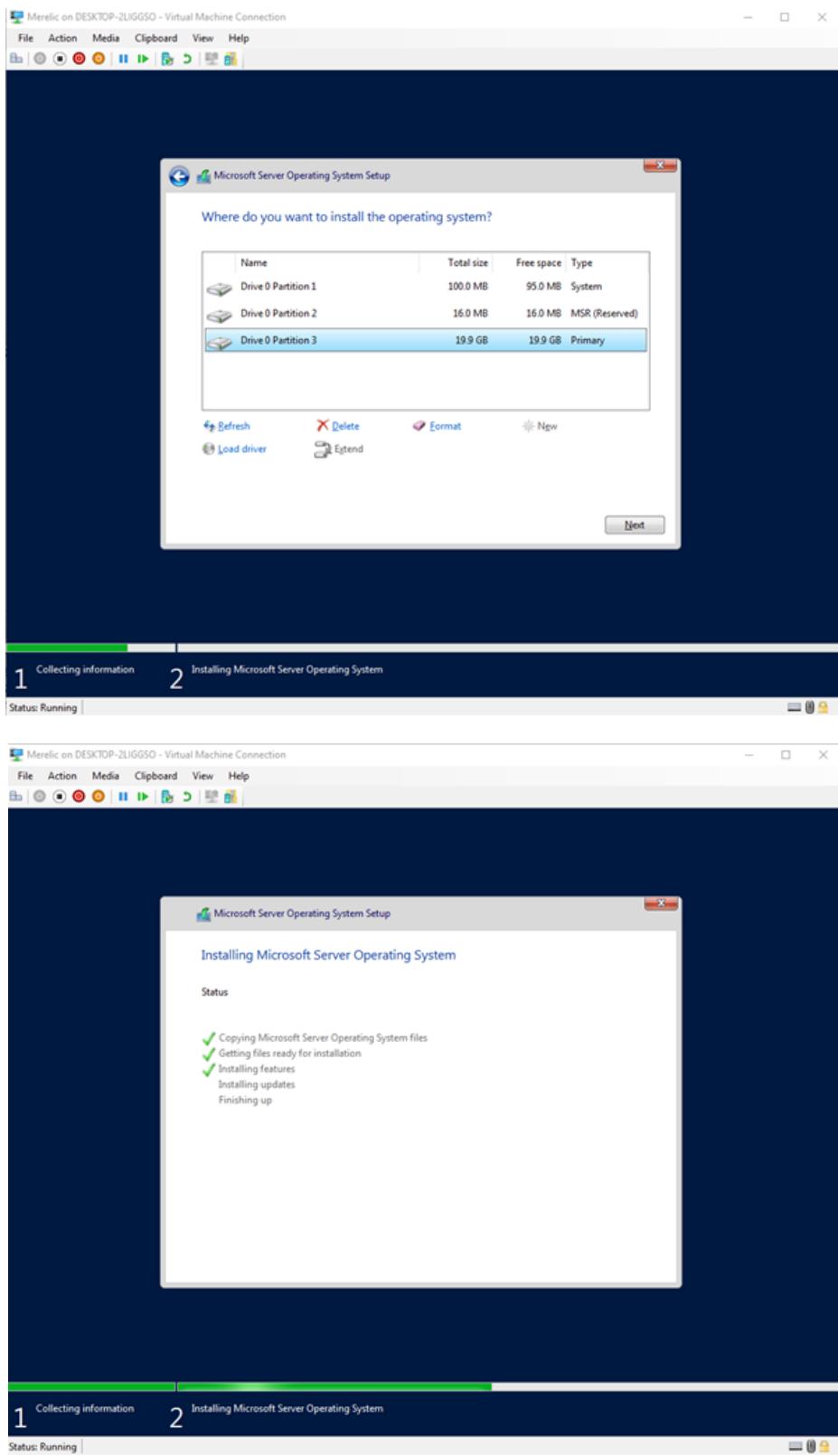


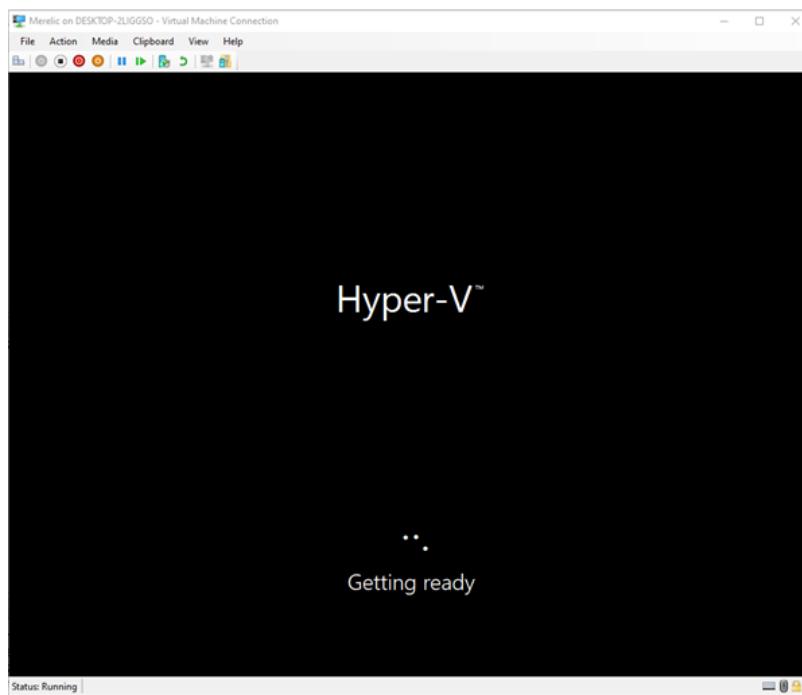




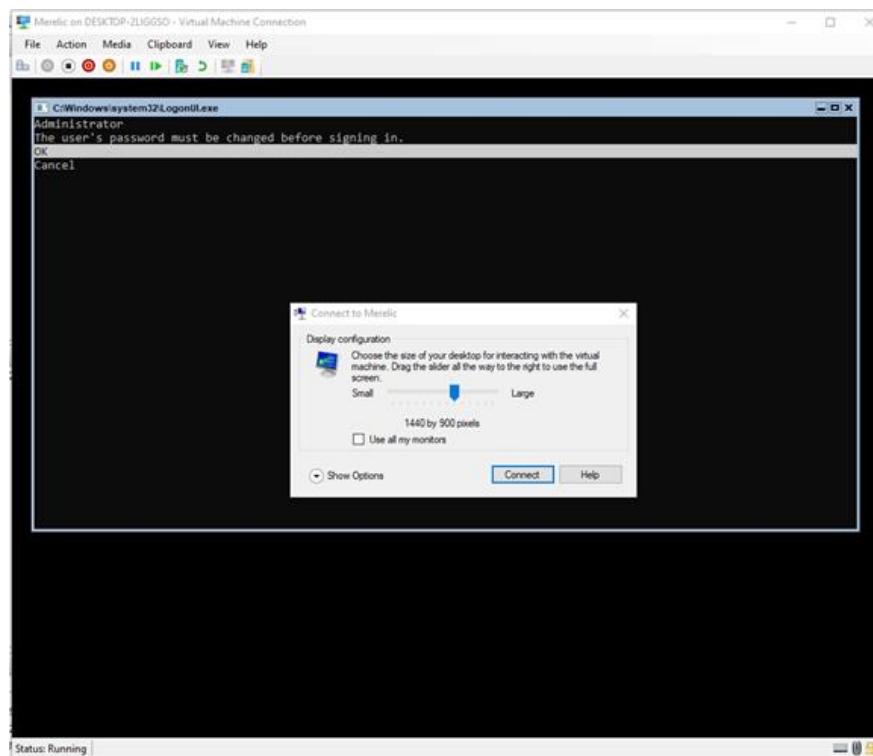
VII.II Instalación del sistema operativo Windows server 2022 Core.

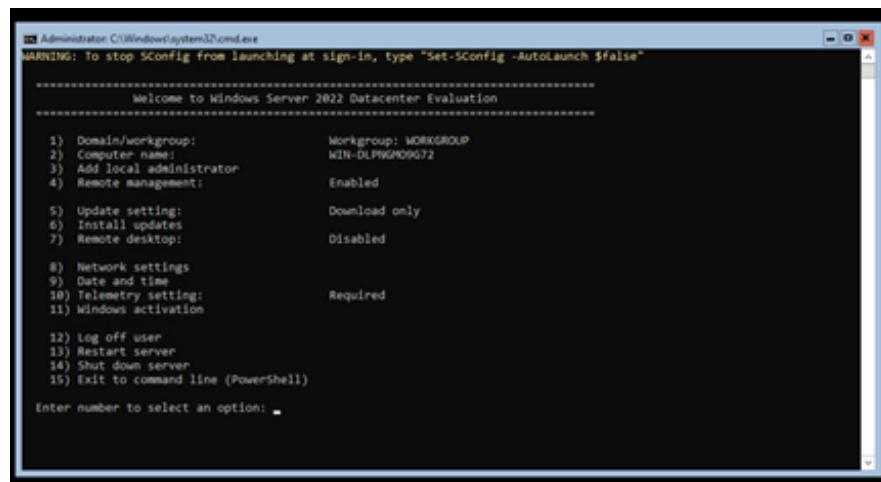
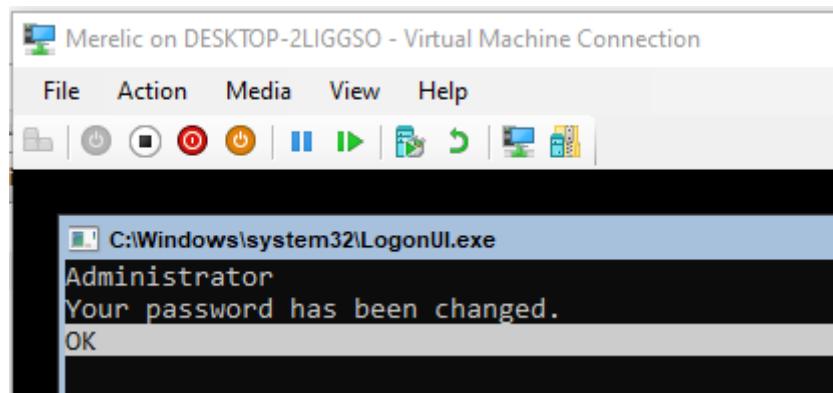
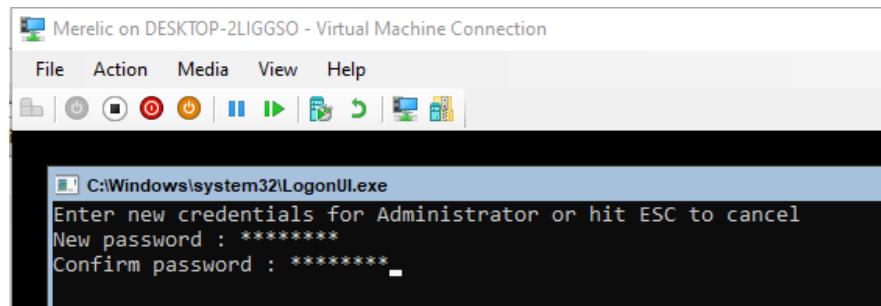
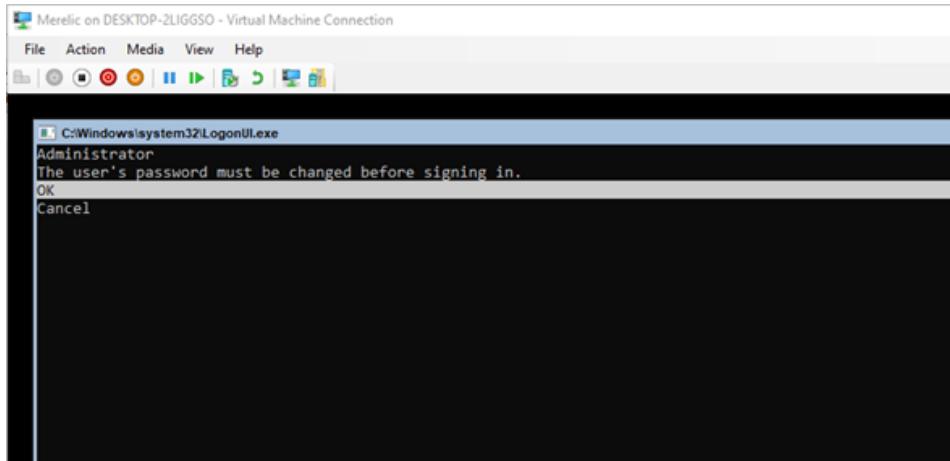






VII.III Configuración básica ws2022 core





```
Administrator: C:\Windows\system32\cmd.exe

=====
Computer name

Current computer name: WIN-DLPNGM09G72
Enter new computer name (Blank=Cancel): MERELICWS2022DC
```

```
=====
Welcome to Windows Server 2022 Datacenter Evaluation
=====

1) Domain/workgroup:           Workgroup: WORKGROUP
2) Computer name:             MERELICWS2022DC
3) Add local administrator
4) Remote management:         Enabled
5) Update setting:            Download only
6) Install updates
7) Remote desktop:            Disabled
```

```
Administrator: C:\Windows\system32\cmd.exe

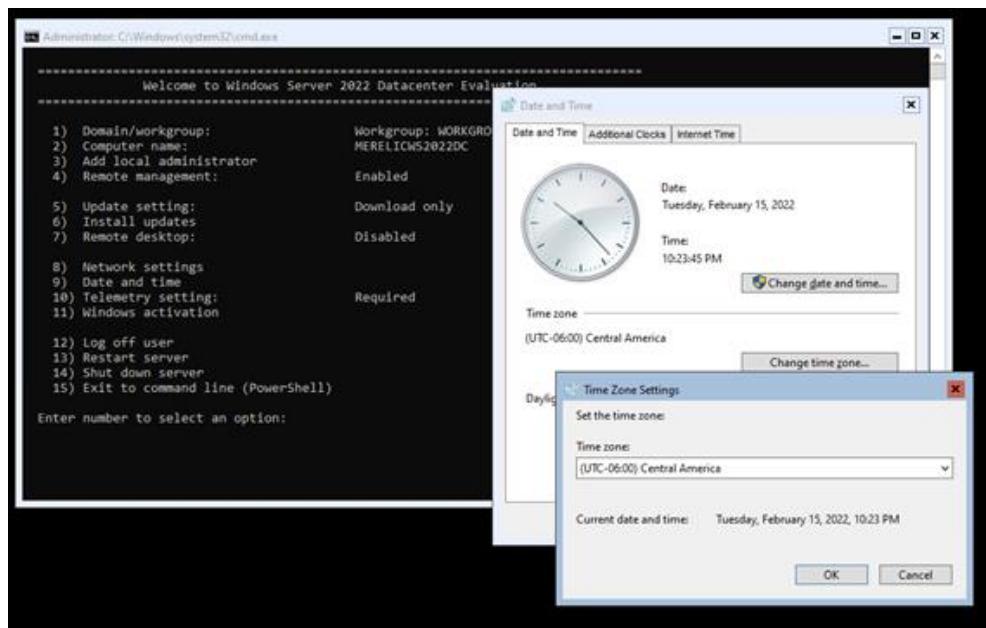
=====
Configure remote management

=====

Remote management is enabled.
Server response to ping is disabled.

1) Enable remote management
2) Disable remote management
3) Enable server response to ping
4) Disable server response to ping

Enter selection (Blank=Cancel): 3
Enabling server response to ping...
Successfully enabled server response to ping.
(Press ENTER to continue):
```



```
Administrator: C:\Windows\system32\cmd.exe
WARNING: To launch Server Configuration tool again, run "SConfig"
PS C:\Users\Administrator> New-NetIPAddress -InterfaceAlias Ethernet -IPAddress 10.0.0.2 -AddressFamily IPv4 -PrefixLength 24
-DefaultGateway 10.0.0.1
```

```
Administrator: C:\Windows\system32\cmd.exe
InterfaceIndex      : 6
InterfaceAlias      : Ethernet
AddressFamily       : IPv4
Type                : Unicast
PrefixLength        : 24
PrefixOrigin        : Manual
SuffixOrigin        : Manual
AddressState        : Tentative
ValidLifetime       : Infinite ([TimeSpan]::MaxValue)
PreferredLifetime   : Infinite ([TimeSpan]::MaxValue)
SkipAsSource        : False
PolicyStore         : ActiveStore

IPAddress          : 10.0.0.2
InterfaceIndex      : 6
InterfaceAlias      : Ethernet
AddressFamily       : IPv4
Type                : Unicast
PrefixLength        : 24
PrefixOrigin        : Manual
SuffixOrigin        : Manual
AddressState        : Invalid
ValidLifetime       : Infinite ([TimeSpan]::MaxValue)
PreferredLifetime   : Infinite ([TimeSpan]::MaxValue)
SkipAsSource        : False
PolicyStore         : PersistentStore

PS C:\Users\Administrator>
```

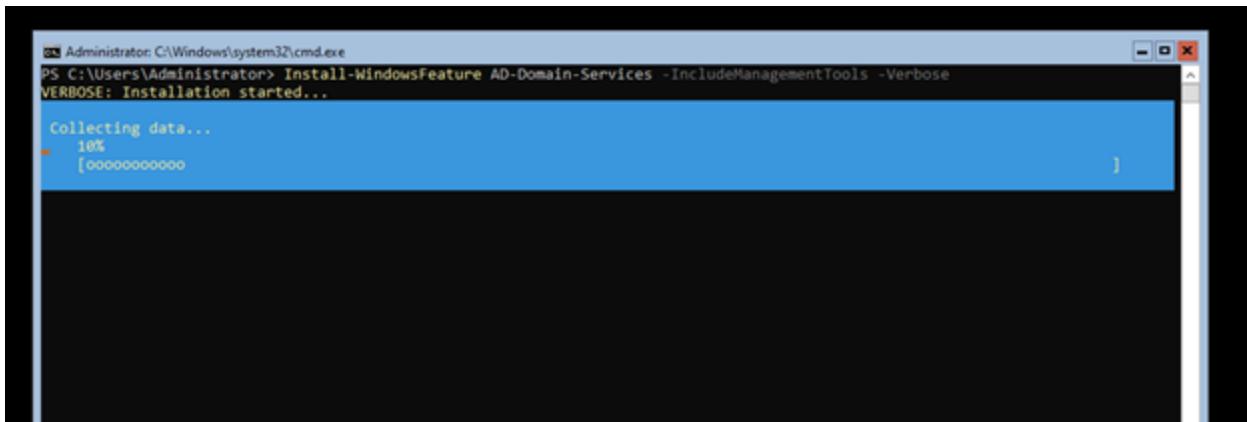
```
Administrator: C:\Windows\system32\cmd.exe
PS C:\Users\Administrator> Set-DnsClientServerAddress -InterfaceAlias Ethernet -ServerAddresses 10.0.0.2
PS C:\Users\Administrator> ipconfig

Windows IP Configuration

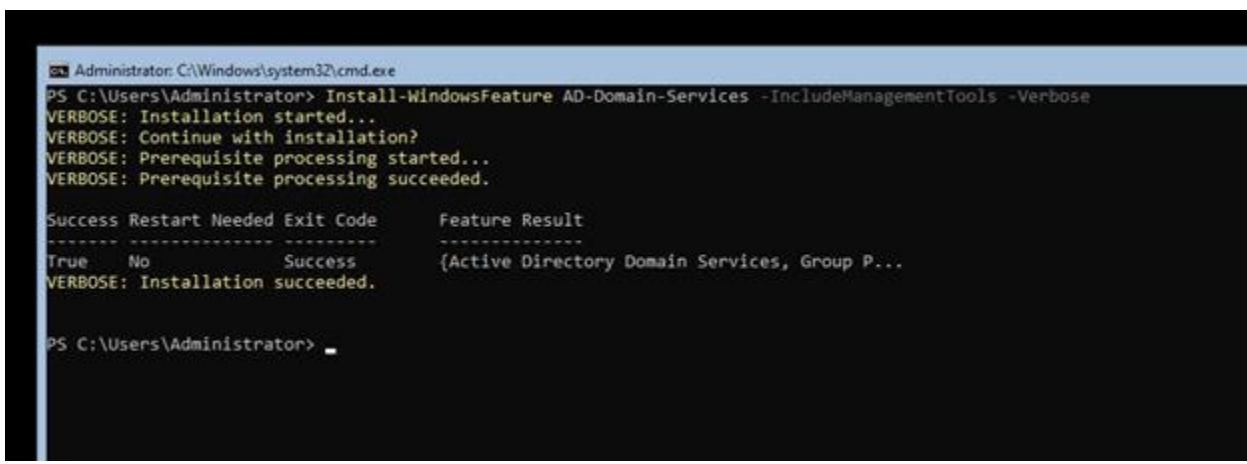
Ethernet adapter Ethernet:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::8c0:53ea:c44b:e097%6
  IPv4 Address. . . . . : 10.0.0.2
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 10.0.0.1
PS C:\Users\Administrator>
```

VII.IV Instalación y configuración del AD



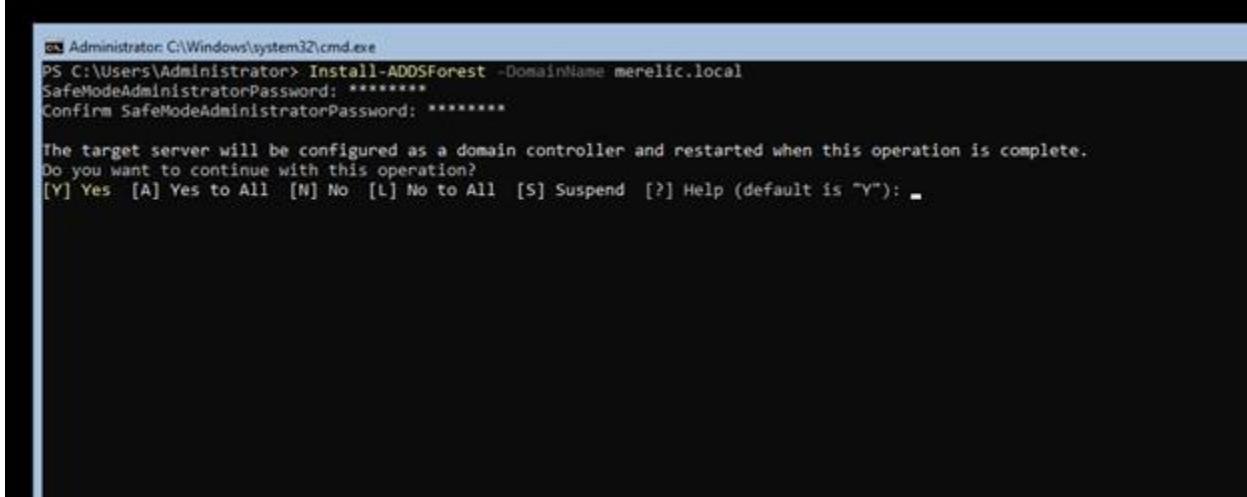
```
Administrator: C:\Windows\system32\cmd.exe
PS C:\Users\Administrator> Install-WindowsFeature AD-Domain-Services -IncludeManagementTools -Verbose
VERBOSE: Installation started...
Collecting data...
  10%
[oooooooooooo]
```

```
Administrator: C:\Windows\system32\cmd.exe
PS C:\Users\Administrator> Install-WindowsFeature AD-Domain-Services -IncludeManagementTools -Verbose
VERBOSE: Installation started...
VERBOSE: Continue with installation?
VERBOSE: Prerequisite processing started...
VERBOSE: Prerequisite processing succeeded.

Success Restart Needed Exit Code      Feature Result
----- ----- ----- -----
True   No        Success          (Active Directory Domain Services, Group P...
VERBOSE: Installation succeeded.

PS C:\Users\Administrator>
```

```
Administrator: C:\Windows\system32\cmd.exe
PS C:\Users\Administrator> Install-ADDSForest -DomainName merelic.local
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"): -
```

```
Administrator: C:\Windows\system32\cmd.exe
PS C:\Users\Administrator> Install-ADDSForest -DomainName merelic.local
SafeModeAdministratorPassword: *****

Install-ADDSForest
    Validating environment and user input
        All tests completed successfully
        [oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo]
    Installing new forest
    Waiting for DNS installation to finish

WARNING: A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "merelic.local". Otherwise, no action is required.

WARNING: Windows Server 2022 domain controllers have a default for the security setting named "Allow cryptography algorithms compatible with Windows NT 4.0" that prevents weaker cryptography algorithms when establishing security channel sessions.

For more information about this setting, see Knowledge Base article 942564 (http://go.microsoft.com/fwlink/?LinkId=104751).

WARNING: A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "merelic.local". Otherwise, no action is required.
```

```
C:\Windows\system32\LogonUI.exe
Enter credentials for Other user or hit ESC to switch users/sign-in methods
User name : Administrator
Password : *****
Sign in to: MEREPLIC
How do I sign in to another domain?
```

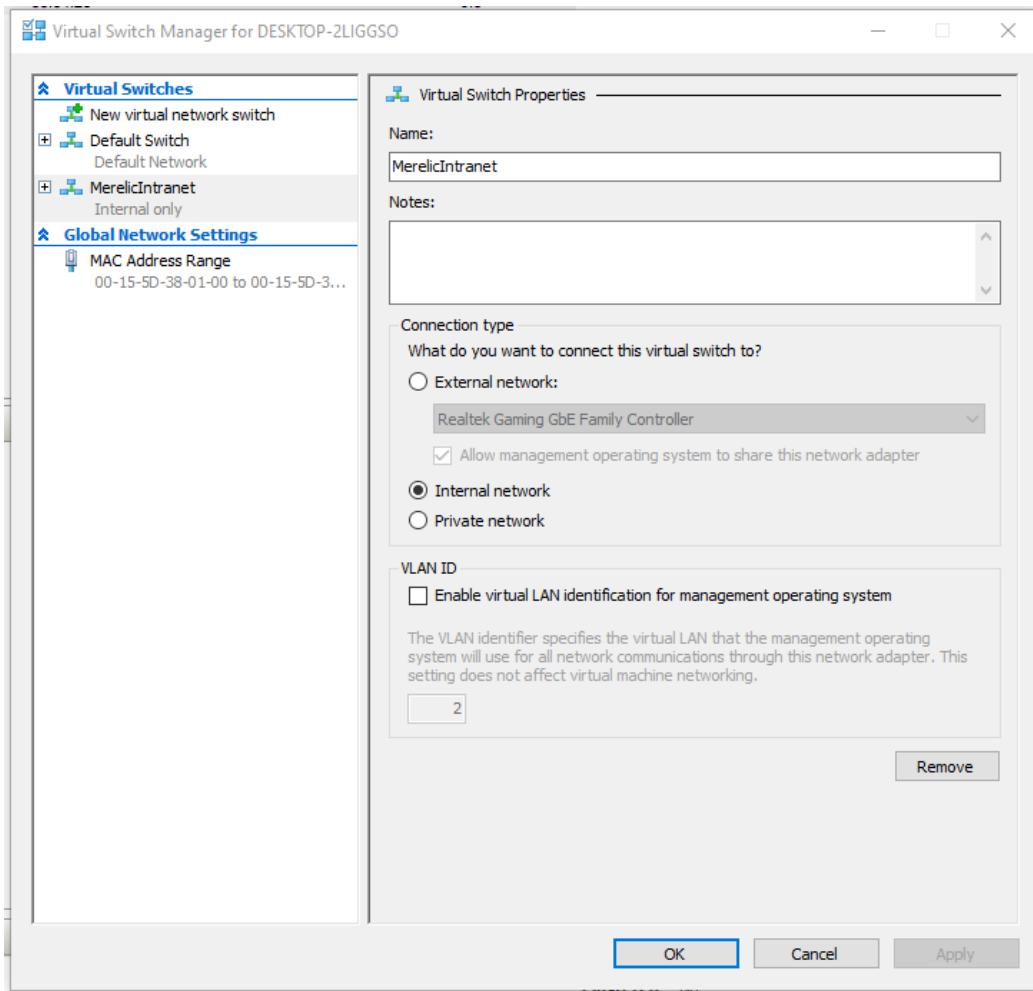
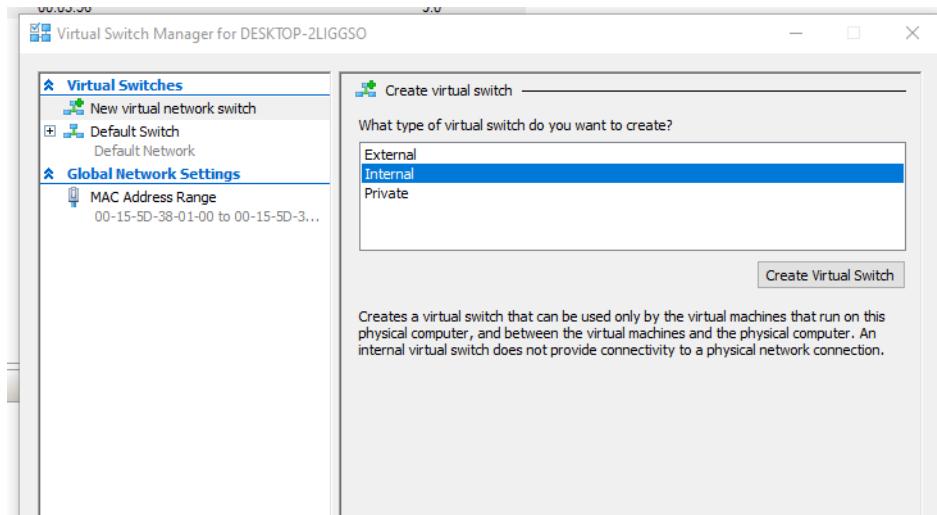
```
Administrator: C:\Windows\system32\cmd.exe
WARNING: To stop SConfig from launching at sign-in, type "Set-SConfig -AutoLaunch $false"

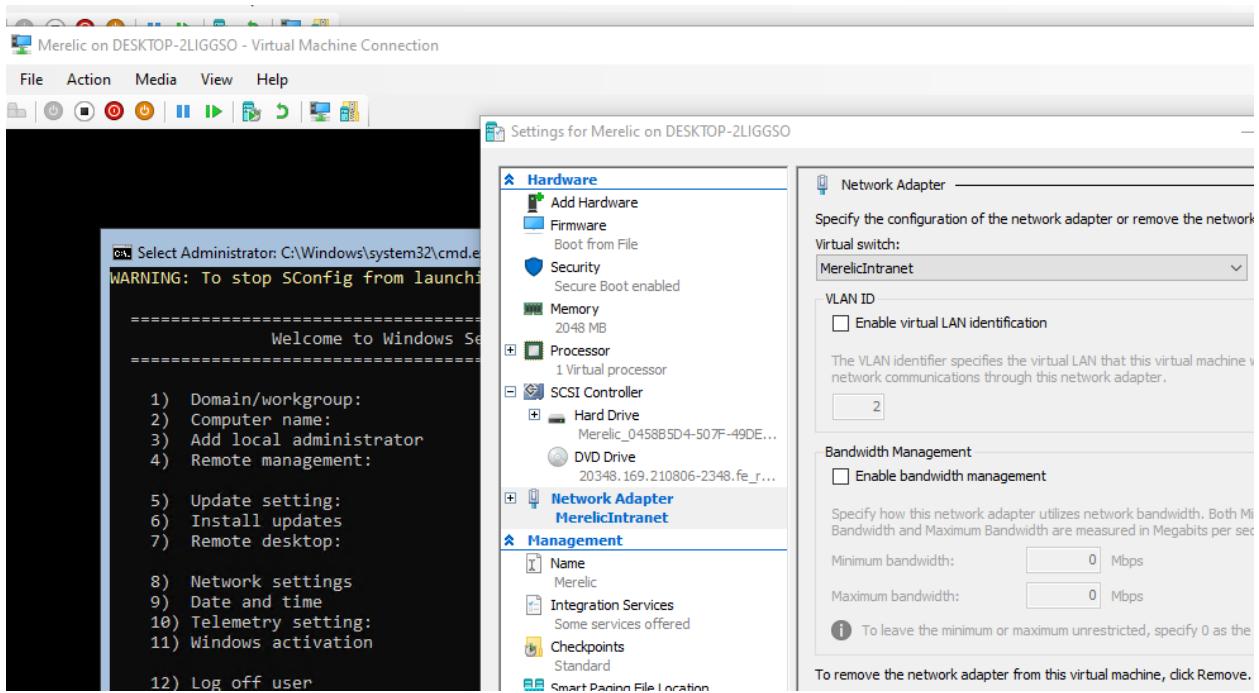
-----
Welcome to Windows Server 2022 Datacenter Evaluation
-----

1) Domain/workgroup: Domain: merelic.local
2) Computer name: MEREPLICWS2022DC
3) Add local administrator
4) Remote management: Enabled
5) Update setting: Download only
6) Install updates
7) Remote desktop: Disabled
8) Network settings
9) Date and time
10) Telemetry setting: Required
11) Windows activation
12) Log off user
13) Restart server
14) Shut down server
15) Exit to command line (PowerShell)

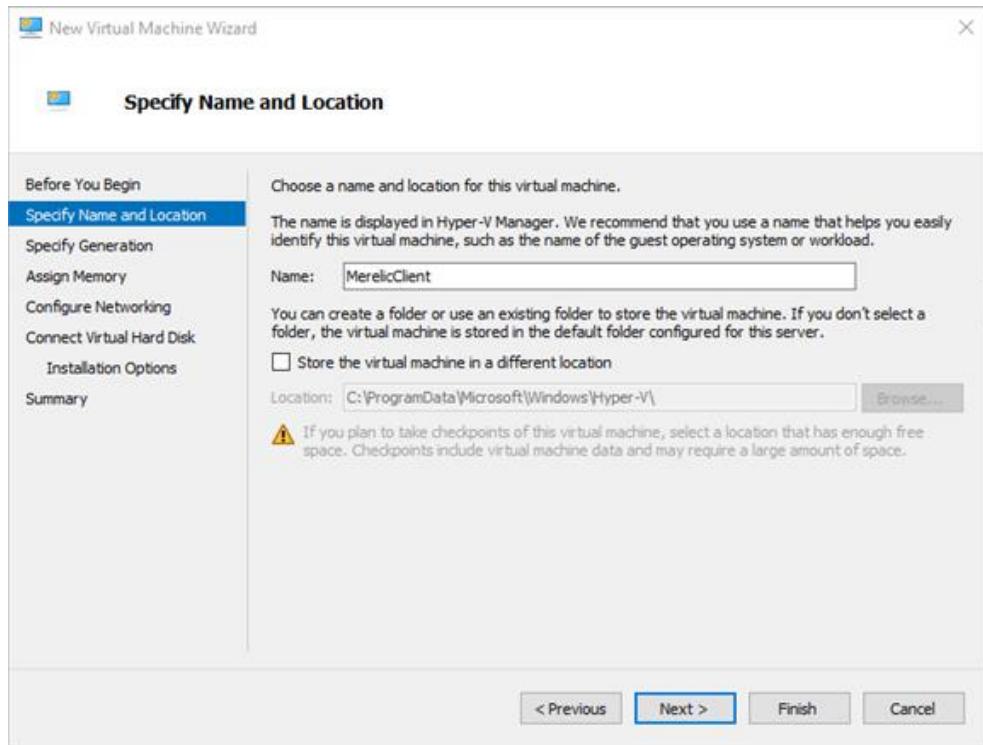
Enter number to select an option: -
```

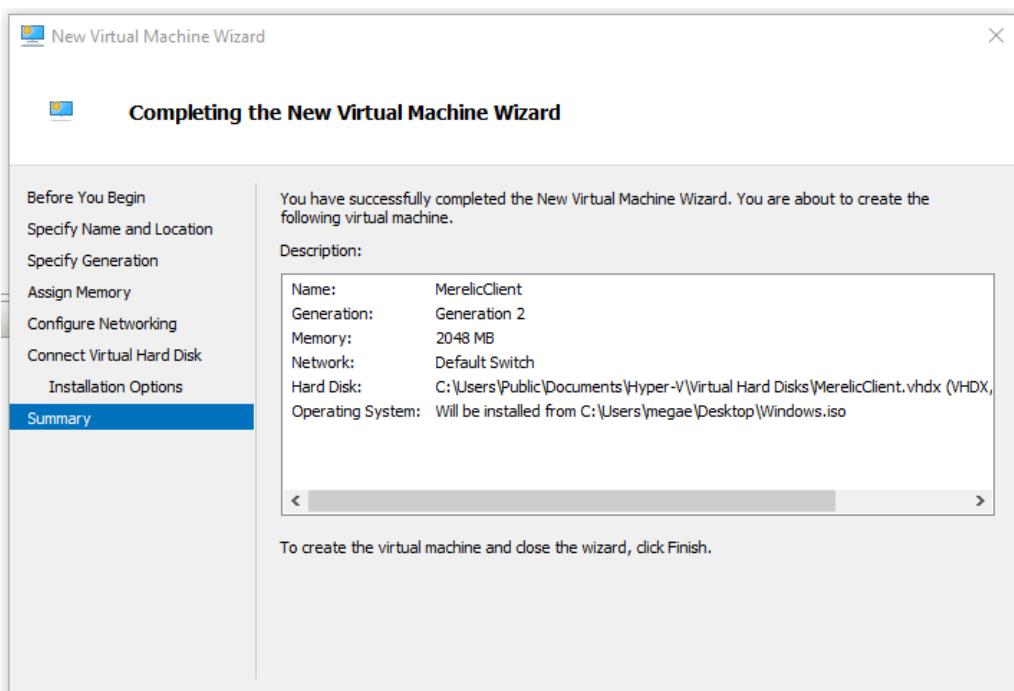
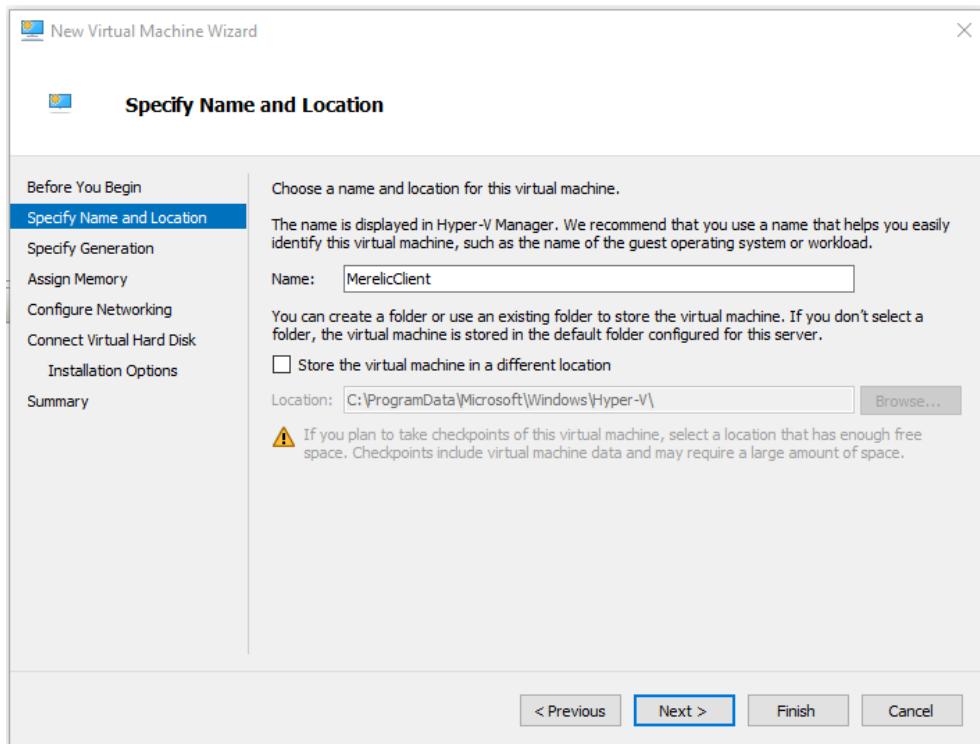
VII.V Creación de la Intranet para las máquinas virtuales

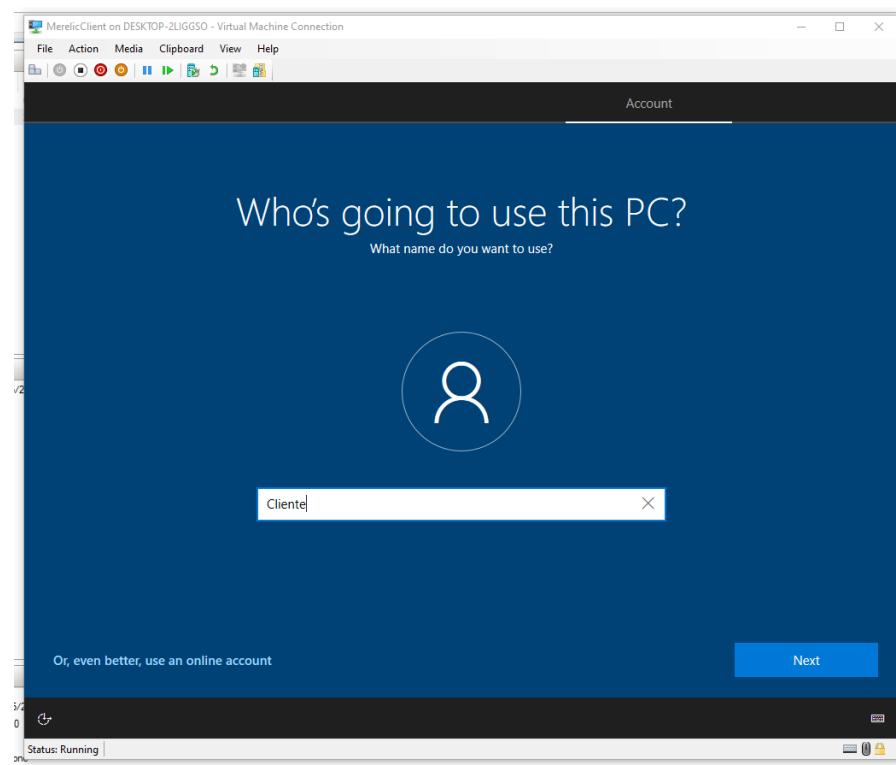
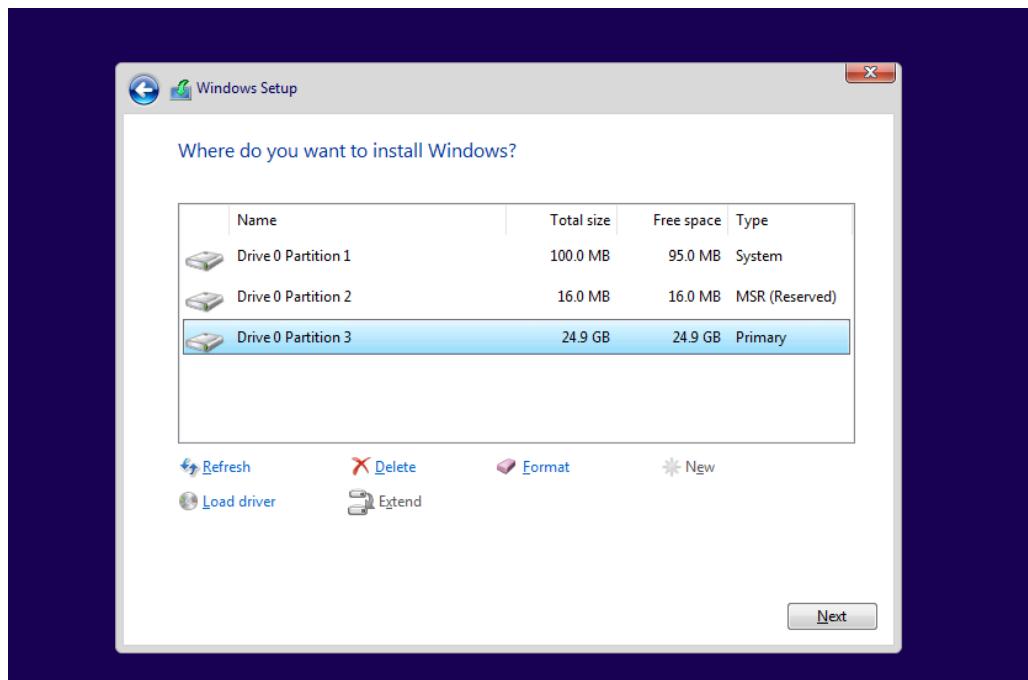




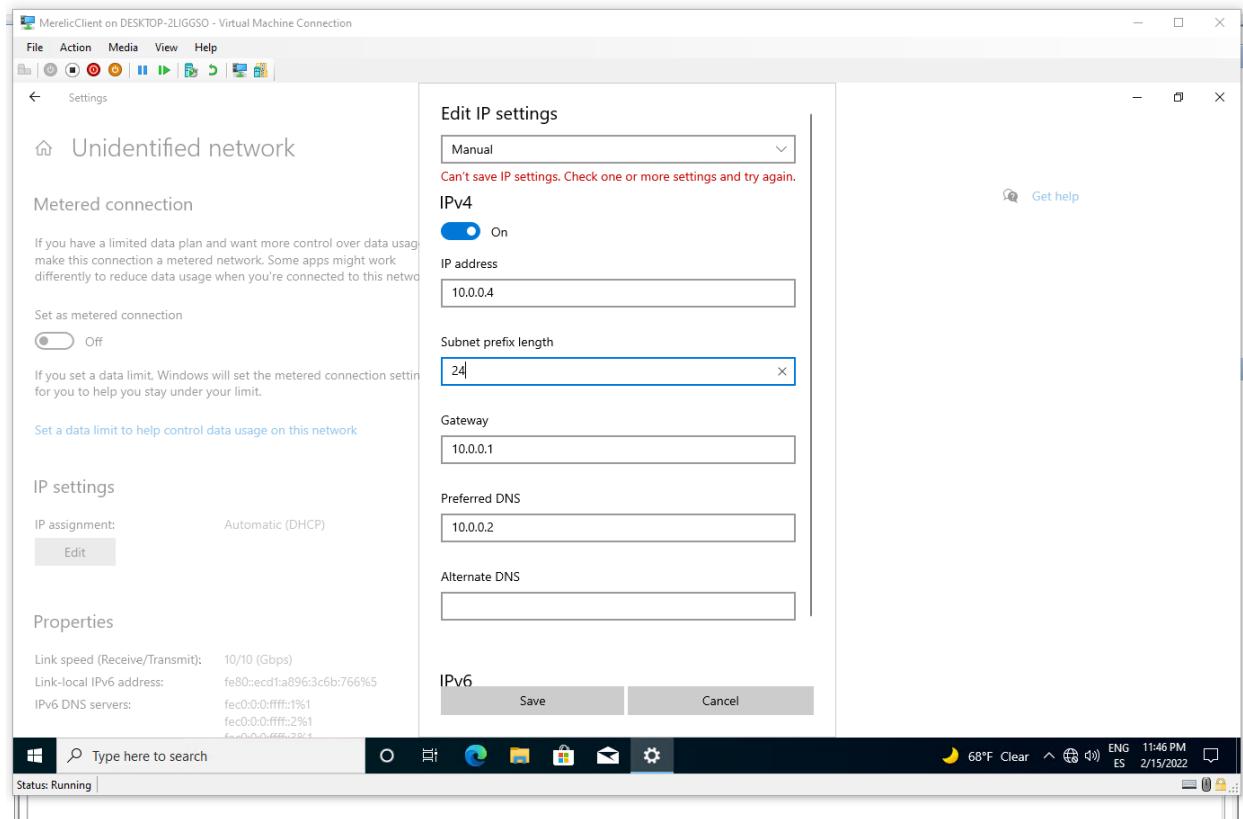
VII.VI Creación de la máquina Virtual cliente







VII. Configuración de parámetros de red en el cliente



```

File Action Media View Help
Type here to search
Status: Running | 68°F Clear ENG 11:46 PM 2/15/2022

← Settings
Select Command Prompt
Microsoft Windows [Version 10.0.19044.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Cliente>ping 10.0.0.2

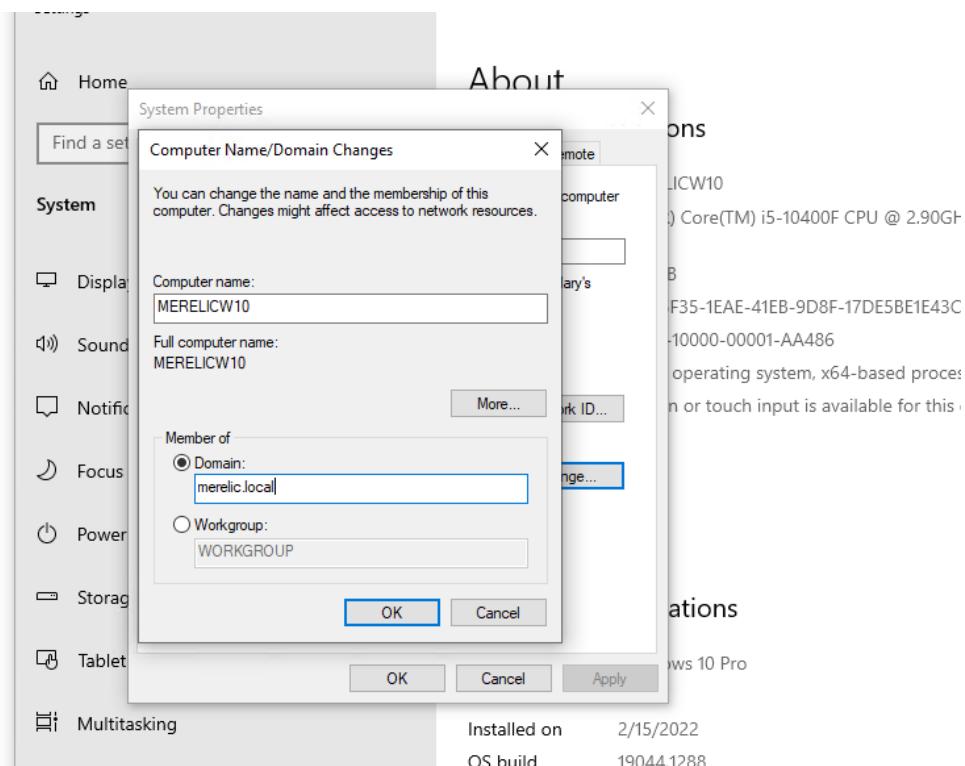
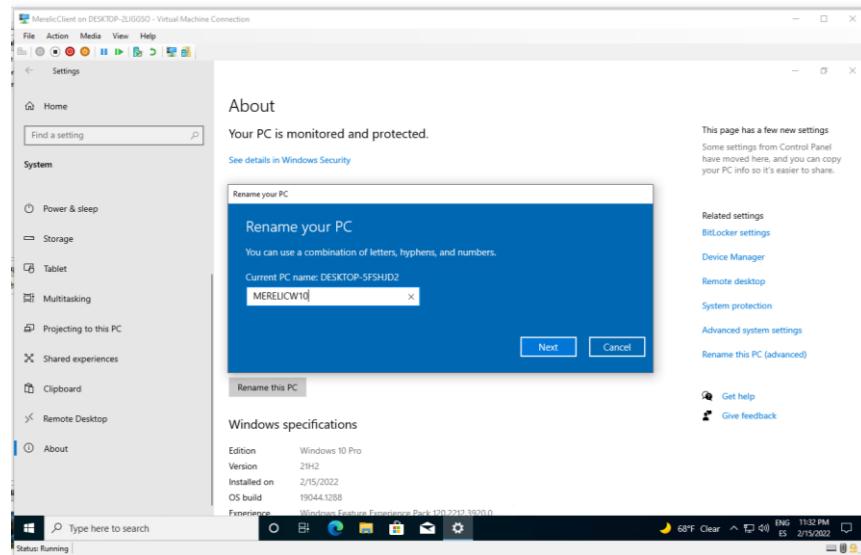
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

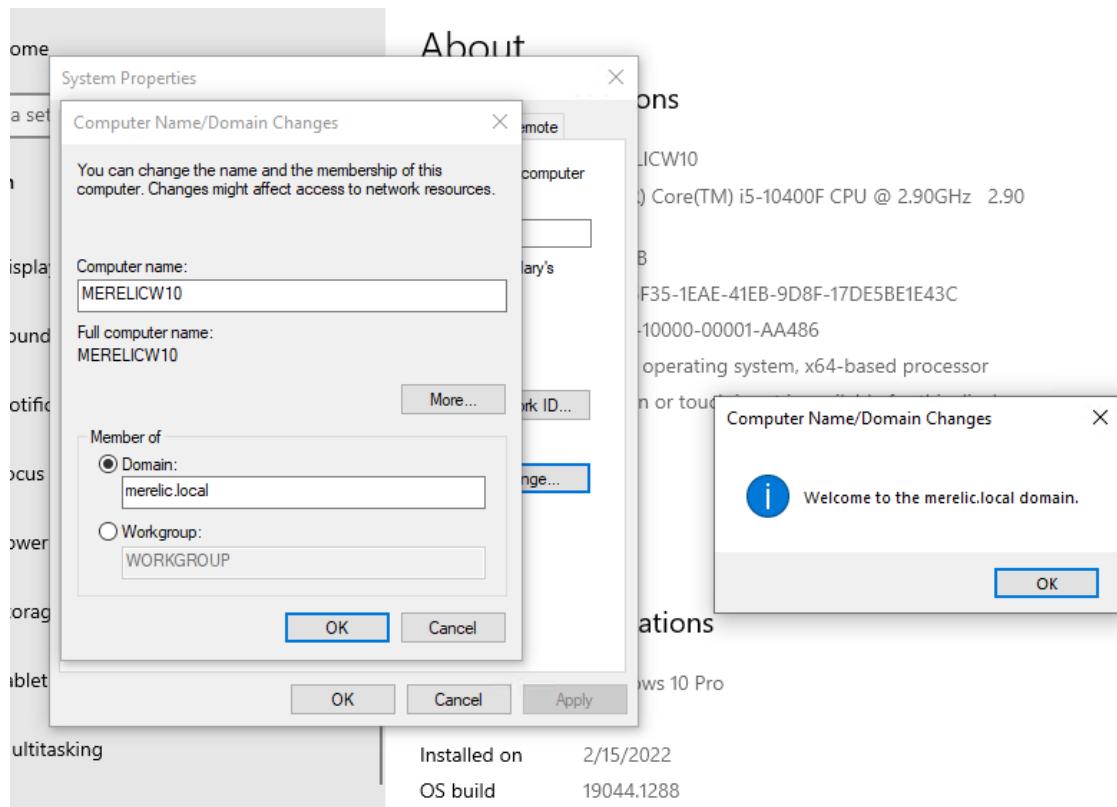
Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

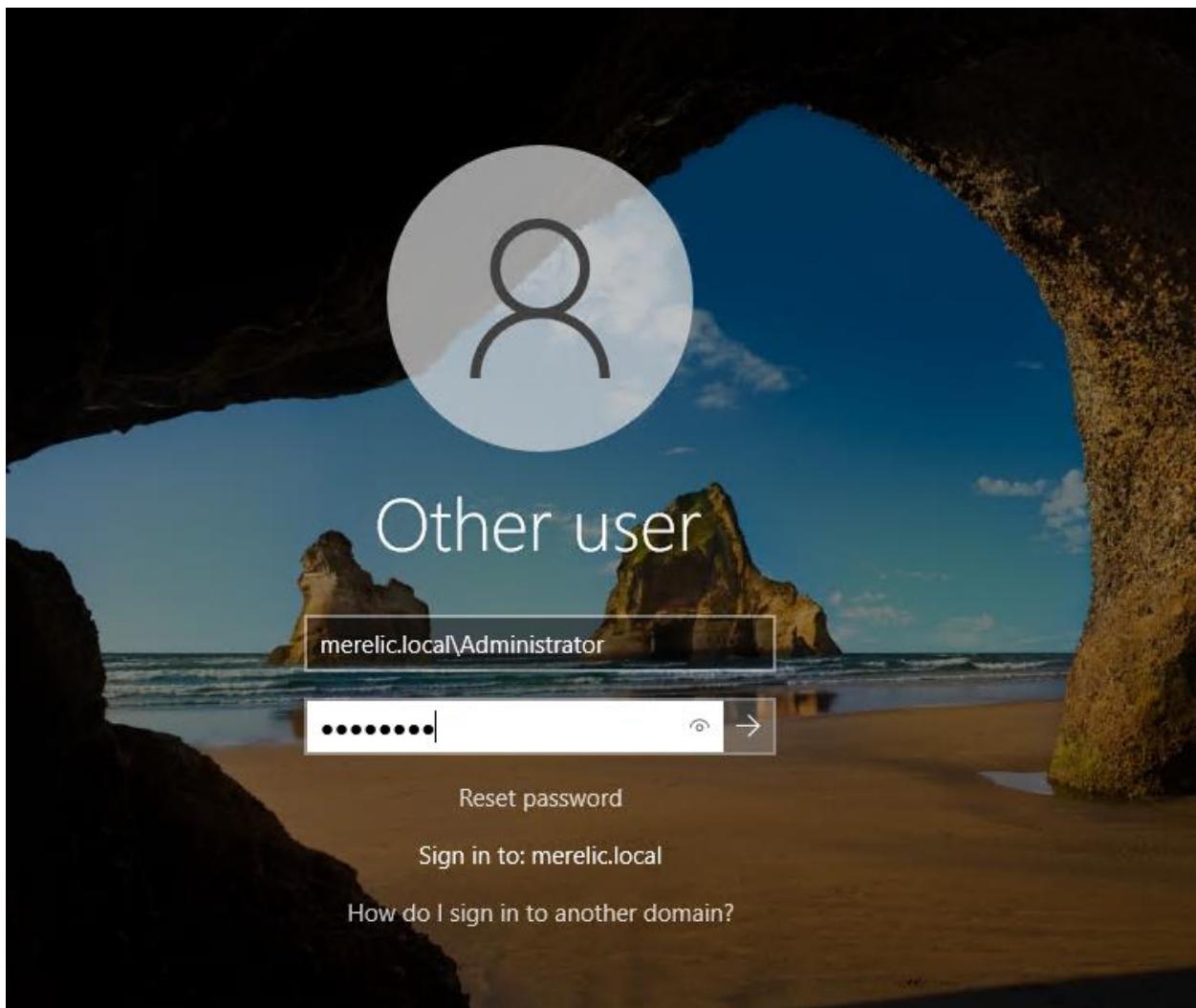
C:\Users\Cliente>

```

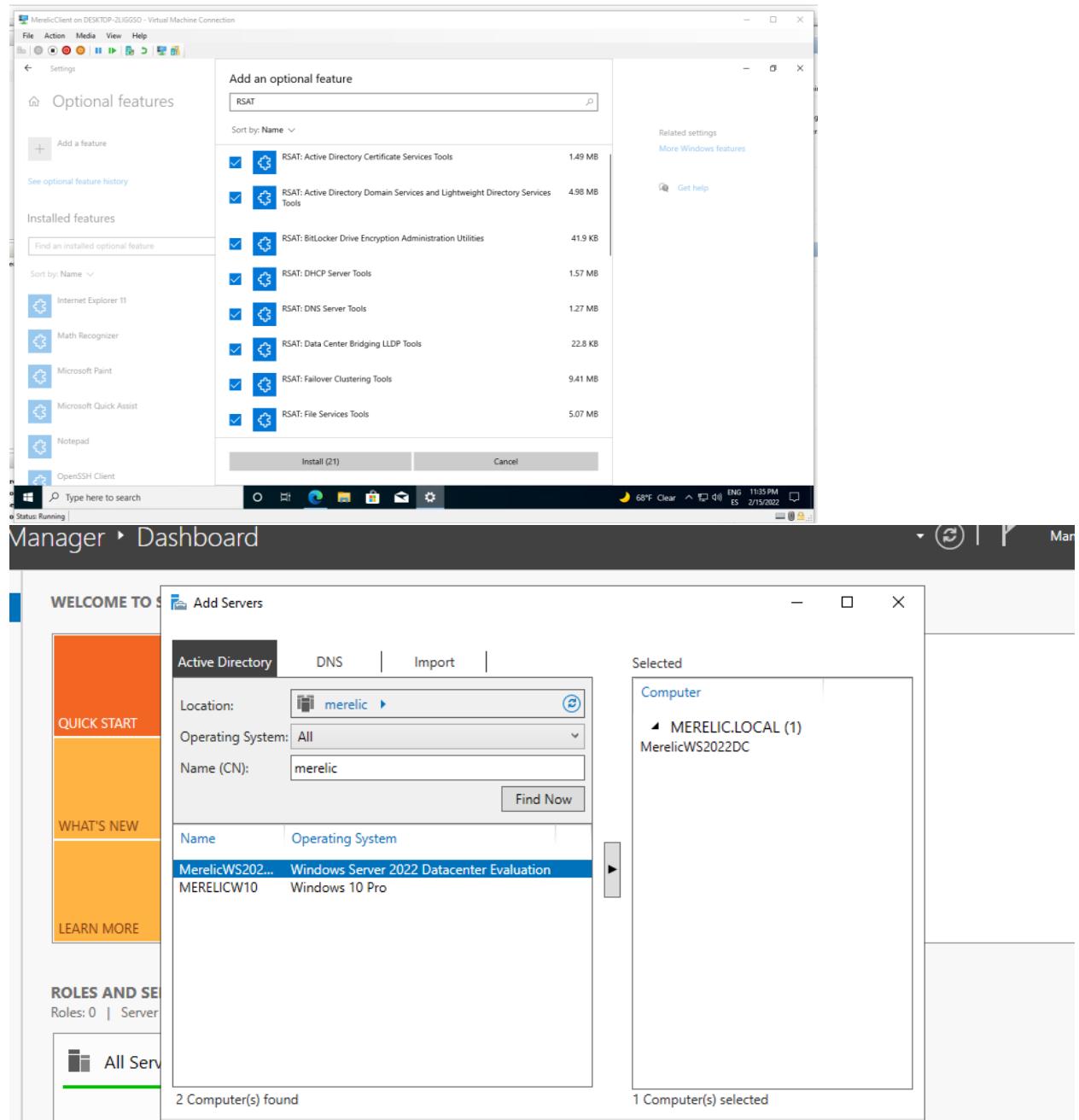
VII. Configuración del AD en el cliente

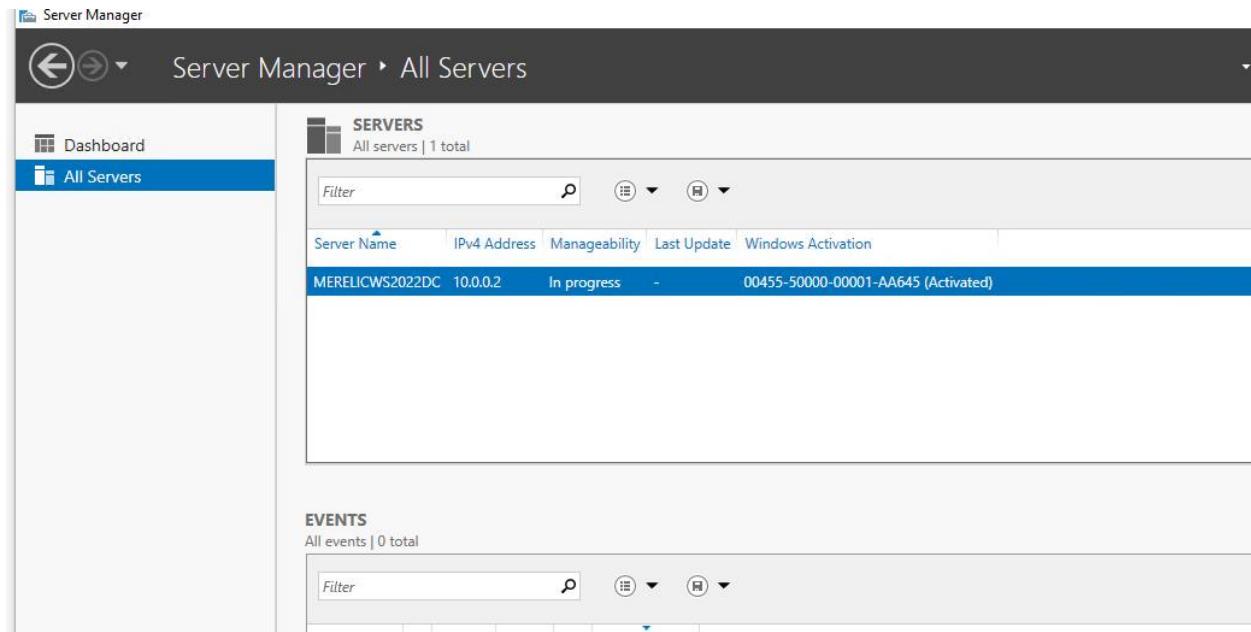






VII.VIII Configuración del Rsat en el cliente





VII.IX Configuración del remote Shell y RDP

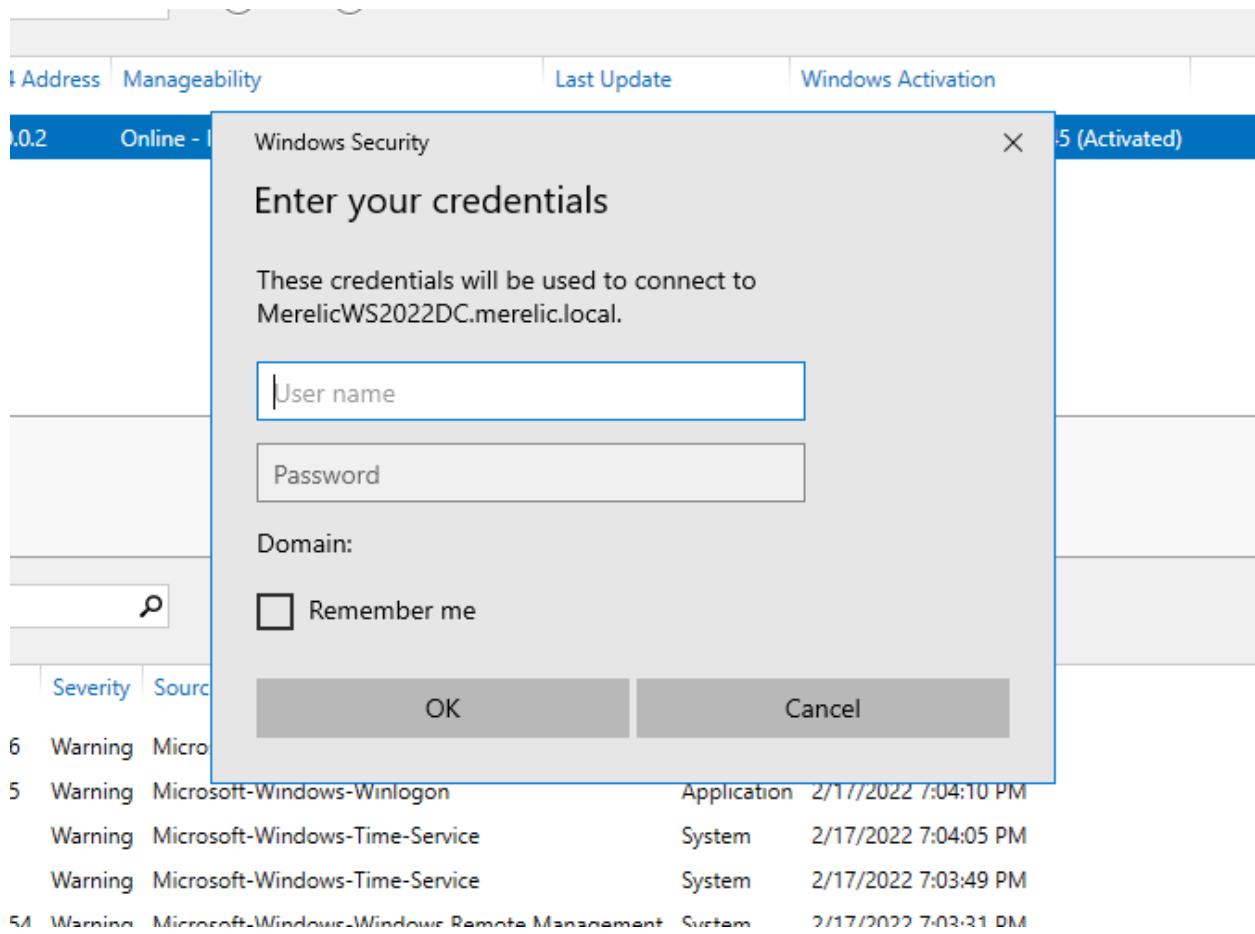
```
Administrator: C:\Windows\system32\cmd.exe
WARNING: To launch Server Configuration tool again, run "SConfig"
PS C:\Users\Administrator> Get-Service Winrm

Status    Name          DisplayName
-----   ----          -----
Running   Winrm        Windows Remote Management (WS-Manag...
PS C:\Users\Administrator> Enable-PSRemoting -force
PS C:\Users\Administrator>
```

```
Administrator: C:\Windows\system32\cmd.exe
PS C:\Users\Administrator> Set-ItemProperty -Path 'HKLM:\SYSTEM\CurrentControlSet\Control\Terminal Server\' -name "fDenyTSConnections" -value 0
PS C:\Users\Administrator> Enable-NetFirewallRule -DisplayGroup "Remote Desktop"
PS C:\Users\Administrator>
```

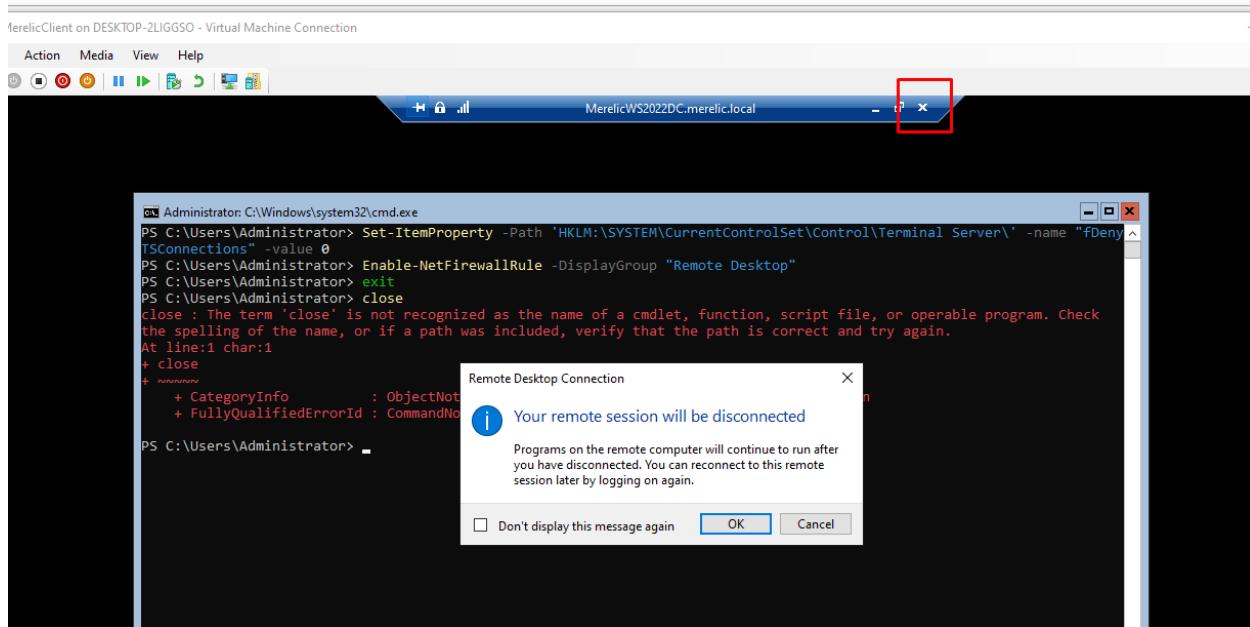
The screenshot shows the Microsoft Server Manager interface. On the left, there's a navigation pane with 'Manager' and 'All Servers'. The main area displays a table for 'SERVERS' with one entry: 'MEREPLICWS2022DC' with IP '10.0.0.2'. Below it is an 'EVENTS' section with 11 total events. A context menu is open over the 'MEREPLICWS2022DC' row, listing various management tools. The 'Remote Desktop Connection' option is highlighted with a red box.

- Add Roles and Features
- Restart Server
- Computer Management**
- Remote Desktop Connection**
- Windows PowerShell
- Configure NIC Teaming
- Active Directory Administrative Center
- Active Directory Domains and Trusts
- Active Directory Module for Windows PowerShell
- Active Directory Sites and Services
- Active Directory Users and Computers
- ADSI Edit
- Dcdiag.exe
- DNS Manager
- Dsacl.exe
- Dsdutil.exe
- Dsmgmt.exe
- File Replicator

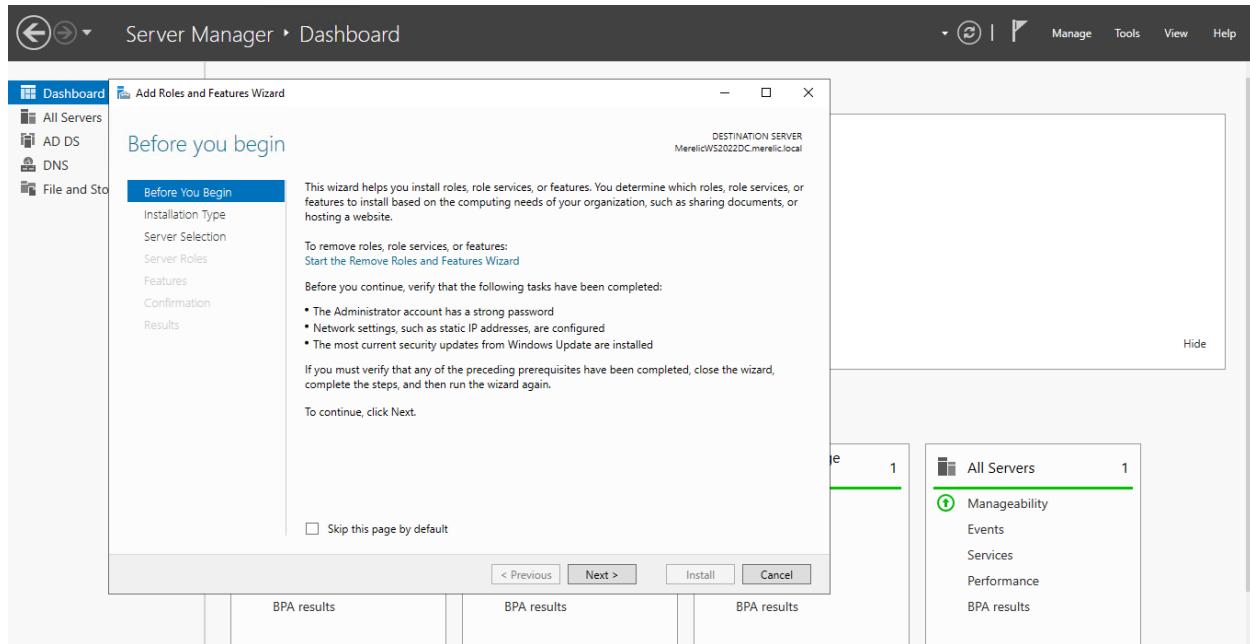


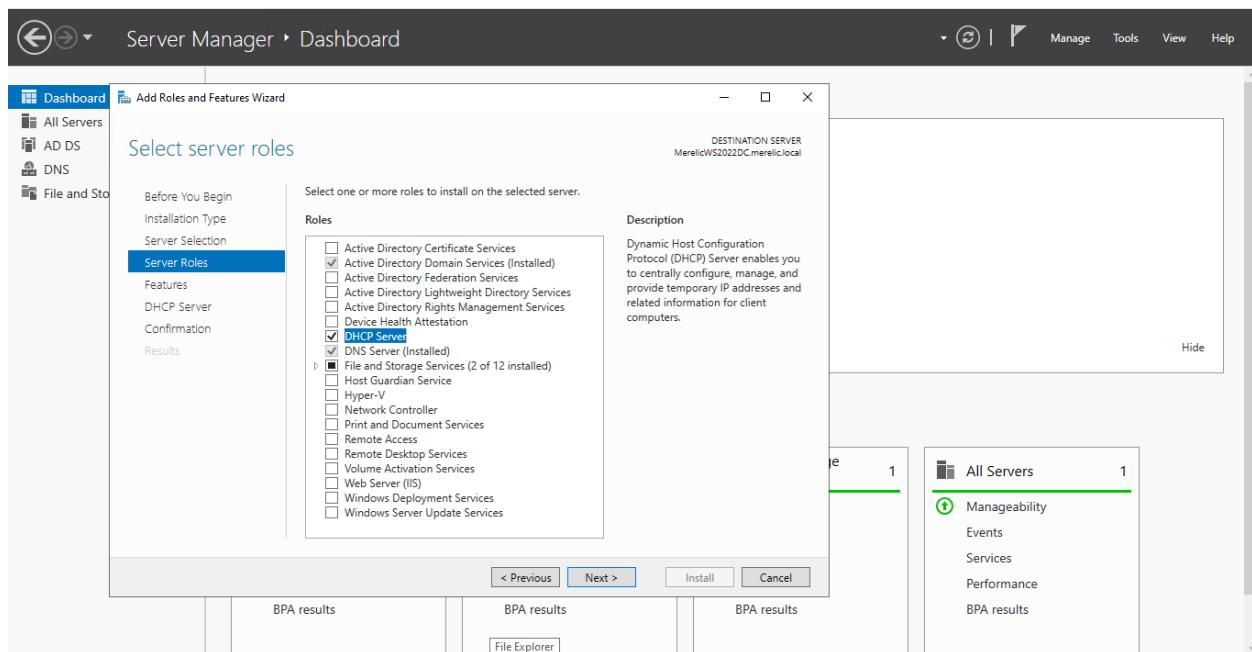
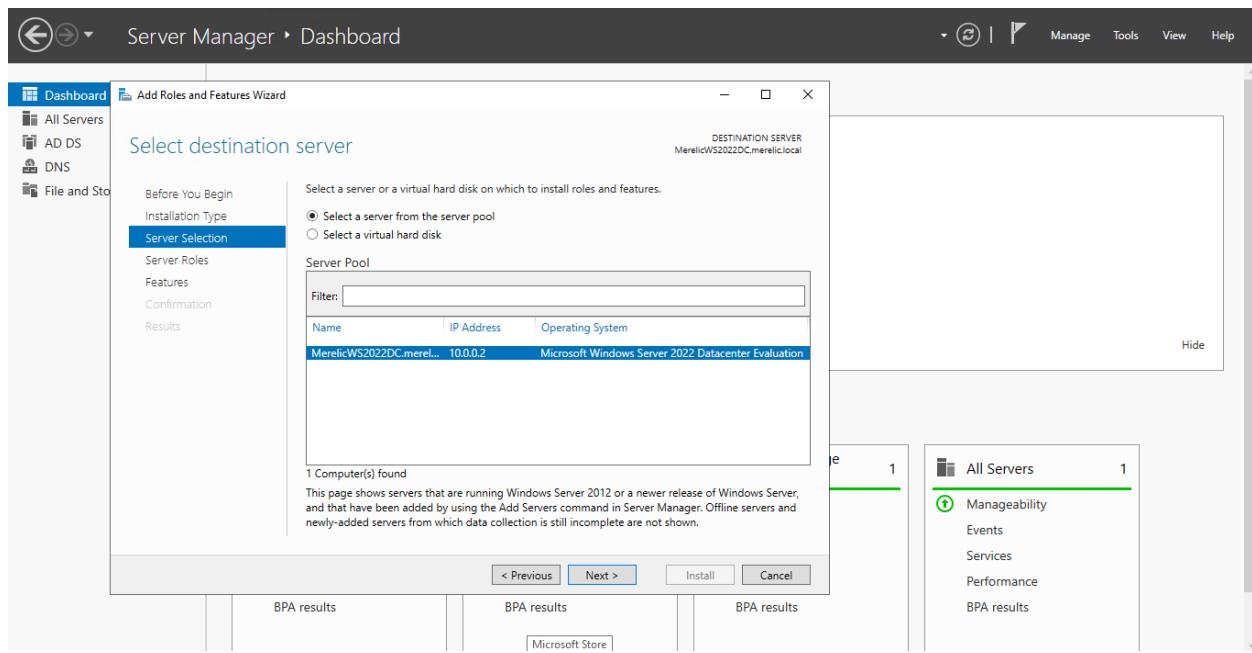
A screenshot of a Windows Command Prompt window titled "MerelicClient on DESKTOP-2LIGGSO - Virtual Machine Connection". The window shows the following PowerShell session:

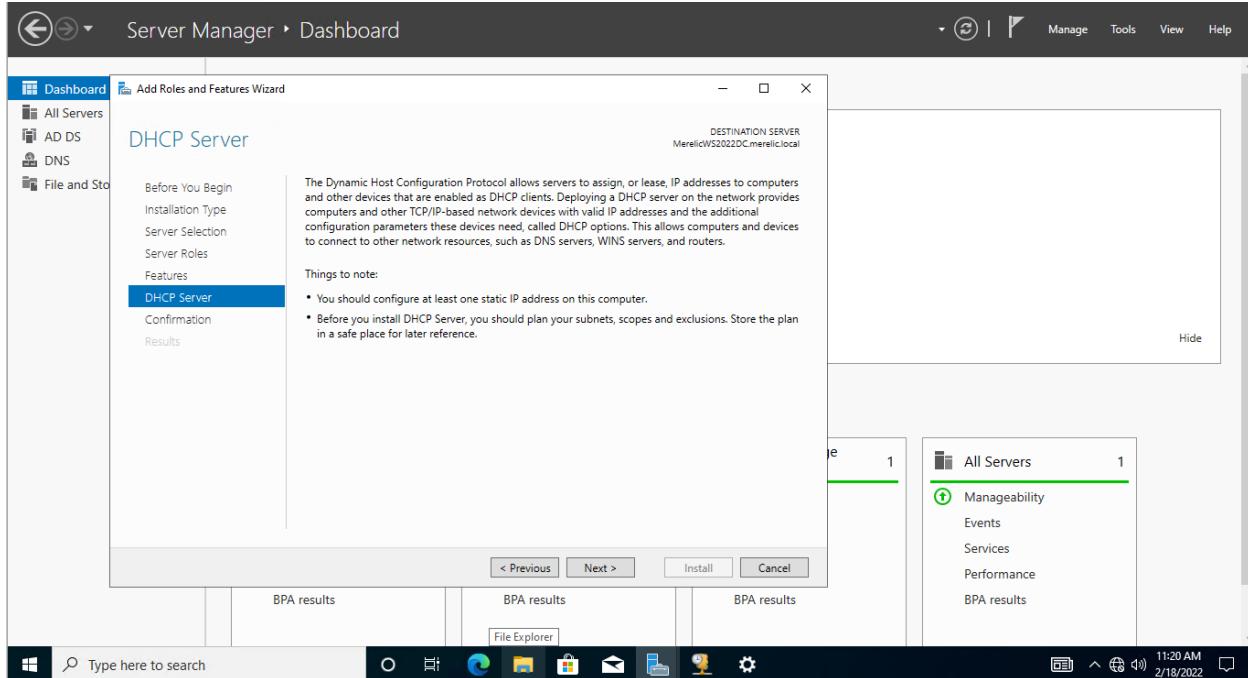
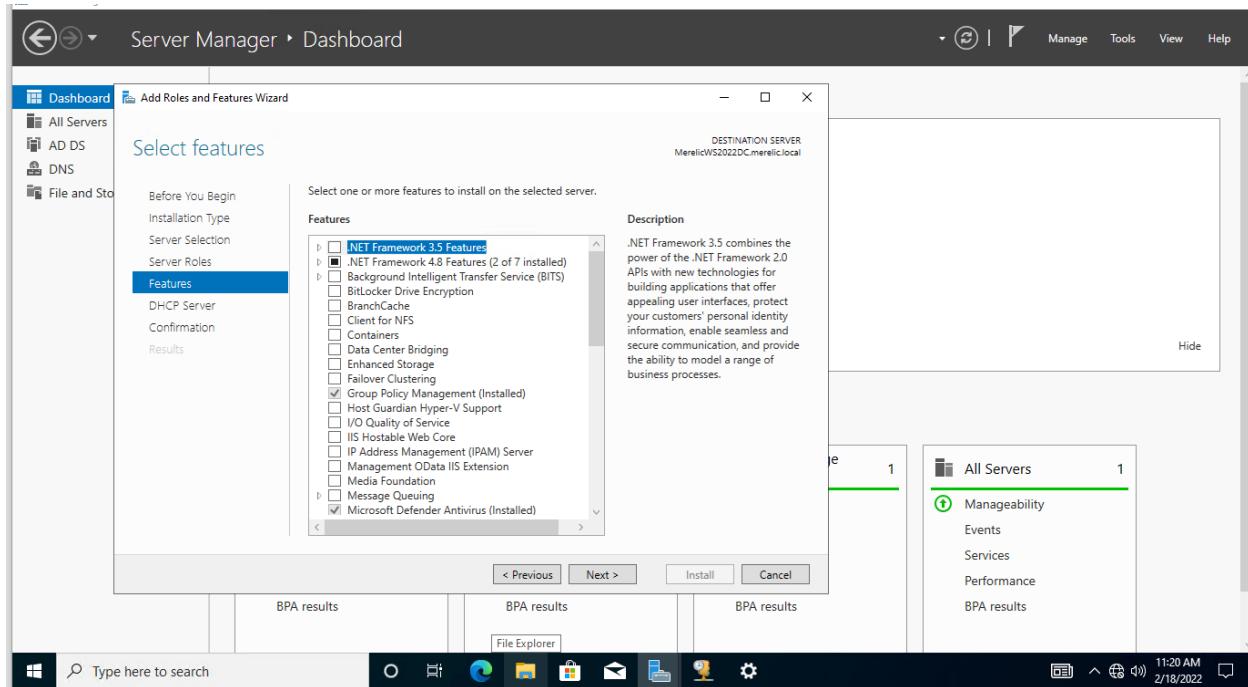
```
PS C:\Users\Administrator> Set-ItemProperty -Path 'HKLM:\SYSTEM\CurrentControlSet\Control\Terminal Server\' -name "fDenyTSConnections" -value 0
PS C:\Users\Administrator> Enable-NetFirewallRule -DisplayGroup "Remote Desktop"
PS C:\Users\Administrator>
```

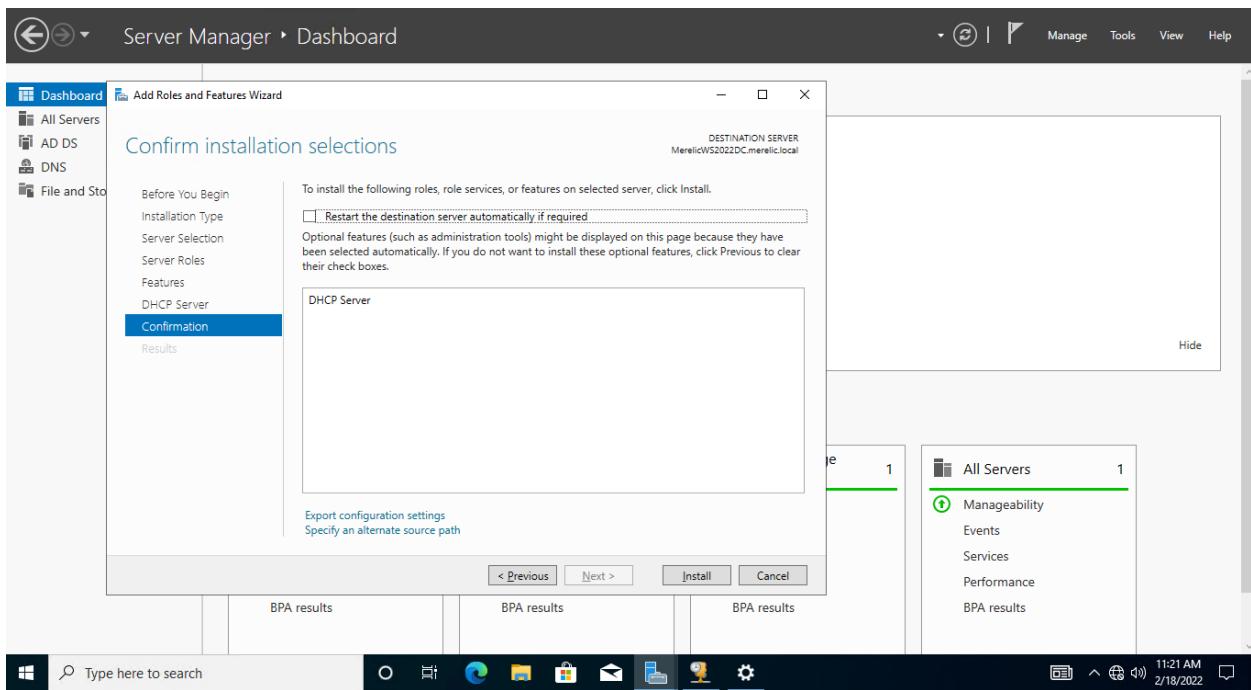
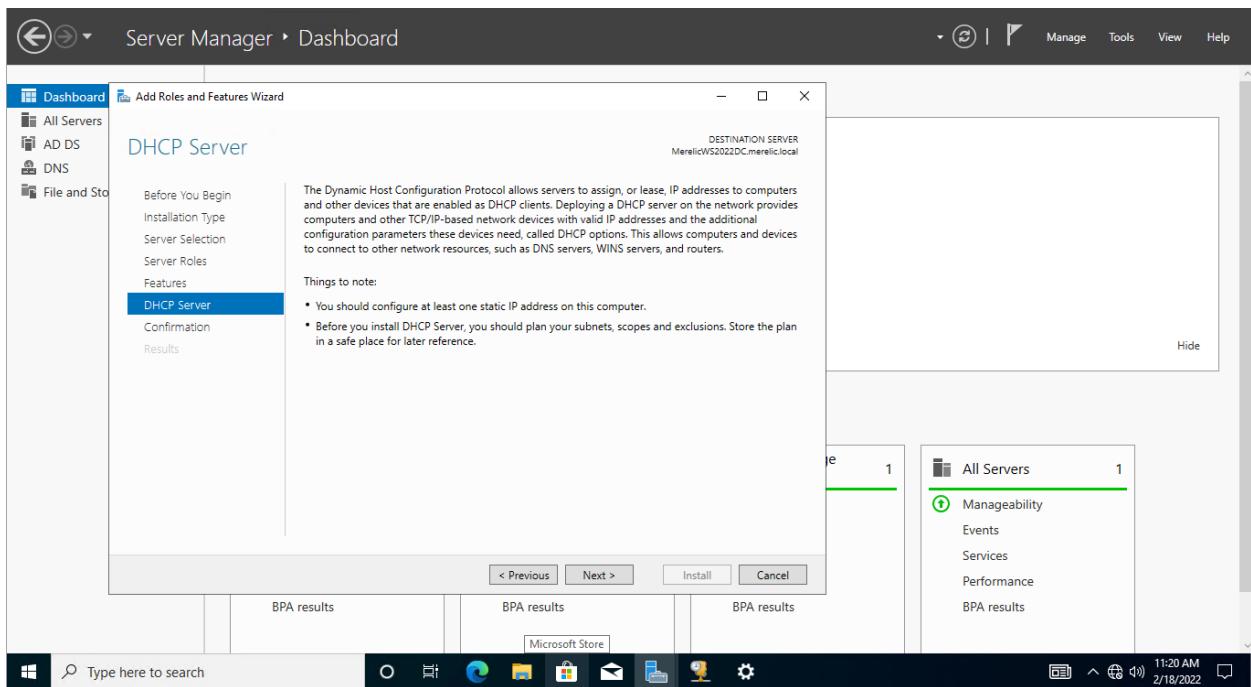


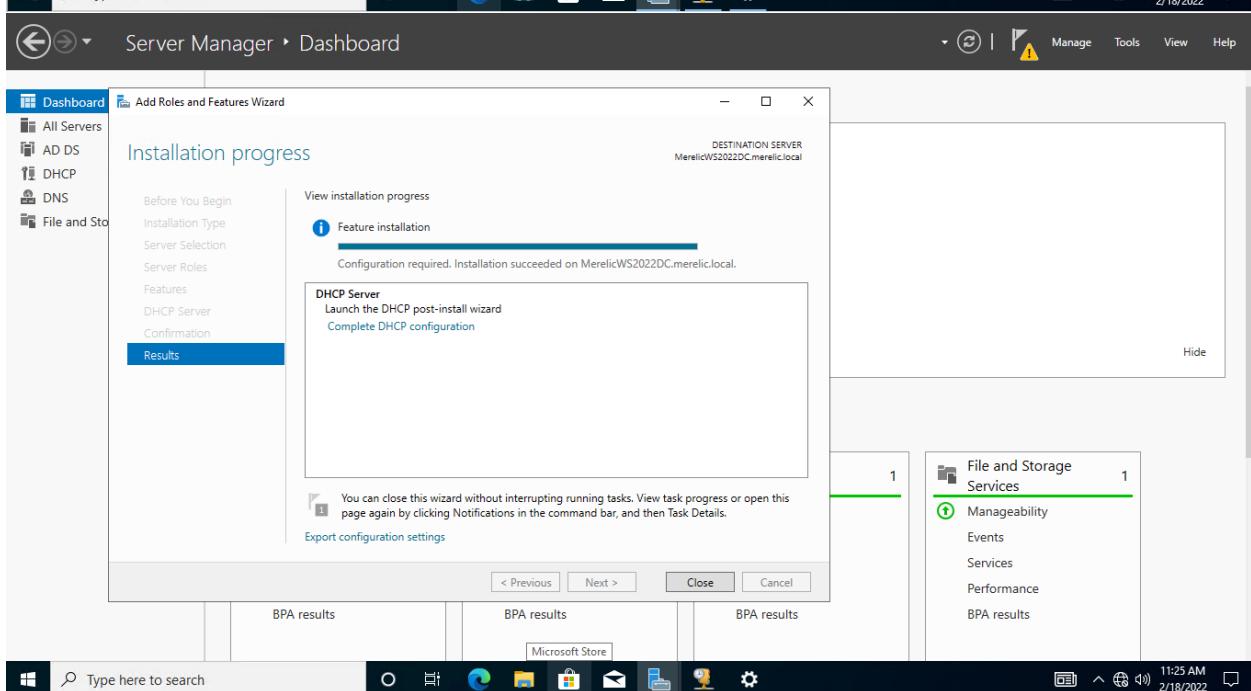
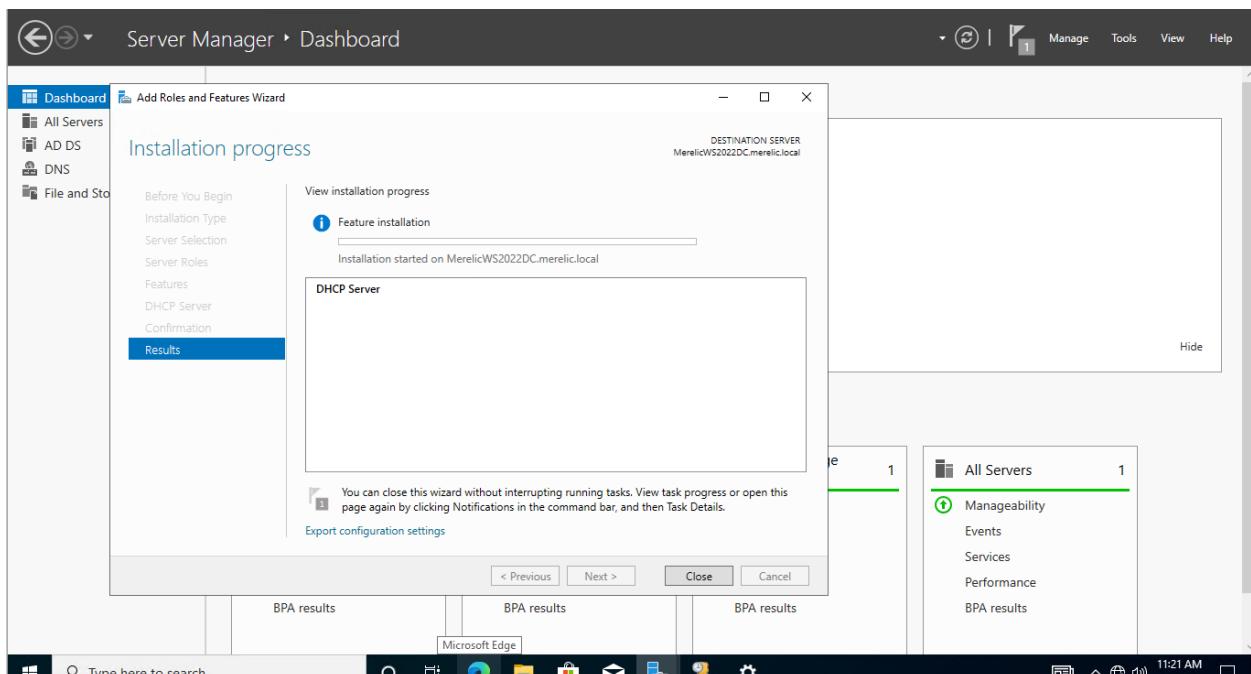
VII.X Configuración del servicio DHCP

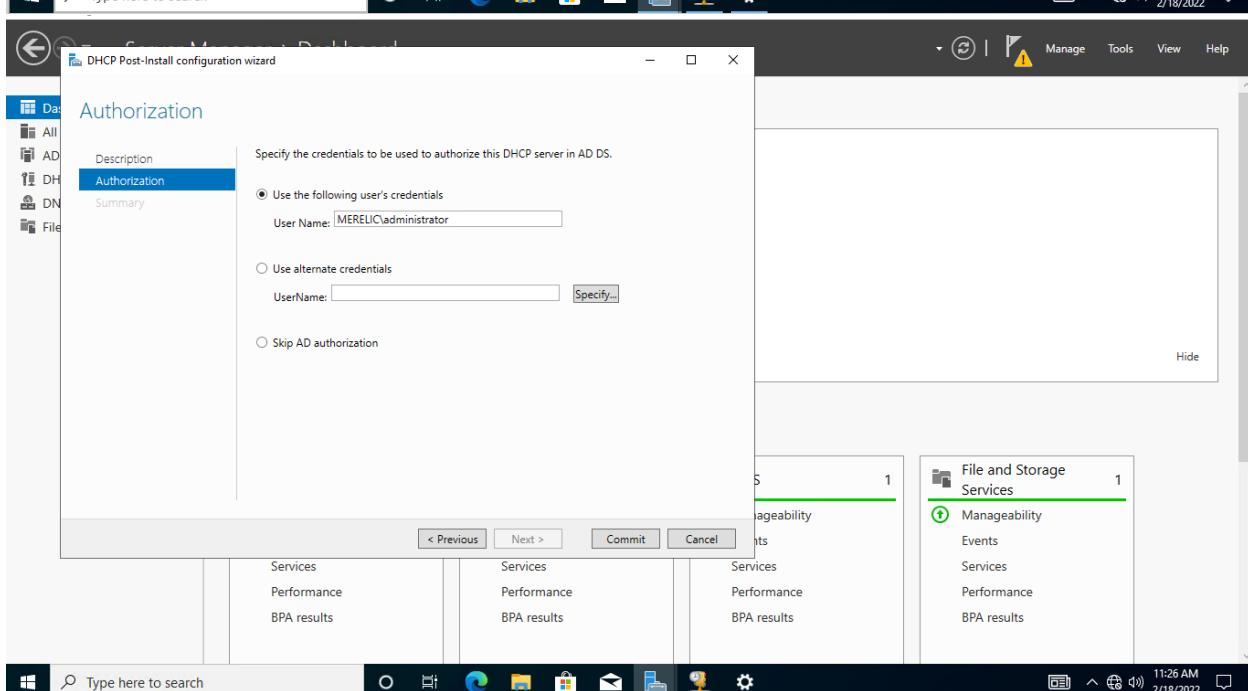
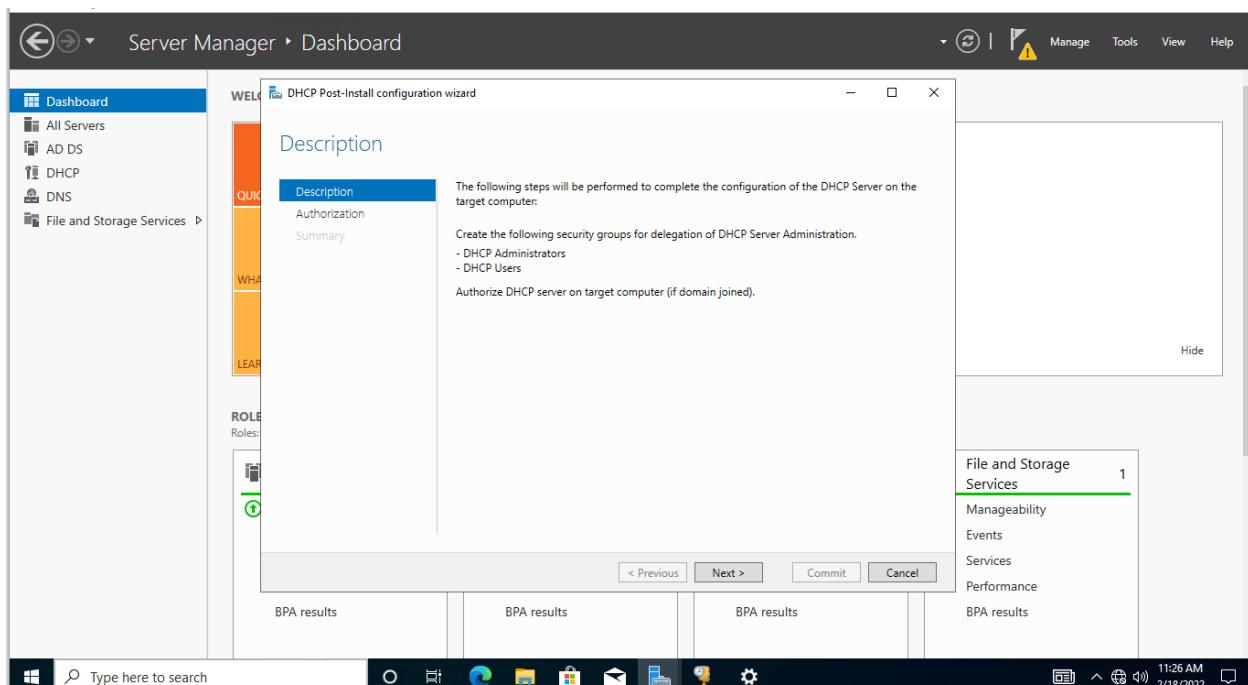


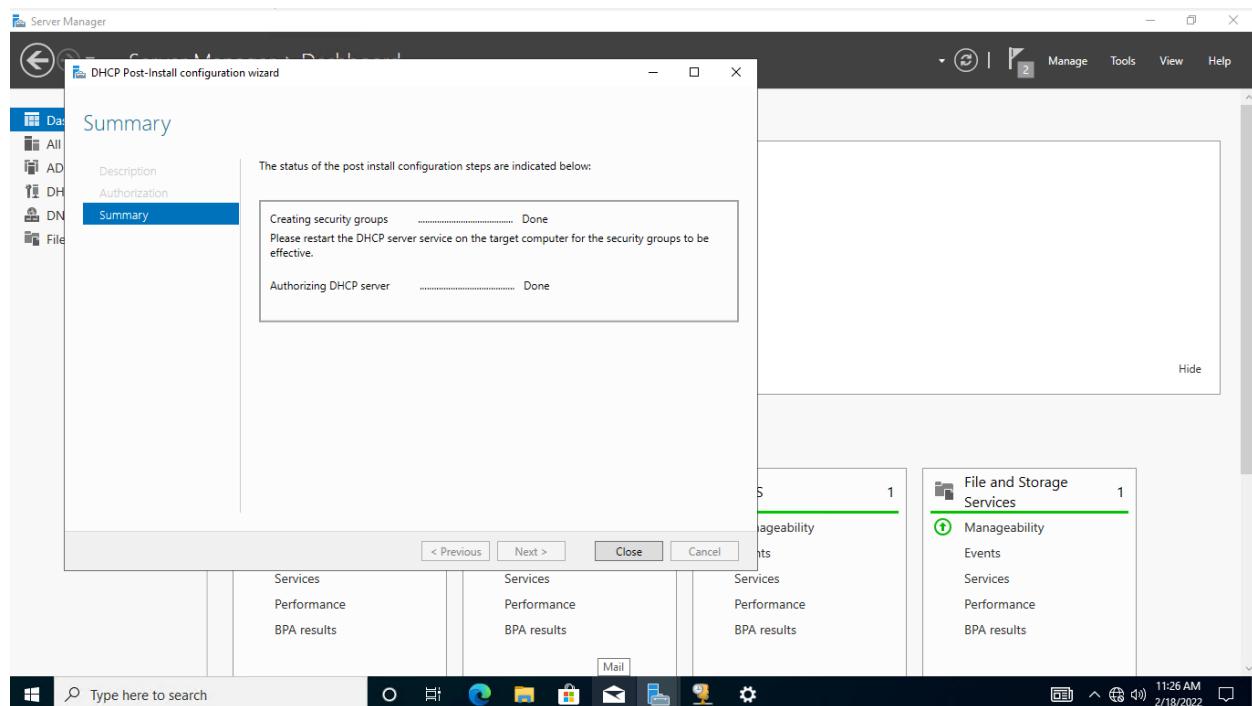




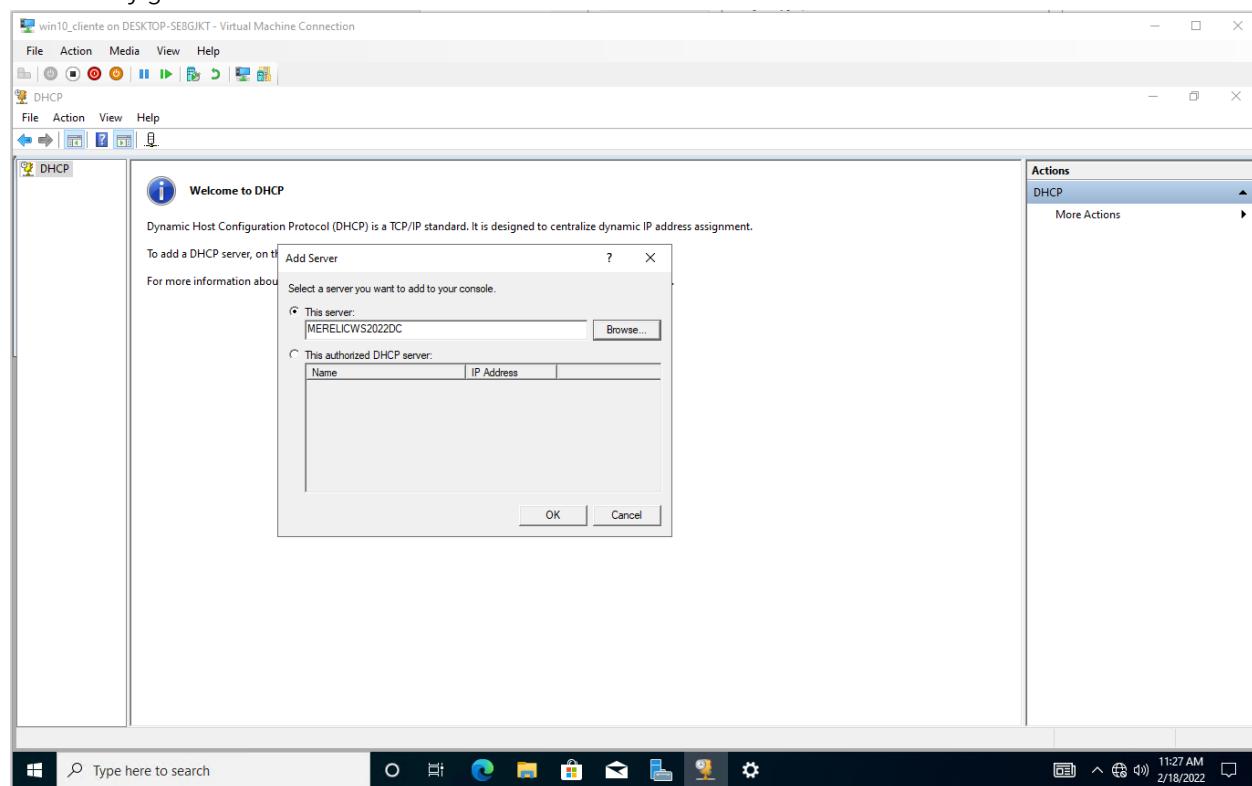


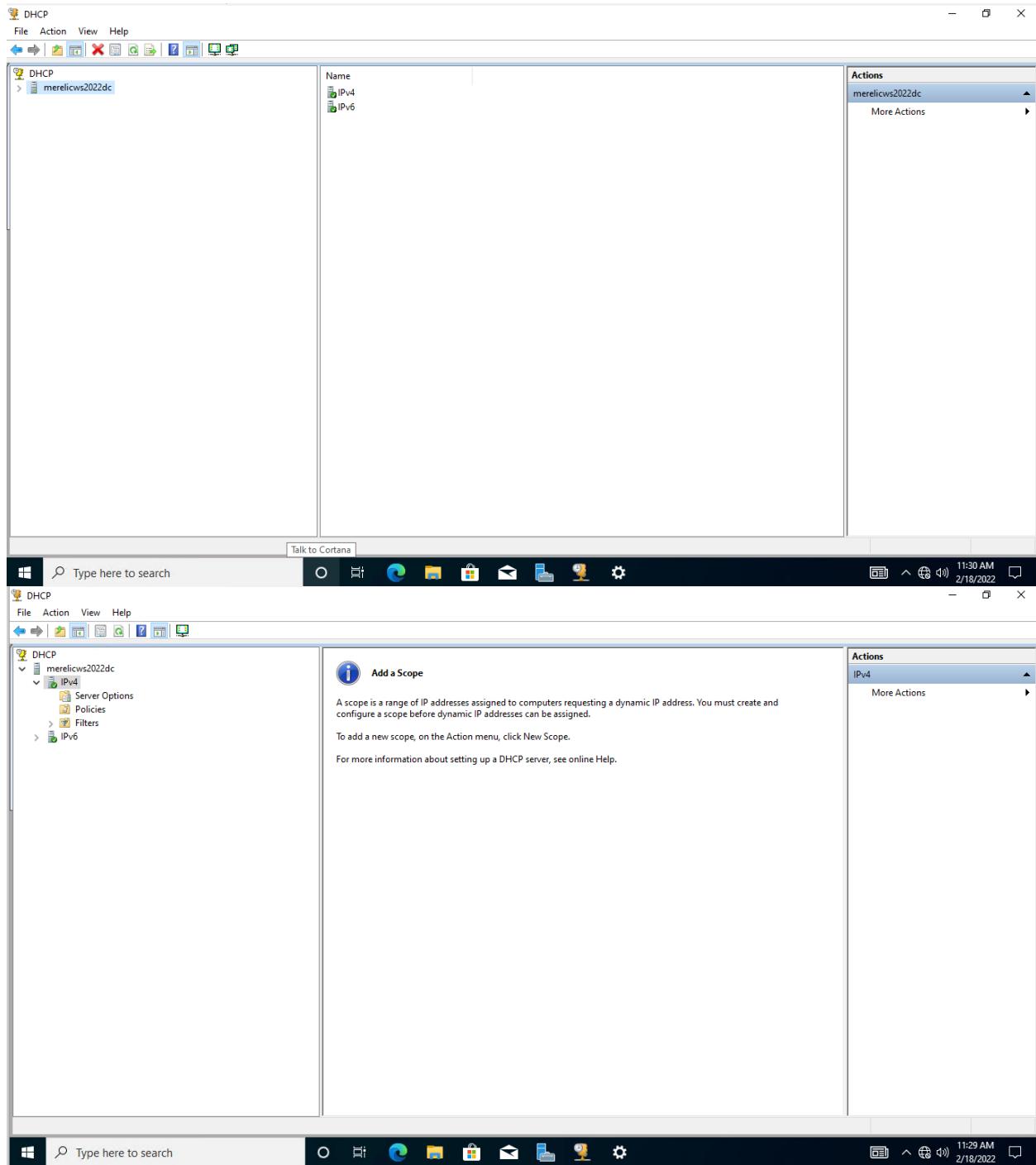


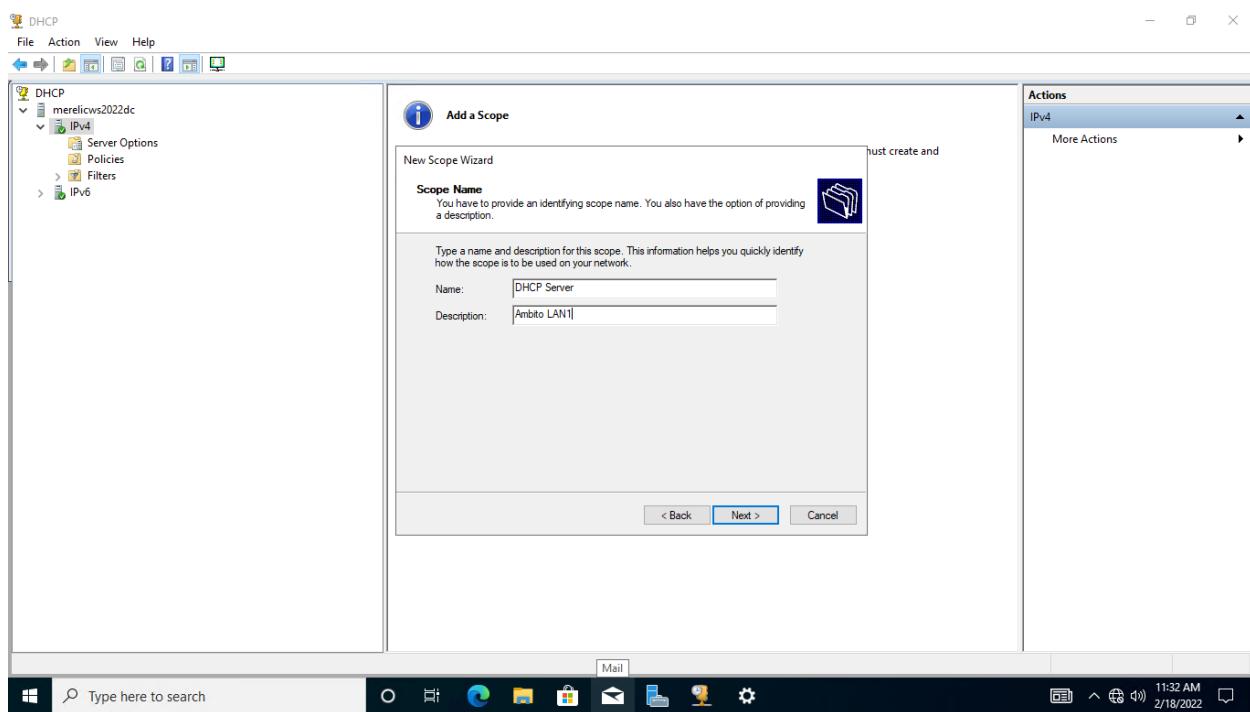
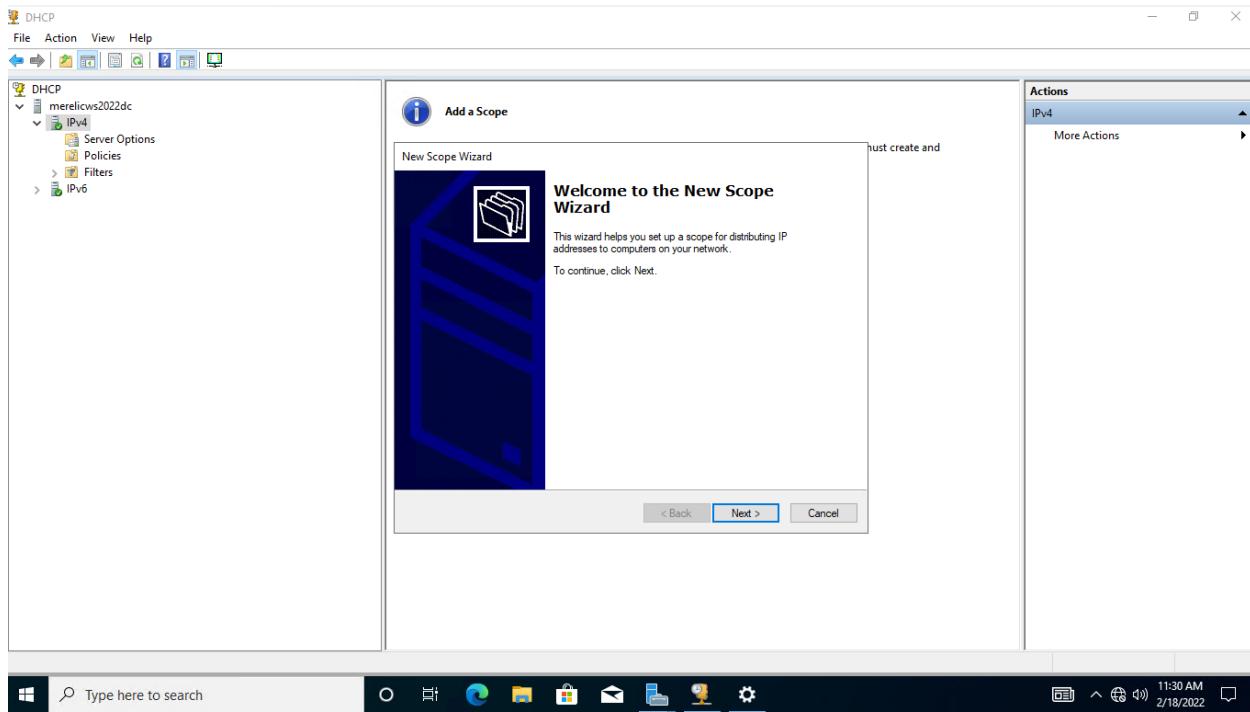


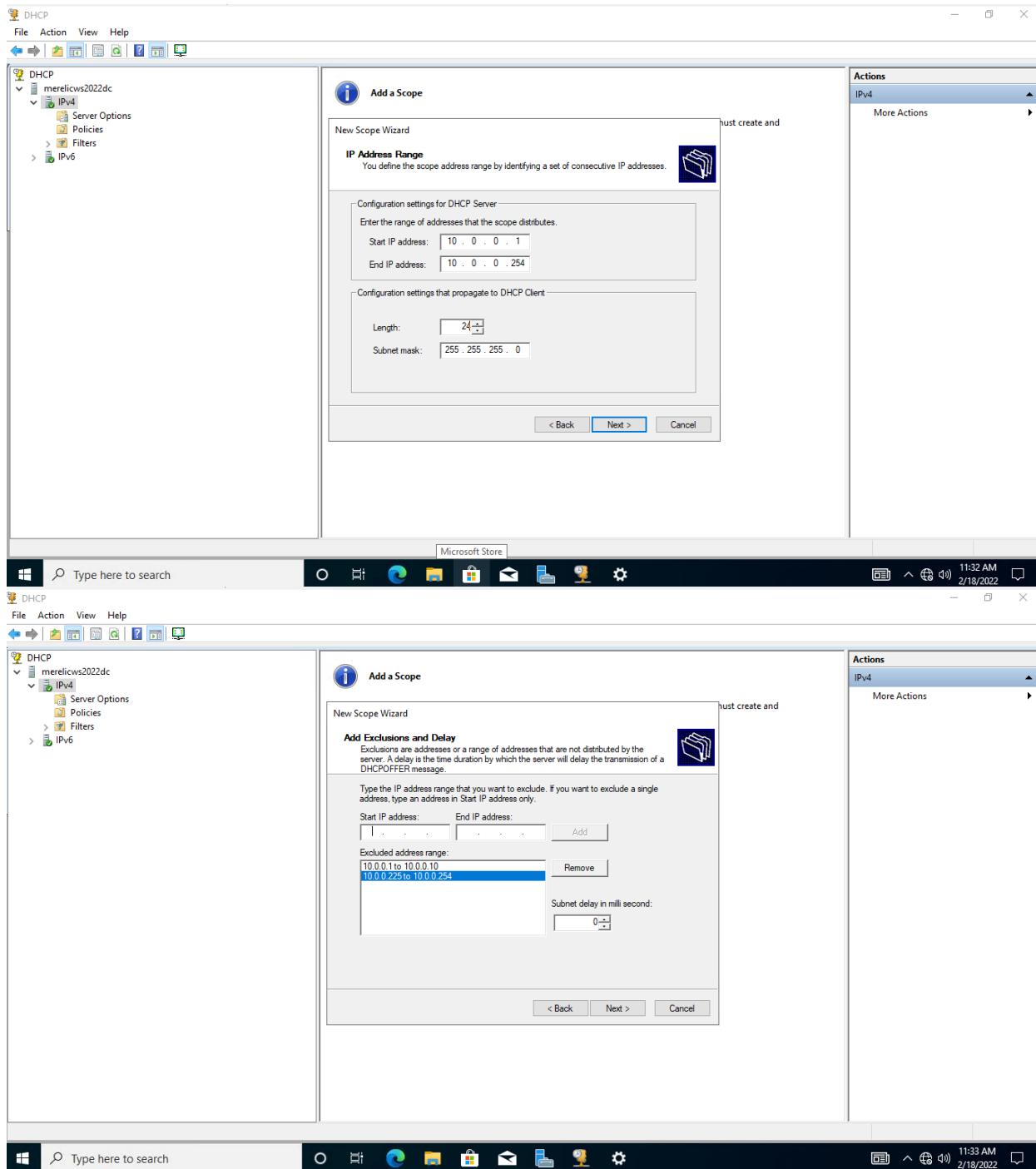


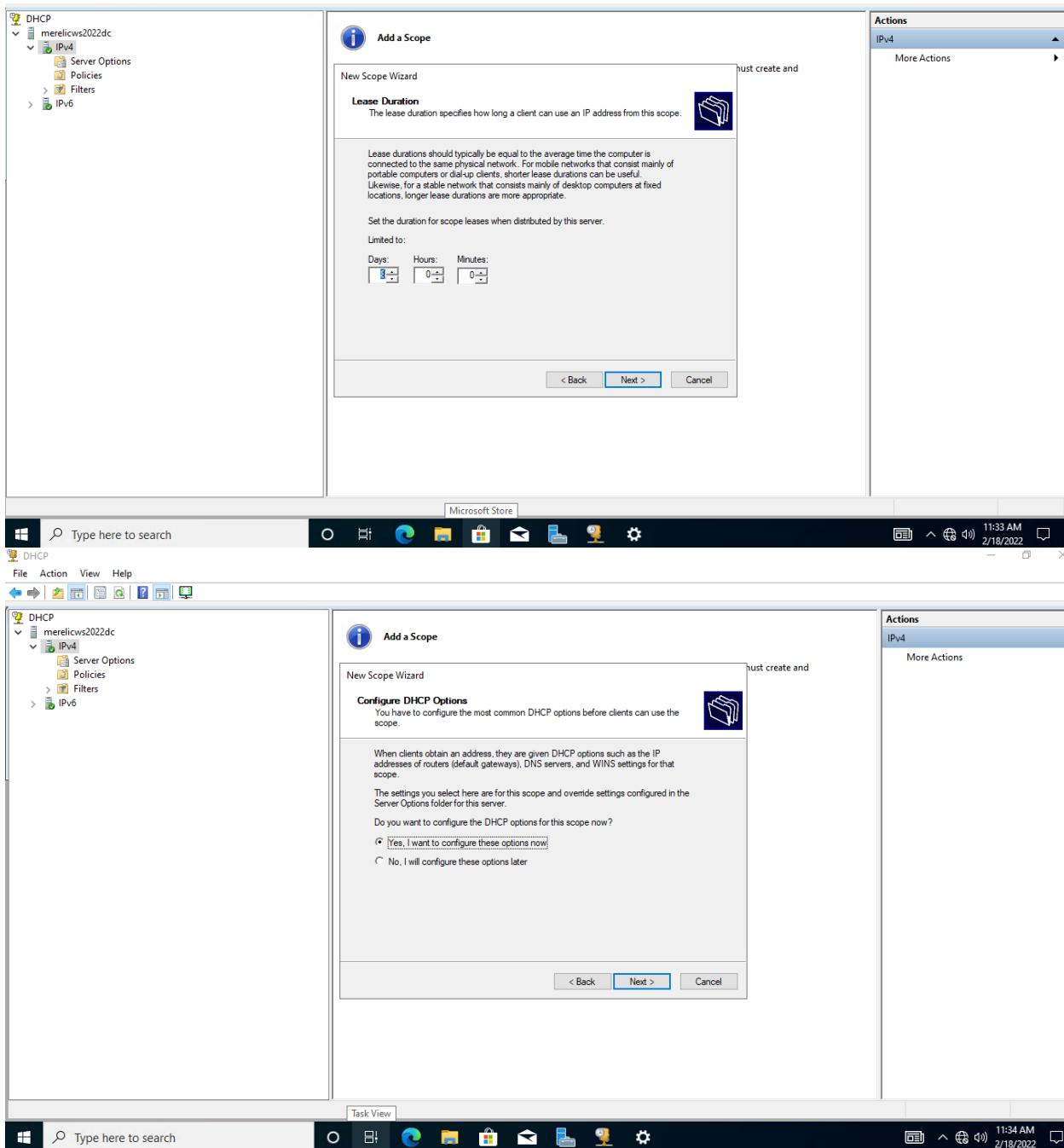
VII.XI Configuración DHCP

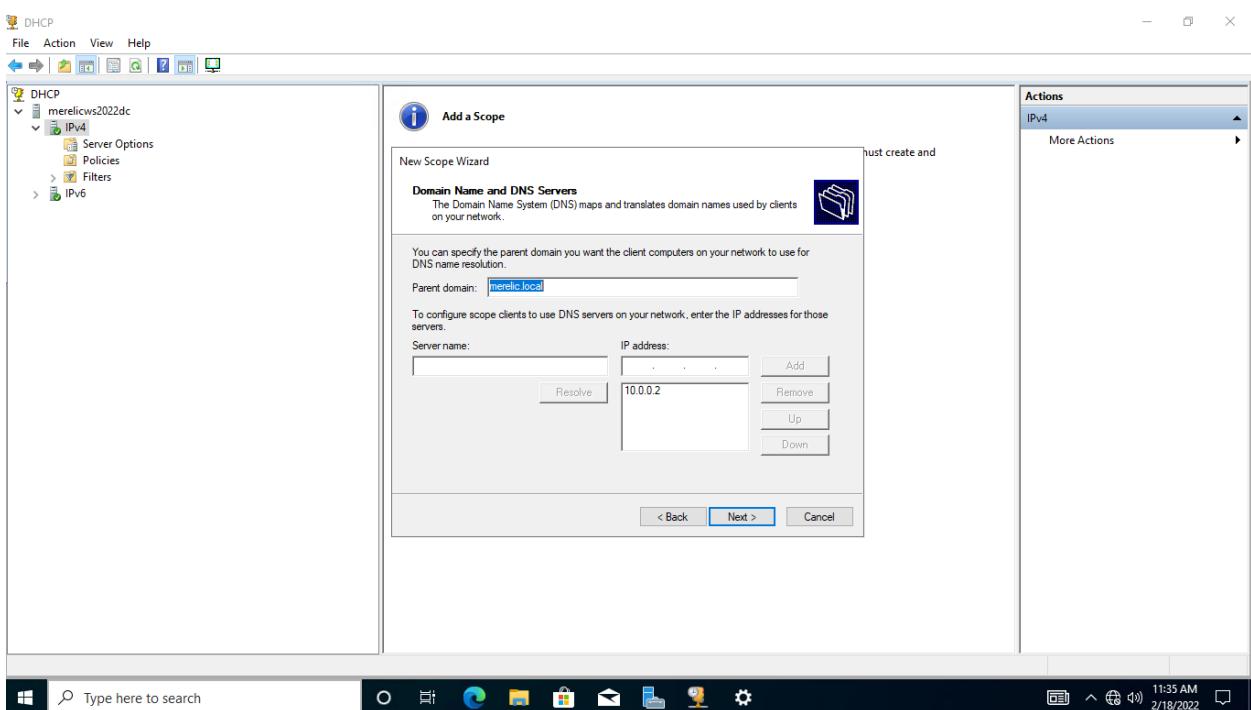
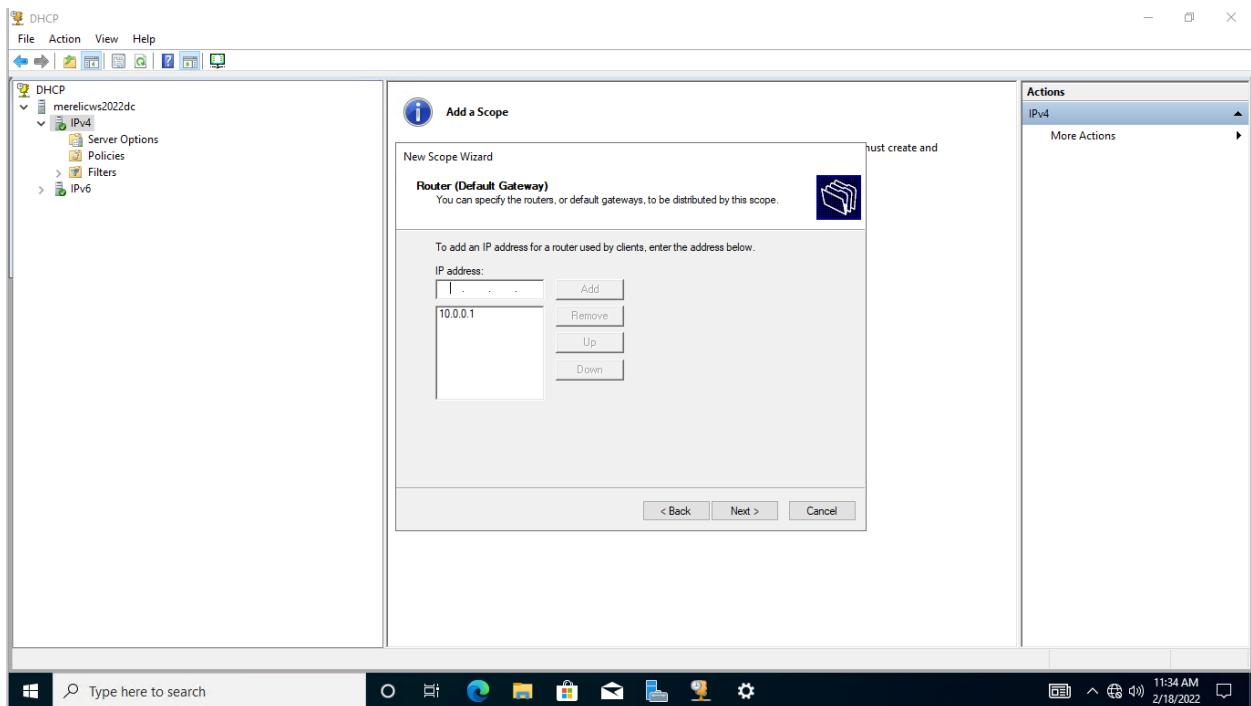


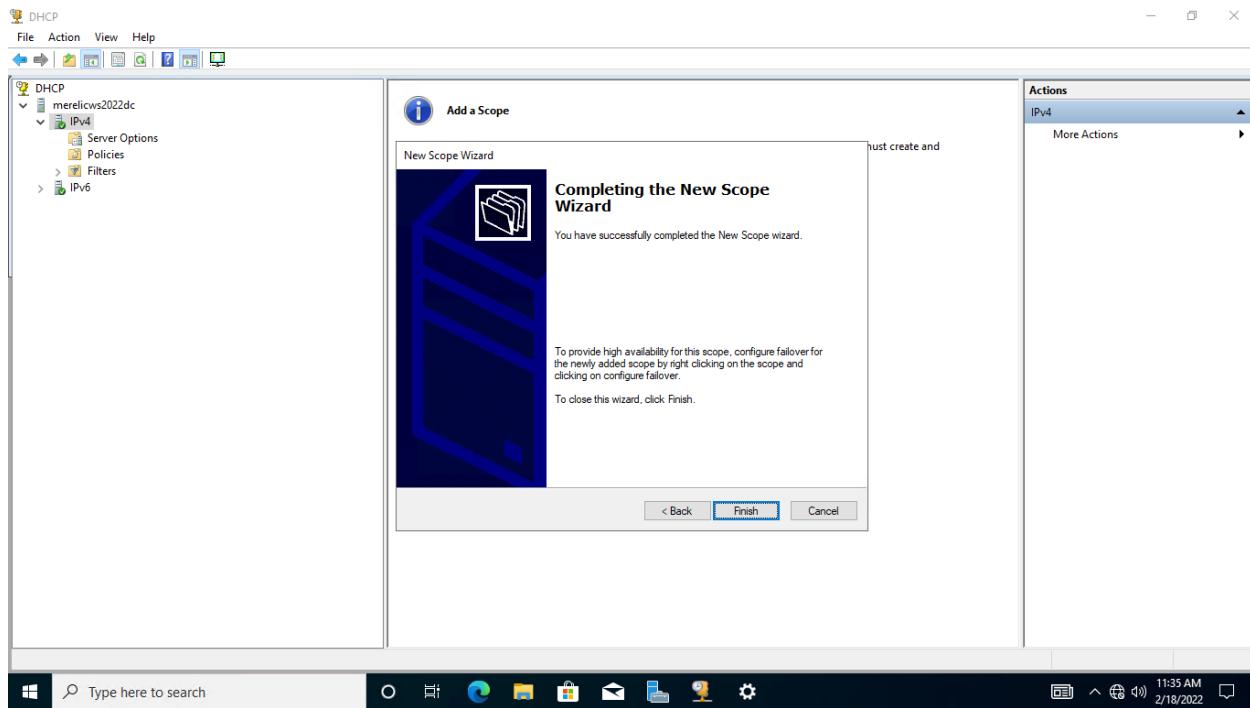




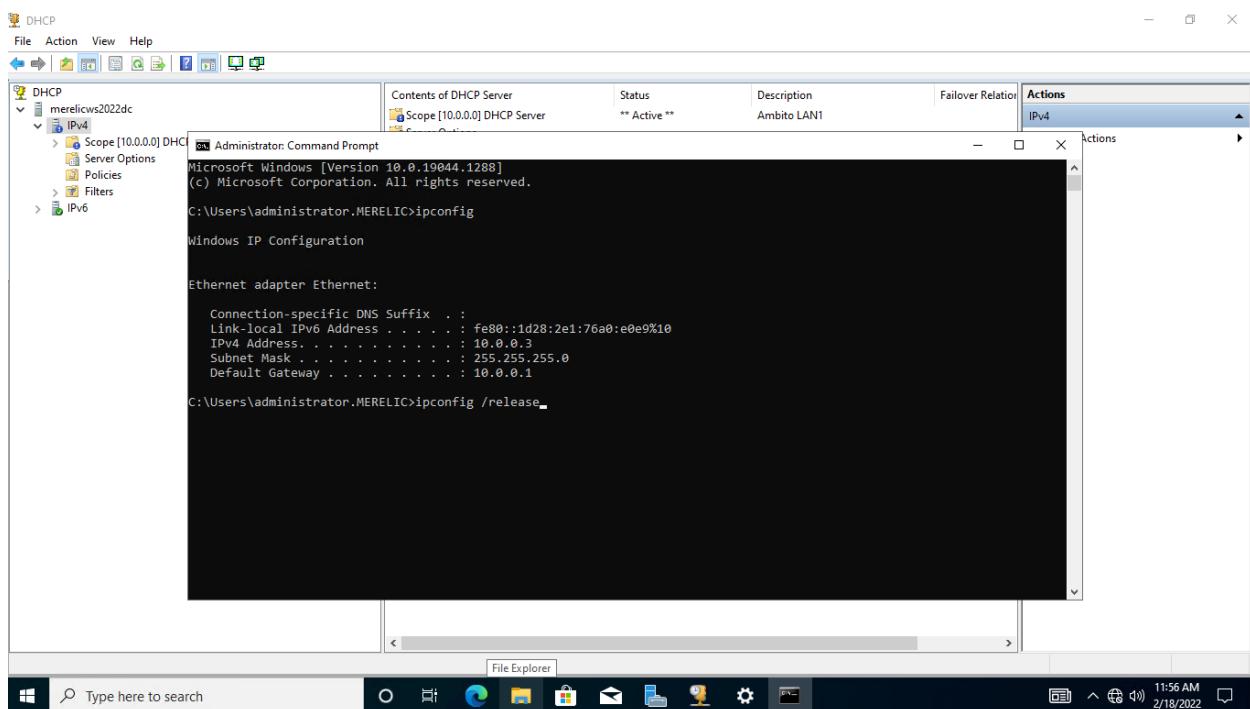


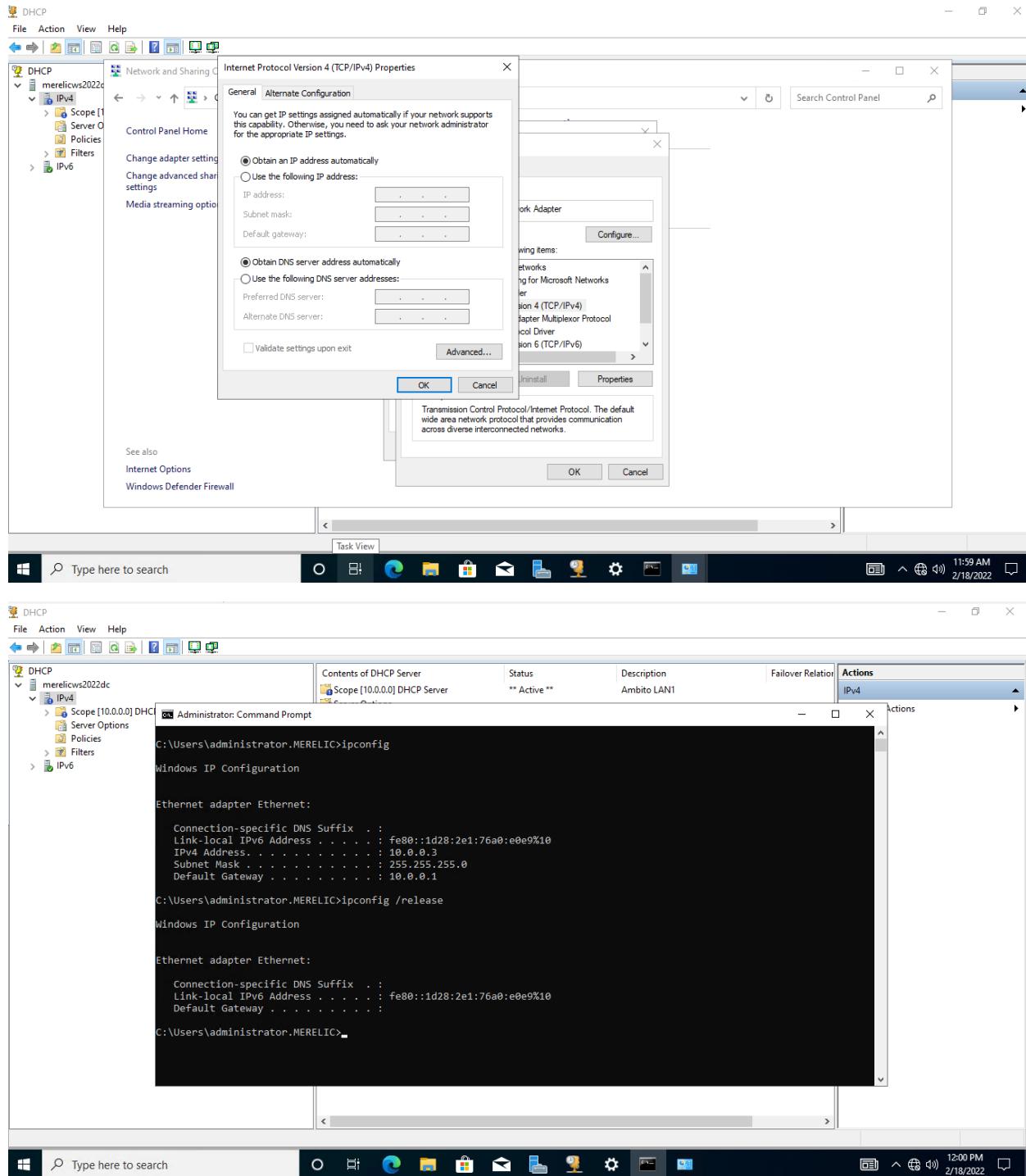


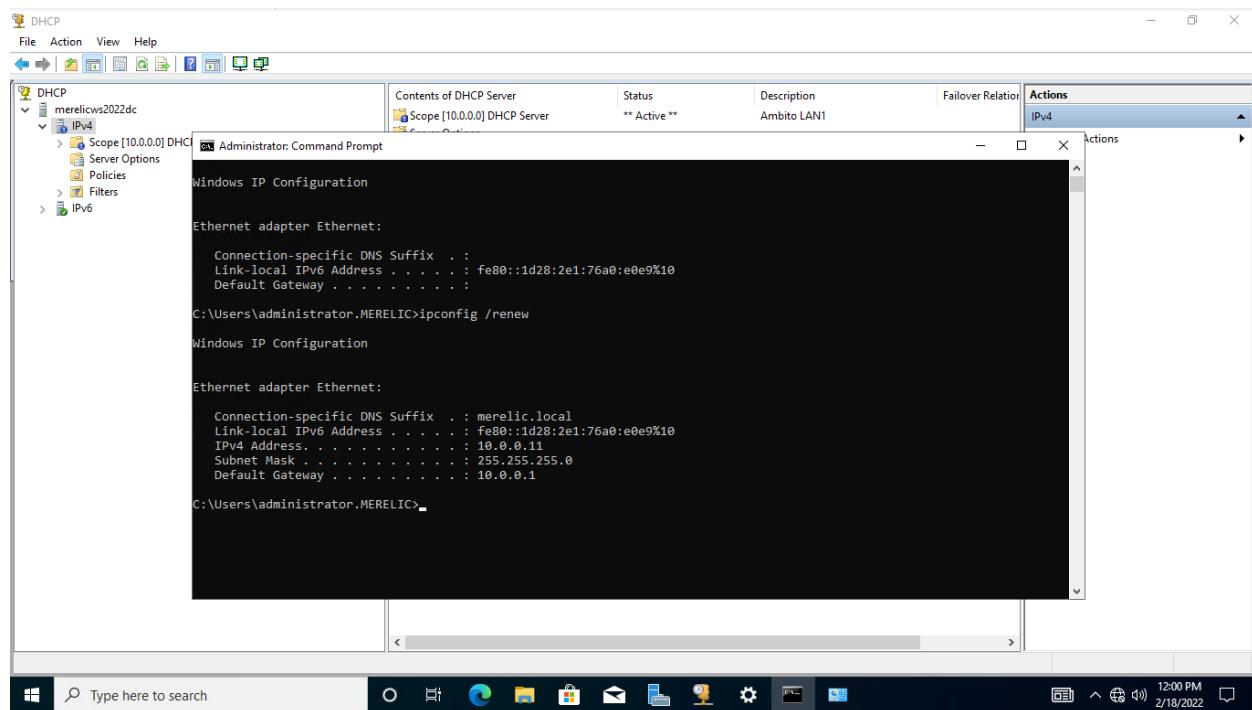




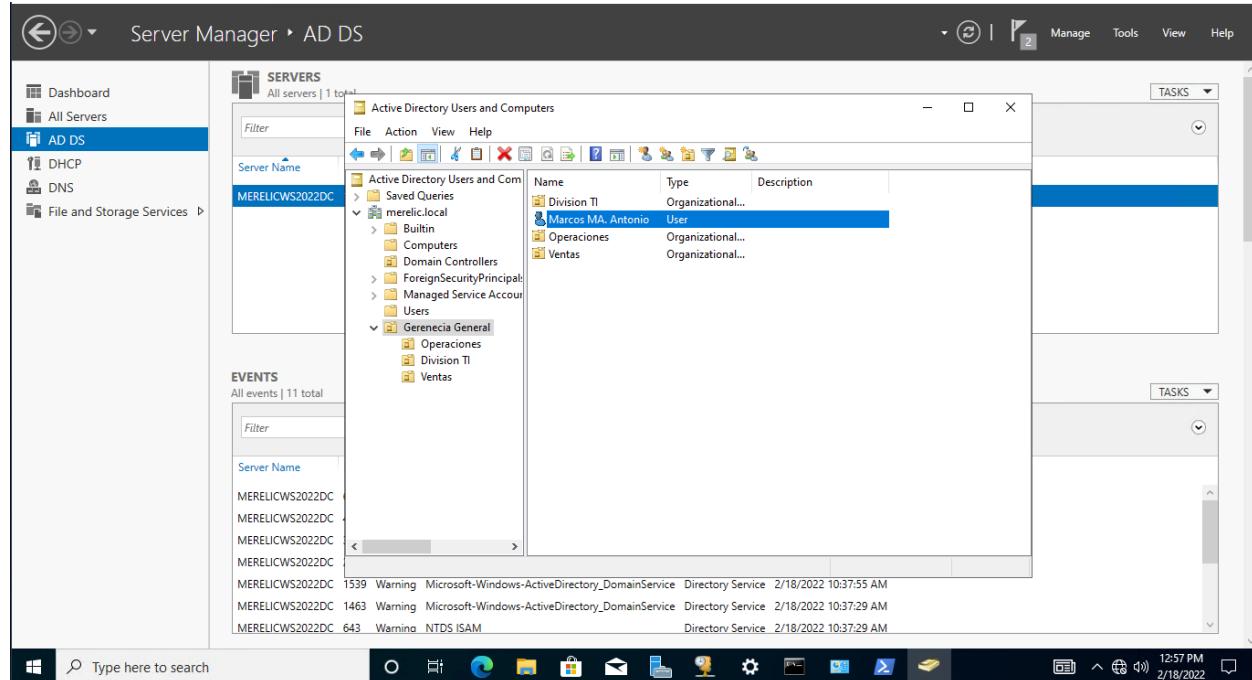
VII.XI DHCP en el cliente

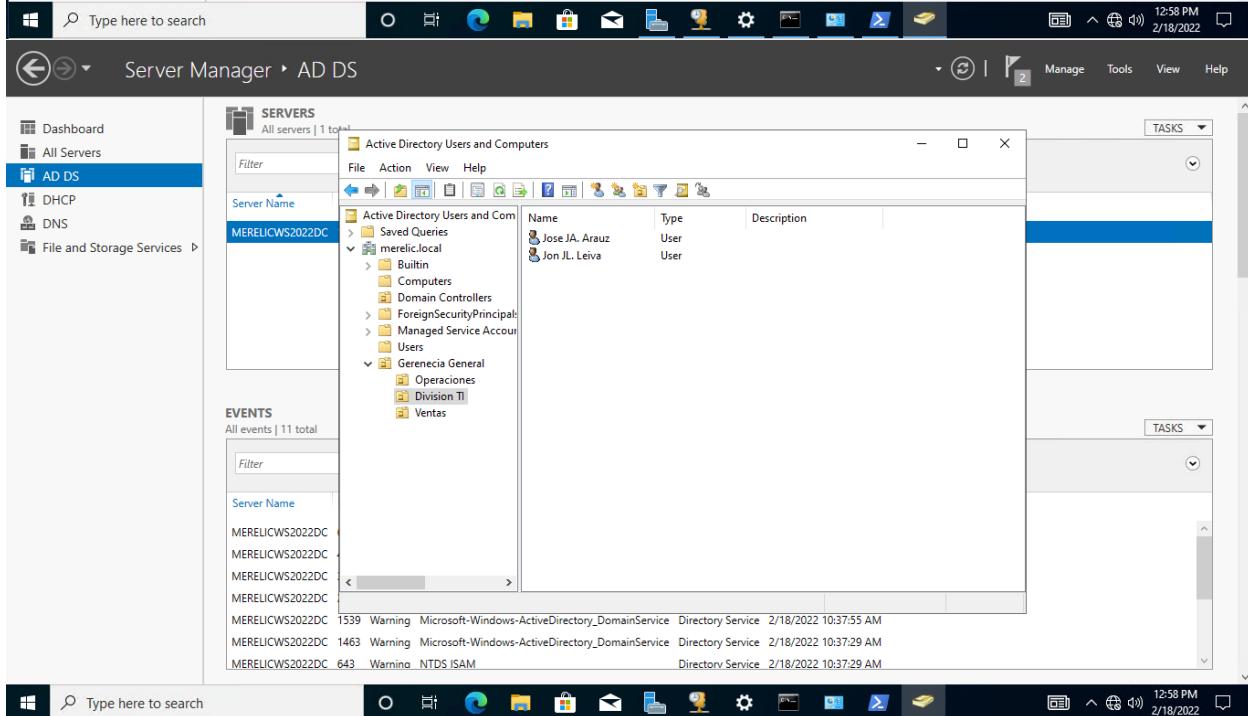
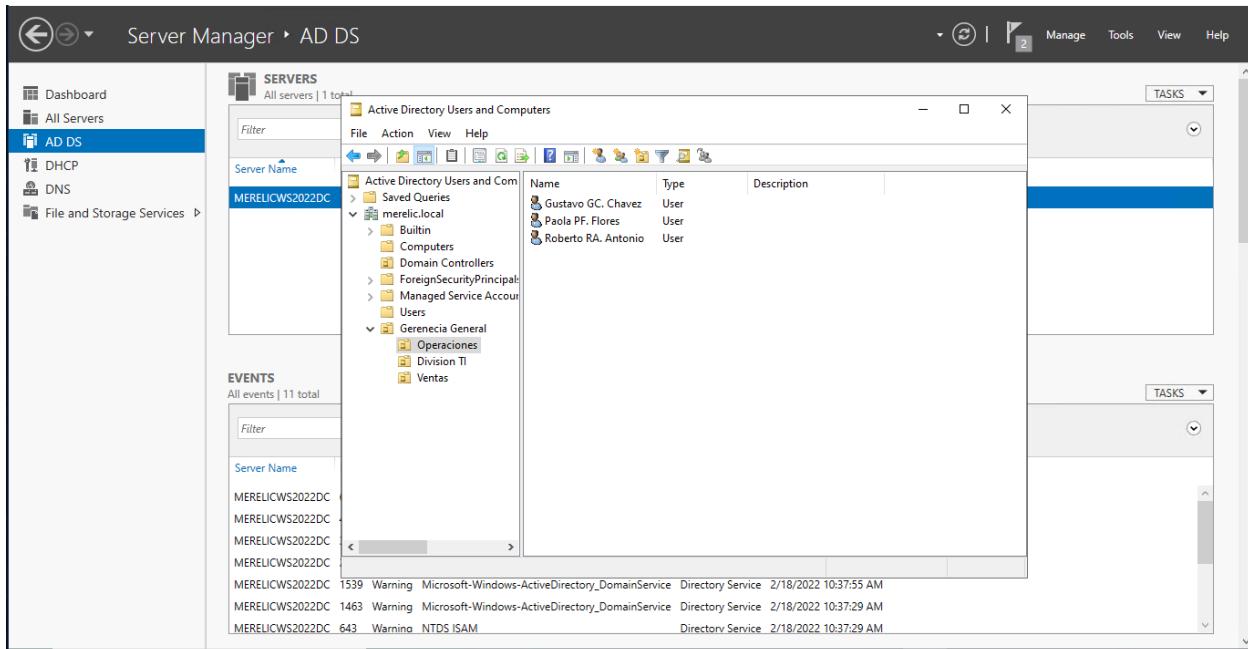


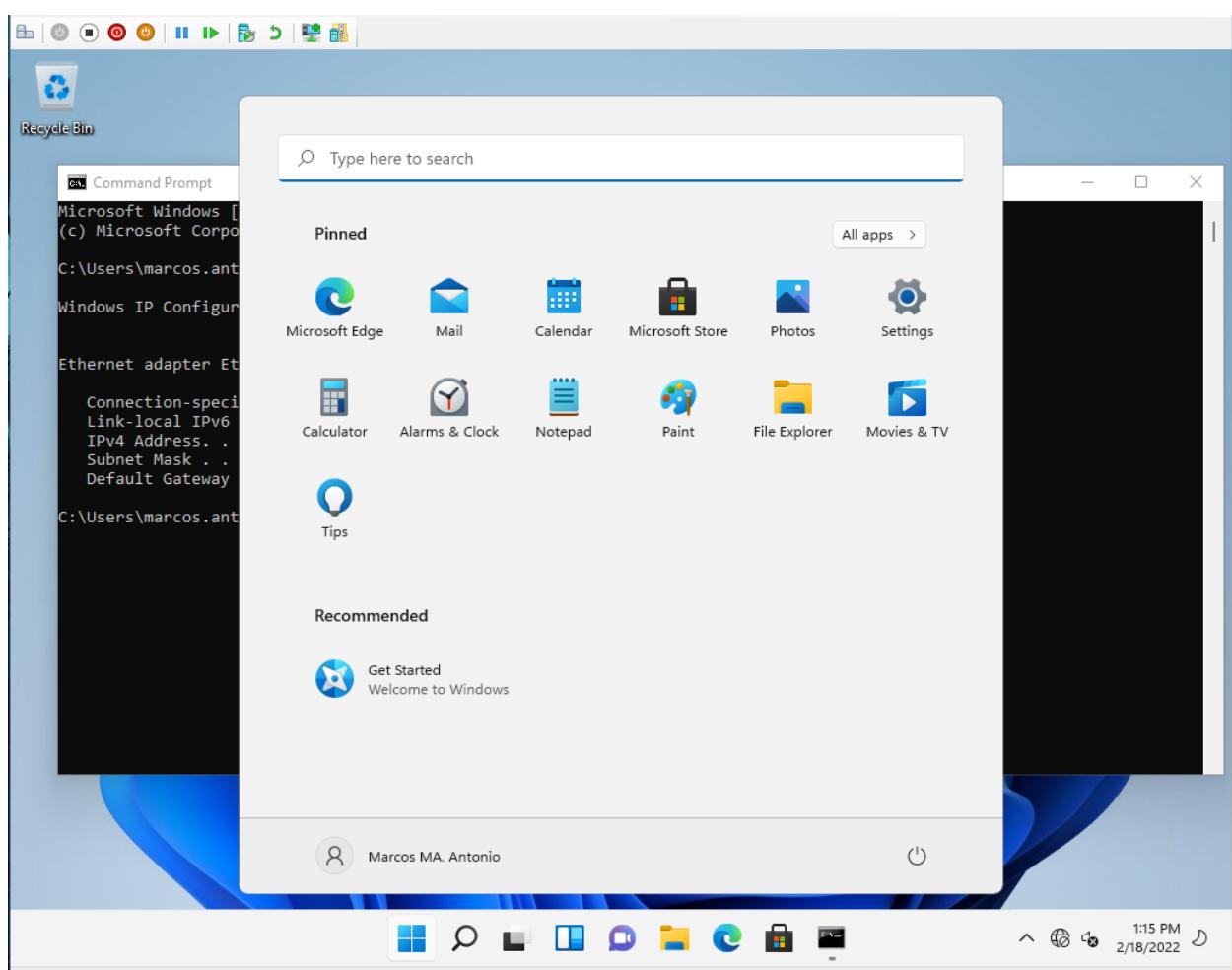
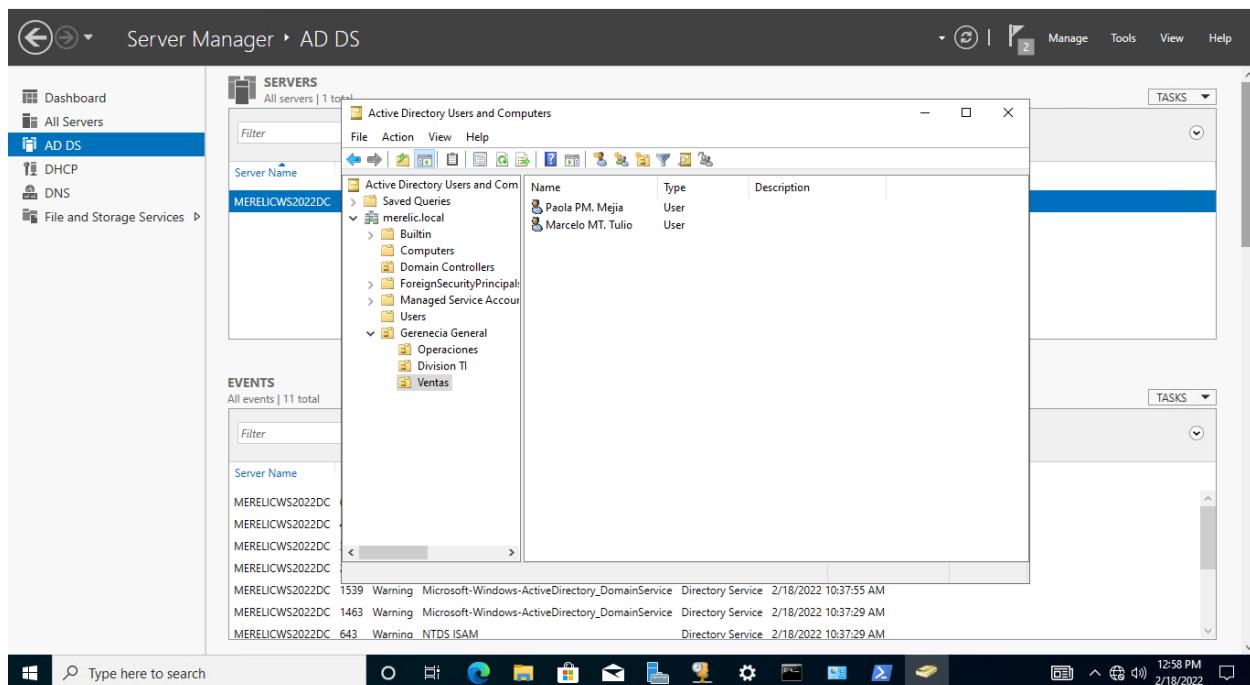


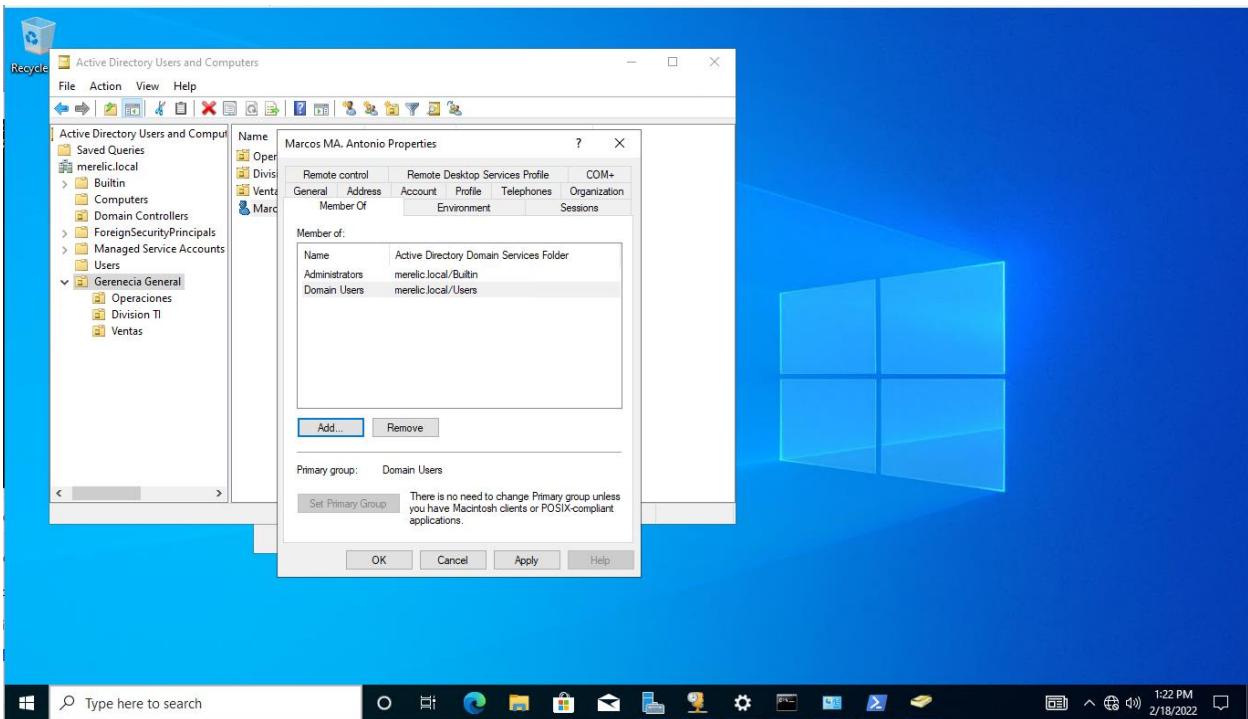


VII.XII Creación de usuario en el active directory

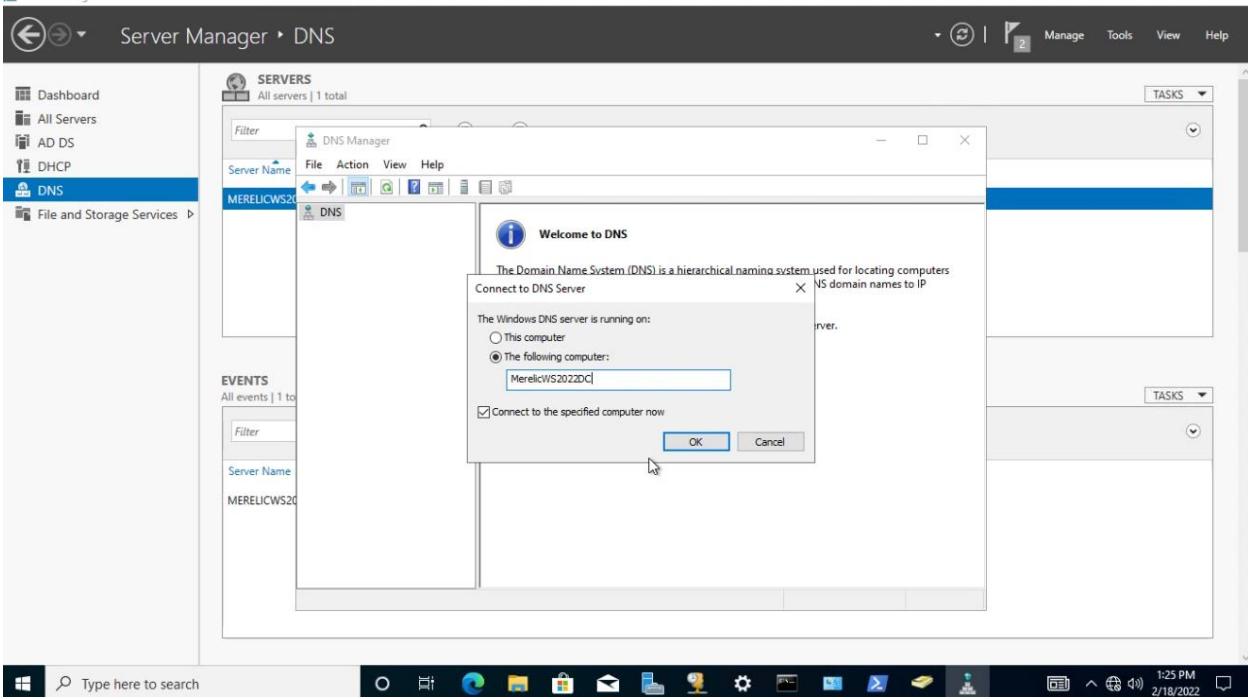


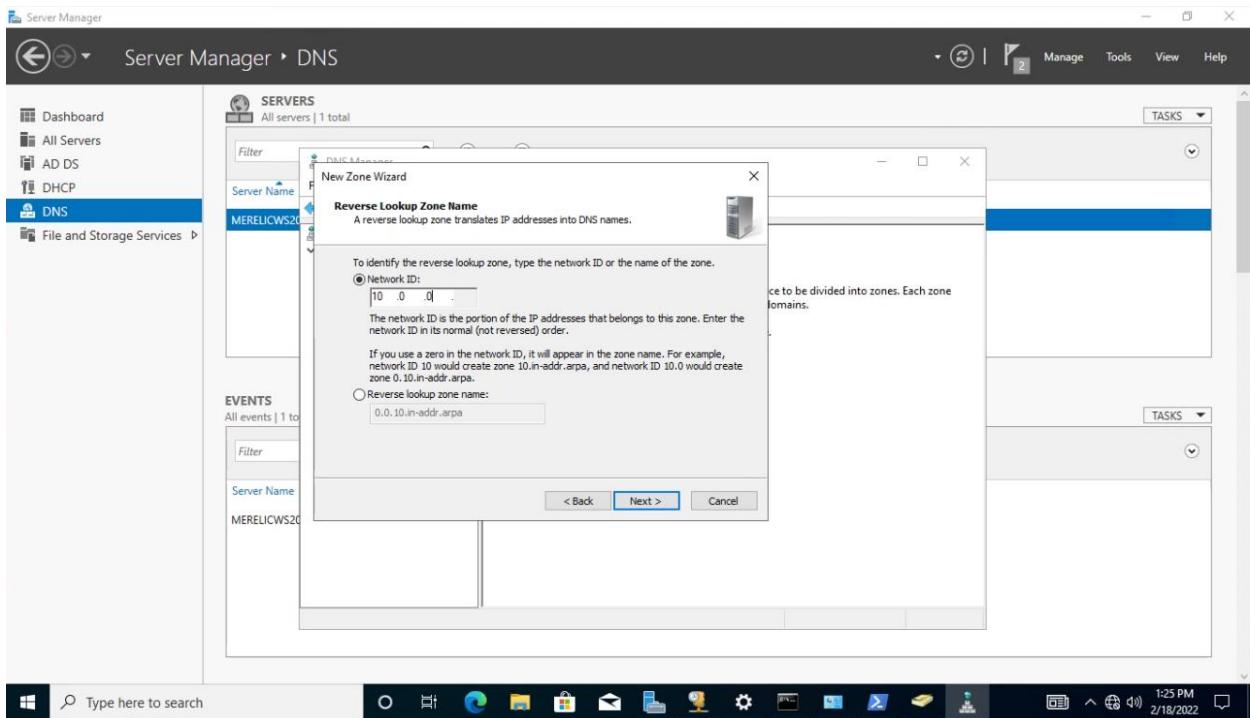
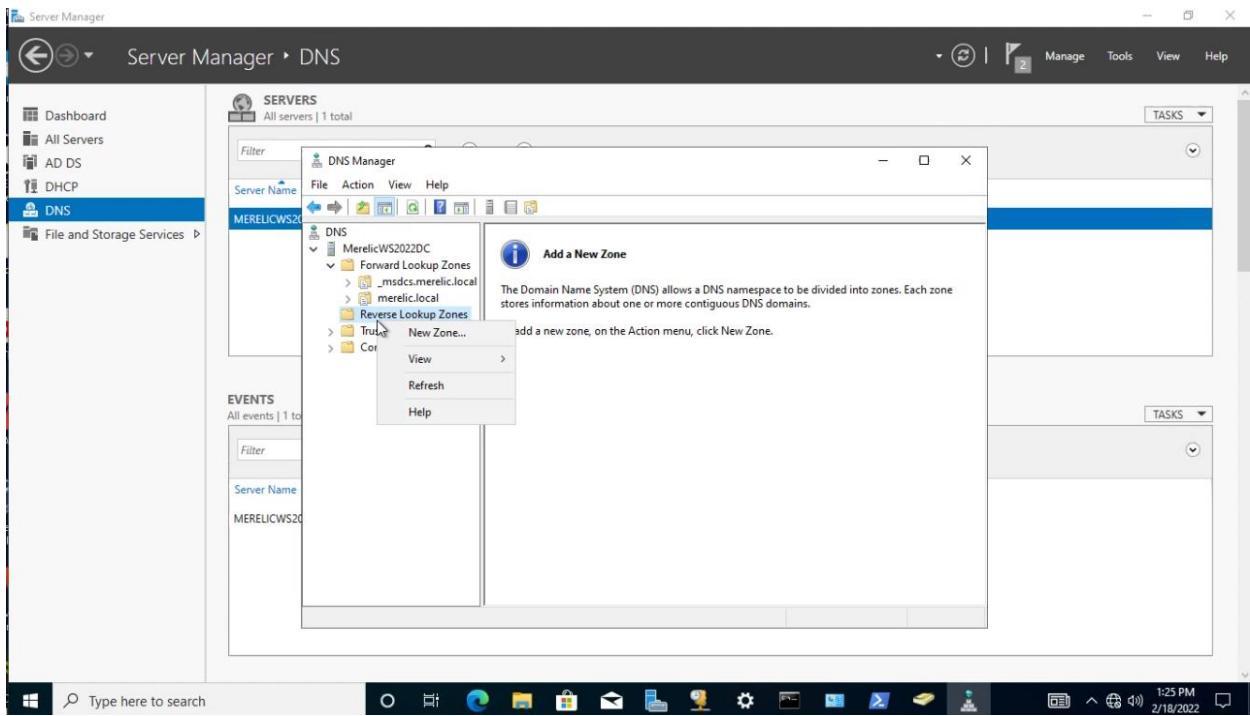


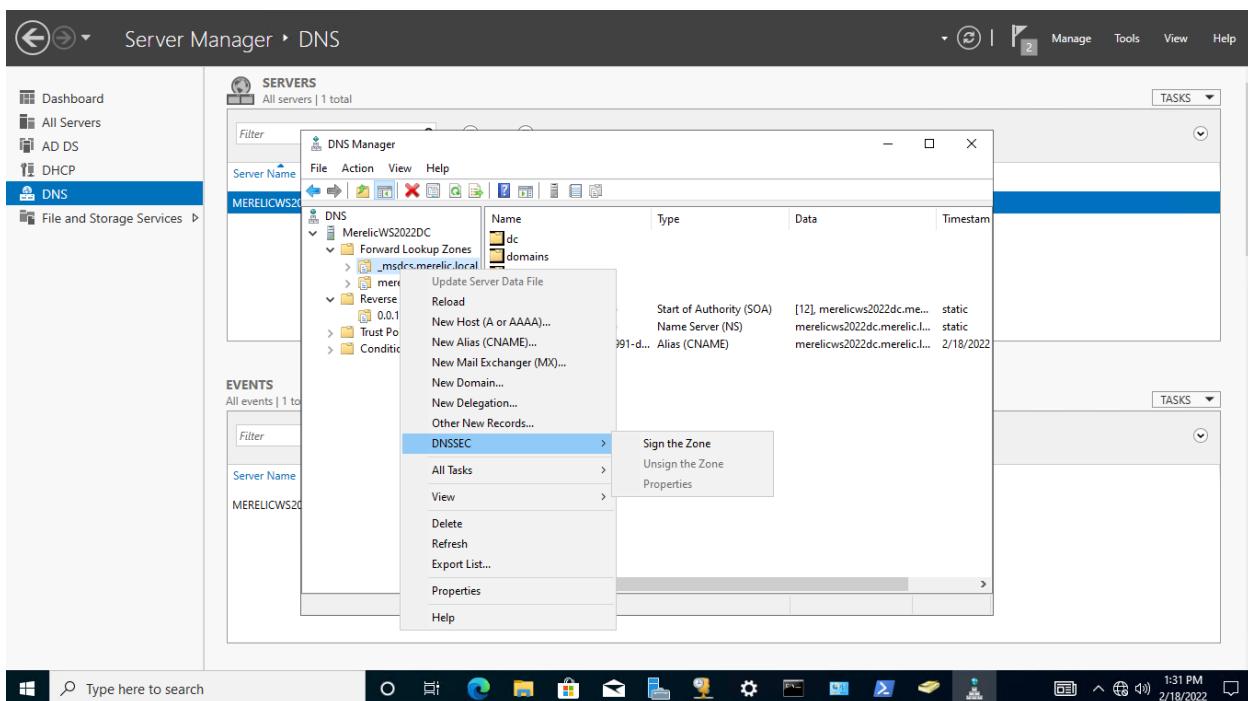
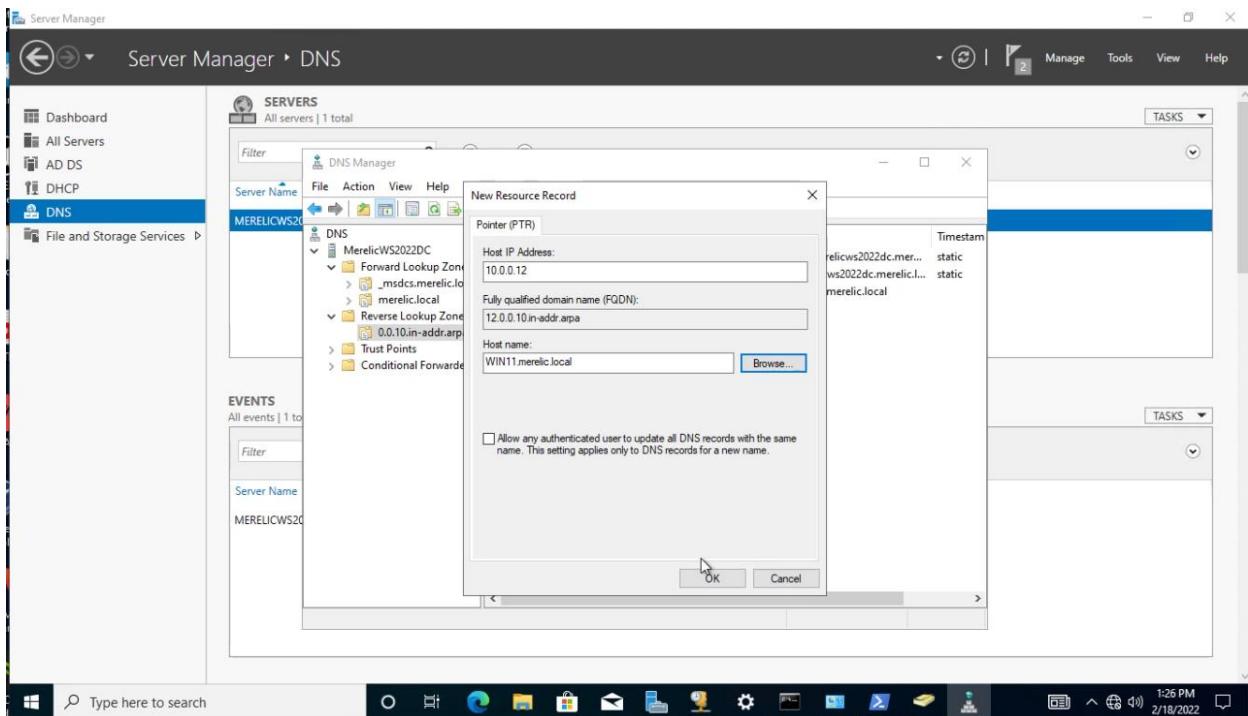


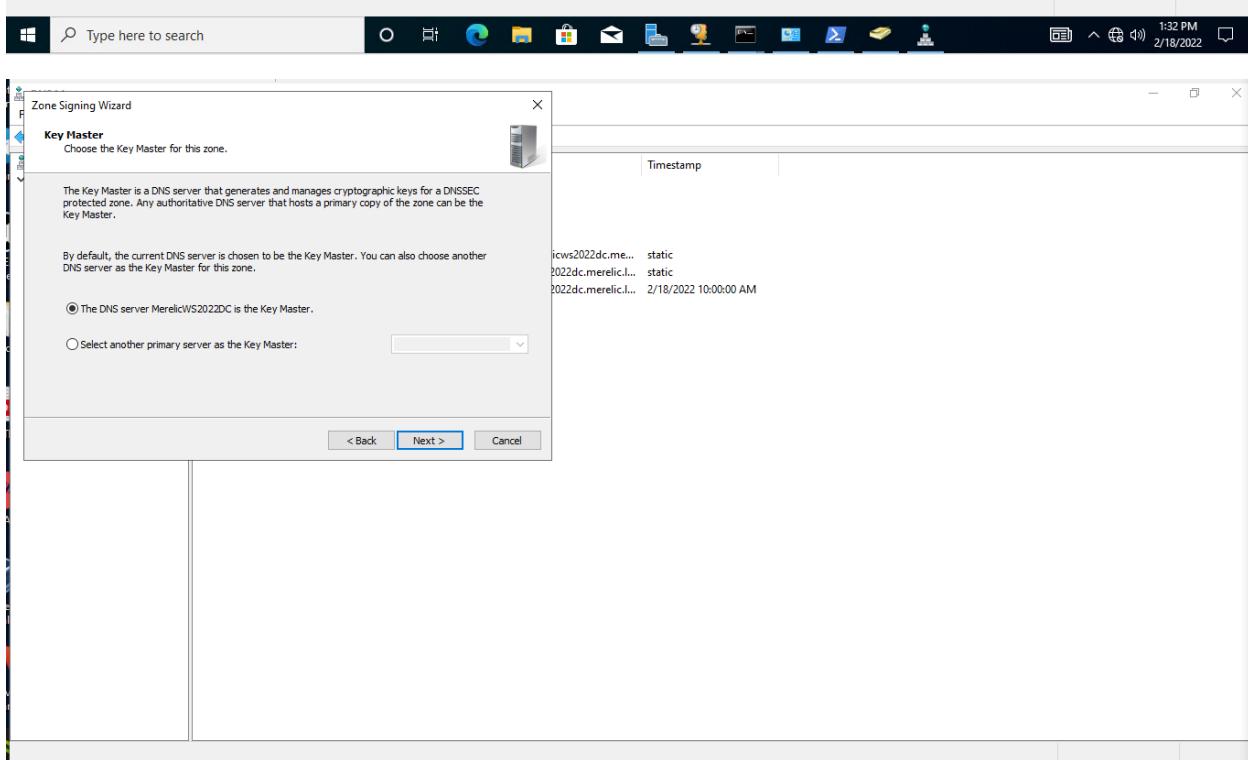
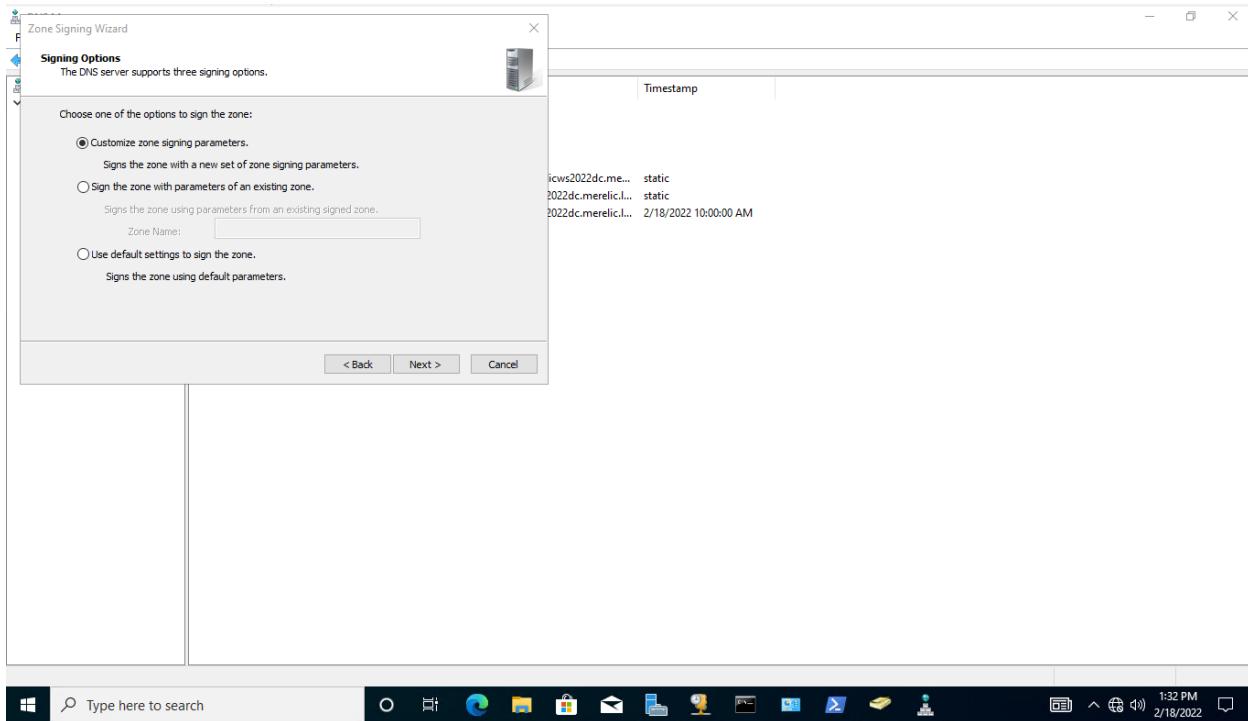


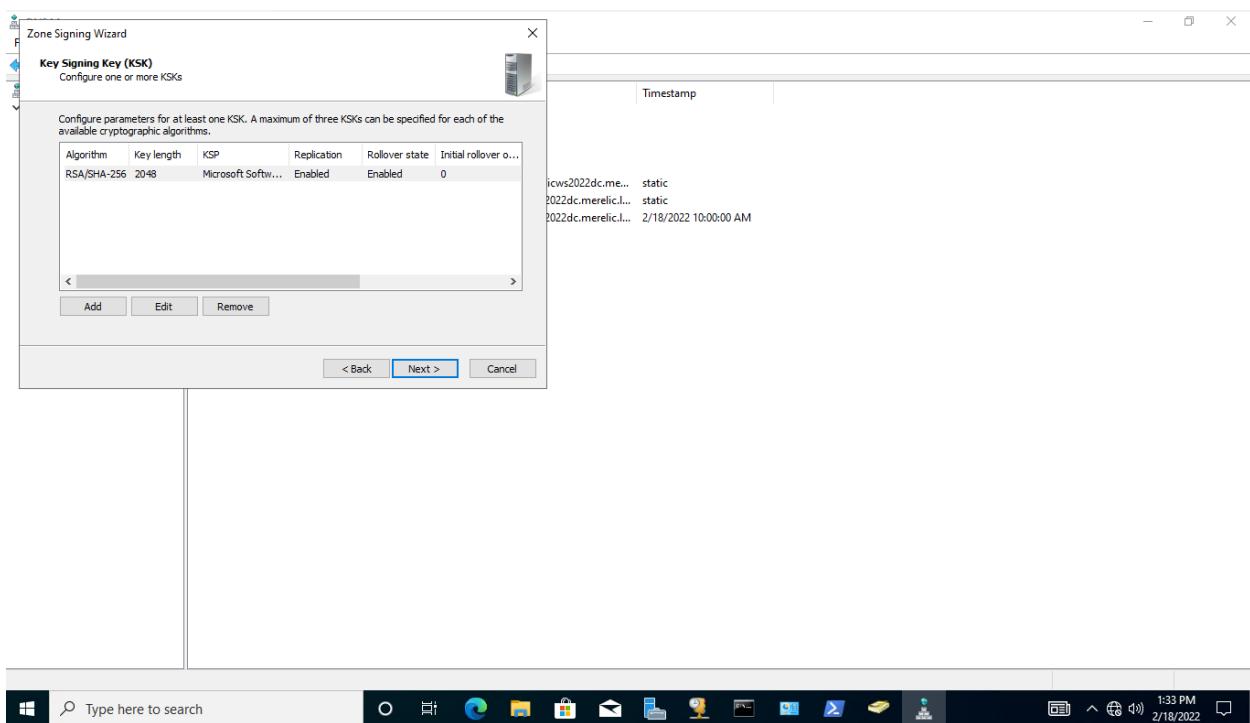
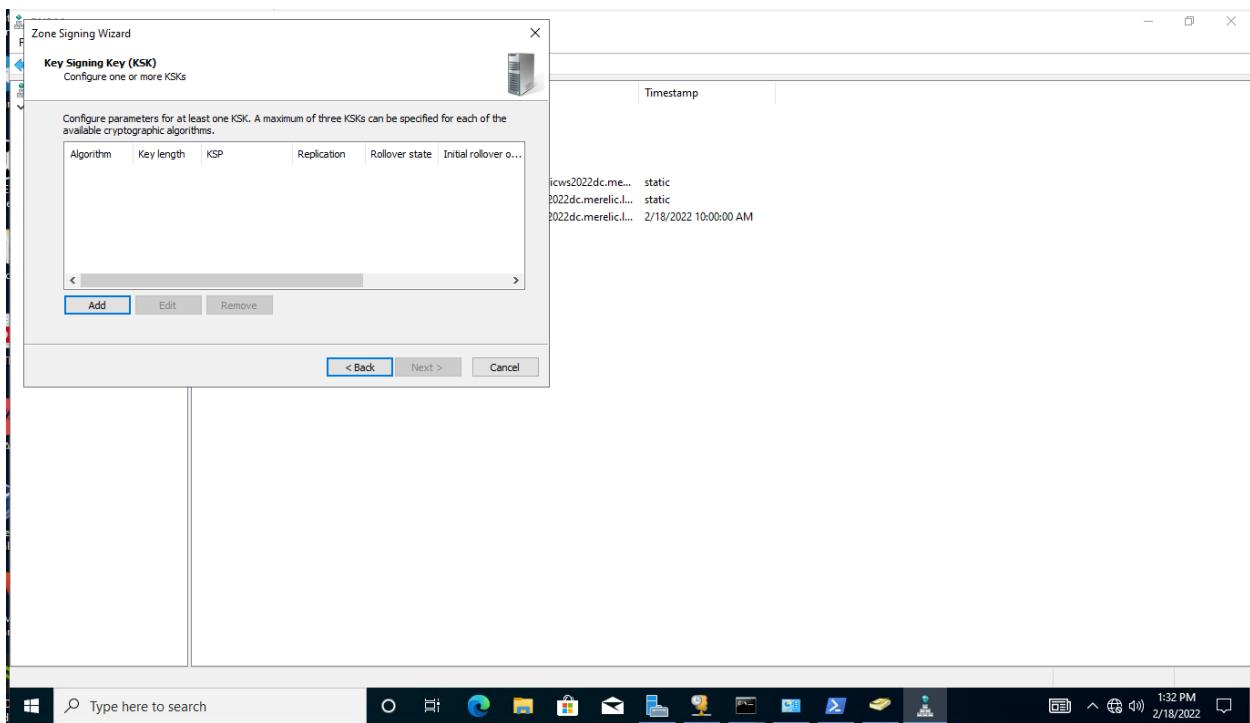
VII.XIII Configuración del servicio DNSSEC

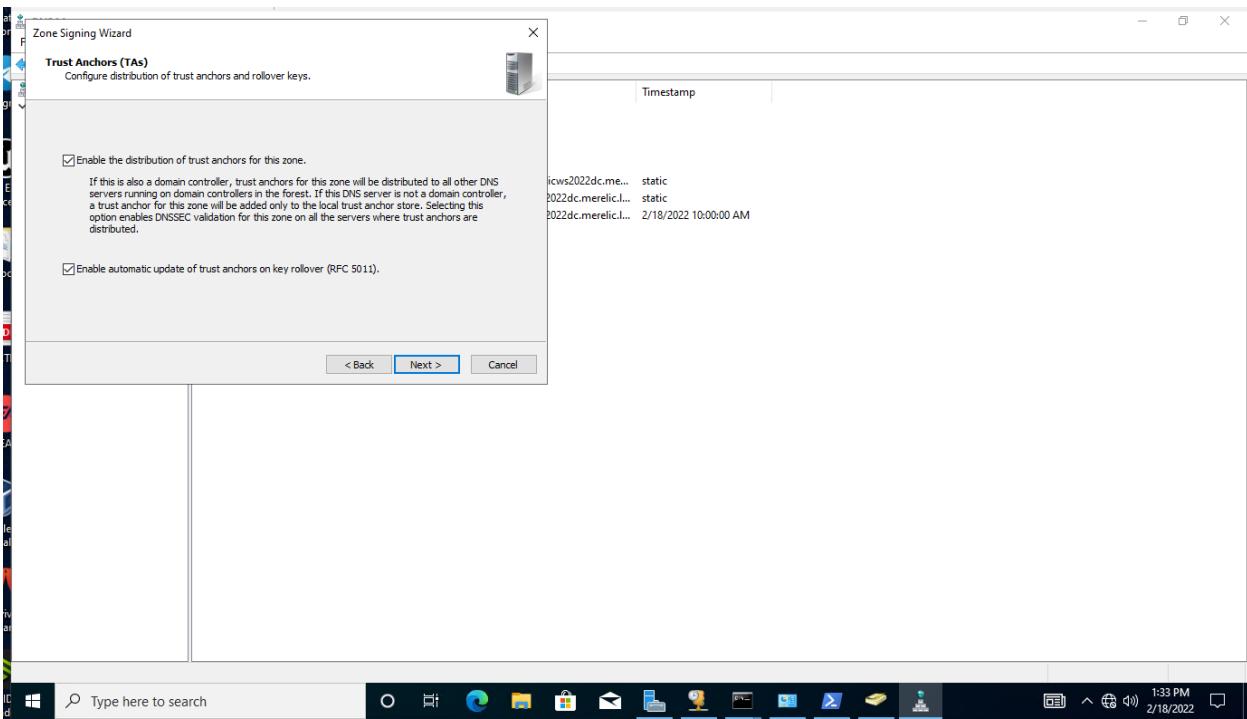
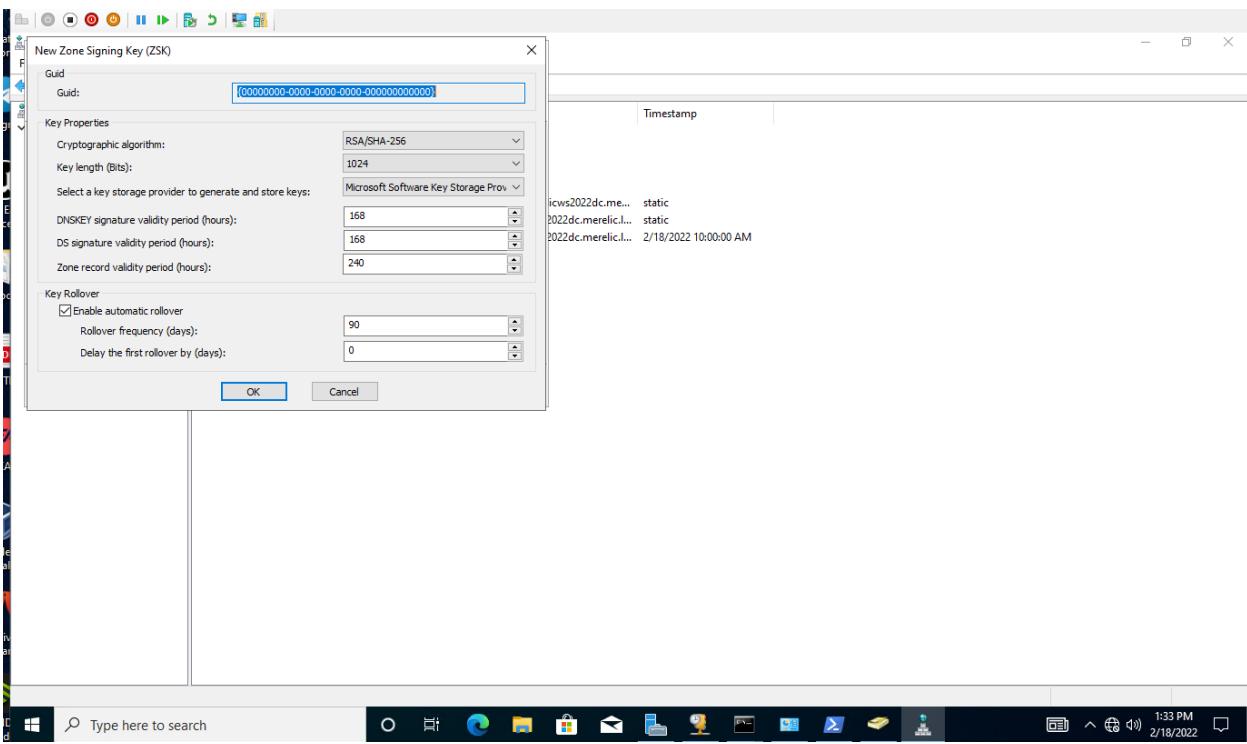


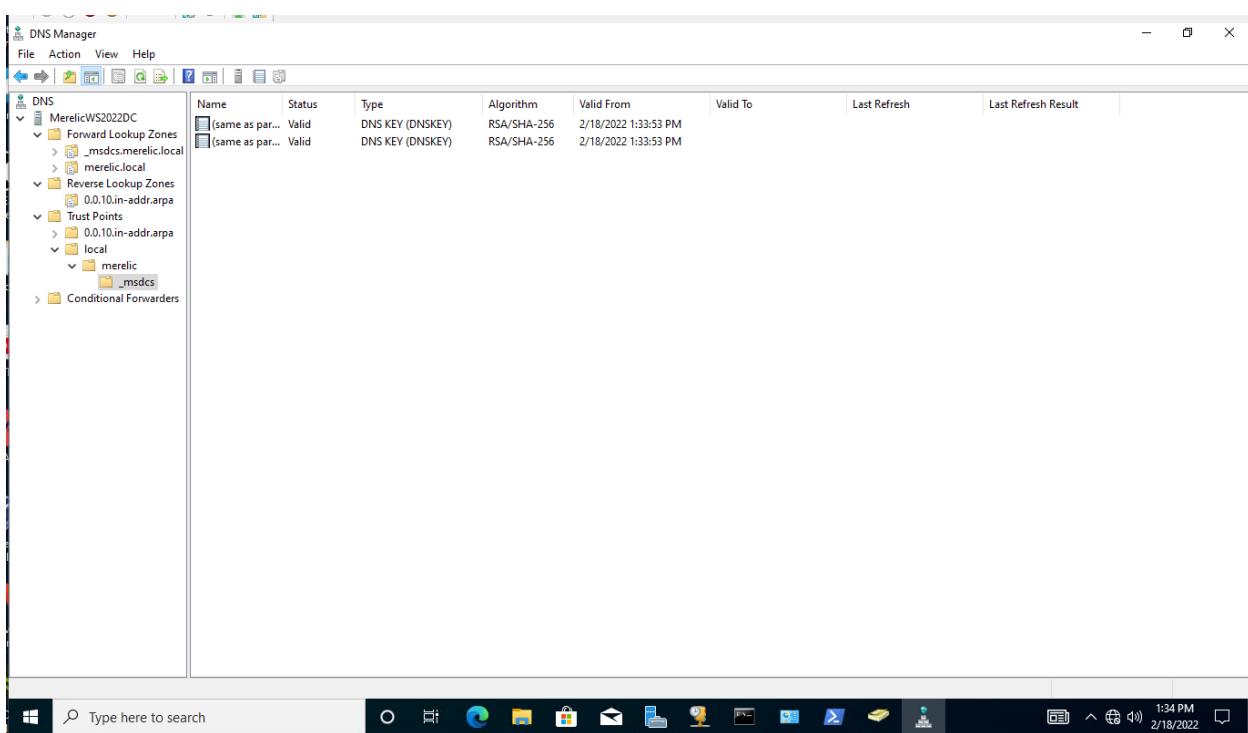
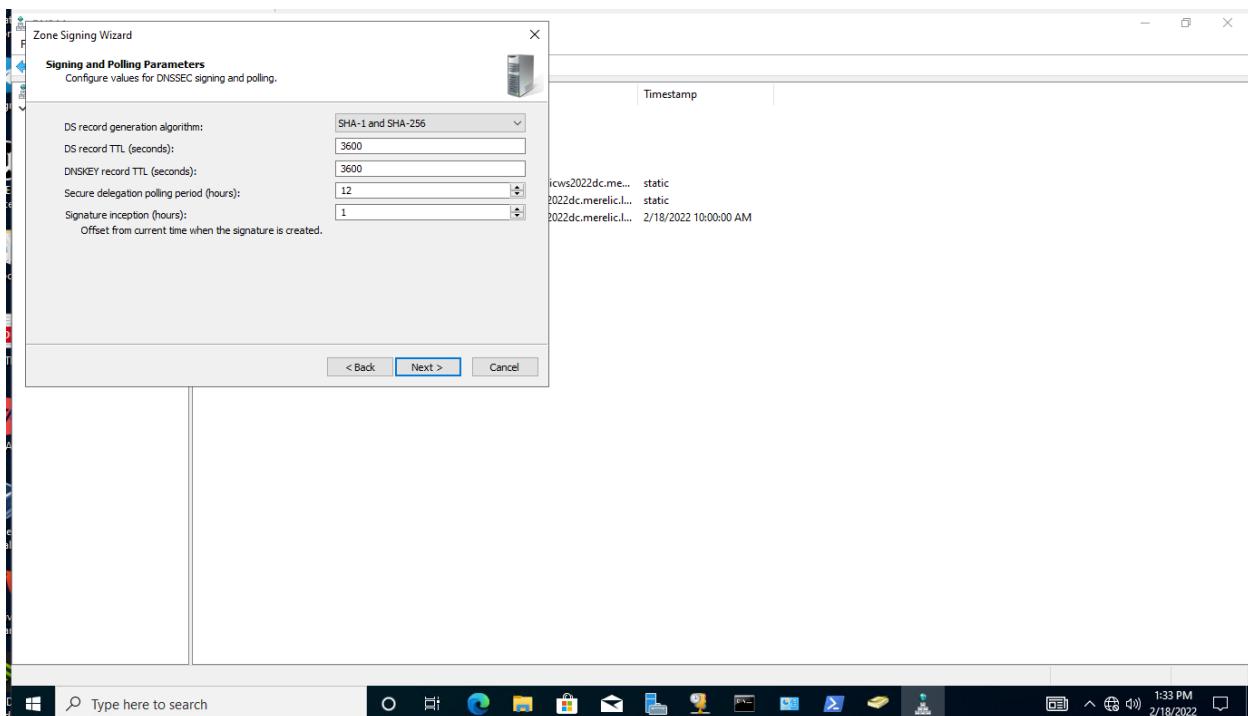


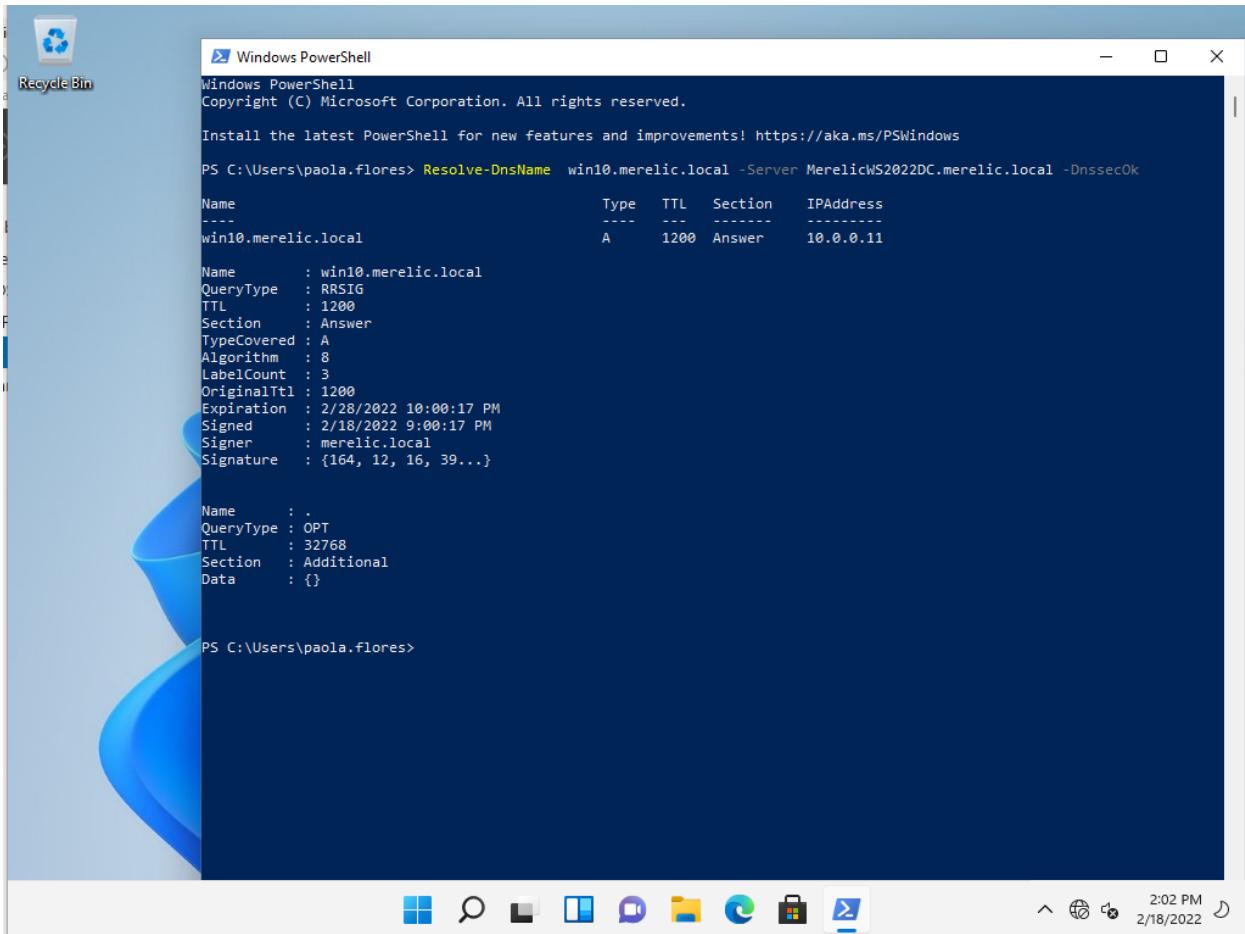












A screenshot of a Windows desktop environment showing a PowerShell window. The desktop background features a blue wave pattern. The PowerShell window title is "Windows PowerShell". The command run is "Resolve-DnsName win10.merelic.local -Server MerelicWS2022DC.merelic.local -DnssecOk". The output shows two entries: one for the A record of win10.merelic.local and another for the SOA record of the root zone (".") with additional information like TTL and Expiration date.

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

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

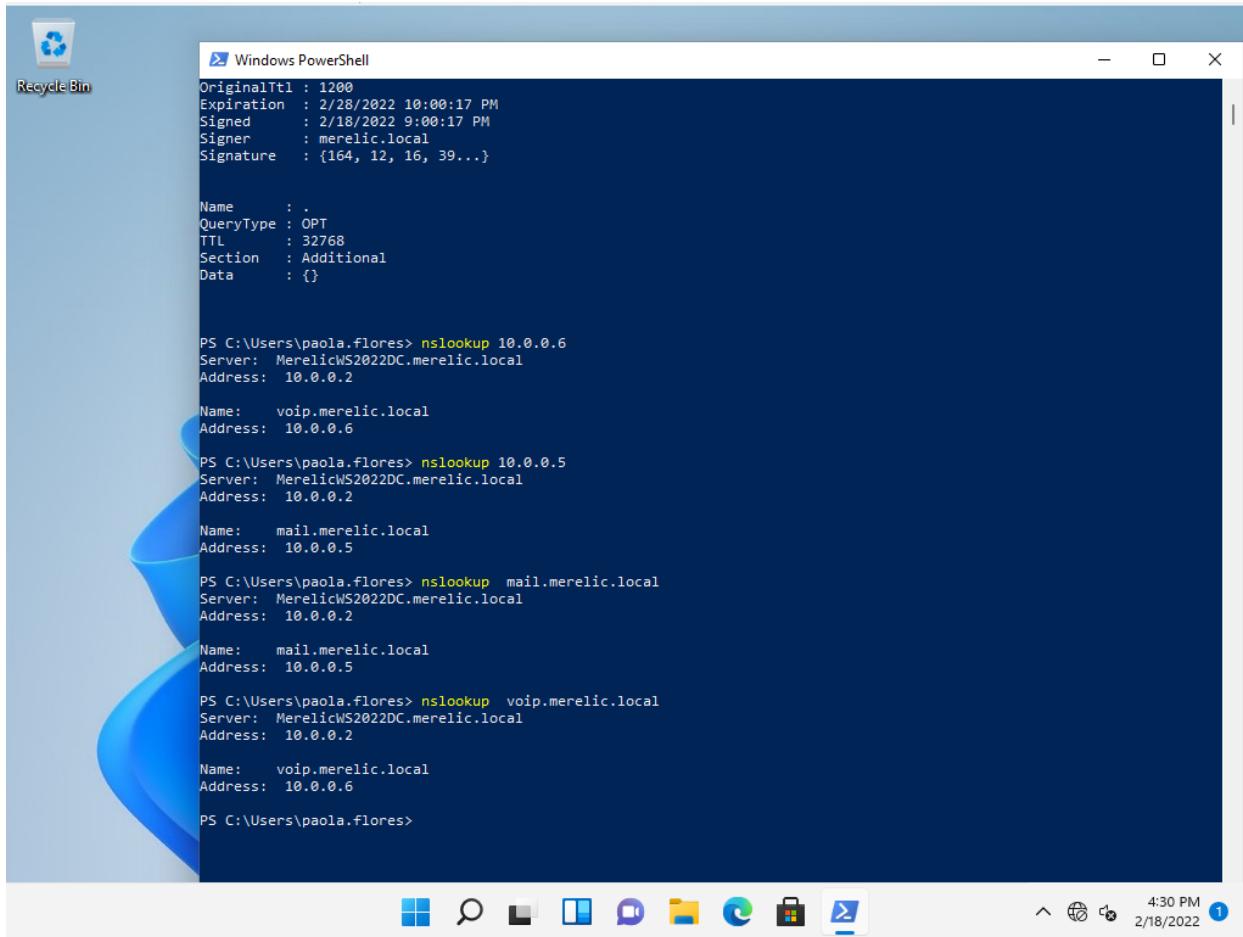
PS C:\Users\paola.flores> Resolve-DnsName win10.merelic.local -Server MerelicWS2022DC.merelic.local -DnssecOk

Name                           Type    TTL     Section   IPAddress
----                           --     --      -----      -----
win10.merelic.local           A       1200   Answer    10.0.0.11

Name : win10.merelic.local
QueryType : RRSIG
TTL : 1200
Section : Answer
TypeCovered : A
Algorithm : 8
LabelCount : 3
OriginalTtl : 1200
Expiration : 2/28/2022 10:00:17 PM
Signed : 2/18/2022 9:00:17 PM
Signer : merelic.local
Signature : {164, 12, 16, 39...}

Name : .
QueryType : OPT
TTL : 32768
Section : Additional
Data : {}

PS C:\Users\paola.flores>
```



Recycle Bin

Windows PowerShell

```
OriginalTtl : 1200
Expiration : 2/28/2022 10:00:17 PM
Signed      : 2/18/2022 9:00:17 PM
Signer      : merelic.local
Signature   : {164, 12, 16, 39...}

Name      : .
QueryType : OPT
TTL       : 32768
Section   : Additional
Data      : {}

PS C:\Users\paola.flores> nslookup 10.0.0.6
Server:  MerelicWS2022DC.merelic.local
Address: 10.0.0.2

Name:  voip.merelic.local
Address: 10.0.0.6

PS C:\Users\paola.flores> nslookup 10.0.0.5
Server:  MerelicWS2022DC.merelic.local
Address: 10.0.0.2

Name:  mail.merelic.local
Address: 10.0.0.5

PS C:\Users\paola.flores> nslookup mail.merelic.local
Server:  MerelicWS2022DC.merelic.local
Address: 10.0.0.2

Name:  mail.merelic.local
Address: 10.0.0.5

PS C:\Users\paola.flores> nslookup voip.merelic.local
Server:  MerelicWS2022DC.merelic.local
Address: 10.0.0.2

Name:  voip.merelic.local
Address: 10.0.0.6

PS C:\Users\paola.flores>
```

4:30 PM 2/18/2022 1