WIPRO NGA Program

Datacenter Batch 2

Capstone Project

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Trainer name - Jitendra Singh Tomar

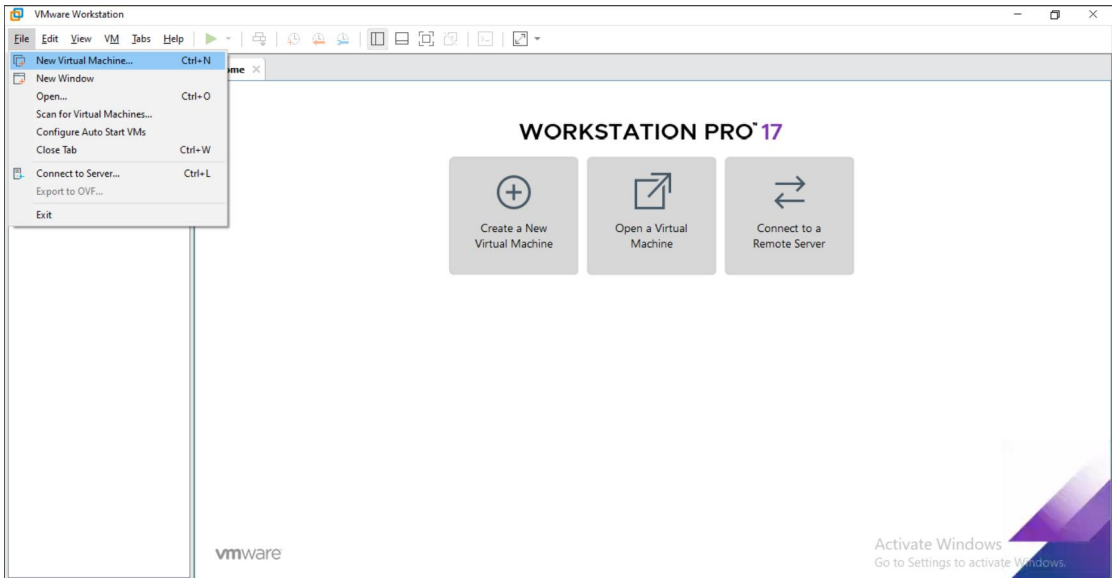
Project Task- 1

Objective:

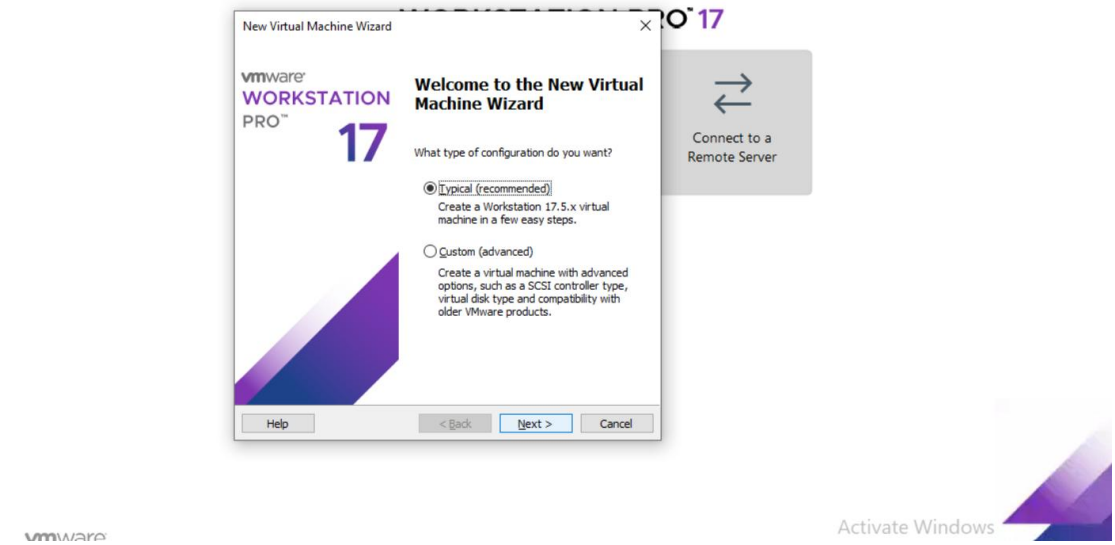
Create a domain controller using domain name as <yourname>.training and create a shared NFS folder (c:\sharables) on domain controller machine with read-only permissions and access this folder on the member machine.

Solution-

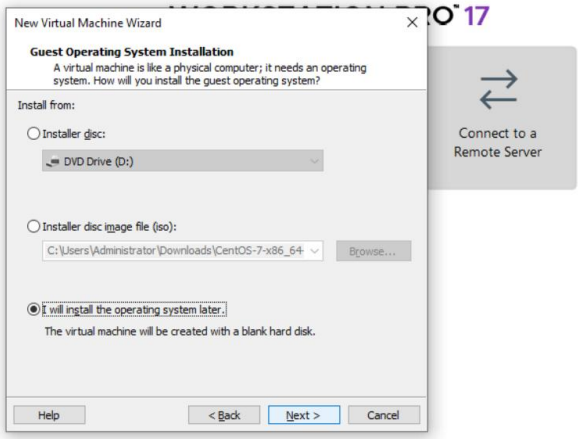
Create a windows server 2016 as domain controller



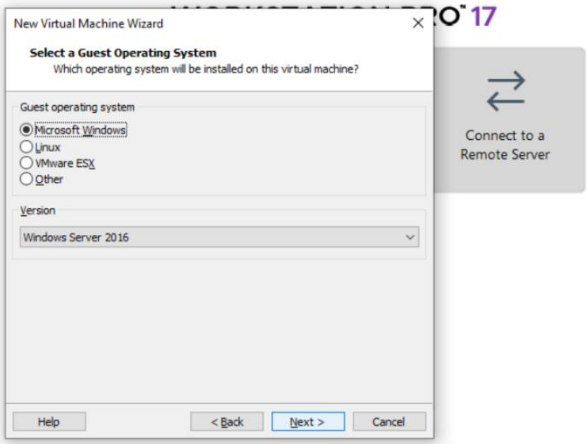
Select Typical-



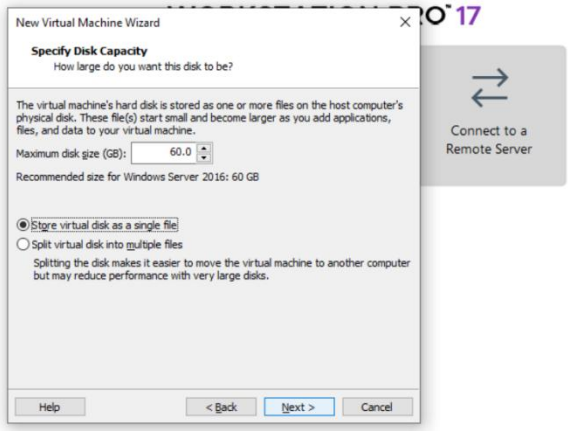
Select I will install later-



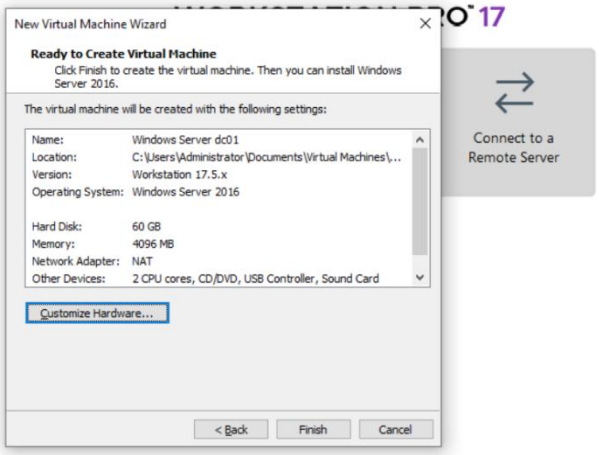
Select the Windows Server Version-



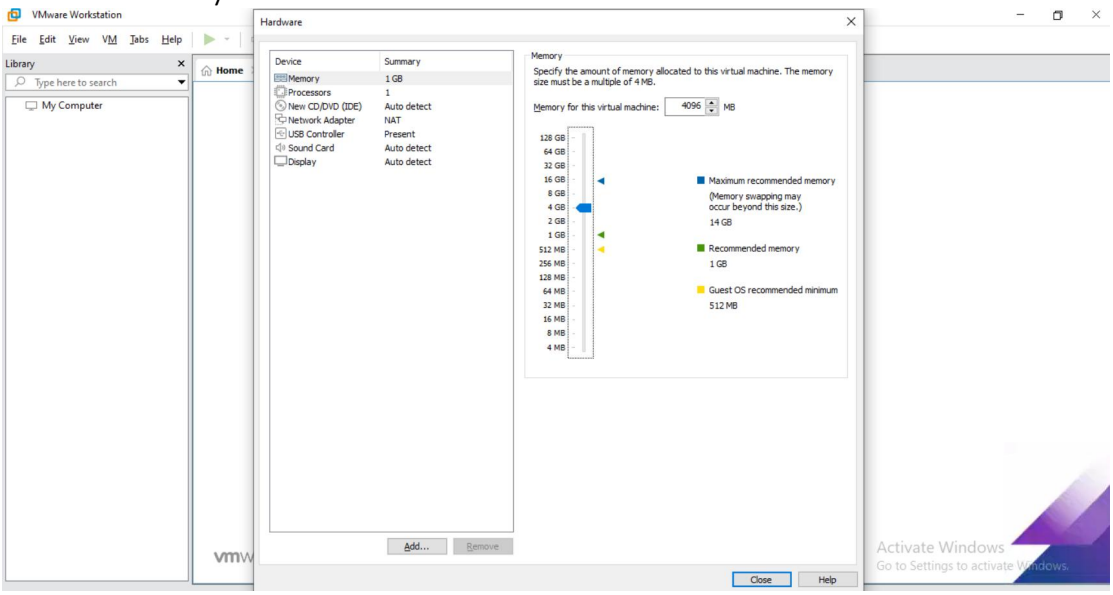
Specify the disk capacity-



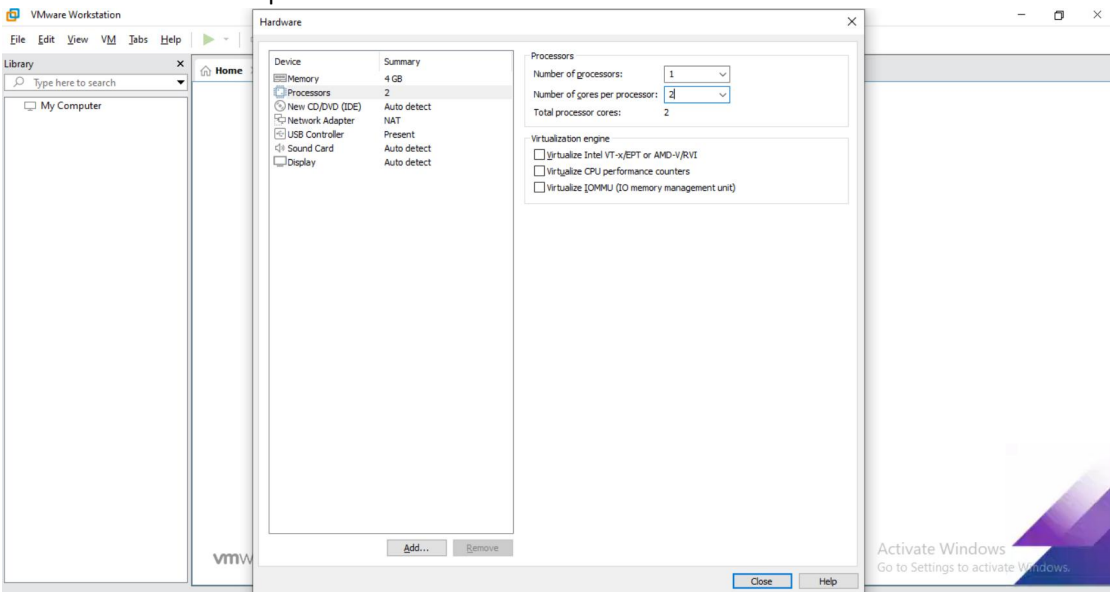
Select Customize Hardware-



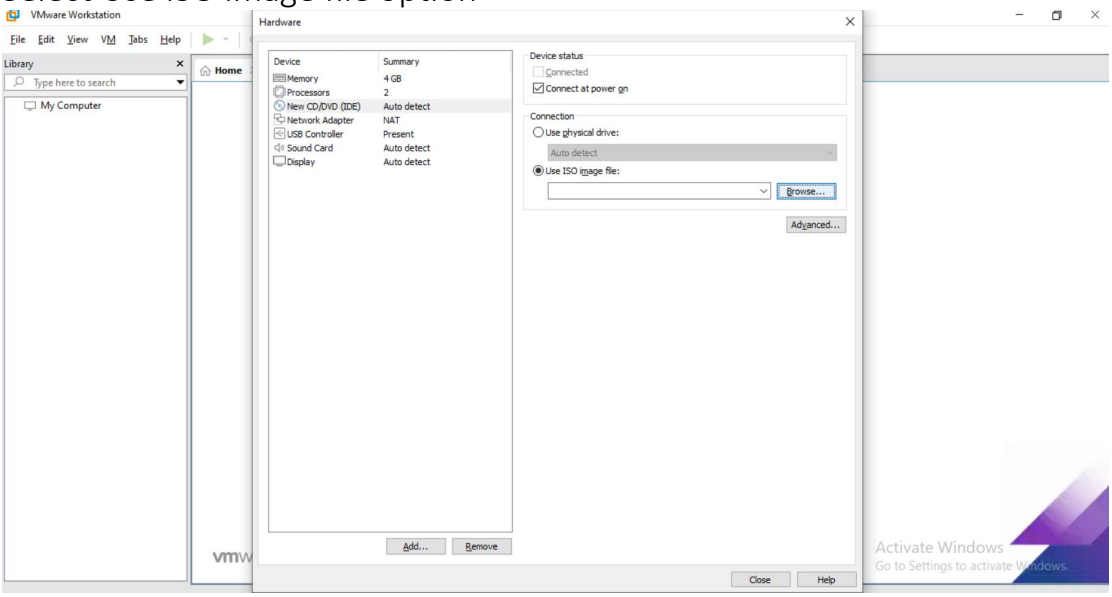
Select memory size-



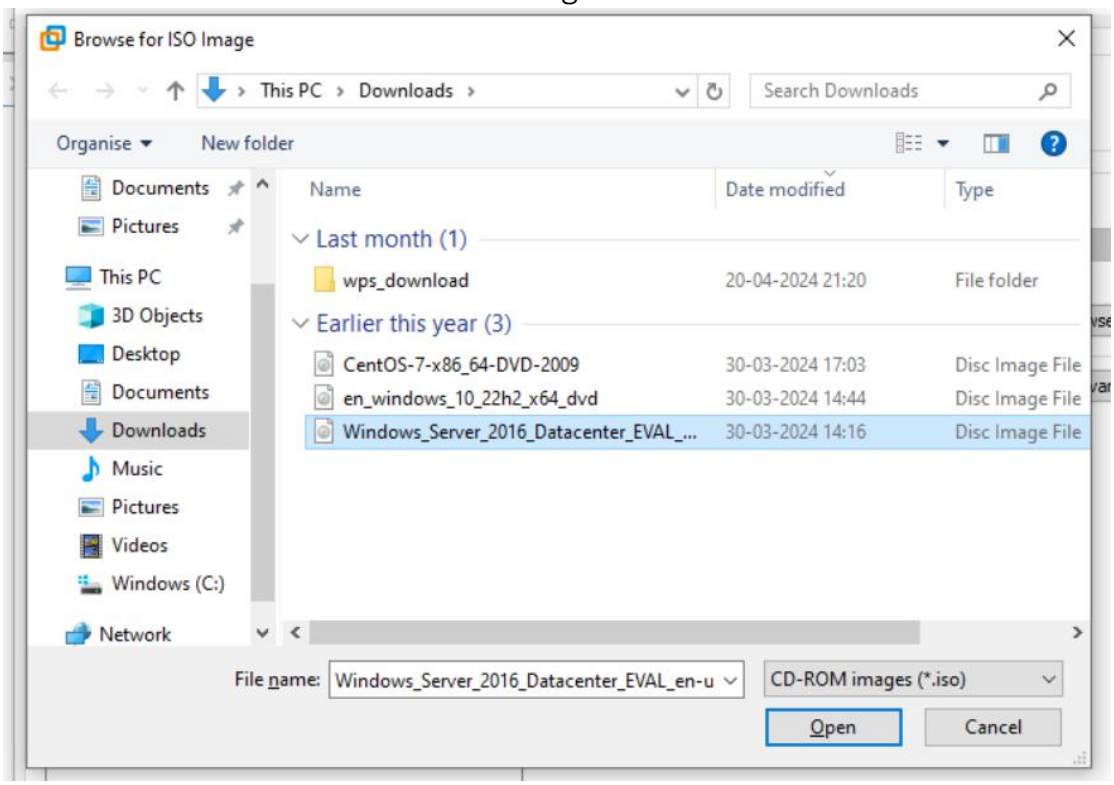
Select number of processors -



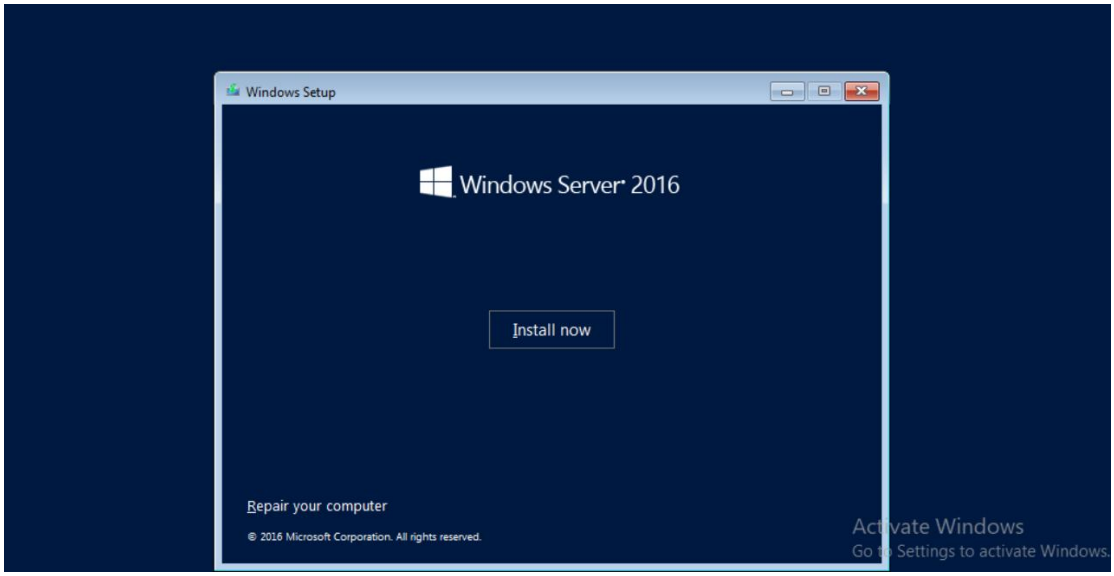
Select Use ISO image file option-



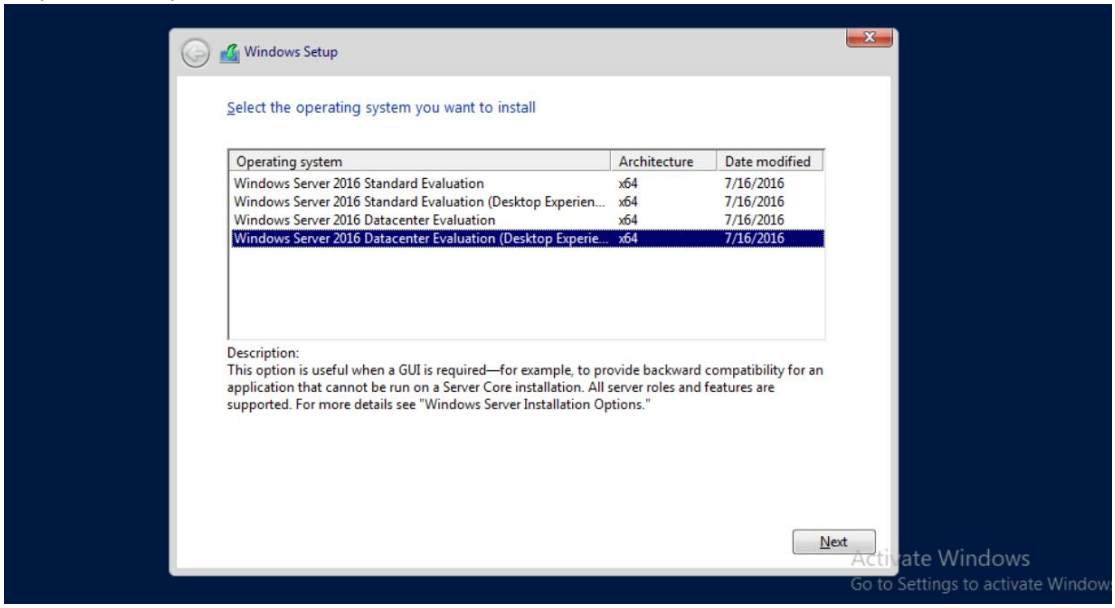
Browse and select the Server ISO image file-



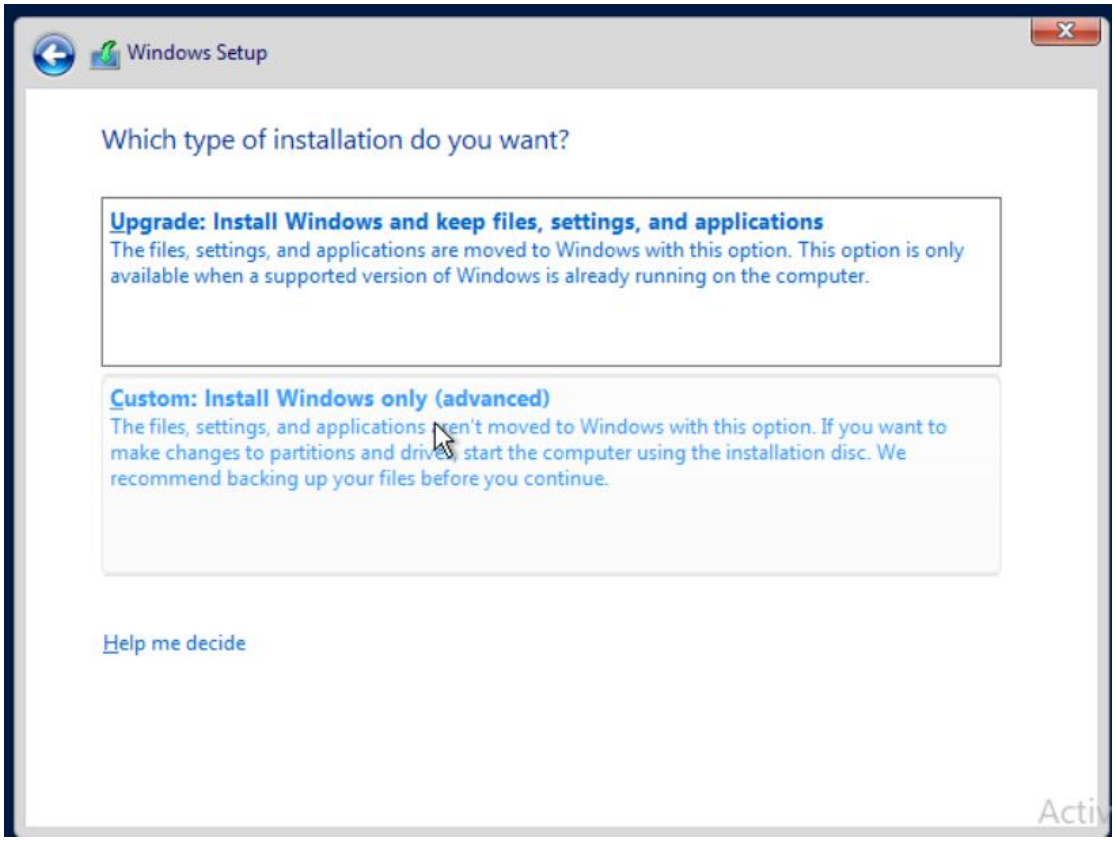
Click on Install Now-



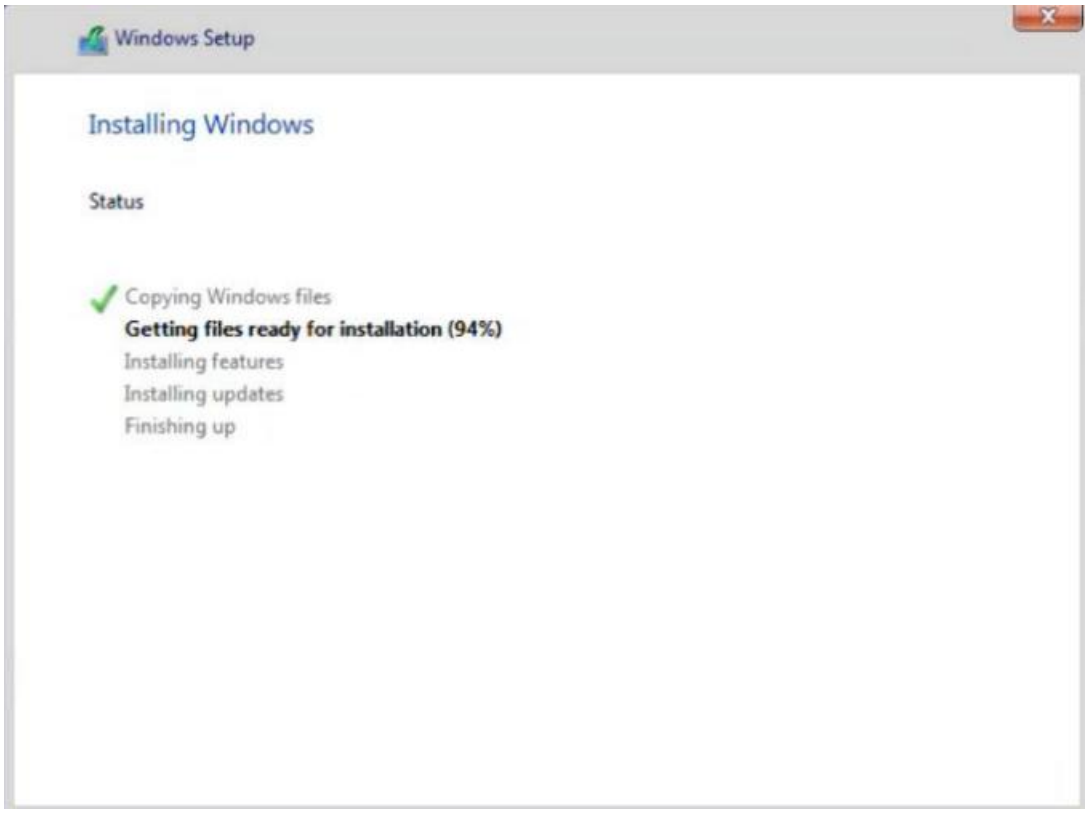
Select the Windows Server 2016 Datacenter Evaluation(Desktop Experience) for GUI -



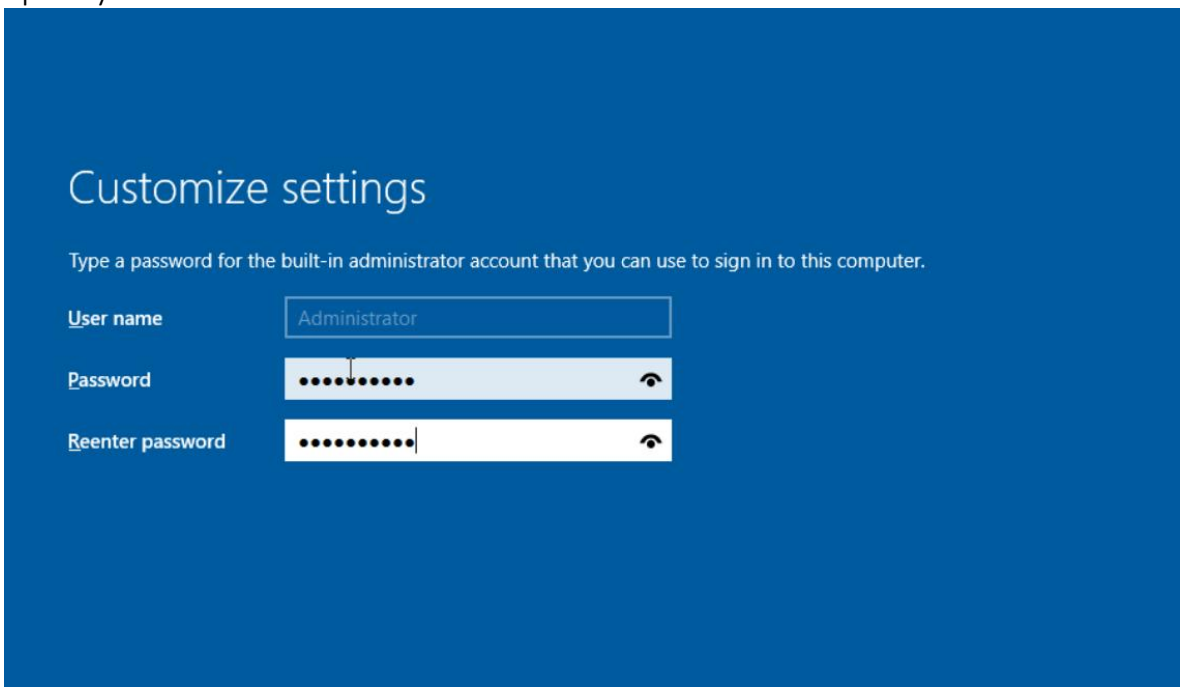
Select Custom -



Installation started-



Specify the Password for Administartor-

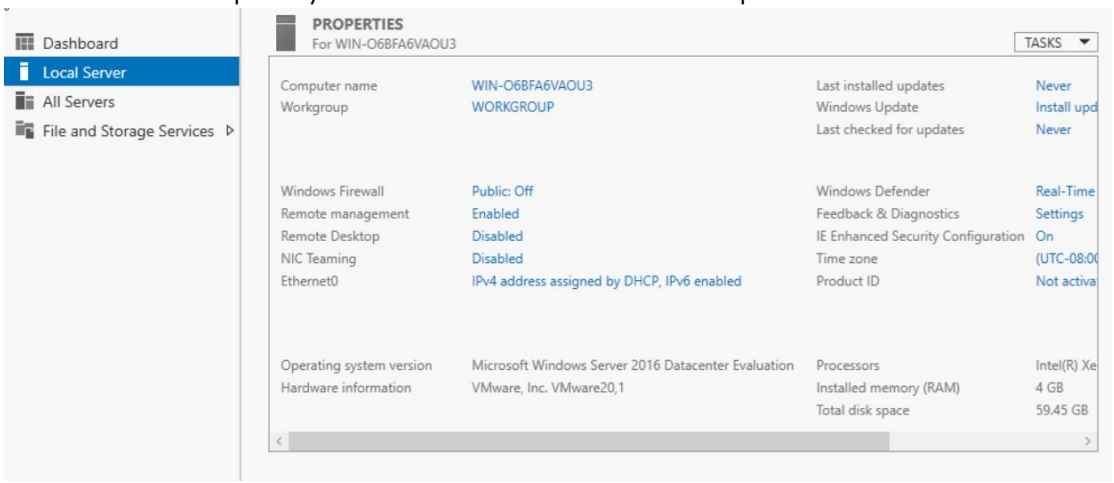


Windows server is ready for post-installation configuration-

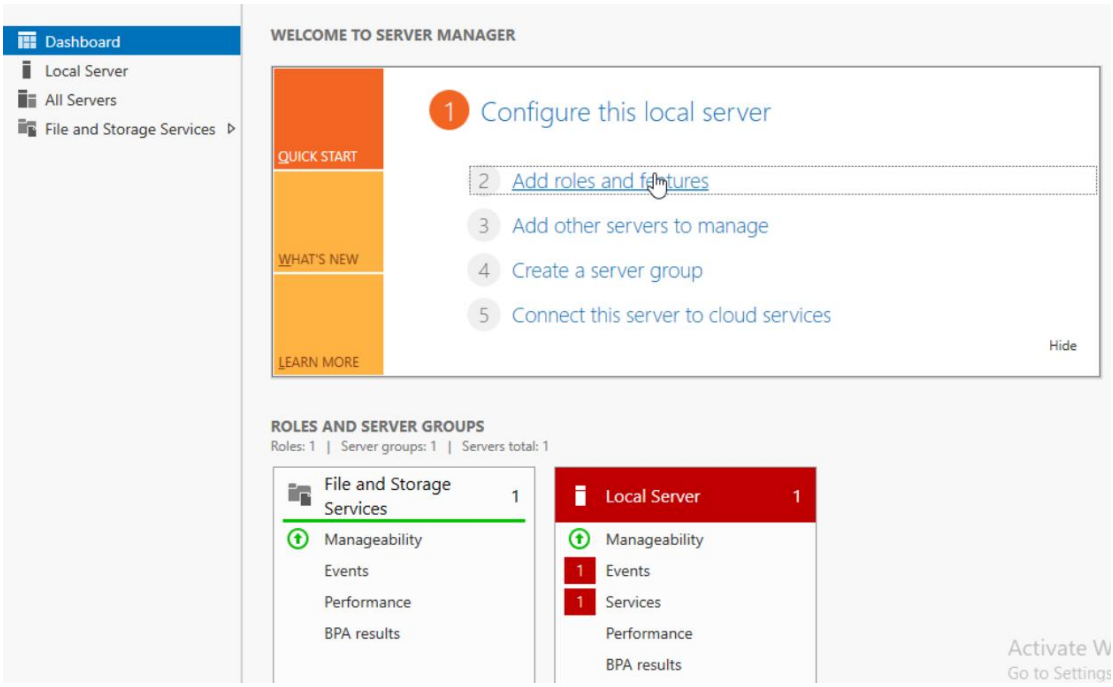
Firewall - off

Time Zone - Asia/Kolkata

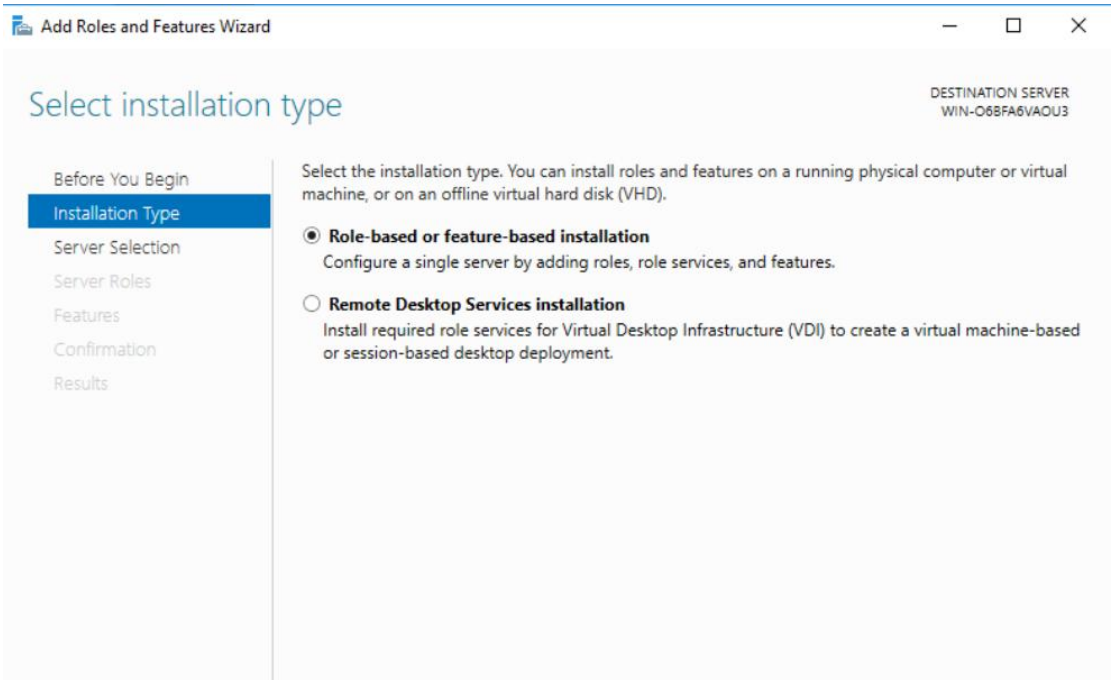
Ethernet0 - Specify the IP Address and DNS loopback address



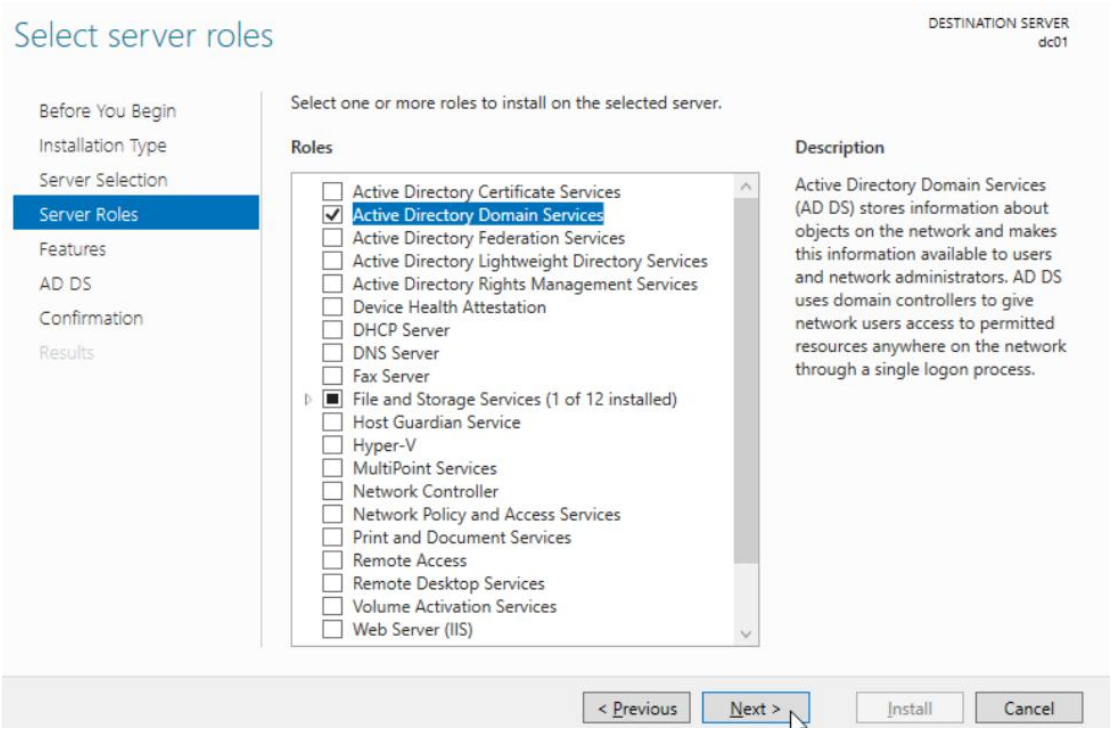
Click on Add roles and features-

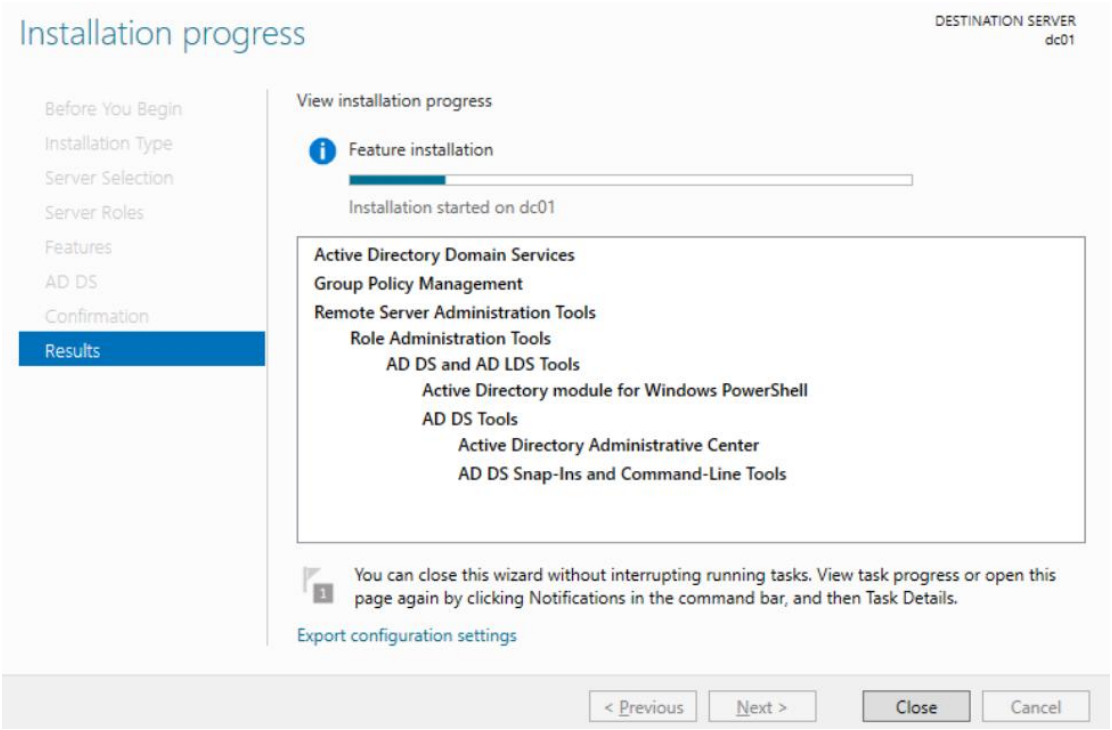


Select Role-based installation-

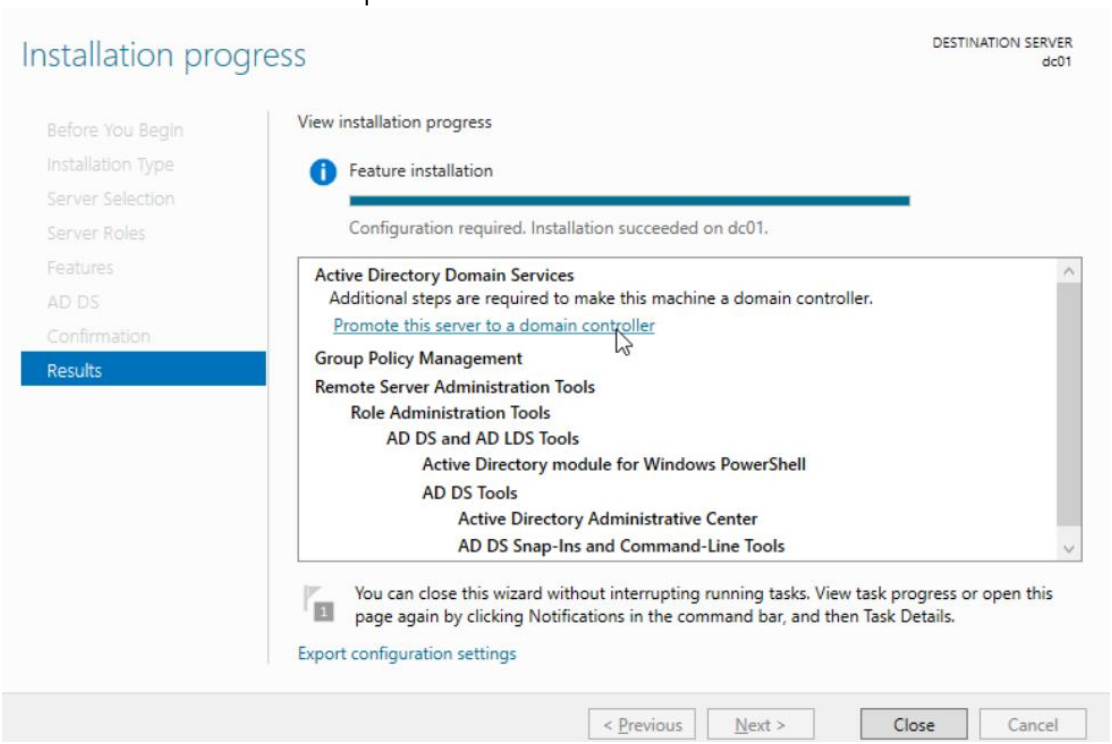


Select Active Directory Domain Services-

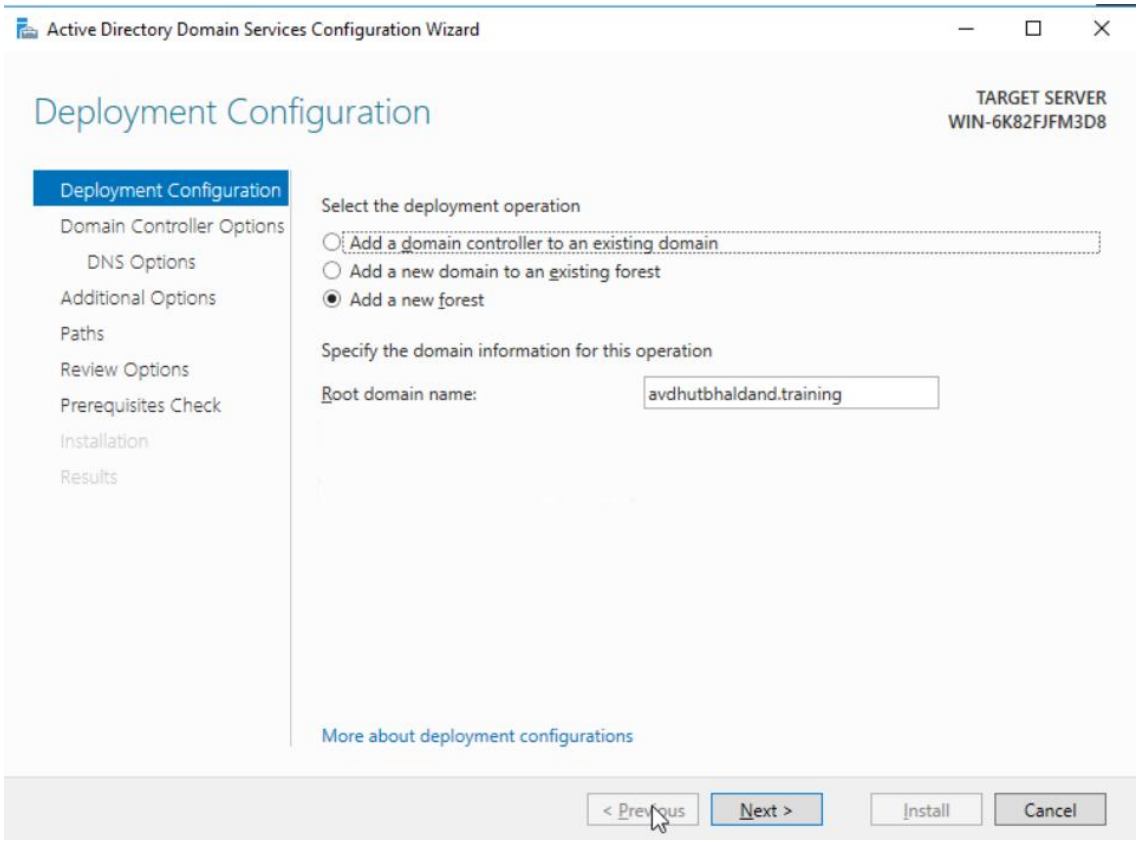




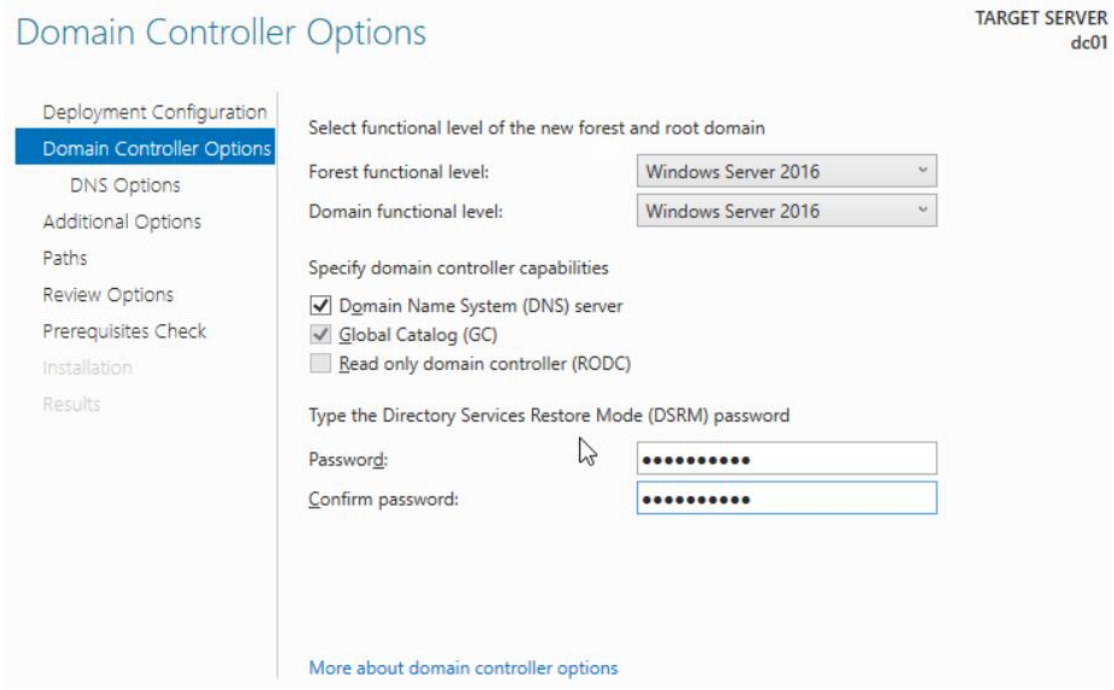
Click on the Blue line to promote server to domain controller-

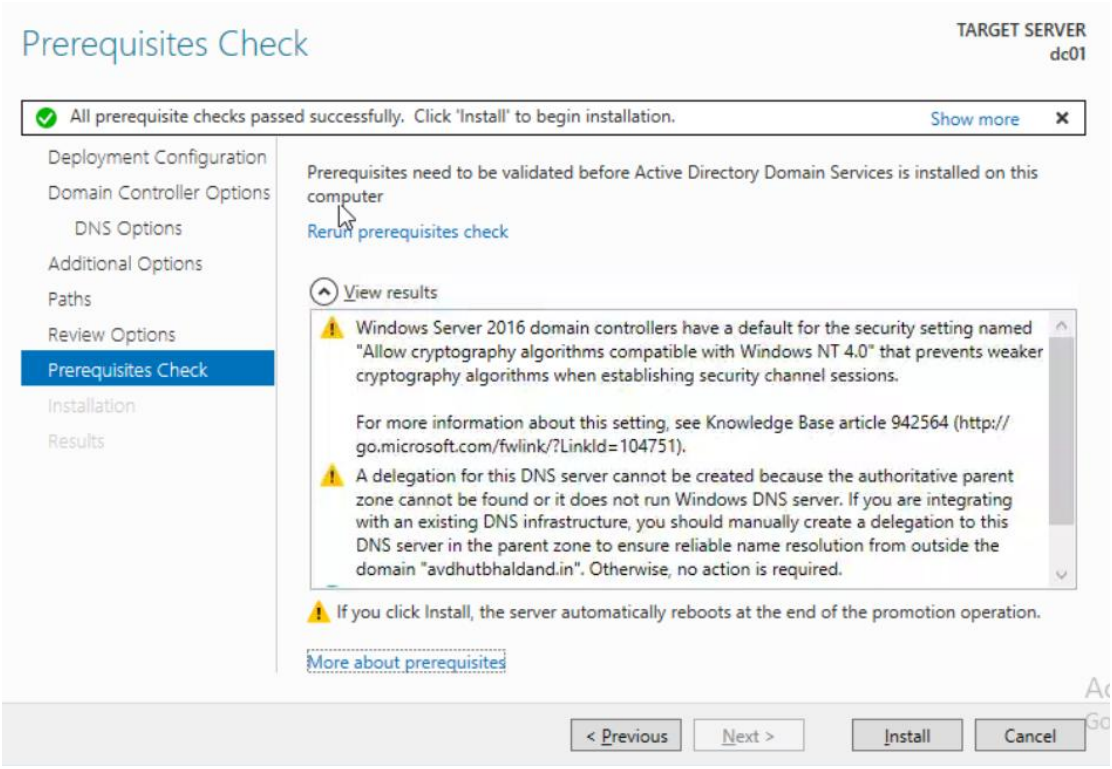


Click on Add a forest and specify domain name-

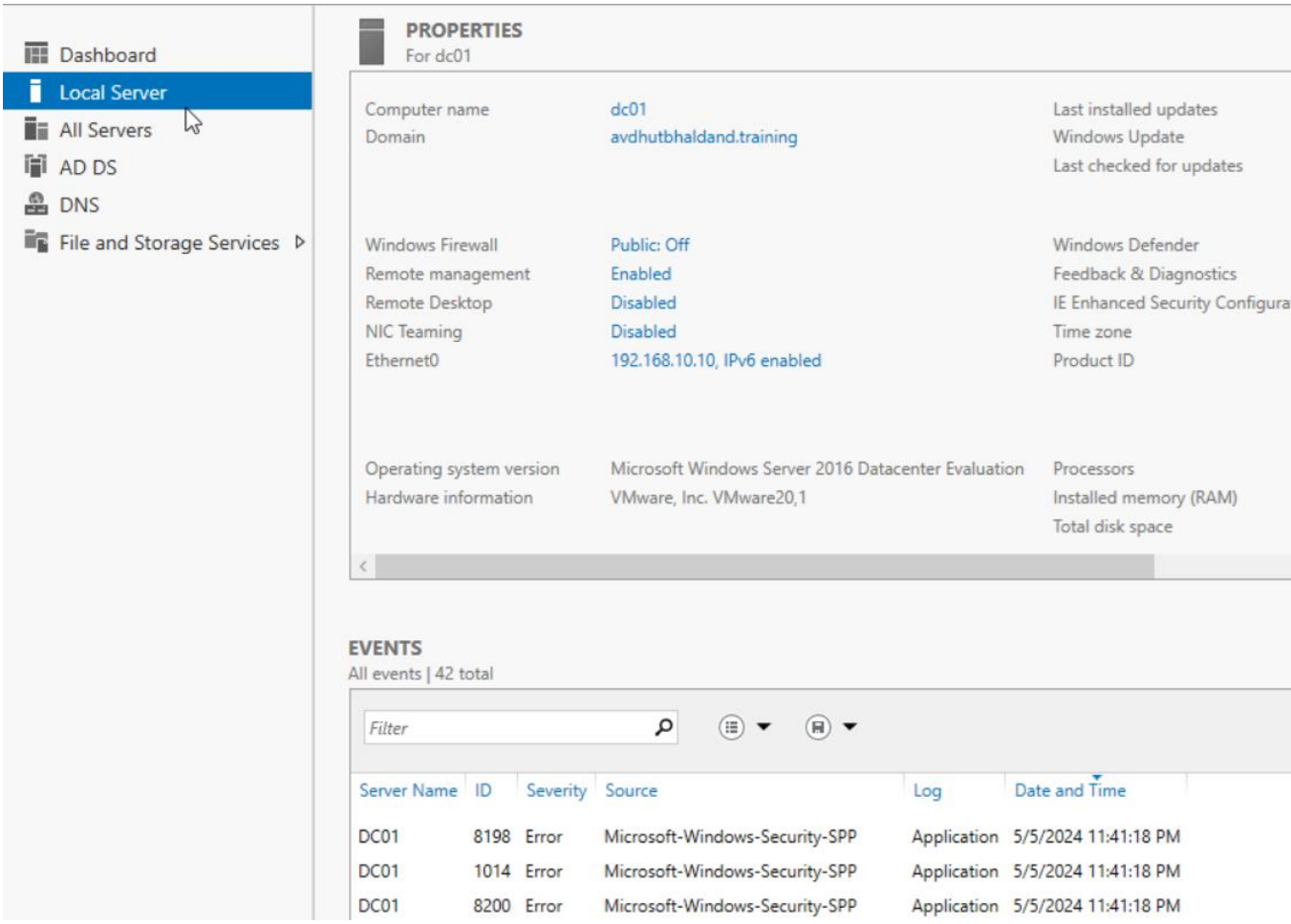


Specify the Password for domain-

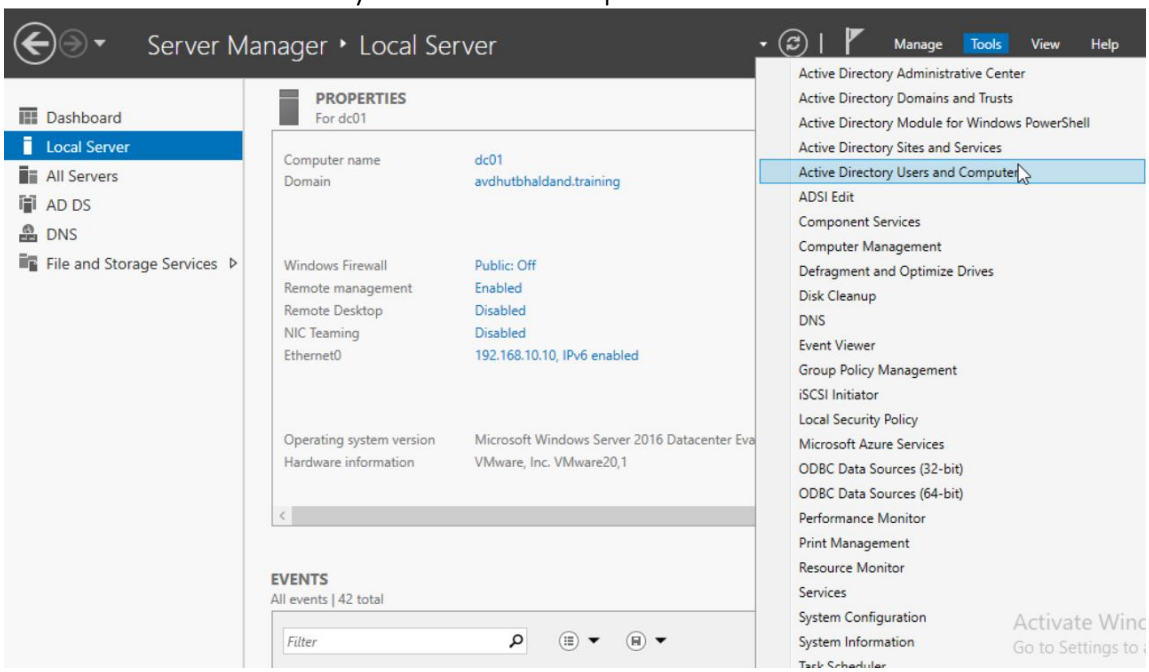




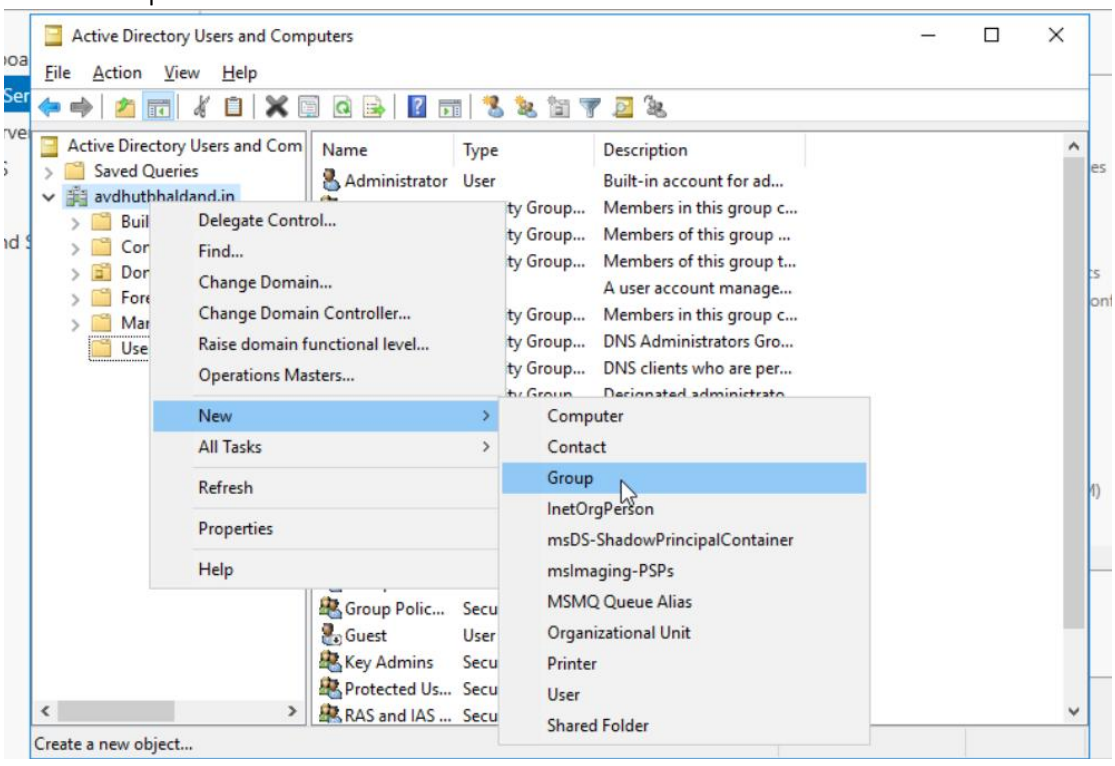
ADDS roles & features are added -

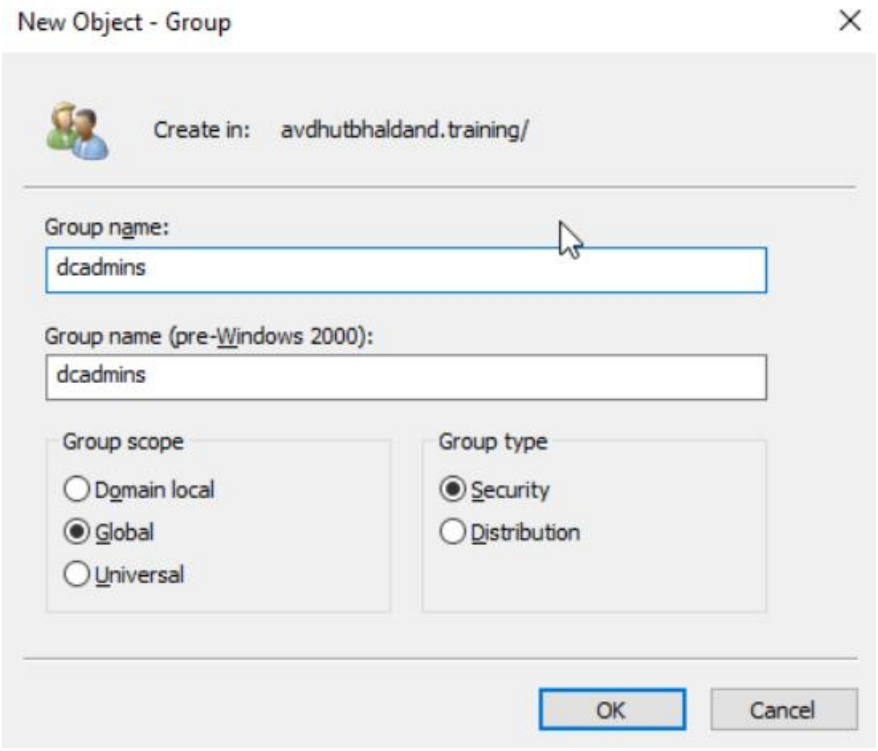


Click on Active Directory Users and Computers-

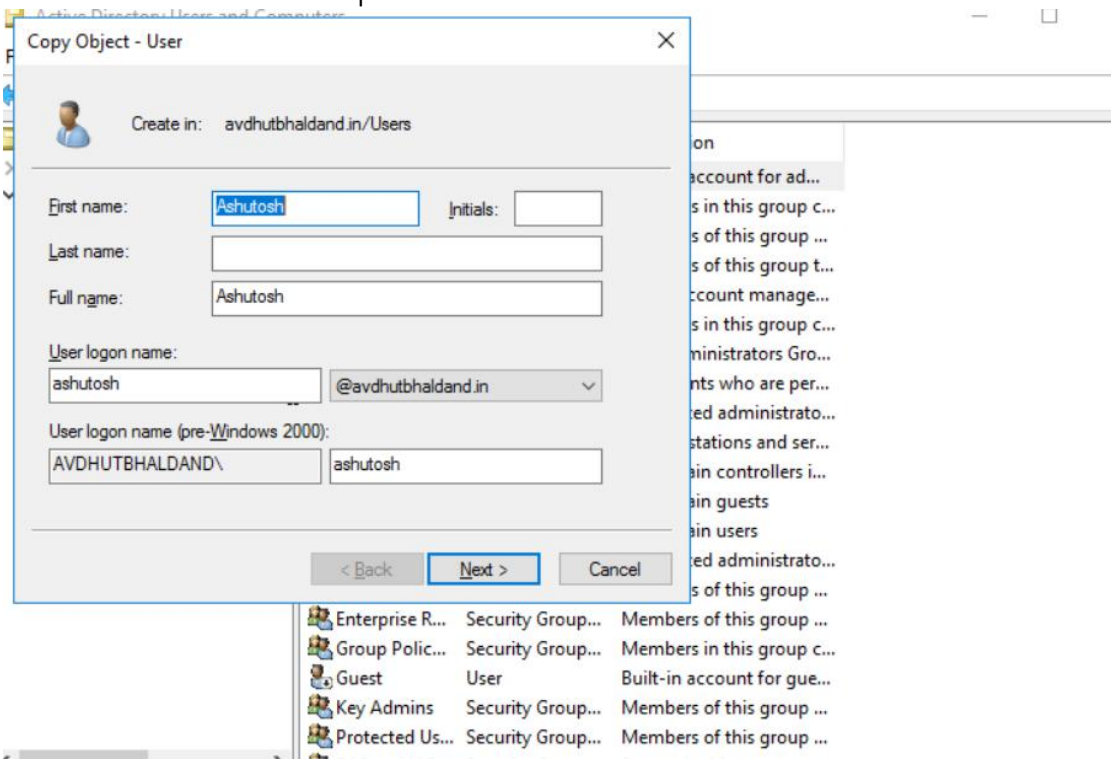


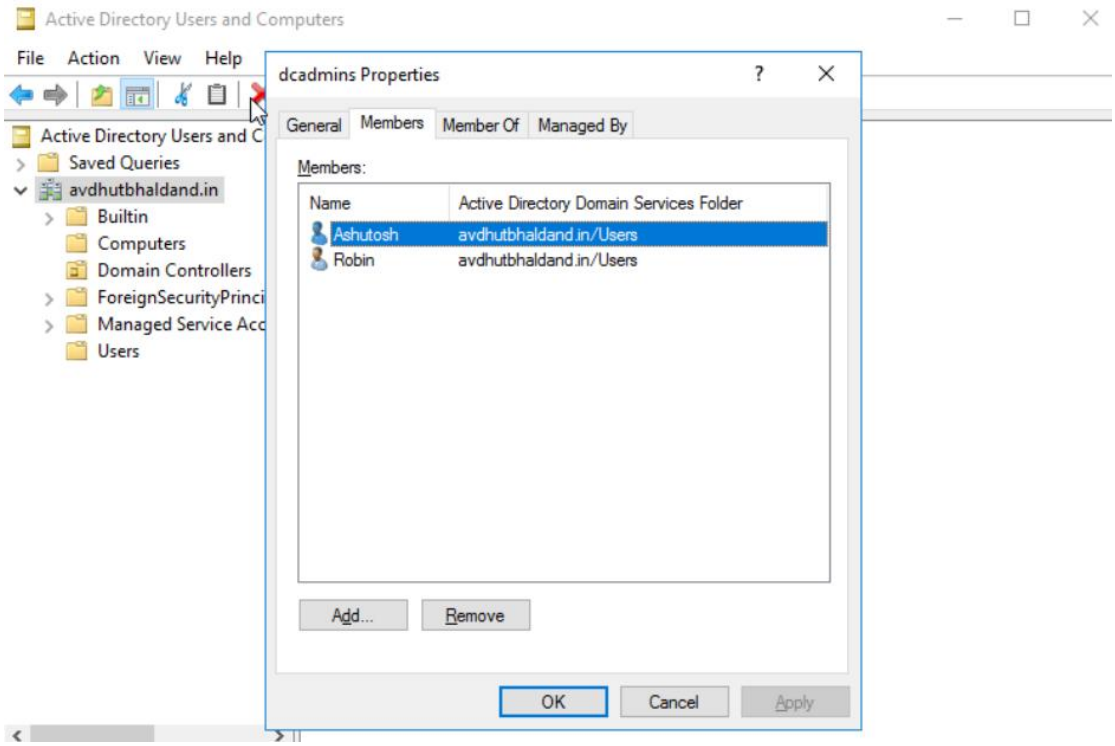
Add Group “dcadmins” in domain-



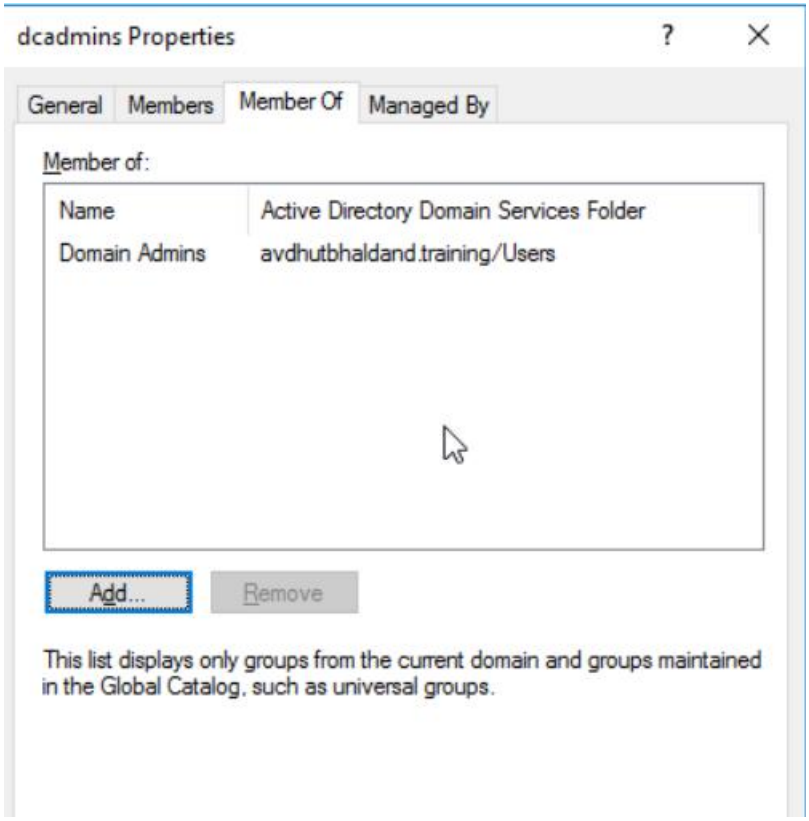


Add 2 users in the Group-

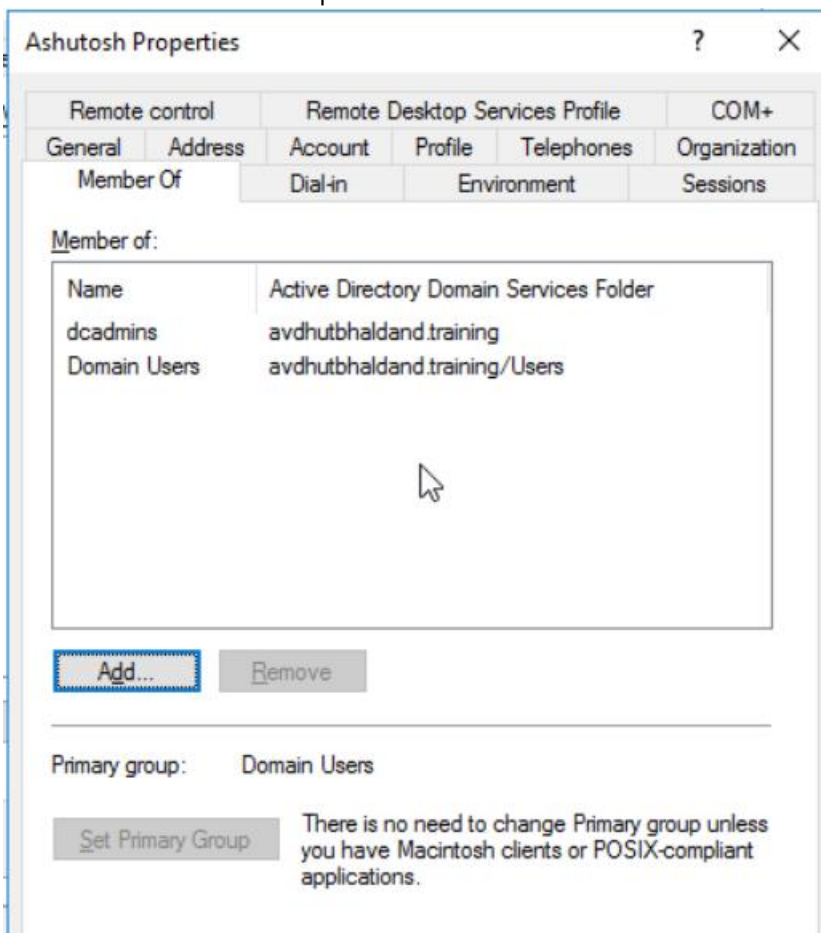




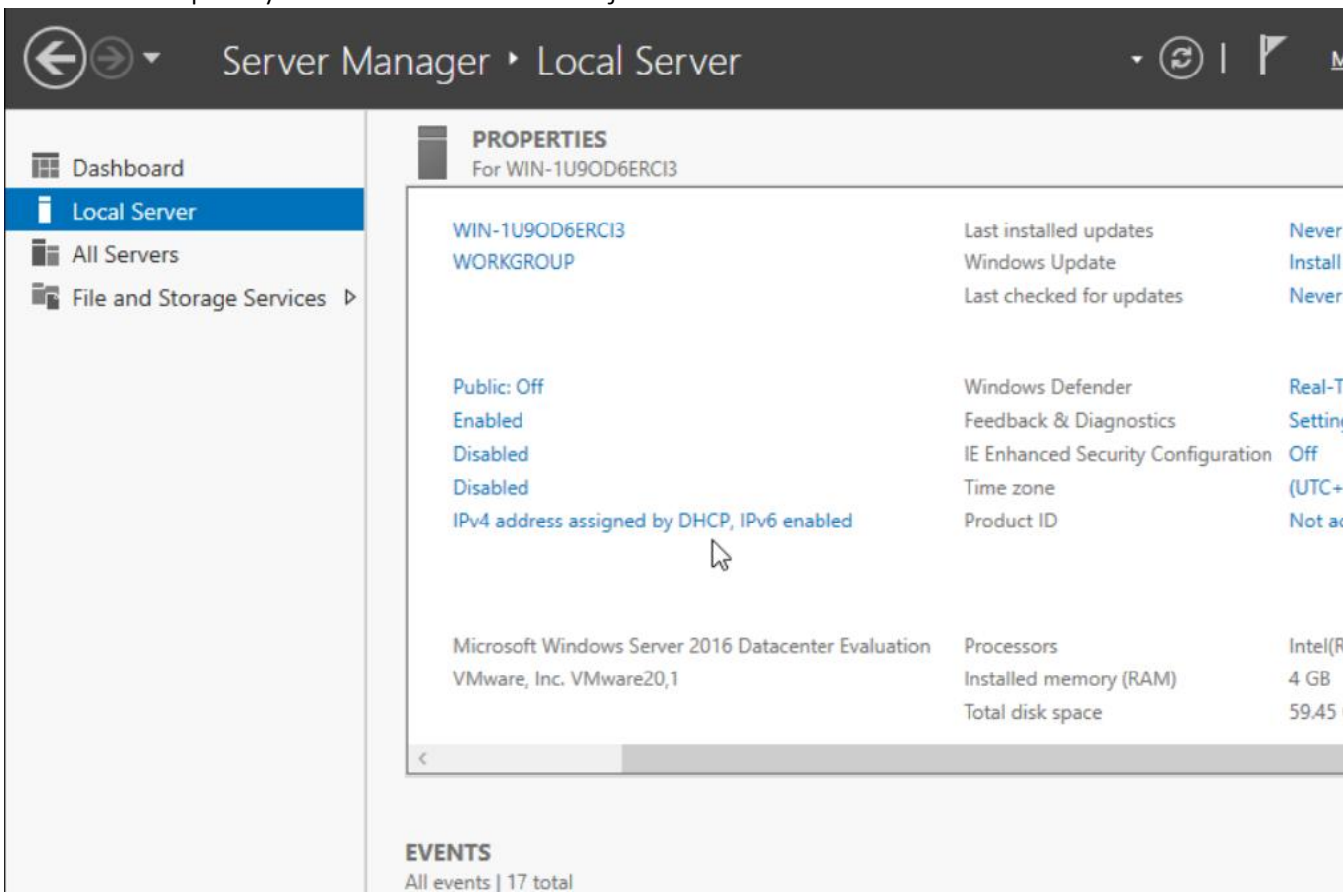
Give the Group Domain Admins privileges-

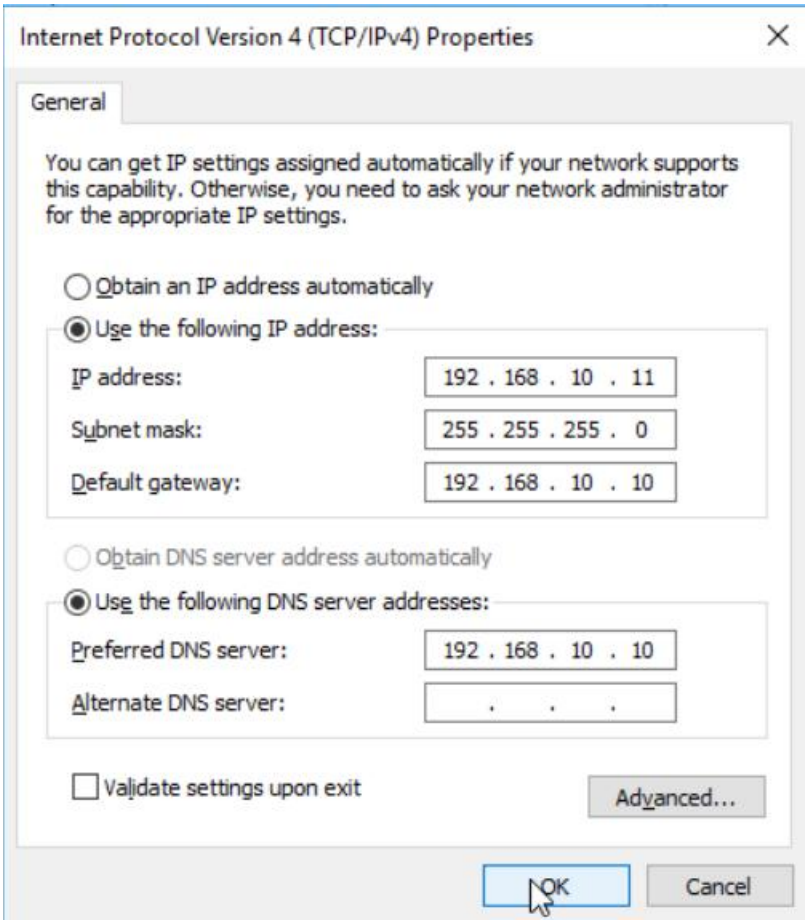


Give users dcadmins priorities-

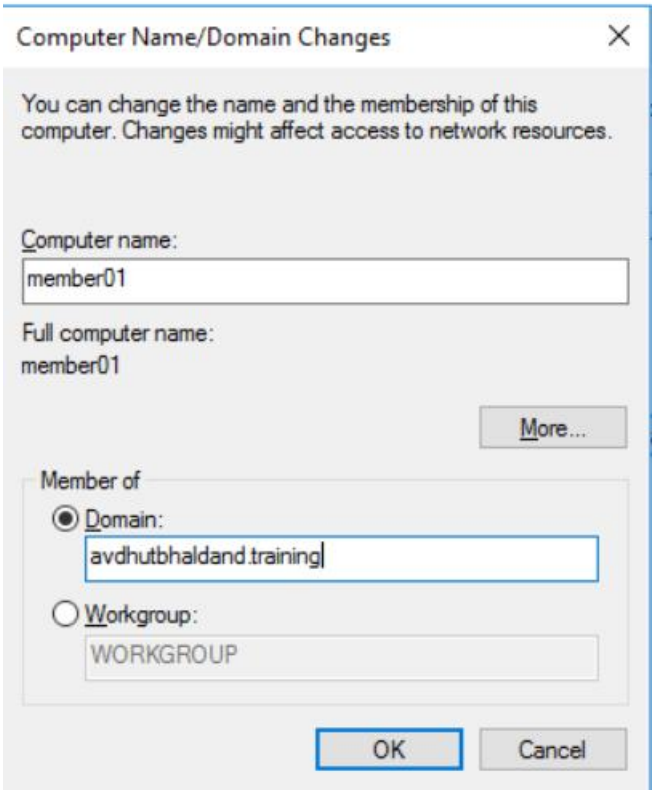


Create another Windows Server same as created earlier-
Firewall - off
Time Zone - Asia/Kolkata
Ethernet0 -Specify IP Address & Domain join the member to dc

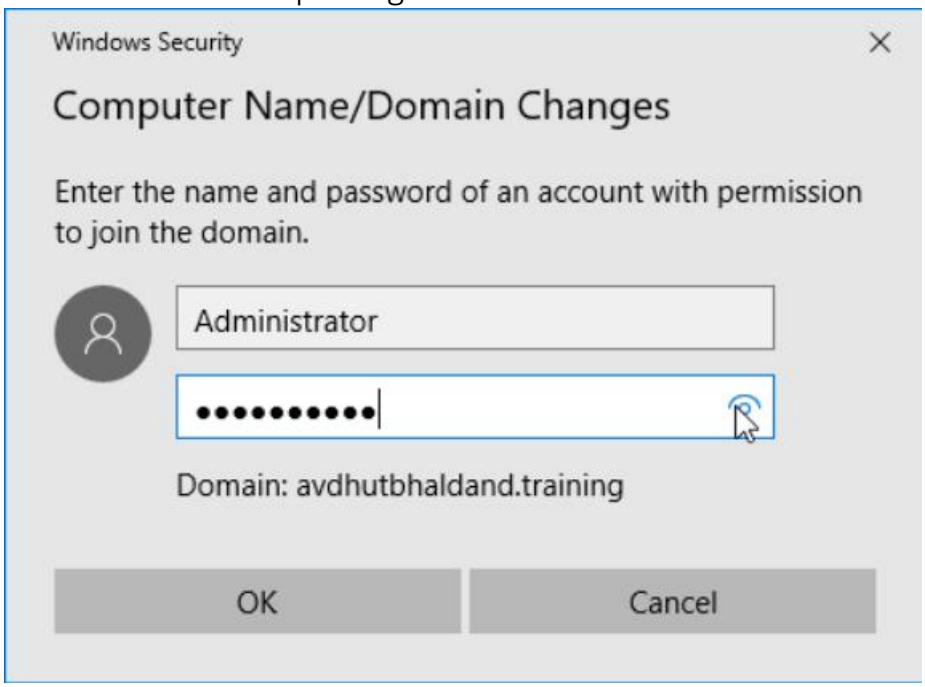




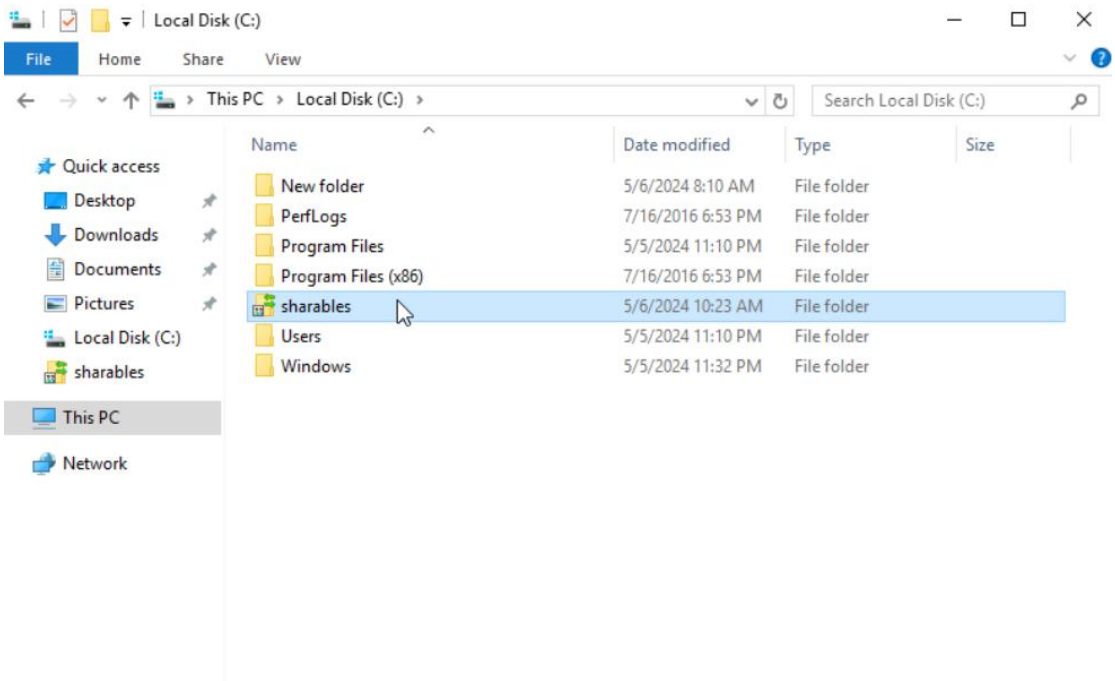
Domain join the member machine -



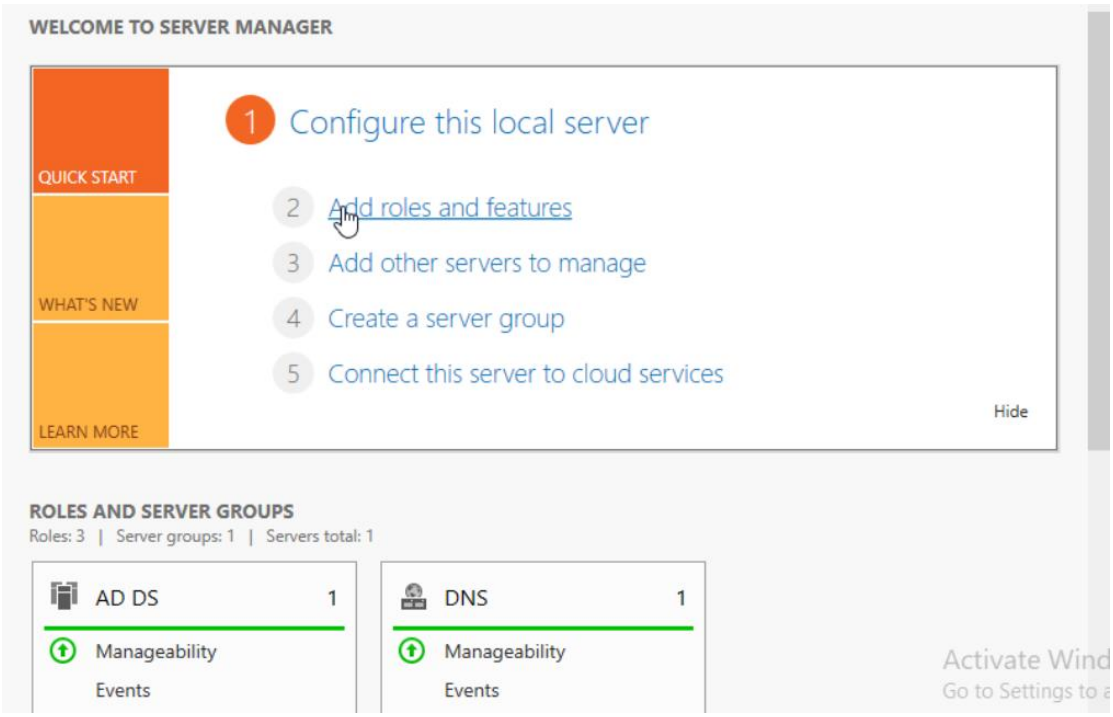
Give Administrator privileges to member machine-



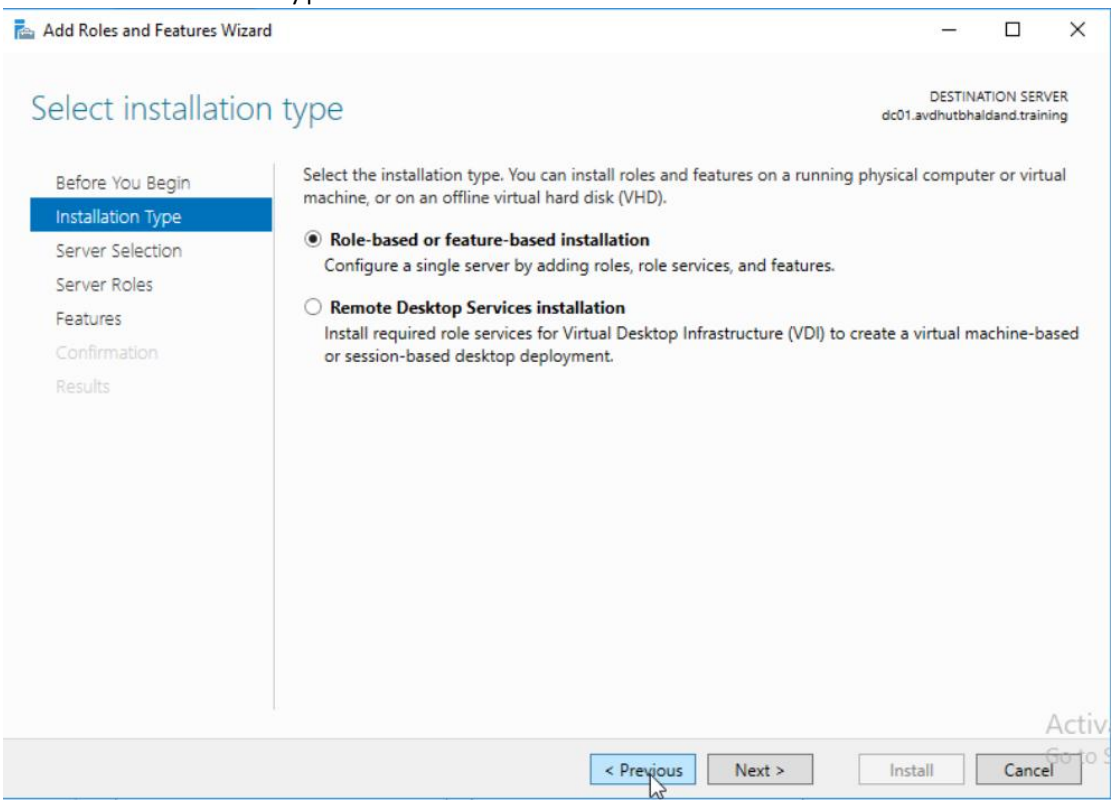
Create a shared NFS folder (c:\sharables) on domain controller-



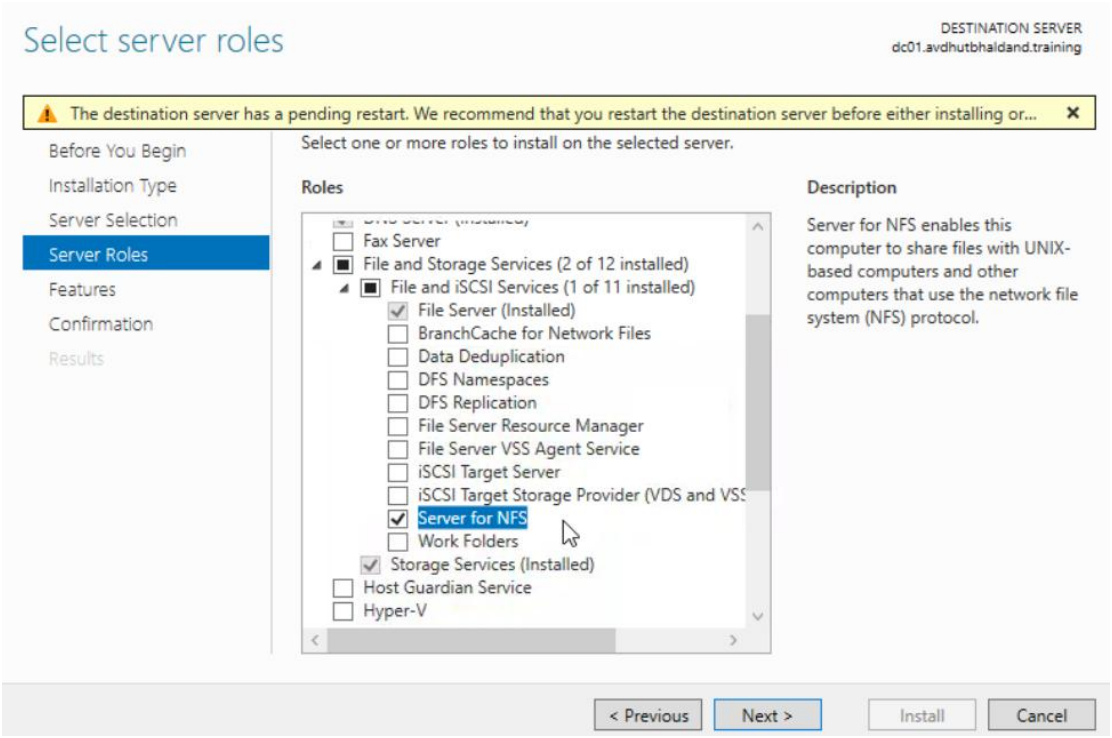
Click Add roles and features on dc machine-

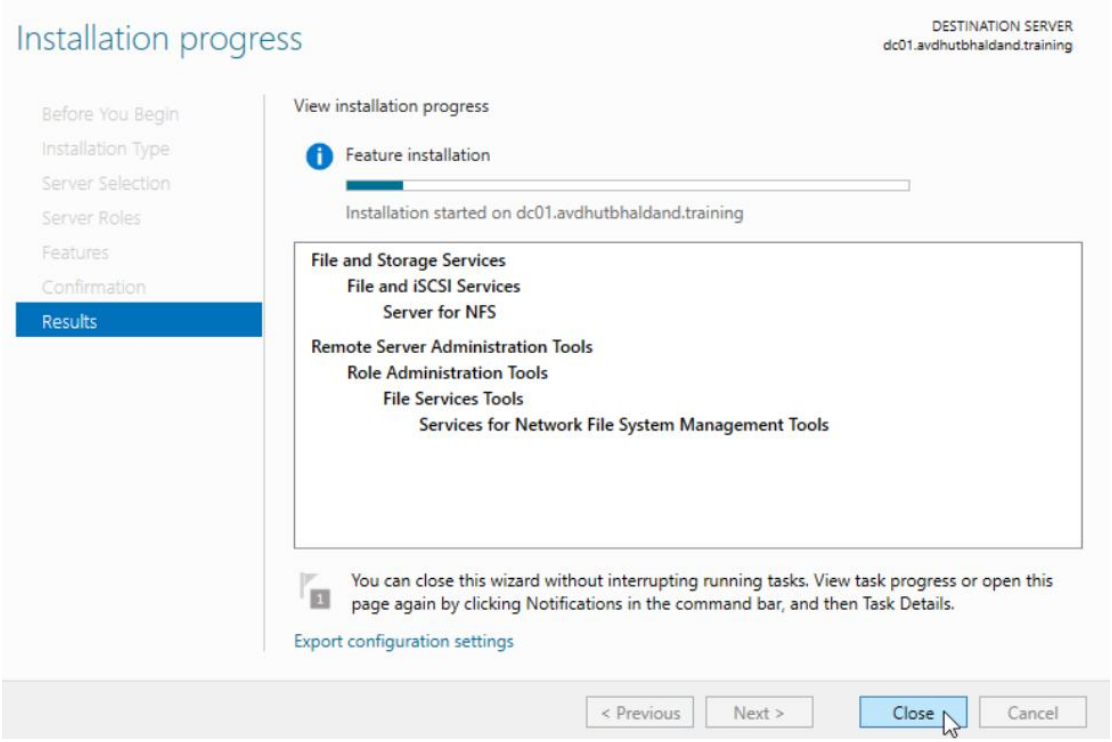


Select Installation type-

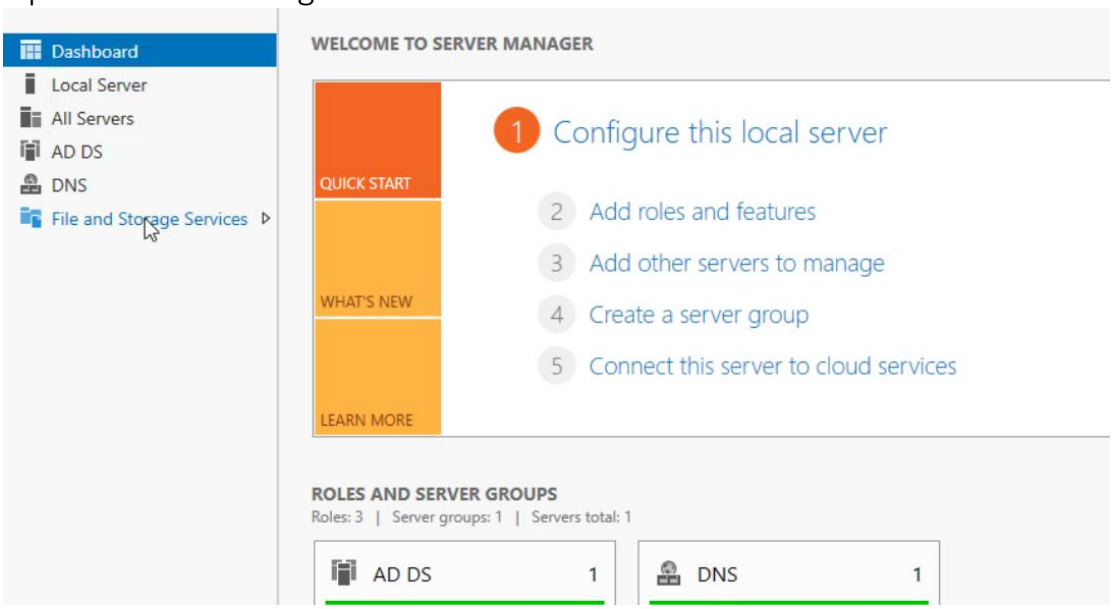


Select Server for NFS and install -

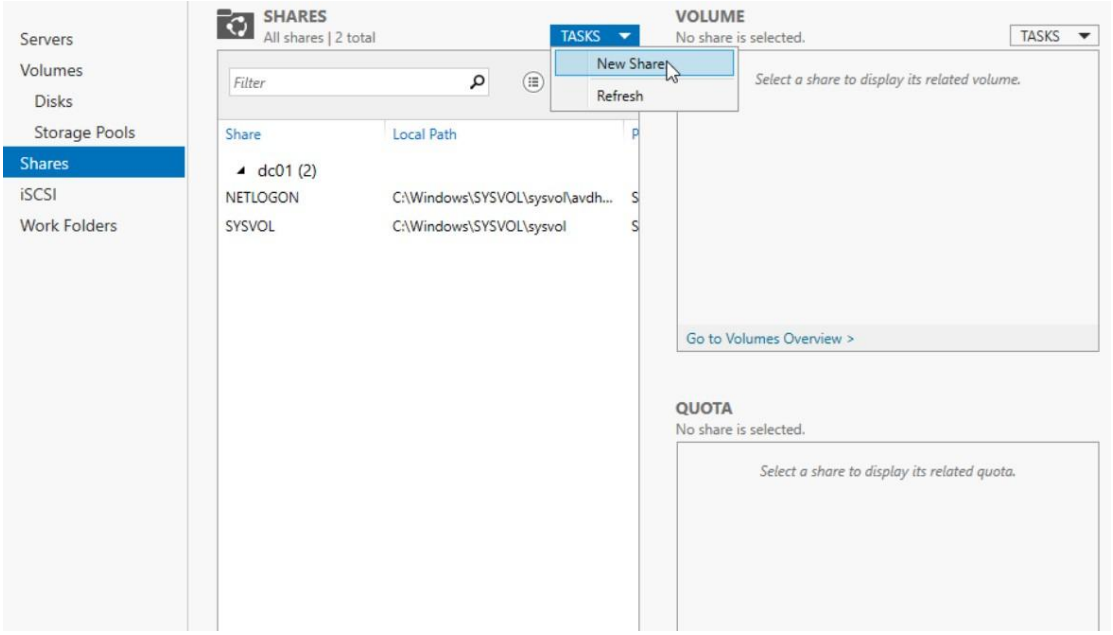




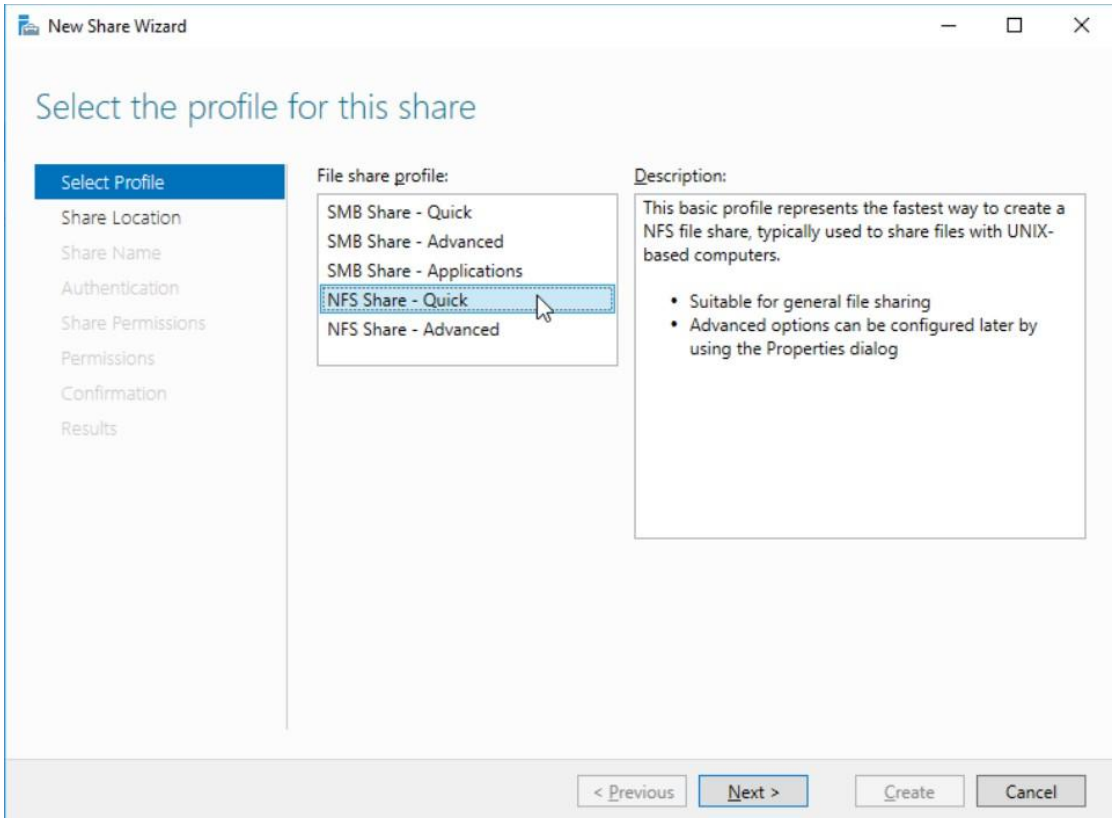
Open File and Storage Services -



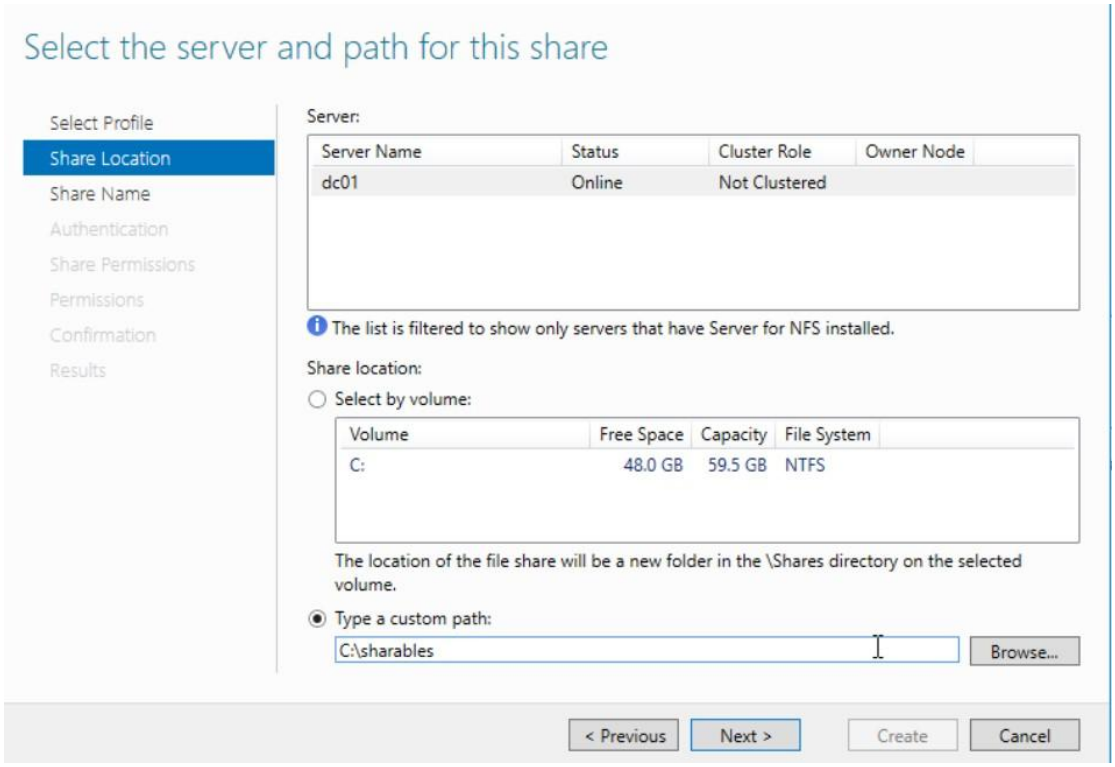
Select Shares and in Tasks select new Share-

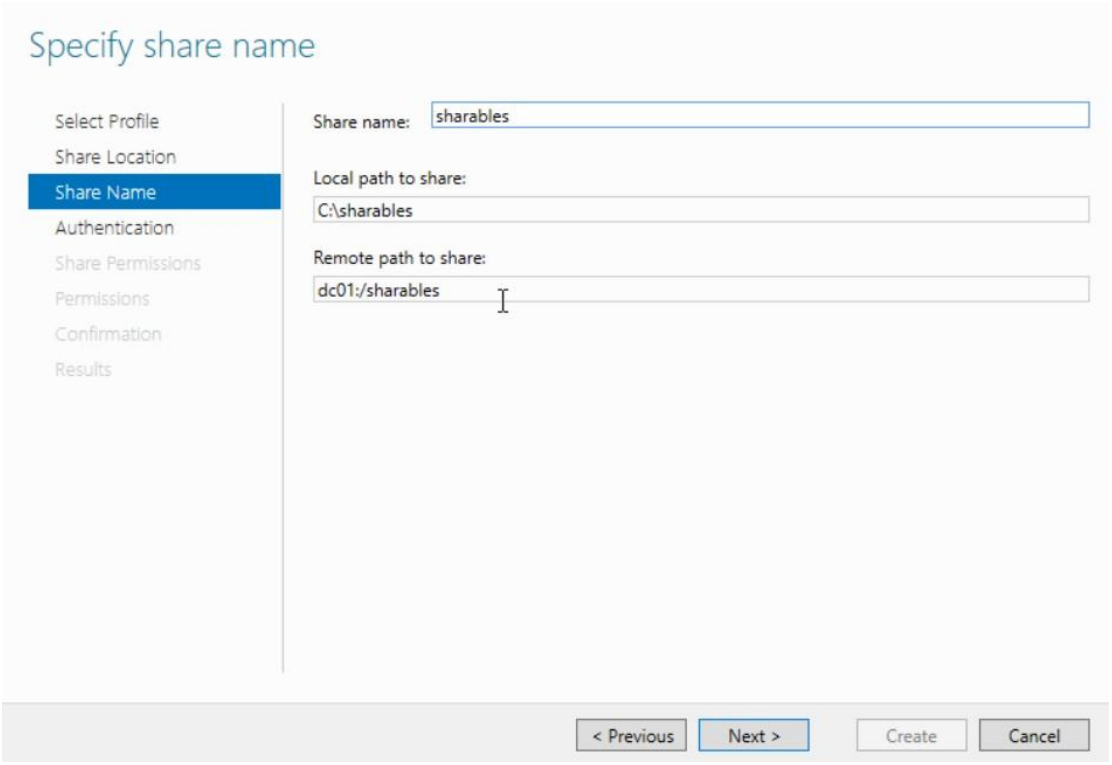


Select NFS Share-Quick -

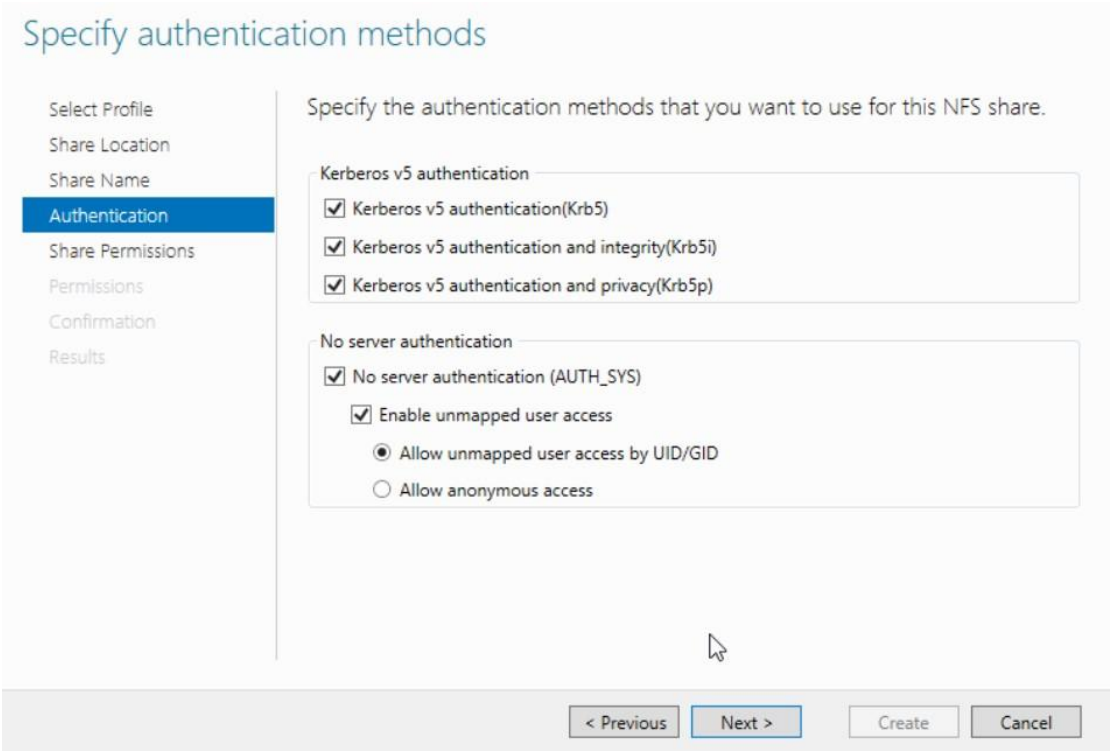


Select Location of the folder ‘sharables’ -

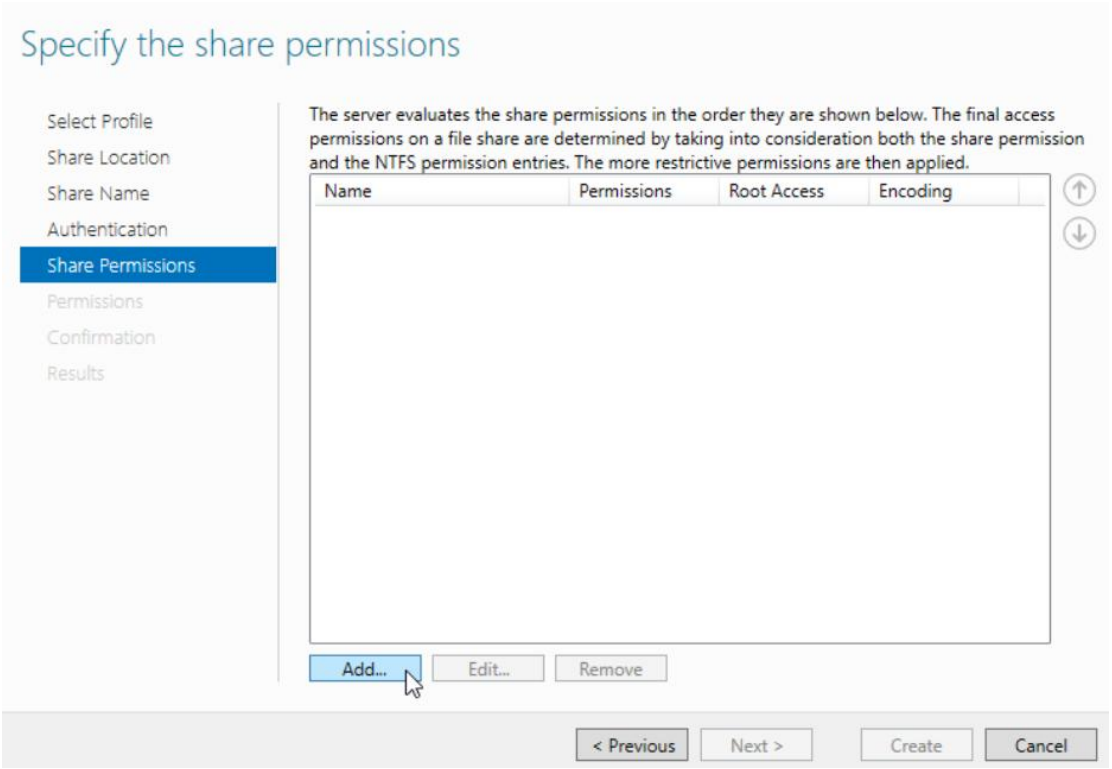




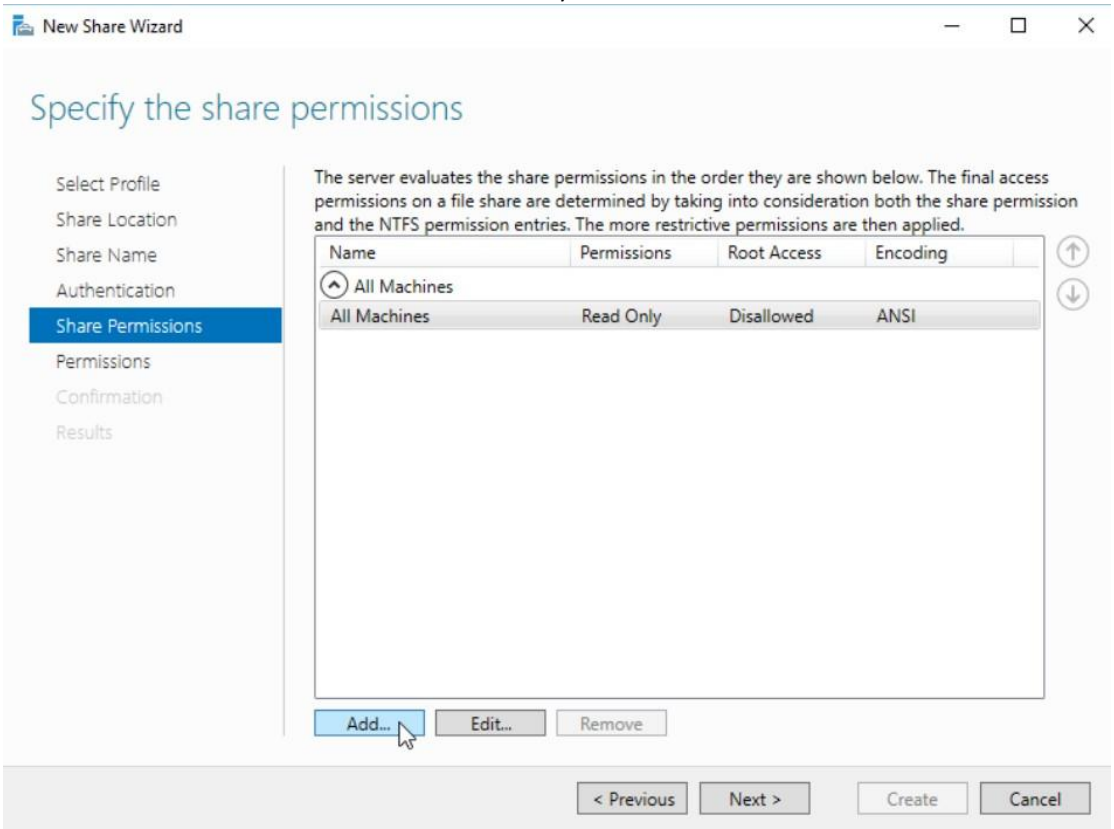
Check all the boxes as followed -



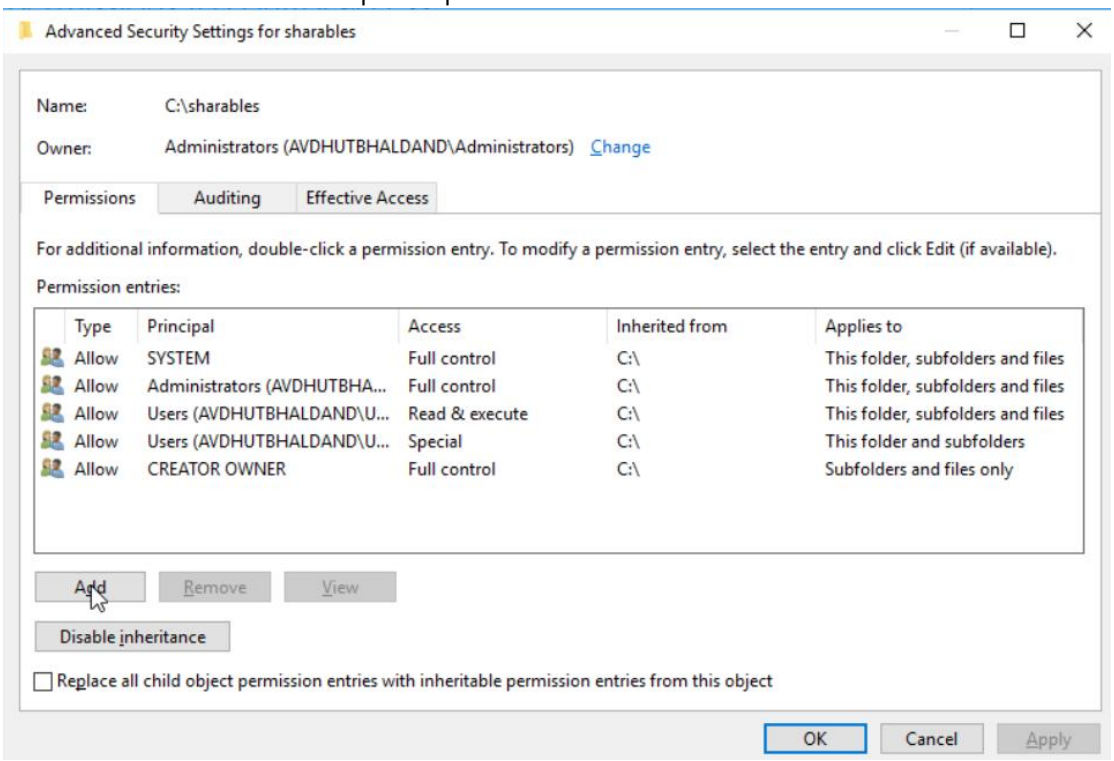
Click on Add to specify share permissions -



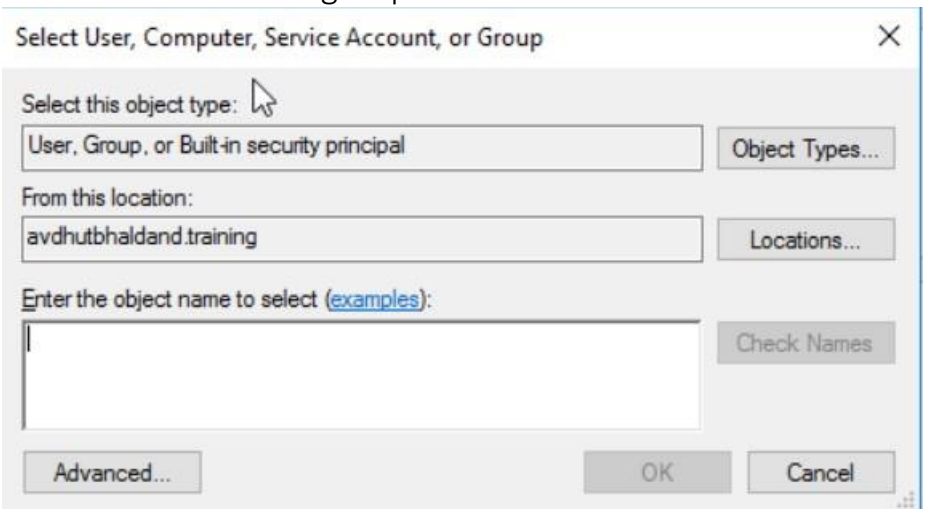
Select for All Machines and Read-Only Permissions -



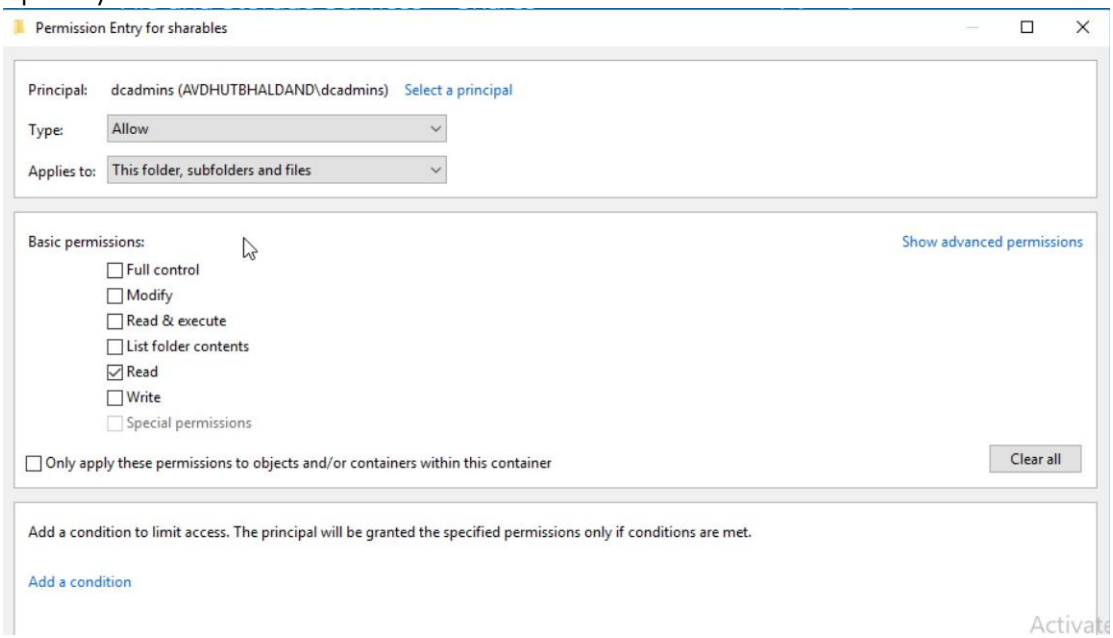
Click on Add to add the principal -



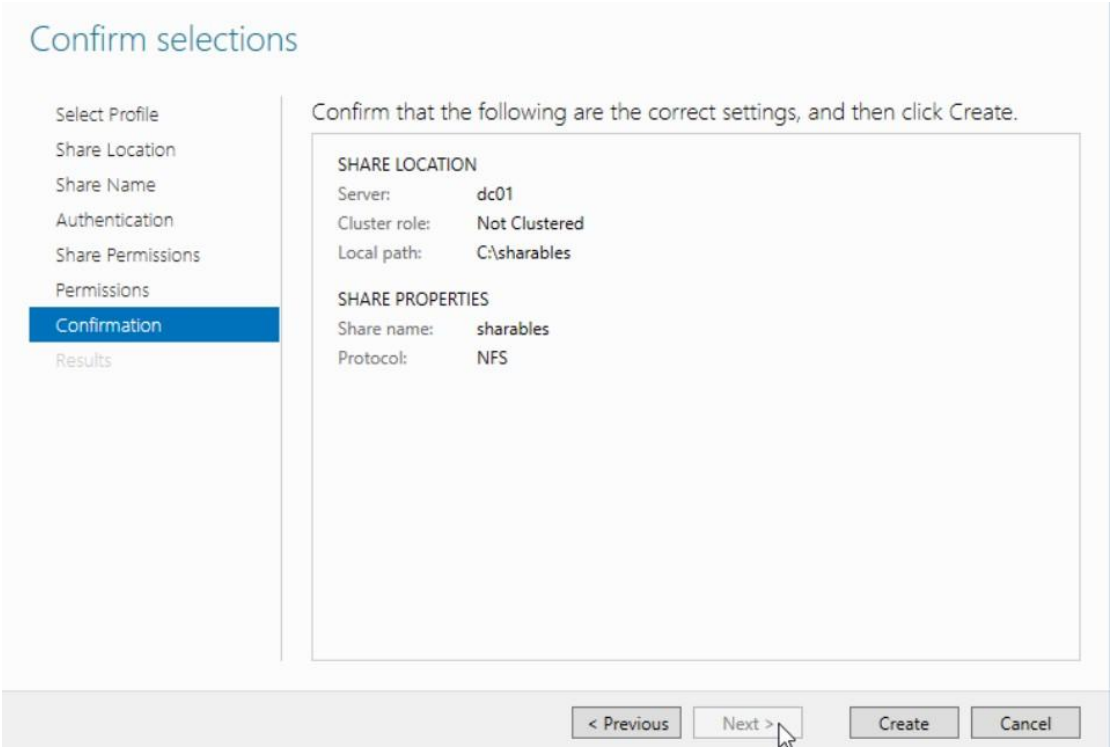
Enter the 'dcadmins' group -



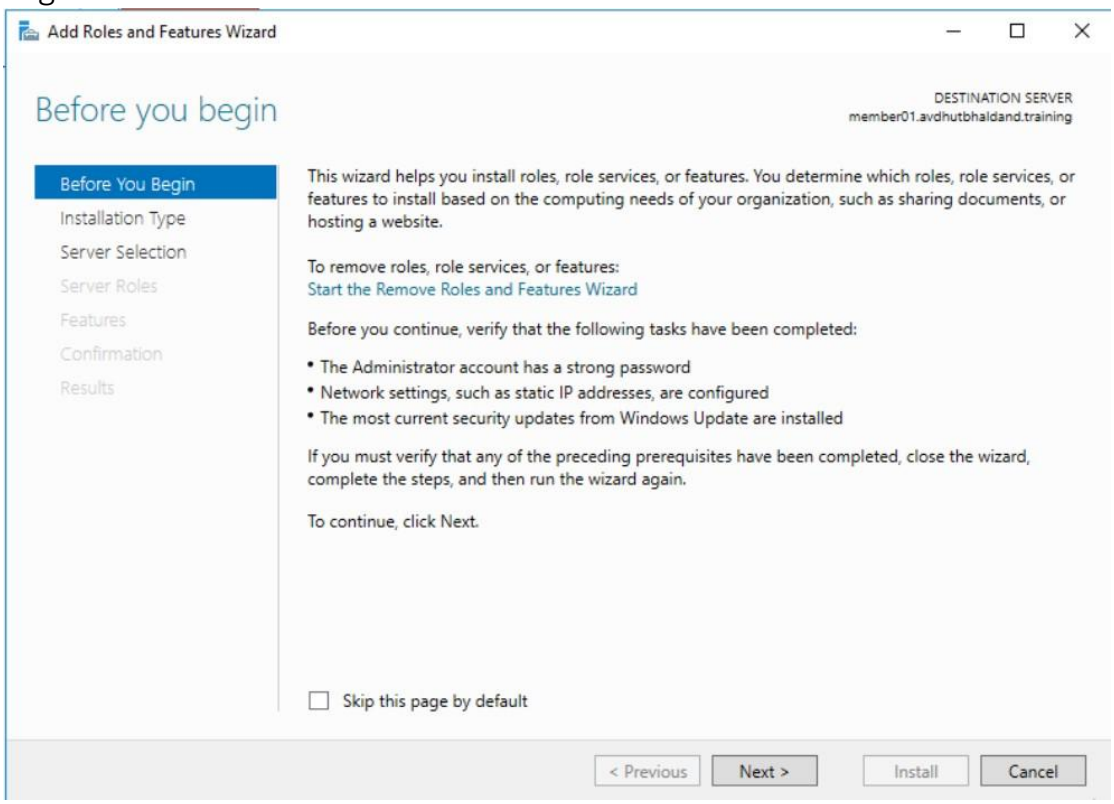
Specify the Permissions-



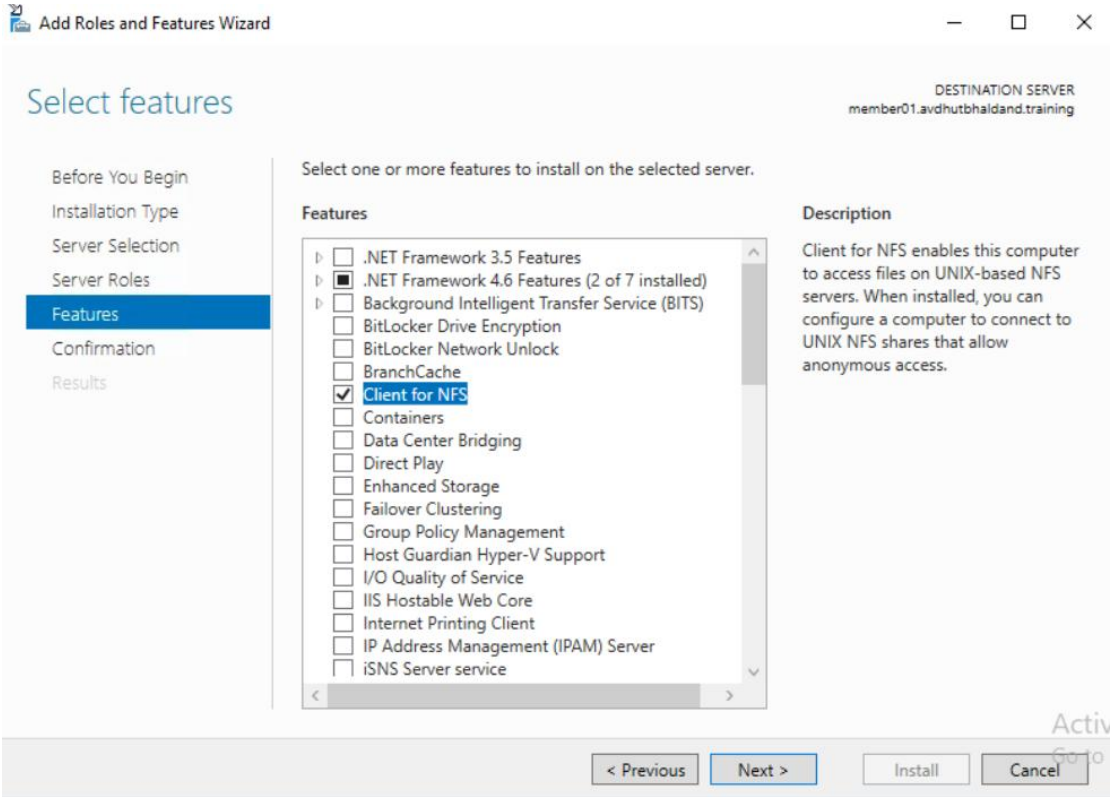
Click on create to create share-

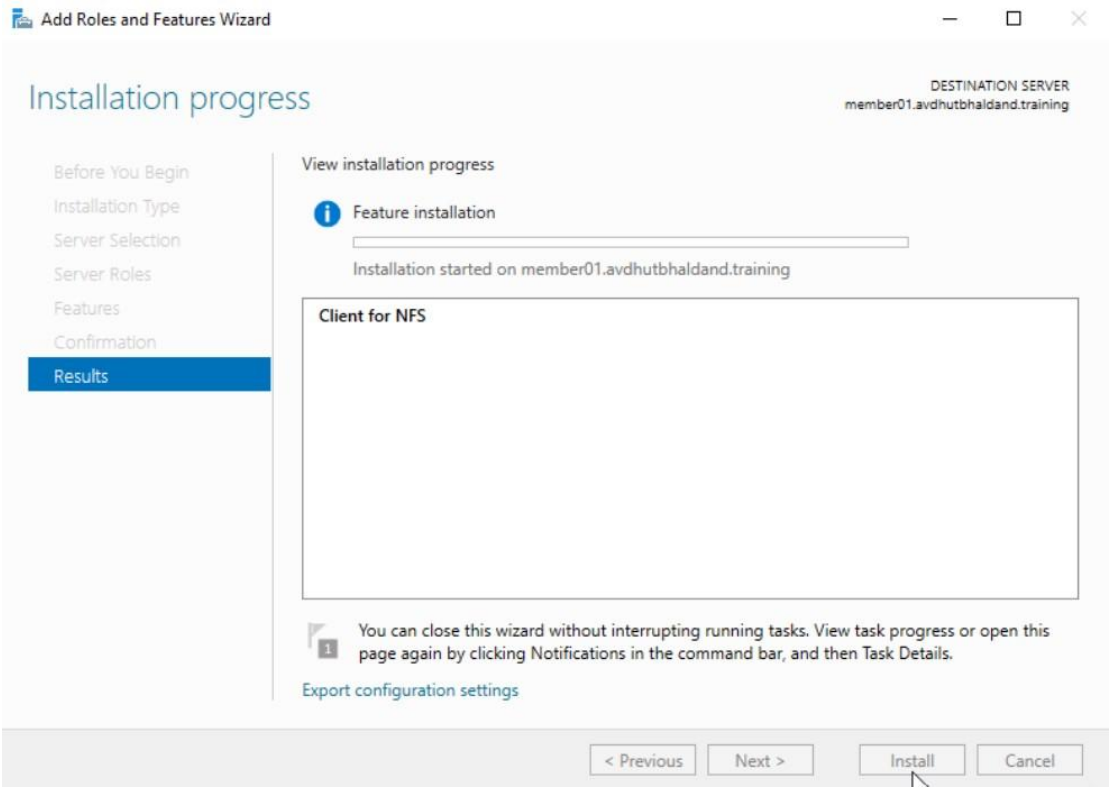


Login to member machine and Click Add roles and features-

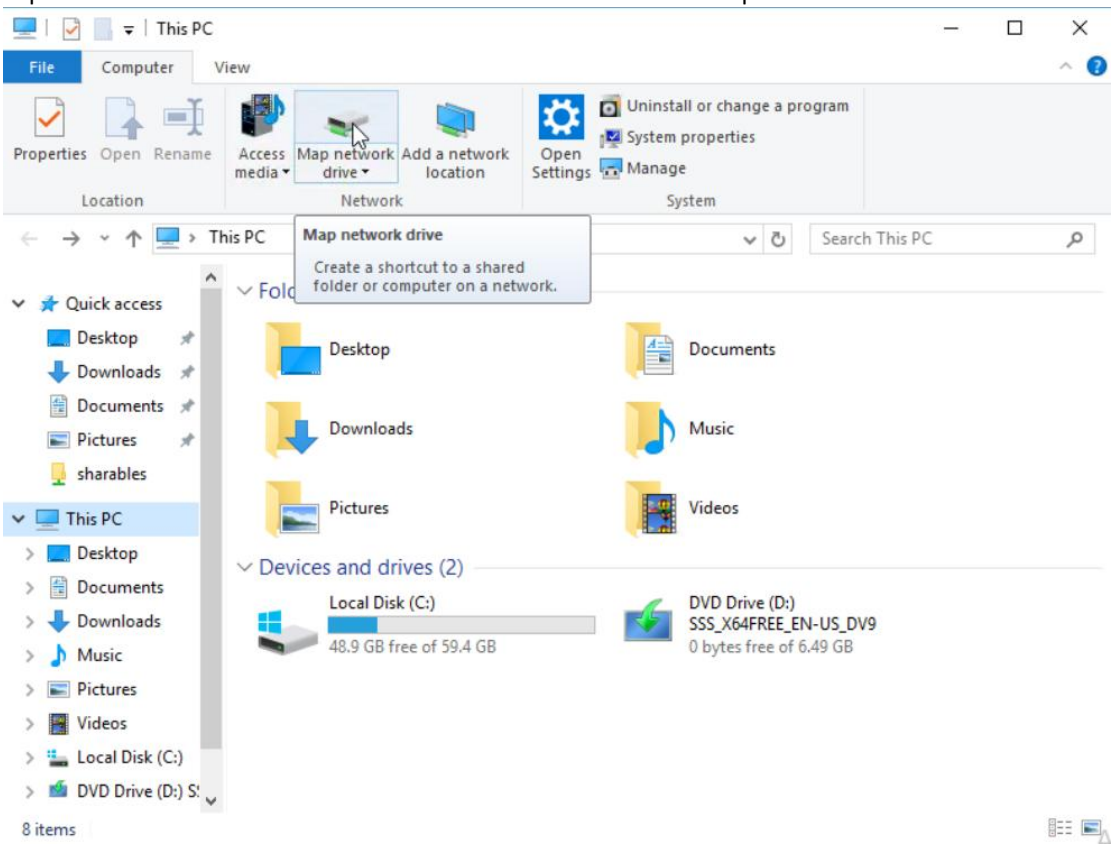


Select Client for NFS features -

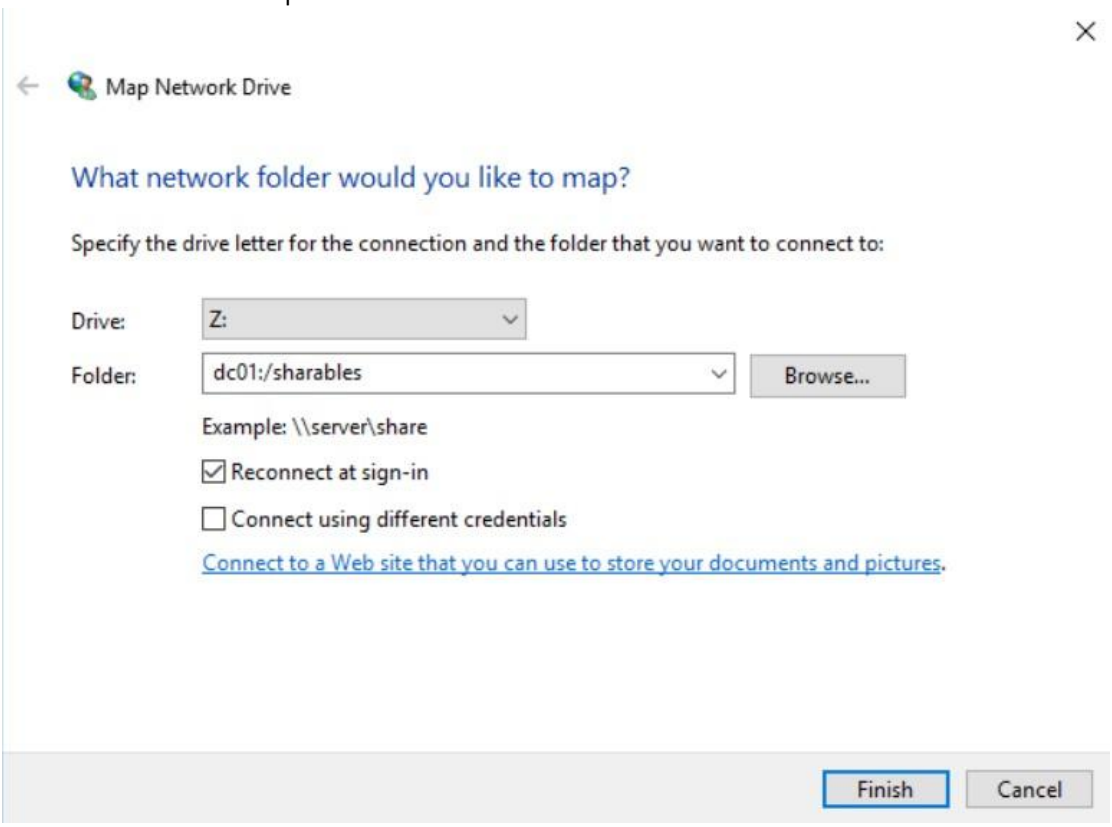




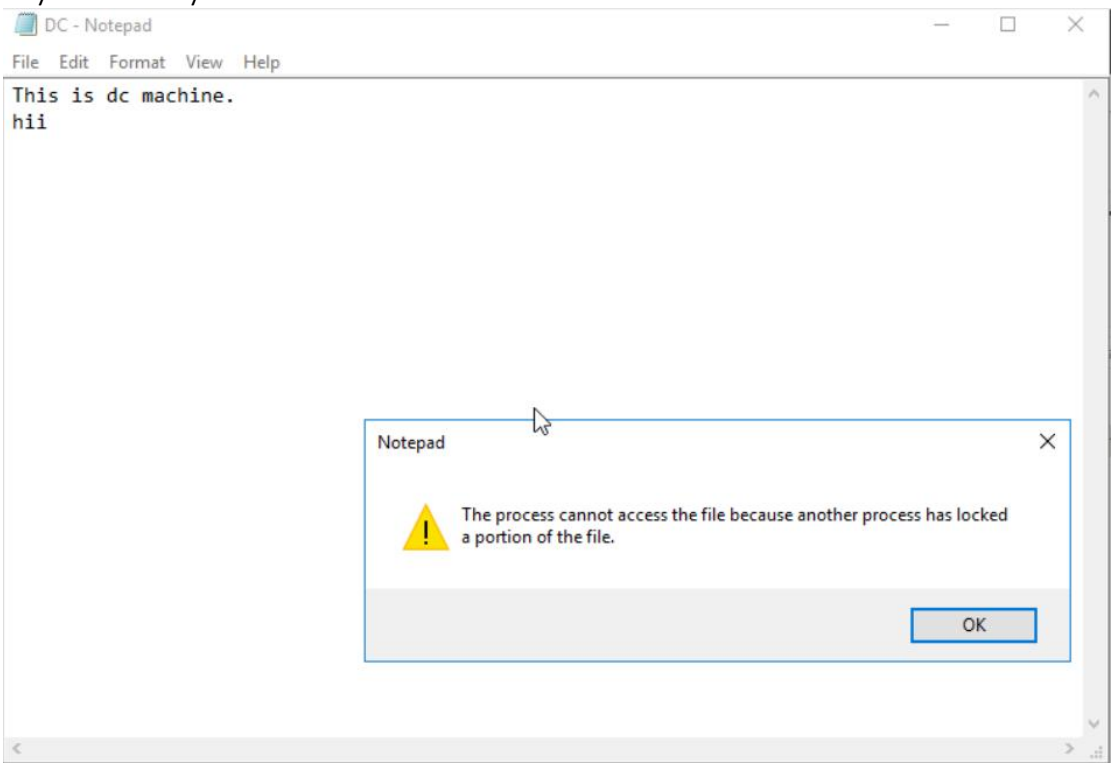
Open This PC on member machine and select Map network drive-



Enter the network path of the created share-



Try to modify the file in the folder and the access will be denied -



Project Task- 2

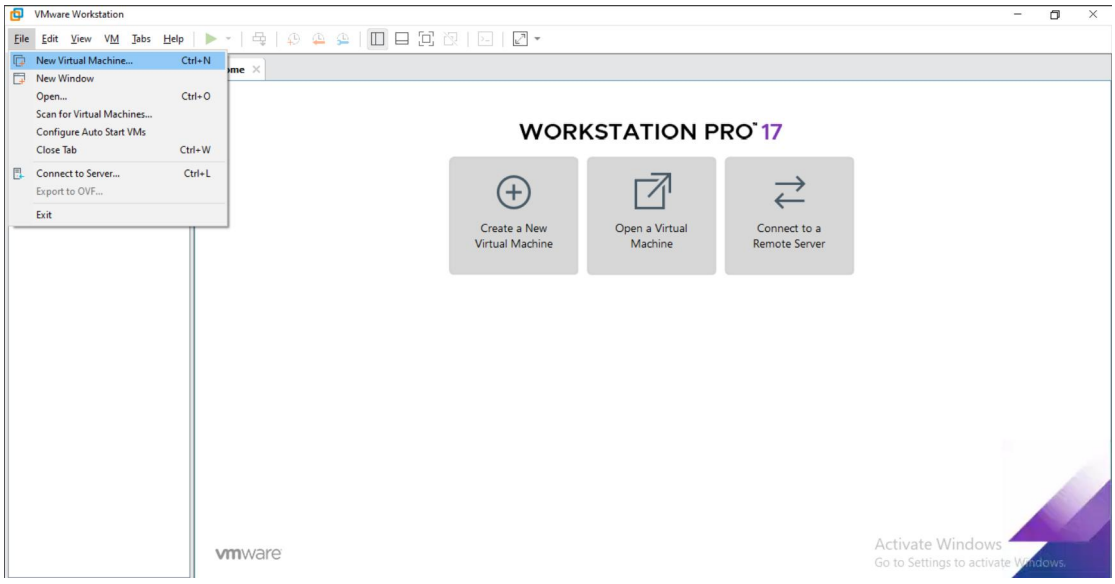
Objective:

Install CentOS 7 server (after installation GUI must be present). Attach 3 disks of 5GB each & create 2 LVMs from these disks of 7GB (/lvm1) and 8GB (/lvm2) with XFS and EXT4 file systems respectively and verify. Install the following RPM packages using the package manager of your choice using single command.

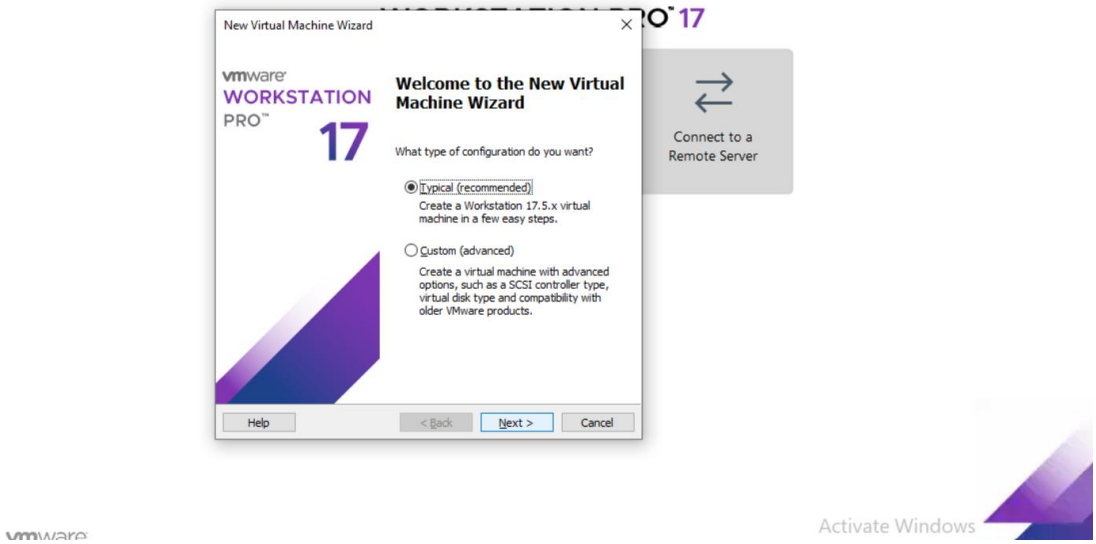
Solution-

Install CentOS 7 server-

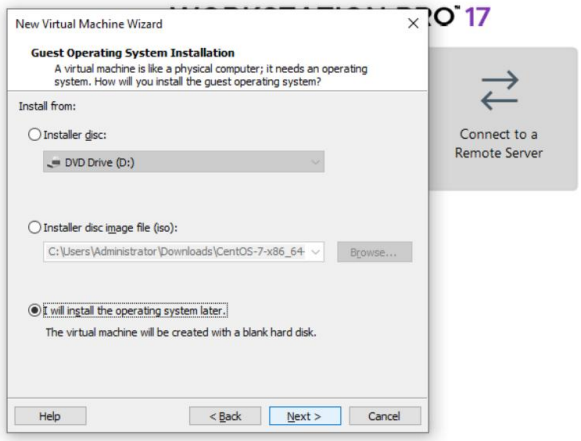
Create New Virtual Machine



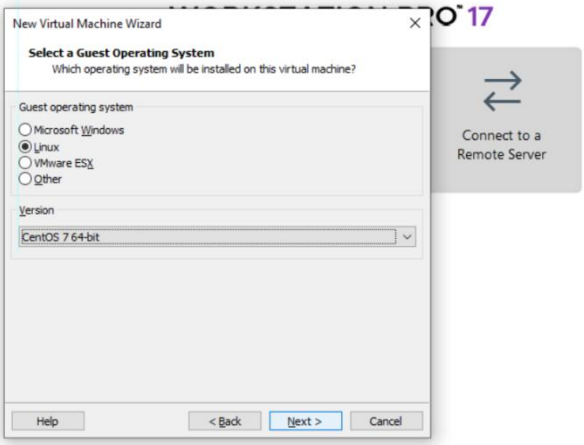
Select Typical-



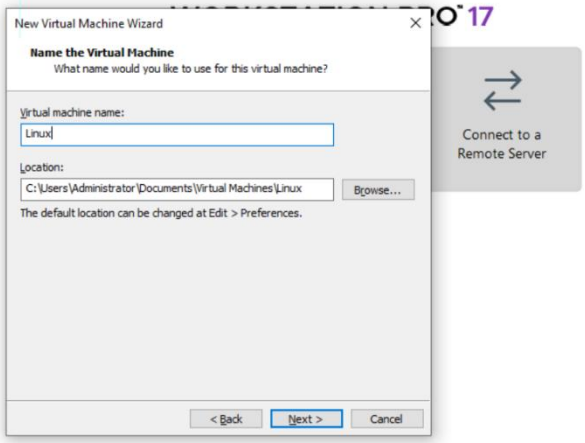
Select I will install later-



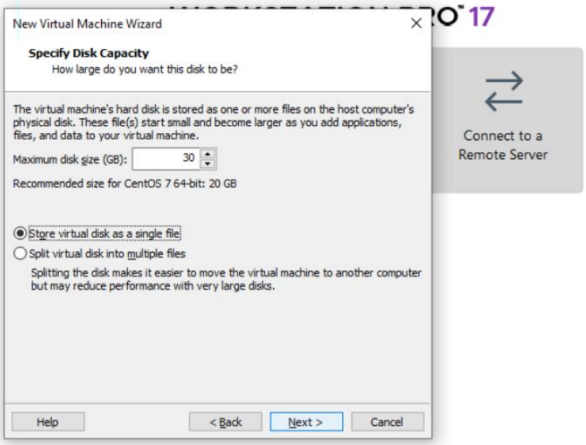
Select the CentOS Version-



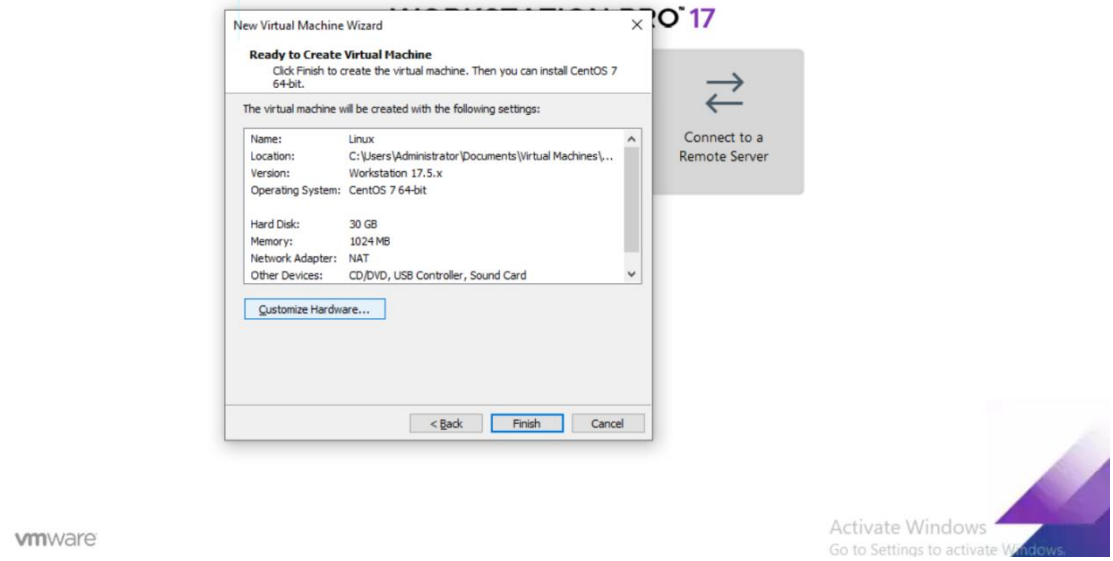
Specify VM Name-



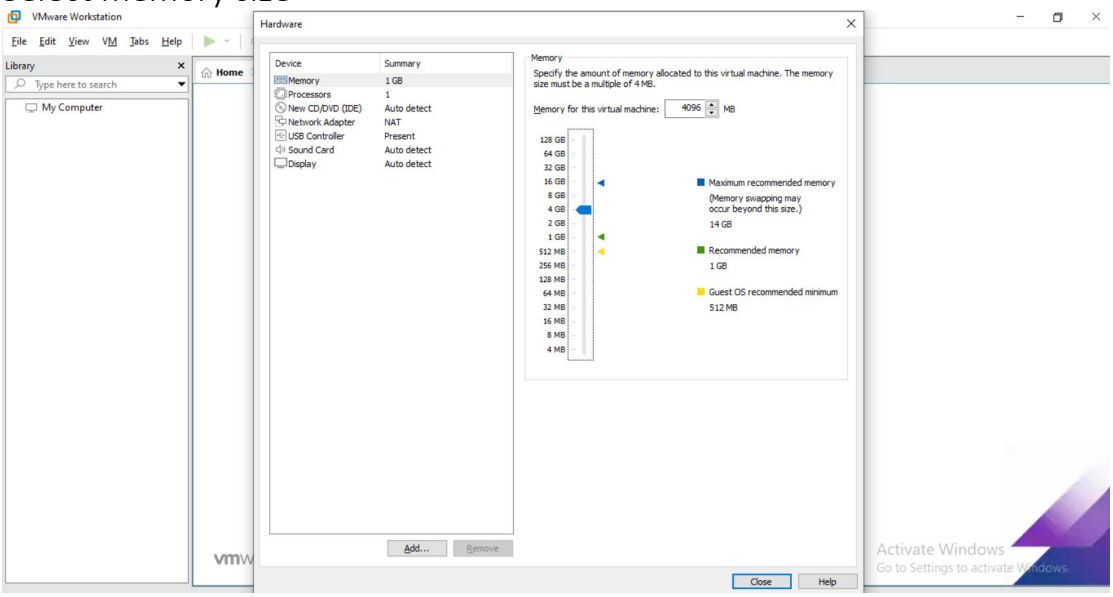
Specify the disk capacity-



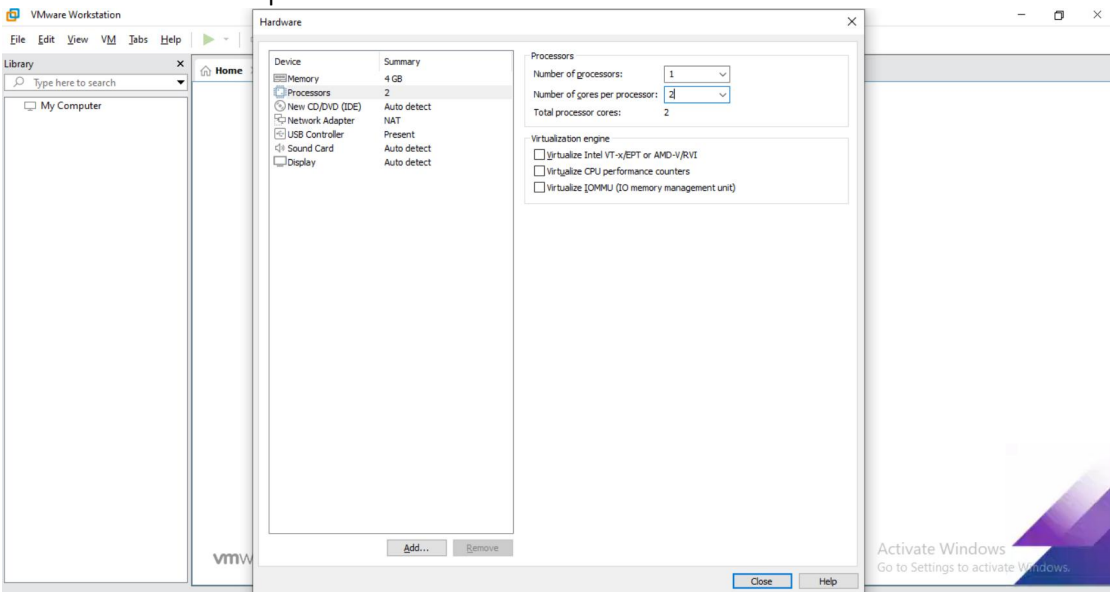
Select Customize Hardware-



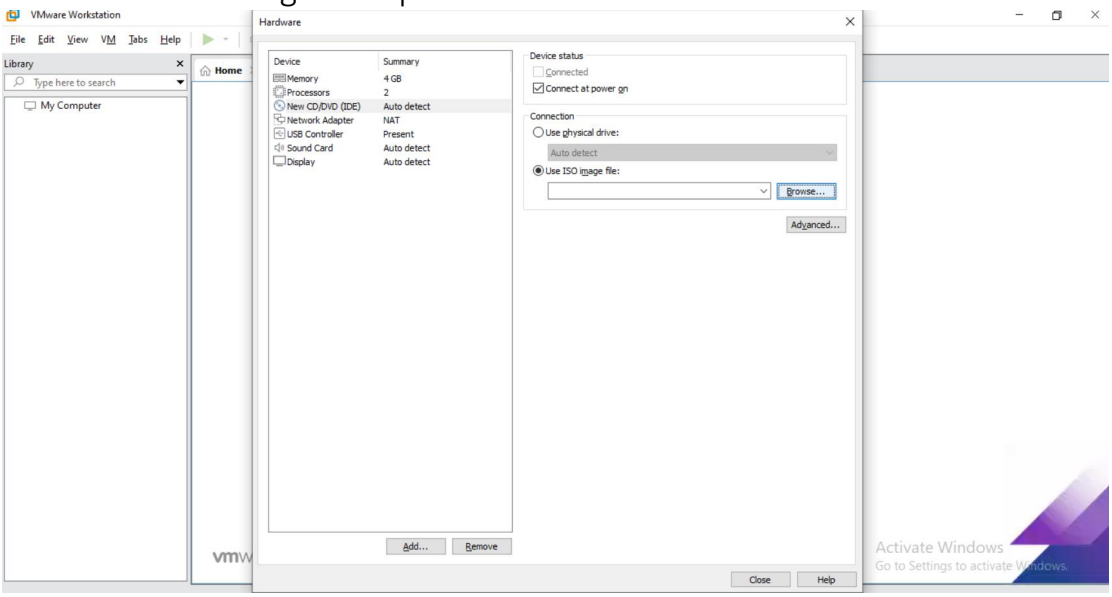
Select memory size-



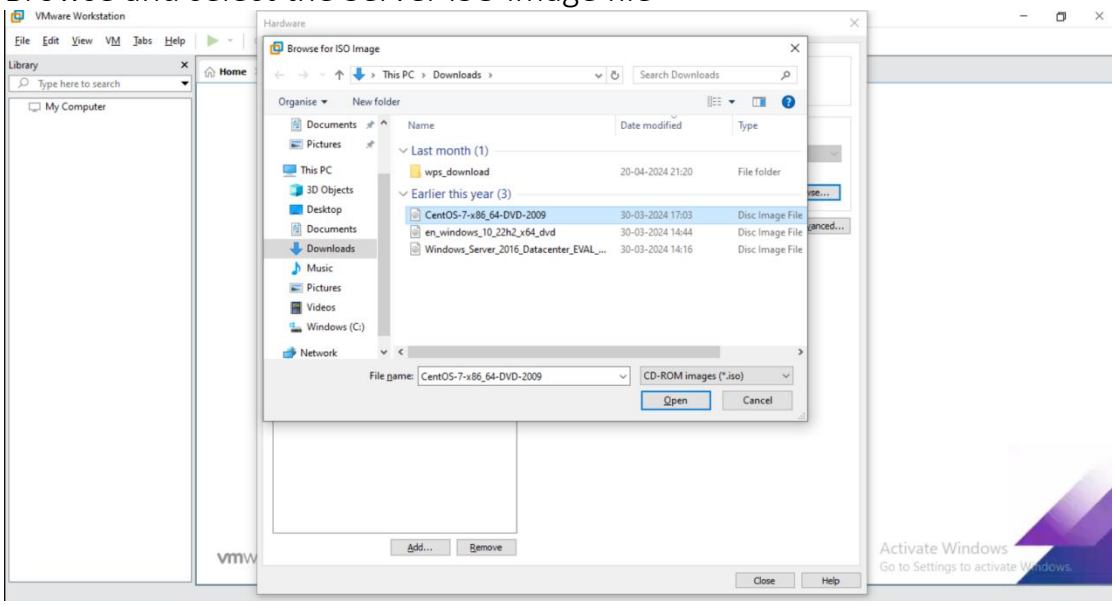
Select number of processors -

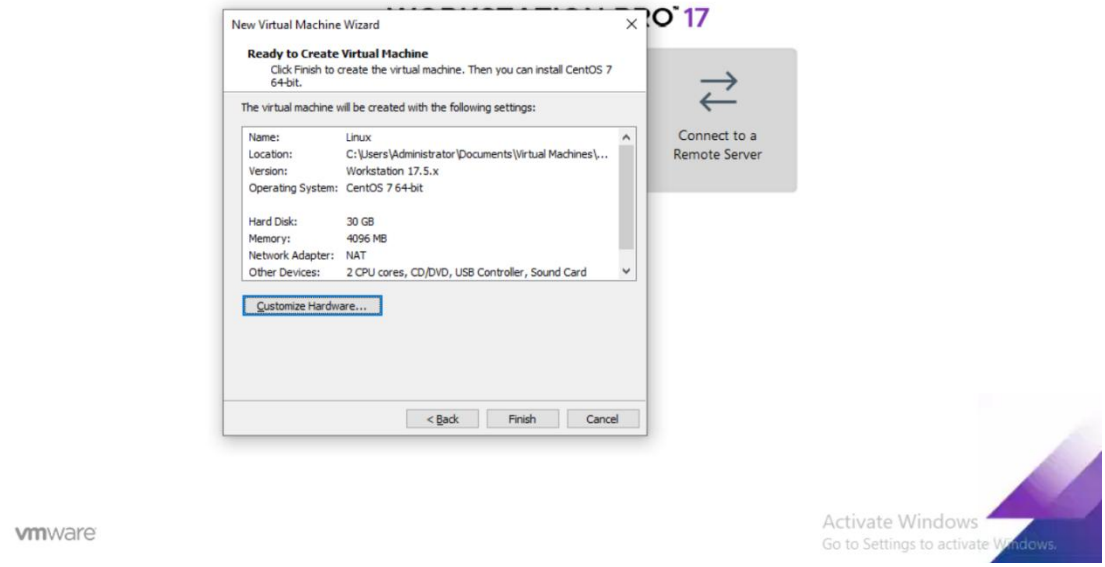


Select Use ISO image file option-

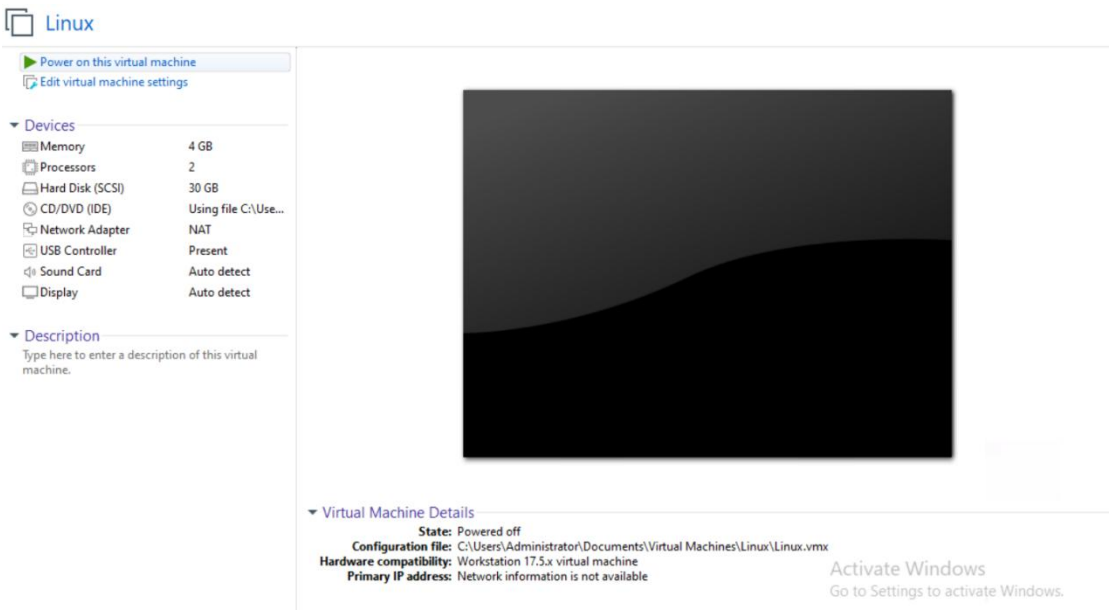


Browse and select the Server ISO image file-



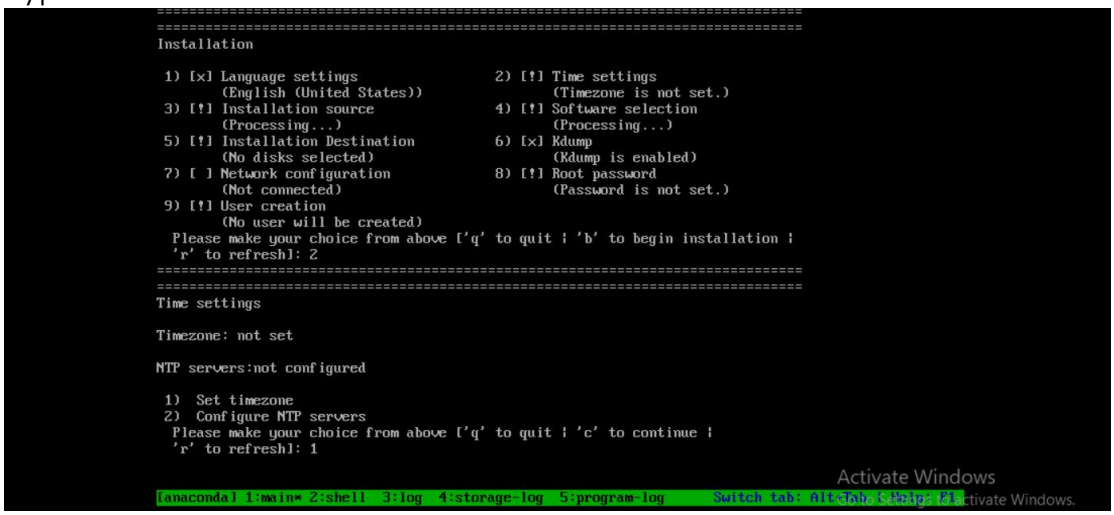


Power ON this VM-

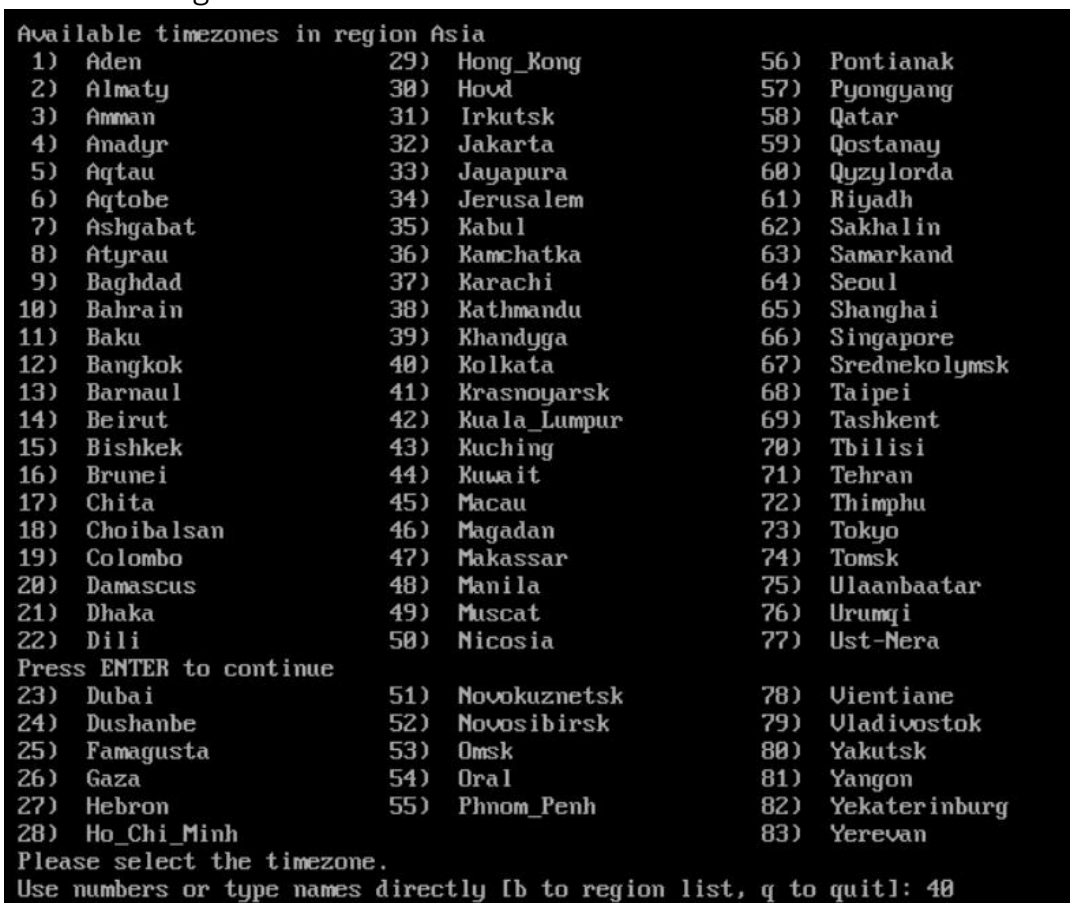


Hit Tab button and add ‘text’ to the line below-

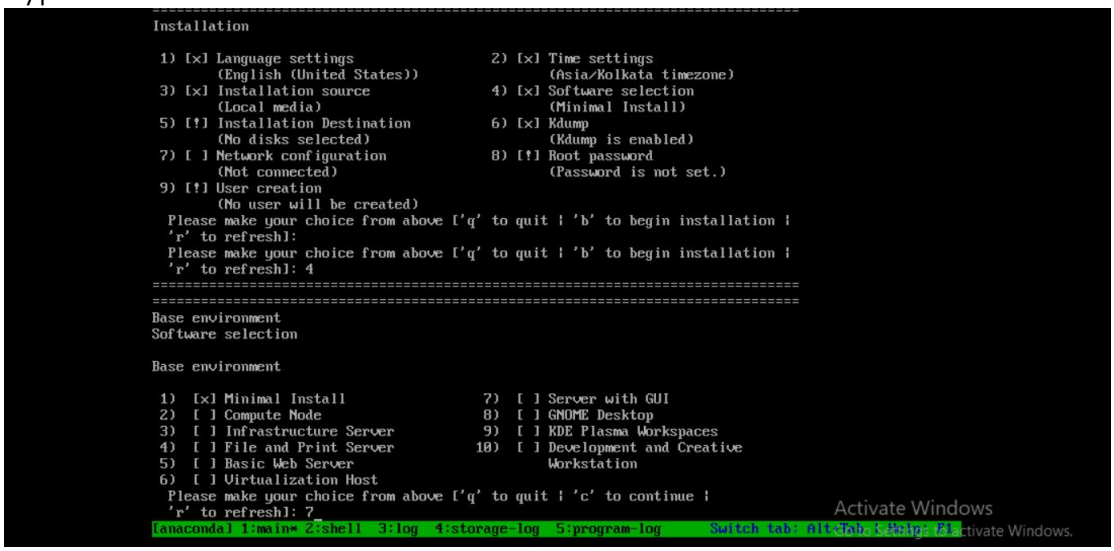
Type 1 to set Time zone-



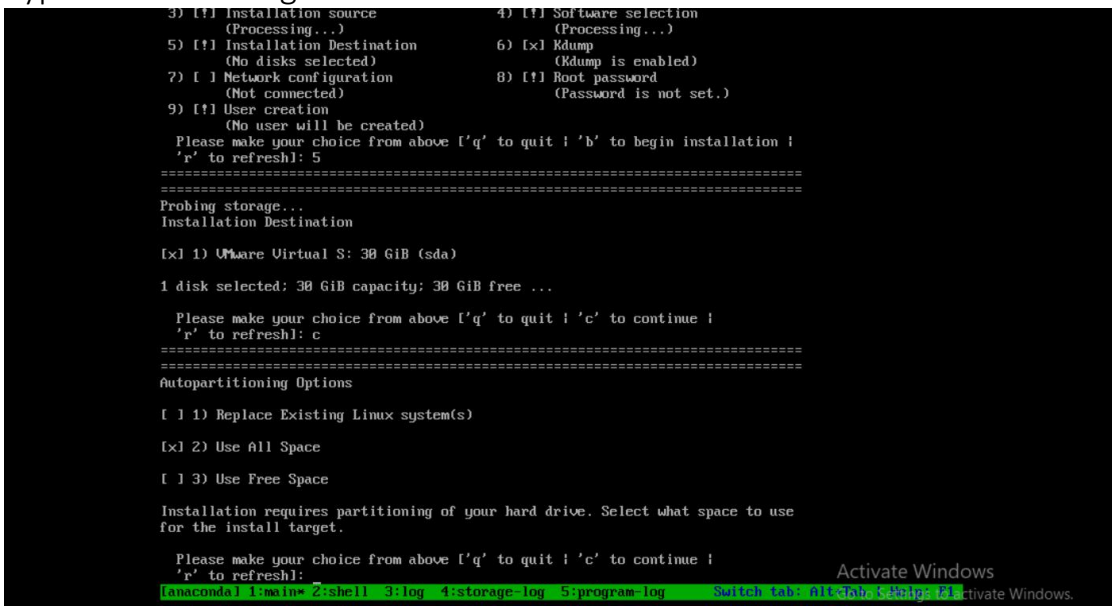
Select the region-



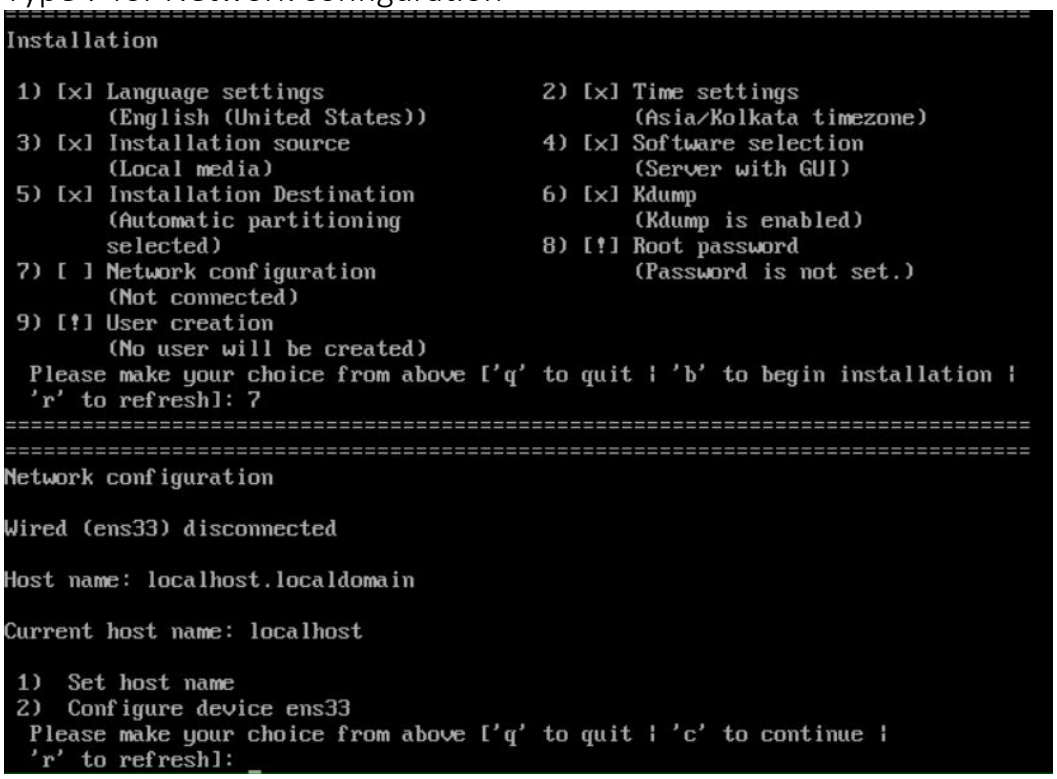
Type 4 for Software selection-



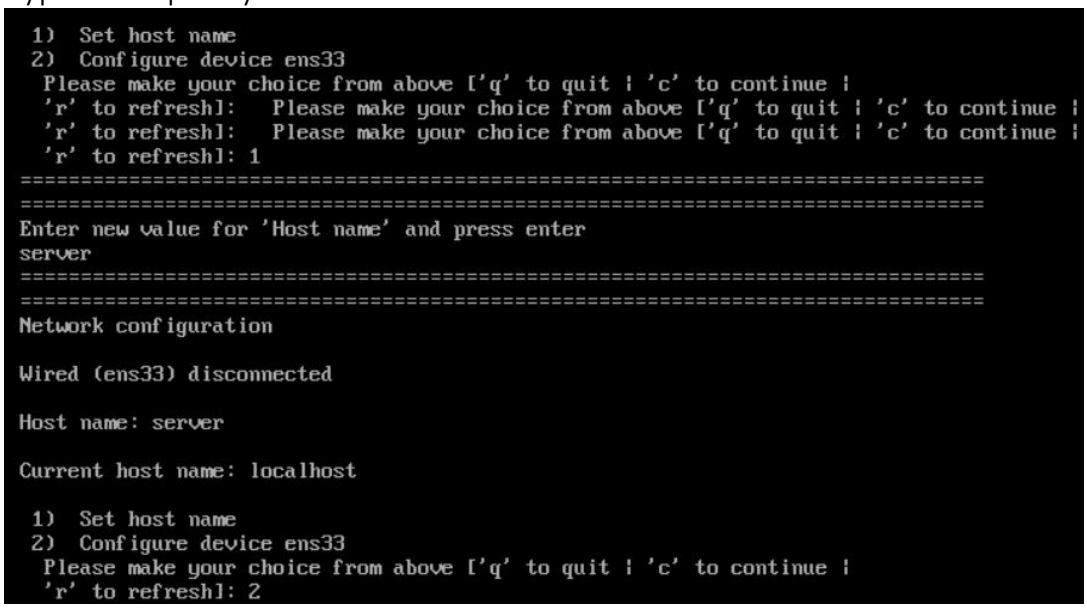
Type 5 for selecting disk -



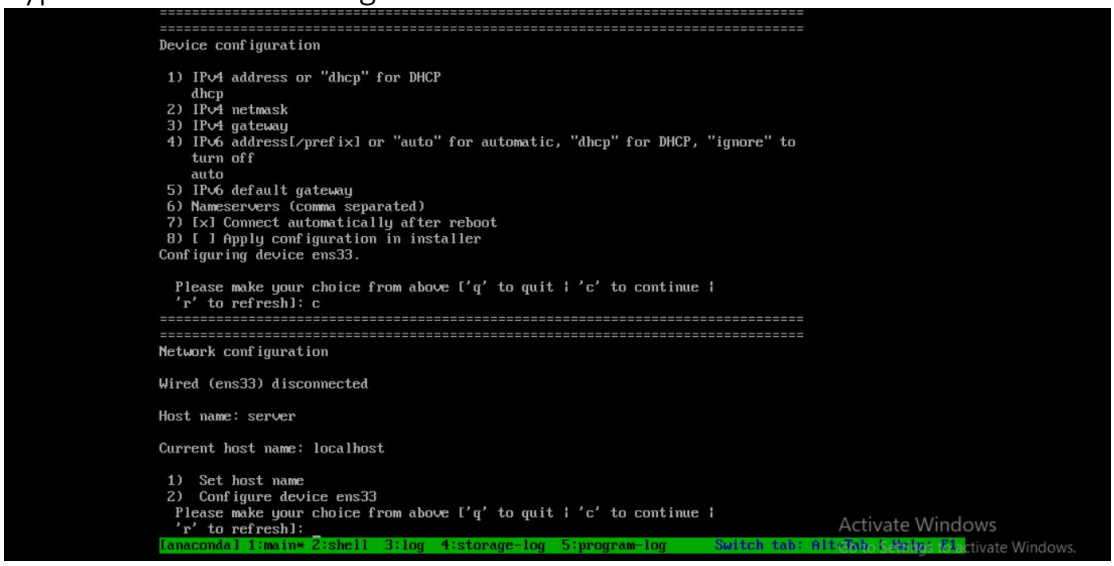
Type 7 for Network configuration-



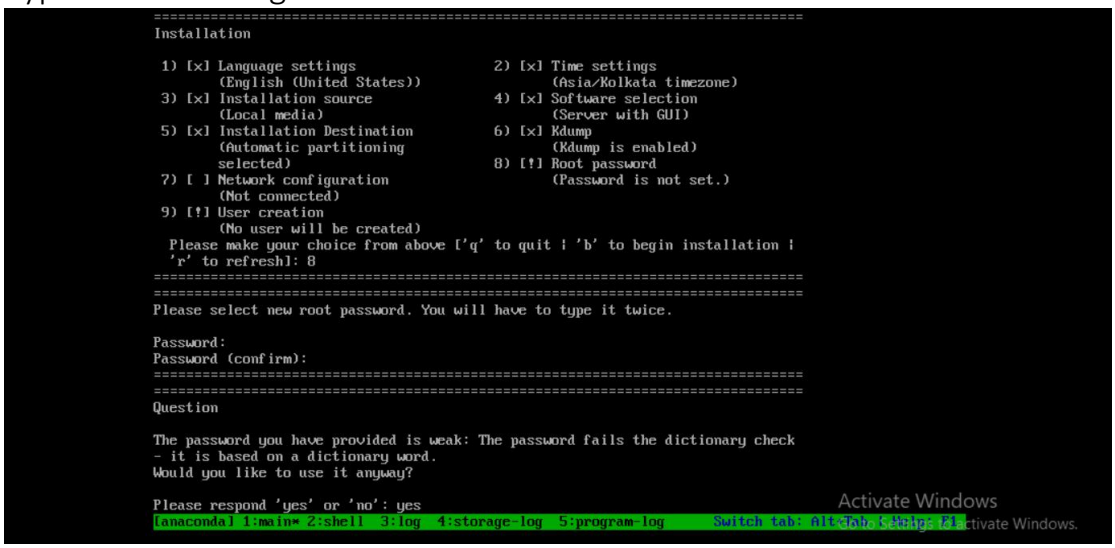
Type 1 to specify host name-



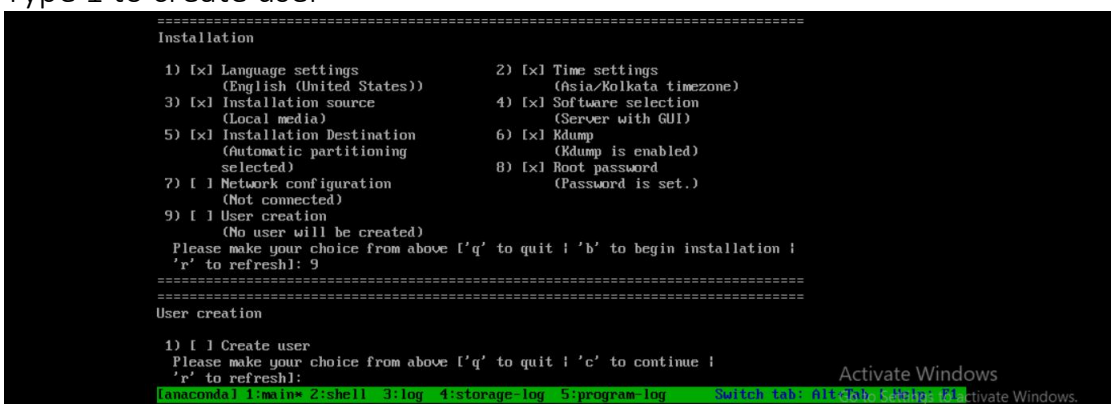
Type 2 for netwok configuration-



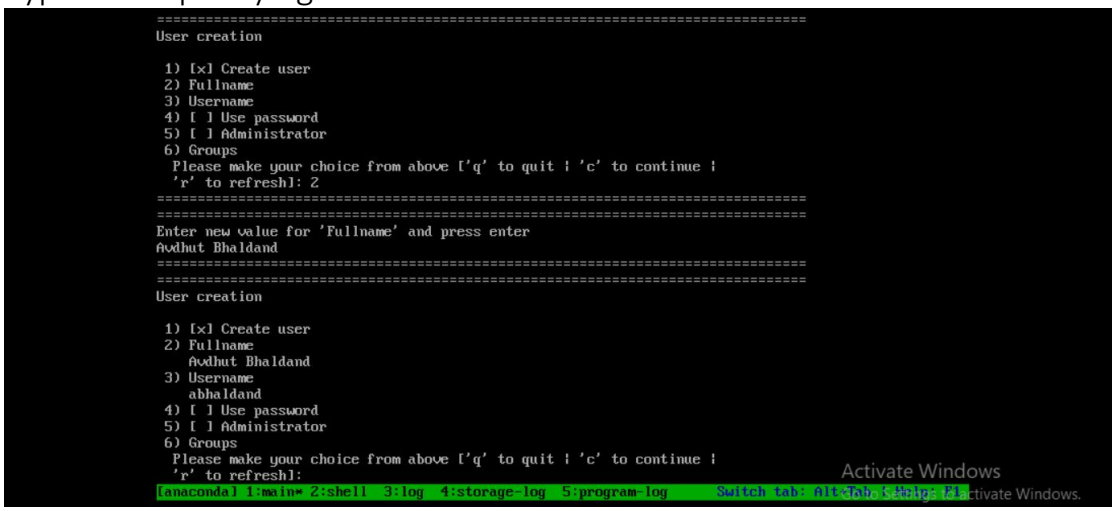
Type 8 for creating user-



Type 1 to create user-



Type 2 for specifying User name-

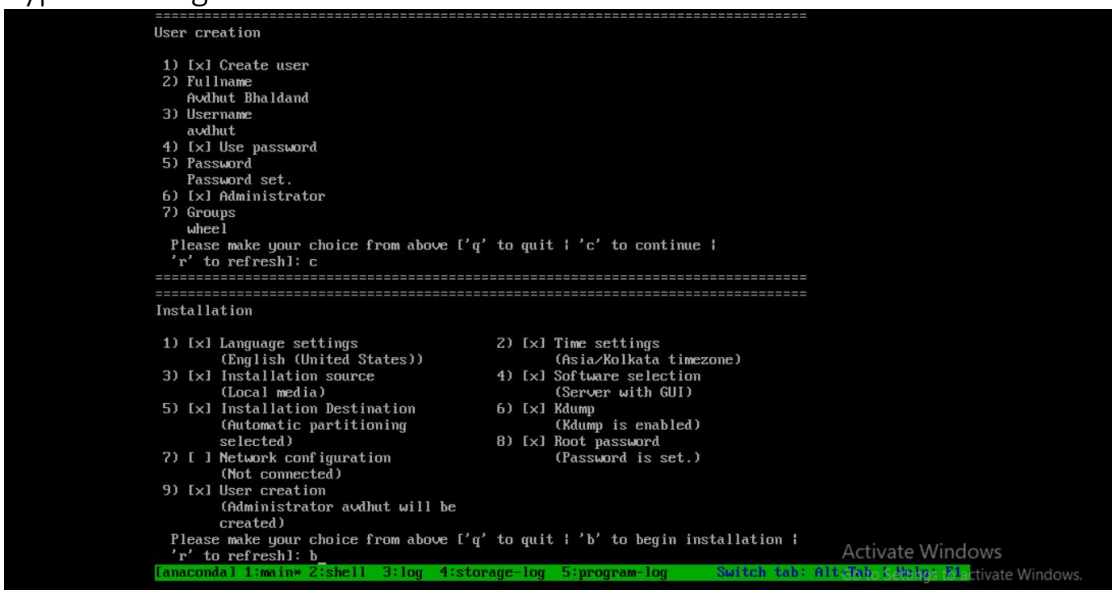


Type 4 to specify password-

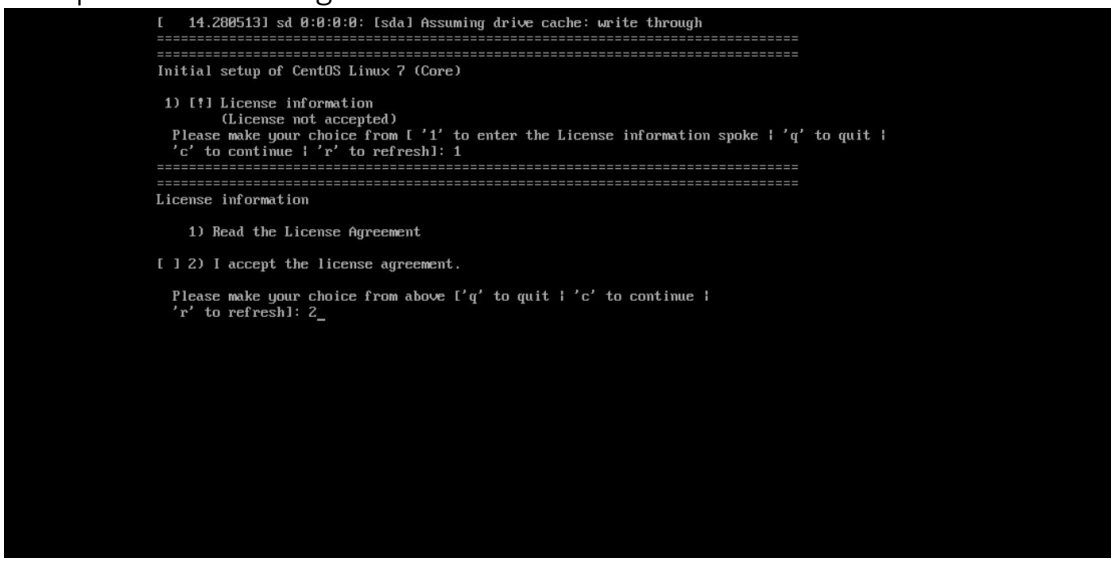
Type 5 to set password-

Type 6 to specify administrator privileges to user-

Type b to begin installation-

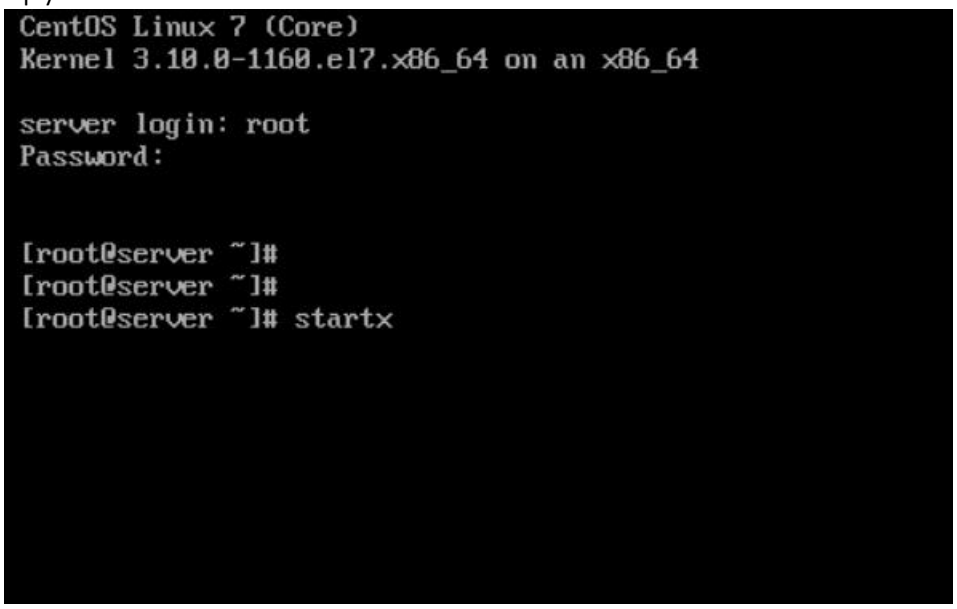


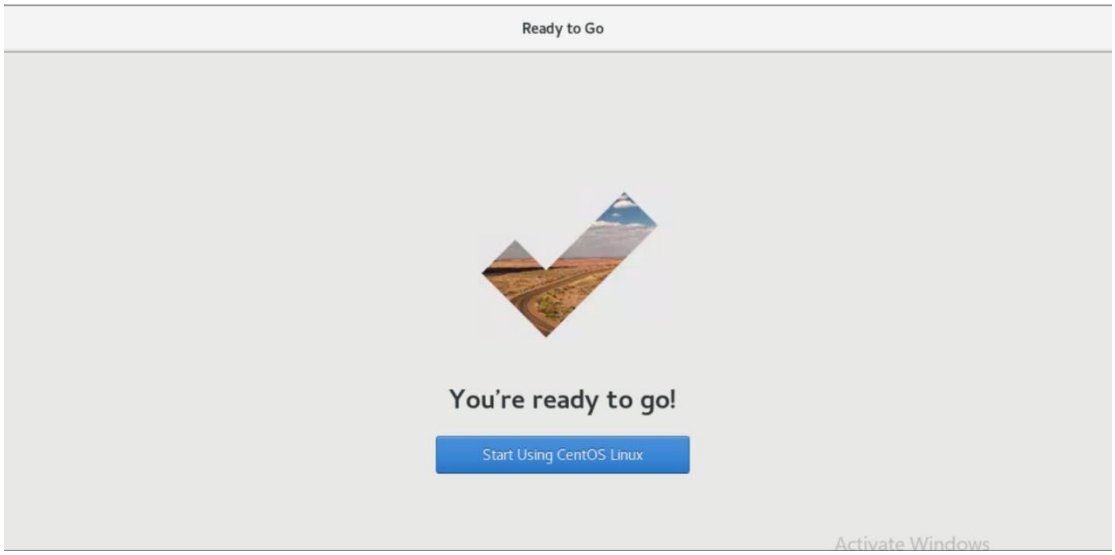
Accept the Licence Agreement-



Login using root-

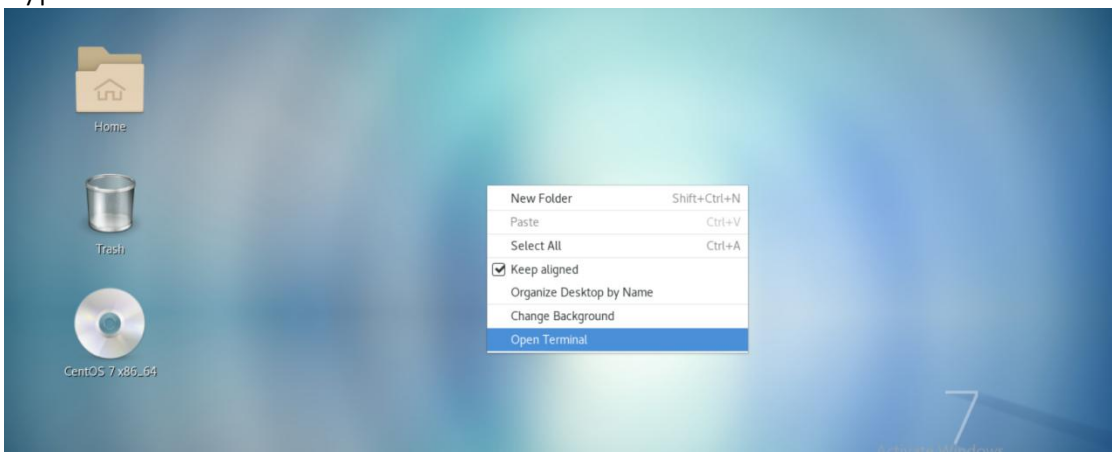
Tpye Command 'startx' to run GUI-



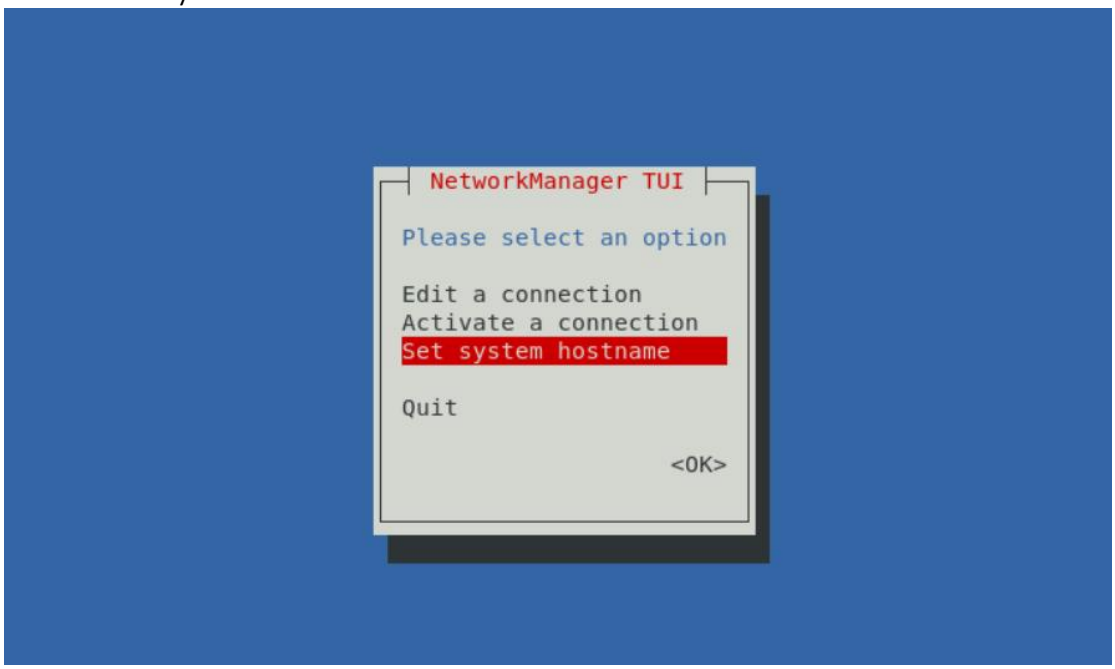


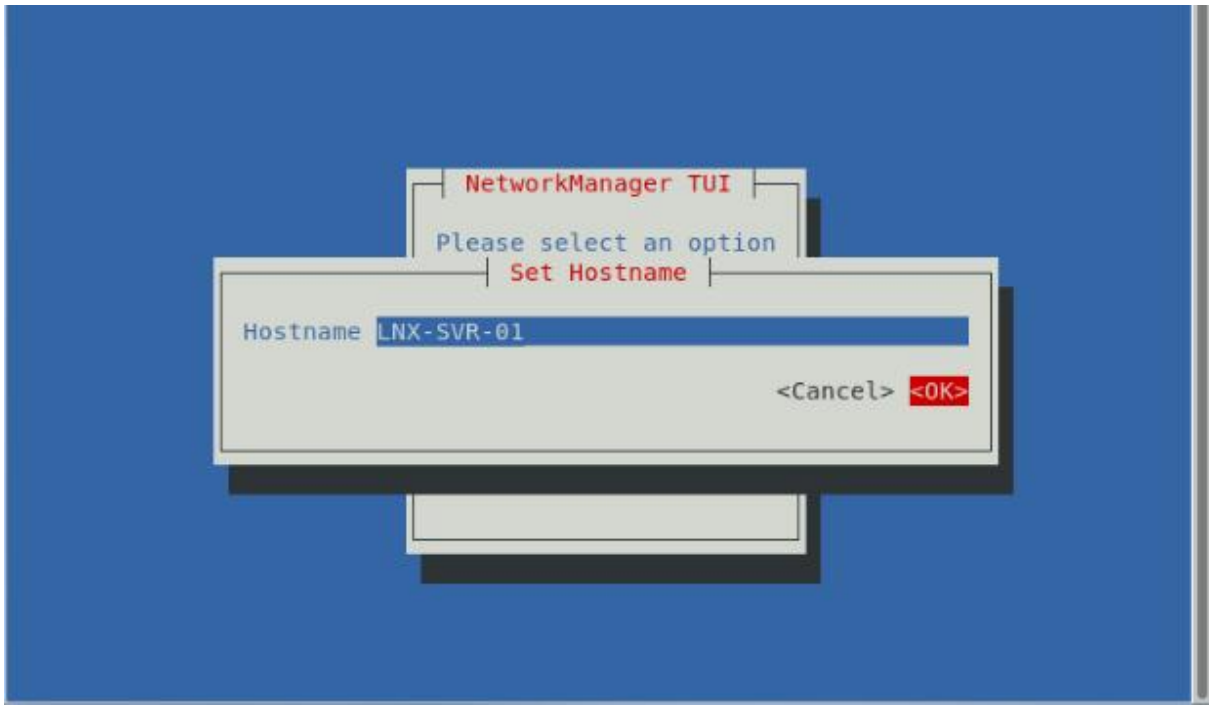
Change your linux server name to "LNX-SVR-01" using NMTUI command.
Change the IP address on linux to 192.168.10.10/24

Right click on screen and Open Terminal-
Type command nmtui and enter-

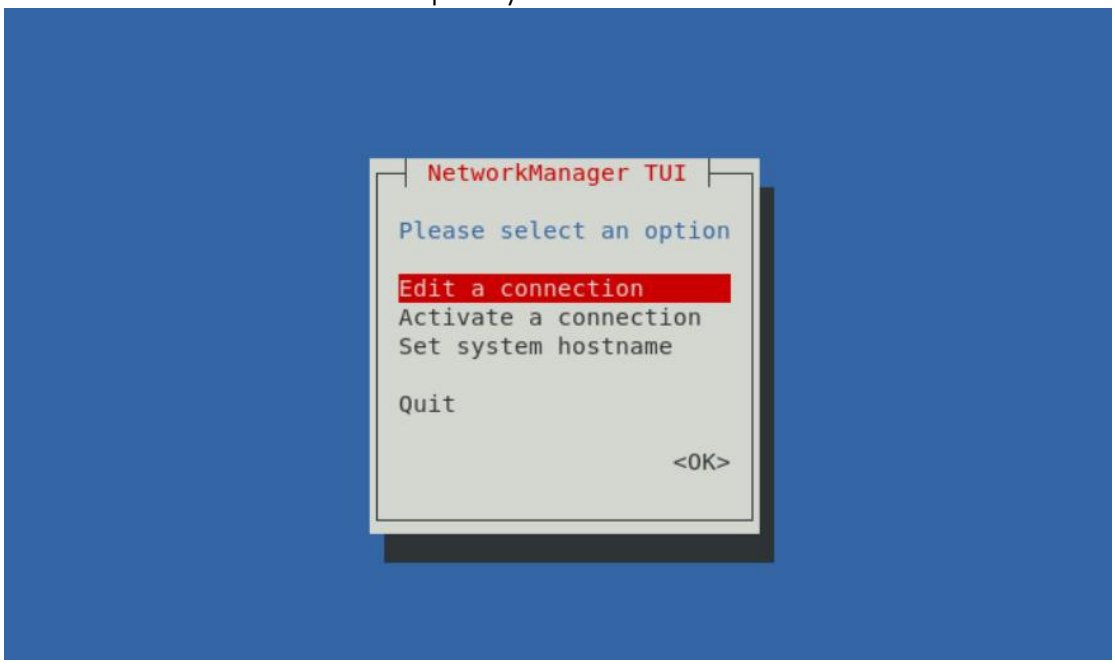


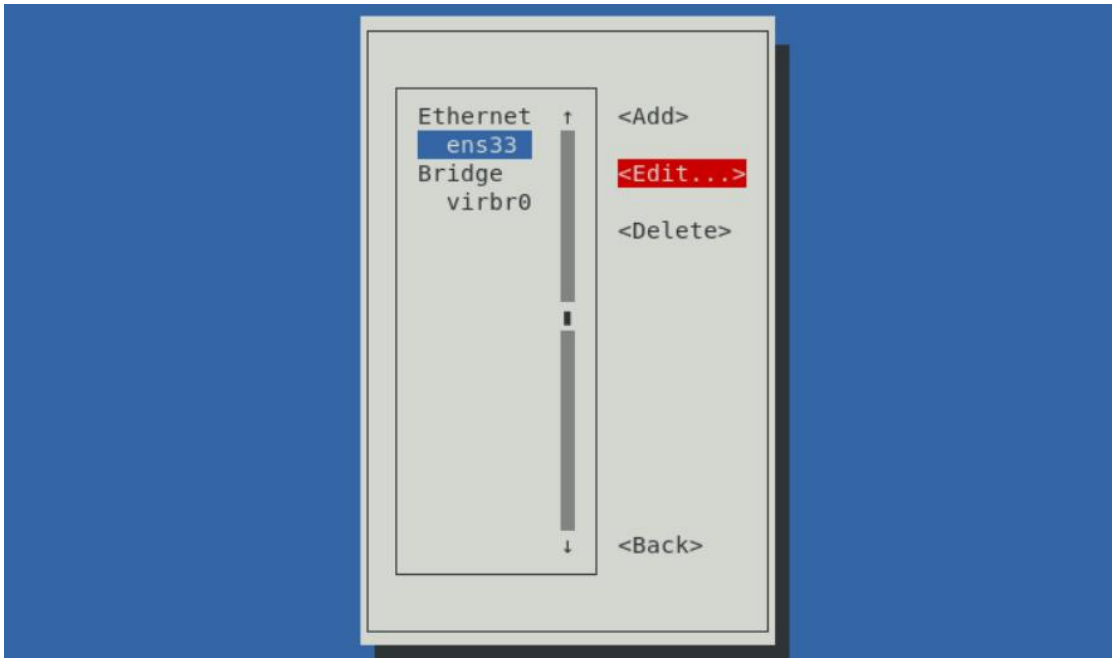
Select Set System Hostname -

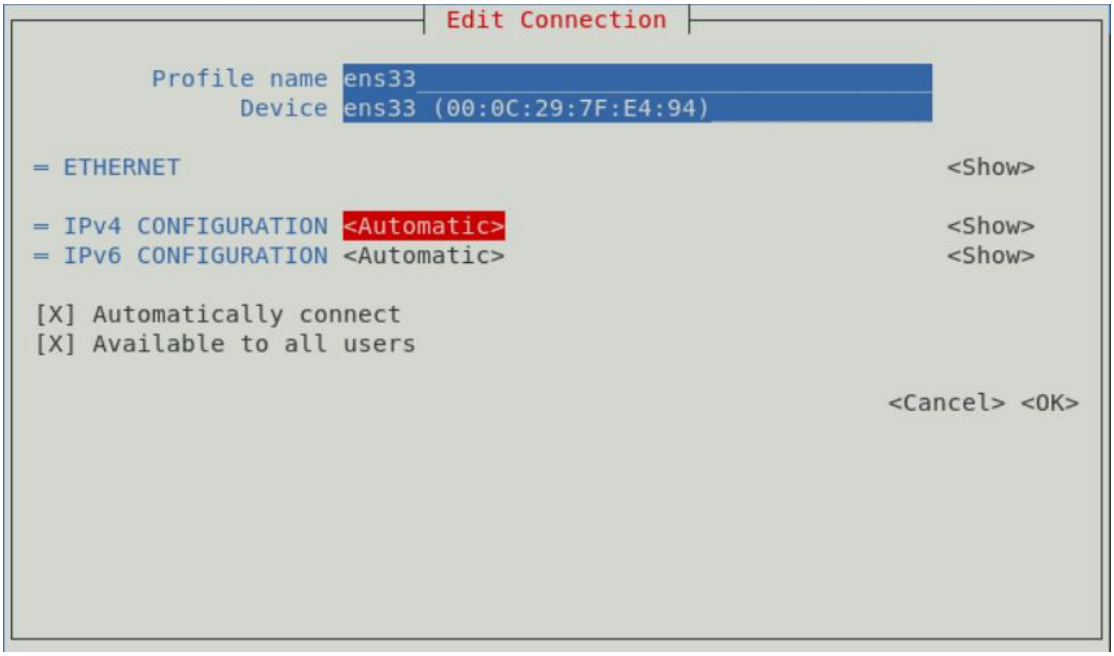


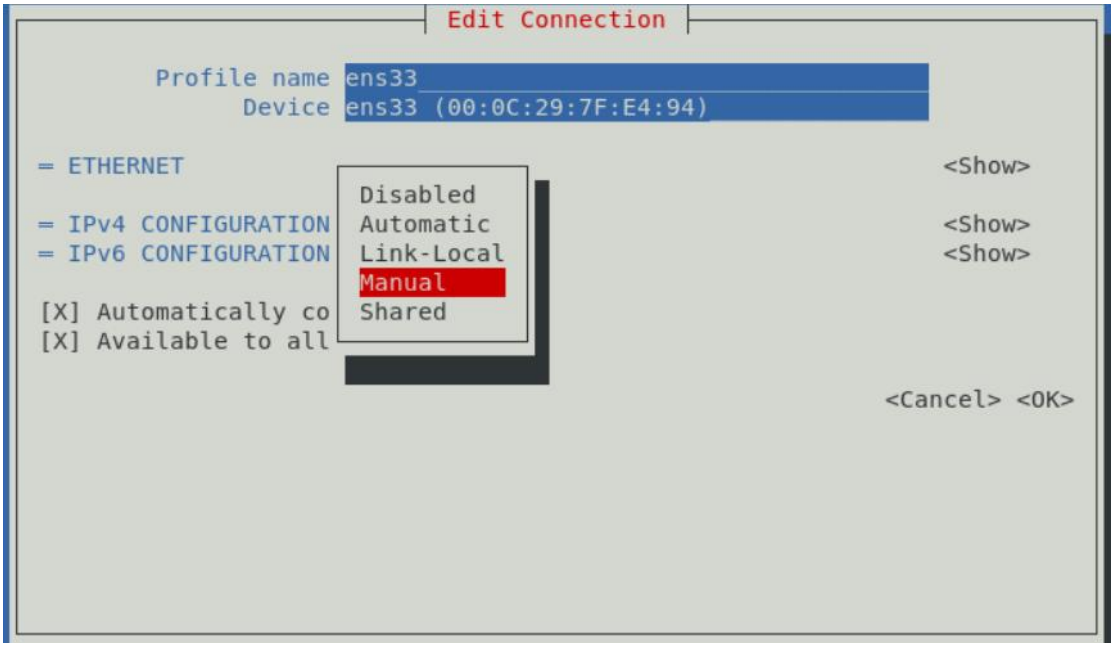


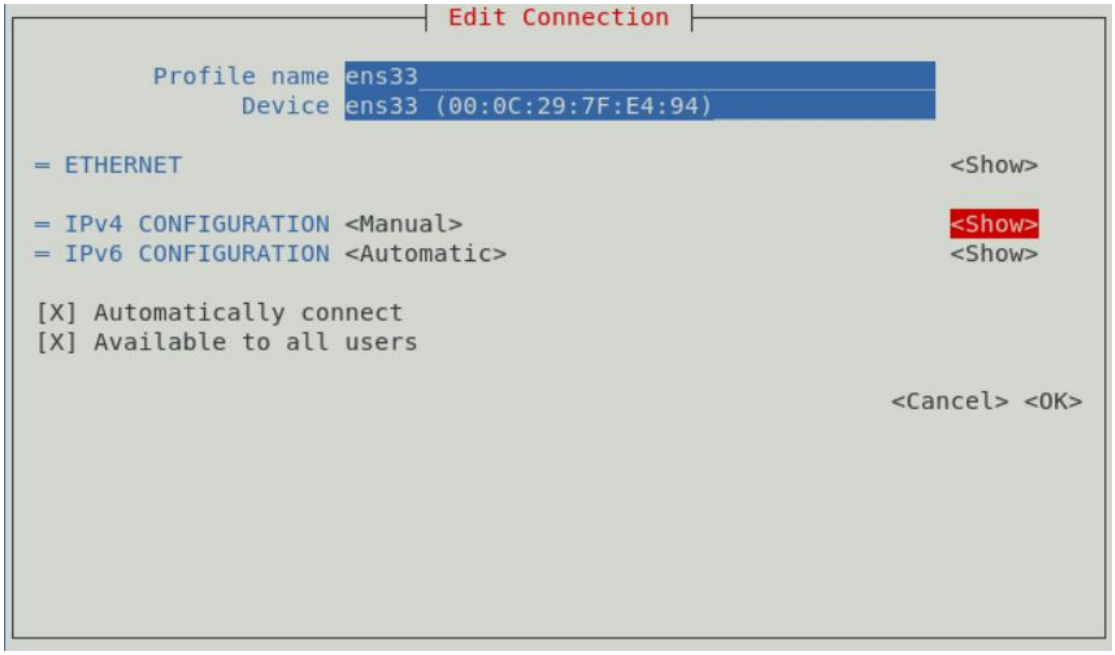
Select Edit a Connection to specify IP Address-

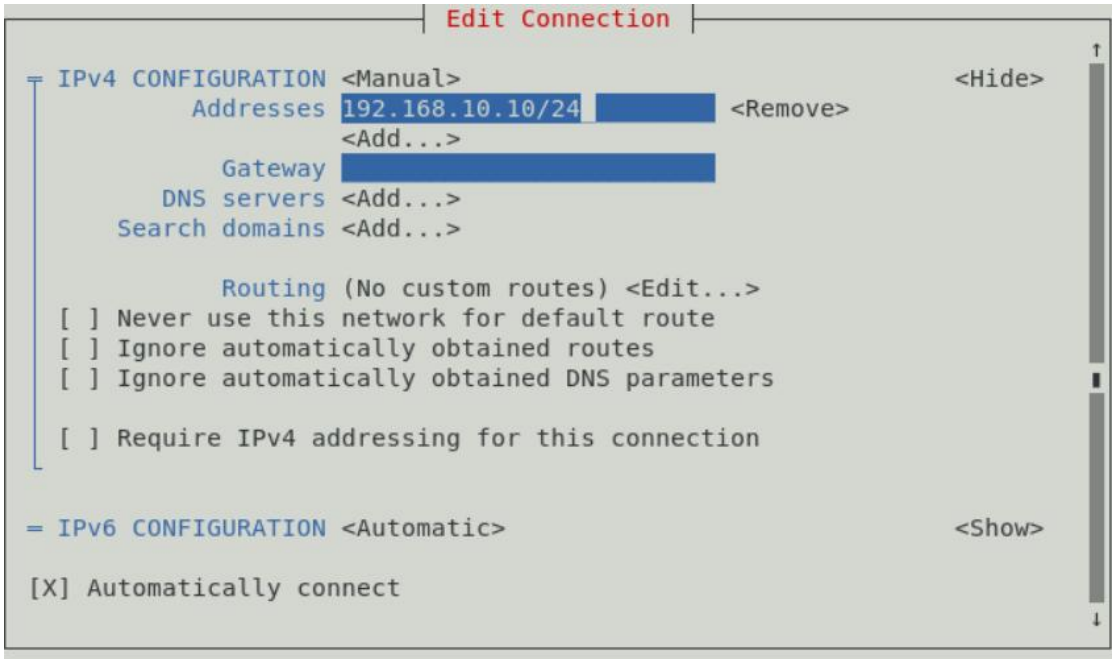





Edit Connection
Profile name ens33
Device ens33 (00:0C:29:7F:E4:94)
= ETHERNET <Show>
= IPv4 CONFIGURATION <Automatic> <Show>
= IPv6 CONFIGURATION <Automatic> <Show>
[X] Automatically connect
[X] Available to all users
<Cancel> <OK>


Edit Connection
Profile name ens33
Device ens33 (00:0C:29:7F:E4:94)
= ETHERNET <Show>
= IPv4 CONFIGURATION <Show>
= IPv6 CONFIGURATION <Show>
[X] Automatically co
[X] Available to all
Disabled
Automatic
Link-Local
Manual
Shared
<Cancel> <OK>



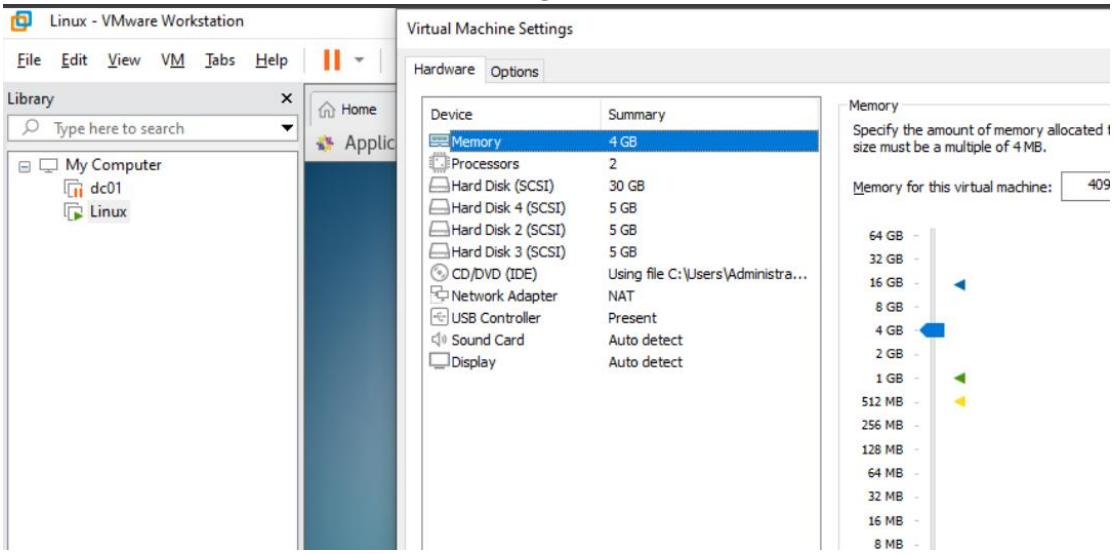


Run cmd systectlm restart network to update network-

```
[root@LNX-SVR-01 ~]# systemctl restart network
[root@LNX-SVR-01 ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.10.10  netmask 255.255.255.0  broadcast 192.168.10.255
        inet6 fe80::20a2:775c:35f5:3188  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:93:42:ca  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 65  bytes 9016 (8.8 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Attach 3 disks of 5GB each & create 2 LVMs from these disks of 7GB (/lvm1) and 8GB (/lvm2) with XFS and EXT4 file systems respectively and verify.

Add 3 disks of 5GB each from settings-



Run cmd ‘init 6’ to restart system-

Run cmd ‘lsblk’ to see attached disks-

```
[root@LNX-SVR-01 ~]# lsblk
NAME            MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda               8:0    0   30G  0 disk
├─sda1            8:1    0    1G  0 part /boot
└─sda2            8:2    0   29G  0 part
  ├─centos-root 253:0    0   26G  0 lvm  /
  └─centos-swap 253:1    0    3G  0 lvm  [SWAP]
sdb               8:16   0    5G  0 disk
sdc               8:32   0    5G  0 disk
sdd               8:48   0    5G  0 disk
sr0              11:0    1 1024M  0 rom
[root@LNX-SVR-01 ~]#
```

Run cmd ‘fdisk </dev/sd…>’ to create partion of disk-

```
[root@LNX-SVR-01 ~]# fdisk /dev/sdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0xfb18fe4d.

Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-10485759, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-10485759, default 10485759):
Using default value 10485759
Partition 1 of type Linux and of size 5 GiB is set

Command (m for help): t
Selected partition 1
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.

[root@LNX-SVR-01 ~]# fdisk /dev/sdc
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0xa3833b4c.

Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-10485759, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-10485759, default 10485759): +2G
Partition 1 of type Linux and of size 2 GiB is set
```

```
Command (m for help): t
Selected partition 1
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'

Command (m for help): n
Partition type:
   p   primary (1 primary, 0 extended, 3 free)
   e   extended
Select (default p):
Using default response p
Partition number (2-4, default 2):
First sector (4196352-10485759, default 4196352):
Using default value 4196352
Last sector, +sectors or +size{K,M,G} (4196352-10485759, default 10485759):
Using default value 10485759
Partition 2 of type Linux and of size 3 GiB is set

Command (m for help): t
Partition number (1,2, default 2): 8e
Partition number (1,2, default 2): 2
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'

Command (m for help): w
The partition table has been altered!
[root@LNX-SVR-01 ~]# fdisk /dev/sdd
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0xab8ece90.

Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-10485759, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-10485759, default 10485759):
Using default value 10485759
Partition 1 of type Linux and of size 5 GiB is set
```

```
Command (m for help): t
Selected partition 1
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@LNX-SVR-01 ~]# lsblk
NAME            MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda               8:0    0   30G  0 disk
├─sda1            8:1    0    1G  0 part /boot
└─sda2            8:2    0   29G  0 part
  ├─centos-root 253:0    0   26G  0 lvm  /
  └─centos-swap 253:1    0    3G  0 lvm  [SWAP]
sdb               8:16   0    5G  0 disk
└─sdb1            8:17   0    5G  0 part
sdc               8:32   0    5G  0 disk
├─sdc1            8:33   0    2G  0 part
└─sdc2            8:34   0    3G  0 part
sdd               8:48   0    5G  0 disk
└─sdd1            8:49   0    5G  0 part
sr0              11:0    1 1024M  0 rom
[root@LNX-SVR-01 ~]#
```

Run cmd ‘pvcreate’ to create Physical volumes -
Run cmd ‘vgcreate’ to create Volume groups-
Run cmd ‘lvcreate’ to create Logical volumes -

```
[root@LNX-SVR-01 ~]# pvcreate /dev/sdb1 /dev/sdc1 /dev/sdc2 /dev/sdd1
  Physical volume "/dev/sdb1" successfully created.
  Physical volume "/dev/sdc1" successfully created.
  Physical volume "/dev/sdc2" successfully created.
  Physical volume "/dev/sdd1" successfully created.
[root@LNX-SVR-01 ~]#
[root@LNX-SVR-01 ~]# vgcreate vg1 /dev/sdb1 /dev/sdc1
  Volume group "vg1" successfully created
[root@LNX-SVR-01 ~]# vgcreate vg2 /dev/sdc2 /dev/sdd1
  Volume group "vg2" successfully created
[root@LNX-SVR-01 ~]#
[root@LNX-SVR-01 ~]# lvcreate -l 100%FREE -n lv1 vg1
  Logical volume "lv1" created.
[root@LNX-SVR-01 ~]# lvcreate -l 100%FREE -n lv2 vg2
  Logical volume "lv2" created.
[root@LNX-SVR-01 ~]#
```

Add file systems to the Logical volumes-

```
[root@LNX-SVR-01 ~]# mkfs.xfs /dev/vg1/lv1
meta-data=/dev/vg1/lv1           isize=512    agcount=4, agsize=458240 blk
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=0, sparse=0
data     =                       bsize=4096   blocks=1832960, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0 ftype=1
log      =internal log           bsize=4096   blocks=2560, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
[root@LNX-SVR-01 ~]# mkfs.ext4 /dev/vg2/lv2
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
524288 inodes, 2095104 blocks
104755 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2145386496
64 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632
```

Make directories and mount the volumes to lvm-

```
[root@LNX-SVR-01 ~]# mkdir /lvm1
[root@LNX-SVR-01 ~]#
[root@LNX-SVR-01 ~]# vim /etc/fstab
[root@LNX-SVR-01 ~]# mount -a
[root@LNX-SVR-01 ~]# mount | grep /lvm1
/dev/mapper/vg1-lv1 on /lvm1 type xfs (rw,relatime,seclabel,attr2,inode64,
[root@LNX-SVR-01 ~]#
[root@LNX-SVR-01 ~]# mkdir /lvm2
[root@LNX-SVR-01 ~]# vim /etc/fstab
[root@LNX-SVR-01 ~]# mount -a
[root@LNX-SVR-01 ~]# mount | grep /lvm2
/dev/mapper/vg2-lv2 on /lvm2 type ext4 (rw,relatime,seclabel,data=ordered)
[root@LNX-SVR-01 ~]#
[root@LNX-SVR-01 ~]# df -h
Filesystem               Size  Used Avail Use% Mounted on
devtmpfs                 1.9G     0  1.9G   0% /dev
tmpfs                    1.9G     0  1.9G   0% /dev/shm
tmpfs                    1.9G   13M  1.9G   1% /run
tmpfs                    1.9G     0  1.9G   0% /sys/fs/cgroup
/dev/mapper/centos-root   26G  4.8G   22G  19% /
/dev/sda1               1014M  185M  830M  19% /boot
tmpfs                    378M   36K  378M   1% /run/user/0
/dev/mapper/vg1-lv1      7.0G   33M  7.0G   1% /lvm1
/dev/mapper/vg2-lv2      7.8G   36M  7.3G   1% /lvm2
```

Install the following RPM packages using the package manager of your choice using single command.

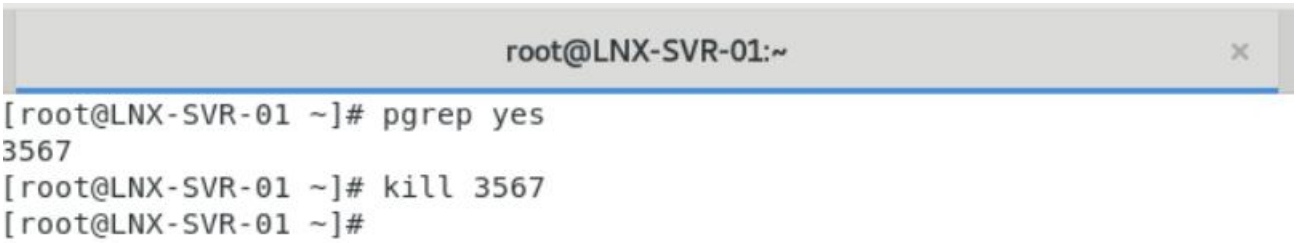
- VSFTPD
- PHP
- System-Config-Kickstart
- finger.

```
[root@LNX-SVR-01 Packages]# yum install -y --nodeps vsftpd-3.0.2-28.el7.x8
oarch.rpm finger-0.17-52.el7.x86_64.rpm
Loaded plugins: fastestmirror, langpacks
Examining vsftpd-3.0.2-28.el7.x86_64.rpm: vsftpd-3.0.2-28.el7.x86_64
Marking vsftpd-3.0.2-28.el7.x86_64.rpm to be installed
Examining php-5.4.16-48.el7.x86_64.rpm: php-5.4.16-48.el7.x86_64
Marking php-5.4.16-48.el7.x86_64.rpm to be installed
Examining system-config-kickstart-2.9.7-1.el7.noarch.rpm: system-config-ki
Marking system-config-kickstart-2.9.7-1.el7.noarch.rpm to be installed
Examining finger-0.17-52.el7.x86_64.rpm: finger-0.17-52.el7.x86_64
Marking finger-0.17-52.el7.x86_64.rpm to be installed
Resolving Dependencies
--> Running transaction check
---> Package finger.x86_64 0:0.17-52.el7 will be installed
---> Package php.x86_64 0:5.4.16-48.el7 will be installed
--> Processing Dependency: httpd-mmn = 20120211x8664 for package: php-5.4.
```

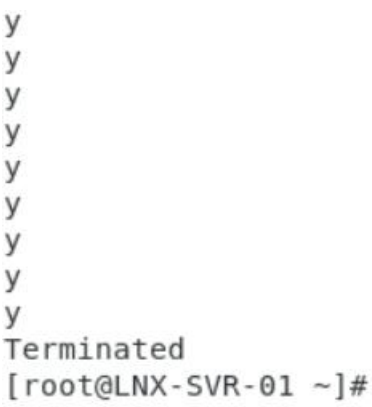
```
================================================================================
 Package                                Arch             Version
================================================================================
Installing:
 finger                                 x86_64           0.17-52.el7
 php                                    x86_64           5.4.16-48.el7
 system-config-kickstart                noarch           2.9.7-1.el7
 vsftpd                                 x86_64           3.0.2-28.el7
```

Use appropriate commands to start and kill the ‘yes’ process and verify

Process 1-
Run process ‘yes’ in second tab and type following commands in tab 1-

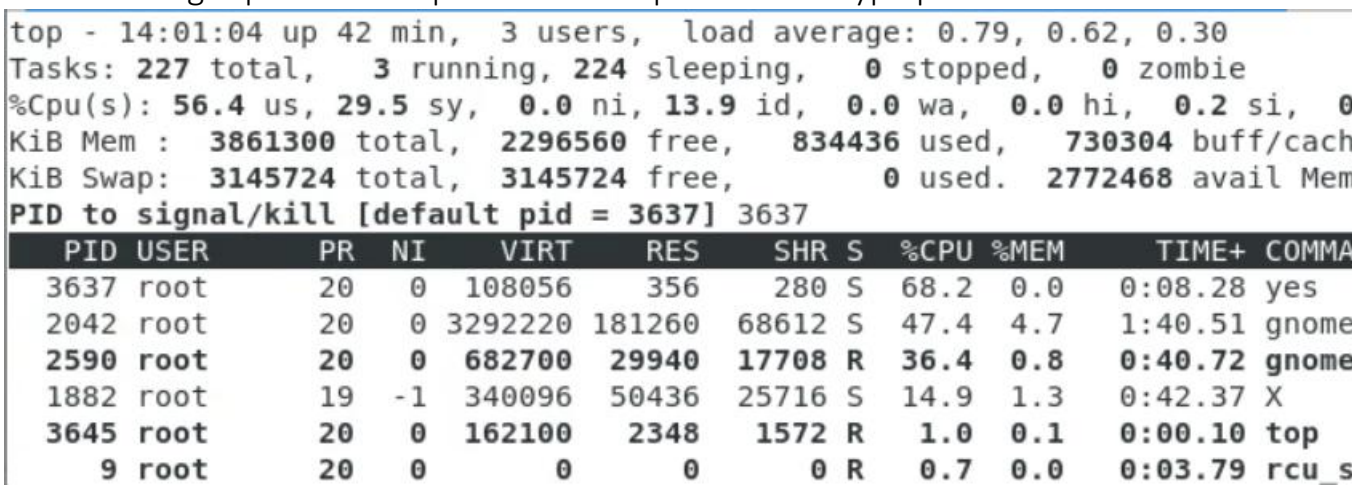


Check in tab 2 the process gets killed/terminated-



Process 2-
Run process ‘yes’ in second tab and type following commands in tab 1-

After running top command press ‘k’ to kill process and type process id-



Check in tab 2 the process gets killed/terminated-

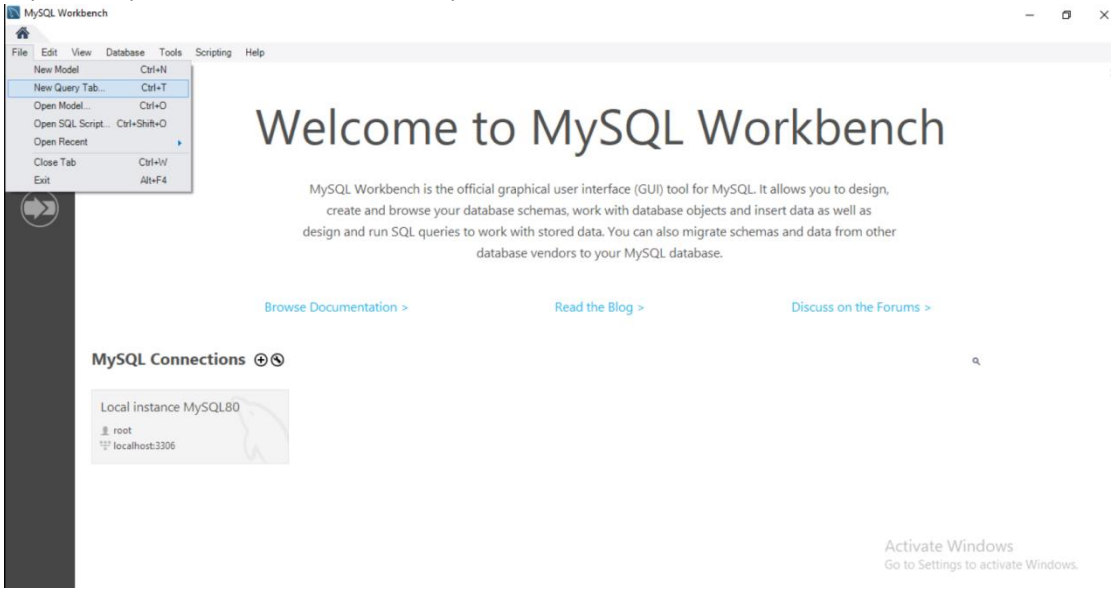
Project Task- 6

Objective:

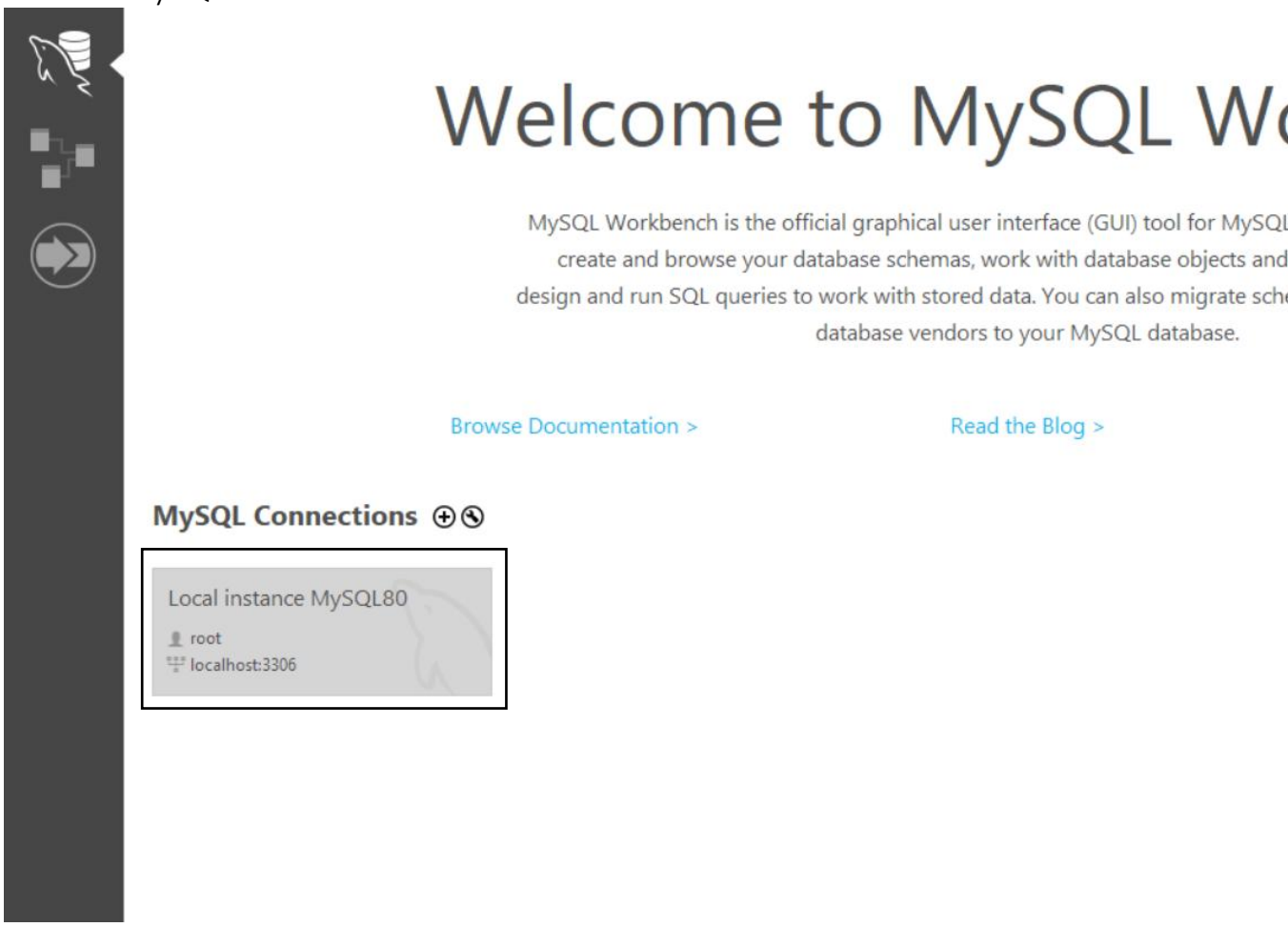
Use MySQL workbench and create an employee database. Create a table empdetails (emp_id, Name, Age, Salary, Position). Create another table emplocation (emp_id, location). Create primary key & foreign key in the tables accordingly and perform CRUD operation on the table. Use joins to display “emp_id, Name, Age, Salary, location” using primary key & foreign key concept

Solution-

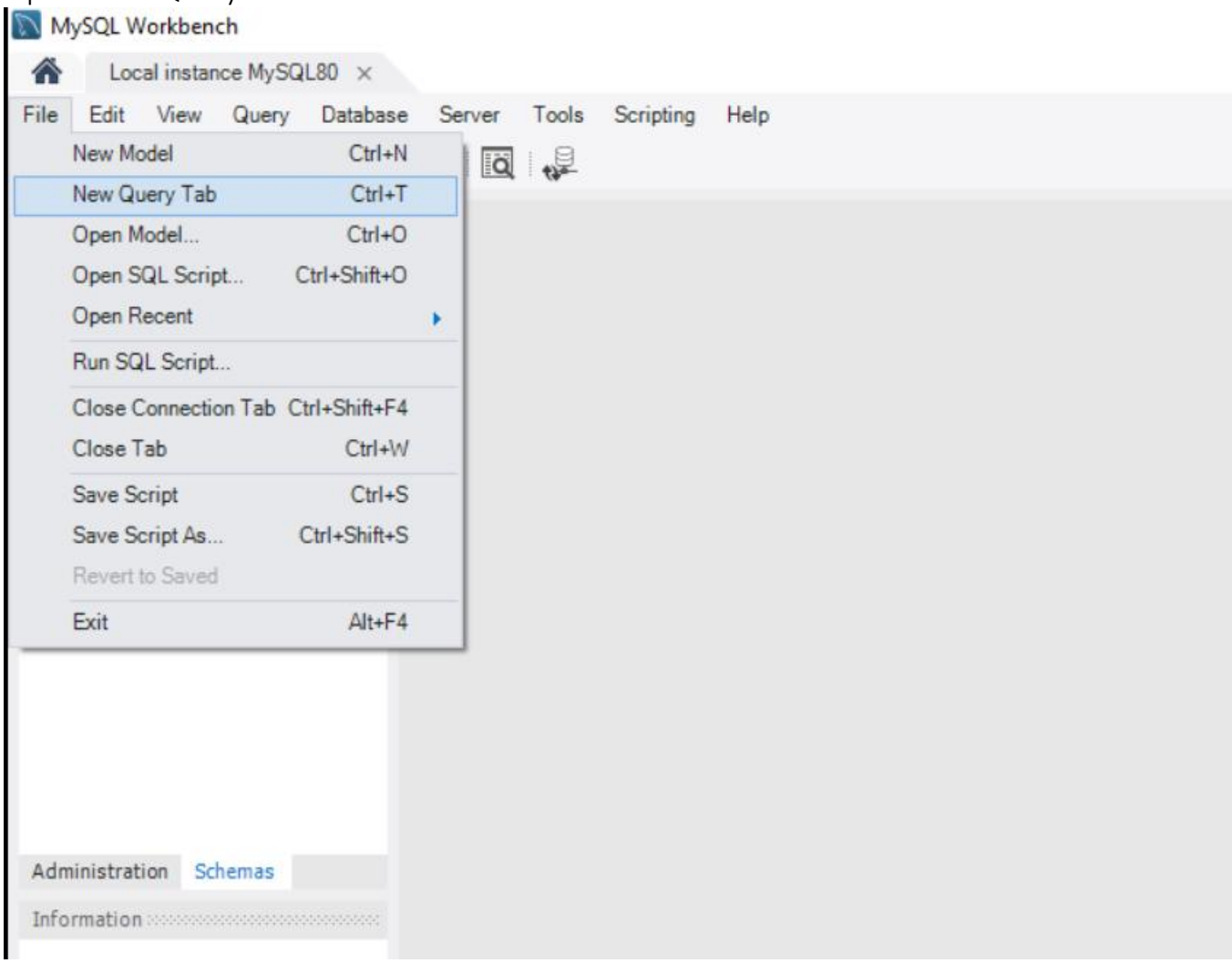
Open MySQL workbench setup.



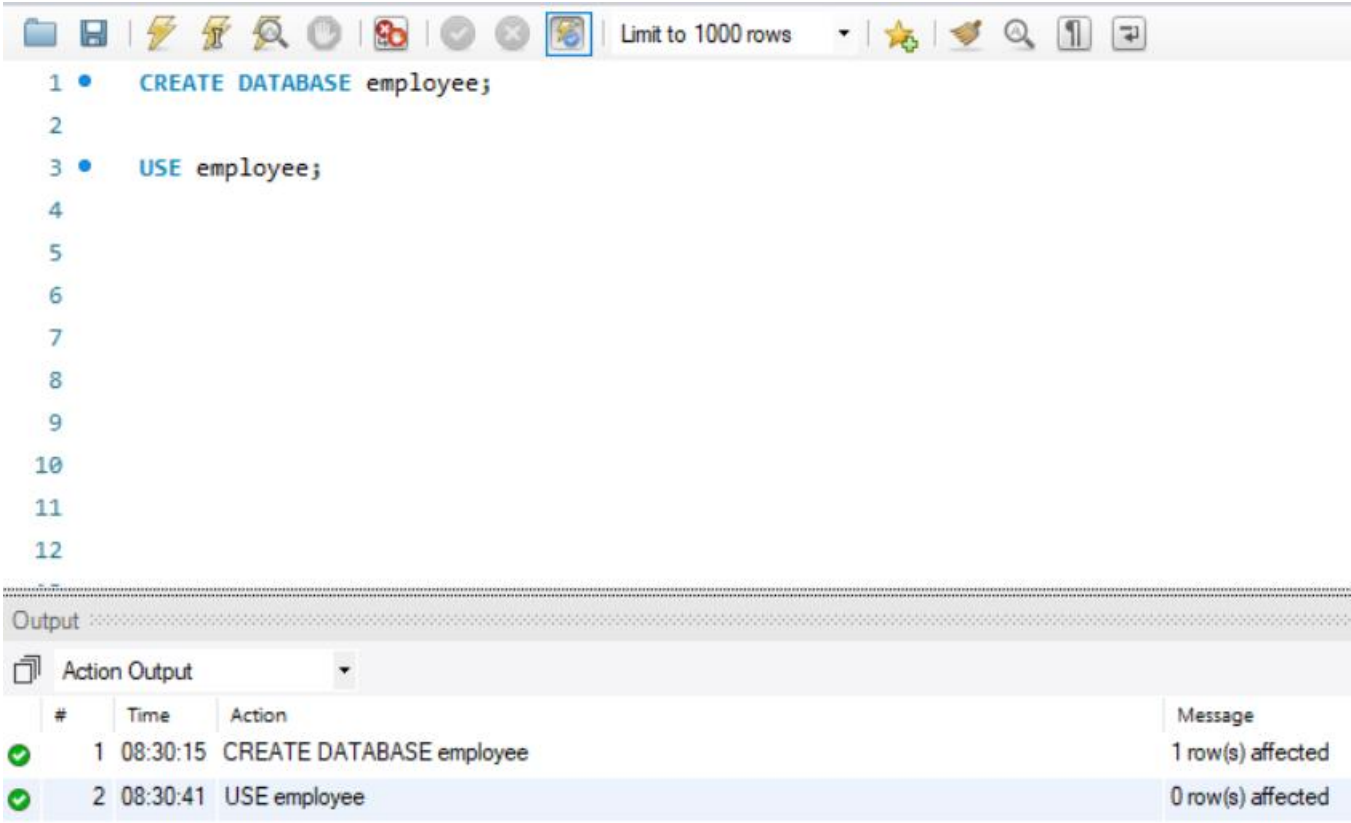
Click on MySQL Connections



Open New Query Tab-

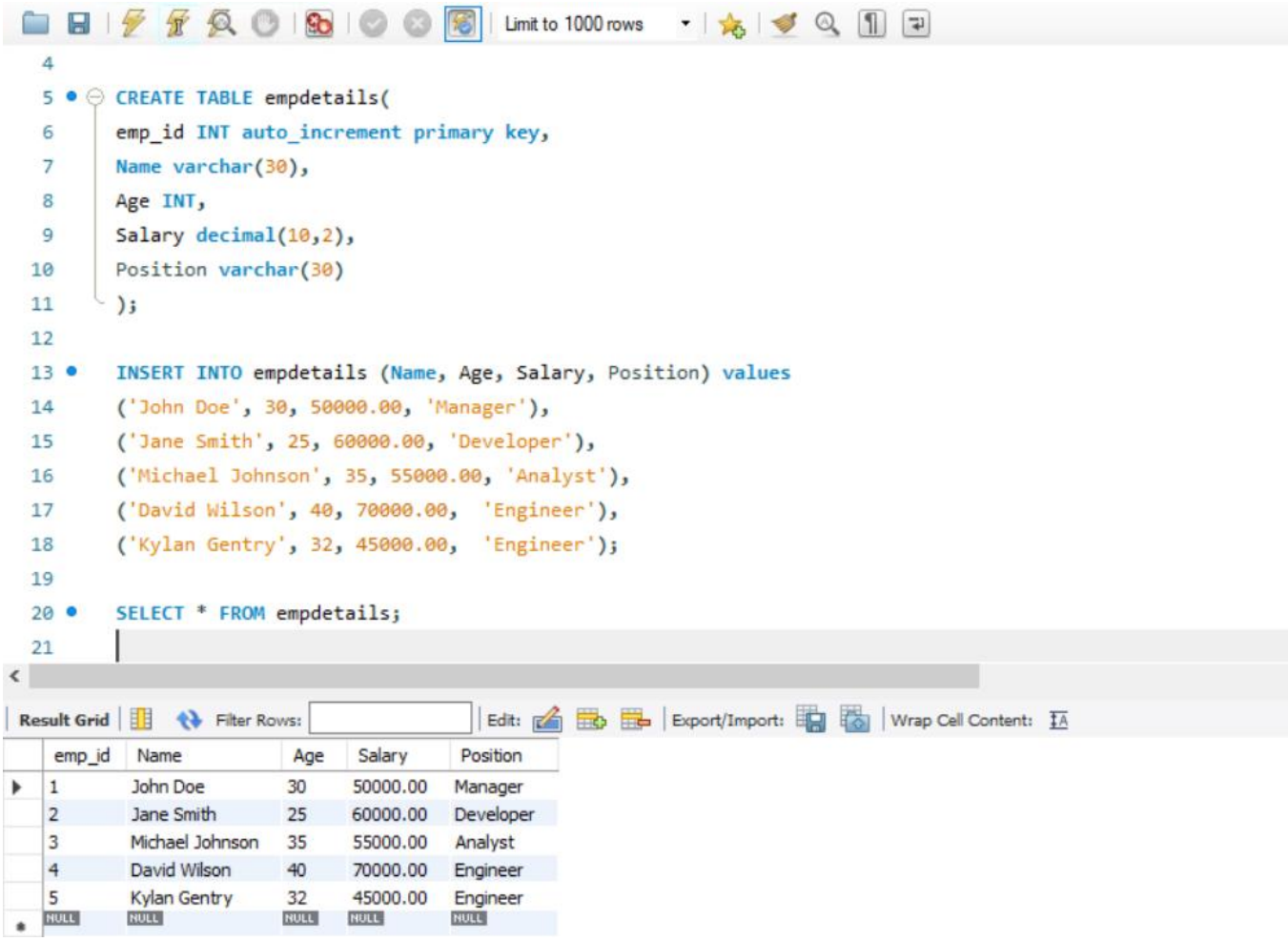


Create a database ‘employee’-



.

Create a table ‘empdetails’ & insert data

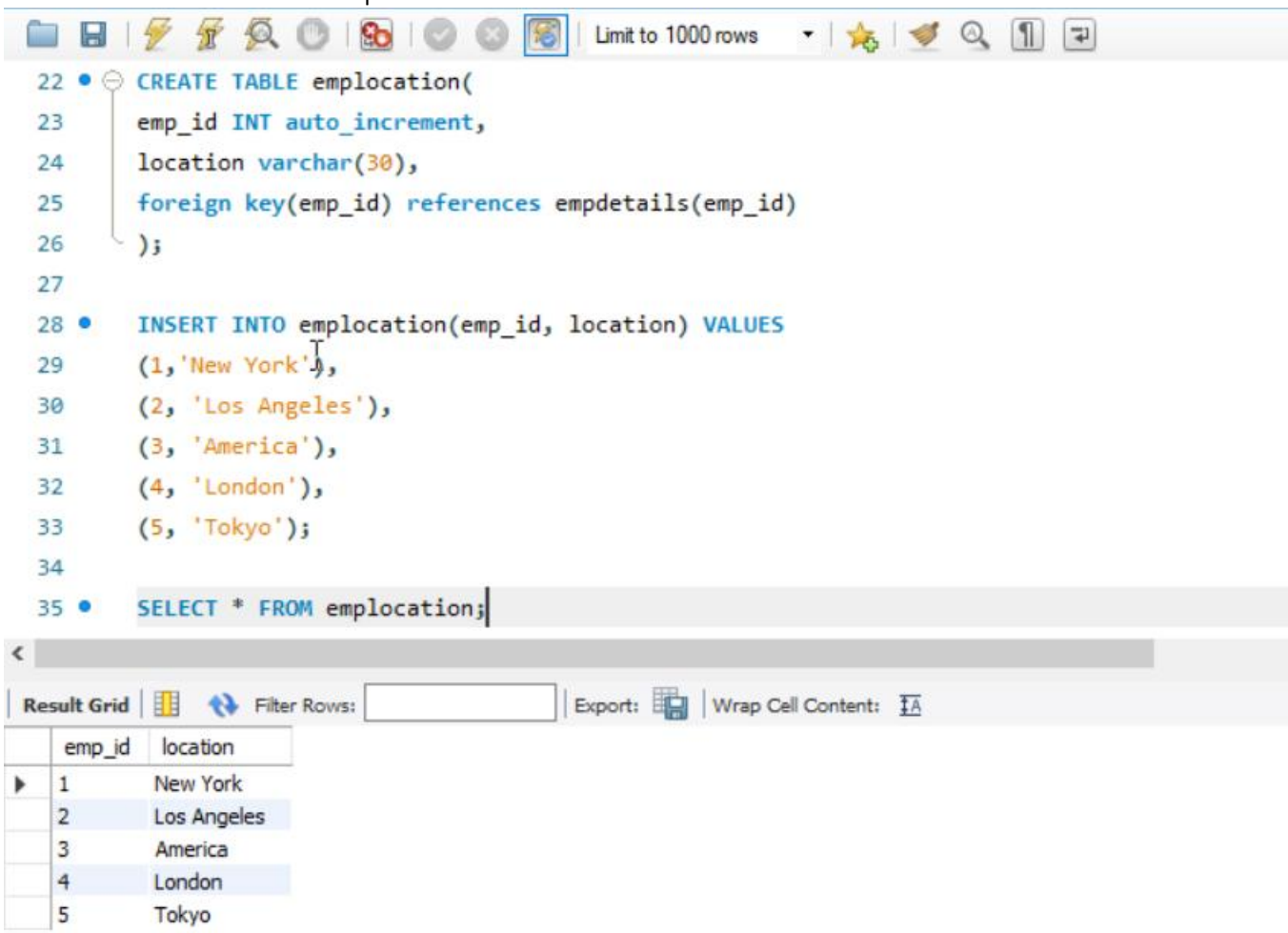


```
4
5  CREATE TABLE empdetails(
6  emp_id INT auto_increment primary key,
7  Name varchar(30),
8  Age INT,
9  Salary decimal(10,2),
10 Position varchar(30)
11 );
12
13 INSERT INTO empdetails (Name, Age, Salary, Position) values
14 ('John Doe', 30, 50000.00, 'Manager'),
15 ('Jane Smith', 25, 60000.00, 'Developer'),
16 ('Michael Johnson', 35, 55000.00, 'Analyst'),
17 ('David Wilson', 40, 70000.00,  'Engineer'),
18 ('Kylan Gentry', 32, 45000.00,  'Engineer');
19
20 SELECT * FROM empdetails;
21
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

emp_id	Name	Age	Salary	Position
1	John Doe	30	50000.00	Manager
2	Jane Smith	25	60000.00	Developer
3	Michael Johnson	35	55000.00	Analyst
4	David Wilson	40	70000.00	Engineer
5	Kylan Gentry	32	45000.00	Engineer
NULL	NULL	NULL	NULL	NULL

Create another table ‘emplocation’ & insert data



```
22  CREATE TABLE emplocation(
23  emp_id INT auto_increment,
24  location varchar(30),
25  foreign key(emp_id) references empdetails(emp_id)
26  );
27
28  INSERT INTO emplocation(emp_id, location) VALUES
29  (1,'New York'),
30  (2, 'Los Angeles'),
31  (3, 'America'),
32  (4, 'London'),
33  (5, 'Tokyo');
34
35  SELECT * FROM emplocation;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

emp_id	location
1	New York
2	Los Angeles
3	America
4	London
5	Tokyo

Updating data in empdetails

```
37 •  UPDATE empdetails
38    SET Salary = 550000.00
39    WHERE emp_id = 4;
40
41 •  SELECT * FROM empdetails;
42
43
44
45
46
47
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

emp_id	Name	Age	Salary	Position
1	John Doe	30	50000.00	Manager
2	Jane Smith	25	60000.00	Developer
3	Michael Johnson	35	55000.00	Analyst
4	David Wilson	40	550000.00	Engineer
5	Kylan Gentry	32	45000.00	Engineer
NULL	NULL	NULL	NULL	NULL

Deleting data in emplocation

```
42
43 •  DELETE FROM emplocation
44    WHERE emp_id = 5 ;
45
46 •  SELECT * FROM emplocation;
47
48
49
50
51
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

emp_id	location
1	New York
2	Los Angeles
3	America
4	London

Reading data using inner join to display (emp_id, Name, Age, Salary, location) as a single output

```
47
48 •  select e.emp_id,e.Name,e.Age,e.Salary,emplocation.location from empdetails e
49    inner join emplocation on e.emp_id=emplocation.emp_id;
50
51
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

emp_id	Name	Age	Salary	location
1	John Doe	30	50000.00	New York
2	Jane Smith	25	60000.00	Los Angeles
3	Michael Johnson	35	55000.00	America
4	David Wilson	40	550000.00	London

THANK YOU