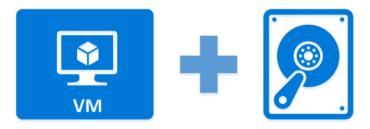
Lab: Working with Azure Managed Disks

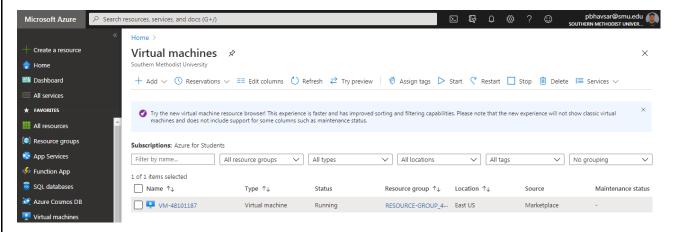
In the previous Lab, we have seen how to configure Resource Groups along with the Virtual Networks, Subnets, Security Groups. We then deployed a Azure Virtual Machine (HTTP Web Server).

In this Lab, we'll focus on how to add additional Azure Managed Disks to an existing Virtual Machine (VM), Azure Managed Disk Snapshots and Restore processes.

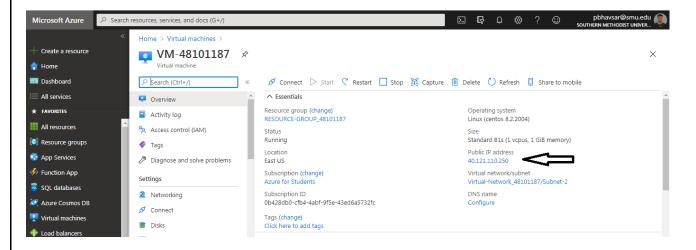


Task 1: Inspect the Azure Environment.

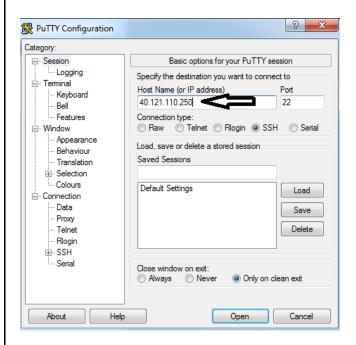
Below is the Virtual Machine (Web Server) which we deployed in the previous Lab.



Copy the Public IP of the Virtual Machine (VM).



Open the PuTTY and Paste the Public IP of the Virtual Machine.



Login into the Linux Virtual Machine with your Credentials.

```
azureuser@VM-48101187:~

login as: azureuser
azureuser@40.121.110.250's password:
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Fri Sep 25 06:07:24 2020 from 70.123.107.76

[azureuser@VM-48101187 ~]$

[azureuser@VM-48101187 ~]$
```

Run the below command to list mounted Disks and Mount Points.

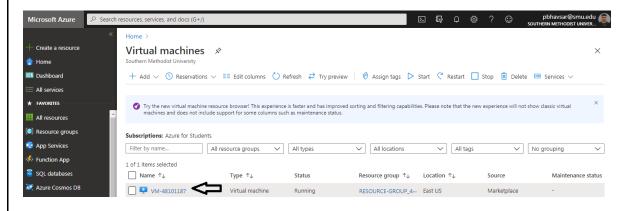
Command: df -h

```
[azureuser@VM-48101187 ~]$ df -h
Filesystem
                Size Used Avail Use% Mounted on
               429M
                        0
                           429M
                                  0% /dev
devtmpfs
                        0
tmpfs
               445M
                           445M
                                  0% /dev/shm
                                  2% /run
               445M
                     6.2M
                           439M
tmpfs
                        0
                                  0% /sys/fs/cgroup
tmpfs
               445M
                           445M
                            29G
                31G 1.8G
                                  6% /
/dev/sda2
                      72M
/dev/sda1
               496M
                           424M 15% /boot
/dev/sda15
               495M 6.8M
                           488M
                                  2% /boot/efi
/dev/sdb1
               3.9G
                      16M
                          3.7G
                                  1% /mnt/resource
                89M
                         0
                             89M
                                  0% /run/user/1000
tmpfs
[azureuser@VM-48101187 ~]$
```

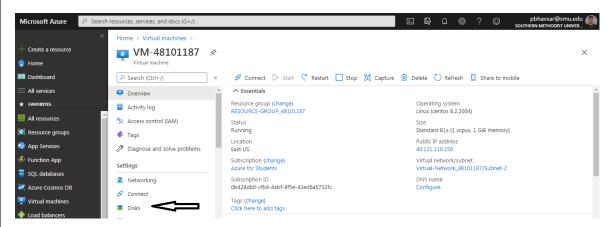
Task 2: Create a New Azure Managed Disk and Attach it to the Virtual Machine.

Let's add a new Azure Managed Disk to the existing Virtual Machine.

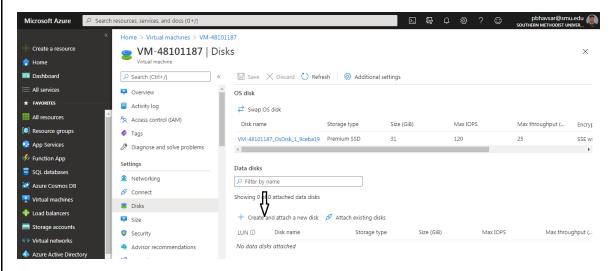
Navigate to the "Virtual Machine" Service and click on the Virtual Machine which you deployed earlier.



Click on Disks.



Click on Create and Attach a new Disk.

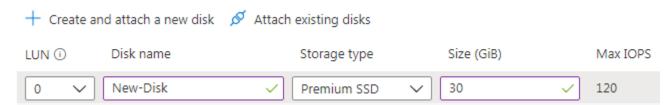


Specify the below Information.

• **Disk Name:** New-Disk

• Storage Type: Premium SSD

Size (GiB): 30



Click on Save.

Step 3: Create and Configure Your File System

Run the below command again to list mounted Disks and Mount Points. Newly attached Disk is not listed yet. **Command:** df -h

```
[azureuser@VM-48101187 ~]$ df -h
Filesystem
               Size Used Avail Use% Mounted on
               429M
                           429M
                                 0% /dev
devtmpfs
                        0
                           445M
                                 0% /dev/shm
               445M
                        0
tmpfs
               445M
                     6.2M 439M
                                 2% /run
tmpfs
tmpfs
               445M
                        0
                           445M
                                 0% /sys/fs/cgroup
/dev/sda2
               31G 1.8G
                           29G
                                 6% /
/dev/sda1
               496M 72M 424M 15% /boot
/dev/sda15
              495M 6.8M 488M
                                2% /boot/efi
/dev/sdb1
               3.9G
                     16M 3.7G
                                 1% /mnt/resource
                                 0% /run/user/1000
tmpfs
                89M
                        0
                           89M
[azureuser@VM-48101187 ~]$
```

Run the below command to list the attached Disk.

```
[azureuser@VM-48101187 ~]$ dmesg | grep SCSI
[ 0.282262] SCSI subsystem initialized
[ 1.202525] Block layer SCSI generic (bsg) driver version 0.4 loaded
46)
[ 15.563377] sd 1:0:1:0: [sdb] Attached SCSI disk
[ 15.650505] sd 0:0:0:0: [sda] Attached SCSI disk
[601741.629520] sd 3:0:0:0: [sdc] Attached SCSI disk
[azureuser@VM-48101187 ~]$
```

Let's create Disk label, Partition Table with the "fdisk" utility. **Command:** sudo fdisk /dev/sdc and "p" and "w"

```
azureuser@VM-48101187:~
[azureuser@VM-48101187 ~]$ sudo fdisk /dev/sdc
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.
Created a new DOS disklabel with disk identifier 0xa9ea268b.
Command (m for help): p
Disk /dev/sdc: 30 GiB, 32212254720 bytes, 62914560 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disklabel type: dos
Disk identifier: 0xa9ea268b
Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
[azureuser@VM-48101187 ~]$
```

Run the below command to configure "ext4" file system on the new Disk. **Command:** sudo mkfs -t ext4 /dev/sdc

```
azureuser@VM-48101187:~
[azureuser@VM-48101187 ~]$ sudo mkfs -t ext4 /dev/sdc .
mke2fs 1.45.4 (23-Sep-2019)
Found a dos partition table in /dev/sdc
Proceed anyway? (y,N) y
Discarding device blocks: done
Creating filesystem with 7864320 4k blocks and 1966080 inodes
Filesystem UUID: 3b13c1fc-752f-4a99-a10e-6572351ae4ce
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000
Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
[azureuser@VM-48101187 ~]$
```

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Now create a New Directory (New-Disk).

Command: sudo mkdir /New-Disk

```
azureuser@VM-48101187:~

[azureuser@VM-48101187 ~]$ sudo mkdir /New-Disk

[azureuser@VM-48101187 ~]$
```

Mount the new Disk on the newly created Directory.

Command: sudo mount /dev/sdc /New-Disk

```
azureuser@VM-48101187:~

[azureuser@VM-48101187 ~]$ sudo mount /dev/sdc /New-Disk/
[azureuser@VM-48101187 ~]$
```

Run the below command again to list mounted Disks and Mount Points. Newly attached Disk is now listed. **Command:** df -h

```
azureuser@VM-48101187:~
[azureuser@VM-48101187 ~]$ df -h
              Size Used Avail Use% Mounted on
devtmpfs
              429M
                      0
                        429M
                               0% /dev
tmpfs
              445M
                     0 445M
                               0% /dev/shm
              445M 6.2M 439M
                               2% /run
tmpfs
tmpfs
              445M 0 445M
                               0% /sys/fs/cgroup
/dev/sda2
              31G 1.8G
                        29G
                               6% /
/dev/sda1
              496M 72M 424M 15% /boot
/dev/sda15
              495M 6.8M 488M 2% /boot/efi
/dev/sdb1
              3.9G 16M 3.7G 1% /mnt/resource
tmpfs
              89M
                    0 89M 0% /run/user/1000
/dev/sdc
               30G
                    45M
                          28G
                               1% /New-Disk <
[azureuser@VM-48101187 ~]$
```

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To configure the Linux VM to mount this Disk whenever the Virtual Machine (VM) is started, you will need to add a line to /etc/fstab.

Command: echo "/dev/sdC /New-Disk ext4 defaults,noatime 1 2" | sudo tee -a /etc/fstab

Command: cat /etc/fstab

Change the Directory to newly created Directory and create a blank file (SMU SMUID).

Command: cd /New-Disk/

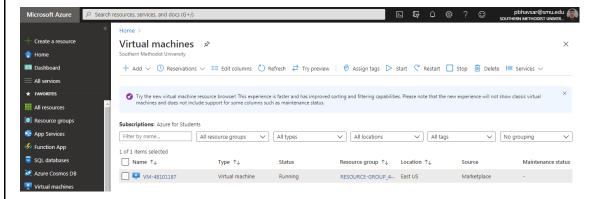
Command: sudo touch SMU SMUID

```
[azureuser@VM-48101187:/New-Disk] $ cd /New-Disk/
[azureuser@VM-48101187 New-Disk] $ sudo touch SMU_48101187
[azureuser@VM-48101187 New-Disk] $ ls

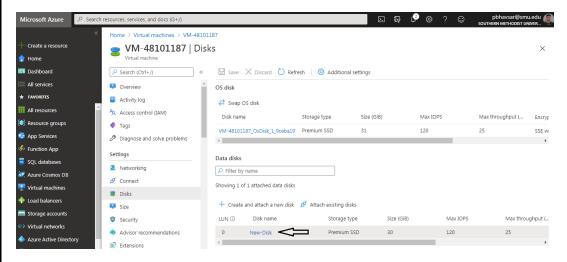
lost+found SMU_48101187
[azureuser@VM-48101187 New-Disk] $ |
```

Task 3: Create an Azure Managed Disk Snapshot.

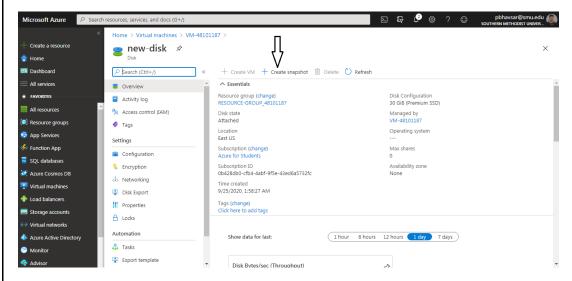
Now navigate to Azure Portal, click on your Virtual Machine (VM).



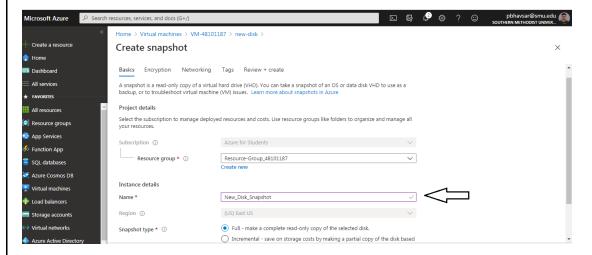
Click on New Disk which you just created.



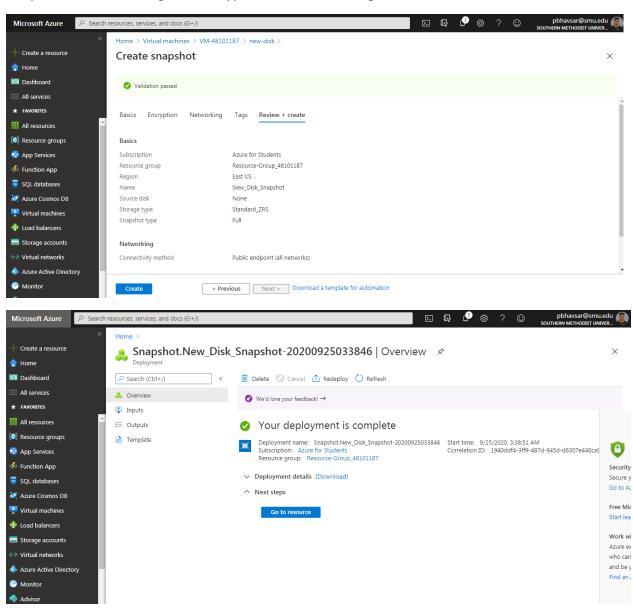
Click on "Create Snapshot".



Give the Snapshot Name.

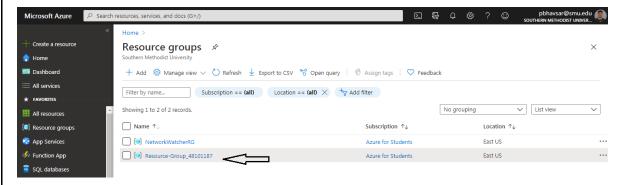


Keep the Default Settings for Encryption and Networking. Click on Create.

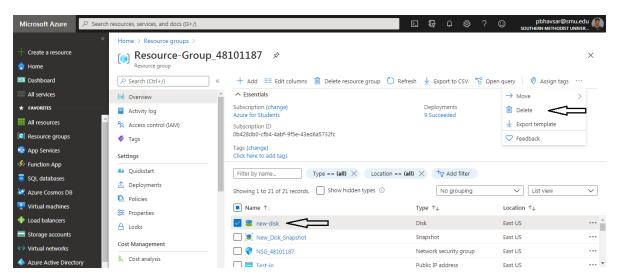


Task 4: Create Failover Scenarios.

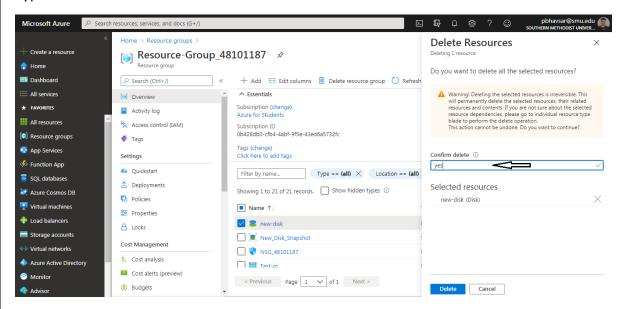
Now go to Resource Groups and select your Resource Group.



Select the Disk which we attached to the Virtual Machine earlier and click on Delete.



Type "Yes" to Confirm and Delete the Disk.

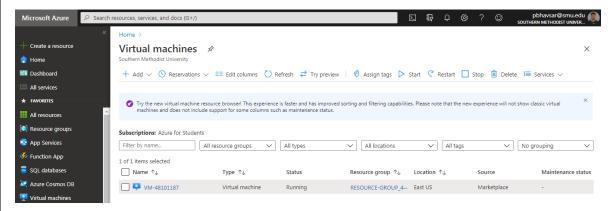


You'll get the ERROR Message as below.

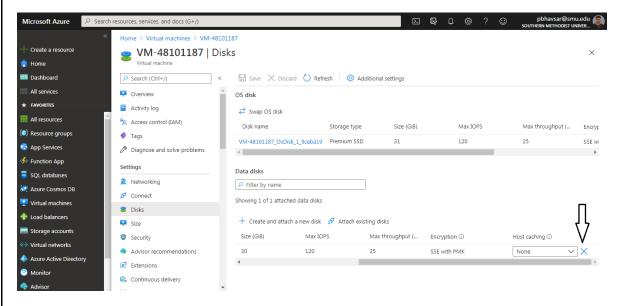


The reason for this Error is that the data disk "New_Disk" is still attached to the Virtual Machine.

Navigate to Virtual Machine Service and select Virtual Machine (VM).



Select the data disk "New_Disk" and click on "X" and Click on Save.



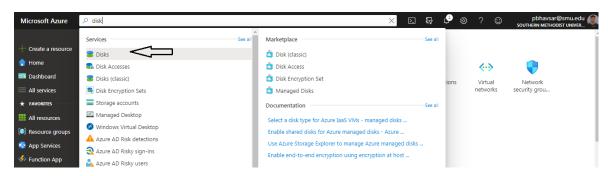
Now, on the Virtual Machine, you won't see the mounted Disks and Mount Point.

```
_ D X
azureuser@VM-48101187:~
login as: azureuser
azureuser@52.255.174.201's password:
Activate the web console with: systemctl enable --now cockpit.socket
Last login: Fri Sep 25 08:54:59 2020 from 70.123.107.76
[azureuser@VM-48101187 ~]$
[azureuser@VM-48101187 ~]$
[azureuser@VM-48101187 ~]$ df -h
               Size Used Avail Use% Mounted on
Filesystem
               429M
devtmpfs
                      0 429M
                                  0% /dev
                                  0% /dev/shm
               445M
                           445M
tmpfs
                                  2% /run
               445M 6.2M
                           439M
tmpfs
tmpfs
               445M
                           445M
                                  0% /sys/fs/cgroup
/dev/sda2
                31G
                     1.8G
                             29G
                                   6% /
                                  15% /boot
dev/sda1
               496M
                            424M
/dev/sda15
               495M
                            488M
                                  2% /boot/efi
                     6.8M
                                   1% /mnt/resource
/dev/sdb1
               3.9G
                      16M
                           3.7G
                89M
                             89M
                                  0% /run/user/1000
tmpfs
[azureuser@VM-48101187 ~]$
```

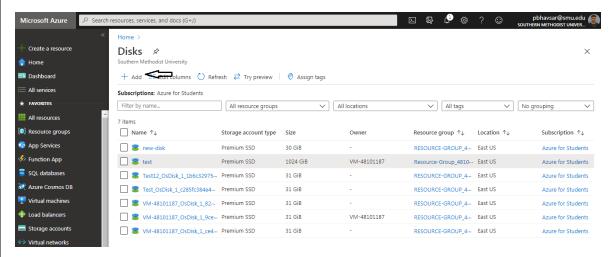
Task 5: Restore from the Azure Managed Disk Snapshot.

Time to restore the Initial Disk (New Disk) from the Azure Managed Disk Snapshot.

Search for "Disks" in Search window.



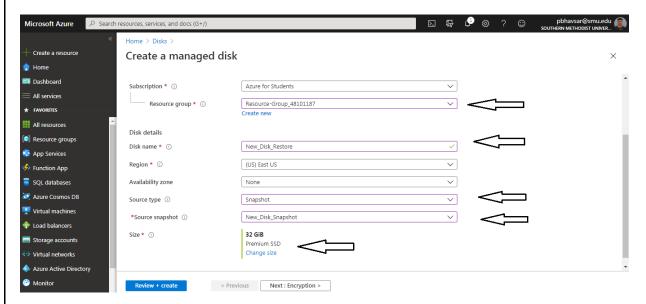
Click on "Add"



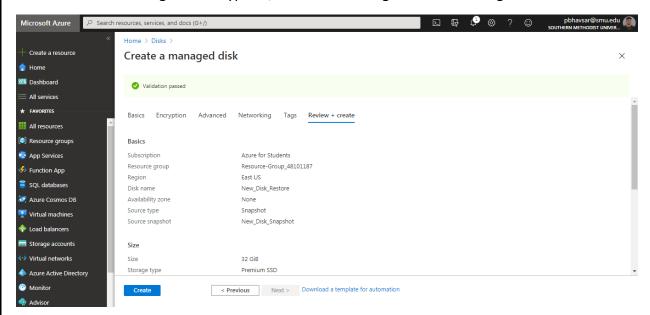
Select your Resource Group and Specify the Disk Name.

Select the Source Type as "Snapshot" and under "Source Snapshot" select the Snapshot which we've taken in the previous **Step-3**.

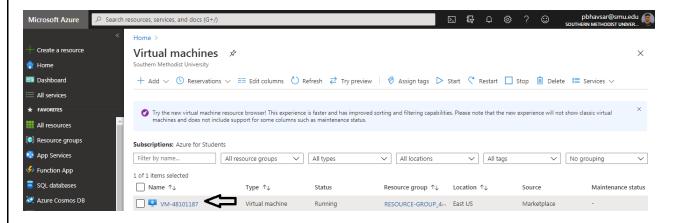
Set the Disk Size to 32 GB as Initial Disk Size was 30 GB.



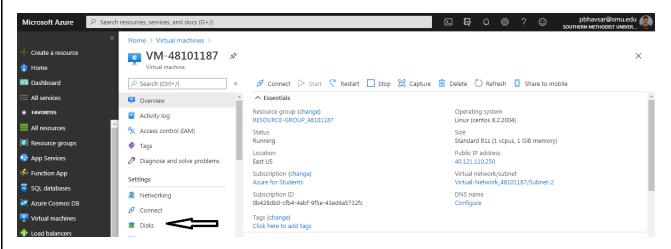
Use the Default Settings for Encryption, Advanced Settings and Networking. Click on Create.



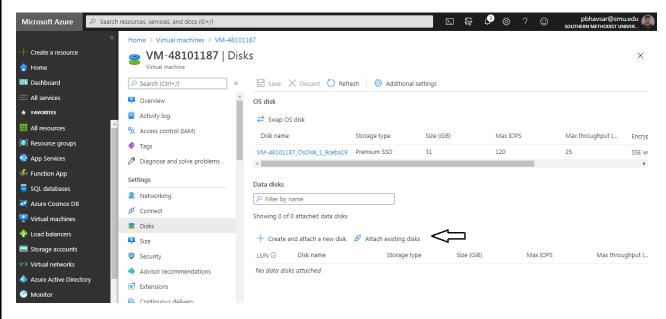
Navigate to the "Virtual Machine" Service and click on the Virtual Machine which you deployed earlier.



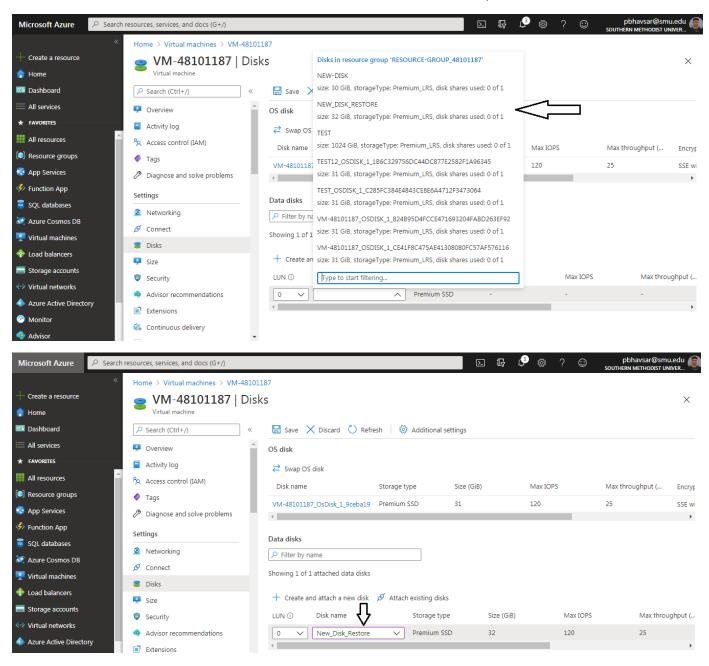
Click on Disks.



Click on Attach Existing Disks.



Under the Disk Name select the Disk which we created from the Disk Snapshot.



Once done click on Save.

Come back to VM's PuTTY Session.

Run the below command again to list mounted Disks and Mount Points. New Disk is not listed yet.

Command: df -h

```
[azureuser@VM-48101187 ~]$ df -h
Filesystem
             Size Used Avail Use% Mounted on
devtmpfs
              429M
                    0 429M 0% /dev
              445M 0
                        445M 0% /dev/shm
tmpfs
                              2% /run
              445M 6.2M 439M
tmpfs
              445M
                     0 445M 0% /sys/fs/cgroup
tmpfs
/dev/sda2
              31G 1.8G 29G
                              6% /
/dev/sda1
             496M 72M 424M 15% /boot
/dev/sda15
                              2% /boot/efi
             495M 6.8M 488M
             3.9G 16M 3.7G 1% /mnt/resource
/dev/sdb1
                   0 89M
                              0% /run/user/1000
tmpfs
              89M
[azureuser@VM-48101187 ~]$
```

Run the below command to list the attached Disk.

```
[azureuser@VM-48101187:~

[azureuser@VM-48101187 ~]$ dmesg | grep SCSI

[ 0.282262] SCSI subsystem initialized

[ 1.202525] Block layer SCSI generic (bsg) driver version 0.4 loaded

46)

[ 15.563377] sd 1:0:1:0: [sdb] Attached SCSI disk

[ 15.650505] sd 0:0:0:0: [sda] Attached SCSI disk

[601741.629520] sd 3:0:0:0: [sdc] Attached SCSI disk

[azureuser@VM-48101187 ~]$
```

Now create a New Directory for the data restore (New-Disk-Restore).

Command: sudo mkdir /New-Disk-Restore

```
azureuser@VM-48101187:~

[azureuser@VM-48101187 ~]$ sudo mkdir /New-Disk-Restore
[azureuser@VM-48101187 ~]$
```

Mount the new Disk on the restored Disk.

Command: sudo mount /dev/sdc /New-Disk-Restore

```
azureuser@VM-48101187;~

[azureuser@VM-48101187 ~]$ sudo mount /dev/sdc /New-Disk-Restore
```

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Change the Directory to "/New-Disk-Restore" and list the files inside it.

It should display the file (SMU_48101187) which we created on our Initial Disk.

```
azureuser@VM-48101187:/New-Disk-Restore

[azureuser@VM-48101187 ~]$ cd /New-Disk-Restore/
[azureuser@VM-48101187 New-Disk-Restore]$ ls

lost+found SMU_48101187

[azureuser@VM-48101187 New-Disk-Restore]$
```

Data has been successfully restored from the Azure Managed Disk's Snapshot.

---- END -----

For questions, contact on below information.

Email: pbhavsar@smu.edu