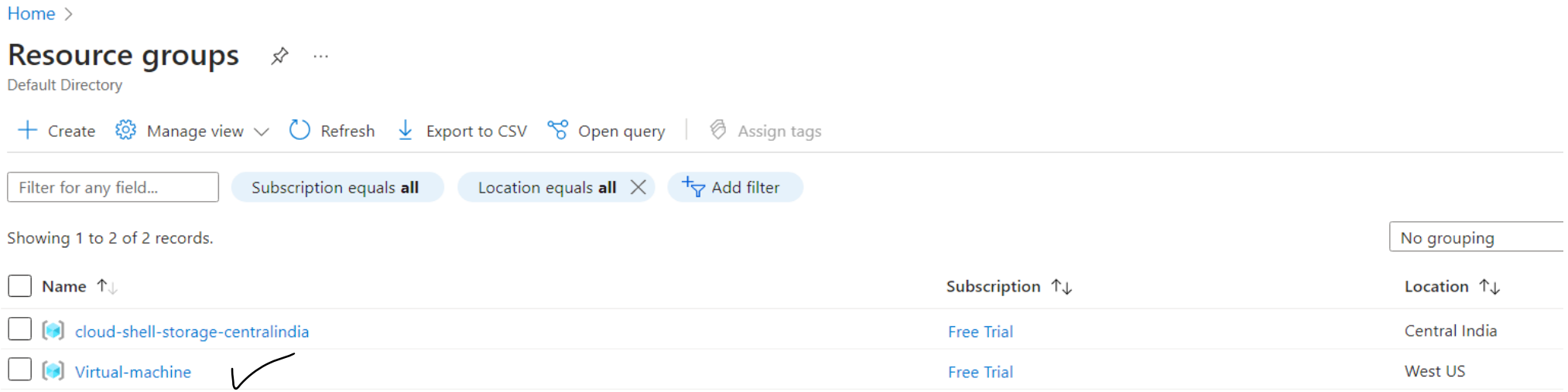
Assignment 1

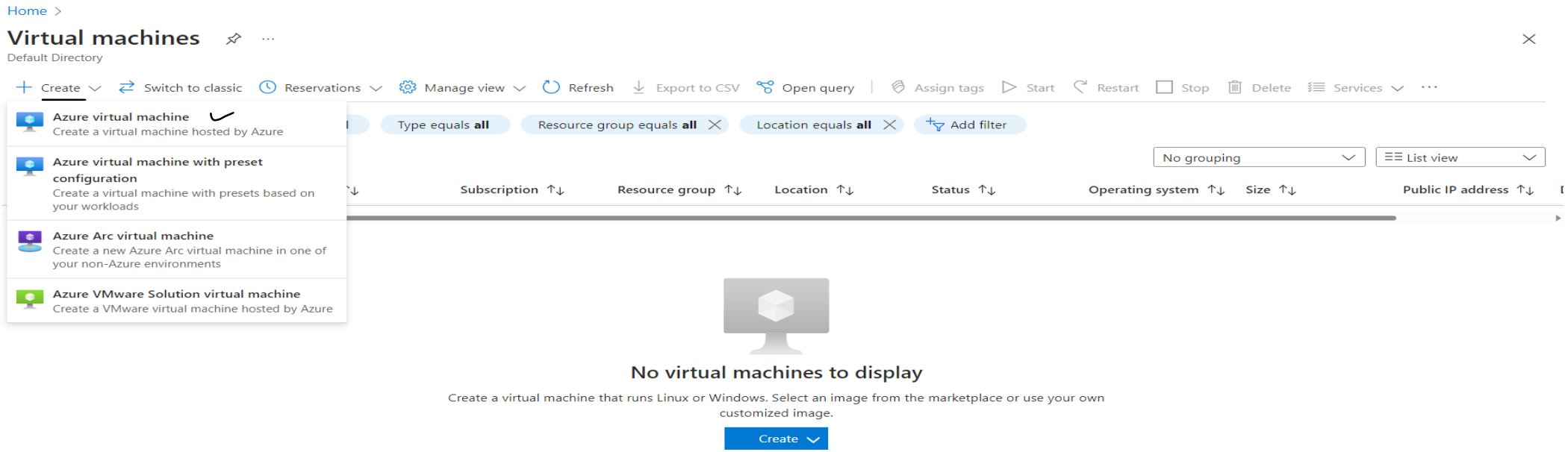
Tasks To Be Performed:

1. Create a VM in the west US region
2. Select the Ubuntu image for creating the VM
3. Open the SSH port
4. Connect to the Linux VM using the terminal

Resource group and virtual machine should be in same region.



Search for virtual machine- create – Azure virtual machines.



Home > Virtual machines >

Create a virtual machine ...

Basics | Disks | Networking | Management | Monitoring | Advanced | Tags | Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. Learn more

This subscription may not be eligible to deploy VMs of certain sizes in certain regions.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Free Trial

Resource group * : new-vm

Create new

Instance details

Virtual machine name * : Linux-vm

Region * : (US) West US

Availability options : No infrastructure redundancy required

Security type : Trusted launch virtual machines

Configure security features

Image * : Ubuntu Server 22.04 LTS - x64 Gen2 (free services eligible)

See all images | Configure VM generation

VM architecture : Arm64 / x64

Run with Azure Spot discount

You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. Learn more

Size * : Standard_B1s - 1 vcpu, 1 GiB memory (₹710.89/month) (free services eligible)

See all sizes

Enable Hibernation (preview)

To enable Hibernation, you must register your subscription. Learn more

Administrator account

Authentication type : SSH public key / Password

Username * : siddharth

Password * : ••••••••••••

Confirm password * : ••••••••••••

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * : None / Allow selected ports

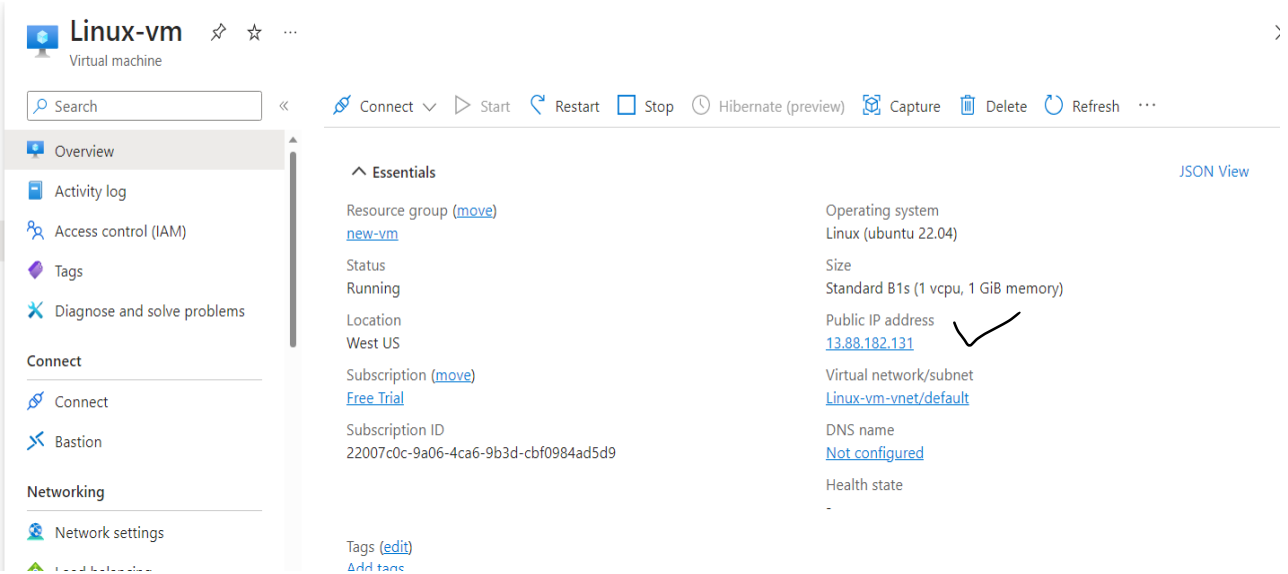
Select inbound ports * : SSH (22)

All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

Review + create | < Previous | Next : Disks >

Create any username and password to connect your virtual machine.
As of now we are not doing any advance settings.
Review and create

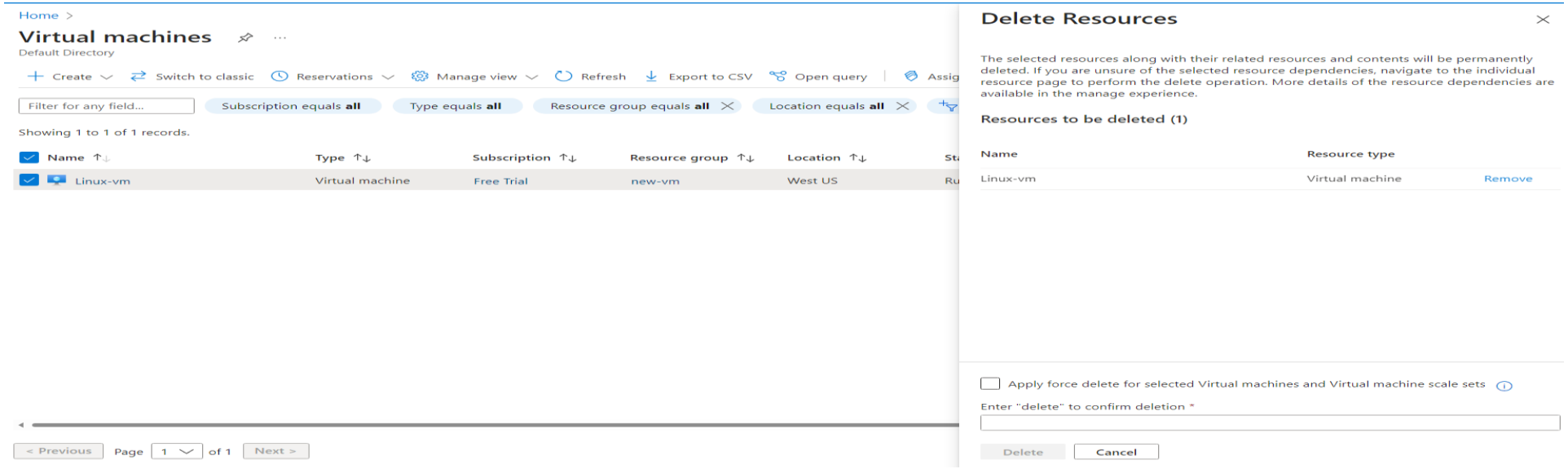
Move inside the VM copy the IP address.
ssh –V
username@ip address of the machine.

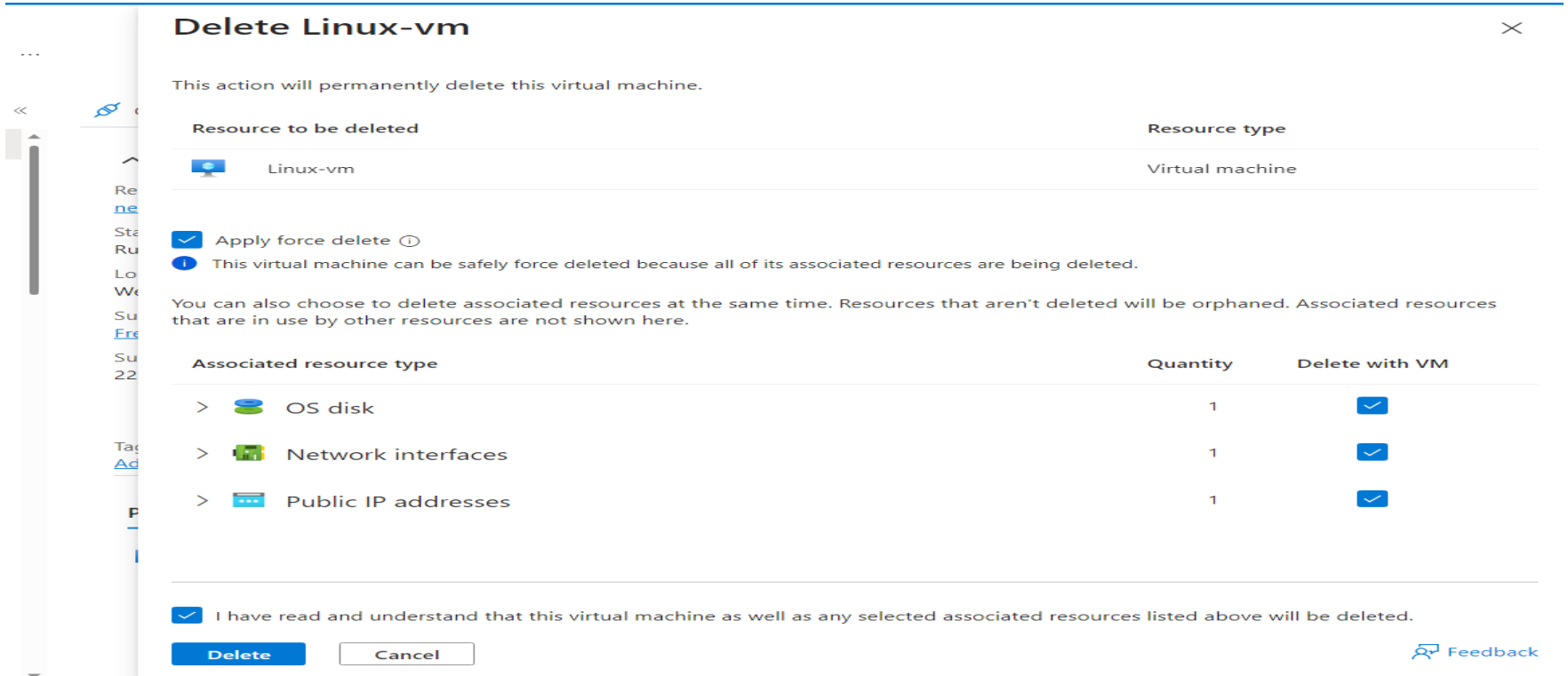


Open the command prompt in you windows and connect using these commands.

```
siddharth@Linux-vm: ~
Microsoft Windows [Version 10.0.19044.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\SHRUTI SHUKLA>ssh -V
OpenSSH_for_Windows_8.1p1, LibreSSL 3.0.2

C:\Users\SHRUTI SHUKLA>ssh siddharth@13.88.182.131
The authenticity of host '13.88.182.131 (13.88.182.131)' can't be established.
ECDSA key fingerprint is SHA256:CSAzIGpag9CjvRmmY/23jZsGnGdPUVc3dSM9KLwIKH0.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '13.88.182.131' (ECDSA) to the list of known hosts.
siddharth@13.88.182.131's password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 6.2.0-1018-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Tue Dec 26 15:39:40 UTC 2023

  System load:  0.16162109375     Processes:             105
  Usage of /:   5.1% of 28.89GB   Users logged in:       0
  Memory usage: 32%               IPv4 address for eth0: 10.0.0.4
  Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

siddharth@Linux-vm:~$
```

There is two deletion method of VM – Always use the force delete.





Assignment 2

Tasks To Be Performed:

1. Create a Windows VM in west US region
2. Open the RDP port
3. Connect to it using Windows Remote Desktop

Home > Virtual machines >

Create a virtual machine ...

Basics | Disks | Networking | Management | Monitoring | Advanced | Tags | Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. Learn more

This subscription may not be eligible to deploy VMs of certain sizes in certain regions.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Free Trial

Resource group * : new-vm

Create new

Instance details

Virtual machine name * : windows-vm

Region * : (US) West US

Availability options : No infrastructure redundancy required

Security type : Trusted launch virtual machines

Configure security features

Image * : Windows Server 2022 Datacenter: Azure Edition - x64 Gen2 (free services el

See all images | Configure VM generation

VM architecture : Arm64 / x64

Arm64 is not supported with the selected image.

Run with Azure Spot discount

You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. Learn more

Size * : Standard_B1s - 1 vcpu, 1 GiB memory (₹940.21/month) (free services eligible)

See all sizes

Enable Hibernation (preview)

To enable Hibernation, you must register your subscription. Learn more

Administrator account

Username * : siddharth

Password * : ••••••••••••

Confirm password * : ••••••••••••

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * : None / Allow selected ports

Select inbound ports * : HTTP (80), RDP (3389)

All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

Review + create | < Previous | Next : Disks >

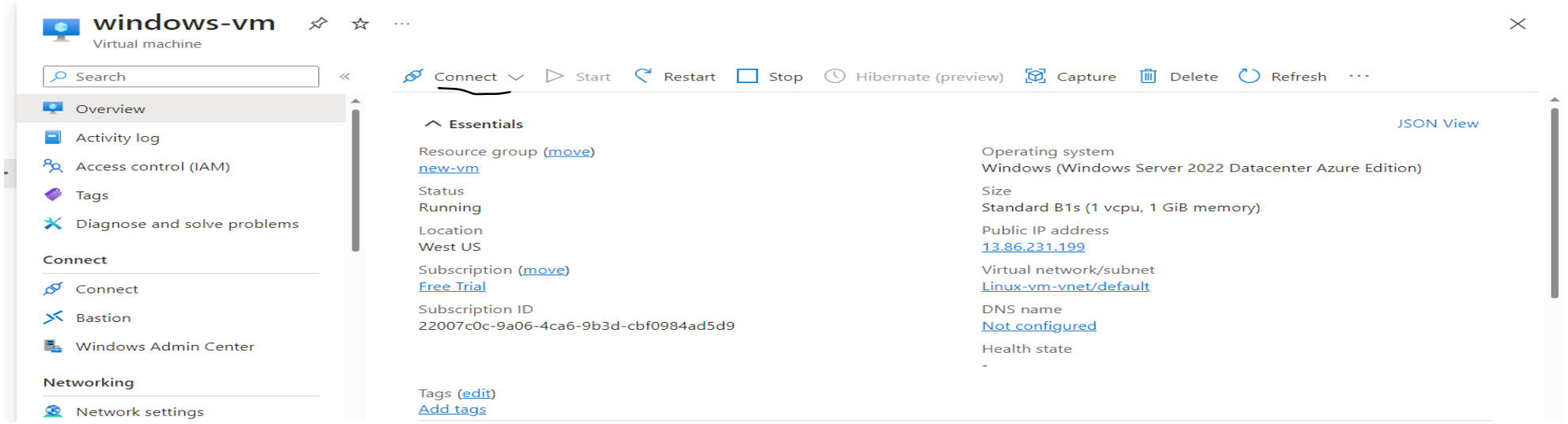
Choose this size of storage virtual machine.

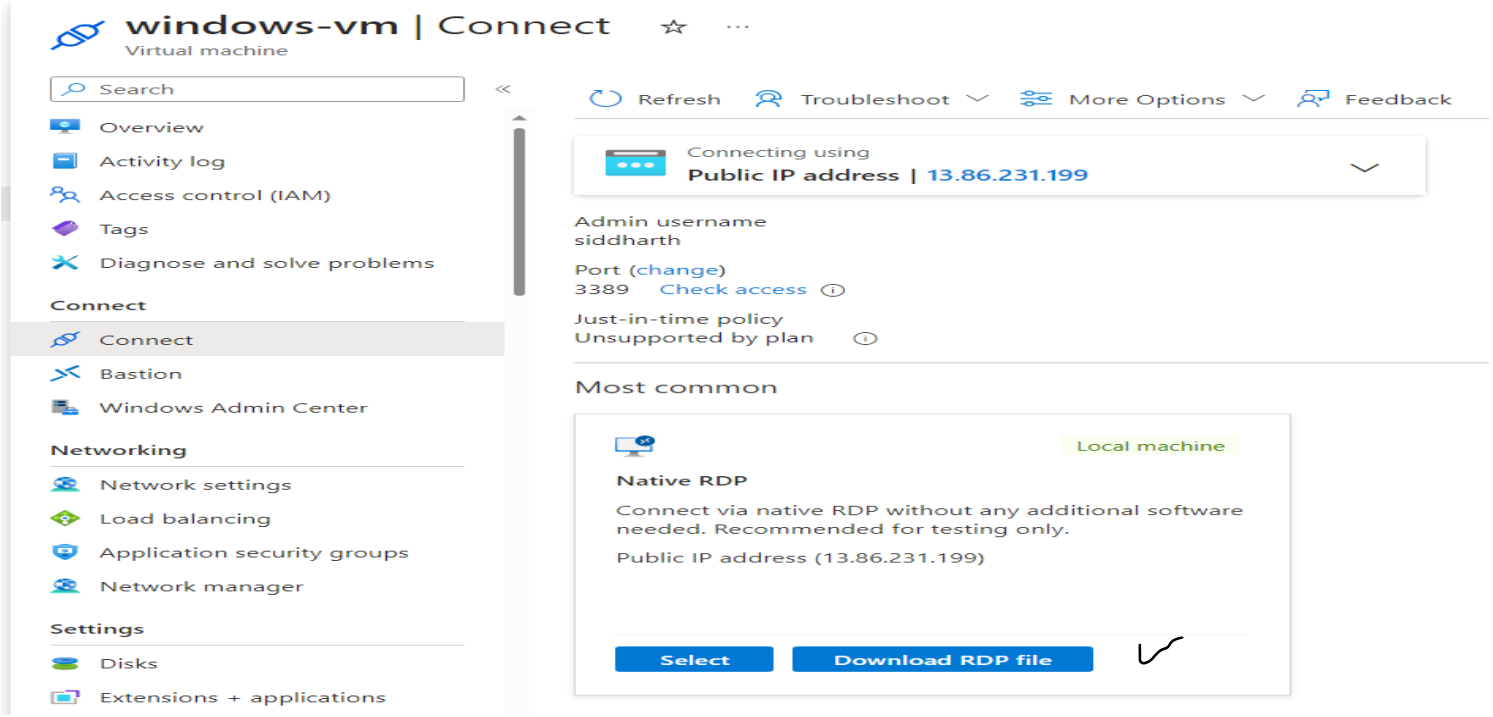
Standard_D2as_v4 - 2 vcpus, 8 GiB memory (₹10,778.07/month)

See all sizes

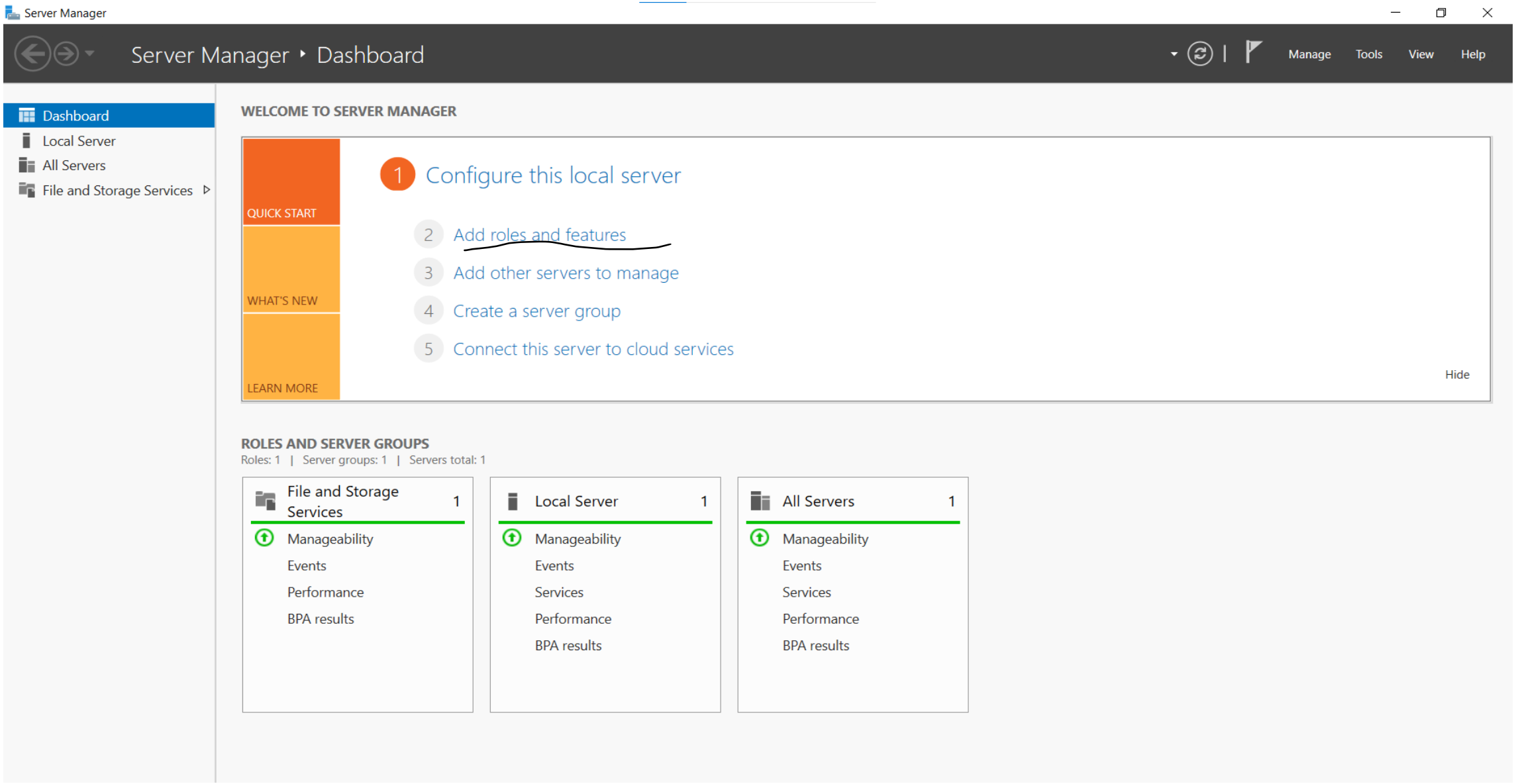
To enable Hibernation, you must register your subscription. Learn more

Move inside the VM – click on connect – Download RDP file and double click to connect with username and password.

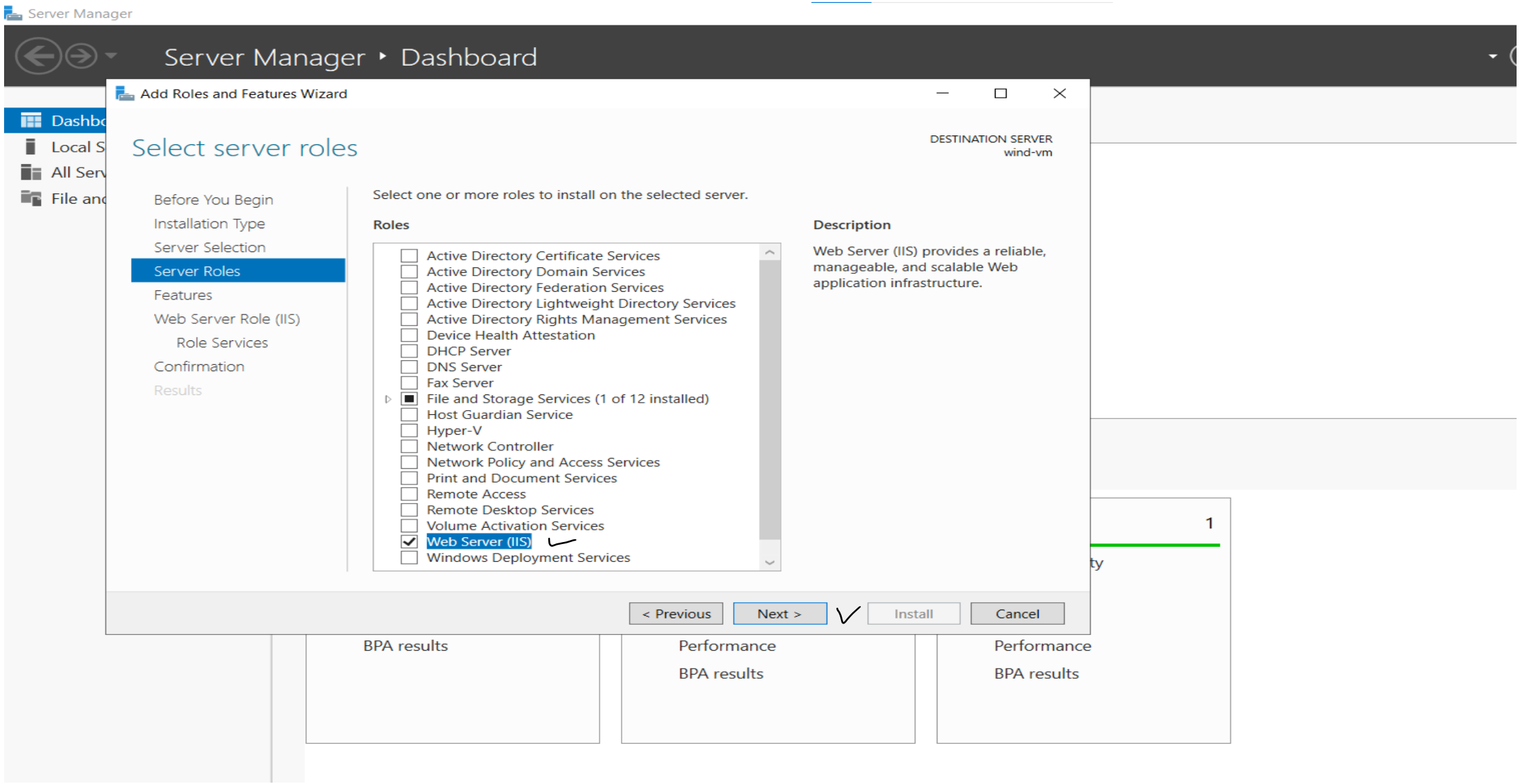




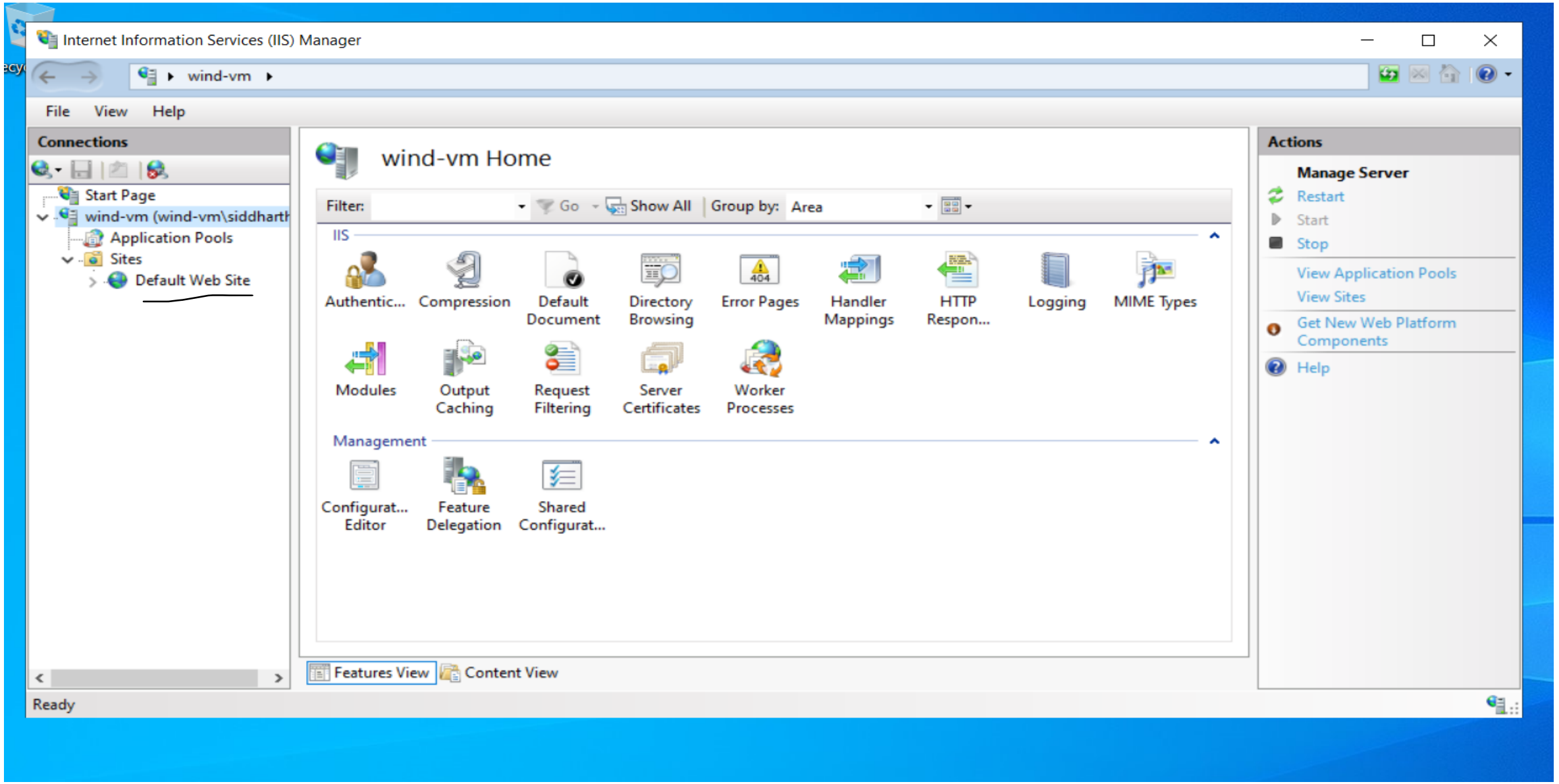
Download the RDP file – double to click to connect – enter password and username – go to server manager.



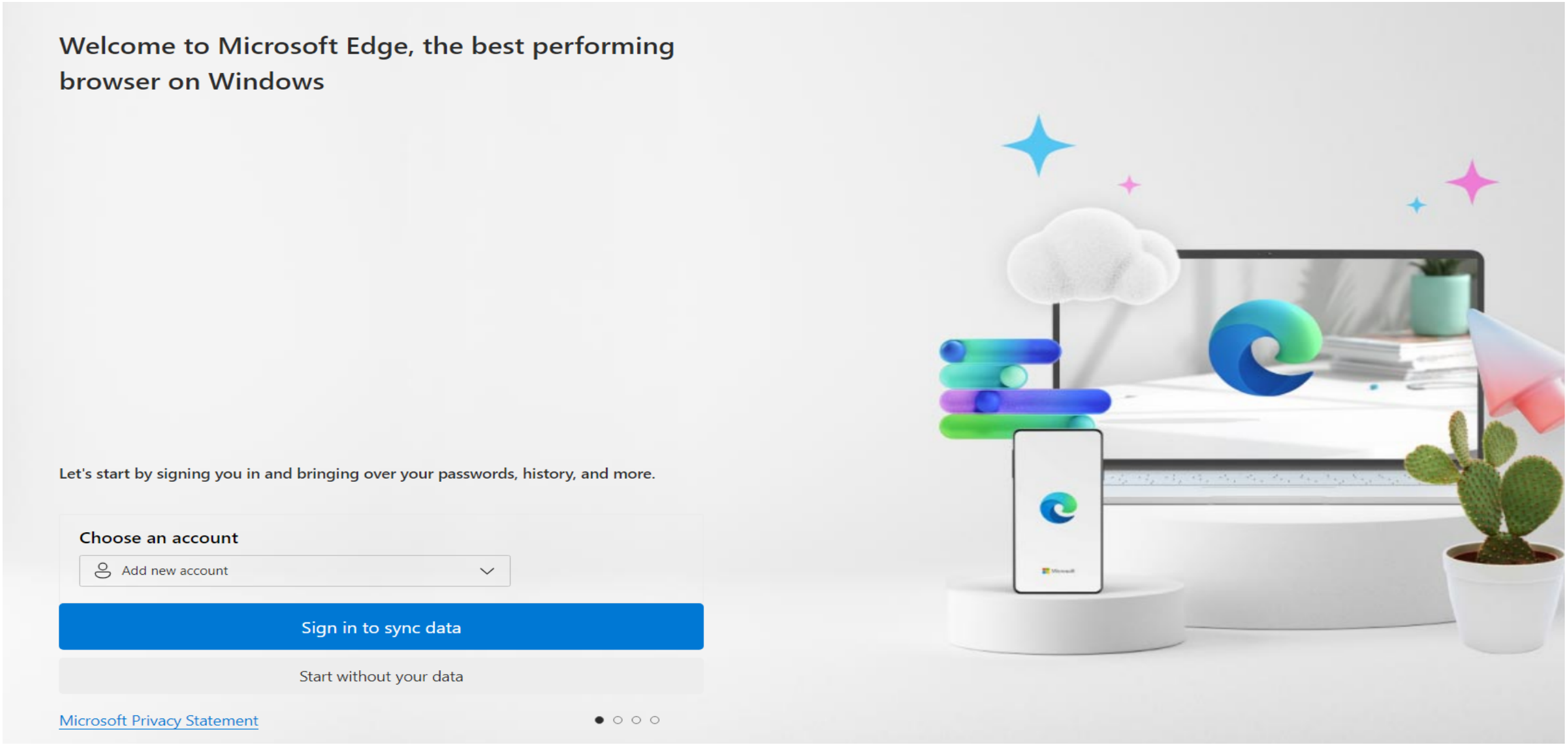
Add roles and features- next next next – choose iis service - install



Search for IIS service manager – in default website .



Click on the default website – go to explore – two files there both were the website interface. OR open the HTTP port 80 edit the first file in notepad save and restart the website – copy the ip address and browse .

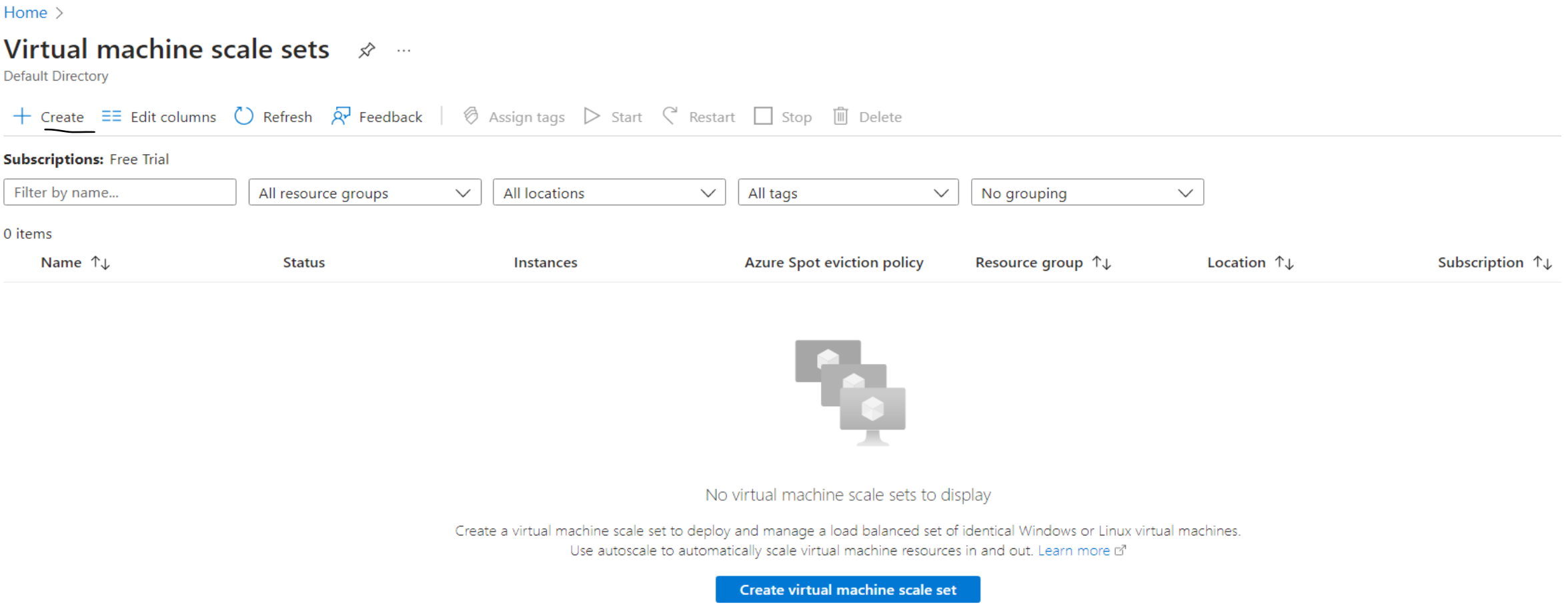


Assignment 3

Tasks To Be Performed:

1. Create a VM scale set with Ubuntu as OS
2. Give min VM's as 1 and maximum as 5
3. For scale-out CPU % is 75 and increase by 1 VM
4. For scale-in CPU % is 25 increase by 1 VM

Create a resource group – using RG create VM with no infrastructure redundancy require – open port 80 for hosting the website in ubuntu OS – Install the nginx web server – stop the VM and create the image – Using the image we have to create the VM Scaling sets.
Search for the VMSS and click on create.



Home > Virtual machine scale sets >

Create a virtual machine scale set ...

Basics | Spot | Disks | Networking | Scaling | Management | Health | Advanced | Tags | Review + create

Azure virtual machine scale sets let you create and manage a group of load balanced VMs. The number of VM instances can automatically increase or decrease in response to demand or a defined schedule. Scale sets provide high availability to your applications, and allow you to centrally manage, configure, and update a large number of VMs.
Learn more about virtual machine scale sets

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Free Trial

Resource group * : 2-01-24
Create new

Scale set details

Virtual machine scale set name * : AutoScaleSet

Region * : (US) East US

Availability zone : Zones 1, 2, 3

Autoscaling can help you respond to an outage by scaling out new instances in another zone. Turn on Autoscaling in the Scaling tab.

Orchestration

A scale set has a "scale set model" that defines the attributes of virtual machine instances (size, number of data disks, etc). As the number of instances in the scale set changes, new instances are added based on the scale set model.
Learn more about the scale set model

Orchestration mode * :
- Flexible: achieve high availability at scale with identical or multiple virtual machine types
- Uniform: optimized for large scale stateless workloads with identical instances

Security type : Standard

Instance details

Image * : ubuntucustomimage/Ubuntu-server/latest - x64 Gen2
See all images | Configure VM generation

VM architecture :
- Arm64
- x64

Arm64 is not supported with the selected image.

Run with Azure Spot discount :

Size * : Standard_B1s - 1 vcpu, 1 GiB memory (₹596.23/month) (free services eligible)
See all sizes

Enable Hibernation (preview)

To enable Hibernation, you must register your subscription. Learn more

Administrator account

Authentication type: Password / SSH public key

Username

Password

Confirm password

Review + create | < Previous | Next : Spot >

Home > Virtual machine scale sets >

Create a virtual machine scale set

Basics | Spot | Disks | **Networking** | Scaling | Management | Health | Advanced | Tags | Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.
Learn more about VMSS networking

Virtual network configuration

Azure Virtual Network (VNet) enables many types of Azure resources to securely communicate with each other, the internet, and on-premises networks. Learn more about VNets

Virtual network * : (New) 2-01-24-vnet (recommended)

Create virtual network

Network interface

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

Create new nic | Delete

NAME	CREATE PUBLI...	SUBNET	NETWORK SECURI...	ACCELERATED N...
2-01-24-vnet-nic01	No	default (10.1.0.0/20)	Basic	Off

Under Network edit Network interface- Disable the load balancer.

Home > Virtual machine scale sets > Create a virtual machine scale set >

Edit network interface

Network interface

Name * : 2-01-24-vnet-nic01

Virtual network : 2-01-24-vnet

Subnet * : default (10.1.0.0/20)

NIC network security group
- None
- Basic
- Advanced

Public inbound ports *
- None
- Allow selected ports

Also allow the SSH port.

Select inbound ports * : HTTP (80), RDP (3389)

All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

Public IP address: Disabled / Enabled

Accelerated networking: Disabled / Enabled

OK | Cancel

Network interface

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

+ Create new nic Delete

NAME	CREATE PUBLI...	SUBNET	NETWORK SECURI...	ACCELERATED N...
2-01-24-vnet-nic01	Yes	default (10.1.0.0/20)	Basic	Off

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. Learn more

Load balancing options

- (•) None
- ( ) Azure load balancer
  Supports all TCP/UDP network traffic, port-forwarding, and outbound flows.
- ( ) Application gateway
  Web traffic load balancer for HTTP/HTTPS with URL-based routing, SSL termination, session persistence, and web application firewall.

Review + create < Previous Next : Scaling >

Home > Virtual machine scale sets >

Create a virtual machine scale set

Basics | Spot | Disks | Networking | **Scaling** | Management | Health | Advanced | Tags | Review + create

An Azure virtual machine scale set can automatically increase or decrease the number of VM instances that run your application. This automated and elastic behavior reduces the management overhead to monitor and optimize the performance of your application. Learn more about VMSS scaling

Initial instance count * 1

Scaling

Scaling policy

- ( ) Manual
- (•) Custom

Minimum number of instances * 1

Maximum number of instances * 5

Scale out

CPU threshold (%) * 75

Duration in minutes * 5

Number of instances to increase by * 1

Scale in

CPU threshold (%) * 25

Number of instances to decrease by * 1

Predictive autoscaling

Enable predictive autoscaling forecast [ ]

Diagnostic logs

Collect diagnostic logs from Autoscale [ ]

Average duration in minute of CPU utilization. Review and create.

Scale-In policy

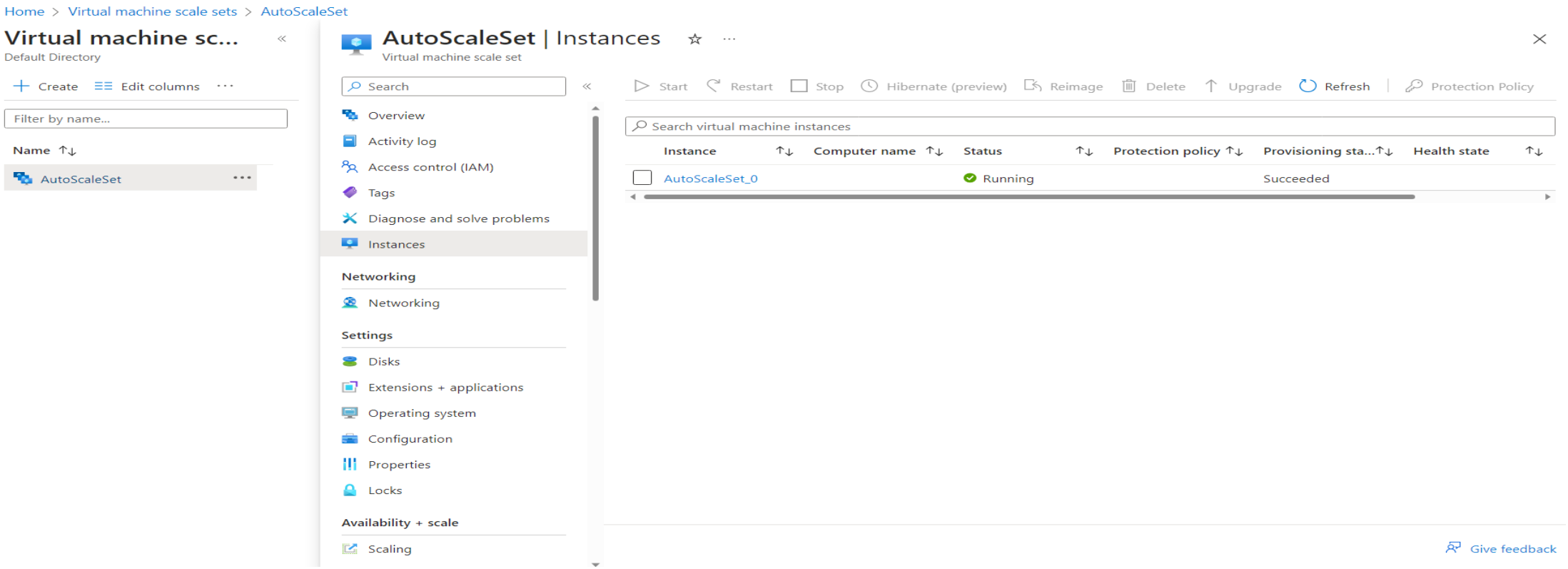
Configure the order in which virtual machines are selected for deletion during a scale-in operation.
Learn more about scale-in policies.

Scale-in policy: Default - Balance across availability zones and fault domains, then delete V...

Apply force delete to scale-in operations [ ]

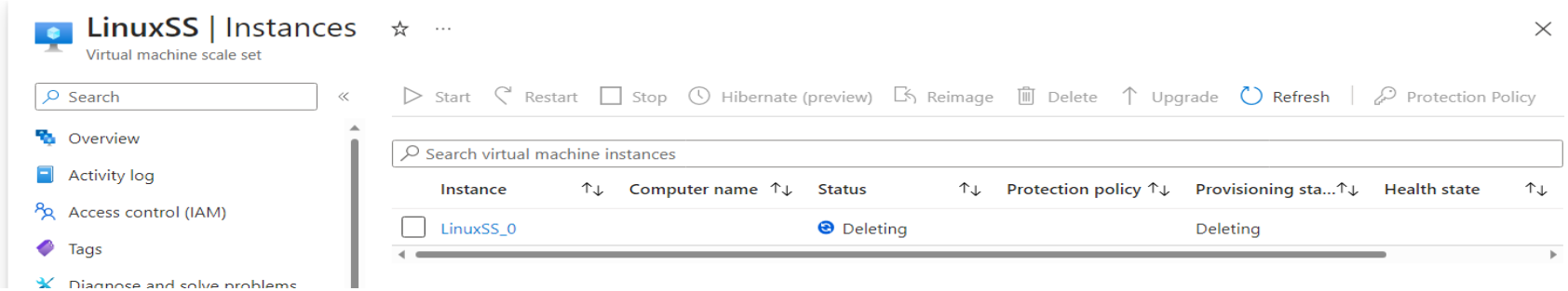
Review + create < Previous Next : Management >

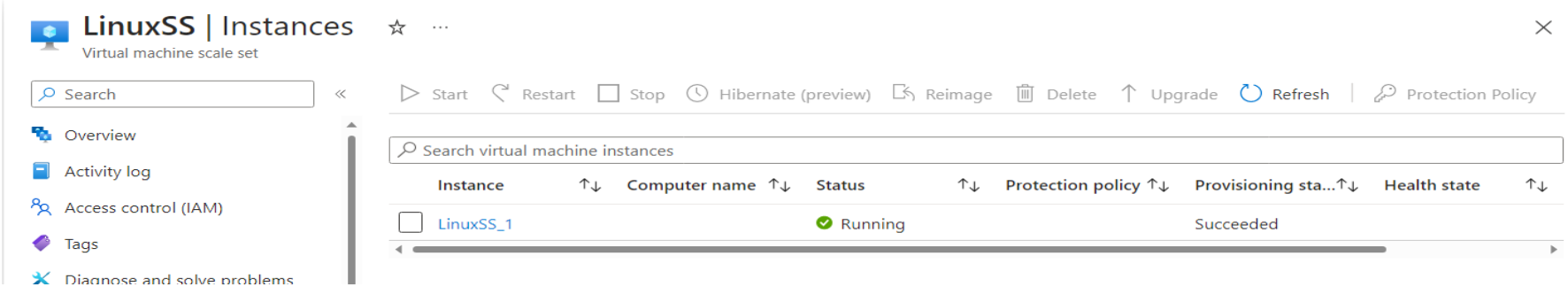
We cannot find the instances running inside the virtual machines – we had to go inside the VMSS –instances.



Go inside the instance copy the IP address and check it is hosting our website or not.

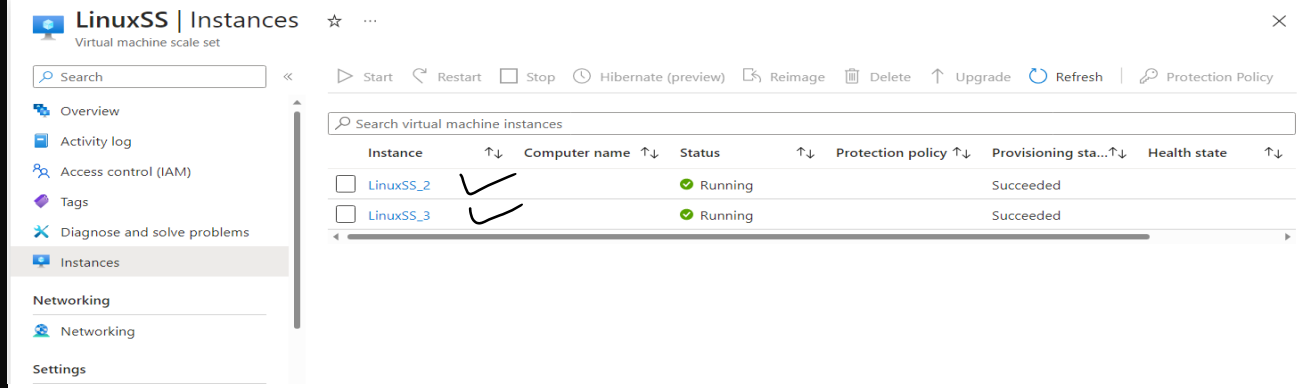
Even if we try to delete the instance , it doesn't delete because the minimum count will be one.





Now we are going to increase the load to increase and decrease the no of instances. Give command sudo apt install stress.

```
Last login: Wed Jan  3 16:14:59 2024 from 152.58.154.177
siddharth@Autoscaling-test:~$ sudo apt install stress
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  stress
0 upgraded, 1 newly installed, 0 to remove and 13 not upgraded.
Need to get 18.4 kB of archives.
After this operation, 55.3 kB of additional disk space will be used.
Get:1 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 stress amd64 1.0.4-6 [18.4 kB]
Fetched 18.4 kB in 0s (632 kB/s)
Selecting previously unselected package stress.
(Reading database ... 59157 files and directories currently installed.)
Preparing to unpack .../stress_1.0.4-6_amd64.deb ...
Unpacking stress (1.0.4-6) ...
Setting up stress (1.0.4-6) ...
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
Processing triggers for man-db (2.9.1-1) ...
siddharth@Autoscaling-test:~$ sudo stress --cpu 8 --timeout 300
stress: info: [1437] dispatching hogs: 8 cpu, 0 io, 0 vm, 0 hdd
stress: info: [1437] successful run completed in 300s
siddharth@Autoscaling-test:~$
```



Assignment 4

Tasks To Be Performed:

1. Create a Linux VM with Ubuntu OS
2. Install Apache2 software
3. Create image out of VM

Create a resource group and VM with Linux OS allow port 80 open to host a website.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Free Trial

Resource group * : image

Create new

Instance details

Virtual machine name * :

Region * : (US) East US

Availability options : No infrastructure redundancy required

Security type : Trusted launch virtual machines

Configure security features

Image * : Ubuntu Server 20.04 LTS - x64 Gen2 (free services eligible)

See all images | Configure VM generation

VM architecture : Arm64 / x64

Administrator account

Authentication type : SSH public key / Password

Username * : siddharth

Password * : ••••••••••••

Confirm password * : ••••••••••••

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * : None / Allow selected ports

Select inbound ports * : HTTP (80), SSH (22)

All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

Review + create | < Previous | Next : Disks >

Connect to VM using such commands in command prompt.

ssh –V

ssh username@ip address

Yes

Password

sudo apt-get update –y

sudo apt-get install apache2 –y

Cd /var/www/html

Ls

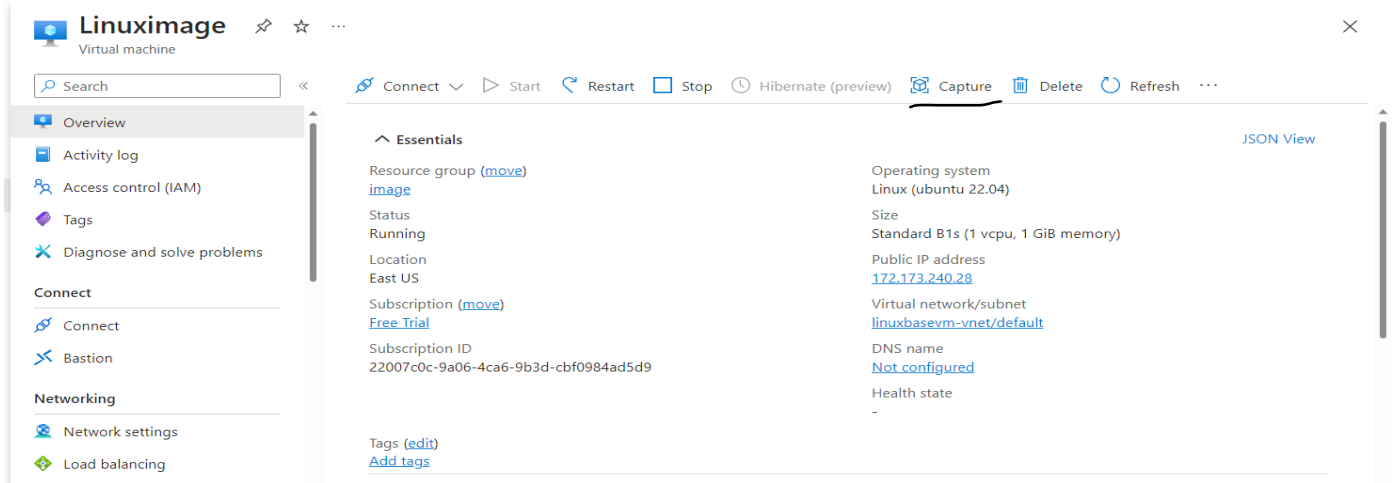
sudo rm index.html

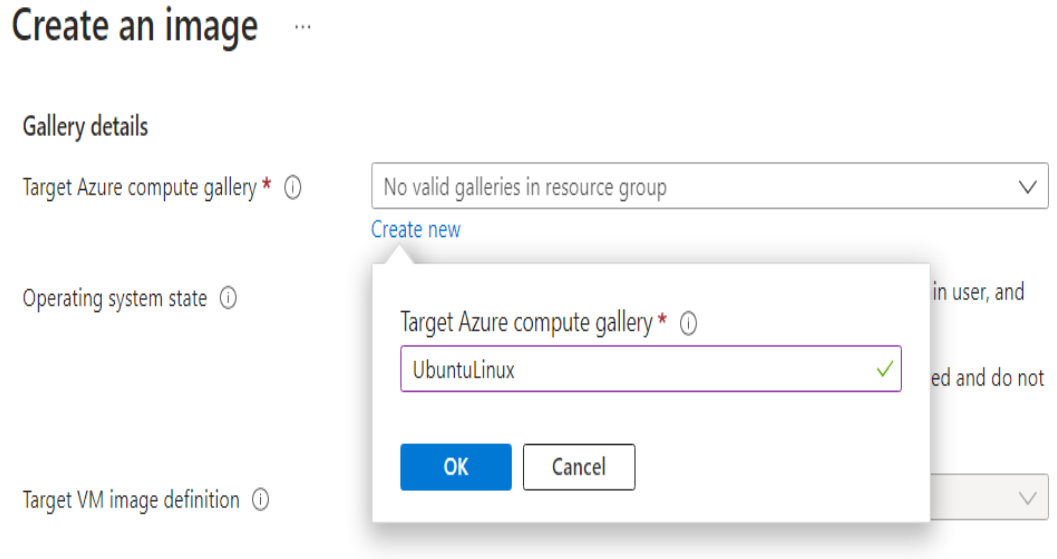
sudo nano index.html edit the file – copy the ip address and browse.

sudo systemctl restart apache2

sudo systemctl status apache2

Before going to create a image of VM we need to stop the VM. Go inside the VM click on capture.





Home > Virtual machines > Linuximage >

Create an image

Basics | Tags | Review + create

Create an image from this virtual machine that can be used to deploy additional virtual machines and virtual machine scale sets. With a shared image, you can easily replicate the image to Azure regions around the world and manage versions of the image. Certain information from the virtual machine will be carried forward to the image including OS type, VM generation, plan, and publishing details. Learn more

Project details

Subscription: Free Trial

Resource group *: image

Instance details

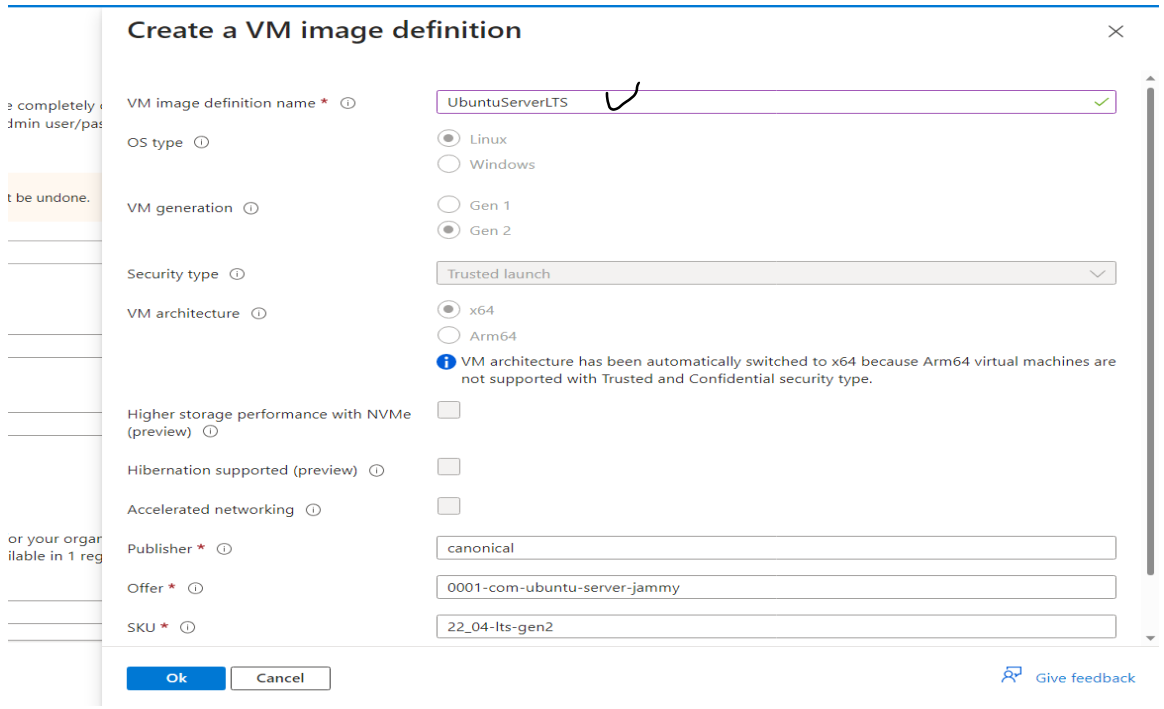
Region: (US) East US

Share image to Azure compute gallery: Yes, share it to a gallery as a VM image version.

No, capture only a managed image.

Managed image is not available because it is not currently supported with Trusted launch virtual machines.

Automatically delete this virtual machine after creating the image



Home > Virtual machines > Linuximage >

Create an image

Gallery details

Target Azure compute gallery * : (new) UbuntuLinux
Create new

Operating system state :
- (●) Generalized: VMs created from this image require hostname, admin user, and other VM related setup to be completed on first boot
- ( ) Specialized: VMs created from this image are completely configured and do not require parameters such as hostname and admin user/password

Using specialized we don't have enter new password.

⚠ Capturing a virtual machine image will make the virtual machine unusable. This action cannot be undone.

Target VM image definition * : (new) UbuntuServerLTS
Create new

Version details

Version number * : 0.0.1

Exclude from latest : ☐

End of life date : 02/29/2024

Shallow replication : ☐

Replication

A VM image version can be replicated to different regions depending on what makes sense for your organization. One example is to always replicate the latest image in multiple regions while all older versions are only available in 1 region. This can help save on storage costs for VM image versions.

Default storage sku : Zone-redundant

Default replica count * : 1

Target regions	Replica count	Storage sku
(US) East US	1	Zone-redundant
	1	Zone-redundant

Review + create | < Previous | Next : Tags >

Now we are going to create VM using this image.
Create new VM – see images- shared images.

Availability options : No infrastructure redundancy required

Security type : Trusted launch virtual machines
Configure security features

Image * : Ubuntu Server 22.04 LTS - x64 Gen2 (free services eligible)
See all images | Configure VM generation

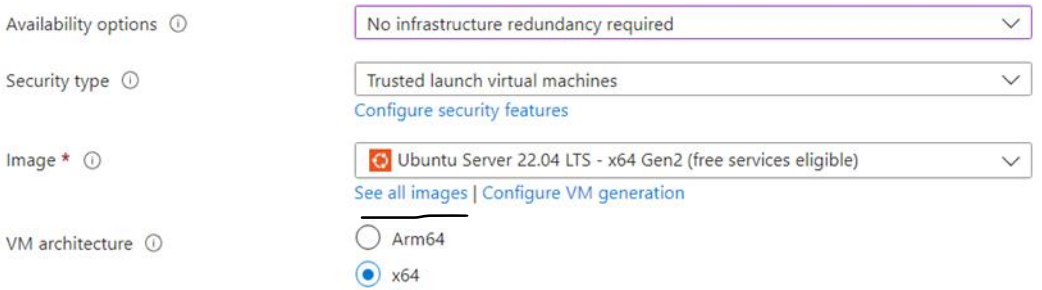
VM architecture :
- ( ) Arm64
- (●) x64

Assignment 5

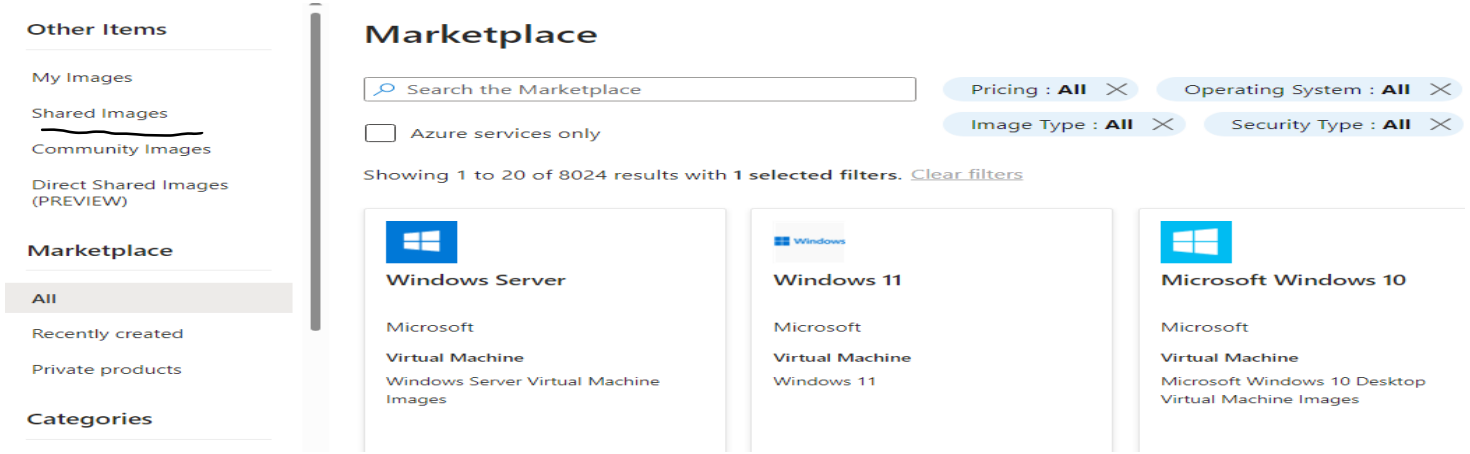
Tasks To Be Performed:

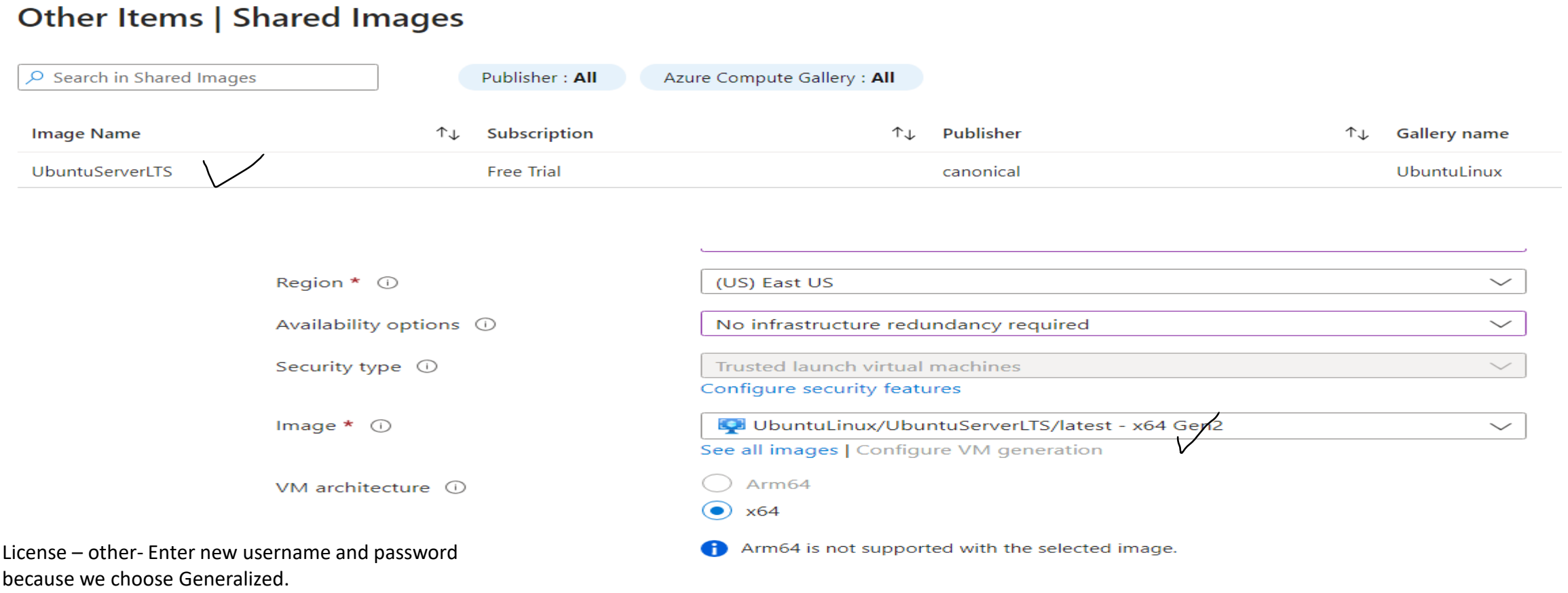
1. Deploy a VM from the previously created image
2. Open port 80 in NSG
3. Start the Apache2 service in the VM
4. Verify if you are able to access the website

Now we are going to create VM using this image.
Create new VM – see images- shared images.

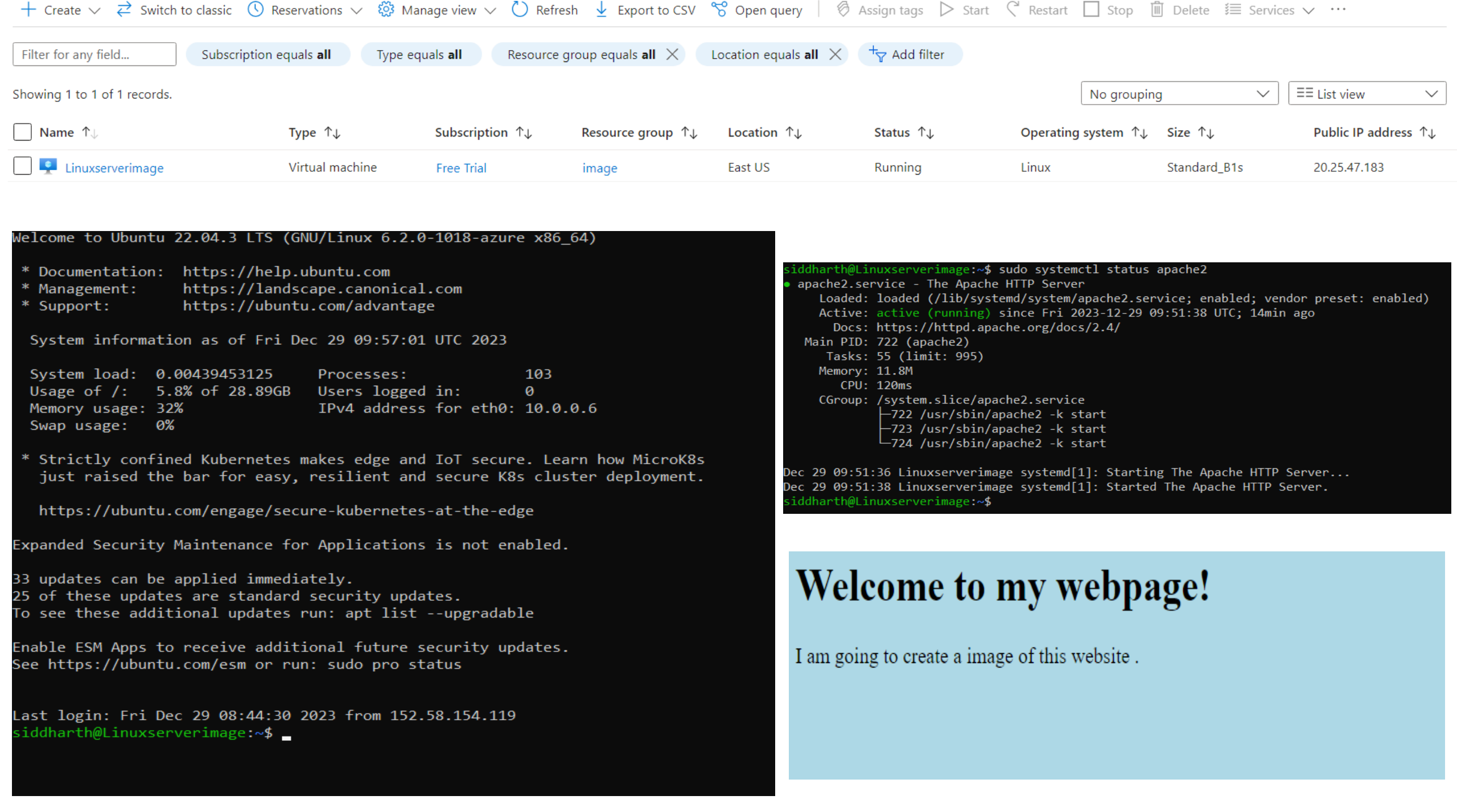


Do all the same settings as also open 80 port .





License – other- Enter new username and password because we choose Generalized.


Create
Switch to classic
Reservations
Manage view
Refresh
Export to CSV
Open query
Assign tags
Start
Restart
Stop
Delete
Services
Filter for any field...
Subscription equals all
Type equals all
Resource group equals all
Location equals all
Add filter
Showing 1 to 1 of 1 records.
No grouping
List view
Name
Type
Subscription
Resource group
Location
Status
Operating system
Size
Public IP address
Linuxserverimage
Virtual machine
Free Trial
image
East US
Running
Linux
Standard_B1s
20.25.47.183
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 6.2.0-1018-azure x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
System information as of Fri Dec 29 09:57:01 UTC 2023
System load: 0.00439453125
Processes: 103
Usage of /: 5.8% of 28.89GB
Users logged in: 0
Memory usage: 32%
IPv4 address for eth0: 10.0.0.6
Swap usage: 0%
* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
just raised the bar for easy, resilient and secure K8s cluster deployment.
https://ubuntu.com/engage/secure-kubernetes-at-the-edge
Expanded Security Maintenance for Applications is not enabled.
33 updates can be applied immediately.
25 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
Last login: Fri Dec 29 08:44:30 2023 from 152.58.154.119
siddharth@Linuxserverimage:~$
siddharth@Linuxserverimage:~$ sudo systemctl status apache2
apache2.service - The Apache HTTP Server
Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
Active: active (running) since Fri 2023-12-29 09:51:38 UTC; 14min ago
Docs: https://httpd.apache.org/docs/2.4/
Main PID: 722 (apache2)
Tasks: 55 (limit: 995)
Memory: 11.8M
CPU: 120ms
CGroup: /system.slice/apache2.service
├─722 /usr/sbin/apache2 -k start
├─723 /usr/sbin/apache2 -k start
└─724 /usr/sbin/apache2 -k start
Dec 29 09:51:36 Linuxserverimage systemd[1]: Starting The Apache HTTP Server...
Dec 29 09:51:38 Linuxserverimage systemd[1]: Started The Apache HTTP Server.
siddharth@Linuxserverimage:~$
Welcome to my webpage!
I am going to create a image of this website .

We can also edit inbound rule under Network settings.