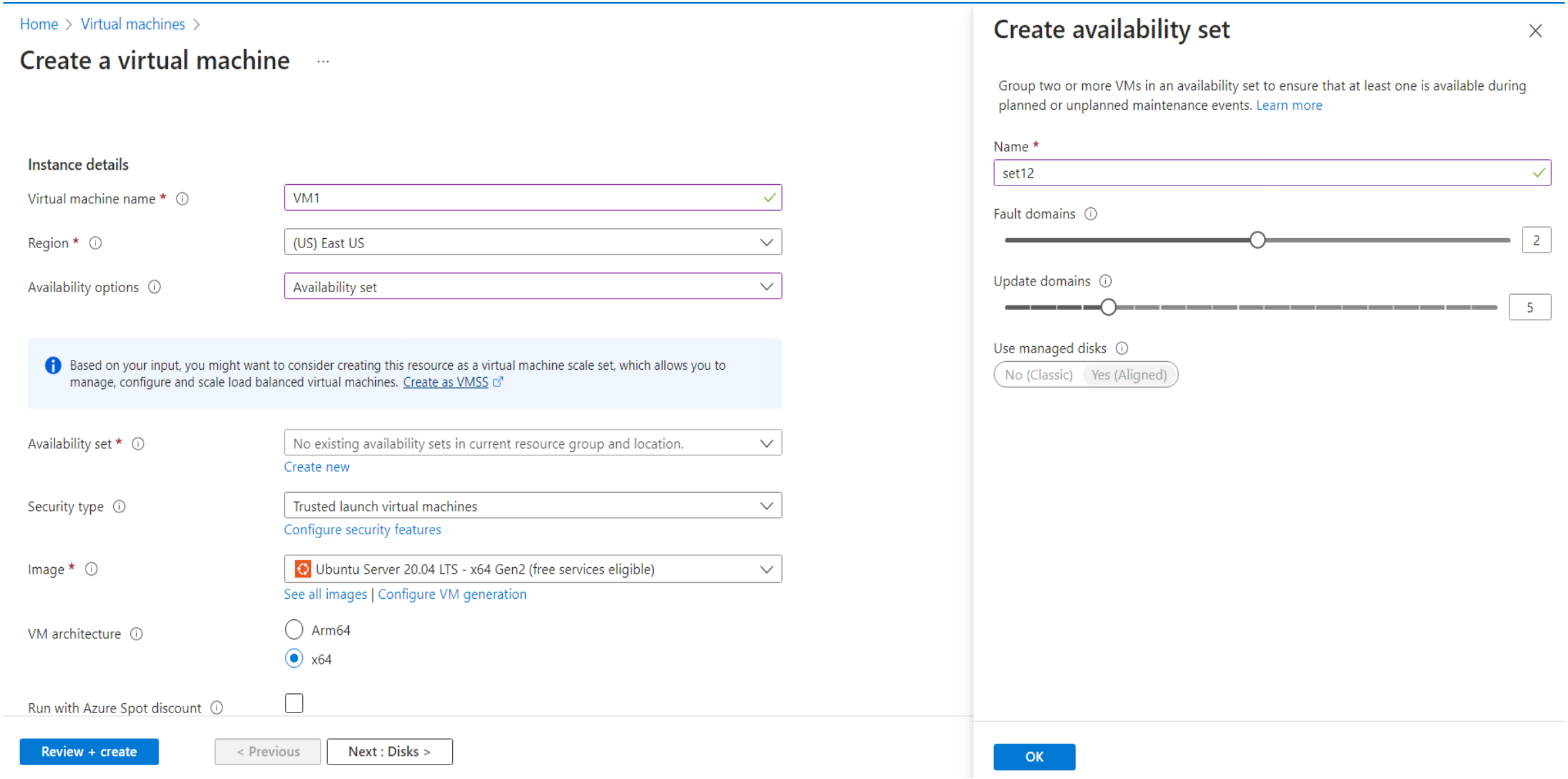
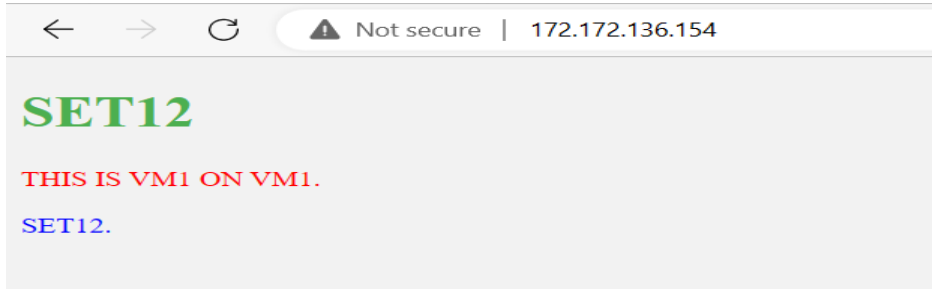
# Assignment 1

**Tasks To Be Performed:**

1. Deploy 2 VMs with Ubuntu and Apache2 installed
2. Change index.html to include the following text
    a. “This is VM1” on VM1
    b. “This is VM2” on VM2
3. Create a load balancer which will balance the traffic between these two VMs

# Create two ubuntu VM with 80 and SSH port open create the availability set for connecting to load balancer- both VM have same availability set  with same VNET.







Add a frontend ip configuration and create new public ip address.

Home > Load balancing | Load Balancer >

## Create load balancer ...

accessible via public IP addresses, or internal where it is only accessible from a virtual network. Azure load balancers also support Network Address Translation (NAT) to route traffic between public and private IP addresses. Learn more.

**Project details**

Subscription * Free Trial

Resource group * 27-01-24
Create new

**Instance details**

Name * loadbalancerVM

Region * East US

SKU * (i) Standard / Gateway / Basic

Type * (i) Public / Internal

Tier * Regional / Global

Review + create | < Previous | Next : Frontend IP configuration > | Download a template for automation

Home >

## Create load balancer ...

Basics | Frontend IP configuration | Backend pools | Inbound rules | Outbound rules | Tags | Review + create

A frontend IP configuration is an IP address used for inbound and/or outbound communication as defined within load balancing, inbound NAT, and outbound rules.

+ Add a frontend IP configuration

| Name ↑↓ | IP address ↑↓ |
|---|---|
| Add a frontend IP to get started | |

### Add frontend IP configuration

Name * myfirstFEIP

IP version: IPv4 / IPv6

IP type: IP address / IP prefix

Public IP address * Choose public IP address
Create new

Gateway Load balancer (i) None

Public IP address *
Choose public IP address
Create new

### Add a public IP address

Name * newpublicip

SKU Standard / Basic

Tier Regional / Global

Static IPs are assigned at the time the resource is created

Home > Create load balancer >

# Add backend pool

Name * Backendone

Virtual network VM1-vnet (27-01-24)

Backend Pool Configuration

- (•) NIC
- ( ) IP address

## IP configurations

IP configurations associated to virtual machines and virtual machine scale sets must be in same location as the load balancer and be in the same virtual network.

+ Add | Remove

| Resource Name | Resource group | Type | IP configuration | IP Address | Availability set |
|---|---|---|---|---|---|

## Add IP configurations to backend pool

IP configurations associated to virtual machines and virtual machine scale sets r

Filter by name... Location : eastus Virtual networ

Show resources that are not available for selection

| Resource Name | Resource group | Type |
|---|---|---|
| Virtual machine (2) | | |
| VM1 | 27-01-24 | Virtual machine |
| VM2 | 27-01-24 | Virtual machine |

Add Cancel

Home > Create load balancer >

# Add backend pool

Name * Backendone

Virtual network VM1-vnet (27-01-24)

Backend Pool Configuration

- (•) NIC
- ( ) IP address

## IP configurations

IP configurations associated to virtual machines and virtual machine scale sets must be in same location as the load balancer and be in the same virtual network.

+ Add | Remove

| Resource Name | Resource group | Type | IP configuration | IP Address | Availability set |
|---|---|---|---|---|---|
| VM1 | 27-01-24 | Virtual machine | ipconfig1 | 10.0.0.4 | SET12 |
| VM2 | 27-01-24 | Virtual machine | ipconfig1 | 10.0.0.5 | SET12 |

Save Cancel Give feedback

# Create load balancer

Basics | Frontend IP configuration | Backend pools | **Inbound rules**

### Load balancing rule

A load balancing rule distributes incoming traffic that is sent to a selected IP addre
traffic.

+ Add a load balancing rule

| Name | Frontend IP configuration |
|---|---|
| Add a rule to get started | |

Health probes are used to check the status of a backend pool instance. If the health probe fails to get a response from a backend instance then no new connections will be sent to that backend instance until the health probe succeeds again.

| | |
|---|---|
| Name * | probe1 |
| Protocol * | TCP |
| Port * | 80 |
| Interval (seconds) * | 5 |
| Used by * | Not used |

Save | Cancel

Health probe * (i) | No exis... probes

# Add load balancing rule

loadbalancerVM

A load balancing rule distributes incoming traffic that is sent to a selected IP address and port combination across a group of backend pool instances. Only backend instances that the health probe considers healthy receive new traffic.

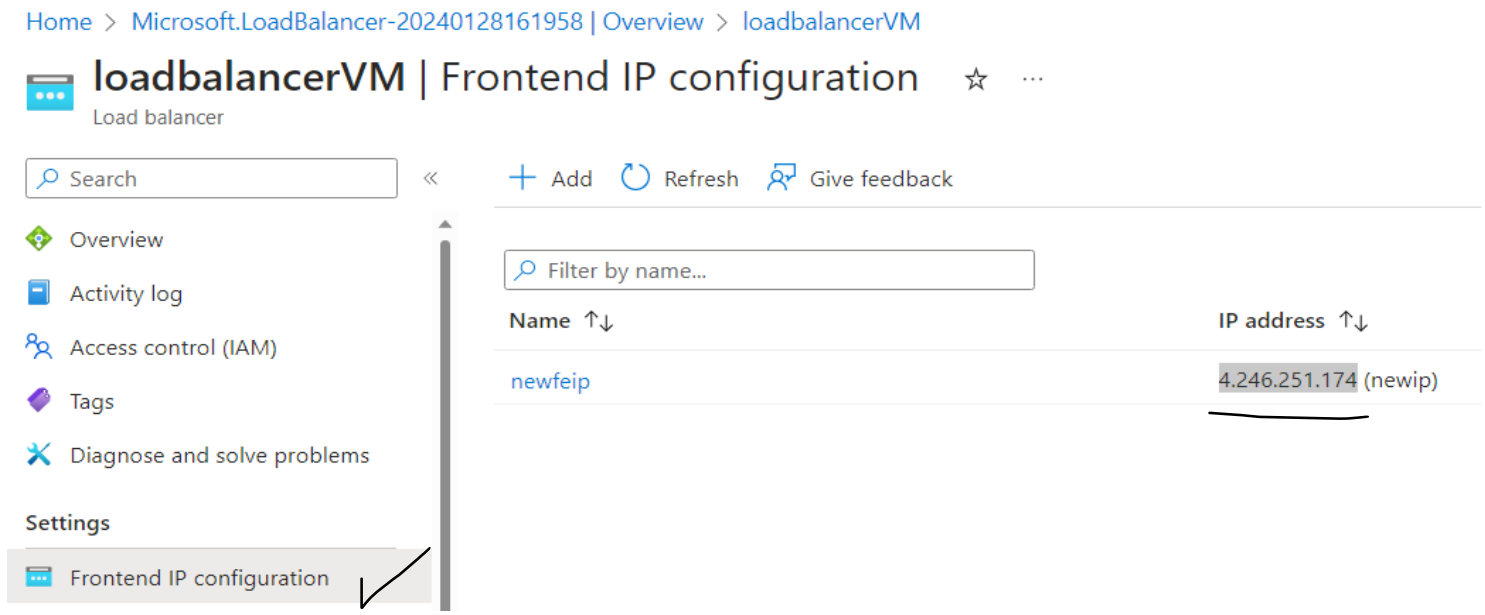
| | |
|---|---|
| Name * | rule1 |
| IP Version * | IPv4 / IPv6 |
| Frontend IP address * | newfeip (To be created) |
| Backend pool * | pool1 |
| Protocol | TCP / UDP |
| Port * | 80 |
| Backend port * | 80 |
| Health probe * | No existing probes<br>Create new |
| Session persistence | None |
| Idle timeout (minutes) * | 4 |
| Enable TCP Reset | ☐ |
| Enable Floating IP | ☐ |
| Outbound source network address translation (SNAT) | (Recommended) Use outbound rules to |

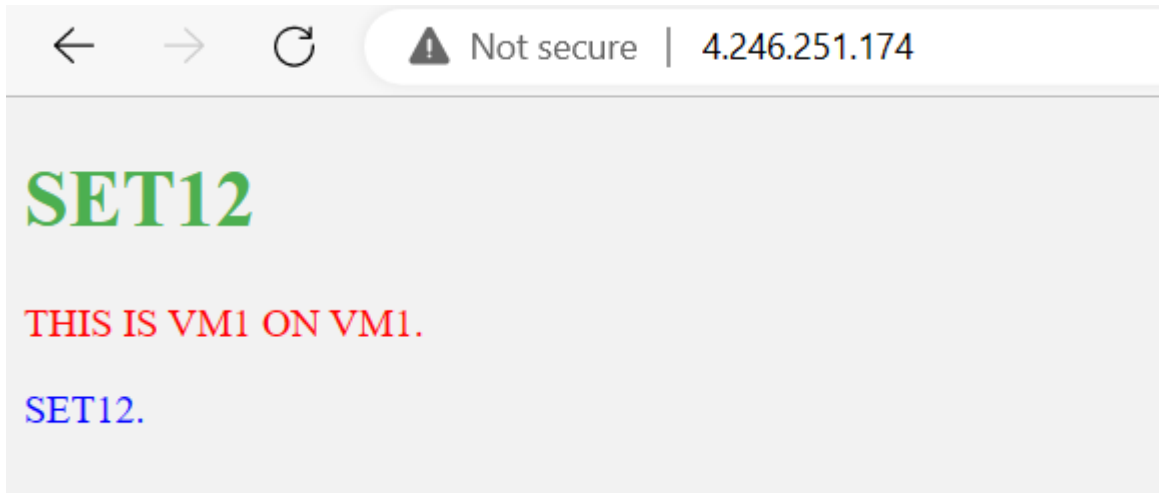
Create new health probe

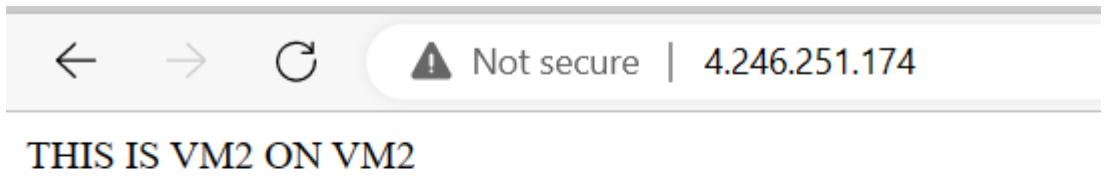
Save | Cancel

Give feedback

Move into frontend Ip configuration- copy the ip and browse- keep refresh to see the distributing traffic.



# Assignment 2

**Tasks To Be Performed:**

Create an application gateway with the following configuration:

a. /vm1 should point to VM1
b. /vm2 should point to VM2

In VM1 keep the default html page and cd /var/www/html , here add new directory – inside this directory create another index.html file
In VM2 remove the default html page but here also cd /var/www/html , here add new directory – inside this directory create another index.html file

```
sid@vm1:~$ cd /var/www/html
sid@vm1:/var/www/html$ ls
index.html
sid@vm1:/var/www/html$ sudo mkdir vm1
sid@vm1:/var/www/html$ ls
index.html  vm1
sid@vm1:/var/www/html$ cd vm1
sid@vm1:/var/www/html/vm1$ sudo nano index.html
sid@vm1:/var/www/html/vm1$ ls
index.html
sid@vm1:/var/www/html/vm1$
```

```
sid@vm2:~$ cd /var/www/html
sid@vm2:/var/www/html$ ls
index.html
sid@vm2:/var/www/html$ sudo rm index.html
sid@vm2:/var/www/html$ ls
sid@vm2:/var/www/html$ sudo mkdir vm2
sid@vm2:/var/www/html$ ls
vm2
sid@vm2:/var/www/html$ cd vm2
sid@vm2:/var/www/html/vm2$ sudo nano index.html
sid@vm2:/var/www/html/vm2$
```

Home > Load balancing | Application Gateway >

## Create application gateway

An application gateway is a web traffic load balancer that enables you to manage traffic to your web application. Learn more about application gateway

### 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 * : 29-01-24
Create new

### Instance details

Application gateway name * : newappgateway

Region * : East US

Tier : Standard V2

Standard V2 allow autoscaling

Enable autoscaling : Yes / No

Minimum instance count * : 0

Maximum instance count : 5

Availability zone : None

Select at least two zones

Previous | Next : Frontends >

Availability zone : None

HTTP2 : Disabled / Enabled

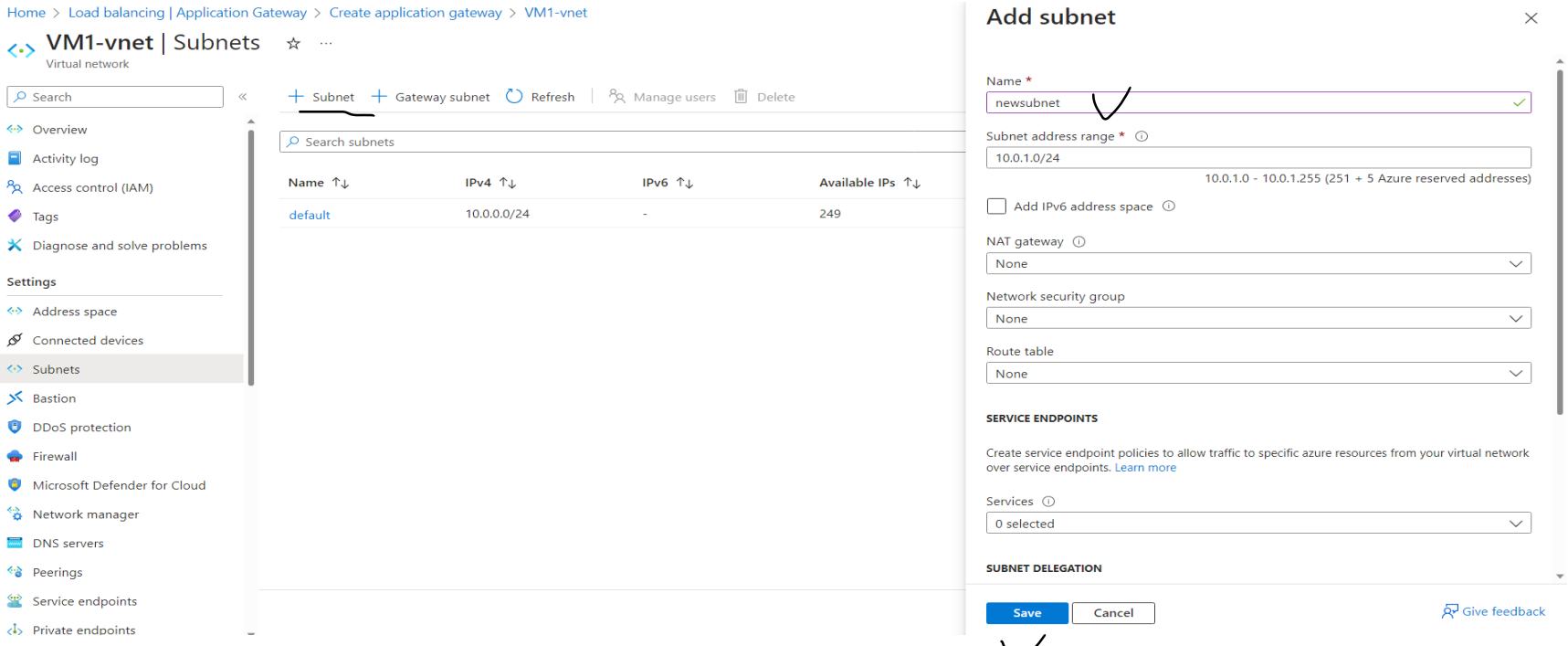
### Configure virtual network

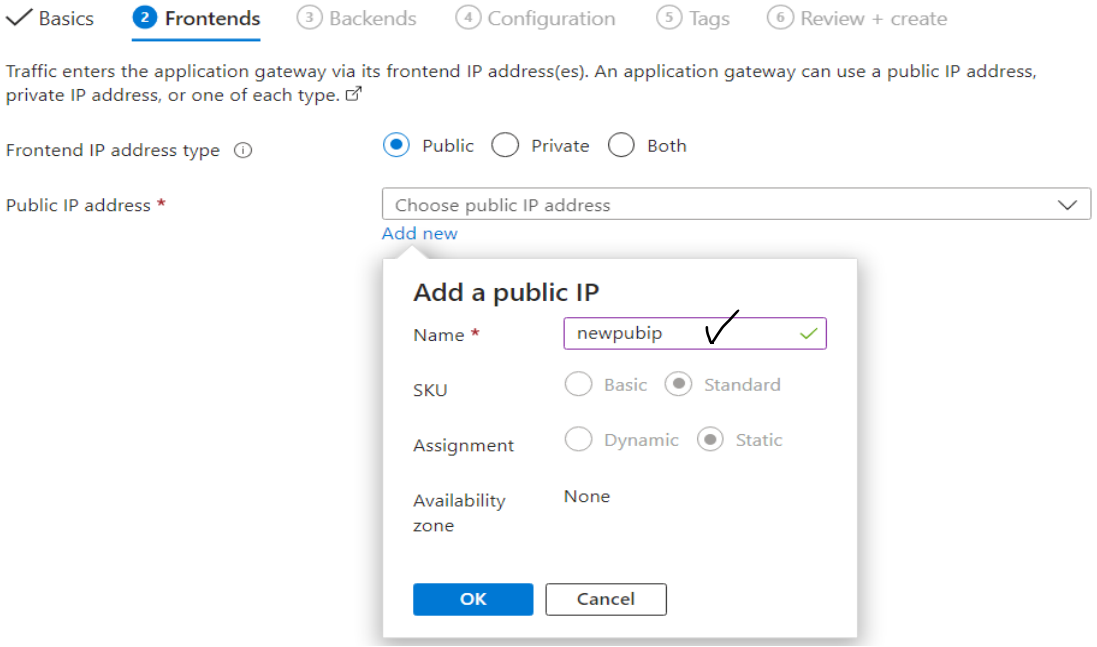
Virtual network * : VM1-vnet
Create new

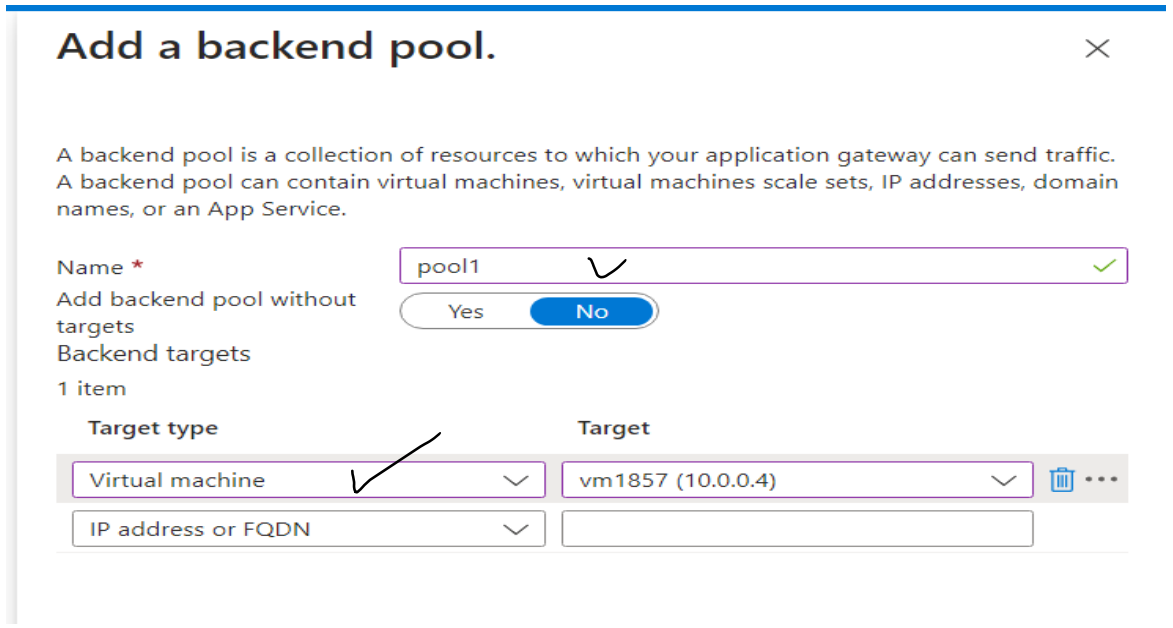
Subnet * : newsubnet (10.0.1.0/24)
Manage subnet configuration

Previous | Next : Frontends >

Create the same virtual network in which both VM running and create new subnet for App GATEWAY.


Home > Load balancing | Application Gateway > Create application gateway > VM1-vnet
VM1-vnet | Subnets
Virtual network
Search
Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Settings
Address space
Connected devices
Subnets
Bastion
DDoS protection
Firewall
Microsoft Defender for Cloud
Network manager
DNS servers
Peerings
Service endpoints
Private endpoints
Subnet
Gateway subnet
Refresh
Manage users
Delete
Search subnets
Name
IPv4
IPv6
Available IPs
default
10.0.0.0/24
-
249
Add subnet
Name *
newsubnet
Subnet address range *
10.0.1.0/24
10.0.1.0 - 10.0.1.255 (251 + 5 Azure reserved addresses)
Add IPv6 address space
NAT gateway
None
Network security group
None
Route table
None
SERVICE ENDPOINTS
Create service endpoint policies to allow traffic to specific azure resources from your virtual network over service endpoints. Learn more
Services
0 selected
SUBNET DELEGATION
Save
Cancel
Give feedback


Basics
2 Frontends
3 Backends
4 Configuration
5 Tags
6 Review + create
Traffic enters the application gateway via its frontend IP address(es). An application gateway can use a public IP address, private IP address, or one of each type.
Frontend IP address type
Public
Private
Both
Public IP address *
Choose public IP address
Add new
Add a public IP
Name *
newpubip
SKU
Basic
Standard
Assignment
Dynamic
Static
Availability zone
None
OK
Cancel


Add a backend pool.
A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machines scale sets, IP addresses, domain names, or an App Service.
Name *
pool1
Add backend pool without targets
Yes
No
Backend targets
1 item
Target type
Target
Virtual machine
vm1857 (10.0.0.4)
IP address or FQDN

# Add a backend pool.

A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machines scale sets, IP addresses, domain names, or an App Service.

Name * pool2

Add backend pool without targets: Yes / No

Backend targets

1 item

| Target type | Target |
|---|---|
| Virtual machine | newvm2855 (10.0.0.5) |
| IP address or FQDN | |

# Create application gateway

Basics ✓ Frontends ✓ 3 Backends 4 Configuration 5 Tags 6 Review + create

A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machine scale sets, app services, IP addresses, or fully qualified domain names (FQDN).

Add a backend pool

| Backend pool | Targets |
|---|---|
| pool1 | 1 target |
| | vm1857 |
| pool2 | 1 target |
| | newvm2855 |

# Create application gateway

Basics ✓ Frontends ✓ Backends ✓ 4 Configuration 5 Tags 6 Review + create

Create routing rules that link your frontend(s) and backend(s). You can also add more backend pools, add a second frontend IP configuration if you haven't already, or edit previous configurations.

## Frontends

+ Add a frontend IP

Public: (new) newpubip

## Routing rules

Add a routing rule

## Backend pools

+ Add a backend pool

pool1

pool2

# Add a routing rule

Configure a routing rule to send traffic from a given frontend IP address to one or more backend targets. A routing rule must contain a listener and at least one backend target.

Rule name * Rule1

Priority * 1

*Listener *Backend targets

A listener "listens" on a specified port and IP address for traffic that uses a specified protocol. If the listener criteria are met, the application gateway will apply this routing rule.

Listener name * port_80

Frontend IP * Public

Protocol HTTP HTTPS

Port * 80

Listener type Basic Multi site

### Custom error pages

Show customized error pages for different response codes generated by Application Gateway. This section lets you configure Listener-specific error pages. Learn more

Bad Gateway - 502 Enter Html file URL

Forbidden - 403 Enter Html file URL

Show more status codes

Add Cancel

Target type Backend pool Redirection

Backend target * pool1 Add new

Add that pool here which has default html page

Backend settings * Add new

Path-based routing

# Add Backend setting

← Discard changes and go back to routing rules

Backend settings name * defaultpage

Backend protocol HTTP HTTPS

Backend port * 80

### Additional settings

Cookie-based affinity Enable Disable

Connection draining Enable Disable

Request time-out (seconds) * 20

Override backend path

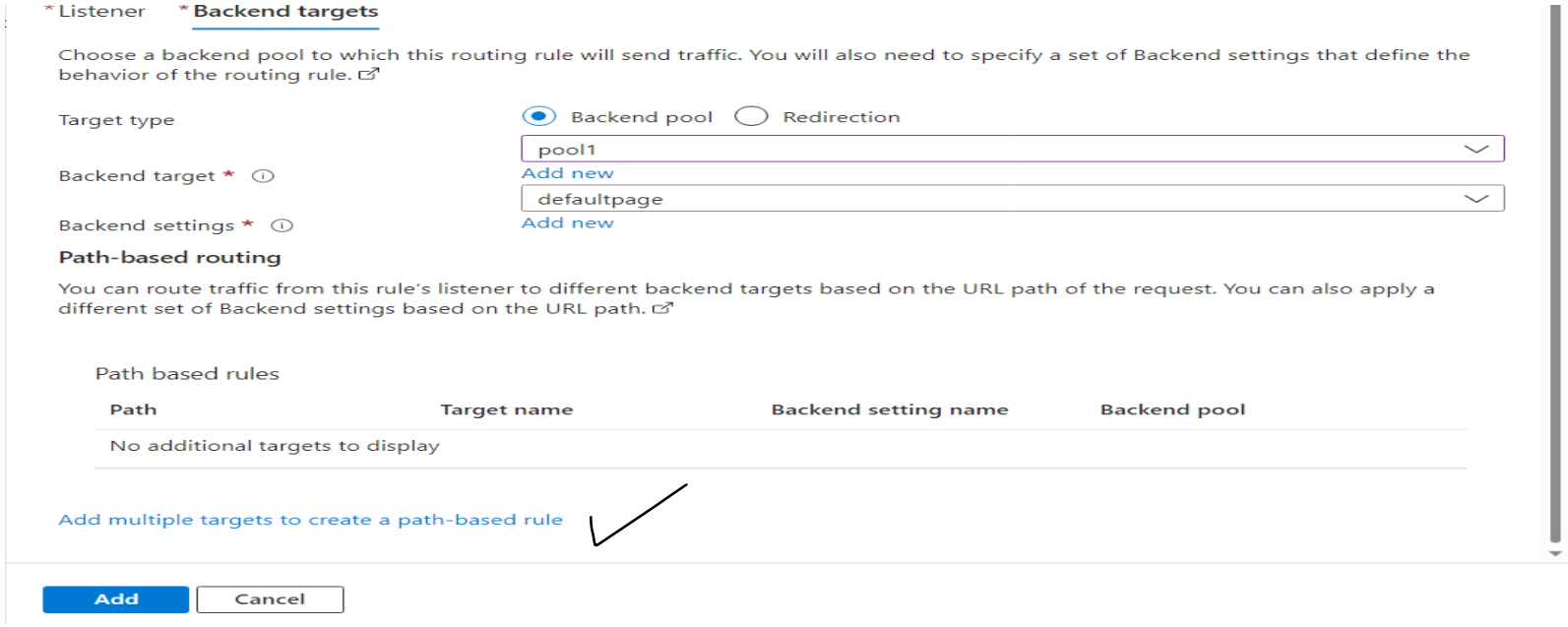
### Host name

By default, the Application Gateway sends the same HTTP host header to the ba
application/service requires a specific host value, you can override it using this s

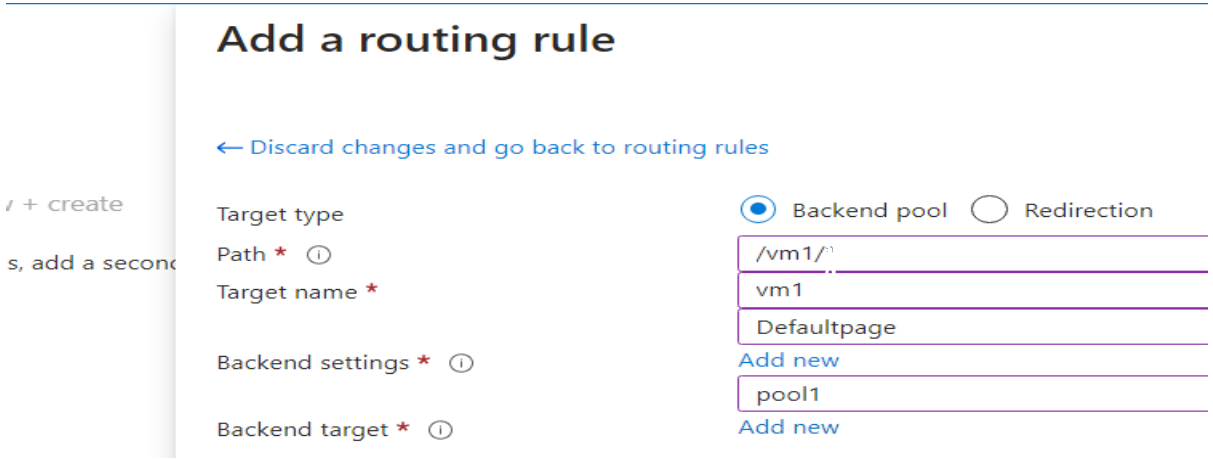
Override with new host name Yes No

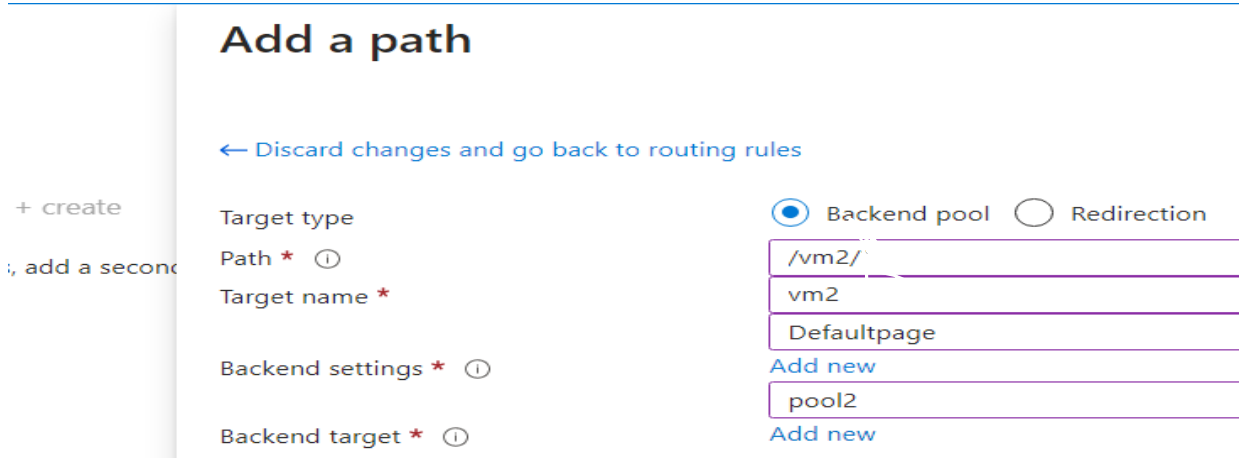
Create custom probes Yes No

Add Cancel




We were creating the path to get inside the /var/www/html/VM1,VM2 folder to see the file inside them.



# Add a routing rule

Configure a routing rule to send traffic from a given frontend IP address to one or more backend targets. A routing rule must contain a listener and at least one backend target.

Rule name *: Rule1

Priority * (i): 1

* Listener * **Backend targets**

Choose a backend pool to which this routing rule will send traffic. You will also need to specify a set of Backend settings that define the behavior of the routing rule.

Target type: (•) Backend pool ( ) Redirection

Backend target * (i): pool1
Add new

Backend settings * (i): Defaultpage
Add new

**Path-based routing**

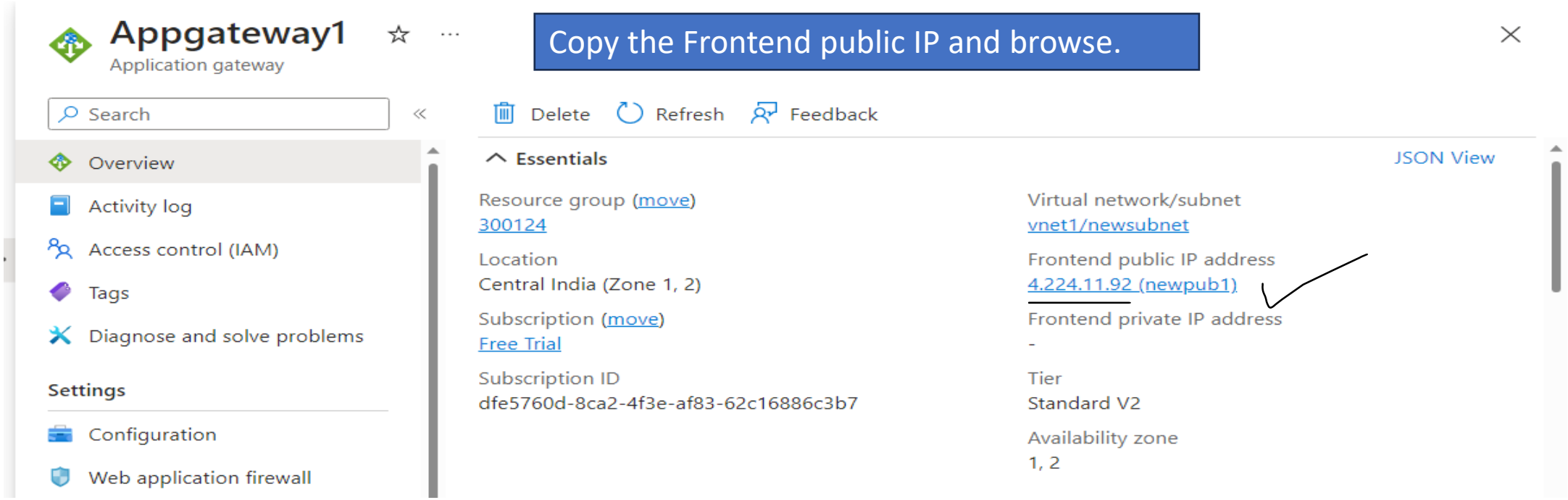
You can route traffic from this rule's listener to different backend targets based on the URL path of the request. You can also apply a different set of Backend settings based on the URL path.

Path based rules

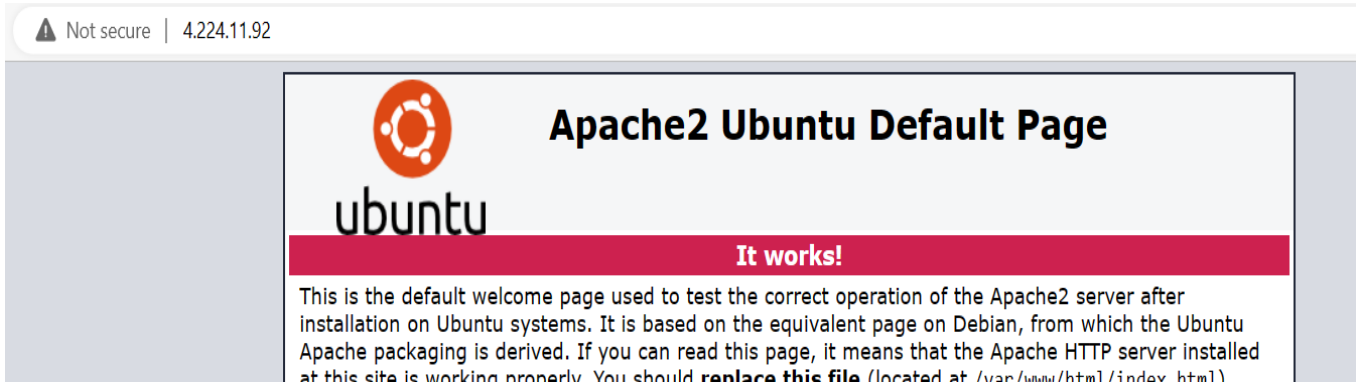
| Path | Target name | Backend setting name | Backend pool | |
|---|---|---|---|---|
| /vm1/* | vm1 | Defaultpage | pool1 | ••• |
| /vm2/* | vm2 | Defaultpage | pool2 | ••• |

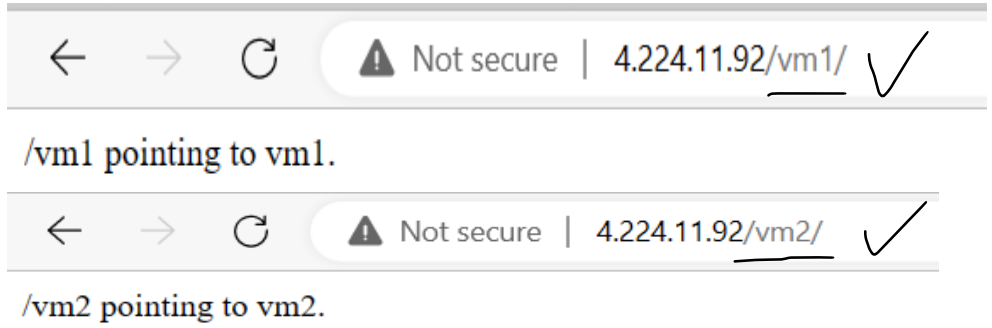
Add | Cancel

Do not put star sign




First it is taking us to the default web page but if we enter the path to the folder , this will show us the file inside the folder.



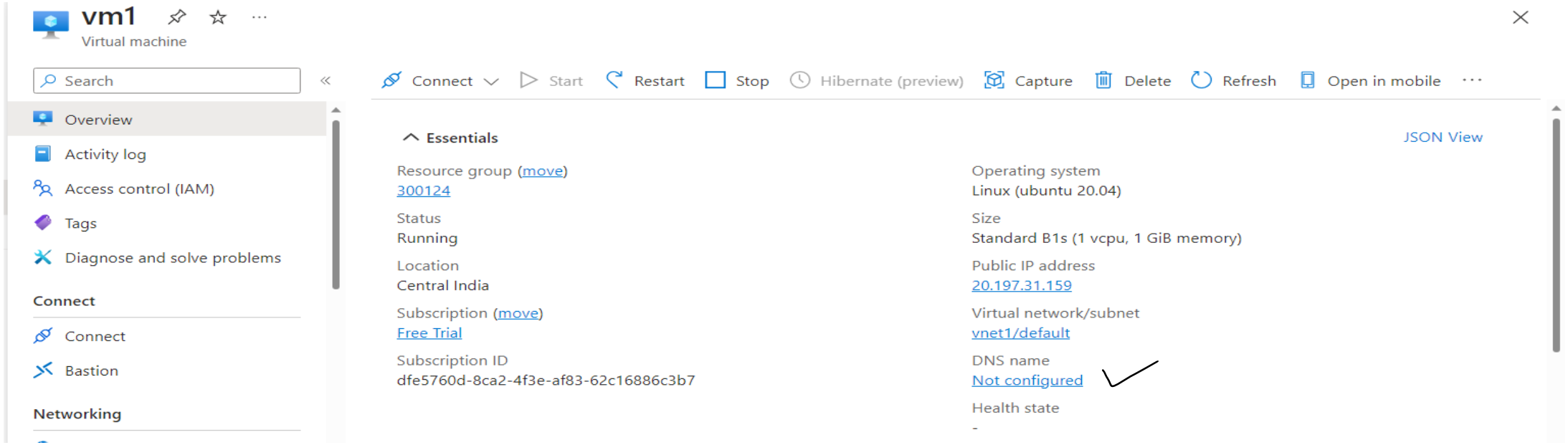



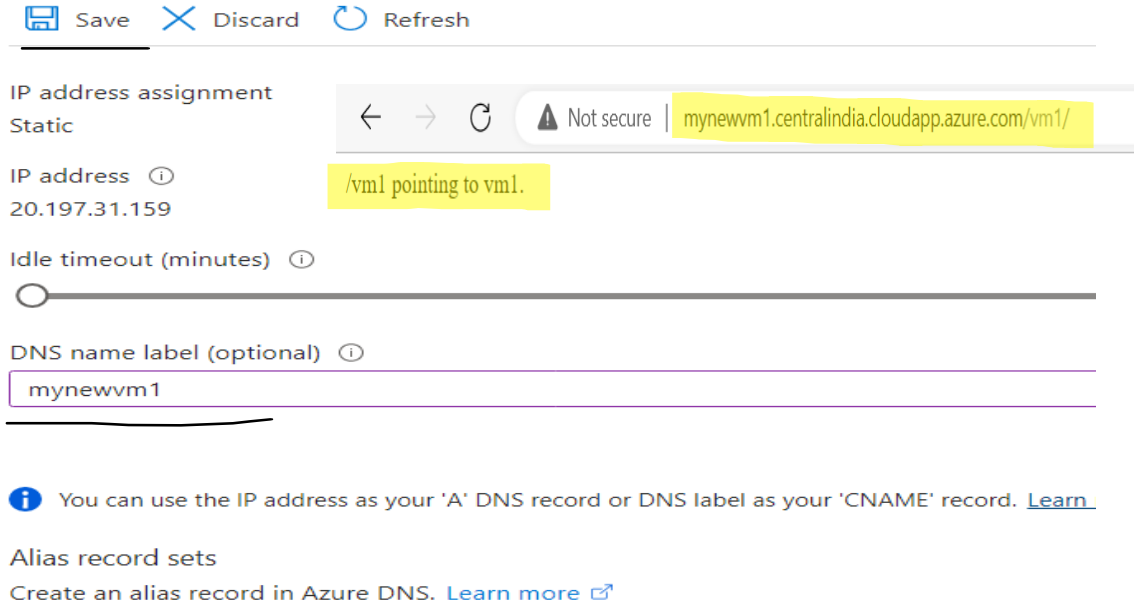
# Assignment 3

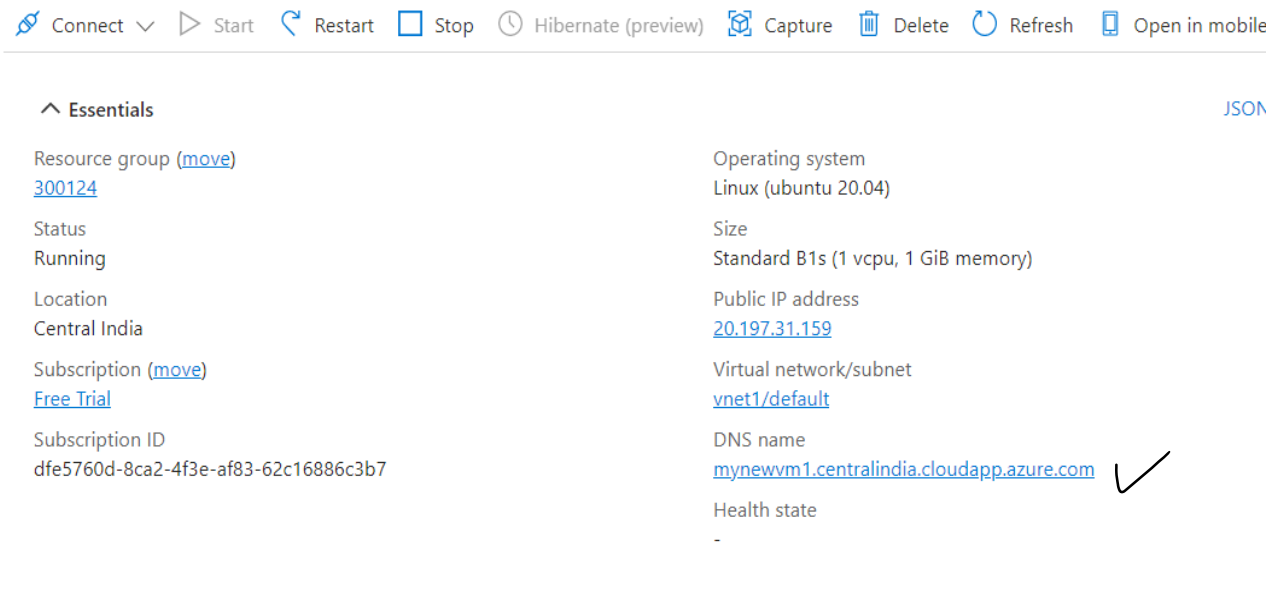
**Tasks To Be Performed:**

1. For the two VMs deployed previously configure DNS for the public IPs of the VM

# Move inside both VM –DNS Name – Save – Copy and search.



# Assignment 4

**Tasks To Be Performed:**

1. Deploy 2 VMs in different regions
2. Balance the load on these VMs geographically

To accomplish this please use Azure Traffic Manager

# Launch another virtual machine in different region and install apache2 server .

## Virtual machines

Default Directory

Create | Switch to classic | Reservations | Manage view | Refresh | Export to CSV | Open query | Assign tags | Start | Restart | Stop

Filter for any field... | Subscription equals **all** | Type equals **all** | Resource group equals **all** | Location equals **all** | Add filter

Showing 1 to 2 of 2 records.

| Name | Type | Subscription | Resource group | Location | Status | Operating system |
|---|---|---|---|---|---|---|
| vm1 | Virtual machine | Free Trial | 300124 | Central India | Running | Linux |
| vm3 | Virtual machine | Free Trial | 300124 | Japan East | Running | Linux |

```
sid@vm3:~$ cd /var/www/html
sid@vm3:/var/www/html$ ls
index.html
sid@vm3:/var/www/html$ sudo rm index.html
sid@vm3:/var/www/html$ sudo nano index.html
sid@vm3:/var/www/html$ sudo cat index.html
This is vm3 for distribute load geographically.
sid@vm3:/var/www/html$
```

Search for traffic manager – create- Routing method(Geographic)- the closest region VM would respond when request comes.

Home > Load balancing | Traffic Manager >

## Create Traffic Manager profile

Name *
new1

Routing method
Geographic

Subscription *
Free Trial

Resource group *
300124
Create new

Resource group location
Central India

Create | Automation options

## new1 | Endpoints

Traffic Manager profile

Search

Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems

Settings
Configuration
Real user measurements
Traffic view
Endpoints
Properties
Locks

Monitoring
Alerts
Metrics
Diagnostic settings
Logs

Add

Search en

Name

No results.

## Add endpoint

new1

Type *
Azure endpoint

Name *
ep1

Enable Endpoint

Target resource type
Public IP address

Public IP address *
vm1-ip (20.197.31.159)

Geo-mapping

You may choose to distribute traffic based on specific geographic locations. The same location can't be specified in two endpoints.

| Regional grouping | Country/Region | State/Province |
|---|---|---|
| All (World) | Choose a Country... | Choose a State/Pr... |
| Choose a regiona... | Choose a Country... | Choose a State/Pr... |

Custom Header settings
Configure in this format, host:contoso.com,customheader:contoso

Do NOT input sensitive customer data in this field (i.e. APIKeys, Secrets, and Auth tokens

Add

Create another endpoint with another VM IP address – if it is saying DNS not configure then go to VM and configure DNS and then add- copy the DNS of Traffic manager and search it will take you nearest region VM closest to your region.

# Add endpoint

new1

Type * ⓘ

Azure endpoint

Name *

ep2

Enable Endpoint

Target resource type

Public IP address

Public IP address *

vm3-ip (20.194.234.214)

Geo-mapping

You may choose to distribute traffic based on specific geographic locations. The same location can't be specified in two endpoints.

| Regional grouping | Country/Region | State/Province |
|---|---|---|
| Australia / Pacific | Choose a Country... | Choose a State/Pr... |
| Choose a regiona... | Choose a Country... | Choose a State/Pr... |

Custom Header settings ⓘ

Configure in this format, host:contoso.com,customheader:contoso

⚠ Do NOT input sensitive customer data in this field (i.e. APIKeys, Secrets, and Auth tokens

Add

# new1 | Endpoints

Traffic Manager profile

Search

Overview
Activity log
Access control (IAM)
Tags

Add Refresh

Search endpoints

| Name | Status | Monitor status | Type |
|---|---|---|---|
| ep1 | Enabled | Online | Azure endpoint |
| ep2 | Enabled | Online | Azure endpoint |

# new1

Traffic Manager profile

Search

Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems

Enable profile Disable profile Refresh Move Delete profile

Essentials JSON View

Resource group (move)
300124

DNS name
http://new1.trafficmanager.net

Status
Enabled

Monitor status
Online

Subscription (move)
Free Trial

Routing method
Geographic

Not secure | new1.trafficmanager.net

## Apache2 Ubuntu Default Page

ubuntu

**It works!**

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

# Assignment 5

**Tasks To Be Performed:**

1. Create a VM without public IP address
2. Connect to this VM using bastion host

Create the ubuntu VM – in public IP choose none.

Home > Virtual machines >

# Create a virtual machine

Basics | Disks | Networking | Management | Monitoring | 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

## Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * : (new) vm4-vnet
Create new

Subnet * : (new) default (10.0.0.0/24)

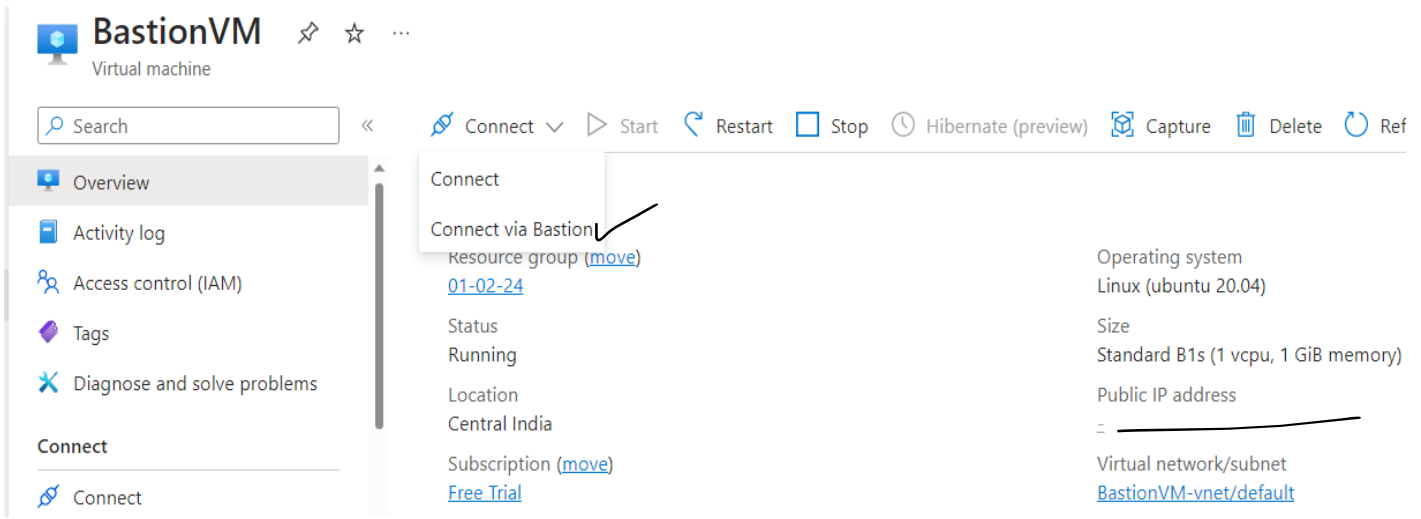
Public IP : None
Create new

NIC network security group : None / Basic / Advanced

Public inbound ports * : None / Allow selected ports

Select inbound ports * : HTTP (80), HTTPS (443), SSH (22)

Review + create | < Previous | Next : Management >




Azure Bastion protects your virtual machines by providing lightweight, browser-based connectivity without the need to expose them through public IP addresses. Deploying will automatically create a Bastion host on a subnet in your virtual network. Learn more

**Create Bastion**

| | |
|---|---|
| Name | BastionVM-vnet-bastion |
| Resource group | 01-02-24 |
| Virtual network | BastionVM-vnet |
| Public IP address | BastionVM-vnet-ip |

Bastion pricing starts with an hourly base rate. Learn more

Deploy Bastion | Configure manually

Click on connect – this will redirected to new browser where VM run – allow pop-up .