



IT4090
Cloud Computing
4th Year, 1st Semester

<Azure Lab 04>

**Create a public load balancer to load
balance VMs using the Azure portal URL**

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<8.25.2024>

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1. Create NAT gateway

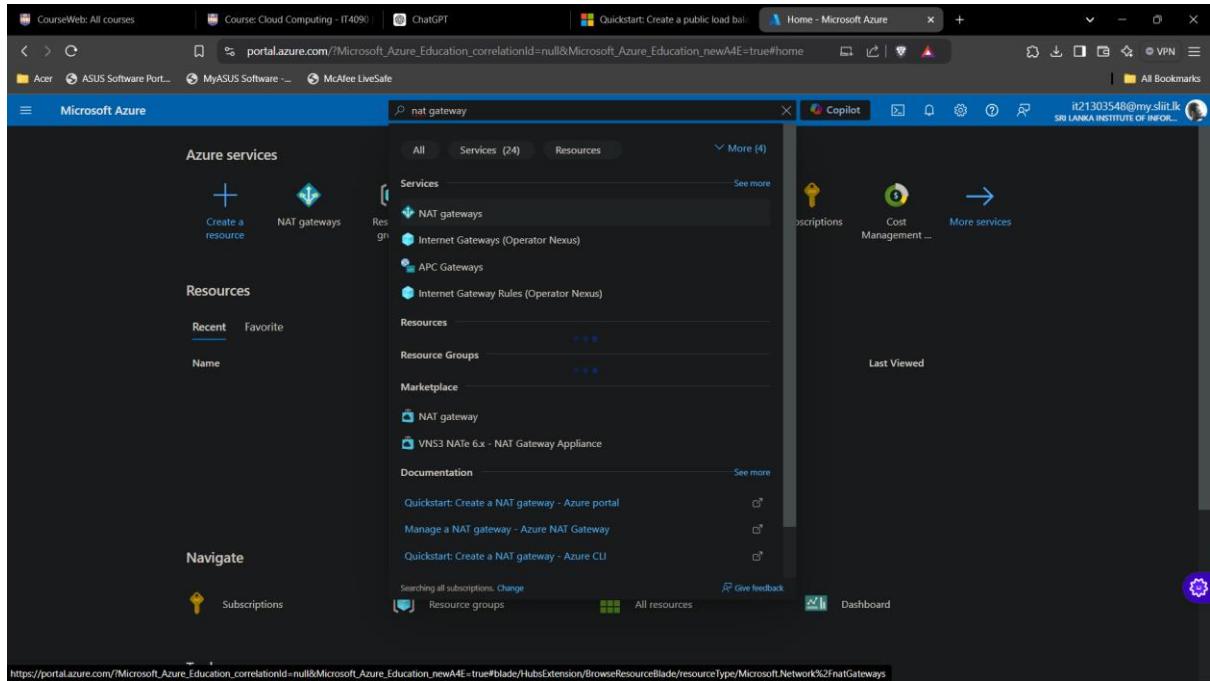


Figure 1 : Search NAT Gateways

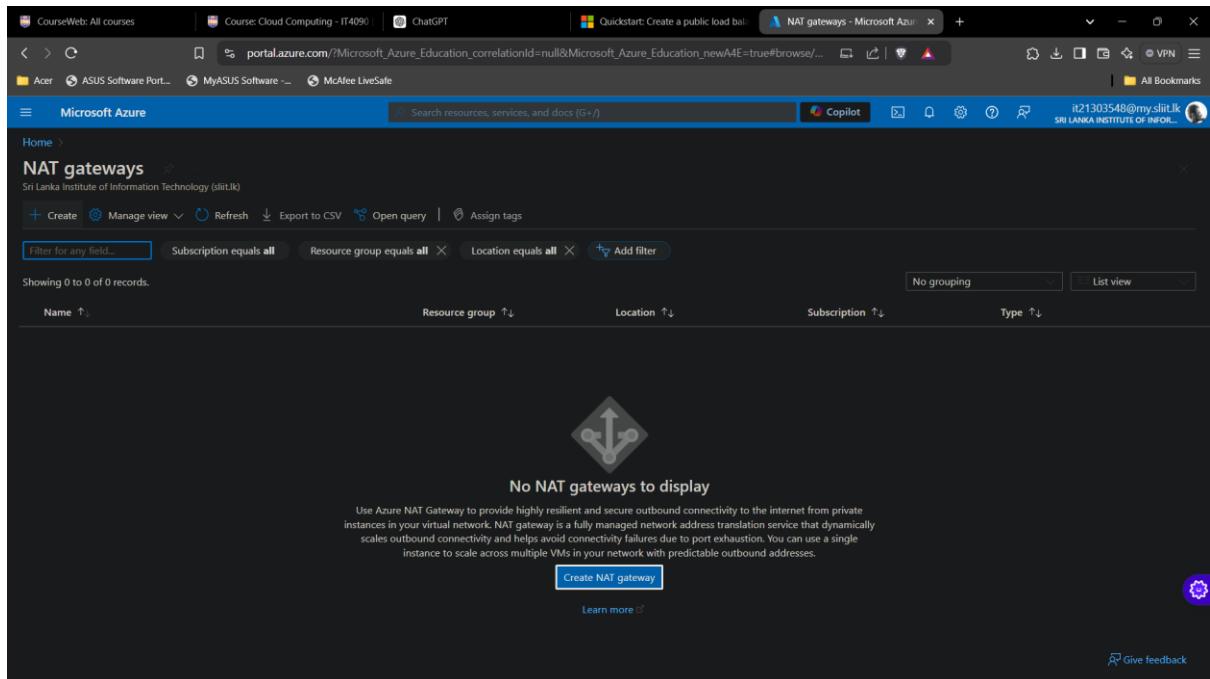


Figure 2 : Open NAT Gateways

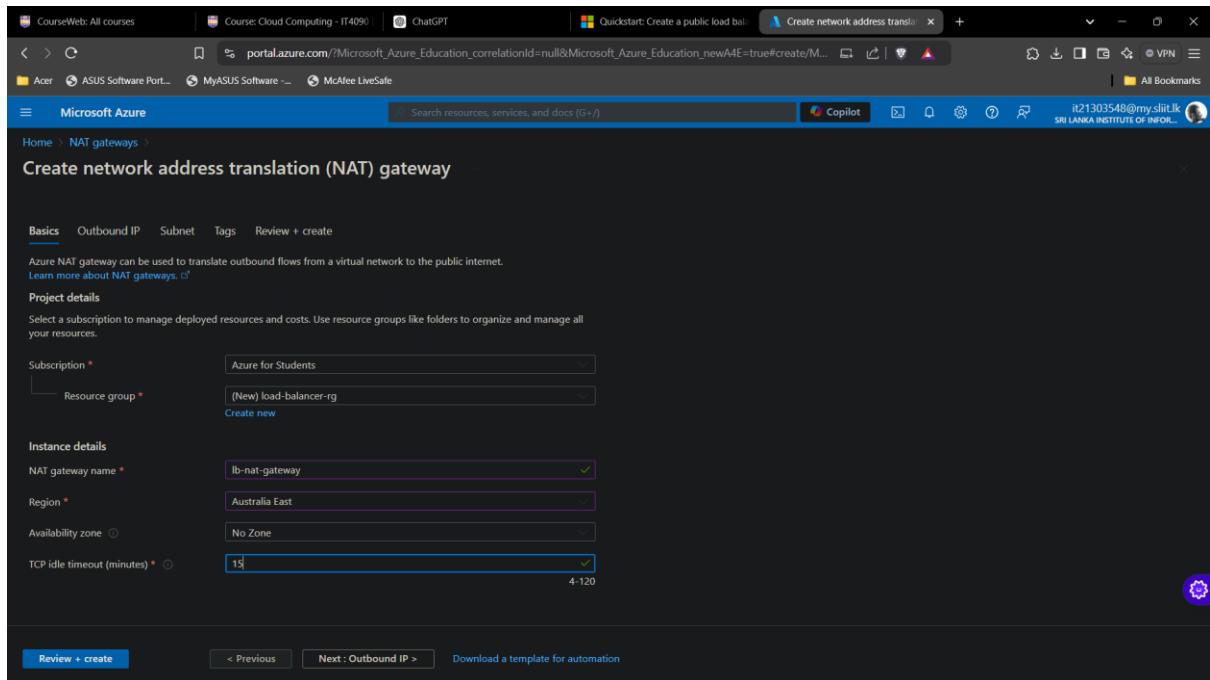


Figure 3 : Fill the Basic Information for NAT Gateway

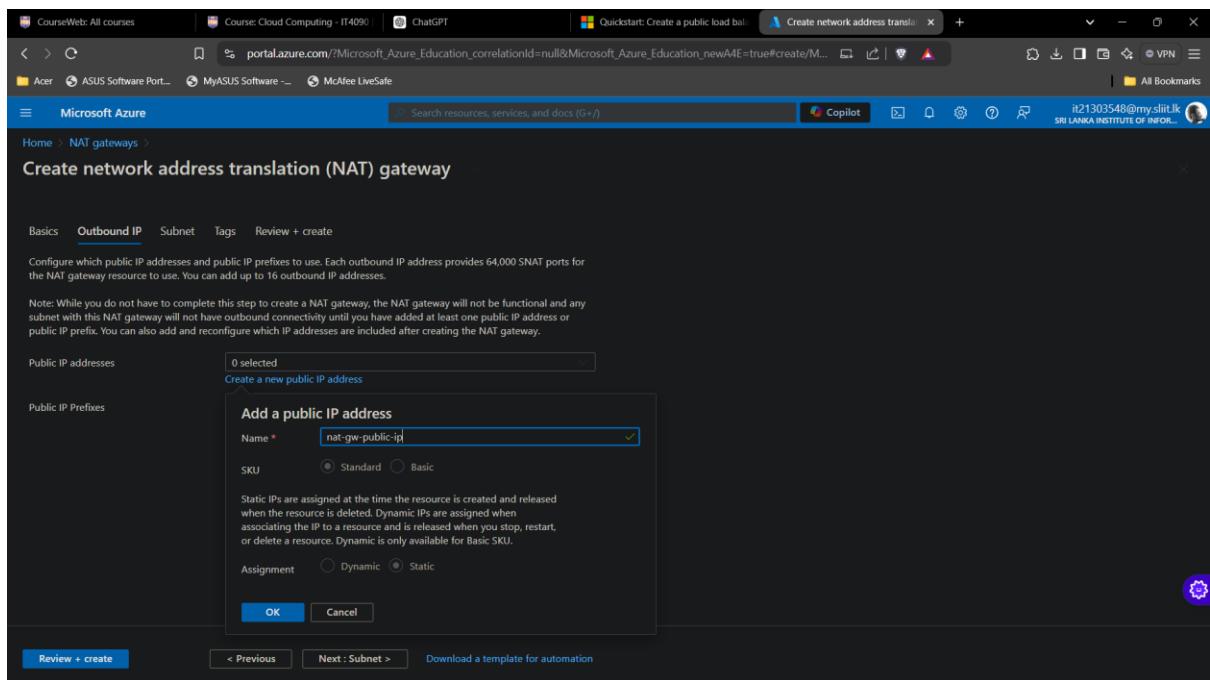
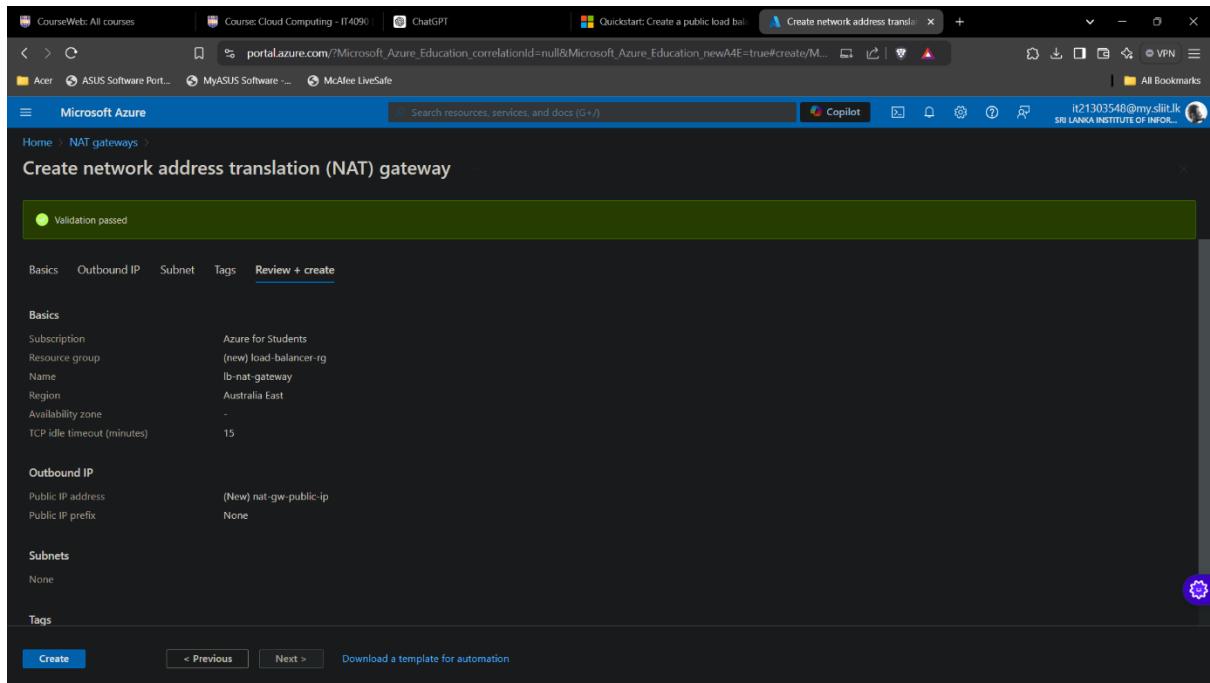


Figure 4 : Fill the outbound IP



Validation passed

Basics Outbound IP Subnet Tags Review + create

Basics

Subscription	Azure for Students
Resource group	(new) load-balancer-rg
Name	lb-nat-gateway
Region	Australia East
Availability zone	-
TCP idle timeout (minutes)	15

Outbound IP

Public IP address	(New) nat-gw-public-ip
Public IP prefix	None

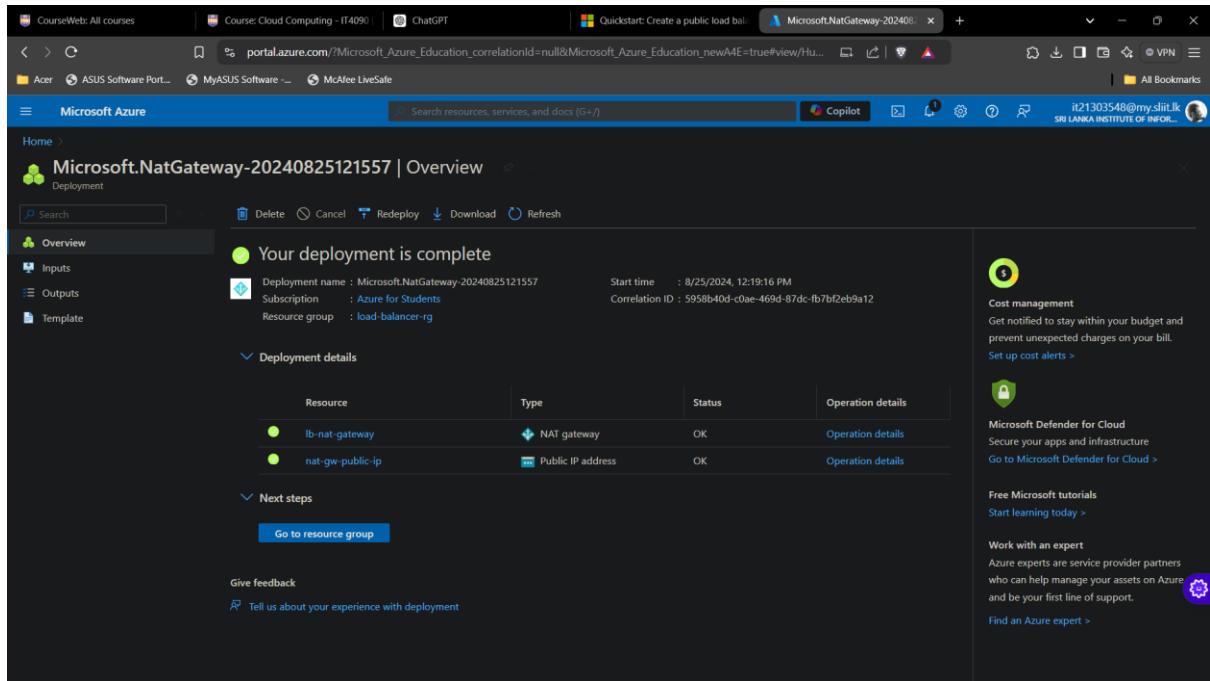
Subnets

None

Tags

Create < Previous Next > Download a template for automation

Figure 5 : Review Nat Gateways



Deployment

Search Delete Cancel Redeploy Download Refresh

Your deployment is complete

Deployment name : Microsoft.NatGateway-20240825121557	Start time : 8/25/2024, 12:19:16 PM
Subscription : Azure for Students	Correlation ID : 5958b40d-c0ae-469d-87dc-fb7bf2eb9a12
Resource group : load-balancer-rg	

Deployment details

Resource	Type	Status	Operation details
lb-nat-gateway	NAT gateway	OK	Operation details
nat-gw-public-ip	Public IP address	OK	Operation details

Next steps

Go to resource group

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Figure 6 : After Create NAT Gateway

2. Create a virtual network and bastion host

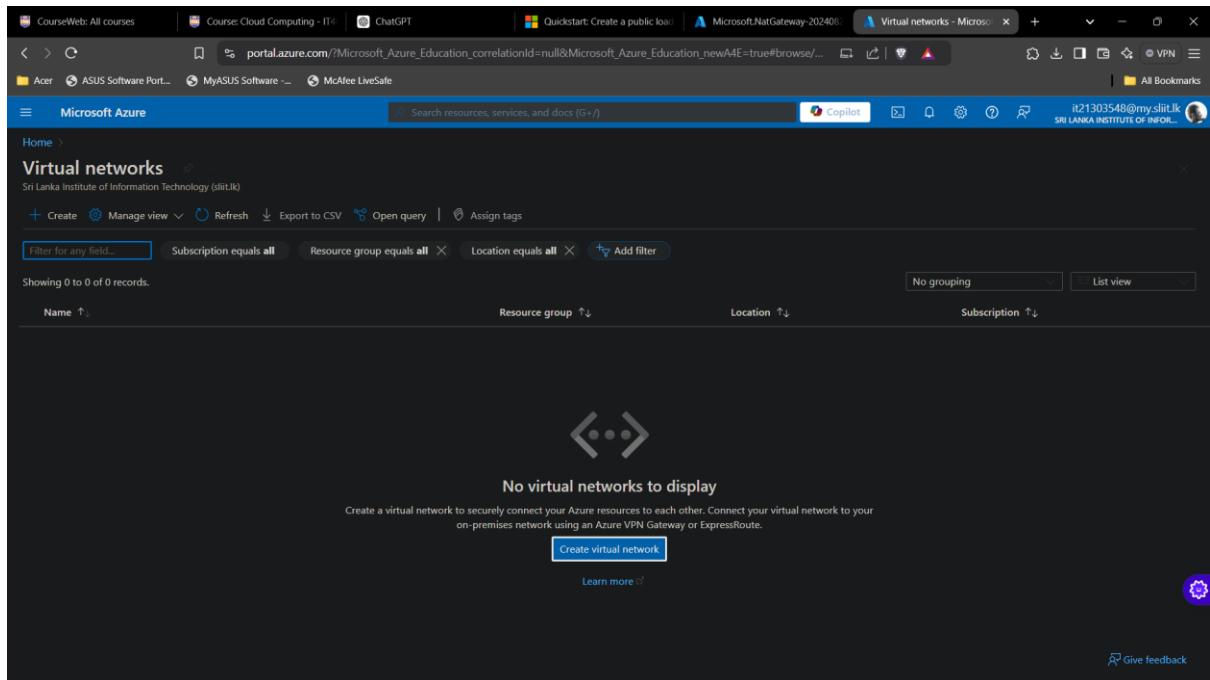


Figure 7 : Search Virtual Networks

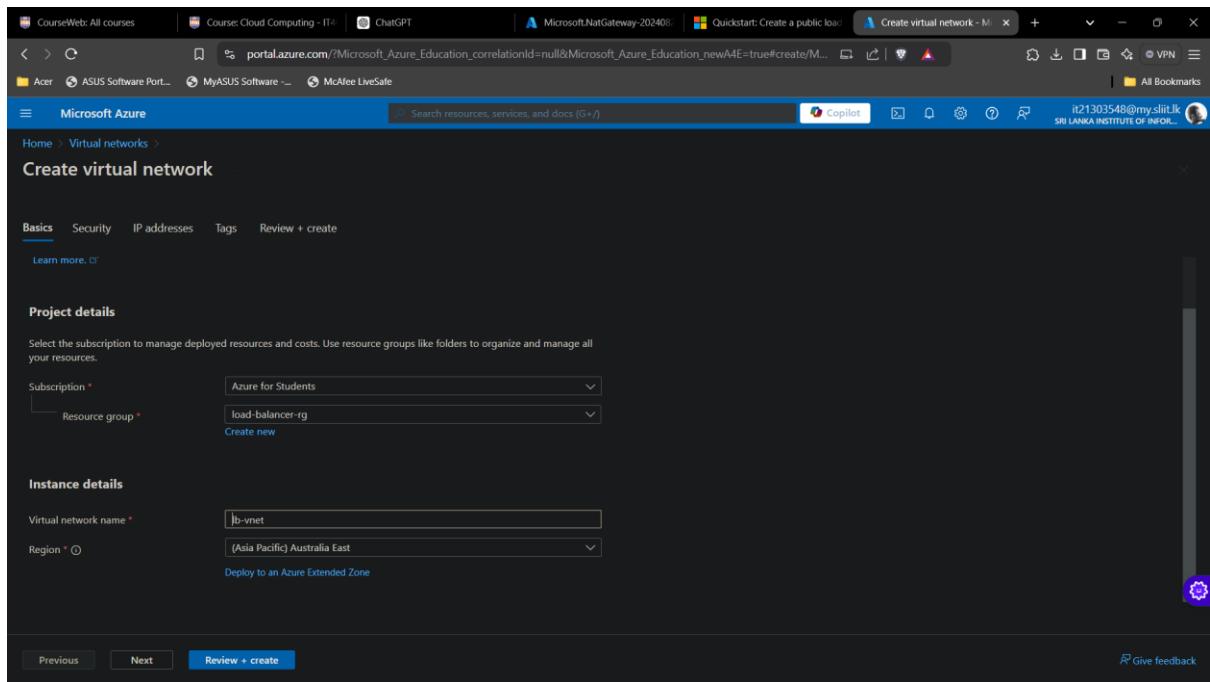


Figure 8 : Open Create Virtual Network

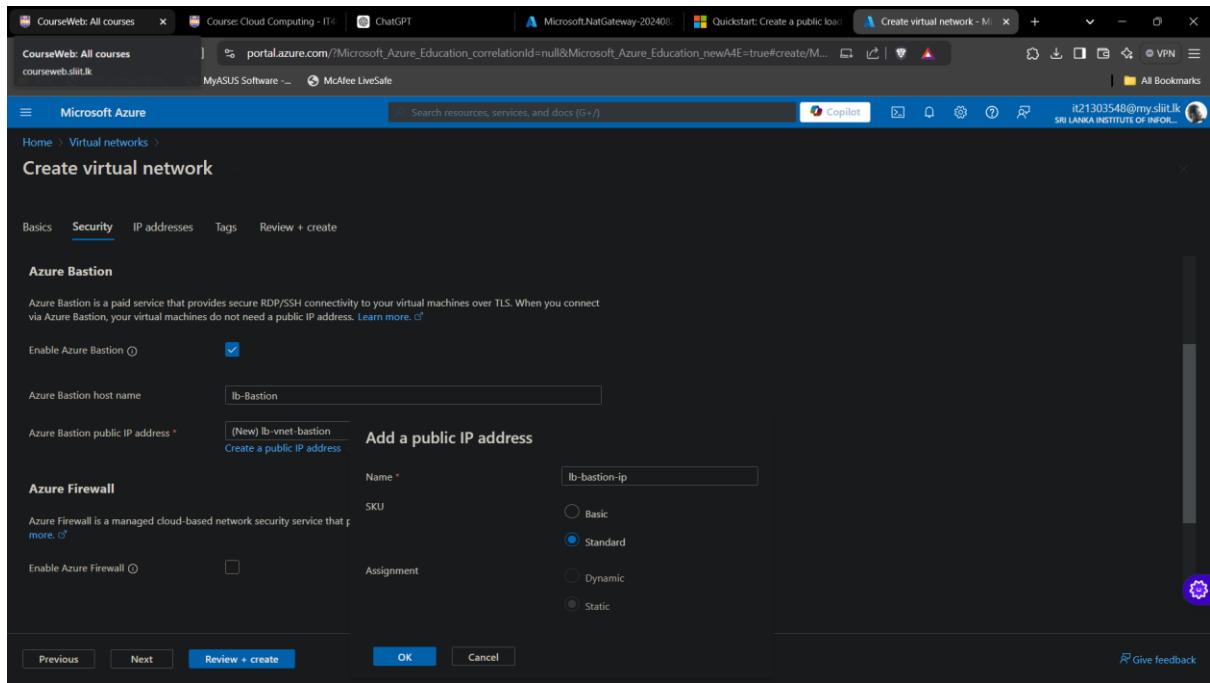


Figure 9 : Fill The Basic Information and Security Information

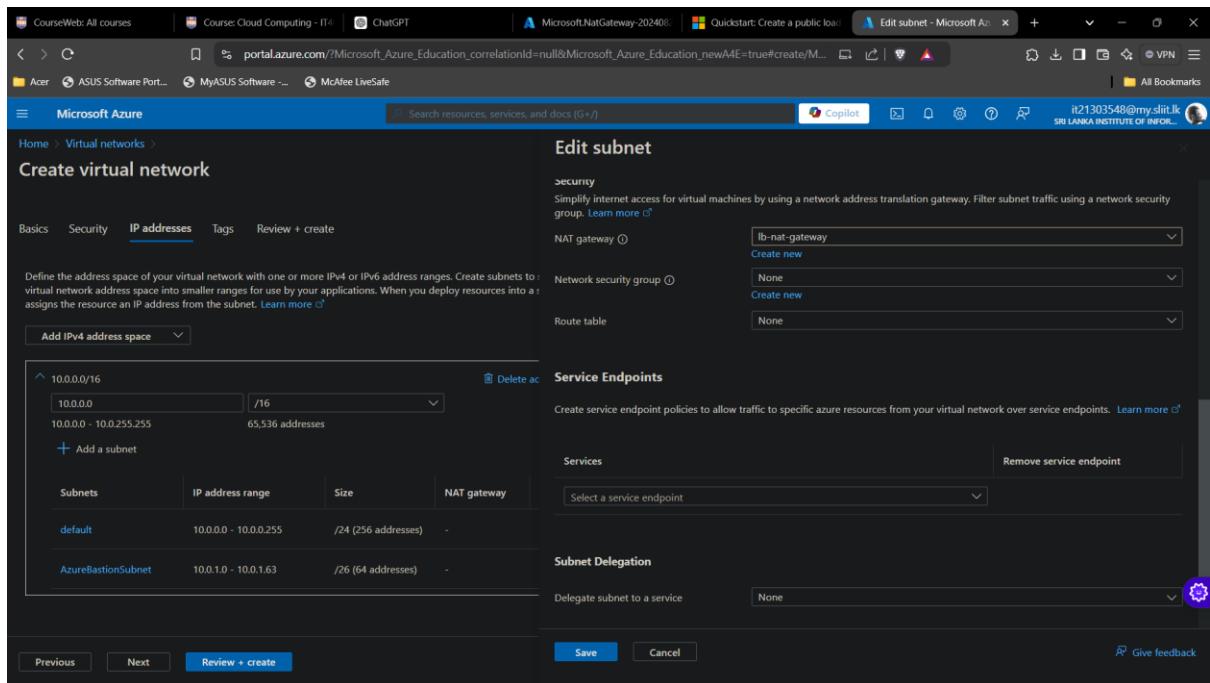


Figure 10 : Fill the IP Address Edit subnet

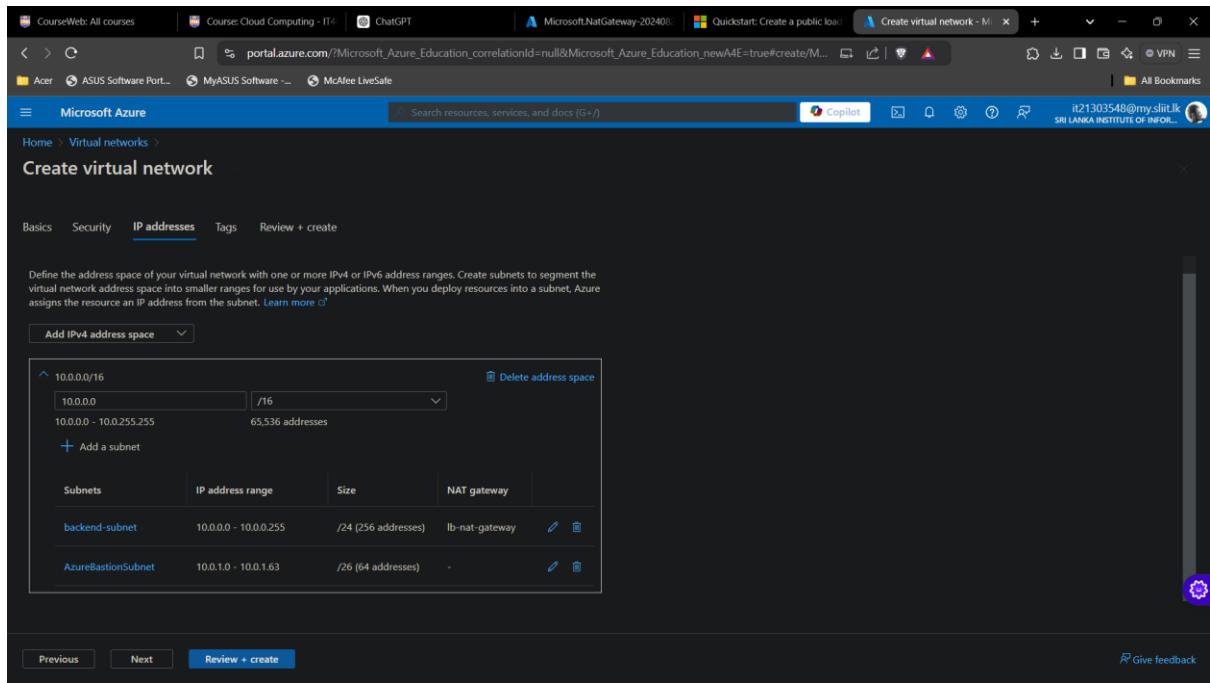


Figure 11 : After save Edit subnet

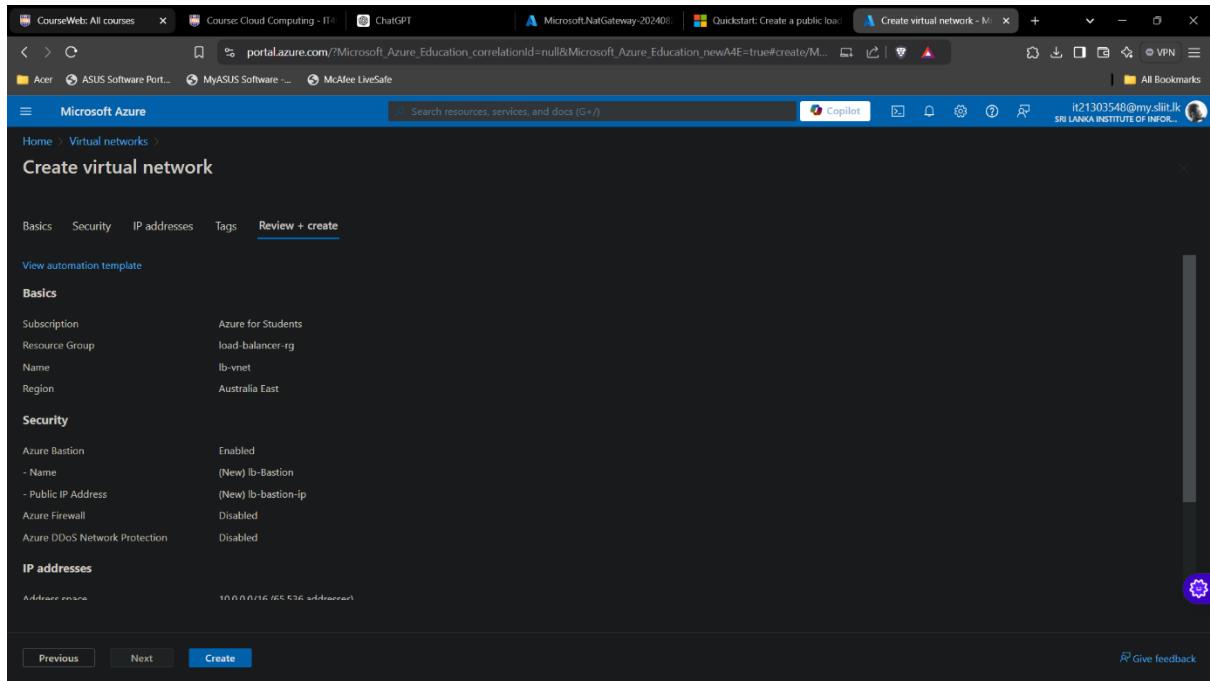


Figure 12 : Reviewing Virtual Networks Details

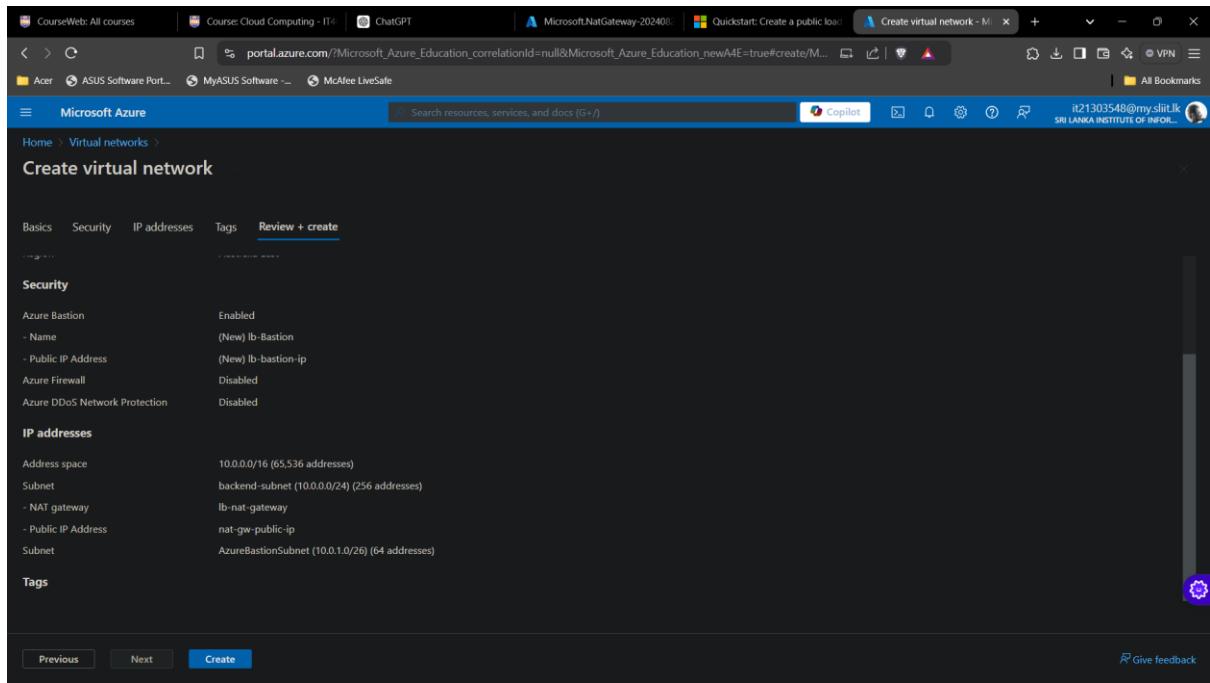


Figure 13 : Reviewing Virtual Networks Details2

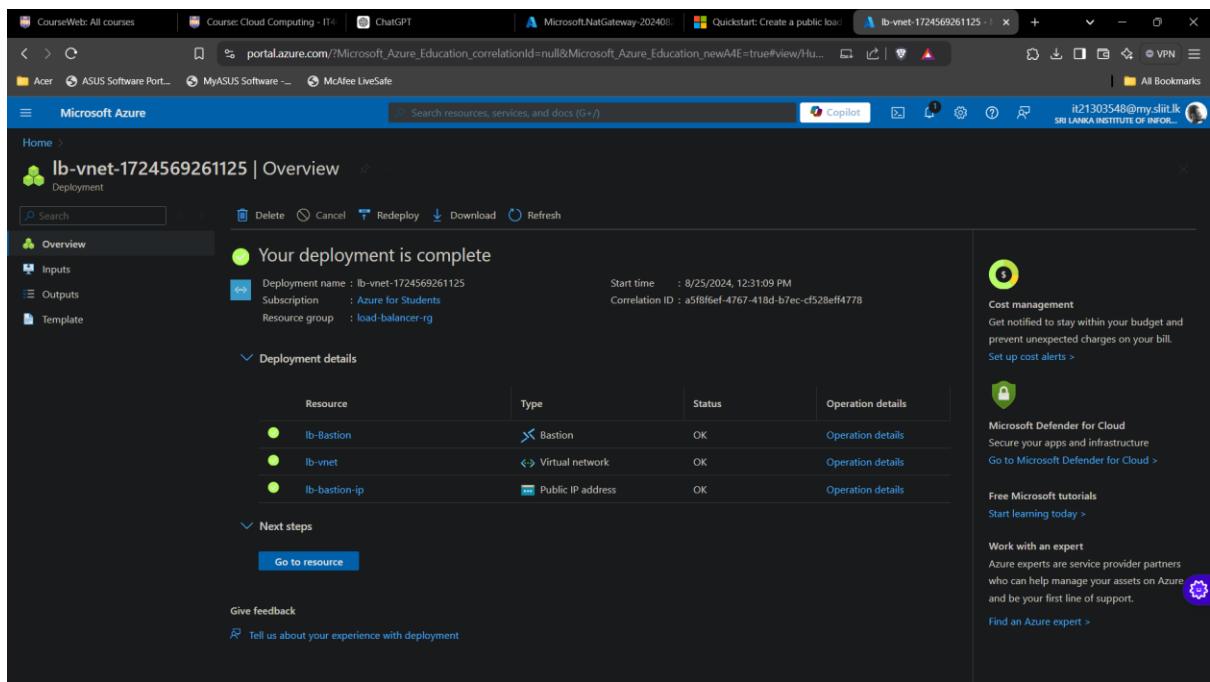
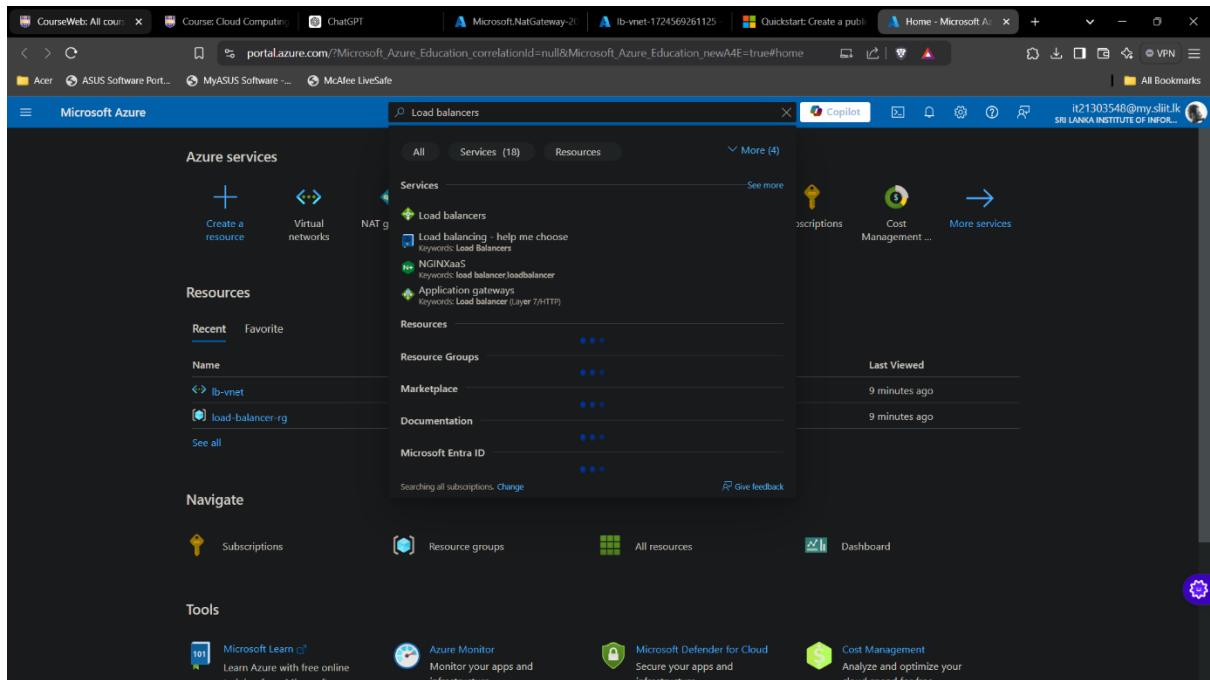


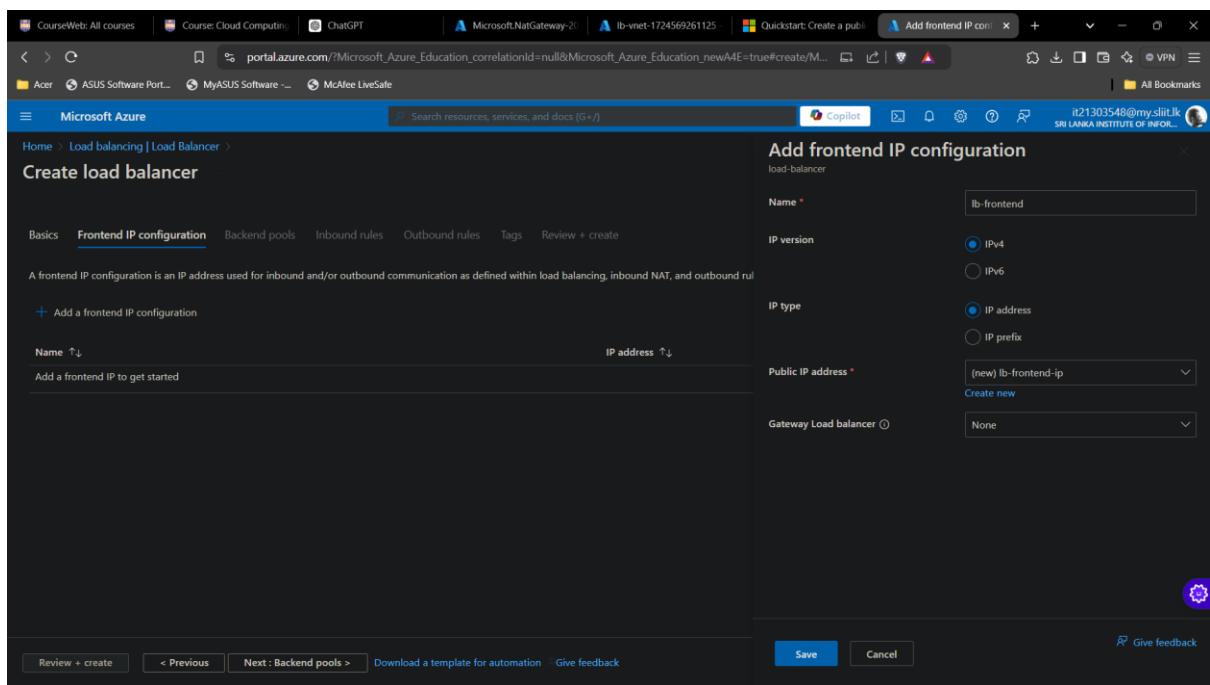
Figure 14 : Finally deployed Network

3. Create load balancer



The screenshot shows the Microsoft Azure portal interface. The search bar at the top contains the text 'Load balancers'. The main results pane shows a list of services under the 'Services' category, with 'Load balancers' being the top result. Other listed services include 'Load balancing - help me choose', 'NGINXaaS', and 'Application gateways'. Below the services, there are sections for 'Resources' (Recent and Favorite), 'Resource Groups', 'Marketplace', 'Documentation', and 'Microsoft Entra ID'. The bottom of the screen features a 'Tools' section with links to Microsoft Learn, Azure Monitor, Microsoft Defender for Cloud, and Cost Management.

Figure 15 : Search Load balancers



The screenshot shows the 'Create load balancer' wizard in the Microsoft Azure portal. The current step is 'Add frontend IP configuration'. The form is titled 'Add frontend IP configuration' and has a sub-section 'load-balancer'. It includes fields for 'Name' (set to 'lb-frontend'), 'IP version' (set to 'IPv4'), 'IP type' (set to 'IP address'), and 'Public IP address' (set to '(new) lb-frontend-ip'). There is also a 'Gateway Load balancer' dropdown set to 'None'. At the bottom of the form are 'Save' and 'Cancel' buttons.

Figure 16 : Add frontend IP Configuration Details

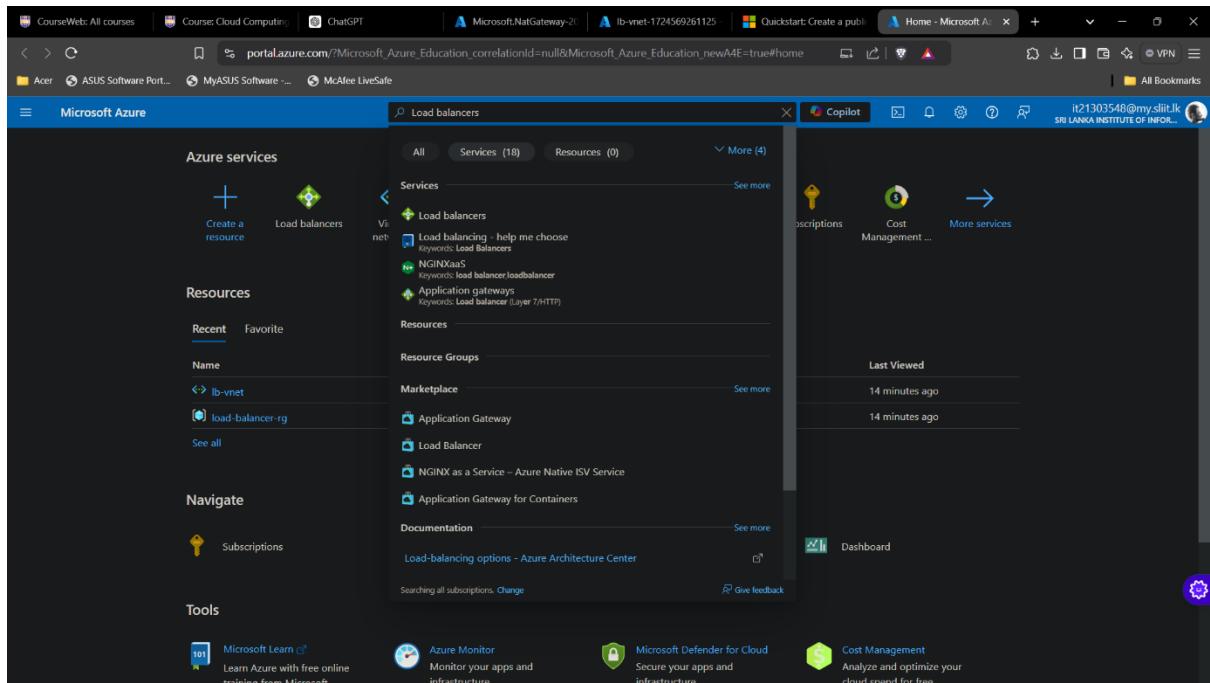


Figure 17 : Search Load balancers

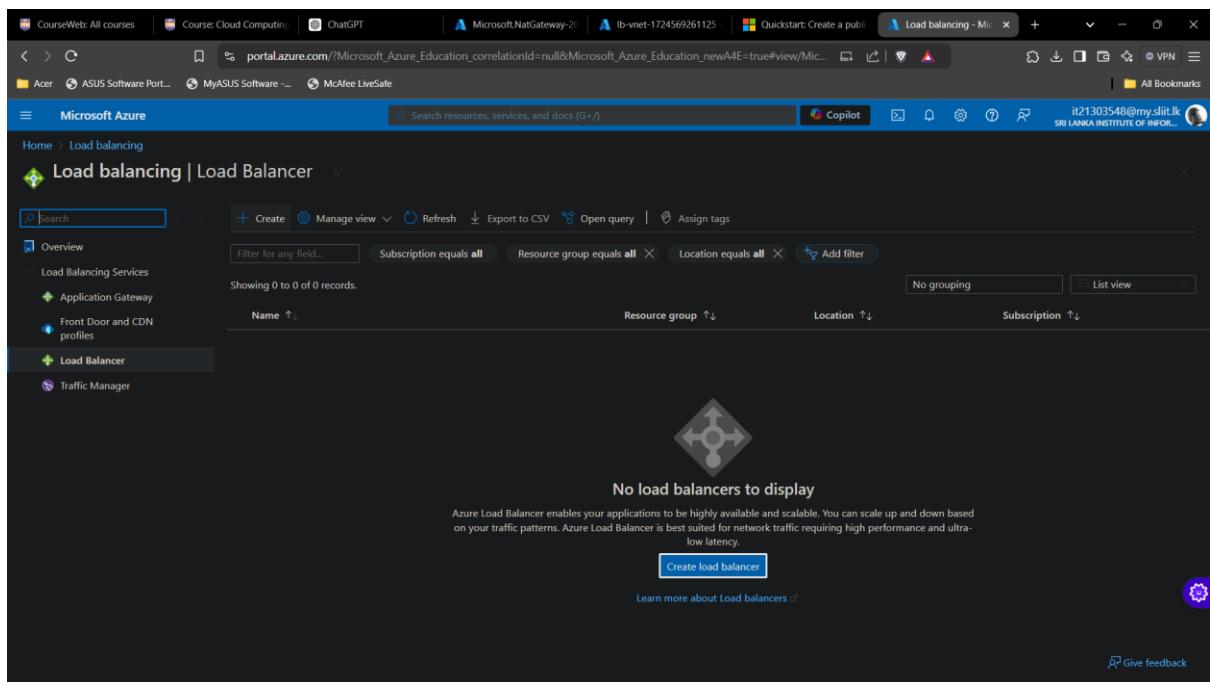


Figure 18 : Create Load Balancers

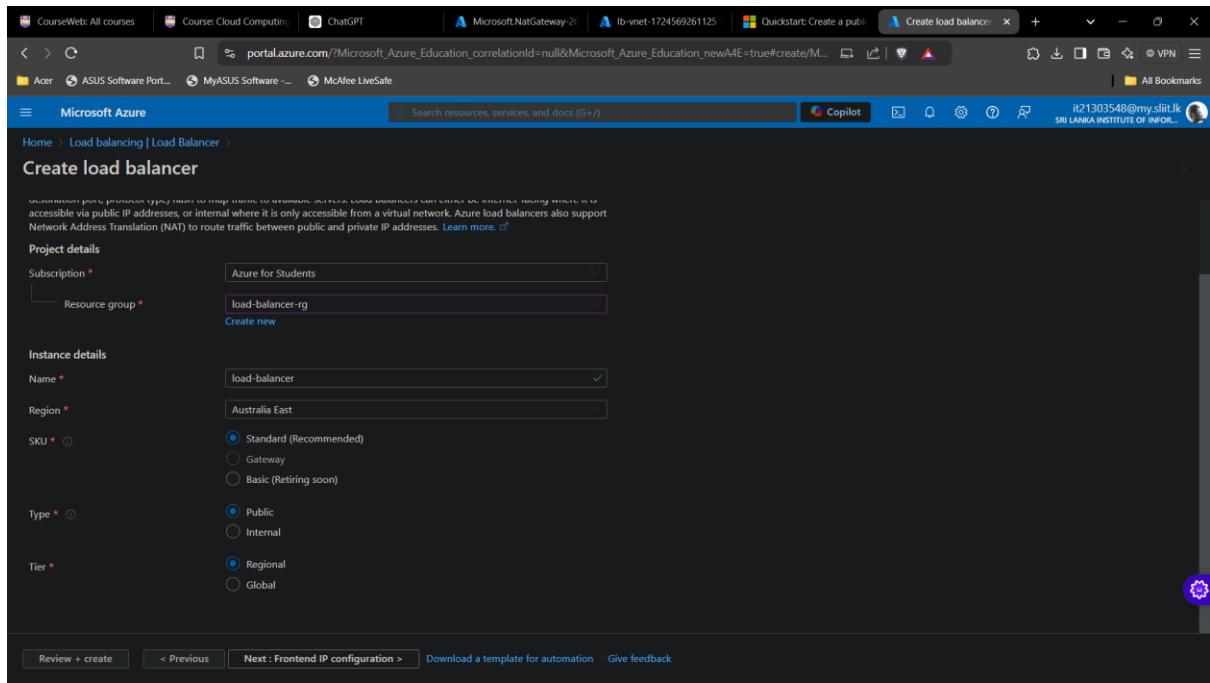


Figure 19 : Create Load Balancers

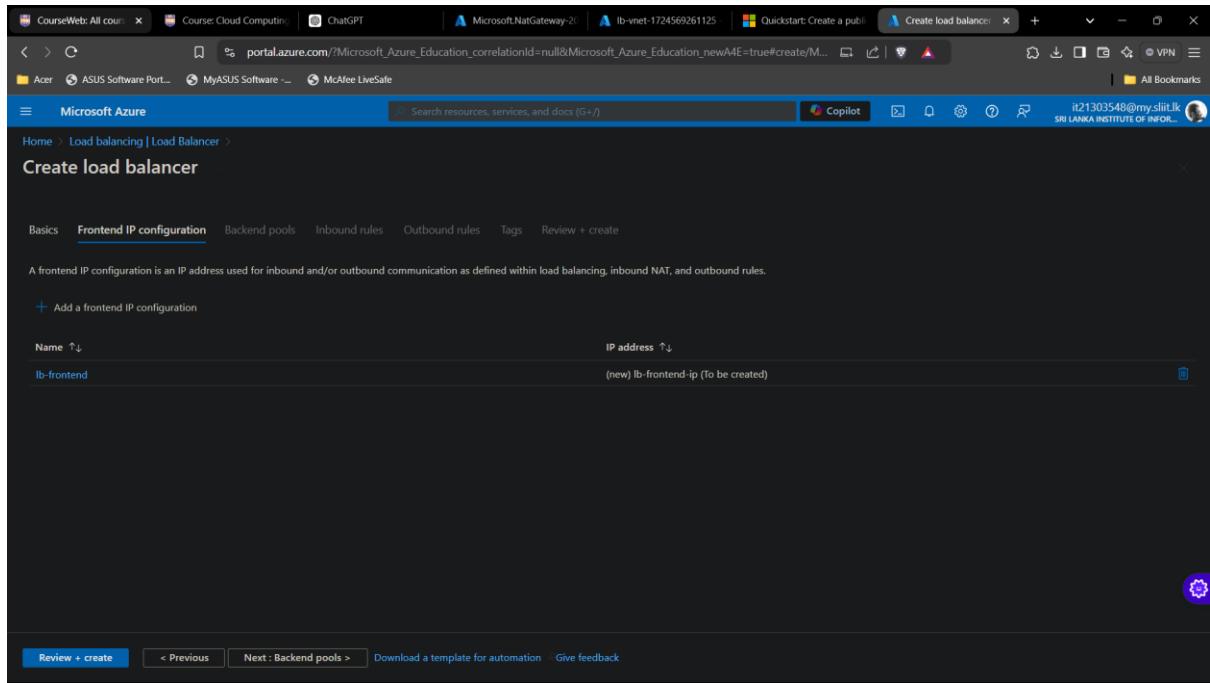


Figure 20 : Create Load Balancers

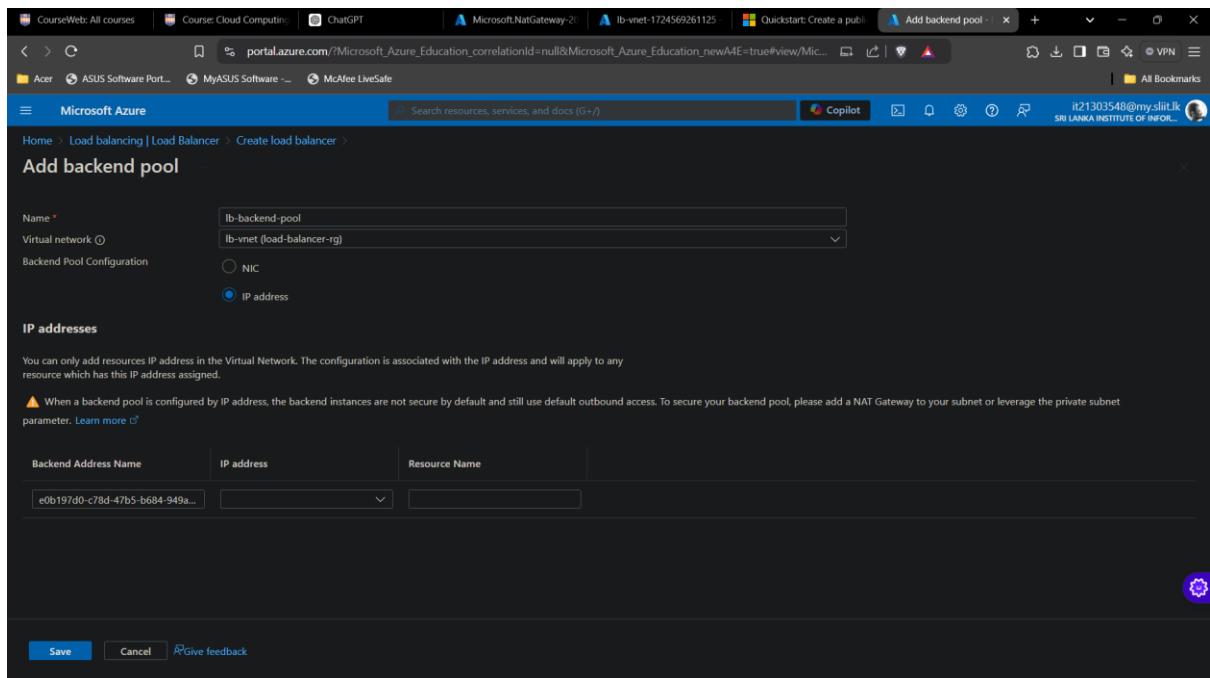


Figure 21 : Add backend pool

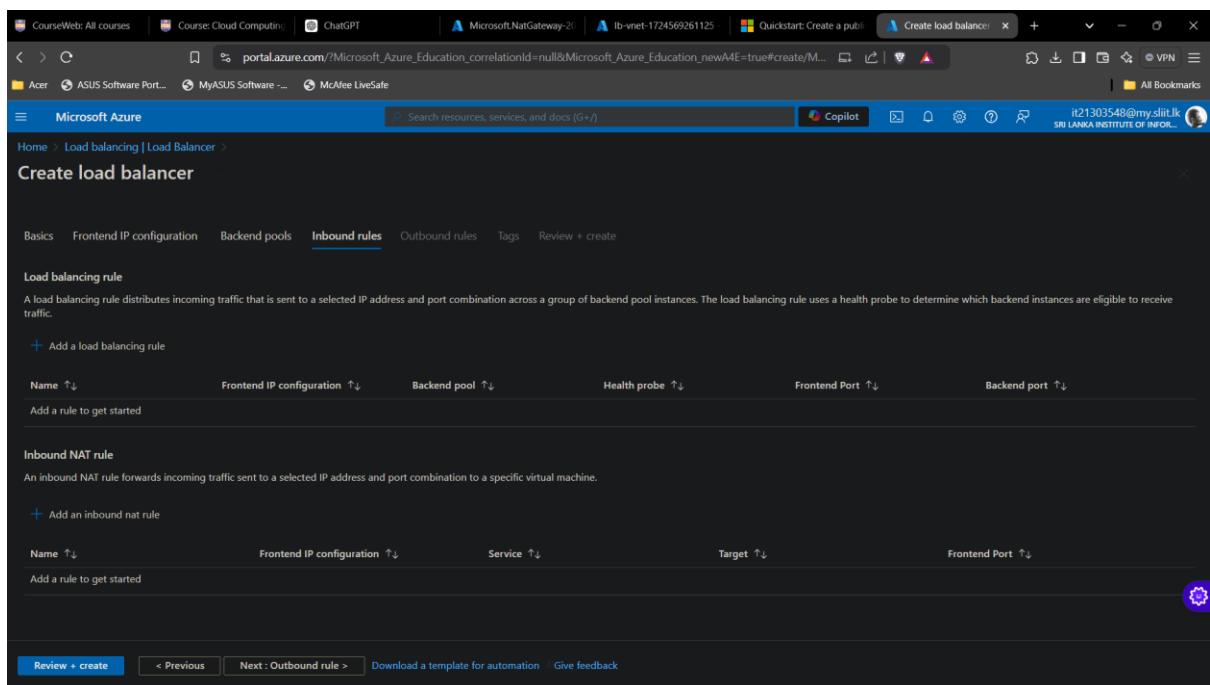
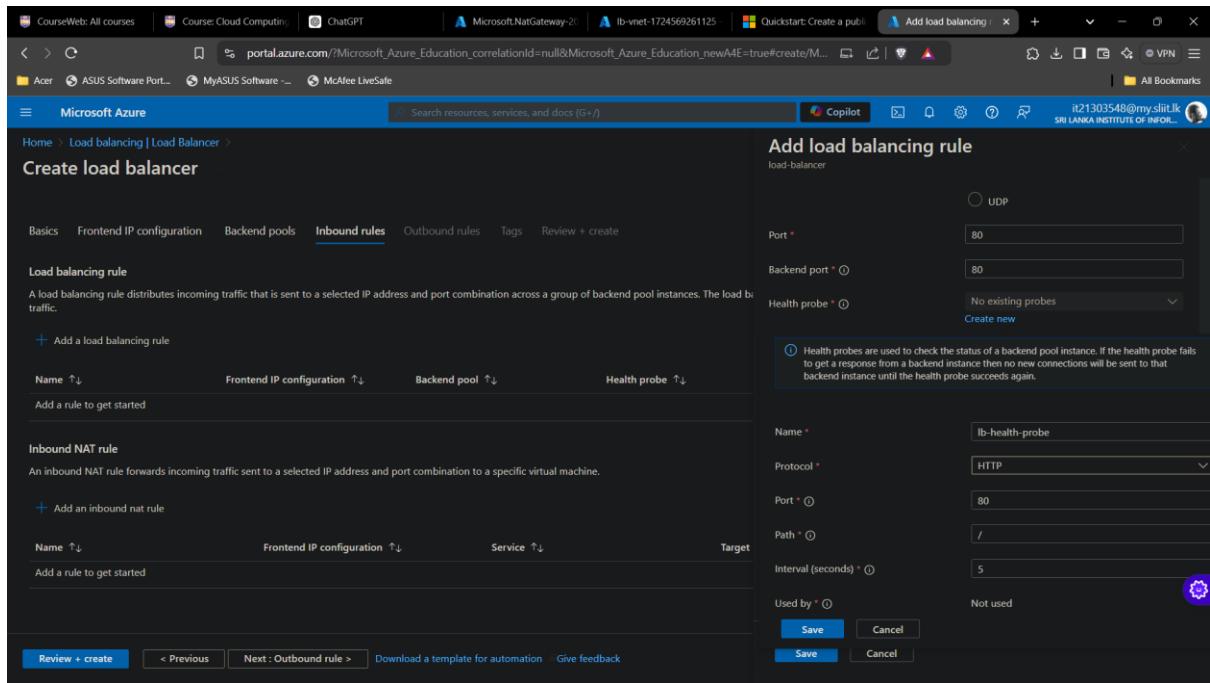
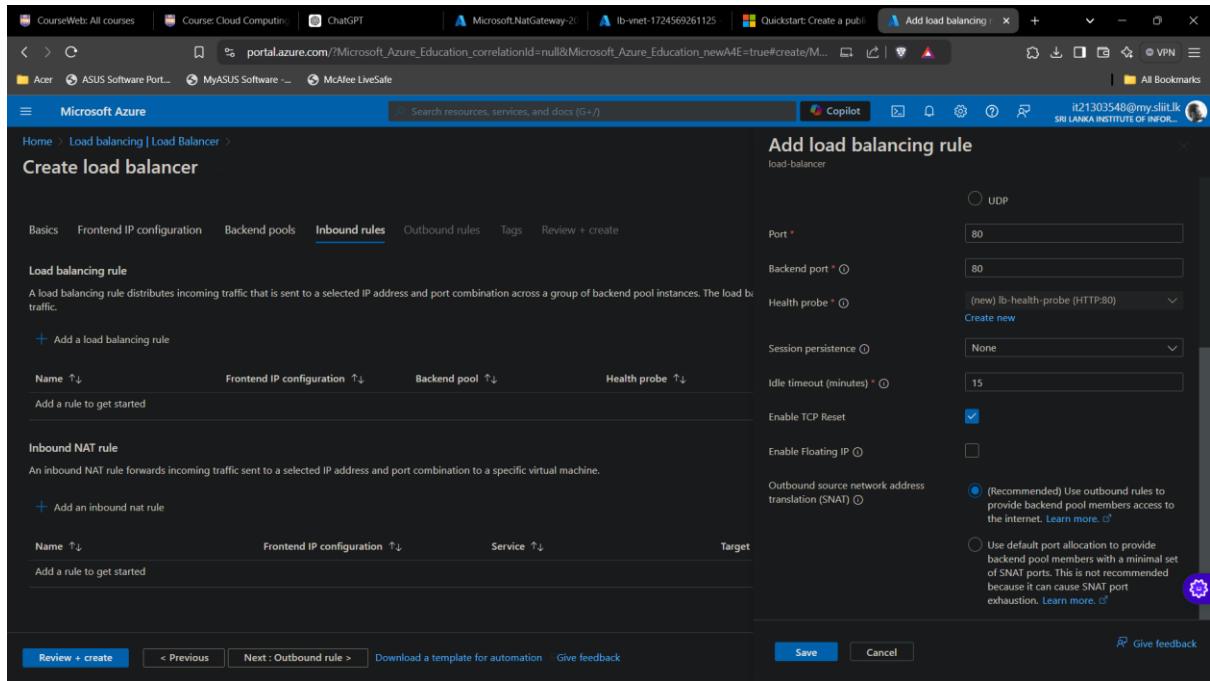


Figure 22 : After Load Balancers



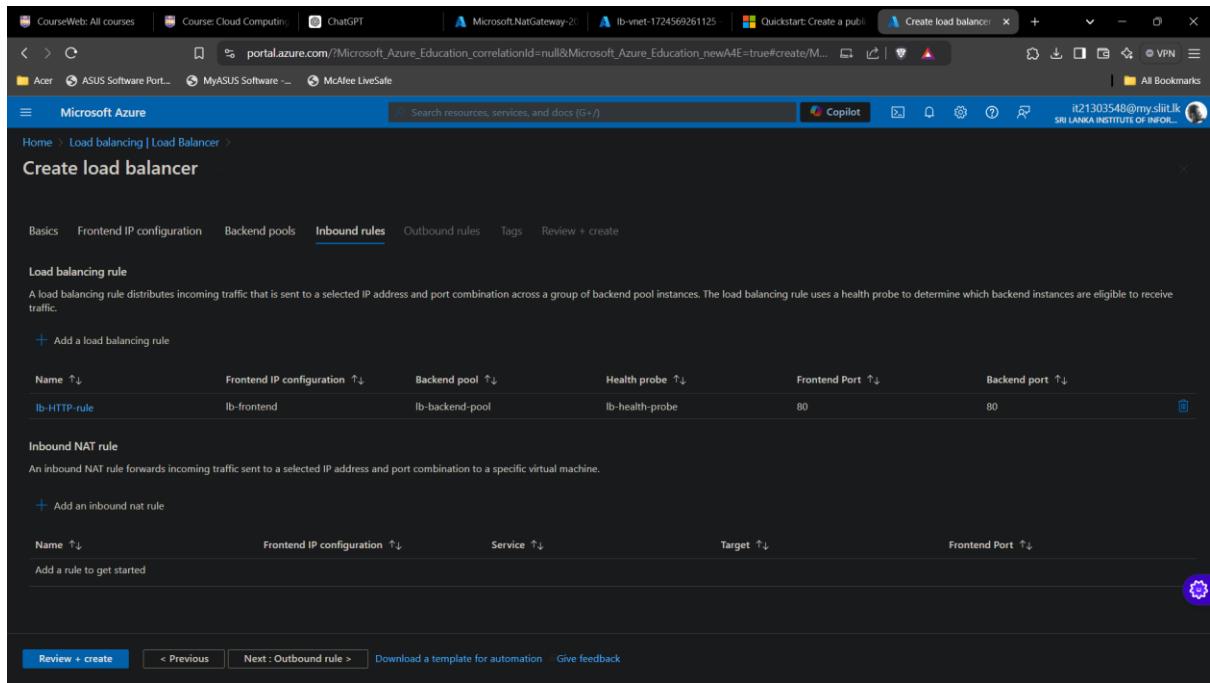
The screenshot shows the 'Add load balancing rule' configuration page in the Microsoft Azure portal. The rule is for port 80 to 80 using UDP. A new health probe 'lb-health-probe' is being created for HTTP port 80 with an interval of 5 seconds. The 'Save' button is highlighted.

Figure 23 : Add Load Balancing rule



The screenshot shows the 'Add load balancing rule' configuration page in the Microsoft Azure portal. The rule is for port 80 to 80 using UDP. A new health probe 'lb-health-probe' is being created for HTTP port 80 with an interval of 15 minutes. The 'Save' button is highlighted.

Figure 24 : Add Load Balancing rule 2



Inbound rules

Load balancing rule

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. The load balancing rule uses a health probe to determine which backend instances are eligible to receive traffic.

Add a load balancing rule

Name ↑↓	Frontend IP configuration ↑↓	Backend pool ↑↓	Health probe ↑↓	Frontend Port ↑↓	Backend port ↑↓
lb-HTTP-rule	lb-frontend	lb-backend-pool	lb-health-probe	80	80

Inbound NAT rule

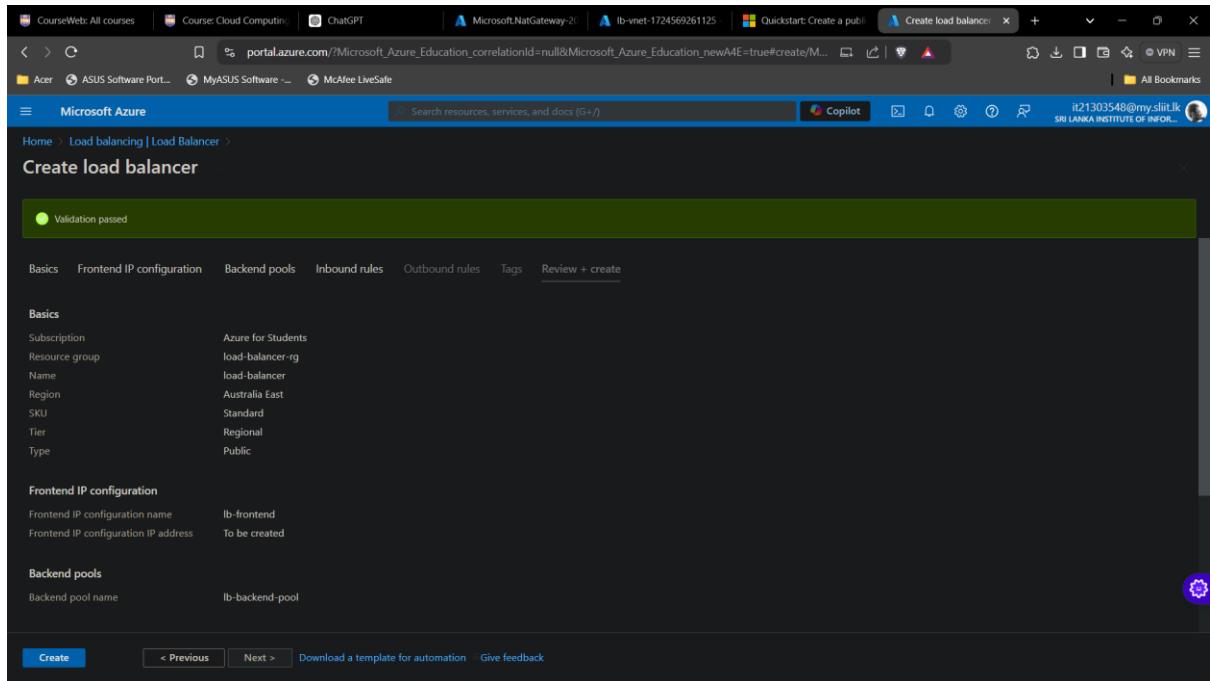
An inbound NAT rule forwards incoming traffic sent to a selected IP address and port combination to a specific virtual machine.

Add an inbound nat rule

Name ↑↓	Frontend IP configuration ↑↓	Service ↑↓	Target ↑↓	Frontend Port ↑↓
Add a rule to get started				

Review + create **< Previous** **Next : Outbound rule >** **Download a template for automation** **Give feedback**

Figure 25 : details



Validation passed

Basics

Subscription	Azure for Students
Resource group	load-balancer-rg
Name	load-balancer
Region	Australia East
SKU	Standard
Tier	Regional
Type	Public

Frontend IP configuration

Frontend IP configuration name	lb-frontend
Frontend IP configuration IP address	To be created

Backend pools

Backend pool name	lb-backend-pool
-------------------	-----------------

Create **< Previous** **Next >** **Download a template for automation** **Give feedback**

Figure 26 : Review Load Balancer

The screenshot shows the Microsoft Azure Load Balancer Overview page for a deployment named "Microsoft.LoadBalancer-20240825124605". The deployment is marked as complete. Key details include:

- Deployment name:** Microsoft.LoadBalancer-20240825124605
- Subscription:** Azure for Students
- Resource group:** load-balancer-rg
- Start time:** 8/25/2024, 12:53:49 PM
- Correlation ID:** 9c55df04-11ac-4232-a919-f469eb1dbfd4

The page also lists resources:

Resource	Type	Status	Operation details
load-balancer	Load balancer	Created	Operation details
lb-frontend-ip	Public IP address	OK	Operation details

On the right side, there are promotional cards for Cost management, Microsoft Defender for Cloud, Free Microsoft tutorials, Work with an expert, and Find an Azure expert.

Figure 27 : Deployment load balancer

4. Create Virtual Machines

The screenshot shows the "Create a virtual machine" wizard on the Microsoft Azure portal. The "Subscription" dropdown is set to "Azure for Students" and the "Resource group" dropdown is set to "load-balancer-rg".

Instance details

- Virtual machine name:** lb-VM1
- Region:** (Asia Pacific) Australia East
- Availability options:** Self-selected zone (selected)
- Availability zone:** Zone 1
- Security type:** Standard

At the bottom, there are navigation buttons: < Previous, Next: Disks >, and Review + create.

Figure 28 : Create Virtual Machines

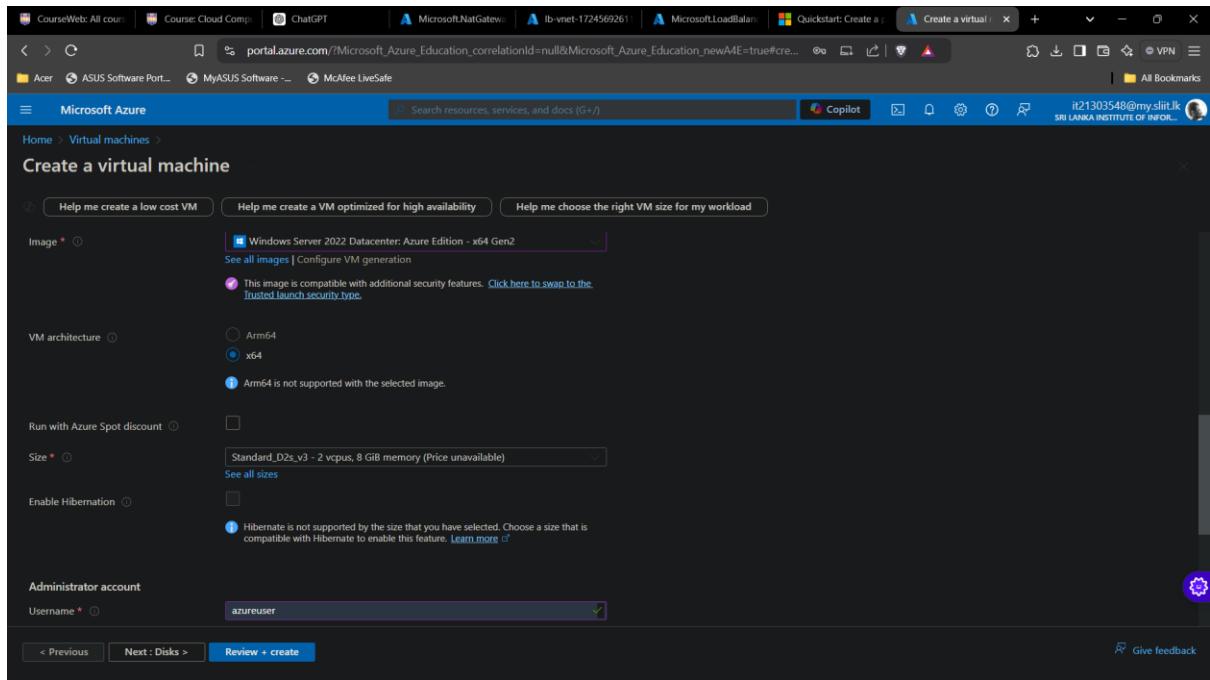


Figure 29 : Fill the details

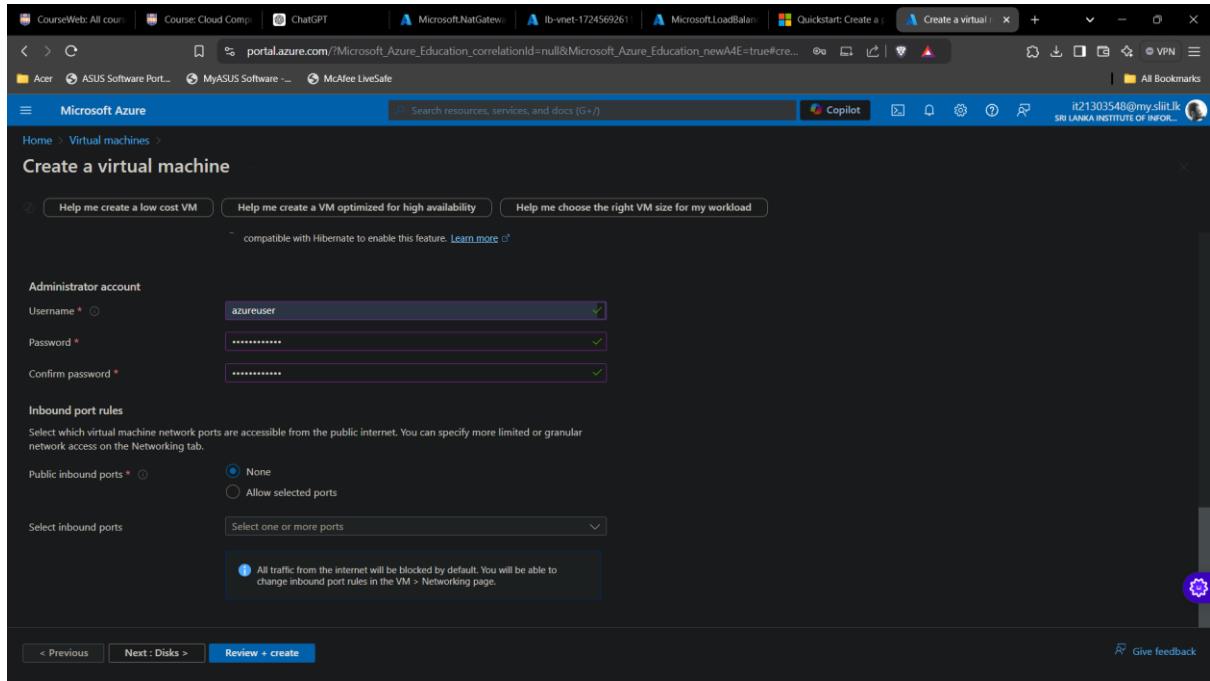


Figure 30 : Fill the details 02

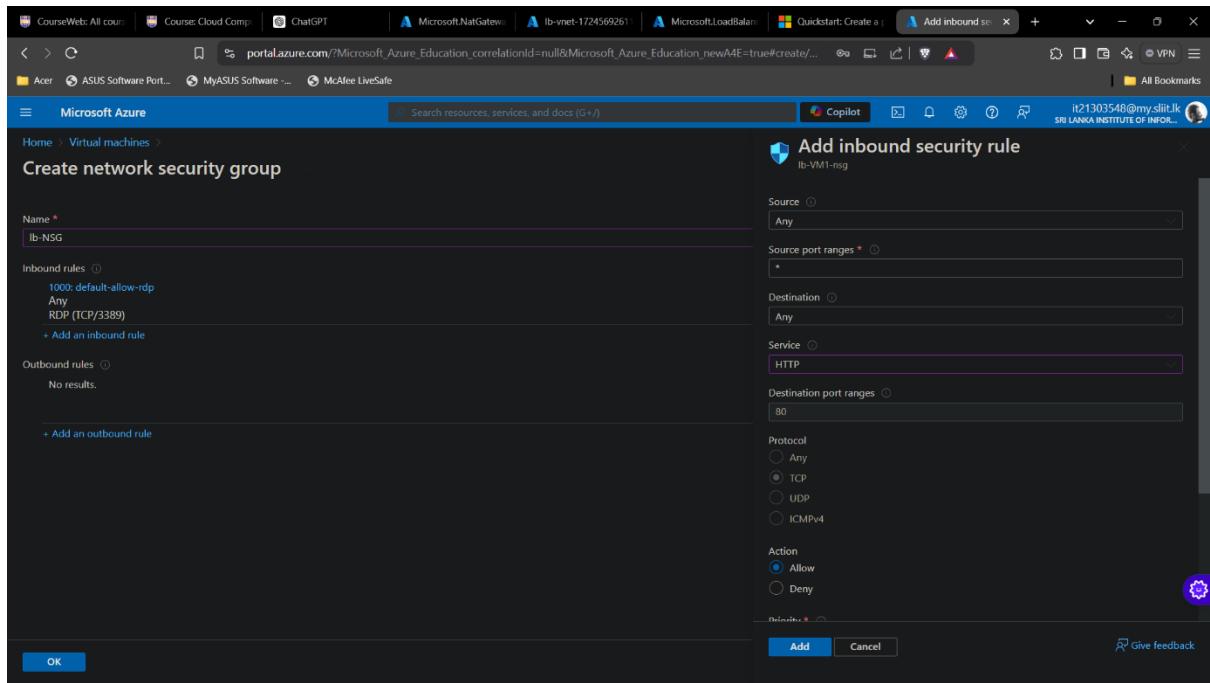


Figure 31 : Add inbound security rule

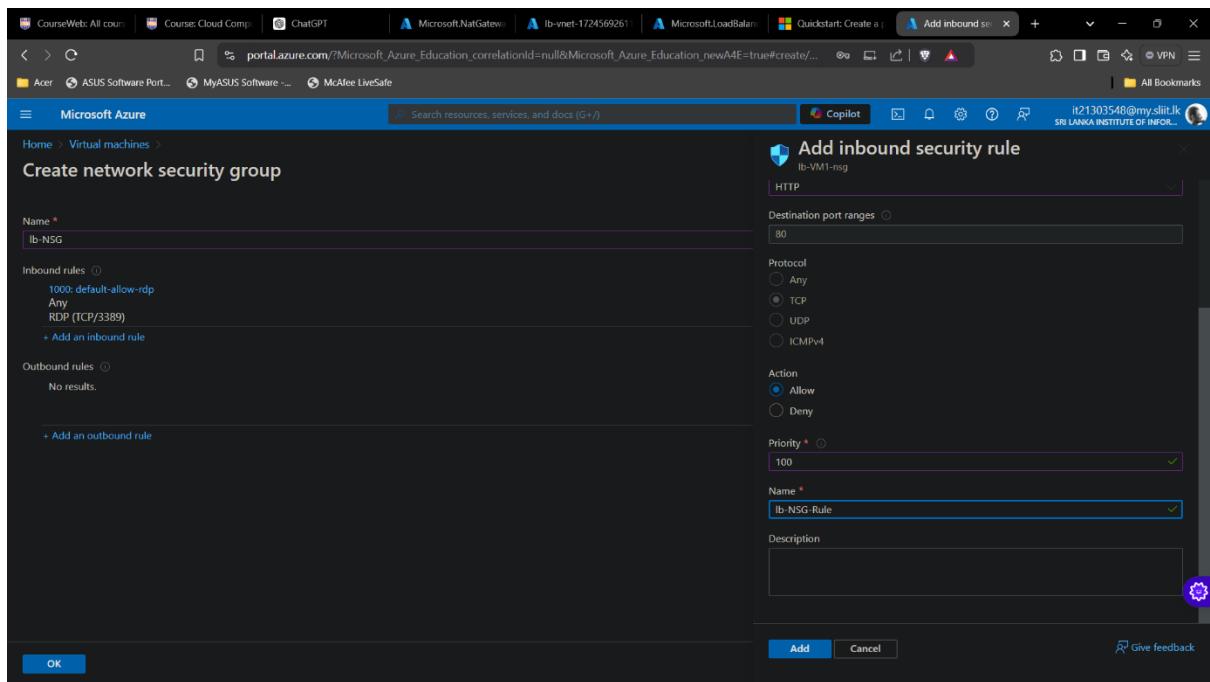


Figure 32 : Add inbound security rule 02

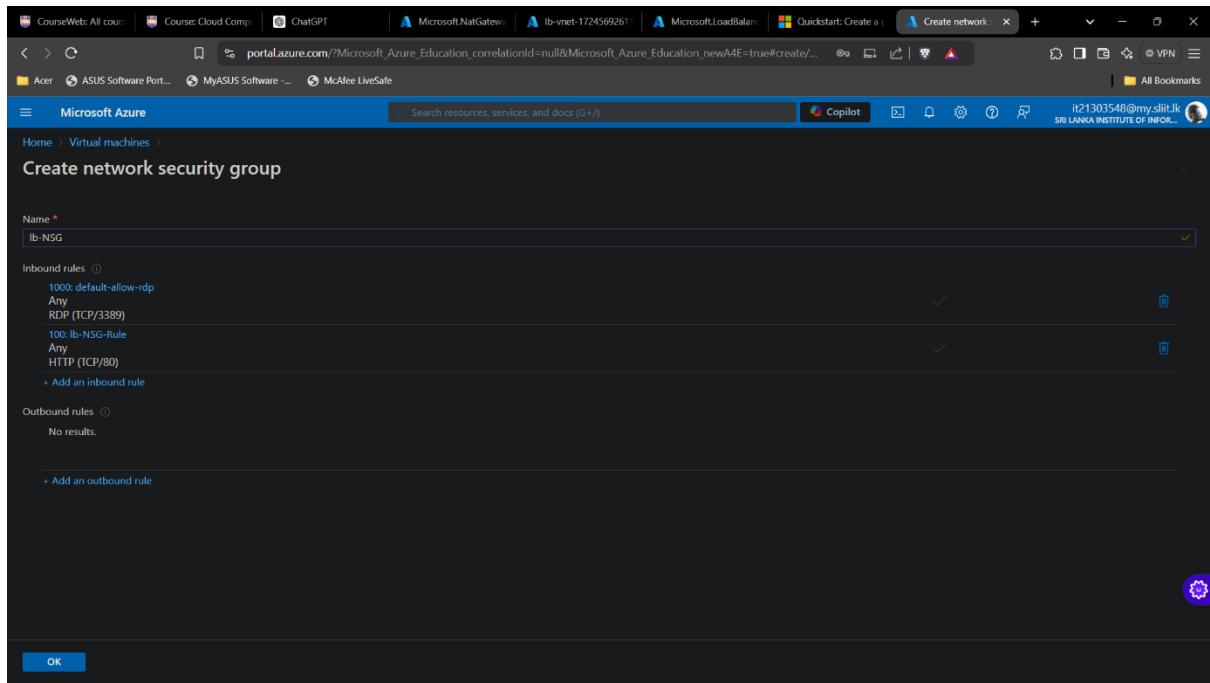


Figure 33 : Create network security group

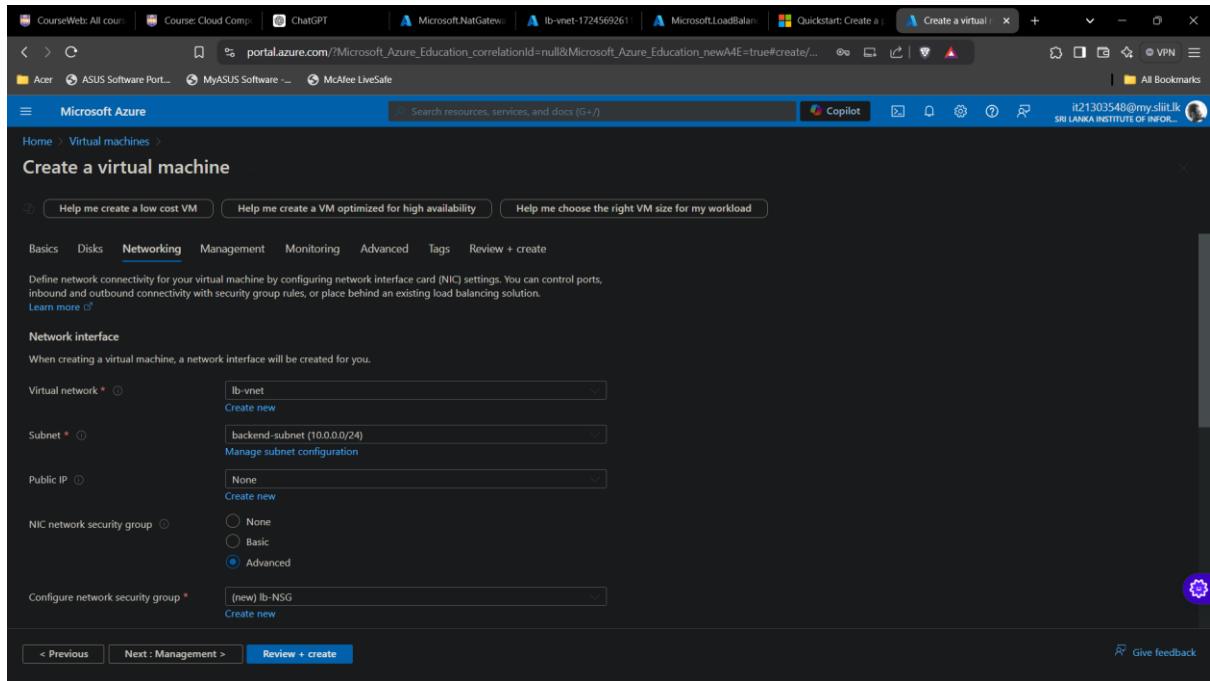


Figure 34 : Create virtual machine 01

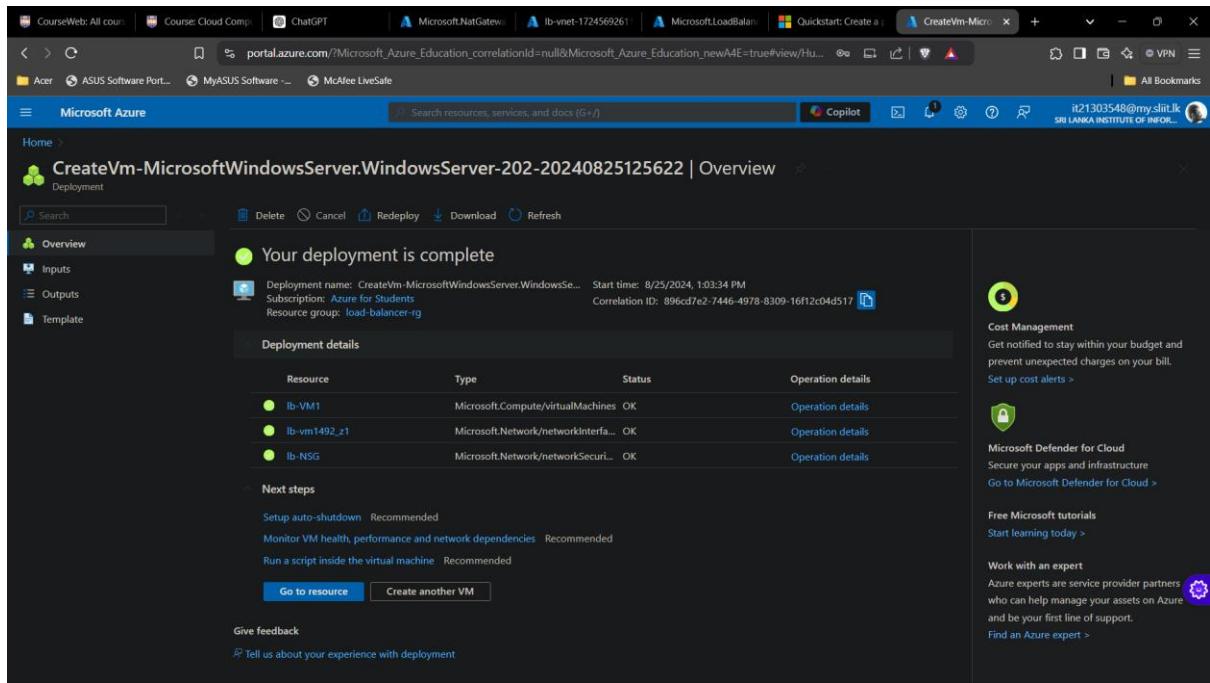


Figure 35 : Create virtual machine 01

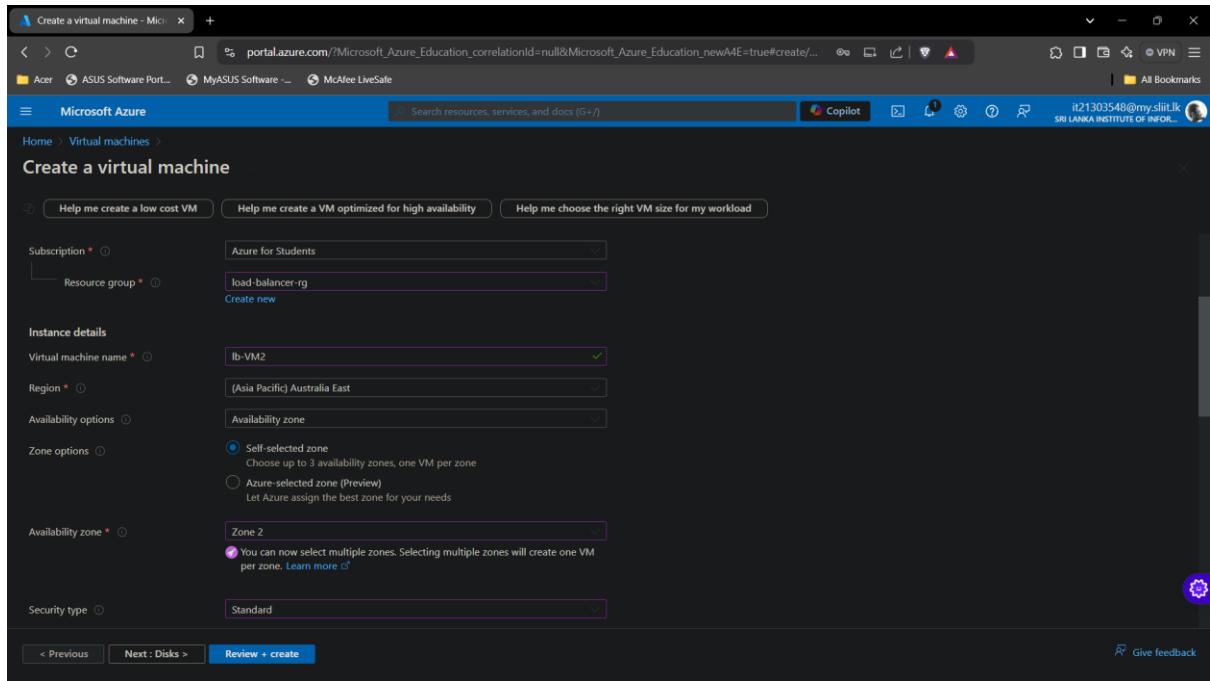


Figure 36 : Create virtual machine 02

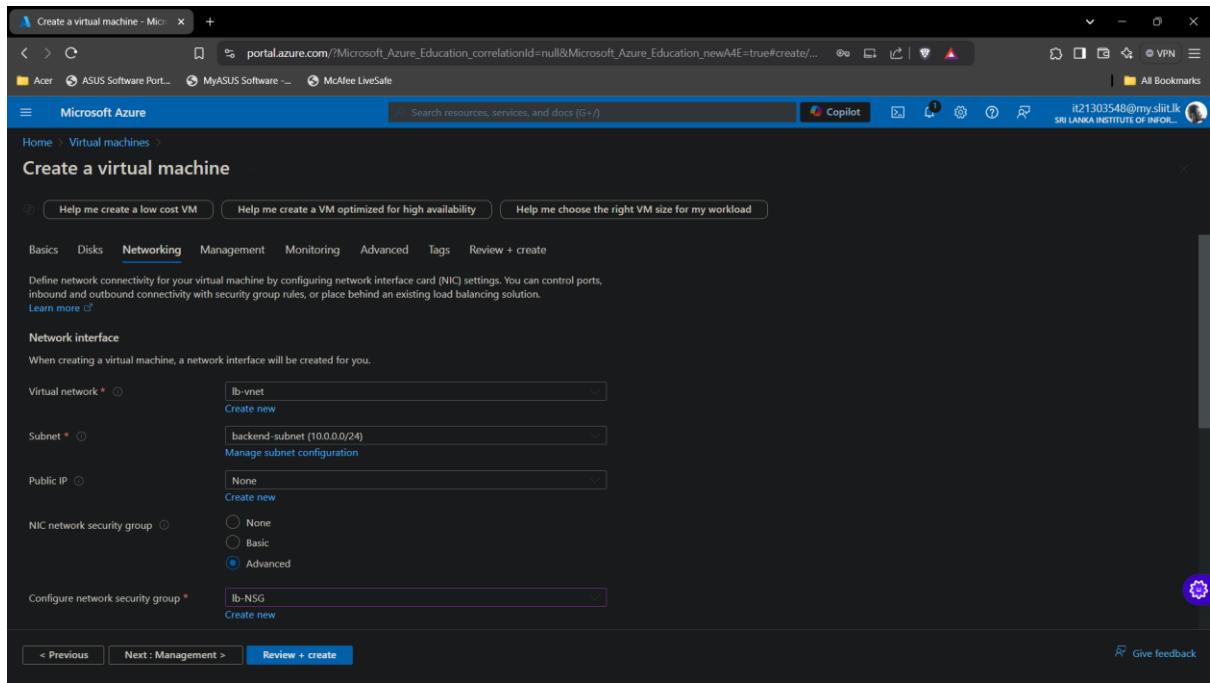


Figure 37 : Create virtual machine 02

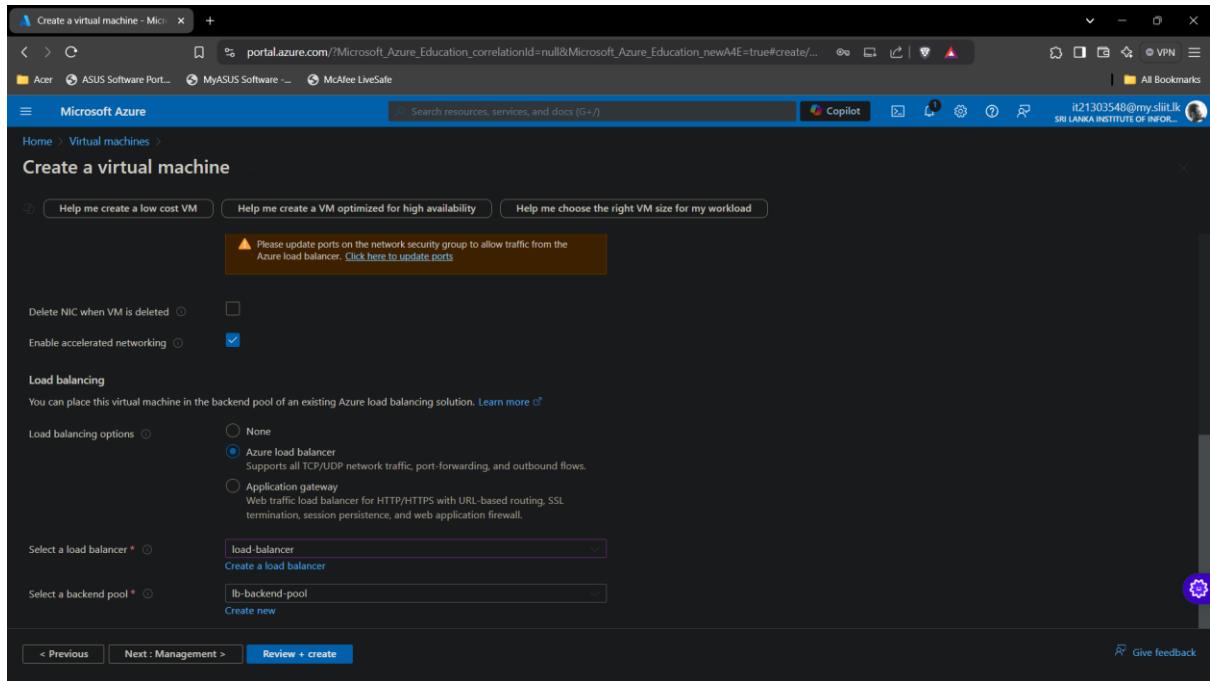


Figure 38 : Create virtual machine 02

Figure 39 : Create virtual machine 02

5. Install IIS

Figure 40 : lb-VM1 Connect

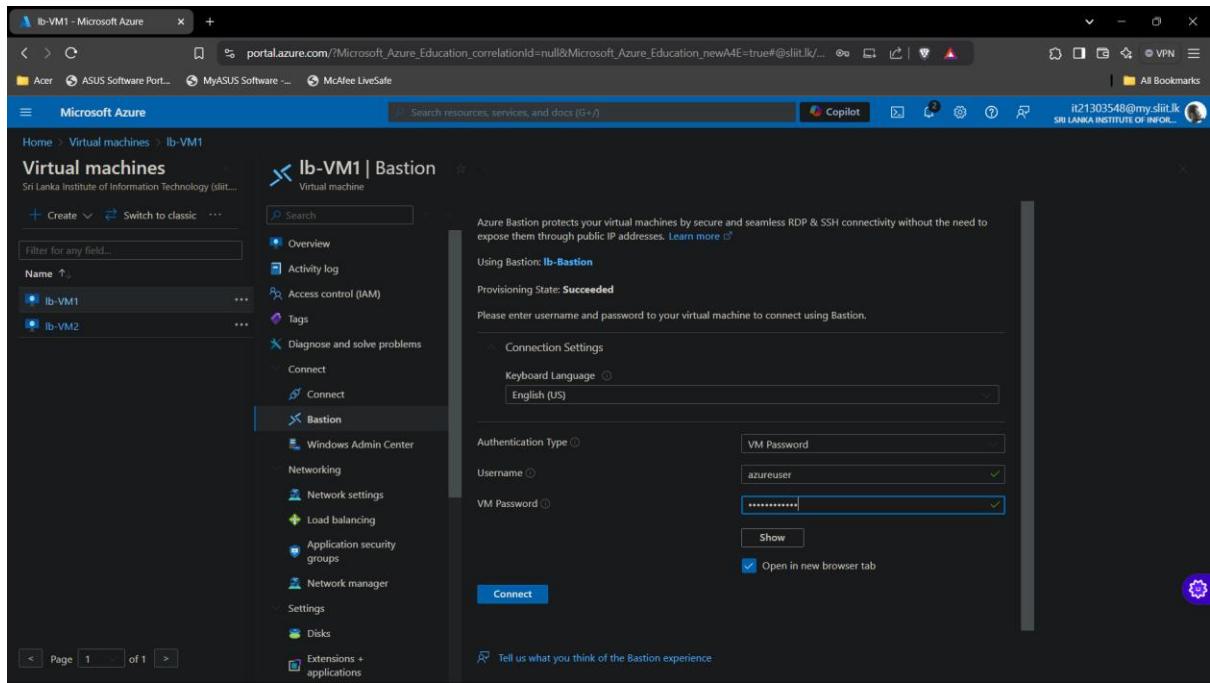


Figure 41 : filling the details Lb-VM1 Bastion and connect

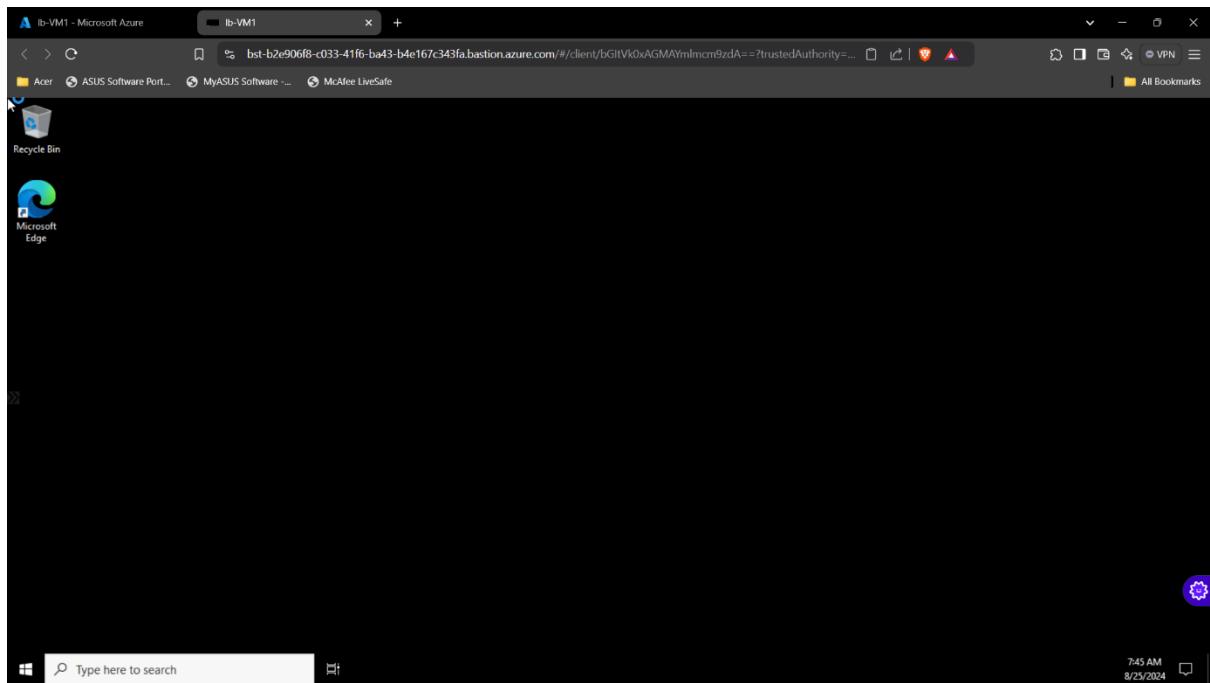


Figure 42 : VM 1 (Windows)

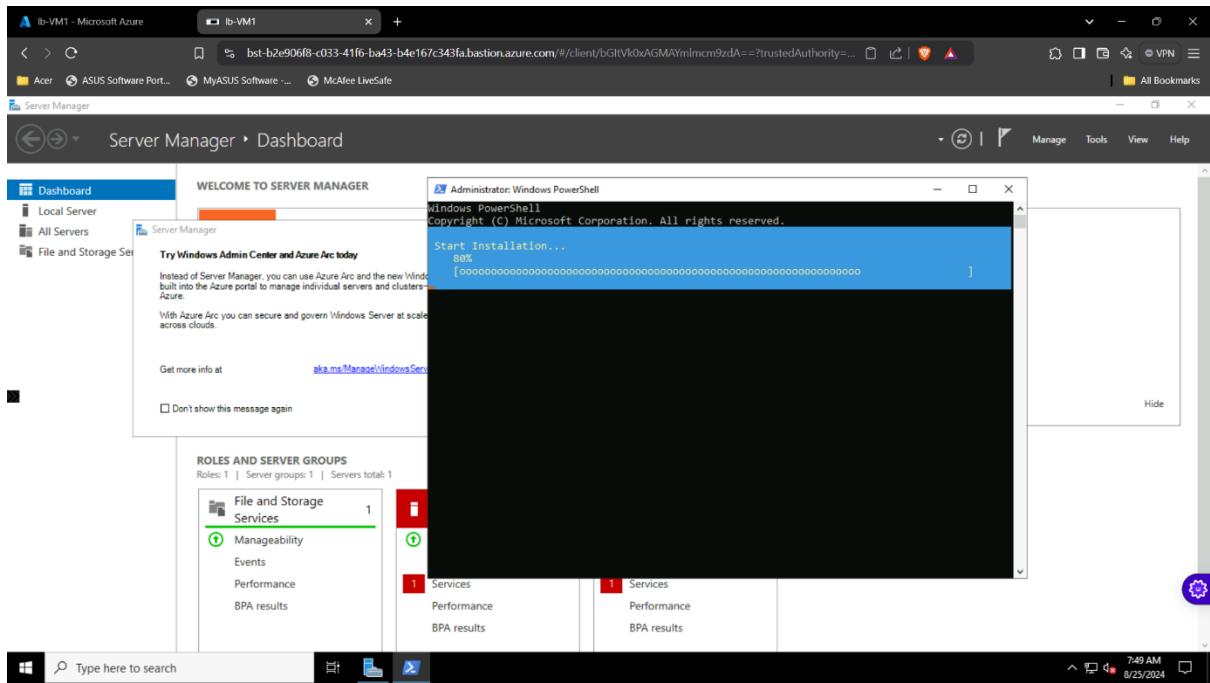


Figure 43 : Install IIS server role lb-VM1

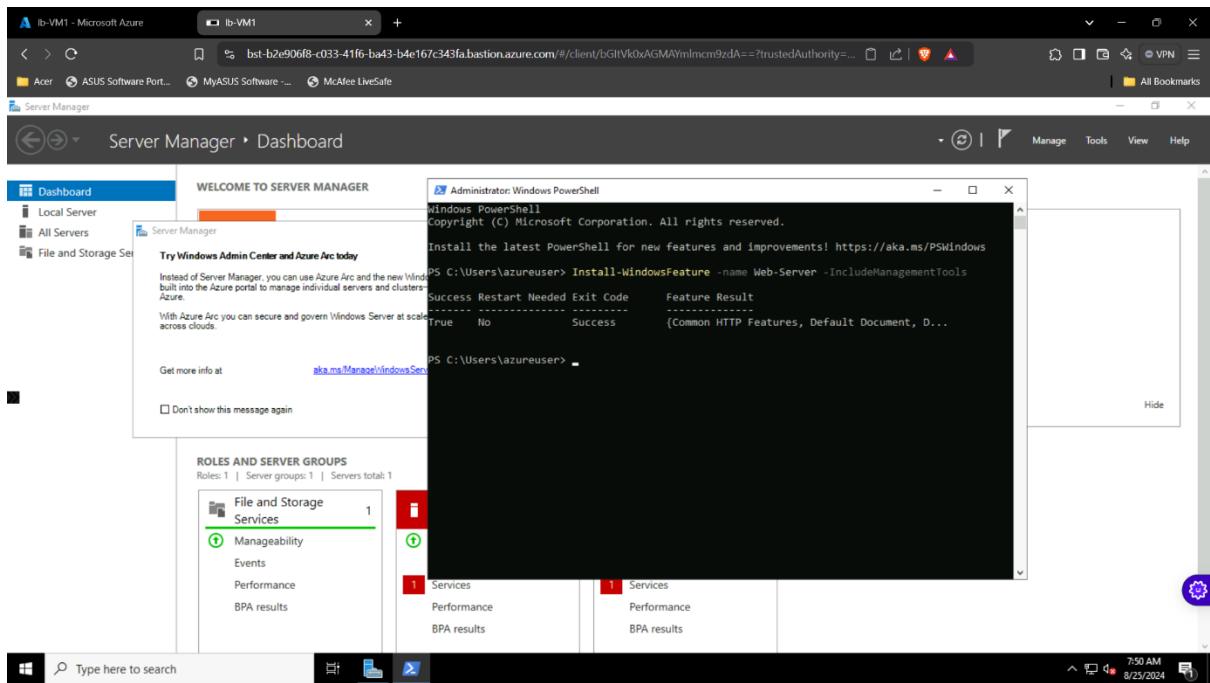


Figure 44 : after install IIS server role lb-VM1

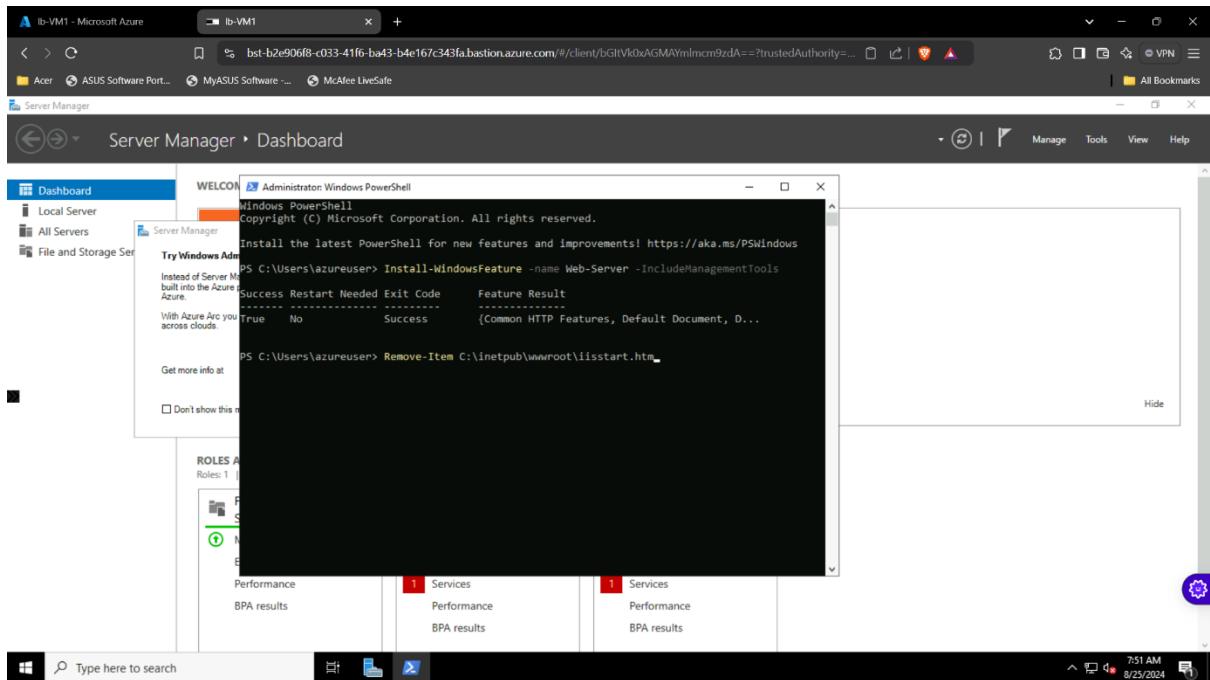


Figure 45 : Remove default htm file lb-VM1

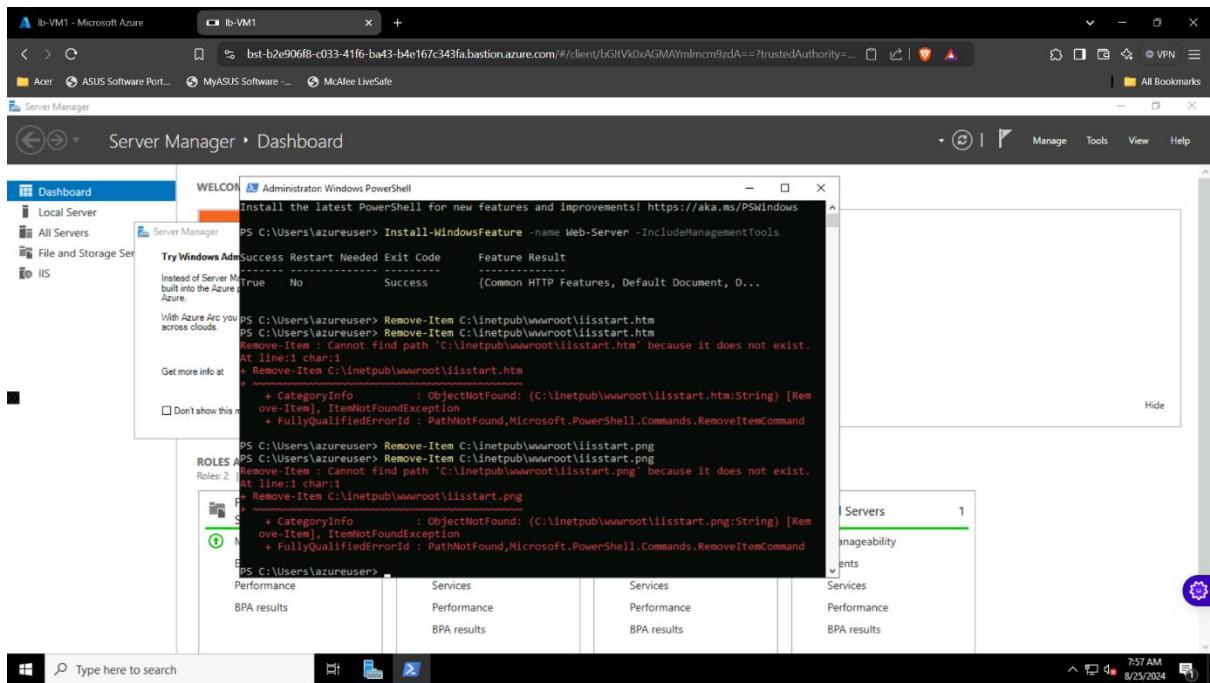


Figure 46 : After Remove default htm file lb-VM1

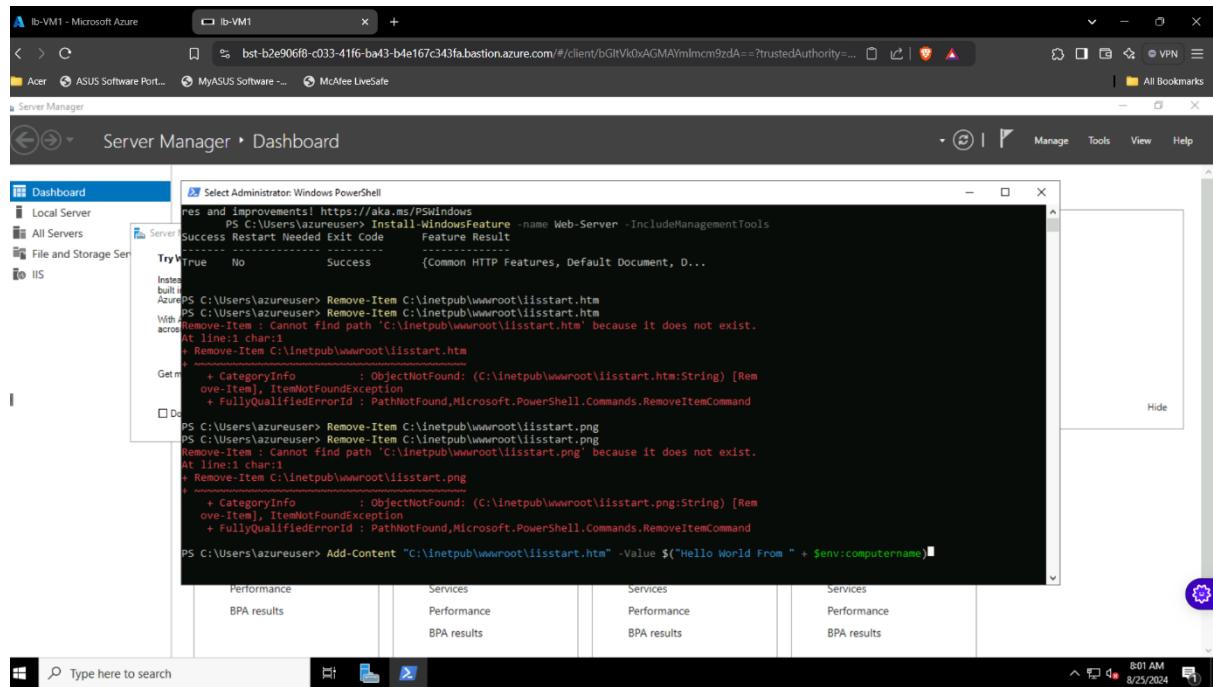


Figure 47 : Add a new htm file that displays server name lb-VM1

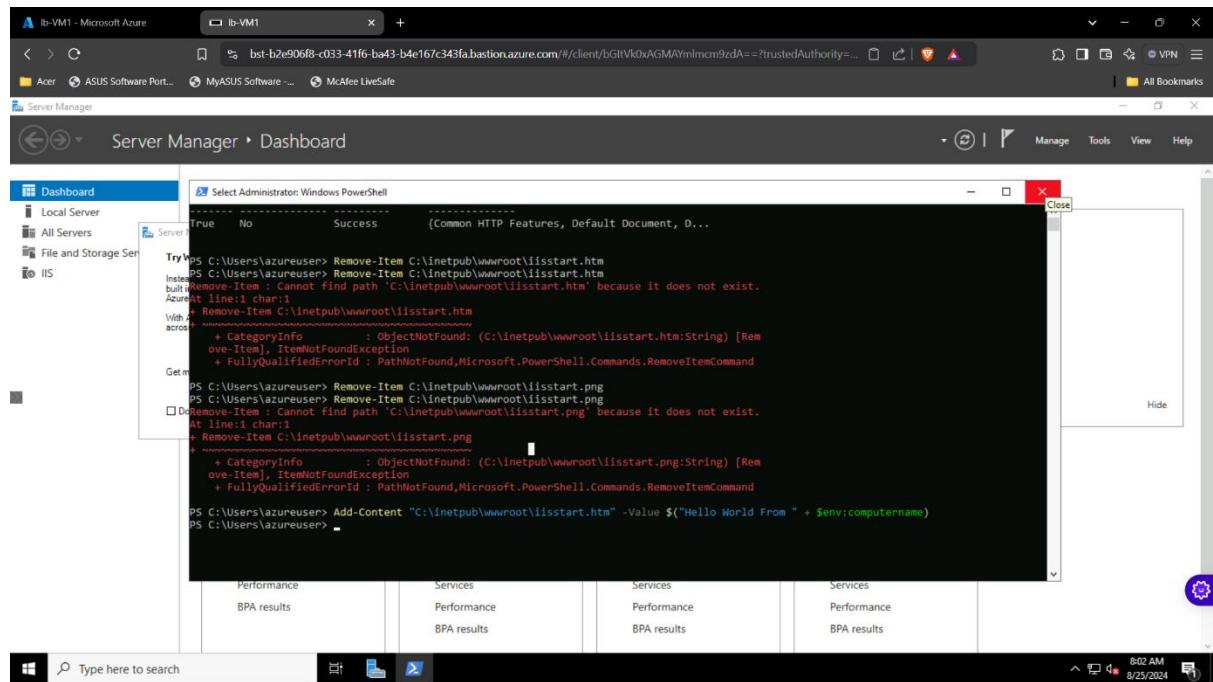


Figure 48 : Finally add new htm file that displays server name lb-VM1

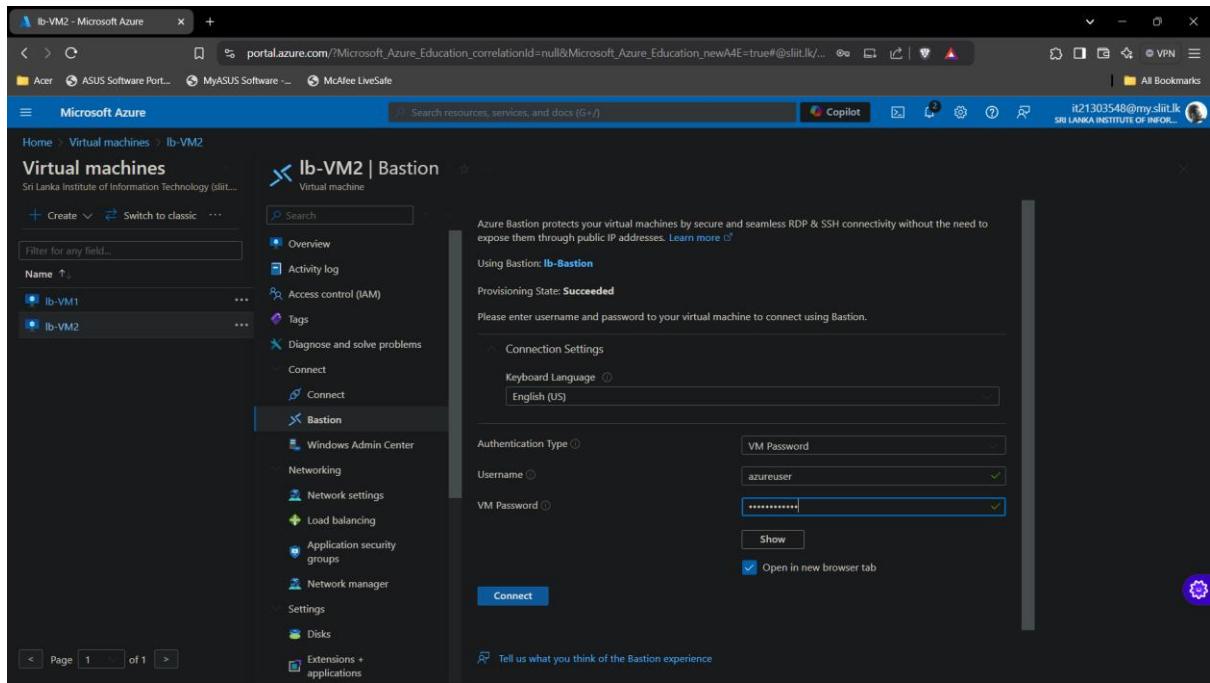


Figure 49 : Connect lb-VM2

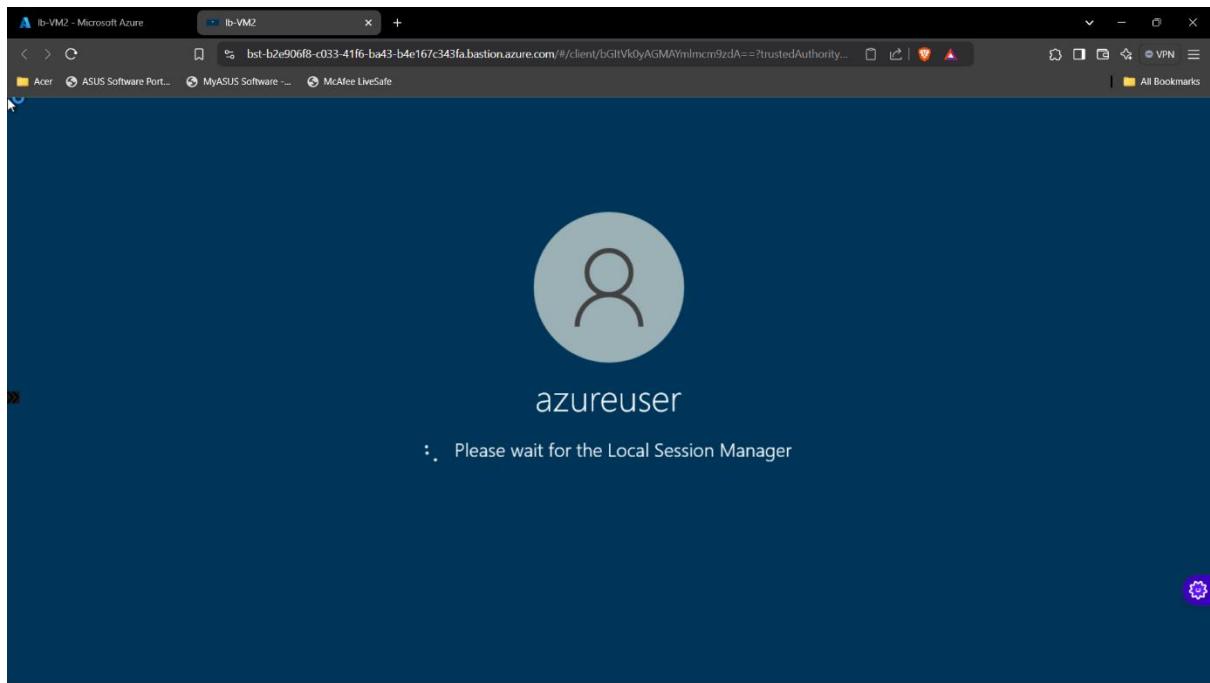


Figure 50 : Connecting...

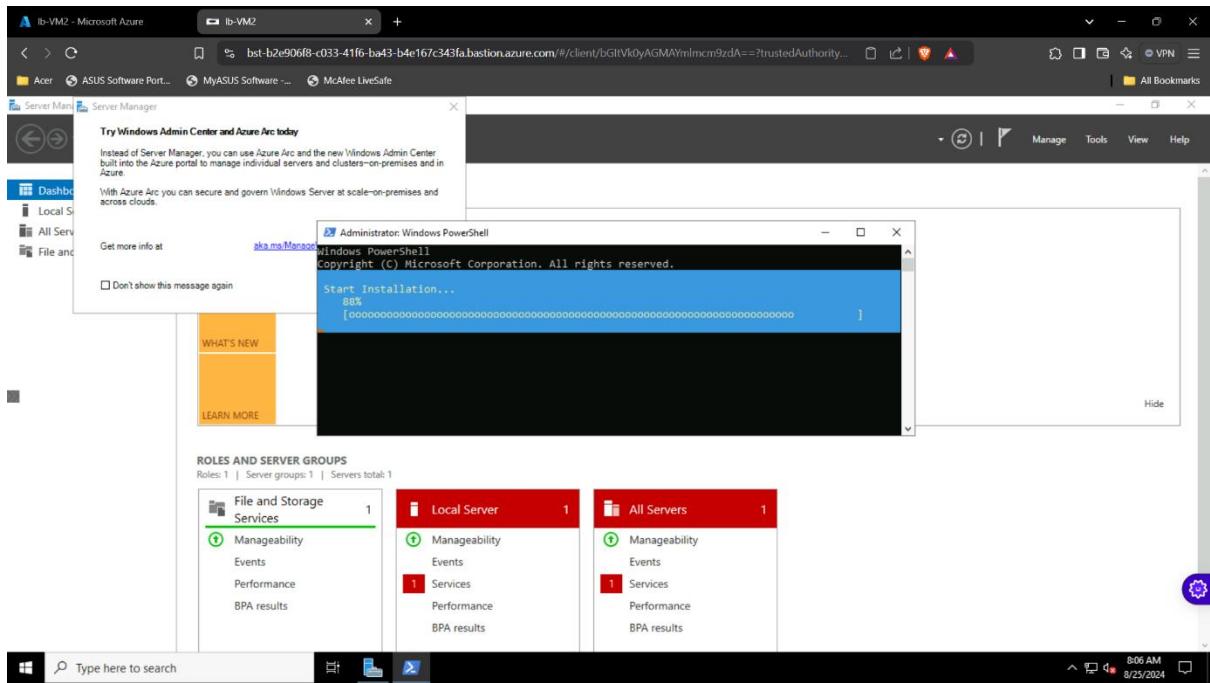


Figure 51 : Install IIS server role lb-VM2

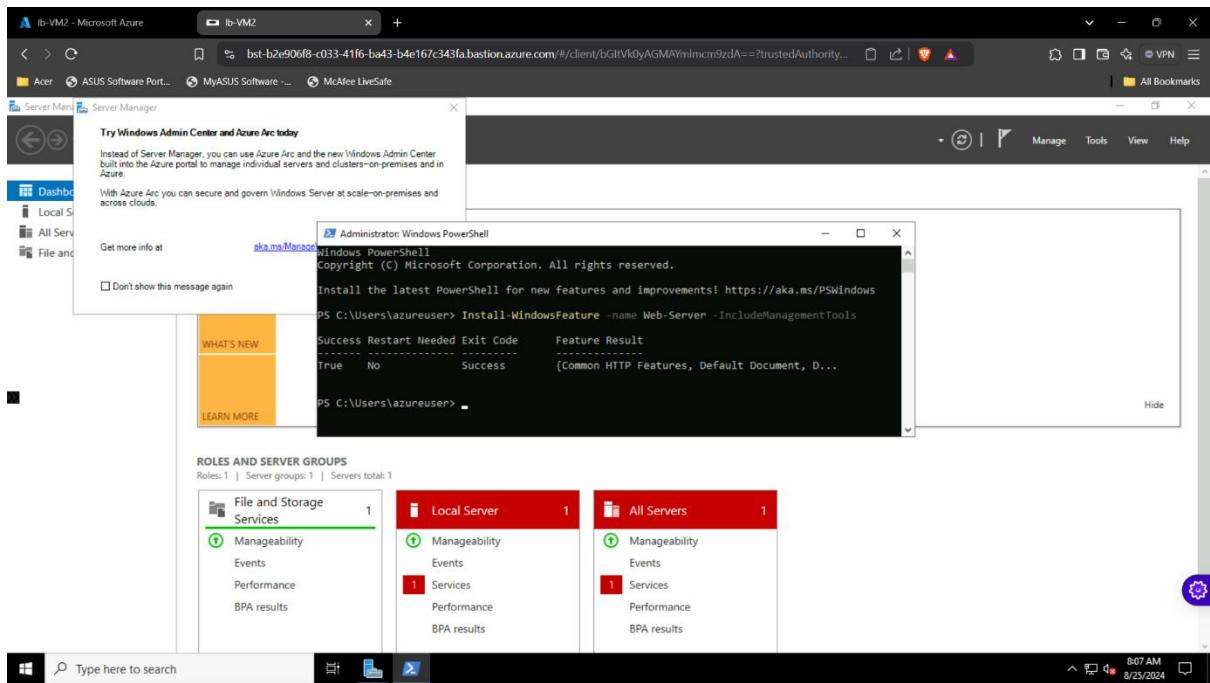


Figure 52 : After Install IIS server role lb-VM2

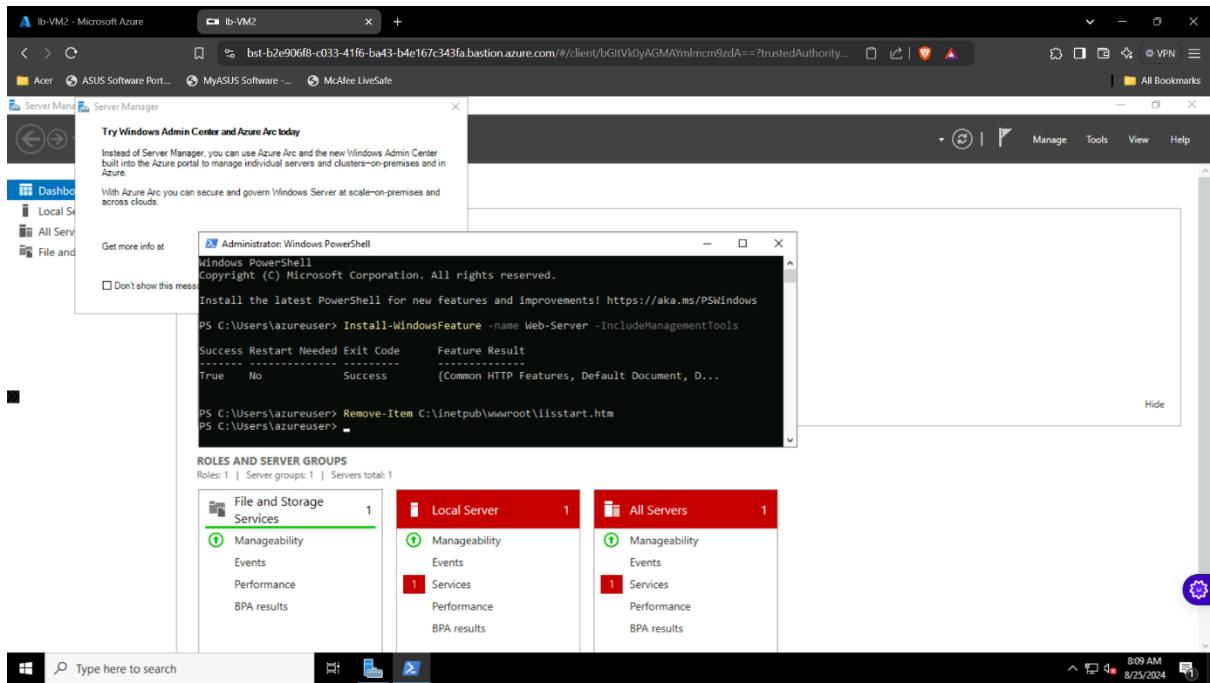


Figure 53 : Remove default htm file lb-VM2

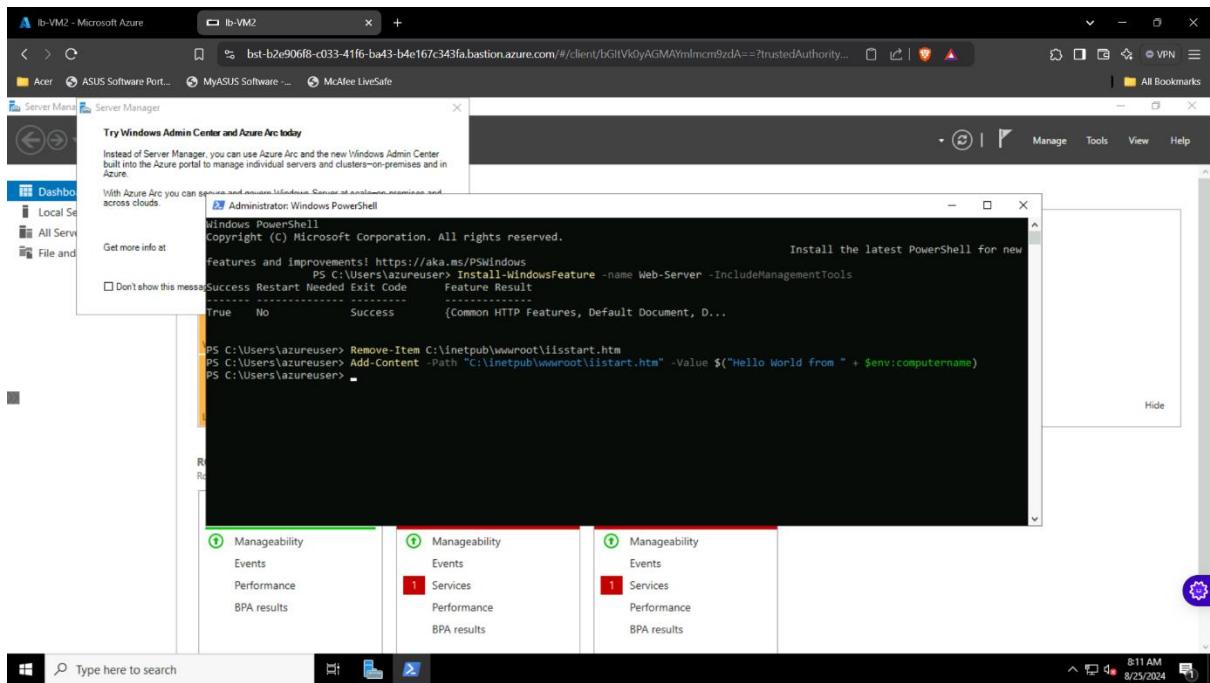
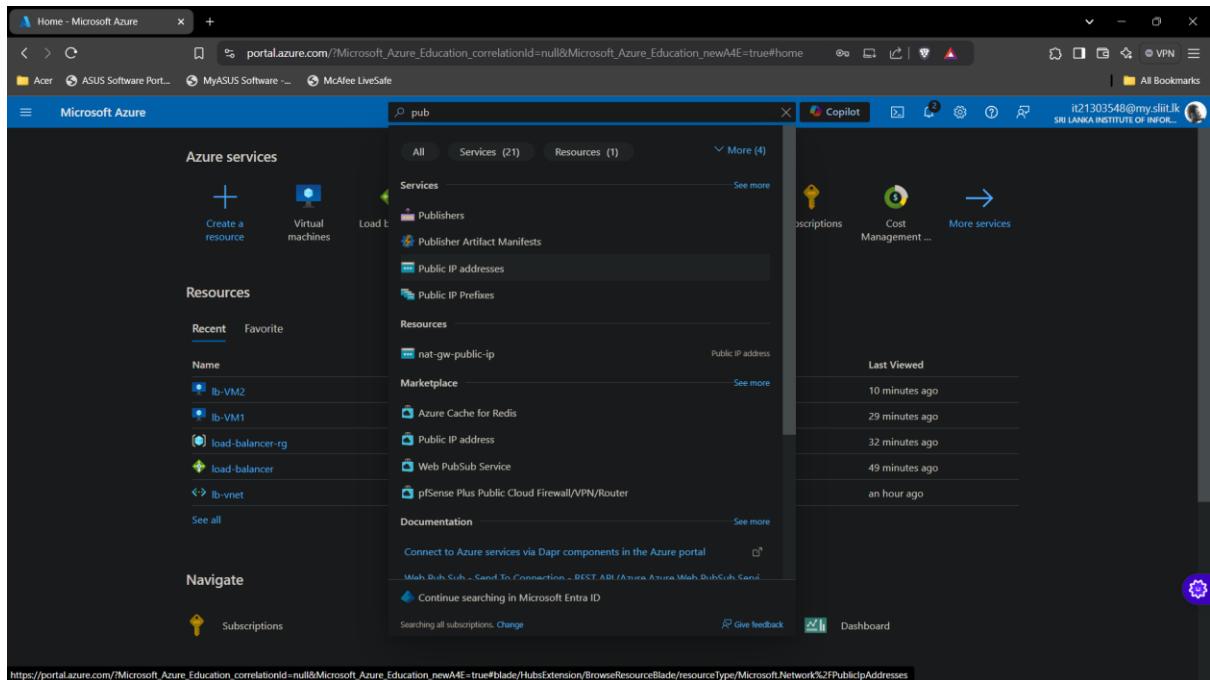


Figure 54 : Add a new htm file that displays server name lb-VM2

6. Test the load balancer



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Microsoft Azure

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lb-VM1

load-balancer-rg

load-balancer

lb-vnet

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Public IP address

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pfSense Plus Public Cloud Firewall/VPN/Router

Documentation

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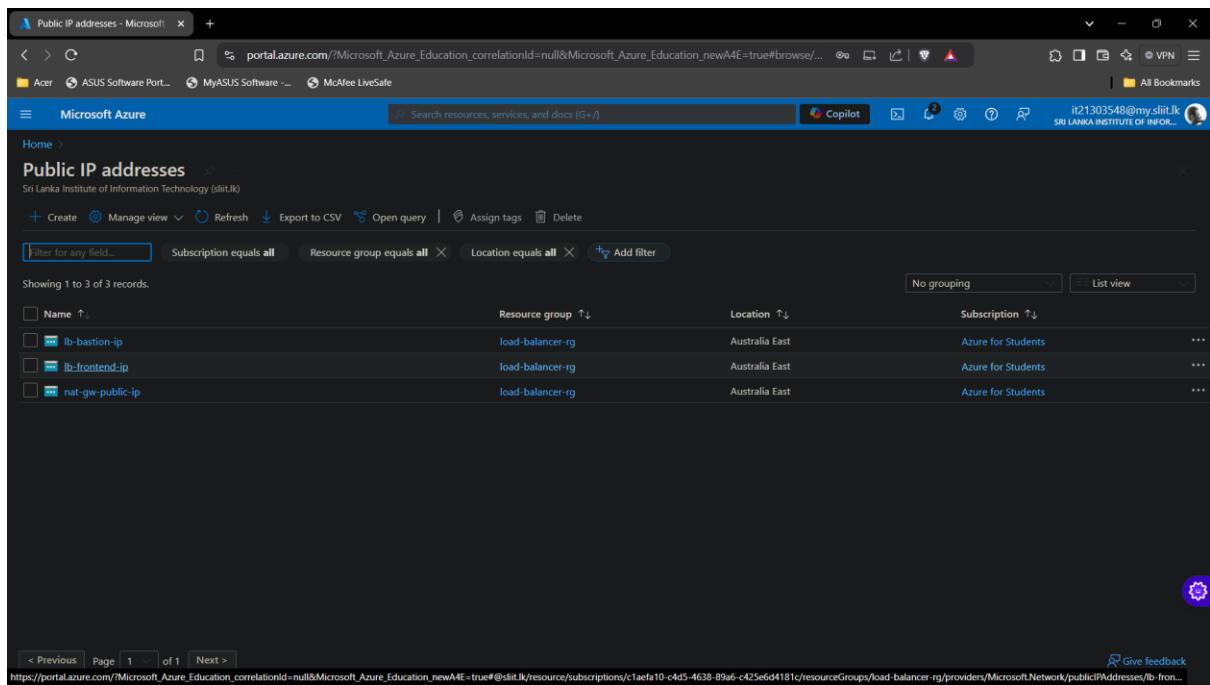
32 minutes ago

49 minutes ago

an hour ago

https://portal.azure.com/?Microsoft_Azure_Education_correlationId=null&Microsoft_Azure_Education_newA4E=true#blade/HubsExtension/BrowseResourceBlade/resourceType/Microsoft.Network%2FPublicIPAddresses

Figure 55 : Search Public IP Address



Home >

Public IP addresses

Sri Lanka Institute of Information Technology (slit.k)

+ Create Manage view Refresh Export to CSV Open query Assign tags Delete

Subscription equals all Resource group equals all Location equals all Add filter

Filter for any field...

No grouping List view

Showing 1 to 3 of 3 records.

Name	Resource group	Location	Subscription
lb-bastion-ip	load-balancer-rg	Australia East	Azure for Students
lb-frontend-ip	load-balancer-rg	Australia East	Azure for Students
nat-gw-public-ip	load-balancer-rg	Australia East	Azure for Students

< Previous Page 1 of 1 Next >

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https://portal.azure.com/?Microsoft_Azure_Education_correlationId=null&Microsoft_Azure_Education_newA4E=true#blade/HubsExtension/BrowseResourceBlade/resourceType/Microsoft.Network%2FPublicIPAddresses/lb-frontend-ip

Figure 56 : Open lb-frontend-ip

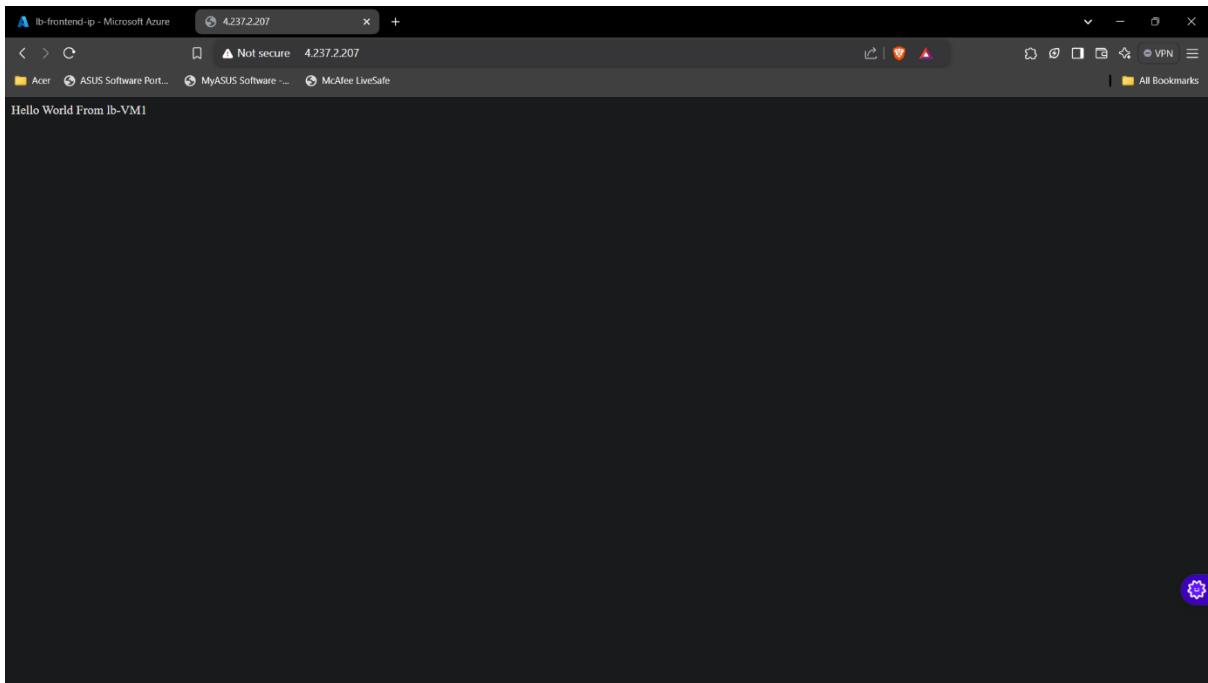


Figure 57 : Output of Frontend

7. Clean up resources

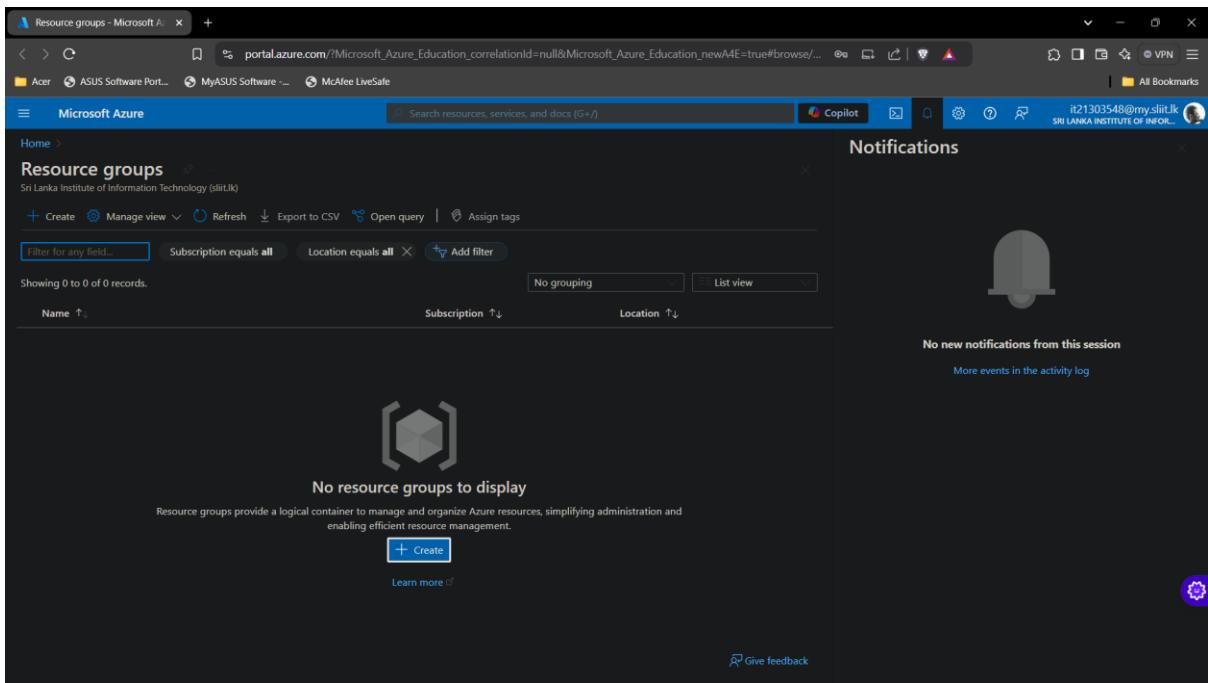


Figure 58 : Delete all resources groups

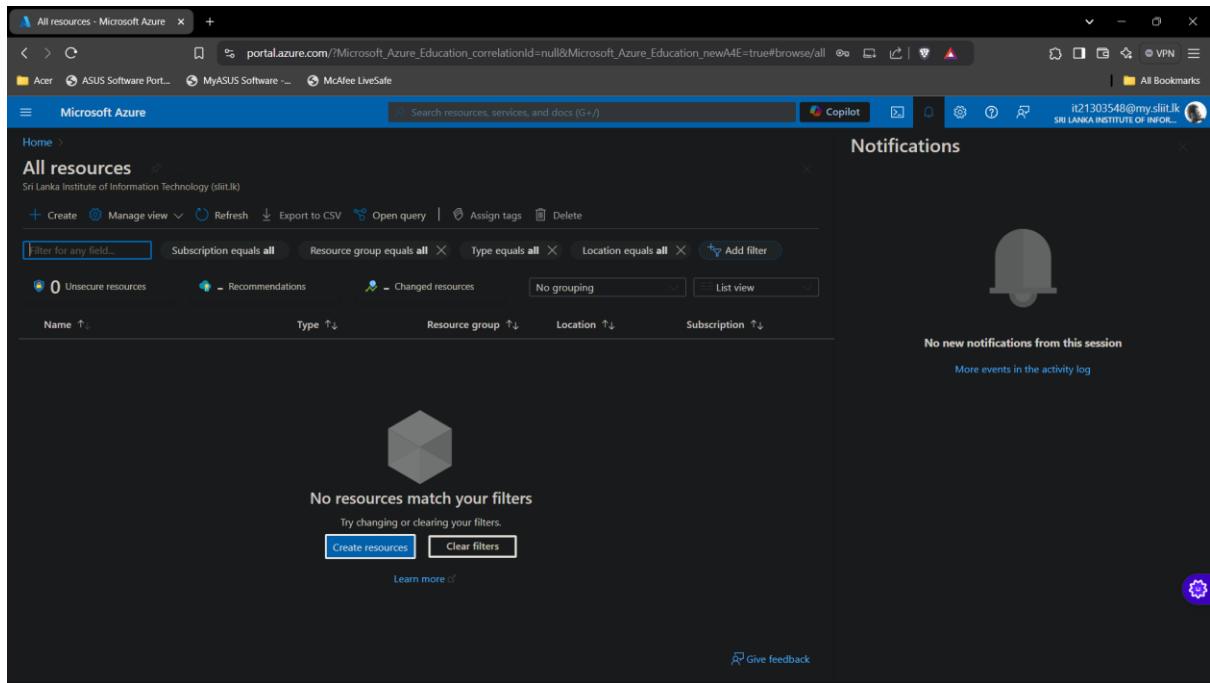


Figure 59 : Delete all resources