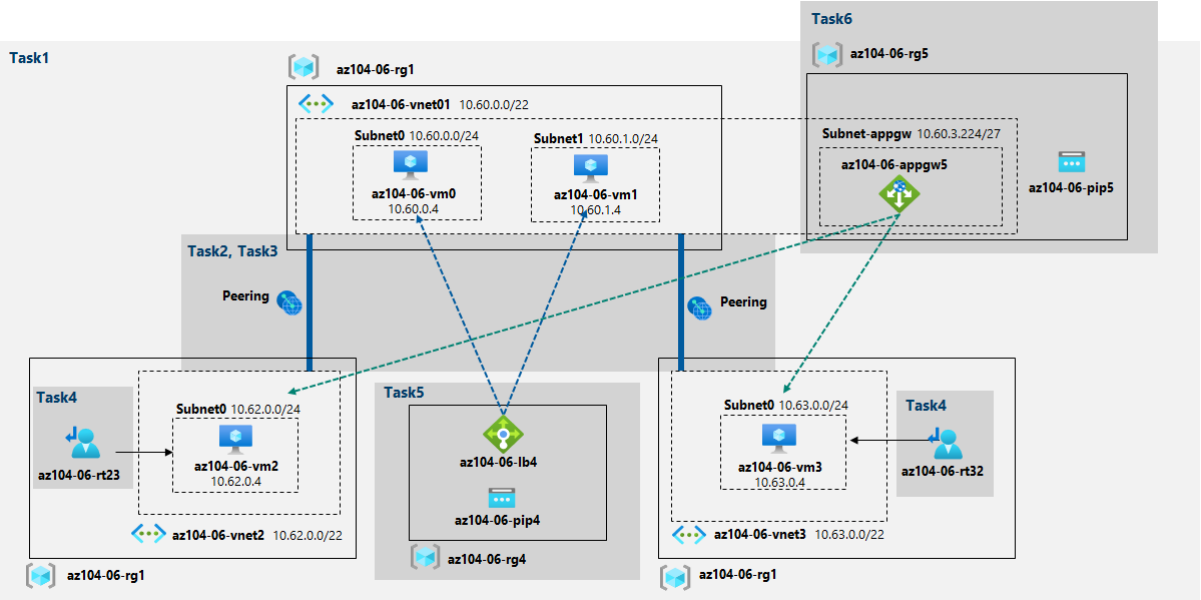
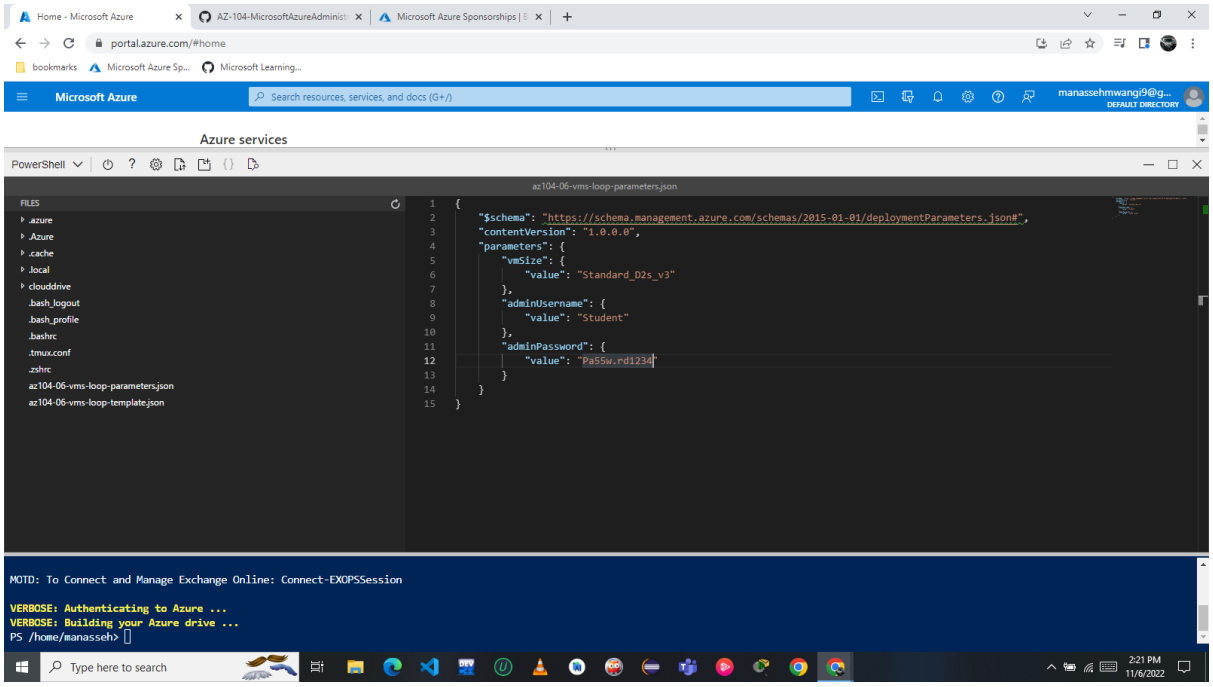
Lab 06 - Implement Traffic Management

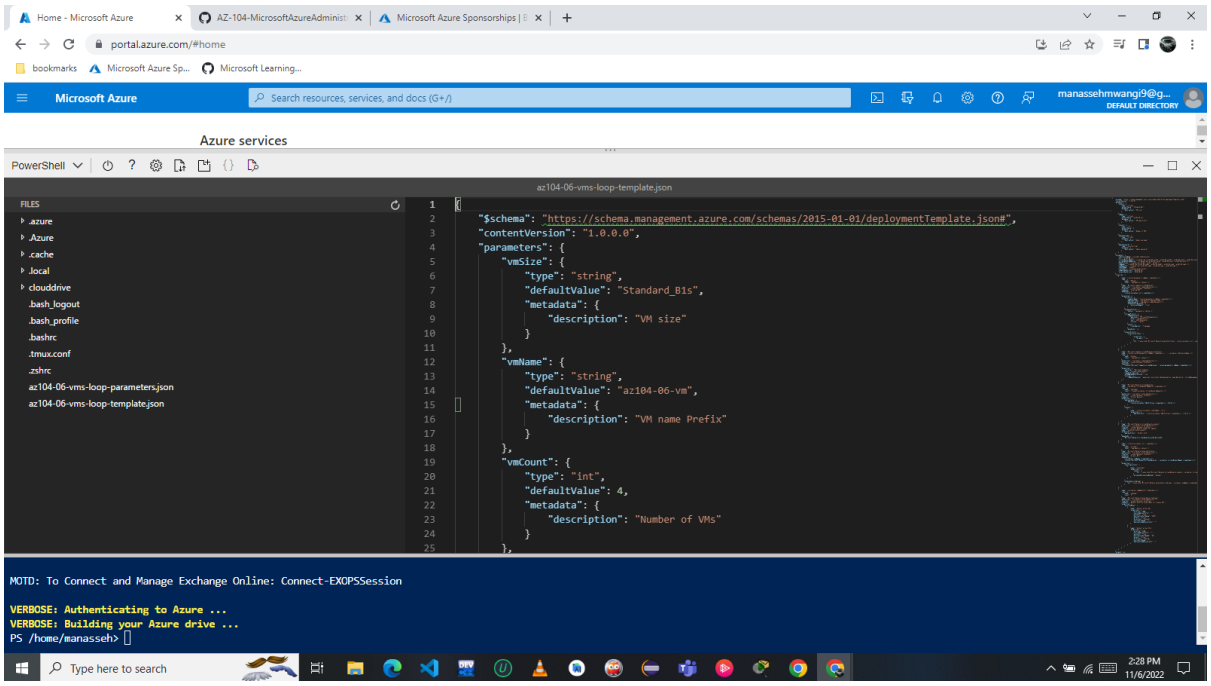
Architecture diagram



In the Azure portal, open the **Azure Cloud Shell**, upload **az104-06-vms-loop-template.json** and **z104-06-vms-loop-parameters.json** into the Cloud Shell home directory.



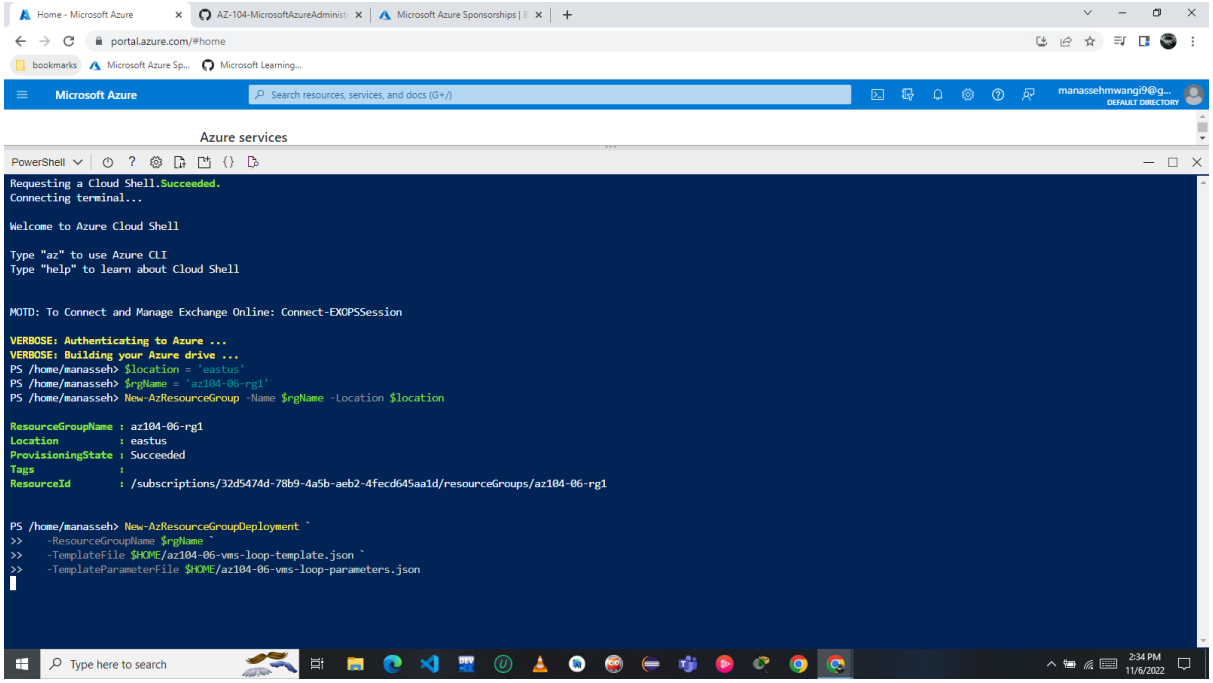
Edit the **Parameters** file you just uploaded and change the password. Edit the virtual machine to standard_B1s that uses VM size that requires only one vCPU



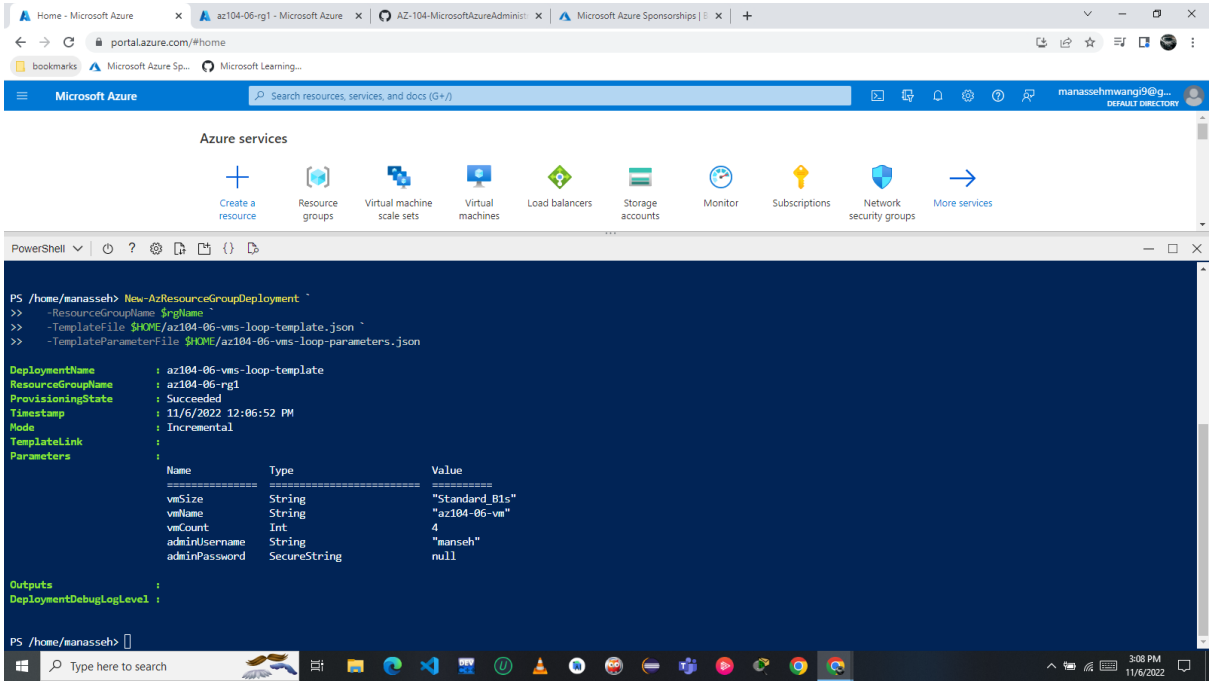
From the Cloud Shell pane, run the following to create the first resource group

Replace the '[Azure region]' placeholder with the name of an Azure region ‘East US’ where you intend to deploy Azure virtual machines.

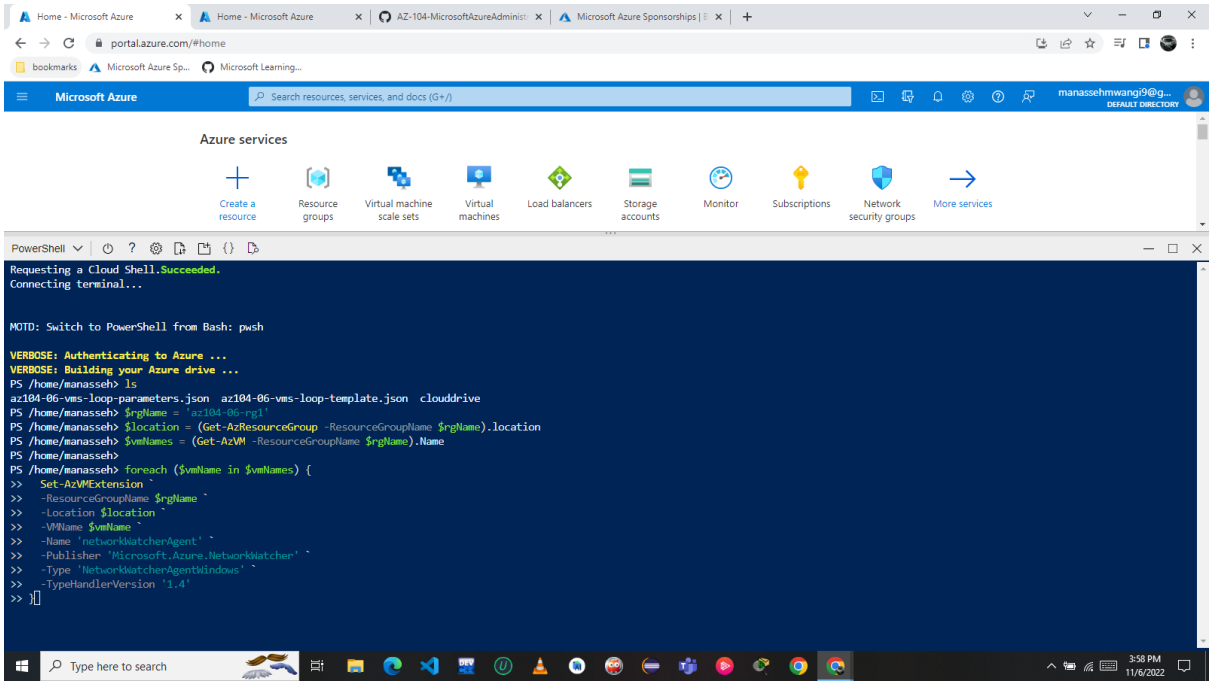
Then the resource group name: And finally create the resource group in your desired location:



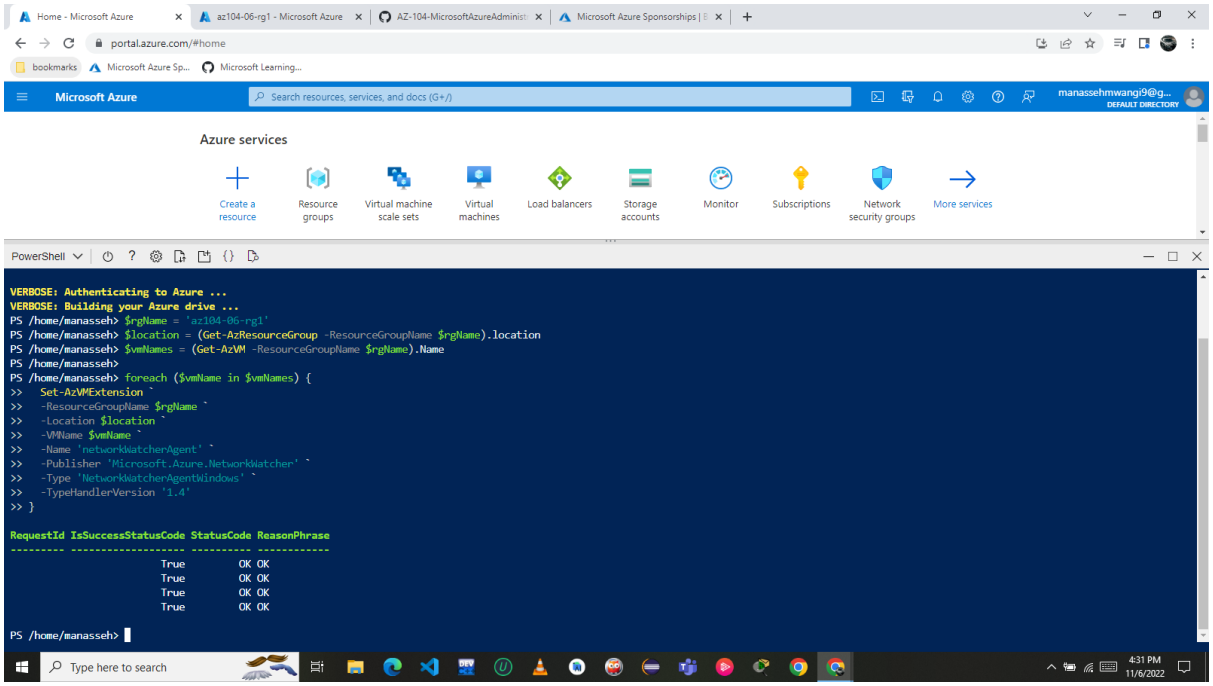
Run the following to create the three virtual networks and four Azure VMs into them by using the template and parameter files you uploaded:



Run the following to install the Network Watcher extension on the Azure VMs deployed in the previous step:



Wait for the deployment to complete before proceeding to the next step



Task 2: Configure the hub and spoke network topology

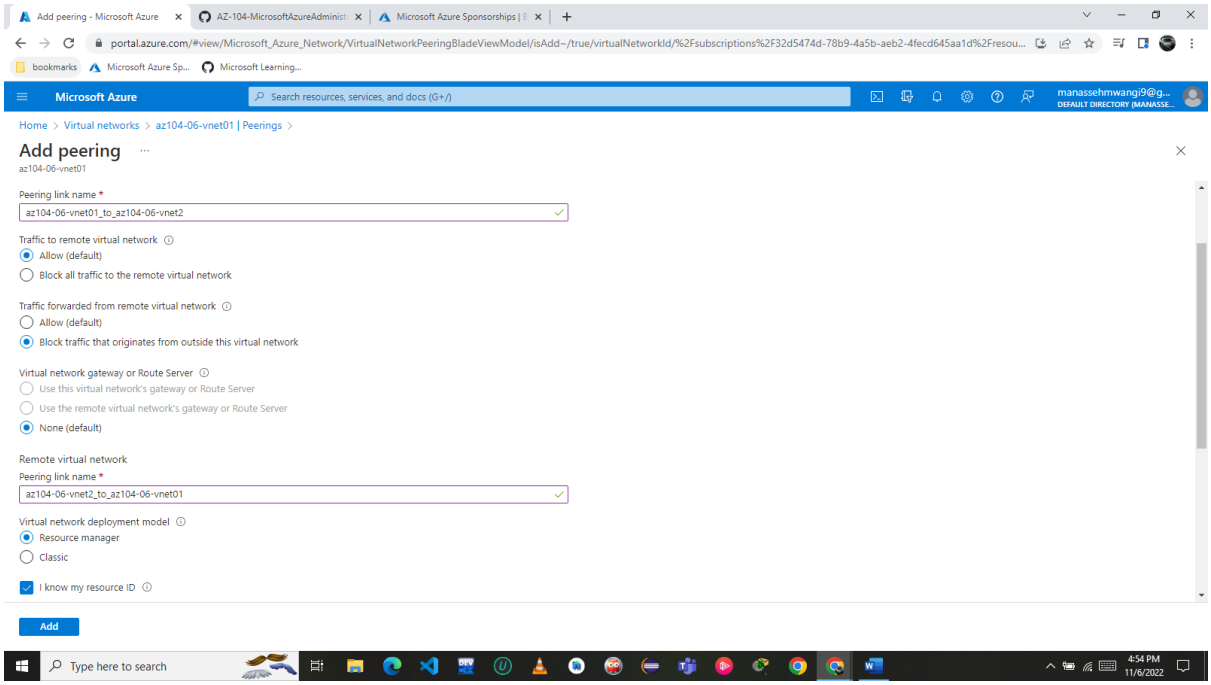
In this task, you will configure local peering between the virtual networks you deployed in the previous tasks in order to create a hub and spoke network topology.

Now examine the vnets and take note of their properties

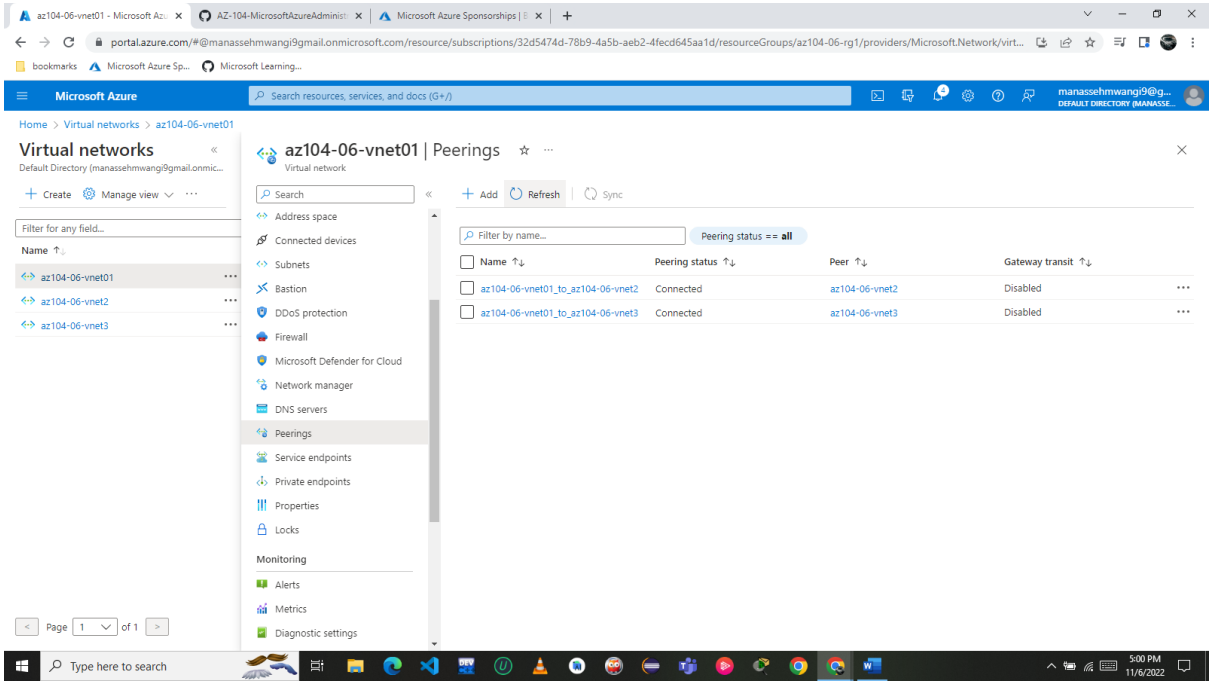
Vnet 01 IP	10.60.0.0/22
Vnet 01 resource ID	/subscriptions/32d5474d-78b9-4a5b-aeb2-4fecd645aa1d/resourceGroups/az104-06-rg1/providers/Microsoft.Network/virtualNetworks/az104-06-vnet01
Vnet 02 IP	10.62.0.0/22
Vnet 02 resource ID	/subscriptions/32d5474d-78b9-4a5b-aeb2-4fecd645aa1d/resourceGroups/az104-06-rg1/providers/Microsoft.Network/virtualNetworks/az104-06-vnet2
Vnet 03 IP	10.63.0.0/22
Vnet 03 resource ID	/subscriptions/32d5474d-78b9-4a5b-aeb2-4fecd645aa1d/resourceGroups/az104-06-rg1/providers/Microsoft.Network/virtualNetworks/az104-06-vnet3

On the **az104-06-vnet01** virtual network blade, click **Peerings** and then click **+ Add**.

This step establishes two local peerings - one from az104-06-vnet01 to az104-06-vnet2 and the other from az104-06-vnet2 to az104-06-vnet01



Repeat the above procedure and this step establishes two local peerings - one from az104-06-vnet01 to az104-06-vnet3 and the other from az104-06-vnet3 to az104-06-vnet01. This completes setting up the hub and spoke topology (with two spoke virtual networks).



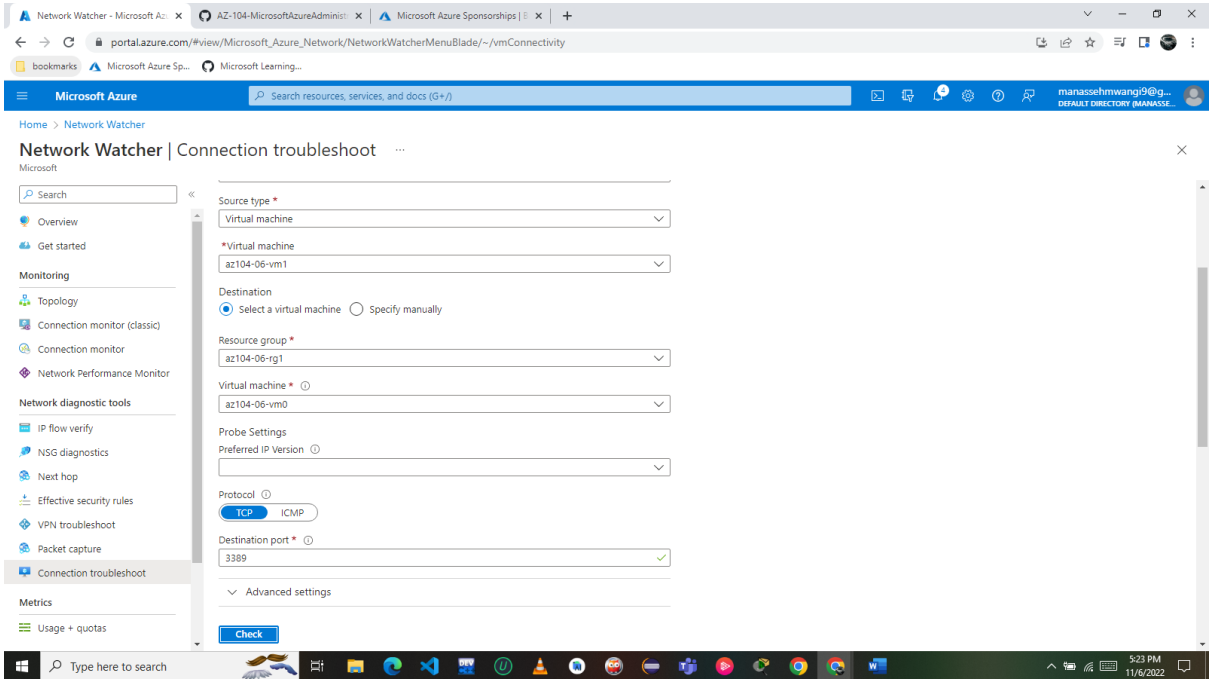
Task 3: Test transitivity of virtual network peering

In this task, you will test transitivity of virtual network peering by using Network Watcher.

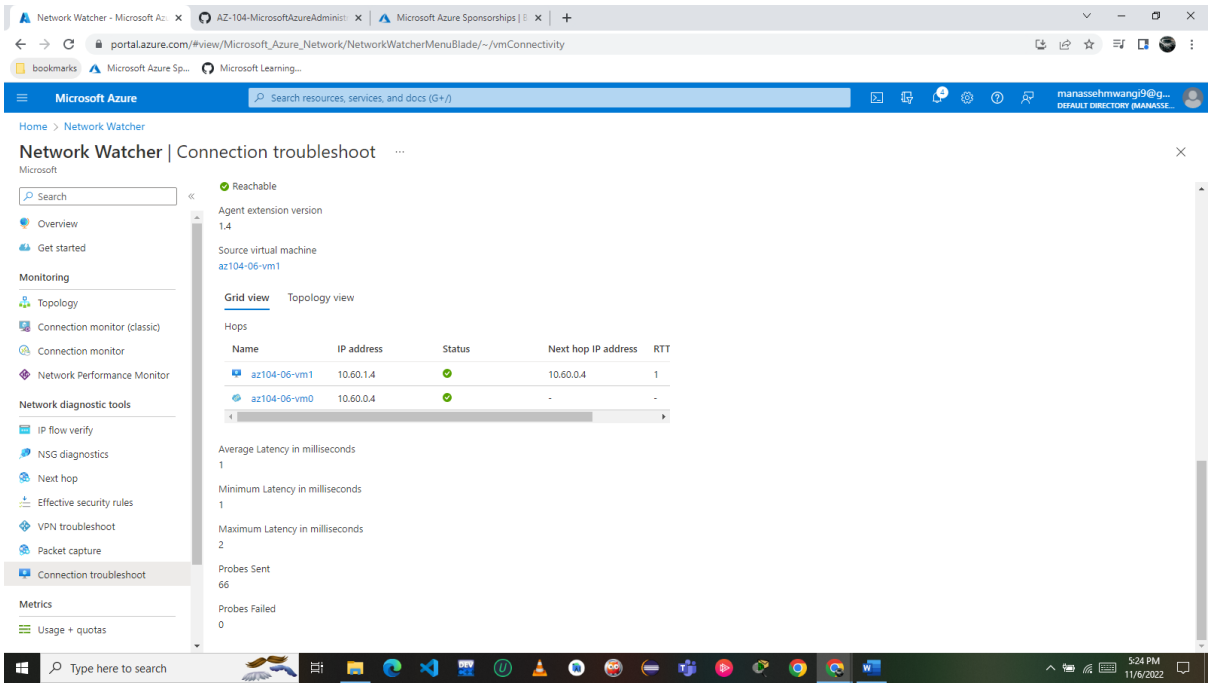
On the **Network Watcher** blade, navigate to the **Connection troubleshoot**.

Note: **10.62.0.4** represents the private IP address of **az104-06-vm2**

One can either the drop down to select the vms or manually key in ip address

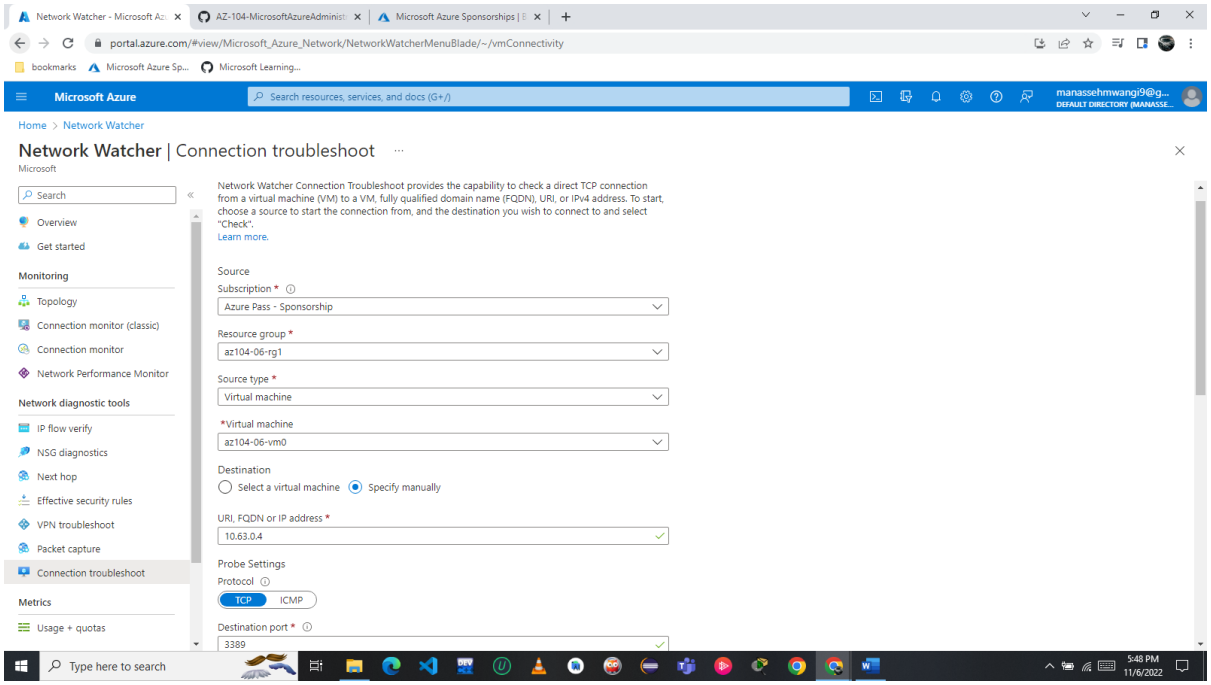


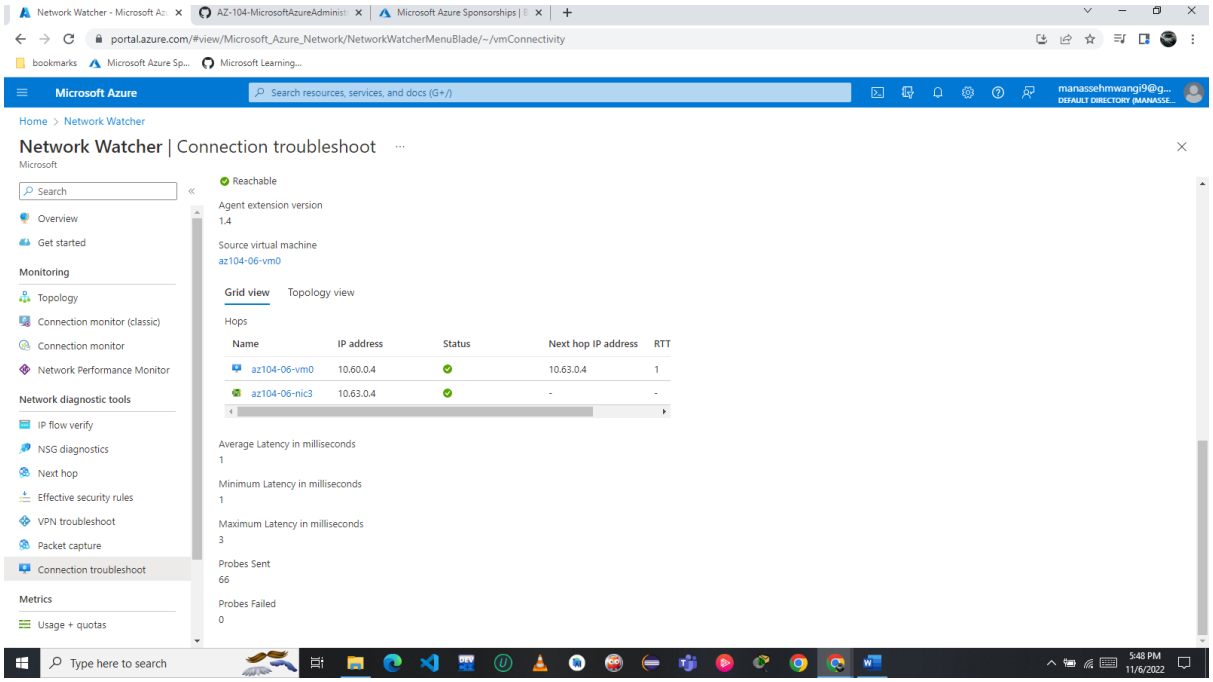
From az104-06vm1 the status of vm0 is **Reachable,** since the hub virtual network is peered directly with the first spoke virtual network.



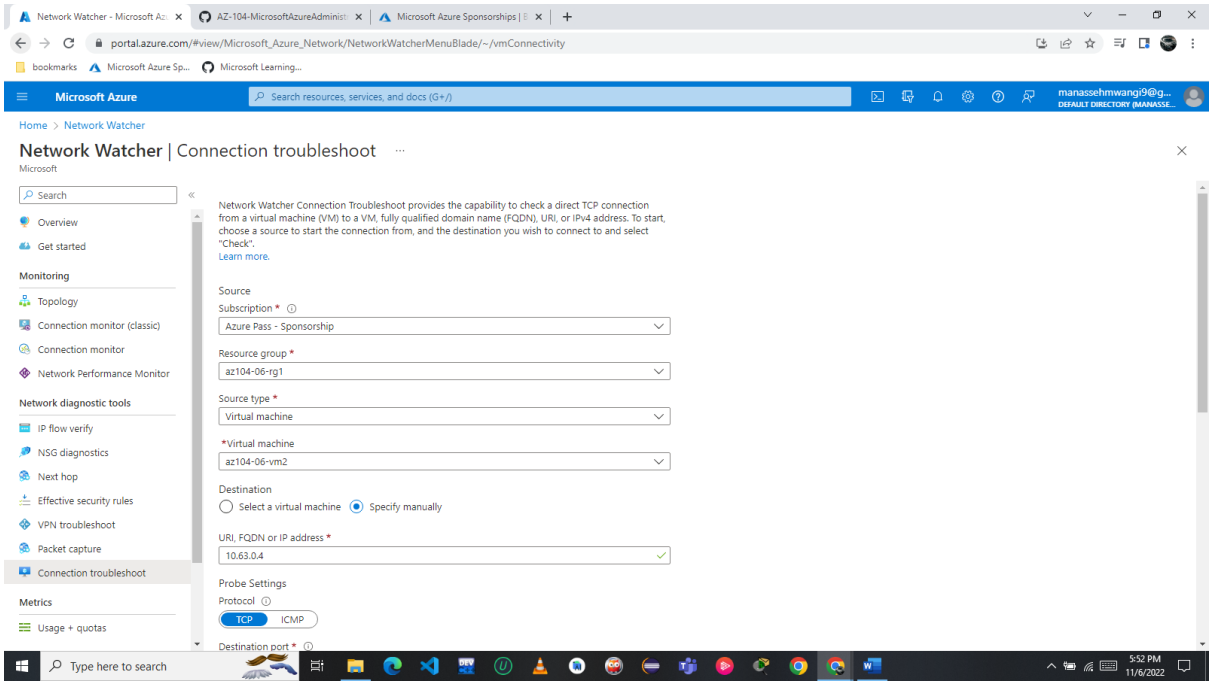
10.63.0.4 represents the private IP address of **az104-06-vm3**

From vm0 the status of vm3 is **Reachable**, the connection was direct, with no intermediate hops in between the VMs.

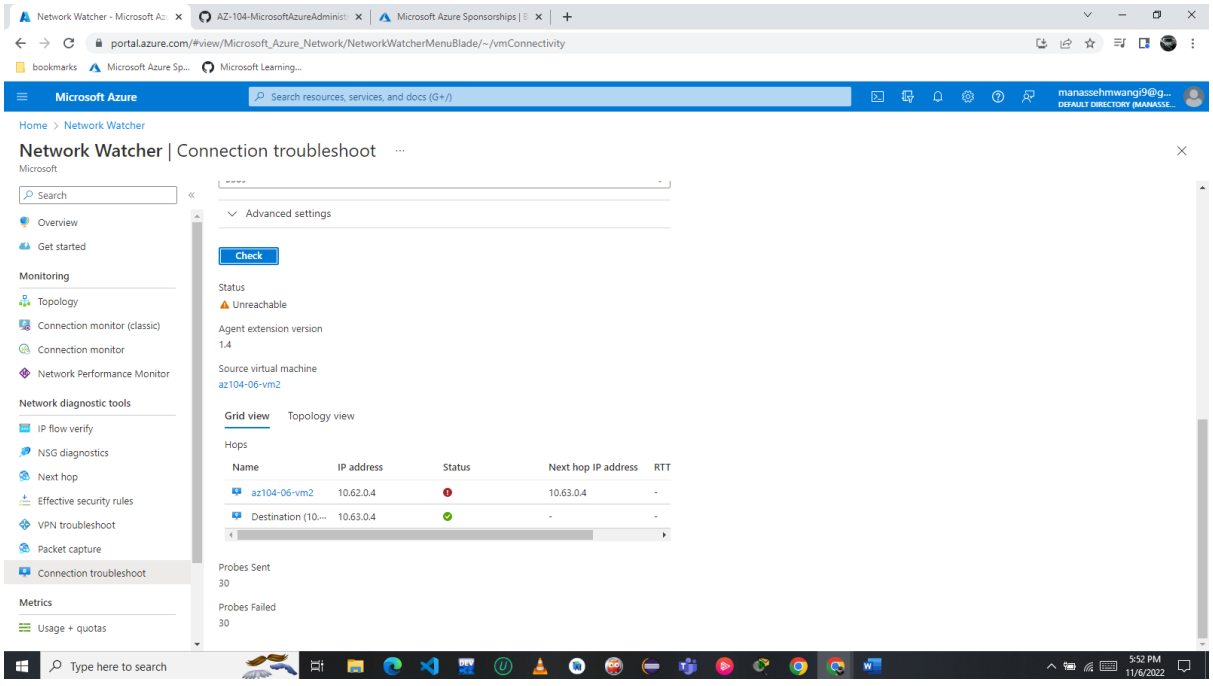




10.63.0.4 represents the private IP address of **az104-06-vm3**



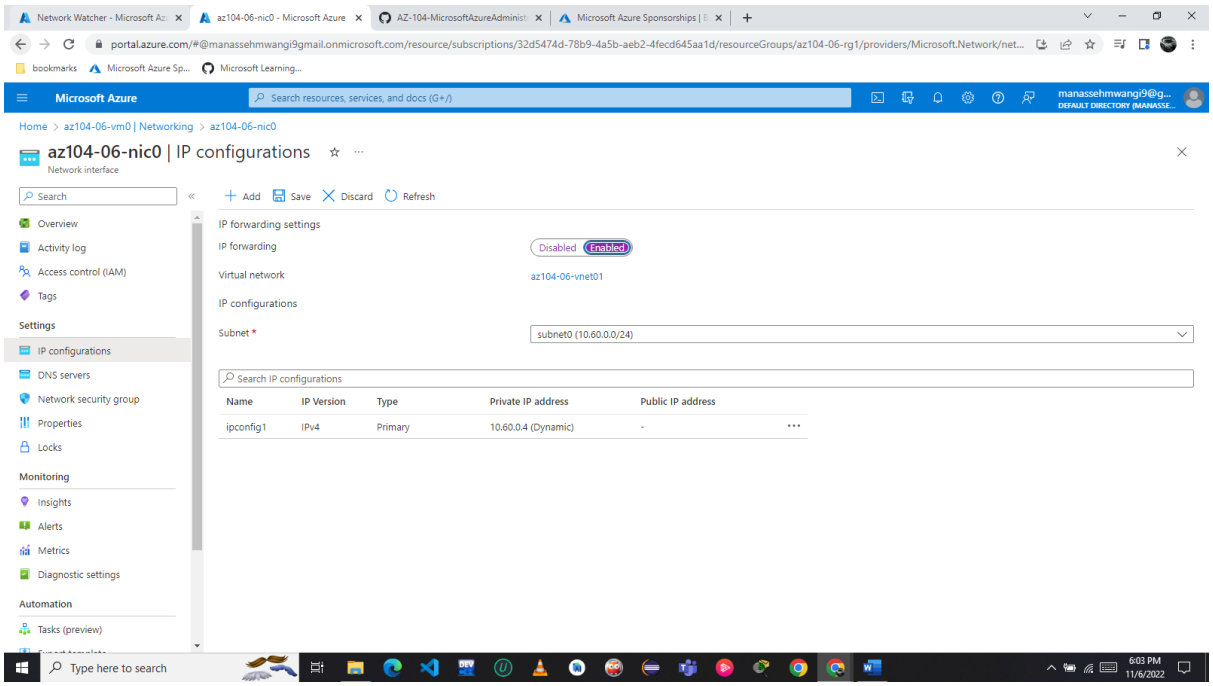
From vm2 the status of vm3 is **Unreachable**. This is expected, since the two spoke virtual networks are not peered with each other (virtual network peering is not transitive).



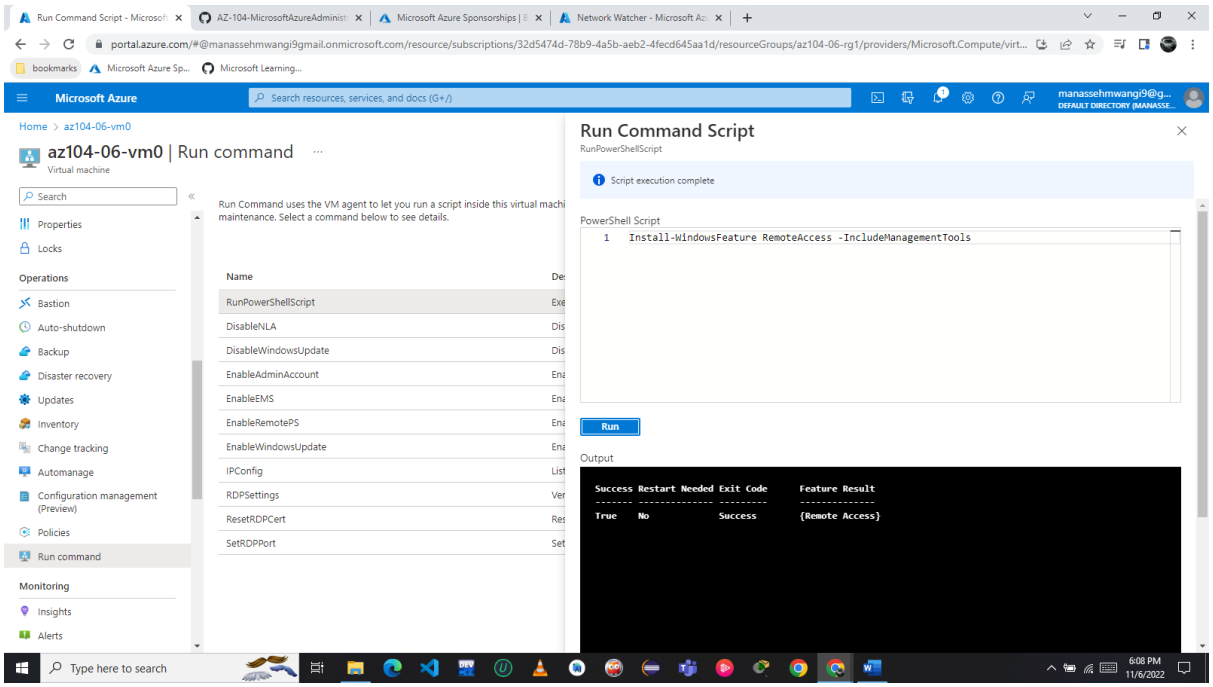
Task 4: Configure routing in the hub and spoke topology

In this task, you will configure and test routing between the two spoke virtual networks by enabling IP forwarding on the network interface of the **az104-06-vm0** virtual machine, enabling routing within its operating system, and configuring user-defined routes on the spoke virtual network.

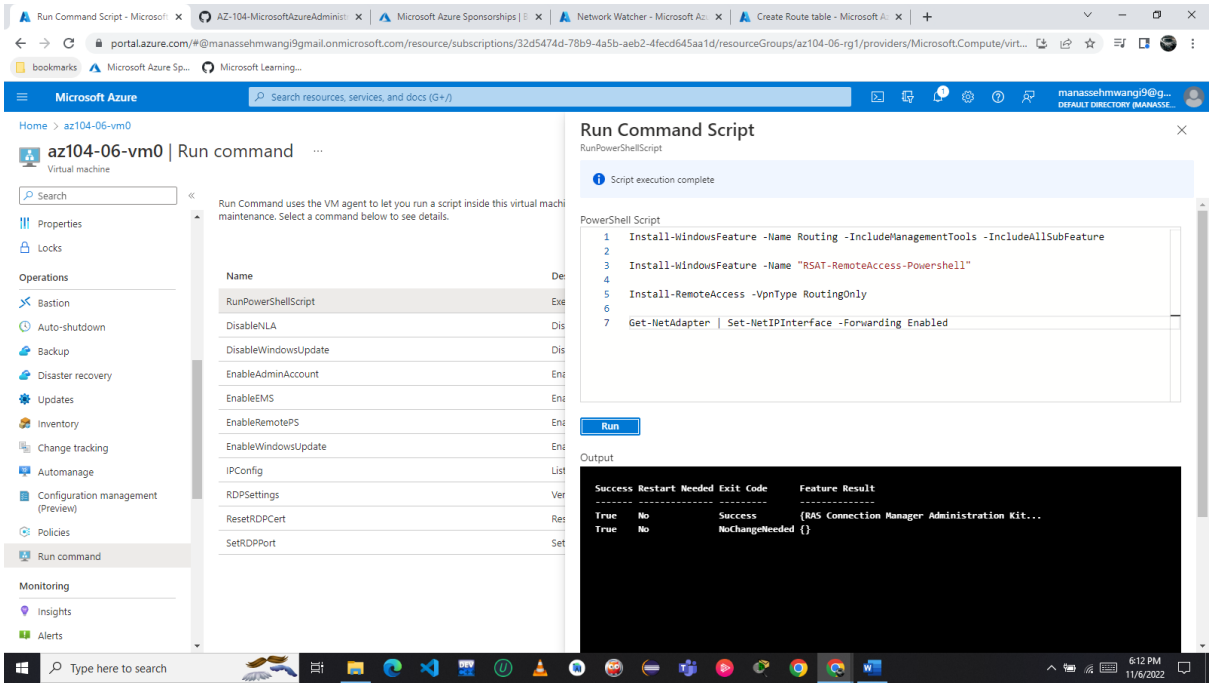
Set **IP forwarding** to **Enabled** and save the change. This setting is required in order for **az104-06-vm0** to function as a router, which will route traffic between two spoke virtual networks.



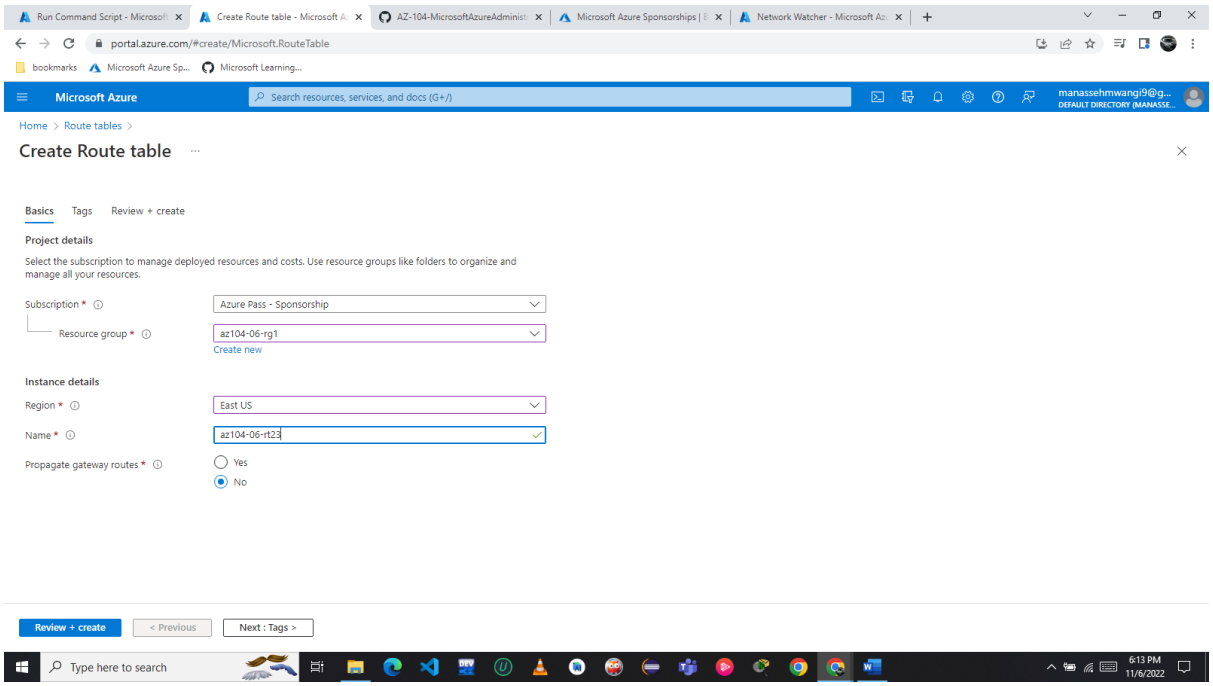
On the **Run Command Script** blade to install the Remote Access Windows Server role.



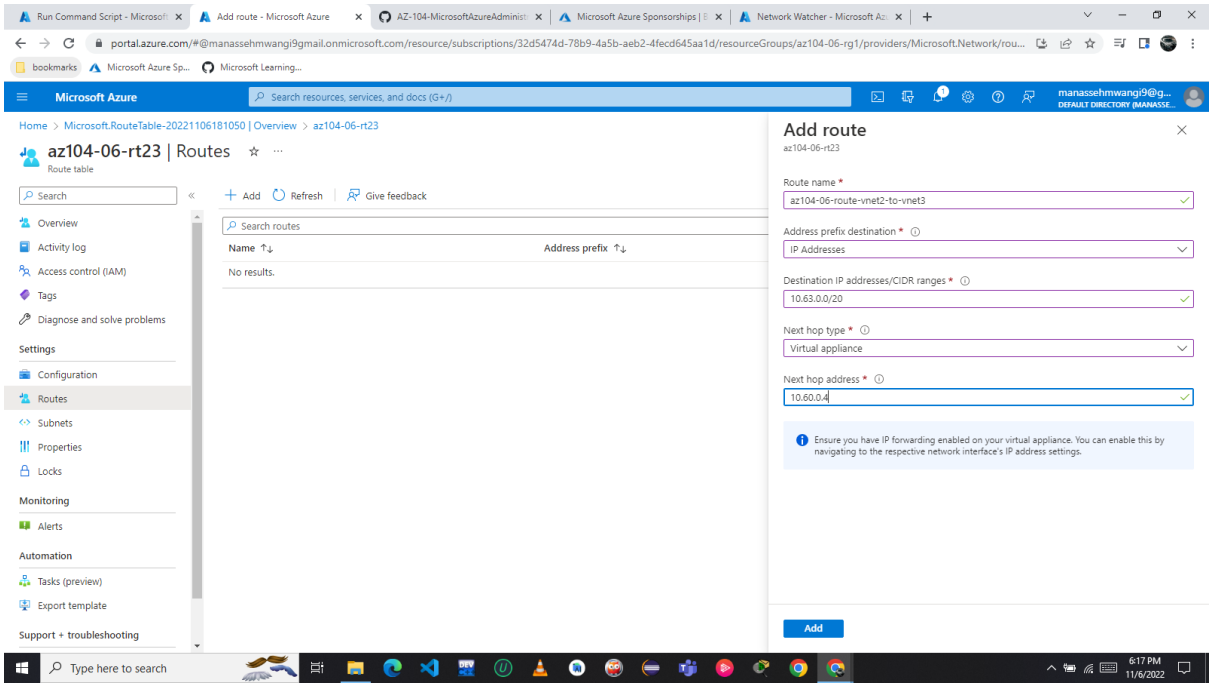
On the **Run Command Script** blade to install the Routing role service.



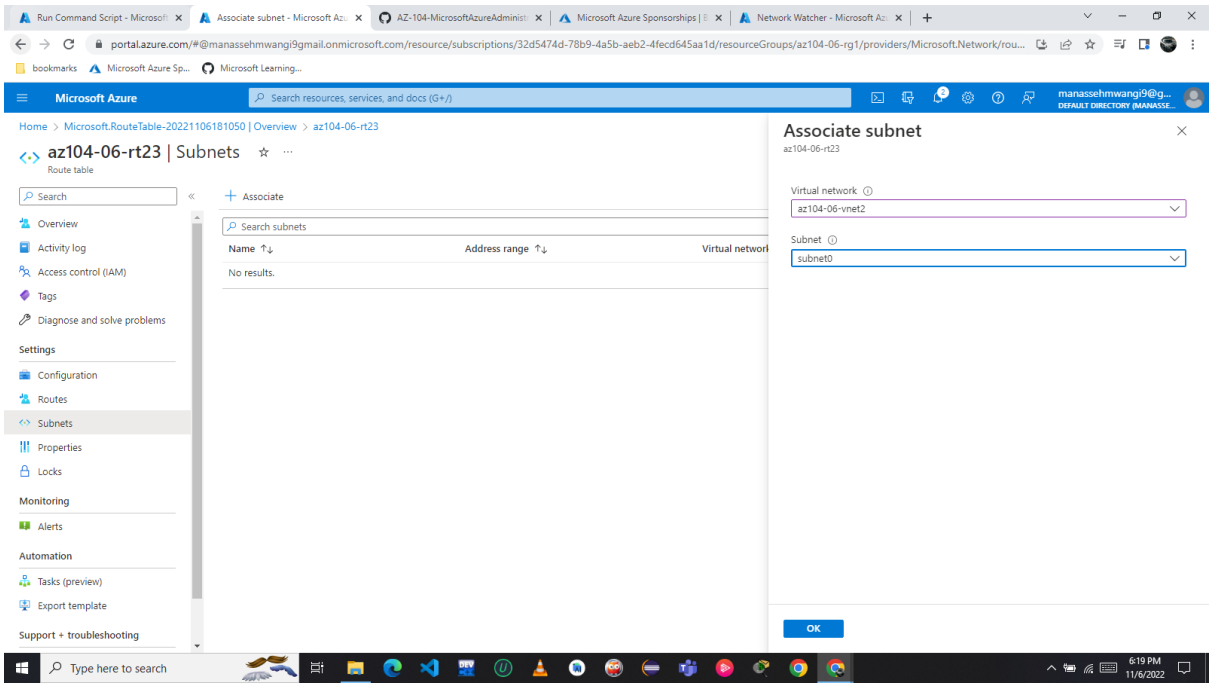
In the Azure portal, search and select **Route tables** and click **+ Create**.



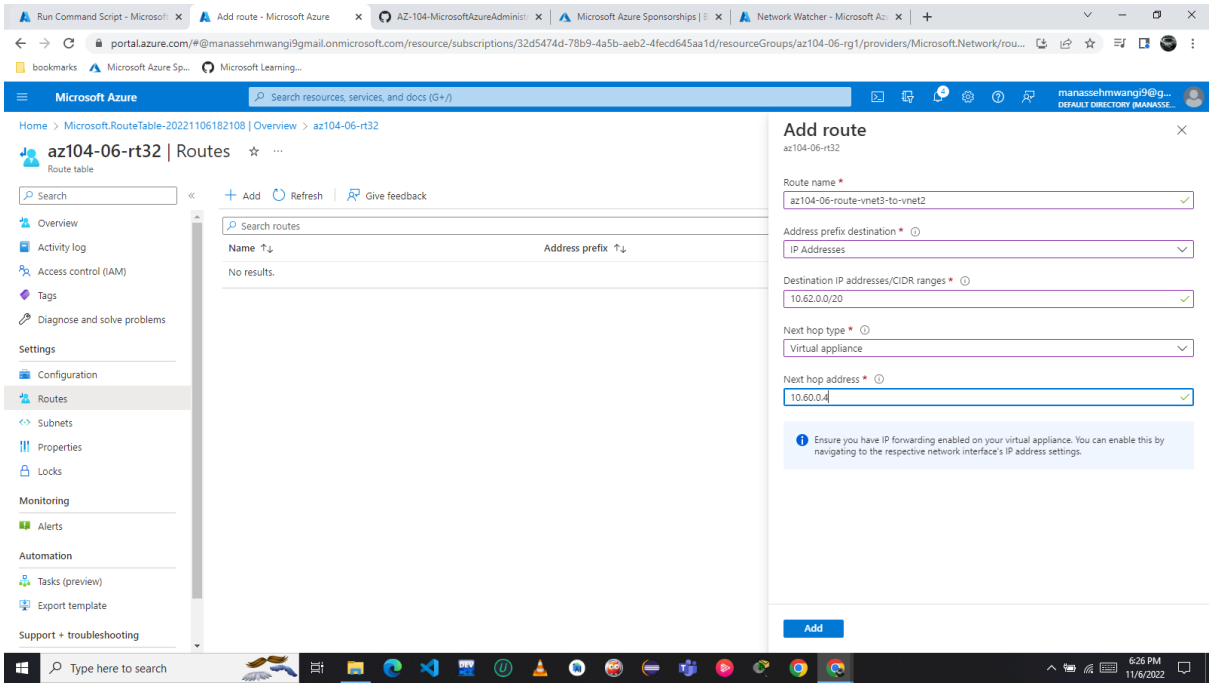
Add a new route with the following settings:

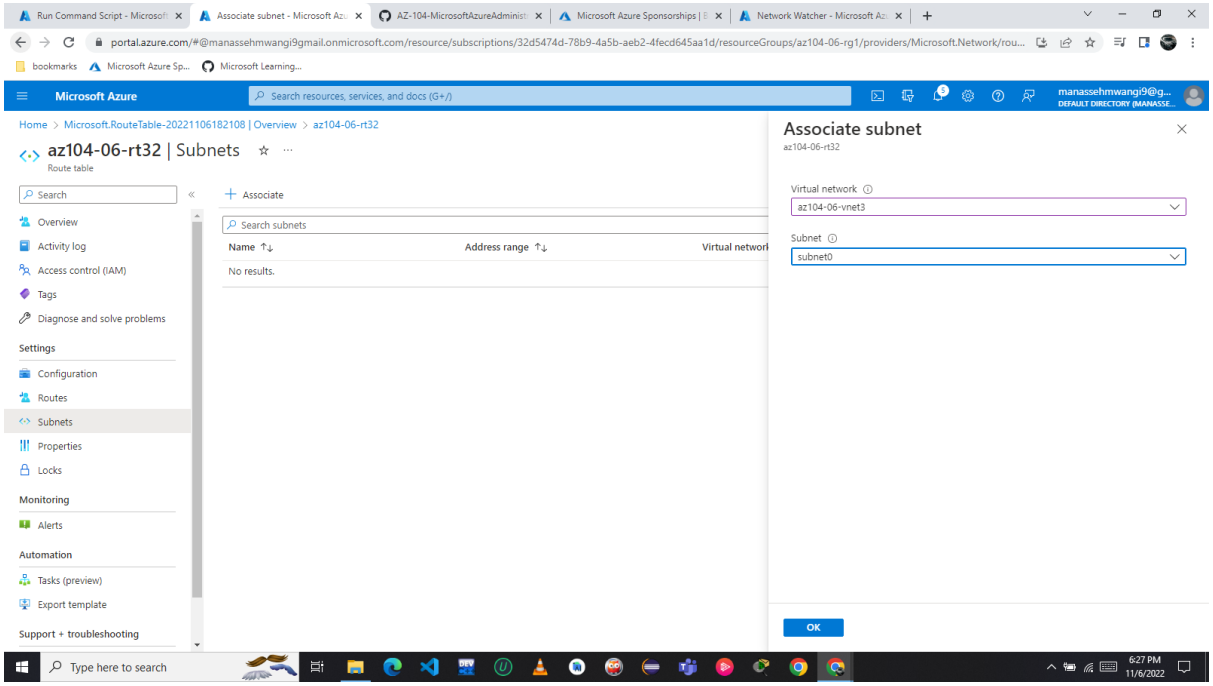


Associate the route table **az104-06-rt23** with the following subnet:



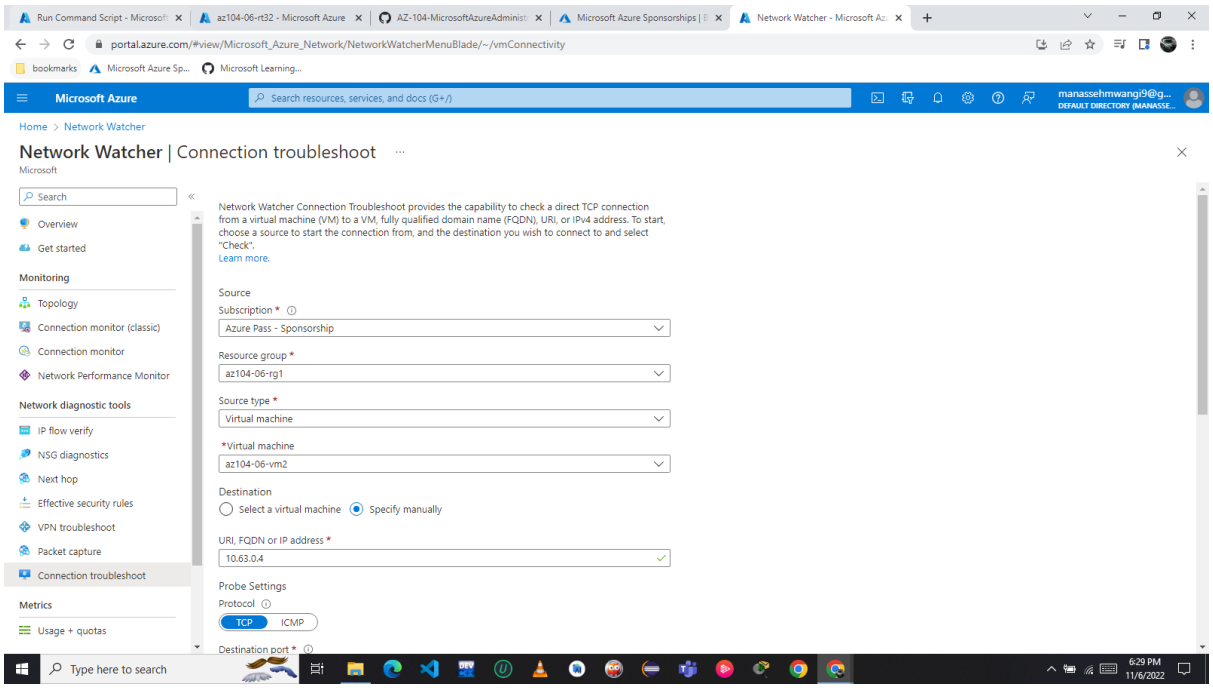
Add a new route table, click **Subnets**, and **Associate**.





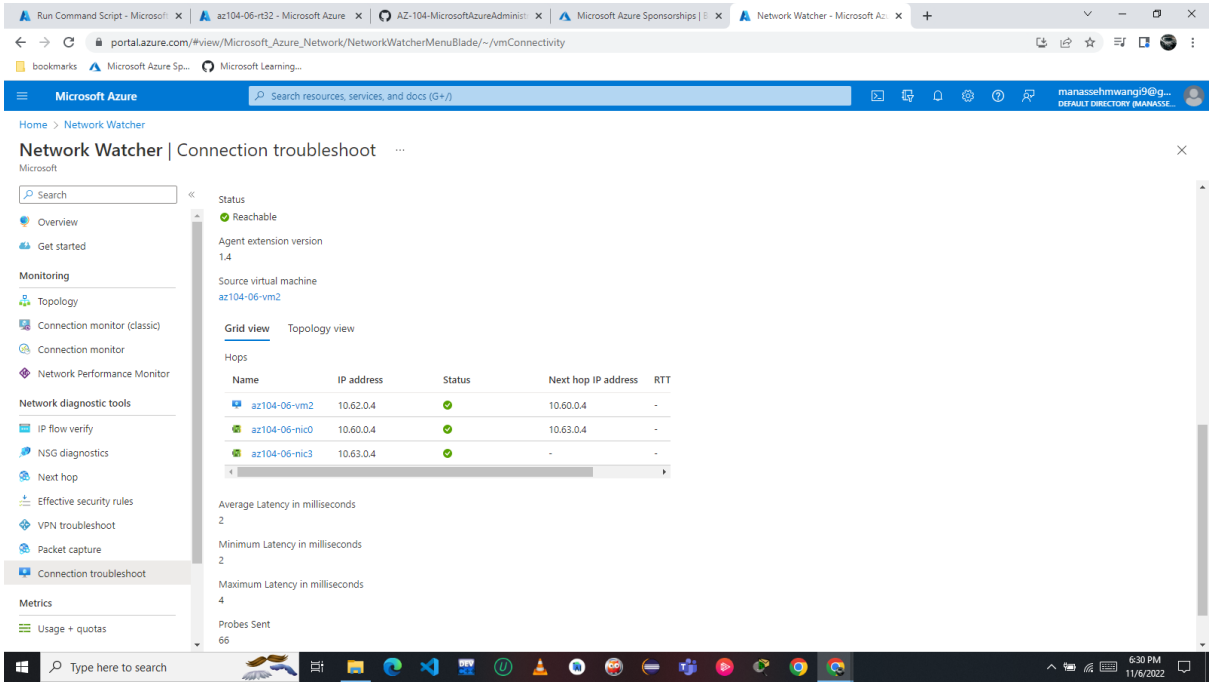
On the **Network Watcher - Connection troubleshoot**

Like we had done on task 3 lets know see if the vms 2 and 3 will interact



The traffic was routed via **10.60.0.4**, assigned to the **az104-06-nic0** network adapter.

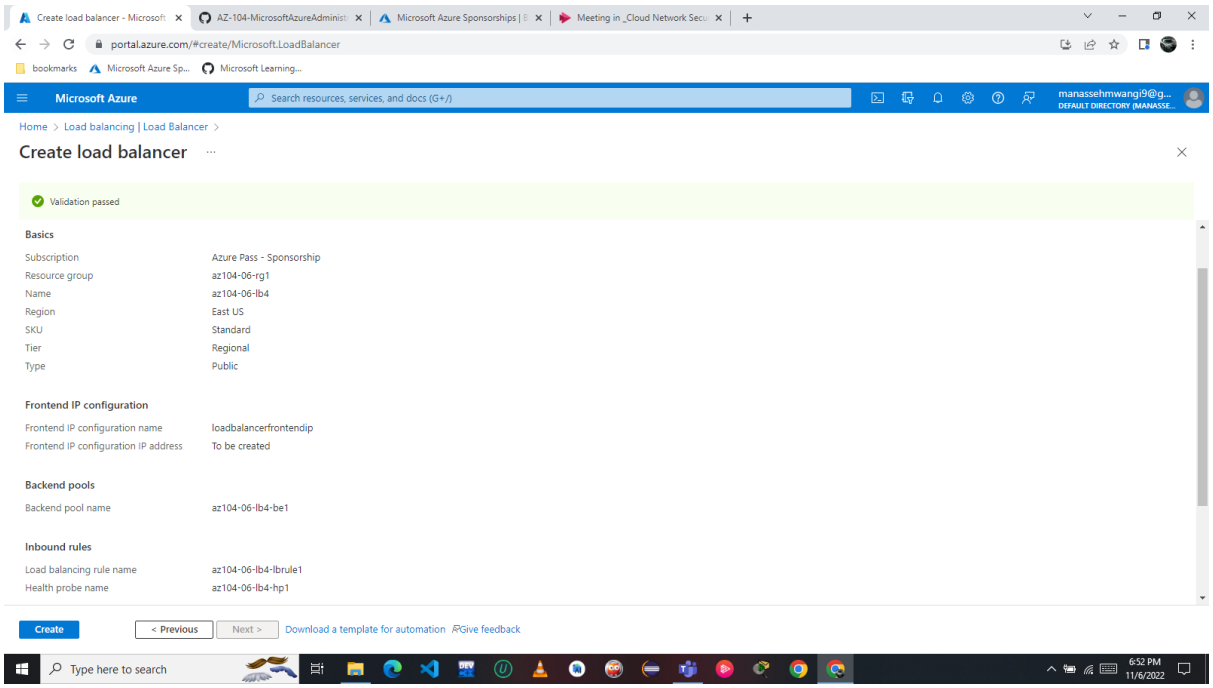
Vm3 is reacable from vm2 since the traffic between spoke virtual networks is now routed via the virtual machine located in the hub virtual network, which functions as a router.



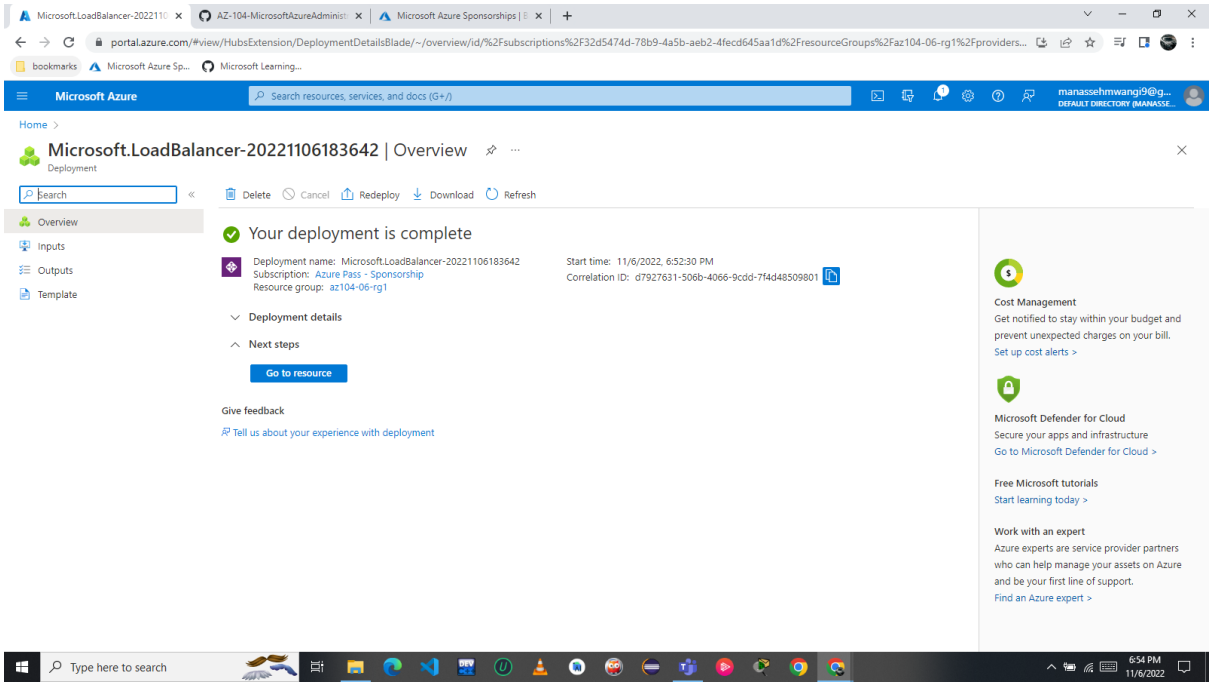
Task 5: Implement Azure Load Balancer

In this task, you will implement an Azure Load Balancer in front of the two Azure virtual machines in the hub virtual network.

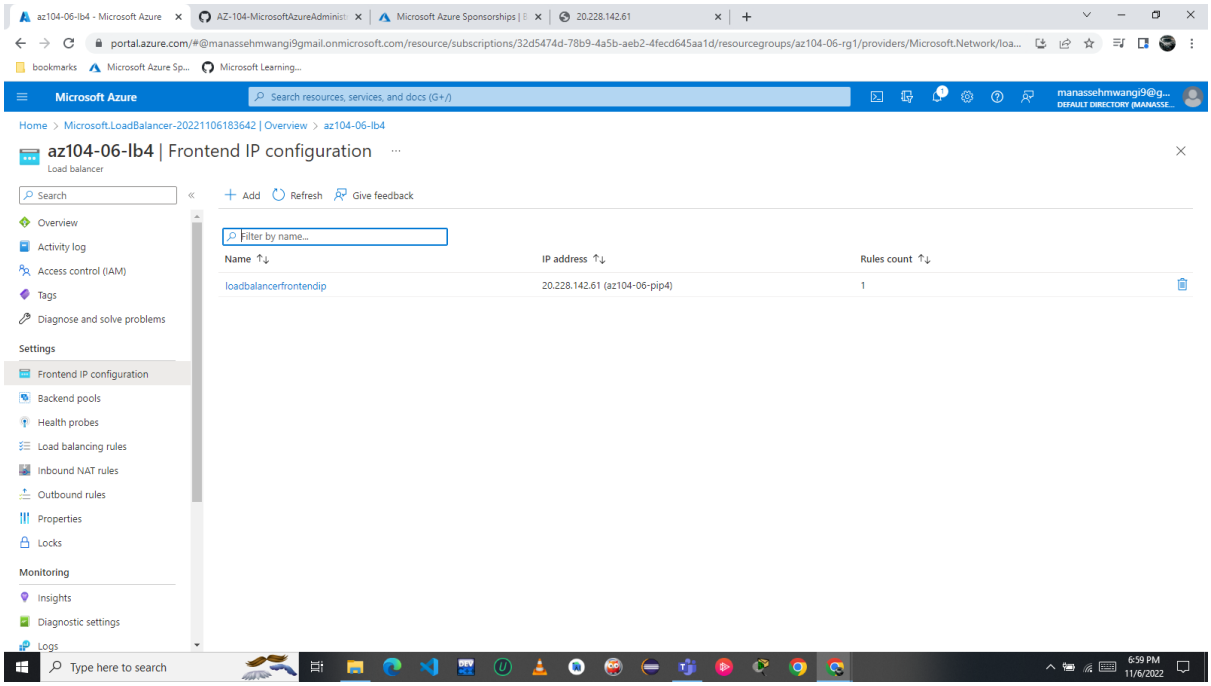
Create a load balancer with the following settings



Wait for the load balancer to deploy

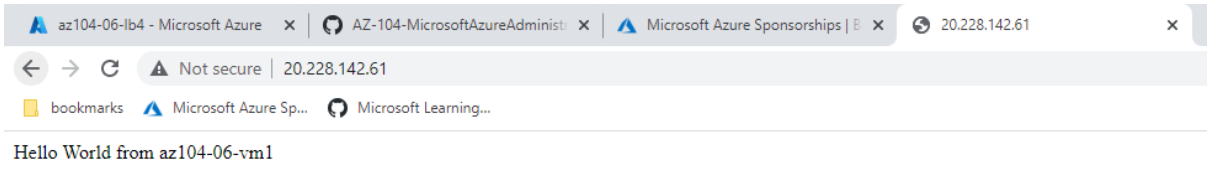


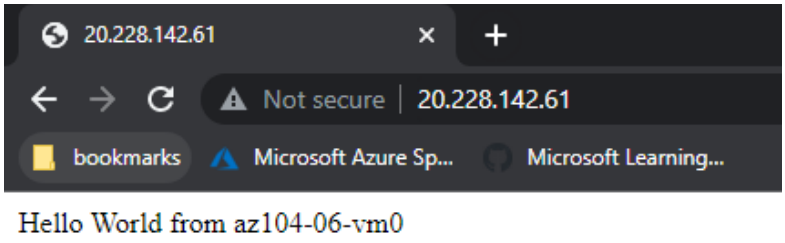
Select **Frontend IP configuration** from the Load Balancer resource page. Copy the IP address.



Open another browser tab and navigate to the IP address

Verify that the browser window displays the message **Hello World from az104-06-vm0** or **Hello World from az104-06-vm1**.



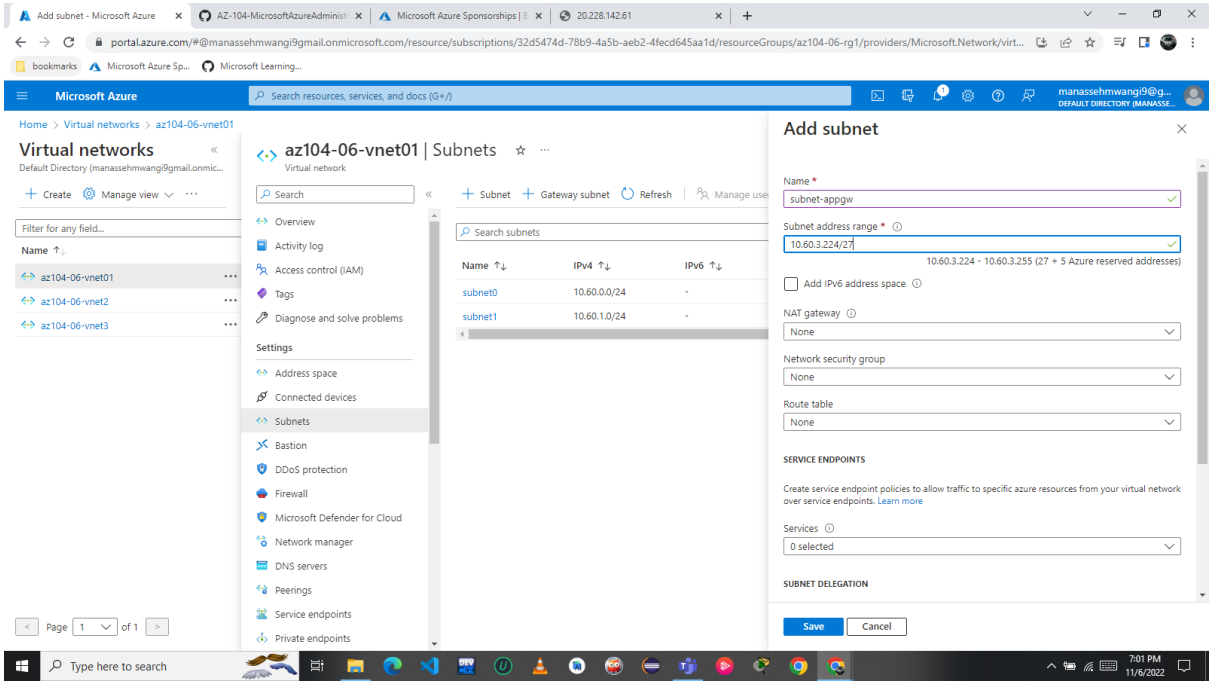


Task 6: Implement Azure Application Gateway

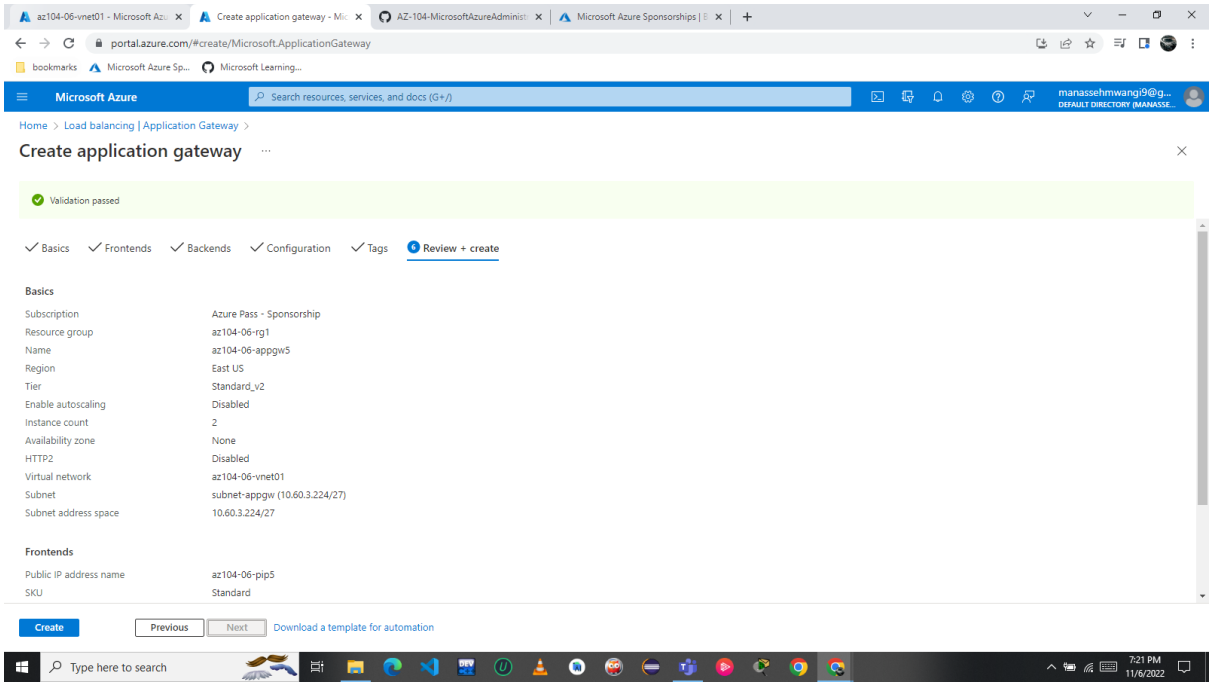
In this task, you will implement an Azure Application Gateway in front of the two Azure virtual machines in the spoke virtual networks.

On the **az104-06-vnet01** virtual network click **Subnets**, and then click **+ Subnet**.

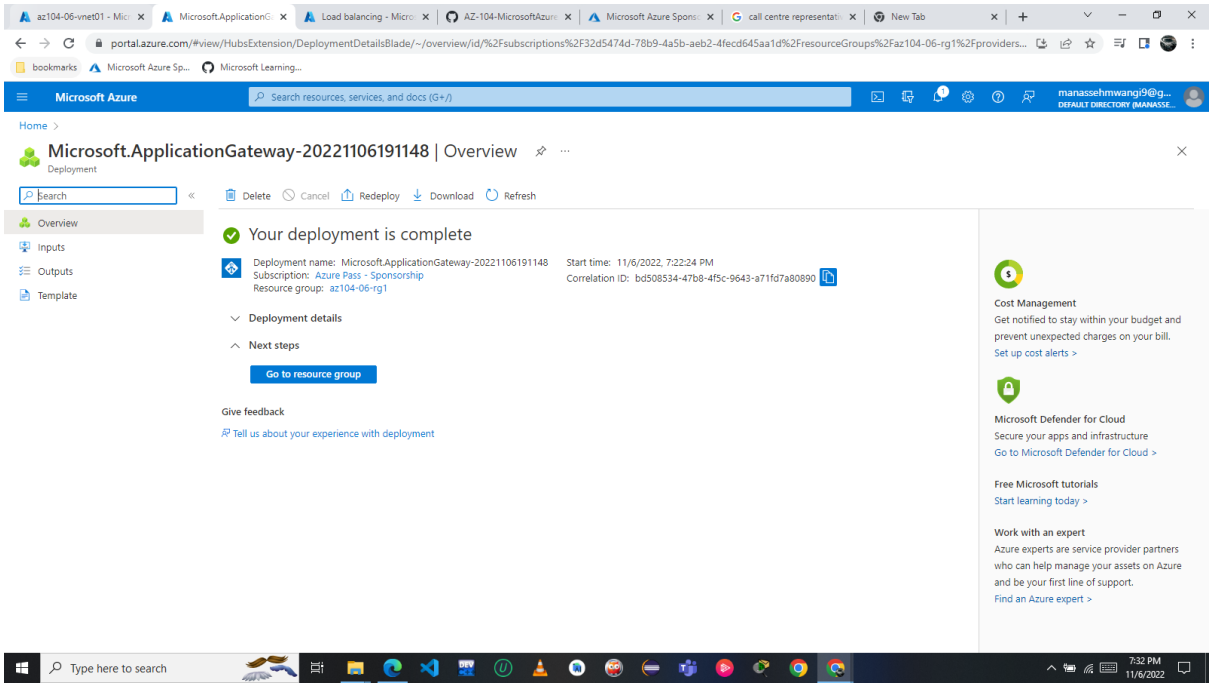
Add a subnet with the following settings



Search and select **Application Gateways** and, on the **Application Gateways** blade, click **+ Create**. Specify the following

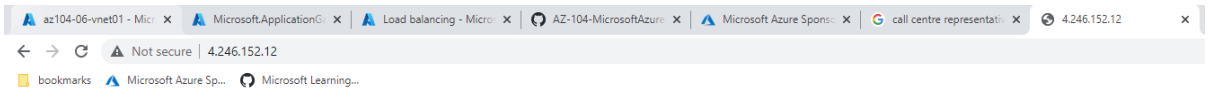


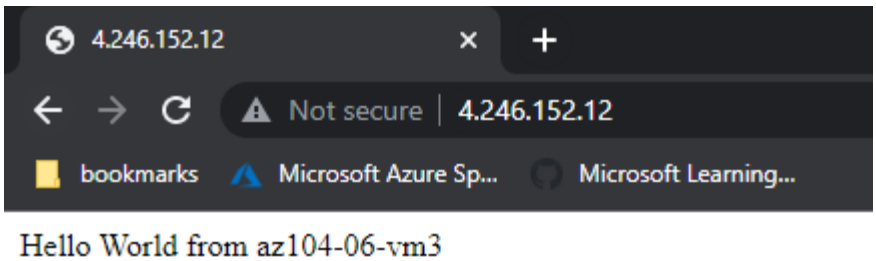
Wait for the Application Gateway instance to be created, this might take 8 minutes.



On the **az104-06-appgw5** Application Gateway blade, copy the value of the **Frontend public IP address**.

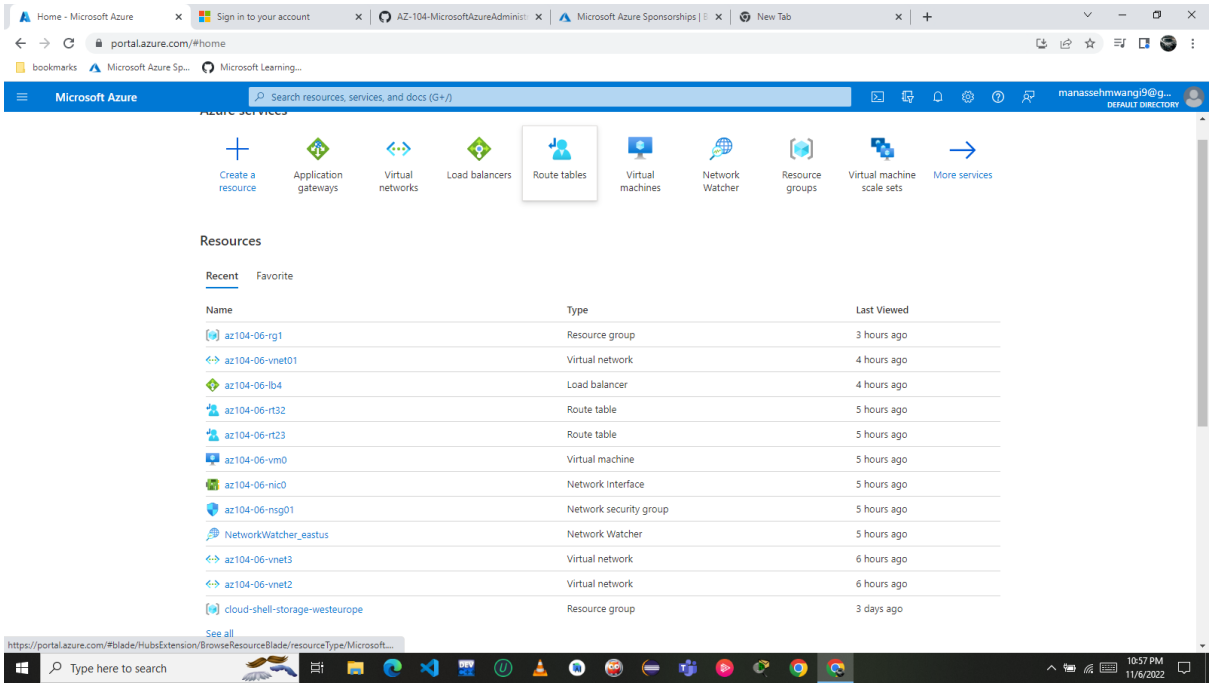
Verify that the browser window displays the message **Hello World from az104-06-vm2** or **Hello World from az104-06-vm3**.





Targeting virtual machines on multiple virtual networks is not a common configuration, but it is meant to illustrate the point that Application Gateway is capable of targeting virtual machines on multiple virtual networks (as well as endpoints in other Azure regions or even outside of Azure), unlike Azure Load Balancer, which load balances across virtual machines in the same virtual network.

The overall resources used.



Remove any newly created Azure resources that you no longer use. Removing unused resources ensures you will not see unexpected charges.