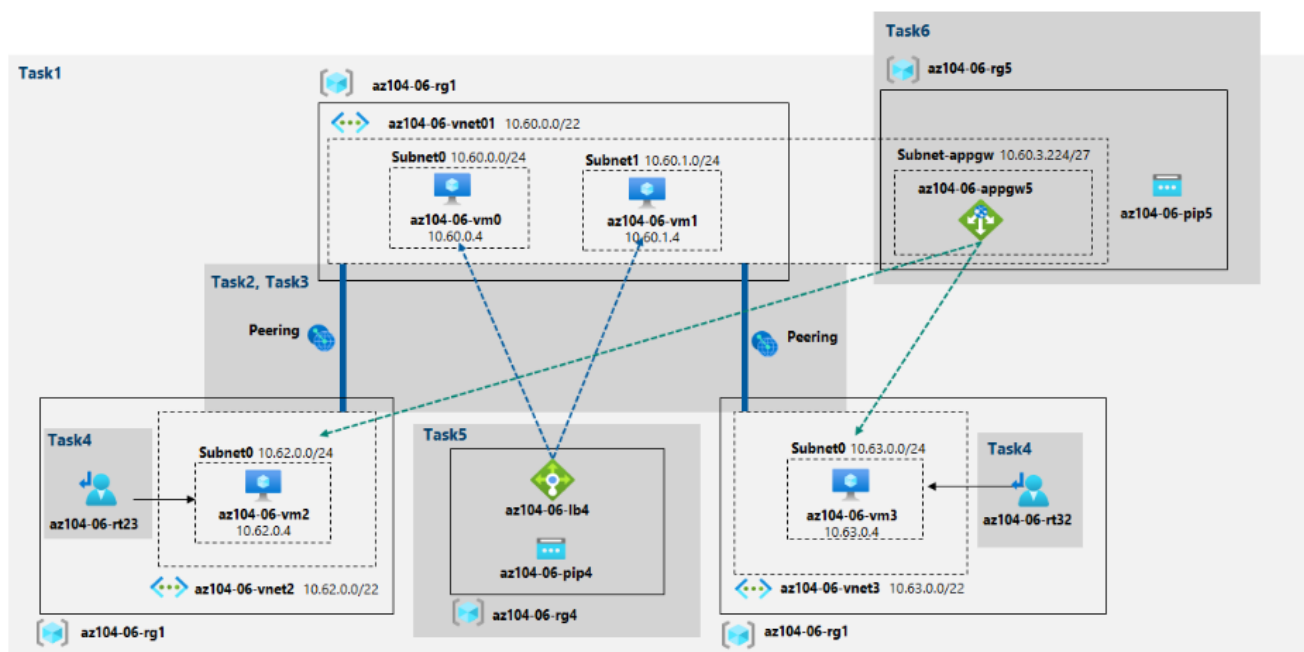


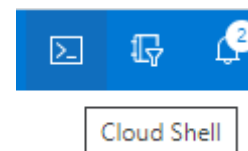
Implement Traffic Management Student

In this lab,

- Task 1: Provision the lab environment
- Task 2: Configure the hub and spoke network topology
- Task 3: Test transitivity of virtual network peering
- Task 4: Configure routing in the hub and spoke topology
- Task 5: Implement Azure Load Balancer
- Task 6: Implement Azure Application Gateway



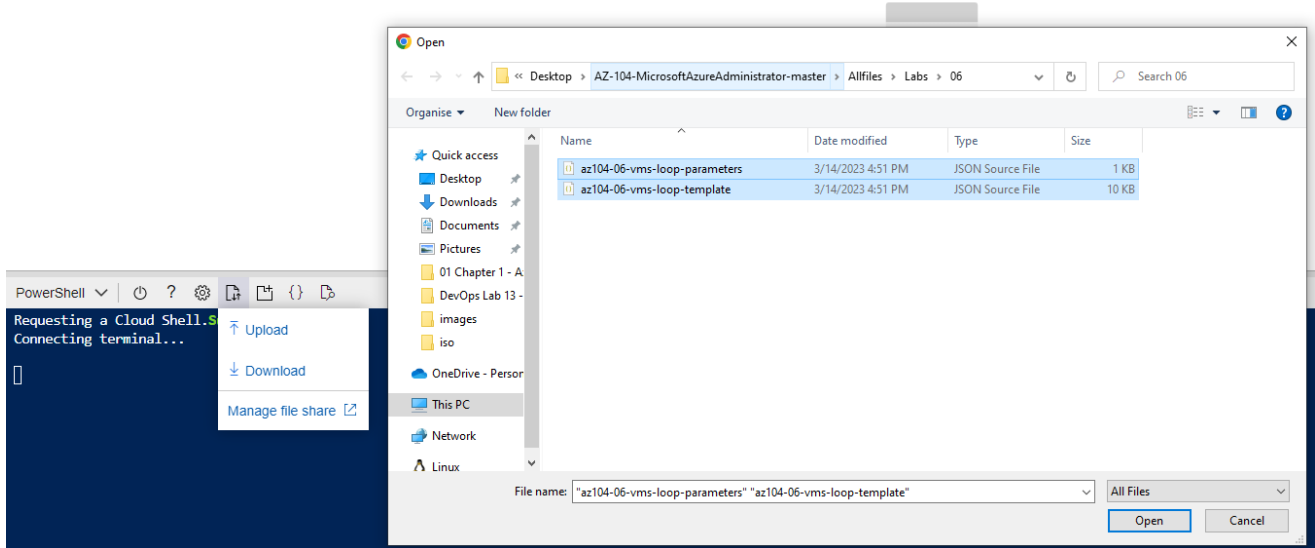
Task 1: Provision the lab environment



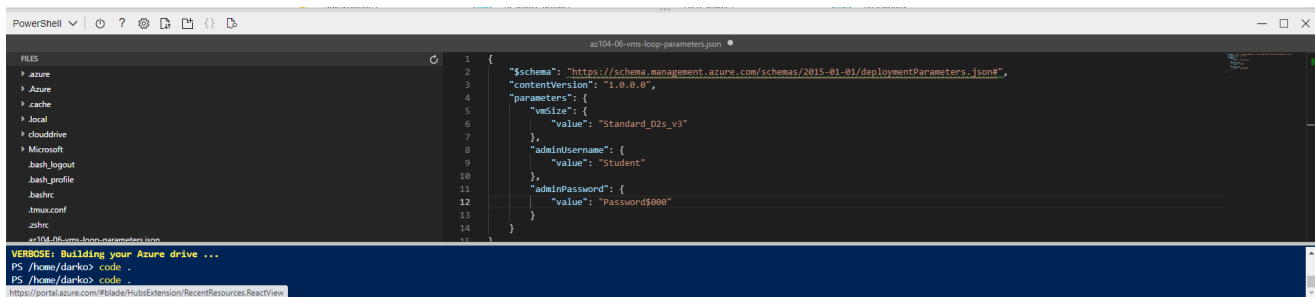
Login to portal.azure. Open powershell and upload two files

File 1: \Allfiles\Labs\06\az104-06-vms-loop-template.json

File 2: \Allfiles\Labs\06\az104-06-vms-loop-template.json



After we upload the scripts, we have to edit the login credentials.



From the powershell run this command to create three virtual networks and four Azure VMs from files we uploaded.

```
New-AzResourceGroupDeployment `
-ResourceGroupName $rgName `
-TemplateFile $HOME/az104-06-vms-loop-template.json `
-TemplateParameterFile $HOME/az104-06-vms-loop-parameters.json
```

Success!!! We created new VM

Home >

Virtual machines

Default Directory (darkoavramovski@hotmail.com@microsoft.com)

+ Create Switch to classic Reservations Manage view Refresh Export to CSV Open query Assign tags Start Restart Stop Delete Services Maintenance

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

Showing 1 to 4 of 4 records.

Name	Type	Subscription	Resource group	Location	Status	Operating system	Size	Public IP address	Disks
az104-06-vm0	Virtual machine	Azure Pass - Sponsorship	az104-06-rg1	West Europe	Running	Windows	Standard_D2s_v3	-	1
az104-06-vm1	Virtual machine	Azure Pass - Sponsorship	az104-06-rg1	West Europe	Running	Windows	Standard_D2s_v3	-	1
az104-06-vm2	Virtual machine	Azure Pass - Sponsorship	az104-06-rg1	West Europe	Running	Windows	Standard_D2s_v3	-	1
az104-06-vm3	Virtual machine	Azure Pass - Sponsorship	az104-06-rg1	West Europe	Running	Windows	Standard_D2s_v3	-	1

< Previous Page 1 of 1 Next >

Give feedback

```
PowerShell PS /home/darko> New-AzResourceGroupDeployment -ResourceGroupName $rgName -TemplateFile $HOME/az104-06-vm-loop-template.json -TemplateParameterFile $HOME/az104-06-vm-loop-parameters.json

DeploymentName      : az104-06-vm-loop-template
ResourceGroupName   : az104-06-rg1
ProvisioningState    : Succeeded
Timestamp           : 3/23/2023 10:01:12 AM
Mode                : Incremental
TemplateLink         :
Parameters           :
    Name                Type                Value
    -----
    vmSize               String              "Standard_D2s_v3"
    vmName               String              "az104-06-vm"
    vmCount              Int                4
    adminUsername         String              "Student"
    adminPassword         SecureString          null

Outputs
:
```

Now we have to create Network Watcher extension on the Azure, for the vm we created in previous step. Run this command in powershell

Success!!! We created new network watche for every VM

Home >

Network interfaces

Default Directory (darkoavramovski@hotmail.com@microsoft.com)

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

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

Showing 1 to 4 of 4 records.

Name	Kind	Virtual ...	Primar...	Attach...	Resource group	Location	Subscription
az104-06-nic0	Regular	az104-06-v...	10.60.0.4	az104-...	az104-06-rg1	West Europe	Azure Pass - Sponsorship
az104-06-nic1	Regular	az104-06-v...	10.60.1.4	az104-...	az104-06-rg1	West Europe	Azure Pass - Sponsorship
az104-06-nic2	Regular	az104-06-v...	10.62.0.4	az104-...	az104-06-rg1	West Europe	Azure Pass - Sponsorship
az104-06-nic3	Regular	az104-06-v...	10.63.0.4	az104-...	az104-06-rg1	West Europe	Azure Pass - Sponsorship

< Previous Page 1 of 1 Next >

Give feedback

```
PowerShell PS /home/darko> -Name 'networkwatcherAgent' -Publisher 'Microsoft.Azure.NetworkWatcher' -Type 'NetworkWatcherAgentWindows' -typeHandlerVersion '1.4'

RequestId IsSuccessStatusCode StatusCode ReasonPhrase
-----
True      OK OK
True      OK OK
True      OK OK
True      OK OK

PS /home/darko>
```

Task 2: Configure the hub and spoke network topology

From the search bar type Virtual networks. Select az104-06-vnet2 / Properties from left side menu . and copy Resource ID also for az104-06-vnet3.

Resource ID

/subscriptions/df86697d-88bc-4474-899b-64b5dfd1d8cf/resourceGroups/az104-06-rg1/providers/Microsoft.Network/virtualNetworks/az104-06-vnet2

Copy to clipboard

Select **az104-06-vnet01** and from left side menu select **Peerings** than click Add new

Microsoft Azure

Search resources, services, and docs (G+ /)

Home > az104-06-vnet01

az104-06-vnet01 | Peerings

☆ ...

Virtual network

Search

<< + Add ↻ Refresh | ↺ Sync

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

Properties

Locks

Monitoring

Alerts

Metrics

Diagnostics settings

Filter by name...

Peering status == all

Name ↑↓

Peering status ↑↓

Peer ↑↓

Add a peering to get started

https://portal.azure.com/#@darkoavramovski1hotmail.onmicrosoft.com/resource/subscriptions/df86697d-88bc-4474-899b-64b5dfd1d8cf/resourceGroups/az104-06-rg1/providers/Microsoft.Network/virtualNetworks/az104-06-vnet01

[Home](#) > [az104-06-vnet01 | Peerings](#) >

Add peering ...

az104-06-vnet01

This virtual network

Peering link name *

az104-06-vnet01_to_az104-06-vnet2 ✓

Traffic to remote virtual network ⓘ

- ☒ Allow (default)
- ☐ Block all traffic to the remote virtual network

Traffic forwarded from remote virtual network ⓘ

- ☐ Allow (default)
- ☒ Block traffic that originates from outside the remote virtual network

Virtual network gateway or Route Server ⓘ

- ☐ Use this virtual network's gateway or Route Server
- ☐ Use the remote virtual network's gateway or Route Server
- ☒ None (default)

Remote virtual network

Peering link name *

az104-06-vnet3_to_az104-06-vnet01 ✓

Virtual network deployment model ⓘ

- ☒ Resource manager
- ☐ Classic

☒ I know my resource ID ⓘ

Resource ID *

/subscriptions/df86697d-88bc-4474-899b-64b5dfd1d8cf/resourceGroups/az104-06-rg1/providers/Microsoft.Network/vir... ✓

Traffic to remote virtual network ⓘ

- ☒ Allow (default)
- ☐ Block all traffic to the remote virtual network

Traffic forwarded from remote virtual network ⓘ

Add

Repeat this proces for az104-06-vnet3

Task 4: Configure routing in the hub and spoke topology

We have to enable **IP forwarding** on VM **az104-06-vm0** we have to go in Virtual Machines/az104-06-vm0/Network Interface: az104-06-nic0 enable **IP forwarding** and click Save

az104-06-nic0 - Microsoft Azure

sfa-homework/DevOps Lab 16 -

portal.azure.com/#@darkoavramovski1hotmail.onmicrosoft.com/resource/...

Microsoft Azure

Search resources, services, and docs (G+)

darkoavramovski1@hot...
DEFAULT DIRECTORY

Home > Virtual machines > az104-06-vm0 | Networking > az104-06-nic0

az104-06-nic0 | IP configurations

Network interface

Search

« + Add Save X Discard Refresh

Overview

Activity log

Access control (IAM)

Tags

Settings

IP configurations

DNS servers

Network security group

Properties

Locks

Monitoring

Insights

Alerts

Metrics

Diagnostic settings

Automation

Tasks (preview)

Export template

Help

Effective security rules

Effective routes

New Support Request

IP forwarding settings

IP forwarding

Disabled Enabled

Virtual network

az104-06-vnet01

IP configurations

Subnet

subnet0

Search IP configurations

Name	IP Version	Type	Private IP address	Public IP address
ipconfig1	IPv4	Primary	10.60.0.4 (Dynamic)	-

Navigate back to Virtual Machines and select **az104-06-vm0** and click **Overview** and **Run command** and select **RunPowerShellScript**.

Run Command Script - Microsoft

sfa-homework/DevOps Lab 16 - / x

+

portal.azure.com/#@darkoavramovski1hotmail.onmicrosoft.com/resource/...

Search resources, services, and docs (G+)

darkoavramovski1@hot...
DEFAULT DIRECTORY

Home > Virtual machines > az104-06

az104-06-vm0 | Ru
Virtual machine

Search

Bastion

Auto-shutdown

Backup

Disaster recovery

Updates

Inventory

Change tracking

Automanage

Configuration management (Preview)

Policies

Run command

Monitoring

Insights

Alerts

Metrics

Diagnostic settings

Logs

Connection monitor (classic)

Workbooks

Automation

Tasks (preview)

Export template

Run Command Script

RunPowerShellScript

Script execution complete

PowerShell Script

1 Install-WindowsFeature RemoteAccess -IncludeManagementTools

Run

Output

Success	Restart	Needed	Exit Code	Feature	Result
True	No		Success	{Remote	Access}

Run Command Script - Microsoft x

Network Watcher - Microsoft Az...

sfa-homework/DevOps Lab 16 - / x

+

portal.azure.com/#@darkoavramovski1hotmail.onmicrosoft.com/resource/...

Search resources, services, and docs (G+)

darkoavramovski1@hot...
DEFAULT DIRECTORY

Home > Virtual machines > az104-06

az104-06-vm0 | Ru
Virtual machine

Search

Bastion

Auto-shutdown

Backup

Disaster recovery

Updates

Inventory

Change tracking

Automanage

Configuration management
(Preview)

Policies

Run command

Monitoring

Insights

Alerts

Metrics

Dagnostic settings

Logs

Connection monitor (classic)

Workbooks

Automation

Run Command Script

RunPowerShellScript

Script execution complete

PowerShell Script

1 Install-WindowsFeature RemoteAccess -IncludeManagementTools
2 Install-WindowsFeature -Name Routing -IncludeManagementTools -IncludeAllSubFeature
3
4 Install-WindowsFeature -Name "RSAT-RemoteAccess-Powershell"
5
6 Install-RemoteAccess -VpnType RoutingOnly
7
8 Get-NetAdapter | Set-NetIPInterface -Forwarding Enabled

Run

Output

Success	Restart	Needed	Exit Code	Feature	Result
True	No		NoChangeNeeded	{}	
True	No		Success	{RAS Connection Manager Administration Kit...	
True	No		NoChangeNeeded	{}	

Now we have to create route tables

portal.azure.com/#create/Microsoft.RouteTable-ARM

Microsoft Azure Search resources, services, and docs (G+)

Home > Route tables >

Create Route table

Basics Tags Review + create

Project details

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

Subscription * ⓘ Azure Pass - Sponsorship

Resource group * ⓘ az104-06-rg1
[Create new](#)

Instance details

Region * ⓘ East US

Name * ⓘ az104-06-rt23

Propagate gateway routes * ⓘ
☐ Yes
☒ No

[Review + create](#) < Previous Next : Tags >

[Click got to resources](#)

Microsoft.RouteTable-202303231Virtual machines - Microsoft Azurefa-homework/DevOps Lab 16 - x

portal.azure.com/#view/HubsExtension/DeploymentDetailsBlade/~/overvie...

Microsoft AzureSearch resources, services, and docs (G+/)darkoavramovski1@hotmail...DEFAULT DIRECTORY

Home >

Microsoft.RouteTable-20230323190508 | Overview

Deployment

Search

DeleteCancelRedeployDownloadRefresh

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name: Microsoft.Rout...Subscription: Azure Pass - Sponsor...Resource group: az104-06-rg1

Start time: 3/23/2023, 7:06:43 PMCorrelation ID: 557f8d63-11da-4c1d-9f...

Deployment details

Next steps

Go to resource

Go to resource

Give feedback

Tell us about your experience with deployment

Cost Management

Get notified to stay within your budget and prevent unexpected charges on your bill.
Set up cost alerts >

Microsoft Defender for Cloud

Secure your apps and infrastructure
Go to Microsoft Defender for Cloud >

Free Microsoft tutorials

Start learning today >

Work with an expert

Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.
Find an Azure expert >

Now we have to add Routes

az104-06-rt23 - Microsoft Azure

Home - Microsoft Azure

sfa-homework/DevOps Lab 16 -

portal.azure.com/#@darkoavramovski1hotmail.onmicrosoft.com/resource/...

Microsoft Azure

Search resources, services, and docs (G+)

darkoavramovski1@hot...
DEFAULT DIRECTORY

Home > Microsoft.RouteTable-20230323190508 | Overview > az104-06-rt23

az104-06-rt23 | Routes

Route table

Search

Add Refresh Give feedback

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Configuration

Routes

Subnets

Properties

Locks

Monitoring

Alerts

Automation

Tasks (preview)

Export template

Help

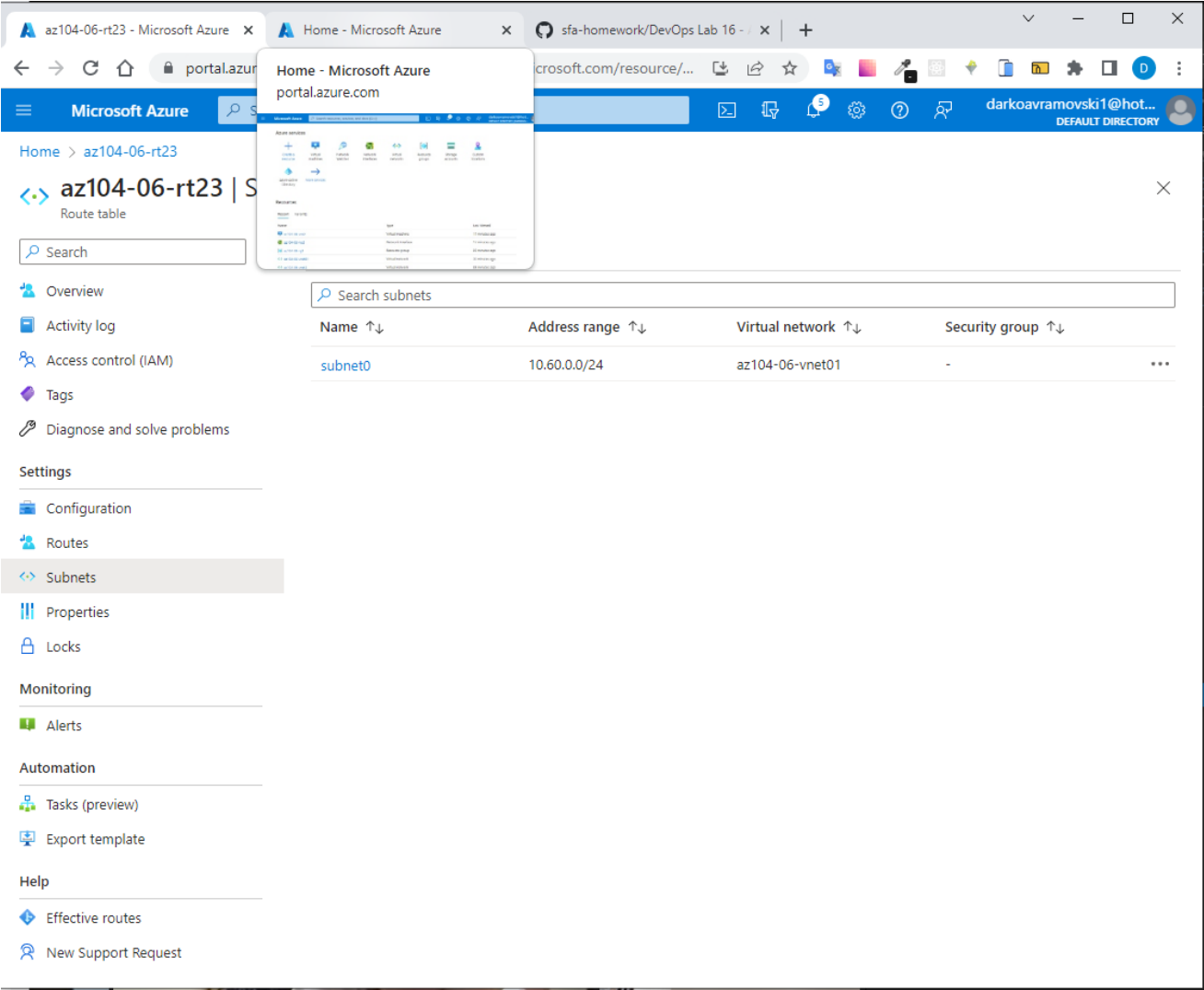
Effective routes

New Support Request

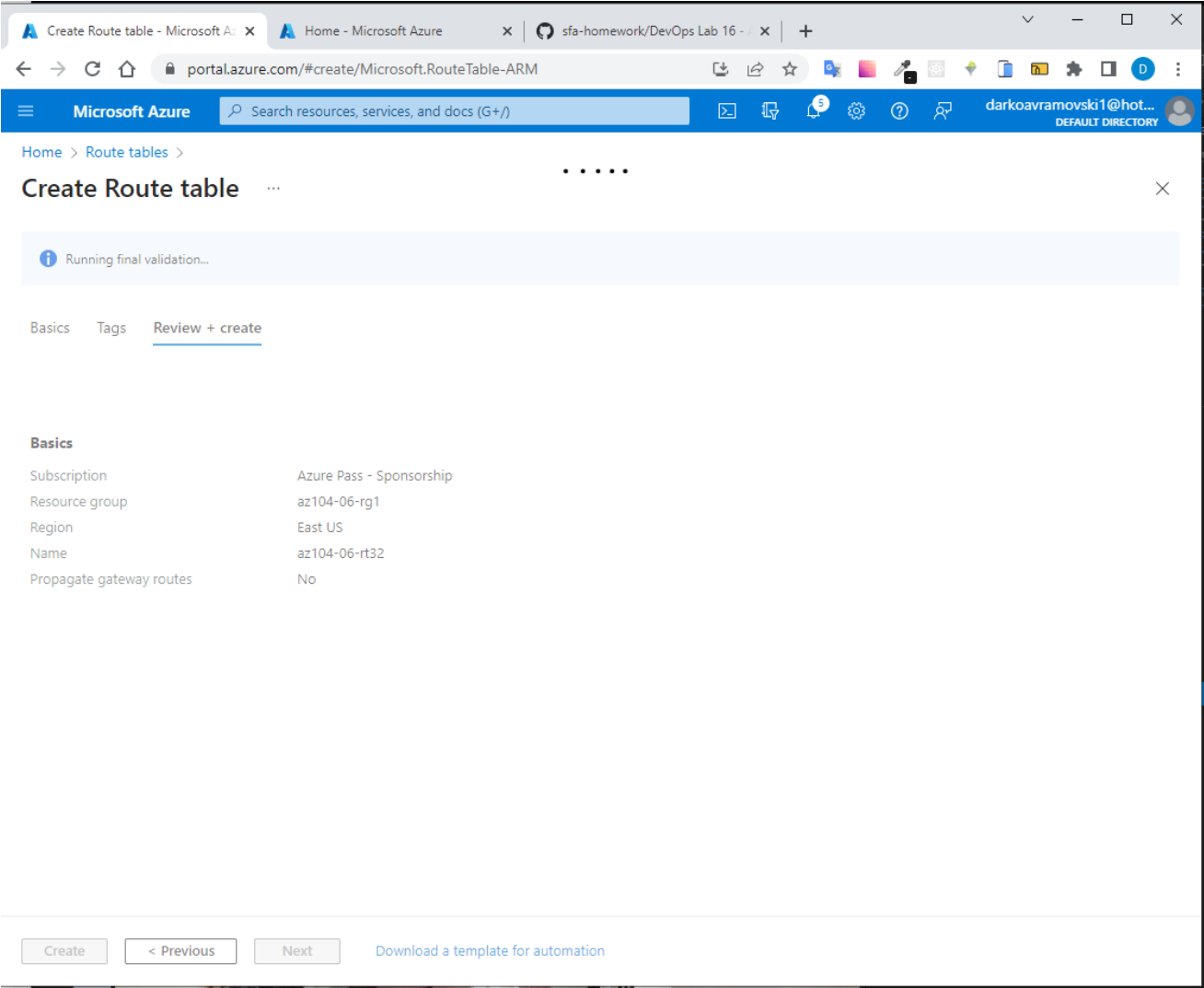
Search routes

Name ↑↓	Address prefix ↑↓	Next hop type ↑↓	Next hop IP address ↑↓	
az104-06-route-vnet2-to-vnet3	10.63.0.0/20	VirtualAppliance	10.60.0.4	...

Create subnet

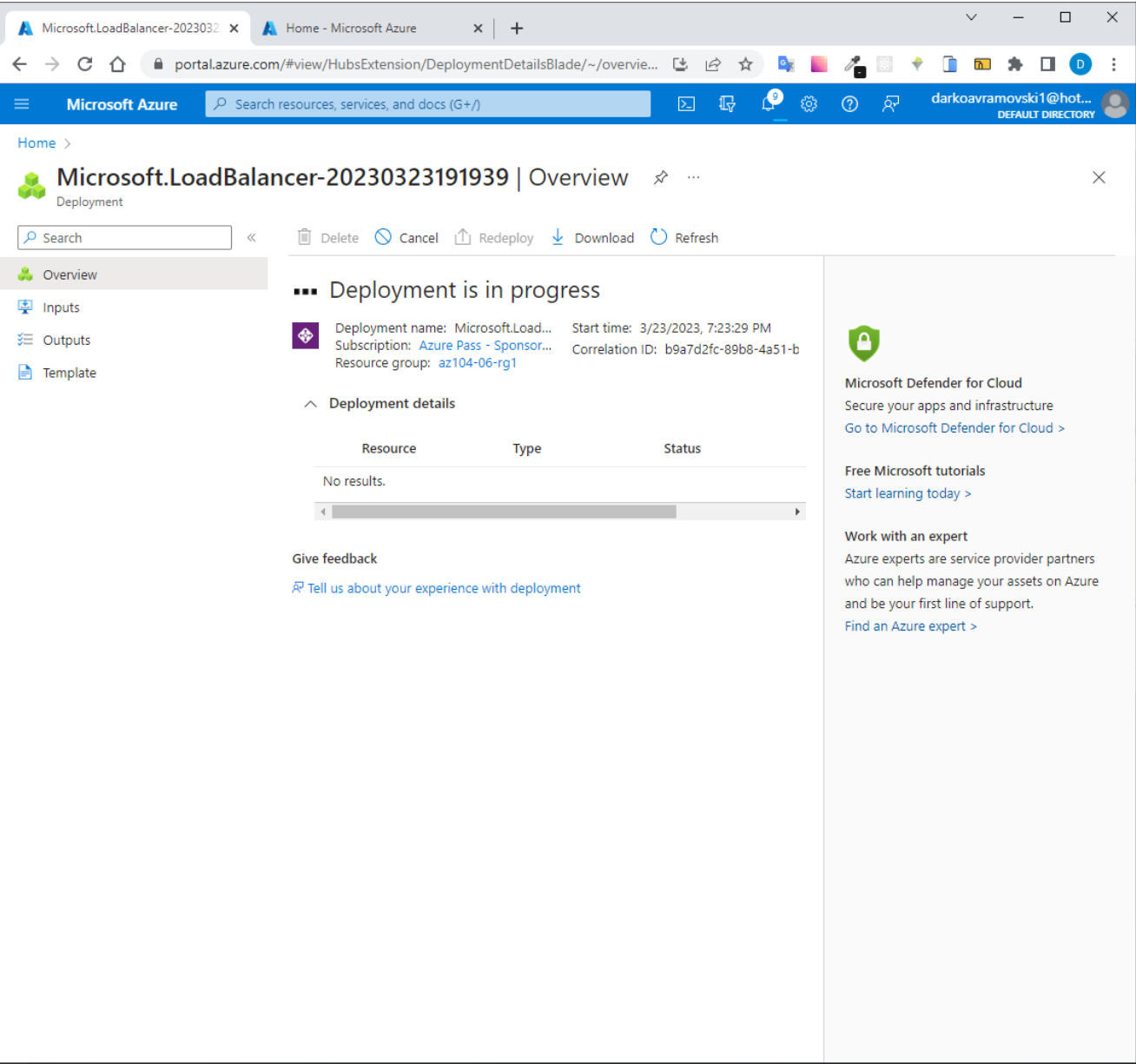


Navigate back to Route tables blade and click + Create.



Task 5: Implement Azure Load Balancer

Open Load balancers click create



Task 6: Implement Azure Application Gateway

In the Azure portal, search and select Virtual networks. On the Virtual networks blade, in the list of virtual networks, click az104-06-vnet01.

Microsoft Azure

Search resources, services, and docs (G+/J)

Home > Virtual networks > az104-06-vnet01

Virtual networks

Default Directory (darkoavramovski@hotmail.onmli...)

Create

Manage view

Filter for any field...

Name ↑

az104-06-vnet01

az104-06-vnet2

az104-06-vnet3

Page 1 of 1

az104-06-vnet01 | Subnets

Virtual network

Search

+ Subnet

+ Gateway subnet

Refresh

Manage users

Delete

Search subnets

Name ↑↓	IPv4 ↑↓	IPv6 ↑↓	Available IPs ↑↓
subnet0	10.60.0.0/24	-	250
subnet1	10.60.1.0/24	-	250

Overview

Activity log

Access control (IAM)

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Microsoft Defender for Cloud

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Peering

Service endpoints

Private endpoints

Properties

Locks

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Metrics

Diagnostic settings

Add subnet

*** Adding subnet

Adding subnet 'subnet-appgw' to virtual network 'az104-06-vnet01'.

subnet-appgw

Subnet address range *

10.60.3.224/27

10.60.3.224 - 10.60.3.255 (27 + 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

Delegate subnet to a service

None

NETWORK POLICY FOR PRIVATE ENDPOINTS

The network policy affects all private endpoints in this subnet. Select the types of network policies that control traffic going to the private endpoints in this subnet. [Learn more](#)

Private endpoint network policy

0 selected

Save

Cancel