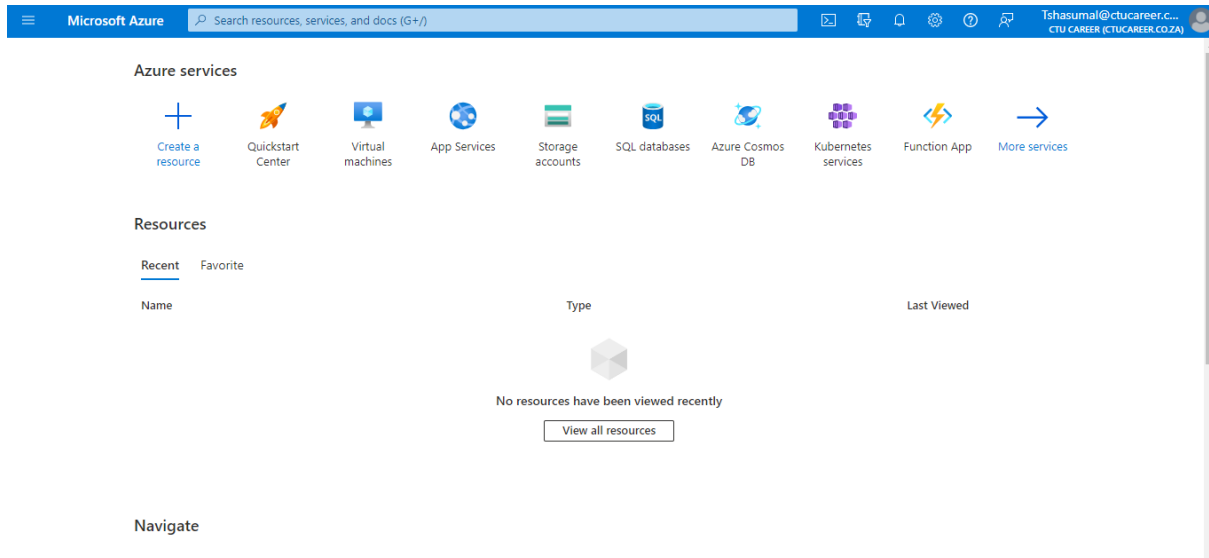


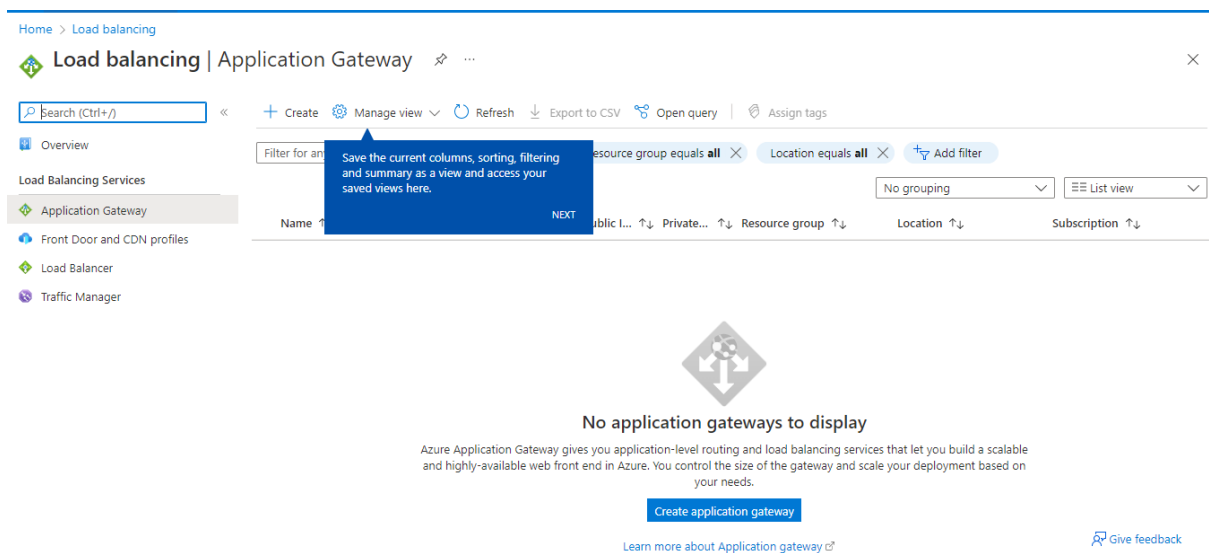
M05-Unit 4 Deploy Azure Application Gateway

Task 1: Create an application gateway

1. Sign in to the Azure portal with your Azure account.



2. On any Azure Portal page, in Search resources, services and docs (G+//), enter application gateway, and then select Application gateways from the results.



3. On the Application gateways page, select + Create.

Create application gateway ...

1 Basics 2 Frontends 3 Backends 4 Configuration 5 Tags 6 Review + create

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 * ⓘ Azure for Students

Resource group * ⓘ [Create new](#)

Instance details

Application gateway name *

Region * East US

Tier ⓘ Standard V2

[Previous](#) [Next : Frontends >](#)

4. On the Create application gateway Basics tab, enter, or select the following information:

Create application gateway ...

INSTANCE DETAILS

Application gateway name * ContosoAppGateway ✓

Region * East US

Tier ⓘ Standard V2

Enable autoscaling ☒ Yes ☐ No

Minimum instance count * ⓘ 0

Maximum instance count 10

Availability zone ⓘ None

HTTP2 ⓘ ☒ Disabled ☐ Enabled

Configure virtual network

Virtual network * ⓘ [Create new](#)

[Previous](#) [Next : Frontends >](#)

5. In Create virtual network, enter, or select the following information:

Create virtual network

The Microsoft Azure virtual network service enables Azure resources to securely communicate with each other in a virtual network which is a logical isolation of the Azure cloud dedicated to your subscription. You can connect virtual networks to other virtual networks, or your on-premises network. [Learn more](#)

Name *

ADDRESS SPACE

The virtual network's address space, specified as one or more address prefixes in CIDR notation (e.g. 192.168.1.0/24).

<input checked="" type="checkbox"/>	Address range	Addresses	Overlap
<input checked="" type="checkbox"/>	<input type="text" value="10.0.0.0/16"/>	10.0.0.0 - 10.0.255.255 (65536 addresses)	None
	<input type="text"/>	(0 Addresses)	None

SUBNETS

The subnet's address range in CIDR notation. It must be contained by the address space of the virtual network.

<input type="checkbox"/>	Subnet name	Address range	Addresses
<input type="checkbox"/>	AGSubnet	10.0.0.0/24	10.0.0.0 - 10.0.0.255 (256 addresses)
<input checked="" type="checkbox"/>	BackendSubnet	10.0.1.0/24	10.0.1.0 - 10.0.1.255 (256 addresses)
	<input type="text"/>	<input type="text"/>	(0 Addresses)

6+7. Accept the default values for the other settings and then select Next: Frontends.

Create application gateway

✓ 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 * [Add new](#)

8. On the Frontends tab, verify Frontend IP address type is set to Public.

Create application gateway ...

✓ 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 ① ☒ Public ☐ Private ☐ Both

Public IP address * [Add new](#)

9. Select Add new for the Public IP address and enter AGPublicIPAddress for the public IP address name, and then select OK.

✓ 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 ① ☒ Public ☐ Private ☐ Both

Public IP address * [Add new](#)

Add a public IP

Name * ✓

SKU ☐ Basic ☒ Standard

Assignment ☐ Dynamic ☒ Static

Availability zone None

10. Select Next: Backends.

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
No results	

11. On the Backends tab, select Add a backend pool.

Review + create

A backend pool can contain virtual machines, virtual machines scale sets, IP addresses, domain names, or an App Service.

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 *

Add backend pool without targets

Backend targets

0 items

Target type	Target
IP address or FQDN	

Add

Cancel

12. In the Add a backend pool window that opens, enter the following values to create an empty backend pool:

new + create

Backend pool can contain virtual machines (VMs), virtual machine scale sets (VMSS), IP addresses, domain names (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 *

BackendPool ✓

Add backend pool without targets

Yes

No

Add

Cancel

13. In the Add a backend pool window, select Add to save the backend pool configuration and return to the Backends tab.

✓ Basics

✓ Frontends

3 Backends

4 Configuration

5 Tags

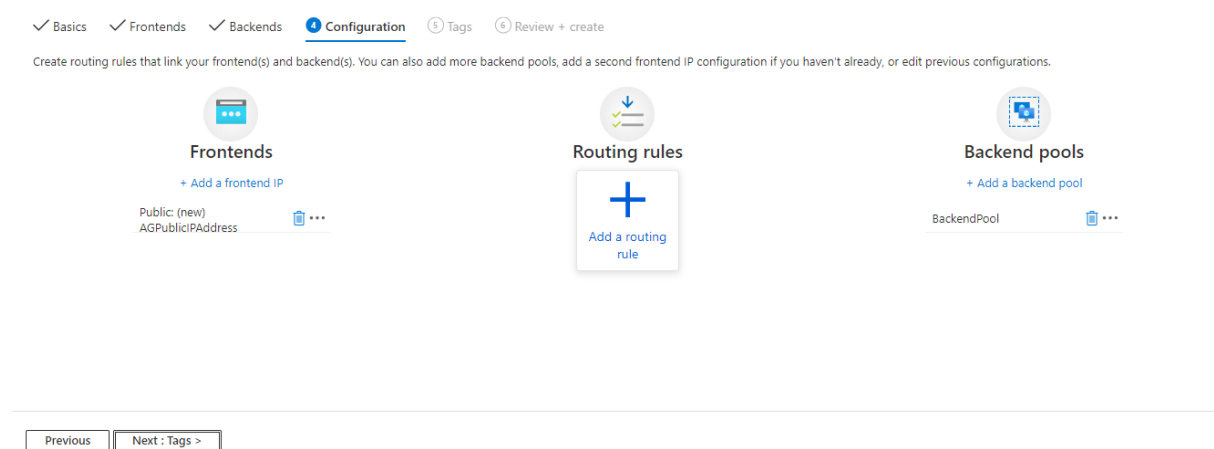
6 Review + create

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).

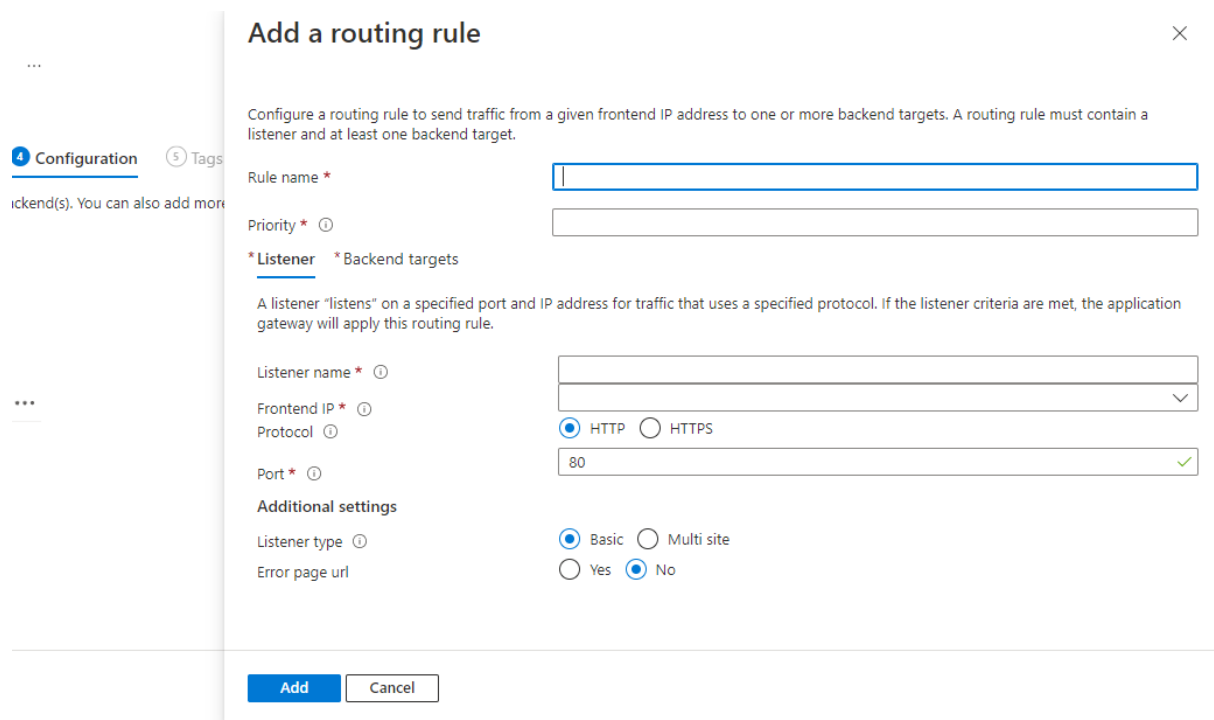
Add a backend pool

Backend pool	Targets	
BackendPool	0 targets	...

14. On the Backends tab, select Next: Configuration.



15. On the Configuration tab, you'll connect the frontend and backend pool you created using a routing rule.



16. In the Routing rules column, select Add a routing rule. +17. In the Rule name box, enter RoutingRule.

IS

rt

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 *

RoutingRule

✓

Priority * ⓘ

* 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.

18. On the Listener tab, enter or select the following information:

5 Tags

so add more

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 *

RoutingRule

✓

Priority * ⓘ

* 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 * ⓘ

Listener

✓

Frontend IP * ⓘ

Public

▼

Protocol ⓘ

☒ HTTP ☐ HTTPS

Port * ⓘ

80

✓

Additional settings

19. Accept the default values for the other settings on the Listener tab.

ion

5) Tags

an also add more

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 *

Priority *

***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 *

Frontend IP *

Protocol ☒ HTTP ☐ HTTPS

Port *

Additional settings

Listener type ☒ Basic ☐ Multi site

Error page url ☐ Yes ☒ No

Add **Cancel**

20. Select the Backend targets tab to configure the rest of the routing rule. +21. On the Backend targets tab, enter or select the following information:

*Listener

***Backend targets**

invalid value. Priority for a rule must be between 1 to 20000

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 *

Backend settings *

Add new

Add new

The value must not be empty.

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.

Add **Cancel**

22. In Add a HTTP setting, enter or select the following information:

Add Backend setting

[← Discard changes and go back to routing rules](#)

Backend settings name *

Backend protocol ☒ HTTP ☐ HTTPS

Backend port *

Additional settings

Cookie-based affinity ☐ Enable ☒ Disable

Connection draining ☐ Enable ☒ Disable

Request time-out (seconds) *

Override backend path

Host name

By default, Application Gateway does not change the incoming HTTP host header from the client and sends the header unaltered to the backend. Multi-tenant services like App service or API management rely on a specific host header or SNI extension to resolve to the correct endpoint. Change these settings to overwrite the incoming HTTP host header.

☐ Yes ☒ No

Override with new host name ☐ Pick host name from backend target

23. Accept the default values for the other settings in the Add an HTTP setting window, then select Add to return to Add a routing rule.

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 *

Priority *

* 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 *

Backend settings *

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

24. Select Add to save the routing rule and return to the Configuration tab.

✓ Basics

✓ Frontends


✓ Backends

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)
AGPublicIPAddress







Routing rules

+ Add a routing rule

RoutingRule

[Manage Backend settings](#)






Backend pools

+ Add a backend pool

BackendPool



Previous

Next : Tags >

25. Select Next: Tags and then Next: Review + create.

✓ Basics

✓ Frontends

✓ Backends

✓ Configuration

Tags

6 Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more](#)

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name ⓘ

Value ⓘ

:

26. Review the settings on the Review + create tab

Create application gateway ...

✓ Validation passed

✓ Basics ✓ Frontends ✓ Backends ✓ Configuration ✓ Tags **Review + create**

Basics

Subscription	Azure for Students
Resource group	(new) ContosoResourceGroup
Name	ContosoAppGateway
Region	East US
Tier	Standard_v2
Enable autoscaling	Enabled
Minimum instance count	0
Maximum instance count	10
Availability zone	None
HTTP2	Disabled
Virtual network	(new) ContosoVNet
Subnet	(new) AGSubnet (10.0.0.0/24)

Create Previous Next [Download a template for automation](#)

27. Select Create to create the virtual network, the public IP address, and the application gateway.

Microsoft.ApplicationGateway-20220906095835 | Overview ...

Deployment

Search (Ctrl+/) << Delete Cancel Redeploy Download Refresh

Overview Inputs Outputs Template

We'd love your feedback! →

Deployment is in progress

Deployment name: Microsoft.ApplicationGateway-2022090... Start time: 9/6/2022, 10:36:49 AM
Subscription: Azure for Students Correlation ID: aa6e1d5d-7280-4135-b3a4-f96d13a102d6
Resource group: ContosoResourceGroup

Deployment details

Resource	Type	Status	Operation details
No results.			

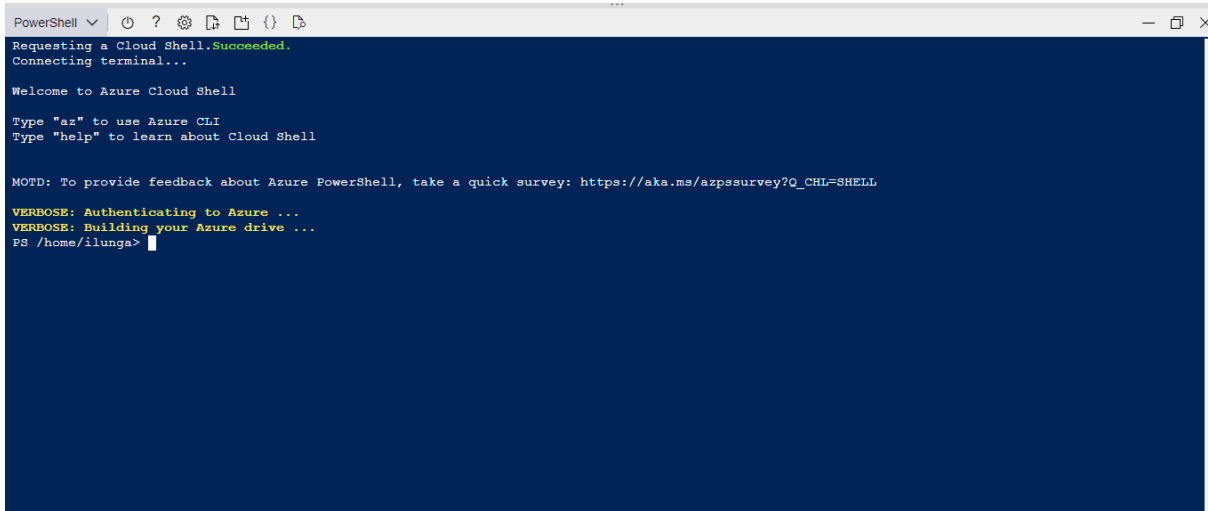
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Task 2: Create virtual machines

1. In the Azure portal, open the PowerShell session within the Cloud Shell pane.

A screenshot of the Azure Cloud Shell PowerShell session. The window has a title bar with 'PowerShell' and standard window controls. The terminal output shows the connection status, a welcome message, and instructions for using the CLI. The prompt is 'PS /home/ilunga>'.

```
PowerShell
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

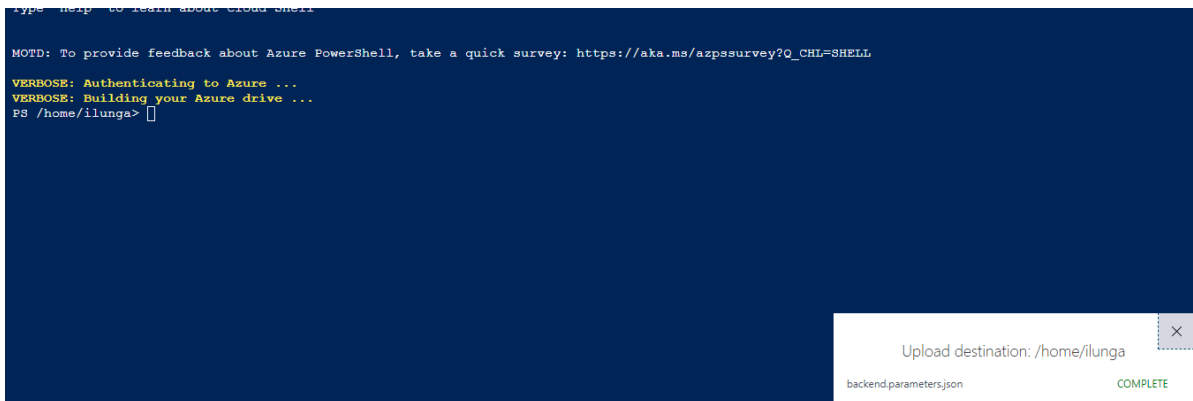
Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

MOTD: To provide feedback about Azure PowerShell, take a quick survey: https://aka.ms/azpsurvey?Q_CHL=SHELL

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/ilunga>
```

2. In the toolbar of the Cloud Shell pane, select the Upload/Download files icon, in the drop-down menu, select Upload and upload the following files backend.json and backend.parameters.json into the Cloud Shell home directory one by one from the source folder F:\Allfiles\Exercises\M05.

A screenshot of the Azure Cloud Shell PowerShell session, showing the same terminal output as the previous image. In the bottom right corner, there is a white notification box with a close button (X). The box contains the text 'Upload destination: /home/ilunga' and 'backend.parameters.json COMPLETE' in green.

```
type help to learn about Cloud Shell

MOTD: To provide feedback about Azure PowerShell, take a quick survey: https://aka.ms/azpsurvey?Q_CHL=SHELL

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/ilunga>
```

Upload destination: /home/ilunga
backend.parameters.json COMPLETE

3. Deploy the following ARM templates to create the VMs needed for this exercise:

```
MOTD: To provide feedback about Azure PowerShell, take a quick survey: https://aka.ms/azpsurvey?Q_CHL=SHELL
VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/ilunga> $RGName = "ContosoResourceGroup"
PS /home/ilunga>
PS /home/ilunga> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile backend.json -TemplateParameterFile backend.parameters.json
```

4. When the deployment is complete, go to the Azure portal home page, and then select Virtual Machines.

```
VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/ilunga> $RGName = "ContosoResourceGroup"
PS /home/ilunga>
PS /home/ilunga> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile backend.json -TemplateParameterFile backend.parameters.json

DeploymentName      : backend
ResourceGroupName   : ContosoResourceGroup
ProvisioningState    : Succeeded
Timestamp           : 9/6/2022 9:01:09 AM
Mode                : Incremental
TemplateLink        :
Parameters
  Name      Type      Value
  =====
  vmName1   String    "BackendVM1"
  nicName1   String    "BackendVM1-nic"
  vmName2   String    "BackendVM2"
  nicName2   String    "BackendVM2-nic"
  vmSize     String    "Standard_DS1_v2"
  adminUsername String    "TestUser"
  adminPassword SecureString null

Outputs
  :
DeploymentDebugLogLevel :
PS /home/ilunga>
```

5. Verify that both virtual machines have been created.

Virtual machines

CTU Career (ctucareer.co.za)

Create

Switch to classic

Reservations

Manage view

Refresh

Export to CSV

Open query

Assign tags

Start

Restart

Stop

Delete

Filter for any field...

Subscription equals all

Type equals all

Resource group equals all

Location equals all

Add filter

No grouping

List view

<input type="checkbox"/>	Name	Type	Subscription	Resource group	Location	Status	Operating system	Size	Public IP
<input type="checkbox"/>	BackendVM1	Virtual machine	Azure for Students	ContosoResourceGroup	East US	Running	Windows	Standard_DS1_v2	-
<input type="checkbox"/>	BackendVM2	Virtual machine	Azure for Students	ContosoResourceGroup	East US	Running	Windows	Standard_DS1_v2	-

Task 3: Add backend servers to backend pool

1. On the Azure portal menu, select All resources or search for and select All resources. Then select ContosoAppGateway.

Home

ContosoAppGateway

Application gateway

Search (Ctrl+/)

Delete

Refresh

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Configuration

Web application firewall

Backend pools

Backend settings

Frontend IP configurations

Essentials

Resource group (move) : ContosoResourceGroup

Location : East US

Subscription (move) : Azure for Students

Subscription ID : 22326a92-2476-4fb9-bdcb-48f3ffdd5831

Tags (edit) : Click here to add tags

Virtual network/subnet : ContosoVNet/AGSubnet

Frontend public IP address : 137.117.72.16 (AGPublicIPAddress)

Frontend private IP address : -

Tier : Standard V2

Show data for last

1 hour

6 hours

12 hours

1 day

7 days

30 days

Sum Total Requests

Sum Failed Requests

1.1

1

0.9

1.1

1

0.9

2. Under Settings, select Backend pools.

ContosoAppGateway | Backend pools

Application gateway

Search (Ctrl+/)

+ Add

Refresh

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Configuration

Web application firewall

Backend pools

Backend settings

Frontend IP configurations

Private link

SSL settings

Listeners

Search backend pools

Name	Rules associated	Targets	
BackendPool	1	0	...

3.Select BackendPool.

Home > ContosoAppGateway | Backend pools >

Edit 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

BackendPool

Add backend pool without targets

YesNo

Backend targets

0 items

Target type	Target
IP address or FQDN	

Associated rule

RoutingRule

Save

Cancel

4. On the Edit backend pool page, under Backend targets, in Target type, select Virtual machine.

Edit 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

BackendPool

Add backend pool without targets

Yes

No

Backend targets

1 item

Target type

Virtual machine

Target

The value must not be empty.

IP address or FQDN

Associated rule

RoutingRule

Save

Cancel

5. Under Target, select BackendVM1.

Edit 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

BackendPool

Add backend pool without targets

Yes

No

Backend targets

1 item

Target type

Virtual machine

Target

BackendVM1-nic (10.0.1.4)

IP address or FQDN

Associated rule

RoutingRule

6. In Target type, select Virtual machine. + 7. Under Target, select BackendVM2.

Edit 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
BackendPool

Add backend pool without targets
Yes **No**

Backend targets
2 items

Target type	Target
Virtual machine	BackendVM1-nic
Virtual machine	BackendVM2-nic (10.0.1.5)
IP address or FQDN	

Associated rule
[RoutingRule](#)

Save Cancel

8.Select Save.

Home > ContosoAppGateway

ContosoAppGateway | Backend pools

Application gateway

Search (Ctrl+/)

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

Settings
Configuration
Web application firewall
Backend pools

+ Add Refresh

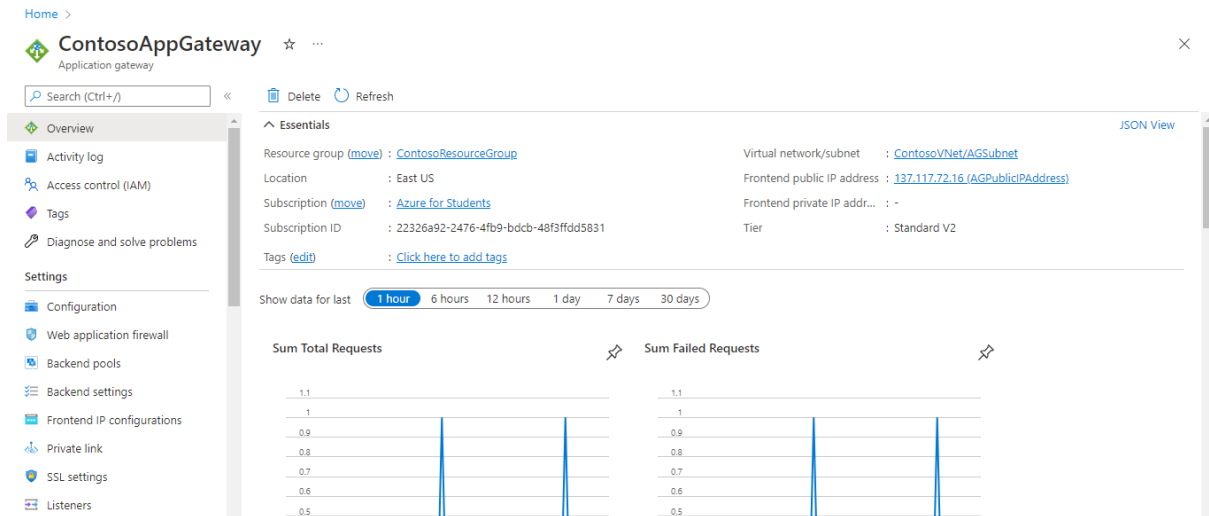
Search backend pools

Name	Rules associated	Targets
BackendPool	1	2

Deployment succeeded
Deployment 'ApplicationGatewayUpdate-20220906124352' to resource group 'ContosoResourceGroup' was successful.
[Pin to dashboard](#) [Go to resource group](#)

Task 4: Test the application gateway

1. Find the public IP address for the application gateway on its Overview page.



2. Copy the public IP address, and then paste it into the address bar of your browser to browse that IP address. + 3. Check the response. A valid response verifies that the application gateway was successfully created and can successfully connect with the backend.



4. Refresh the browser multiple times and you should see connections to both BackendVM1 and BackendVM2.

