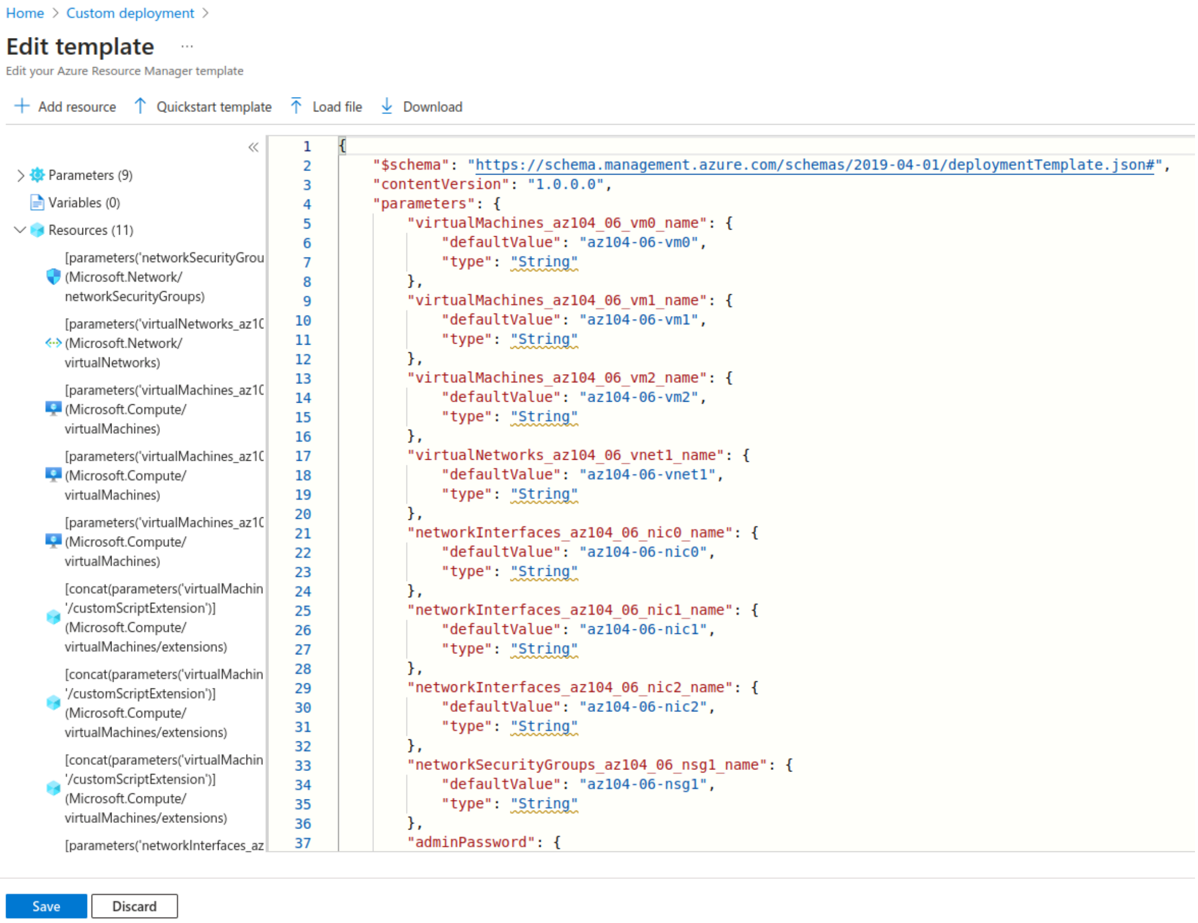
Implement Network Traffic Management

Task 1: Use a template to provision an infrastructure.

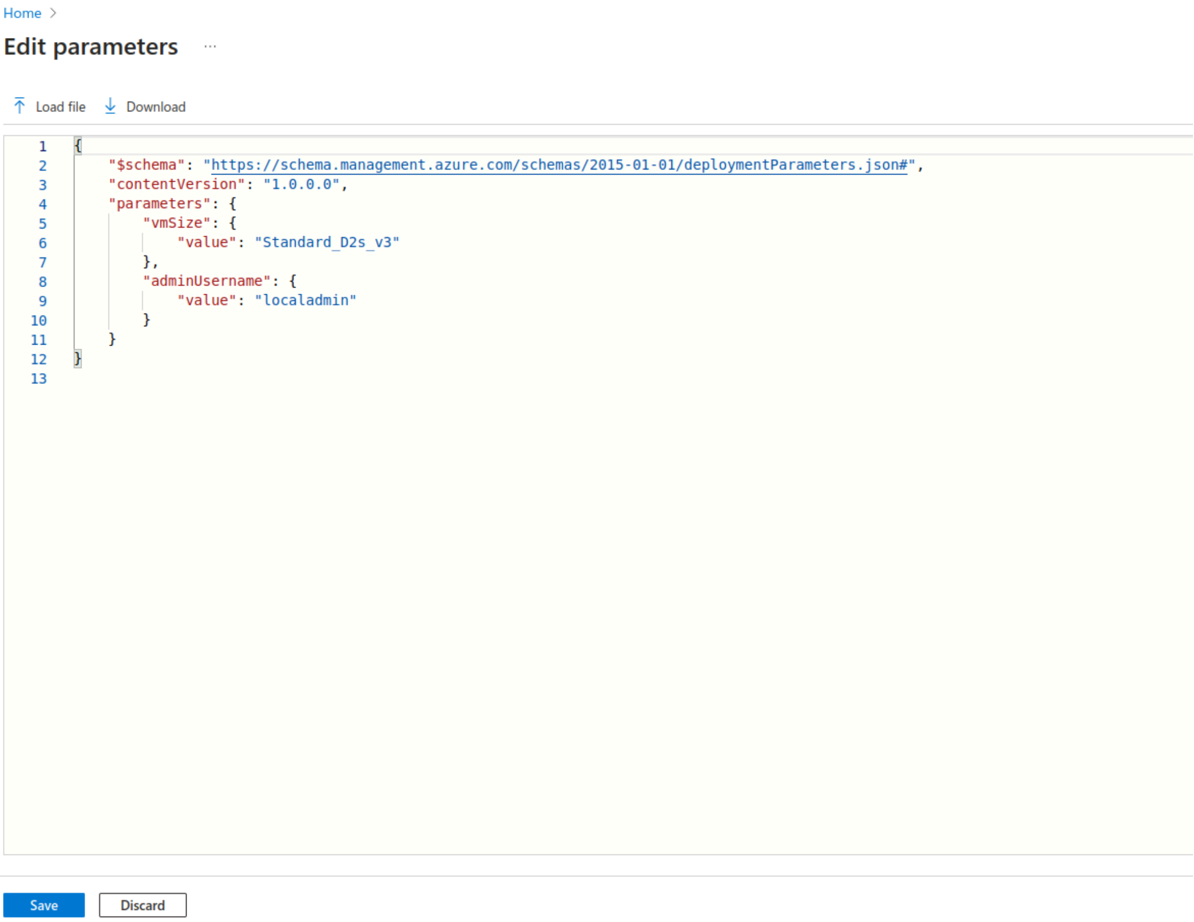
Deploy a custom template:



Home > Custom deployment >
Edit template ...
Edit your Azure Resource Manager template
+ Add resource
Quickstart template
Load file
Download
Parameters (9)
Variables (0)
Resources (11)
[parameters('networkSecurityGrou (Microsoft.Network/ networkSecurityGroups)
[parameters('virtualNetworks_az10 (Microsoft.Network/ virtualNetworks)
[parameters('virtualMachines_az10 (Microsoft.Compute/ virtualMachines)
[parameters('virtualMachines_az10 (Microsoft.Compute/ virtualMachines)
[parameters('virtualMachines_az10 (Microsoft.Compute/ virtualMachines)
[concat(parameters('virtualMachin '/customScriptExtension')] (Microsoft.Compute/ virtualMachines/extensions)
[concat(parameters('virtualMachin '/customScriptExtension')] (Microsoft.Compute/ virtualMachines/extensions)
[concat(parameters('virtualMachin '/customScriptExtension')] (Microsoft.Compute/ virtualMachines/extensions)
[parameters('networkInterfaces_az
Save
Discard

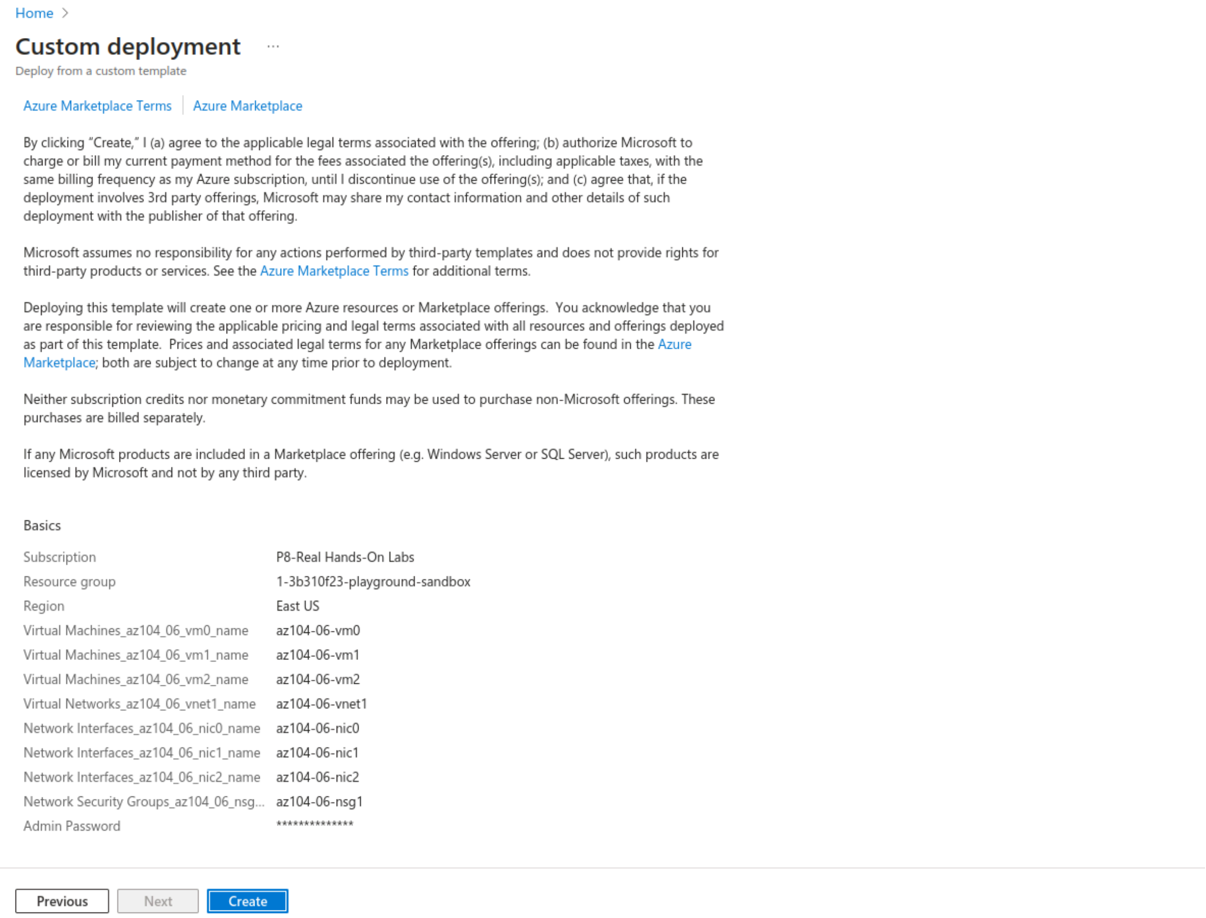
```json
{
    "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
    "contentVersion": "1.0.0.0",
    "parameters": {
        "virtualMachines_az104_06_vm0_name": {
            "defaultValue": "az104-06-vm0",
            "type": "String"
        },
        "virtualMachines_az104_06_vm1_name": {
            "defaultValue": "az104-06-vm1",
            "type": "String"
        },
        "virtualMachines_az104_06_vm2_name": {
            "defaultValue": "az104-06-vm2",
            "type": "String"
        },
        "virtualNetworks_az104_06_vnet1_name": {
            "defaultValue": "az104-06-vnet1",
            "type": "String"
        },
        "networkInterfaces_az104_06_nic0_name": {
            "defaultValue": "az104-06-nic0",
            "type": "String"
        },
        "networkInterfaces_az104_06_nic1_name": {
            "defaultValue": "az104-06-nic1",
            "type": "String"
        },
        "networkInterfaces_az104_06_nic2_name": {
            "defaultValue": "az104-06-nic2",
            "type": "String"
        },
        "networkSecurityGroups_az104_06_nsg1_name": {
            "defaultValue": "az104-06-nsg1",
            "type": "String"
        },
        "adminPassword": {
```

Figure 1. Deploying a custom template.



```
{
    "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentParameters.json#",
    "contentVersion": "1.0.0.0",
    "parameters": {
        "vmSize": {
            "value": "Standard_D2s_v3"
        },
        "adminUsername": {
            "value": "localadmin"
        }
    }
}
```

Figure 2. Deploying a custom parameter.



Custom deployment ···

Deploy from a custom template

By clicking "Create," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

Microsoft assumes no responsibility for any actions performed by third-party templates and does not provide rights for third-party products or services. See the Azure Marketplace Terms for additional terms.

Deploying this template will create one or more Azure resources or Marketplace offerings. You acknowledge that you are responsible for reviewing the applicable pricing and legal terms associated with all resources and offerings deployed as part of this template. Prices and associated legal terms for any Marketplace offerings can be found in the Azure Marketplace; both are subject to change at any time prior to deployment.

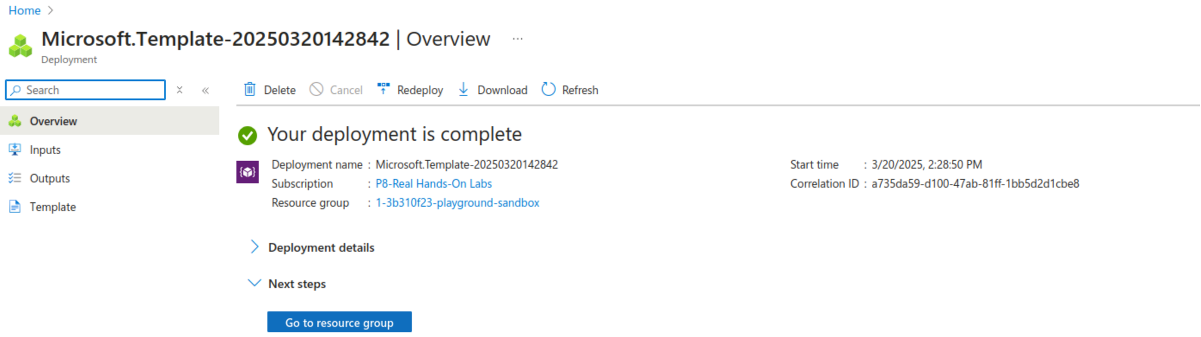
Neither subscription credits nor monetary commitment funds may be used to purchase non-Microsoft offerings. These purchases are billed separately.

If any Microsoft products are included in a Marketplace offering (e.g. Windows Server or SQL Server), such products are licensed by Microsoft and not by any third party.

Basics

Subscription	P8-Real Hands-On Labs
Resource group	1-3b310f23-playground-sandbox
Region	East US
Virtual Machines_az104_06_vm0_name	az104-06-vm0
Virtual Machines_az104_06_vm1_name	az104-06-vm1
Virtual Machines_az104_06_vm2_name	az104-06-vm2
Virtual Networks_az104_06_vnet1_name	az104-06-vnet1
Network Interfaces_az104_06_nic0_name	az104-06-nic0
Network Interfaces_az104_06_nic1_name	az104-06-nic1
Network Interfaces_az104_06_nic2_name	az104-06-nic2
Network Security Groups_az104_06_nsg...	az104-06-nsg1
Admin Password	**************

Figure 3. Review.



Your deployment is complete

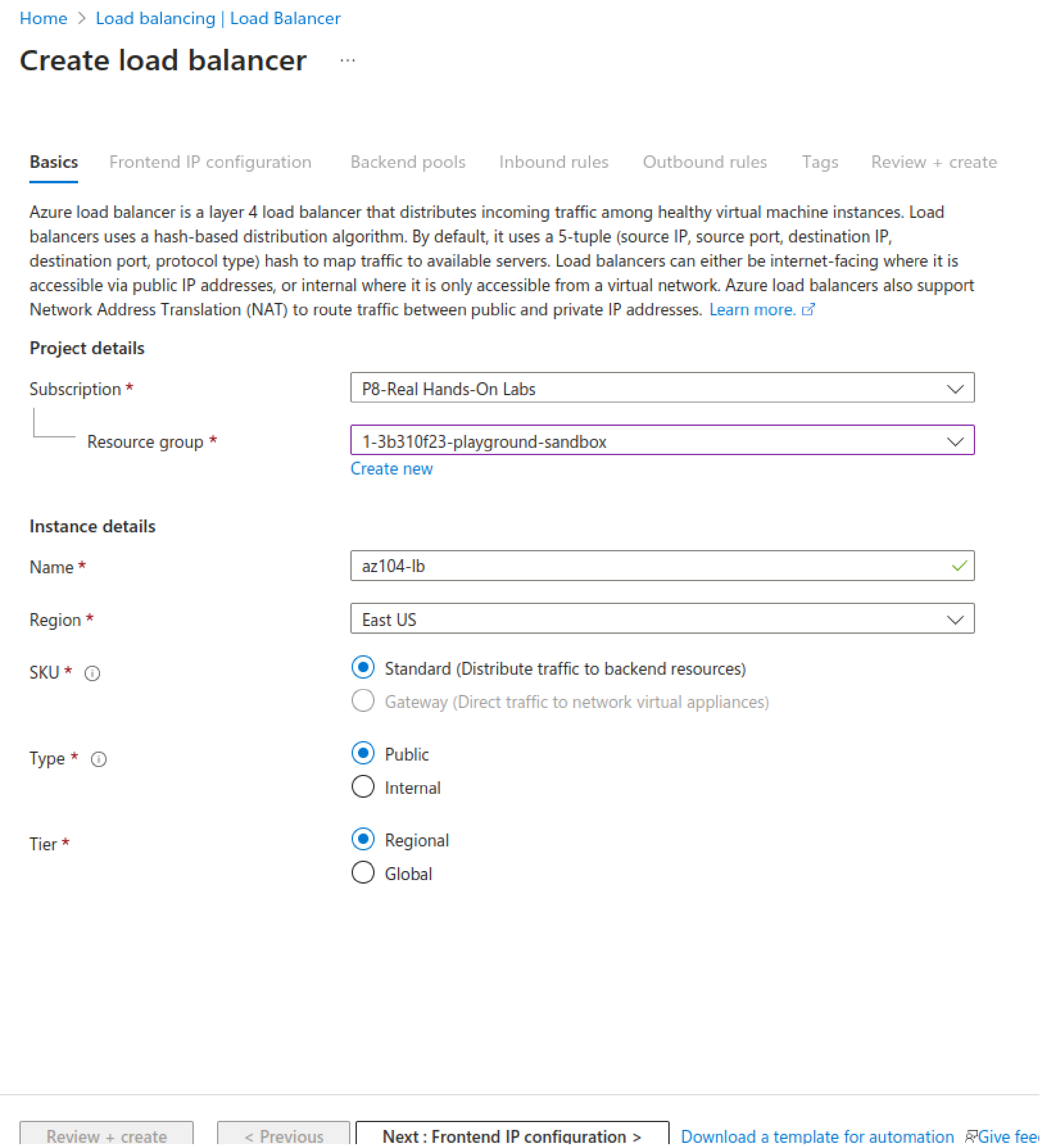
Deployment name : Microsoft.Template-20250320142842
Subscription : P8-Real Hands-On Labs
Resource group : 1-3b310f23-playground-sandbox

Start time : 3/20/2025, 2:28:50 PM
Correlation ID : a735da59-d100-47ab-81ff-1bb5d2d1cbe8

Figure 4. Complete deployment.

Task 2: Configure an Azure Load Balancer.

Load balancers:



Home > Load balancing | Load Balancer

Create load balancer ···

Azure load balancer is a layer 4 load balancer that distributes incoming traffic among healthy virtual machine instances. Load balancers uses a hash-based distribution algorithm. By default, it uses a 5-tuple (source IP, source port, destination IP, destination port, protocol type) hash to map traffic to available servers. Load balancers can either be internet-facing where it is 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 *: P8-Real Hands-On Labs

Resource group *: 1-3b310f23-playground-sandbox

Create new

Instance details

Name *: az104-lb ✓

Region *: East US

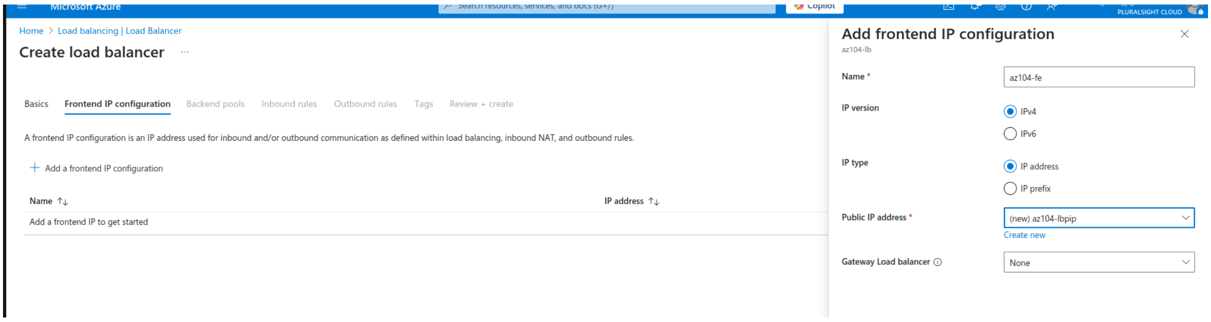
SKU *: ● Standard (Distribute traffic to backend resources) ○ Gateway (Direct traffic to network virtual appliances)

Type *: ● Public ○ Internal

Tier *: ● Regional ○ Global

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

Figure 5. Creating a load balancer.



Home > Load balancing | Load Balancer

Create load balancer ···

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

az104-lb

Name *: az104-fe

IP version: ● IPv4 ○ IPv6

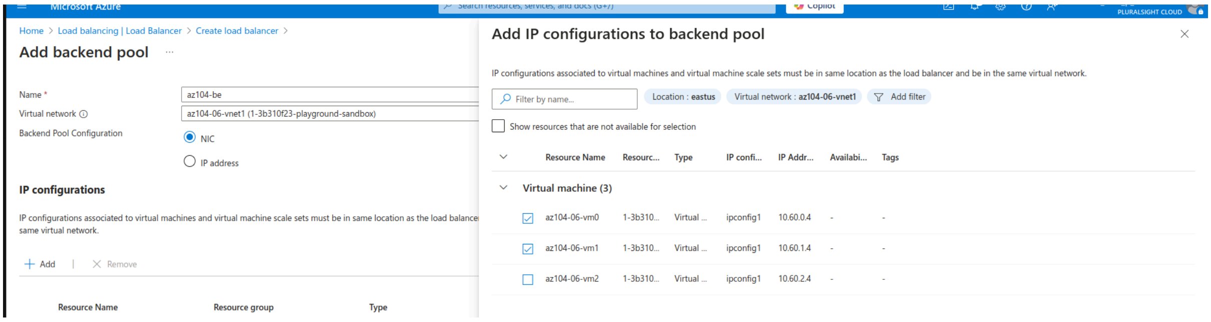
IP type: ● IP address ○ IP prefix

Public IP address *: (new) az104-lbpip

Create new

Gateway Load balancer ⓘ: None

Figure 6. Add frontend ip configuration.


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
PLURALSIGHT CLOUD
Home > Load balancing | Load Balancer > Create load balancer >

Add backend pool

Name * az104-be

Virtual network az104-06-vnet1 (1-3b310f23-playground-sandbox)

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 balance same virtual network.

Resource Name	Resource group	Type

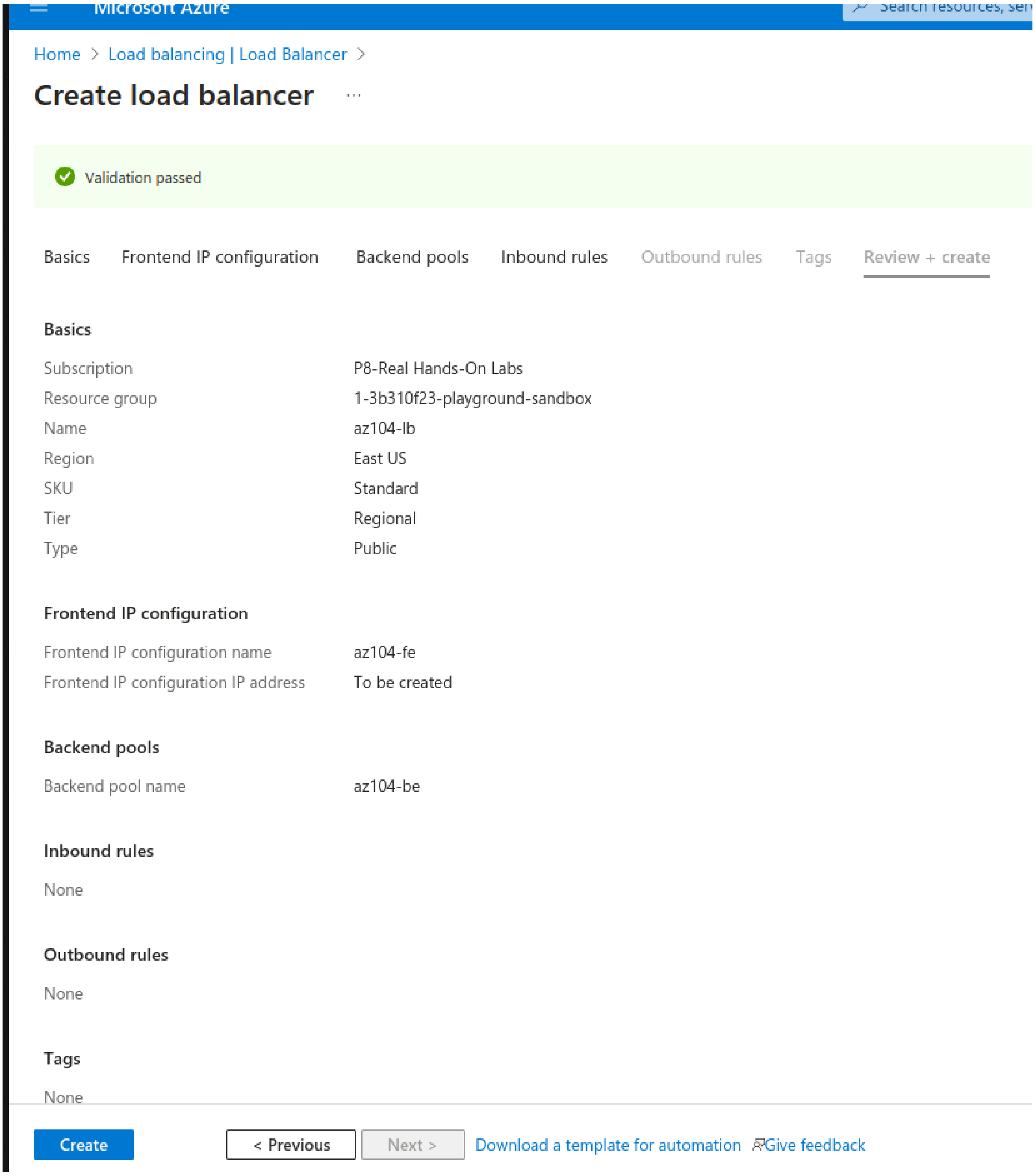
Add IP configurations to backend pool

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.

□ Show resources that are not available for selection

	Resource Name	Resourc...	Type	IP confi...	IP Addr...	Availabi...	Tags
Virtual machine (3)							
☑	az104-06-vm0	1-3b310...	Virtual ...	ipconfig1	10.60.0.4	-	-
☑	az104-06-vm1	1-3b310...	Virtual ...	ipconfig1	10.60.1.4	-	-
□	az104-06-vm2	1-3b310...	Virtual ...	ipconfig1	10.60.2.4	-	-

Figure 7. Add ip configuration to backend pool.



Create load balancer

Validation passed

Basics

Subscription	P8-Real Hands-On Labs
Resource group	1-3b310f23-playground-sandbox
Name	az104-lb
Region	East US
SKU	Standard
Tier	Regional
Type	Public

Frontend IP configuration

Frontend IP configuration name	az104-fe
Frontend IP configuration IP address	To be created

Backend pools

Backend pool name	az104-be

Inbound rules

None

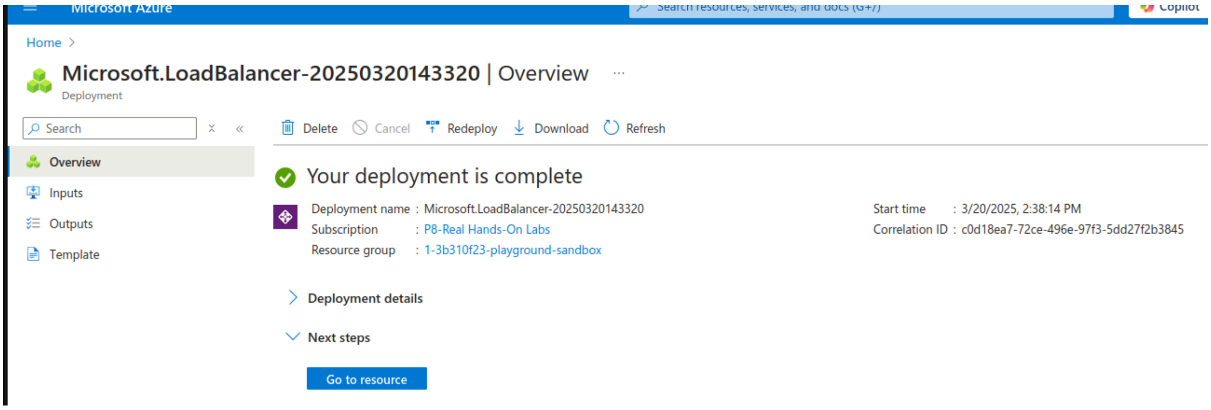
Outbound rules

None

Tags

None

Figure 8. Review.



Microsoft.LoadBalancer-20250320143320 | Overview

Deployment

Your deployment is complete

Deployment name : Microsoft.LoadBalancer-20250320143320

Subscription : P8-Real Hands-On Labs

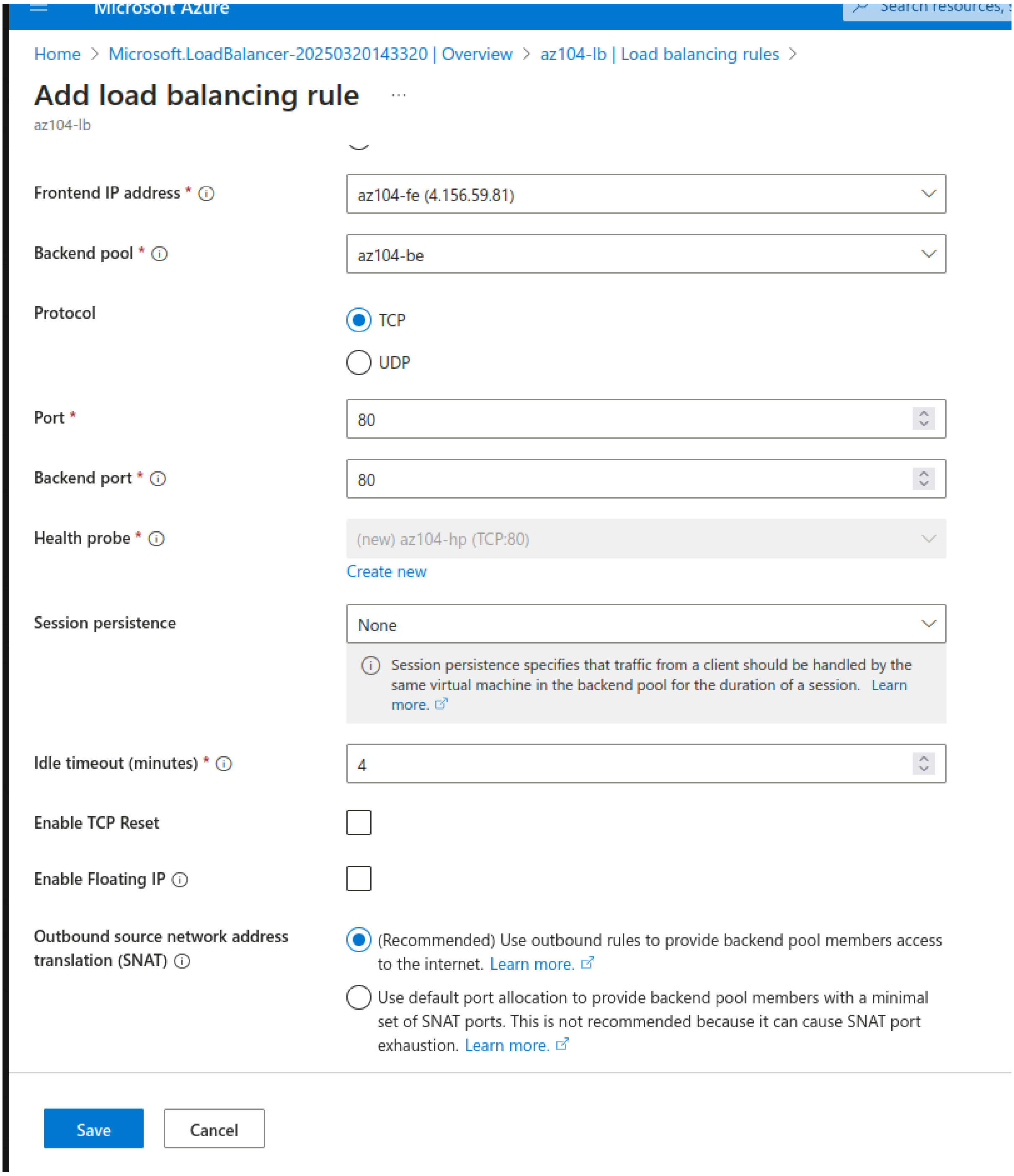
Resource group : 1-3b310f23-playground-sandbox

Start time : 3/20/2025, 2:38:14 PM

Correlation ID : c0d18ea7-72ce-496e-97f3-5dd27f2b3845

Figure 9. Complete deployment.

Add a rule to determine how incoming traffic is distributed:



Home > Microsoft.LoadBalancer-20250320143320 | Overview > az104-lb | Load balancing rules >

Add load balancing rule ...

az104-lb

Frontend IP address * ⓘ: az104-fe (4.156.59.81)

Backend pool * ⓘ: az104-be

Protocol: ● TCP ○ UDP

Port *: 80

Backend port * ⓘ: 80

Health probe * ⓘ: (new) az104-hp (TCP:80)

Create new

Session persistence: None

ⓘ Session persistence specifies that traffic from a client should be handled by the same virtual machine in the backend pool for the duration of a session. Learn more.

Idle timeout (minutes) * ⓘ: 4

Enable TCP Reset: □

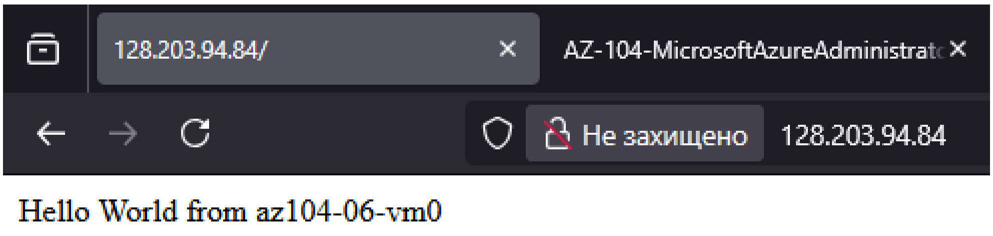
Enable Floating IP ⓘ: □

Outbound source network address translation (SNAT) ⓘ:

● (Recommended) Use outbound rules to provide backend pool members access to the internet. Learn more.

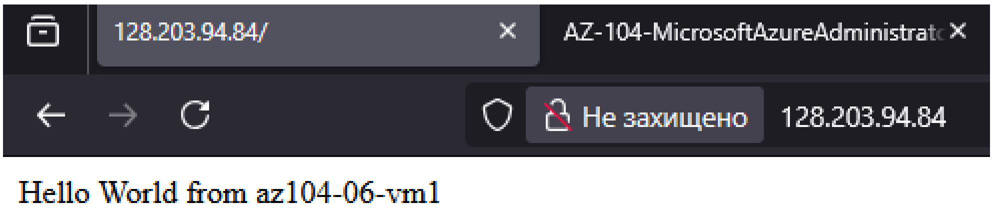
○ Use default port allocation to provide backend pool members with a minimal set of SNAT ports. This is not recommended because it can cause SNAT port exhaustion. Learn more.

Figure 10. Add load balancing rule.



Hello World from az104-06-vm0

Figure 11. vm0.

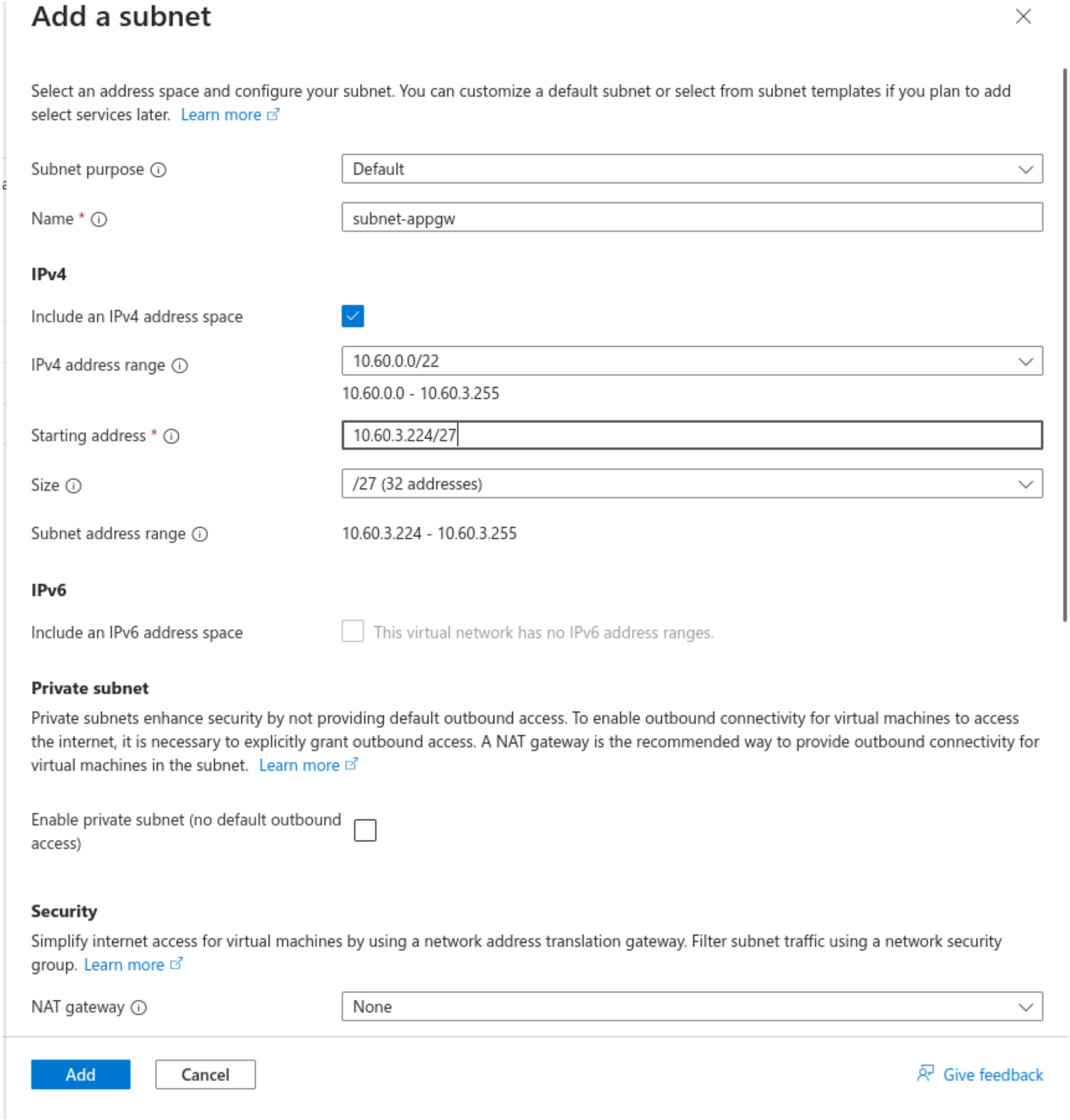


Hello World from az104-06-vm1

Figure 12. vm1.

Task 3: Configure an Azure Application Gateway.

Virtual networks:



Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. Learn more

Subnet purpose ⓘ	Default
Name * ⓘ	subnet-appgw

IPv4

Include an IPv4 address space	☑
IPv4 address range ⓘ	10.60.0.0/22 10.60.0.0 - 10.60.3.255
Starting address * ⓘ	10.60.3.224/27
Size ⓘ	/27 (32 addresses)
Subnet address range ⓘ	10.60.3.224 - 10.60.3.255

IPv6

Include an IPv6 address space	□ This virtual network has no IPv6 address ranges.

Private subnet

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. Learn more

Enable private subnet (no default outbound access) □

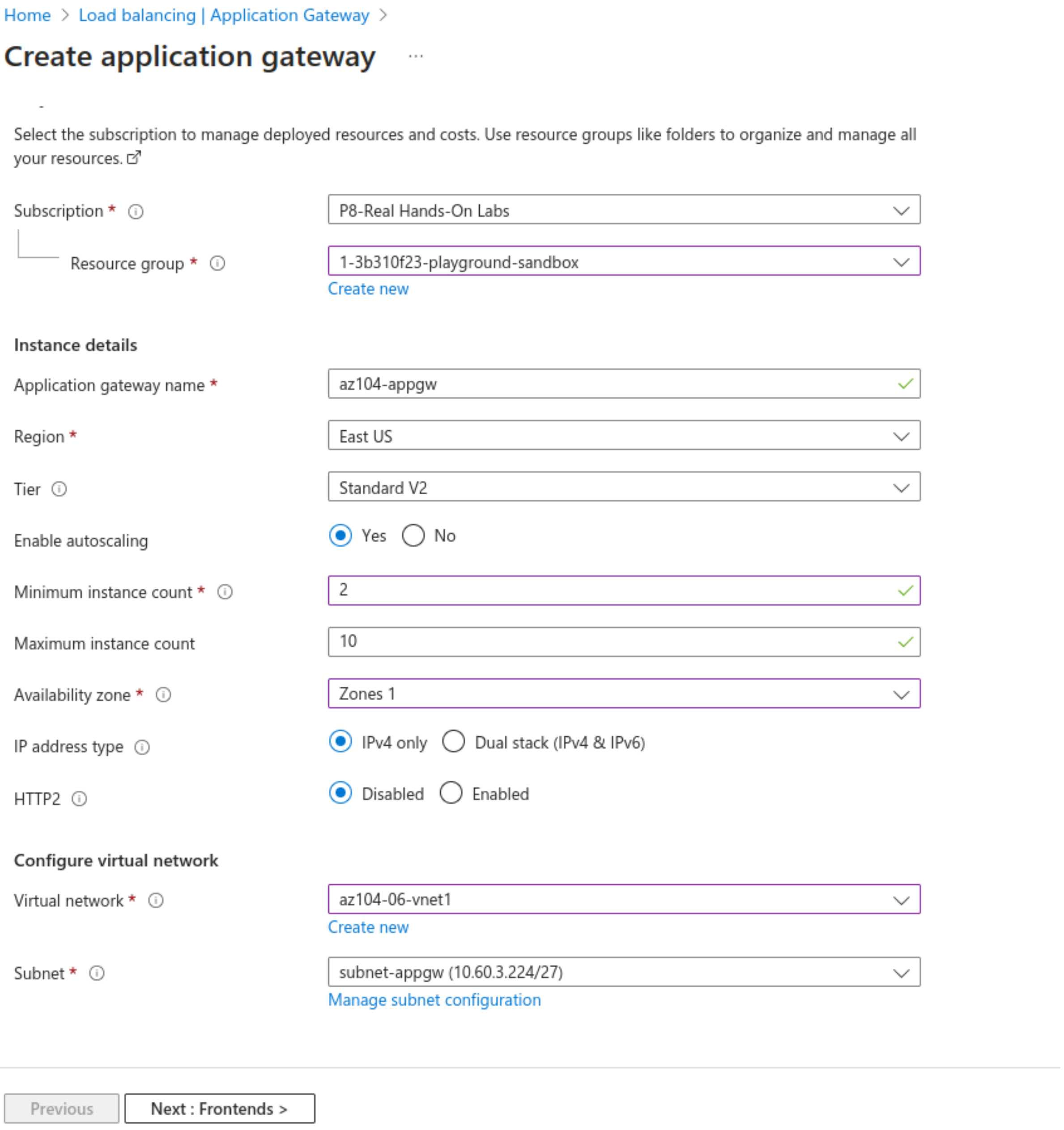
Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. Learn more

NAT gateway ⓘ None

Figure 13. Add a subnet.

Application gateways:



Home > Load balancing | Application Gateway >

Create application gateway ...

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

Subscription * : P8-Real Hands-On Labs

Resource group * : 1-3b310f23-playground-sandbox
Create new

Instance details

Application gateway name * : az104-appgw ✓

Region * : East US

Tier : Standard V2

Enable autoscaling: ● Yes ○ No

Minimum instance count * : 2 ✓

Maximum instance count: 10 ✓

Availability zone * : Zones 1

IP address type: ● IPv4 only ○ Dual stack (IPv4 & IPv6)

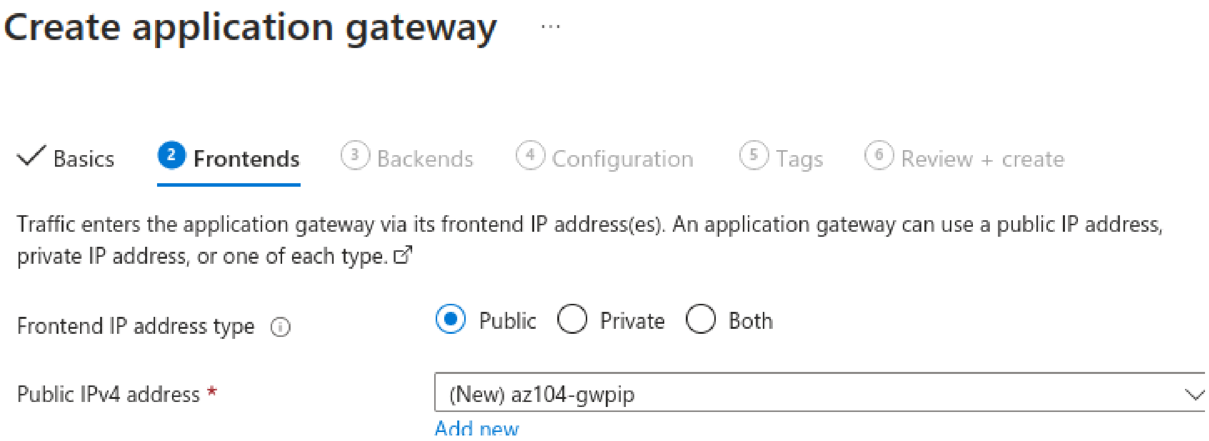
HTTP2: ● Disabled ○ Enabled

Configure virtual network

Virtual network * : az104-06-vnet1
Create new

Subnet * : subnet-appgw (10.60.3.224/27)
Manage subnet configuration

Figure 14. Creating an application gateway.



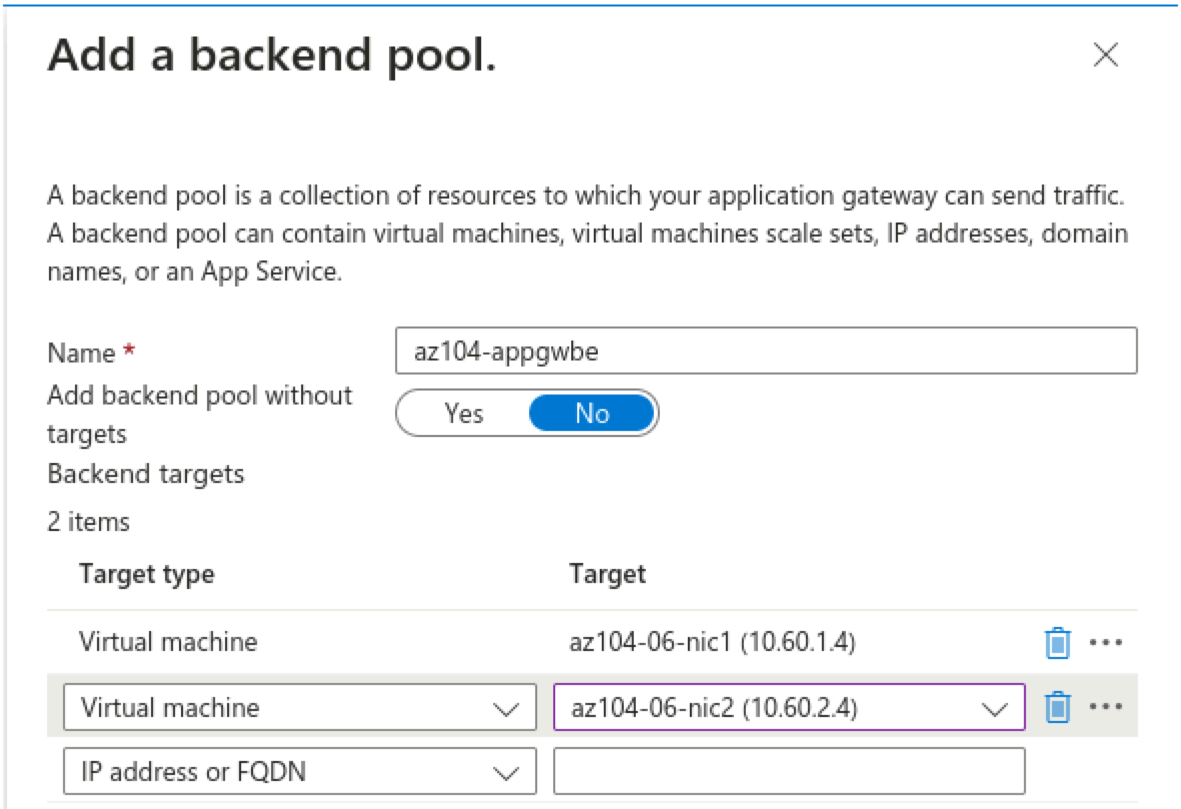
Create application gateway ...

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 IPv4 address * : (New) az104-gwpip
Add new

Figure 15. Frontends.



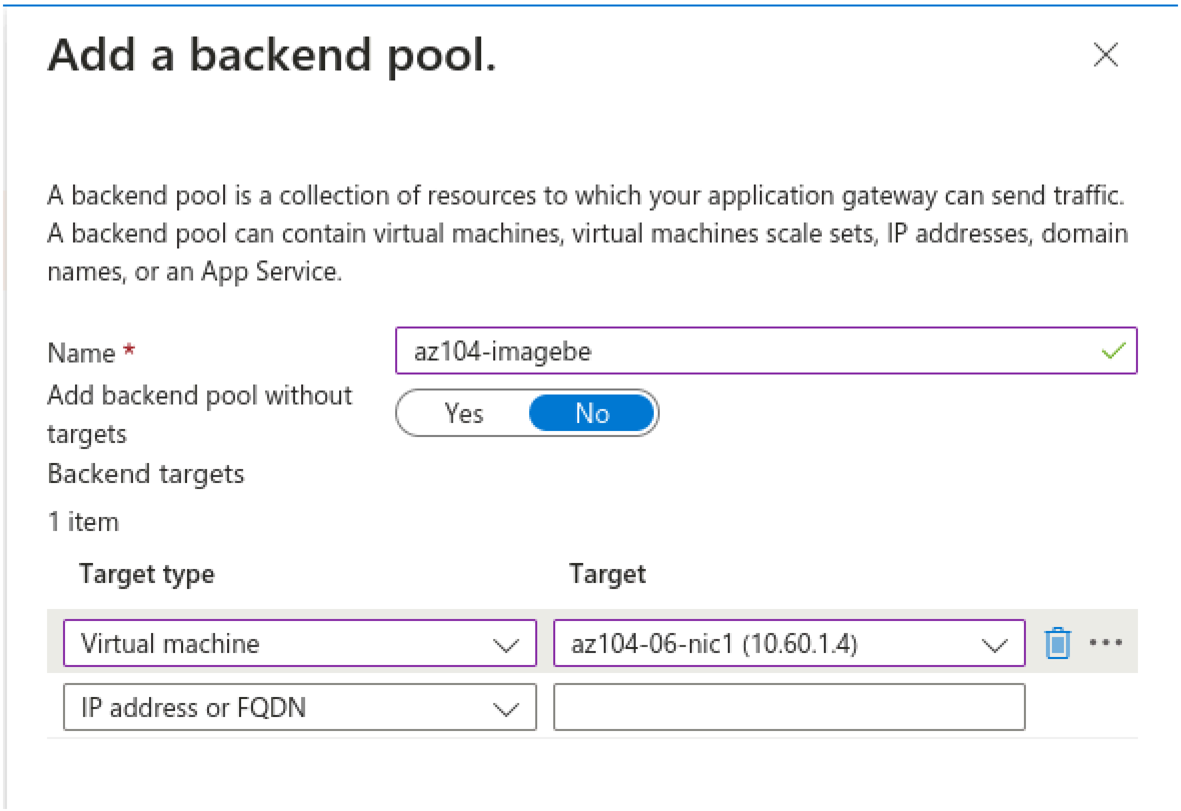
Add a backend pool.

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 *	az104-appgwbe
Add backend pool without targets	Yes [✓ No]
Backend targets	
2 items	

Target type	Target
Virtual machine	az104-06-nic1 (10.60.1.4)
Virtual machine	az104-06-nic2 (10.60.2.4)
IP address or FQDN	

Figure 16. Add a backend pool appgwbe.



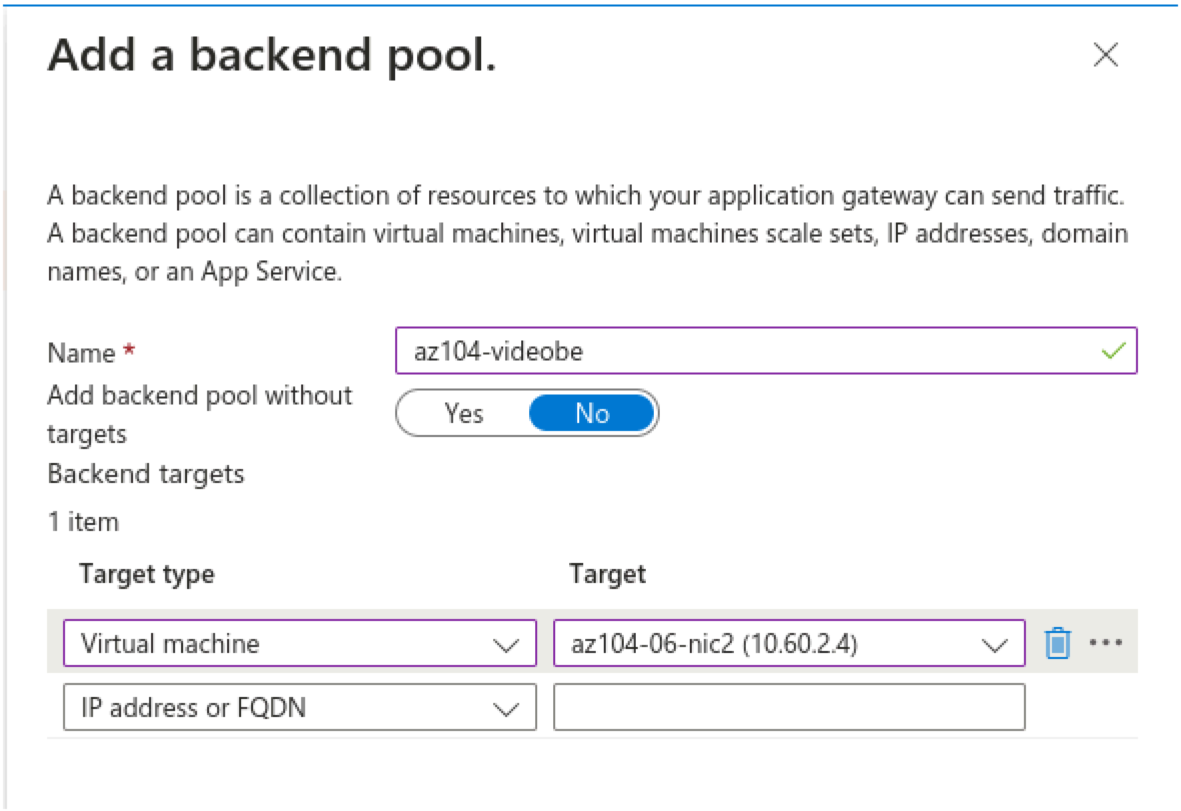
Add a backend pool.

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 *	az104-imagebe ✓
Add backend pool without targets	Yes [✓ No]
Backend targets	
1 item	

Target type	Target
Virtual machine	az104-06-nic1 (10.60.1.4)
IP address or FQDN	

Figure 17. Add a backend pool imagebe.



Add a backend pool.

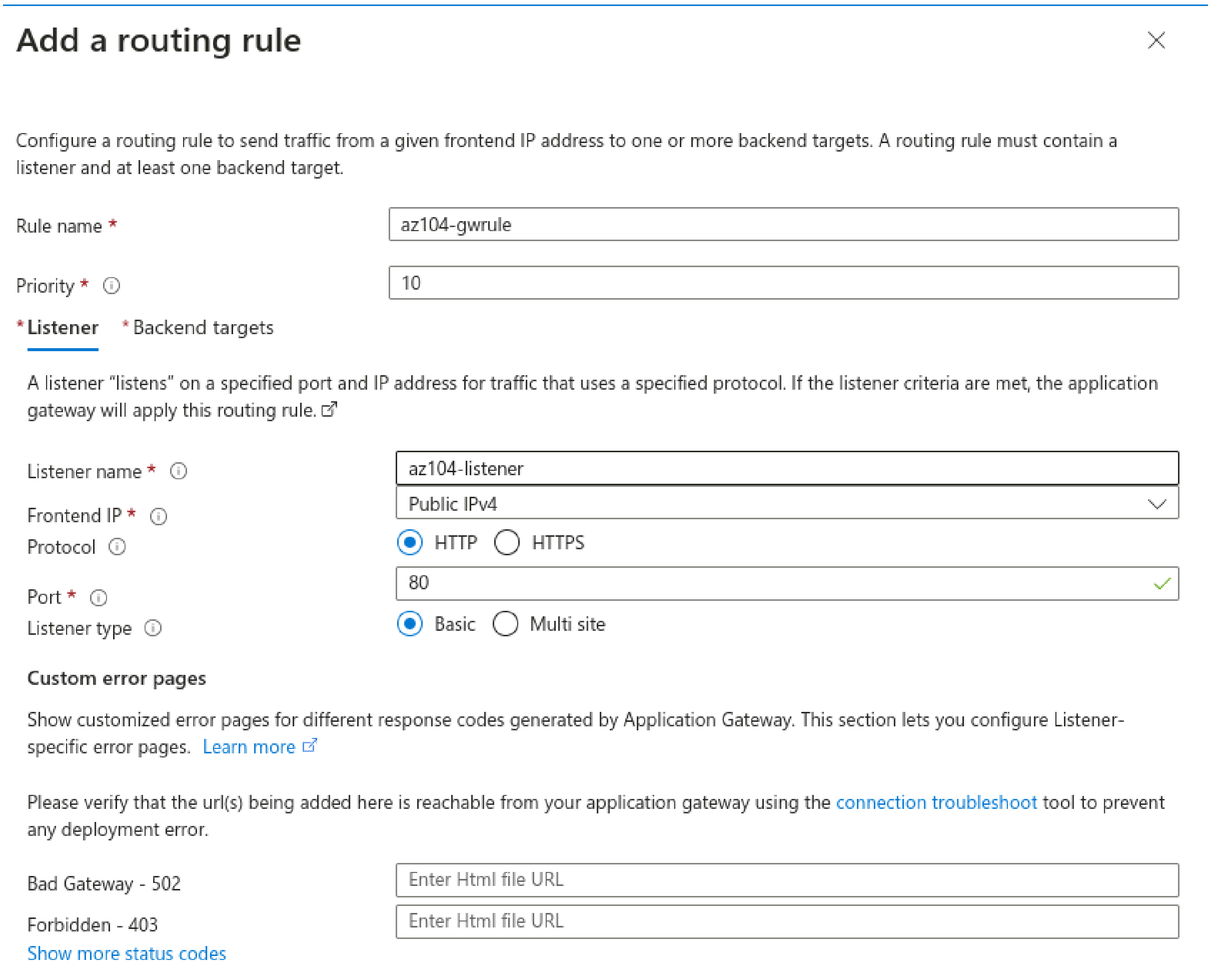
A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machines scale sets, IP addresses, domain names, or an App Service.

Name *	az104-videobe ✓
Add backend pool without targets	Yes [✓ No]
Backend targets	

1 item

Target type	Target
Virtual machine	az104-06-nic2 (10.60.2.4)
IP address or FQDN	

Figure 18. Add a backend pool videobe.



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 *	az104-gwrule
Priority * ⓘ	10

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 * ⓘ	az104-listener
Frontend IP * ⓘ	Public IPv4
Protocol ⓘ	● HTTP ○ HTTPS
Port * ⓘ	80 ✓
Listener type ⓘ	● Basic ○ Multi site

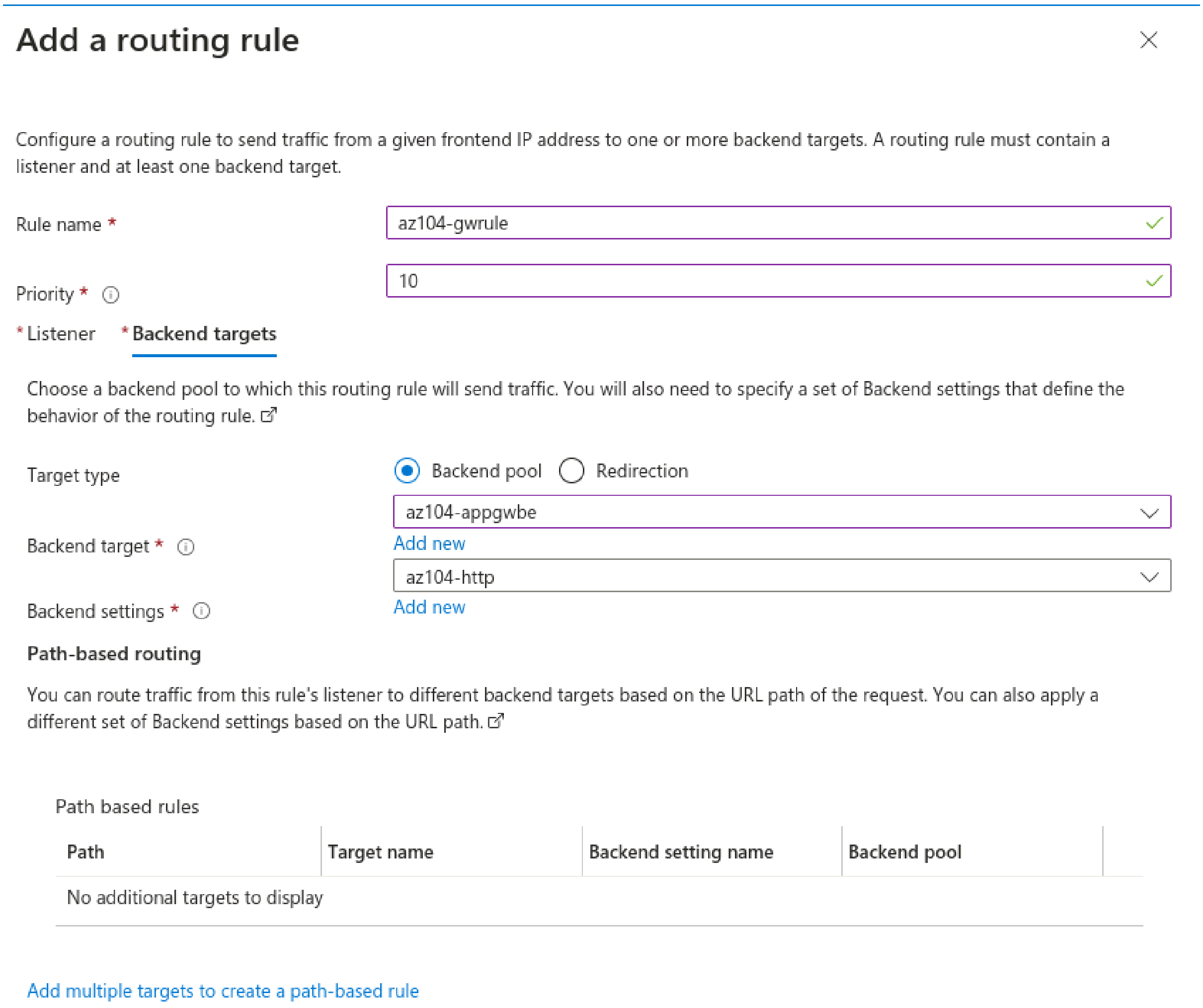
Custom error pages

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

Please verify that the url(s) being added here is reachable from your application gateway using the connection troubleshoot tool to prevent any deployment error.

Bad Gateway - 502	Enter Html file URL
Forbidden - 403	Enter Html file URL

Figure 19. Add a routing rule listener.



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 *	az104-gwrule ✓
Priority * ⓘ	10 ✓

* 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 * ⓘ	az104-appgwbe Add new
Backend settings * ⓘ	az104-http 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.

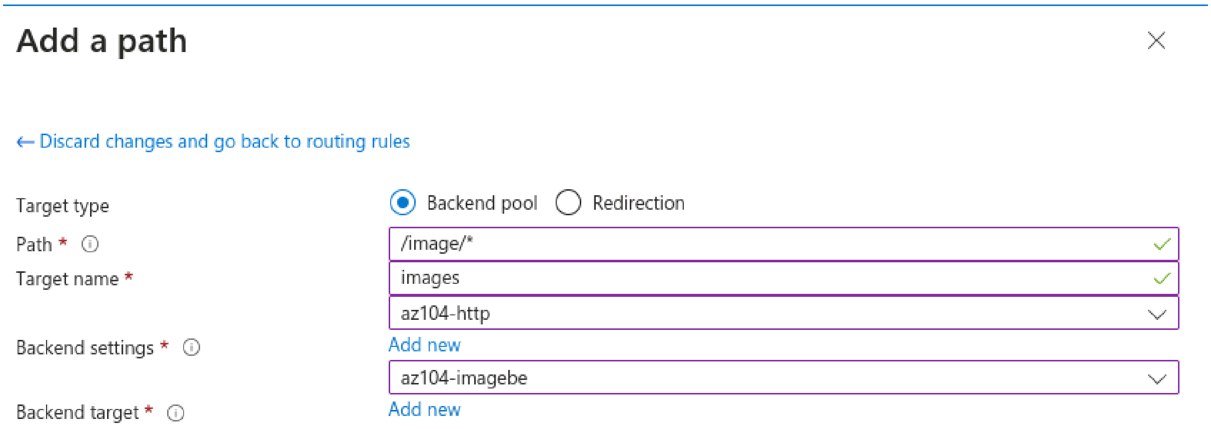
Path based rules

Path	Target name	Backend setting name	Backend pool
No additional targets to display			

Add multiple targets to create a path-based rule

Figure 20. Add a routing rule for backend targets.

Rule - routing to the images backend



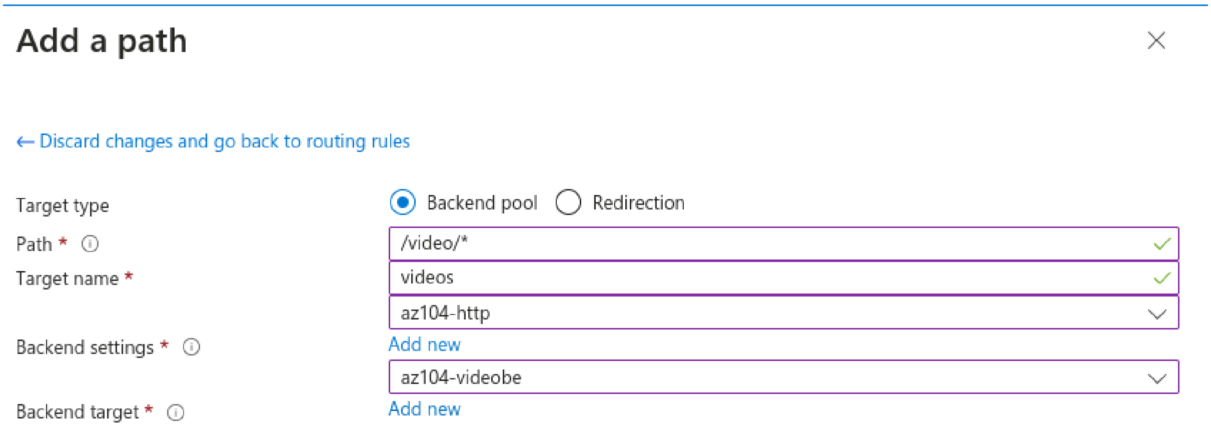
Add a path

← Discard changes and go back to routing rules

Target type	● Backend pool ○ Redirection
Path * ⓘ	/image/* ✓
Target name *	images ✓
Backend settings * ⓘ	az104-http Add new
Backend target * ⓘ	az104-imagebe Add new

Figure 21. Adding a path image.

Rule - routing to the videos backend



Add a path

← Discard changes and go back to routing rules

Target type: ● Backend pool ○ Redirection

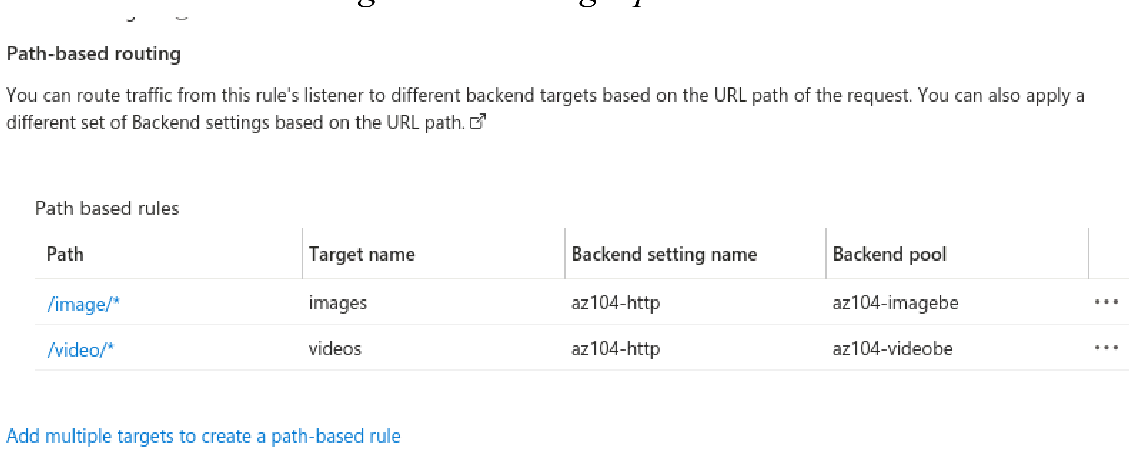
Path * ⓘ: /video/* ✓

Target name *: videos ✓

Backend settings * ⓘ: az104-http
Add new

Backend target * ⓘ: az104-videobe
Add new

Figure 22. Adding a path video.



Path-based routing

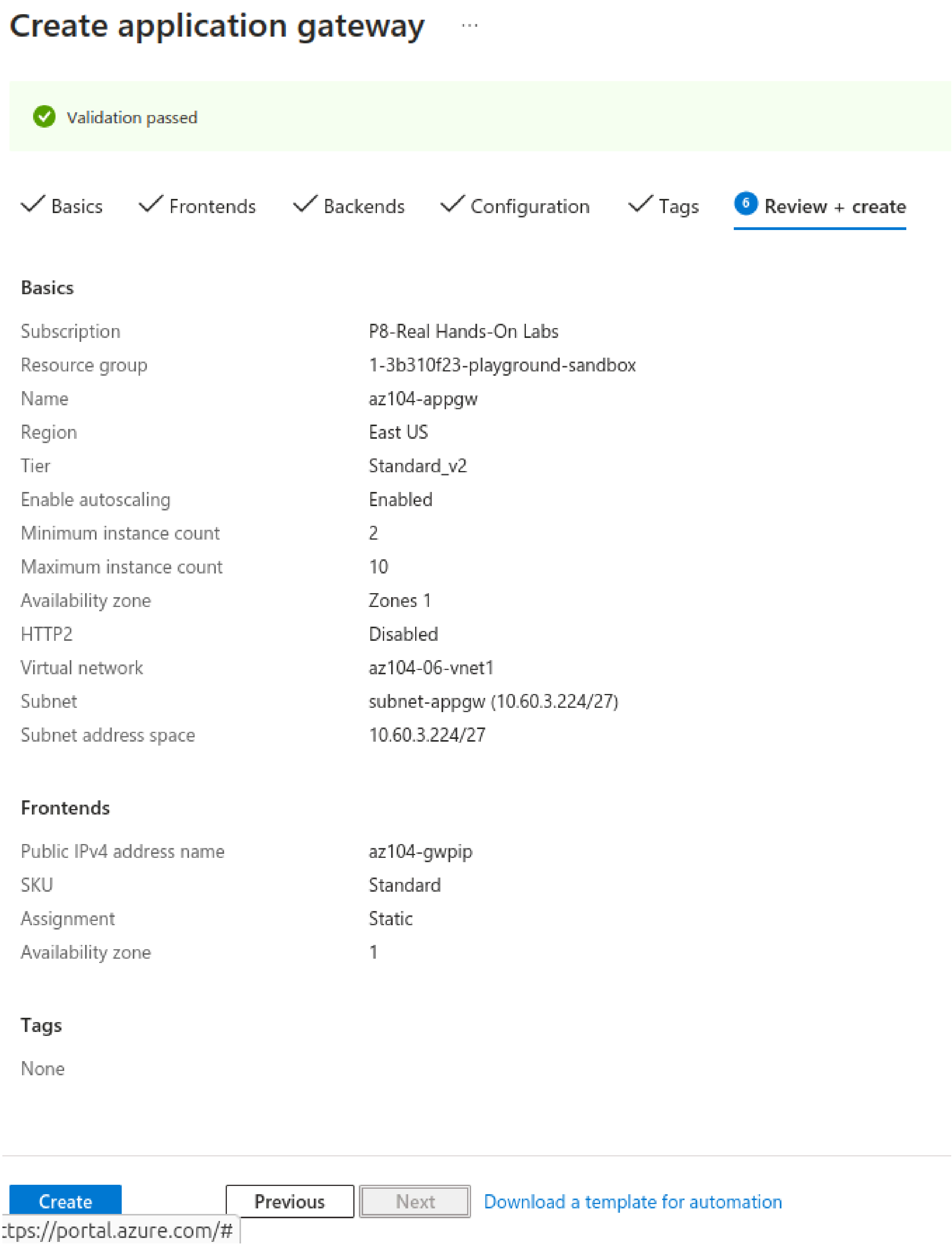
You can route traffic from this rule's listener to different backend targets based on the URL path of the request. You can also apply a different set of Backend settings based on the URL path.

Path based rules

Path	Target name	Backend setting name	Backend pool	
/image/*	images	az104-http	az104-imagebe	...
/video/*	videos	az104-http	az104-videobe	...

Add multiple targets to create a path-based rule

Figure 23. Complete adding.



Create application gateway ...

✓ Validation passed

Basics

Subscription	P8-Real Hands-On Labs
Resource group	1-3b310f23-playground-sandbox
Name	az104-appgw
Region	East US
Tier	Standard_v2
Enable autoscaling	Enabled
Minimum instance count	2
Maximum instance count	10
Availability zone	Zones 1
HTTP2	Disabled
Virtual network	az104-06-vnet1
Subnet	subnet-appgw (10.60.3.224/27)
Subnet address space	10.60.3.224/27

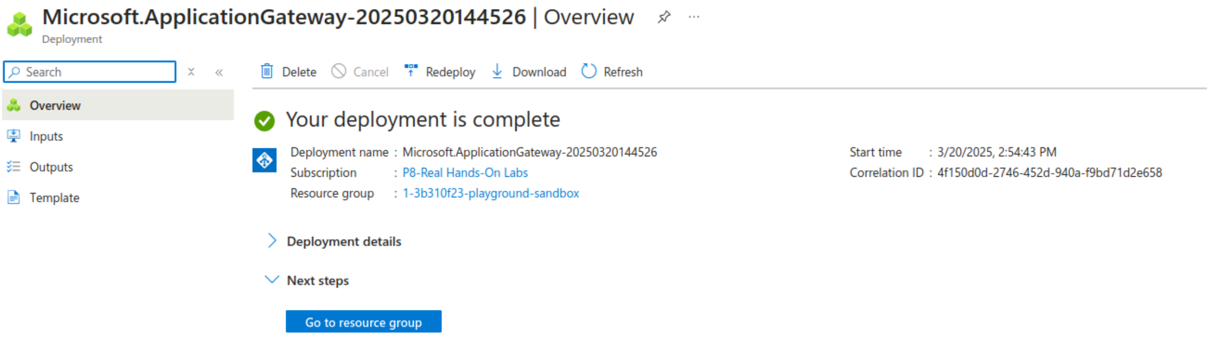
Frontends

Public IPv4 address name	az104-gwpip
SKU	Standard
Assignment	Static
Availability zone	1

Tags

None

Figure 24. Review.


Microsoft.ApplicationGateway-20250320144526 | Overview

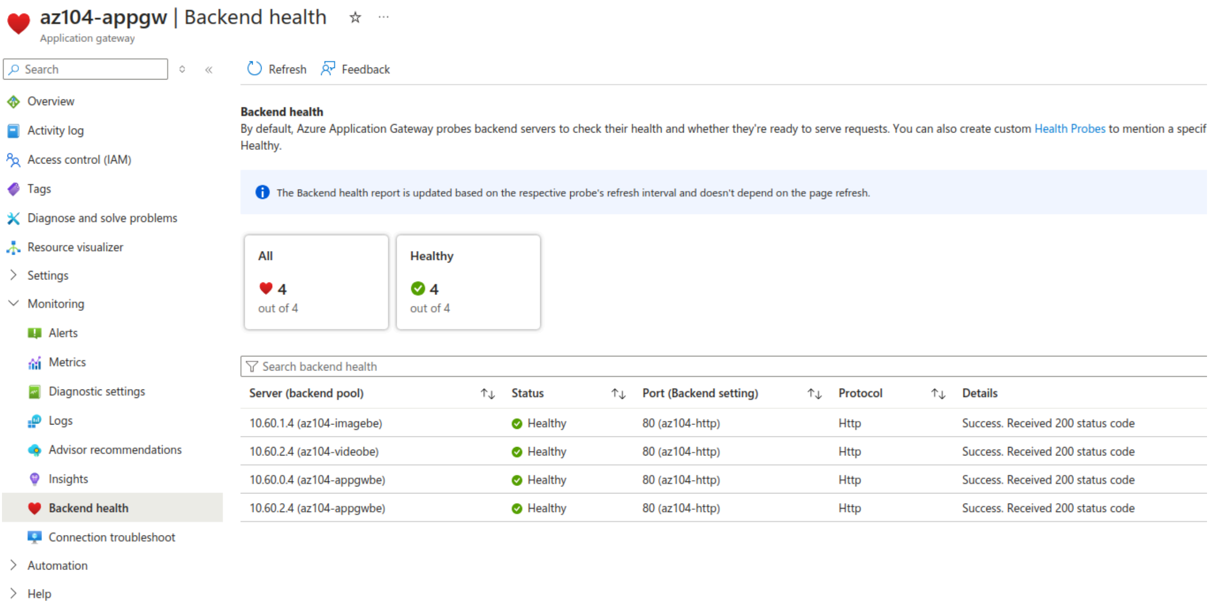
Deployment

Your deployment is complete

Deployment name : Microsoft.ApplicationGateway-20250320144526
Subscription : P8-Real Hands-On Labs
Resource group : 1-3b310f23-playground-sandbox

Start time : 3/20/2025, 2:54:43 PM
Correlation ID : 4f150d0d-2746-452d-940a-f9bd71d2e658

Figure 25. Complete deployment.


az104-appgw | Backend health

Application gateway

Backend health

By default, Azure Application Gateway probes backend servers to check their health and whether they're ready to serve requests. You can also create custom Health Probes to mention a specif Healthy.

The Backend health report is updated based on the respective probe's refresh interval and doesn't depend on the page refresh.

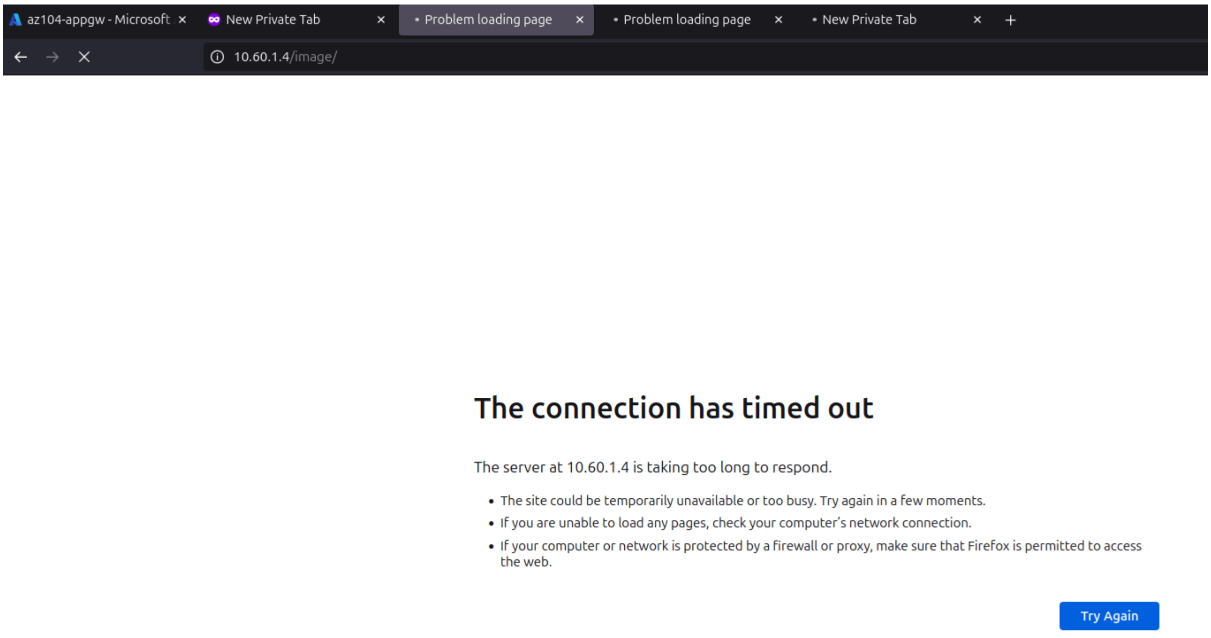
All: 4 out of 4

Healthy: ✓ 4 out of 4

Server (backend pool)	Status	Port (Backend setting)	Protocol	Details
10.60.1.4 (az104-imagebe)	✓ Healthy	80 (az104-http)	Http	Success. Received 200 status code
10.60.2.4 (az104-videobe)	✓ Healthy	80 (az104-http)	Http	Success. Received 200 status code
10.60.0.4 (az104-appgwbe)	✓ Healthy	80 (az104-http)	Http	Success. Received 200 status code
10.60.2.4 (az104-appgwbe)	✓ Healthy	80 (az104-http)	Http	Success. Received 200 status code

Figure 26. Backend health.

I tried it many times, but it just ran out of time:

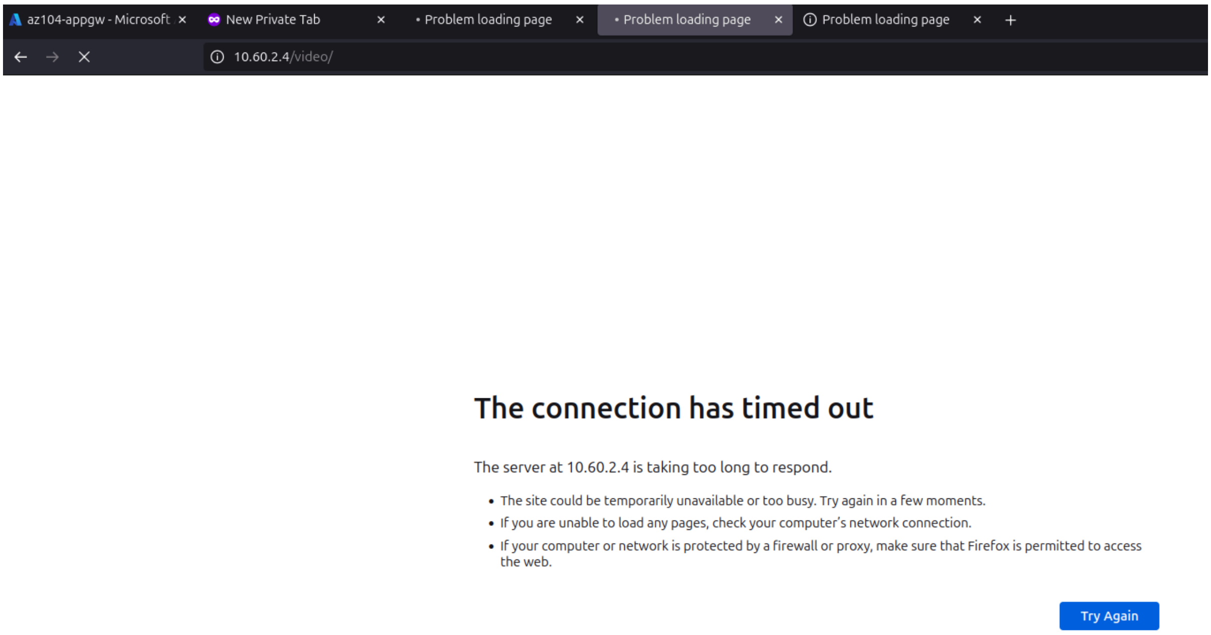


The connection has timed out

The server at 10.60.1.4 is taking too long to respond.

- The site could be temporarily unavailable or too busy. Try again in a few moments.
- If you are unable to load any pages, check your computer's network connection.
- If your computer or network is protected by a firewall or proxy, make sure that Firefox is permitted to access the web.

Figure 27. Try to reach image.



The connection has timed out

The server at 10.60.2.4 is taking too long to respond.

- The site could be temporarily unavailable or too busy. Try again in a few moments.
- If you are unable to load any pages, check your computer's network connection.
- If your computer or network is protected by a firewall or proxy, make sure that Firefox is permitted to access the web.

Figure 28. Try to reach video.