

M07-Unit 6 Create an Azure private endpoint using Azure PowerShell

Task 1: Create a resource group and deploy the prerequisite web app

An Azure resource group is a logical container into which Azure resources are deployed and managed.

Create a resource group with New-AzResourceGroup:

```
MOTD: Download scripts from PowerShell Gallery: Install-Script <script name>

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/ilunga> New-AzResourceGroup -Name 'CreatePrivateEndpointQ5-rg' -Location 'eastus'

ResourceGroupName : CreatePrivateEndpointQ5-rg
Location           : eastus
ProvisioningState   : Succeeded
Tags               :
ResourceId          : /subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg

PS /home/ilunga> 
```

Deploy the following ARM templates to create the PremiumV2-tier Azure Web App needed for this exercise:

```
PS /home/ilunga> $RGName = "CreatePrivateEndpointQ5-rg"
PS /home/ilunga>
PS /home/ilunga> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile template.json -TemplateParameterFile parameters.json

```

```

PS /home/ilunga> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile template.json -TemplateParameterFile parameters.json
New-AzResourceGroupDeployment: 1:54:09 PM - The deployment 'template' failed with error(s). Showing 1 out of 1 error(s).
Status Message: Website with given name GEN-UNIQUE already exists. (Code: Conflict)
- Website with given name GEN-UNIQUE already exists. (Code:)
- (Code:Conflict)
- (Code:)
CorrelationId: f261bb00-2fde-4a5b-adf7-fdb9491fb4e2

DeploymentName      : template
ResourceGroupName   : CreatePrivateEndpointQS-rg
ProvisioningState    : Failed
Timestamp           : 9/21/2022 1:54:09 PM
Mode                : Incremental
TemplateLink         :
Parameters          :
                    Name      Type      Value
                    =====
webAppName          String    "GEN-UNIQUE"
location            String    "westus"
sku                 String    "PremiumV2"
skucode             String    "P1v2"
language            String    ".net"
helloWorld          Bool      false
repoUrl             String    ""

Outputs            :
DeploymentDebugLogLevel :

PS /home/ilunga>

```

```

MOTD: Download scripts from PowerShell Gallery: Install-Script <script name>

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

DeploymentName      : template
ResourceGroupName   : CreatePrivateEndpointQS-rg
ProvisioningState    : Succeeded
Timestamp           : 9/26/2022 9:58:02 AM
Mode                : Incremental
TemplateLink         :
Parameters          :
                    Name      Type      Value
                    =====
webAppName          String    "UNILILUNGA"
location            String    "westus"
sku                 String    "PremiumV2"
skucode             String    "P1v2"
language            String    ".net"
helloWorld          Bool      false
repoUrl             String    ""

Outputs            :
DeploymentDebugLogLevel :

```

Task 2: Create a virtual network and bastion host

You'll create a virtual network, subnet, and bastion host.

The bastion host will be used to connect securely to the virtual machine for testing the Private Endpoint.

Create a virtual network and bastion host with:

- New-AzVirtualNetwork
- New-AzPublicIpAddress
- New-AzBastion

```

PS /home/ilunga> $bastsubnetConfig = New-AzVirtualNetworkSubnetConfig -Name AzureBastionSubnet -AddressPrefix 10.0.1.0/24
WARNING: Upcoming breaking changes in the cmdlet 'New-AzVirtualNetworkSubnetConfig' :
Update Property Name
Cmdlet invocation changes :
    Old Way : -ResourceId
    New Way : -NatGatewayId
Update Property Name
Cmdlet invocation changes :
    Old Way : -InputObject
    New Way : -NatGateway
Note : Go to https://aka.ms/azps-changewarnings for steps to suppress this breaking change warning, and other information on breaking changes in Azure PowerShell.
PS /home/ilunga>
PS /home/ilunga> ## Create the virtual network. ##
PS /home/ilunga>
PS /home/ilunga> $parameters1 = @{
>>
>> Name = 'MyVNet'
>>
>> ResourceGroupName = 'CreatePrivateEndpointQ5-rg'
>>
>> Location = 'eastus'
>>
>> AddressPrefix = '10.0.0.0/16'
>>
>> Subnet = $subnetConfig, $bastsubnetConfig
>>
>> }
PS /home/ilunga>
PS /home/ilunga> $vnet = New-AzVirtualNetwork @parameters1

```

```

PS /home/ilunga>
PS /home/ilunga> $publicip = New-AzPublicIpAddress @parameters2
WARNING: Upcoming breaking changes in the cmdlet 'New-AzPublicIpAddress' :
Default behaviour of Zone will be changed
Cmdlet invocation changes :
    Old Way : Sku = Standard means the Standard Public IP is zone-redundant.
    New Way : Sku = Standard and Zone = {} means the Standard Public IP has no zones. If you want to create a zone-redundant Public IP address, please specify
ones in the region. For example, Zone = ['1', '2', '3'].
It is recommended to use parameter '-Sku Standard' to create new IP address. Please note that it will become the default behavior for IP address creation in the future.
Note : Go to https://aka.ms/azps-changewarnings for steps to suppress this breaking change warning, and other information on breaking changes in Azure PowerShell.
PS /home/ilunga>
PS /home/ilunga> ## Create bastion host ##
PS /home/ilunga>
PS /home/ilunga> $parameters3 = @{
>>
>> ResourceGroupName = 'CreatePrivateEndpointQ5-rg'
>>
>> Name = 'myBastion'
>>
>> PublicIpAddress = $publicip
>>
>> VirtualNetwork = $vnet
>>
>> }
PS /home/ilunga>
https://portal.azure.com/#home/vzBastion @parameters3

```

```

ResourceGroupName : CreatePrivateEndpointQ5-rg
DnsName            : bst-7bd86a8e-9d95-4bb2-ac1c-b42ddafd527d.bastion.azure.com
ResourceGuid       :
ProvisioningState   : Succeeded
IpConfigurationsText : [
    {
        "Subnet": {
            "Id": "/subscriptions/22326a92-2476-4fb9-bdc8-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/providers/Microsoft.Network/virtualNetworks/MyVNet/subnets/AzureBastionSubnet"
        },
        "PublicIpAddress": {
            "Id": "/subscriptions/22326a92-2476-4fb9-bdc8-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/providers/Microsoft.Network/publicIPAddresses/myBastionIP"
        },
        "ProvisioningState": "Succeeded",
        "PrivateIpAllocationMethod": "Dynamic",
        "Name": "IpConf",
        "Etag": "W/\"0e5af24f-0432-418b-a6d7-6c3527a225a0\"",
        "Id": "/subscriptions/22326a92-2476-4fb9-bdc8-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/providers/Microsoft.Network/bastionHosts/myBastion/bastionHostIpConfigurations/IpConf"
    }
]
Sku                : {
    "Name": "Basic"
}
Scale Units        : 2

```

Task 3: Create a test virtual machine

In this section, you'll create a virtual machine that will be used to test the Private Endpoint.

Create the virtual machine with:

Get-Credential (Note: when prompted enter a local admin account credentials for the VM (i.e. Student and Pa55w.rd1234)).

- New-AzNetworkInterface
- New-AzVM
- New-AzVMConfig
- Set-AzVMOperatingSystem
- Set-AzVMSourceImage
- Add-AzVMNetworkInterface

```
MOTD: Manage Azure Active Directory: Get-Command -Module AzureAD*

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/ilunga> ## Set credentials for server admin and password. ##
PS /home/ilunga>
PS /home/ilunga> $cred = Get-Credential

PowerShell credential request
Enter your credentials.
User: student
Password for user student: *****

PS /home/ilunga>
PS /home/ilunga> ## Command to get virtual network configuration. ##
PS /home/ilunga>
PS /home/ilunga> $vnet = Get-AzVirtualNetwork -Name myVNet -ResourceGroupName CreatePrivateEndpointQ5-rg
PS /home/ilunga>
PS /home/ilunga>
```

```
>> }
PS /home/ilunga>
PS /home/ilunga> $vmConfig = New-AzVMConfig @parameters2 | Set-AzVMOperatingSystem -Windows @parameters3 | Set-AzVMSourceImage @parameters4 | Add-AzVMNetworkInterface -
Id $nicVM.Id
PS /home/ilunga>
PS /home/ilunga> ## Create the virtual machine ##
PS /home/ilunga>
PS /home/ilunga> New-AzVM -ResourceGroupName 'CreatePrivateEndpointQ5-rg' -Location 'eastus' -VM $vmConfig
WARNING: Upcoming breaking changes in the cmdlet 'New-AzVM' :
Starting on 10/12/2022 the "New-AzVM" cmdlet will deploy with the Trusted Launch configuration by default. To know more about Trusted Launch, please visit https://docs.
microsoft.com/en-us/azure/virtual-machines/trusted-launch
It is recommended to use parameter "-PublicIpSku Standard" in order to create a new VM with a Standard public IP. Specifying zone(s) using the "-Zone" parameter will also
result in a Standard public IP. If "-Zone" and "-PublicIpSku" are not specified, the VM will be created with a Basic public IP instead. Please note that the Standard SK
U IPs will become the default behavior for VM creation in the future
Note : Go to https://aka.ms/azps-changewarnings for steps to suppress this breaking change warning, and other information on breaking changes in Azure PowerShell.
WARNING: Error occurred when creating storage account for boot diagnostics. Keep creating a VM with disabling boot diagnostics. : Microsoft.Rest.ValidationException:
'Kind' cannot be null.
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.Models.StorageAccountCreateParameters.Validate()
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperations.BeginCreateWithHttpMessagesAsync(String resourceGroupName, String accountName
, StorageAccountCreateParameters parameters, Dictionary`2 customHeaders, CancellationToken cancellationToken)
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperations.CreateWithHttpMessagesAsync(String resourceGroupName, String accountName, Sto
rageAccountCreateParameters parameters, Dictionary`2 customHeaders, CancellationToken cancellationToken)
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperationsExtensions.CreateAsync(IStorageAccountsOperations operations, String resourceG
roupName, String accountName, StorageAccountCreateParameters parameters, CancellationToken cancellationToken)
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperationsExtensions.Create(IStorageAccountsOperations operations, String resourceGroupN
ame, String accountName, StorageAccountCreateParameters parameters)
    at Microsoft.Azure.Commands.Compute.NewAzureVMCommand.CreateStandardStorageAccount(StorageManagementClient client)
```

```
'Kind' cannot be null.
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.Models.StorageAccountCreateParameters.Validate()
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperations.BeginCreateWithHttpMessagesAsync(String resourceGroupName, String accountName
, StorageAccountCreateParameters parameters, Dictionary`2 customHeaders, CancellationToken cancellationToken)
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperations.CreateWithHttpMessagesAsync(String resourceGroupName, String accountName, Sto
rageAccountCreateParameters parameters, Dictionary`2 customHeaders, CancellationToken cancellationToken)
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperationsExtensions.CreateAsync(IStorageAccountsOperations operations, String resourceG
roupName, String accountName, StorageAccountCreateParameters parameters, CancellationToken cancellationToken)
    at Microsoft.Azure.PowerShell.Cmdlets.Compute.Helpers.Storage.StorageAccountsOperationsExtensions.Create(IStorageAccountsOperations operations, String resourceGroupN
ame, String accountName, StorageAccountCreateParameters parameters)
    at Microsoft.Azure.Commands.Compute.NewAzureVMCommand.CreateStandardStorageAccount(StorageManagementClient client)

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

Task 4: Create a Private Endpoint

In this section, you'll create the Private Endpoint and connection using:

- New-AzPrivateLinkServiceConnection

- New-AzPrivateEndpoint

```
PS /home/ilunga>
PS /home/ilunga> $webapp = Get-AzWebApp -ResourceGroupName CreatePrivateEndpointQ5-rg
PS /home/ilunga>
PS /home/ilunga> ## Create Private Endpoint connection. ##
PS /home/ilunga>
PS /home/ilunga> $parameters1 = @{
>>
>>   Name = 'myConnection'
>>
>>   PrivateLinkServiceId = $webapp.ID
>>
>>   GroupID = 'sites'
>> }
PS /home/ilunga>
PS /home/ilunga> $privateEndpointConnection = New-AzPrivateLinkServiceConnection @parameters1
PS /home/ilunga>
PS /home/ilunga> ## Place virtual network into variable. ##
PS /home/ilunga>
PS /home/ilunga> $vnet = Get-AzVirtualNetwork -ResourceGroupName 'CreatePrivateEndpointQ5-rg' -Name 'myVNet'
PS /home/ilunga>
PS /home/ilunga> ## Disable private endpoint network policy ##
PS /home/ilunga>
PS /home/ilunga> $vnet.Subnets[0].PrivateEndpointNetworkPolicies = "Disabled"
PS /home/ilunga>
PS /home/ilunga> $vnet | Set-AzVirtualNetwork

Name                : MyVNet
ResourceGroupName   : CreatePrivateEndpointQ5-rg
Location             : eastus
```

```
PS /home/ilunga>
PS /home/ilunga> New-AzPrivateEndpoint @parameters2

Name                : myPrivateEndpoint
Type                : Microsoft.Network/privateEndpoints
Location            : eastus
ResourceGroupName   : CreatePrivateEndpointQ5-rg
ProvisioningState    : Succeeded
Etag                : W/"5f4068ed-d307-4834-85bf-c366a0370731"
Id                  : /subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/providers/Microsoft.Network/privateEndpoints/myPrivateEndpoint
Subnet               : {
                        "Id": "/subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/providers/Microsoft.Network/virtualNetworks/MyVNet/subnets/myBackendSubnet",
                        "IpAllocations": []
                      }
NetworkInterfaces    : [
                        {
                          "VnetEncryptionSupported": false,
                          "Id": "/subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/providers/Microsoft.Network/networkInterfaces/myPrivateEndpoint.nic.fe0612ca-99ca-4208-9ce0-e3834b004c9e"
                        }
                      ]
PrivateLinkServiceConnections : [
                        {
                          "ProvisioningState": "Succeeded",
                          "PrivateLinkServiceId": "/subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/provi
```

```

                        "sites"
                      ],
                      "PrivateLinkServiceConnectionState": {
                        "Status": "Approved",
                        "Description": "",
                        "ActionRequired": "None"
                      },
                      "Name": "myConnection",
                      "Etag": "W/"5f4068ed-d307-4834-85bf-c366a0370731\"",
                      "Id": "/subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQ5-rg/providers/Microsoft.Network/privateEndpoints/myPrivateEndpoint/privateLinkServiceConnections/myConnection"
                    }
  ]
ManualPrivateLinkServiceConnections : []
CustomDnsConfigs                     : [
  {
    "Fqdn": "uniilunga.azurewebsites.net",
    "IpAddresses": [
      "10.0.0.5"
    ]
  },
  {
    "Fqdn": "uniilunga.scm.azurewebsites.net",
    "IpAddresses": [
      "10.0.0.5"
    ]
  }
]
ExtendedLocation                     : null
ApplicationSecurityGroups             : []
```

Task 5: Configure the private DNS zone

In this section you'll create and configure the private DNS zone using:

- New-AzPrivateDnsZone
- New-AzPrivateDnsVirtualNetworkLink
- New-AzPrivateDnsZoneConfig
- New-AzPrivateDnsZoneGroup

```
PS /home/ilunga>
PS /home/ilunga> $link = New-AzPrivateDnsVirtualNetworkLink @parameters2
PS /home/ilunga>
PS /home/ilunga> ## Create DNS configuration ##
PS /home/ilunga>
PS /home/ilunga> $parameters3 = @{
>>
>> Name = 'privatelink.azurewebsites.net'
>>
>> PrivateDnsZoneId = $zone.ResourceId
>>
>> }
PS /home/ilunga>
PS /home/ilunga> $config = New-AzPrivateDnsZoneConfig @parameters3
PS /home/ilunga>
PS /home/ilunga> ## Create DNS zone group. ##
PS /home/ilunga>
PS /home/ilunga> $parameters4 = @{
>>
>> ResourceGroupName = 'CreatePrivateEndpointQS-rg'
>>
>> PrivateEndpointName = 'myPrivateEndpoint'
>>
>> Name = 'myZoneGroup'
>>
>> PrivateDnsZoneConfig = $config
>>
>> }
PS /home/ilunga>
PS /home/ilunga> New-AzPrivateDnsZoneGroup @parameters4
```

```
Id : /subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/CreatePrivateEndpointQS-rg/providers/Microsoft.Network/privateEndpoints/myPrivateEndpoint/privateDnsZoneGroups/myZoneGroup
ProvisioningState : Succeeded
PrivateDnsZoneConfigs : [
  {
    "Name": "privatelink.azurewebsites.net",
    "PrivateDnsZoneId": "/subscriptions/22326a92-2476-4fb9-bdcb-48f3ffdd5831/resourceGroups/createprivateendpointqs-rg/providers/Microsoft.Network/privateDnsZones/privatelink.azurewebsites.net",
    "RecordSets": [
      {
        "RecordType": "A",
        "RecordSetName": "uniilunga",
        "Fqdn": "uniilunga.privatelink.azurewebsites.net",
        "ProvisioningState": "Succeeded",
        "Ttl": 10,
        "IpAddresses": [
          "10.0.0.5"
        ]
      },
      {
        "RecordType": "A",
        "RecordSetName": "uniilunga.scm",
        "Fqdn": "uniilunga.scm.privatelink.azurewebsites.net",
        "ProvisioningState": "Succeeded",
        "Ttl": 10,
        "IpAddresses": [
          "10.0.0.5"
        ]
      }
    ]
  }
]
```

Task 6: Test connectivity to the Private Endpoint

1.Sign in to the Azure portal +2.Select Resource groups in the left-hand navigation pane +3.Select CreatePrivateEndpointQS-rg.

Resource groups
CTU Career

+ Create Manage view ...

Filter for any field...

Name ↑

- cloud-shell-storage-west europe
- CreatePrivateEndpointQS-rg**
- NetworkWatcherRG

Page 1 of 1

CreatePrivateEndpointQS-rg
Resource group

Search

+ Create Manage view Delete resource group Refresh Export to CSV Open query ...

Essentials

Subscription ([move](#))
[Azure for Students](#)

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

Tags ([edit](#))
[Click here to add tags](#)

Deployments
[1 Succeeded](#)

Location
East US

Resources Recommendations

Filter for any field... Type equals all Location equals all Add filter

Showing 1 to 12 of 12 records. Show hidden types No grouping

List view

Name ↑	Type ↑	Location ↑
AppServicePlan-GEN-UNIQUE	App Service plan	West US
AppServicePlan-UNILUNGA	App Service plan	West US
myBastion	Bastion	East US

4. Select myVM. +5. On the overview page for myVM, select Connect then Bastion.

myVM | Bastion
Virtual machine

Search

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

Settings

- Networking
- Connect**
- Windows Admin Center (preview)
- Disks
- Size
- Microsoft Defender for Cloud
- Advisor recommendations
- Extensions + applications

Azure Bastion Service enables you to securely and seamlessly RDP & SSH to your VMs in your Azure virtual network, without exposing a public IP on the VM, directly from the Azure portal, without the need of any additional client/agent or any piece of software. [Learn more](#)

Using Bastion: **myBastion**, Provisioning State: **Succeeded**

Please enter username and password to your virtual machine to connect using Bastion.

Connection Settings

Username

Authentication Type

Password

Show

☒ Open in new browser tab

Connect

[Tell us what you think of the Bastion experience](#)

Server Manager

Server Manager Dashboard

Manage Tools View Help

Try managing servers with Windows Admin Center

Windows Admin Center brings together new and familiar features in one browser-based app. It runs on a server or a PC, and there's no additional cost beyond your Windows licenses.

[Get more info at aka.ms/WindowsAdminCenter](#)

☐ Don't show this message again

WHAT'S NEW

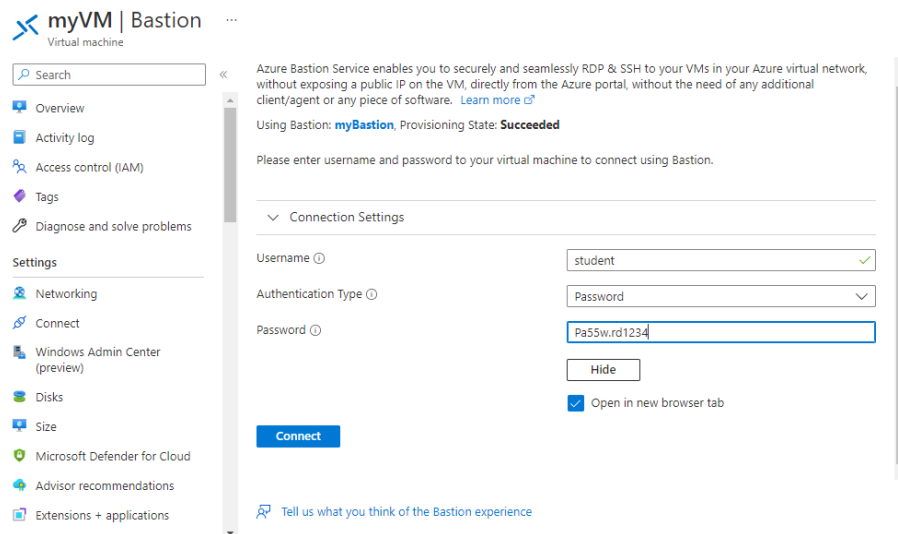
- 4 Create a server group
- 5 Connect this server to cloud services

ROLES AND SERVER GROUPS

Roles: 1 | Server groups: 1 | Servers total: 1

Role	Count
File and Storage Services	1
Local Server	1
All Servers	1

6. Select the blue Use Bastion button. +7. Enter the username and password that you entered during the virtual machine creation.



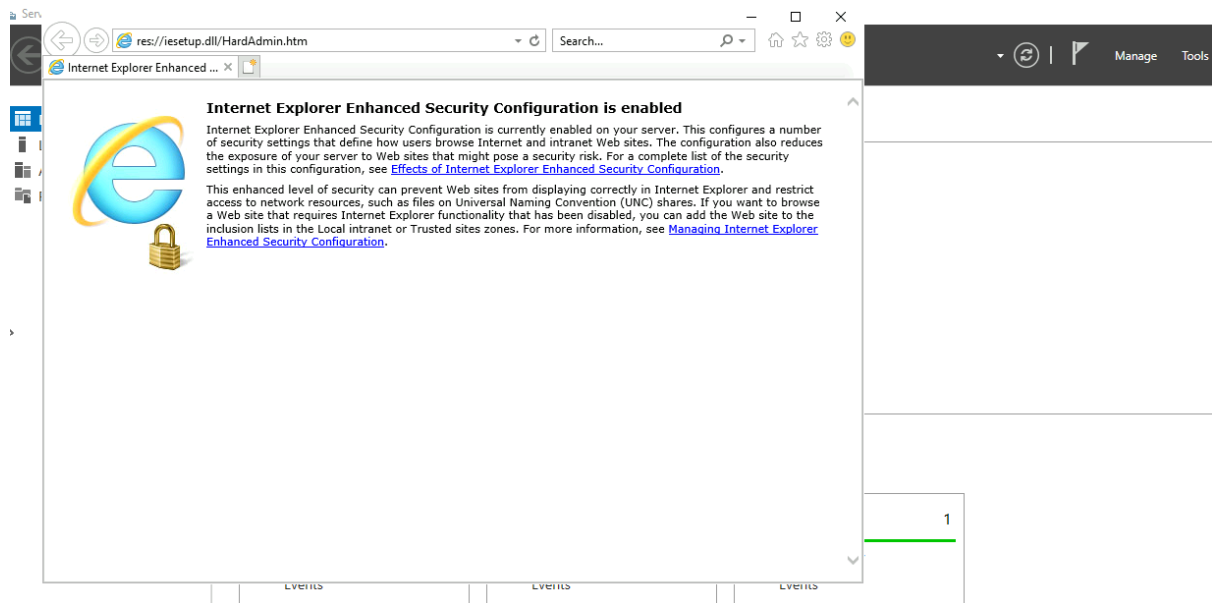
8. Open Windows PowerShell on the server after you connect. +9. Enter `nslookup <your- webapp-name>.azurewebsites.net`. Replace `<your-webapp-name>` with the name of the web app you created in the previous steps. You'll receive a message similar to what is displayed below:

```
PS /home/ilunga> nslookup
> UNILUNGA.azurewebsites.net
Server:      168.63.129.16
Address:     168.63.129.16#53

Non-authoritative answer:
UNILUNGA.azurewebsites.net canonical name = unilunga.privatelink.azurewebsites.net.
unilunga.privatelink.azurewebsites.net canonical name = waws-prod-bay-211.sip.azurewebsites.windows.net.
waws-prod-bay-211.sip.azurewebsites.windows.net canonical name = waws-prod-bay-211-581b.westus.cloudapp.azure.com.
Name:   waws-prod-bay-211-581b.westus.cloudapp.azure.com
Address: 40.112.243.100
>
```

A private IP address of 10.0.0.5 is returned for the web app name. This address is in the subnet of the virtual network you created previously.

1. In the bastion connection to myVM, open Internet Explorer.



2. Enter the url of your web app, <https://<your-webapp-name>.azurewebsites.net>

