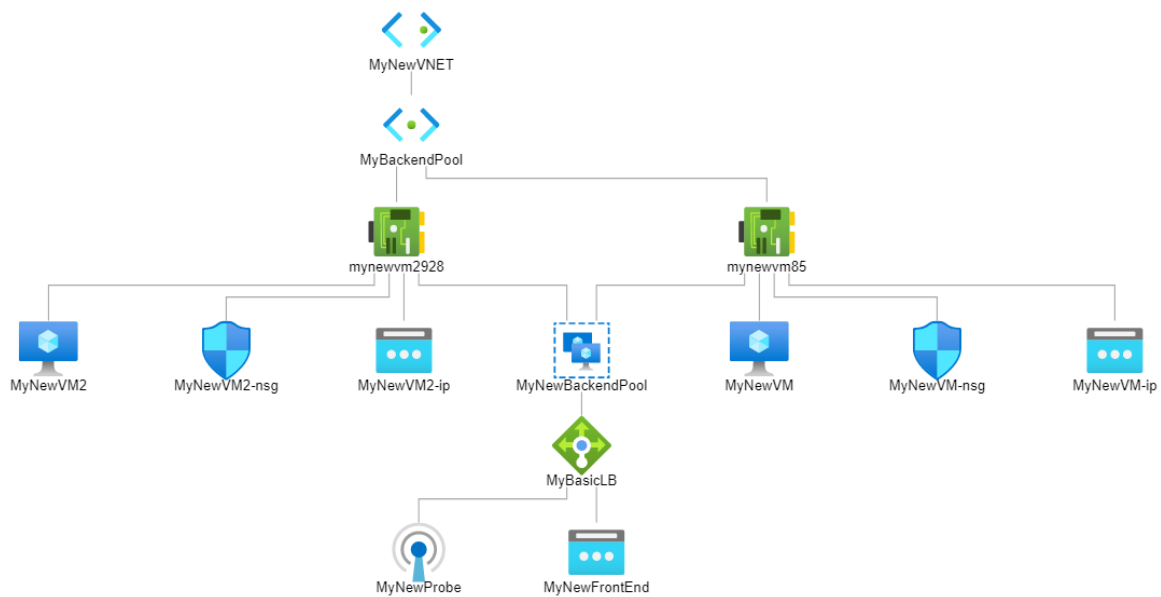


You run a very popular webshop that has to handle lots of incoming traffic from customers all around the world that wants to order your products. You have to be sure that the load coming in is evenly spread across multiple VMs hosting the website and is available 24/7. I would like you to create and test the following:

- Create a Virtual Network
- Create Virtual Machines
- Install IIS on both Virtual Machines
- Create a Load Balancer
- Test the Load Balancer



Tasks

1. Create a Virtual network

1. From the Azure Portal, click on **Create** a resource button:

Azure services



2. In the search box, enter **Virtual Network**:

Virtual network  
Microsoft



Virtual network  Add to Favorites

Microsoft

★ 4.1 (24 Marketplace ratings) | ★ 4.1 (16 external ratings)

Plan

Virtual network

Create

3. Select **Create** and enter the following values in the **Basics** tab:
 - Resource group: **MyNewRG**
 - Instance details:
 - Virtual Network Name: **MyNewVNET**
 - Region: **East US**

Create virtual network ...



Basics IP Addresses Security Tags Review + create

Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. VNet enables many types of Azure resources, such as Azure Virtual Machines (VM), to securely communicate with each other, the internet, and on-premises networks. VNet is similar to a traditional network that you'd operate in your own data center, but brings with it additional benefits of Azure's infrastructure such as scale, availability, and isolation. [Learn more about virtual network](#)

Project details

Subscription * ⓘ



Resource group * ⓘ

[Create new](#)

Instance details

Name *

Region *

4. Click on the **Next: IP Addresses** button:

Review + create

< Previous

Next : IP Addresses >

5. Enter or select the following details:
- IPv4 address space: **10.1.0.0/16**

Basics IP Addresses Security Tags Review + create

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

IPv4 address space

6. Check the box on the left of the **default** subnet, and click on the **Remove Subnet** button:

+ Add subnet



Remove subnet



Subnet name

Subnet address range



default

10.1.0.0/24

7. Click on the **+Add Subnet** button:



Add subnet



Remove subnet

Subnet name



This virtual network doesn't have any subnets.

8. On the **Add Subnet** page, enter the following details and click on **add**:

- Subnet Name: **MyBackendPool**
- Subnet Address range: **10.1.0.0/24**
- NAT gateway: Leave the defaults
- Service gateway: Leave the defaults

Add subnet



Name *

MyBackendPool



Subnet address range * ⓘ

10.1.0.0/24

10.1.0.0 - 10.1.0.255 (251 + 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. To use network security groups, application security groups, or user defined routes to control traffic going to a private endpoint, set the private endpoint network policy to enabled. [Learn more](#)

Private endpoint network policy

Disabled



Save

Cancel

9. Click on **Review + Create** and then click on **Create**:




✓ Your deployment is complete

Deployment name: Microsoft.VirtualNetwork-20221020095911

Subscription: 

Resource group: [MyNewRG](#)

Start time: 10/20/2022, 10:16:29 AM

Correlation ID: e505a445-dab4-41f2-a222-8bc37cb925be 

∨ Deployment details

∧ Next steps

[Go to resource](#)

Give feedback

 [Tell us about your experience with deployment](#)

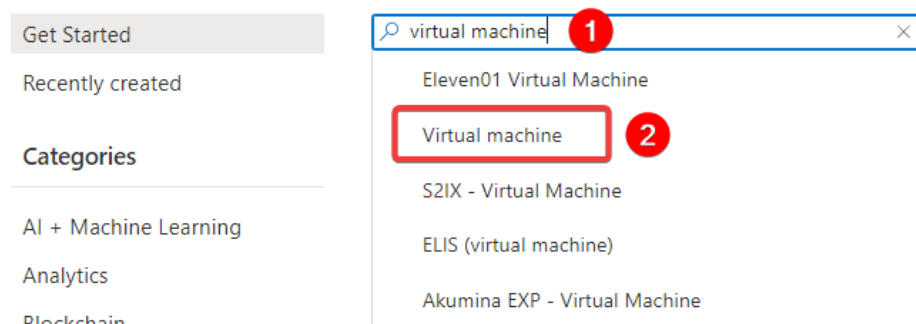
2. Create Virtual machines

The network isn't complete without Virtual Machines and a Firewall is useless without a compute resource. I need you to create them:

1. In the search box at the top of the Azure Portal, search for **Virtual Machines** and select it from the list:

[Home](#) >

Create a resource ...



2. On the **Basics** tab, enter or select the following details:

- Resource group: **MyNewRG**
- Instance details:
 - Virtual Machine Name: **MyNewVM**
 - Region: **East US**
 - Availability options: Select Availability set
 - Availability set: Click on **Create new**
 - Name: **MyNewAvailabilitySet**
 - Fault Domains: **2**
 - Update Domains: **2**
 - Image: **Windows Server 2019 Datacenter - Gen2**
 - Azure Spot instance: Leave the default (unchecked).
 - Size: **Standard_B2s**
- Administrator Account:
 - Username: **VM1**
 - Password: Enter a password
 - Confirm password: Re-enter password
- Inbound Port rules:
 - Public inbound ports: **Allow selected ports**
 - Select inbound ports: **HTTP (80), RDP (3389)**

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

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

Subscription * ⓘ

Resource group * ⓘ
[Create new](#)

Instance details

Virtual machine name * ⓘ

Region * ⓘ

Availability options ⓘ

⚠ Based on your input, you might want to consider creating this resource as a virtual machine scale set, which allows you to manage, configure and scale load balanced virtual machines. [Create as VMSS](#)

Availability set * ⓘ
[Create new](#)

Security type ⓘ

Image * ⓘ
[See all images](#) | [Configure VM generation](#)

VM architecture ⓘ ☐ Arm64
☒ x64
i Arm64 is not supported with the selected image.

Run with Azure Spot discount ⓘ ☐

Size * ⓘ
[See all sizes](#)

Administrator account

Username * ⓘ

Password * ⓘ

Confirm password * ⓘ

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * ⓘ ☐ None
☒ Allow selected ports

Select inbound ports *

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Licensing

Save up to 49% with a license you already own using Azure Hybrid Benefit. [Learn more](#)

Would you like to use an existing Windows Server license? * ⓘ ☐

[Review Azure hybrid benefit compliance](#)

3. Click on the **Next: Disks** button at the bottom:

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

4. Select the following:

Disk options

OS disk type * ⓘ

Standard SSD (locally-redundant storage) ▼

If performance is critical for your workloads, choose Premium SSD disks for lower latency, higher IOPS and bandwidth, and bursting. [Learn more](#)

5. At the bottom, click on the **Next: Networking** button:

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

6. Select the following details and leave the rest as default:

- Network Interface:
 - Virtual Network: **MyNewVNET**
 - Subnet: Select **MyBackenedPool**
 - Public IP: Create new
 - SKU: Basic
 - Assignment: Static

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * ⓘ

MyNewVNET ▼

[Create new](#)

Subnet * ⓘ

MyBackendPool (10.1.0.0/24) ▼

[Manage subnet configuration](#)

Public IP ⓘ

(new) MyNewVM-ip ▼

[Create new](#)

Create public IP address ×

Name *
MyNewVM-ip ✓

1

SKU * ⓘ
☒ Basic ☐ Standard

Assignment 2
☐ Dynamic ☒ Static


3

7. Click on the **Review + Create** button and then select **Create**:

1

2 [Download a template for automation](#)

✓ Your deployment is complete

 Deployment name: CreateVm-MicrosoftWindo... Start time: 10/21/2022, 9:30:59...
Subscription: [MyNewSubscription](#) Correlation ID: 7550ebe4-34c5-4
Resource group: [MyNewRG](#)

▼ Deployment details

^ Next steps

[Setup auto-shutdown](#) Recommended

[Monitor VM health, performance and network dependencies](#) Recommended

[Run a script inside the virtual machine](#) Recommended

Give feedback

[Tell us about your experience with deployment](#)

8. Repeat steps 1 - 7 to deploy another VM and enter or select the following details:

- Basics tab:
 - Resource group: **MyNewRG**
 - Instance details:
 - Virtual Machine Name: **MyNewVM2**
 - Region: **East US**

- Availability options: **Availability set**
 - Availability set: **MyNewAvailabilitySet**
 - Image: **Windows Server 2019 Datacenter - Gen2**
 - Azure Spot instance: Leave the default (unchecked)
 - Size: **Standard_B2s**
- Administrator Account:
 - Username: **VM2**
 - Password: Enter a password
 - Confirm password: Re-enter password
- Inbound Port rules:
 - Public inbound ports: **Allow selected ports**
 - Select inbound ports: **HTTP (80), RDP (3389)**
- Disks tab:
 - OS disk type: **Standard SSD**
- Networking tab:
 - Network Interface:
 - Virtual Network: **MyNewVNET**
 - Subnet: **MyBackenedPool**
 - Public IP: **Create new**
 - SKU: **Basic**
 - Assignment: **Static**

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details


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

Subscription *	<div>Pay-As-You-Go</div>
Resource group *	<div>MyNewRG</div> <div>Create new</div>

Instance details

Virtual machine name *	<div>MyNewVM2</div>
Region *	<div>(US) East US</div>
Availability options	<div>Availability set</div>

⚠ Based on your input, you might want to consider creating this resource as a virtual machine scale set, which allows you to manage, configure and scale load balanced virtual machines. [Create as VMSS](#)

Availability set *	<div>MyNewAvailabilitySet</div> <div>Create new</div>
Security type	<div>Standard</div>
Image *	<div> Windows Server 2019 Datacenter - Gen2</div> <div>See all images Configure VM generation</div>
VM architecture	<div><div><input type="radio"/> Arm64</div><div><input checked="" type="radio"/> x64</div><div>i Arm64 is not supported with the selected image.</div></div>
Run with Azure Spot discount	<div><input type="checkbox"/></div>
Size *	<div>Standard_B2s - 2 vcpus, 4 GiB memory (\$36.21/month)</div> <div>See all sizes</div>

Administrator account

Username *	<div>VM2</div>
Password *	<div>*****</div>
Confirm password *	<div>*****</div>

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports *	<div><div><input type="radio"/> None</div><div><input checked="" type="radio"/> Allow selected ports</div></div>
Select inbound ports *	<div>HTTP (80), RDP (3389)</div>

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

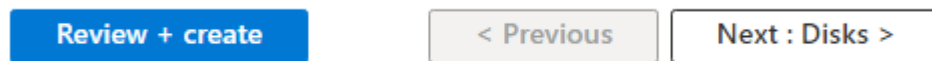
Licensing

Save up to 49% with a license you already own using Azure Hybrid Benefit. [Learn more](#)

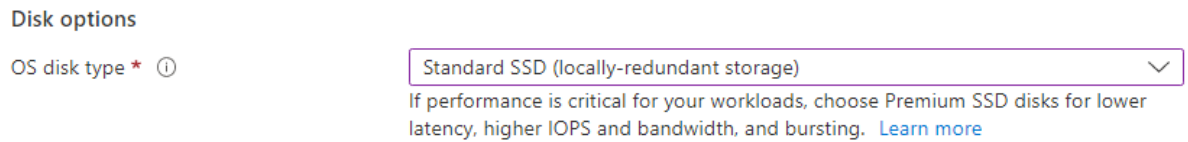
Would you like to use an existing Windows Server license? *	<div><input type="checkbox"/></div>
---	-------------------------------------

[Review Azure hybrid benefit compliance](#)

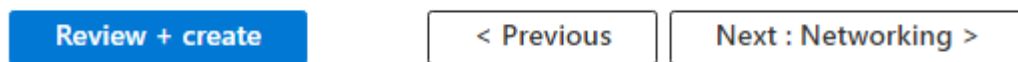
9. Click on the **Next: Disks** button at the bottom:



10. Select the following:

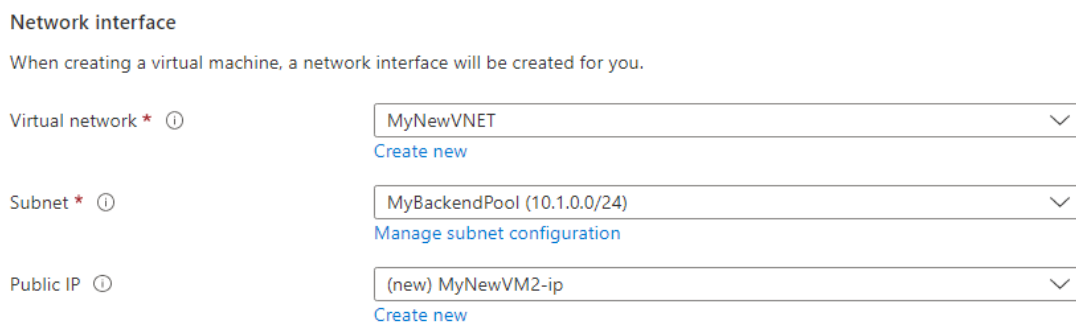


11. At the bottom, click on the **Next: Networking** button:

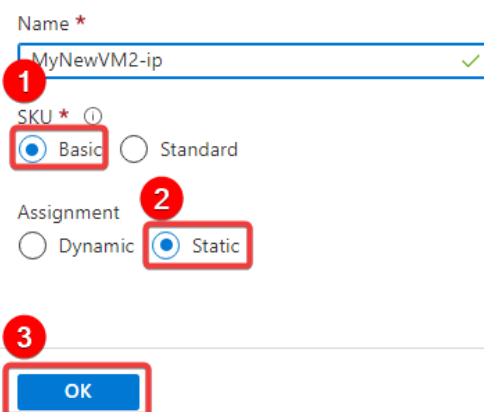


12. Select the following details and leave the rest as default:

- Network Interface:
 - Virtual Network: **MyNewVNET**
 - Subnet: Select **MyBackenedPool**
 - Public IP: **Create new**
 - SKU: **Basic**
 - Assignment: **Static**



Create public IP address ×



13. Click on the **Review + Create** button and then select **Create**:

Review + create 1 < Previous Next : Management >

Create 2 < Previous Next > [Download a template for automation](#)

✓ Your deployment is complete

Deployment name: CreateVm-MicrosoftWindo... Start time: 10/21/2022, 9:30:59...
Subscription: MyNewRG Correlation ID: 7550ebe4-34c5-4
Resource group: MyNewRG

Deployment details

Next steps

- [Setup auto-shutdown](#) Recommended
- [Monitor VM health, performance and network dependencies](#) Recommended
- [Run a script inside the virtual machine](#) Recommended

[Go to resource](#) [Create another VM](#)

[Give feedback](#)
[Tell us about your experience with deployment](#)

3. Install IIS on the Virtual Machines

1. In the search box at the top of the Azure Portal, search for **Virtual Machines** and select **MyNewVM** from the list and click on **Connect**:

MyNewVM Virtual machine

Search << **Connect** >> Start Restart Stop

Overview

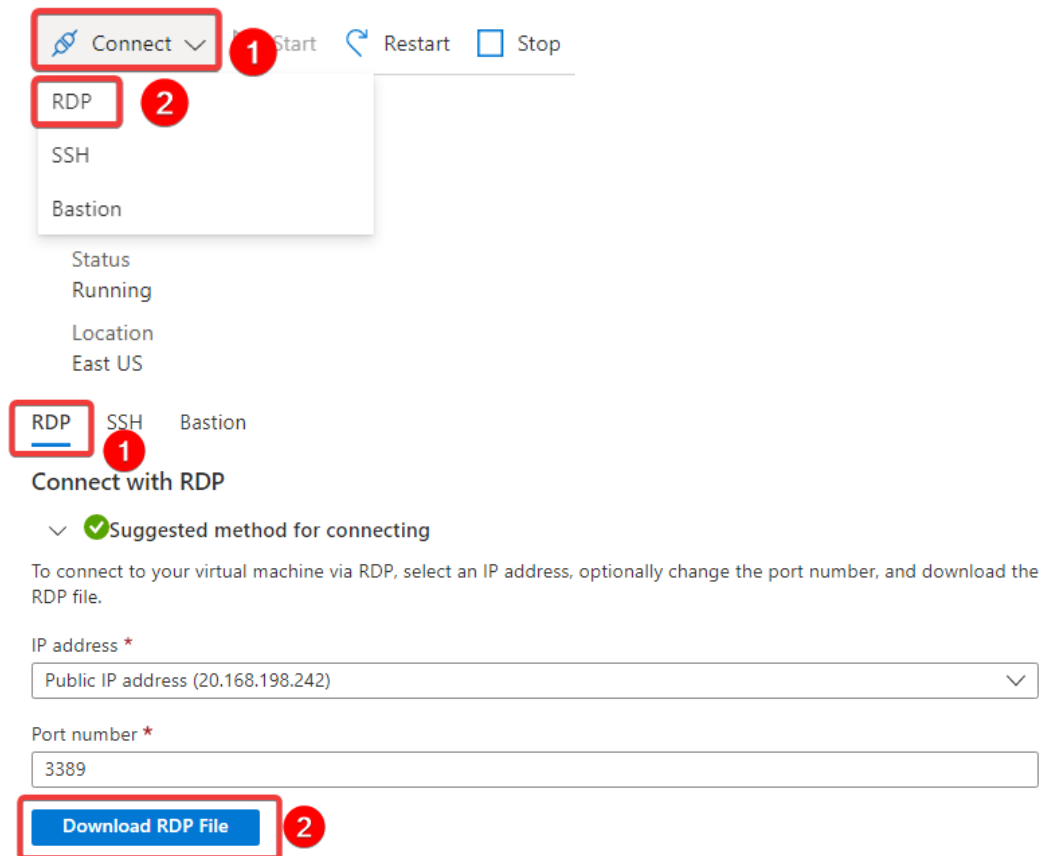
- Activity log
- Access control (IAM)
- Tags

Essentials

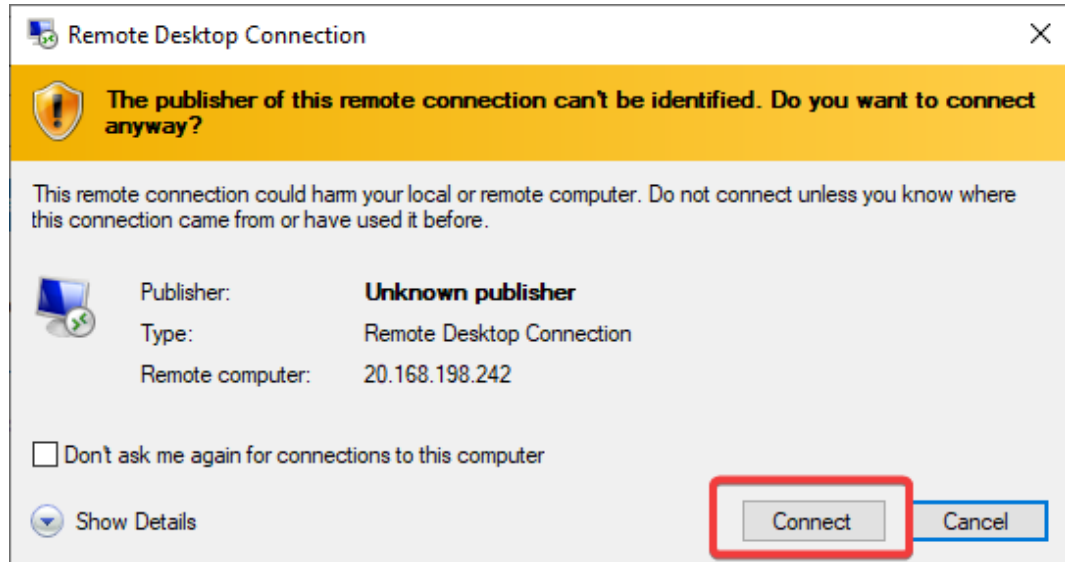
Resource group [\(move\)](#)
[MYNEWRG](#)

Status
Running

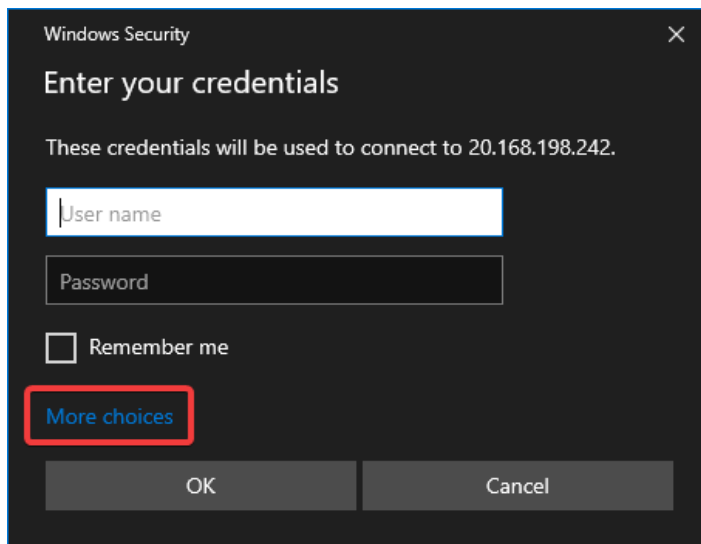
2. Select **RDP** and click the **Download RDP File** button:



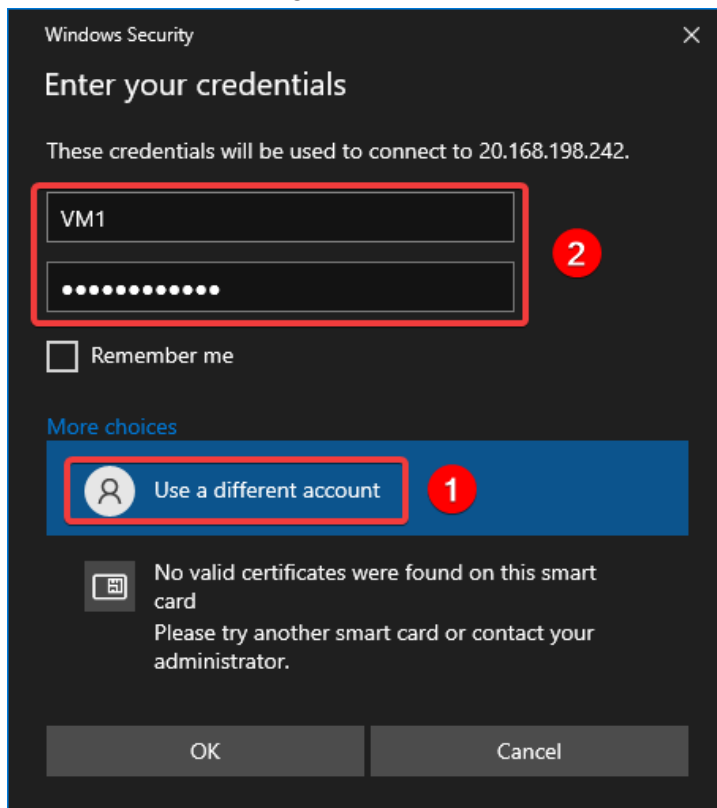
3. Open the downloaded **RDP** file and select **Connect**:



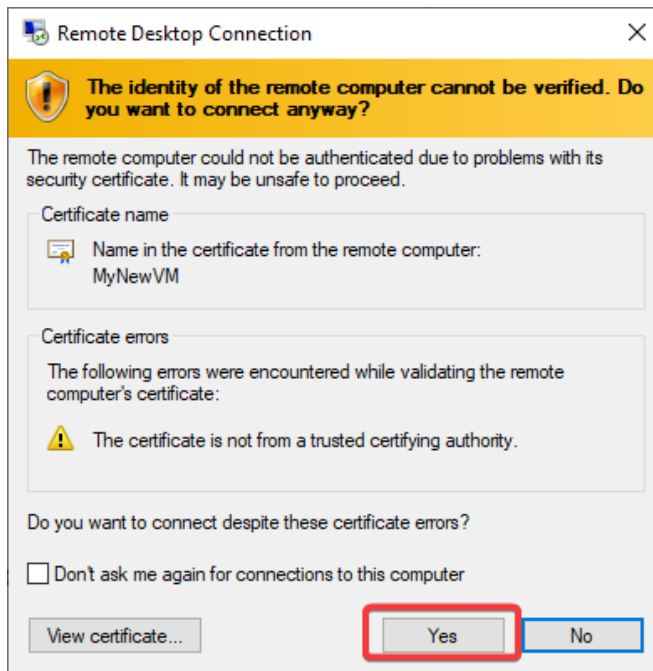
4. On the **Windows Security** prompt, click on **More choices**:



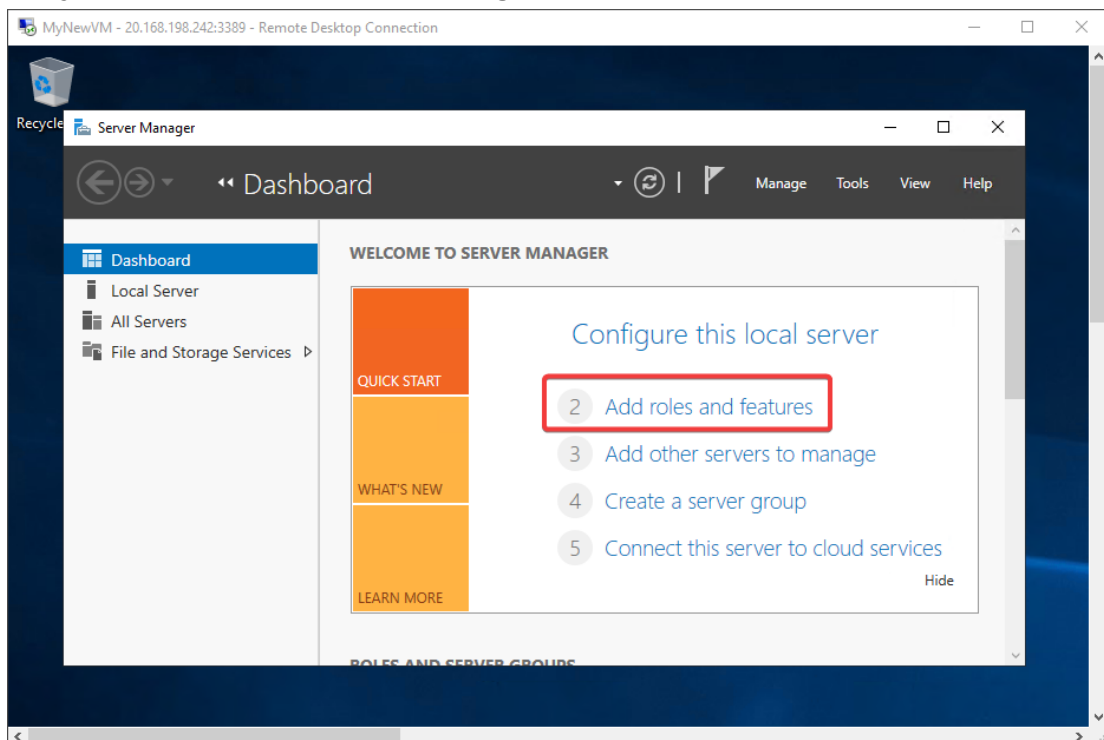
5. Click on **Use a different account** and enter the username and password you specified while creating the Virtual Machine and click on **OK**:



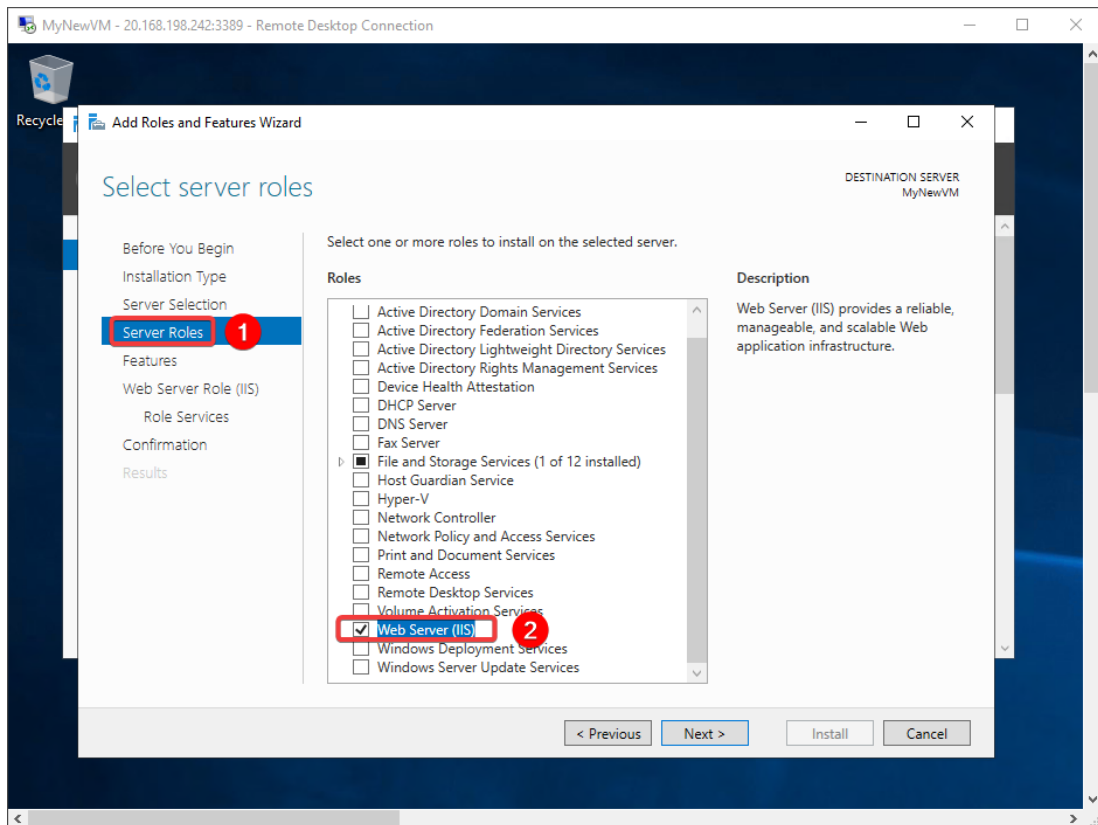
6. You may receive a certificate warning during the sign-in process. Click **Yes** to continue:



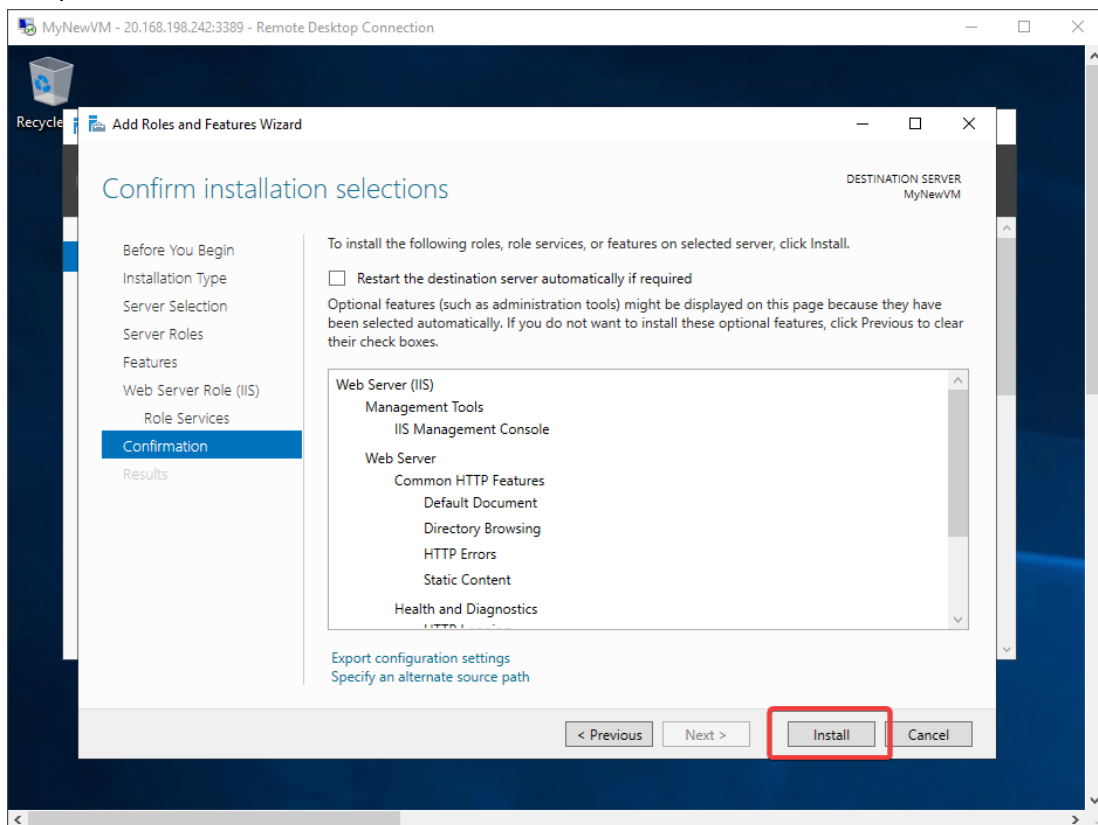
7. In **MyNewVM**, open the **Server Manager** and click on **Add Roles and Features**:

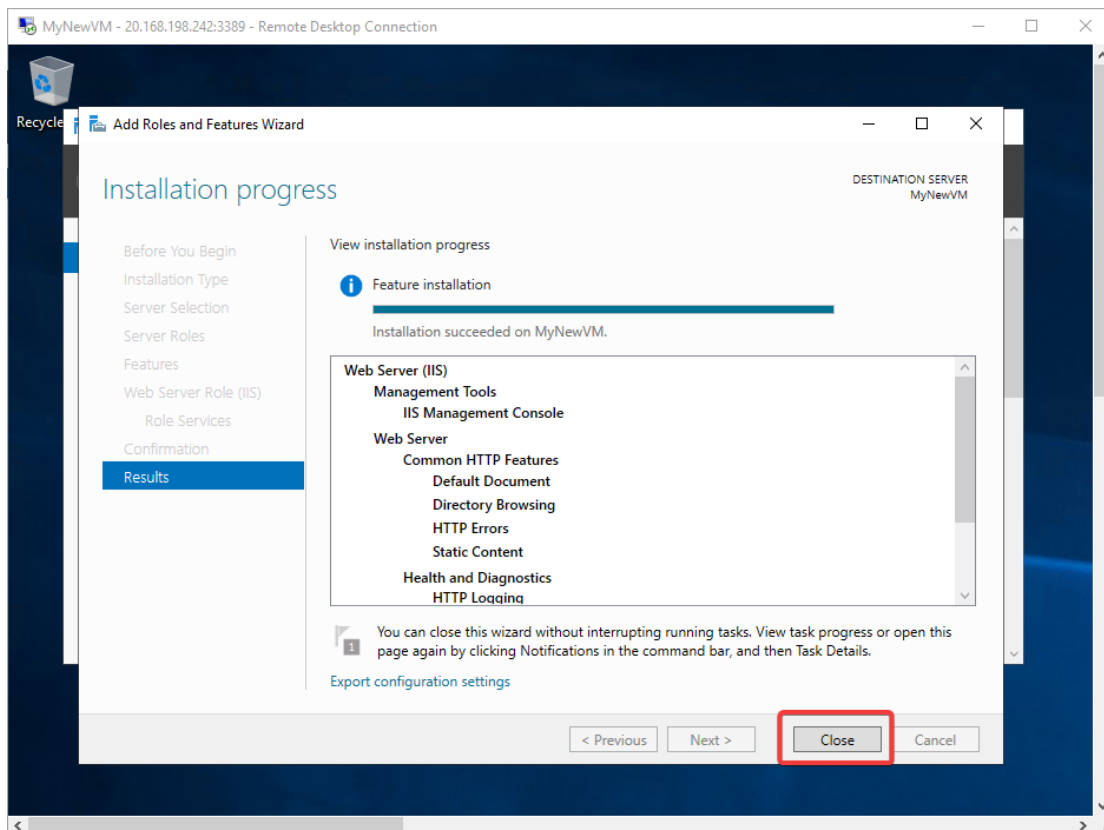
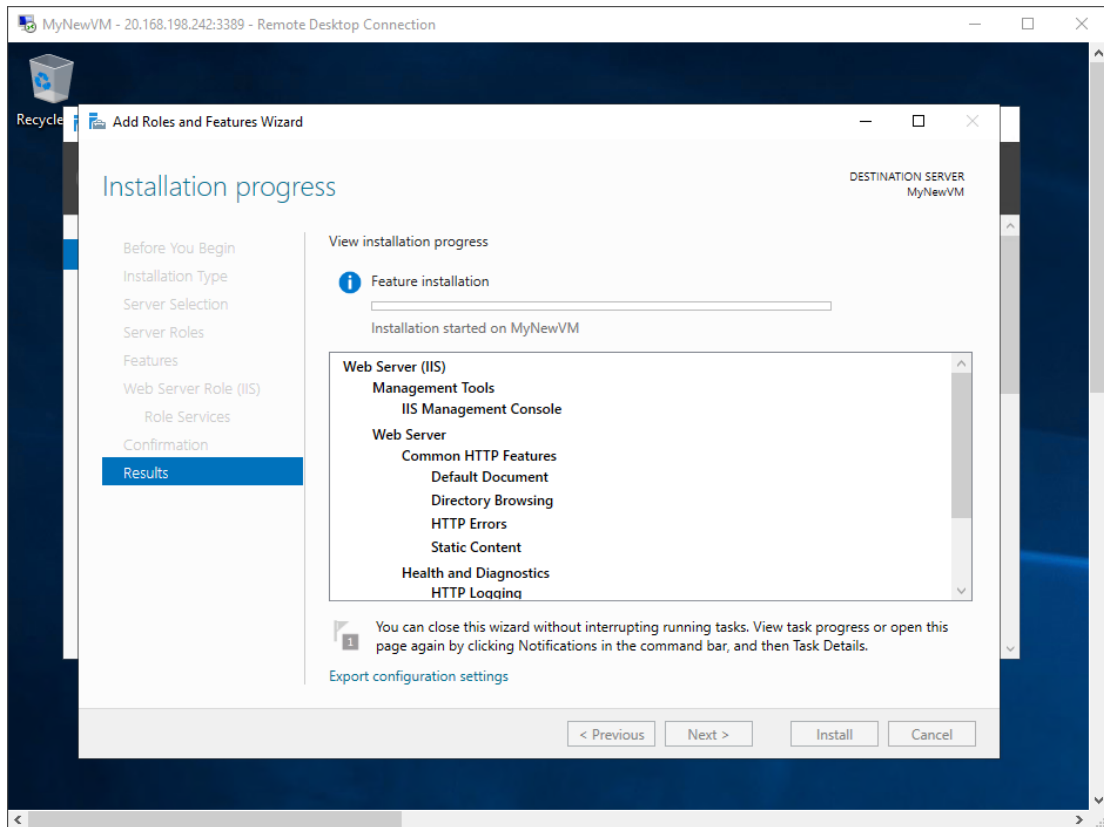


8. Click on **Next** until you get an option to select **Web Server (IIS)**. Choose to install all features. Then, again click on **Next** until you get an option to install:

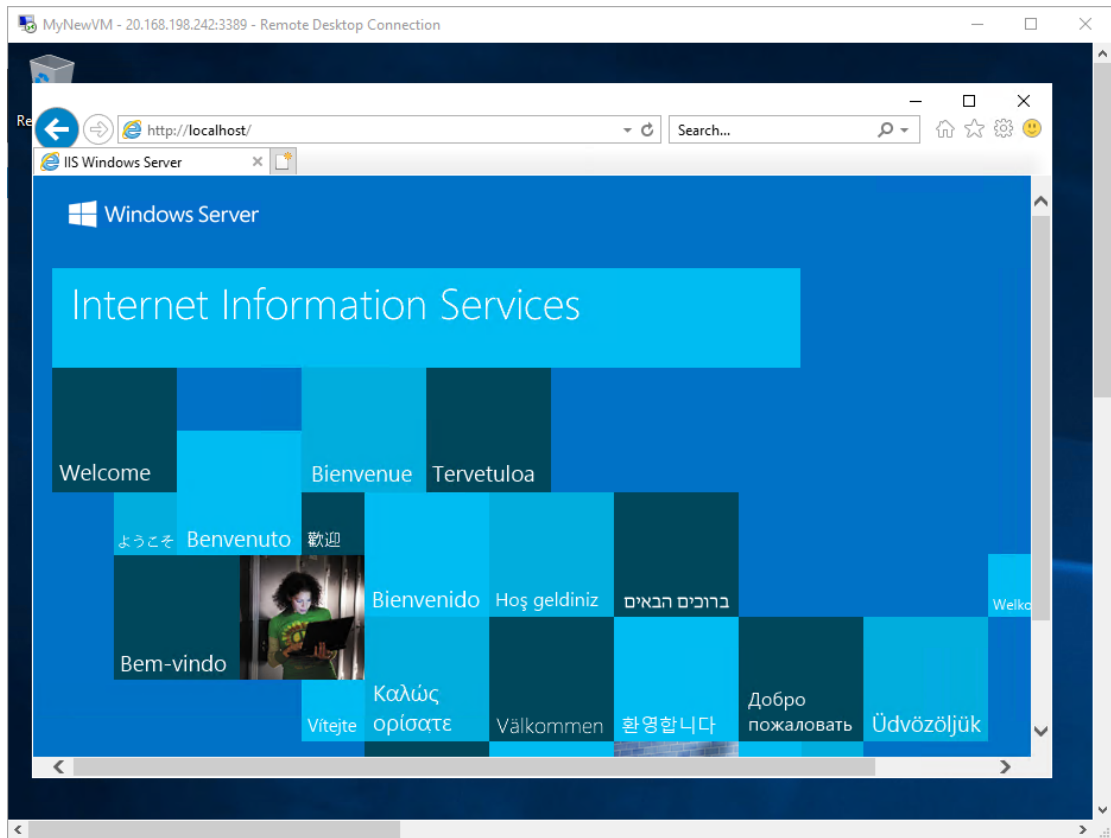


9. Click **Next** until you see the **Install** button. Click on it, and once the installation is complete, click on **Close**:

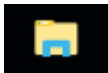




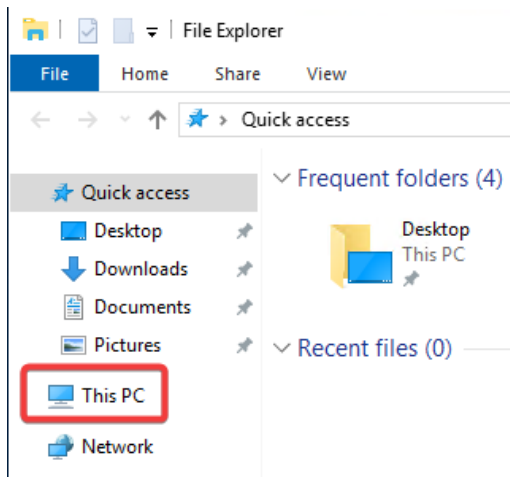
10. Open **Internet explorer** on the windows machine and enter **http://localhost/** in the search bar to confirm that Internet Information Services (IIS) is installed on the machine:



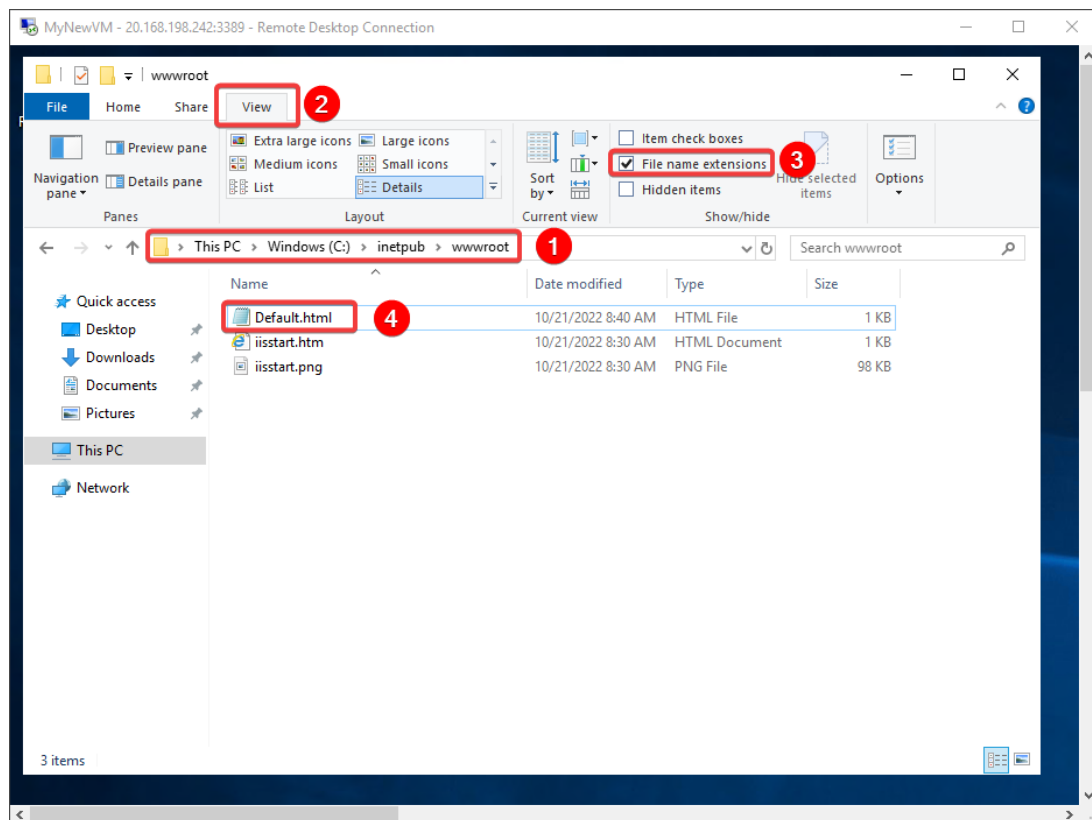
11. Click on **File Explorer**:



12. Click on **This PC** in file explorer:

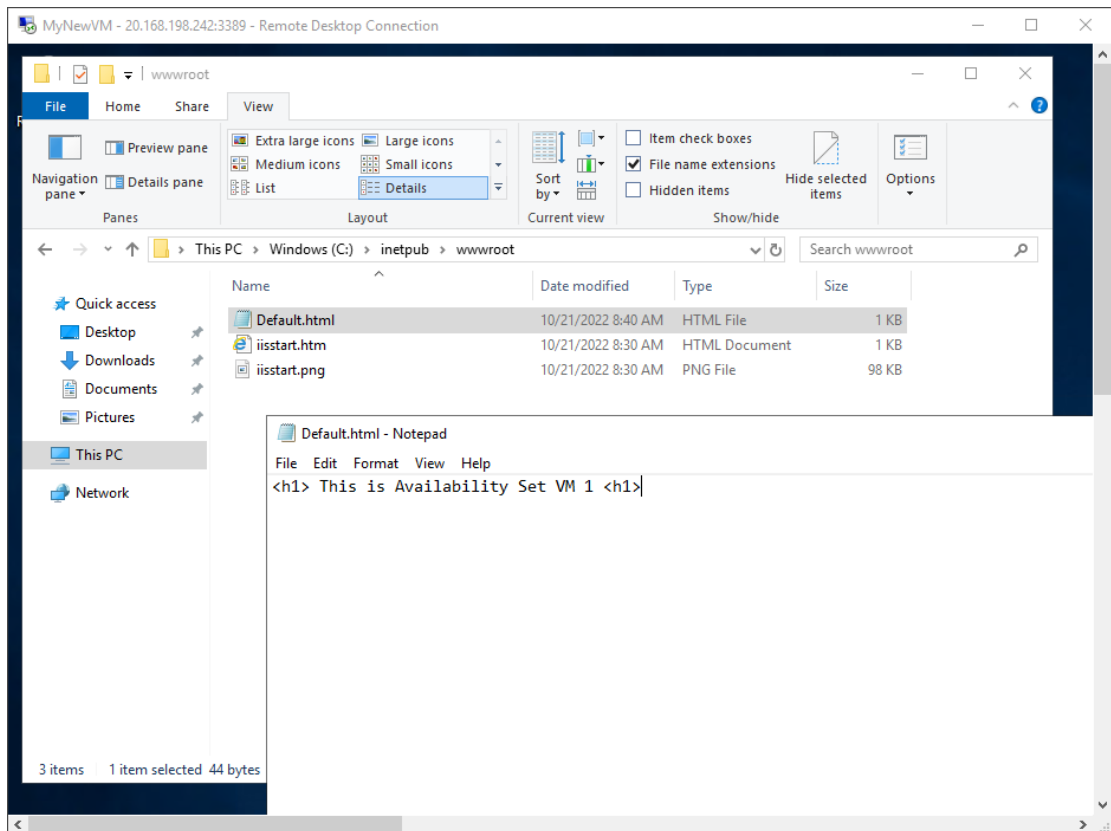


13. Navigate to **C:\inetpub\wwwroot** and click on **View** to enable **filename extensions**, then create a **Default.html** document:



14. Paste the below code into the HTML file and save it:

<h1> This is Availability Set Machine 1 </h1>



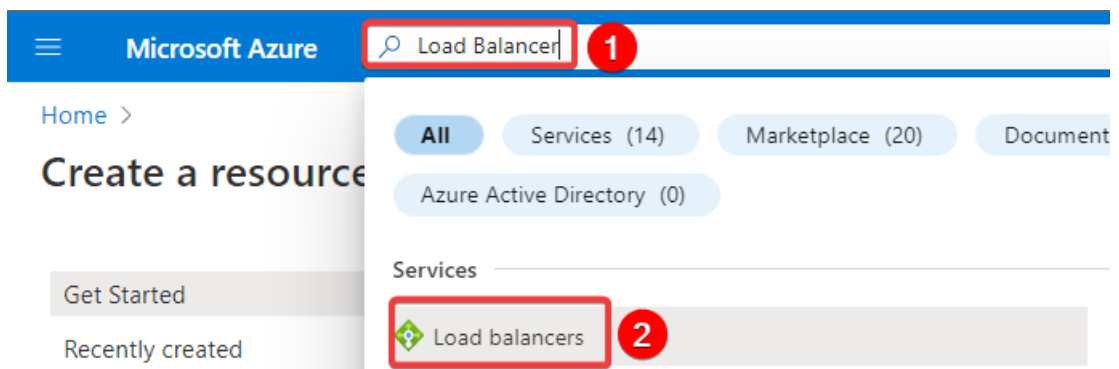
15. Repeat steps 1 - 14 to install IIS on **MyNewVM2**.

16. Paste the below code into the HTML file and save it:

<h1> This is Availability Set VM 2 </h1>

4. Create Load Balancer

1. In the search box at the top of the Azure Portal, search for **Load Balancer** and select it from the list:



2. On the load balancer page, select **+Create**:



3. Enter or select the following details in the **Basics** tab:

- Resource group:
 - **MyNewRG**
- Instance details:
 - Name: **BasicLB**
 - Region: **East US**
 - SKU: **Basic**
 - Type: **Public**
 - Tier: **Regional**

Create load balancer ...

Basics Frontend IP configuration Backend pools Inbound rules Outbound rules Tags Review + create

Azure load balancer is a layer 4 load balancer that distributes incoming traffic among healthy virtual machine instances. Load balancers use 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 *

Resource group * [Create new](#)

Instance details

Name * ✓

Region *

SKU * ⓘ ☐ Standard ☐ Gateway ☒ Basic

Microsoft recommends Standard SKU load balancer for production workloads. [Learn more about pricing differences between Standard and Basic SKU](#)

Type * ⓘ ☒ Public ☐ Internal

Tier * ☒ Regional ☐ Global

4. Click on the **Next: Frontend IP Configuration** button:

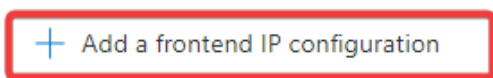


5. Click on **+ Add a Frontend IP configuration**:

Create load balancer ...

Basics Frontend IP configuration Backend pools

A frontend IP configuration is an IP address used for inbound



6. On the Add frontend IP configuration page, enter or select the following details, click on **OK** and on **Add**:

- Name: **MyNewFrontEnd**
- IP version: **IPv4**
- Public IP address: **Create new**
 - Name: **MyNewPIP**
 - Assignment: **Static**

Add frontend IP configuration ×

1

Name *

MyNewFrontEnd ✓

IP version

☒ IPv4 ☐ IPv6

Public IP address *

2 (New) MyNewPIP

Create new

3 Add a public IP address

Name * MyNewPIP

SKU ☒ Basic ☐ Standard

Tier ☒ Regional ☐ Global

4

Assignment * ☐ Dynamic ☒ Static

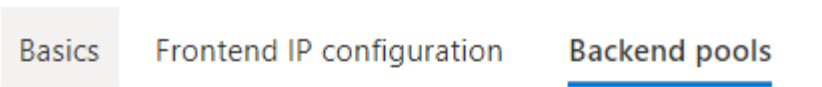
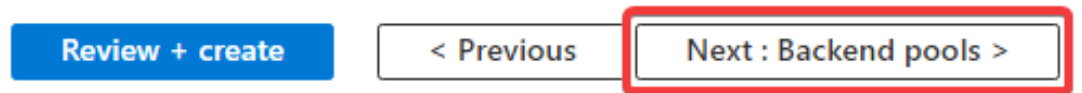
5

OK Cancel

6

Add

7. Click on **Next: Backend pools** and click on **+Add a backend pool**:



A backend pool is a collection of resources to which your load b

[+ Add a backend pool](#)

Name Virtual network

[Add a backend pool to get started](#)

8. On the Add backend pool page, enter or select the following details:

- Name: **MyNewBackendPool**
- Virtual Network: **MyNewVNET**

Add backend pool ...

Name *

Virtual network ⓘ

9. Click on **+Add** to add your VMs:

[+ Add](#) | [X Remove](#)

<input type="checkbox"/>	Resource Na...	Resource gro...	Type	IP configurat...	IP Address	Availability ...
--------------------------	----------------	-----------------	------	------------------	------------	------------------

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.

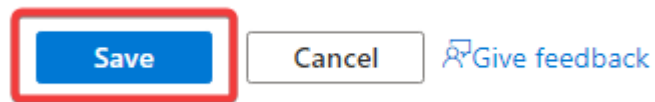
Location : eastus Virtual network : MyNewVNET [Add filter](#)

☐ Show resources that are not available for selection

Resource Name	Resource group	Type	IP configuration	IP Address	Availability set	Tags
Virtual machine (2)						
<input checked="" type="checkbox"/> MyNewVM	MYNEWRG	Virtual machine	ipconfig1	10.1.0.4	MYNEWAVAILABILITYSET	-
<input checked="" type="checkbox"/> MyNewVM2	MyNewRG	Virtual machine	ipconfig1	10.1.0.5	MYNEWAVAILABILITYSET	-

2 [Add](#) [Cancel](#) [Give feedback](#)

10. Now click on **Save**:



11. Click on **Next: Inbound rule** and under the Load Balancing rule section click on **+Add load balancing rule** and enter or select the following details:

- Name: **MyNewLBRule**
- IP version: **IPv4**
- Frontend IP address: **MyNewFrontEnd**
- Backend pool: **MyNewBackendPool**
- Protocol: **TCP**
- Port: **80**
- Backend port: **80**
- Health probe: **Create new**
 - Name: **MyNewProbe**
 - Protocol: **TCP**
 - Port: **80**
 - Interval: **5**

Load balancing rule

A load balancing rule distributes incoming traffic across multiple backend instances that are eligible to receive traffic.

1

+ Add a load balancing rule

Name ↑↓

Add a rule to get started

MyNewLBRule



i A load balancing rule distributes incoming traffic that is sent to a selected IP address and port combination across a group of backend pool instances. Only backend instances that the health probe considers healthy receive new traffic.

Name

MyNewLBRule

IP Version *

☒ IPv4

1 ☐ IPv6

Frontend IP address * **i**

MyNewFrontEnd (To be created) **2**

Backend pool * **i**

MyNewBackendPool

Protocol *

☒ TCP

☐ UDP

Port *

80 **3**

Backend port * **i**

80 **4**

Health probe * **i**

MyNewProbe (TCP:80)

Create new **5**

Session persistence **i**

None

Idle timeout (minutes) * **i**

4

Floating IP **i**

☒ Disabled

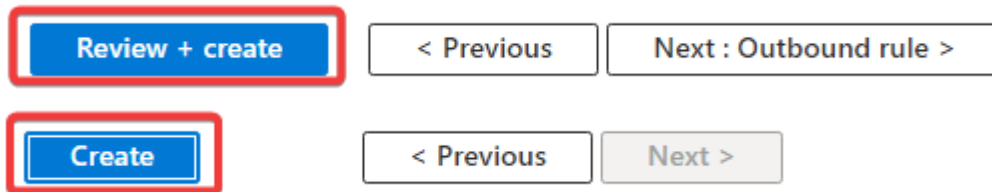
☐ Enabled

6

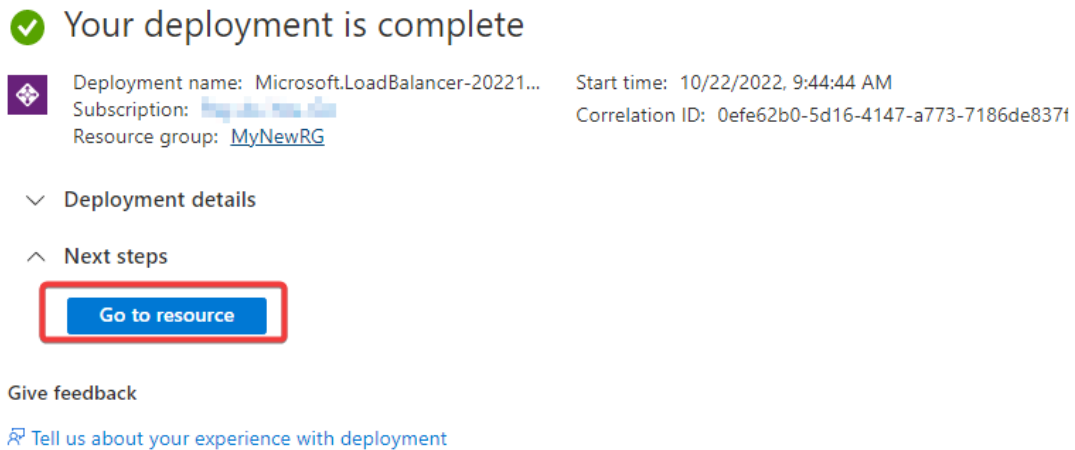
Save

Cancel

12. Click on the **Review + Create** button and then click on **Create**:

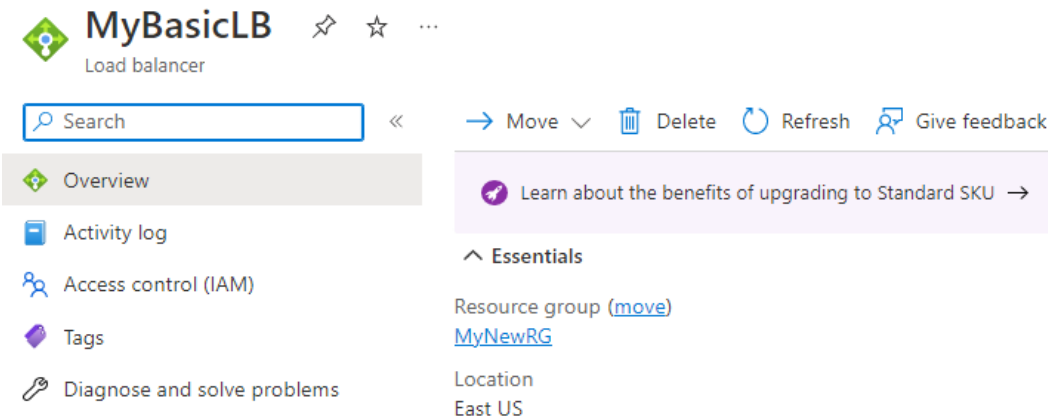


13. Click on **Go to resource**:

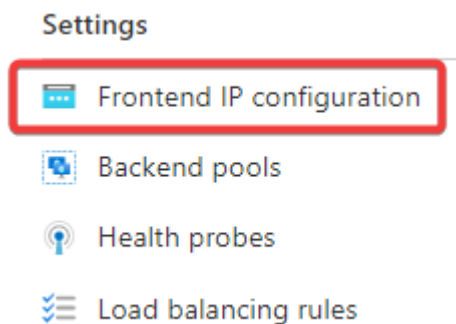


5. Test load balancer

1. In the search box at the top of the Azure Portal, search for **Load Balancer** and click on **MyBasicLB** from the list:



2. From the left menu, go to **Frontend IP Configuration**:



3. Copy the **MyNewFrontEnd** public IP address:

Type ⓘ Public

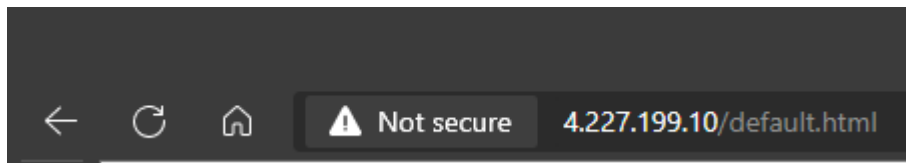
Public IP address *

MyNewPIP (4.227.199.10)

Create new

4. Open a new tab in your browser and paste the public IP in the below format and press enter:

http://<yourpublicip>/default.html



5. You will be redirected to one of the two Virtual Machines in the backend pool:

