

## Manage Virtual Machines

Manage Virtual Machines	1
Task 1: Deploy zone-resilient Azure virtual machines by using the Azure portal.	1
Task 2: Manage compute and storage scaling for virtual machines.	3
Task 3: Create and configure Azure Virtual Machine Scale Sets.	5
Task 4: Scale Azure Virtual Machine Scale Sets.	11
Task 5: Create a virtual machine using Azure PowerShell (optional 1).	14
Task 6: Create a virtual machine using the CLI (optional 2).	14

### Task 1: Deploy zone-resilient Azure virtual machines by using the Azure portal.

Virtual machines:

Size \* ⓘ

Standard\_D2s\_v3 - 2 vcpus, 8 GiB memory (\$154.03/month) ⓘ

[See all sizes](#)

**i** Item(s) availability based on policy assignment(s) for the selected scope.  
vadergen2labs/Microsoft.Authorization/8ab9bdb77b304947a1347e88 ([Policy details](#))

**x** This size is not available in zone 1,2. Zones '3,2' are supported

*Figure 1. Creating a VM.*


Availability zone \* ⓘ



Zones 2, 3

**i** Based on your zone selection, we will place 2 virtual machines, one in each selected zone. You may want to create this resource as a Virtual Machine Scale Set (VMSS) instead which allows you to manage, configure and scale load balanced virtual machines. [Create as VMSS](#)


*Figure 2. Zone.*


Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.


Encryption at host  ☐


 Encryption at host is not registered for the selected subscription. [Learn more](#) 

**OS disk**

OS disk size 

OS disk type \* 

Delete with VM  ☒

Key management 





Enable Ultra Disk compatibility  ☐

Figure 3. Configuring disk type.


Select inbound ports


 All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

Delete public IP and NIC when VM is deleted  ☒

Enable accelerated networking  ☒



**Load balancing**


You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#) 

Load balancing options 

- ☒ None
- ☐ Azure load balancer  
Supports all TCP/UDP network traffic, port-forwarding, and outbound flows.
- ☐ Application gateway  
Web traffic load balancer for HTTP/HTTPS with URL-based routing, SSL termination, session persistence, and web application firewall.

Figure 4. No load balancing.

 Hotpatch is not available for this image. [Learn more](#) 

Patch orchestration options 




 Some patch orchestration options are not available for this image. [Learn more](#) 

Figure 5. Patch orchestration.

## Diagnostics

Boot diagnostics 

- ☐ Enable with managed storage account (recommended)
- ☐ Enable with custom storage account
- ☒ Disable

Figure 6. Diagnostics.

## Price

2 X Standard D2s v3  
by Microsoft  
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ  
**0.4220 USD/hr**  
[Pricing for other VM sizes](#)

## TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

## Associated resources

Virtual machines (new) myVm-1, myVm-2  
Public IPs (new) myVm-1-ip, myVm-2-ip

## Basics

Subscription P9-Real Hands-On Labs  
Resource group 1-98472184-playground-sandbox  
Region South Central US  
Availability options Availability zone  
Zone options Self-selected zone  
Availability zone 2, 3

*Figure 7. Review creating.*

Home >

CreateVm-MicrosoftWindowsServer.WindowsServer-201-20250319204939 | Overview ⓘ ⋮

Deployment

Search × « Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name: CreateVm-MicrosoftWindowsServer.WindowsS... Start time: 3/19/2025, 8:55:28 PM  
Subscription: P9-Real Hands-On Labs Correlation ID: 496d4444-a411-415d-9029-9c532f242e8b ⓘ  
Resource group: 1-98472184-playground-sandbox

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

*Figure 8. Complete deployment.*

## Task 2: Manage compute and storage scaling for virtual machines.

Availability + scale:

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-201-20250319204939 | Overview > myVm-1

**myVm-1** | Size ☆ ...  
Virtual machine

Search

Overview  
Activity log  
Access control (IAM)  
Tags  
Diagnose and solve problems  
Resource visualizer  
Connect  
Networking  
Settings  
Availability + scale  
**Size**  
Availability + scaling  
Security  
Backup + disaster recovery

If the virtual machine is currently running, changing its size will cause it to be restarted. Stopping the virtual machine may reveal additional sizes. →

DS Display cost: Monthly vCPUs: All RAM (GiB): All Add filter

Showing 33 of 149 VM sizes. Subscription: P9-Real Hands-On Labs Region: South Central US Current size: Standard\_DS1\_v2

VM Size ↑↓	Type ↑↓	vCPUs ↑↓	RAM (GiB) ↑↓	Data
D-Series v2 The 2nd generation D family sizes for your general purpose needs				
DS1_v2	General purpose	1	3.5	4
DS11-1_v2	Memory optimized	1	14	8
DS12-1_v2	Memory optimized	1	28	16
DS2_v2	General purpose	2	7	8
DS11_v2	Memory optimized	2	14	8
DS12-2_v2	Memory optimized	2	28	16
DS13-2_v2	Memory optimized	2	56	32
DS3_v2	General purpose	4	14	16

Figure 9. VM size.

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-201-20250319204939 | Overview > myVm-1

**myVm-1** | Disks ☆ ...  
Virtual machine

Search Refresh Additional settings Feedback Troubleshoot

Overview  
Activity log  
Access control (IAM)  
Tags  
Diagnose and solve problems  
Resource visualizer  
Connect  
Networking  
Settings  
**Disks**  
Extensions + applications  
Operating system  
Configuration  
Advisor recommendations

The configuration of this virtual machine and its attached disk(s) may not allow for the disk(s) to utilize their full throughput performance. The current MBps. You can change the virtual machine size to support additional disk(s) throughput. [Learn more](#)

**OS disk**

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS
myVm-1_OsDisk_1_30e9f0e7d9b54a26865aabe8e9a5c283	Premium SSD LRS	127	500

**Data disks**

Filter by name

Showing 1 of 1 attached data disks

+ Create and attach a new disk Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS
0	vm1-disk1	Standard HDD (locall...	32	500

Figure 10. VM disks.

Home > myVm-1 | Disks > vm1-disk1

## vm1-disk1 | Size + performance

Search

Explore ways to boost disk performance

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Settings

Configuration

Size + performance

Encryption

Storage type

Why are some options disabled?

Standard SSD (locally-redundant storage)

Size	Disk tier	Provisioned IOP
4 GiB	E1	500
8 GiB	E2	500
16 GiB	E3	500
32 GiB	E4	500
64 GiB	E6	500
128 GiB	E10	500
256 GiB	E12	500

Figure 11. Setting standard SSD.

Data disks

Filter by name

Showing 1 of 1 attached data disks

Create and attach a new disk Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (MB/s)	Encryption	Host caching
0	vm1-disk1	Standard HDD LRS	32	500	60	SSE with PMK	Read/write

Figure 12. Reseted disk.

## Task 3: Create and configure Azure Virtual Machine Scale Sets.

Virtual machine scale sets:

Arm64 is not supported with the selected image.

Size \*

Standard\_D2s\_v3 - 2 vcpus, 8 GiB memory (\$154.03/month)

See all sizes

Standard\_D2s\_v3: This size is not available in zone 1,2,3. Zones '3,2' are supported

Figure 13. VM creating scale set.

# vnet-southcentralus ...

Name \*

vmss-vnet

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. [Learn more](#)

+ Add a subnet

^ 10.82.0.0/20 

🗑 Delete address space

10.82.0.0/20

/20

10.82.0.0 - 10.82.15.255 4,096 addresses

Subnets	IP address range	Size	NAT gateway	
<a href="#">snet-southcentralus-1</a>	10.82.0.0 - 10.82.0.255	/24 (256 addresses)	-	<div><div></div><div></div></div>
<a href="#">subnet0</a>	10.82.1.0 - 10.82.1.255	/24 (256 addresses)	-	<div><div></div><div></div></div>

Figure 14. Creating vnet.



## Add inbound security rule



vmss1-nsg

Source ⓘ

Any

Source port ranges \* ⓘ

\*

Destination ⓘ

Any

Service ⓘ

HTTP

Destination port ranges ⓘ

80

Protocol

- ☐ Any
- ☒ TCP
- ☐ UDP
- ☐ ICMPv4

Action

- ☒ Allow
- ☐ Deny

Priority \* ⓘ

1010

Name \*

allow-http ✓

Description

Figure 15. Add inbound rule.

## Create network security group ...

Name \*

vmss1-nsg

Inbound rules ⓘ

1000: default-allow-ssh

Any

SSH (TCP/22)

1010: allow-http

Any

HTTP (TCP/80)

[+ Add an inbound rule](#)

Outbound rules ⓘ

No results.

[+ Add an outbound rule](#)



Subnet \* ⓘ

snet-southcentralus-1 (10.82.0.0/24)

NIC network security group ⓘ

☐ None

☐ Basic

☒ Advanced

Configure network security group \*

(new) vmss1-nsg

[Create new](#)

Public IP address ⓘ

☐ Disabled ☒ Enabled

**i** Public IP addresses have a nominal charge. [Estimate price](#) ↗

Accelerated networking ⓘ

☐ Disabled ☒ Enabled

*Figure 16. Creating a subnet.*

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#) ↗

Load balancing options ⓘ

☐ None

☒ Azure load balancer  
Supports all TCP/UDP network traffic, port-forwarding, and outbound flows.

☐ Application gateway  
Web traffic load balancer for HTTP/HTTPS with URL-based routing, SSL termination, session persistence, and web application firewall.

**⚠** To allow traffic from your load balancing product, please update the appropriate port configuration on your network security group associated with your network interface.

Select a load balancer \* ⓘ

(new) vmss-lb

[Create a load balancer](#)

*Figure 17. Select a load balancer.*

Boot diagnostics ⓘ


☐ Enable with managed storage account (recommended)

☐ Enable with custom storage account

☒ Disable

Figure 18. Selecting boot diagnostics.

## Create a Virtual Machine Scale Set (VMSS) ...

 Validation passed

Subscription	P9-Real Hands-On Labs
Resource group	1-98472184-playground-sandbox
Virtual machine scale set name	vmss1
Region	South Central US
Orchestration mode	Uniform
Availability zone	2,3
Image	Windows Server 2019 Datacenter - Gen2
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Scaling mode	Manually update the capacity
Instance count	2
Security type	Standard
Enable Hibernation	No
Username	localadmin

### Spot

Azure Spot	No
------------	----

### Disks

OS disk size	Image default
OS disk type	Premium SSD LRS
Use managed disks	Yes
Ephemeral OS disk	No

### Networking

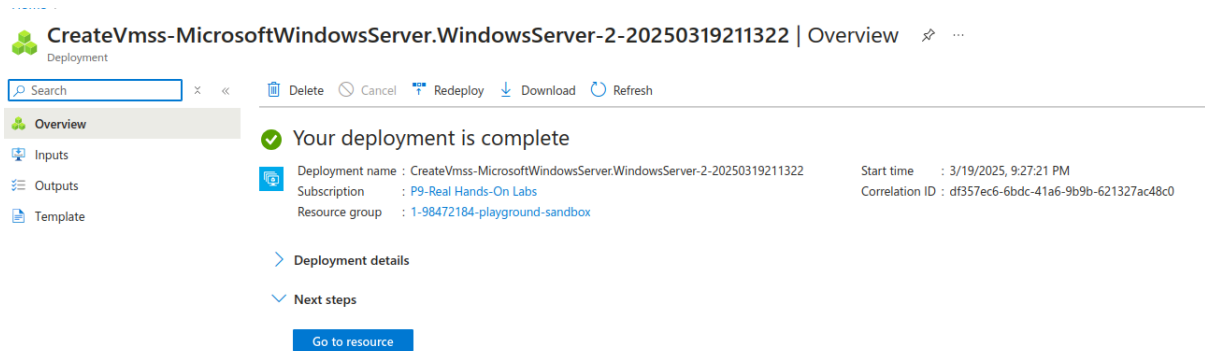
Virtual network	(New) vmss-vnet (1-98472184-playground-sandbox)
Network interfaces	vmss1-nsg
Load balancing	Yes

< Previous

Next >

Create

Figure 19. Created VM scale set.



*Figure 20. Completed deployment.*

## Task 4: Scale Azure Virtual Machine Scale Sets.

Scale out rule:

## Criteria

Metric namespace \*

Virtual Machine Host

Metric name

Percentage CPU

1 minute time grain

Dimension Name

Operator

Dimension Values

Add

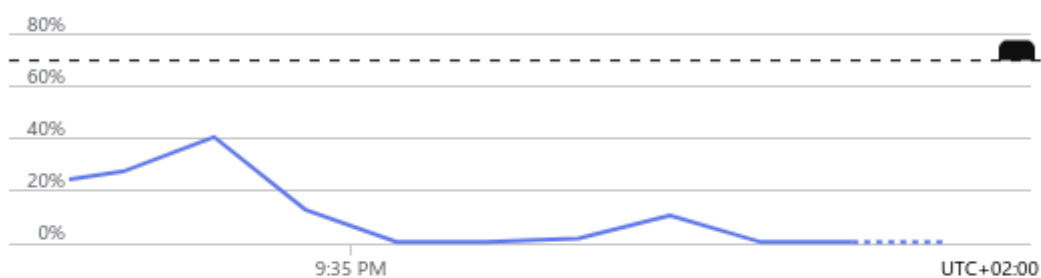
VMName

<>

All values

+

If you select multiple values for a dimension, autoscale will aggregate the metric across the selected values, not evaluate the metric for each values individually.



Percentage CPU (Average)

28.89 %

☐ Enable metric divide by instance count ⓘ

Operator \*

Greater than

Metric threshold to trigger scale action \* ⓘ

70

%

Duration (minutes) \* ⓘ

10

Time grain (minutes) ⓘ

1

Time grain statistic \* ⓘ

Average

Time aggregation \* ⓘ

Average

## Action

Operation \*

Increase percent by

Cool down (minutes) \* ⓘ

5

Percentage \*

50

✓

Add

Figure 21. Configuring scale out rule.

Scale in rule:

## Criteria

Metric namespace \*

Virtual Machine Host

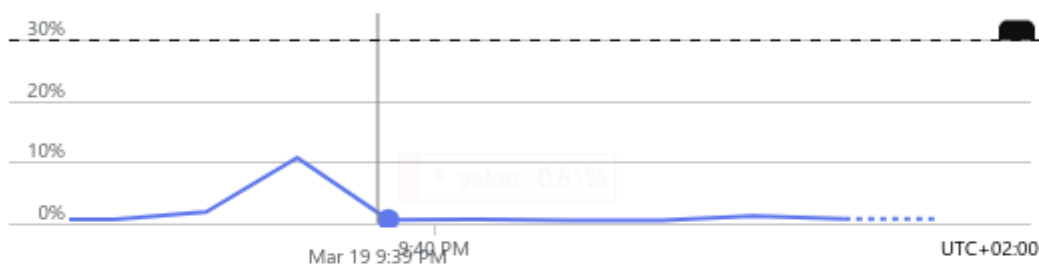
Metric name

Percentage CPU

1 minute time grain

Dimension Name	Operator	Dimension Values	Add
VMName	=	All values	+

If you select multiple values for a dimension, autoscale will aggregate the metric across the selected values, not evaluate the metric for each values individually.



Percentage CPU (Average)

3.24 %

☐ Enable metric divide by instance count ⓘ

Operator \*

Less than

Metric threshold to trigger scale action \* ⓘ

30

%

Duration (minutes) \* ⓘ

10

Time grain (minutes) ⓘ

1

Time grain statistic \* ⓘ

Average

Time aggregation \* ⓘ

Average

## Action

Operation \*

Decrease percent by

Cool down (minutes) \* ⓘ

5

Percentage \*

50

Add

Figure 23. Configuring scale in rule.

Instance limits

Minimum \* ⓘ  Maximum \* ⓘ  Default \* ⓘ

Schedule

This scale condition is executed when none of the other scale condition(s) match

Figure 24. Instance limits.

## Task 5: Create a virtual machine using Azure PowerShell (optional 1).

### Cloud Shell:

```
PS /home/cloud> New-AzVm -ResourceGroupName '1-98472184-playground-sandbox' -Name myPSVM -Location East US -Image Win2019datacenter -Zone 1 -Size Standard_D2s_v3 -Credential (Get-Credential)
PowerShell credential request
Enter your credentials.
User: vlad
Password for user vlad: *****
You can reference https://aka.ms/findImagePS on how to find VM Images using PowerShell.

ResourceGroupName : 1-98472184-playground-sandbox
Id                : /subscriptions/28e1e42a-4438-4c30-9a5f-7d7b488fd883/resourceGroups/1-98472184-playground-sandbox/providers/Microsoft.Compute/virtualMachines/myPSVM
VmId              : 345fd136-c02f-405f-af29-6916fc2077b1
Name              : myPSVM
Type              : Microsoft.Compute/virtualMachines
Location          : eastus
Tags              : {}
HardwareProfile   : {VmSize}
NetworkProfile    : {NetworkInterfaces}
OSProfile         : {ComputerName, AdminUsername, WindowsConfiguration, Secrets, AllowExtensionOperations, RequireGuestProvisionSignal}
ProvisioningState : Succeeded
StorageProfile    : {ImageReference, OsDisk, DataDisks}
Zones             : {1}
FullyQualifiedDomainName : mypsvm-991249.East US.cloudapp.azure.com
TimeCreated       : 3/19/2025 8:01:00 PM
Etag              : 2
```

Figure 25. Creating a VM.

```
PS /home/cloud> Get-AzVM -ResourceGroupName '1-98472184-playground-sandbox' -Status
```

ResourceGroupName	Name	Location	VmSize	OsType	NIC	Provisioning	Zone	PowerState	MaintenanceAllowed
1-98472184-playground-sandbox	myPSVM	eastus	Standard_D2s_v3	Windows	myPSVM	Succeeded	1	VM running	
1-98472184-playground-sandbox	myVm-1	southcentralus	Standard_DS1_v2	Windows	myvm-1278_z2	Succeeded	2	VM running	
1-98472184-playground-sandbox	myVm-2	southcentralus	Standard_D2s_v3	Windows	myvm-1792_z3	Succeeded	3	VM running	

```
PS /home/cloud>
```

Figure 26. Created a VM.

```
PS /home/cloud> Stop-AzVM -ResourceGroupName '1-98472184-playground-sandbox' -Name 'myPSVM'
Virtual machine stopping operation
This cmdlet will stop the specified virtual machine. Do you want to continue?
[Y] Yes [N] No [S] Suspend [?] Help (default is "Y"): Y

OperationId : 7dd029e0-5062-4568-abc4-28509e46d062
Status      : Succeeded
StartTime   : 3/19/2025 8:03:48 PM
EndTime     : 3/19/2025 8:04:36 PM
Error       :

PS /home/cloud>
```

Figure 27. Stop a VM.

```
PS /home/cloud> Get-AzVM -ResourceGroupName '1-98472184-playground-sandbox' -Status
```

ResourceGroupName	Name	Location	VmSize	OsType	NIC	Provisioning	Zone	PowerState	MaintenanceAllowed
1-98472184-playground-sandbox	myPSVM	eastus	Standard_D2s_v3	Windows	myPSVM	Succeeded	1	VM deallocated	
1-98472184-playground-sandbox	myVm-1	southcentralus	Standard_DS1_v2	Windows	myvm-1278_z2	Succeeded	2	VM running	
1-98472184-playground-sandbox	myVm-2	southcentralus	Standard_D2s_v3	Windows	myvm-1792_z3	Succeeded	3	VM running	

Figure 28. Checking a status.

## Task 6: Create a virtual machine using the CLI (optional 2).

### Bash:

```

Your Cloud Shell session will be ephemeral so no files or system changes will persist beyond your current session.
cloud [ ~ ]$ az vm create --name myCLIVM --resource-group 1-98472184-playground-sandbox --image Ubuntu2204 --admin-username localadmin --generate-ssh-keys
SSH key files '/home/cloud/.ssh/id_rsa' and '/home/cloud/.ssh/id_rsa.pub' have been generated under ~/.ssh to allow SSH access to the VM. If using machines without
a safe location.
{
  "fqdns": "",
  "id": "/subscriptions/28e1e42a-4438-4c30-9a5f-7d7b488fd883/resourceGroups/1-98472184-playground-sandbox/providers/Microsoft.Compute/virtualMachines/myCLIVM",
  "location": "southcentralus",
  "macAddress": "00-0D-3A-77-15-CD",
  "powerState": "VM running",
  "privateIpAddress": "10.0.0.6",
  "publicIpAddress": "104.210.152.57",
  "resourceGroup": "1-98472184-playground-sandbox",
  "zones": ""
}
cloud [ ~ ]$

```

*Figure 29. Creating a VM.*

```

{
  "plan": null,
  "platformFaultDomain": null,
  "powerState": "VM running",
  "priority": null,
  "privateIps": "10.0.0.6",
  "provisioningState": "Succeeded",
  "proximityPlacementGroup": null,
  "publicIps": "104.210.152.57",
  "resourceGroup": "1-98472184-playground-sandbox",
  "resources": null,
  "scheduledEventsPolicy": null,
  "scheduledEventsProfile": null,
  "securityProfile": {
    "encryptionAtHost": null,
    "encryptionIdentity": null,
    "proxyAgentSettings": null,
    "securityType": "TrustedLaunch",
    "uefiSettings": {
      "secureBootEnabled": true,
      "vTpmEnabled": true
    }
  }
}

```

*Figure 30. Created a VM.*

```

cloud [ ~ ]$ az vm deallocate --resource-group 1-98472184-playground-sandbox --name myCLIVM
cloud [ ~ ]$

```

*Figure 31. Delocating a VM.*

```
},  
"plan": null,  
"platformFaultDomain": null,  
"powerState": "VM deallocated",  
"priority": null,  
"privateIps": "10.0.0.6",  
"provisioningState": "Succeeded",  
"proximityPlacementGroup": null,  
"publicIps": "104.210.152.57",  
"resourceGroup": "1-98472184-playground-sandbox",  
"resources": null,  
"scheduledEventsPolicy": null,  
"scheduledEventsProfile": null,  
"securityProfile": {  
  "encryptionAtHost": null,  
  "encryptionIdentity": null,  
  "proxyAgentSettings": null,  
  "securityType": "TrustedLaunch",  
  "uefiSettings": {  
    "secureBootEnabled": true,  
    "vTpmEnabled": true  
  }  
}
```

*Figure 32. Checking a status.*