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Section: A

LAB: 08

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

Validation passed

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Basics

Subscription	Azure for Students
Resource group	(new) az104-rg8
Region	Central India
Availability options	Availability zone
Zone options	Self-selected zone
Availability zone	1, 2
Security type	Standard
Image	Windows Server 2025 Datacenter - Gen2
VM architecture	x64
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Enable Hibernation	No

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az104-vm1 | Overview

az104-vm1 virtual machine agent status is not ready. Troubleshoot the issue →

Help me copy this VM in any region

Connect Start Restart Stop Hibernate Capture Delete Refresh Scale Open in mobile Feedback

Essentials

Resource group (move)	: az104-rg8	Operating system	: Windows
Status	: Running	Size	: Standard D2s v3 (2 vcpus, 8 GiB memory)
Location	: Central India (Zone 1)	Primary NIC public IP	: 4.187.236.250 1 associated public IPs
Subscription (move)	: Azure for Students	Virtual network/subnet	: az104-vm1-vnet/default
Subscription ID	: 2abc1374-49a7-48c3-b0a8-366511eba3ea	DNS name	: Not configured
Availability zone	: 1	Health state	: -
		Time created	: 12/22/2025, 3:31 PM UTC

Tags (edit) : Add tags

Add or remove favorites by pressing Ctrl+Shift+F

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

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

D2ds_v4 Display cost : Monthly vCPUs : All RAM (GiB) : All Add filter

Showing 1 of 457 VM sizes. Subscription: Azure for Students Region: Central India Current size: Standard_D2ds_v4 Learn more about VM sizes Group by series

VM Size ↑

D-Series v4 D2ds_v4

Resize **Cancel**

Prices presented are estimates in USD that include only Azure infrastructure costs and any discounts for the subscription and location. The prices don't include any applicable software costs. Final charges will appear in your local currency in cost analysis and billing views. [View Azure pricing calculator.](#) [Give feedback](#)

<https://portal.azure.com/#view/HubsExtension/DeploymentDetailsBl...>

Search Refresh Additional settings Feedback Troubleshoot

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (MiB/s)	Encryption
az104-vm1_OsDisk_1_0739aa36e91c4e59b	Premium SSD LRS	127	500	100	SSE with PMK

Data disks

Filter by name

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (MiB/s)	Encryption
0	vm1-disk1	Standard HDD (LRS)	32	500	60	Platform-managed

Apply Discard changes

<https://portal.azure.com/#ctrl+Shift+F>

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Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (MiB/s)	Encryption
az104-vm1_OsDisk_1_0739aa36e91c4e59b	Premium SSD LRS	127	500	100	SSE with PMK

Data disks

Filter by name

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

Apply Discard changes

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Microsoft Azure

az104-vm1 | Disks

Virtual machine

Search

Refresh | Additional settings | Feedback | Troubleshoot

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption
az104-vm1_OsDisk_1_0739aa36e91c4e59b	Premium SSD LRS	127	500	100	SSE with PMK

Data disks

Filter by name

Showing 0 of 0 attached data disks

+ Create and attach a new disk | Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption
No data disks attached						

Apply | Discard changes

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Microsoft Azure

Home > Storage center | Azure Disks > vm1-disk1

vm1-disk1 | Size + performance

Disk

Search

Explore ways to boost disk performance

Diagnose and solve problems

Resource visualizer

Settings

Configuration

Size + performance

Encryption

Networking

Disk Export

Properties

Locks

Monitoring

Automation

Help

Standard SSD (locally-redundant storage)

Why are some options disabled?

Size	Disk tier	Provisioned IOPS	Provisioned thro...	Max Shares	Max burst IOPS	Max burst throughput
4 GiB	E1	500	100	3	600	150
8 GiB	E2	500	100	3	600	150
16 GiB	E3	500	100	3	600	150
32 GiB	E4	500	100	3	600	150
64 GiB	E6	500	100	3	600	150
128 GiB	E10	500	100	3	600	150
256 GiB	E15	500	100	3	600	150
512 GiB	E20	500	100	3	600	150

Save | Discard | Give feedback

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Microsoft Azure

Home > az104-vm1

az104-vm1 | Disks

Virtual machine

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Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption
az104-vm1_OsDisk_1_0739aa36e91c4e59b	Premium SSD LRS	127	500	100	SSE with PMK

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 (...)	Encryption
0	vm1-disk1	Standard SSD LRS	32	500	100	SSE with PMK

Apply | Discard changes

Add or remove favorites by pressing Ctrl+Shift+F

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

Basics

Subscription	Azure for Students
Resource group	az104-rg8
Virtual machine scale set name	vmss1
Region	Central India
Orchestration mode	Uniform
Availability zone	1,2
Image	Windows Server 2025 Datacenter - Gen2
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Scaling mode	Manually update the capacity
Instance count	2

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Add a subnet

Subnets	IP address range	Size	NAT gateway
subnet0	10.82.0.0 - 10.82.0.255	/24 (256 addresses)	-

Add IPv4 address space | Save Cancel

Add inbound security rule

Source	Any
Source port ranges	*
Destination	Any
Service	HTTP
Destination port ranges	80
Protocol	TCP

Priority ↑ Name ↑ Port ↑

1000	default-allow-ssh	22
65000	AllowVnetInBound	Any
65001	AllowAzureLoadBalanc...	Any
65500	DenyAllInBound	Any

Add Cancel Give feedback

vmss1 Virtual machine scale set

Overview

Resource group (az104-rg8) Status: 2 out of 2 succeeded Subscription: Azure for Students Location (move): Central India Subscription ID: 2abc1374-49a7-48c3-b0a8-366511eba3ea

Operating system: Windows Size: Standard_D2s_v3 (2 instances) Public IP address: 135.235.255.255 Public IP address (IP...): - Virtual network/subnet: vmss-vnet/subnet0 Orchestration mode: Uniform Time created: 22/12/2025, 4:59:18 pm UTC

Tags (edit) : Add tags

Properties **Monitoring** **Capabilities** **Recommendations (0)**

Virtual machine profile Operating system: Windows Capacity reservation group: -

Status Provisioning state: Succeeded Power state: 2 out of 2 instances running

Task 4: Scale Azure Virtual Machine Scale Sets

Scaling

Default* Auto created default scale condition

Delete warning: The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode: Scale based on a metric (selected) Scale to a specific instance count

Rules: It is recommended to have at least one scale rule. To create new rules, click [Add a rule](#).

Instance limits: Minimum * 2 Maximum * 2 Default * 2

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

Scale rule

Metric source: Current resource (vmss1)

Resource type: Virtual machine scale sets Resource: vmss1

Criteria: Metric namespace: Virtual Machine Host Metric name: Percentage CPU Dimension Name: VMName Operator: = Dimension Values: 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 value individually.

Graph showing Percentage CPU over time: 20%, 40%, 60%, 80%

Scaling

Default* Auto created default scale condition

Delete warning: The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode: Scale based on a metric (selected) Scale to a specific instance count

Rules: It is recommended to have at least one scale rule. To create new rules, click [Add a rule](#).

Scale out: When: vmss1 (Average) Percentage CPU > 70 Increase percent by 50

Instance limits: Minimum * 2 Maximum * 2 Default * 2

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

Microsoft Azure | Scaling

vmss1 | Virtual machine scale set

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Default* Auto created default scale condition

Delete warning: The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode: Scale based on a metric (selected) Scale to a specific instance count

Rules:

- Scale out: When vmss1 (Average) Percentage CPU > 70 Increase percent by 50
- Scale in: When vmss1 (Average) Percentage CPU < 30 Decrease percent by 50

+ Add a rule

Instance limits: Minimum * 2 Maximum * 2 Default * 2

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

Add

Percentage CPU (Average): 17.01 %

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

10:35 PM UTC+05:00

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vmss1 | Virtual machine scale set

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Default* Auto created default scale condition

Delete warning: The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode: Scale based on a metric (selected) Scale to a specific instance count

Rules:

- Scale out: When vmss1 (Average) Percentage CPU > 70 Increase percent by 50
- Scale in: When vmss1 (Average) Percentage CPU < 30 Decrease percent by 50

+ Add a rule

Instance limits: Minimum * 2 Maximum * 2 Default * 2

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

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Microsoft Azure | Scaling

vmss1 | Virtual machine scale set

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Default* Auto created default scale condition

Delete warning: The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode: Scale based on a metric (selected) Scale to a specific instance count

Rules:

- Scale out: When vmss1 (Average) Percentage CPU > 70 Increase percent by 50
- Scale in: When vmss1 (Average) Percentage CPU < 30 Decrease percent by 50

+ Add a rule

Instance limits: Minimum * 2 Maximum * 10 Default * 2

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

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Task 5: Create a virtual machine using Azure PowerShell (option 1)

```
PS /home/zainab> New-AzVm ` 
>>   -ResourceGroupName 'az104-rg8' ` 
>>   -Name 'myPSVM' ` 
>>   -Location 'Central India' ` 
>>   -Image 'Win2019Datacenter' ` 
>>   -Zone '1' ` 
>>   -Size 'Standard_D2s_v3' ` 
>>   -Credential (Get-Credential)

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

WARNING: Upcoming breaking changes in the cmdlet 'New-AzVM' :
The default VM size will change from 'Standard_D2s_v3' to 'Standard_D2s_v5'.
- This change will take effect on '11/1/2025'
- The change is expected to take effect in Az version : '15.0.0'
- The change is expected to take effect in Az.Compute version : '11.0.0'
Note : Go to https://aka.ms/azps-changenewarnings for steps to suppress this breaking change warning, and other information on breaking changes in Azure PowerShell.
You can reference https://aka.ms/findImagePS on how to find VM Images using PowerShell.
```

```
ResourceGroupName      : az104-rg8
Id                   : /subscriptions/2abc1374-49a7-48c3-b0a8-366511eba3ea/resourceGroups/az104-rg8/providers/Microsoft.Compute/virtualMachines/myPSVM
VmId                : 905b2fe5-b7de-463f-8732-b9d5d6f9924b
Name                 : myPSVM
Type                 : Microsoft.Compute/virtualMachines
Location             : centralindia
Tags                : {}
HardwareProfile     : {VmSize}
NetworkProfile       : {NetworkInterfaces}
OSProfile            : {ComputerName, AdminUsername, WindowsConfiguration, Secrets, AllowExtensionOperations, RequireGuestProvisionSignal}
ProvisioningState    : Succeeded
StorageProfile       : {ImageReference, OsDisk, DataDisks, AlignRegionalDisksToVMZone}
Zones               : {1}
FullyQualifiedDomainName : mypsvm-72ba60.Central India.cloudapp.azure.com
TimeCreated          : 12/22/2025 6:28:50 PM
Etag                : "2"

PS /home/zainab> 
```

```
PS /home/zainab> Get-AzVm ` 
>>   -ResourceGroupName 'az104-rg8' ` 
>>   -Status

ResourceGroupName Name Location VmSize OsType NIC Provisioning Zone PowerState MaintenanceAllowed
----- ----- ----- ----- ----- ----- ----- ----- -----
az104-rg8       myPSVM centralindia Standard_D2s_v3 Windows myPSVM Succeeded 1 VM running

PS /home/zainab> 
```

Task 6: Create a virtual machine using the CLI (option 2)

```
sh-5.2$ az vm create \
--name myCLIVM \
--resource-group az104-rg8 \
--image Ubuntu2004 \
--size Standard_B2s \
--admin-username localadmin \
--generate-ssh-keys
The default value of '--size' will be changed to 'Standard_D2s_v5' from 'Standard_DS1_v2' in a future release.
{
  "fqdns": "",
  "id": "/subscriptions/2abc1374-49a7-48c3-b0a8-366511eba3ea/resourceGroups/az104-rg8/providers/Microsoft.Compute/virtualMachines/myCLIVM",
  "location": "centralindia",
  "macAddress": "00-22-48-6E-48-90",
  "powerState": "VM running",
  "privateIpAddress": "192.168.1.5",
  "publicIpAddress": "135.235.153.66",
  "resourceGroup": "az104-rg8"
}
sh-5.2$ az vm show --name myCLIVM --resource-group az104-rg8 --show-details --output table
Name      ResourceGroup      PowerState      PublicIps      Fqdns      Location
-----
myCLIVM  az104-rg8        VM running     135.235.153.66    centralindia
sh-5.2$ az vm deallocate --resource-group az104-rg8 --name myCLIVM
sh-5.2$ az vm show --name myCLIVM --resource-group az104-rg8 --show-details --output table
Name      ResourceGroup      PowerState      PublicIps      Fqdns      Location
-----
myCLIVM  az104-rg8        VM deallocated  135.235.153.66    centralindia
```