Azure Virtual Machine Management and Scaling

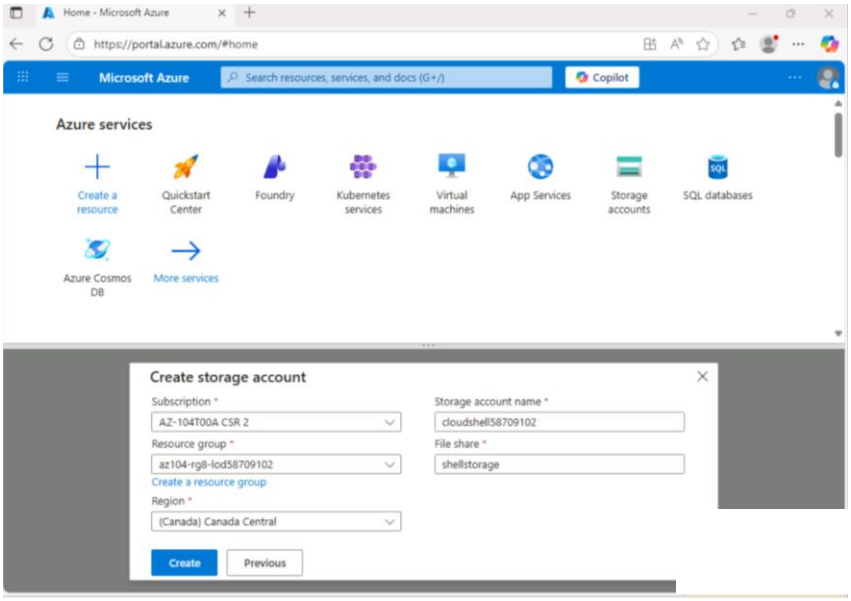
Project Overview

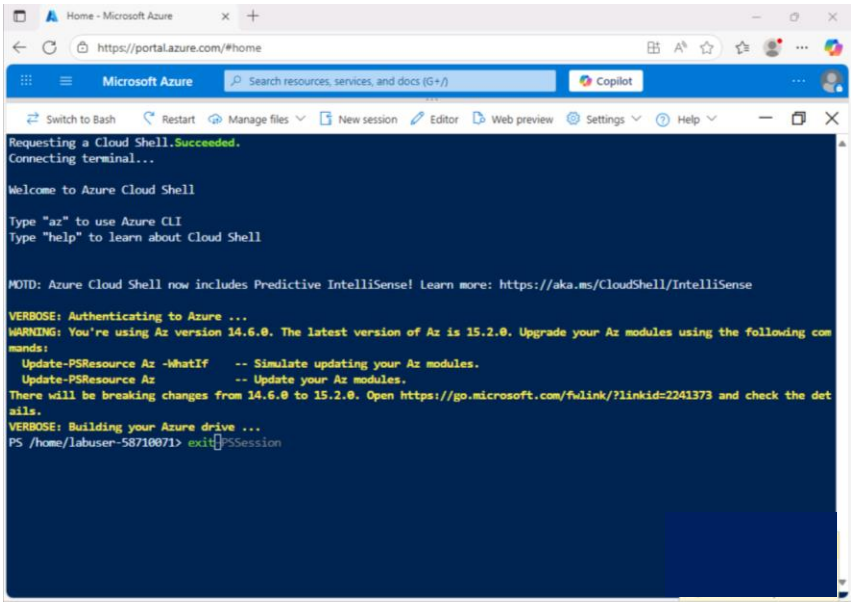
This document presents hands-on experience managing and scaling Microsoft Azure virtual machines in a cloud environment. The focus is on operational administration tasks commonly performed in production cloud environments, including:

- Virtual machine configuration
- Availability and resiliency considerations
- Compute and storage scaling
- Automated scaling using Virtual Machine Scale Sets
- Administration using Azure Portal, PowerShell, and CLI

Cloud Shell Environment Preparation

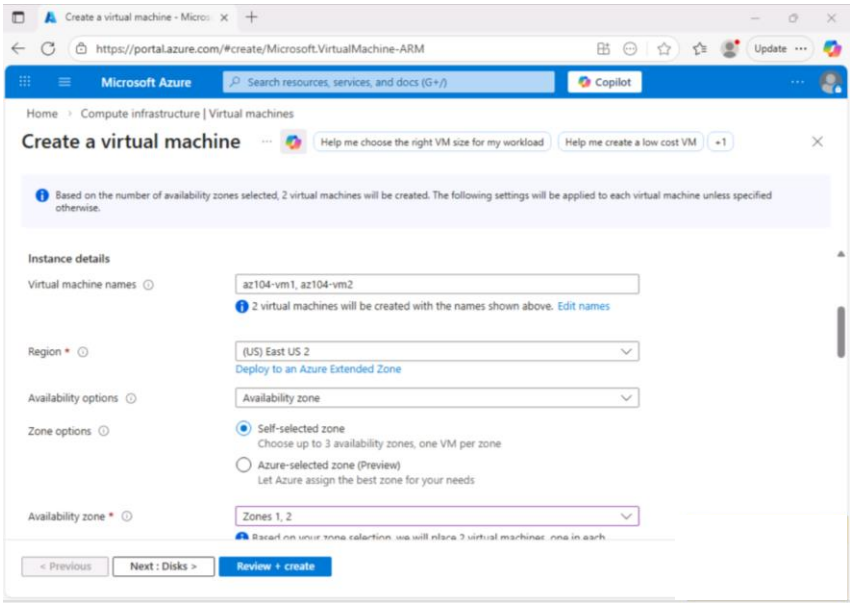
This section documents the preparation of the Azure Cloud Shell environment to support command-line administration tasks, including verification of subscription context and readiness for PowerShell and CLI operations.

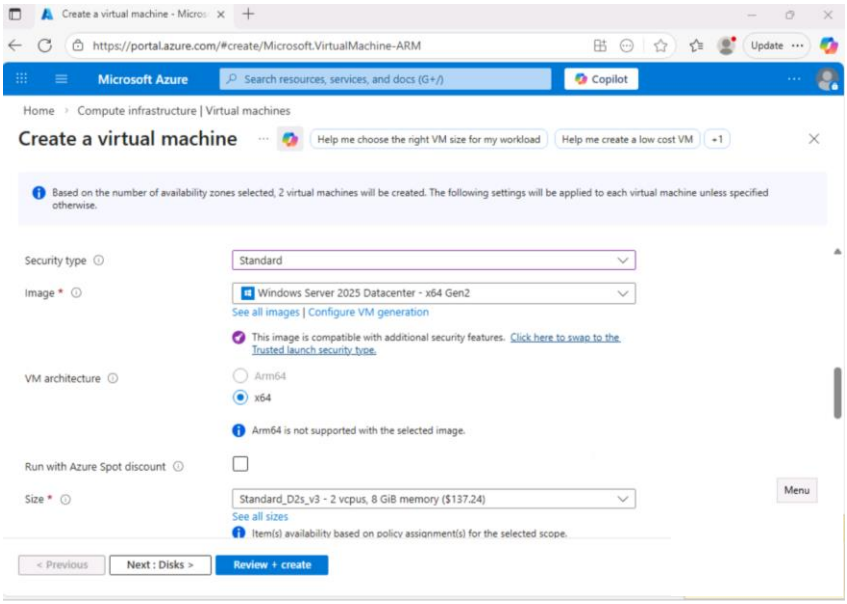


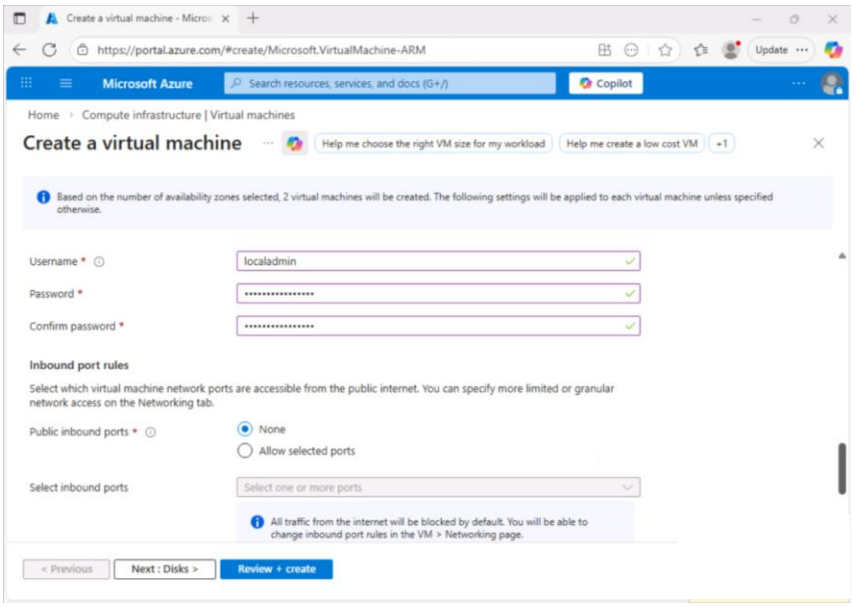


Availability and Resiliency Configuration for Azure Virtual Machines

This section highlights configuration decisions related to availability zones and redundancy options designed to improve fault tolerance and ensure service continuity.




Create a virtual machine - Micros
https://portal.azure.com/#create/Microsoft.VirtualMachine-ARM
Update
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home
Compute infrastructure | Virtual machines
Create a virtual machine
Help me choose the right VM size for my workload
Help me create a low cost VM
+1
Based on the number of availability zones selected, 2 virtual machines will be created. The following settings will be applied to each virtual machine unless specified otherwise.
Security type
Standard
Image *
Windows Server 2025 Datacenter - x64 Gen2
See all images | Configure VM generation
This image is compatible with additional security features. Click here to swap to the Trusted launch security type.
VM architecture
Arm64
x64
Arm64 is not supported with the selected image.
Run with Azure Spot discount
Size *
Standard_D2s_v3 - 2 vcpus, 8 GiB memory ($137.24)
See all sizes
Item(s) availability based on policy assignment(s) for the selected scope.
Menu
< Previous
Next : Disks >
Review + create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Microsoft Azure
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Home
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Create a virtual machine
Help me choose the right VM size for my workload
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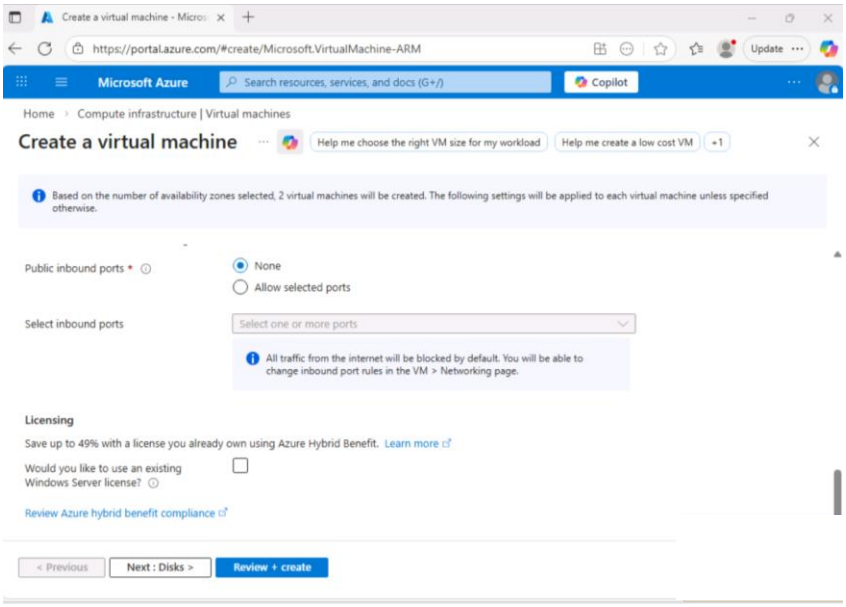
Based on the number of availability zones selected, 2 virtual machines will be created. The following settings will be applied to each virtual machine unless specified otherwise.
Username *
localadmin
Password *
Confirm password *
Inbound port rules
Select which virtual machine network ports are accessible 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
Select one or more 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.
< Previous
Next : Disks >
Review + create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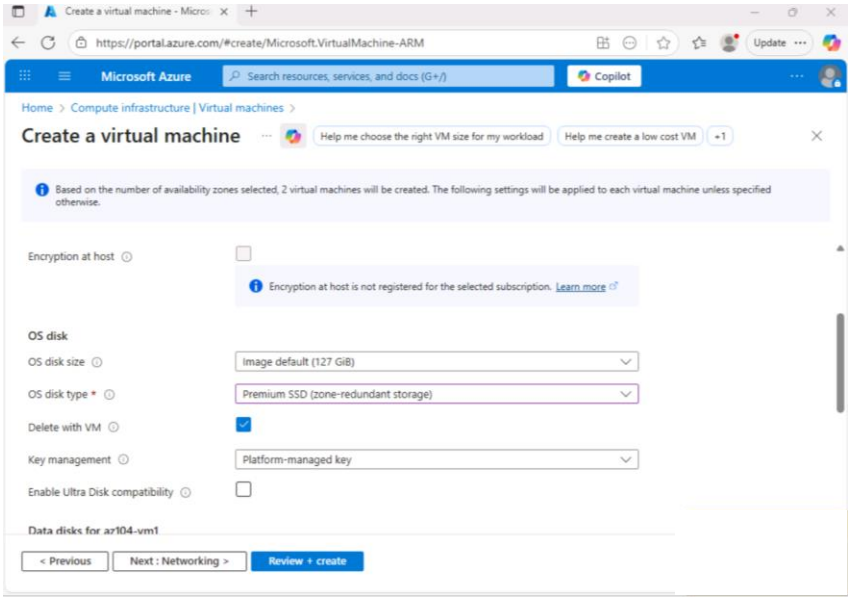
Based on the number of availability zones selected, 2 virtual machines will be created. The following settings will be applied to each virtual machine unless specified otherwise.
Public inbound ports *
None
Allow selected ports
Select inbound ports
Select one or more ports
All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.
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
< Previous
Next : Disks >
Review + create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Help me create a low cost VM
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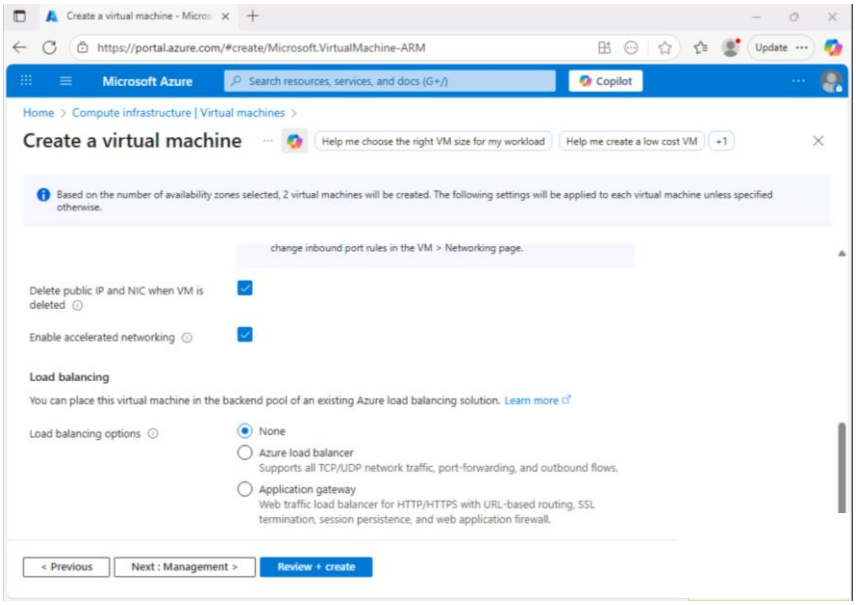
Based on the number of availability zones selected, 2 virtual machines will be created. The following settings will be applied to each virtual machine unless specified otherwise.
Encryption at host
Encryption at host is not registered for the selected subscription. Learn more
OS disk
OS disk size
Image default (127 GiB)
OS disk type *
Premium SSD (zone-redundant storage)
Delete with VM
Key management
Platform-managed key
Enable Ultra Disk compatibility
Data disks for az104-vm1
< Previous
Next : Networking >
Review + create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Help me choose the right VM size for my workload
Help me create a low cost VM
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Based on the number of availability zones selected, 2 virtual machines will be created. The following settings will be applied to each virtual machine unless specified otherwise.
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.
< Previous
Next : Management >
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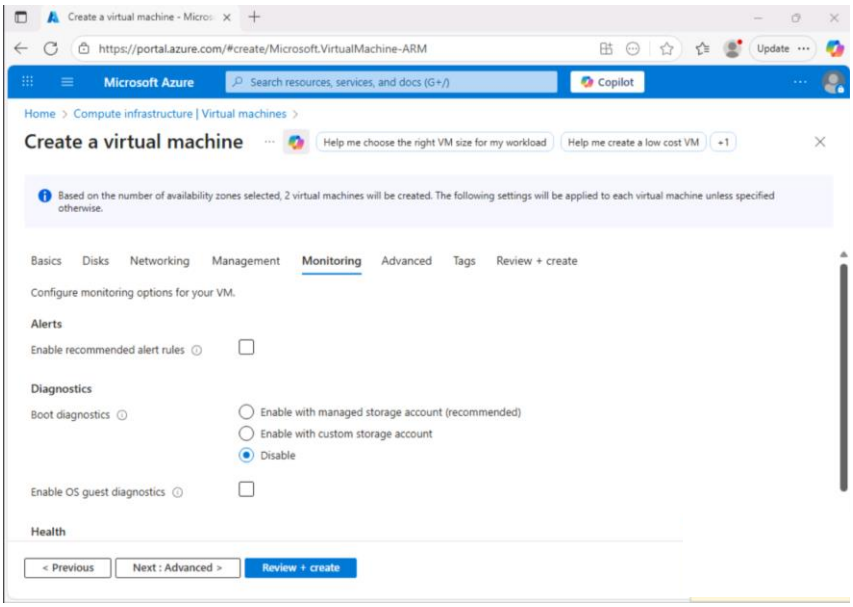
Create a virtual machine - Micros
https://portal.azure.com/#create/Microsoft.VirtualMachine-ARM
Update
Microsoft Azure
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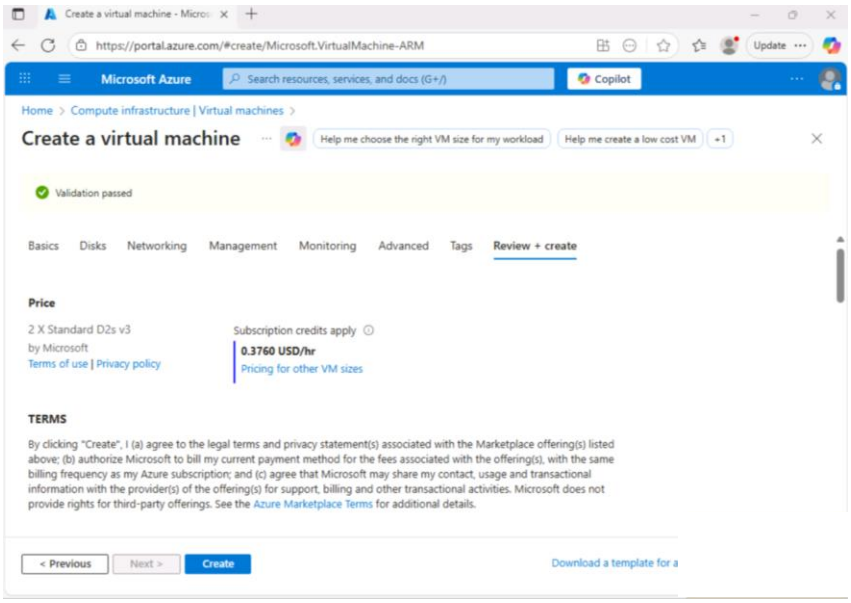
Home > Compute infrastructure | Virtual machines >
Create a virtual machine
Help me choose the right VM size for my workload
Help me create a low cost VM
+1
Based on the number of availability zones selected, 2 virtual machines will be created. The following settings will be applied to each virtual machine unless specified otherwise.
Basics
Disks
Networking
Management
Monitoring
Advanced
Tags
Review + create
Configure monitoring options for your VM.
Alerts
Enable recommended alert rules
Diagnostics
Boot diagnostics
Enable with managed storage account (recommended)
Enable with custom storage account
Disable
Enable OS guest diagnostics
Health
< Previous
Next : Advanced >
Review + create


Create a virtual machine - Micros
https://portal.azure.com/#create/Microsoft.VirtualMachine-ARM
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Microsoft Azure
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Home > Compute infrastructure | Virtual machines >
Create a virtual machine
Help me choose the right VM size for my workload
Help me create a low cost VM
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Validation passed
Basics
Disks
Networking
Management
Monitoring
Advanced
Tags
Review + create
Price
2 X Standard D2s v3
by Microsoft
Terms of use | Privacy policy
Subscription credits apply
0.3760 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.
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Next >
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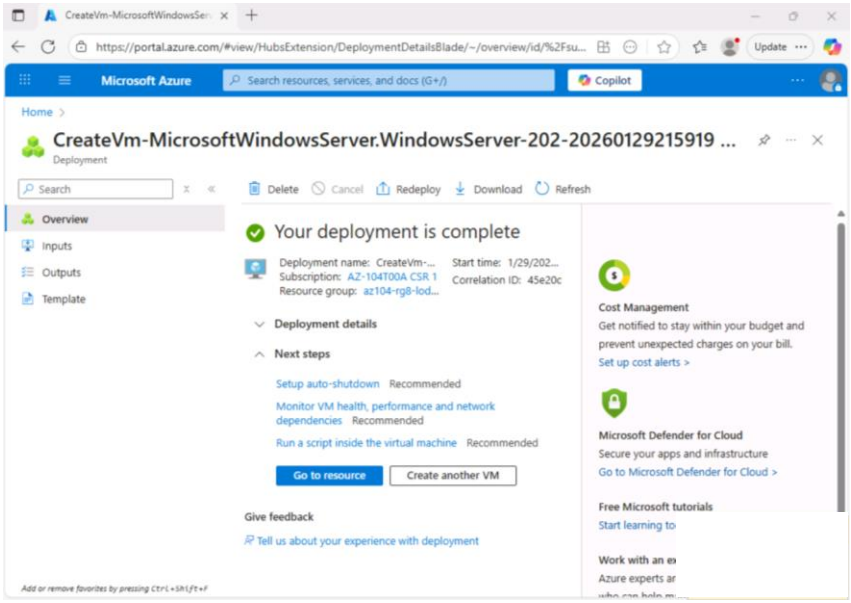
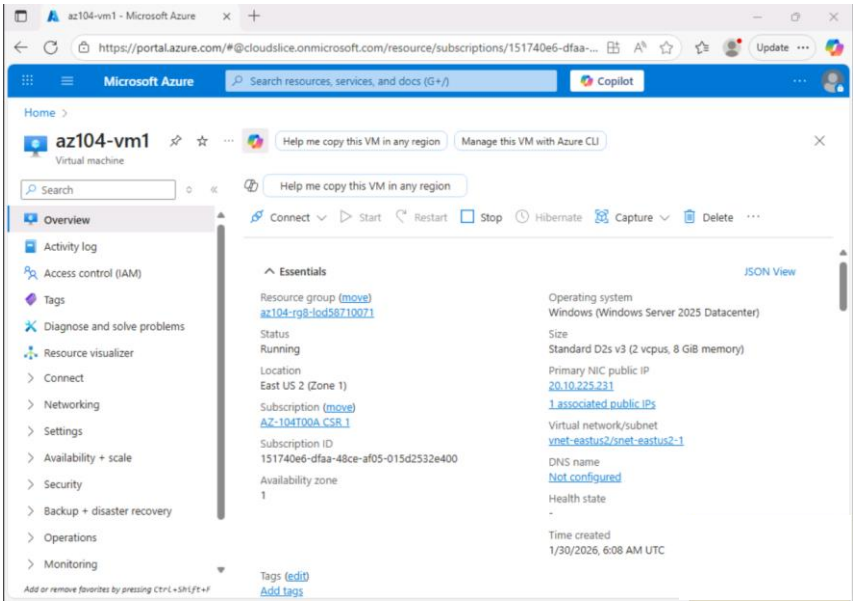
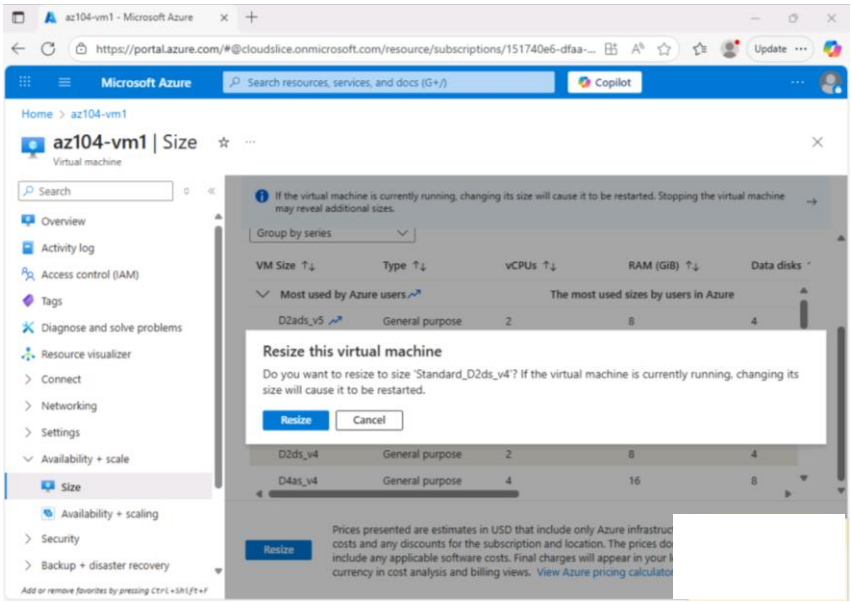
Download a template for a

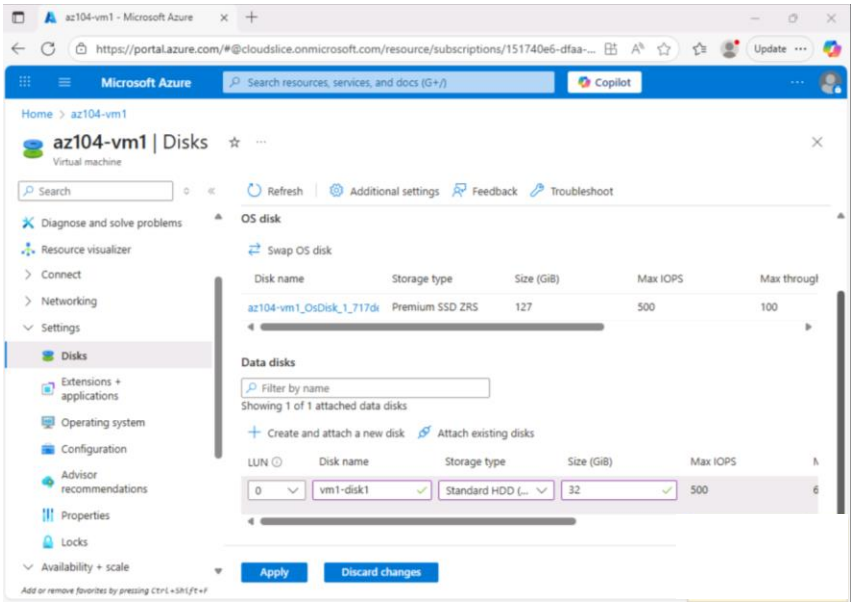

CreateVm-MicrosoftWindowsSer
https://portal.azure.com/#view/HubsExtension/DeploymentDetailsBlade/~/overview/id/%2Fsu...
Update
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home >
CreateVm-MicrosoftWindowsServer.WindowsServer-202-20260129215919 ...
Deployment
Search
Overview
Inputs
Outputs
Template
Delete
Cancel
Redeploy
Download
Refresh
Your deployment is complete
Deployment name: CreateVm-...
Subscription: AZ-104T00A CSR 1
Resource group: az104-rg8-lod...
Start time: 1/29/202...
Correlation ID: 45e20c
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
Cost Management
Get notified to stay within your budget and prevent unexpected charges on your bill.
Set up cost alerts >
Microsoft Defender for Cloud
Secure your apps and infrastructure
Go to Microsoft Defender for Cloud >
Free Microsoft tutorials
Start learning to
Work with an ex
Azure experts ar
Add or remove favorites by pressing Ctrl+Shift+F



Compute and Storage Scaling

This section demonstrates adjustments to compute sizing and storage configuration to meet changing performance and capacity requirements while maintaining operational efficiency.




az104-vm1 - Microsoft Azure
https://portal.azure.com/#@cloudslice.onmicrosoft.com/resource/subscriptions/151740e6-dfaa-...
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Microsoft Azure
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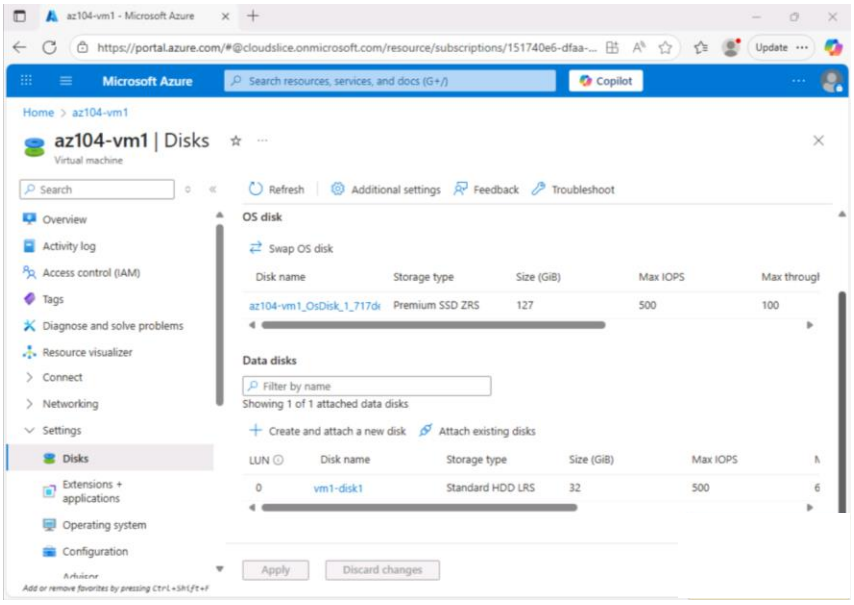
Copilot
Home > az104-vm1
az104-vm1 | Disks
Virtual machine
Search
Refresh
Additional settings
Feedback
Troubleshoot
Diagnose and solve problems
Resource visualizer
Connect
Networking
Settings
Disks
Extensions + applications
Operating system
Configuration
Advisor recommendations
Properties
Locks
Availability + scale
Add or remove favorites by pressing Ctrl+Shift+F
OS disk
Swap OS disk
Disk name
Storage type
Size (GiB)
Max IOPS
Max throughput
az104-vm1_OsDisk_1_717d
Premium SSD ZRS
127
500
100
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 (...
32
500
Apply
Discard changes


az104-vm1 - Microsoft Azure
https://portal.azure.com/#@cloudslice.onmicrosoft.com/resource/subscriptions/151740e6-dfaa-...
Update
Microsoft Azure
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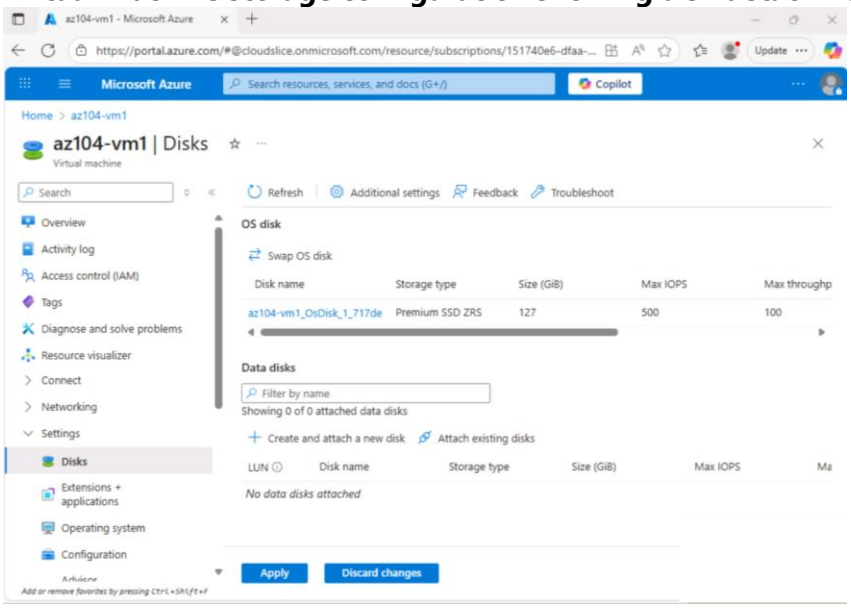
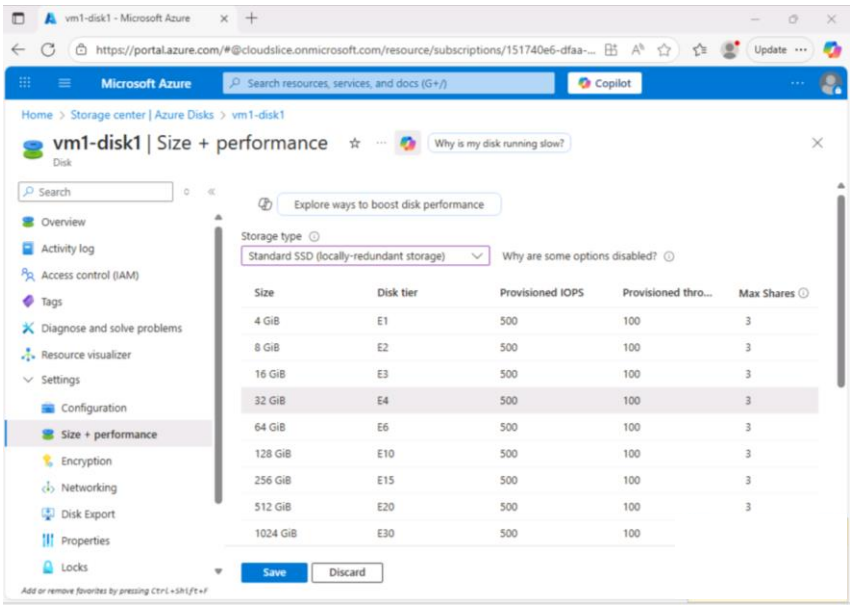
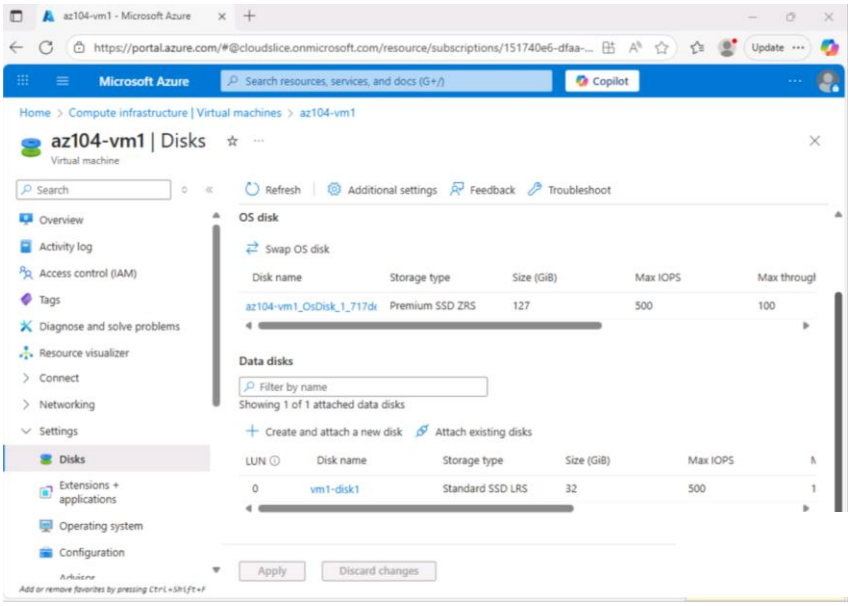
Copilot
Home > az104-vm1
az104-vm1 | Disks
Virtual machine
Search
Refresh
Additional settings
Feedback
Troubleshoot
Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Resource visualizer
Connect
Networking
Settings
Disks
Extensions + applications
Operating system
Configuration
Add or remove favorites by pressing Ctrl+Shift+F
OS disk
Swap OS disk
Disk name
Storage type
Size (GiB)
Max IOPS
Max throughput
az104-vm1_OsDisk_1_717d
Premium SSD ZRS
127
500
100
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 LRS
32
500
Apply
Discard changes

Virtual machine storage configuration showing disk detachment.

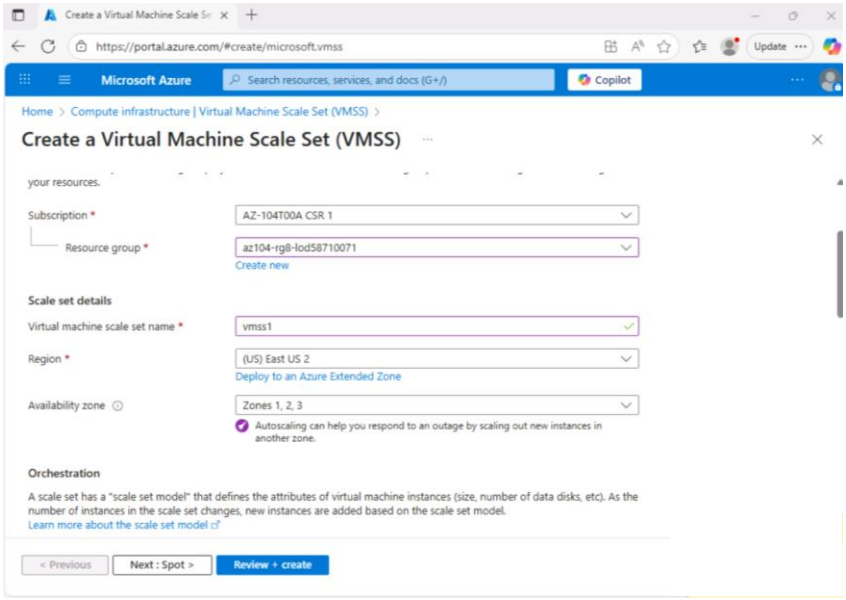


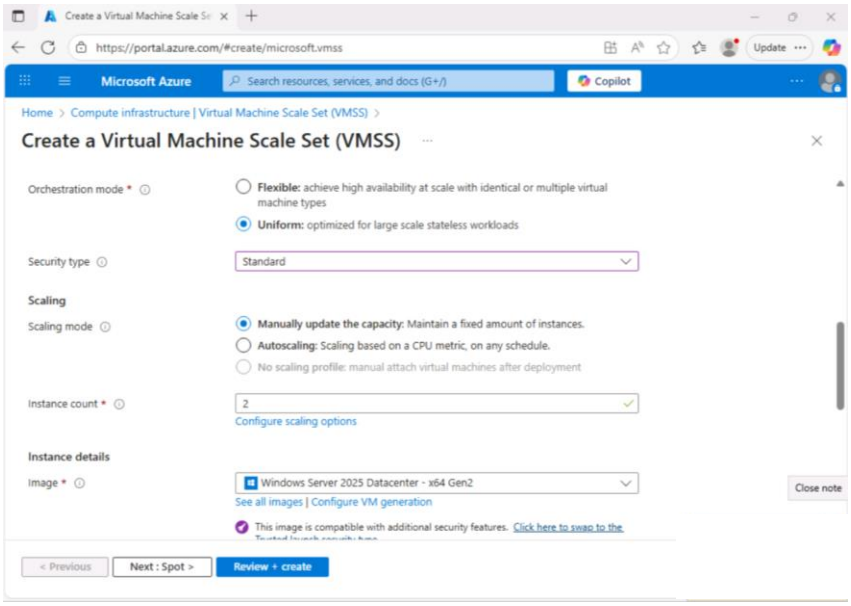


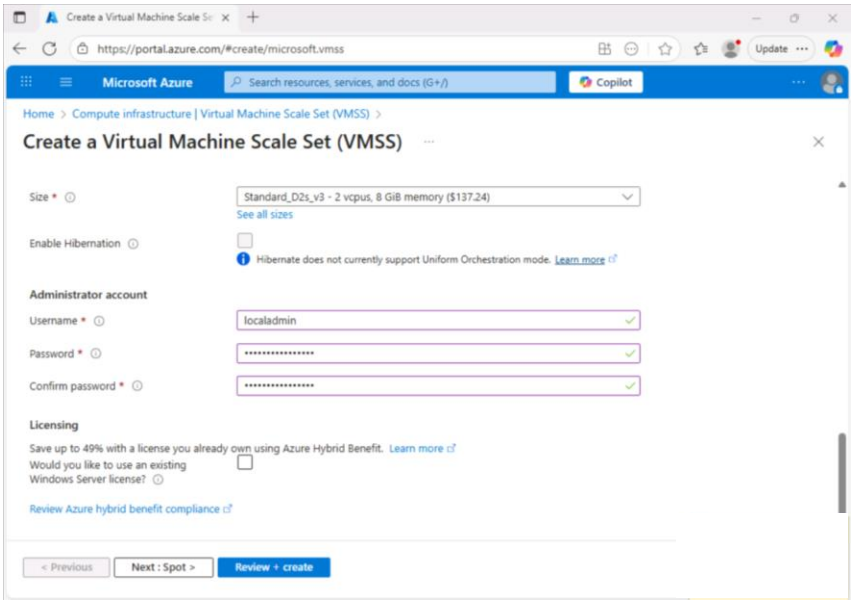


Virtual Machine Scale Set Configuration

This section documents the creation and configuration of Azure Virtual Machine Scale Sets to support consistent deployment and centralized management of multiple virtual machine instances.




Create a Virtual Machine Scale Se
https://portal.azure.com/#create/microsoft.vmss
Update
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) >
Create a Virtual Machine Scale Set (VMSS)
Orchestration mode *
Flexible: achieve high availability at scale with identical or multiple virtual machine types
Uniform: optimized for large scale stateless workloads
Security type
Standard
Scaling
Scaling mode
Manually update the capacity: Maintain a fixed amount of instances.
Autoscaling: Scaling based on a CPU metric, on any schedule.
No scaling profile: manual attach virtual machines after deployment
Instance count *
2
Configure scaling options
Instance details
Image *
Windows Server 2025 Datacenter - x64 Gen2
See all images | Configure VM generation
This image is compatible with additional security features. Click here to swap to the
Close note
< Previous
Next : Spot >
Review + create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Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) >
Create a Virtual Machine Scale Set (VMSS)
Size *
Standard_D2s_v3 - 2 vcpus, 8 GiB memory ($137.24)
See all sizes
Enable Hibernation
Hibernate does not currently support Uniform Orchestration mode. Learn more
Administrator account
Username *
localadmin
Password *
Confirm password *
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
< Previous
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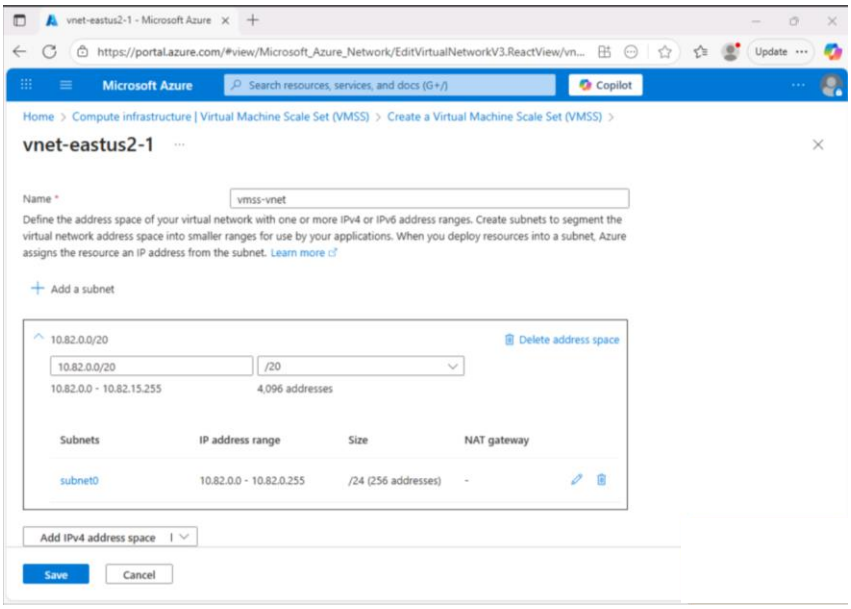
vnet-eastus2-1 - Microsoft Azure
https://portal.azure.com/#view/Microsoft_Azure_Network/EditVirtualNetworkV3.ReactView/vn...
Update
Microsoft Azure
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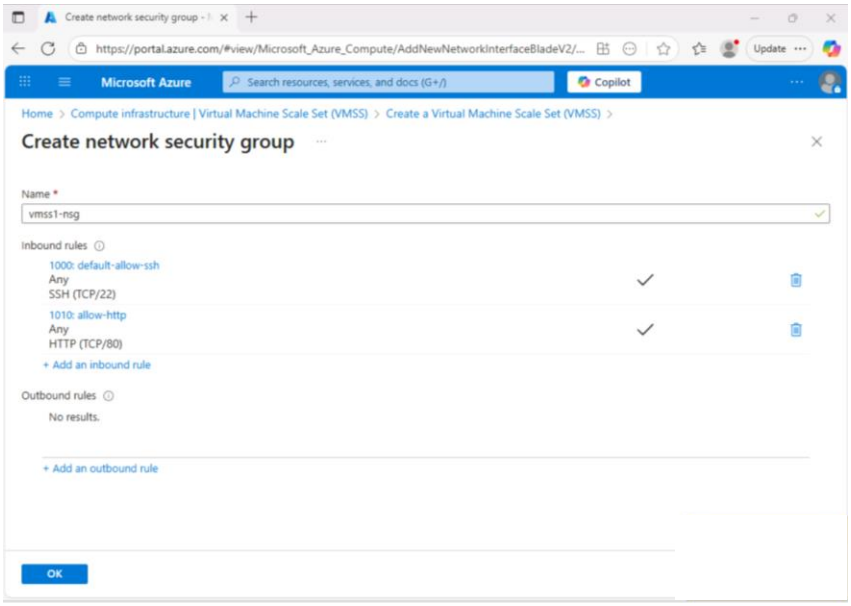
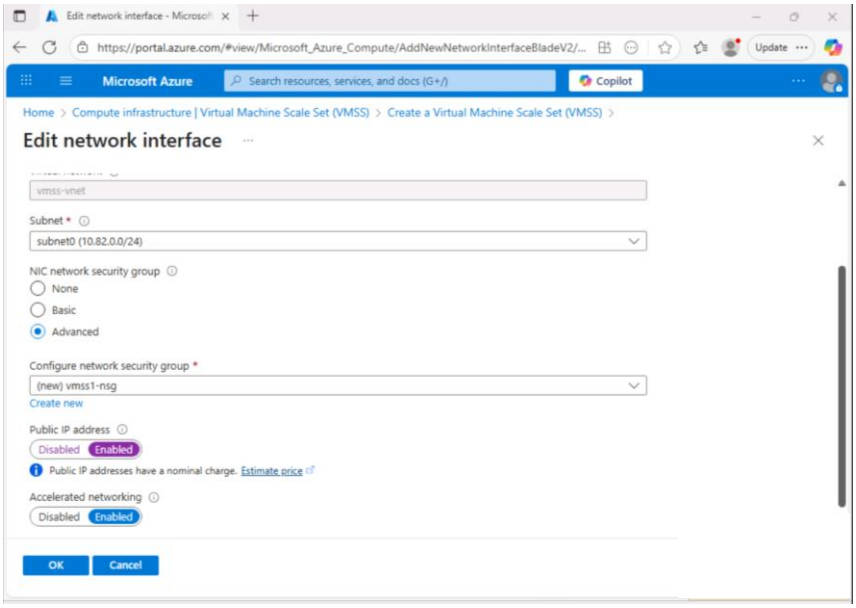
Copilot
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) > Create a Virtual Machine Scale Set (VMSS) >
vnet-eastus2-1
Name *
vmss-vnet
Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space 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
subnet0
10.82.0.0 - 10.82.0.255
/24 (256 addresses)
-
Add IPv4 address space
Save
Cancel


Create network security group
https://portal.azure.com/#view/Microsoft_Azure_Compute/AddNewNetworkInterfaceBladeV2/...
Update
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) > Create a Virtual Machine Scale Set (VMSS) >
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
OK


Edit network interface - Microsoft
https://portal.azure.com/#view/Microsoft_Azure_Compute/AddNewNetworkInterfaceBladeV2/...
Update
Microsoft Azure
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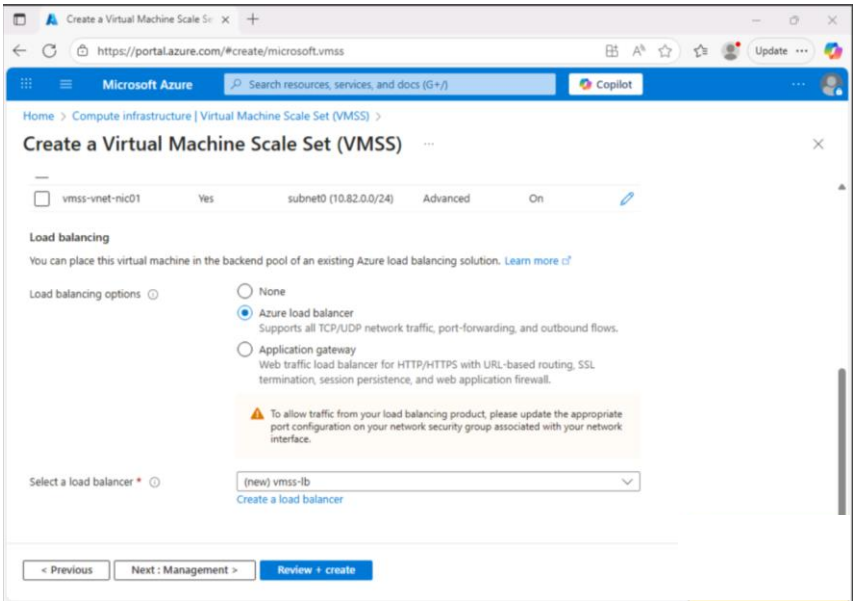
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) > Create a Virtual Machine Scale Set (VMSS) >
Edit network interface
vmss-vnet
Subnet *
subnet0 (10.82.0.0/24)
NIC network security group
None
Basic
Advanced
Configure network security group *
(new) vmss1-nsg
Create new
Public IP address
Disabled
Enabled
Public IP addresses have a nominal charge. Estimate price
Accelerated networking
Disabled
Enabled
OK
Cancel


Create a Virtual Machine Scale Se
https://portal.azure.com/#create/microsoft.vmss
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Microsoft Azure
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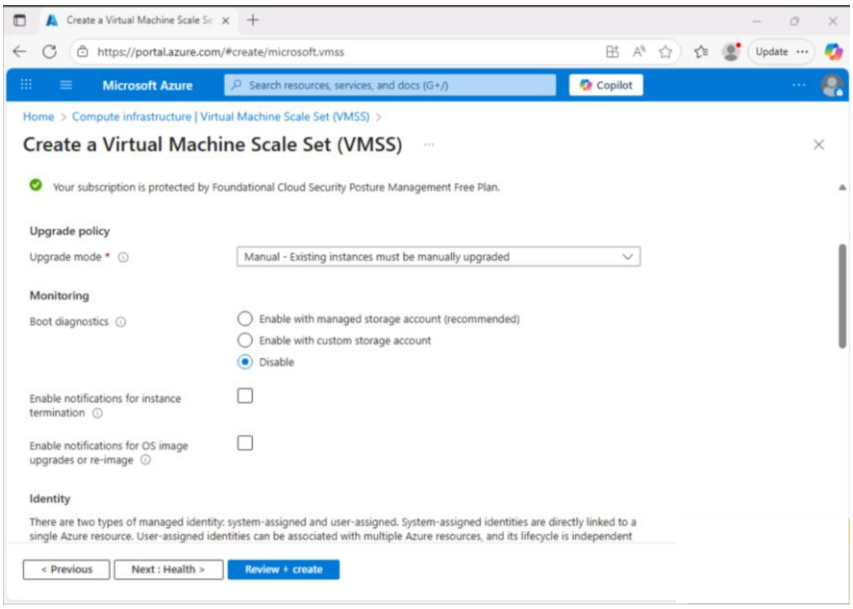
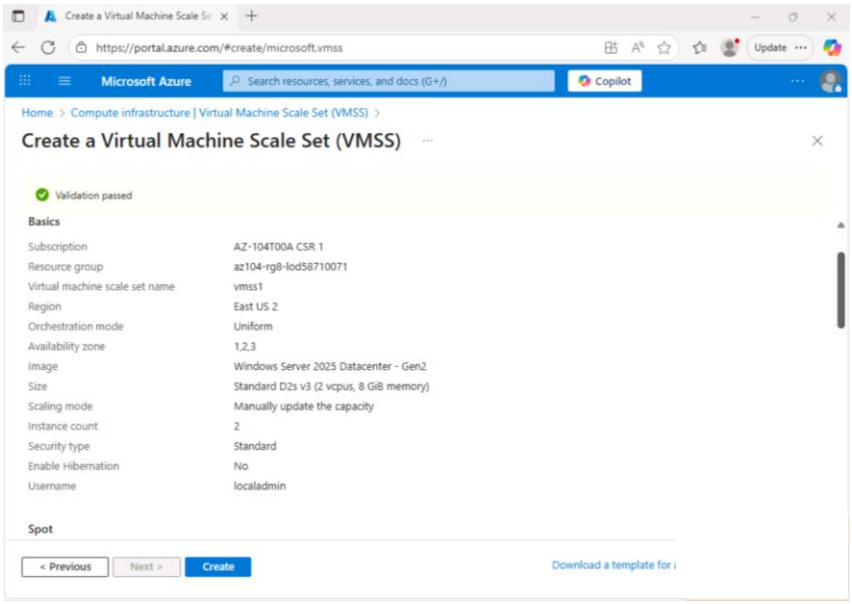
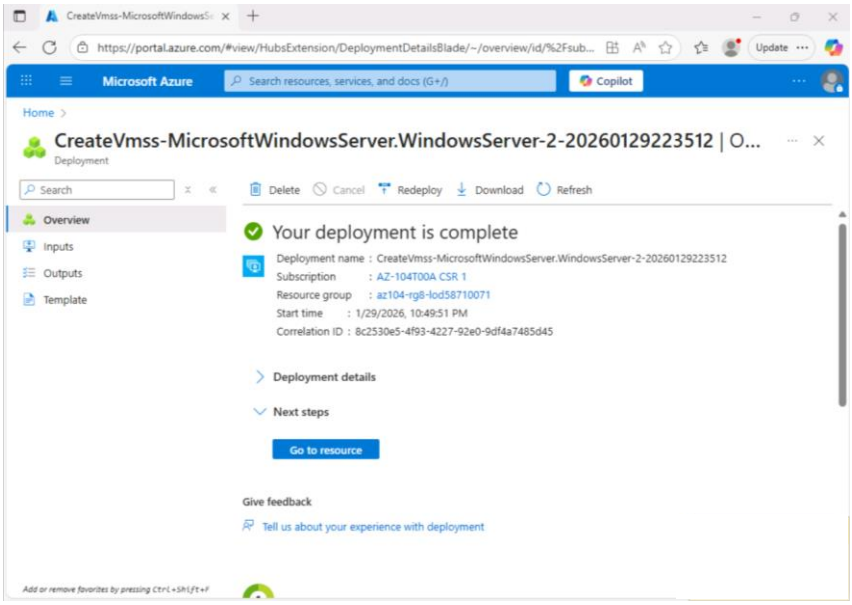
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) >
Create a Virtual Machine Scale Set (VMSS)
vmss-vnet-nic01
Yes
subnet0 (10.82.0.0/24)
Advanced
On
Load balancing
You can place this virtual machine in the backend pool of an existing Azure load balancing solution. Learn more
Load balancing 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
< Previous
Next : Management >
Review + create


Create a Virtual Machine Scale Se
https://portal.azure.com/#create/microsoft.vmss
Update
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) >
Create a Virtual Machine Scale Set (VMSS)
Your subscription is protected by Foundational Cloud Security Posture Management Free Plan.
Upgrade policy
Upgrade mode *
Manual - Existing instances must be manually upgraded
Monitoring
Boot diagnostics
Enable with managed storage account (recommended)
Enable with custom storage account
Disable
Enable notifications for instance termination
Enable notifications for OS image upgrades or re-image
Identity
There are two types of managed identity: system-assigned and user-assigned. System-assigned identities are directly linked to a single Azure resource. User-assigned identities can be associated with multiple Azure resources, and its lifecycle is independent
< Previous
Next : Health >
Review + create

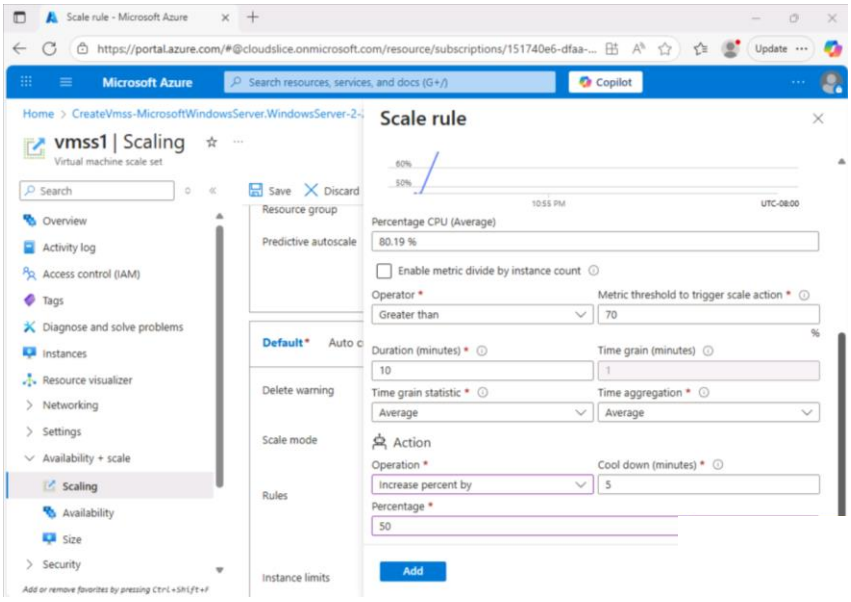

Create a Virtual Machine Scale Se
https://portal.azure.com/#create/microsoft.vmss
Update
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) >
Create a Virtual Machine Scale Set (VMSS)
Validation passed
Basics
Subscription AZ-104T00A CSR 1
Resource group az104-rg8-lod58710071
Virtual machine scale set name vmss1
Region East US 2
Orchestration mode Uniform
Availability zone 1,2,3
Image Windows Server 2025 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
< Previous
Next >
Create
Download a template for



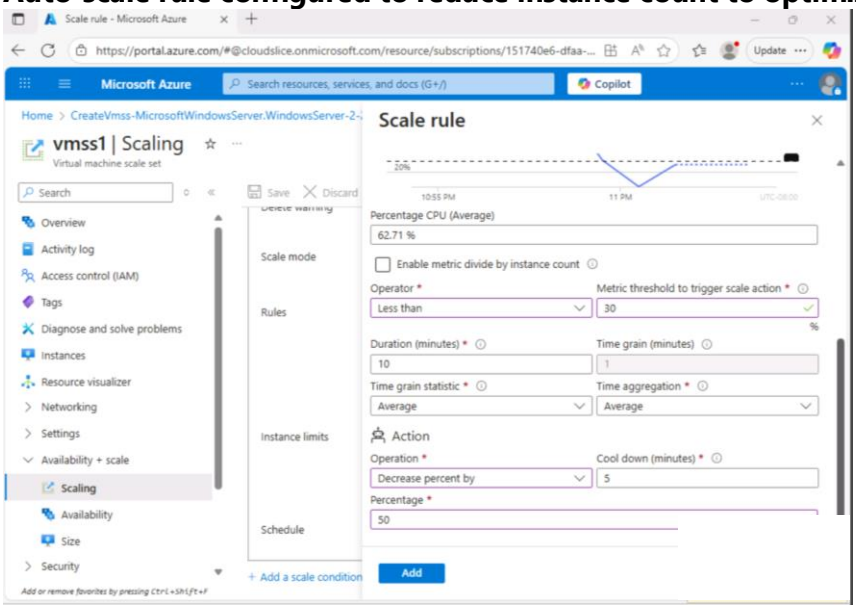
Auto-Scaling Rules and Instance Limits

This section outlines the configuration of scale-out and scale-in rules, including performance-based triggers and instance boundaries used to automatically adjust capacity based on workload demand.

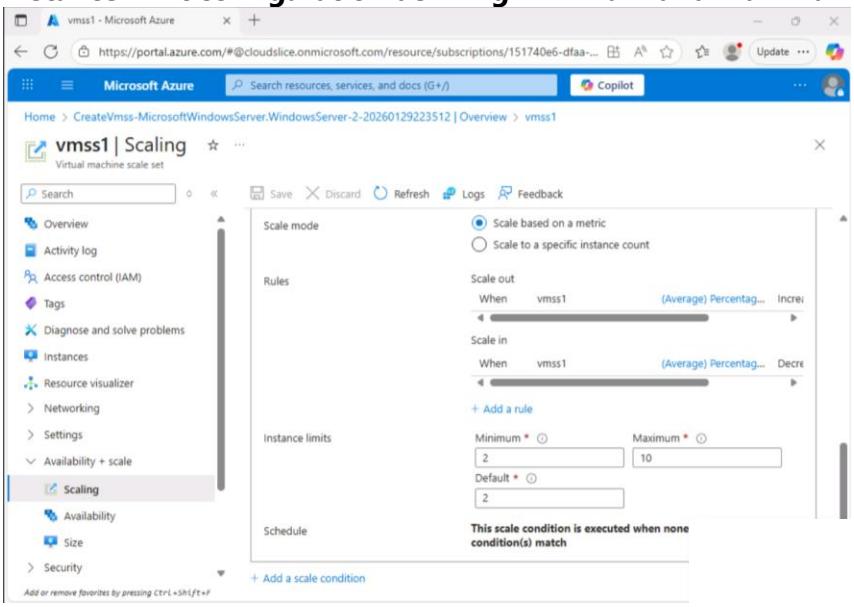
Auto-scale rule configured to increase instance count based on defined performance thresholds.



Auto-scale rule configured to reduce instance count to optimize resource utilization.



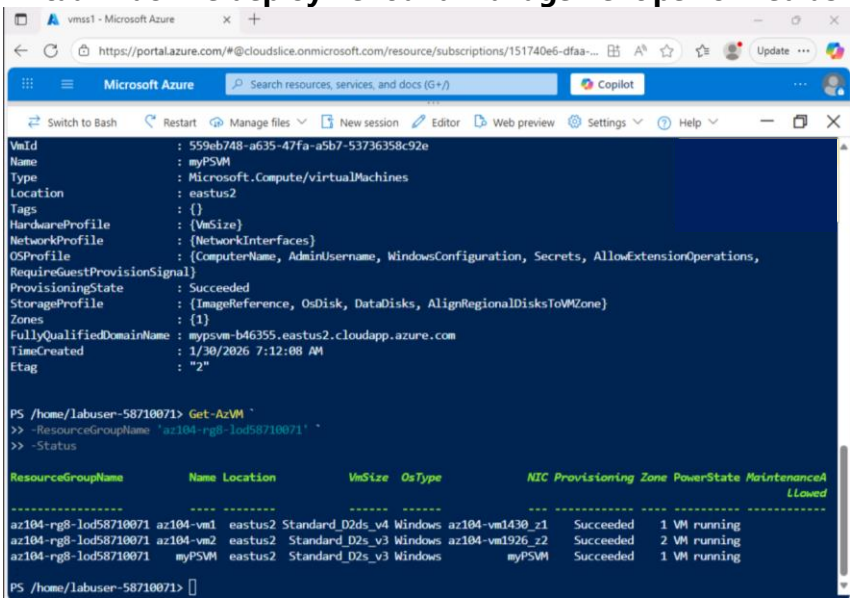
Instance limit configuration defining minimum and maximum scaling boundaries.

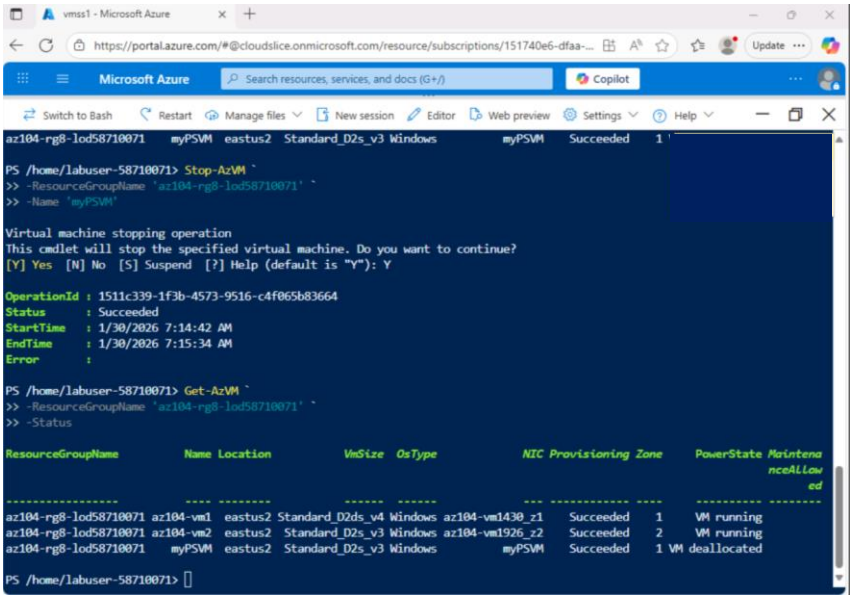


Command-Line Administration

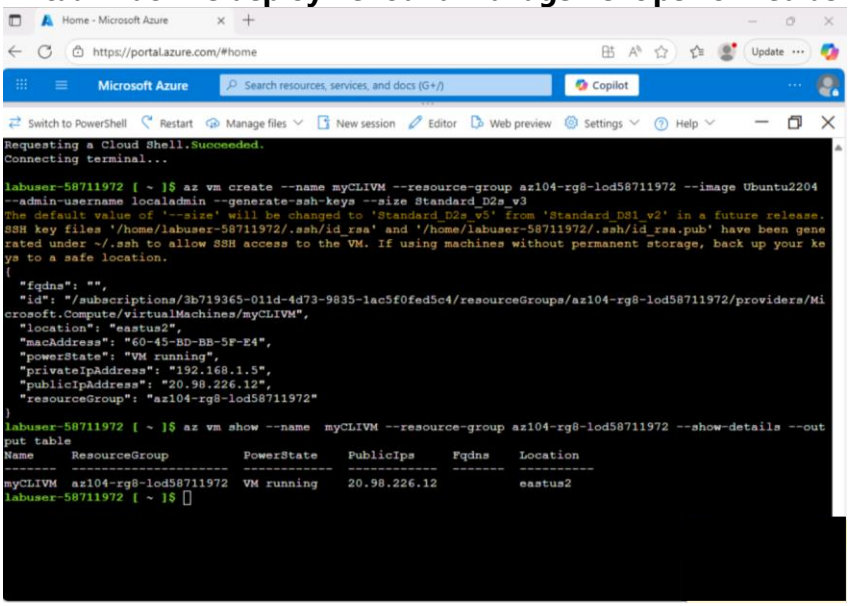
This section demonstrates virtual machine management tasks performed using Azure PowerShell and Azure CLI, highlighting automation-friendly alternatives to portal-based administration.

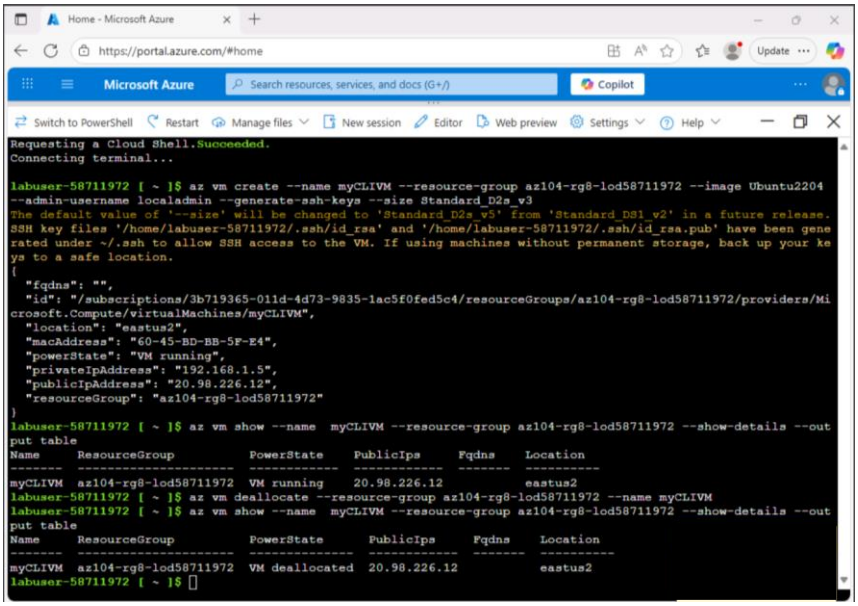
Virtual machine deployment and management performed using Azure PowerShell.





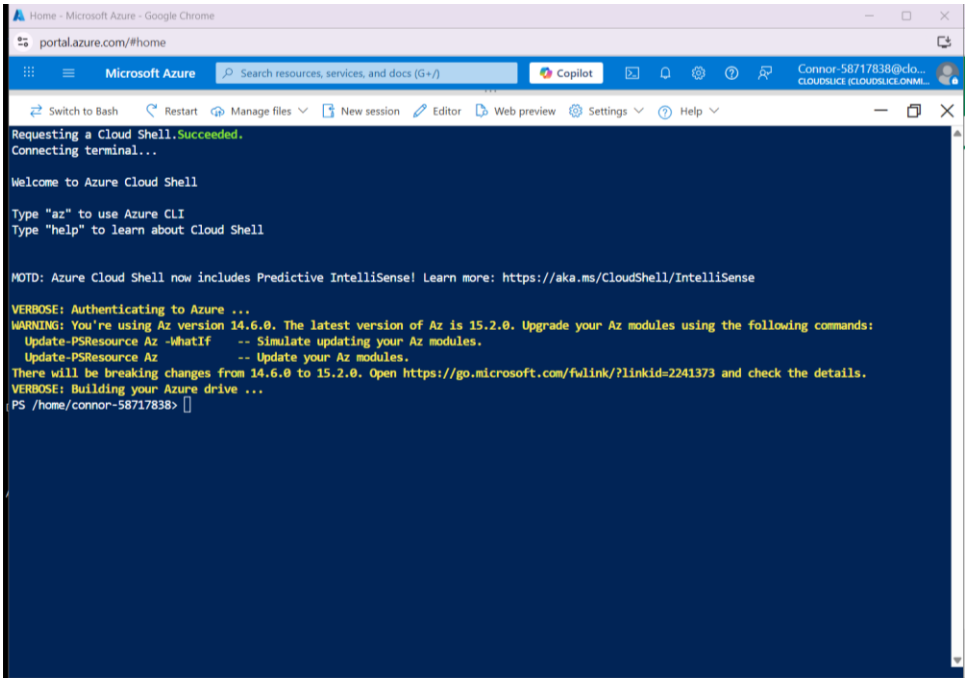
Virtual machine deployment and management performed using Azure CLI.

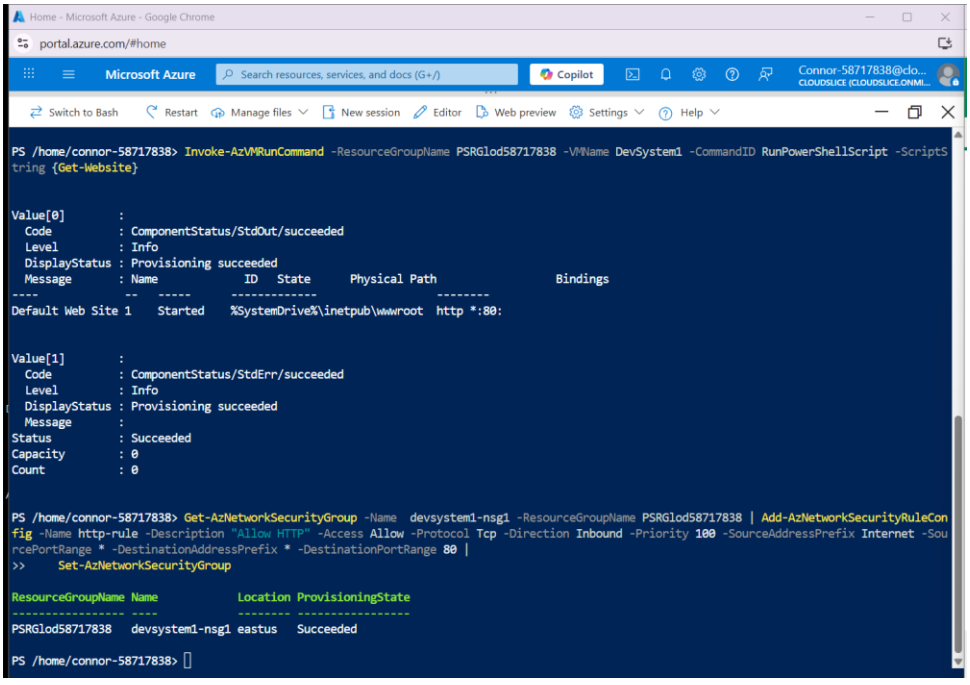


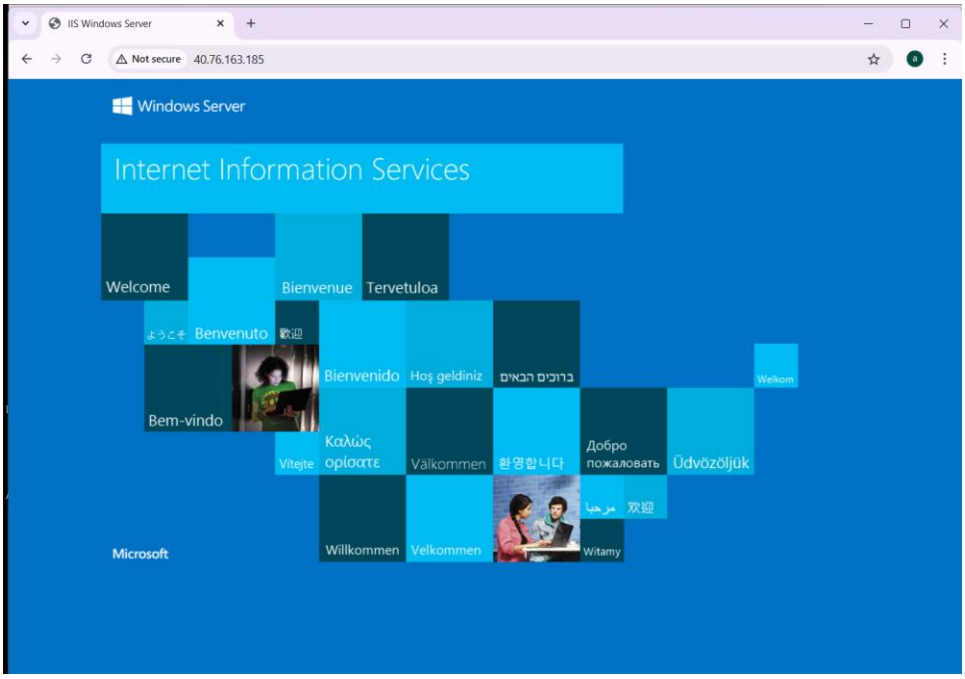


Virtual Machine Administration Using Azure Cloud Shell

This section demonstrates administrative management of an existing Azure virtual machine using Azure Cloud Shell, including reviewing configuration details and performing operational tasks through command-line tools.






IIS Windows Server
Not secure
40.76.163.185
Windows Server
Internet Information Services
Welcome
Bienvenue
Tervetuloa
ようこそ
Benvenuto
歡迎
Bienvenido
Hoş geldiniz
ברוכים הבאים
Welkom
Bem-vindo
Vitejte
Καλώς ορίσατε
Välkommen
환영합니다
Добро пожаловать
Üdvözöljük
مرحبا
欢迎
Willkommen
Velkommen
Witamy
Microsoft