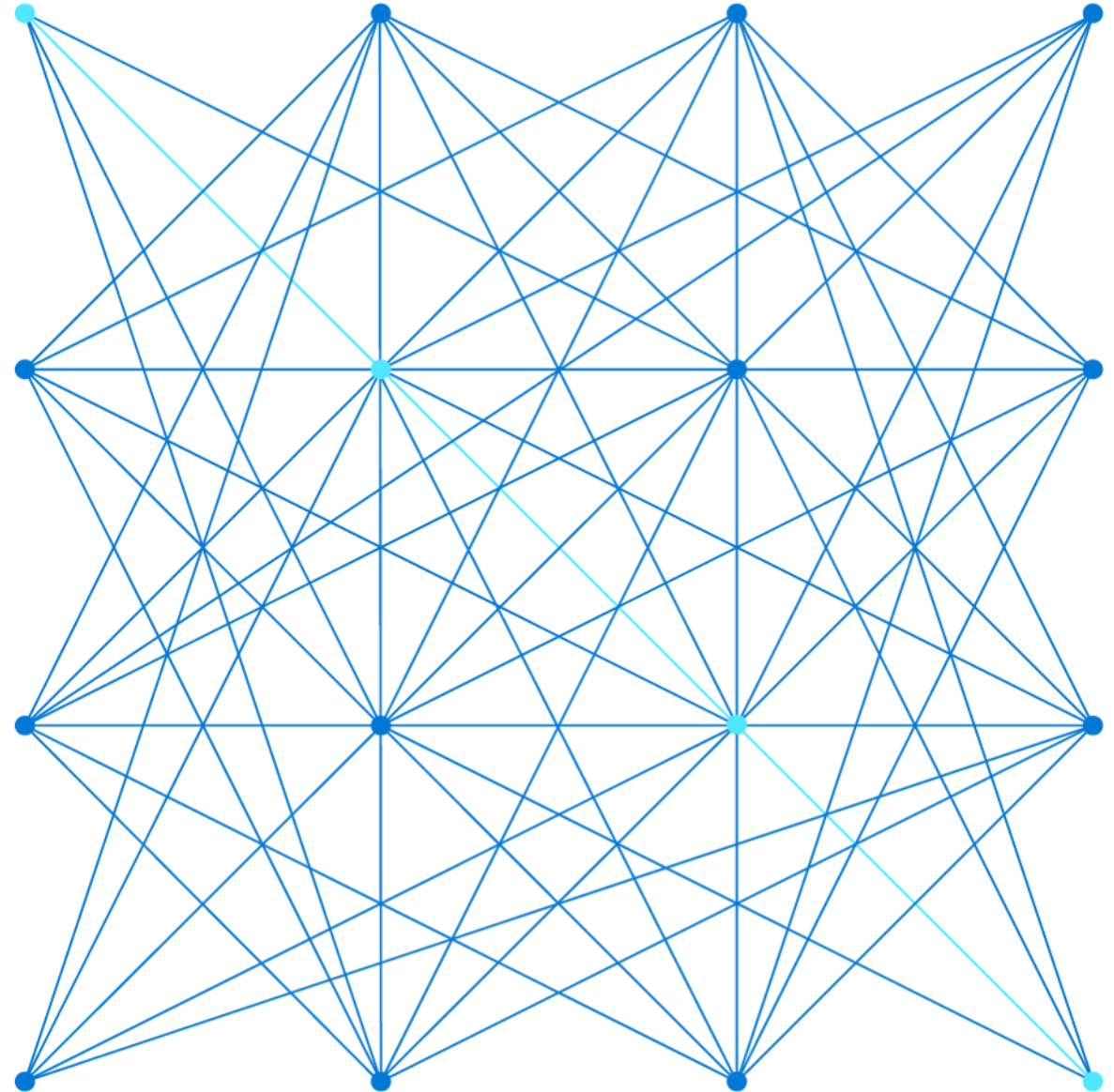


AZ-104

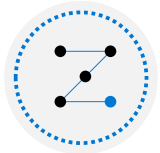
Administer Azure Virtual Machines



About this course: Course Outline



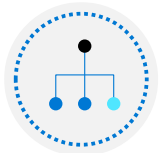
01: Administer Identity



02: Administer Governance and Compliance



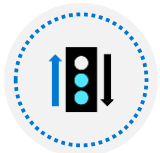
03: Administer Azure Resources



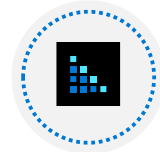
04: Administer Virtual Networking



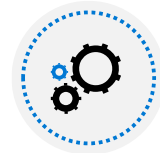
05: Administer Intersite Connectivity



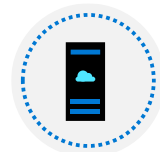
06: Administer Network Traffic Management



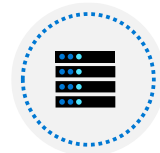
07: Administer Azure Storage



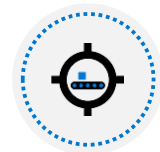
08: Administer Azure Virtual Machines



09: Administer PaaS Compute Options

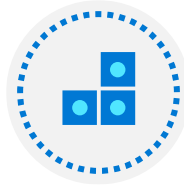


10: Administer Data Protection



11: Administer Monitoring

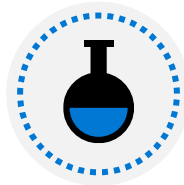
Administer Azure Virtual Machines Overview



[Configure Virtual Machines](#)

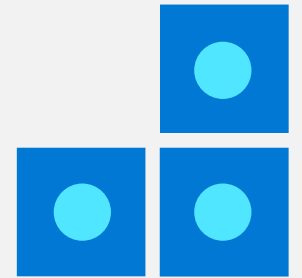


[Configure Virtual Machine Availability](#)



[Lab 08 – Manage Virtual Machines](#)

Configure Virtual Machines



Configure Virtual Machines Introduction



Review Cloud Services Responsibilities



Plan Virtual Machines



Determine Virtual Machine Sizing



Determine Virtual Machine Storage



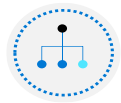
Demonstration - Creating a VM in the Portal



Connect to Virtual Machines



Connect to Windows Virtual Machines

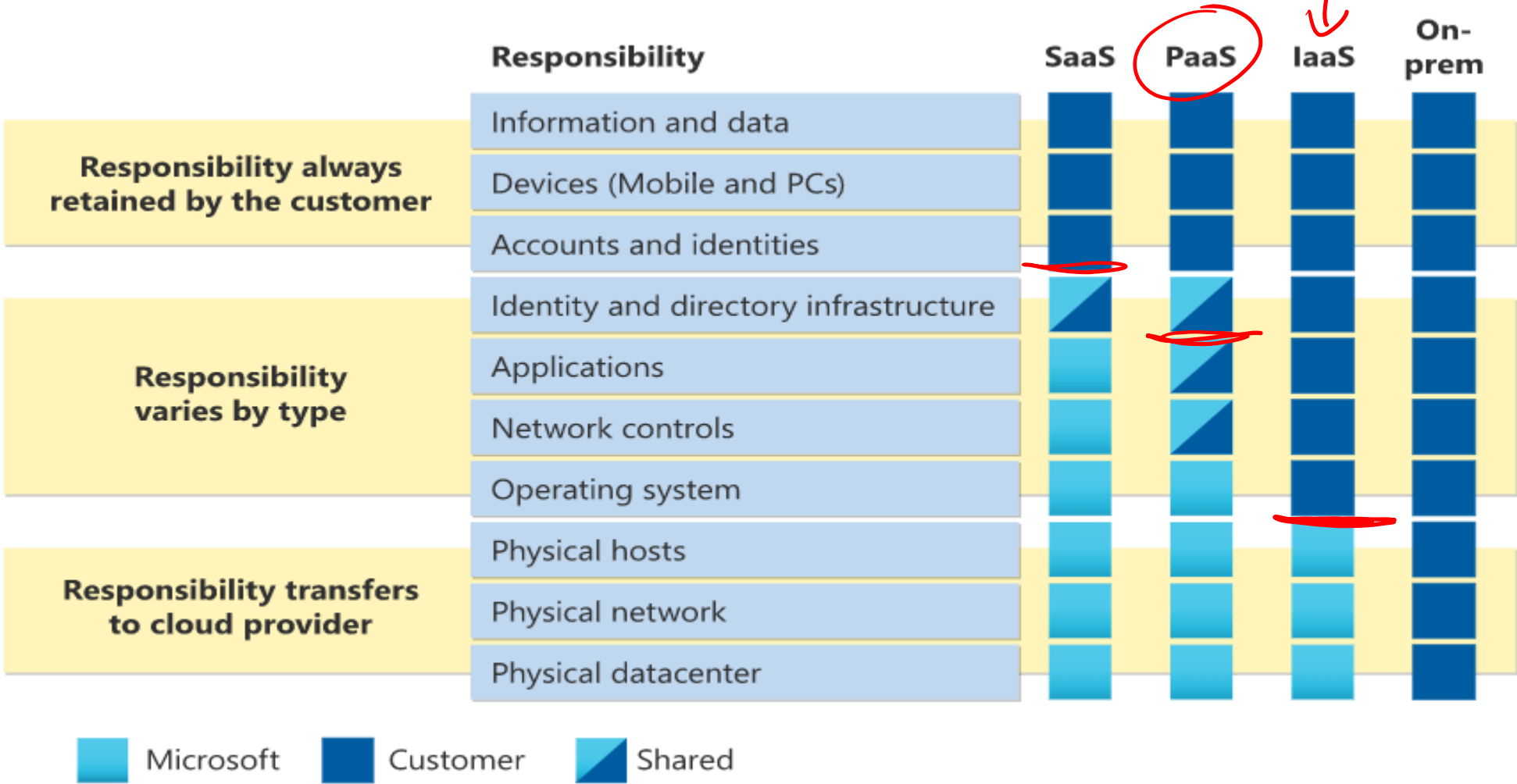


Connect to Linux Virtual Machines



Summary and Resources

Review Cloud Services Responsibilities



Plan Virtual Machines

Size

DS2_v3
DS3_v2

Start with the network

Name the virtual machine

Choose a location

- Each region has different hardware and service capabilities
- Locate Virtual Machines as close as possible to your users and to ensure compliance and legal obligations

Consider pricing



70+ Azure regions
Available in 140 countries

Determine Virtual Machine Sizing

Type	Description
General purpose	Balanced CPU-to-memory ratio.
Compute optimized	High CPU-to-memory ratio.
Memory optimized	High memory-to-CPU ratio.
Storage optimized	High disk throughput and I/O.
GPU	Specialized virtual machines targeted for heavy graphic rendering and video editing.
High performance compute	Our fastest and most powerful CPU virtual machines

Determine Virtual Machine Storage

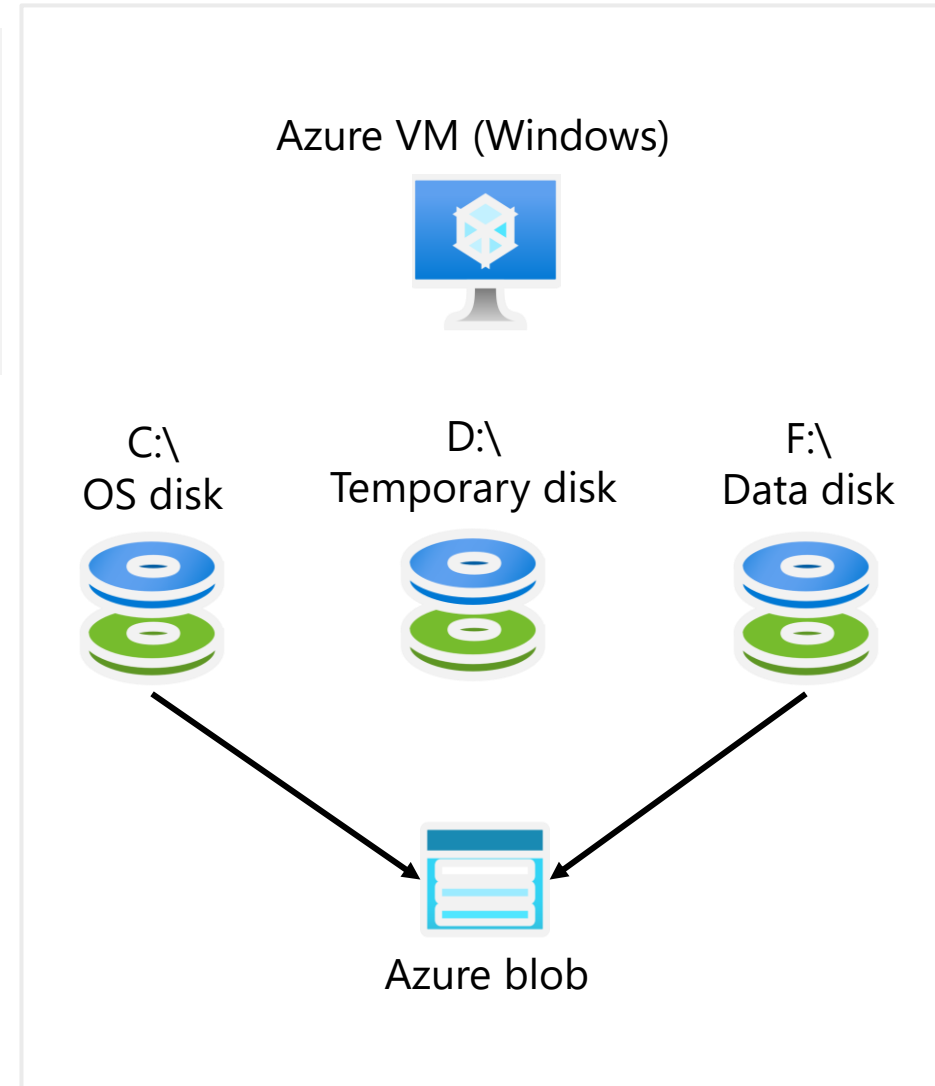
Each Azure VM has two or more disks:

- OS disk
- Temporary disk (not all SKUs have one, content can be lost)
- Data disks (optional)

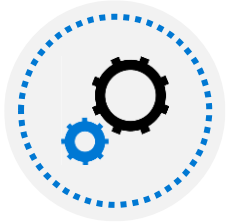
OS and data disks reside in Azure Storage accounts:

- Azure-based storage service
- Standard (HDD, SSD) or Premium (SSD), or Ultra (SSD)

Azure VMs use managed disks



Demonstration – Creating a VM in the Portal

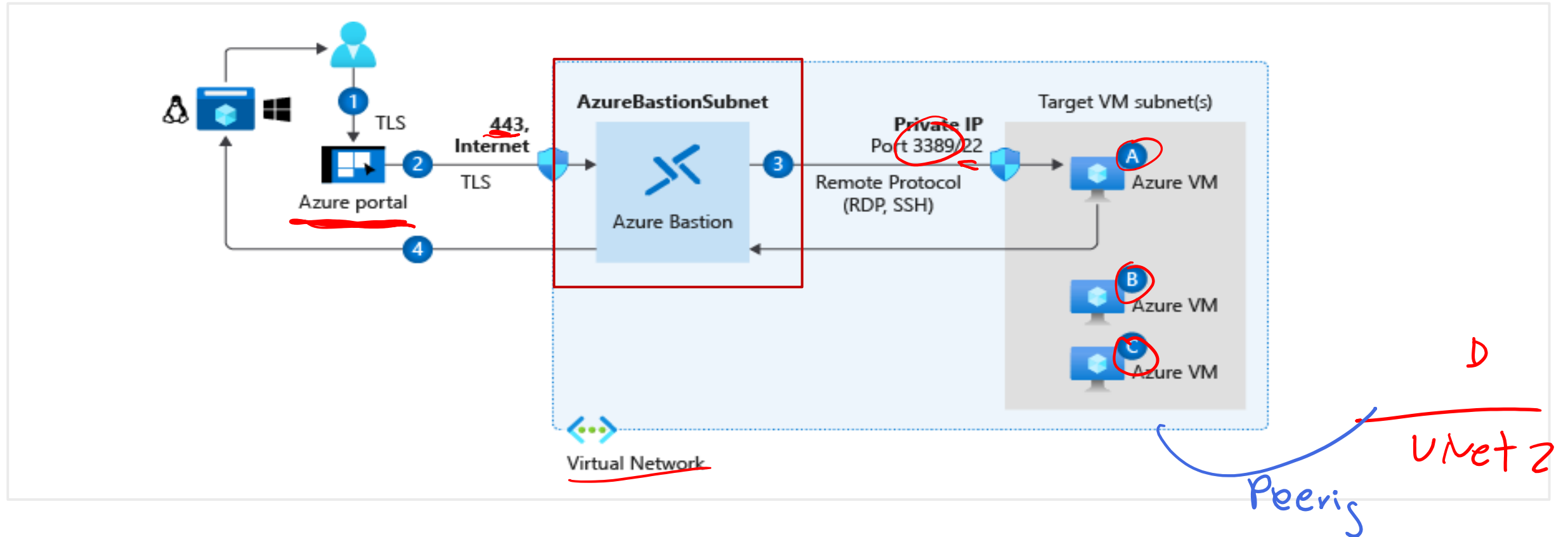


Create the virtual machine



Connect to the virtual machine – Bastion, RDP, or SSH

Connect to Virtual Machines



Bastion Subnet for RDP/SSH through the Portal over SSL

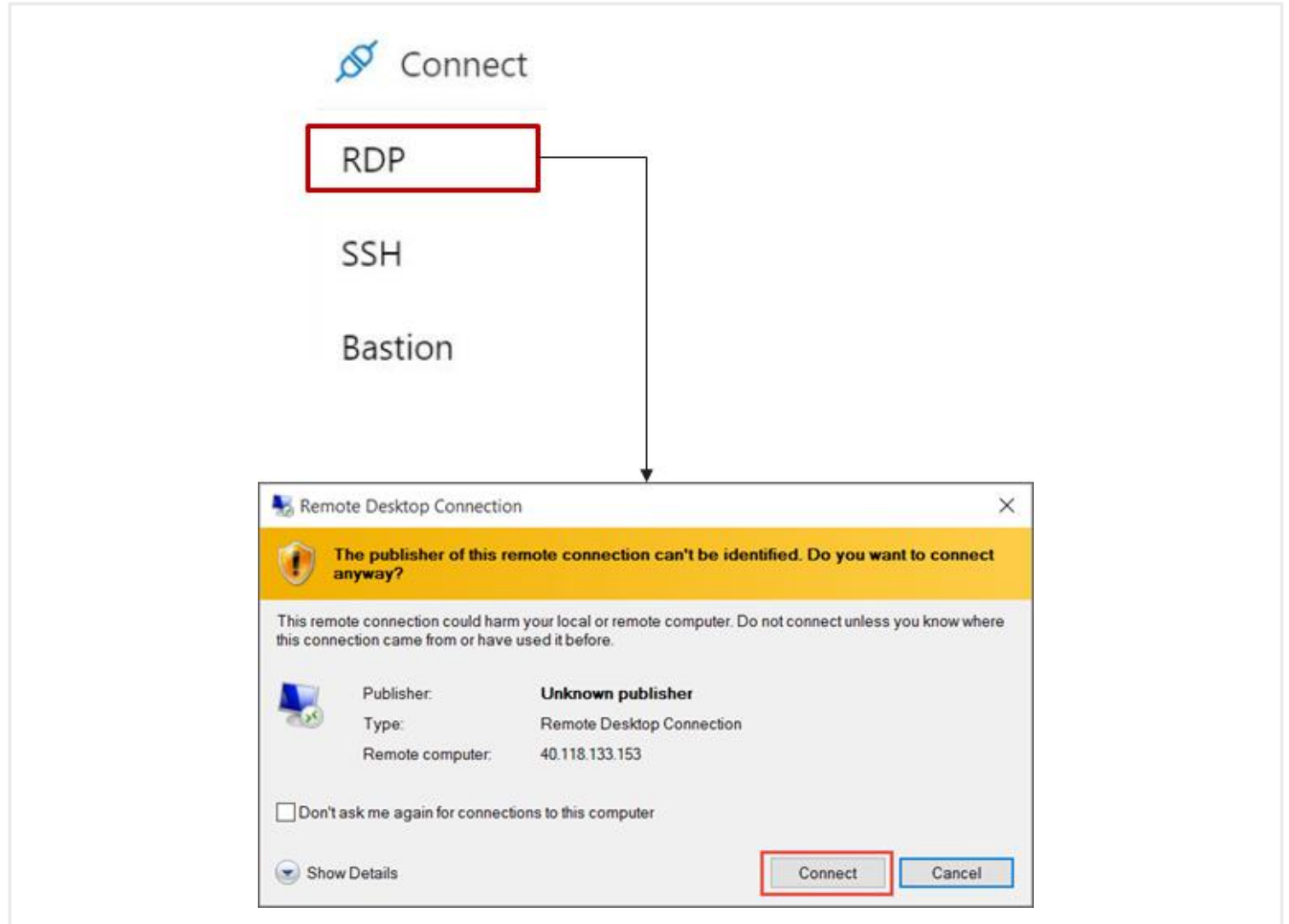
Remote Desktop Protocol for Windows-based Virtual Machines

Secure Shell Protocol for Linux based Virtual Machines

Connect to Windows Virtual Machines

Remote Desktop Protocol (RDP) creates a GUI session and accepts inbound traffic on TCP port 3389

WinRM creates a command-line session so you can run scripts



Connect to Linux Virtual Machines

Administrator account

Authentication type

Username * ⓘ

SSH public key * ⓘ

Provide an RSA public key in the single-line format (starting with "ssh-rsa") or the multi-line PEM format. You can generate SSH keys using ssh-keygen on Linux and OS X, or PuTTYGen on Windows.



[Learn more about creating and using SSH keys in Azure](#)

Authenticate with a SSH public key or password

SSH is an encrypted connection protocol that allows secure logins over unsecured connections

There are public and private keys

Summary and Resources - Configure Virtual Machines

Knowledge Check Questions



Microsoft Learn Modules (docs.microsoft.com/Learn)

[Introduction to Azure virtual machines \(Sandbox\)](#)

[Choose the right disk storage for your virtual machine workload](#)

[Create a Linux virtual machine in Azure \(Sandbox\)](#)

[Create a Windows virtual machine in Azure \(Sandbox\)](#)

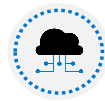
[Connect to virtual machines through the Azure portal by using Azure Bastion](#)

A sandbox indicates a hands-on exercise.

Configure Virtual Machine Availability



Configure Azure Virtual Machine Availability Introduction



Plan for Maintenance and Downtime



Setup Availability Sets



Review Update and Fault Domains



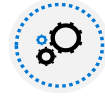
Review Availability Zones



Compare Vertical to Horizontal Scaling



Create Scale Sets (2 student topics)



Configure Autoscale (2 student topics)



Demonstration – Virtual Machine Scaling



Summary and Resources

Plan for Maintenance and Downtime

Unplanned Hardware Maintenance

When the platform predicts a failure, it will issue an **unplanned hardware maintenance** event

Action: Live migration

Unexpected Downtime

Unexpected Downtime is when a virtual machine fails unexpectedly

Action: Automatically migrate (heal)

Planned Maintenance

Planned Maintenance events are periodic updates made to the Azure platform

Action: No action

Setup Availability Sets

Instance details

Name * ⓘ

avset01 ✓

Region * ⓘ

(US) East US ▼

Fault domains ⓘ

2

Update domains ⓘ

5

Use managed disks ⓘ

No (Classic) Yes (Aligned)

Two or more instances in
Availability Sets = 99.95% SLA

Configure multiple
Virtual Machines in
an Availability Set

Configure each
application tier
into separate
Availability Sets

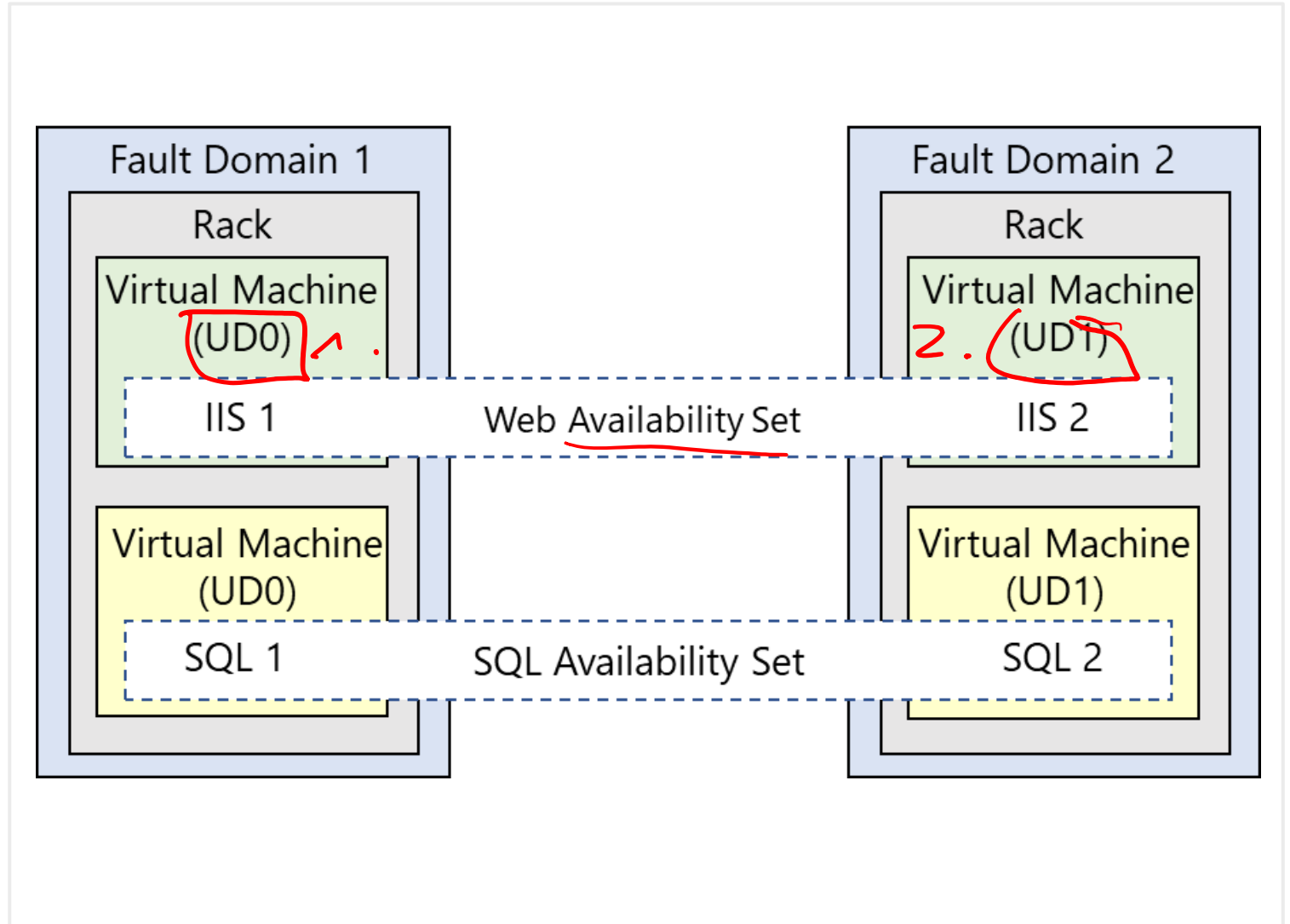
Combine a Load
Balancer with
Availability Sets

Use managed disks
with the Virtual
Machines

Review Update and Fault Domains

Update domains allows Azure to perform incremental or rolling upgrades across a deployment. During planned maintenance, only one update domain is rebooted at a time

Fault Domains are a group of Virtual Machines that share a common set of hardware, switches, that share a single point of failure. VMs in an availability set are placed in at least two fault domains



Review Availability Zones

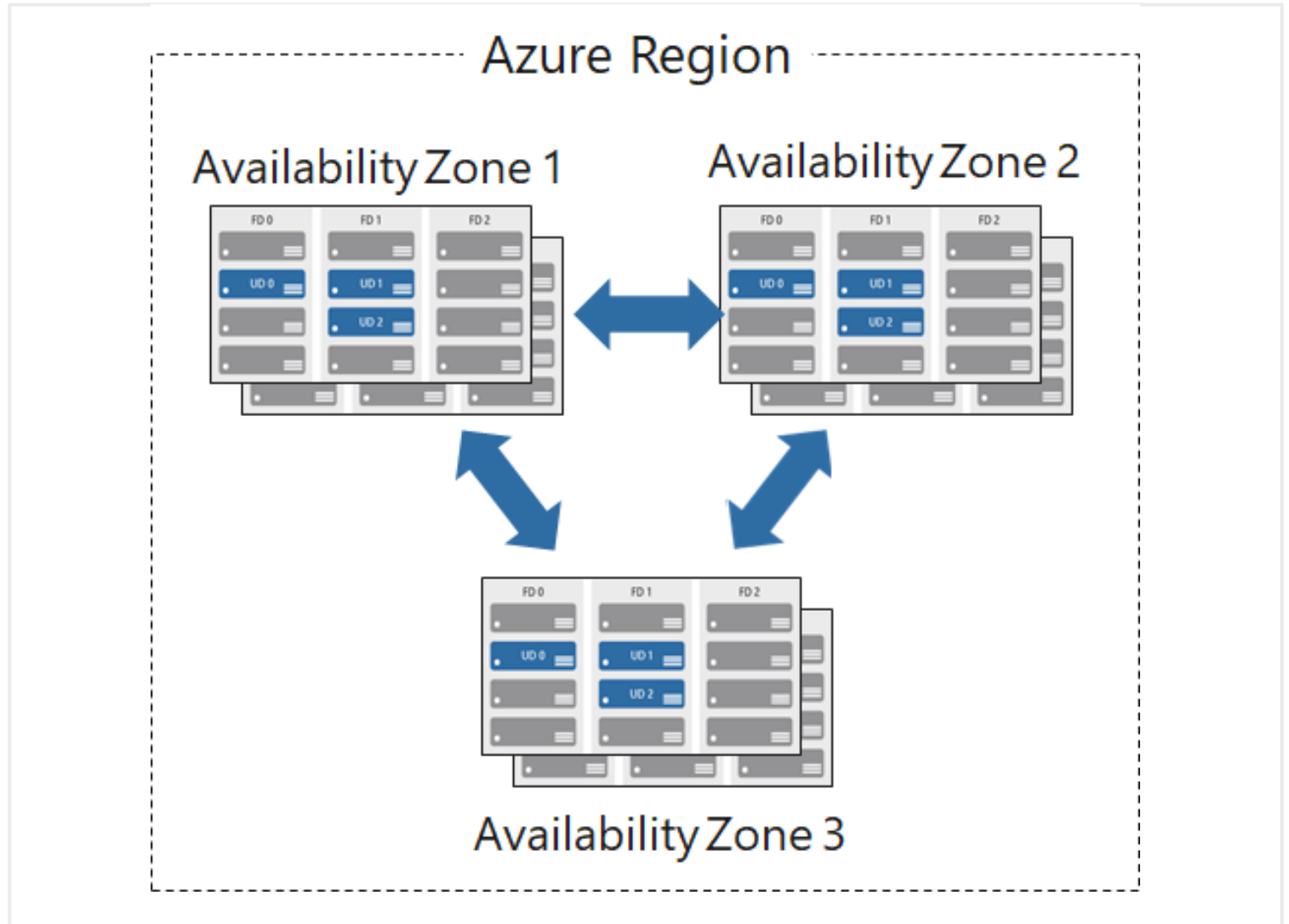
Unique physical locations
in a region

Includes datacenters with
independent power, cooling,
and networking

Protects from datacenter failures

Combines update and
fault domains

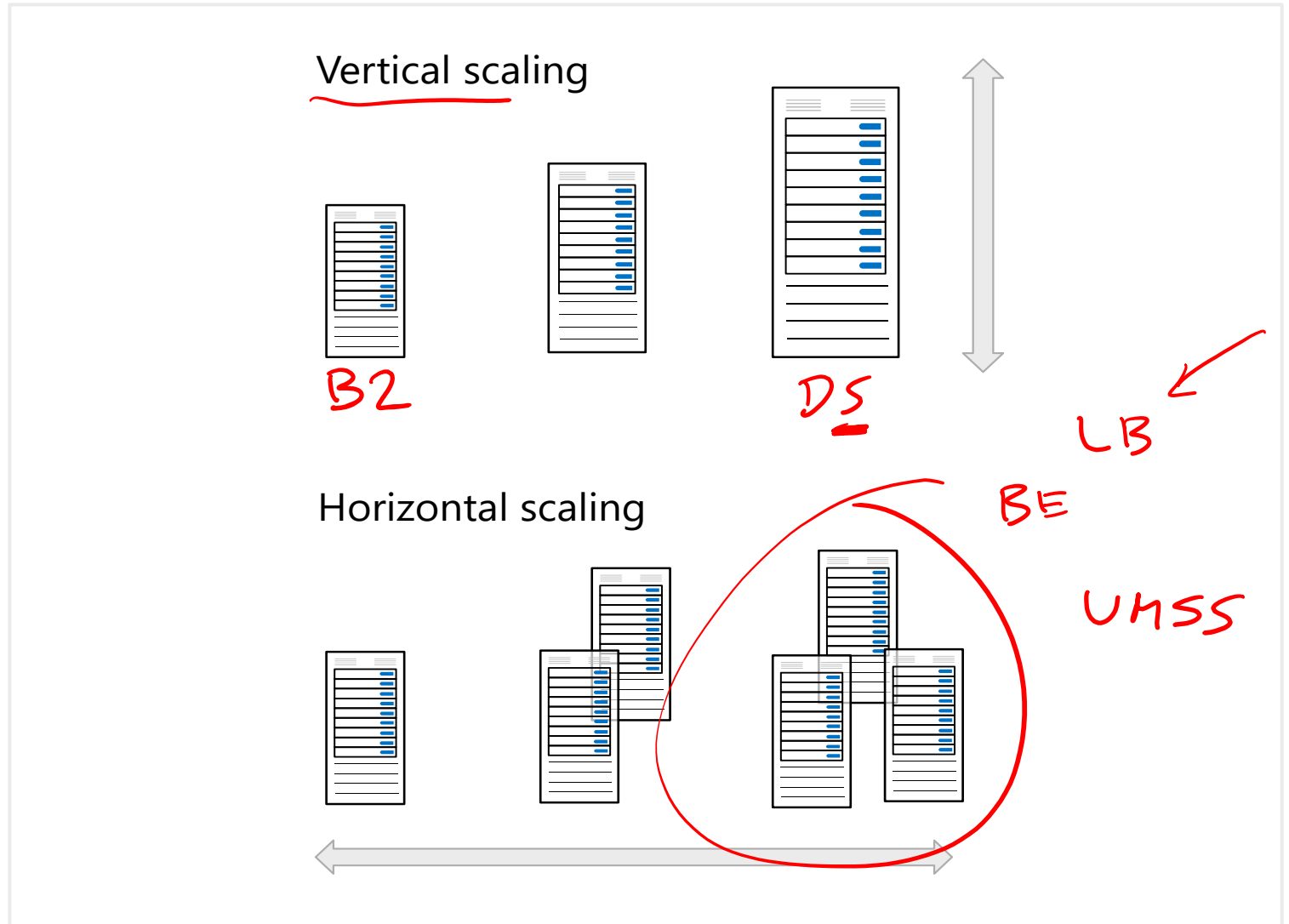
Provides 99.99% SLA



Compare Vertical to Horizontal Scaling

Vertical scaling (scale up and scale down) is the process of increasing or decreasing power to a single instance of a workload; usually manual

Horizontal scaling (scale out and scale in) is the process of increasing or decreasing the number of instances of a workload; frequently automated



Create Scale Sets

Instance count. Number of VMs in the scale set (0 to 1000)

Instance size. The size of each virtual machine in the scale set

Azure Spot Instance. Unused capacity at a discounted rate

Use managed disks

Enable scaling beyond 100 instances

Orchestration

A scale set has a "scale set model" that defines the attributes of virtual machine instances (size, number of data disks, etc). As the number of instances in the scale set changes, new instances are added based on the scale set model.

[Learn more about the scale set model](#)

Orchestration mode * ⓘ

☒ **Flexible:** achieve high availability at scale with identical or multiple virtual machine types

☐ **Uniform:** optimized for large scale stateless workloads with identical instances

Security type ⓘ

Standard

Instance details

Image * ⓘ

Ubuntu Server 20.04 LTS - x64 Gen2

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

VM architecture ⓘ

☐ Arm64

☒ x64

Run with Azure Spot discount ⓘ

☐

Size * ⓘ

Standard_D2s_v3 - 2 vcpus, 8 GiB memory (\$70.08/month)

[See all sizes](#)

Configure Autoscale

Define a minimum, maximum, and default number of VM instances

Create more advanced scale sets with scale out and scale in parameters

Scaling

Scaling policy ⓘ

☐ Manual scaling

☒ Autoscaling

Minimum number of instances * ⓘ

Maximum number of instances * ⓘ

Scale out

CPU threshold (%) * ⓘ

Duration in minutes * ⓘ

Number of instances to increase by * ⓘ ✓

Scale in

CPU threshold (%) * ⓘ

Number of instances to decrease by * ⓘ ✓

Demonstration – Virtual Machine Scaling



Configure Virtual Machine Scale Sets



Review manual scaling, scale-in policies, and custom scaling options

Summary and Resources – Configure Virtual Machine Availability

Knowledge Check Questions

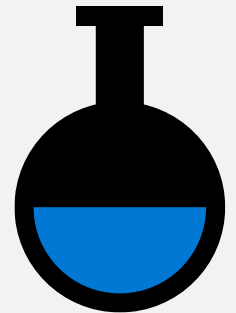
Microsoft Learn Modules (docs.microsoft.com/Learn)



[Build a scalable application with virtual machine scale sets](#)

[Implement scale and high availability with Windows Server VM](#)

Lab – Manage Virtual Machines



Lab 08 – Manage Virtual Machines

Lab scenario

You are tasked with identifying different options for deploying and configuring Azure Virtual Machines

Objectives

Task 1:

Deploy zone-resilient Virtual Machines in the Azure portal and with templates

Task 2:

Configure Azure Virtual Machines by using virtual machine extensions

Task 3:

Scale compute and storage for Azure Virtual Machines

Task 4:

Deploy zone-resilient scale sets by using the Azure portal

Task 5:

Configure Azure virtual machine scale sets by using extensions


Task 6:

Scale compute and storage for Azure virtual machine scale sets

Next slide for an architecture diagram 

Lab 08 – Architecture diagram

Task 1


 az104-08-rg01

 az104-06-vnet01 10.80.0.0/20

Subnet0 10.80.0.0/24


az104-08-vm0
10.80.0.4


Zone1


az104-08-vm1
10.80.0.5

Zone2

Task 2


az10408rg01diag938


scripts



az104-08-install_IIS.ps1

Task 3, Task 4, Task 5, Task 6, Task 7

 az104-08-rg02

 az104-08-rg02-vnet 10.82.0.0/20

Subnet0 10.82.0.0/24


az10408vmss0

az10408vmss0-nsg



az10408vmss0-lb



az10408vmss0-ip

End of presentation

