

Microsoft Azure Administrator: Configure Virtual Machines for High Availability and Scalability

CONFIGURE HIGH AVAILABILITY AND SCALABILITY



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Course Coverage of Certification Objectives



Configure High Availability and Scability

- Configure VMs for high availability
 - Availability sets and zones
 - Fault and update domains
- Deploy and configure scale sets



Exercise Files

Slides

Code

Links to Resources

The screenshot displays the Pluralsight course page for "Securing Microsoft Azure Networks" by Michael Teske. The page is divided into several sections:

- Header:** The course title "Securing Microsoft Azure Networks" is prominently displayed, followed by the author's name "by Michael Teske".
- Description:** A paragraph states: "This course provides a fundamental understanding of Azure network security services, resources, and features to help you better secure your Azure environment. Along the way, you'll learn Microsoft's best practices and their role in your journey."
- Actions:** Below the description are buttons for "Start Course", "Bookmark", "Add to Channel", and "Download Course".
- Table of Contents:** A horizontal menu includes "Table of contents", "Description", "Transcript", "Exercise files" (which is the active tab), "Discussion", "Learning Check", and "Recommended".
- Exercise Files Section:** This section contains the text: "These exercise files are intended to provide you with the assets you need to create a video-based hands-on experience. With the exercise files, you can follow along with the author and re-create the same solution on your computer. We find this to be even more effective than written lab exercises." Below this text is a button labeled "Download exercise files".
- Course Author:** A sidebar on the right introduces Michael Teske as an "Author Evangelist with Pluralsight" who has "20+ years of experience in the IT Ops industry".
- Course Info:** This sidebar section lists the course level as "Beginner", a rating of "★★★★★", a duration of "1h 30m", and a release date of "28 May 2019".
- Share course:** At the bottom of the sidebar are social media icons for Facebook, Twitter, and LinkedIn.



Configure for High Availability



High Availability Constructs

Availability Zones

Fault Domains

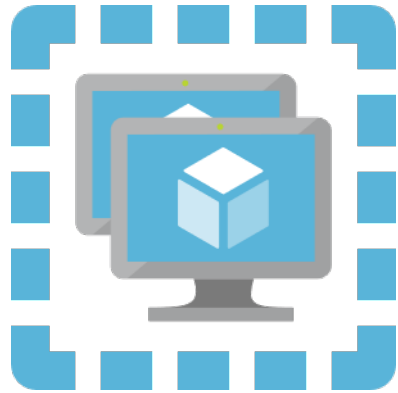
Update Domains

Availability Sets

Scale Sets



Availability Zones



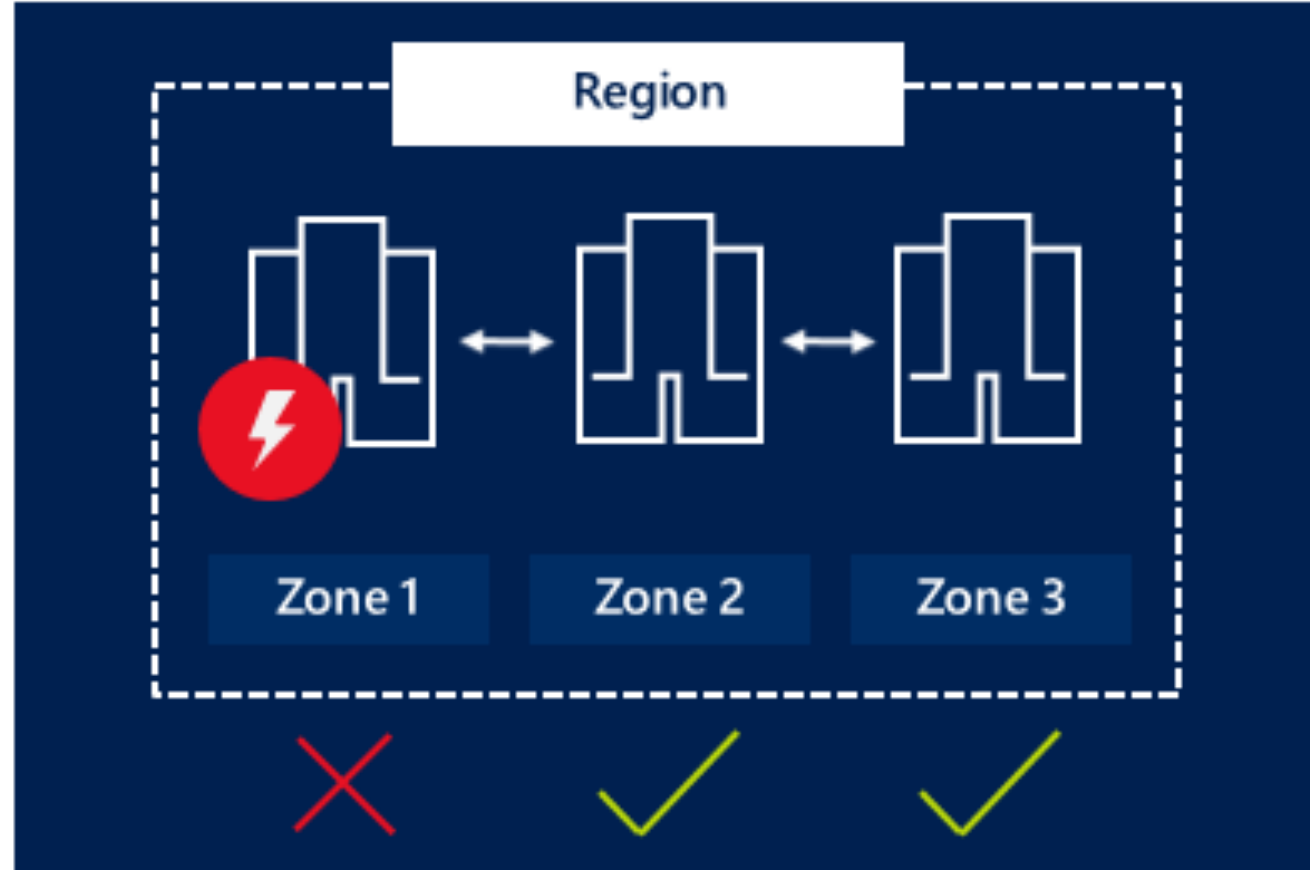
**Availability zones distribute VMs across
*Azure regions***

- Good for application deployments
- 3 zones per region

**Standard SKU load balancers are
availability zone aware**

Standard SKU PIPs are required

Availability Zones



Reference: <https://bit.ly/2Izf9s9>



Availability Zones

[Home](#) > [Virtual machines](#) >

Create a virtual machine

Basics Disks Networking Management 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 * ⓘ

ps-course-development

Resource group * ⓘ

ps-course-rg

[Create new](#)

Instance details

Virtual machine name * ⓘ

web-1

Region * ⓘ

(US) Central US

Availability options ⓘ

Availability zone

Availability zone * ⓘ

Image * ⓘ

1

2

3

Azure Spot instance ⓘ



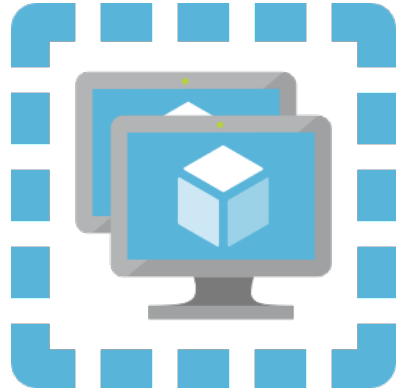
SLA Availability Zones

“For all Virtual Machines that have two or more instances deployed across two or more Availability Zones in the same Azure region, we guarantee you will have Virtual Machine Connectivity to at least one instance at least 99.99% of the time.”

Reference: <https://bit.ly/2IrIG6S>



Fault Domains

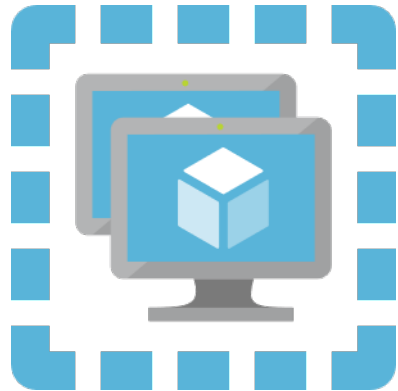


Logical group of hardware in an Azure datacenter

VMs in the same fault domain share common power source and physical network switch



Update Domains



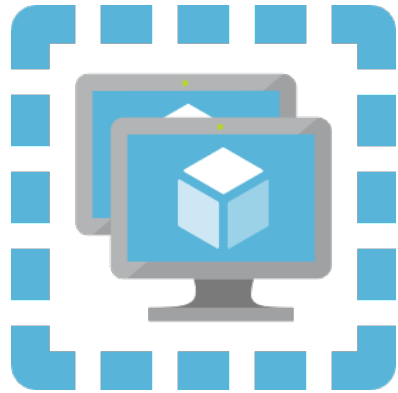
Update domains

- Protect against normal maintenance updates
 - Applying updates to hardware

VMs created in the same update domain will be restarted together during planned maintenance

Only one update domain restarted at a time

Availability Sets



Availability sets group VMs to distribute across a single datacenter

- Minimize disruptions caused by maintenance or outages
- Good for VMs

Cannot add a VM to availability set post deployment.

- Must be done at creation

Availability Set

[Home](#) > [Availability sets](#) >

Create availability set

Basics Advanced Tags Review + create

An Availability Set is a logical grouping capability for isolating VM resources from each other when they're deployed. Azure makes sure that the VMs you place within an Availability Set run across multiple physical servers, compute racks, storage units, and network switches. If a hardware or software failure happens, only a subset of your VMs are impacted and your overall solution stays operational. Availability Sets are essential for building reliable cloud solutions. [Learn more about availability sets.](#)

Project details

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

Subscription * ⓘ

ps-course-development

Resource group * ⓘ

ps-course-rg

[Create new](#)

Instance details

Name * ⓘ

web-pool

Region * ⓘ

(US) Central US

Fault domains ⓘ

2

Update domains ⓘ

5

Use managed disks ⓘ

No (Classic)

Yes (Aligned)

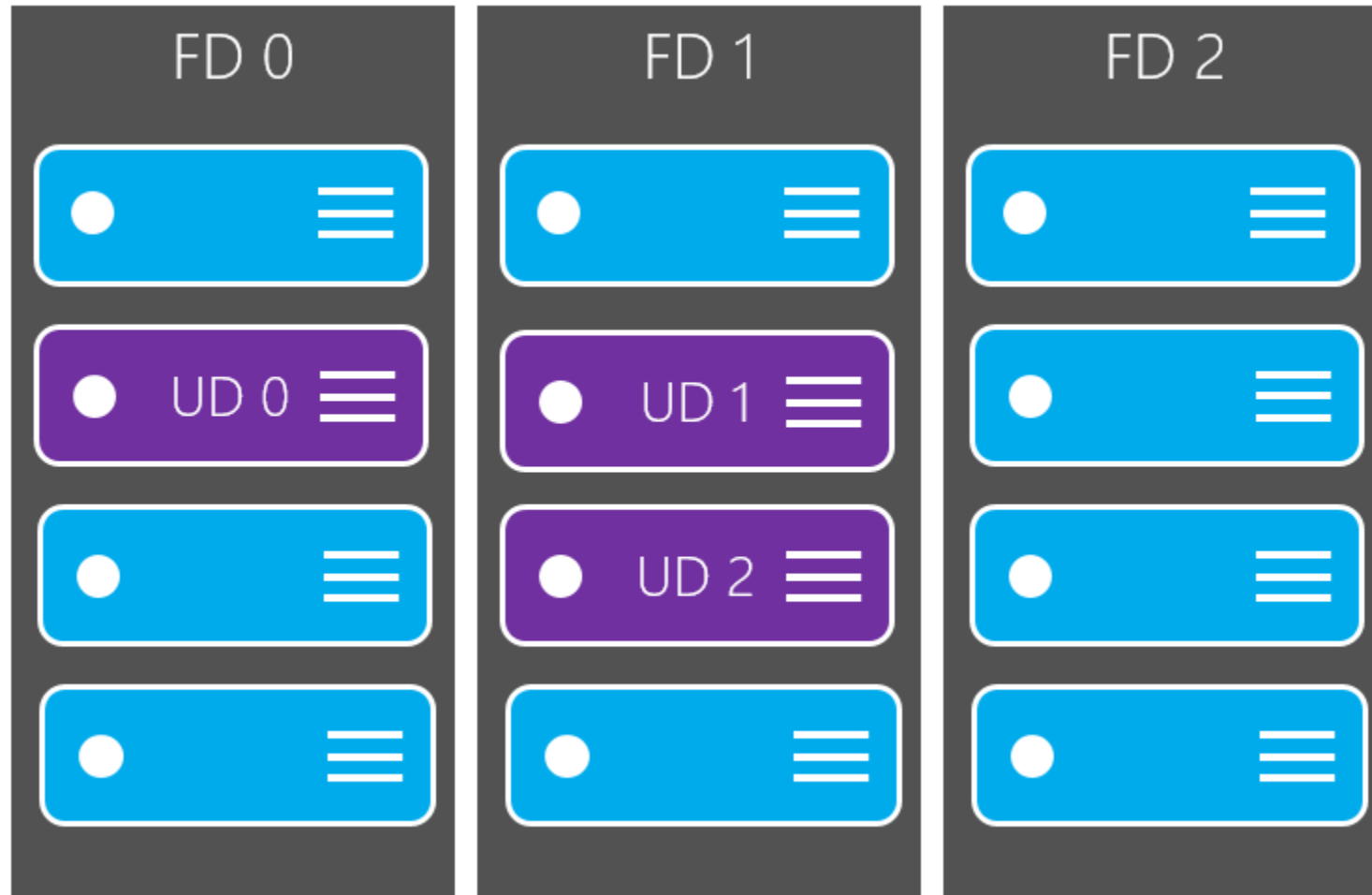
Review + create

< Previous

Next : Advanced >



Availability Sets



Availability Sets

[Home](#) > [Virtual machines](#) >

Create a virtual machine

[Basics](#) [Disks](#) [Networking](#) [Management](#) [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 *

ps-course-development

Resource group *

ps-course-rg

[Create new](#)

Instance details

Virtual machine name *

web1

Region *

(US) Central US

Availability options

Availability set

Availability set *

web-pool

[Create new](#)

Image *

Ubuntu Server 18.04 LTS - Gen1

[Browse all public and private images](#)

Azure Spot instance

☐ Yes ☒ No

[Review + create](#)

[< Previous](#)

[Next : Disks >](#)



SLA for Availability Sets

For all Virtual Machines that have two or more instances deployed in the same Availability Set or in the same Dedicated Host Group, we guarantee you will have Virtual Machine Connectivity to at least one instance at least 99.95% of the time.

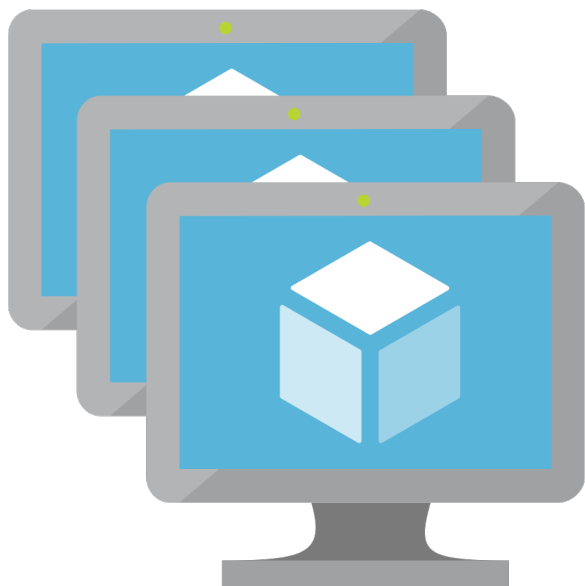
Reference: <https://bit.ly/2IrlG6S>



Configure for High Scalability



Virtual Machine Scale Sets



Group of load balanced virtual machines

Can scale automatically based on demand or schedule

2 or more VMs recommended

No additional cost other than extra instances

Can be deployed across multiple update/fault domains



Virtual Machine Scale Sets

web-pool | Scaling

Virtual machine scale set

Search (Ctrl+/)

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Instances

Networking

Scaling

Disks

Operating system

Security

Size

Extensions

Continuous delivery

Configuration

Upgrade policy

Health and repair

Identity

Properties

Save Discard Refresh Logs Provide feedback

Custom autoscale

Autoscale setting name *

web-pool-Autoscale-727

Resource group

ps-course-rg

Default*

Auto created 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

Scale to a specific instance count

Rules

No metric rules defined; click hyperlink [Add a rule](#) to scale out and scale in your instances based on rules. For example: 'Add a rule that increases instance count by 1 when CPU percentage is above 70%'.

+ Add a rule

Instance limits

Minimum

1

Maximum

2

Default

1


Schedule

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

+ Add a scale condition

A circular button with a right-pointing arrow, indicating the next slide in the presentation.

Virtual Machine Scale Sets

 **web-pool** | Scaling

Virtual machine scale set

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Operating system

Security

Size

Extensions

Continuous delivery

Configuration

Upgrade policy

Health and repair

Identity

Properties

Scale rule

×

Metric source

Current resource (web-pool)

Resource type

Virtual machine scale sets

Resource

web-pool

Criteria

Time aggregation * ⓘ

Average

Metric namespace *

Virtual Machine Host

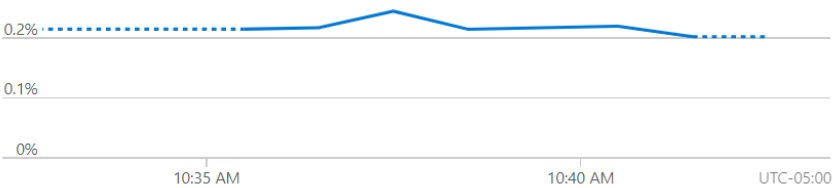
Metric name

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)

0.22 %

☐ Enable metric divide by instance count ⓘ

Operator *

Metric threshold to trigger scale action * ⓘ

+

Add

Instead, you can disable autoscale to

count

out and scale in your instances based on

nt by 1 when CPU percentage is above

Default ⓘ

1 ✓

le condition(s) match



web-po
Virtual machine

Search (Ctrl+/)

- Overview
- Activity log
- Access control (l
- Tags
- Diagnose and so

Settings

- Instances
- Networking
- Scaling
- Disks
- Operating system
- Security
- Size
- Extensions
- Continuous deliv
- Configuration
- Upgrade policy
- Health and repa
- Identity
- Properties

Percentage CPU (Average)

0.22 %

☐ Enable metric divide by instance count ⓘ

Operator *

Greater than



Metric threshold to trigger scale action * ⓘ

70

%

Duration (in minutes) * ⓘ

10

Time grain (in mins) ⓘ

1

Time grain statistic * ⓘ

Average



Action

Operation *

Increase count by



Cool down (minutes) * ⓘ

5

Instance count *

1



Add



Demo



Deploying to an Availability Zones

Deploying to an Availability Sets

Create Virtual Machine Scale Set



Summary



Availability zones distribute VMs across *Azure regions*

- SLA 99.99%

Fault domains are a rack of servers in an Azure datacenter

Update domains servers protect against normal maintenance

- I.e. Hardware updates

Availability sets group VMs to distribute across a single datacenter

- SLA 99.95%
- Must be assigned during deployment



Summary



Virtual machine scale sets are a group of load balanced VMs

- No additional costs
- Can be deployed across multiple update/fault domains
- Rules can be created based on performance metrics or schedules
- Understand how a rule may impact the number of instances scaled based on metrics

