

FLEXIBLE ORCHESTRATION

Scale sets with Flexible orchestration:

Achieve high availability at scale with identical or multiple virtual machine types.

With Flexible orchestration, Azure provides a unified experience across the Azure VM ecosystem. Flexible orchestration offers high availability guarantees (up to 1000 VMs) by spreading VMs across fault domains in a region or within an Availability Zone. This enables you to scale out your application while maintaining fault domain isolation that is essential to run quorum-based or stateful workloads, including:

1. Quorum-based workloads
2. Open-Source databases
3. Stateful applications
4. Services that require High Availability and large scale
5. Services that want to mix virtual machine types or Spot and on-demand VMs together
6. Existing Availability Set applications

 One of the main advantages of Flexible orchestration is that it provides orchestration features over standard Azure IaaS VMs, instead of scale set child virtual machines. This means you can use all of the standard VM APIs when managing Flexible orchestration instances, instead of the Virtual Machine Scale Set VM APIs you use with Uniform orchestration. There are several differences between managing instances in Flexible orchestration versus Uniform orchestration. In general, we recommend that you use the standard Azure IaaS VM APIs when possible. In this section, we highlight examples of best practices for managing VM instances with Flexible orchestration.

 Flexible orchestration mode can be used with all VM sizes. Flexible orchestration mode provides the highest scale and configurability for VM sizes that support memory preserving updates or live migration such as when using the B, D, E and F-series or when the scale set is configured for maximum spreading between instances `platformFaultDomainCount=1`. Currently, the Flexible orchestration mode has additional constraints for VM sizes that don't support memory preserving updates including the G, H, L, M, and N-series VMs and instances are spread across multiple fault domains. You can use the Compute Resource SKUs API to determine whether a specific VM SKU supports memory preserving updates.

Feature	Memory Preserving Updates Supported or Scale set with Max Spreading (platformFaultDomainCount=1)	Memory Preserving Updates Not Supported and Fixed Spreading (platformFaultDomainCount > 1)
Maximum Virtual Machine Scale Sets Instance Count	1000	200
Mix operating systems	Yes	Yes
Mix Spot and On-demand instances	Yes	No
Mix General Purpose and Specialty SKU Types	Yes (FDCount = 1)	No
Maximum Fault Domain Count	Regional – 3 (depending on the regional fault domain max count) Zonal – 1	Regional – 3 Zonal – 1
Spread instances across zones	Yes	Yes
Assign VM to a Specific Zone	Yes	Yes
Assign VM to a Specific Fault domain	Yes	No
Update Domains	No	No
Single Placement Group	Optional. This will be set to false based on first VM deployed	Optional. This will be set to true based on first VM deployed

💡 TO BEGIN WITH THE LAB

Step 1: Create scale set with Flexible Orchestration

1. The process is same which was done while creating the set.
2. Open Azure Portal. Go to create resources
3. Then search Virtual Machine Scale Set. Click on create.
4. Select your resource give it a name.

Create a virtual machine scale set

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

Subscription *	Free Trial
Resource group *	app-grp
	Create new
Scale set details	
Virtual machine scale set name *	demo-set
Region *	(Asia Pacific) Central India
Availability zone ⓘ	None

5. Then select orchestration as Flexible.

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 * ⓘ	<input checked="" type="radio"/> Flexible: achieve high availability at scale with identical or multiple virtual machine types <input type="radio"/> Uniform: optimized for large scale stateless workloads with identical instances
Security type ⓘ	Standard

6. Select image as ubuntu, then select the options shown below.

Instance details

Image * ⓘ Ubuntu Server 20.04 LTS - x64 Gen2 (free services eligible) ▼
[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

Run with Azure Spot discount ⓘ

Size * ⓘ Standard_B1s - 1 vcpu, 1 GiB memory (₹642.10/month) (free services eligible) ▼
[See all sizes](#)

Enable Hibernation (preview) ⓘ
i To enable Hibernation, you must register your subscription. [Learn more](#) ↗

Administrator account

Authentication type ⓘ Password SSH public key

Username * ⓘ ✓

Password * ⓘ ✓

Confirm password * ⓘ ✓

Review + create

[< Previous](#) [Next : Spot >](#)

7. On the networking section you will see that a network interface has been created.
8. Now you need to click **pencil** like option in the network interface option.
9. This will take you to a new window to select or change few options as per your choice.

Network interface

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

+ Create new nic Delete

<input type="checkbox"/>	NAME	CREATE PUBLI...	SUBNET	NETWORK SECURI...	ACCELERATED N...
<input type="checkbox"/>	app-grp-vnet-nic01	No	default (10.0.0.0/20)	Basic	Off edit

10. There you need to keep these settings to default.

Network interface

Name *

Virtual network

Subnet *

NIC network security group

None
 Basic
 Advanced

11. Then in public inbound ports click on Allow selected ports.

12. Then select SSH (22), this will allow us to log in to our ubuntu virtual machine.

Public inbound ports *

None
 Allow selected ports

Select inbound ports *

SSH (22)
 HTTP (80)
 HTTPS (443)
 SSH (22)
 RDP (3389)

13. In the last click on enable to Public IP address. We will need a public IP to log in to our virtual machine.

14. Then click ok and move forward.

Public IP address

Disabled Enabled

Accelerated networking

Disabled Enabled

OK **Cancel**

15. In the scaling section change the initial instance count to 1 because you want to create only one instance for the time being.
16. Keep rest of the things to default and move to review page.
17. Now you need to create your scale set virtual machine.

Create a virtual machine scale set ...

Basics Spot Disks Networking **Scaling** Management Health Advanced Tags Review + create

An Azure virtual machine scale set can automatically increase or decrease the number of VM instances that run your application. This automated and elastic behavior reduces the management overhead to monitor and optimize the performance of your application. [Learn more about VMSS scaling](#)

Initial instance count * ✓

Scaling

Scaling policy ⓘ

Manual

Custom

Improve your availability by selecting multiple zones

Scale-In policy

Configure the order in which virtual machines are selected for deletion during a scale-in operation.

[Learn more about scale-in policies](#)

Scale-in policy

ⓘ

Apply force delete to scale-in operations

ⓘ

18. When the deployment is completed.

Your deployment is complete



Deployment name : CreateVmss-canonical.0001-com-ubuntu-ser... Start time : 12/27/2023, 9:08:59 PM

Subscription : Free Trial

Correlation ID : ca041e9e-f6e9-4086-b17e-855df9e1bdb7

Resource group : app-grp

Deployment details

Next steps

[Go to resource](#)

19. Go to all resources.

FAVORITES

All resources

20. Here in the all resources, you can see you have your demo-set ready and with that there are some more options such as you can see your public IP there.

21. Which was not in the case with Uniform orchestration, you have seen that in the last lab which you did.

All resources X

Default Directory (pulkitkumar2711@gmail.onmicrosoft.com)

+ Create Manage view Refresh Export to CSV Open query Assign tags Delete

Filter for any field... Subscription equals all Resource group equals all Type equals all Location equals all + Add filter

No grouping					List view
0 Recommendations	9 Changed resources	2 Unsecure resources			
Name ↑	Type ↑	Resource group ↑	Location ↑	Subscription ↑	
□ app-grp-vnet	Virtual network	app-grp	Central India	Free Trial	...
□ app-grp-vnet-nic01-a0c74660	Network Interface	app-grp	Central India	Free Trial	...
□ app-set	Availability set	app-grp	Central India	Free Trial	...
□ appstorage2711	Storage account	app-grp	Central India	Free Trial	...
□ appvault2711	Key vault	app-grp	Central India	Free Trial	...
□ basicNsgapp-grp-vnet-nic01	Network security group	app-grp	Central India	Free Trial	...
□ demo-set	Virtual machine scale set	app-grp	Central India	Free Trial	...
□ demo-set_3d68ad8f	Virtual machine	app-grp	Central India	Free Trial	...
□ demo-set_3d68ad8f_disk1_3e4a5bcddee648cd868bd468801e4778	Disk	APP-GRP	Central India	Free Trial	...
□ NetworkWatcher_centralindia	Network Watcher	NetworkWatcherRG	Central India	Free Trial	...
□ publicip-app-grp-vnet-nic01-a0c74660	Public IP address	app-grp	Central India	Free Trial	...

Step 2: Create a virtual machine by using scale set.

1. Now go to create resources and create a virtual machine.
2. Select your resource group then give machine a name
3. Now in the availability options select **Virtual machine scale set**.
4. Then select your scale set.

Project details

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

Subscription *	Free Trial
Resource group *	app-grp Create new

Instance details

Virtual machine name *	newvm ✓
Region *	(Asia Pacific) Central India
Availability options	Virtual machine scale set
Virtual machine scale set *	demo-set Create new

5. The rest of the steps are same to create the virtual machine. Complete those steps.

Fault domain ⓘ

Security type ⓘ

Image * ⓘ [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

Run with Azure Spot discount ⓘ

You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more](#)

Size * ⓘ [See all sizes](#)

Administrator account

Authentication type ⓘ SSH public key Password

Username * ⓘ

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 *

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

[Review + create](#)[< Previous](#)[Next : Disks >](#)

6. Jump review page and create your virtual machine.
7. Once the deployment is complete. Go to all resources.

✓ Your deployment is complete

Deployment name: CreateVm-canonical.0001-com-ubuntu-server-f... Start time: 12/27/2023, 9:21:33 PM
Subscription: Free Trial Correlation ID: 65dd20dd-1598-465a-b841-4c797cf2a817 

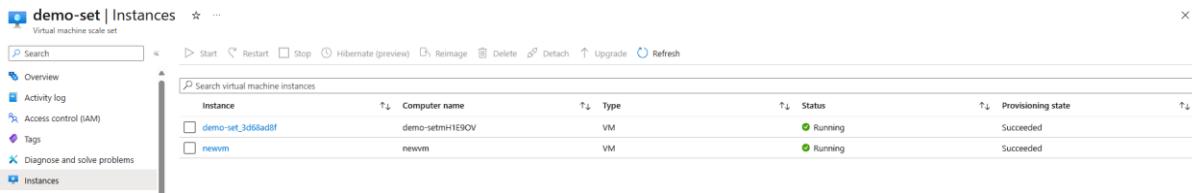
Deployment details

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](#)

8. In the all-resources page, open your scale set.
9. There go to instances there you can see your virtual machine along side with the scale set instance.



Instance	Computer name	Type	Status	Provisioning state
demo-set_3d68adbf	demo-setmiH1E9OV	VM	Running	Succeeded
newvm	newvm	VM	Running	Succeeded

👉 So, you've seen some key differences when it comes on to having virtual machine in the flexible orchestration mode. If you just have the requirement of the machines being part of the skill set and you don't want match them separately, but you just have one resource that is a skill set, then you can go with the uniform orchestration mode. But if you want to have execute commands against the virtual machine separately, then you can make use of the flexible orchestration mode.