

AZURE AVAILABILITY SET

What is an availability set?

Availability sets are logical groupings of VMs that reduce the chance of correlated failures bringing down related VMs at the same time. Availability sets place VMs in different fault domains for better reliability, especially beneficial if a region doesn't support availability zones. When using availability sets, create two or more VMs within an availability set. Using two or more VMs in an availability set helps highly available applications and meets the 99.95% Azure SLA. There's no extra cost for using availability sets, you only pay for each VM instance you create.

Availability sets offer improved VM to VM latencies compared to availability zones, since VMs in an availability set are allocated in closer proximity. Availability sets have fault isolation for many possible failures, minimizing single points of failure, and offering high availability. Availability sets are still susceptible to certain shared infrastructure failures, like datacentre network failures, which can affect multiple fault domains.

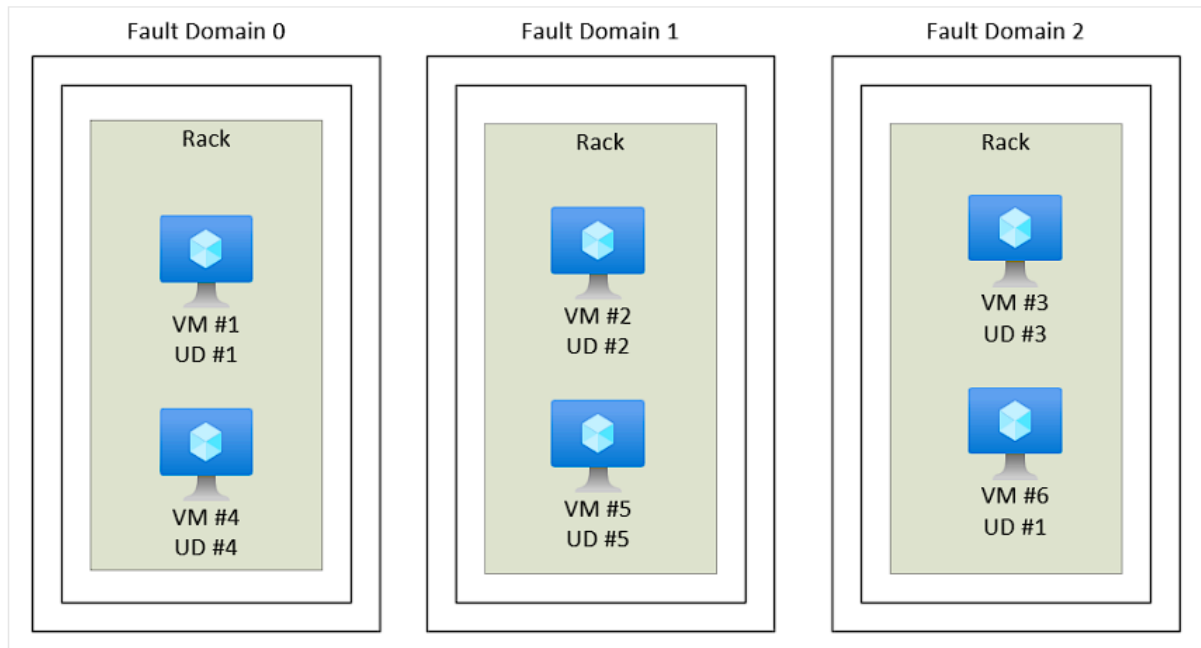
For more reliability than availability sets offer, use availability zones. Availability zones offer the highest reliability since each VM is deployed in multiple datacentres, protecting you from loss of either power, networking, or cooling in an individual datacentre. If your highest priority is the best reliability for your workload, replicate your VMs across multiple availability zones.

How do availability sets work?

Each virtual machine in your availability set is assigned an update domain and a fault domain by the underlying Azure platform. Each availability set can be configured with up to 3 fault domains and 20 update domains. These configurations can't be changed once the availability set has been created. Update domains indicate groups of virtual machines and underlying physical hardware that can be rebooted at the same time. When more than five virtual machines are configured within a single availability set with five update domains, the sixth virtual machine is placed into the same update domain as the first virtual machine, the seventh in the same update domain as the second virtual machine, and so on. The order of update domains being rebooted may not proceed sequentially during planned maintenance, but only one update domain is rebooted at a time. A rebooted update domain is given 30 minutes to recover before maintenance is initiated on a different update domain.

Fault domains define the group of virtual machines that share a common power source and network switch. By default, the virtual machines configured within your availability set are separated across up to three fault domains. While placing your virtual machines into an availability set doesn't protect your application from operating system or application-specific failures, it does limit the impact of potential physical hardware failures, network outages, or power interruptions.

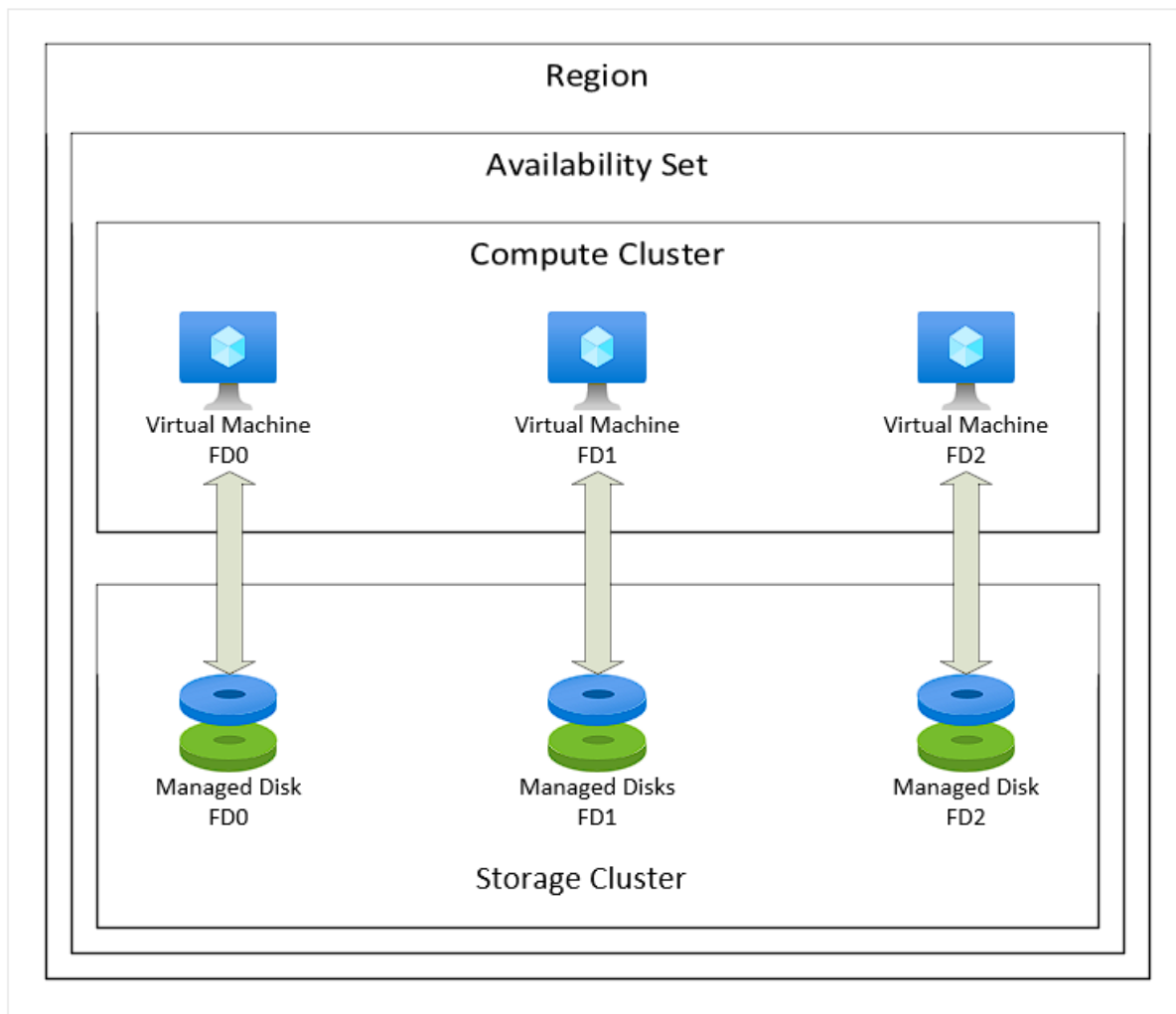
VMs are also aligned with disk fault domains. This alignment ensures that all the managed disks attached to a VM are within the same fault domains.



Under certain circumstances, two VMs in the same availability set might share a fault domain. You can confirm a shared fault domain by going to your availability set and checking the Fault Domain column. A shared fault domain might be caused by the completing following sequence when you deployed the VMs:

1. Deploy the first VM.
2. Stop/deallocate the first VM.
3. Deploy the second VM.

Under these circumstances, the OS disk of the second VM might be created on the same fault domain as the first VM, so the two VMs will be on same fault domain. To avoid this issue, we recommend that you don't stop/deallocate VMs between deployments.



TO BEGIN WITH THE LAB

Step 1:

1. Log in to Azure Portal.
2. Go to create resources page.
3. There you need to create Linux Virtual machine.
4. Select your resource group. Then give a name to your virtual machine.

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 * ⓘ

appvm1

- Then in the Availability options, you need to select Availability set.

Availability set

No infrastructure redundancy required

Availability zone

Physically separate your resources within an Azure region.

Virtual machine scale set

Distribute VMs across zones and fault domains at scale

Availability set

Automatically distribute your VMs across multiple fault domains.

Instance details

Virtual machine name *	appvm1
Region *	(Asia Pacific) Central India
Availability options	Availability set

- Now you need to create an Availability set.
- For that click on Create new.
- Give it a name then click on OK (at the bottom)

Availability set *	No existing availability sets in current resource group and location.
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[Create new](#)

Create availability set



Group two or more VMs in an availability set to ensure that at least one is available during planned or unplanned maintenance events. [Learn more](#)

Name *

app-set

Fault domains

<div></div>	2
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Update domains

<div></div>	5
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Use managed disks

No (Classic)	Yes (Aligned)
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9. Now for the image select Ubuntu server.

Availability set *	<div>(new) app-set</div> <div>Create new</div>
Security type	<div>Standard</div>
Image *	<div> Ubuntu Server 20.04 LTS - x64 Gen2 (free services eligible)</div> <div>See all images Configure VM generation</div> <div> This image is compatible with additional security features. Click here to swap to the Trusted launch security type.</div>
VM architecture	<div><input type="radio"/> Arm64</div> <div><input checked="" type="radio"/> x64</div>
Run with Azure Spot discount	<input type="checkbox"/>
Size *	<div>Standard_B1s - 1 vcpu, 1 GiB memory (₹642.10/month) (free services eligible)</div> <div>See all sizes</div>
Enable Hibernation (preview)	<div><input type="checkbox"/></div> <div> To enable Hibernation, you must register your subscription. Learn more</div>
Administrator account	
Authentication type	<div><input type="radio"/> SSH public key</div> <div><input checked="" type="radio"/> Password</div>
Username *	<div>demour</div> <div>✓</div>
Password *	<div>.....</div> <div>✓</div>
Confirm password *	<div>.....</div> <div>✓</div>
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 *	<div><input type="radio"/> None</div> <div><input checked="" type="radio"/> Allow selected ports</div>
Select inbound ports *	<div>SSH (22)</div>
<div> All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.</div>	

Review + create

< Previous

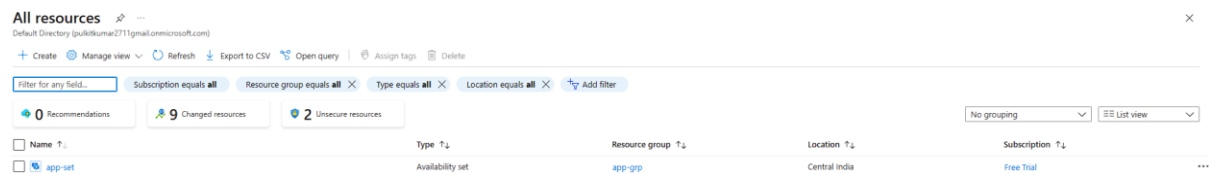
Next : Disks >

10. Now keep rest of the setting to default and jump to review page and create your machine.

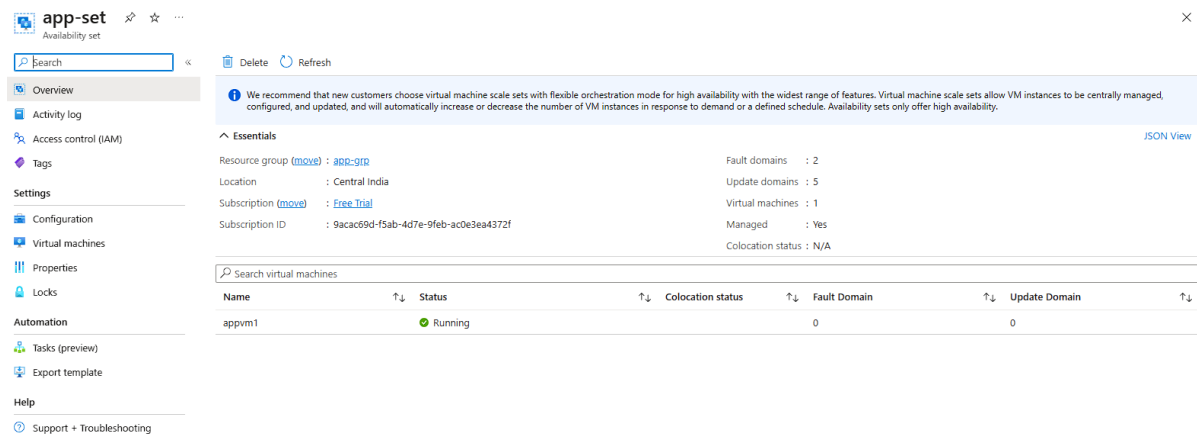
11. Wait for the deployment. Once it gets deployed Go to all resources.



12. In the all resources, you can see your app-set which is your availability set.



13. Open it and there you can see your machine is in running state and it is assigned Fault domain to zero and Update domain to zero.



See, nothing has changed when it comes onto the VM itself, so you can still log onto the VM, you can install your workload, etc. That remains the same. It's only from an infrastructure aspect that now this VM is being made part of something, a logical setting.

Step 2:

1. Now you need to create a new virtual machine with the same **Availability set**.

Create a virtual machine ...

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 * ⓘ	appvm2
Region * ⓘ	(Asia Pacific) Central India
Availability options ⓘ	Availability set

i Based on your input, you might want to consider creating this resource as a virtual machine scale set, which allows you to manage, configure and scale load balanced virtual machines. [Create as VMSS](#)

Availability set * ⓘ	app-set
Security type ⓘ	Standard
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.](#)

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

Enable Hibernation (preview) ⓘ ☐

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

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](#)

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[Next : Disks >](#)

2. After doing the above setting, jump to review page and create your virtual machine.
3. After the machine has deployed, go to All resources and open app-set which is your availability set.
4. You can see that a new virtual machine can be seen there which is also in the running state.

app-set Availability set

Search

Overview | Activity log | Access control (IAM) | Tags | Settings | Configuration | Virtual machines | Properties | Locks | Automation | Tasks (preview) | Export template | Help | Support + Troubleshooting

ⓘ We recommend that new customers choose virtual machine scale sets with flexible orchestration mode for high availability with the widest range of features. Virtual machine scale sets allow VM instances to be centrally managed, configured, and updated, and will automatically increase or decrease the number of VM instances in response to demand or a defined schedule. Availability sets only offer high availability.

Essentials

Resource group (move) : [app-gp](#) Fault domains : 2
 Location : Central India Update domains : 5
 Subscription (move) : [Free Trial](#) Virtual machines : 2
 Subscription ID : 9acac69d-f5ab-4d7e-9feb-ac0e3ea4372f Managed : Yes
 Colocation status : N/A

Search virtual machines

Name	↑↓ Status	↑↓ Colocation status	↑↓ Fault Domain	↑↓ Update Domain	↑↓
appvm1	Running		0	0	
appvm2	Running		1	1	

You will see this VM has been made part of fault domain one and update domain one. So, if any fault occurs on the physical infrastructure that is linked onto, let's say for domain zero, then it would only impact upon one. When Microsoft needs to make updates onto the underlying physical servers, it would first make the update onto, let's say update domain zero. At that point in time, appvm1 may not be available if a restart is required on the underlying physical server. Once that update is complete and appvm1 is in the running state, in case if it was restarted, then the updates would go on to update domain one. And at that point in time, I said if a restart is required, then appvm2 would be restarted accordingly. So again, availability set is just an option to increase the availability of your infrastructure.