

We can make machines part of the availability set . When we do this - vm is added to fault and updates domains .

Fault domain : Each fault domain

So each fault domain has its own server, physical server along with the required physical components. So over here, each power source is separate from the other power source so that different servers and all of them have different power and networking sources.

Now, when you go ahead and create a VM and you assign it onto an availability set, that VM will be assigned onto a fault domain. Now, when you go ahead and create another VM that's part of your application, it will be assigned onto another domain.

So it'll be launched on another server and similarly for the other VM as well.

So in this case, what happens is that if any one of the elements goes down, so let's say the power goes down over here, that means this server is no longer available.

That means this VM is no longer available. But then you have the other VM's still available.

So that means your entire application infrastructure is available, as a whole.

It is your responsibility to ensure that you create the VM and assign it onto the availability set.

The availability set is not going to go out and create the virtual machine for you.

The availability set will actually go ahead and ensure that the VM's are distributed across the fault domains when you go ahead and assign the VM on to the availability set.

That's when it comes to the fault domains.

So if anything goes wrong, right, you have the fault domains in place.

UPDATE DOMAINS :

So in the update domain , normally Microsoft needs to go out and perform updates on the underlying physical server, so this could be bios level updates or other upgrades that are required for the physical server itself.

And sometimes during these updates, it is required to go ahead and maybe restart that physical server.

So if you have to go ahead and restart, let's say this physical server, that means these VM's will not be available. Again

I said that when you go out and create a VM and assign it onto an availability set, It will go ahead and assign

that VM onto a fault domain and also onto an update domain.

So let's imagine that you have three VM's that are part of an update domain.

So if this machine were to get restarted, right, this physical server, then you would not have these three VMS in place.

Now, please note over here, I'm giving the worst use case scenario.

Actually, when the VMS are spread across the update and fault domains, they will be spread evenly to ensure that you do have maximum capacity when it comes to the VMS that are running. over here I'm just showing you worst case scenario.

So over here that means all of your, I said three VMS will not be available.

Now, normally Microsoft tries to ensure that your VM is, you know, ported onto another physical Server

so that there is no downtime for your virtual machine.

But this can't be guaranteed 100 percent of the time.

Now, let's say that this update, which has been carried out on the physical machine, has to be carried out on all physical machines.

Now, instead of actually carrying out the update on all physical machines at the same time, what they

will do is that they will go ahead and update or perform the updates on the machine with one update domain the first update domain.

Once that is done, it'll go ahead and perform the updates on the next update domain

So instead of actually performing updates on all of the servers at a time, it'll go ahead and update

each server one at a time.

So this gives the opportunity for the VMS to be available.

So I said in this worst case scenario, let's say that this VM is currently being updated. so you won't

have one VM not available for a short span of time, but you still have the other ones available.

And then when the update is complete on this physical server it will go out and perform

Now the update on the next physical server

And during that time, this machine will become available and the others will not be available.

So when it comes to an availability set, the entire idea is to go out and protect your infrastructure.

That is, your applications running on VMS against updates that are made onto the physical infrastructure, also onto any faults that can occur on the physical infrastructure itself.

So if you go in and make use of an availability set, if you have two or more virtual machines which are deployed in the same availability set, then you get better SLA for your entire virtual machine connectivity.

So remember, this is one of the availability options that is available when it comes to Azure

When you host your virtual machines in Azure, you sometimes need to cater to the following

1. An unplanned event wherein the underlying infrastructure fails unexpectedly. The failures could be attributed to network failures , local disk failures or even rack failures.
2. Planned maintenance events , wherein Microsoft needs to make planned updates to the underlying physical environment. In such cases , a reboot might be required on your virtual machine.

You can increase the availability of your application by making use of availability sets. Each virtual machine that is assigned to the availability set is assigned a separate fault and update domain.

Fault domains are used to define the group of virtual machines that share a common source and network switch. You can have up to 3 fault domains.

Update domains are used to group virtual machines and physical hardware that can be rebooted at the same time. You can have up to 20 update domains.

Working with AVAILABILITY SET :

AVAILABILITY SET > CREATE > Select number of fault -2 and update- 2 domain .

Use managed disk for VM .

Subscription * ⓘ Free Trial ▼

Resource group * ⓘ az104-hands-on ▼
[Create new](#)

Instance details

Name * ⓘ avail-set ✓

Region * ⓘ (US) East US ▼

Fault domains ⓘ 2

Update domains ⓘ 2

Use managed disks ⓘ No (Classic) Yes (Aligned)

Advanced > Proximity placement group - Ensure vm placed together , for better communication between vm . > Create .

Basics

Subscription	Free Trial
Resource group	az104-hands
Region	East US
Name	avail-set
Fault domain count	2
Update domain count	2
Use managed disks	Yes (Aligned)

Advanced

Proximity placement group	None
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Tags

Create

< Previous

Next >

Create ubuntu VM > Availability options > availability zone / VM scale set / Availability set .
 select availability set . >

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 * ⓘ

avail-set

[Create new](#)

Availability set should be in the same region as VM .

Existing vm cant be added to the availability set , we can recreate vm to make it part of the availability set.

Create a new vm as part of the same availability set .

The screenshot shows the Azure portal interface for a virtual machine named 'avail2'. The left sidebar contains a search bar and a list of navigation options: Overview (selected), Activity log, Access control (IAM), Tags, Diagnose and solve problems, tings, Networking, and Connect. The main content area displays the 'Essentials' section for the VM, which is currently in a 'Running' state. The details listed are: Resource group (move) : AZ104-HANDS-ON, Status : Running, Location : East US, Subscription (move) : Free Trial, Subscription ID : e864397b-40c0-4810-a41f-a837b964047a, and Tags (edit) : Click here to add tags. At the top of the main content area, there is a toolbar with icons for Connect, Start, Restart, Stop, Capture, Delete, and Refresh.

avail2 ☆ ☆ ...
Virtual machine

Search << Connect ▾ ▶ Start ↺ Restart □ Stop 📷 Capture 🗑 Delete ↻ Refi

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

tings

Networking

Connect

^ Essentials

Resource group (move) : [AZ104-HANDS-ON](#)

Status : Running

Location : East US

Subscription (move) : [Free Trial](#)

Subscription ID : e864397b-40c0-4810-a41f-a837b964047a

Tags (edit) : [Click here to add tags](#)

So if 1 fault domain goes down then another 1 will be available .

If there is an update - it will happen in 1 domain and we will have another update domain vm running .

avail-set Availability set

Search << Delete Refresh

Overview

Activity log

Access control (IAM)

Tags

ings

Configuration

Virtual machines

Properties

Locks

ation

Tasks (preview)

Export template

Essentials

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 a 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.

Resource group (move) : [az104-hands-on](#) Fault domains : 2

Location : East US Update domains : 2

Subscription (move) : [Free Trial](#) Virtual machines : 2

Subscription ID : e864397b-40c0-4810-a41f-a837b964047a Managed : Yes

Colocation status : N/A

Search virtual machines

Name	↑↓	Status	↑↓	Colocation status	↑↓	Fault Domain	↑↓	Update Domain
avail1		Running				0		0
avail2		Running				1		1

We can see both vm added to the availability set .

1. Placing a new virtual machine in the availability set

We have already seen how virtual machines get placed in an availability set.

Below is a snapshot of what would happen if we placed another virtual machine in the availability set.

Dashboard > All resources > availaset

availaset Availability set

Search (Ctrl+/) << Delete Refresh

Overview

Activity log

Access control (IAM)

Tags

Settings

Configuration

Virtual machines

Properties

Locks

Export template

Support + troubleshooting

New support request

Resource group (change) : [azuredemo](#) Fault domains : 2

Location : Central US Update domains : 2

Subscription (change) : [Pay-As-You-Go](#) Virtual machines : 3

Subscription ID : 20c6eec9-2d80-4700-b0f6-4fde579a8783 Managed : Yes

Search virtual machines

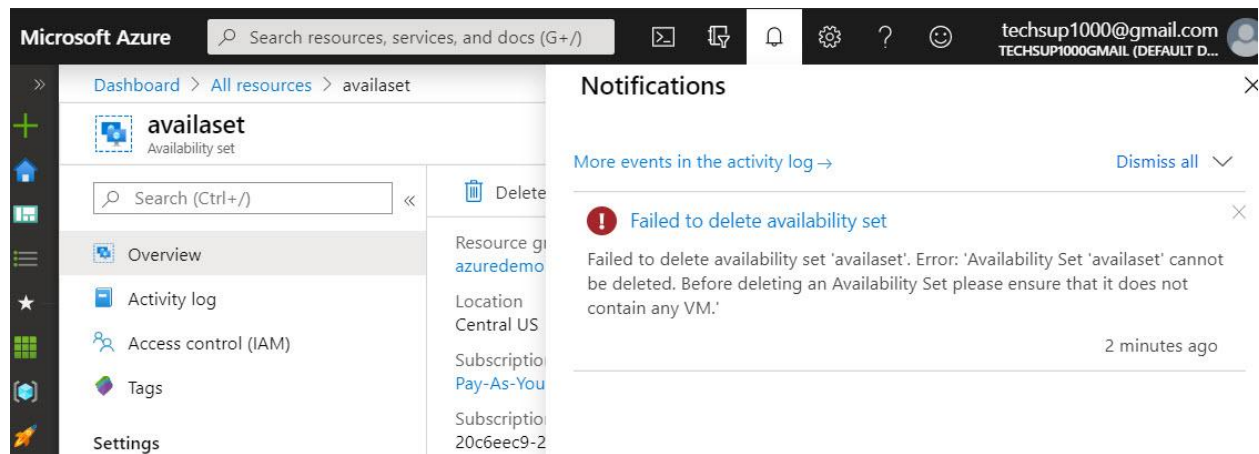
Name	↑↓	Status	↑↓	Fault Domain	↑↓	Update Domain	↑↓
availvm3		Running		0		0	
availvm1		Running		0		1	
availvm2		Running		1		0	

The availability set service would place the machine accordingly so that the virtual machines get placed across the various fault and update domains.

2. What happens if we try to delete the availability set as it is?

Would it delete the underlying virtual machines accordingly.

Well from the Azure portal, if we just try to delete the availability set as it is, we will get the following error message



Hence we first have to ensure no virtual machine is associated with the availability set

So to delete the availability set, you can first delete the virtual machines linked to the availability set and then go ahead and delete the availability set.

USE CASE :

a company wants to go out and move their on premise application onto an Azure subscription.

application is going to be posted on several Azure virtual machines.

And you have to ensure that the application will be running on at least four virtual machines during a plan Azure maintenance period.

So when it comes to this requirement, you have to ensure that you use or make use of availability sets.

Remember, if you want to go out and protect against data center level failures, then you'll go out and use availability zones.

Now, over here we are talking about a plan for the Azure maintenance period.

So should you go ahead and focus on update domains or fault domains?

Well, you have to go out and focus on update domains because update domains actually help to protect against

a particular maintenance that is carried out on the underlying infrastructure. Fault domains

are when any sort of fault occur onto the underlying hardware itself

Now, the next question is that what is the minimum number of update domains that you should create

to ensure that during any plan, Azure maintenance event, you have at least four virtual machines in place.

Well over here, the answer is that you should have at least five update domains in place.

So over here, let's say you have 5 update domains and you go ahead and create five virtual machines.

So these machines or VM's, will be spread across these different update domains.

And during any Azure maintenance period, it will actually go out and perform the maintenance on each

update domain at a time.

So let's assume that's going it and doing the update on this update domain

So during this time, if there is a restart of this entire infrastructure that is hosting the update

domain, then during that time this VM will not be up and running.

But you still have the other update domains in place that means you are going out and meeting the requirement

of having at least four VMS running during an Azure maintenance period.

Remember, when the maintenance is complete on this particular update domain then it will go ahead

and proceed onto the next.

So over here, just giving a use case scenario in case you're asked on what is the number of update domains

that you should actually have in place when it comes to an Azure maintenance period

Autoscroll