



Azure Site Recovery

Azure Site Recovery (ASR) is a disaster recovery as a service (DRaaS) offered by Microsoft Azure. It provides a simple, automated, and cost-effective solution for protecting and recovering applications and workloads in the event of a disaster.

1. **Replication:** ASR replicates workloads running on physical servers, virtual machines (VMs), or in other clouds to Azure.
2. **Orchestration and Automation:** It orchestrates the failover and failback processes, ensuring consistency and minimizing downtime. Automation enables streamlined recovery workflows.
3. **Multi-Platform Support:** ASR supports various platforms including Windows and Linux, Hyper-V, VMware, and physical servers.
4. **Application Consistency:** Application-aware replication ensures data consistency and integrity during failover and failback.
5. **Customizable Recovery Plans:** Administrators can create customized recovery plans specifying the sequence of actions to be taken during failover, including startup order, dependencies, and scripts.
6. **Non-disruptive Testing:** ASR allows for non-disruptive testing of recovery plans without impacting production workloads.
7. **Integration with Azure:** ASR seamlessly integrates with other Azure services such as Azure Backup, Azure Monitor, and Azure Virtual Network, providing a comprehensive disaster recovery solution.



Use Cases:

1. **Disaster Recovery:** Protect critical workloads against data center failures, natural disasters, or other disruptive events by replicating them to Azure. ASR ensures business continuity by enabling rapid failover and recovery.
2. **Data Center Migration:** Facilitate seamless migration of workloads from on-premises data centers to Azure with minimal downtime and risk. ASR simplifies the migration process by replicating VMs to Azure and orchestrating the migration steps.
3. **Application Mobility:** Enable workload mobility across different environments (on-premises, Azure, or other clouds) for workload balancing, maintenance, or testing purposes.
4. **DevOps and Testing:** Support DevOps practices by providing on-demand, isolated environments for development, testing, and troubleshooting without impacting production workloads.
5. **Compliance and Security:** Meet regulatory compliance requirements by ensuring data protection and disaster recovery readiness. ASR helps organizations implement robust business continuity and data protection strategies.

In this lab, we are setting up Azure Site Recovery (ASR) to replicate a virtual machine (VM) from one region to another in Azure. The end goal is to demonstrate how to configure ASR for disaster recovery, perform a failover test to ensure the VM can be recovered in a different region, and verify that the replicated data and applications are intact and functional. This exercise helps users understand how to implement and manage disaster recovery solutions using Azure Site Recovery.

😊 To begin with the Lab:

1. In this lab, first we need to create a virtual machine. The process is the same as before just choose standard in the security type.

Basics Disks Networking Management Monitoring 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 * ⓘ Azure Pass - Sponsorship

Resource group * ⓘ demo-resource-group [Create new](#)

Instance details

Virtual machine name * ⓘ demoVM

Region * ⓘ (Europe) North Europe

Availability options ⓘ No infrastructure redundancy required

Security type ⓘ Standard Standard

Image * ⓘ Windows Server 2022 Datacenter - x64 Gen2 [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 ⓘ x64 Arm64

Arm64 is not supported with the selected image.

Run with Azure Spot discount ⓘ

Size * ⓘ Standard_D2s_v3 - 2 vcpus, 8 GiB memory (₹12,085.69/month) [See all sizes](#)

Administrator account

Username *	demouser	✓
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 *	<input type="radio"/> None <input checked="" type="radio"/> Allow selected ports
Select inbound ports *	HTTP (80), RDP (3389)

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

2. Then in the disks section we need to choose to create and attach a new disk. You need to choose the size for the disk and click on OK.

Data disks for demoVM

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

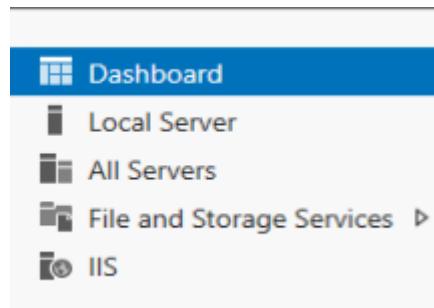
LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM ⓘ
Create and attach a new disk		Attach an existing disk			

Create a new disk to store applications and data on your VM. Disk pricing varies based on factors including disk size, storage type, and number of transactions. [Learn more ↗](#)

Name *	demoVM_DataDisk_0
Source type *	None (empty disk)
Size *	16 GiB Premium SSD LRS Change size
Key management	Platform-managed key
Enable shared disk	<input type="radio"/> Yes <input checked="" type="radio"/> No
Delete disk with VM	<input type="checkbox"/>

3. Then just create your virtual machine. Once it is deployed download the RDP file and login to your VM.

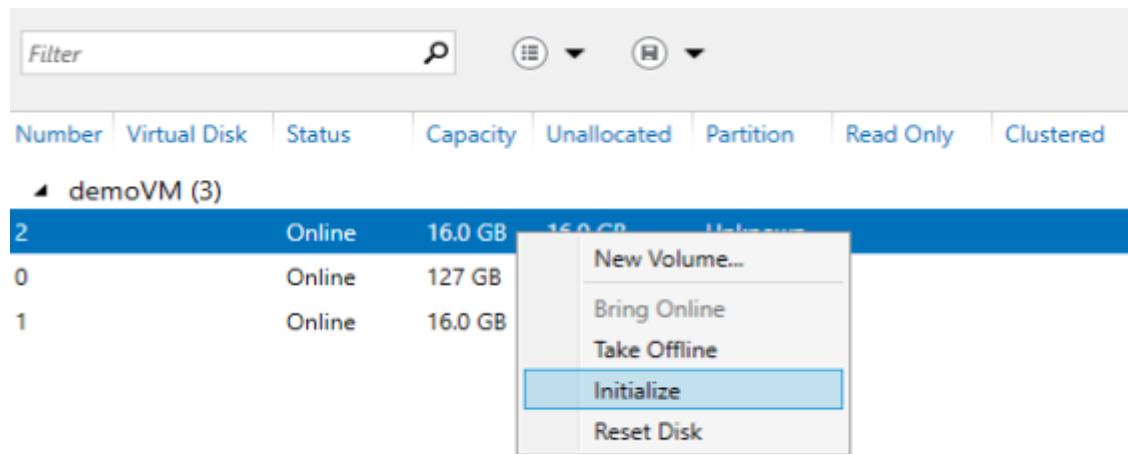
4. First you are going to install IIS on your VM then you need to open Notepad and create a Default.html page. After that you need to configure the new disk, once it is configured then you need to create two files on that disk using notepad.
5. To have the disk in place you need to go to file and storage service in server manager. Then in disks you will see your 16 GB of disk which is currently unknown.



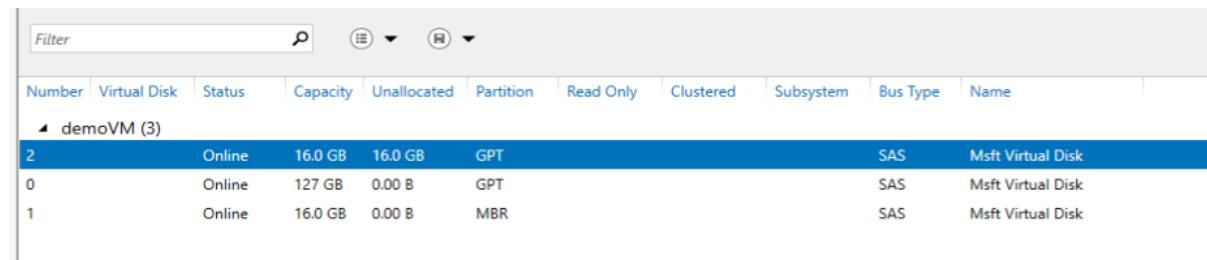
The screenshot shows the Windows Server Manager dashboard. The left sidebar has a tree view with nodes: Local Server, All Servers, File and Storage Services (which is expanded), and IIS. The main pane is titled "DISKS" and shows "All disks | 3 total". A table lists three disks:

Number	Virtual Disk	Status	Capacity	Unallocated	Partition	Read Only	Clustered	Subsystem	Bus Type	Name
2	Online	16.0 GB	16.0 GB	Unknown				SAS	SAS	Msft Virtual Disk
0	Online	127 GB	0.00 B	GPT				SAS	SAS	Msft Virtual Disk
1	Online	16.0 GB	0.00 B	MBR				SAS	SAS	Msft Virtual Disk

6. Now you need to right click on it and choose initialize. Then you will see that its status has been changed from unknown to GPT.



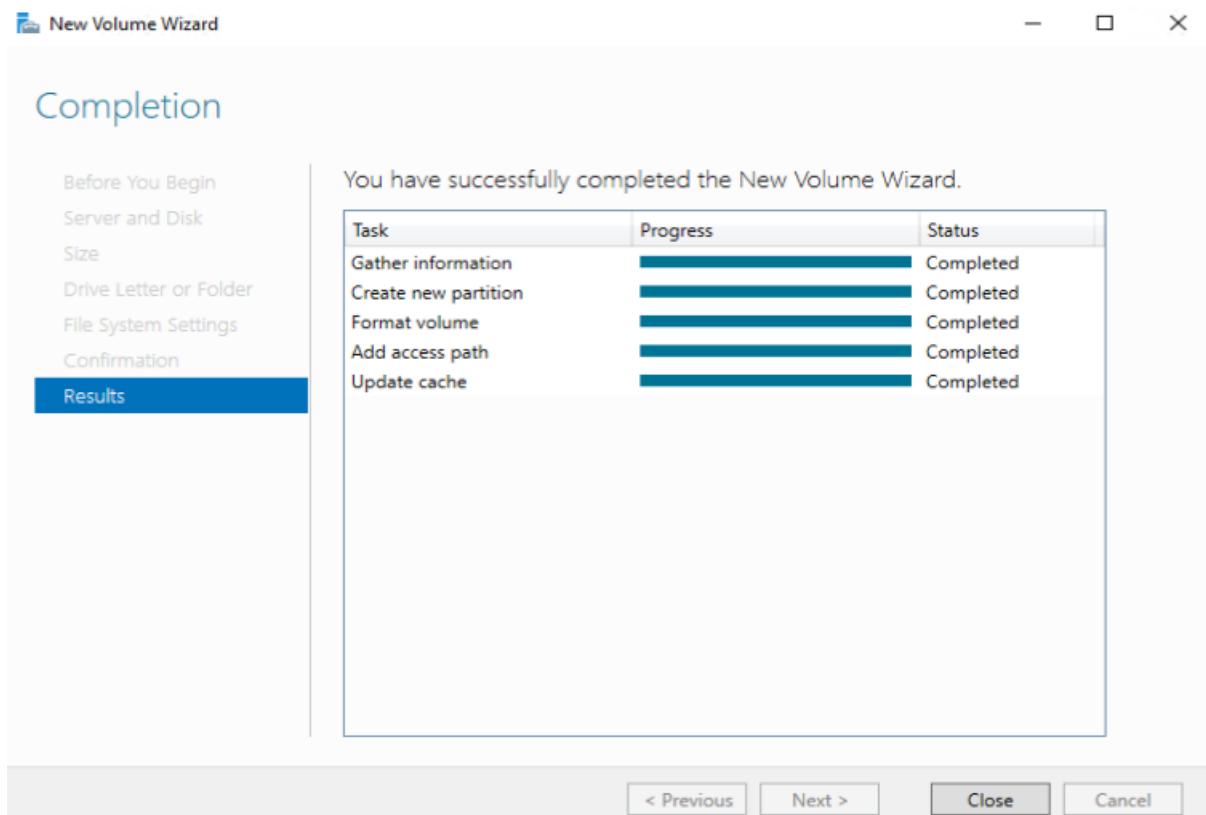
The screenshot shows a context menu for the second disk in the list. The menu options are: New Volume..., Bring Online, Take Offline, Initialize (which is highlighted with a blue border), and Reset Disk.



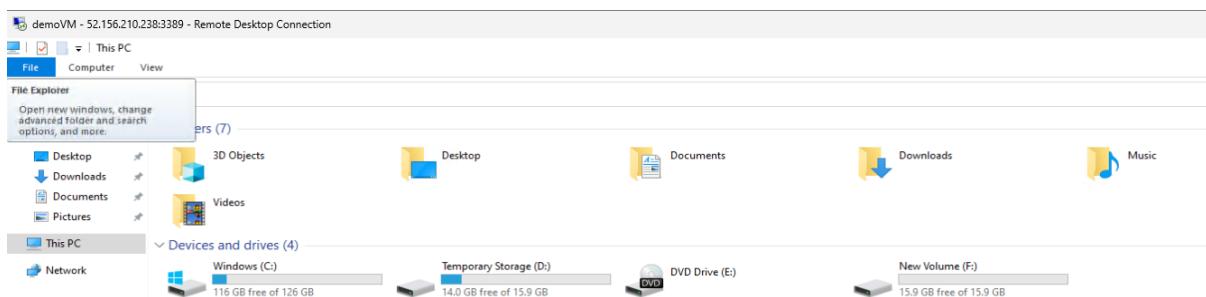
The screenshot shows the DISKS table again. The second disk now has a status of "GPT" under the "Partition" column, indicating it has been initialized.

Number	Virtual Disk	Status	Capacity	Unallocated	Partition	Read Only	Clustered	Subsystem	Bus Type	Name
2	Online	16.0 GB	16.0 GB	16.0 GB	GPT			SAS	SAS	Msft Virtual Disk
0	Online	127 GB	0.00 B	0.00 B	GPT			SAS	SAS	Msft Virtual Disk
1	Online	16.0 GB	0.00 B	0.00 B	MBR			SAS	SAS	Msft Virtual Disk

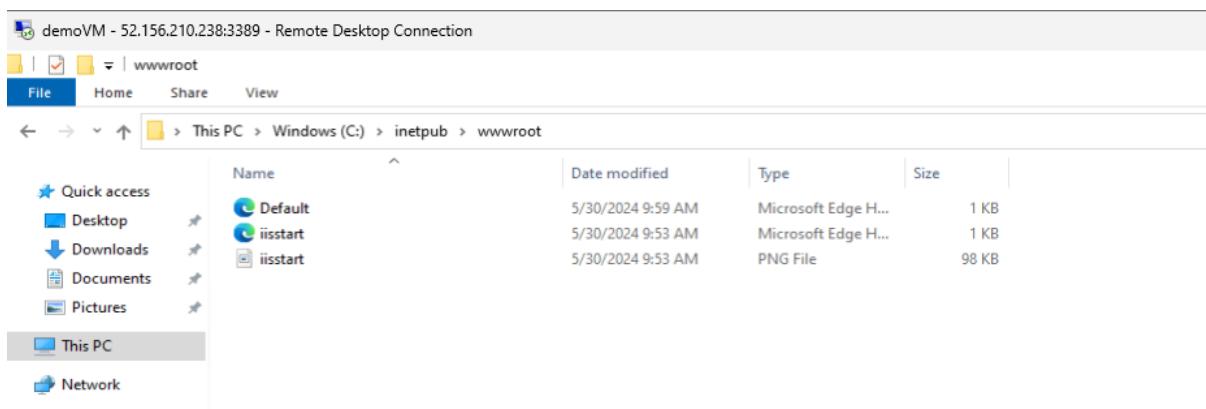
7. After that you need to right click on it again and this time choose new volume and create a disk out of it.



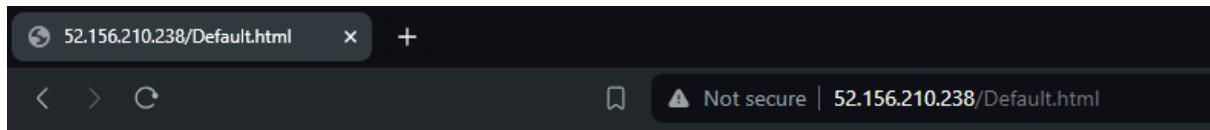
8. Now if you go to file explorer you will see the new disk in place.



9. Also we have installed the IIS and create the default.html page at this location.



10. Now if you copy and paste the public IP address of VM then you will see the default page.



This is server DemoVM

11. Also, you can see that we have the two files that we need in our new drive F. We created a folder then stored two files in it.

Name	Date modified	Type	Size
FileA	5/30/2024 1:15 PM	Text Document	1 KB
FileB	5/30/2024 1:15 PM	Text Document	1 KB

12. Now in your Azure Portal in your VM come to disaster recovery. Currently, it is giving us the region of West US, but we'll change it to the UK South or Central India, or any other location then you can click on next for advanced settings.

The screenshot shows the Azure portal interface for managing a virtual machine named 'demoVM'. On the left, there's a navigation sidebar with various options like Home, demoVM, Virtual machine, Availability + scaling, Security, Identity, Microsoft Defender for Cloud, Backup + disaster recovery, Backup, Disaster recovery (which is highlighted with a red box), Restore point, Operations, Auto-shutdown, Run command, Updates, Health monitoring, Configuration management, Policies, Inventory, and Change tracking. The main content area is titled 'demoVM | Disaster recovery' and shows the 'Basics' tab selected. It includes a 'Welcome to Azure Site Recovery' message and a map showing the disaster recovery path between the source region (West US) and the target region (UK South). Buttons at the bottom allow users to 'Review + Start replication', 'Previous', or 'Next : Advanced settings'.

Basics Advanced settings Review + Start replication



Welcome to Azure Site Recovery

You can replicate your virtual machines to another Azure region for business continuity and disaster recovery needs. [Learn more about Azure Site Recovery.](#)

Disaster recovery between availability zones? ⓘ

No

Target region * ⓘ

UK South



13. For the advanced settings keep it to default, if you want then you can explore the settings and look at what resources will be created. After that move to review and start your replication.

Basics Advanced settings Review + Start replication

ⓘ Enable Site Recovery on High Churning VMs – Site Recovery now supports churn (data change rate) up to 100 MB/s per VM. Go to **Storage settings** to enable it. [Learn more](#) about this feature.

Target settings

General settings	Source	Target	Info
Subscription	Azure Pass - Sponsorship	Azure Pass - Sponsorship	ⓘ
VM resource group	demo-resource-group	(new) demo-resource-group-asr	ⓘ
Virtual network	demoVM-vnet	(new) demoVM-vnet-asr	ⓘ
Availability	Single instance	Single instance Availability set Availability zone	ⓘ
		Not Applicable	ⓘ
Proximity placement gr...	Not Applicable	Select	ⓘ

Capacity Reservation Settings

Reserve a capacity at the destination location - for this Virtual machine size - Standard_D2s_v3
[Why to reserve capacity at the destination location?](#)

[Review + Start replication](#)

[Previous](#)

[Next : Review + Start replication](#)

14. Now it will take around 15-20 minutes to create the replication. After almost 30 minutes you can see that our replication has been completed.

✓ Enabling replication for 1 vm(s)

Successfully completed the operation.

a minute ago

✓ Deployment succeeded

Deployment 'CreatingSystemIdentity-1717077061472' to resource group 'site-recovery-vault-rg-1' was successful.

↗ Pin to dashboard **Go to resource group**

17 minutes ago

15. Also, while your replication was creating if click on view details at that time then you will directed to the site recovery vault here you can see the resources that have been created. And if you go to all resources then you can see what resources have been created in another region as replicated items.

Site Recovery jobs													
Site-recovery-vault-centralindia													
Filter		Export jobs											
Try our new Business Continuity Center for the at scale BCDR management of your resources protected across Azure Backup and Site Recovery.													
<input type="text"/> Filter items...													
Name	Status	Type	Item	Start time	Duration								
Protection configuration	Successful	Cloud	asr-a2a-default-centralindia-container	30/5/2024, 7:29:50 pm	00:00:04								
Protection configuration	Successful	Cloud	asr-a2a-default-northeurope-container	30/5/2024, 7:29:48 pm	00:00:03								
Enable replication	Successful	Protected item	demovm	30/5/2024, 7:29:30 pm	00:07:31								
Associate replication policy	Successful	Replication policy	24-hour-retention-policy	30/5/2024, 7:27:35 pm	00:01:51								
Associate replication policy	Successful	Replication policy	24-hour-retention-policy	30/5/2024, 7:25:43 pm	00:01:35								
Map Networks	Successful	Network	demovm-vnet-asr	30/5/2024, 7:25:43 pm	00:00:03								
Map Networks	Successful	Network	demovm-vnet	30/5/2024, 7:25:11 pm	00:00:03								
Create protection container	Successful	Cloud	asr-a2a-default-centralindia-container	30/5/2024, 7:25:11 pm	00:00:00								
Create a site	Successful	Server	asr-a2a-default-centralindia	30/5/2024, 7:23:37 pm	00:01:25								
Create protection container	Successful	Cloud	asr-a2a-default-northeurope-container	30/5/2024, 7:23:37 pm	00:00:10								
Create a site	Successful	Server	asr-a2a-default-northeurope	30/5/2024, 7:22:01 pm	00:01:26								
Create replication policy	Successful	Replication policy	24-hour-retention-policy	30/5/2024, 7:21:51 pm	00:00:00								

16. Now in your VM go to disaster recovery. Here you will see that the replication is healthy, but the status is still at 0%. So, we need to for around another 20-30 minutes and wait until it gets 100% synchronized.

demoVM Replicated items

Overview

Essentials

Health and status	Failover readiness
Replication Health	0% Synchronized
Status	No issues
RPO	9.61.7055.1

Latest recovery points

Click above to see the latest recovery points.

Errors(0) No errors Events - Last 72 hours(0) No events

17. After about 30 minutes later we can see that the status has changed to protected.

The screenshot shows the Azure portal interface for a replicated item named 'demoVM'. The top navigation bar includes options like 'Failover', 'Test Failover', 'Cleanup test failover', 'Commit', 'Resynchronize', 'Change recovery point', 'Re-protect', 'Disable Replication', 'Error Details', and 'Refresh'. Below the navigation is a search bar and a 'Overview' section. Under 'General', there's a 'Properties' link. The main content area is titled 'Essentials' and contains two sections: 'Health and status' and 'Failover readiness'. In 'Health and status', 'Replication Health' is 'Healthy' (green), 'Status' is 'Protected', and 'RPO' is '57 secs [As on 30/5/2024, 8:08:33 pm]'. In 'Failover readiness', 'Last successful Test Failover' is 'Never performed successfully' (orange). 'Configuration issues' shows 'No issues' (green). 'Agent version' is '9.6.1.7055.1' (green) and 'Agent status' is 'Healthy' (green). A 'Latest recovery points' box is present, stating 'Click above to see the latest recovery points.' Below the essentials section are three buttons: 'Errors(0) No errors', 'Events - Last 72 hours(0) No events', and 'Open in new page'.

18. Now we are going to stop our primary VM so that we can simulate a condition that our infrastructure has gone down.

19. Now in your disaster recovery for your primary VM click on test failover.

This screenshot is identical to the one above, showing the 'demoVM' replication status as 'Protected'. The 'Test Failover' button in the top navigation bar is highlighted with a red box.

20. Then just choose the virtual network that was created in the other location and click on test failover.

Test failover

demoVM

Pre-validation successful

Test failover direction

Source North Europe

Destination Central India

Test failover settings

Recovery point * Latest processed (lowest RTO) (30/5/2024, 8:17:35 pm) (2 out of 2 disks)

Azure virtual network * demoVM-vnet-asr (mapped)

It is recommended that the networks selected for test failover and failover operations are different.
[Learn more about DR Drills](#)

21. After around 2 minutes our test failover has successfully completed.

✓ Starting the task to perform test failover of virtual machine 'demoVM'...

Successfully completed the operation.

a minute ago

22. Now if you go to virtual machines you can see that we have 2 VMs now, primary and the test VM.

The screenshot shows the Azure portal's 'Virtual machines' list. It displays two records: 'demoVM' and 'demoVM-test'. Both are listed as 'Virtual machine' type, running on 'Azure Pass - Sponsor' in their respective 'demo-resource-group' and 'Central India' locations. The 'demoVM' status is 'Stopped (deallocated)', while 'demoVM-test' is 'Running'. Other columns include Subscription, Resource group, Location, Status, Operating system, Size, Public IP address, and Disks.

Name	Type	Subscription	Resource group	Location	Status	Operating system	Size	Public IP address	Disks
demoVM	Virtual machine	Azure Pass - Sponsor	demo-resource-group	North Europe	Stopped (deallocated)	Windows	Standard_D2s_v3	52.156.210.238	2
demoVM-test	Virtual machine	Azure Pass - Sponsor	demo-resource-group	Central India	Running	Windows	Standard_D2s_v3	-	2

23. If you go to your VM you will see that it has no Public IP address. So, we are going to create a Public IP address and assign it to the VM.

The screenshot shows the 'demoVM-test' VM details page. The left sidebar lists navigation options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Bastion, Windows Admin Center, Networking, Network settings, and Load balancing. The main pane displays the 'Essentials' section with details such as Resource group (demo-resource-group-asr-1), Status (Running), Location (Central India), Subscription (Azure Pass - Sponsorship), Subscription ID (6e13e5d6-4287-42a8-b80f-91d6b14e3aec), and Tags (edit, Add tags). On the right, there are sections for Operating system (Windows Server 2022 Datacenter), Public IP address (None), Virtual network/subnet (demoVM-vnet-asr/default), DNS name (None), Health state (None), and Time created (30/5/2024, 2:51 pm UTC).

24. From the marketplace search for a Public IP address and choose to create one. Here you need to choose your resource group. For that you can go to your demo test VM and look at which resource group it has been created then choose the same resource group. After that choose your region and then give your IP address a name. Then go ahead and create your IP address.

Basics DDoS Protection Tags Review + create

Create a public IP address. Associate it with a virtual machine or other Azure resources. Internet resources communicate to Azure resources through a public IP address. [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 * ⓘ	Azure Pass - Sponsorship
Resource group * ⓘ	demo-resource-group-asr
	Create new

Instance details

Region *	(Asia Pacific) Central India
	Deploy to an Azure Extended Zone

25. Once you have the IP address then you need to go to your demo test VM and go to its network interface and navigate to IP configuration then choose IP config and choose your public IP address.

demovm788-test | IP configurations

Network Interface

IP Settings

Enable IP forwarding (unchecked)

Virtual network: demoVM-vnet-asr

Subnet: default (10.0.0.0/24) 250 free IP addresses

Add Make primary Delete

Name	IP Version
ipconfig1	IPv4

demovm788-test

IPv4 [Learn more](#)

Name: ipconfig1

IP version: IPv4

Type: Primary

Allocation: Dynamic

Private IP address: 10.0.0.4

Public IP address settings:

Associate public IP address:

Public IP address: test-ip-address (4.188.110.75) [Create a public IP address](#)

Save Cancel

26. Then we need to create a network security group for our test VM. For that in the marketplace search for NSG and create one. Now you just need to choose your resource group and give it a name and create your NSG.

Basics Tags Review + create

Project details

Subscription * Azure Pass - Sponsorship

Resource group * demo-resource-group-asr [Create new](#)

Instance details

Name * test-NSG

Region * Central India

27. Once it is deployed then you need to open it and go to inbound security rules and add two rules one for HTTP port 80 and other is RDP port 3389.

[test-NSG | Inbound security rules](#)

Network security group

Overview Activity log Access control (IAM) Tags Diagnose and solve problems

Inbound security rules Outbound security rules Network interfaces Subnets Properties Locks

Priority ↑	Name ↑	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
100	AllowAnyHTTPInbound	80	TCP	Any	Any	Allow
110	AllowAnyRDPInbound	3389	TCP	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny

28. Then go to network interfaces and associate your demo test VM with it.

[test-NSG | Network interfaces](#)

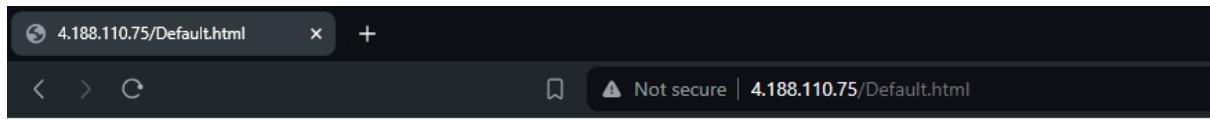
Network security group

Overview Activity log Access control (IAM) Tags Diagnose and solve problems

Inbound security rules Outbound security rules Network interfaces Subnets

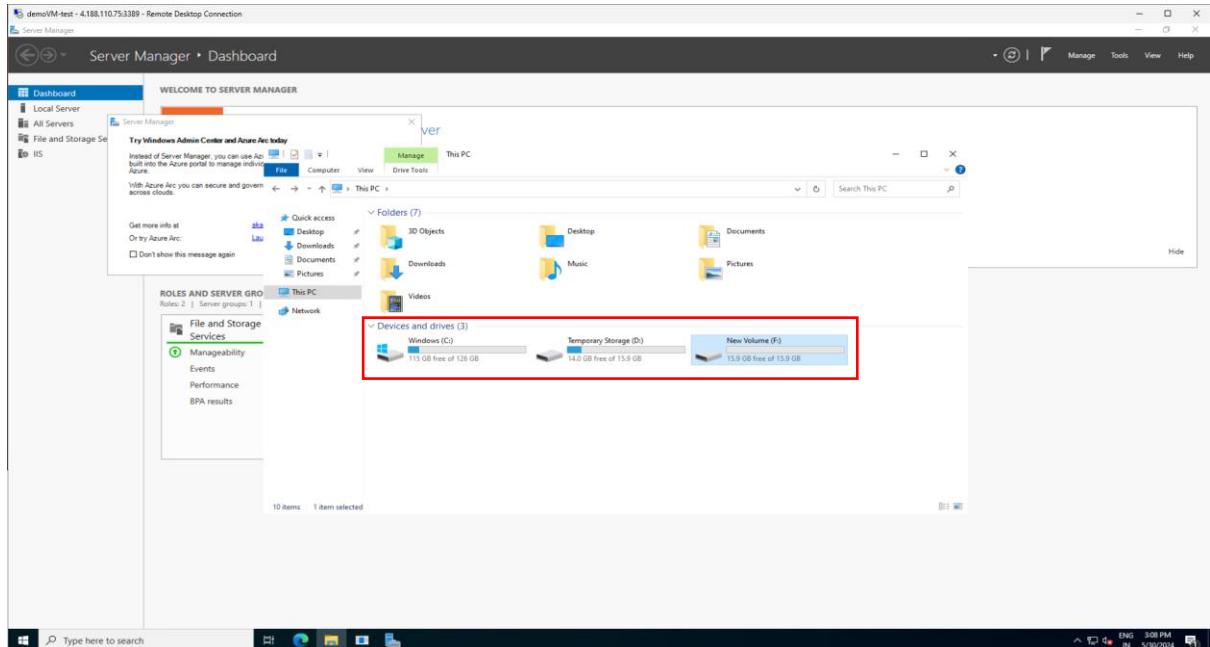
Name ↑↓	Public IP address ↑↓	Private IP address ↑↓
demovm788-test	4.188.110.75	10.0.0.4

29. Now you need to copy the public IP address of the test VM and paste it into a new browser and you will see the default web page running.

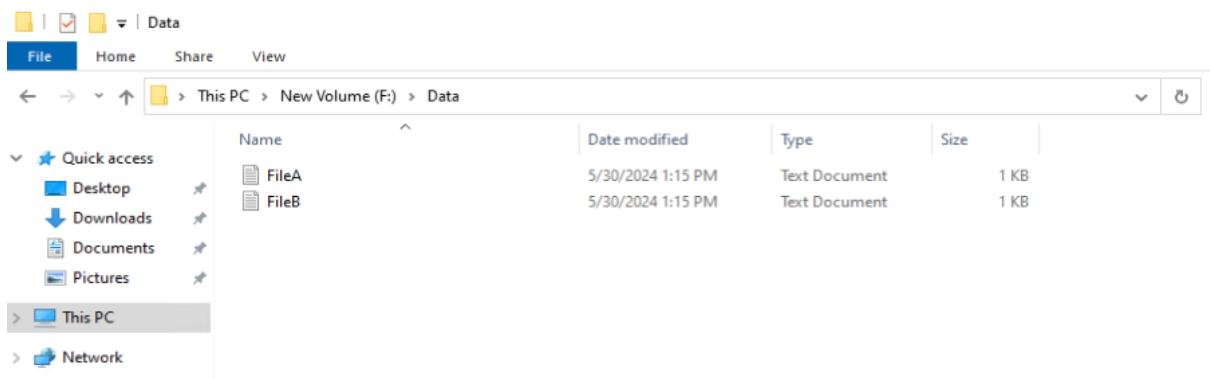


This is server DemoVM

30. Now you need to download the RDP file for test VM and login to your VM. Once you are in then open the file explorer you will see your disks in place.



31. Also, if you go and check your files you will see that they are also present which means, replication was successful.



32. Once you are done go to your primary VM and then go to disaster recovery and click on cleanup test failover.

The screenshot shows the Azure Site Recovery interface for a replicated item named 'demoVM'. The top navigation bar includes 'Search', 'Failover', 'Test Failover', 'Cleanup test failover' (which is highlighted with a red box), 'Commit', 'Resynchronize', and 'Change recovery point'. On the left, there's a sidebar with 'Overview', 'General' (selected), 'Properties', 'Compute', 'Network', and 'Disks'. The main content area has two sections: 'Health and status' (Replication Health: Warning, Status: Cleanup test failover pending, RPO: -) and 'Failover readiness' (Last successful Test Failover: -, Configuration issues: No issues, Agent version: 9.61.7055.1, Agent status: Healthy). A message at the bottom says 'Try our new Business Continuity Center for the at scale BCDR management of your resources protected across Azure Backup and Site Recovery.'

33. Then we need to delete the recovery vault. For that go to it and choose replicated items then we need to disable replication for demo VM.

The screenshot shows the 'Site-recovery-vault-centralindia | Replicated items' page. The sidebar includes 'Locks', 'Getting started' (Backup, Site Recovery), 'Protected items' (Backup items, Replicated items - selected), and 'Manage' (Backup policies). The main content shows a table with one result: 'demoVM' (Name), 'Warning' (Replication Health), 'Protected' (Status), 'North Europe' (Active location), and 'Healthy' (Failover Health). A message at the top says 'Last refreshed at: 30/5/2024, 8:43:57 pm' and 'Finished loading data from service.'

34. Then go to properties and choose soft delete and security settings then disable both of them and click on update.

The screenshot shows the 'Site-recovery-vault-centralindia | Properties' page. The sidebar includes 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Settings' (Identity, Networking), 'Properties' (Locks), 'Getting started' (Backup, Site Recovery), and 'Protected items' (Backup items, Replicated items). The main content shows 'Soft delete can help you recover your data after it has been deleted.' It includes options for 'Enable soft delete for cloud workloads' (unchecked) and 'Enable soft delete and security settings for hybrid workloads' (unchecked). Below these are 'Soft delete retention period (for cloud and hybrid workloads)' (set to 14 days) and 'Enable Always-on soft delete' (unchecked). A note says 'Checking this box enables soft delete, MFA and alert notifications for workloads running on premises. Refer to this link for minimum version requirements.' At the bottom are 'Update' and 'Cancel' buttons.

35. Then go ahead and delete your recovery vault and after that all of your resources.