



DH2i DxEnterprise 19.5 Software: MSSQL HA Instances for Linux on Azure Quickstart Guide

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Introduction

This quick-start guide describes how to set up and configure a MSSQL HA (FCI) with shared disk solution for DxEnterprise running in Azure. Using this guide, the user will create an availability set and virtual machines, configure Azure shared disks, and create and configure an Azure load balancer that will allow access to the resources assigned to the DxEnterprise Vhost.

Create the Availability Set and Virtual Machines

1. Login to the Azure Management Portal.
2. Search for **Availability Sets** using the top search bar, then select **Add**.
3. Assign the availability set to a resource group and give it a name.

The screenshot shows the 'Create availability set' page in the Microsoft Azure portal. The page is divided into several sections: 'Project details' and 'Instance details'. In the 'Project details' section, the 'Subscription' is set to 'Microsoft Azure Sponsorship' and the 'Resource group' is 'dxr-rg'. In the 'Instance details' section, the 'Name' is 'dxr-availset', the 'Region' is '(US) West US', 'Fault domains' is set to 2, 'Update domains' is set to 5, and 'Use managed disks' is set to 'Yes (Aligned)'. The 'Review + create' button is visible in the bottom-left corner.

4. Select **Review + Create** in the bottom-left corner, then select **Create**.
5. Search for **DxEnterprise** in the top search bar and select one of the DxEnterprise offers available under **Marketplace**.
6. Under Select a software plan, choose an operating system and select **Create**.
7. Configure a virtual machine template and assign it to the availability set.
 - a. Assign the VM to the same resource group as the availability set and give it a name.
 - b. Under Instance Details > Availability options, select **Availability set**.
 - c. A new drop-down box will appear. Select the availability set created in step 4.
 - d. Setup an authentication type.
 - e. Under Networking, select **Create New** and set the SKU of the public IP address to standard.

NOTE: There is an option under network settings to place the virtual machine behind an existing load balancing solution. Do not select this option.

f. **Select Review + Create, then Create.**

The screenshot shows the 'Create a virtual machine' page in the Microsoft Azure portal. The page is divided into several sections:

- Project details:** Subscription (Microsoft Azure Sponsorship), Resource group (dxe-rg).
- Instance details:** Virtual machine name (dxe1), Region ((US) West US), Availability options (Availability set), Availability set (dxe-availset), Image (DxEnterprise on Ubuntu (BYOL)), Azure Spot instance (No), Size (Standard_D2s_v3 - 2 vcpus, 8 GiB memory).
- Administrator account:** Authentication type (SSH public key), Username (AzureUser), SSH public key source (Generate new key pair), Key pair name (dxe-key).

8. Repeat steps 7a-f for additional VM(s).
9. The availability set has been created with VMs assigned to it. Return to the Azure homepage by selecting **Microsoft Azure** in the top-left corner.

Install DxEnterprise

To install DH2i DxEnterprise on Linux, please reference the following documentation:

- [DxEnterprise v19.5 Quickstart for RHEL](#)
- [DxEnterprise v19.5 Quickstart for Ubuntu](#)

Activate the Server Licenses

- `sudo dxcli activate-server AAAA-BBBB-CCCC-DDDD`

Set a Cluster Passkey (First node installation)

- `sudo dxcli cluster-set-secret`

Create a Cluster

Join two or more nodes to the DxEnterprise cluster using the "sudo dxcli join-cluster" command. If prompted to join via NAT proxy, input "no", input the IP address of the cluster node you wish to join, and then enter the cluster passkey.

- `sudo dxcli join-cluster`

Install Microsoft SQL Server

To install Microsoft SQL Server on Linux, please see the below link from Microsoft Docs, select the correct operating system and follow the steps.

- [Installation guidance for SQL Server on Linux](#)

Configure Storage

Present Storage

Note: Please ensure proper presentation of storage to nodes. If there is storage that is not managed by this DxEnterprise cluster presented to the nodes, it is possible to overwrite or corrupt the data held on that storage.

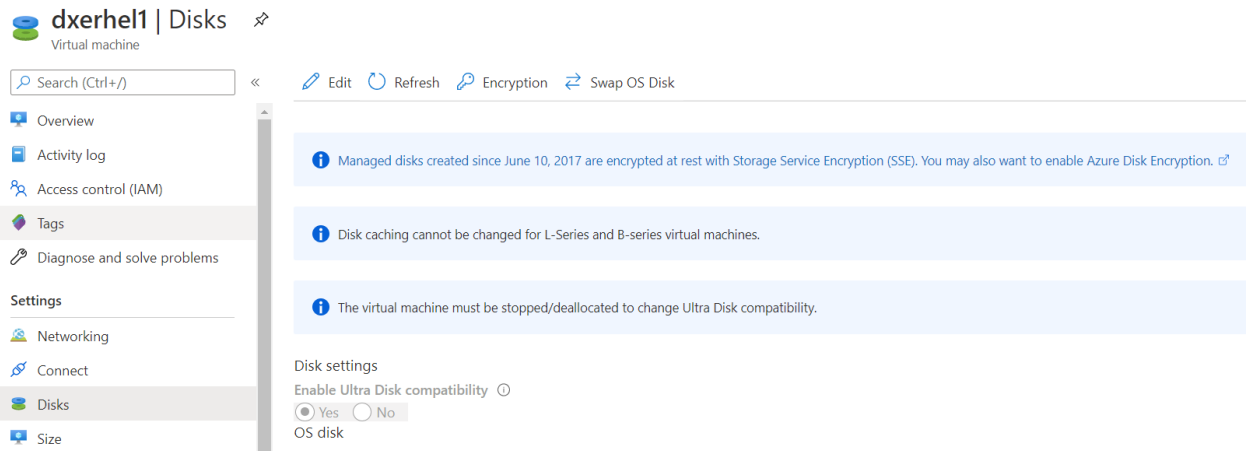
DxEnterprise supports any storage that is SCSI-3 Persistent Reservation compliant. The below examples are specific to the Azure Shared Disk feature.

Create and configure Azure Shared Disk

On July 16, 2020, Microsoft announced the general availability of Azure Shared Disks. Azure Shared Disks is the industry's first shared block storage in the cloud. Azure Shared Disks are available both on Ultra Disks and Premium SSDs.

Note: there are various limitations for Azure disks that can be used as shared disks. For example, the VMs and the disks must be residing in the same Availability Zone for regions that support Availability Zone/Set, or Proximity Placement Groups. Thus, it's important to provision appropriately as they cannot be changed after the creation.

Before an Azure shared disk can be used, the VMs must have its Ultra disk feature enabled. From the Azure Portal, go to the Disk property of the VM and enable the Ultra Disk Compatibility.



Ultra disk feature can also be enabled via Azure CLI:

- `az vm update -g <resource_group> -n <vm_name> --set additionalCapabilities.ultraSSDEnabled=1`

To deploy an Azure disk (e.g. Ultra disk) as shared disk that is shareable across multiple VMs, specify the `maxShare` parameter to a value greater than 1.

- `az disk create -g <resource_group> -n <disk_name> --size-gb <desired_size> -l <location> --sku UltraSSD_LRS --max-shares <number_of_VMs_sharing>`

Once the shared disk is created with `maxShare>1`, it can be attached to the VMs via Azure CLI:

- `az vm disk attach --resource-group <resource_group> --vm-name <vm_name> --name <disk_name>`

Manage the Disk(s)

DxEnterprise leverages native file system (NTFS/ext4/xfs) and shared storage technology to coordinate access to a pool of disk resources in the cluster. Managing a disk puts that disk under DxEnterprise control. To manage a disk, use the “`sudo dxcli add-disk`” command. The “`sudo dxcli get-disks`” command can be used to look up a diskid of interest.

Syntax

```
dxcli add-disk <disk_id> [label]
```

Parameters

Name	Description	Required
disk_id	The ID of the disk	True
label	The unique label for the disk	False

Example

```
sudo dxcli add-disk 50842140-be32-d3a7-45d4-3999bf3ad3a8 "Cluster Disk 1"
```

Create a Volume

Create a volume on the managed disk using the “sudo dxcli create-volume” command.

Syntax

```
dxcli create-volume <disk_id>,<size_in_bytes>
```

Parameters

Name	Description	Required
disk_id	The ID of the disk	True
size_in_bytes	The size of the volume to create in bytes.	True

Example

```
sudo dxcli create-volume 50842140-be32-d3a7-45d4-3999bf3ad3a8,1073741824
```

Format the Volume

Format a volume on the managed disk using the “sudo dxcli format-volume” command. The “sudo dxcli get-disk-detail <disk_label>” command can be used to look up a volume ID of interest.

Syntax

```
dxcli format-volume <volume_id> <fstype> <label> <block_size> <quick_format:true|false>  
<compression:true|false> [optional_parameters]
```

Parameters

Name	Description	Required
volume_id	The ID of the volume.	True
fstype	The file system type. [FAT FAT32 exFAT EXT3 EXT4 NTFS UDF ReFS XFS]	True
label	The label for the volume.	True
Block_size	The block size in bytes. [512 1024 2048 4096 8192 16384 32768 65536]	True
quick_format:true false	Whether or not to perform a quick format.	True
compression:true false	Whether or not to enable compression.	True
optional_parameters	Optional parameters from format.com.	False

Example

```
sudo dxcli format-volume 3409ed39-60c1-4f49-8186-dfface26e2a1 EXT4 Volume1 4096  
quick_format:true compression:false
```

Assign a Mount Point for the Volume

Assign a mount point to the volume using the “sudo dxcli set-mountpoint” command.

Syntax

```
dxcli set-mountpoint <volume_id> <mount_point>
```

Parameters

Name	Description	Required
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volume_id	The ID of the volume	True
mount_point	The mount path.	True

Example

```
sudo dxcli set-mountpoint 3409ed39-60c1-4f49-8186-dfface26e2a1 /mnt/volume1
```

Create a Vhost

DxEnterprise uses Virtual Hosts (Vhosts) to provide failover support and high availability. A Vhost virtualizes the network name and IP address associated to a particular SQL Server Instance, file share, and/or service. Instead of using the network name and IP address of a physical server, a Vhost is created and assigned a unique name/virtual IP-address pair. Clients access the databases associated with an instance via the Vhost name or IP address; they do not need to know which node is running the SQL instance. When a Vhost is configured, the user will need to specify at least one node to participate in the Vhost. It is recommended to create A and PTR records for each Vhost in DNS for resolution as well as add Vhost entries to each node's local hosts file.

To add a Vhost, use the "sudo dxcli cluster-add-vhost" command.

Syntax

```
dxcli cluster-add-vhost <vhost> <vips> <nodes> [autofailback] [priority[1-5]]
```

Parameters

Name	Description	Required
vhost	The name of the Vhost.	True
vips	The virtual IP(s) for the Vhost (comma separated list for multiples). The use of a loopback address (127.0.0.1) is supported, but must be preceded by an asterisk (*).	True
nodes	The node(s) to add to the Vhost (comma separated list for multiples).	True
autofailback	Set autofailback option, or leave blank if autofailback is not desired.	False
priority	The priority order of failover between Vhosts (1 is the highest and 5 is the lowest).	False

Example

```
sudo dxcli cluster-add-vhost vhost1 192.168.1.10 dxemssql1,dxemssql2
```

Manage a Vhost Diskgroup

A diskgroup is a logical set of disks that are added to a Vhost. When a disk is added to a Vhost diskgroup, the disk will be set online on the active node and offline on all other nodes. If there is a failure of a disk within the diskgroup, the Vhost will failover onto the next available node in the cluster.

To assign a disk to a Vhost, use the "sudo dxcli vhost-set-diskgroup" command.

Syntax

```
dxcli vhost-set-diskgroup <vhost> <disk_ids>
```

Parameters

Name	Description	Required
vhost	The name of the Vhost.	True
disk_ids	A full list of pipe () delimited disk IDs to add to the diskgroup.	True

Example

```
sudo dxcli vhost-set-diskgroup VHOST1 50842140-be32-d3a7-45d4-3999bf3ad3a8
```

Add a SQL instance to a Vhost

When a SQL Server instance is added to a Vhost, DxEnterprise virtualizes the network name and IP address associated with the SQL Server instance creating a Virtual SQL Server instance. Clients can then access the Virtual SQL Server instance via the Vhost\instance name.

Assigning a SQL Server instance to a Vhost creates a managed instance. To add a SQL instance to a Vhost, use the "sudo dxcli add-instance" command.

Syntax

```
add-instance <vhost>\<instance> <port> <sql_data_path> <sql_log_path> [sql_login] [sql_pass]  
[keep]
```

Parameters

Name	Description	Required
vhost	The name of the Vhost.	True
instance	The name of the SQL instance.	True
port	The port to be used.	True
sql_data_path	The path for the SQL data.	True
sql_log_path	The path for the SQL logs.	True
sql_login	A sysadmin user for the SQL instance.	False
sql_pass	The password for the SQL sysadmin user. "dxcli encrypt-text <pass>" command can be used to generate encrypted string.	False
keep	Specify this parameter to keep the current SQL data.	False

Example

```
sudo dxcli add-instance vhost1\mssqlserver 1433 /mnt/volume1/data /mnt/volume1/log sa  
Gks+GJplFmUbTLIBy4wPmw==
```

References

- [DH2i Support Portal](#)
- [DxEnterprise 19.5 Documentation](#)
- [DxEnterprise v19.5 DxCli Guide](#)
- [Share an Azure managed disk](#)
- [Enable shared disk](#)