DH2i DxEnterprise 20.0 Software: MSSQL HA Instances for Linux on Azure Quick Start Guide

DH2i Company

Support: +1 (800) 380-5405 ext. 2
https://dh2i.com/support/
eFax: +1 970-295-4505
Email: support@dh2i.com
https://www.dh2i.com

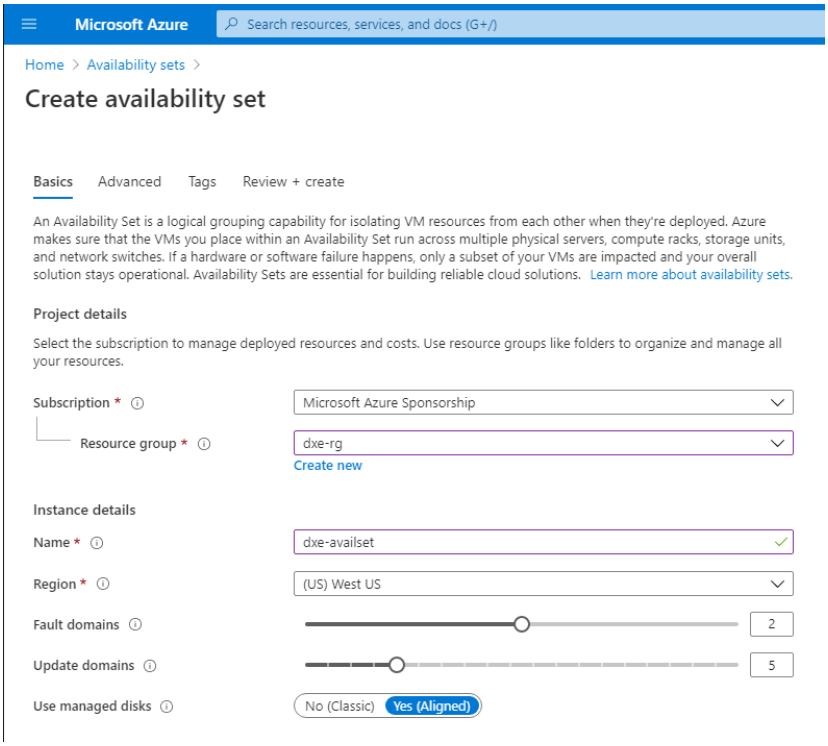
MSSQL HA Instances for Linux on Azure

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.

Setup Virtual Machines

Create the Availability Set and Virtual Machines

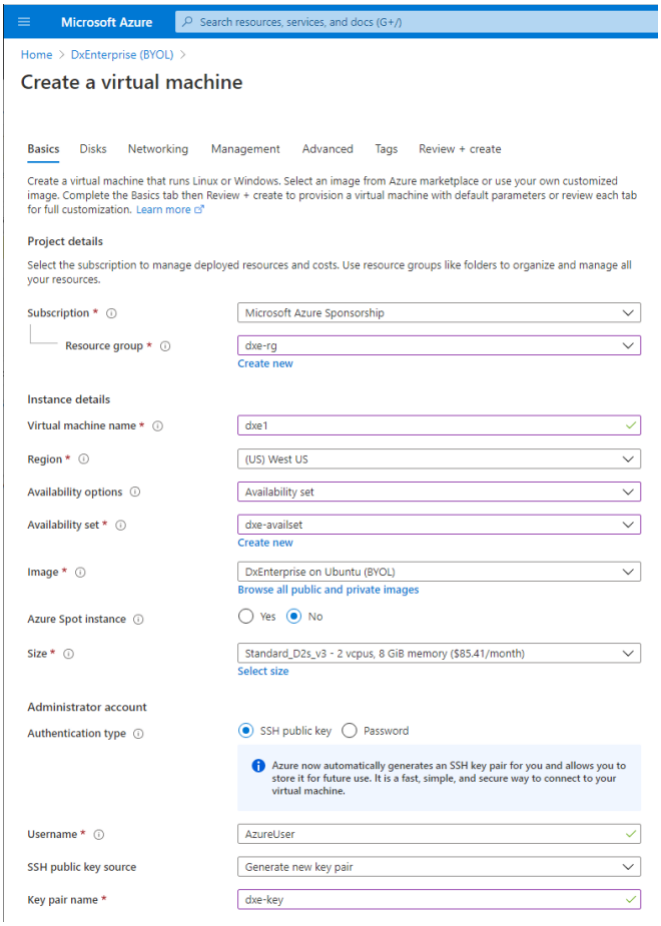
1. Login to the Azure Management Portal.
2. Search for **Availability Sets** using the top search bar, then select **Add**.
3. Assign the availability set to a resource group and give it a name.



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**.



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, Join Cluster, and Install SQL Server

- Be sure to reference the Azure Marketplace Image Quick Start Guide for instructions on starting DxEnterprise, activating the node, and creating a cluster.
- Install Microsoft SQL Server on each node using Microsoft documentation for Linux.

Configure Storage

Present Storage

Present storage to the nodes. DxEnterprise supports any storage that is SCSI-3 Persistent Reservation compliant. The examples provided below are specific to Azure Shared Disks.

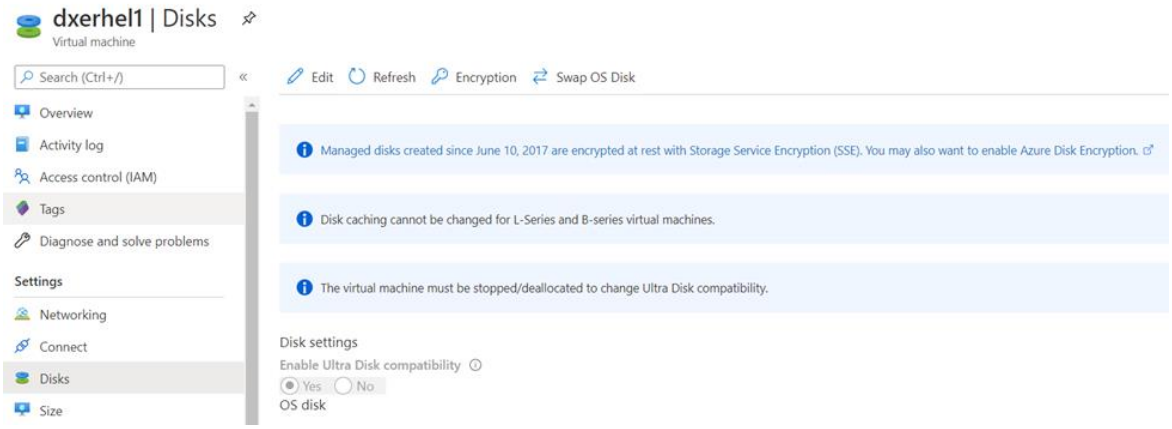
***NOTE:** Please ensure proper presentation of storage to nodes. If storage not managed by the DxEnterprise cluster is presented to the nodes, it is possible to overwrite or corrupt data held on that storage.*

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 Zones, Availability Sets, or Proximity Placement Groups. It is important to provision resources appropriately as they cannot be changed after creation.*

1. 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 **Ultra Disk Compatibility**.



   The Ultra Disk feature can also be enabled via the Azure CLI:

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

2. To deploy an Azure disk (e.g. Ultra Disk) as a shared disk that is shareable across multiple VMs, modify the `max-shares` 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>`
3. Once the shared disk is created with `max-shares` set to a value greater than 1, it can be attached to the VMs via the Azure CLI:
   - `az vm disk attach --resource-group <resource_group> --vm-name <vm_name> --name <disk_name>`

Configure Disk(s) in DxEnterprise

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.

1. To manage a disk, use the `sudo dxcli add-disk` command. The `sudo dxcli get-disks` command can be used to retrieve a list of disk IDs.

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"
```

2. Create a volume on the managed disk by 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
```

3. Retrieve the volume ID using the `sudo dxcli get-disk-detail` command.

Syntax

```
dxcli get-disk-detail <disk_id>
```

Parameters

Name	Description	Required
disk_id	The ID of the disk	True

Example

```
dxcli get-disk-detail 50842140-be32-d3a7-45d4-3999bf3ad3a8
```

4. Format the volume on the managed disk using the `sudo dxcli format-volume` command.

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
```

5. Assign a mount point for the volume using the `sudo dxcli set-mountpoint` command.

Syntax

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

Parameters

Name	Description	Required
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 and Configure a DxEnterprise Vhost

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]] [ilb_ports]
```

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
ilb_ports	Port(s) to use for internal load balancer probing (comma-separated list for multiples).	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.

1. OPTIONAL: This step is only required if the SQL Server sysadmin (SA) account credentials will be provided in step 2. Encrypt the SQL Server sysadmin password using `sudo dxcli encrypt-text` command.

   Syntax

   ```
   dxcli encrypt-text <value>
   ```

Parameters

Name	Description	Required
value	The text to be encrypted.	True

Example

```
dxcli encrypt-text Passw0rd
```

2. 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. Insert the encrypted SQL sysadmin password from the previous step for the `sql_pass` parameter.

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. If using Windows authentication, the credential must be supplied in UPN format (e.g. user@domain.com).	False
sql_pass	The encrypted password for the SQL sysadmin user.	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+GJplFmUbTLlBy4wPmw==
```

(Optional) Configure Azure Load Balancer

To configure an Azure Load Balancer, please view the quick start guide.

References

- DH2i Support Portal
- DxEnterprise v20.0 Documentation
- DxEnterprise v20.0 DxCli Guide
- Microsoft – Share an Azure managed disk
- Microsoft – Enable shared disk
- Microsoft – Install SQL Server on Linux