ITAS 166
Hyper-V Failovers and Replicas

Project 2

WEDNESDAY, APRIL 13, 2022

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Objective

This documentation will cover converting a VMware VM to a Hyper-V VM and importing the VM into a Hyper-V failover cluster. Once in the failover cluster it will include setting the VM to be replicated to a server outside the failover cluster. To begin, it will briefly cover setting up a simple file server with iSCSI disks to be shared between the failover cluster and to move files around the domain. This whole document will assume you have already created the dobbythehouseelf.local domain and joined all the required servers as shown in the network diagram.

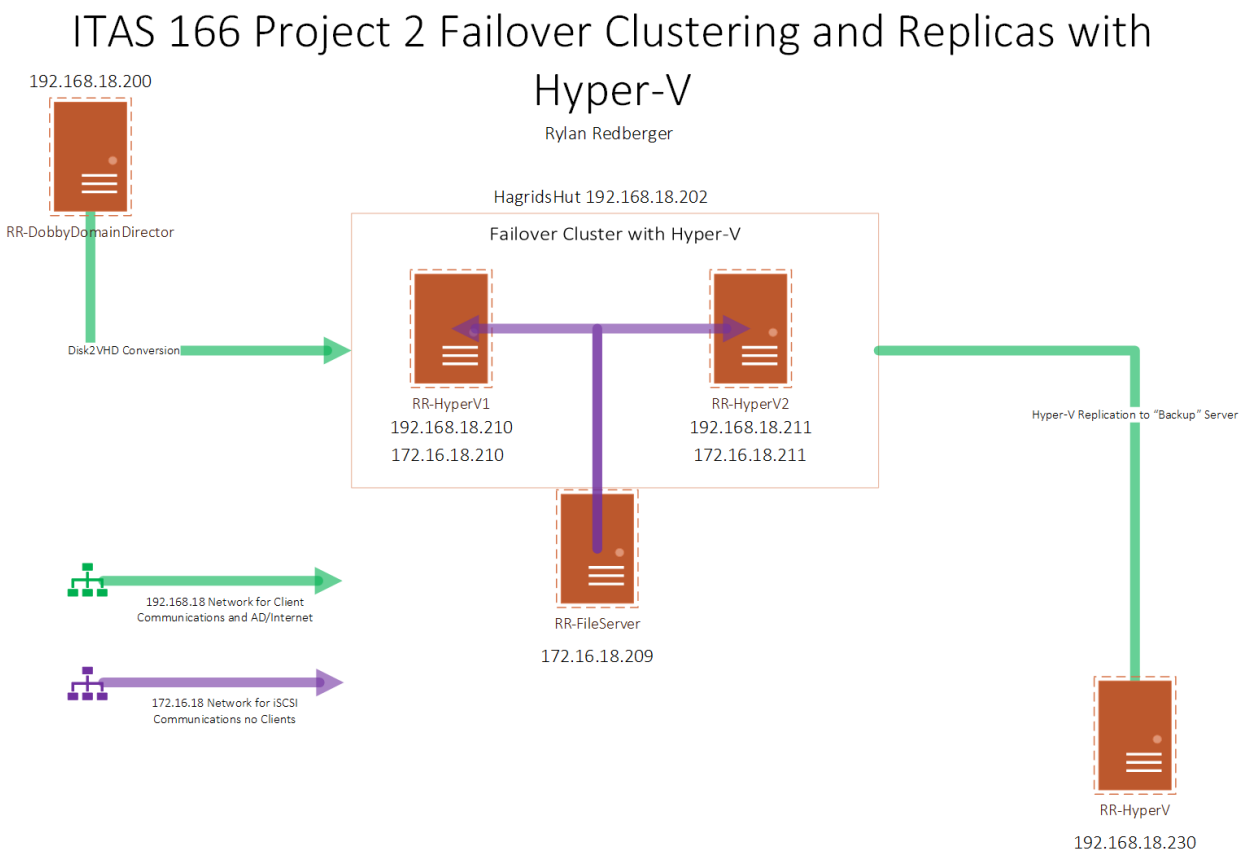
Demonstration

Below is the link to the video demonstration showcasing Failover Clustering and Hyper-V Replicas.

YouTube Video

Network Diagram

Below is a simple diagram depicting the basic network configuration for this project as well as each stage of the process.



Setting Up a File Server

We will need a centralized place to store all the files within the failover cluster as well as move files between the servers.

Begin by adding the File Server role within Server Manager. Once completed, in Server Manager go to File and Storage Services and then the iSCSI sub-tree. Select *To create an iSCSI virtual disk…*

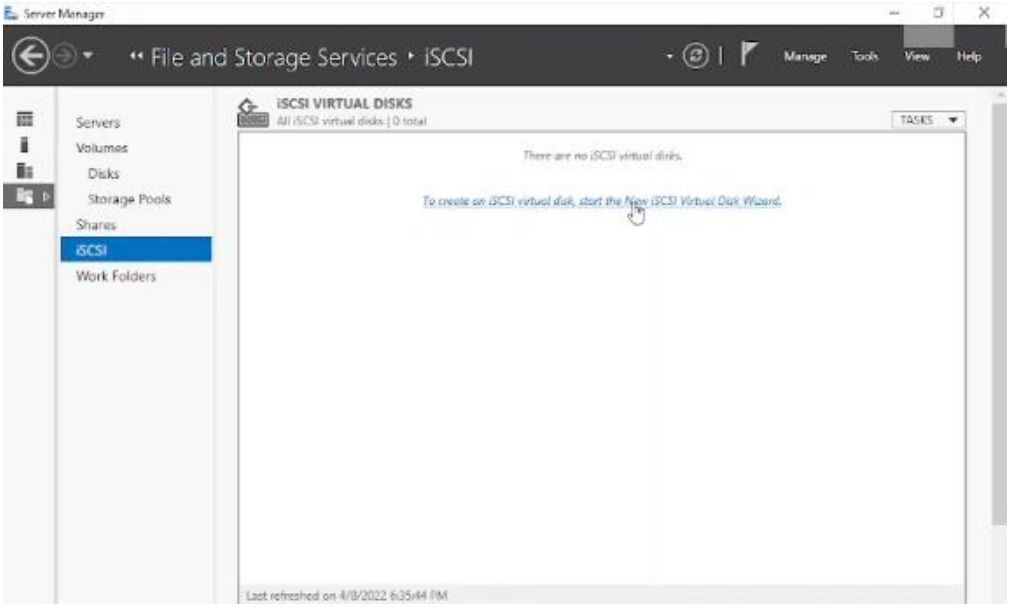


Figure 1 Create iSCSI disk wizard

The iSCSI wizard will pop up and select the other drive which you wish to create the iSCSI share within.

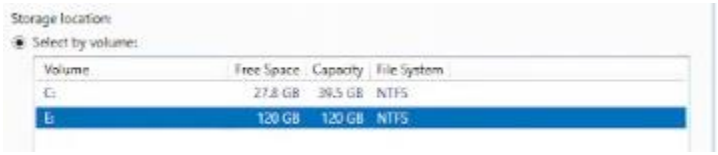


Figure 2 Choose disk iSCSI

Follow the wizard steps including the Virtual Disk size, create a new iSCSI target, name it, and select the allowed IP addresses to connect.

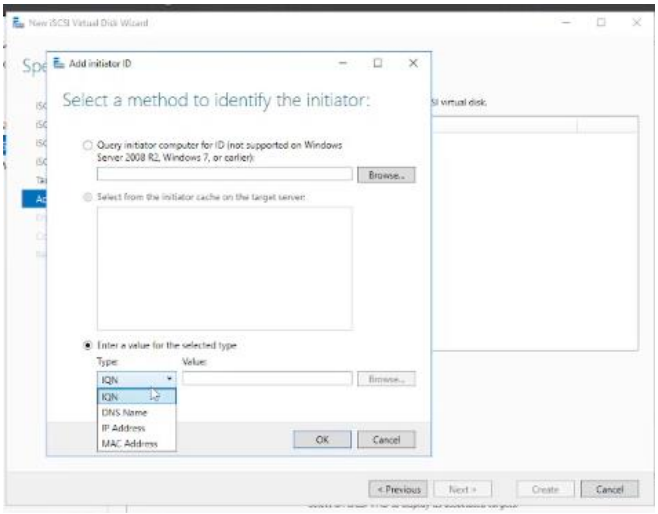


Figure 3 Identify Initiator method

I did this twice, once with my main data volume, as well as for a quorum disk that will be used in the failover cluster setup later. For my main data volume, I created a 120 GB volume and a 5 GB volume for my quorum disk.

Next, open the iSCSI initiator on the client servers, and connect using the IP of the file server.

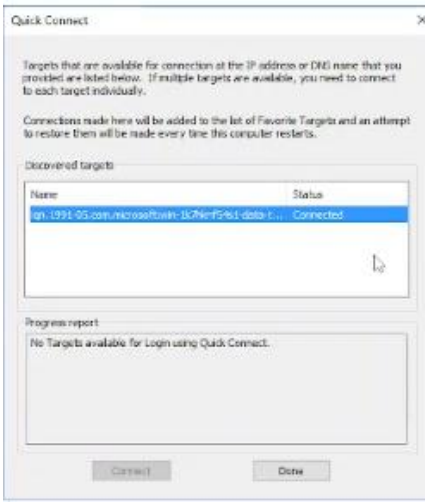


Figure 4 Quick connect to iSCSI shares

Below you can see both disks within Disk Management.

Figure 5 Disk management iSCSI disks

This concludes this section of documentation as we now have 2 available disks for later use. Keep in mind you could set these up with a raid level for extra redundancy.

Converting the Domain Controller to a Hyper-V VM

To start, create a simple file share on the file server on one of the iSCSI disks created earlier.

Initialize and create a volume on the disk.

Create a folder, and right-click to get to properties.

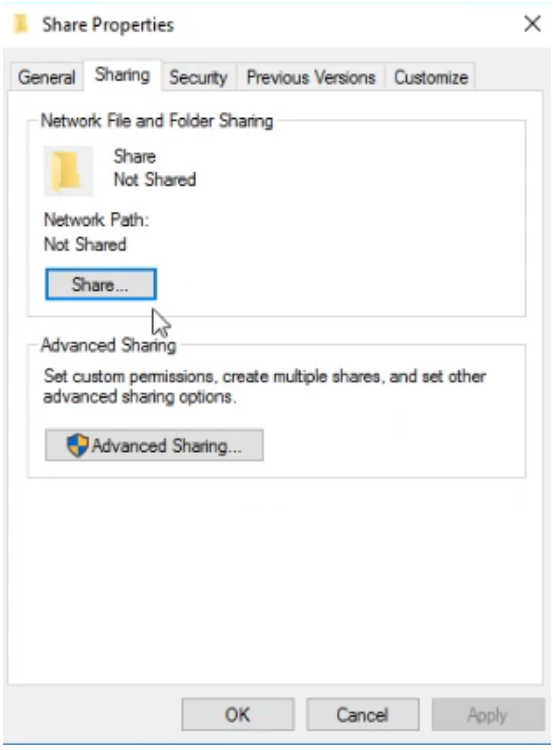


Figure 6 Share properties

Click the Share… button and then confirm by clicking Share.

To convert the domain controller, I used the Microsoft tool Disk2VHD. Simply download the tool from the Microsoft website, then run it on the Domain Controller.

Select both volumes to include and locate the file share you just created for the location. Make sure to check Prepare for use in Virtual PC.

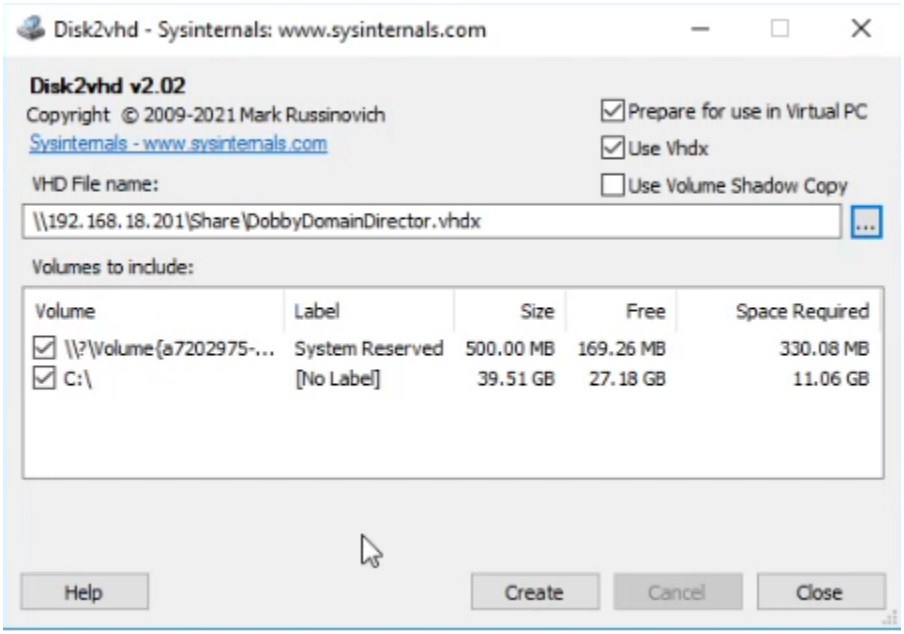


Figure 7 Disk2VHD program

Click the Create button to create the .vdhx file on the file share so it is easily accessible for other servers.

Once completed double check your .vhdx file is on the file share ready to be used.

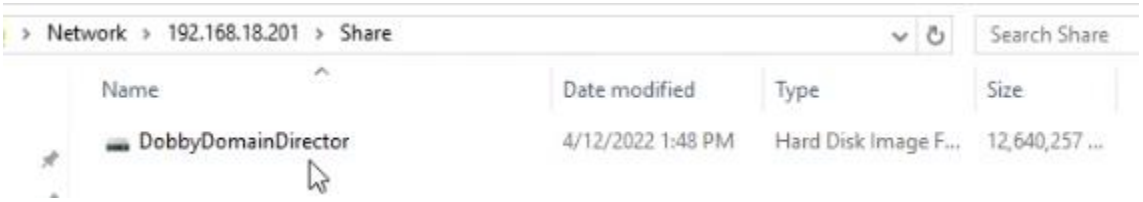


Figure 8 VHDX file on file share

Creating a Hyper-V Failover Cluster

To create a Failover Cluster, you must first install the Failover Clustering Feature within Server Manager.

Once completed, open the Failover Cluster Manager from Server Manager.

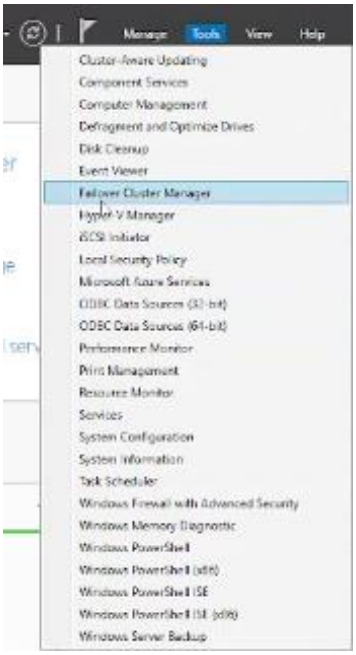


Figure 9 Failover Cluster Manager

Once in Failover Cluster Manager select the Validate Configuration… button and input both servers by their DNS name.

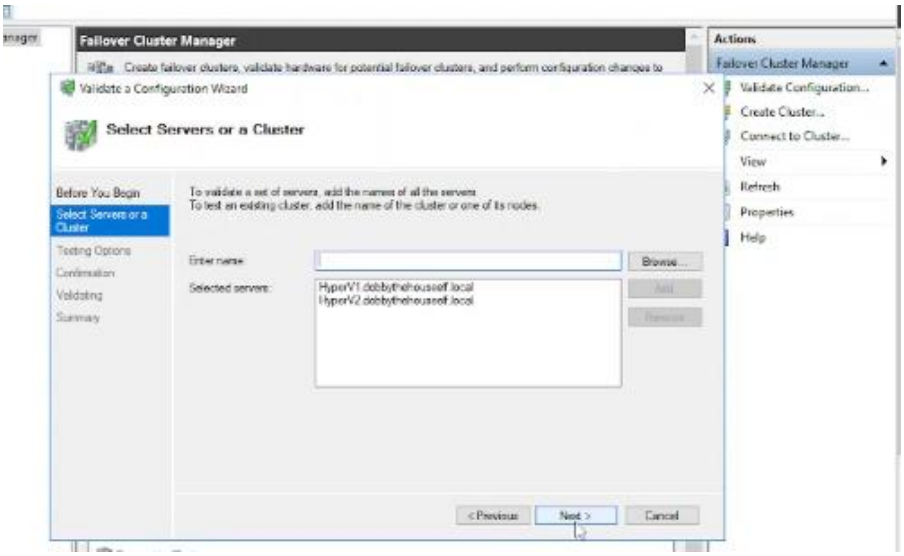


Figure 10 Validate Cluster Configuration

Select the Next > button and select Run all tests, continue to initialize the test, and wait for the test to complete.

Once my test completed, I had a few warnings such as updates but more importantly it warned me I would not be able to live migrate VMs due to different processor versions.

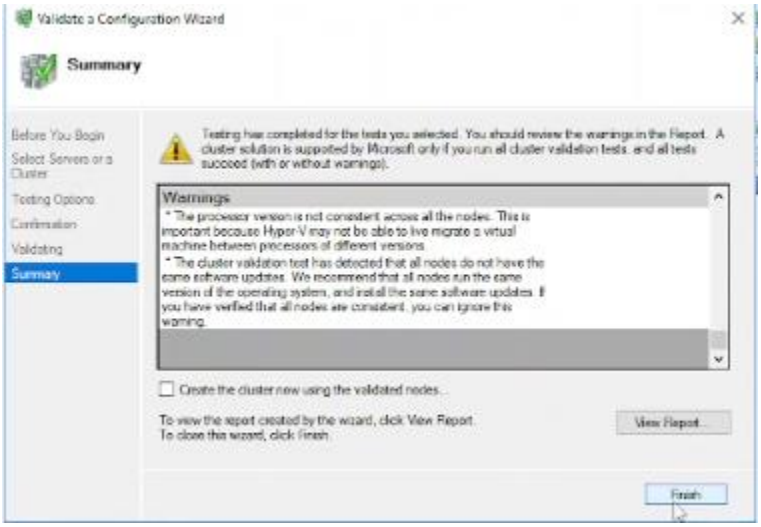


Figure 11 Validator Warnings

As I wanted to be able to live migrate VMs within Cluster Manager after some investigating both servers were on different hosts. To fix this I could simply migrate my VM from one Compute Resource to another, making sure both hosts had the same hardware. (Example: the R810 servers)

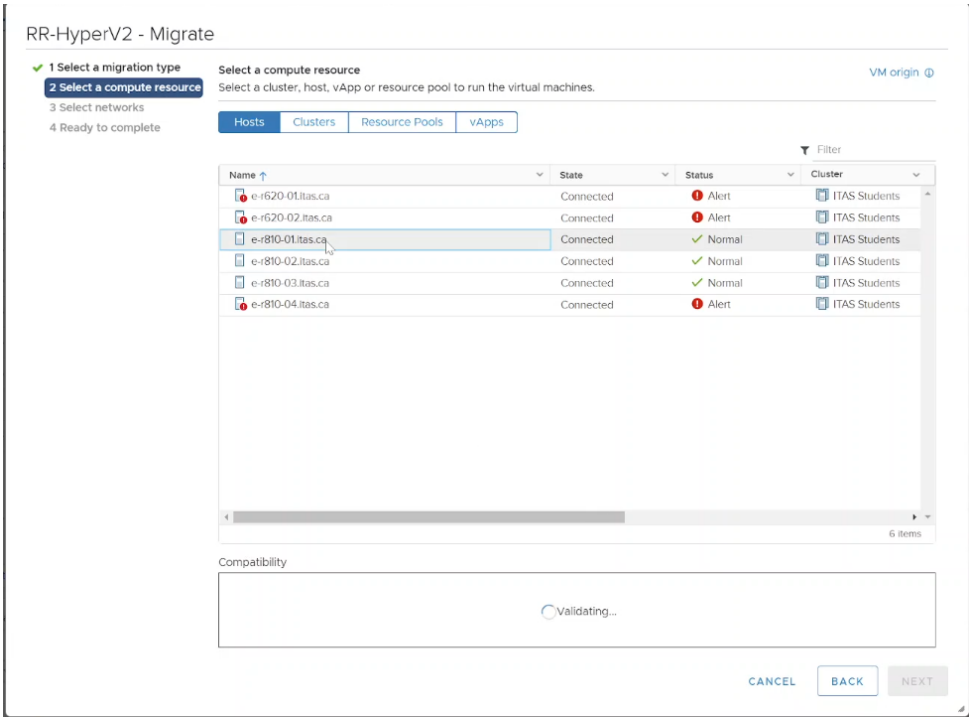


Figure 12 Migrate VM host

Once completed I no longer received the warning message after completion of the validator.

Now to create the cluster click the Create Cluster button to create the new Cluster.

Give the cluster an IP, and a name. (I named my cluster HagridsHut to keep with the theme.)

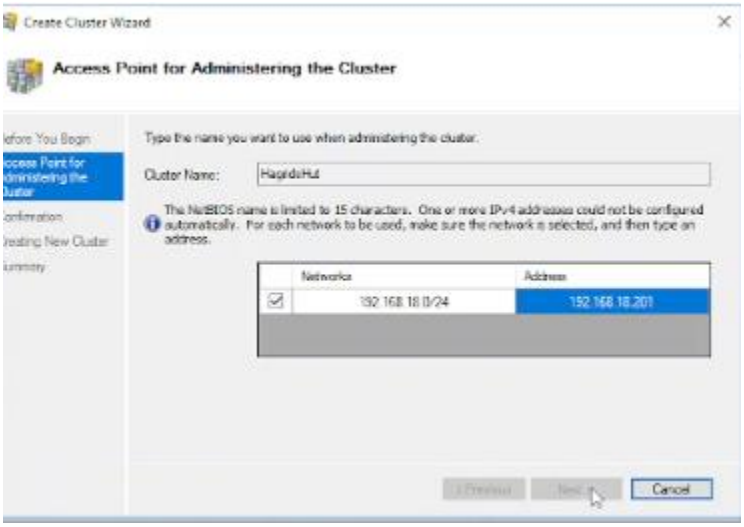


Figure 13 Create Failover Cluster AP

Once completed I had a Failover Cluster running with no roles.

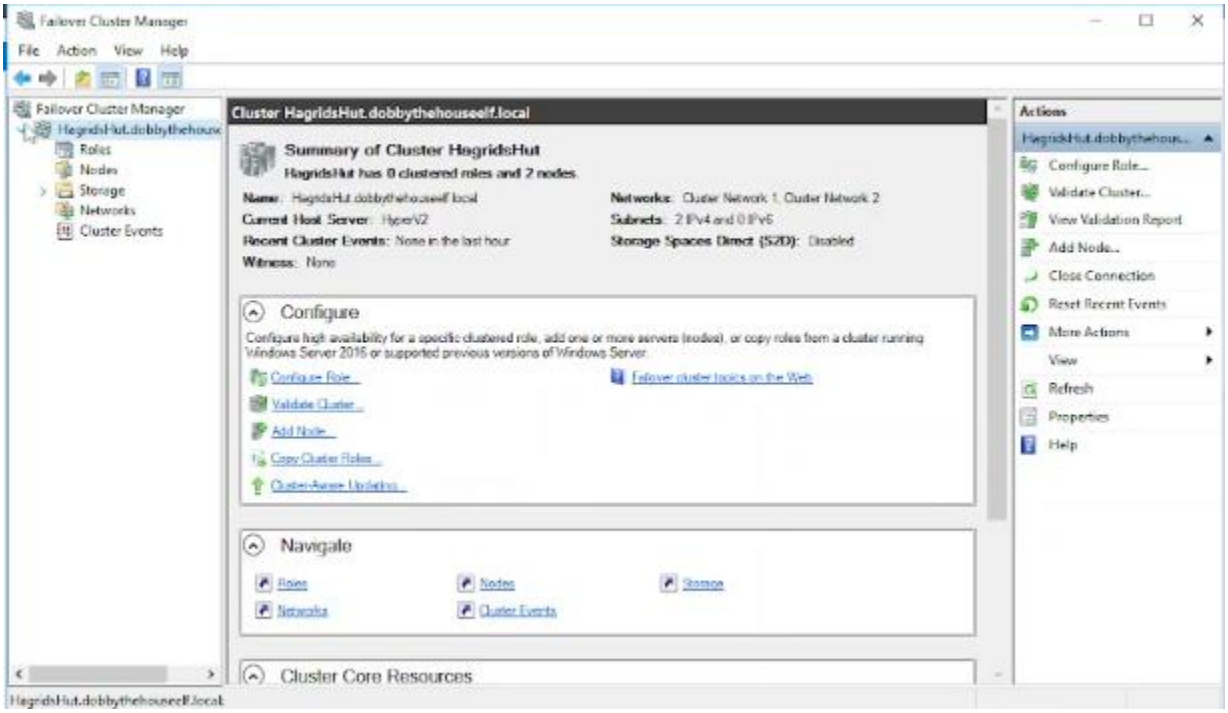


Figure 14 Failover Cluster Manager

First, under the Disks tab select Add Disk and add both iSCSI disks to the cluster.

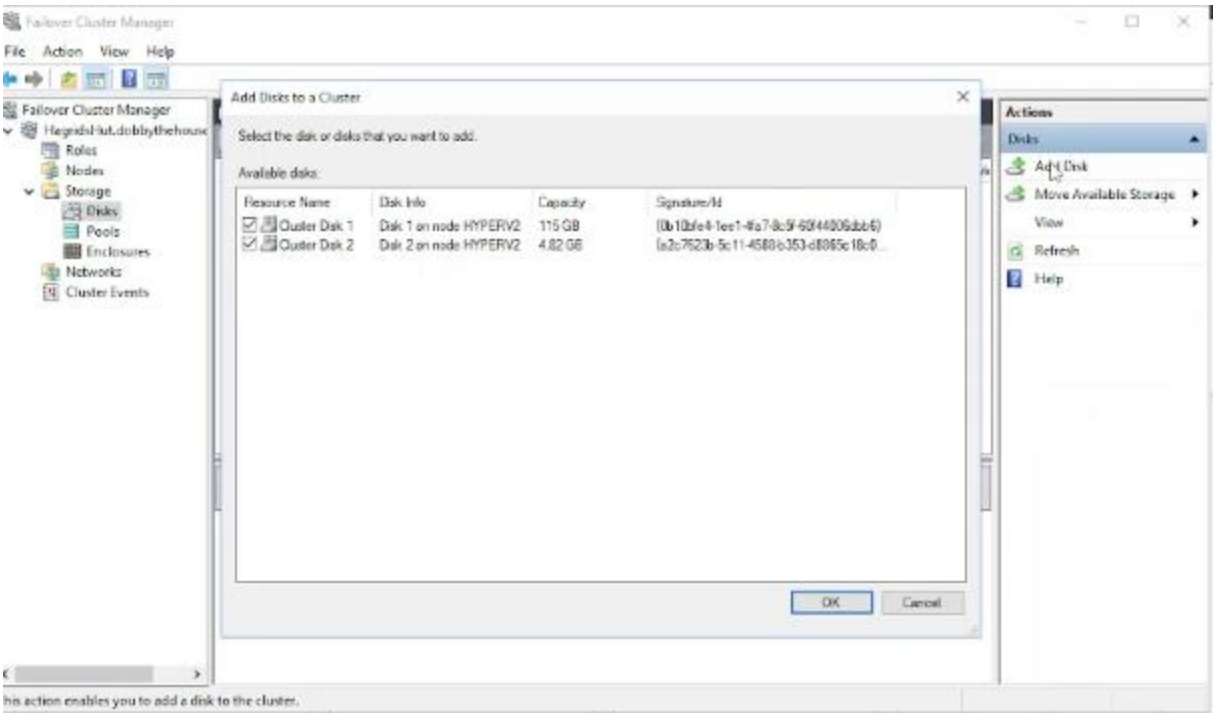


Figure 15 Failover Cluster Manager disks

Right-click the Failover Cluster object and click More Actions > Configure Cluster Quorum Settings.

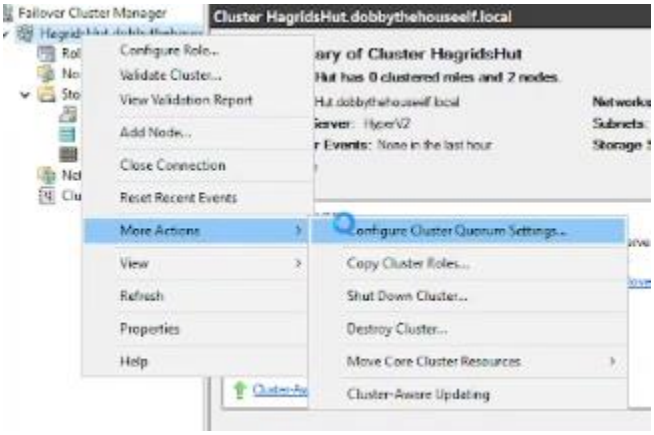


Figure 16 Configure cluster quorum settings

Choose Select the Quorum Witness and Configure a Disk Witness. Select the small 5GB disk and confirm the selection.

Next, add the larger disk to the CSV (Clustered Shared Volume) by right-clicking it and selecting Add to Cluster Shared Volumes.

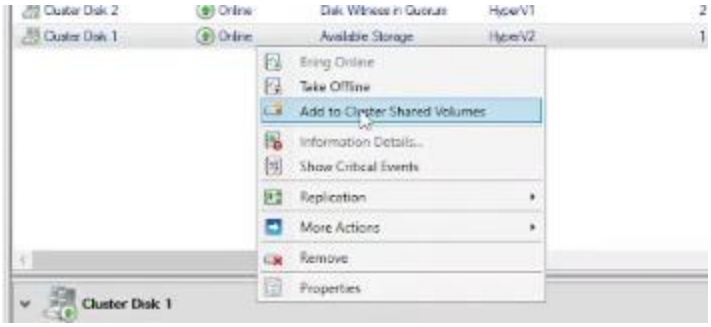


Figure 17 Add CSV

The failover cluster is completed, it just needs a VM to run.

Creating a VM from the Domain Controller

Within Hyper-V manager, select New > Virtual Machine…

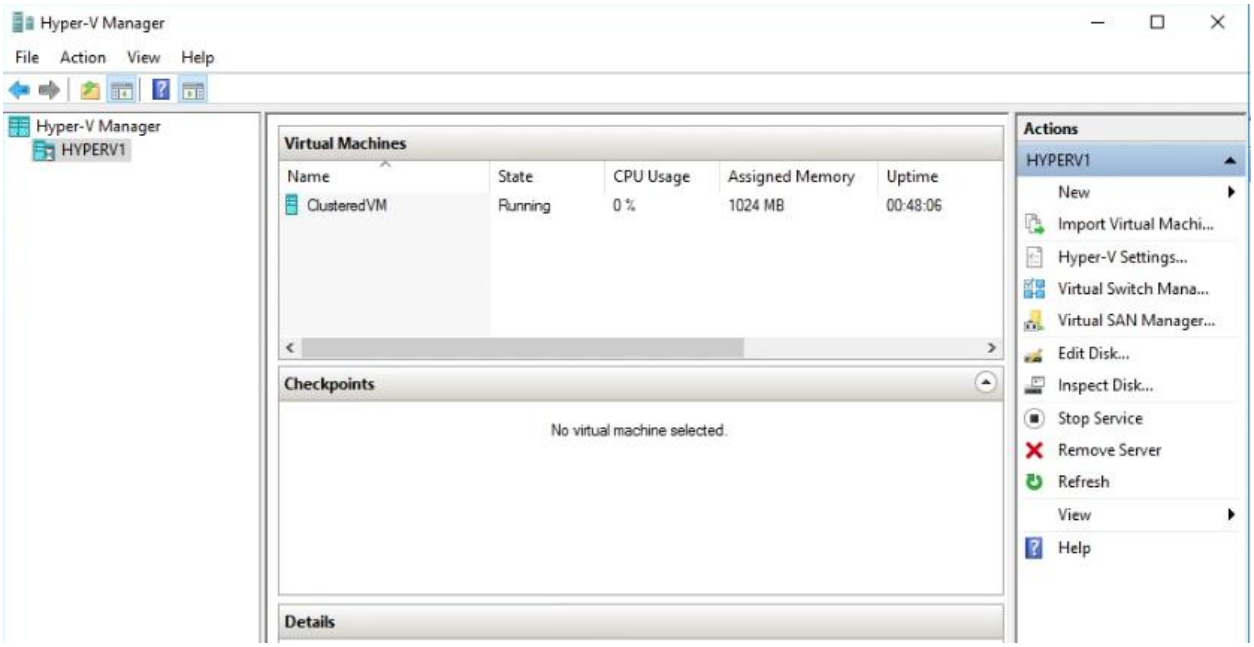


Figure 18 Hyper-V Manager

In the wizard, name the Virtual Machine. (I named mine the same as the real computer)

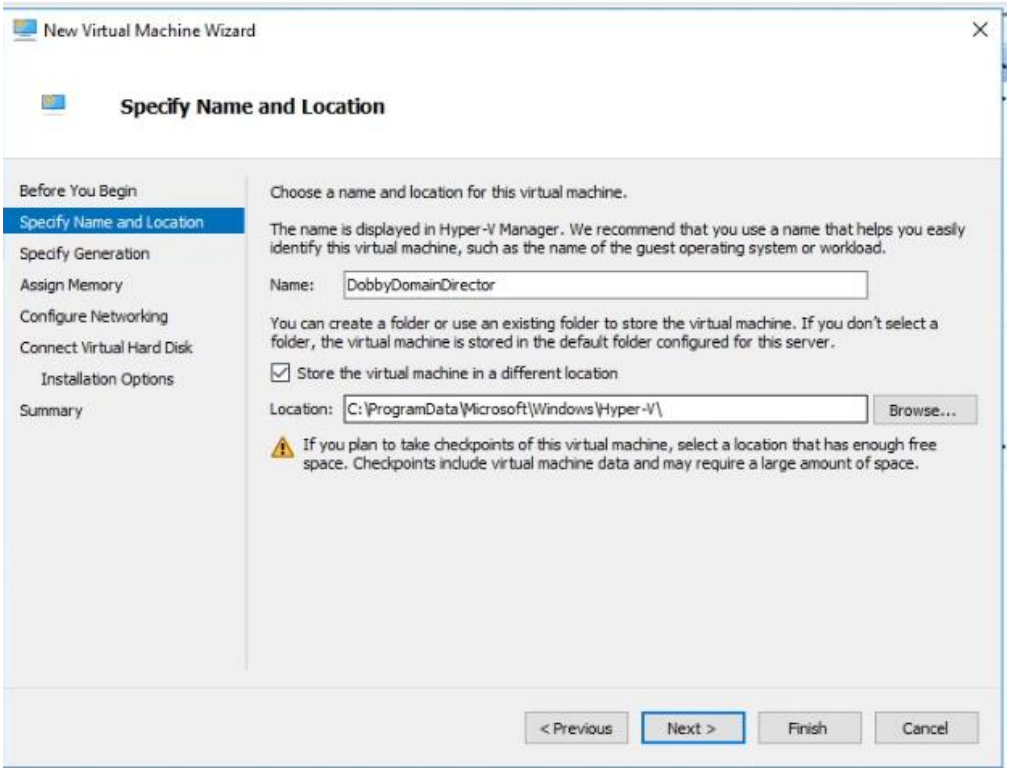


Figure 19 New Virtual Machine wizard

Be sure to check the Store the virtual machine in a different location checkbox, then select Browse…

Go to C:\ClusterStorage\Volume1\VMs some of the names may be slightly different due to configuration but you are looking for your CSV you created earlier. You may have to create VMs folder, and inside said folder create a new folder that will contain the domain controller Failover Cluster VM.

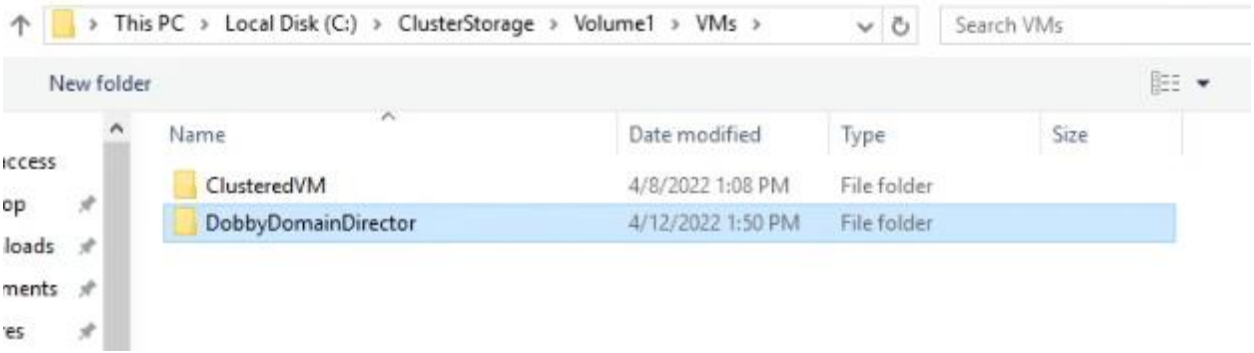


Figure 20 VM location

Select that file location and click Next >

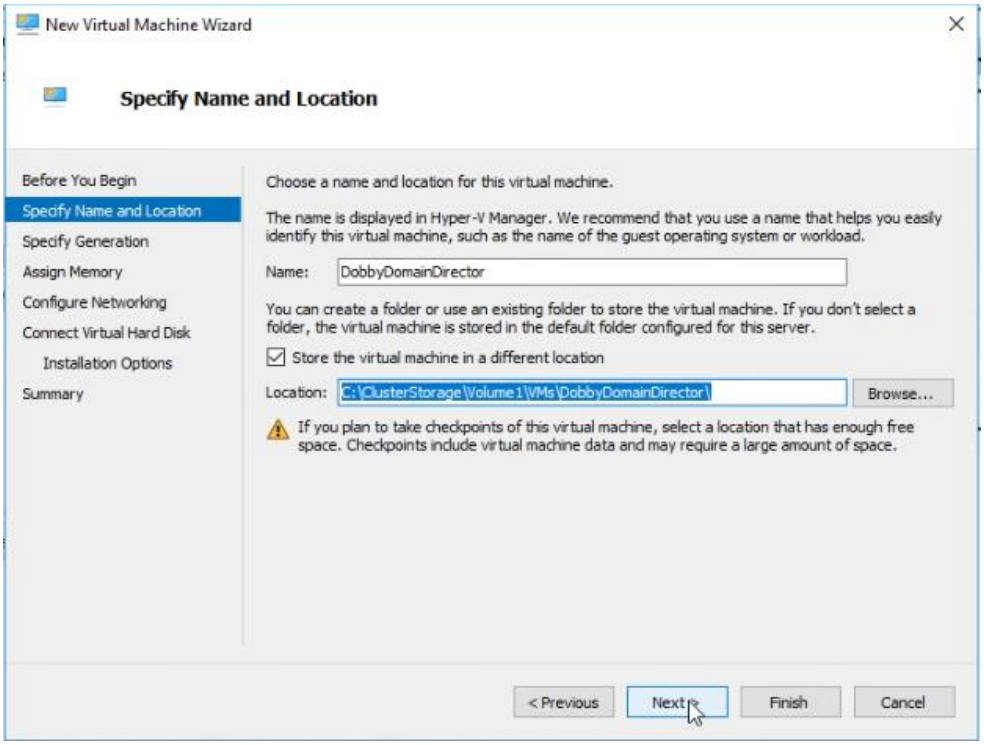


Figure 21 Specify name and location

Select a Generation 1 VM and Next.

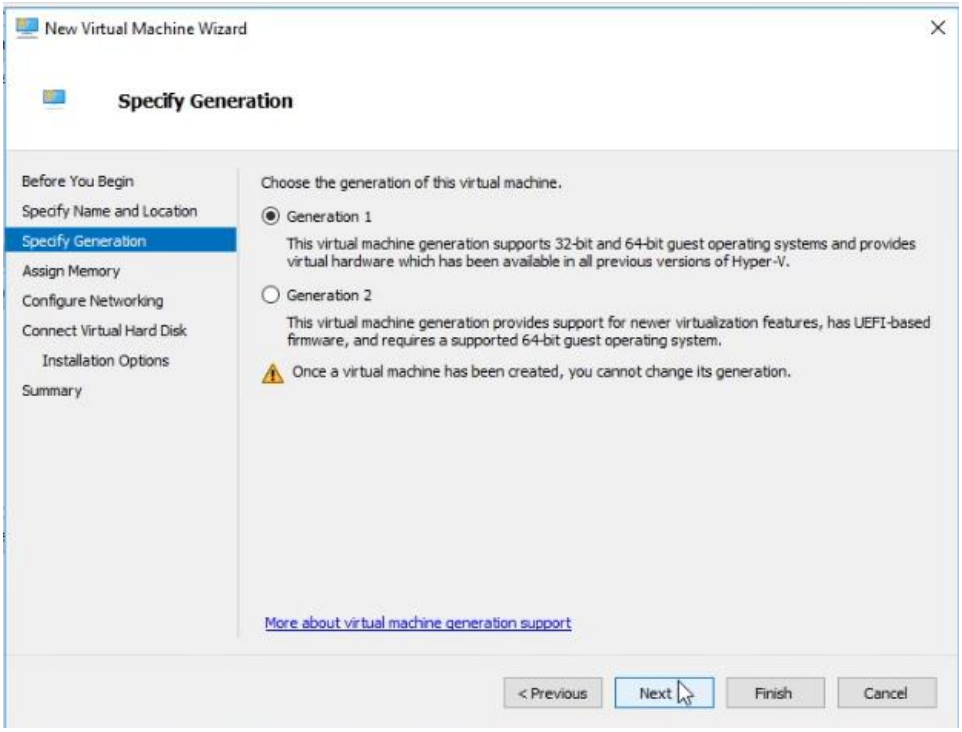


Figure 22 Generation 1 VM option

Assign as much memory as your host allows, select your previous network that should be attached to the same network as the host.

Copy the .vhdx file from the network share to the C:\ClusterStorage\Volume1\VMs\DobbyDomainDirector or wherever your CSV is located.

Back in the wizard select the Use an existing virtual hard disk option and locate your moved .vhdx file within C:\ClusterStorage\Volume1\VMs\DobbyDomainDirector.

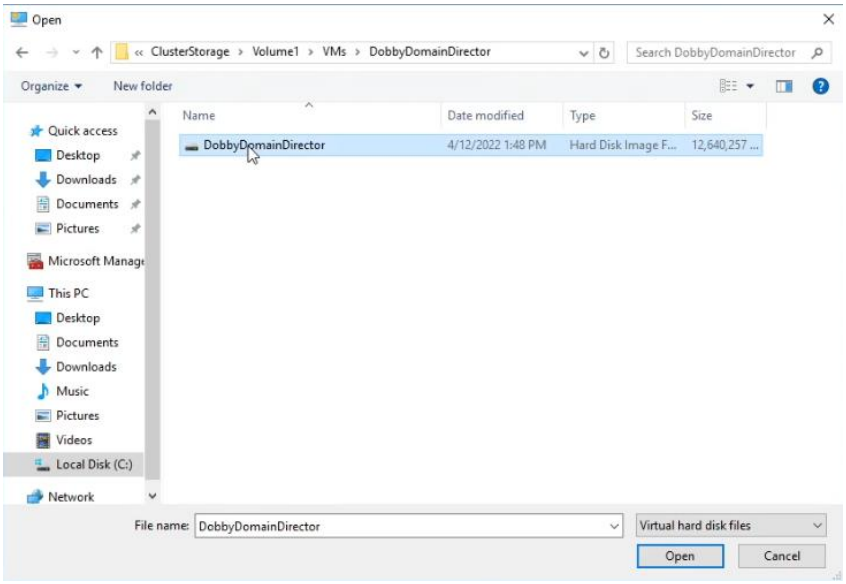


Figure 23 DobbyDomainDirector.vhdx

Click Open and finish the wizard.

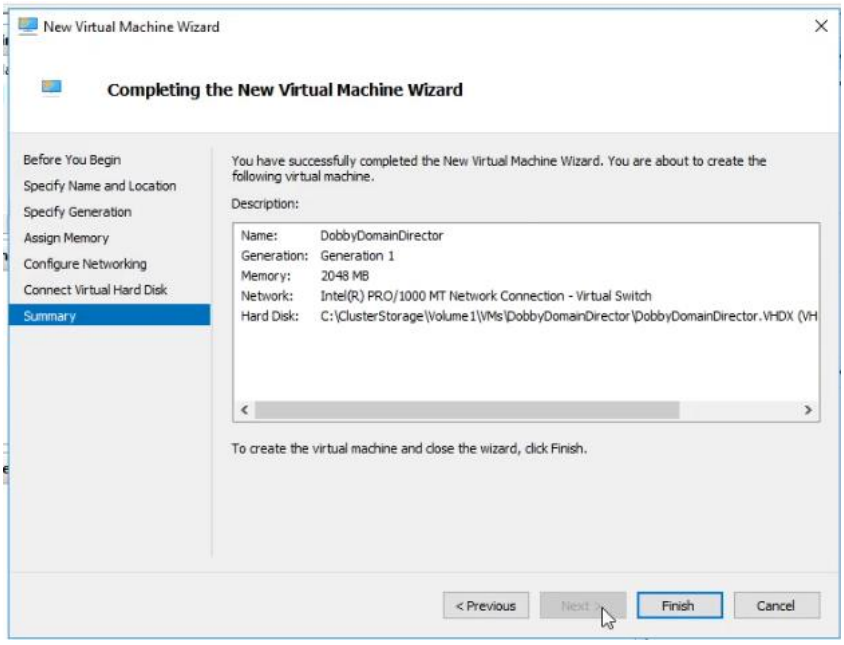


Figure 24 New virtual machine wizard completion

Once completed, the domain controller should show up within Hyper-V manager, and power on fine.

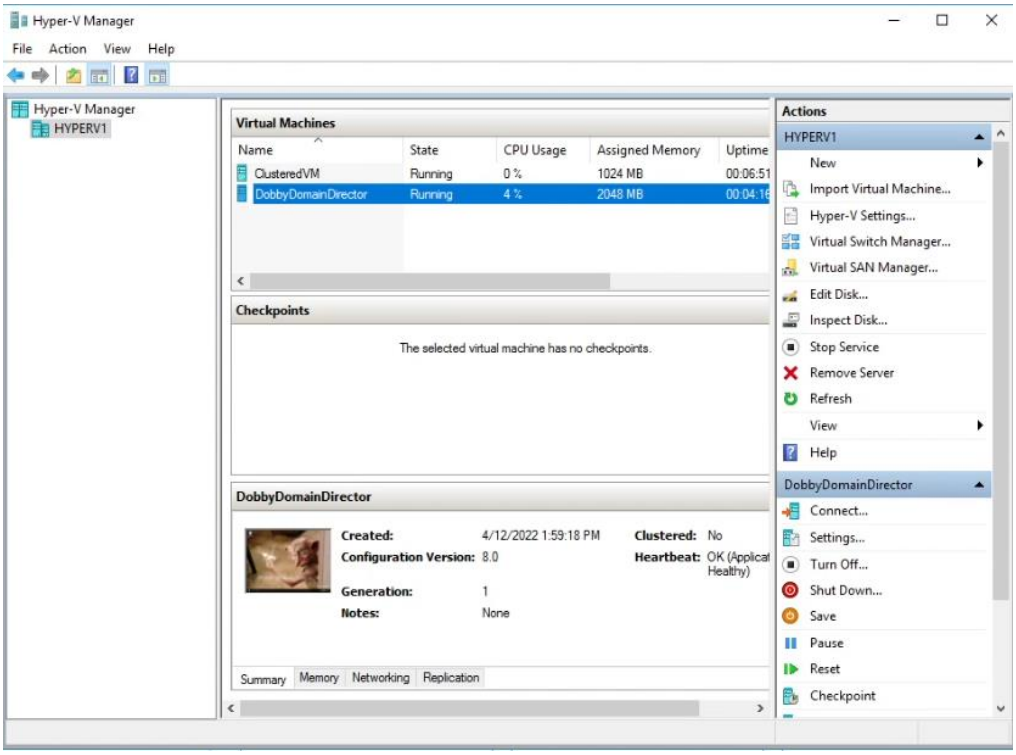


Figure 25 Domain controller in Hyper-V Manager

Within Failover Cluster Manager, under the Roles tab, select Configure Role… and choose the Virtual Machine option.

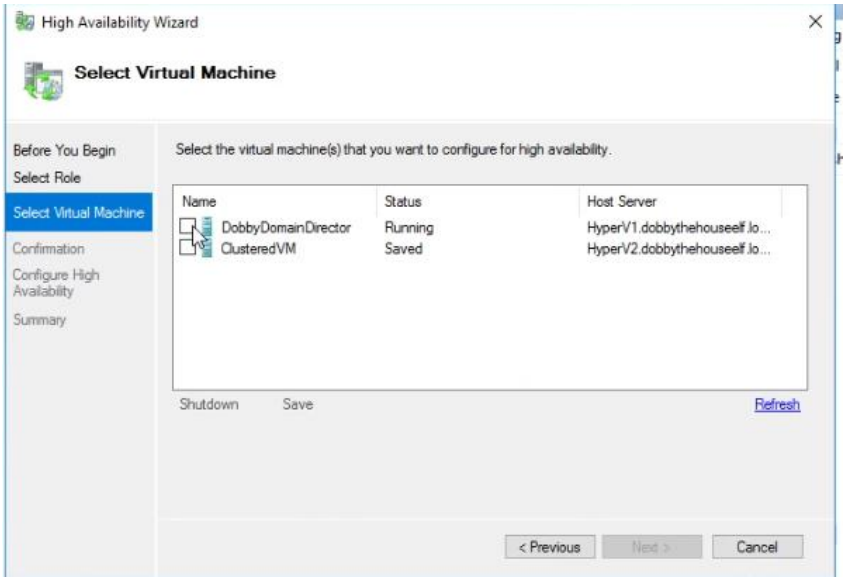


Figure 26 High availability wizard

Select the Virtual machine from the list and confirm the selection. Finally, complete the High Availability Wizard.

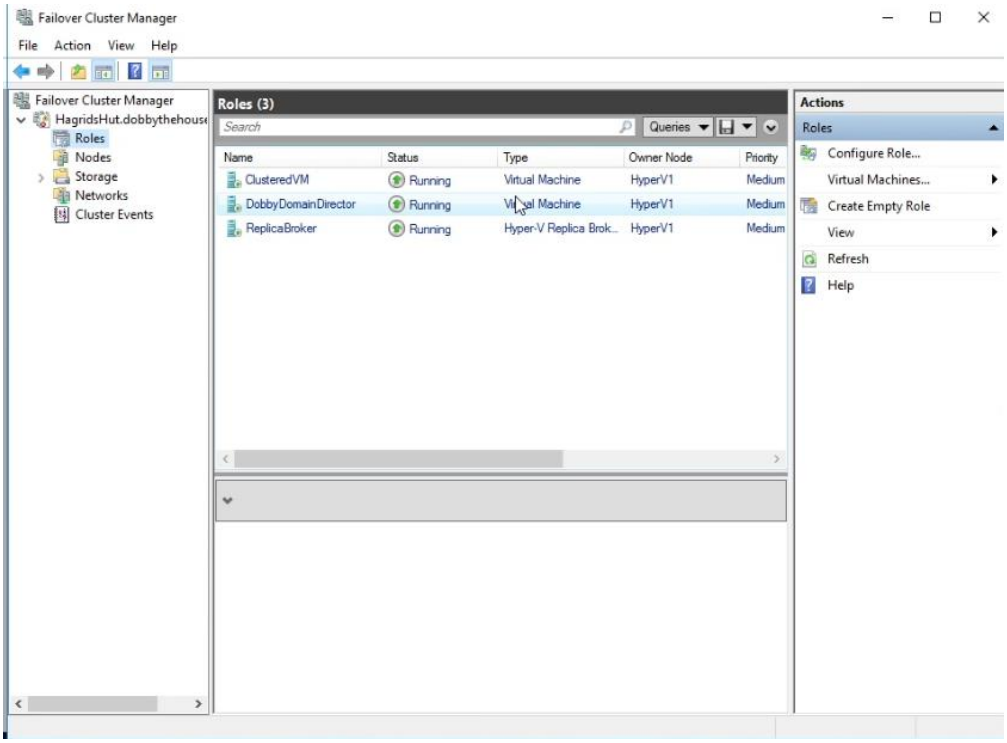


Figure 27 Failover Cluster Manager running VMs

The virtual machine should now be a part of the Failover Cluster and shutting down the Owner Node of the virtual machine should automatically move the VM from one host to another.

Replicating a VM From the Failover Cluster

Finally, to replicate the domain controller to a Hyper-V server outside the failover cluster begin by adding the Replica Broker role within Failover Cluster Manager.

As done before under the Roles tab select Configure Role… and choose the Replica Broker role.

The next step is to configure your replica target server to accept replica connections. On the target server within Hyper-V select Hyper-V settings, and under Replication Configuration check, Enable this computer as a Replica server, as well as check the Use Kerberos (HTTP) option. Make sure to also select the Allow replication from any authenticated server option. (Or add your Failover Cluster servers to the allowed servers) Hyper-V will ask you to allow the rule in the firewall. Simply go to the Windows Firewall rule exceptions and click on Inbound Rules. Then enable the Hyper-V Replica HTTP listener.

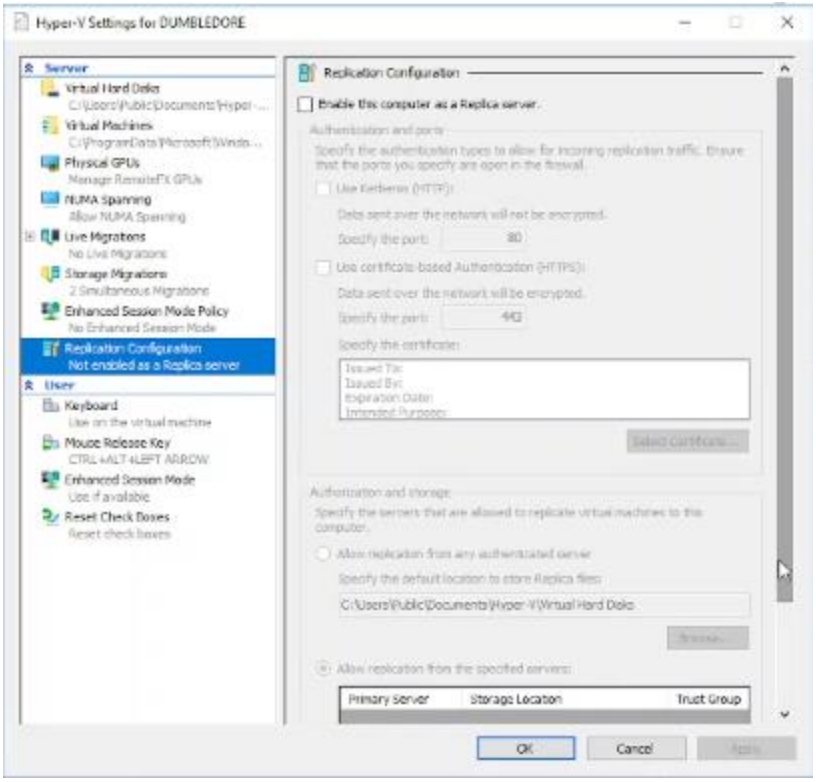


Figure 28 Hyper-V settings

Once completed right-click the domain controller VM within the Failover Cluster and select Replication > Enable Replication…

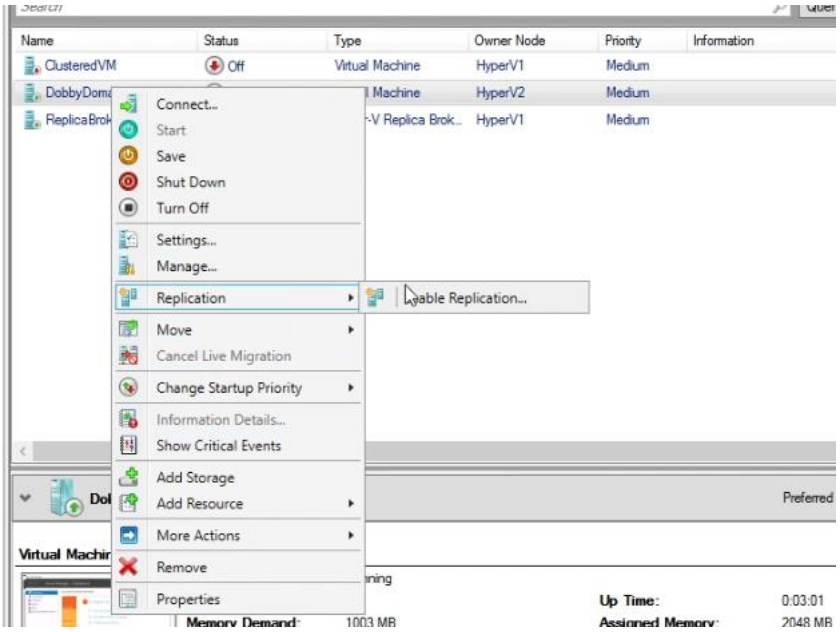


Figure 29 Enable replication option

In the wizard, enter the DNS name of your stand-alone Hyper-V server. In my case I named mine Dumbledore.

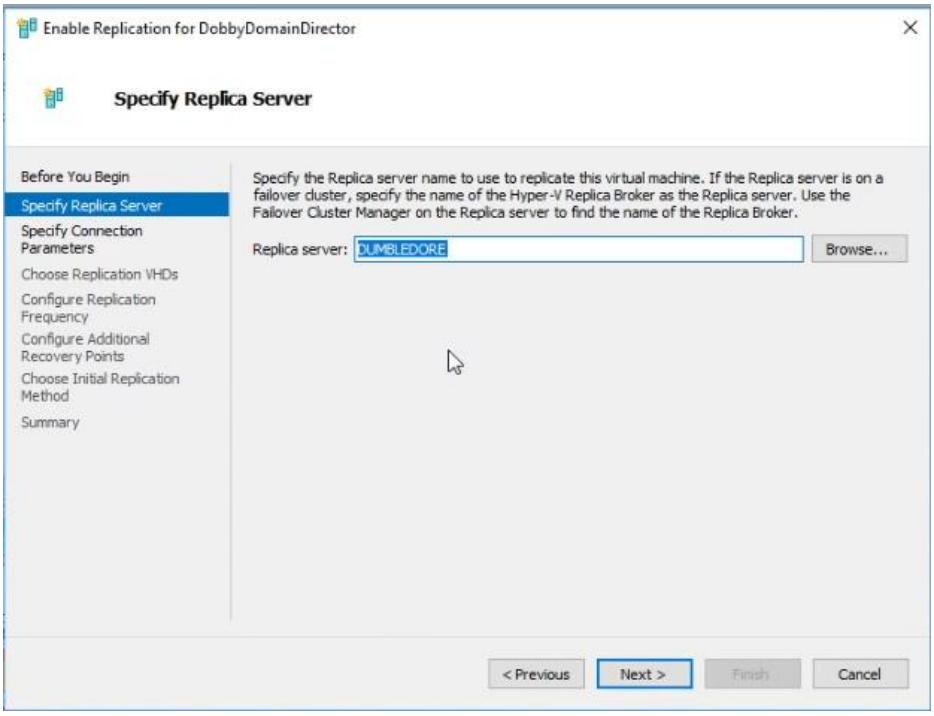


Figure 30 Specify replica server

If Dumbledore is configured correctly, it should pass inspection without problem. I left all my replication settings at their default value and finished the wizard. You can see the status of the replication by right clicking the VM and selecting Replication > View Replication Health.

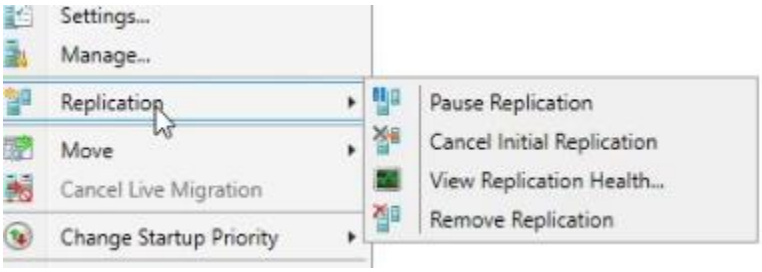


Figure 31 Replication options

You can see there are more actions under this panel to edit the replication.

Wallpaper Abomination

I recommend not looking at this section for too long and I am not responsible for any damages it does to you but continue with caution.

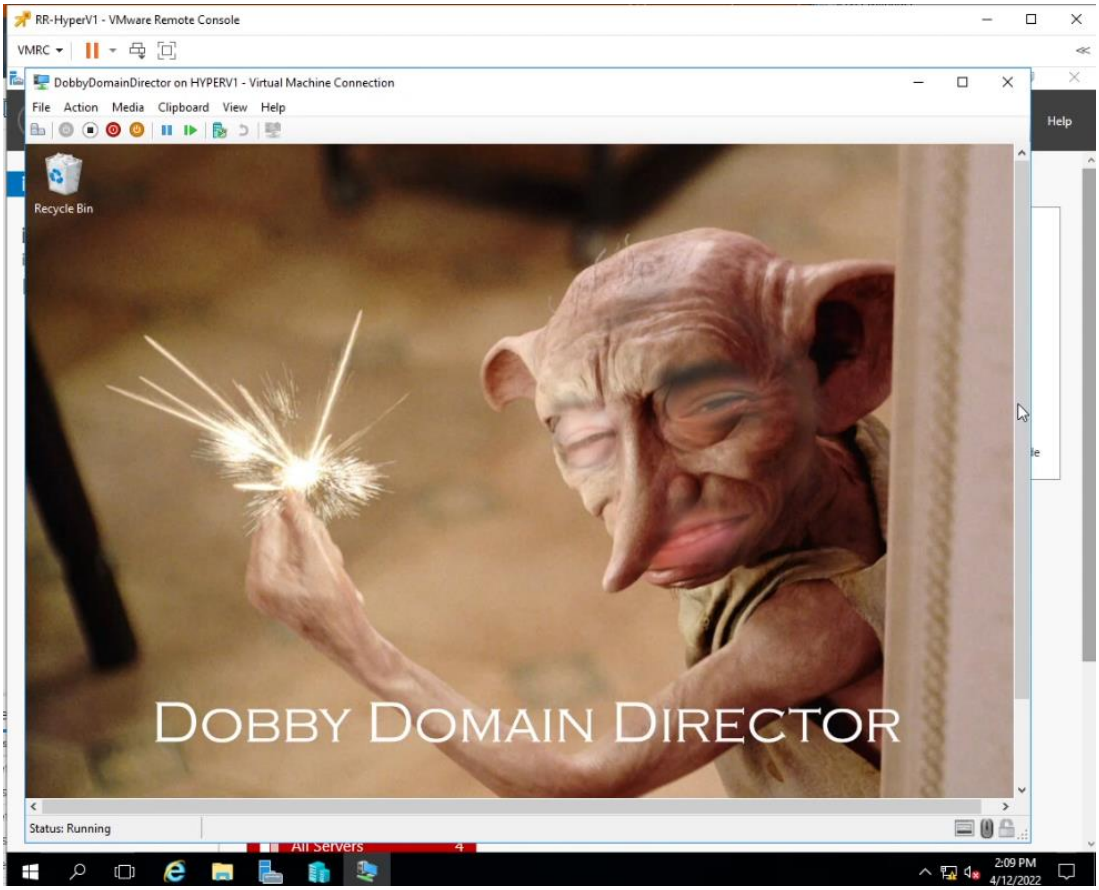


Figure 32 Domain controller wallpaper

Above is my domain controller with the awful wallpaper running within my Hyper-V Failover Cluster redundant system with a Hyper-V Replica backup.

Conclusion

This project reminded me of how I should not use Photoshop, but more importantly, using Hyper-V Replicas and Failover Clustering. It is very neat to be able to move VMs around freely and its much clearer why virtualization is the way of the future as it is much easier to manage (when it works properly) as well as create redundant backups.

References

Archiveddocs. (n.d.). *Deploy a hyper-V cluster*. Microsoft Docs. Retrieved April 14, 2022, from https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/jj863389(v=ws.11)

BenjaminArmstrong. (n.d.). *Set up hyper-V replica*. Microsoft Docs. Retrieved April 14, 2022, from https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/manage/set-up-hyper-v-replica

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Pottermore. (2020, March 16). *7 times Dobby was a comedy genius*. Wizarding World. Retrieved April 14, 2022, from https://www.wizardingworld.com/features/7-times-dobby-was-a-comedy-genius