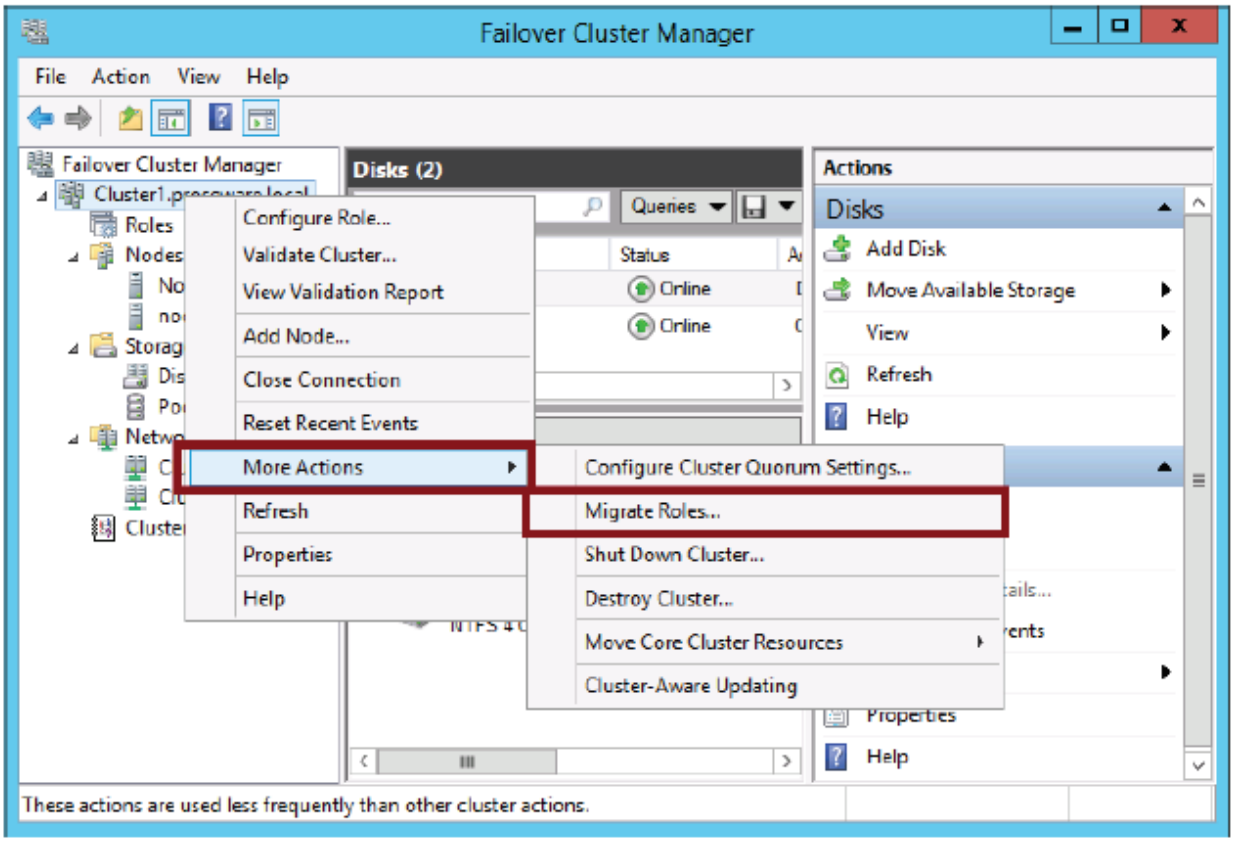
How to Move Highly Available (Clustered) VMs to Windows Server 2012 with the Cluster Migration Wizard

Unlike with NLB, you can't perform a rolling upgrade to a failover cluster. The only way you can upgrade a failover cluster to Windows Server 2012 or Windows Server 2012 R2 is to create a new cluster with the new operating system and migrate the roles on the old cluster to it.

Fortunately, Windows Server 2012 and Windows Server 2012 R2 include a wizard to help you do that. By using the wizard, you create the new cluster, shut down the roles on the old cluster, and then use the wizard to pull the roles to the new cluster. To start the Migrate a Cluster Wizard, in Failover Cluster Manager, right-click the cluster icon in the console tree, click More Actions, and then click Migrate Roles as shown in Figure 1-30.



The Windows Server 2012 Cluster Migration Wizard is a powerful and time-saving tool that copies cluster roles from a source cluster to a target cluster. Although the Cluster Migration Wizard can move almost any clustered workload to Windows Server 2012, we get many

questions about migrating highly available virtual machines (HA VMs). There are two ways that you will be able to move HA VMs to a Windows Server 2012 Failover Cluster:

1. Windows Server 2012 Cluster Migration Wizard integrated into the Failover Clustering feature
2. System Center Virtual Machine Manager 2012 (SCVMM 2012) with Service Pack 1

In this blog I will focus on using the Cluster Migration Wizard to move HA VMs. Depending on what operating system version you are running today, there are some considerations:

Tool	Migrate Clustered VMs	Migrate Clustered VMs from Windows Server 2008 R2 SP1 to Window Server 2012	Move Clustered VMs from Windows Server 2008 SP2 to Windows Server 2012
Windows Server 2012 Failover Clustering Cluster Migration Wizard	Yes	Yes	Yes
System Center Virtual Machine Manager 2012 (SCVMM 2012)	Yes	Yes	No

Note: Live Migration of virtual machines (VMs) from Windows Server 2008 R2 to Windows Server 2012 is not supported. As a result, migrating VMs to Windows Server 2012 can be fast, but it is not a zero-downtime event - a brief maintenance window is required to cut over to the new cluster roles. Fortunately, cluster migration can be tested with no impact to a running cluster, so that issues can be identified prior to actual migration.

Windows Server 2012 Cluster Migration Wizard Source and Target OS Versions

The Windows Server 2012 Cluster Migration Wizard will move VMs from the following Windows Server OS versions:

Source Cluster Node OS	Target Cluster Node OS
Windows Server 2008 SP2	Windows Server 2012
Windows Server 2008 R2 SP1	Windows Server 2012
Windows Server 2012	Windows Server 2012

Note: The Windows Server 2012 Cluster Migration Wizard requires that the latest service packs be installed on the source clusters. Windows Server 2008 clusters are required to be upgraded to Service Pack 2 prior to migration. Windows Server 2008 R2 clusters are required to be upgraded to Service Pack 1 prior to migration.

Migration for Highly Available (Clustered) Hyper-V VMs

The following steps are required to prepare a new (target) cluster for the Cluster Migration Wizard – it may typically take approximately two hours to prepare a new Windows Server 2012 cluster with a small number of nodes. Here is an overview of the process:

1. The new (target) cluster nodes need to be physically configured (network, storage) – or in the case of cluster virtualization, the virtual network and storage settings of the VMs need to be configured. Ideally, both the old (source) cluster and the new (target) cluster will see common shared storage– storage can be reused and this will allow for the smoothest migration
2. Windows Server 2012 needs to be installed on all of the nodes in the cluster target cluster, and the Hyper-V Server Role and Failover Clustering feature should be installed on all nodes as well.
3. Create the new Windows Server 2012 target cluster using the Failover Cluster Manager or the New-Cluster PowerShell cmdlet.
4. Launch the Cluster Migration Wizard from the Failover Cluster Manager, select the source cluster, and then select the cluster roles on the source cluster that you'd like to migrate to the new cluster.
5. The Pre-Migration Report will identify issues that can impact migration of the selected cluster roles. After migrating, a Post-Migration Report will identify any manual steps that are needed to bring the cluster online.
6. The new cluster roles are always created offline - when VMs and users are ready, the following steps should be used during a maintenance window:

    i. The source VMs should be shut down and turned off.

    ii. The source cluster CSV volumes that have been migrated should be off-lined.

    iii. The storage that is common to both clusters (LUNS) should be masked (hidden) from the source cluster, to prevent accidental usage by both clusters.

    iv. The storage that is common to both clusters (LUNS) should be presented to the new cluster.

v. The CSV volumes on the target cluster should be on-lined.

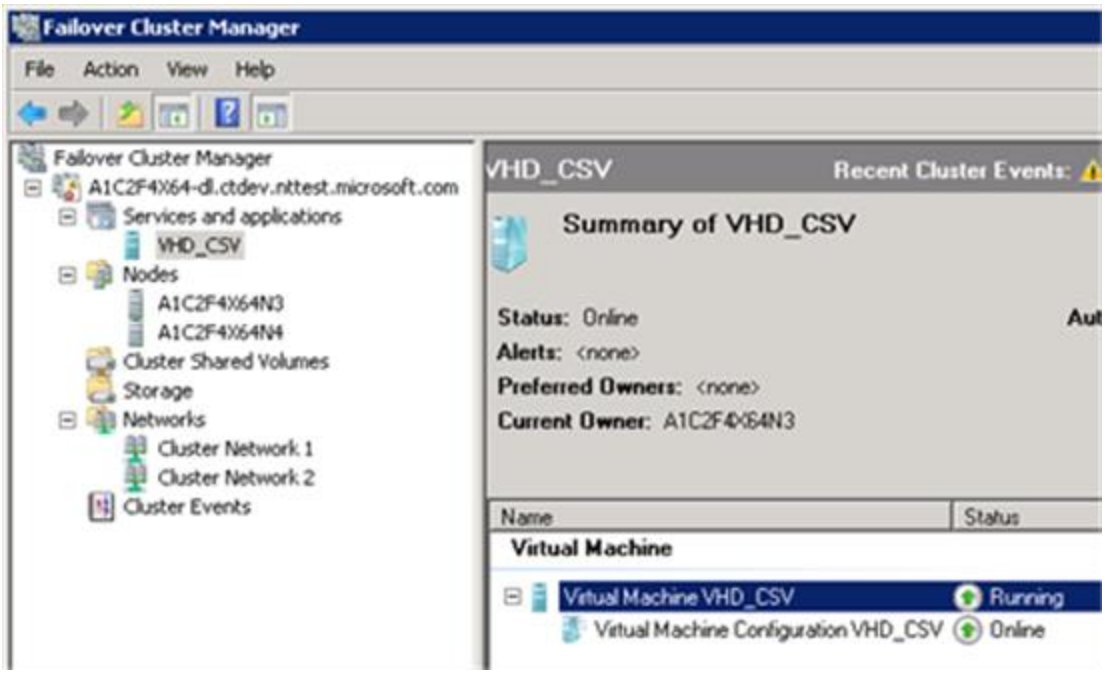
vi. The VMs on the target cluster should be on-lined.

vii. VMs are migrated and ready for use!

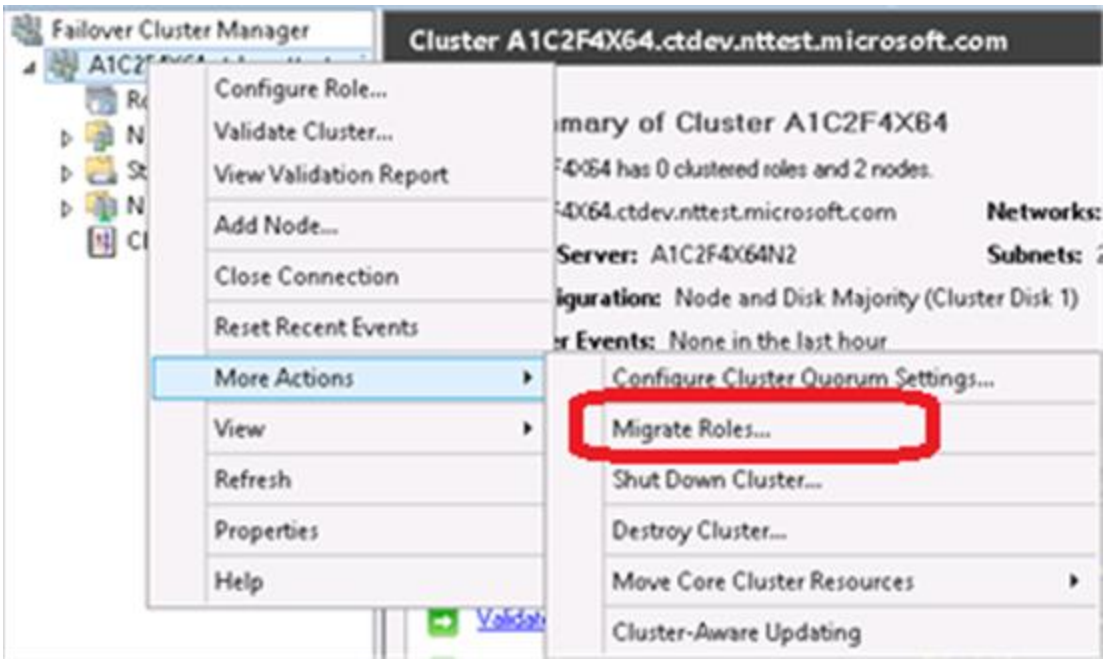
Note: If one VM on a CSV disk is selected for migration, the Cluster Migration Wizard will require all VMs (and auto-select them for you) on that CSV to be migrated too.

Walk Through: Migrating a HA VM from Windows Server 2008 R2 to Windows Server 2012

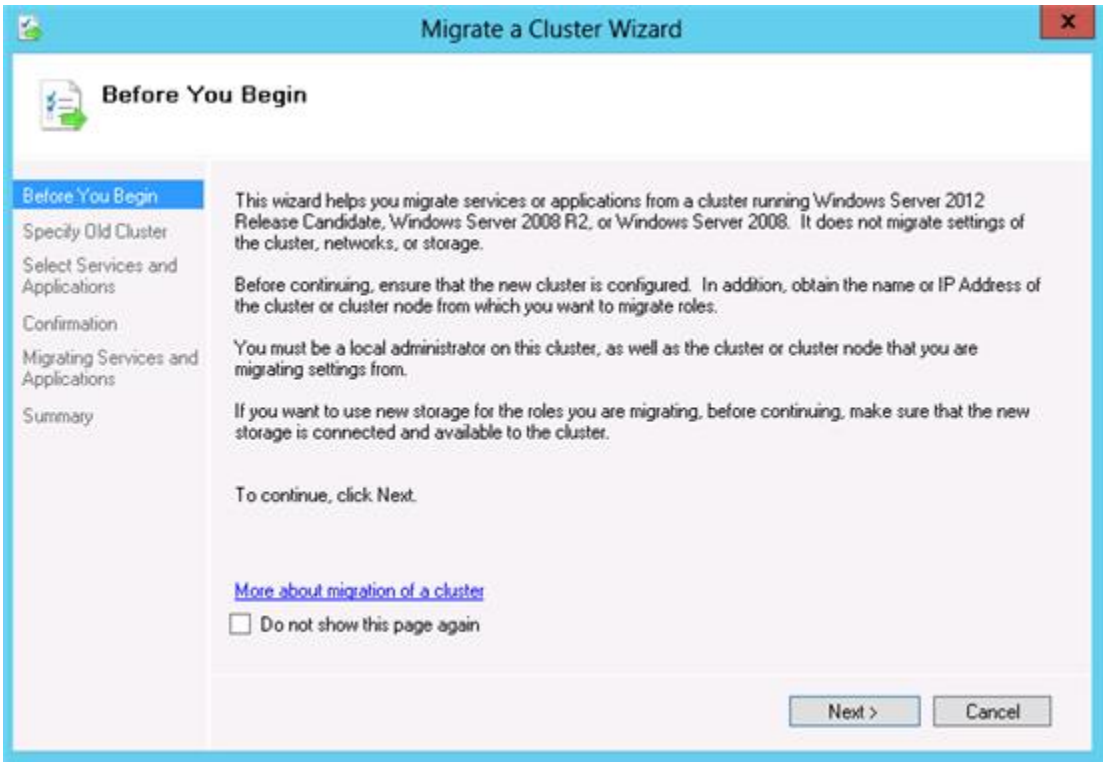
A. Let's assume that we've completed the planning steps 1-3 above, and that we have a Highly Available VM running on a Windows Server 2008 R2 cluster – the source cluster - notice that the VM is running, and that it depends on a CSV disk resource:



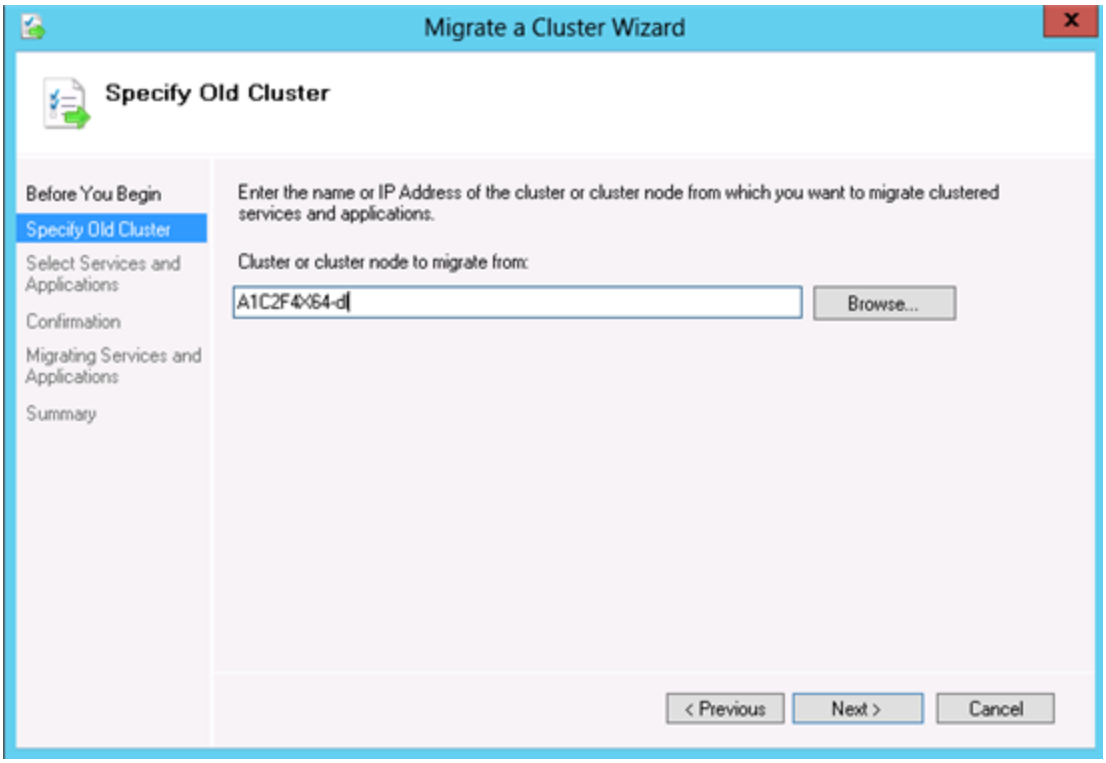
B. On the Windows Server 2012 cluster – the target cluster - from the Failover Cluster Manger, select a cluster and then use the **More Actions | Migrate Roles…** menu to launch the Cluster Migration Wizard:



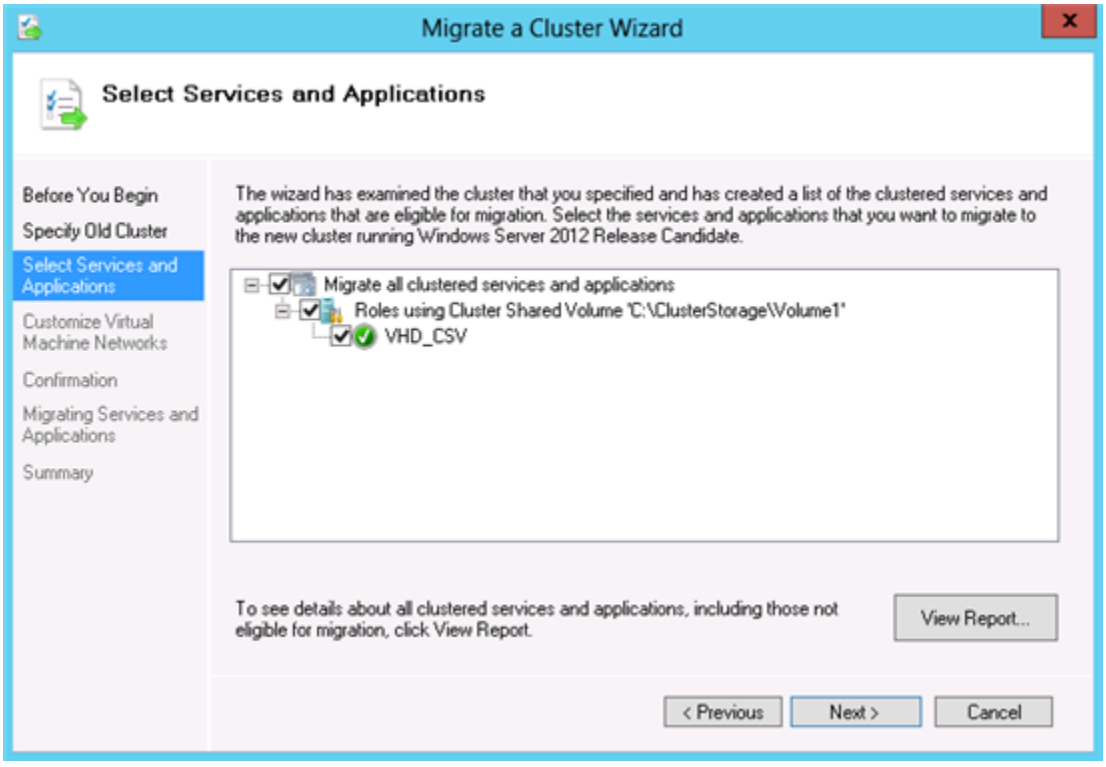
C. The Cluster Migration Wizard (Migrate a Cluster Wizard) will appear – press Next:



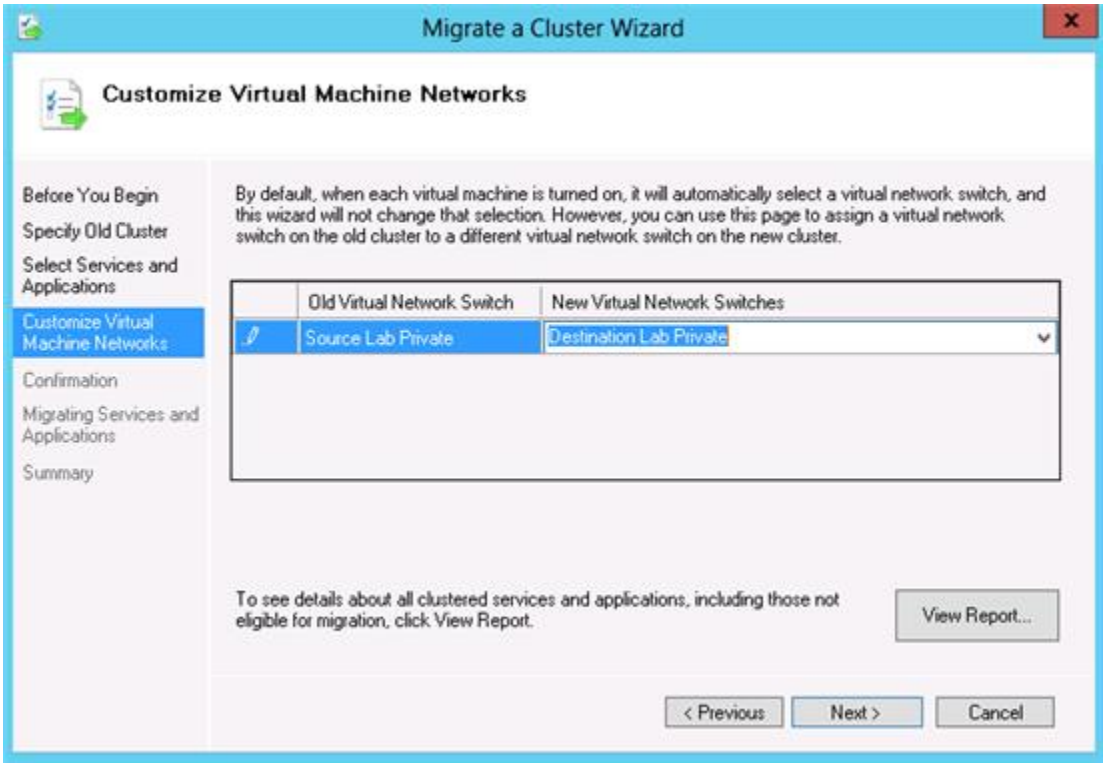
D. Specify the name of the source cluster – press Next:



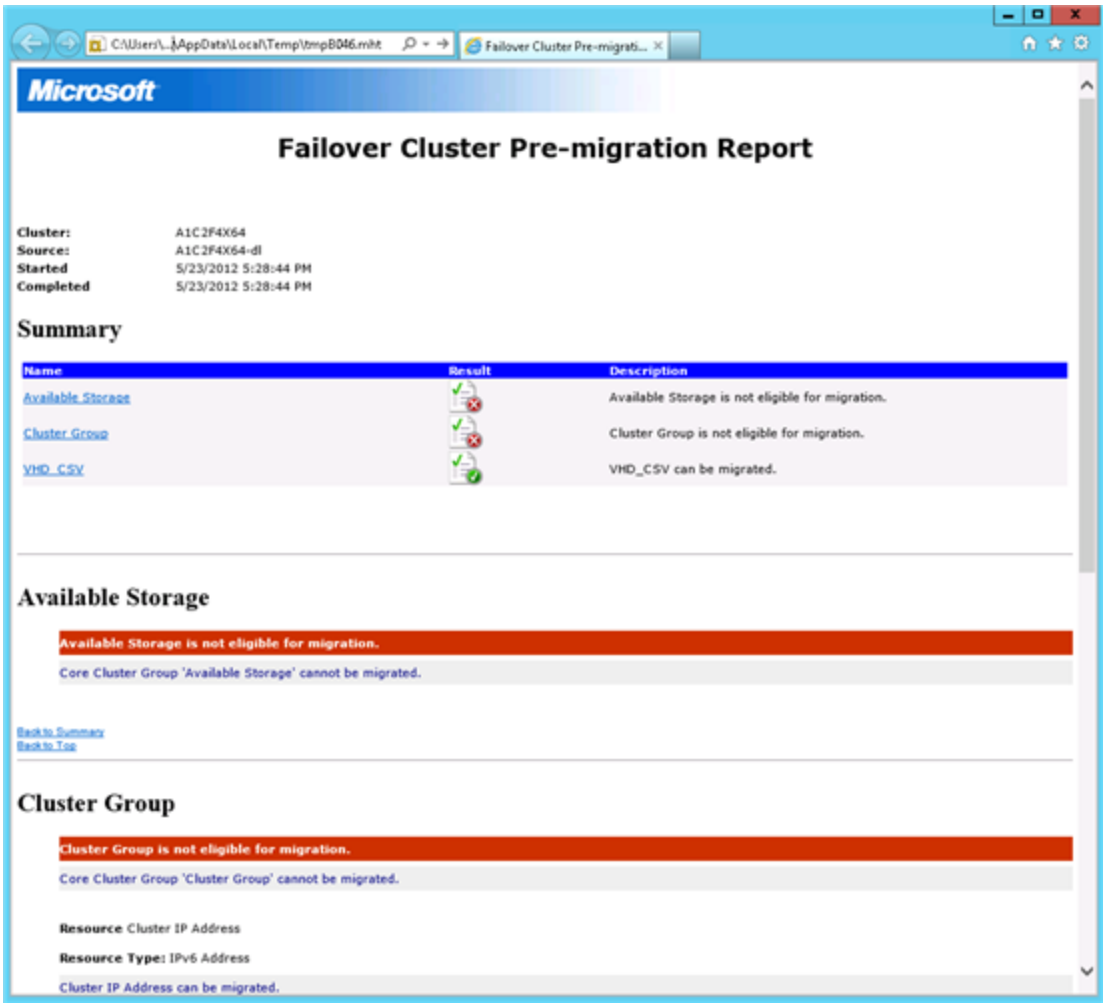
E. The source cluster (Windows Server 2008 R2) will be scanned, and the resources that can be moved will be identified – here I have selected the VM called “VHD_CSV”:



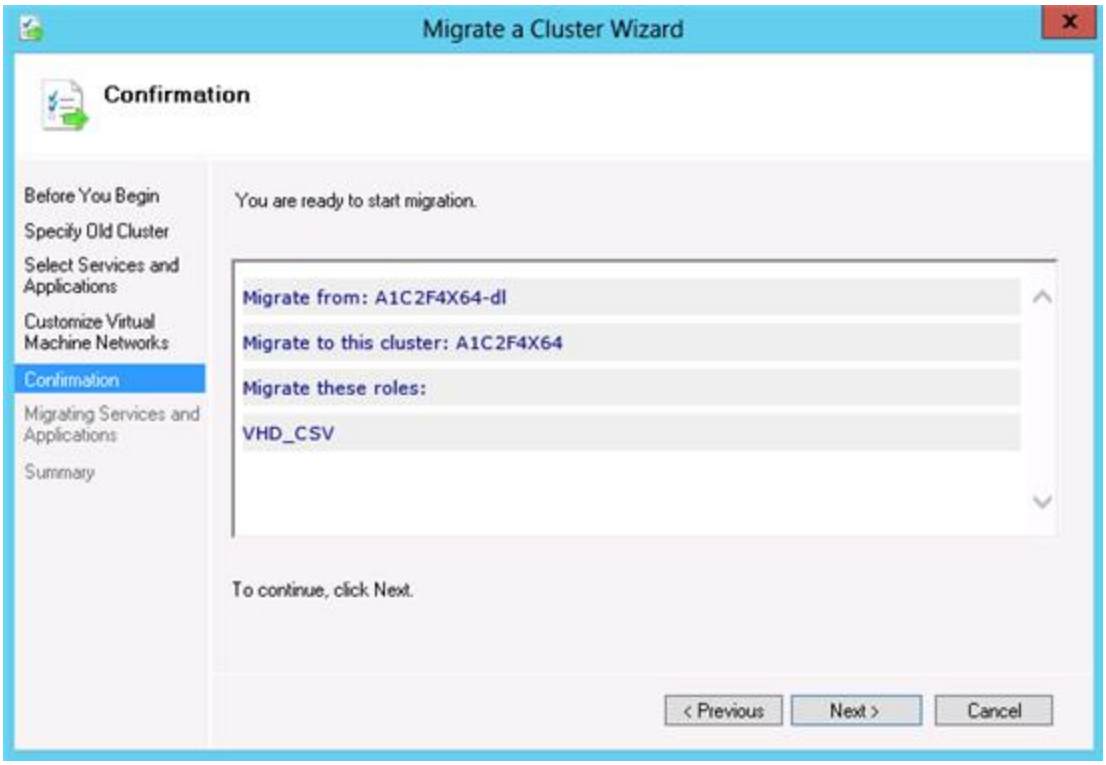
F. After pressing Next, we see that the Migration Wizard will prompt us for the Virtual Network Switch that the VM should use on the new (target) cluster – here I use the drop-down menu and select “Destination Lab Private”:



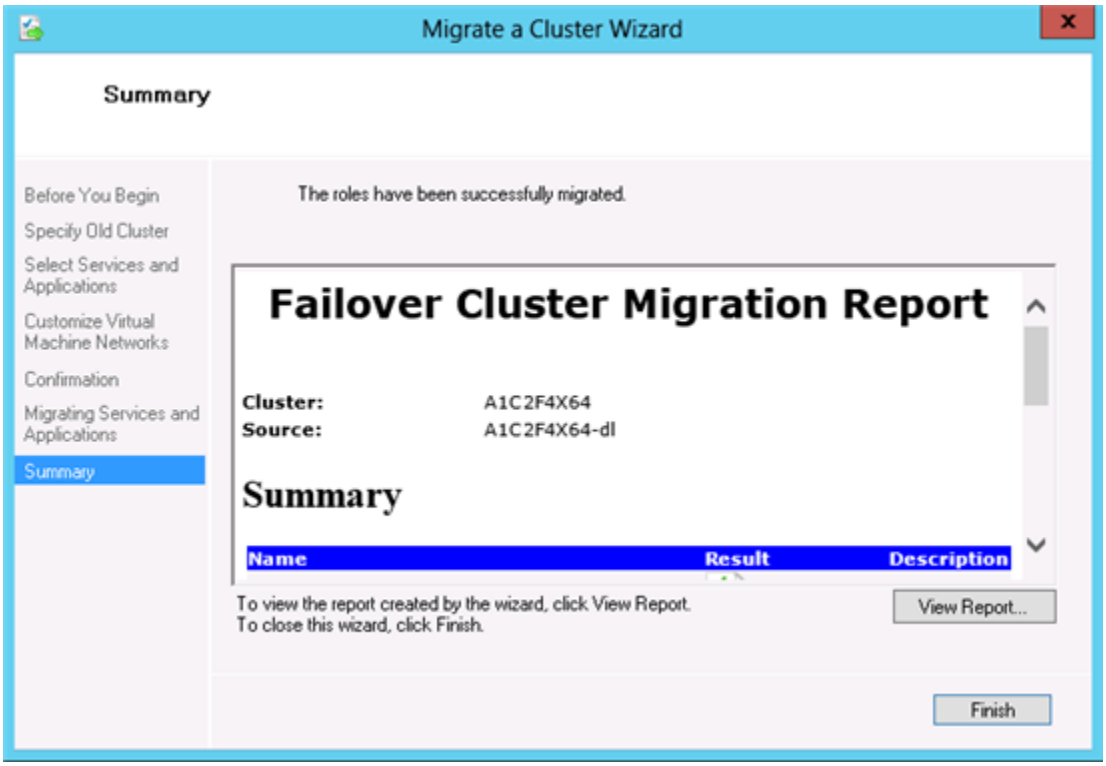
G. Pressing View Report will display the Pre-Migration Report – this will show you the Cluster Migration Wizard’s analysis of the cluster roles that can be migrated. Note that the Cluster Group and Available Storage are never migrated:



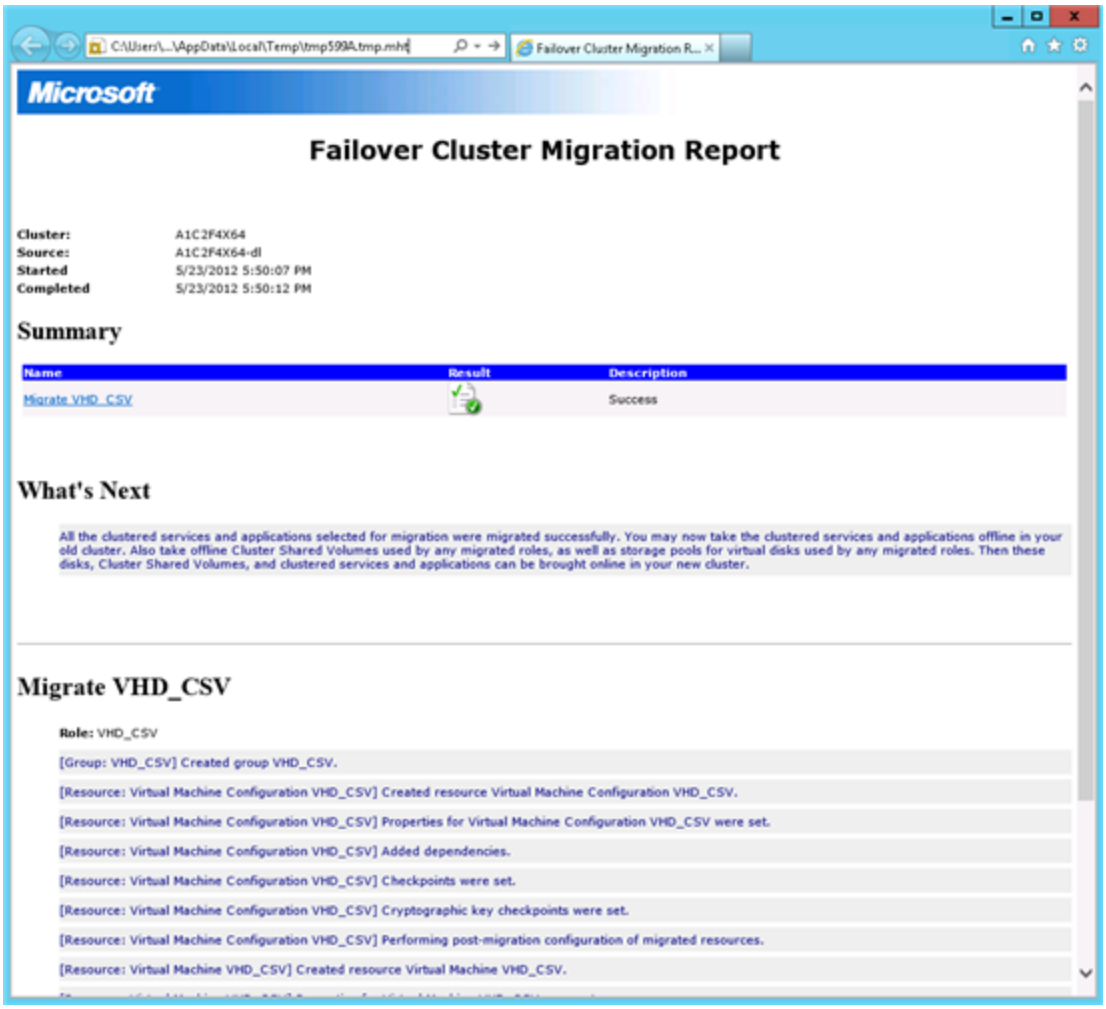
H. When you are ready to migrate the resources, press Next:



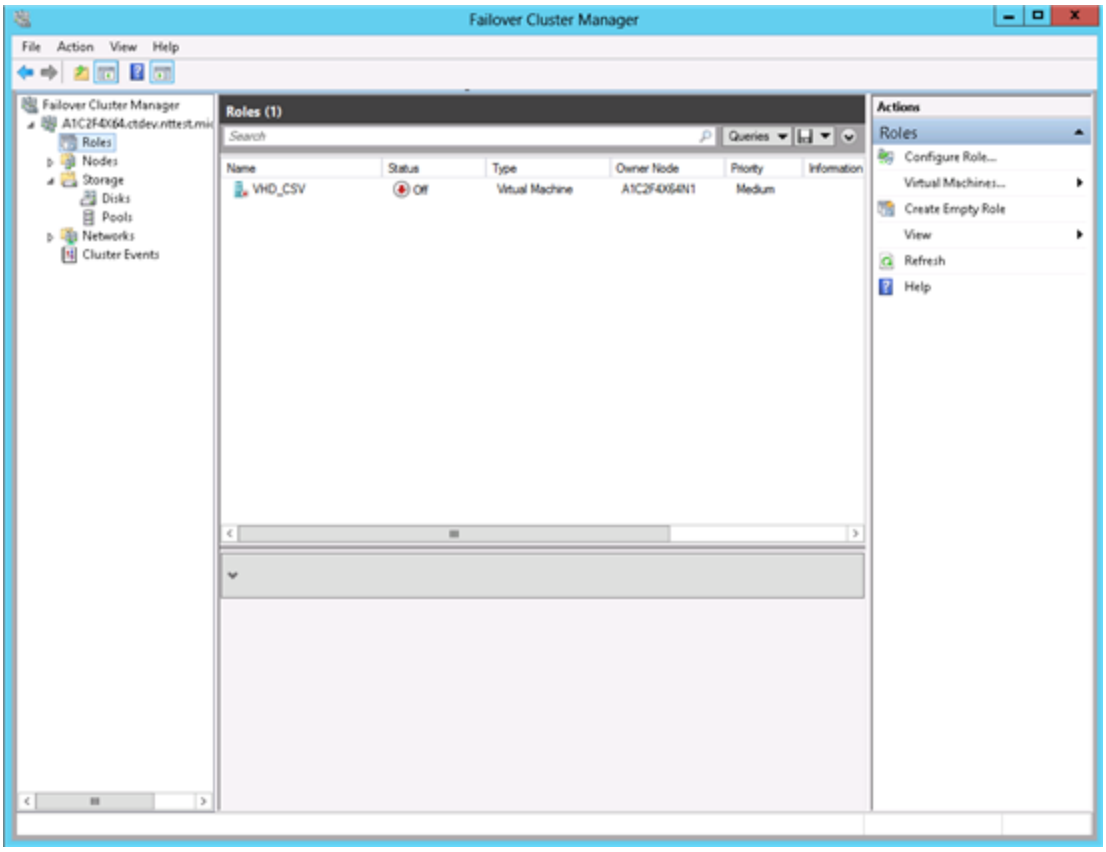
I. After migrating resources, the Post-Migration Report is displayed in the dialog:



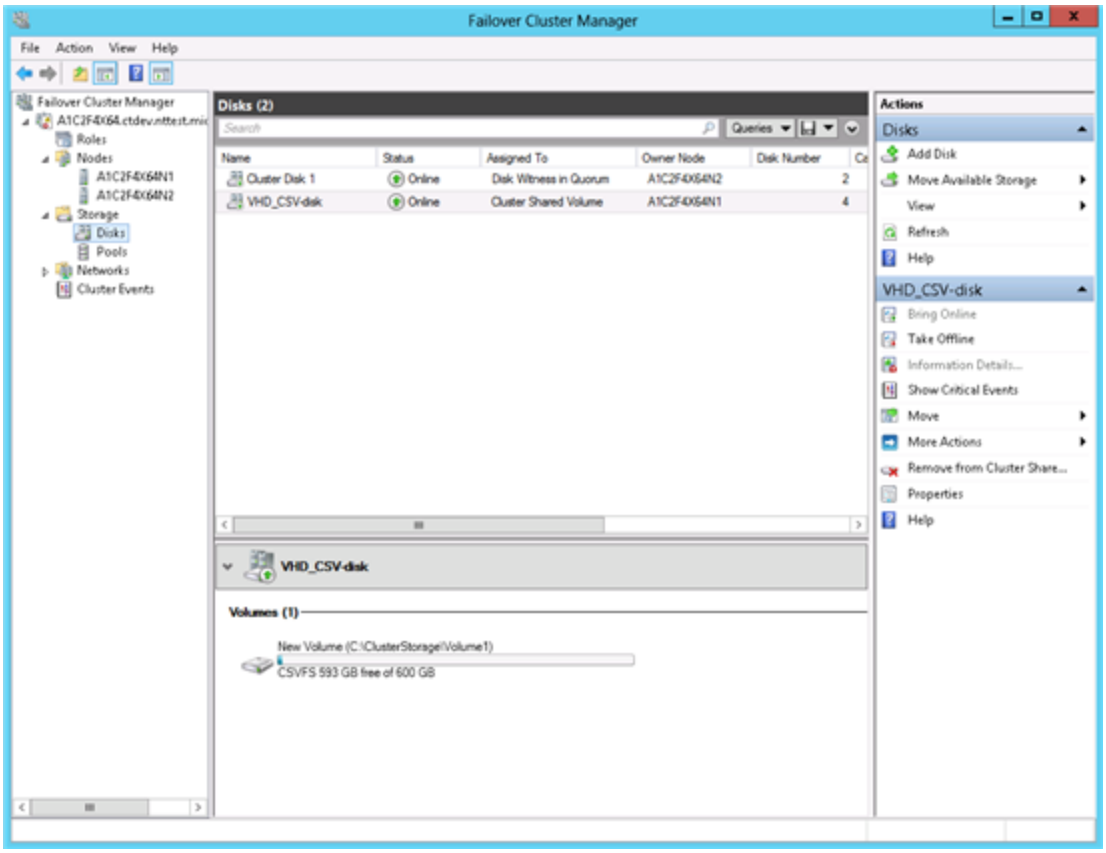
J. By pressing View Report, the full report will be displayed in the default browser:



K. Note that there are two new resources on the target cluster – identical to the source cluster. Under Roles, you will see the VHD_CSV VM – note that it is **Off**. Migrated VMs are always initially set to off on the Target clusters, this allows you to pre-stage the new cluster, but to control when to make the cut over:



L. Under Storage then Disks, you will see the VHD_CSV-disk Physical Disk resource that was copied to the target cluster:



M. Now that the target cluster has been pre-staged, use the following steps during a maintenance window to cut over to the new Windows Server 2012 cluster:

1. Shutdown all VMs on the source Windows Server 2008 R2 cluster that have been migrated.

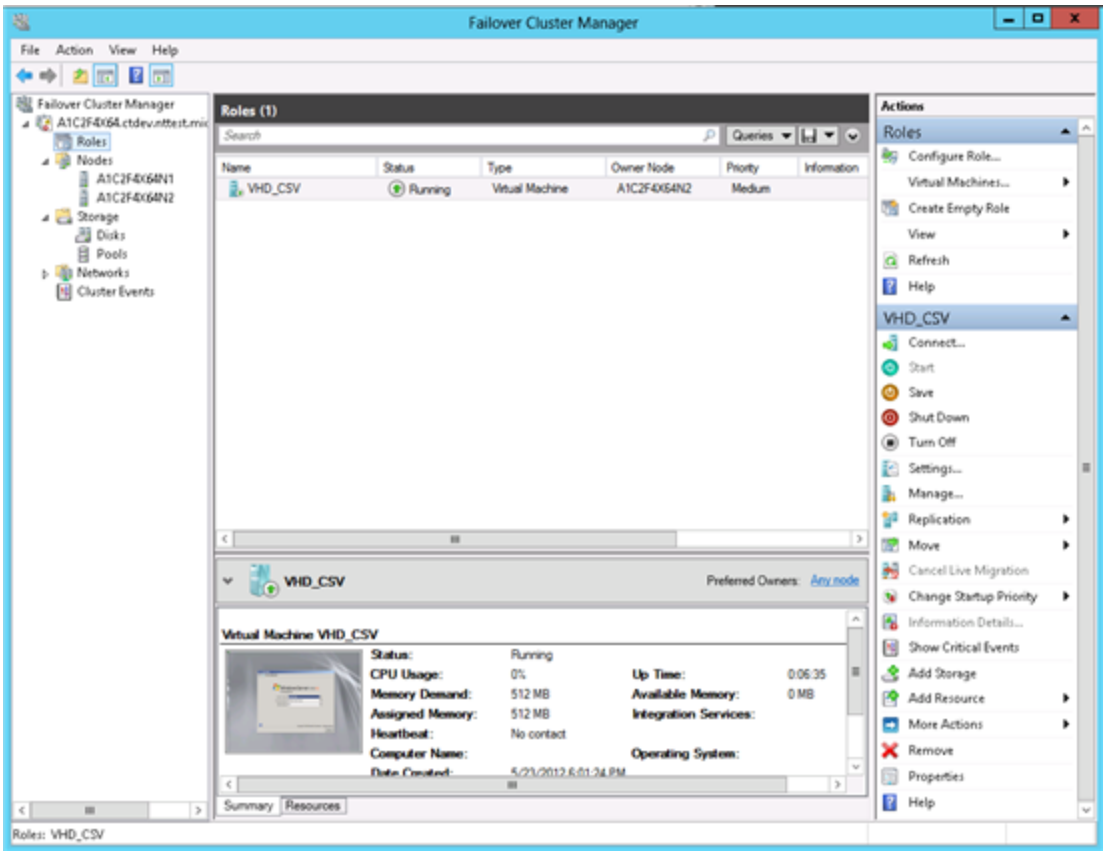
2. Configure the storage:

a. Unmask the common shared storage (LUNs) so that they are not presented to the Windows Server 2008 R2source cluster

Note: Data could become corrupt if they are presented to multiple clusters at the same time.

b. Mask the common shared storage (LUNs) to the Windows Server 2012 target cluster.

3. Start all VMs on the target Windows Server 2012 cluster.



Summary

In Windows Server 2012, the Cluster Migration Wizard is a powerful tool that provides agility and flexibility to customers using highly available VMs on Failover Clusters.