

Using FlashNAS ZFS

with

Microsoft Hyper-V Server 2012

and

Live Migration

Abstract:

This application note provides step-by-step instructions to help you configure FlashNAS ZFS systems for use with Microsoft Hyper-V and enable simpler virtual machine live migration. All FlashNAS ZFS systems are tested and certified compatible with a wide range of virtualization technologies to help users maximize utility through virtualized environments. They allow more productivity with less hardware, increasing organizational effectiveness while helping reduce costs.

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FlashNAS ZFS Series NAS

FlashNAS ZFS is a mid-range to high performance NAS solution for organizations and enterprises of all sizes, with a focus on SMBs and individual or SOHO users. The FlashNAS ZFS series delivers unified storage, consolidating file and block-based app server duties. It employs the ZFS file system to boost data integrity and enable features such as remote replication/access, unlimited snapshot, secure pool mirror, and efficient compression. All FlashNAS ZFS products are compatible with Windows Server, VMware, and Citrix, and are very user-friendly. They ensure high availability through redundant hardware components, including dual controllers and power supplies. In addition to better reliability, their modular build promotes faster and simpler maintenance and upgrades. Usability is improved via Global Namespace support, which brings streamlined yet intricate management, while for scalability the future-proof FlashNAS ZFS series can grow to 256 drives and 1.5PB via JBOD.

Windows Server 2012 and Hyper-V

Microsoft Hyper-V Server virtualization technology works with Microsoft Server 2012, but can be used standalone thanks to compatibility with non-Windows operating systems. Hyper-V is a compact software suite, with low system requirements. It is very useful for storage server consolidation, and a common solution for virtual desktop infrastructure (VDI) setup. It allows users to run Windows on a host of virtual desktops, with easy access and clear management. Hyper-V supports multiple live migration operations across physical storage, all in a secure environment that automatically prioritizes data movement by importance or frequency of access. Hyper-V works well on FlashNAS ZFS series products since it is very scalable, and capable of virtualizing nearly any workload. With FlashNAS ZFS and Hyper-V, you get more utility out of hardware with minimal effort, as the familiar Windows Server environment does not require new advanced skills.

Using FlashNAS ZFS with Hyper-V

To ensure host high availability and fast failover performance, we leverage Windows clustering with two hosts as the operating environment for our Hyper-V demonstration configurations.

System Topology

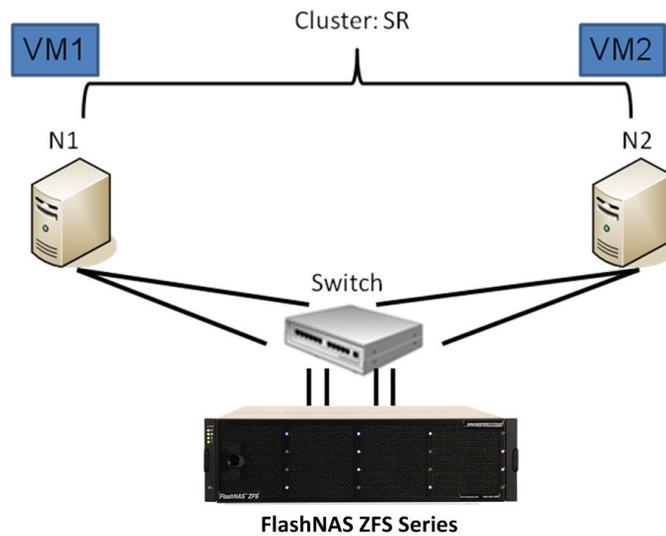


Figure 1: topology

The FlashNAS ZFS series provides storage with high availability to clustered servers. We then create a virtual machine on each cluster server, and perform live migration to transfer a virtual machine from the N1 cluster server to the N2 cluster server. Figure 1 shows the complete topology. In addition, the FlashNAS ZFS series also provides great performance with dual controllers on select models. To maintain stable load balancing, we recommend having pool 1 managed by controller A for the quorum disk, and pool 2 managed by controller B for the cluster shared volume as figure 2 shows.

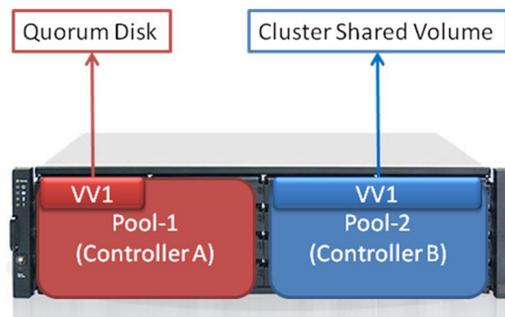
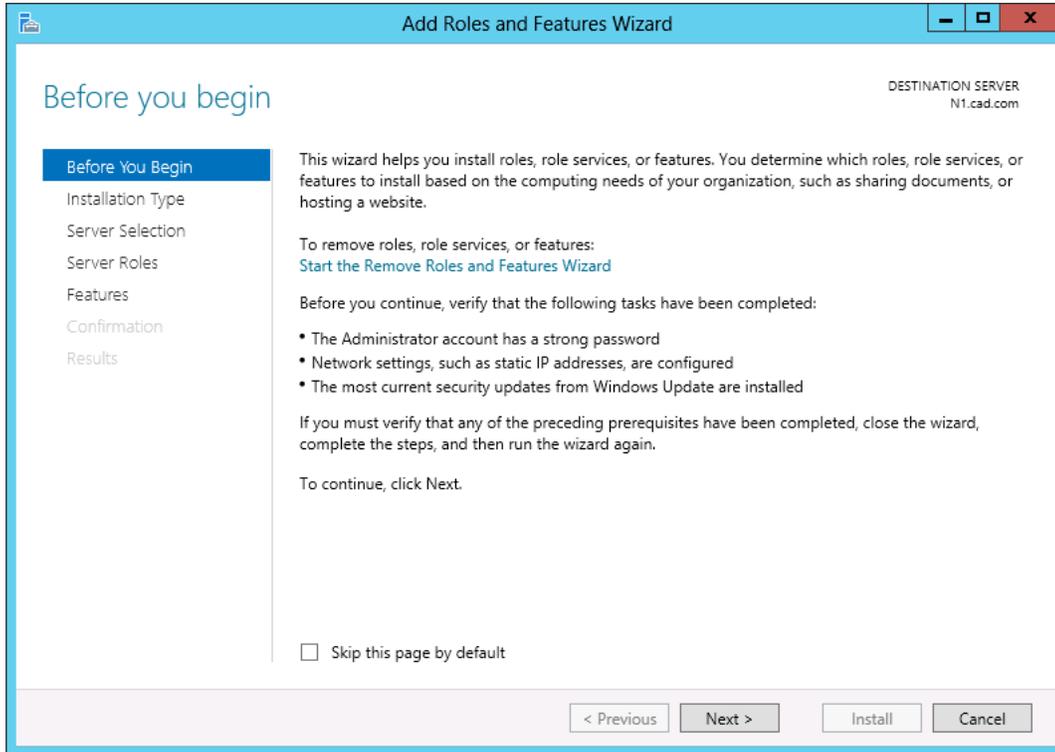


Figure 2: load balancing

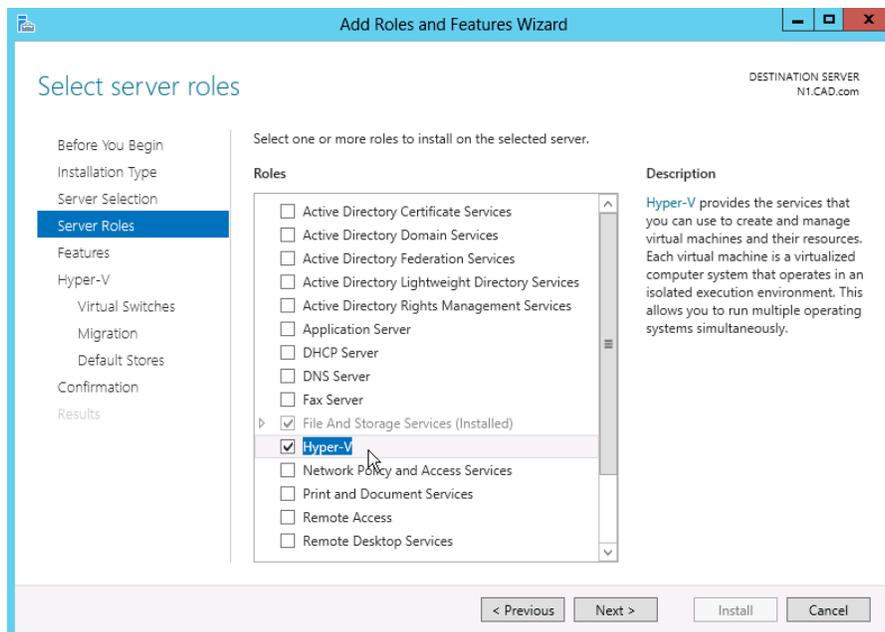
Adding Hyper-V Server Role in Windows Server 2012

Step 1: enter the host motherboard BIOS -> enable virtualization-related features

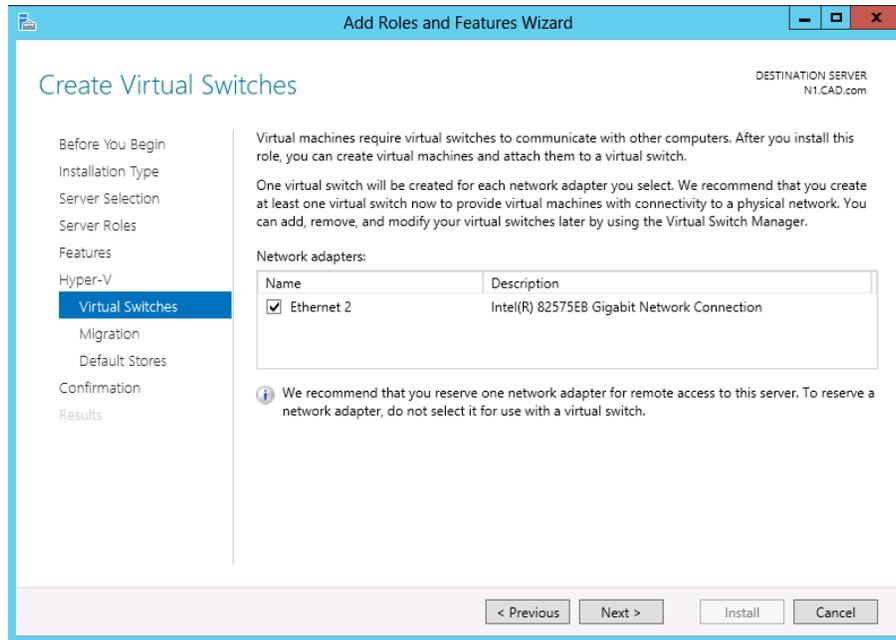
Step 2: launch the Windows Server 2012 Server Manager Dashboard, and then click Add Roles and Features



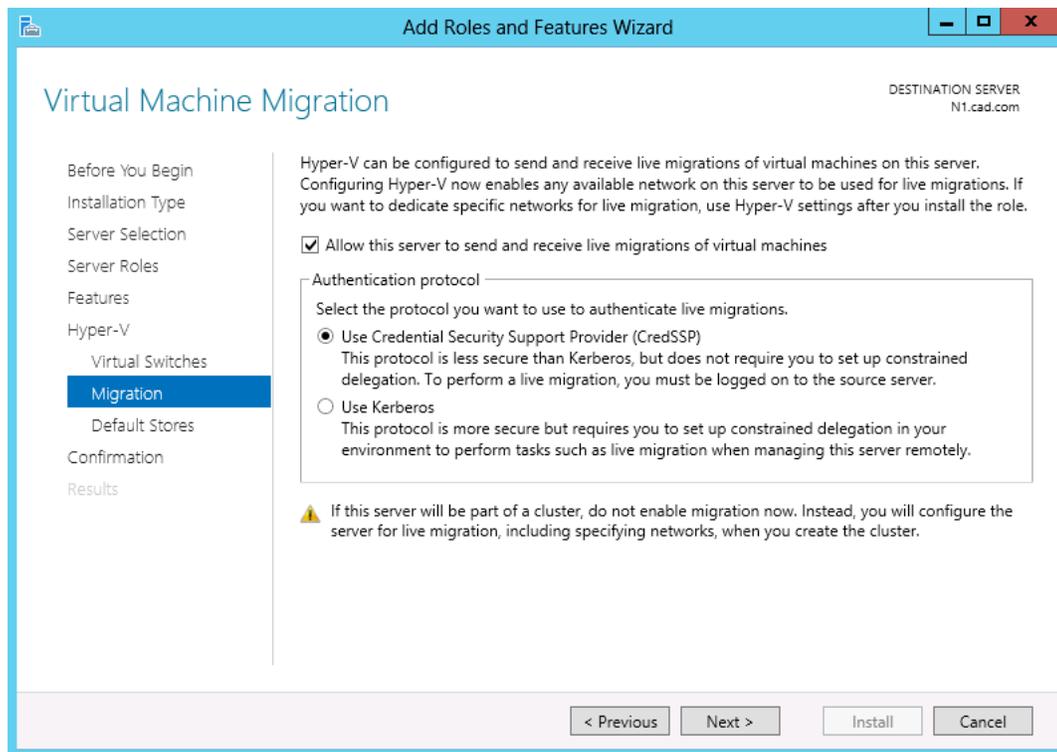
Step 3: select the Hyper-V role



Step 4: select Virtual Switches



Step 5: check “Allow this server to send and receive live migration of virtual machines”



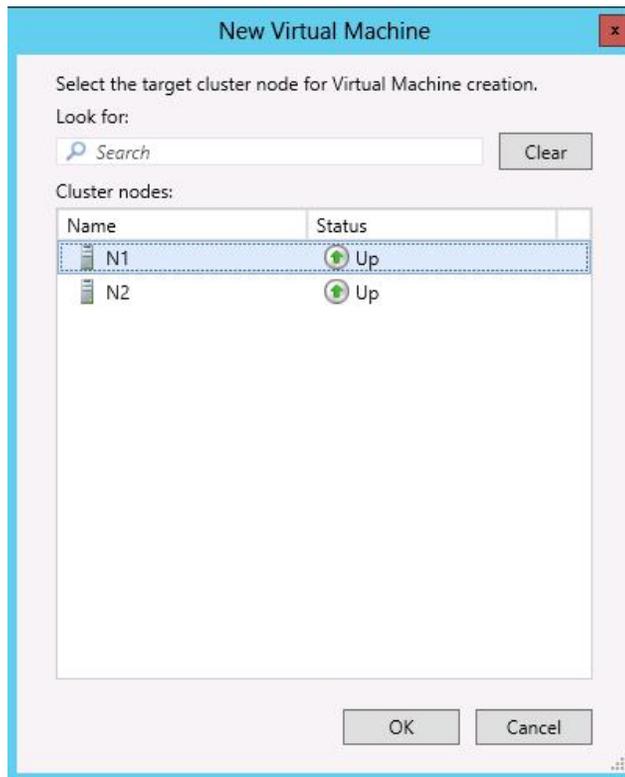
Step 6: restart your computer

Adding Virtual Machines in Hyper-V

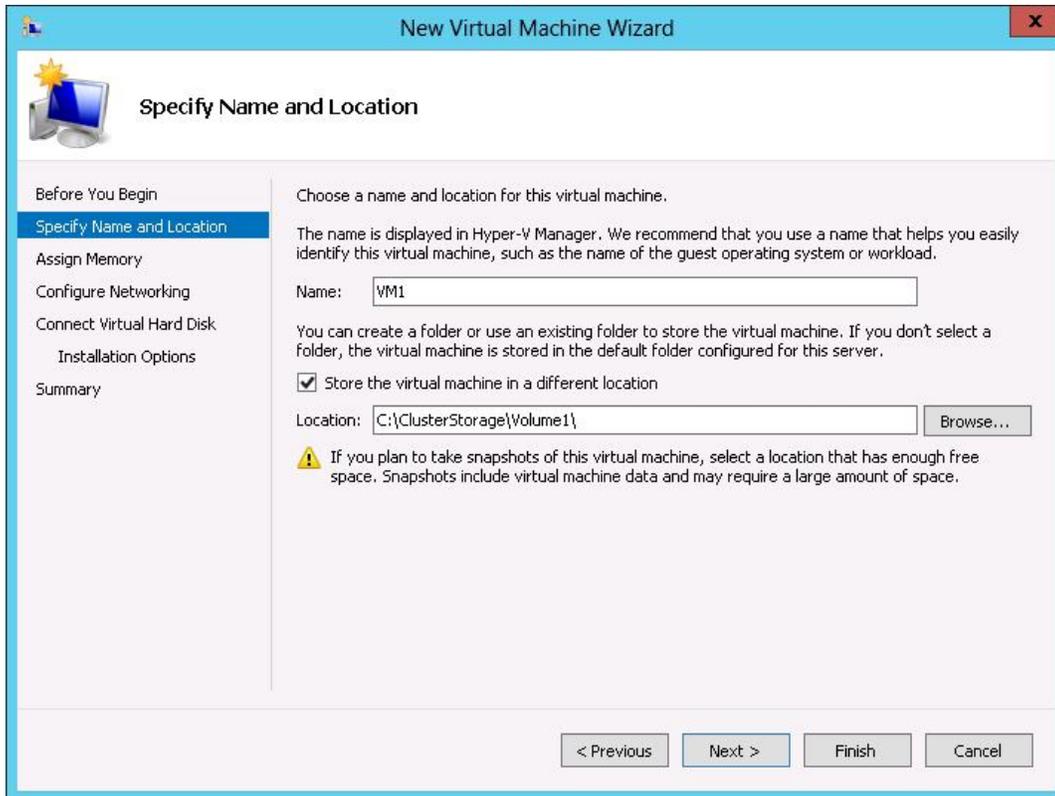
Step 1: launch New Virtual Machine role



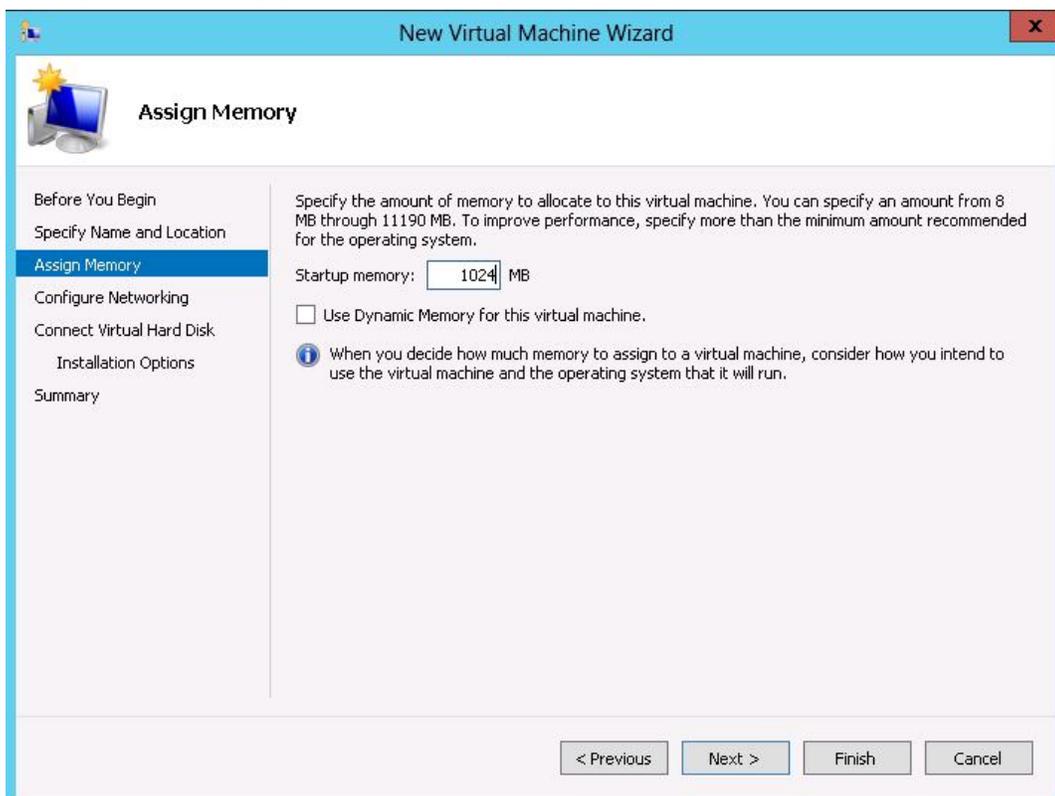
Step 2: choose one cluster node



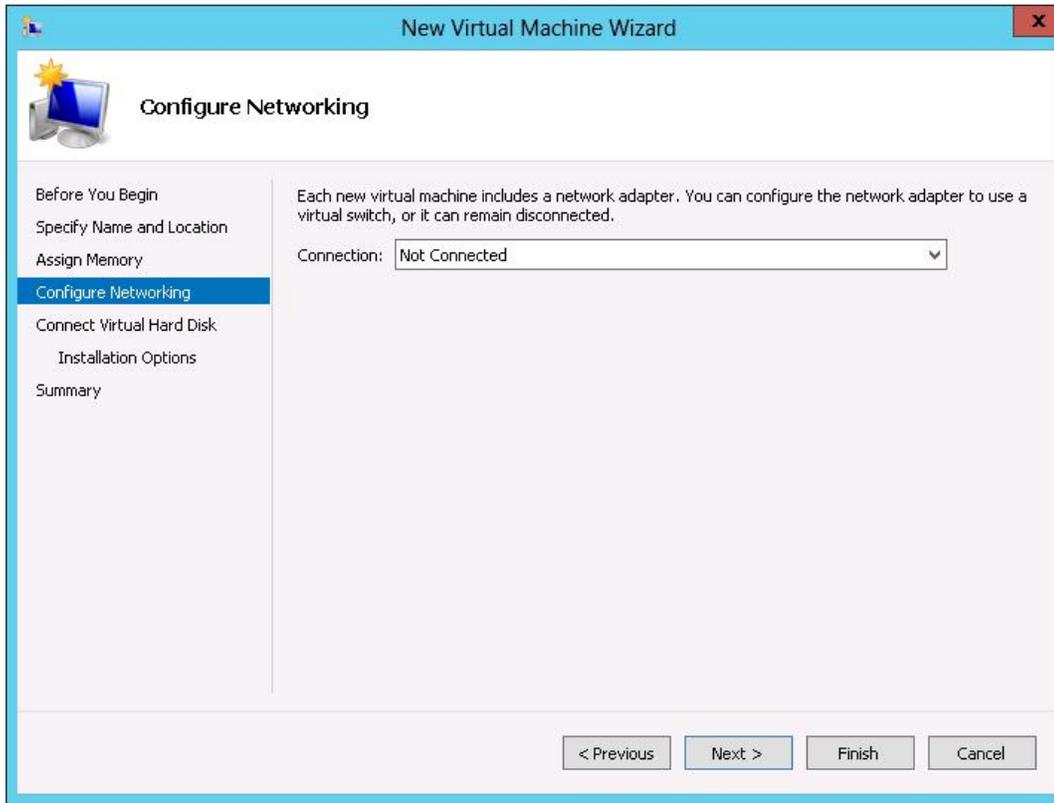
Step 3: in the New Virtual Machine wizard, specify a name for the virtual machine and the location you would like to store it



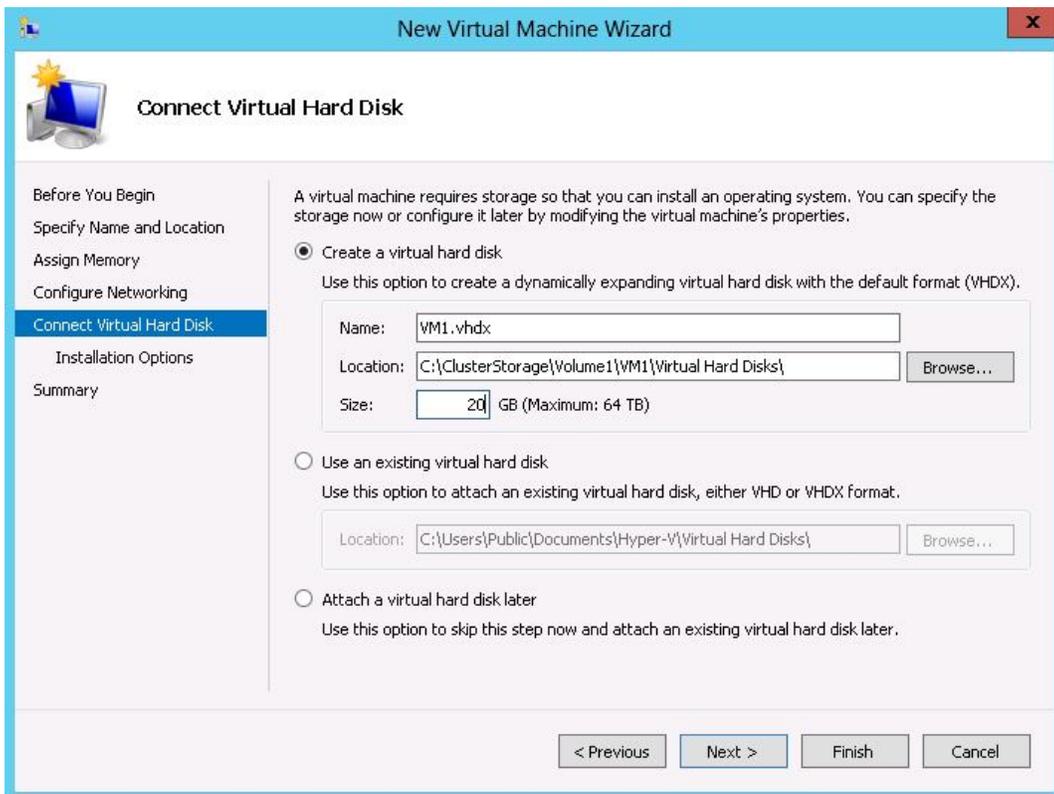
Step 4: specify the memory you would like to allocate to the virtual machine



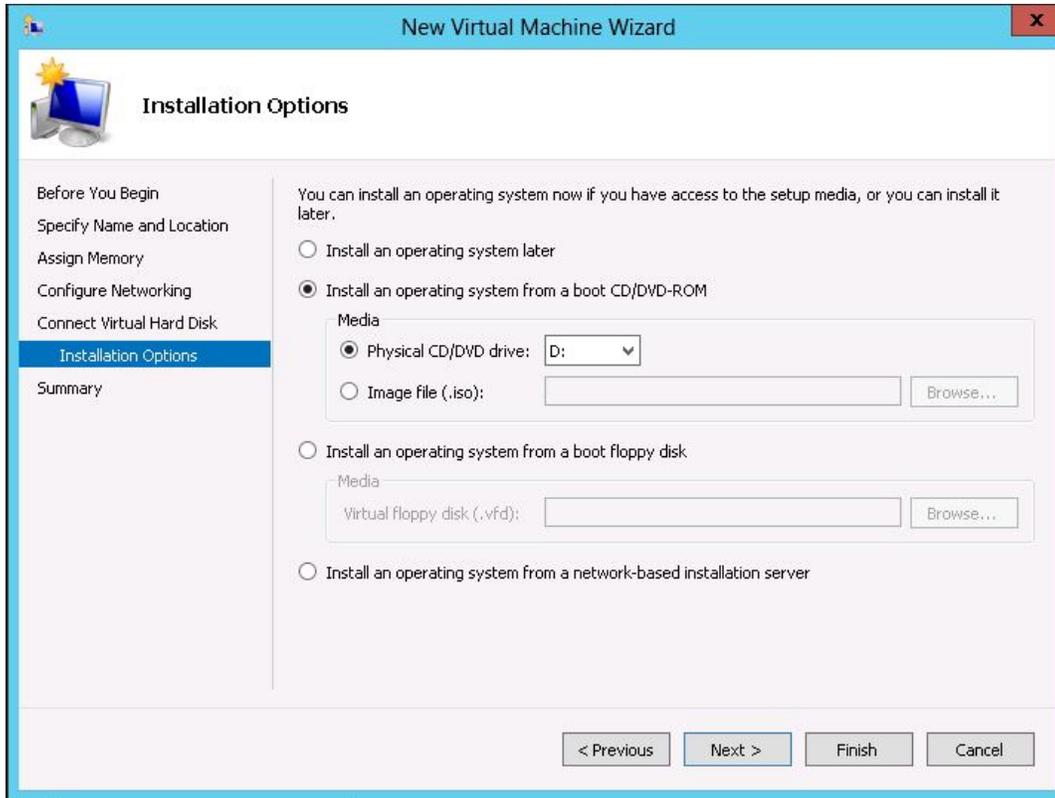
Step 5: configure networking



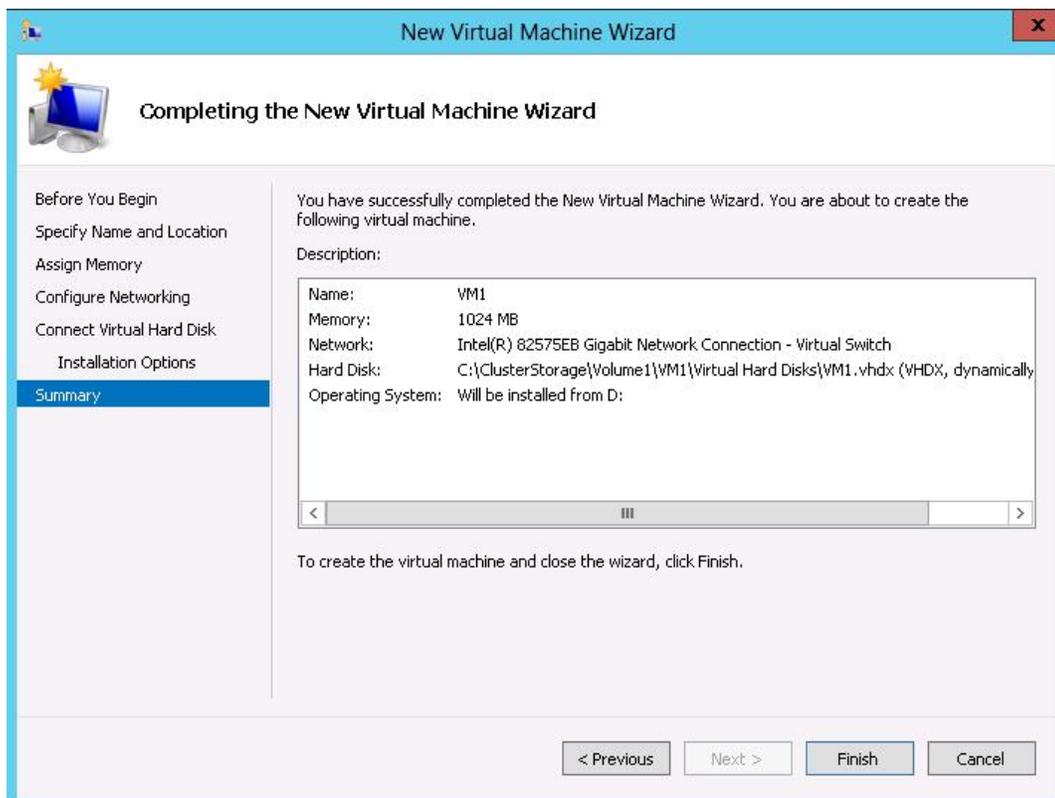
Step 6: specify the name, location, and size of the virtual hard disk you would like to create to store the operating system of the virtual machine



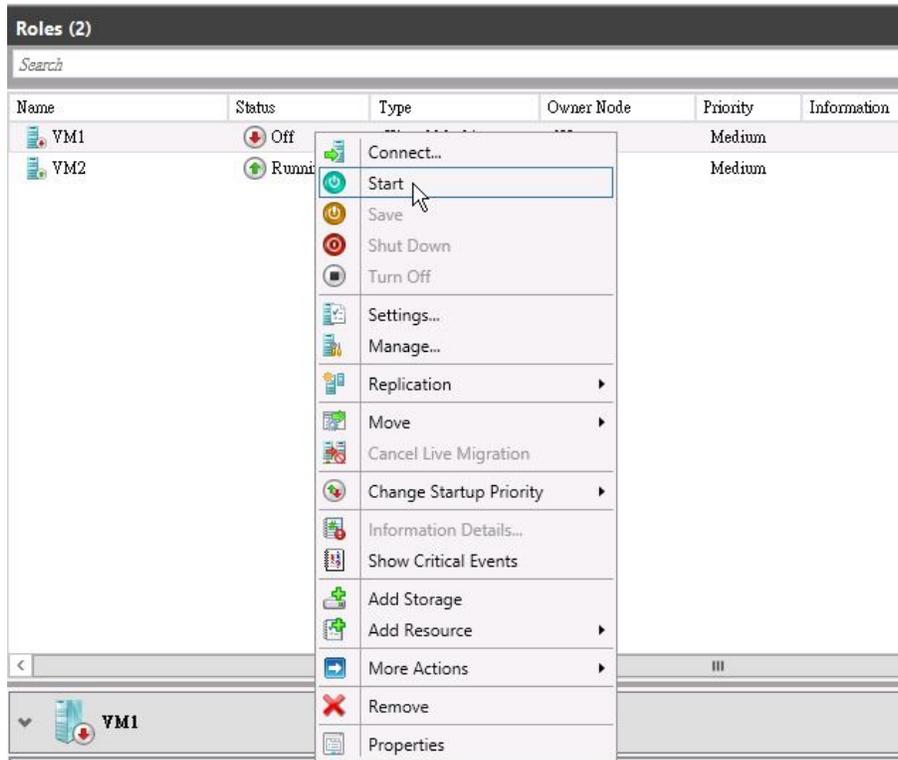
Step 7: select physical CD/DVD or image file installation of the operating system



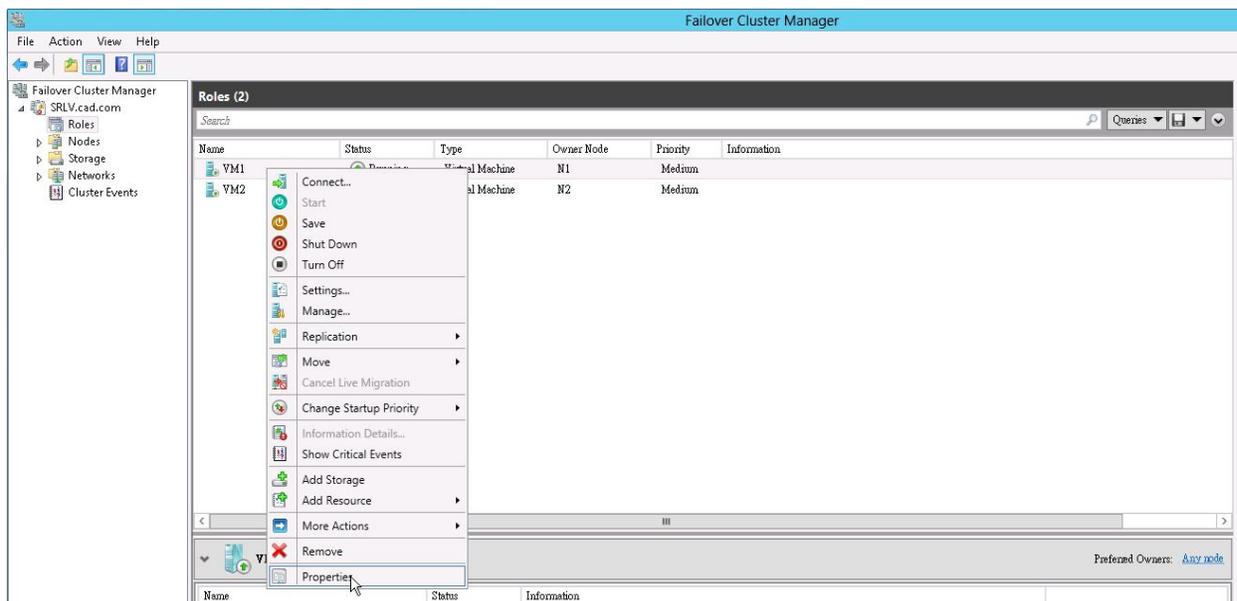
Step 8: complete the new virtual machine and view wizard summary



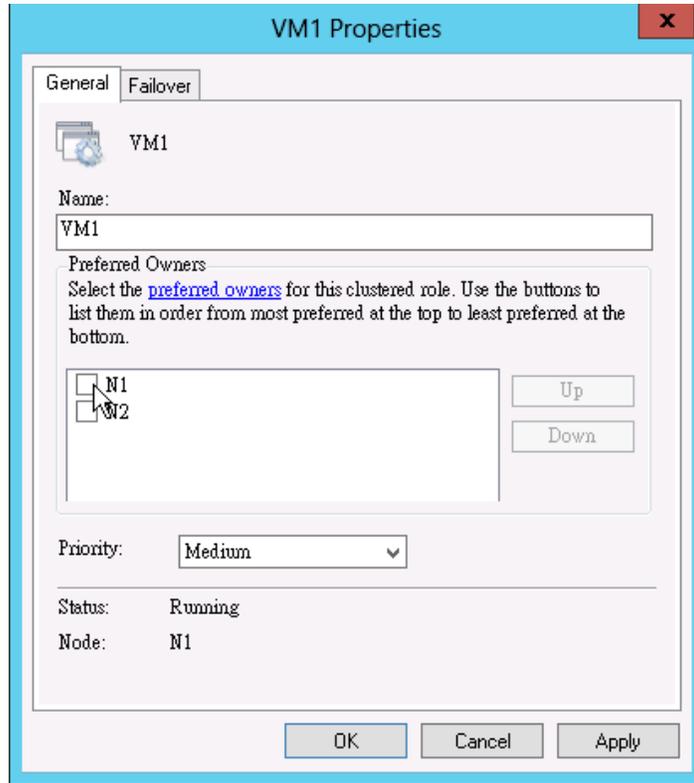
Step 9: complete the creation process, and the virtual machine is ready. Click the Start action to begin operating system installation



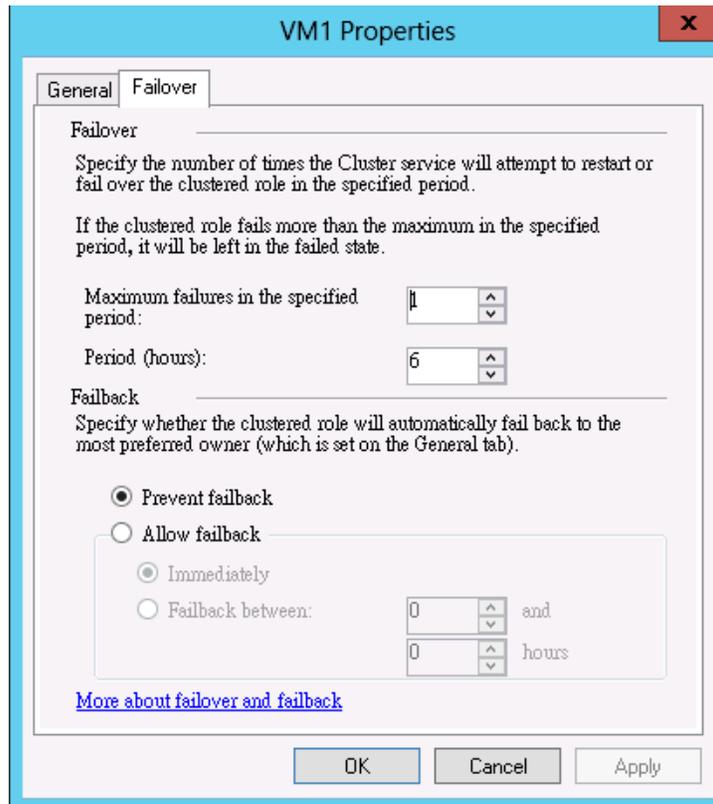
Step 10: configure virtual machine failover/failback. Begin by right clicking on the virtual machine you just created and select Properties



Step 11: in the General tab of the Properties page, select Auto Start if you want the virtual machine to automatically start operating after failover occurs



Step 12: in the Failover tab, you can set the proper failover/failback policy for the virtual machine



Performing Live Migration

Live migration allows you to quickly and transparently move operational virtual machines from one node of the failover cluster to another node in the same cluster without a dropped network connection or downtime. In other words, the migration is live because the virtual machines continue working as it takes place, preventing impact on your productivity. After completing failover clustering and clustered shared volume (CSV) configuration as above, simply follow the steps below to perform live migration.

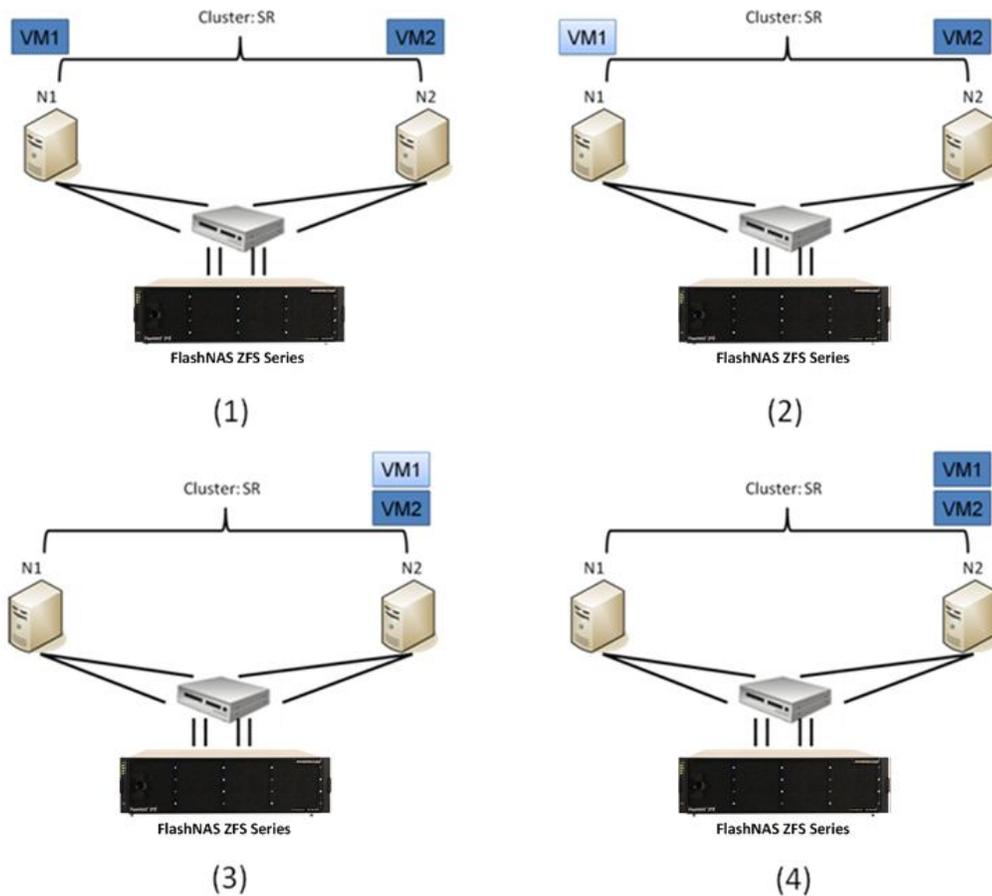
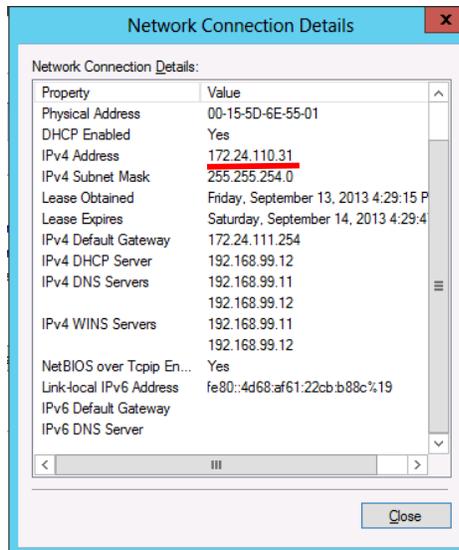


Figure 3: virtual machine live migration steps

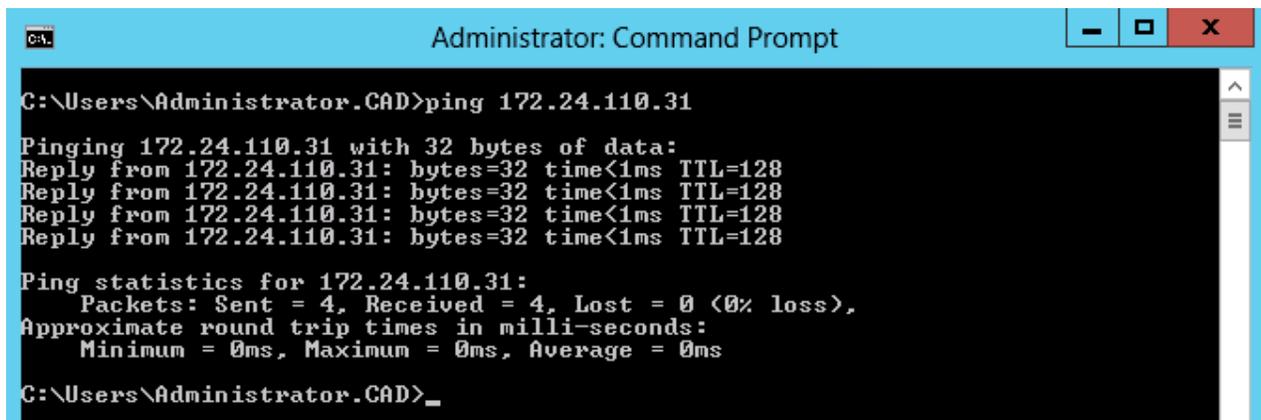
For our demonstration, we are migrating VM1 from the N1 clustered server to the N2 clustered server as figure 3 shows.

Verification of Live Migration

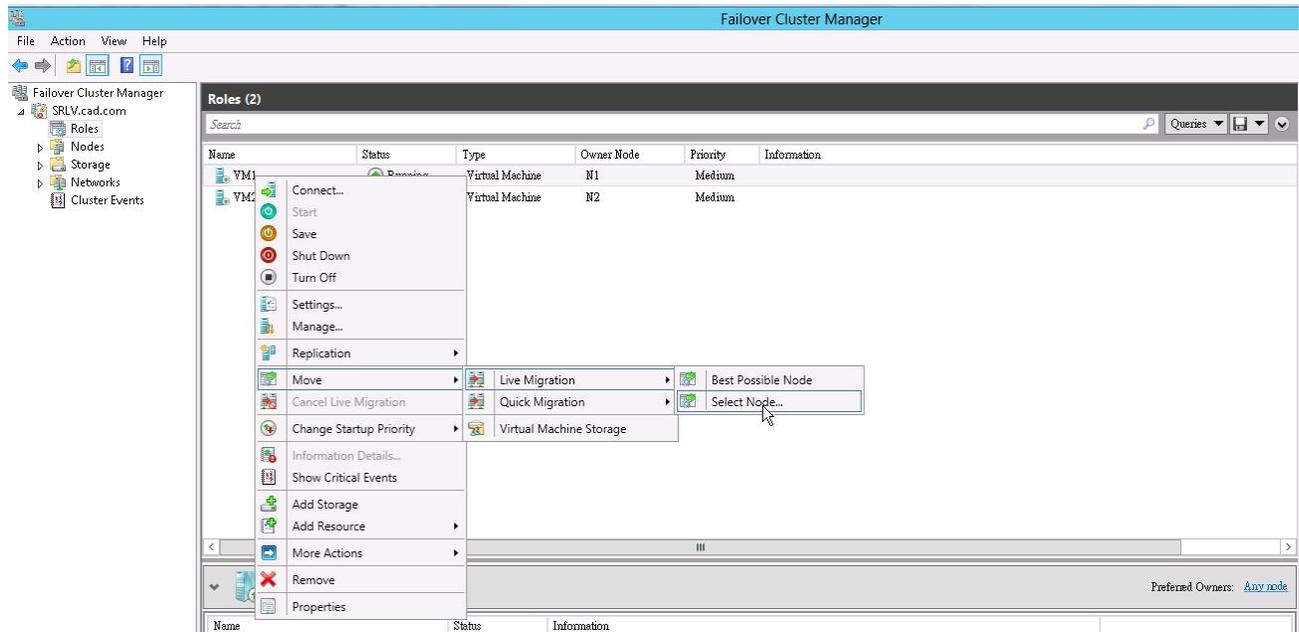
We use the ping method to verify live migration. For example, we have the network IP address for a specific virtual machine, like VM1 from our demonstration, which is found at IP 172.24.110.31.



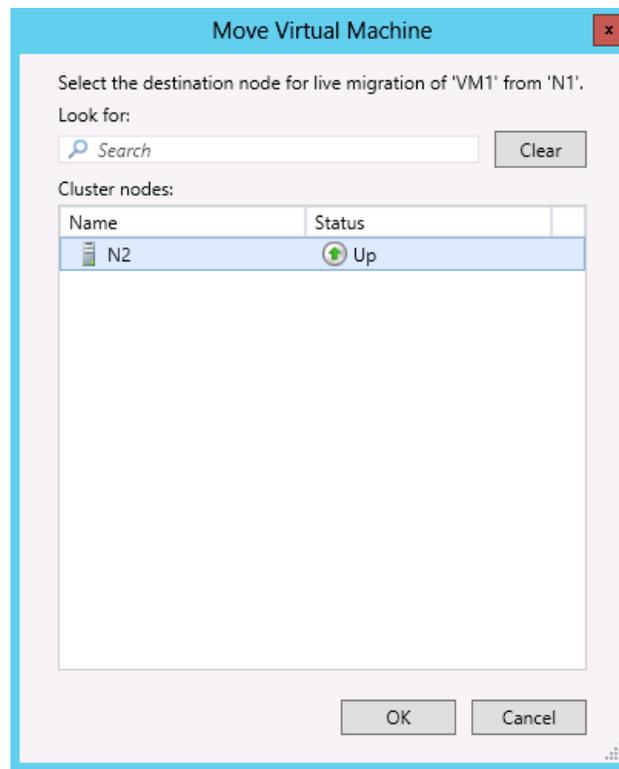
We can then check virtual machine status via the ping command during the live migration process.



Step 1: in the Failover Cluster Manager, select the virtual machine you would like to migrate and right click on it, then select Move -> Live Migration -> Select Node



Step 2: we only have the other node to look at, since as noted before we are using a two-node cluster



Step 3: after live migration is complete, verify the Owner Node of the virtual machine has changed

The first screenshot shows VM1 in 'Live Migrat...' status with Owner Node N1. The second screenshot shows VM1 in 'Running' status with Owner Node N2.

Name	Status	Type	Owner Node	Priority	Information
VM1	Live Migrat...	Virtual Machine	N1	Medium	Live Migrating, 3% completed
VM2	Running	Virtual Machine	N2	Medium	

Name	Status	Type	Owner Node	Priority	Information
VM1	Running	Virtual Machine	N2	Medium	
VM2	Running	Virtual Machine	N2	Medium	

Step 4: check the package receiving status via the ping command

```
C:\Users\Administrator.CAD>ping 172.24.110.31 -t

Pinging 172.24.110.31 with 32 bytes of data:
Reply from 172.24.110.31: bytes=32 time<1ms TTL=128
Reply from 172.24.110.31: bytes=32 time=1ms TTL=128
Reply from 172.24.110.31: bytes=32 time=1ms TTL=128
Reply from 172.24.110.31: bytes=32 time<1ms TTL=128
Reply from 172.24.110.31: bytes=32 time<1ms TTL=128
Request timed out.
Request timed out.
Reply from 172.24.110.31: bytes=32 time<1ms TTL=128
```

As shown in the screenshot above, the virtual machine returned two timeout requests during live migration.

Conclusion

With FlashNAS ZFS series systems and their assured virtualization support, making the most of the new features and capabilities of Windows Server 2012 is easy and reliable. Functions such as CSV and Hyper-V live migration are simplified and convenient, and can be achieved by many team members other than IT experts. FlashNAS ZFS series solutions also provide the high performance and availability required to sustain smooth and stable shared storage with extensive virtualization. Like all FlashNAS, the new models were designed as a platform for Windows Server 2012 environments, as well as virtualization using other operating systems. They allow you to fully realize your IT infrastructure potential to gain utmost benefit from hardware investment while helping keep costs under control. Winchester Systems will continue to develop virtualization-centric solutions, and our support network means systems are regularly updated to stay compatible with new software.