Software to Simplify and Share SAN Storage

Enhancing Virtual Datacenters Built on Microsoft® Hyper-V R2™ with Sanbolic® Melio 2010™

Configuration Guide

October 2010

www.sanbolic.com

Introduction

With the release of **Microsoft® *Windows® Server 2008 R2*™** and ***Hyper-V R2*™**, Microsoft has taken a huge leap forward in the server virtualization race, offering some of the more advanced features and functions found in the leading hypervisor, VMware® *ESX*™ (*vSphere*™). Using Hyper-V R2, organizations can leverage many of its inherent capabilities to build dynamic, cost-effective virtual datacenters that provide applications and/or services internally or within the cloud on demand. And while many industry pundits acknowledge that with Hyper-V R2, Microsoft's server virtualization offering is closer than ever to achieving "enterprise-ready" stature, there are still a few rather significant shortcomings that make it difficult for an organization to realize all the benefits afforded by a true, enterprise-class server virtualization platform.

For those organizations that have encountered these "drawbacks" while dabbling with Hyper-V R2 or for those that would prefer to bypass these drawbacks entirely, there is a solution: **Sanbolic® *Melio 2010*™**. A *complete* storage solution comprised of advanced software components that work in collaboration with one another, Melio 2010 enhances the value of applications deployed in today's enterprise datacenters by extending the benefits of virtualization to the storage layer.

About Melio 2010

At the core of Sanbolic Melio 2010 is an all-purpose, 64-bit, symmetrical cluster file system called ***Melio FS***™ that allows multiple Windows servers to share concurrent read-and-write access to volumes on SAN storage. Employing an advanced, multi-layer locking mechanism, Melio FS enhances Hyper-V server virtualization by addressing the limitations in performance, scalability, manageability and versatility imposed by the current storage component for Hyper-V, *Cluster Shared Volumes*™ or *CSV*™. Using Melio FS to provide highly scalable, highly available shared storage for VM files, organizations deploying Hyper-V achieve the following:

- Significant boosts in performance as a result of multiple Hyper-V hosts sharing concurrent read-and-write access to VHDs via enhanced VHD locking.
- Enhanced storage utilization as only one LUN is required to store all VM files.
- Quick and seamless scale-out as new Hyper-V hosts and new storage resources can be added to the infrastructure dynamically, without any system downtime.
- Reliable data protection in the form of cluster-wide VSS-based snapshots.
- Concurrent access to centrally-managed shared iSCSI target volumes by multiple virtual machines to enhance application performance, scalability and availability.
- Support for network sharing of data on Melio shared volumes.
- Support for up to 16 failover clusters and 256 hypervisors.

Compatible with all industry-standard server and storage hardware, Melio 2010 can be used with iSCSI or Fibre Channel SANs. It's also simple to install, allowing administrators to set up highly scalable, highly available, easy-to-manage shared storage in a matter of minutes. In addition, integration with Windows Failover Clustering is seamless as the Failover Cluster Service manager automatically recognizes storage

managed by Sanbolic's cluster volume manager ***LaScala***™, which provides centralized management for volumes formatted with the Melio cluster file system.

By harnessing the combined capabilities of Hyper-V R2, Melio 2010 and SAN storage, organizations are able to take advantage of high-performance block-based storage, which can be accessed by multiple servers simultaneously, to create highly scalable and highly available Hyper-V clusters that can effectively meet both current and future demands, regardless of the intensity of those demands.

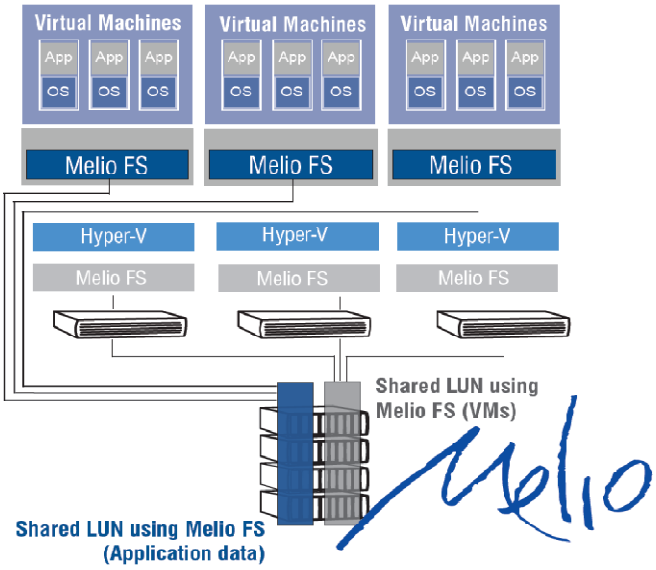
How Melio 2010 Enhances Hyper-V R2

Since a Hyper-V virtual machine (VM) can only be active on one host at a time, Windows Failover Clustering, which provides high availability for applications by failing over an application to a standby server when the primary server fails, must be used to move a VM between physical hosts while the VM remains active (aka "live migration").

In order to enable live migration for a VM, shared storage must be used to allow all host nodes to share concurrent access to the VM's files. Using Melio FS, all Hyper-V host nodes participating in a Failover Cluster can share concurrent, block-level read-and-write access to VM files located on a single storage volume.

Note: *Since shared access to the volume is managed by Melio FS and not the Failover Cluster, the Melio volume should not be added to the Failover Cluster as a clustered disk resource and, thus, should not appear in the Storage section of the Failover Cluster management console.*

To enhance the performance, scalability and availability of applications running on the VMs, application data can be stored on another Melio shared volume that can be accessed by multiple VMs simultaneously via iSCSI, allowing organizations to realize a greater return on their investment in Hyper-V server virtualization.



How to Create a Highly Scalable and Highly Available Hyper-V Server Virtualization Platform using Sanbolic Melio 2010

Note: *Although the following instructions pertain to a two-node Hyper-V cluster, the same steps apply to Hyper-V clusters comprised of more than two physical host nodes.*

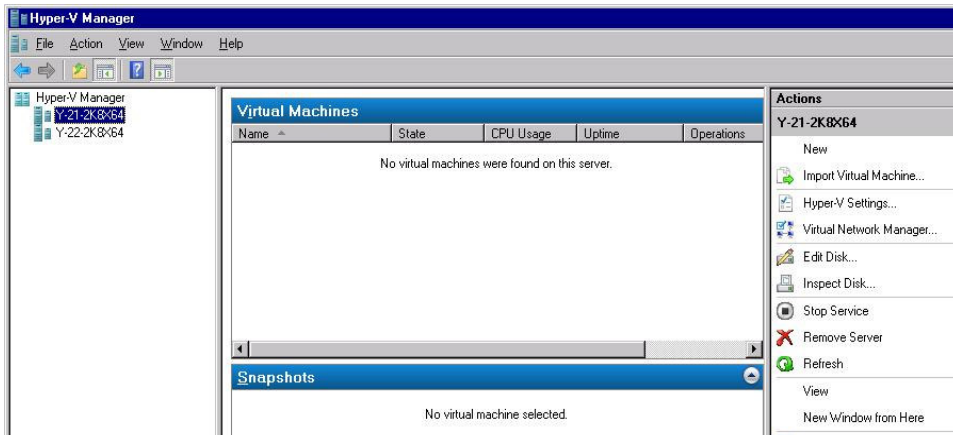
Prerequisites:

- **Operating Systems** – Windows Server 2008 R2 Enterprise or Datacenter edition
- **Roles and Features** – Hyper-V, Failover Clustering
- **Software** – Sanbolic Melio 2010
- **Failover Clustering** – Failover Clustering for all host nodes participating in the Hyper-V cluster must be fully-functional, including the establishment of a valid quorum. Click the following link to learn more about recommended quorum configurations: http://technet2.microsoft.com/windowsserver2008/en/library/13c0a922-6097-4f34-ac64-18820094128b1033.mspx?mfr=true
- **Networking** – A minimum of two network adapters, each with TCP/IP connectivity to the LAN. Also, an additional network adapter connected to a stand-alone (private) network dedicated for Melio FS cluster administration traffic.
- **Storage** – All host nodes participating in the Hyper-V cluster must have access to SAN storage.
- **Hardware** – Two identical host nodes (i.e., same CPU type and number; same amount of RAM; same number of network adapters) that have passed the Failover Clustering Hardware Validation test. (Click the previous link to learn more about Failover Clustering and Failover Clustering Hardware Validation.)

Once all of the prerequisites outlined above have been met, download the following tech note to create highly scalable, highly available, easy-to-manage shared storage using Melio 2010: http://www.sanbolic.com/pdfs/Quick_Guide_to_Creating_Shared_Storage_using_Melio_2010.pdf

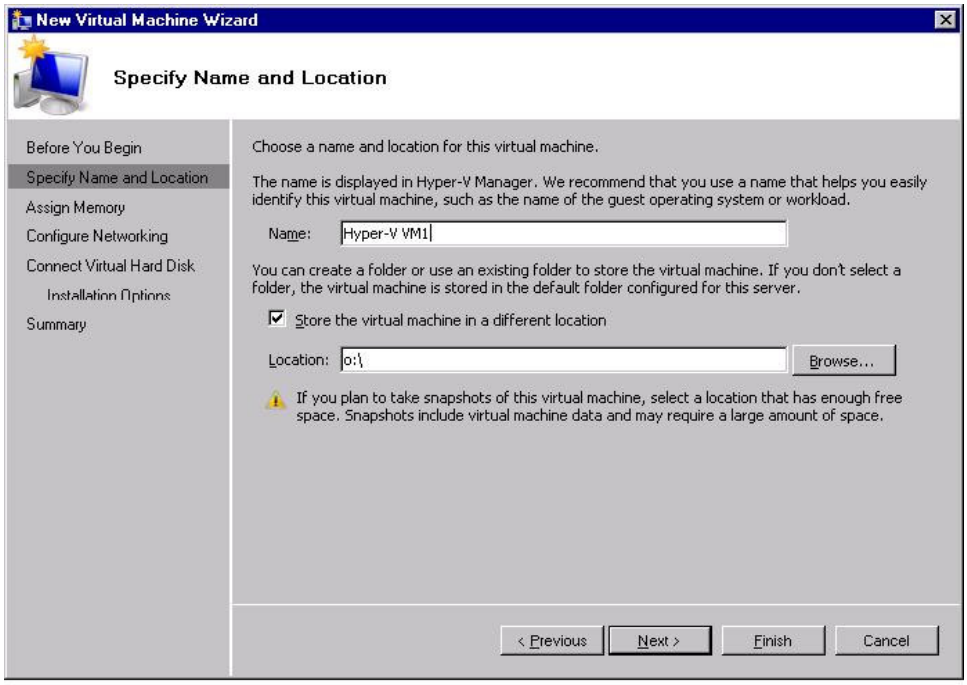
Creating a Hyper-V Virtual Machine (VM):

1. Open the Hyper-V management console (*Start > Administrative Tools > Hyper-V Manager*).

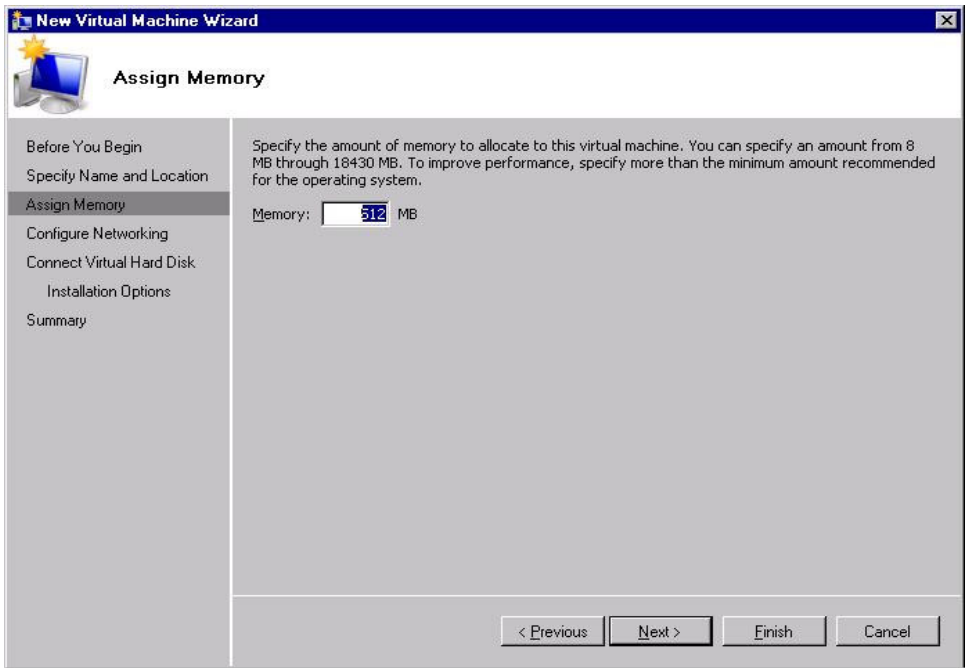


2. On the right-hand side of the management console, select **New > Virtual Machine**.

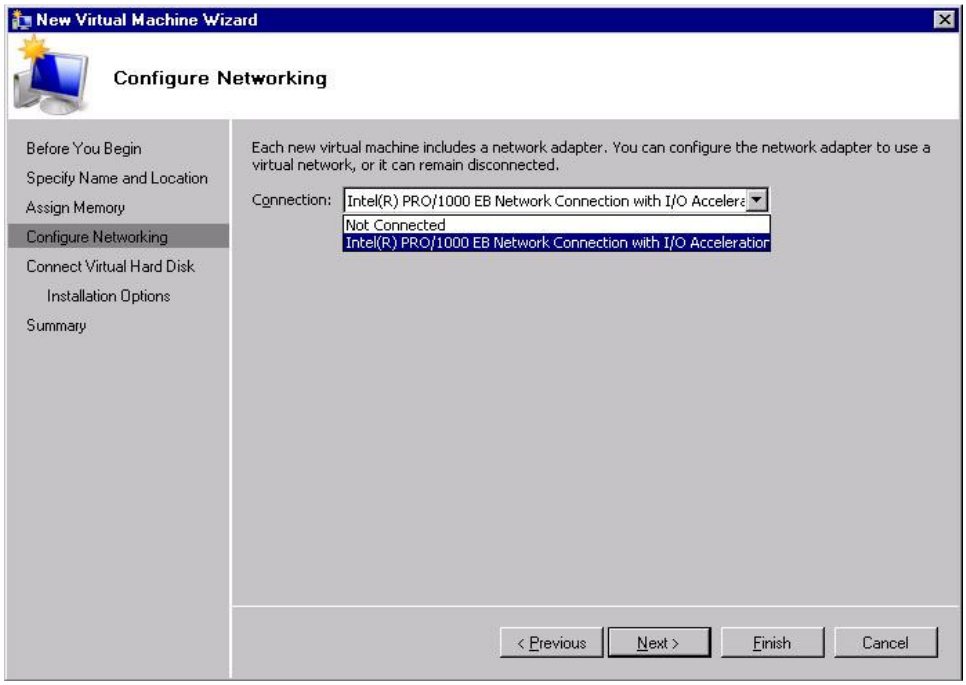
3. Follow the steps in the **New Virtual Machine Wizard** to create a new virtual machine.



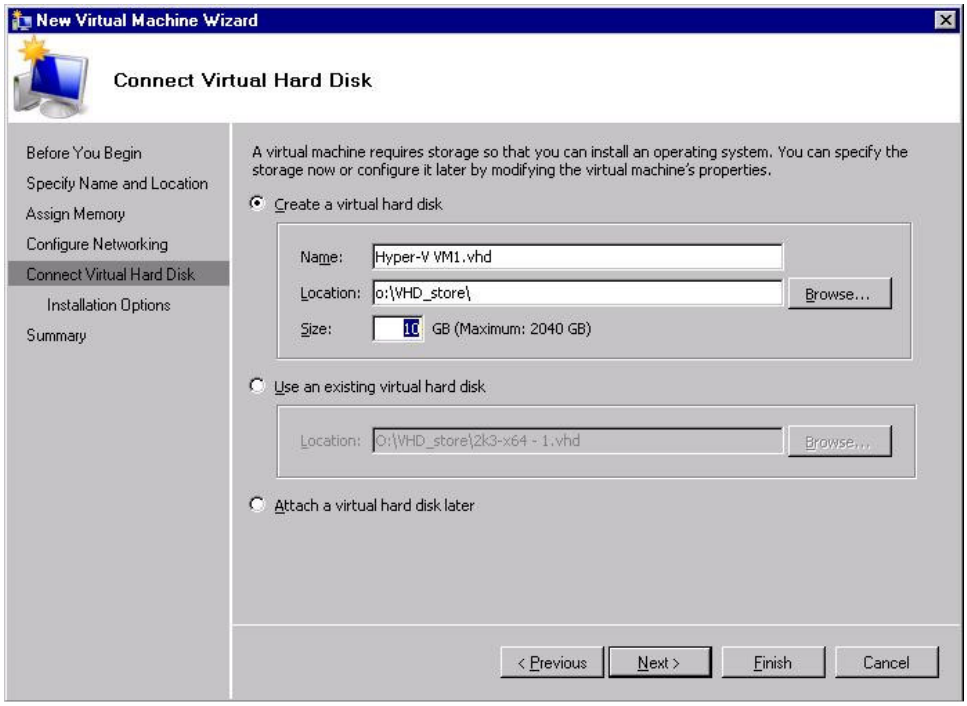
4. Enter a name for the virtual machine.
5. Select the checkbox **Store the virtual machine in a different location**.
6. Click **Browse** and navigate to the folder on the Melio shared volume where the virtual machine files will reside.
7. Click **Next**.



8. Assign memory to the virtual machine.
9. Click **Next**.

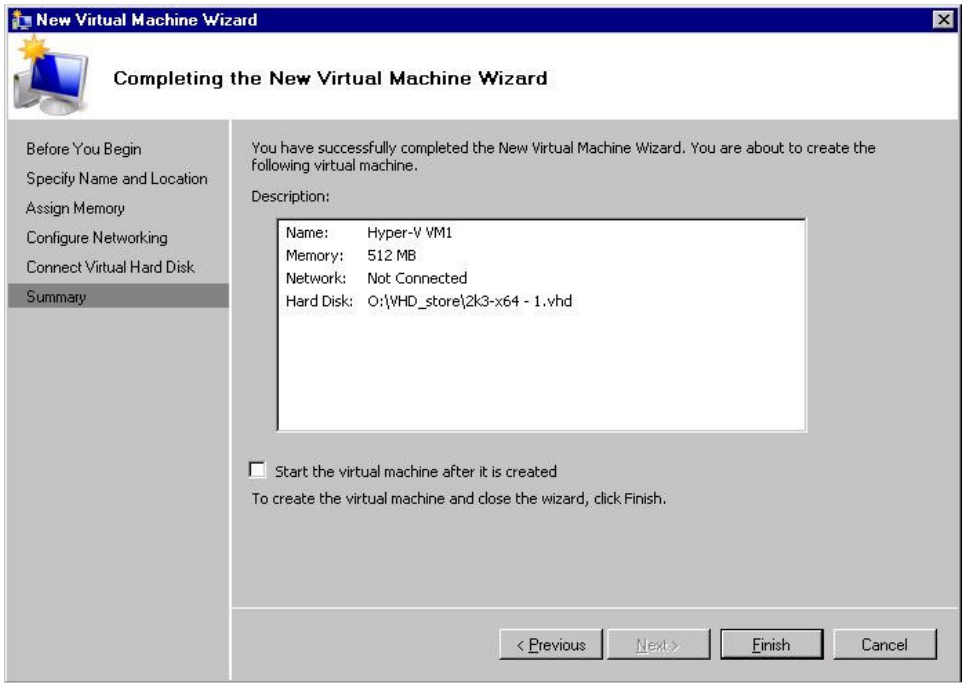


10. Select and assign a network (non-Melio FS network) to the virtual machine.
11. Click **Next**.

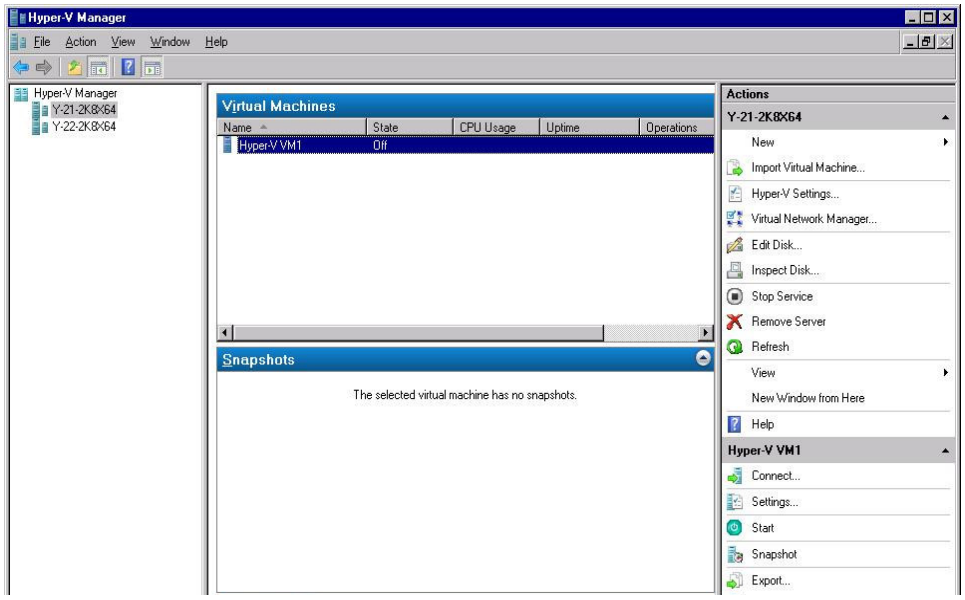


12. To create a virtual hard disk (.VHD) for the virtual machine, enter a name for the virtual hard disk.
13. Click **Browse** and navigate to the folder on the Melio shared volume where the .VHDs will reside.
14. Enter the size for the virtual hard disk.
15. If a .VHD already exists for the virtual machine, select the button **Use an existing virtual hard disk**.
16. Click **Browse** and navigate to the folder on the Melio shared volume where the .VHD resides.
17. To attach a .VHD to the virtual machine at a later time or if a .VHD will not be used by the virtual machine, select the button **Attach a virtual hard disk later**.

18. Click **Finish** to create the virtual machine.

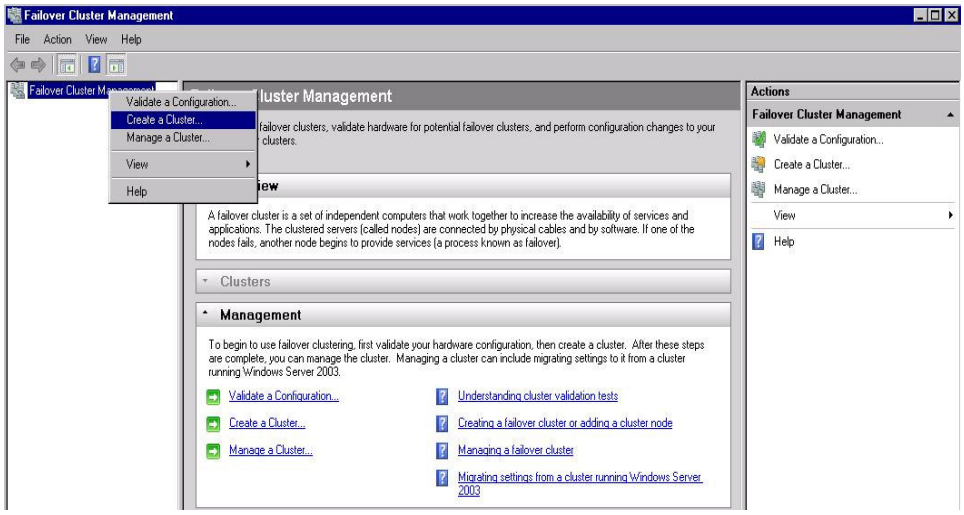


19. If the virtual machine is going to be started immediately and an existing virtual hard disk was attached to the virtual machine, select **Start the virtual machine after it is created** and click **Finish**.
20. If the virtual machine is going to be started immediately and a new virtual hard disk was attached to the virtual machine, select the checkbox **Start the virtual machine after it is created**, install the media containing the operating system for this virtual machine into the physical host node and click **Finish.** When the virtual machine starts, follow the instructions to install the OS on the virtual machine.
21. The new virtual machine will appear in the Hyper-V management console.

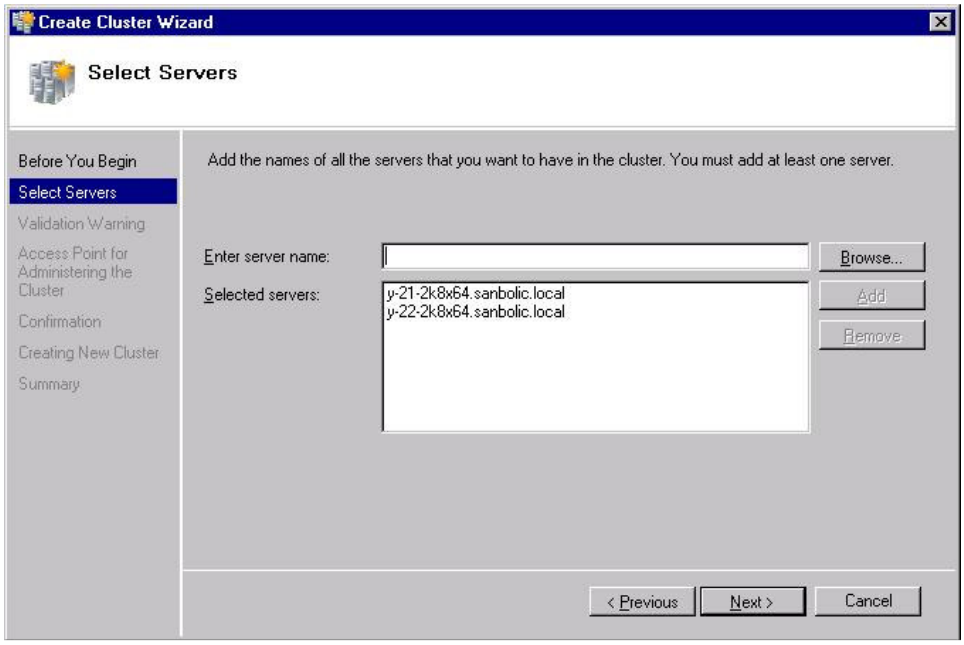


Configuring Windows Failover Clustering for Hyper-V Virtual Machines:

1. Open the Failover Cluster management console (*Start > Administrative Tools > Failover Cluster manager*).

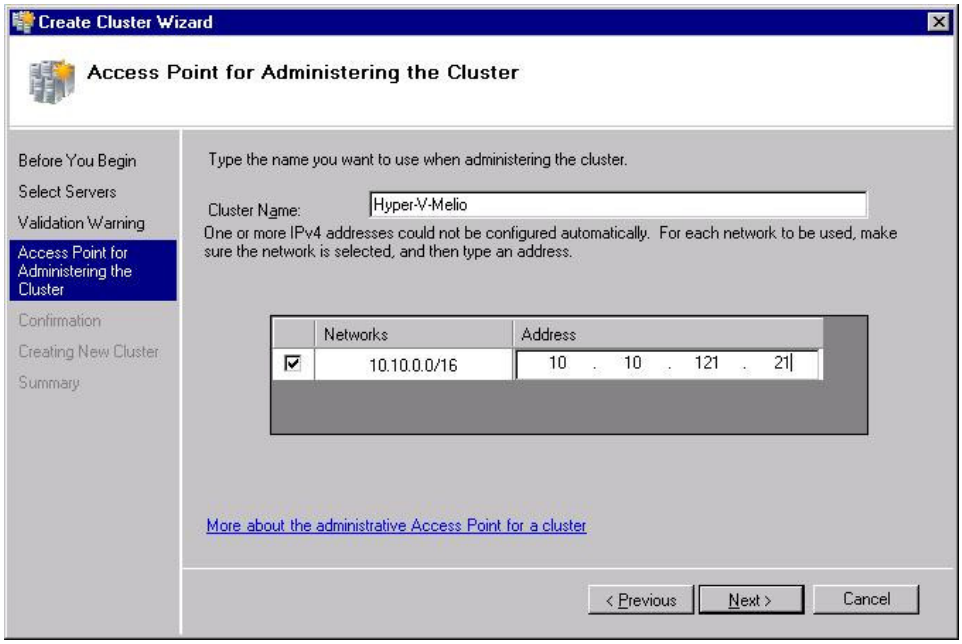


2. Right-click on the Failover Cluster manager and select **Create a Cluster**.
3. Follow the steps in the **Create Cluster Wizard** to create a new Failover Cluster.

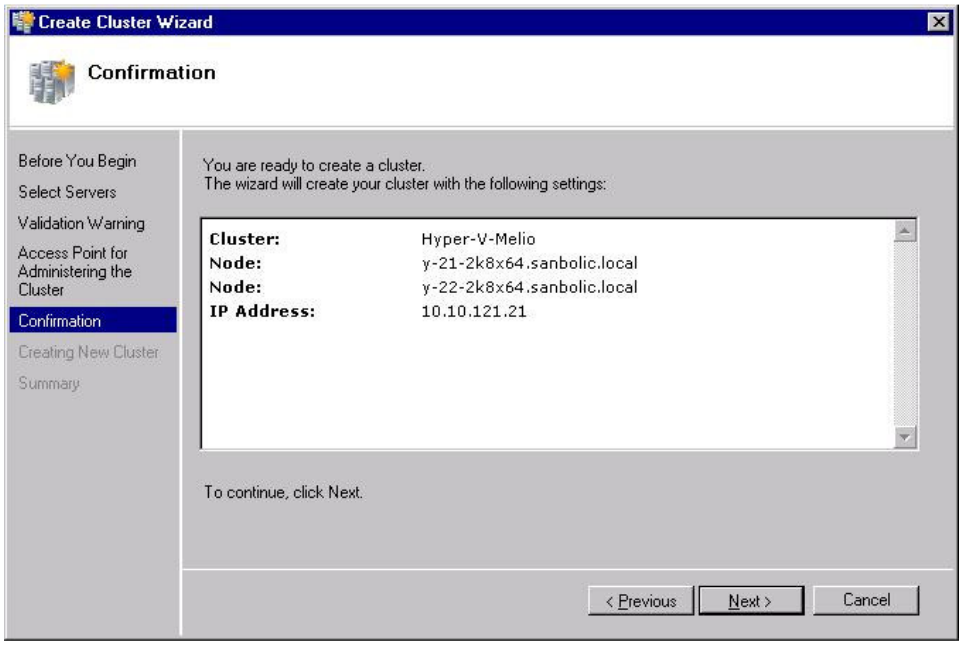


4. Enter the names of the Hyper-V host nodes that will be participating in the Failover Cluster.
5. Click **Next**.

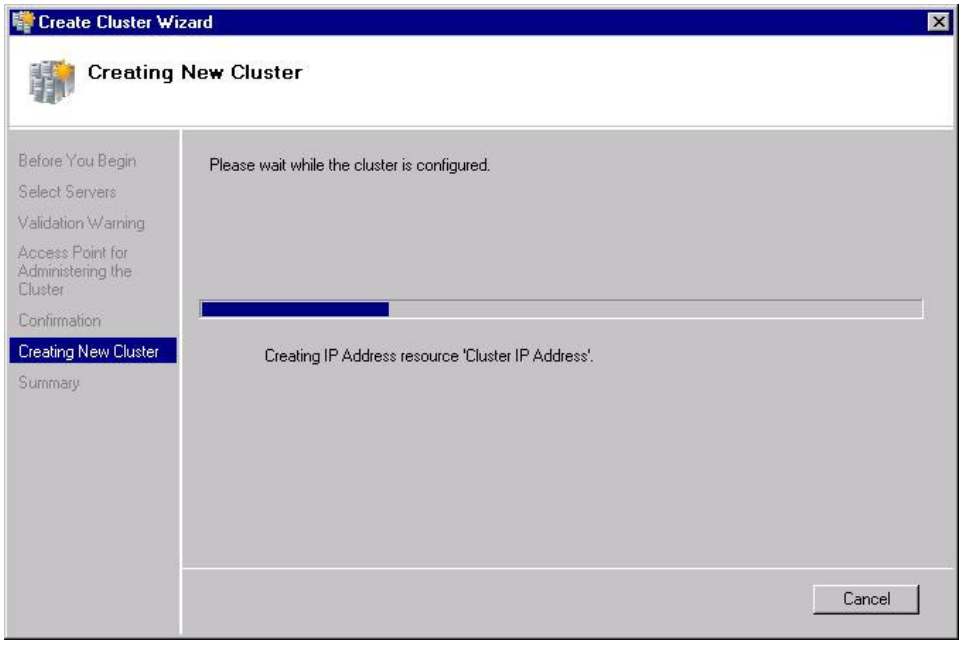
6. In the Failover Cluster Validation Warning window, select **Yes** to run the configuration validation tests.
7. Once the Validation tests have completed successfully, continue configuring the Failover Cluster.



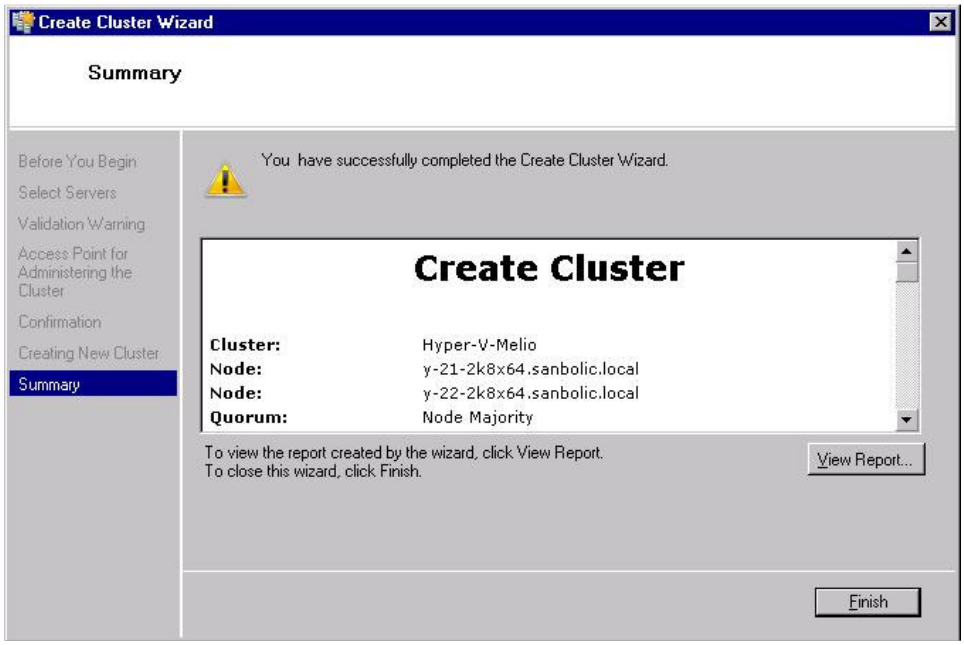
8. Enter a name and IP address for the Failover Cluster.
9. Click **Next**.



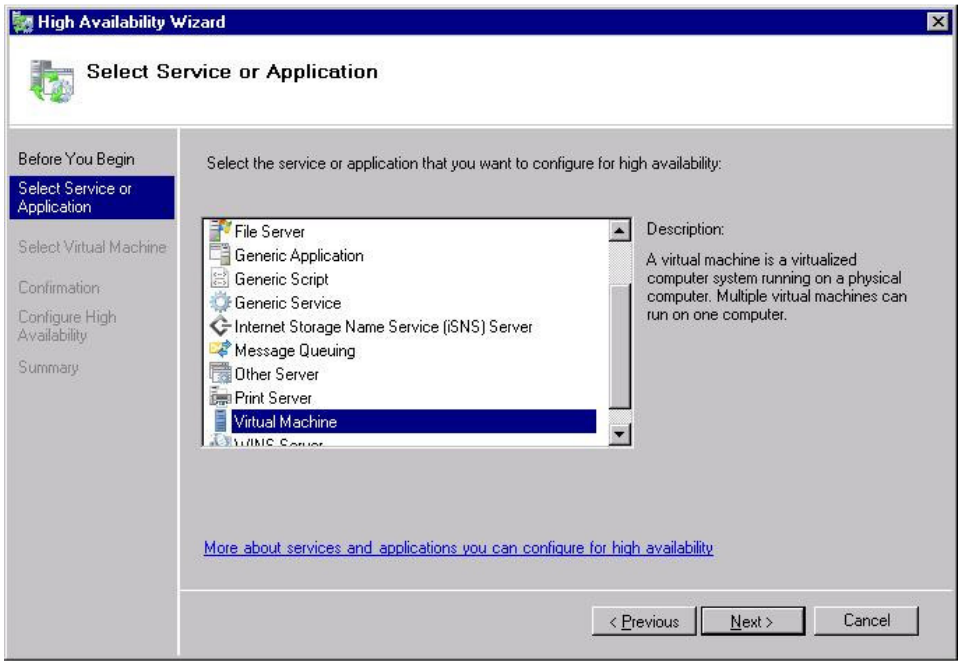
10. Review the configuration settings and click **Next** to create the Failover Cluster.
11. A window will appear stating that the Failover Cluster is being created.



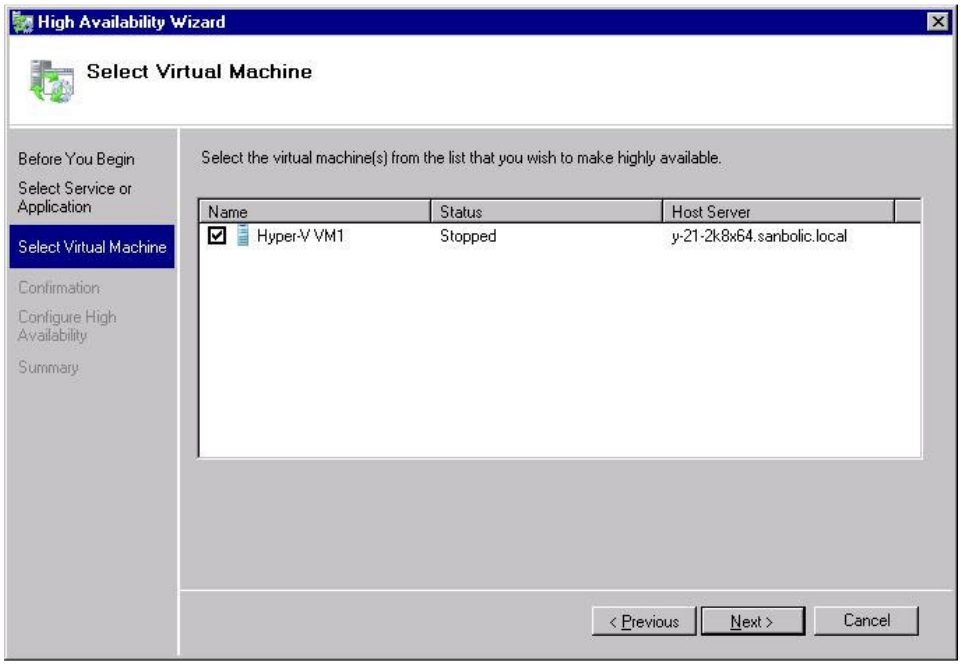
12. Once the Failover Cluster has been created, a window will appear stating that the Failover Cluster has been successfully created (see following illustration).



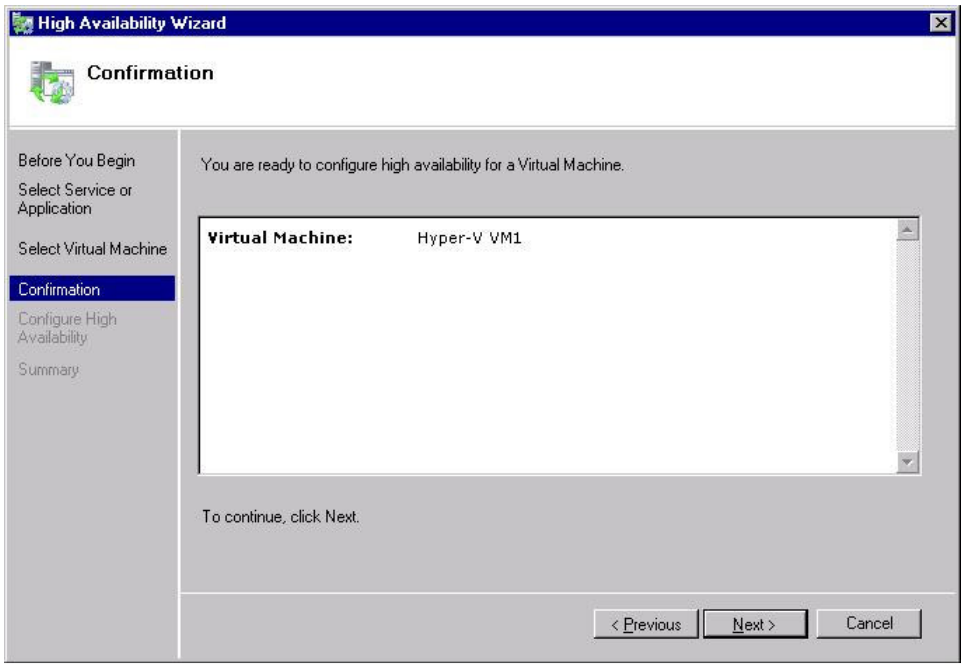
13. Click **Finish** to close the **Create Cluster Wizard**.
14. On the left-hand side of the Failover Cluster management console, right-click on **Services and Applications** and select **Select Service or Application**.



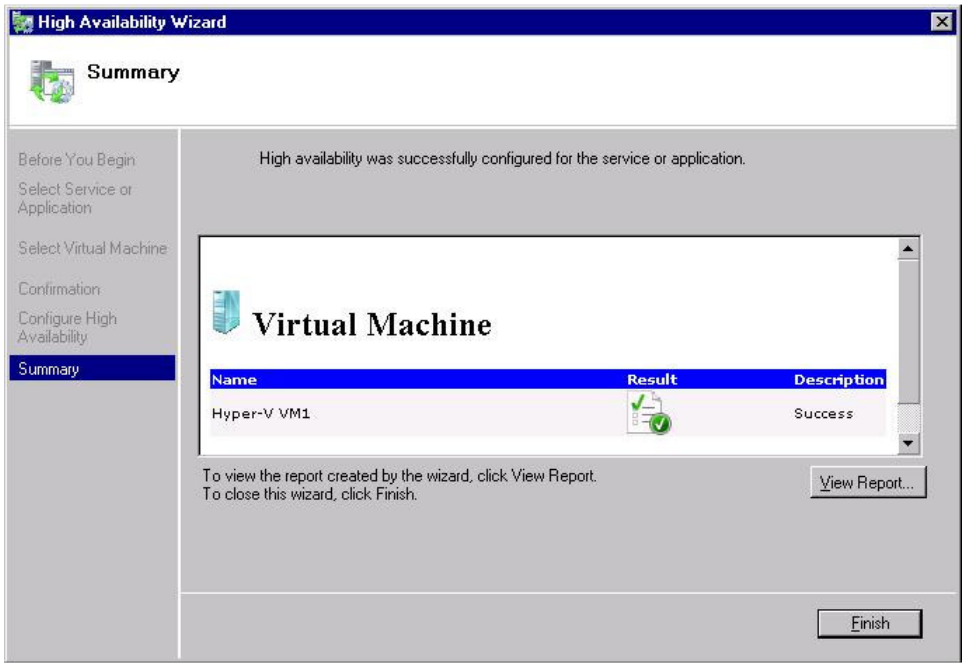
15. In the **Select Service or Application** window, select **Virtual Machine** and click **Next**.



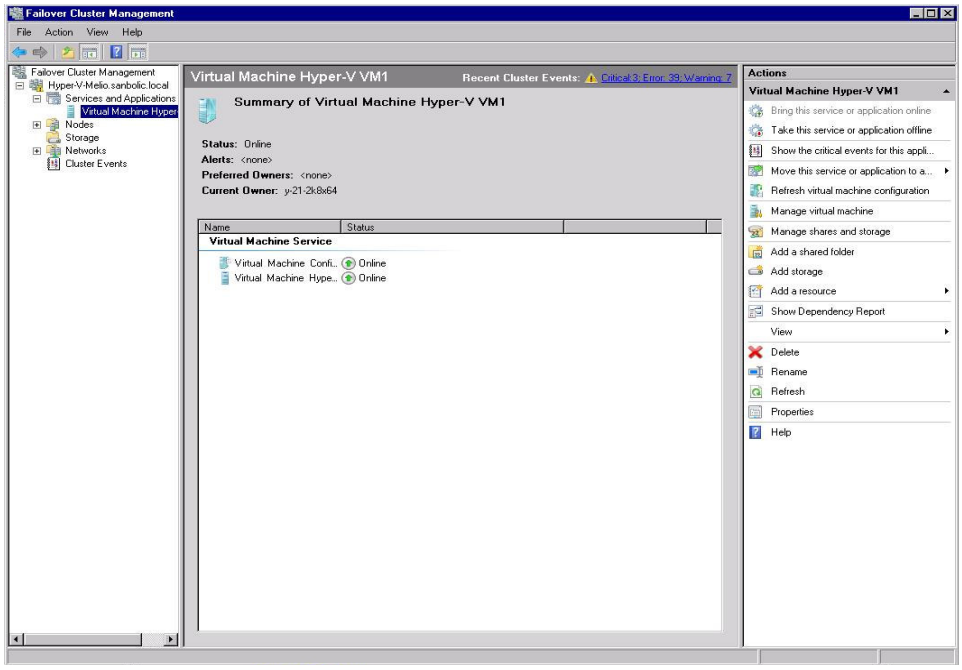
16. In the **Select Virtual Machine** window, select the virtual machine (created earlier) and click **Next**.



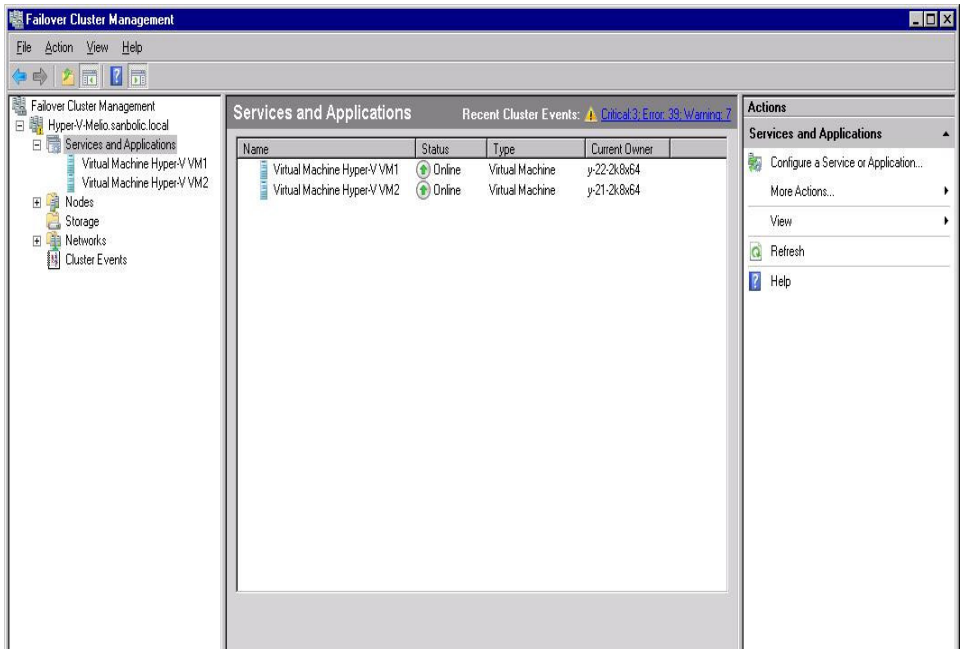
17. In the **Confirmation** window, click **Next** to configure high availability for the virtual machine.
18. Once the virtual machine has been added to the Failover Cluster, a window will appear stating that high availability was successfully configured for the virtual machine (see following illustration).



19. Note that the virtual machine now appears under **Services and Applications** on the left-hand side of the Failover Cluster management console.



20. On the left-hand side of the Failover Cluster management console, right-click on the virtual machine and select **Start**.
21. Once the virtual machine is started, right-click on the virtual machine again and select **Live Migrate virtual machine to another node** and then select the other Hyper-V host node in the Failover Cluster.
22. A message will appear in the Failover Cluster management console stating that the virtual machine has successfully migrated to the other Hyper-V host node in the Failover Cluster.
23. Create additional virtual machines in the Hyper-V management console and then configure high availability for the virtual machines using the Failover Cluster manager (see following illustration).



Congratulations… you now have a flexible and robust server virtualization platform built on Hyper-V R2 and Melio 2010 shared storage that supports live migration of virtual machines between Hyper-V host nodes for minimal system downtime and maximum user productivity.

Conclusion

Offering a highly scalable, highly available, easy-to-manage shared storage solution for **Microsoft *Hyper-V R2***, **Sanbolic *Melio 2010*** empowers organizations with the ability to create flexible, scalable, dynamic virtual datacenters capable of meeting both current and future demands. The end result: organizations are able to achieve all of the benefits afforded by enterprise-class server virtualization in order to realize the greatest return on their investments in ***Hyper-V R2***.

Sanbolic Inc.
304 Pleasant Street, 2nd Floor
Watertown, MA 02472
Phone: 617-833-4249
Fax: 617-926-2808
Email: sales@sanbolic.com
Support: support@sanbolic.com

Microsoft GOLD CERTIFIED Partner