

E-Guide

Hyper-V 3.0: Creating new virtual data center design options

Top four methods for deployment

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Hyper-V 3.0: Four latest deployment methods

New features of Hyper-V provide IT pros with new options for designing virtual data centers. Inside this e-guide, our experts take a look at four of the latest techniques for deploying Hyper-V 3.0 to help you determine a best-suited approach for your environment.

New virtual data center design decisions with Hyper-V 3.0

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With new Windows Server 2012 and Hyper-V 3.0 features -- such as the SMB 3.0 protocol, share-nothing live migration and SOFS clusters, organizations will have more virtual data center design options.

Choosing which design is the best will largely depend on the size of the company as well as its IT maturity. With that, here's a look at four ways to deploy Hyper-V in a virtual data center.

1. Single-server Hyper-V 3.0 deployment

A single-server Hyper-V configuration has always been easy to install and maintain. You can install Hyper-V in a few mouse clicks onto any hardware supported by Microsoft Windows. Storage, networking and other configurations require minimal upfront thinking and few design decisions.

The changes to the Server Message Block (SMB) 3.0 protocol in Windows Server 2012 add a new twist to this type of virtual data center design. With SMB 3.0, Hyper-V hosts can handle the virtual machine (VM) processing requirements, while offloading the disk activities to remote Windows file servers.

While this option was technically feasible in previous Hyper-V versions, it usually resulted in poor VM performance. Compared to block-level storage technologies, such as iSCSI and Fibre Channel, the SMB protocol was a poor candidate for the remote storage of virtual disks. After extensive changes to the SMB protocol in Windows Server 2012, Microsoft now asserts

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that, once properly configured, Hyper-V 3.0 VMs hosted atop SMB shares will attain performance levels that equal iSCSI or Fibre Channel.

Assuming this assertion is borne out, you can now host VHDX files locally or atop a remote Windows Server 2012 file server in single-server Hyper-V environments.

2. A non-clustered, multi-server Hyper-V deployment

Another simple Hyper-V 3.0 design provides increased resources over a single-server infrastructure, and does not require the use of clusters or shared storage to live migrate VMs or virtual disk files between Hyper-V hosts.

This is made possible thanks to Hyper-V 3.0's new support for cluster-less and SAN-less Live Migration. In Windows Server 2012, Hyper-V virtual machines and/or their virtual disk files can be live migrated between any configured Hyper-V hosts. That means no downtime for moving VMs or their storage between individual Hyper-V hosts.

There is an important caveat to this new live migration functionality: Live migrations outside a Windows Failover Cluster must be triggered proactively, which means that an administrator must initiate the live migration from a console. Reactive migrations are not natively supported, such as those used to ensure VM high availability to protect against host failures.

That said, PowerShell is deeply integrated into Hyper-V 3.0 and Windows Server 2012, so it stands to reason that homegrown or aftermarket solutions that add HA-like support to this configuration may quickly become available.

3. A non-clustered, multi-server Hyper-V deployment with highly available storage

As you can imagine, one or more non-clustered Hyper-V hosts pointing to a single SMB-based file server is a study in single points of failure. Losing either the Hyper-V host or file server will automatically cause every, running VM to fail.

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At the same time, traditional file server clustering atop earlier versions of Windows Failover Clustering will also cause problems. Traditional file-server clustering follows an active-passive model, where the file server is, in fact, a file-services instance that exists on only one cluster node at a time. If the active cluster node fails, all file server and VM processing will stop until the instance is restarted on a surviving cluster node.

This limitation likely drove Microsoft to introduce a new type of active-active file server cluster in Windows Server 2012 called a Scale-Out File Server (SOFS). Combined with the SMB performance improvements, this fault-tolerant file server intends to remove some of the complexity in managing Hyper-V storage. Administrators must still make iSCSI or Fibre Channel connections to remote block-level storage; however, those connections are exposed as common Windows file shares to Hyper-V hosts.

Microsoft designed this file server to exclusively host large files with limited metadata access. This makes the Scale-Out File Server a good fit for use in database applications or hosting VM disk files. As of now, Microsoft supports SOFS clusters only for Hyper-V and SQL Server.

Microsoft also hopes to offer the SOFS as an alternative to standard SAN solutions. Combined with another new technology, Storage Spaces, which pools storage from various sources, a SOFS cluster supports connections to locally-attached, shared spanning disks via PCI-RAID. For Microsoft's intended implementation, PCI-RAID is a fairly leading-edge technology, and so it remains an option to keep an eye on.

Ultimately, Microsoft hopes SOFS will reduce the complex configurations associated with storage connections, and time will tell if the new file server technology achieves this goal.

4. Clustered Hyper-V with highly available storage

Hyper-V 3.0 will likely see the greatest adoption in production scenarios outside of small and low-complexity virtual data centers.

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A Hyper-V 3.0 cluster of two or more hosts provides high availability and load balancing, when coupled with System Center Virtual Machine Manager, for production workloads. In Windows Server 2012, you have the option to cluster hosts via traditional storage connections such as iSCSI or Fibre Channel, or through the arguably simpler Windows file share approach facilitated by SOFS.

Microsoft asserts that using SOFS as network-attached storage (NAS) atop a SAN delivers an easier management experience as well as better backup capabilities from the integration between SMB and Microsoft Volume Shadow Copy Service. Like with all these new capabilities, testing the final release of Hyper-V 3.0 will be necessary to validate the added value of SOFS.

Even so, the expanded Hyper-V 3.0 cluster options and live migration capabilities give IT pros more flexibility and virtual data center design options. While most mission-critical and production environments will still require advanced features for maintaining VM availability, small and low-complexity environments now have more architectural decisions from which to choose.



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