

New Features in Windows Storage Spaces 2012 R2

For the free video please see
<http://itfreetraining.com/server#spaces-new-2012r2>

This video will look at the new features added to Windows Server 2012 R2 with Windows Storage Spaces. Windows Storage Spaces is a system introduced in Windows 8 and Windows Server 2012 that allows multiple physical drives to be combined together to form the one drive.

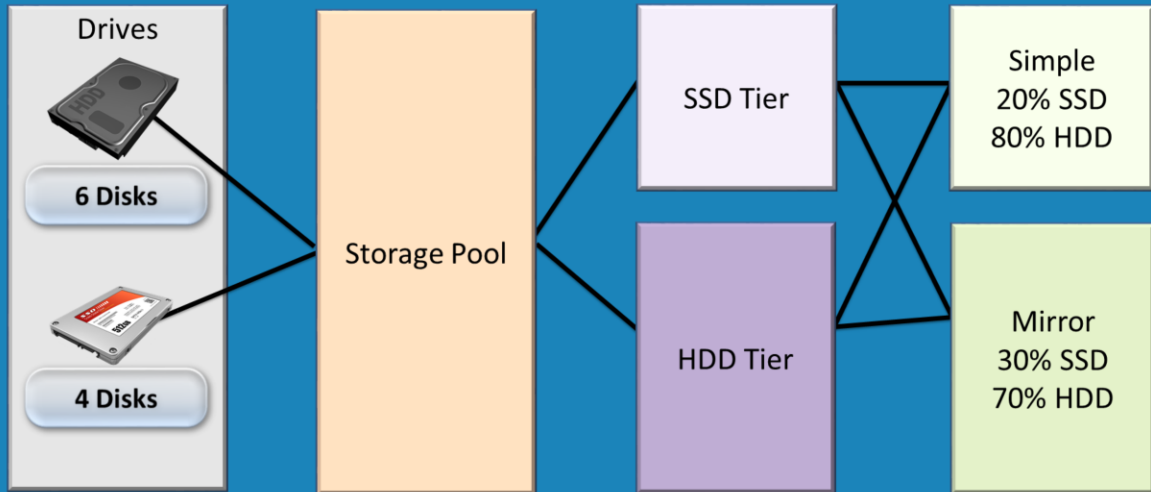
Storage Spaces New Features

- Storage tiers
- Write-back cache
- Parity space support for failover clusters
- Dual parity
- Auto rebuild storage spaces from free space

This video will look at the 5 new features included in Windows Storage Spaces in Windows Server 2012 R2. Three of the features are transparent and are available automatically and do not need to be configured.

Storage Tiers

- Stores data based on usage improving performance



Solid state drives differ from Traditional Hard disks in that the access time is quite fast. Storage Tiers allow the administrator to divide storage into a solid tier and a physical hard disk tier. When an administrator creates a simple or mirror drive using Windows Storage Spaces, the administrator can choose a percentage of how much space will be used on each tier. Windows will automatically place files that are used more often on the solid state tier and less used files on the other tier. At this stage, Windows Storage Spaces does not support parity for storage tier. Parity allows data to be divided up between drives for performance and redundancy.

Write-back cache

- Uses solid state drives as cache
 - Used for small random writes
- On by default and does not need to be configured
- Requires the following
 - Simple spaces requires one SSD
 - Two-way mirror requires two SSD
 - Three-way mirror requires three SSD

Traditional on a RAID system, the overall system will be slowed down when a lot of small random writes are performed. If you have solid state drives in the Windows Storage pool, Windows Server 2012 R2 will automatically reserve part of the solid state drive to use as a write-back cache. When a lot of small random writes are received, these are written to the solid state cache. Since solid states have fast access time, this is very quick. Later on, the data in the cache is transferred to the other physical drive in the system as required. This feature is enabled automatically, however in order for it to work it requires a certain number of solid state drives depending on the type of redundancy you are using in the system. For example, a 2-way mirror requires two copies of the data to be available at all times in order for it to be redundant. For this reason, the write back cache needs to hold 2 copies of the data in case a solid state drive failed before the data could be transferred. If you do not have the required number of solid state drives, the feature will not be available.

Parity space support for failover clusters

- Windows Server 2012 R2 now supports
 - Simple, mirror and parity
- Parity was not supported in Windows Server 2012

Support has been added for Windows clusters to use drives created in Windows Storage Spaces that use parity. Previously in Windows Server 2012 parity support was not available.

Dual parity

- Stores parity on 2 drives
- Allows 2 drive failures
- Requires 7 drives in the storage pool

Windows Server 2012 R2 Storage Spaces adds the option for dual parity. Dual parity means that the virtual drive can still keep working after 2 disk failures. In order to use this feature, you need to have 7 drives in the storage pool.

Auto rebuild storage spaces from free space

- When a drive fails
 - Rebuild is performed to free space
 - No need for hot swap drives



Let's consider a standard RAID of 5 drives with one being used as parity. If a drive was to be replaced, the 4 other drives would need to read to perform a read and then the data written on the new drive. This is a slow process as writes are only being performed on the one drive. With Windows Storage Spaces for Windows Server 2012 R2, rather than writing all the data to a single drive, any free space on the other drives in the Windows Storage Space can be used to write to. Assuming redundancy requirements are still met, this means multiple drives are being used rather than just the one.