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Veritas Storage Foundation HA for Windows Improves Performance and Availability

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Management Summary

There are many of us that remember when punch cards were used to read programs into large mainframes, and not used to decide the fate of the presidential election in the state of Florida. In those days, disk drives were big, bulky, expensive, and slow by today's standards. Data was not written haphazardly on disk but was carefully allocated to the appropriate track. We understood the mechanics of a spinning disk drive. Each platter consisted of concentric tracks. Less important data was placed on the outermost track because, simply, it took longer to retrieve it from that location. It took a long time, relatively speaking for the head to go to the outermost track to find the data and read it. Data that is more important was placed closer to the middle of the platter.

Later, disk systems got smaller, faster, and a lot less expensive and it no longer seemed necessary or practical to allocate data on disk carefully. When disk performance became a problem, the solution was simple. Buy more disk drives and spread out the data across more spindles. It made the administrator's job easier, and it made the storage sales rep happy.

Now, the tide has changed again. We need to maximize disk performance without buying more storage. We want to consolidate storage and drive up storage utilization. That saves money. Achieving these consolidation goals, while maintaining high levels of performance requires a great deal of planning and careful execution. In many enterprises, time for carefully planning storage consolidation migrations is in short supply.

Veritas Storage Foundation High Availability 5.0 for Windows from Symantec is a new high availability product that combines *Veritas Storage Foundation for Windows* and *Veritas Cluster Server*. There are new enhancements within Veritas Storage Foundation *for Windows* that improve disk system performance. No longer do administrators have to plan - carefully - where to put data to maximize performance. The Veritas software will configure the storage according to best practices. That makes the goal of driving up storage utilization while maintaining performance achievable.

There are other enhancements to Veritas Storage Foundation High Availability 5.0 for Windows. Read on to find out more about this new release.

Improving Performance

Disk drives are composed of many concentric tracks residing on each platter. These tracks are divided into sectors, which are typically 512 bytes in length. Most physical disks maintain 64 sectors per track. Microsoft Windows allocates the first 63 sectors on the first track to the Master Boot Record. That means that Windows always creates partitions starting with the sixty-fourth sector. The partition is not "track aligned"; that is, the first 512 bytes of the partition is written to the last sector of the first track. The next 512 bytes is written to first sector of the second track. Partitions that span tracks create I/O performance problems.

Microsoft recommends that data centers run the *Diskpart* tool to align storage boundaries. This tool only works for basic disks and does not support *dynamic disks*, which can consist of simple, spanned, mirrored, or striped volumes. However, dynamic disks cannot contain the information to boot an operating system from that partition. Veritas Storage Foundation for Windows supports dynamic disks. *Microsoft Logical Disk Manager* keeps storage configuration information in the Windows registry; *Veritas Storage Foundation for Windows* does not. Using the Symantec product, Windows servers do not have to be brought down to change storage configurations. Symantec's implementation of dynamic disks provides more flexibility, and allows other Windows servers to have access to this storage.

Veritas Storage Foundation for Windows can automatically provide track alignment for most disk storage arrays. Track alignment can be specified for many disk arrays, including those available from EMC, HP, HDS, IBM, and NetApp. Any allocations to that array are automatically track aligned. The benefits of track alignment can be substantial – performance improvements up to 40% can be achieved by turning on this one feature.

The Storage Foundation GUI is the centralized graphically user interface to automate the management of storage resources. Storage bottlenecks can be detected easily and data can be migrated, nondisruptively, to a less active portion of the disk array. *Dynamic Volume Shrink*, a new feature, allows volumes to be reduced in size without recreating the volume.

Another new feature, *Volume "Shred"*, allows the contents of volumes to be erased securely – a necessary requirement to ensure that compliance regulations are met.

Dynamic Multi-pathing Option

If only one path is configured between a server and a storage array, then the loss of that path results in an outage. For critical applications, such as Microsoft *Exchange*, this can cut off communications between employees, customers, and business partners dramatically. It is always a wise choice to have multiple paths defined between servers and storage. *Veritas Dynamic Multi-pathing (DMP)* manages these paths; if one path fails, the I/O is directed down the second path.

When multiple paths are operational, better performance is achieved by spreading the I/O across several paths. There are several ways to spread out the I/Os. For example, the round robin algorithm sends the first I/O to path one, the second to path two, etc. Veritas DMP's *Dynamic Least Queue Depth* algorithm analyzes the number of I/Os that are queued for each path and distributes new I/Os to the paths with the smallest number of queued I/Os. There are other schemes available, and each scheme can provide better, or worse, performance for a particular application.

Symantec has performed numerous tests to determine which algorithms work best for applications and have optimized these algorithms for *SQL* and Exchange. Veritas Dynamic Multi-pathing is fully compliant with Microsoft Windows' MPIO framework for both iSCSI and Fibre Channel and supports disk storage arrays from EMC, HDS, HP, IBM, and NetApp.

Management Enhancements

The Veritas Storage Foundation Management Server (SFMS) is a recent addition to the suite of Storage Management products and is designed to be used with Veritas Storage Foundation 5.0 and 4.x. SFMS is a free license add-on for data centers that have Veritas Storage Foundation under an active support contract. SFMS provides a single console for administrators to monitor and administer application, server, and storage resources through their Veritas Storage Foundation environment.

Administrators can connect to SFMS via a

Web browser and view resources at a high level, or drill down to specific areas, such as applications groups and databases, operating system details, HBAs, disks and volumes to identify and fix problems online. For example, when a disk group error occurs, the administrator can quickly determine which application uses that resource and start the process to re-build that group with a few mouse clicks. The administrator can detect and resolve problems before they become major outages.

SFMS also provides a view of all repli-cated volumes under the control of Veritas Volume Replicator Option by Symantec. Ad-ministrators can determine if the applications are properly protected and, if needed, they can create replication links.

Another management enhancement – Storage Foundation for Windows provides a Microsoft MOM Pack to allow storage man-agement to be integrated into *Microsoft Oper-ations Manager* (MOM 2000 and 2005).

Data Protection Enhancements

FlashSnap Option allows administrators to make point-in-time copies of volumes that can be used for many purposes such as backup, testing, and development. FlashSnap is now fully integrated with *Windows Server 2003*'s *Volume Shadowcopy Services (VSS)* and sup-ports VSS-based snapshots. This integration ensures that applications, such as *Exchange*, are quiesced before the point-in-time copy is created providing an *application consistent* copy of the data. A new snapshot wizard makes it easy to define, configure, and start and stop the creation of snapshots.

Replicating data to remote sites is not new to Symantec. This ability has been available for many years with the *Veritas Volume Repli-cator Option*. What is new in this release is Windows support for *bunker replication*. Bunker replication supports the best of synch-ronous and asynchronous replication. Data is synchronously replicated to a "bunker" and also asynchronously replicated to a site many miles away. If the main data center suffers a major outage, then the data stored at the bunker can be compared to the data replicated to the remote location. The remote location can retrieve any missing data from the bunker. This ensures that the remote location has the most current data for recovery.

Veritas Storage Foundation and Veritas Volume Replicator provide for data protection and data availability respectively. Now, Veritas Storage Foundation HA for Windows provides application availability, as well.

High Availability

Veritas Storage Foundation *High Avail-ability (HA) for Windows* combines two pro-ducts – *Veritas Storage Foundation for Win-dows* with *Veritas Cluster Server (VCS)*. Veritas Storage Foundation HA for Windows monitors applications running on any Win-dows server and moves those applications to another server when an outage occurs, thus minimizing planned or unplanned downtime. Support is provided for clusters that are local or remote, across any distance and connected over the network. There is a new web-based management console – *VCS Cluster Manage-ment Console (CMC)* - provided at no additi-onal cost, which provides centralized visibility, operational control, and uptime reporting across all VCS installations and across all sup-ported OS platforms in the Enterprise. Admin-istrators that have used other Symantec pro-ducts to manage clustered configurations for *Unix* and *Linux* environments will find this management product looks and acts the same as these other products. There is support for both physical and virtual servers, such as those running under *Microsoft Virtual Server* and *VMware*. Veritas Cluster Server gives you the flexibility to map physical servers to virtual servers (P2V), or virtual servers to other vir-tual servers (V2V). Storage Foundation HA for Windows has out-of-the-box support for most Windows-based applications, such as Exchange, *SQL Server*, *SharePoint Portal Server*, and over thirty enterprise applications, including those from SAP, Oracle, BEA, etc. All the agents for applications come free with Storage Foundation HA for Windows.

A Variety of Licensing Levels

As physical and virtual server environ-ments converge, product licensing for these environments have become an administrative concern. The Storage Foundation for Win-dows' licensing policy is tailored to physical or virtual environments. There are three li-cense levels.

- *Standard License* - For each Windows Standard License, each software license allows you to run, at any one time, one instance of the server software in a physical or virtual OS environment on a particular server.

- *Enterprise License* - For each Windows Enterprise License, each software license allows you to run, at any one time, one instance of the server software in a physical OS environment and up to four instances of the server software in virtual OS environments on a particular server.

- *Datacenter License* - For each Windows Datacenter License, each software license allows you to run, at any one time, an unlimited number of instances of the server software in physical or virtual OS environments on a particular server.

Disaster Recovery Protection

By combining the automation capabilities of site-to-site clustering with remote site data replication, customers can attain real-time disaster recovery protection. However, such real-time DR infrastructure operates in an environment of continuous change, such as application or operating system changes, or changes to the storage environment, and must be regularly revised and tested to reflect those changes. Too often, the DR infrastructure is not tested for months (or years). When disaster strikes and these plans are put into action, the infrastructure is hopelessly out of date. The result can be downtime, loss of data, and loss of business revenue and customers. *Fire Drill*, a key feature of Veritas Cluster Server, is now available for Windows and supports SQL and Exchange (among other applications) and allows administrators to test - regularly and proactively - their real-time DR infrastructure, without production impact, before a disaster strikes.

Additional Tools

The Veritas Cluster Simulator tool is available online so that customers can simulate, completely, a new or existing Cluster Server clustering environment from their laptop or desktop PC prior to actual implementation of clusters.

Veritas Storage Foundation and High

Availability Solutions Configuration Center is a long name for a configuration wizard that makes complex tasks easy. This new tool guides administrators, step by step, through the task of configuring Fire Drill, data replication, and high-availability/disaster-recovery solutions for Exchange, SQL Server, Oracle, and other applications.

Try it For Free

Data centers with Microsoft servers can now try Storage Foundation for free. Symantec supplies a version of this product called *Veritas Storage Foundation Basic for Windows* that can be downloaded from their website. This version does not contain support for clusters, or options such as FlashSnap, or Volume Replicator. It will support up to four volumes, two processor sockets per system, and Dynamic Multi-pathing for SAN connectivity and management. It can be the perfect solution for a small business or large enterprises that support end-tier servers and need to manage their Microsoft environments better. Or, it can be an easy way to investigate many of the benefits of Veritas Storage Foundation for Windows on a limited number of volumes, before simply upgrading to the full-featured solution, without requiring a new installation.

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About the Author

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