



## SAN-AWARE OPERATING SYSTEMS ENABLE SERVER-BASED STORAGE PROVISIONING

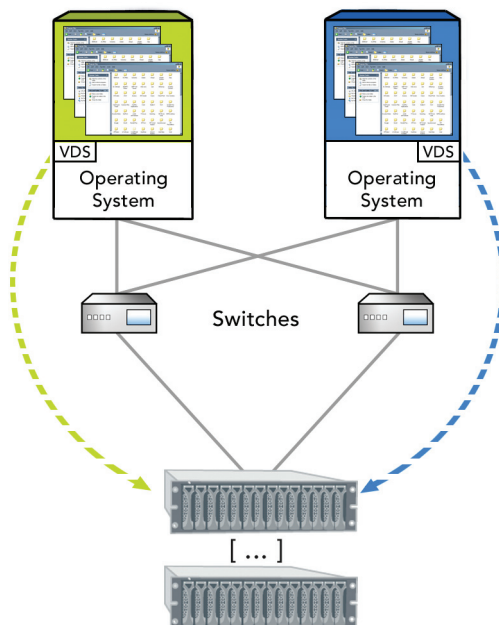
With “Virtual disk” technologies you’ll be able to increase a mailbox size from within your messaging application, or increase a table size from within the database application.

In the past few years, advances that make storage easier to use, manage, and grow have provided tremendous benefits. Storage consolidation was a launching point for various new technologies delivering advanced functionality. The next generational shift that is in process will free storage administrators from handling storage provisioning for applications – instead, applications will be able to request and provision storage for themselves. While today multiple tools are required to add storage to your database, soon the database will be able to take care of that itself.

### ENABLING TECHNOLOGY

In a previous Coffee Break we talked about operating systems becoming SAN aware, and how SAN-aware snapshots using technologies like Microsoft® Volume Shadow Copy Service (VSS) dramatically improve backup operations. Now, with technologies such as Microsoft’s Virtual Disk Service (VDS) in Windows Server™ 2003 R2, operating systems have become aware of basic storage provisioning. Simply put, an application can determine if it needs additional capacity and then request the additional storage directly.

For example, your e-mail and database applications will be written with storage provisioning capabilities that plug into VDS – if they are implemented with VDS-integrated storage, they will be able to add capacity on their own. The administrator can ask Microsoft Exchange to increase a mailbox size, and then the storage array, Windows® OS, and Exchange application will automatically work together to accomplish that. A DBA can ask the Oracle® database to increase the size of a table, and it’s done automatically. If there isn’t enough disk space to do the job, Oracle will inform the administrator of that.



### THE OLD WAY – NOT WORTH THE EFFORT

While it is possible today to provision storage for an application, it’s an awkward and unwieldy solution. The process involves multiple time-consuming steps, requiring individual tools to be installed by the administrator. The administrator must configure the storage array to make additional LUNS available to the operating system, then enable the operating system to recognize the new capacity, then enable the application to recognize the capacity, and then tell the application to adjust to it. It is not surprising with this tedious and usually downtime-dependent process that many administrators try to avoid it by over-provisioning storage to servers and applications up front. While they must endure poor utilization and higher than necessary costs, at least they suffer less application downtime.

This new “virtual disk” technology does not require the application to be omnipotent; it simply requires each layer to be integrated with the virtual disk plug-in. Once the operating system creates a SAN-aware mechanism with plug-ins for applications and storage, the application and storage vendors simply build integration into that API for a holistic storage provisioning process. This enables a completely featured, dynamic, flexible storage environment.

Windows Server 2003 R2 provides these capabilities and the tools to use them. Storage Manager for SANs (SMfS) provides a GUI interface for not only viewing available storage resources in a SAN, but also for adding storage to existing LUNs and creating new LUNs online. The same mechanisms used by SMfS are available to any application, providing a single mechanism for application designers to integrate with SAN storage. The result is “develop once, deploy anywhere” application operations.

#### SERVER-LEVEL STORAGE PROVISIONING

Does your operating system support SAN provisioning for storage arrays across different technologies and vendors?
Is the integration burden for SAN provisioning on your IT staff?
Do you have a standard OS administrator tool for adding storage to existing LUNs and creating new LUNs online?
Can applications in the application management tool provision storage?

#### OS EVOLUTION OFFERS HOLISTIC BENEFITS

VSS enabled an easier backup method that ensured data consistency and better protection; similarly, VDS opens up a new style of application-level provisioning that makes managing capacity much simpler and more user-friendly. By creating this infrastructure, operating system designers have shifted SAN integration from IT administrators or vendor professional services back to the system and storage vendors – resulting in easily deployable and repeatable solutions. Customers get the ability to add capacity to applications easily, and application and storage vendors get the benefit of differentiating their products with minimal effort and expense.

#### SIMPLIFYING NETWORKED STORAGE

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