

# Commentary

August 1, 2008

## Modular Storage and Servers Working Together for SMBs

*SMB IT groups have to balance increased demand for service in the face of application-workload and storage growth with the need to keep budgets within check. Using both server and storage virtualization with a server-storage combination can give the best of both worlds — better service and lower operational costs. Also, tying the server-storage purchase decision together can yield the one-stop shopping benefits of simplicity, scalability, savings, and service. IBM provides an example of how this can work through a broad portfolio of SMB-focused servers (System x and BladeCenter) and storage products (modular arrays, SAN switches, and tape products).*

### The Squeeze Is On SMB IT

IT groups are in a bind. On the one hand, demands for service — such as for availability and responsiveness — continue to increase in the face of ever-more-demanding applications accompanied with the need for more data, both of which result in unfettered storage growth. On the other hand, difficult economic conditions continue to make ongoing cost containment a priority.

For small-to-medium businesses (SMBs), that squeeze is exacerbated because of limited staff depth and levels of specialization that limit their ability to make cost-cutting moves that larger enterprises have available to them because of their larger staffs. The challenge that SMB IT groups face, then, is how to meet higher demands while still keeping costs under control.

### The Time for Action Is Now

Business as usual is not the answer. Following the same cost curve as before to add the necessary servers and storage to meet increasing demands does not meet the cost containment imperative.

Yet not providing the required increased server and storage capacity and performance capabilities is not a realistic alternative. That would be like an electric utility not adding capacity to meet additional demand. Not only does this risk decreased customer and enterprise support, but also competitive disadvantage.

And SMB IT groups do not have the luxury of taking a long time to deliberate, as the problem will only get worse — not better.

### The Action Imperative Is Virtualization

No one technology is a panacea, but the renewed interest in virtualization has

# Commentary

---

come about because of its promise to provide for not only cost savings, but also IT benefits, such as improved manageability. In essence, virtualization is not just the hot topic du jour, but is rather a game-changing approach that enables IT to meet increased service demands without breaking the bank — letting IT breathe again.

## *The Starting Point of Virtualization Is Server Virtualization*

The premise of server virtualization is a simple one. Servers in general are underutilized. Combining multiple instances of operating systems (and their associated applications) onto fewer servers dramatically improves CPU utilization.

A whole slew of benefits potentially ensue. The number of physical servers consolidates into fewer physical servers and that is a direct cost savings. Fewer physical servers translate into less power and cooling required, leading to operational cost savings. Planning for higher availability and for disaster recovery can now be more focused and more cost effective (and, in the case of some SMBs, feasible for the first time) because of the fewer number of physical servers that have to be considered in the planning process. With today's per-server software pricing, software costs are often reduced. The resulting simplification of the architecture often makes life easier for administrators, saving people costs. And the benefits beat goes on. No wonder that even smaller firms have already opted to go the server virtualization route or are seriously considering doing so.

## *The End Point of Virtualization Is Storage Virtualization*

But server virtualization is not the only type of virtualization that an SMB should consider. Storage virtualization also has distinct benefits. Creating a single pool of storage can offer better storage utilization, improved IT administrator productivity, and greater flexibility in meeting the unexpected, i.e. the problems that everyone knows will happen although nobody knows exactly what and when they will be.

Businesses need to squeeze as much operational cost and IT complexity out of their IT infrastructure as possible. Do not stop with only the server half of virtualization if, after careful examination, storage virtualization makes sense.

Many smaller businesses may feel that they do not have enough storage to justify storage virtualization. Yet if a business is big enough to consider server virtualization, should it not also consider storage virtualization? For example, insulating host applications from changes to the physical storage infrastructure can improve application availability. A business does not have to be a large one to justify high availability for its online mission-critical revenue generating application. No, the decision is not only about saving disk drives, but rather about how to manage storage better for the business as well as make life easier for IT.

## **Thinking About One-Stop Buying of Servers and Storage Together**

Businesses have long been able to decouple the buying decision for servers from the buying decision for storage in storage networks. That means that businesses do not have to buy servers and storage from the same vendor, and it

# Commentary

provides IT organizations with a rich set of storage alternatives. However, the richness of choice comes at the price of increased purchase decision-making responsibility.

The famous principle of Occam's Razor — which can be paraphrased as “all other things being equal, the simplest solution is the best” — applies here. Note that this principle does not necessarily mean that you should choose the simplest solution in terms of functionality, but rather the simplest in terms of making a purchase decision.

Two other factors that have to be considered in making a choice are product differentiation and cost. Does one product demonstrate significant differentiation in its functionality or does it offer a significant cost savings? Note that if there are only small differences in either differentiation or cost, other criteria become more important.

In particular, if differentiation and cost differences are small, then the server vendor would seem to have a leg up in the storage purchase decision as well, because a one-stop shop can deliver additional simplicity, scalability, savings, and service (see Table 1).

All other things being equal, the “keep it simple” approach favors one-stop shopping.

## IBM Illustrates How Modular Storage and Servers Come Together

Obviously, IBM has a strong server heritage, but it also has a long and strong storage heritage as well. IBM recognizes the close relationship between servers and storage because

**Table 1: Benefits of the 4 Ss — Tying the SMB Server-Storage Purchase Decision Together**

<b>Benefit</b>	<b>How Benefit Occurs</b>
<b>Simplicity</b>	One-stop shopping for product selection and one touch point for planning, implementation, and ongoing support
<b>Scalability</b>	Vendor offers a wide range of combined server-storage choices that can not only meet current needs, but also leave the necessary headroom to meet future growth requirements. Vendors can tune the servers and storage jointly for additional scalability.
<b>Savings</b>	Administrative and managerial savings through easier admin.-coordination efforts through the product lifecycles
<b>Service</b>	One number to call simplifies problem resolution issues

Source: Mesabi Group August 2008

both are housed with the Systems and Technology Group (STG) organizationally.

How can modular storage and servers from IBM work together to add value to the customer? First, IBM extends the basics of the simplicity, scalability, savings, and service benefits of one-stop shopping through a comprehensive set of server-storage products that are focused on meeting the needs of the SMB market.

# Commentary

Secondly, the ingredient that gets the most out of the server-storage mix is virtualization software. Specifically, virtualization software can tune both server-side processing and storage-side data management in a coordinated way. IBM illustrates how a tighter coupling of the IBM server decision with the IBM storage decision provides a strong alignment of the new virtualization software functions with hardware capabilities.

Moreover, because of its size, experience, and large technology development pipeline, IBM is able to offer some extra benefits in management software, testing, and service.

Let's explore these themes in more depth.

## **IBM Offers a Comprehensive Set of Server and Storage Hardware Choices**

The basic benefits of tying the server and storage purchase decision together seem attractive, as long as Occam's razor applies, but still require proof in the form of actual products and services.

IBM has matched a broad range of server and storage products to the specific needs of SMB organizations. Each business is different so the product set has to be sufficiently broad so that each business can find the mix that meets its requirements.

IBM has identified System x and BladeCenter servers as the servers that are most likely to meet the needs of SMB organizations. IBM has selected a set of disk systems and tape products that work with System x and BladeCenter servers (see Table 2).

On the traditional storage array side, IBM offers a number of modular arrays — the DS3200, the DS3300, the DS3400, and DS4700 Express — as well as a number of switching products — SAN24B-4 Express, Cisco MDS 9124 Express, and SAN16B-2 Express — when the array will be used in conjunction with a storage area network (SAN).

Where a heavy dose of network-attached storage (NAS) is required, IBM offers a series of products that support both NAS and SAN requirements in the same array. That is why they are called unified storage systems. Those systems include the N3300 Express and the N3600 Express.

And, as IT organizations know, tape is far from dead for SMBs where tape is a well-established part of their storage infrastructure. The TS2240 Tape Drive can be used in a standalone mode or in combination with tape library automation — notably the TS3100 Tape Library or the TS3200 Tape Library.

As part of this picture, IBM brings to the table two other strengths — world-class service and R&D commitment. Service is critical to any business. Not only is the quality of service important, but so is its availability — so the fact that IBM is everywhere is comforting. Moreover, IBM has always recognized the continual need to keep its products up to speed for essential business needs, and therefore IBM's never-ending commitment to R&D should also be a comforting factor in any purchase decision.

## **How VMware Server Virtualization and SMB-focused Storage Work Together**

Although it's not the only game in the server virtualization town, VMware is the company that comes to mind when

**Table 2: The Breadth of Storage for System x and BladeCenter Servers**

<b>SMB-focused Products</b>	<b>Focus</b>	<b>System x</b>	<b>BladeCenter</b>
<b>Modular Arrays</b>			
DS3200	DAS using SAS-attached storage up to 14.4TB	X	X
DS3300	iSCSI storage up to 14.4 TB	X	X
DS3400	FC storage up to 14.4 TB	X	X
DS4700 Express	FC storage up to 84 TB	X	X
<b>Associated SAN Products</b>			
SAN24B-4 Express	8 Gbps SAN switch	X	X
Cisco MDS 9124 Express	4 Gbps SAN switch	X	X
SAN16B-2 Express	4 Gbps SAN switch	X	X
<b>Unified (NAS + SAN) Storage Systems</b>			
N3300 Express	Supports NAS file protocols as well as FC and iSCSI block protocols up to 68 TB	X	X
N3600 Express	Supports NAS file protocols as well as FC and iSCSI block protocols up to 104 TB	X	X
<b>Tape Storage Systems</b>			
TS2240 Tape Drive	Half-high (HH) LTO 4 technology at native 120 MB/sec and 800 GB capacity	X	X
TS3100 Tape Library	Up to 2 HH drives; 24 cartridge slots for native 19.2 TB capacity	X	X
TS3200 Tape Library	Up to 4 HH drives; 48 cartridge slots for native 38.4 TB capacity	X	X

Note: There may be minor exceptions in certain categories.

Source: Mesabi Group August 2008

## Commentary

---

talk turns to server virtualization. And VMware makes sure that it is very open and neutral when partnering. Every storage company worth its salt partners with VMware.

But IBM has long been a well-known partner of VMware, and that is reflected in its efforts to make sure that its products work effectively in a VMware environment.

Of course, VMware Virtual Infrastructure 3 runs on VMware ServerProven System x servers or a BladeCenter chassis, which are the most likely IBM server platforms that an SMB would choose.

And networked storage such as IBM's is very important for any VMware implementation. VMware ESX Server features — such as VMotion, Storage VMotion, Resource Pools, Dynamic Resource Scheduler (DRS), and High Availability — require network storage, such as all of the IBM SMB-focused disk systems (with the exception of the DAS-focused DS3200).

To help with both provisioning and with ongoing centralized management of storage, IBM offers the Storage Manager on both DS3000 and DS4000 models. Administrators can use the Storage Manager's Java technology-based Web browser interface to customize and change settings as well as configure volumes. They can also define storage mappings, handle routine maintenance, do performance tuning, and dynamically add new enclosures and capacity to existing volumes. All this can be done without disruption to user access of data.

In addition, IBM also offers a point-in-time snapshot capability (FlashCopy) and logical volume copy capability

(VolumeCopy) on the DS3000/DS4000 models and equivalent products on the N3000 products.

All these capabilities complement VMware Virtual Infrastructure 3 to help make the whole IT infrastructure run better.

### *Working With VMware to Meet Data Protection Requirements*

One area that requires particular attention is the ability to provide data protection from both a local (i.e., operational recovery) and remote (i.e., disaster recovery) perspective. The reason for the increased focus is that more operating system (and associated application) "eggs" are contained in one physical server "basket." Thus, users should emphasize making sure that single-server operational recovery works swiftly — which requires that IT first do backup well and then have a recovery plan in place — and that disaster recovery works, which means extending the operational recovery requirements to a secondary site from which recovery can occur if operational recovery fails.

FlashCopy and Volume Copy, which provide point-in-time snapshot capability for all DS3000 and DS4000 arrays, work with VMware Centralized Backup to eliminate backup windows (since the backup application can be run in the "background" while applications continue to run in the "foreground"). That enables production applications to run longer, which is a good thing, especially if the application is an always-on revenue generator. For data protection, IT can use the IBM products to either improve the ability to recover more rapidly from a logical data protection problem (such as data

corruption) via FlashCopy or likewise for a physical problem (such as multiple hard disk failures) via Volume Copy.

Where more severe physical problems occur (such as an array-destroying fire or hurricane), users can employ Enhanced Remote Mirroring for the DS4700 Express for disaster-recovery failover to a remote site in a virtualized environment. Similar capabilities for operational recovery and disaster recovery such as SnapShot and SnapMirror, exist on N3000 arrays.

### *Using Storage to Manage Better in a VMware Environment*

The storage solution that works in conjunction with VMware has to be able to both scale-out and scale-up. Running into a storage ceiling would be not only disruptive to service levels, but also costly to remedy, so businesses do not want to grow out of what they have. IBM's SMB-focused disk arrays can horizontally-scale to meet the virtual infrastructure plans of an SMB business. Moreover, those arrays deliver high-performance block-level storage that scales with the VMware VMFS3 file system to support the demands from virtual machines and multiple applications.

### **Storage Virtualization Using IBM's SAN Volume Controller Seals the Deal**

If server virtualization is good for a business, does it make sense to stop with the virtualization job half done? After all, the goal is to extract as much cost savings and operational efficiencies as possible. And, as noted above, implementing server virtualization requires dealing with storage-related issues anyway. There is no sense in

coming up with one set of answers now and then reworking them later in light of storage virtualization.

### *IBM Is a Proven Leader in Storage Virtualization*

IBM has a well-proven storage virtualization product that spans all sizes of business, from the SMB to the large enterprise space. The IBM System Storage SAN Volume Controller (SVC) is an in band storage virtualization appliance. Since its launch in July 2003, IBM states that it has been deployed in more than 4,000 SVC systems. An SVC system is composed of a minimum of two nodes, which is a clustered pair of SVC appliances that together constitute an I/O group. Additional I/O groups (up to a maximum of 4) can be added to increase cluster performance and bandwidth.

The reason for the clustering is to increase the availability of the SVC system. IBM has made it a goal to provide SVC availability of 99.999% (which is equivalent to 5.25 minutes of unplanned downtime per year). Calculations across the entire SVC population show that this high goal was achieved for 10 of the 12 months prior to and including March 2008.

### *SMBs May Have More Complex Storage Environments Than They Think*

Now, some SMBs may feel that server virtualization is a good idea, but they don't have a complex enough environment to justify a storage virtualization solution. However, consider for a moment what server virtualization entails. What server virtualization does is consolidate *multiple* applications upon a single (or few) ESX servers. Note that the word *multiple* means that

# Commentary

---

many SMBs have to worry about a number of applications and not just one. That can include a broad range of requirements, such as an online revenue generating application using a database management system, office productivity tools, and Microsoft Exchange as well as custom applications. And each of these has its own storage requirements, which were typically served in the past by different storage systems.

The result is that users need to manage this storage both as a whole and as separate data stores — a more complex task. Moreover, users need to plan for future storage growth, and so need to leave room for additional storage systems to be added. Storage virtualization does this quite nicely. In particular, IBM's SVC is a single management point for managing storage as a single pool, or multiple pools if desired.

### *Thin Provisioning Illustrates a Key Benefit of Storage Virtualization*

Planning the storage requirements precisely is impossible, as future growth requirements cannot be predicted with certainty. One way of handling that unpredictability is through thin provisioning, which SVC calls its Space-Efficient Virtual Disks (SEV) function. With thin provisioning, virtual volumes can be grown and shrunk on demand. IT administrators do not have to worry about forecasting the unpredictable.

Yes, better disk utilization can usually defer the acquisition of new disks, yielding cost savings, but it is also vital to prevent the unnecessary impact on service levels that could occur if an out-of-space condition occurs for an

application (which is especially embarrassing if there is plenty of actual physical storage capacity left). SVC can report on disk usage and set warning thresholds as required.

### *And the Storage Virtualization Beat Goes On*

And SVC provides not only day-to-day operational benefits, but also planning and long-term pluses. With SVC, administrators have the flexibility to create multiple tiers of storage that have different characteristics and can meet different formal or informal service level agreement (SLA) requirements. Since SVC works across a wide variety of heterogeneous storage, an old legacy storage system could be retired to serve as a secondary tier of storage, while one of the SMB-focused IBM systems could take over as primary storage. Note that the migration process that involves both tiers of storage could occur without any downtime to the application or to the user.

In fact, the non-disruptive migration of data alone can often justify a storage virtualization decision. Migration may occur at storage refresh cycles (such as when a lease is up), to move data to a different place so that maintenance can occur without disruption at the old storage locations, or to move data to a more cost-effective tier of storage.

Another question might be: why SVC? After all, there are a number of other good storage virtualization products. However, products from larger vendors are designed for large-scale implementations, and not for use by SMB organizations. SVC applies across all sizes of businesses; that means that SMBs benefit from the robustness and



# Commentary

---

product features that the very largest businesses demand.

A number of smaller vendors offer storage virtualization either in conjunction with proprietary arrays or as standalone software. While these are capable products, IBM can argue the tight integration of SVC with its disk storage products as well as its overall product breadth, R&D resource commitment, and time-tested world-class service and support. Moreover, the capabilities of SVC, such as SEV for thin provisioning, are complementary to what VMware delivers for server virtualization in VMware Virtual Infrastructure 3.

## Little Extras Add Up

IBM offers a number of little extras that individually deliver a benefit and collectively illustrate the value-add that IBM, because of its size, experience, and technological prowess, can bring to the table.

### *IBM Director*

The IBM Director is a suite of software tools that provide a single point of management to control and manipulate an IT infrastructure. IT administrators can use IBM Director to view and track the configuration of systems in detail and to monitor the usage and performance of key components, such as processors, disks, and memory. This family of products therefore gives IT administrators the capability to manage both physical and virtual systems in order to help increase overall availability and help lower IT costs.

IBM Director works with all the SMB-focused servers (System x and Blade-Center) and storage (from the DS3000,

DS4000, and N3000 series of products). Cost should not be a factor in using the IBM Director suite, as it is provided at no additional charge for use on IBM Systems.

IBM Director is the synergistic glue that gives IBM a strong talking point on why one-stop shopping for IBM servers and storage is something that should be strongly considered.

### *Testing*

Product interoperability testing is an important function for all vendors. But only IBM and one other vendor can offer a truly end-to-end storage solution that encompasses both disk and tape as well as backup and restore software. Moreover, IBM tests all of its products, virtualized server as well as virtualized storage to ensure that everything is going to work together.

### *Service and Support*

Everyone is familiar with the high level of support that IBM provides. Support requires both quality of service and responsiveness. Getting what is needed, where it is needed, and when it is needed, requires world-wide capabilities that only a large vendor can supply.

But from an SMB perspective, service and support is also a dollars and cents issue that should factor into the overall TCO for a purchase decision. Just as with a car, a longer warranty is important. IBM offers a 3 year, 24x7 customer replacement unit within the next business day. That warranty is on both hardware and software. Moreover, look at what else goes with the purchase price. IBM throws in Storage Manager, the overall storage software

management tool for the DS3000 and DS4000 products, at no extra charge.

## Conclusion

IT has always had a split personality as far as business is concerned. On the one hand IT is not only a information utility that provides essential services, but also one that has to evolve (new application demands) and grow (handle increased volumes of data) to enable a business to meet competitive pressures. On the other hand, IT is treated as a cost center where the objective is to squeeze out as many dollars as is humanly possible. SMB IT groups are especially impacted, because today they have the same increases in demand demands that larger businesses are seeing without comparable budget dollars to reallocate.

SMB IT groups therefore need to rethink how they should go about their decision-making in order to meet increased service demands with tighter budgets.

One possibility is to couple the server and storage purchase decisions, with one stop shopping from the same vendor. All else being equal (product capability and relative price), one stop shopping simplifies the purchase and service call process, ensures the scalability of chosen

products, and eases coordination efforts throughout product lifecycles.

Another possibility is to combine both server and storage virtualization together to squeeze the most out of operational costs (such as through better utilization of both server and storage) while at the same time improving service levels (such as better availability).

IBM offers a broad portfolio of SMB-focused servers (System x and BladeCenter) and end-to-end storage products (DS3000/DS4700 modular arrays, SAN switches, N3000 unified NAS and SAN arrays, and LTO-based tape products). This comprehensive portfolio simplifies one-stop shopping, but the product also works closely with VMware server virtualization and SVC storage virtualization.

SMBs should see server virtualization as beginning the process of transformation of the SMB IT infrastructure, and storage virtualization as fulfilling virtualization's total promise. Therefore, SMBs who are considering buying servers and storage should give careful consideration to what IBM has to offer.

---

## David Hill

---

Analyst Name: David Hill  
Topic Area: SMB Storage

Mesabi Group LLC  
26 Country Lane  
Westwood, MA 02090  
[www.mesabigroup.com](http://www.mesabigroup.com)

*Mesabi Group LLC is an affiliate of Valley View Ventures that aims to provide thought leadership and sound advice to both vendors and users of information technology. .*

Phone: (781) 326-0038  
email the author: [davidhill@mesabigroup.com](mailto:davidhill@mesabigroup.com)

---

The information contained in this publication has been obtained from sources Mesabi Group LLC believes to be reliable, but is not warranted by Mesabi Group LLC. Commentary opinions reflect the analyst's judgment at the time and are subject to change without notice. Unless otherwise noted, the entire contents of this publication are copyrighted by Mesabi Group LLC, and may not be reproduced, stored in a retrieval system, or transmitted in any form or by any means without prior written consent by Mesabi Group LLC