

IBM: Server and Storage Virtualization

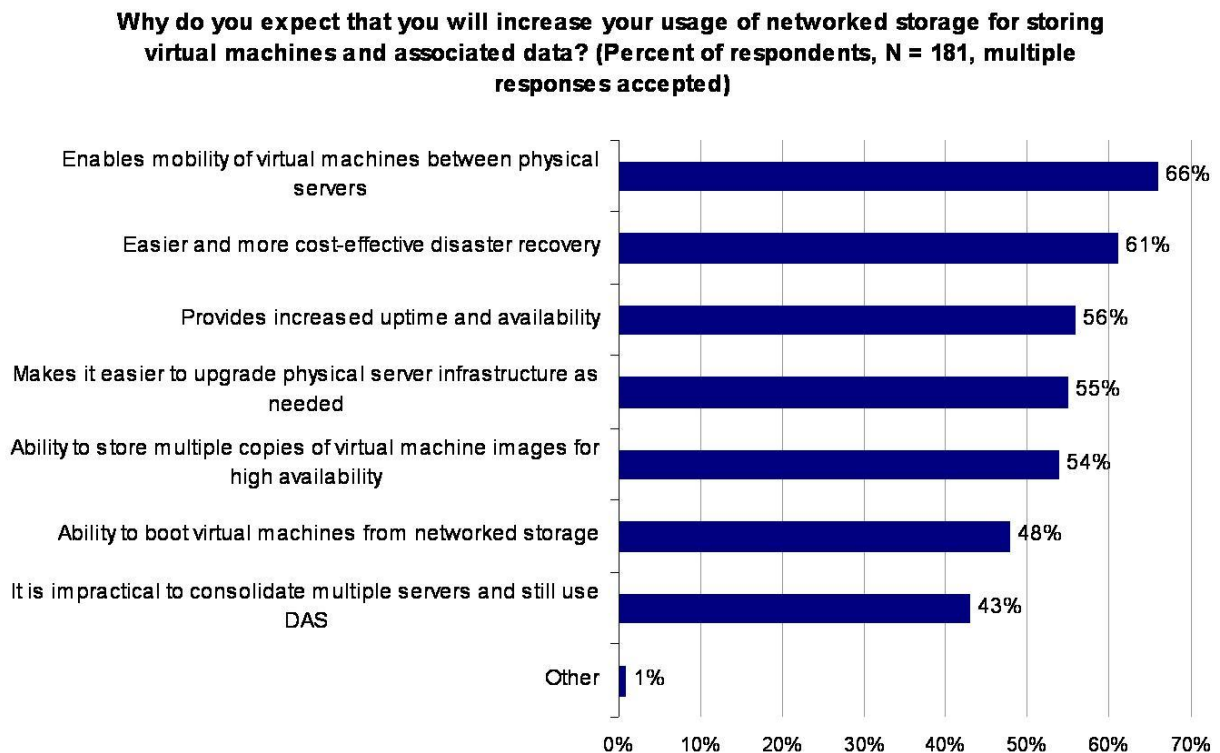
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Author: Mark Bowker, Analyst
With Tony Asaro, Senior Analyst

Abstract: ESG recently completed research on how virtual servers are impacting storage networking. IBM is one of the leaders in server and storage virtualization and they are in a unique position to respond and drive the market.

ESG defines Virtualization as *logical view and control of physical infrastructure*. Its goal is to provide greater optimization, utilization and simplification of that physical infrastructure. We are seeing the value of virtualization clearly manifested on the server side of the data center. Virtual machine technology is becoming pervasive with end-users consolidating physical servers and leveraging the mobility and manageability of virtual machines. It is having a major impact on the data center, storage networking, data protection and disaster recovery.

FIGURE 1. VIRTUAL SERVER IMPACT ON NEW STORAGE SYSTEM ACQUISITION



Source: ESG Research: *The Impact of Server Virtualization on Storage, 2007*

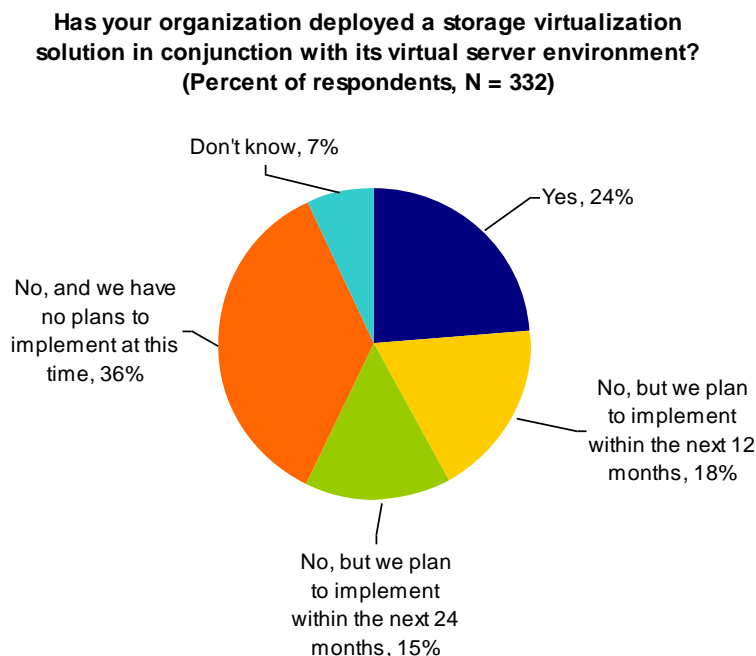
ESG research has found that end-users want to implement virtualized servers on storage networks for a number of reasons (see Figure 1). Once multiple virtual servers are consolidated into a single physical server, it becomes impractical and imprudent to continue utilizing internal storage. The implementation of multiple virtual servers on a single physical platform creates risk, which can be completely mitigated by storing virtual server images and their corresponding applications and data on a reliable storage networking platform.

Maintenance tasks—such as physical server upgrades, the addition of new online applications and the ability to transparently move virtual machines to other platforms based on performance needs—are greatly simplified by virtualization, providing a leap in efficiency. Virtual servers create value in a number of ways, including reduced floor space, reduction in power and cooling and the ability to implement cost-effective and simplified disaster recovery. The benefits are far reaching. End-users are consolidating their servers, which will drive the need to consolidate storage. Server consolidation in turn drives storage consolidation and networking.

Server and Storage Virtualization

As shown in Figure 2, end-users are seeing the value of implementing both storage and server virtualization. A number of server virtualization adopters (24%) also implemented storage virtualization as an integrated solution. Another 33% intend to implement server and storage virtualization solutions within the next 12 to 24 months.

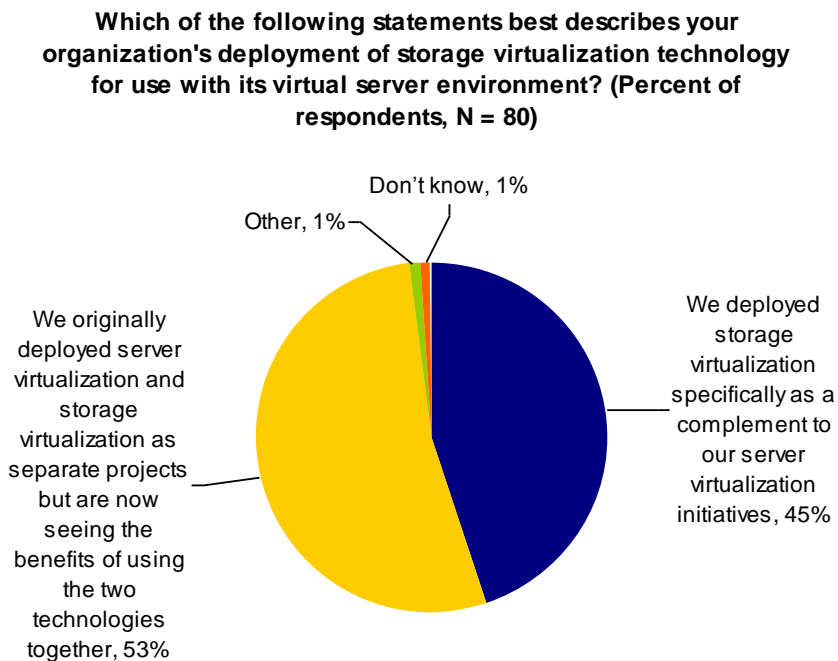
FIGURE 2. SERVER AND STORAGE VIRTUALIZATION IMPLEMENTATION



Source: ESG Research: *The Impact of Server Virtualization on Storage*, 2007

Further, the adopters of both technologies indicate a strong correlation between server and storage virtualization (Figure 3). 45% of the respondents specifically deployed server and storage virtualization solutions as part of the same project and 53% implemented each separately, but now see the benefits of using them together.

FIGURE 3. VIRTUAL SERVER AND STORAGE VIRTUALIZATION CORRELATION



Source: ESG Research: *The Impact of Server Virtualization on Storage*, 2007

ESG research has found that end users that have embraced storage virtualization see clear value in integrating it with server virtualization. The goal of virtualization is to provide logical view and control of physical infrastructure in order to enable greater optimization, utilization and simplification of management. Having only one side of your data center virtualized (i.e. servers) is useful, but does not create efficiencies throughout. The combination of both server and storage virtualization is being embraced by early adopters since they see the value of a highly virtualized data center for both compute and storage.

IBM SAN Volume Controller (SVC)

The IBM SVC is a leading storage virtualization solution with thousands of implementations in mission-critical data centers. The SVC provides a clustered architecture that supports up to 8 nodes in a single cluster in addition to supporting volume management on a long list of heterogeneous storage systems; transparent data migrations; snapshot capability and remote replication. IBM has put the SVC through its paces in terms of testing, quality assurance, application integration, interoperability, performance testing, etc. Additionally, and perhaps more importantly, a large number of end-users are using the IBM SVC in production environments running applications important to their business.

While the server side of the data center is becoming far more virtualized, the storage side is still only semi-virtualized. Today, storage systems for the most part are only partially networked. We have done a great job creating a partial network in which host systems share storage system resources. However, the storage systems themselves share no communication with one another. They are discrete and isolated devices that are networked to host systems, but not to each other. In reality, network storage systems are not fully networked.

As a storage virtualization solution, the IBM SVC networks your networked storage by consolidating the management of multiple storage systems. Additionally, it can move data between different storage systems transparently, providing capacity and load balancing. For example, a data center can have a storage system that is 70% full and another that is 40% full. Moving data between these two systems can be an arduous and cumbersome task that would most likely require a great deal of human resources and system downtime. However, using a storage virtualization solution makes this process transparent—it can be performed with minimal human involvement and requires no downtime. The SVC can perform remote mirroring between heterogeneous storage systems for lower cost and more efficient disaster recovery.

The combination of server and storage virtualization elevates the utilization of the physical infrastructure. As said earlier, the role of virtualization is to get greater optimization, utilization and simplification of physical assets. Virtual machines do this effectively with servers and storage virtualization solutions, such as the IBM SVC, work well with storage systems.

IBM Storage and Server Virtualization

Naturally, server virtualization can be implemented with NAS and SAN solutions without implementing storage virtualization. In fact, our research has found that across the board, the implementation of virtual machine technology drives further NAS and SAN adoption:

- The amount of virtual server storage capacity on the storage networks of early adopters will grow from 60% to 74% over the next 18 months. What this means is that people are reducing the amount of DAS they have and are putting more of their data onto network storage as a direct result of implementing virtual servers.
- We found that 71% of adopters will buy new storage systems. As adopters expand their virtual machine implementations, they also grow their storage networks accordingly (63%), need larger storage systems to accommodate consolidated server data (56%) and want to use storage systems that are easier to manage in their virtual machine environment (48%).
- 51% of adopters implemented remote replication based on their virtual server implementations. This indicates that virtual machines enable disaster recovery due to their mobility versus physical server infrastructure.

IBM has a number of FC, iSCSI and NAS solutions that are already being used in production environments and with end-users that have deployed server virtualization. In fact, IBM is one of the leading server vendors implementing server virtualizations in the market today. Combined with existing storage systems, storage virtualization, and other capabilities, IBM brings a lot to the table for end-users.

ESG's View

The combination of server and storage virtualization makes sense and over time should become requisite in the data center, in one form or another. In fact, the more pervasive that server virtualization becomes the greater contrast it will create with non-virtualized storage environments and the inefficiency of these solutions will become more apparent. Storage networks are not truly networked. Without storage virtualization all of your storage systems are individual systems that do not communicate with one another. The host systems can access any storage system on the network, but the storage systems themselves have no inter-relationship with one another. Storage virtualization networks your networked storage and creates efficiencies that lead to far greater optimization of these important infrastructure assets.

Virtual machine technology is a rapidly pervasive solution that is still only emerging in the market. We are in the first wave of virtualization and it is making a big impact on the market. However, there are additional waves to come. IBM is a total solutions provider that includes data center infrastructure, software and professional services. As such, IBM is in a unique position to provide value to end-users. Technology is not a panacea and with any new solution, there is a great deal of confusion that leads to inefficiencies. End-users need to look towards their vendor partners to help them through these challenges. It is critical that IBM leverage its leadership as a total solutions provider to support the continued growth of virtual machines through this wave and the others that are sure to come. The challenge for IBM isn't integrating virtual machines with its infrastructure or services. Being who they are and doing what they do, it is nearly impossible for anything but success in this arena. However, IBM has a real opportunity to raise the game. This isn't just about virtual machines making it less expensive and more efficient to manage servers, but a new way to implement data center infrastructure that has far reaching implications. IBM is one of the few vendors that can not only respond to where the market is going, but also drive it toward new destinations.