TANEJA GROUP
TECHNOLOGY ANALYSTS

S O L U T I O N P R O F I L E

Five Benefits of IBM System Storage SAN Volume Controller Based on Real World Deployments

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After many years of sluggish market adoption, we believe that storage virtualization has turned the corner and matured to the point where end users are finally deriving tangible business value from a virtualized storage environment. The technology adoption cycle for storage virtualization has proven to be particularly steep and challenging. Over the past five years, the industry has witnessed a Darwinian shakeout as many of the early pioneers have gone out of business or been acquired. Nonetheless, IBM and its System Storage SAN Volume Controller (SVC) have stayed the course and are well positioned to capitalize as the market for storage virtualization expands.

For this profile, Taneja Group conducted interviews with five IBM SVC end users to ascertain the real world benefits that they have realized from SVC and their motivations for deploying the technology. Each of these end users has chosen to make SVC a central part of it storage infrastructure strategy and leverage the technology to support their mission-critical applications. From these interviews, it became clear that storage virtualization has become a core element of the storage strategy of forward thinking end users and that the technology is finally delivering the value that it had promised earlier this decade. In this profile, we briefly introduce IBM SVC, detail the types of end users with whom we spoke, characterize their environments, and then analyze five tangible benefits of storage virtualization that emerged from our interviews.

Meet IBM SVC

IBM is a leader in the storage virtualization market and at present boasts over 2,200 deployments. Launched in July of 2003, IBM System Storage SAN Volume Controller (SVC) is an in band block storage virtualization appliance. The product abstracts the idiosyncrasies of the underlying storage devices and provides a single management point for managing storage as a single pool or multiple pools. From a pool, SVC presents virtualized disks, potentially composed of storage from different vendors. A storage pool simplifies the provisioning of storage to applications and hosts and allows under-utilized capacity to be freed. SVC supports an extensive range of IBM and non-IBM storage listed at www.ibm.com/servers/storage/software/virtualization/svc/interop.html

SVC supports the ability to create a single pool or tier of storage or if need be, to create multiple tiers or pools of storage. Through this approach, enterprises can create multiple storage pools with different characteristics that meet different SLAs and

price/performance characteristics. SVC allows a storage administrator to migrate data from one storage tier to another regardless of whether the storage is from one or multiple suppliers. This migration occurs without any downtime to the application or the user.

Furthermore, SVC acts as a platform for delivering advanced storage applications like snapshots and replication across the entire storage infrastructure. Using FlashCopy (IBM's snapshot technology), Metro Mirror (IBM's synchronous mirroring technology across Metropolitan Area Networks) or Global Mirror (IBM's asynchronous replication capability for replicating data across a Wide Area Network) options, SVC can become the central point for implementing data protection and disaster recovery strategies across the storage infrastructure.

SVC is based on a clustered, redundant, highly scalable architecture. SVC is deployed only in clustered pairs of appliances—each with 8GB of cache—running SVC software. A pair of SVC appliances (or "nodes") is known as an I/O group. In order to ensure redundancy, a single SVC node is not a supported configuration. Adding another I/O group (that is, two SVC nodes) can increase cluster performance and bandwidth. A maximum of 4 I/O groups (a total of 8 nodes) can be added together in a single SVC cluster. Therefore, end users can start small and scale as their storage needs and I/O throughput profile changes over time.

Five Real World SVC Deployments

As part of this profile, we detail five end users who have deployed and used IBM System Storage SAN Volume Controller for their mission-critical storage needs. Taneja Group interviewed each end user as to why they chose SVC and the benefits that they have realized from deploying storage virtualization in their environment.

Broadly speaking, each of these end users has made a significant commitment to storage virtualization and SVC. Each of the end users with whom we spoke have what we consider "significant" deployments utilizing SVC and virtualizing tens of TBs and in several cases hundreds of TBs of production data. Moreover, all of these end users have chosen SVC as the foundation for supporting mission-critical applications, such as databases, ERP, and other revenue producing applications. We think that this speaks volumes about the scalability, reliability, and confidence that these end users have in the IBM SVC product.

Below we detail the five companies that we spoke with and their specific infrastructure environments:

1. **Large Consumer Packaged Goods (CPG) Company.** This CPG company has virtualized over 70% of its storage infrastructure with SVC, amounting to over 160 TB of production and test and development data across two data centers. At present, it has four clusters deployed ranging in size from 2 nodes to 8 nodes. The SVC virtualized SAN

supports mission-critical applications like Lotus Domino, SAP, and many Oracle databases throughout the two locations. SVC has been a central piece of the storage infrastructure since 2003.

2. **Large Automobile Manufacturer.** This Automobile Manufacturer has deployed five SVC clusters each with between 4 and 6 nodes to virtualize over 200 TBs of storage across two locations. For business continuity purposes, the company has created a single SAN spanning the two locations that are only six miles apart. The SVC virtualized SAN supports over 6,000 applications, including web servers, Websphere, Oracle databases, and mission-critical automotive applications. The company has a mix of Linux, Windows, and AIX hosts connected to a SAN populated by almost entirely IBM storage.

3. **Large Insurance Company.** This large insurance company has recently deployed SVC in production across four data centers. The company has deployed four 4-node clusters and is making heavy use of replication to ensure business continuity in the case of an outage.

4. **Midsize Insurance Company.** This $1B revenue insurance company has deployed a 4-node SVC cluster to virtualize 24 TBs of storage. The SVC virtualized SAN supports mission-critical applications such as Lotus Domino, DB2 and SQL Server databases, and file servers. The company has been a thought leader in terms of leveraging virtualization technology on both server and storage sides and creating a truly virtualized data center where server and storage assets can be re-provisioned quickly.

5. **IT Service Provider for State Government Agencies**. This organization acts as the IT services arm to host the infrastructure for five state agencies. The organization elected to deploy SVC three years ago and now has implemented a 3 tier storage environment consisting of over 35 TBs of storage. To date, it has deployed three clusters ranging from 4 to 6 nodes in size. The SVC virtualized SAN supports over 250 hosts and includes mission-critical custom applications and Microsoft Exchange.

Five Real World Benefits of SVC

From out interactions with these end users, a clear pattern emerged in terms of the benefits and business value that these end users are realizing from SVC and a virtualized SAN environment.

Benefit #1: Migrate Data Without Disruption

Unanimously, every SVC end user cited data migration and data mobility without disruption to applications as a key driver and value proposition for deploying SVC. As virtualization has moved from hype to reality, online data migration is a high ROI and pain saving value proposition. End users can easily demonstrate the benefits of online data migration and justify the purchase of SVC based on this usage model alone.

For example, the CPG company purchases all of its storage using lease equipment financing. The company buys all of its projected storage capacity for the next year in December and then must migrate data off old equipment coming off lease during January and February. Each year, they replace between 40 to 100 TBs of capacity. Before SVC, this migration process required up to 2 man months of manual effort. However, with SVC deployed, the CPG company has compressed migrations to less than two weeks. By shortening the overlap between new and old equipment, the CPG company drives hard dollar savings each year to the bottom line.

Another SVC end user making heavy use of online data migration is the large automobile manufacturer. Like the CPG company, they finance most of their storage equipment and capacity needs using leasing and lines of credit. However, the main driver for deploying SVC initially was their desire to standardize on a single storage supplier. To that end, they deployed SVC to migrate away from EMC storage that was coming off lease and move to a tiered storage model based on various types and models of IBM storage.

In addition to the benefits of the initial migration, the automobile manufacturer makes heavy use of the online data migration capability to support planned outages without downtime and to promote and demote data among storage tiers. The automobile manufacturer uses SVC to migrate data off a storage system before scheduling it for maintenance and upgrades. By enabling the non-disruptive movement of data, SVC allows the IT department to perform the maintenance at any time during the day, instead of a specified maintenance window. Secondly, SVC's data migration capability is integral to the automobile manufacturer's storage tiering strategy. SVC allows the storage administrators to promote data from more cost-effective storage to higher performance storage or vice versa. This flexibility allows the administrator to optimize their storage infrastructure to the needs of the business without lengthy, disruptive migrations.

Benefit #2: Improved Storage Utilization

The end users with whom we interviewed attested that they saw their storage utilization rates gradually improve as they migrated to a virtualized SAN environment powered by SVC. The State Government service provider, the CPG firm, and the large insurance company all cited improved storage utilization as a key justification and benefit for deploying SVC. From our findings, we have found that end users see their storage utilization increase from between 25% and 50% to over 75% as a result of deploying storage virtualization technology. Before implementing SVC, many of the firms stated that they had over provisioned their storage environments to avoid costly downtime and that they lacked strong central controls to manage capacity effectively. With SVC, they were able to streamline storage provisioning and allocate capacity when and where it was needed.

Benefit #3: Single Point of Storage & Data Protection Management

SVC end users sourcing storage from multiple vendors or even from a sole supplier

see tremendous value in utilizing SVC as the single control point managing storage and data protection policies in their environment. Clearly, storage virtualization abstracts the idiosyncrasies and individual management commands and interfaces of each vendor's storage systems. However, the SVC customers that are pursuing single source storage strategies also reported benefit from a single control point. Even though these end users have sourced their storage from a single vendor, they have deployed multiple types and models of a single vendor's storage from the midrange to the high end systems, resulting in different management interfaces and tools across their portfolio of midrange to high end storage. Therefore, they realize the same benefit of a single control point that end users with heterogeneous storage environments experience.

Above and beyond unified storage management across storage devices, end users also realized value in utilizing SVC and its replication and mirroring capabilities across all devices and locations. Given the fact that all the end users with whom we spoke were supporting mission-critical applications across multiple locations, many of them relied heavily on replication and mirroring technologies in SVC to synchronize and protect data against a disaster or site outage. For example, the CPG firm, large insurance company, and state government service provider all had deployed SVC clusters in multiple data centers and were replicating a subset of the data between the sites for disaster recovery purposes. In other cases like the automobile manufacturer, the SAN was stretched across two data centers six miles apart. Regardless, a common management interface and control point made what is already a difficult storage task easier and reduced the chance of operator error.

Benefit #4: Path to Tiered Storage

The SVC end users with whom we spoke viewed SVC as an integral component of facilitating and supporting a tiered storage environment. In addition to the online data migration capabilities, SVC enables these end users to create pools or classes of storage that can be allocated to specific application data. The end users with whom we spoke had developed advanced methodologies for defining and managing these classes of storage. Ultimately, these users cited cost reduction as the primary driver for adopting a tiered storage strategy. Each of these end users recognized that a "one size all" approach to storage was inefficient and did not mesh with the fact that each application had different storage SLAs and performance requirements.

For example, the state government service provider used SVC to create a three tiered storage strategy. As a service provider, the organization had to maintain SLAs around the availability of the SAN, while keeping costs in check. SVC was the key control point for implementing and managing the classes of storage.

The service provider created separate storage pools and assigned capacity to each pool. To that end, they erected a three tier environment where tier 1 consisted of IBM ESS high end storage, tier 2 consisted of IBM DS 4000 controllers with Fibre Channel disk, and tier 3 was EMC Centera storage for

regulatory compliance. The service provider used SVC to virtualize tier 1 and tier 2 storage and promote and demote data between these two tiers and used custom procedures to migrate data to EMC Centera for long term compliance archival. Moreover, the service provider is considering adding a low cost capacity storage tier utilizing midrange storage and SATA drives to its environment in the near future. By leveraging a tiered storage model, the service provider could meet differing storage SLAs by application, yet still keep costs down.

Benefit #5: Reduced Storage Provisioning Times

Many of the end users with whom we spoke mentioned that SVC helped them streamline and compress their storage provisioning times and process. By reducing the time to provision storage, SVC helps reduce the Operating Expenditures (OPEX) portion of storage management– typically 3-4X the amount of the initial storage purchase. Given the rapid growth in capacity in their environments, these storage administrators welcomed this added efficiency because it allowed the company's infrastructure to respond quicker to the business needs and freed them up to focus on more strategic storage issues, instead of manual provisioning tasks.

The CPG firm and automobile manufacturer are representative of the tangible benefits derived from reduced storage provisioning times. For the CPG company, SVC dramatically reduced the manual steps to provision storage in their environment. Before SVC, the capacity of each new storage system would be pre-carved into 32GB LUNs. However, since they were doubling capacity year over year, creating standardized LUN sizes for each new array became unworkable and too labor intensive. The process scaled fine when the firm was dealing with several arrays, but did not scale well as the number of systems and capacity increased. With SVC, the CPG company can now add new capacity to a pre-existing pool of storage and create a virtual volume of any size automatically without any manual intervention. Ultimately, SVC has allowed the CPG company to scale its storage infrastructure without increasing headcount dramatically.

In the case of the automobile manufacturer, SVC allowed them to compress the storage provisioning time from 6 hours to under 1 hour. By decreasing the provisioning time, the storage infrastructure has become more responsive to the needs of the business and allowed the storage administrators to focus on strategic storage issues.

Taneja Group Opinion

Real world customers who are using the technology as an integral component of their infrastructure are the ultimate barometer of the success or failure of a technology, like storage virtualization. For the last couple of years, the hype and hyperbole surrounding storage virtualization exceeded the number of deployments and the business value being delivered by the technology. However, that is changing.

IBM SVC has proven its mettle and emerged as a leader in the market. From our interactions with SVC users, the technology is

adding demonstrable value to their SAN environments. Each of the end users had carefully scrutinized their purchase of SVC and justified the investment based on tangible metrics for improving storage management. Unlike the early days of storage virtualization where the business value was undefined, these end users had spent considerable time rationalizing their purchase and understanding the value of a virtualized environment.

From our vantage point, we see three crucial keys to IBM's success – a comprehensive product capability designed for the enterprise, a device support matrix that is second to none, and the backing of IBM Global Services and a large army of IBM Business Partners.

What strikes us as most impressive from our interactions with IBM SVC end users is the far reaching and varied impact that SVC has had on their storage operations. Unanimously, all the SVC end users cited online data movement without disruption as being a key enabling capability that provided greater flexibility and agility to managing their storage environment. Furthermore, it became clear to us that SVC was the means for many of these customers to implement sophisticated tiered storage environments and reduce their storage provisioning times. Clearly, SVC had become a valuable addition to storage infrastructure.

In general, end users believed that SVC enabled their storage operations to become more responsive to the lines of business and deliver a higher level of service. From our perspective, that is the ultimate litmus test of a successful product and technology.

Moreover, the quality and type of these customers speak to the maturity of storage virtualization and the success of SVC in particular. Three of the five companies with which we spoke were Fortune 50 organizations and all of them relied on SVC as the focal point for meeting the requirements of their most important, mission-critical applications. These were mainstream enterprises with mainstream problems and challenges. SVC was an excellent fit for them.

Based on our interactions with SVC end users, we can unequivocally say that if you are evaluating storage virtualization technology, you should put IBM SVC on the top of your list. IBM has proven its product in the market and emerged as a leader in the storage virtualization industry.