ITG Executive Summary

VALUE PROPOSITION FOR IBM SYSTEM STORAGE: COST/BENEFIT CASE FOR SAP DEPLOYMENT IN MIDSIZE INSTALLATIONS

Challenges

It is a time of unprecedented challenges for the SAP world. Recent SAP documents and statements have variously referred to the need to maintain business momentum in "challenging times…hard times…perilous times…tough times…volatile times…turbulent times."

Economic conditions have led many organizations to adopt conservative strategies that focus on cost cutting. But other challenges remain. These include globalization, competitive pressures, shifts in market and competitive structures, new regulatory requirements and the growing complexity and volatility of business environments.

For many users, the evolution of the SAP solution portfolio presents opportunities to meet short-term challenges in ways that will enable long-term growth and enhance competitive performance.

Compared to the SAP ERP solutions of an earlier era, the company's new Business Suite 7 portfolio is functionally broader, more flexible and more diverse. Its scope has expanded beyond transactional processes to address new variables such as the way in which information is used and the effectiveness of collaboration with customers and partners, and within the business itself.

With deployment of Business Suite 7, the SAP environments of midsize users can become as complex as those of their large corporate counterparts. Even small organizations are now adopting latest-generation tools for business intelligence (BI), analytics, marketing and sales automation, forecasting and planning, collaboration, e-commerce and other applications that were once the domain of Fortune 500 companies.

The value of new capabilities will depend, in no small measure, on the underlying system infrastructures that support them. If these infrastructures are effective, it will be possible to increase competitiveness and operational excellence without excessive growth in costs and complexities.

Challenges posed by storage resources are often greater than those of other segments of system infrastructures. Organizations must deal not only with increasingly diverse workloads and pervasive demands for data access, but also with annual capacity growth rates that are routinely in the 30 to 50 percent range, and often higher for individual applications.

This report is about meeting these challenges. Specifically, it looks at the role that IBM System Storage solutions may play in creating effective storage infrastructures that support SAP environments in midsize organizations.

The following sections outline the requirements for an effective SAP storage infrastructure in three critical areas – functional capabilities, cost-effectiveness, and integration and optimization – and show how IBM System Storage offerings can help to meet these.

Capabilities

An effective SAP storage infrastructure requires four main sets of components: (1) storage platforms; (2) software tools for point-in-time copy, backup and recovery, archiving and content management, business continuity, storage infrastructure management and other functions; (3) cross-platform virtualization capabilities; and (4) storage area network (SAN) integration.

IBM System Storage offerings provide all of the components necessary for a state-of-the-art SAP storage infrastructure. Many have been customized to meet SAP-specific requirements.

The overall IBM System Storage portfolio is illustrated in figure 1.

Figure 1
IBM System Storage Offerings for SAP Deployment
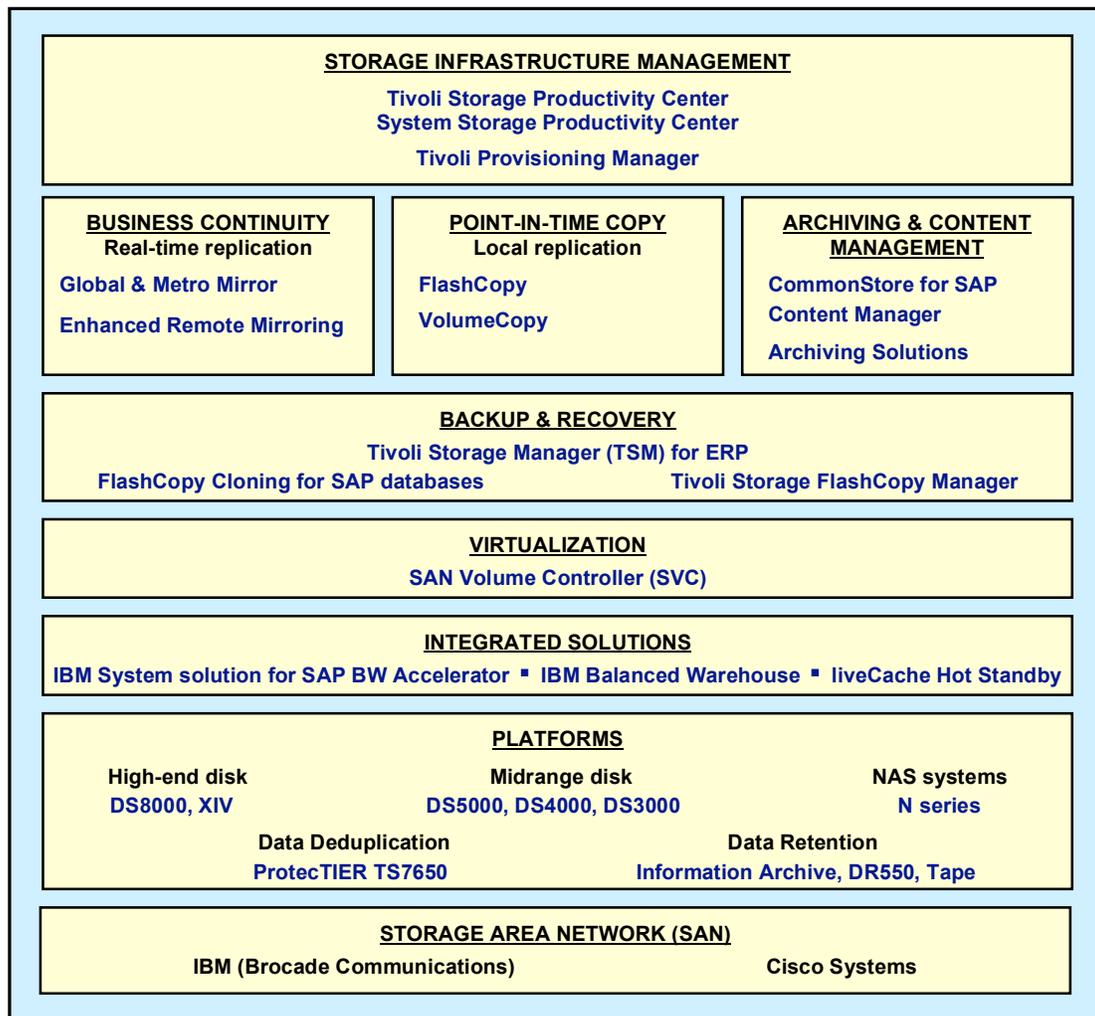
Key components of this portfolio include:

- *Platforms*. IBM disk systems range from the high-end IBM System Storage DS8000 to entry-level DS3000 systems designed for small business, departmental and remote site use.

  The flagship IBM midrange disk system, the System Storage DS5000, has enjoyed strong demand among SAP users since its introduction in August 2008.

The DS5000 has been described as a "game-changer." It not only demonstrates industry-leading performance for a wide range of workloads, but also features innovative design concepts that are designed to allow for growth and expandability well beyond the four- to five-year lifecycles that are the norm for most present-day disk systems.

DS8000 and DS5000 systems incorporate a number of new technologies, including support for solid state drives (SSDs), disk-level encryption and (in the case of DS8000 systems) thin provisioning.

The IBM XIV Storage System has also enjoyed strong acceptance among SAP users. Its innovative, low-cost architecture and ease of administration have made it popular not only for performance- and availability-sensitive Tier 1 applications, but also for Tier 2 and in some cases Tier 3 applications. It has proved highly cost-competitive in all of these roles.

IBM offers a parallel set of System Storage *N series systems*, which are primarily employed for file serving using network-attached storage system (NAS) protocols. Common Internet File System and Network File System (CIFS-NFS) are supported. N series systems are accompanied by an extensive suite of software tools for data protection, restore, availability, retention, compliance and other functions.

Among SAP users, N series offerings typically support distributed Microsoft Windows Server and SQL Server environments. They are also commonly used in smaller installations that do not employ SANs.

The IBM portfolio also includes the new IBM Information Archive and earlier System Storage DR550 data retention systems; a variety of tape offerings ranging from mainframe-class virtual tape servers to midrange and low-end systems; and IBM System Storage ProtecTIER TS7650 data deduplication systems, which offer the potential to significantly reduce backup costs.

- *Software*. IBM platforms are complemented by a full suite of software, including industry-leading tools for such functions as point-in-time copy (FlashCopy, VolumeCopy), archiving and content management (CommonStore for SAP, IBM Content Manager and others), and backup and recovery (Tivoli Storage Manager family).

  In addition, IBM offers two solution sets for real-time replication for business continuity (disaster recovery) purposes. High-end IBM Global Mirror and Metro Mirror offerings for DS8000 systems support high-volume systems for many of the world's largest SAP users.

  For midrange users, Enhanced Remote Mirroring solutions for DS5000 systems provide comparable capabilities at lower price points. Enhanced Remote Mirroring solutions are also supported for earlier IBM DS4000 systems.

  Storage infrastructure management services across all platforms and software tools are provided by the Tivoli Storage Productivity Center suite, which may interface to higher-level IBM Tivoli solutions for enterprise service management. For example, Tivoli Provisioning Manager may be employed to automate a wide range of database, system and storage administration tasks.

- *Virtualization*. The IBM System Storage SAN Volume Controller (SVC) is – by a wide margin – the industry's most widely used storage virtualization solution. SVC is a recognized leader in performance, as well as in the number of IBM and third-party platforms and software tools it supports. Many large SAP users have successfully deployed it.

In contrast to some competitive approaches, which provide virtualization only within single disk system frames, SVC offers network-based virtualization. Its services can be extended across heterogeneous disk systems, enabling users to increase capacity utilization, consolidate systems and simplify administration for a wide range of IBM as well as non-IBM platforms.

Organizations may also take advantage of IBM Global Mirror and Metro Mirror offerings across all supported storage systems.

- *Integrated solutions*. IBM offers a set of integrated, application-specific hardware and software solutions for SAP users.

  These include the IBM Systems solution for SAP NetWeaver Business Warehouse (BW) Accelerator and the IBM liveCache hot standby solution for SAP Advanced Planning and Optimization (APO) systems.

  IBM InfoSphere Balanced Warehouse solutions, which incorporate preconfigured servers, storage and networks for high-performance business intelligence (BI) applications, may also be employed in SAP environments.

- *Storage area networks*. IBM markets, installs and supports a range of SAN solutions, including enterprise-class SAN directors and routers, and entry-level and midrange SAN switches supplied by Brocade Communications Systems (offered under the IBM logo) and Cisco Systems.

Moreover, there is a further level of capability. The overall performance, functionality and cost-effectiveness of a storage infrastructure depend not only upon individual hardware, software and network components, but also on the manner in which these are integrated and optimized.

From this perspective, the strength of the IBM System Storage portfolio is not simply that all requirements are addressed. It is also that they are addressed in a consistent and integrated manner.

Cost-effectiveness

Cost Variables

The business criticality of SAP solutions means that, for most organizations, it is not realistic simply to target cost reduction. Inexpensive solutions may impair quality of service, with bottom-line impacts for businesses that may more than cancel out IT cost savings.

Equally, however, there is no reason to spend more than is necessary. Adoption of "best practice" techniques in such areas as system design, consolidation, application development and support, and operating efficiency has become the norm among SAP users. The objective is to be cost-effective.

There are a number of reasons to pay special attention to storage costs. One is that storage volumes continue to grow rapidly. Some applications, such as BI and records retention for business and compliance purposes, are experiencing exceptional growth.

The increasing breadth and complexity of SAP solution portfolios, adoption of new "informational" tools, organic database growth, and increasing cross-system replication volumes mean, however, that storage growth has become pervasive across the entire SAP environment. Unicode adoption is causing further acceleration – the industry norm is that Unicode transitions increase disk capacity by 30 percent or more.

For these reasons, any strategy to increase the cost-effectiveness of storage infrastructures must address the full range of variables that affect overall costs over multi-year periods.

These include not only initial acquisition costs, but also costs of system upgrades, along with hardware maintenance, software support, storage administration personnel, facilities (including data center occupancy and energy consumption) and other recurring items.

Allowance for these variables may have a significant impact on costs for different platforms. This may be illustrated by comparisons of overall three-year costs for Hewlett-Packard and IBM disk systems presented in this report.

Comparisons are based on three composite profiles of disk system installations in midsize life sciences, media and manufacturing companies employing a variety of SAP solutions. In calculating costs, allowance was made for annual capacity growth rates between 10 and 50 percent, depending on applications and installations.

Additional information on profiles, configurations and cost calculations may be found in the Detailed Data section of this report.

Costs are compared for latest-generation HP StorageWorks Enterprise Virtual Array (EVA) systems, and IBM DS5000 and XIV systems for different sets of applications in the same installations:

- **Core business systems**. Three-year costs for use of HP EVA and IBM DS5000 systems were compared for high-end systems requiring the highest levels of performance, availability and business continuity.

   These included enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM) and other systems.

- **Other applications**. Three-year costs for use of HP EVA and IBM XIV systems were compared for a broader range of Tier 1 and Tier 2 systems.

   XIV systems have also been deployed by many organizations to support core business systems comparable to those upon which EVA and DS5000 cost comparisons are based.

Comparisons are summarized below.

HP EVA and IBM DS5000 Systems

As figure 2 shows, costs for DS5000 systems averaged 21 percent less than those of EVA equivalents.

Figure 2
**Comparison of Three-year Costs for HP EVA and IBM DS5000 Systems:
Averages for All Installations**

In this presentation, system costs include hardware and software licenses, while maintenance/support costs are for hardware maintenance and software support. These categories are employed to correspond to pricing for XIV systems featured in the second set of cost comparisons discussed below.

Comparisons include costs of HP and IBM hardware, as well as license and support costs for operating systems and business continuity, point-in-copy, and access path management tools. Maintenance/support costs are for 24x7 coverage of hardware and software, net of applicable warranties.

HP EVA systems include latest-generation 8400, 6400 and 4400 models configured with HP Virtual Controller System (operating system), Command View (system management), Business Copy (point-in-time copying), Continuous Access (business continuity) and SecurePath (multipathing) software.

DS5000 systems include DS5100 and DS5300 models equipped with IBM DS Storage Manager (operating system and system management), FlashCopy and VolumeCopy (point-in-time copying), Enhanced Remote Mirroring (business continuity), Redundant Disk Array Controller (multipathing) and Host Access software.

Lower DS5000 costs are due to a number of factors. These include higher performance, which contributes to lower DS5000 hardware costs (smaller, less expensive DS5000 models are able to handle the same workloads as larger EVA equivalents), and greater configuration flexibility (fewer drives are required to provide redundancy) as well as to differences in software packaging and pricing. Facilities costs are also lower for DS5000 systems.

HP EVA and IBM XIV Systems

Differences in three-year costs between HP EVA and IBM systems are more striking. As figure 3 shows, costs for use of XIV systems average 60 percent less than for EVA equivalents.

Figure 3
**Comparison of Three-year Costs for HP EVA and IBM XIV Systems:
Averages for All Installations**
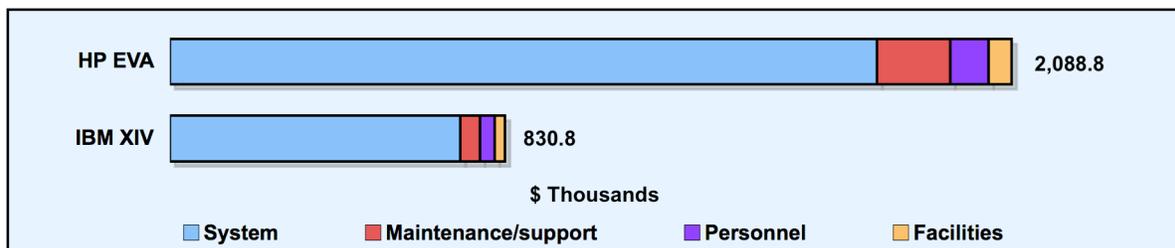
For these comparisons, HP EVA models and software stacks are the same as described above, except that HP Continuous Access software is not employed.

EVA and XIV platforms represent significantly different architectures, and their respective vendors have adopted widely varying system packaging and pricing models.

EVA systems are built around a conventional midrange disk systems architecture, and employ Fibre Channel (FC) or, for applications requiring lower performance levels, Serial ATA (SATA) drives. Like most vendors, HP offers separately priced hardware, software, maintenance and software support options.

The XIV system's parallel grid architecture allows use of commodity hardware components, in particular SATA drives, to deliver high levels of performance for comparatively low costs. The core principle is that parallelism allows the totality of system resources to be exploited in a highly efficient manner, which compensates for the performance limitations of individual components.

The XIV system is offered by IBM in bundled configurations with between 27 TB and 79 TB of usable capacity. Bundles include hardware and a suite of software that includes the XIV operating system and tools for remote replication, snapshot copying, data migration, multipathing, host connectivity and system management functions. Hardware as well as software maintenance is offered for a single price.

XIV systems maintenance and, for EVA systems, hardware maintenance and software support costs are again for 24x7 coverage over a three-year period, including allowance for applicable warranties.

The XIV system also benefits from high levels of system integration and automation that translate into lower levels of storage administration staffing, while use of SATA drives as well as other XIV capabilities result in lower power consumption than for EVA systems.

In all comparisons for all platforms, costs for hardware, software, maintenance and software support for all platforms are based on "street" prices; i.e., discounted prices actually paid by users.

Integration and Optimization

Infrastructure Mandates

Choices of disk systems may materially affect the costs of an SAP storage infrastructure. There is also, however, a larger cost dimension.

The overall costs of infrastructures supporting SAP solutions are materially affected by their design and implementation. High levels of integration and optimization, extensive automation, and effective cross-infrastructure management tools and practices can result in greater cost-effectiveness than if requirements are addressed in an ad hoc manner with "mix and match" combinations of hardware and software.

For example, if integration tasks are not adequately addressed by vendor offerings, organizations will be obliged to invest more heavily in custom services to achieve the same result. The costs and difficulties of supporting mixed software complexes over time may also be greater.

A poorly optimized infrastructure will affect other costs. Low capacity utilization will increase costs for hardware and for software, particularly when offerings are priced on a per terabyte basis, and may result in excessive energy consumption. Lower staff productivity will escalate personnel costs.

The creation of an efficient storage infrastructure, however, cannot simply address costs. Organizations must also ensure that adequate levels of functionality, performance and quality of service – including such variables as availability, recoverability and security – are delivered not only to support current SAP solution environments, but also to enable their future evolution.

The core challenge is to achieve all of these objectives – which is the goal of the IBM Information Infrastructure strategy.

Information Infrastructure

The IBM Information Infrastructure initiative, announced in 2009, is a subset of the company's broader Dynamic Infrastructure strategy, which extends across the company's entire portfolio of product and service offerings.

The Information Infrastructure initiative combines IBM storage offerings – including the products and solutions described in this report – with customized requirements assessment, infrastructure design and implementation services. The objective is to deliver solutions in four primary areas, summarized by the company as Compliance, Availability, Retention and Security (CARS).

A key IBM focus has been to apply new technology to these areas. For example, the IBM XIV system offers the potential for significant reductions in acquisition as well as operating costs for disk systems; IBM Information Archive solutions address key compliance and retention requirements; and IBM Tivoli solutions and advanced encryption technologies may be employed to enhance information security. Many other such examples might be cited.

Energy efficiency remains an IBM priority. Use of SATA drives and of SSDs in multiple IBM systems offers the potential for lower energy consumption. ProtecTIER devices offer a similar potential for backup and archival storage. More generally, the company continues to build industry-leading energy efficiency features into all of its storage systems.

The Information Infrastructure initiative also addresses the need to better synchronize system processes for servers and storage systems. For example, performance-related functions are closely optimized across z/OS mainframe and DS8000 systems. A high-end business continuity solution set built around IBM Metro Mirror and Global Mirror exploits the strengths of both platforms.

The IBM Global Services (IGS) organization also offers customized integration and optimization of SAP enterprise infrastructures incorporating servers, storage systems, software and networks.

IBM IT Optimization for SAP Business Suite solution consists of product and service offerings that enable the creation of common, organization-wide services for service-level management, provisioning, system automation, data management and movement, financial management and other functions. These extend across IBM server and storage platforms as well as software.

IBM IT Optimization for SAP Business Suite solution has been implemented for a number of large SAP user organizations. Implementation is customized to meet the requirements of individual customers.

These capabilities are relevant to the needs of organizations that are undertaking SAP Business Suite deployments, as well to those that continue to employ R/3 Enterprise systems.

Conclusions

The business value of SAP deployment is realized through application solutions and through the business transformations they enable. However, the extent to which this value will be realized will depend in no small measure on the quality, functionality and cost-effectiveness of underlying platforms, and on the manner in which these are integrated and optimized.

There are many vendors of storage products and services. However, few can deliver state-of-the-art solutions that address all of the major requirements for a storage infrastructure supporting complex SAP landscapes. Moreover, in designing and implementing such an infrastructure, there are even fewer who can draw upon extensive skills and experience in all required areas of competency.

Among these, IBM is the obvious leader.

Additional Information

This ITG Executive Summary is based upon results and methodology contained in a Management Brief released by the International Technology Group. For copies of this Management Brief, please email requests to info-itg@pacbell.net.

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