IBM System z Storage Management Strategy

IBM System z Storage Management Strategy

IBM provides a rich set of System z® storage management solutions to help IT organizations address today's enterprise challenges that include the following:

- Mitigating operational risk
- Rising labor costs
- Growing variety and volume of data
- Increasing complexity
- Rising rate of change

Organizations benefit from a comprehensive management solution that satisfies business demands such as information availability, operational stability, and increased productivity while maintaining continuity of business services. This paper provides an overview of the IBM System z Storage Management strategy. The strategy ensures existing and future investments are well positioned to satisfy growing business demands, leverage existing system management assets, and create greater IT returns that result in lower operational risk and improved business insight. Details are provided about each layer of the IBM System z Storage Management solution:

- Process management
- IBM Service Management foundation
- Operational management

The paper uses the term "System z" to refer to z/OS®, OS/390®, z/VM®, and Linux operating system platforms running on System z hardware. Linux on System z is vital to providing a runtime environment for heterogeneous workloads in the enterprise. However, the focus of this paper is the z/OS and z/VM operating system platforms.

To help the reader obtain more information, the paper provides links to the internet within the text and in a section titled "Where to Get More Information."

The Need for Storage Management

The z/OS operating system is justifiably renowned for its ability to manage and provide thousands of users secure access to massive amounts of business critical data. Businesses are looking for ways to manage storage even better, and to recentralize scattered, distributed, and often unsecured information without compromising business flexibility. There are sophisticated, adaptable tools and technologies available for z/OS, and customers can choose from among a rich set of state-of-the-art capabilities from IBM z/OS Storage Management to address their exact needs.

Figure 1 illustrates common business challenges, as cited by IT organizations that underscore the need for comprehensive storage management. The following sections summarize industry trends that create demand for capabilities provided by the z/OS operating environment and require IBM z/OS Storage Management to perform "heavily lifting" for IT organizations.

Mitigating Operational Risk

For decades, the z/OS operating system has provided the program execution environment for the most mission-critical business application workloads in a large variety of industry sectors around the world. Providing the most reliable, most secure, and most available runtime in the industry, the native z/OS operating environment ensures data requirements scale to the needs of the business.

Businesses today must secure mission critical data and keep customer data private. System z leads the industry in protecting enterprise data and managing storage in ways conducive to mitigating business risk. z/OS data is protected from unethical hackers by storing it in secure, centralized IT infrastructure and encrypting it end-to-end in the enterprise: in the database, over the network wire, in the tape hardware and in the disk hardware (per a future statement of direction by IBM). Encryption is based on security policies and key management ensures managed access to data over time.

Reliable access to z/OS data is paramount for business financial performance. For example, Governments levy fines on financial institutions if large transfers of funds are delayed because currency markets can be affected by abnormal fluctuations. Similarly, businesses can lose substantial income opportunity due to IT problems that prevent high performance credit card transactions from occurring.

IBM z/OS Storage Management provides performance and availability monitoring of all components that a transaction depends on: z/OS operating system; CICS®, IMS[TM] and DB2® for z/OS middleware;
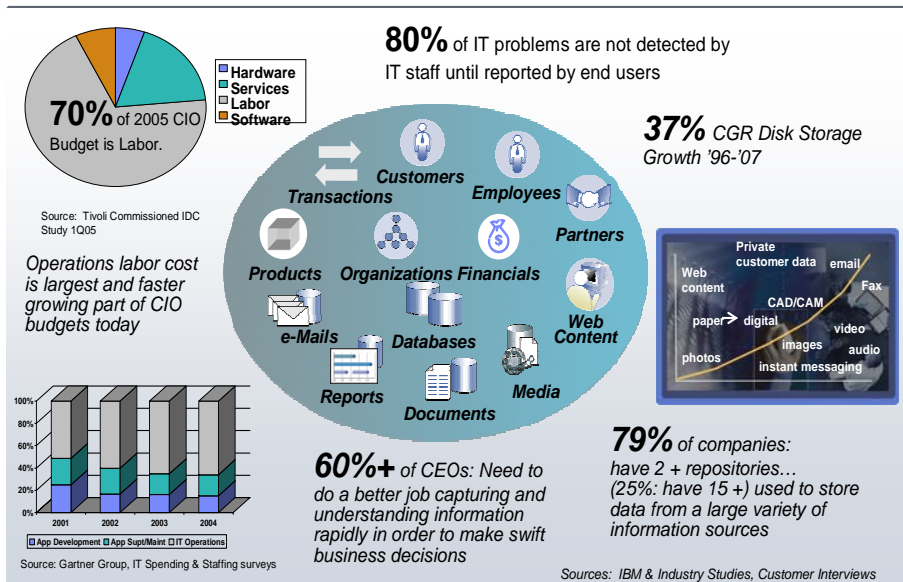

Figure 1 Storage Management Challenges

IO subsystem, disk subsystem, tape library, SMS managed data, ABARS, and so on. Operational risk associated with storage IT infrastructure functional failures or poor performance is lowered by detecting potential problems before they occur in the IT operating environment.

Rising Labor Costs

The pie chart in Figure 1 illustrates that 70% of a CIO budget is used for labor costs today. Within this labor budget, IT staffing and IT spending surveys by the Gartner Group indicate that costs for operations labor is the largest and fastest growing portion of budgets. Rising IT labor costs impact both growth and productivity. Studies show that about 70% of IT budgets are spent on labor to maintain existing levels of service, leaving only 30% to develop new applications.

IT organizations with a System z focus must also contend with a maturing population of IT staff with System z skills. z/OS applications have been developed and deployed using System z IT infrastructure for decades. Mature IT processes have emerged that depend on proprietary scripts, utilities or other custom built tools. Cost effective z/OS storage management provides automation that is needed to replace time consuming manual tasks or proprietary solutions. IT organization's investment in

automation will help businesses mitigate the rising labor cost trend, and ensure that adequate time can be spent on new workloads and innovation.

IBM z/OS Storage Management provides simplified graphical user interfaces that help IT staff who are new to the platform learn and execute operational tasks. These modern interfaces aggregate and combine performance and availability operational data from many sources to reduce the time and skills needed to diagnose problems. Businesses are able to leverage a younger generation of workers in their organization as they grow and maintain System z skills. In addition, IT operations System z staff are being asked by organizations to share their experience with others to help improve IT operations for distributed operating system platforms. Commonality between management tools used in each platform helps to improve efficiencies in operational storage management, as well as provide skill investment protection by enabling cross-training.

Growing Variety and Volume of Data

Disk storage growth (reported to be 37% compound growth rate) has contributed to steady spending on hardware, software, and people. Businesses cite that the growing variety and volume of data is a contributing factor in this rapid disk growth. IT organizations must provide the capability to harvest data in order to create business value from IT. Figure 1 displays the many types of information repositories containing either data or content. Data is typically relational data, multi-dimensional data, and hierarchical data used in transaction processing. Content is related to check processing, forms processing, and all unstructured data stored in repositories, including records management.

More and more distinctions are being drawn between "data" and "information." IBM's Information On Demand Ecosystem shown in Figure 2 helps create business value by integrating, analyzing, and optimizing heterogeneous types and sources of information throughout its lifecycle, to manage risk and to create new business insight. IBM z/OS Storage Management assists IT organizations to create
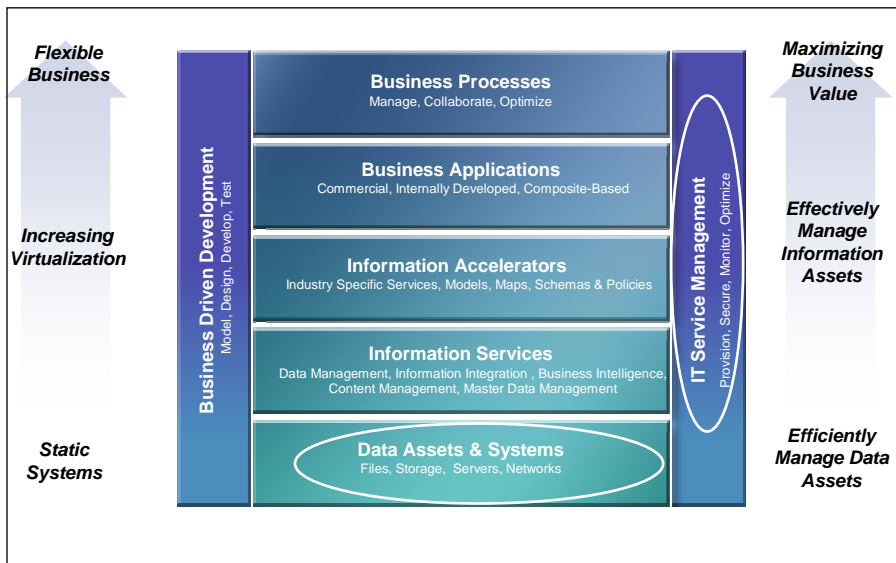

Figure 2 IBM Information On Demand Ecosystem

information by helping to identify IT data with business value. IBM's z/OS platform, coupled with IBM Storage Management product offerings, put "information to work" by making it available to any customer, employee, partner, or process that needs it.

IBM Information On Demand enables business needs to drive application development that leverages **Service Oriented Architecture (SOA)** to decouple information from the application or platform silos in which that information is locked. This makes information available as a *service* to the business, which results in higher levels of consistency, flexibility, and accessibility. Note that **IBM Service Management** is a critical piece of this approach and is detailed later in this paper.

Regardless of the extent that SOA principles are used within an IT organization, IBM z/OS Storage Management protects data to ensure it has high quality and high availability, by automating the creation of additional space. Performance and availability monitoring of both z/OS operating system and the storage subsystem allow IT organizations to make informed decisions about where storage should be placed for new or growing applications. Storage allocation management detects out of space conditions and provides remedies to ensure high application availability. The placement of the data archived to tape is optimized to decrease waste and improve access times. IT organizations can deliver information services with high confidence to satisfy tougher compliance regulations, which demand much improved audit, access, and reporting capabilities.

Increasing Complexity

Increasingly complex business infrastructures and application topologies make it more difficult for organizations to enhance, manage, and align IT services with business goals. IT organizations know that in the future there will be more software and hardware components needed to expand storage for existing IT services or to provide storage for new IT services.

There is a growing trend to develop business applications that are composed of services implemented using the SOA application pattern. These service-based applications often require more integrated data management to seamlessly supply new storage space. IT organizations are required to respond to the business need for new innovation more quickly than in the past. While the environment for application developers might be simplified with new architecture patterns, often the IT environment needed to run the new workload becomes more complex.

In addition, services require hardware and software infrastructure to support operating environments that span beyond the native z/OS operating environment and into other platforms in the enterprise. Figure 3 depicts the complexity of a composite application that transforms and integrates new SOA workloads with existing z/OS applications, data formats and storage subsystems. SOA federation
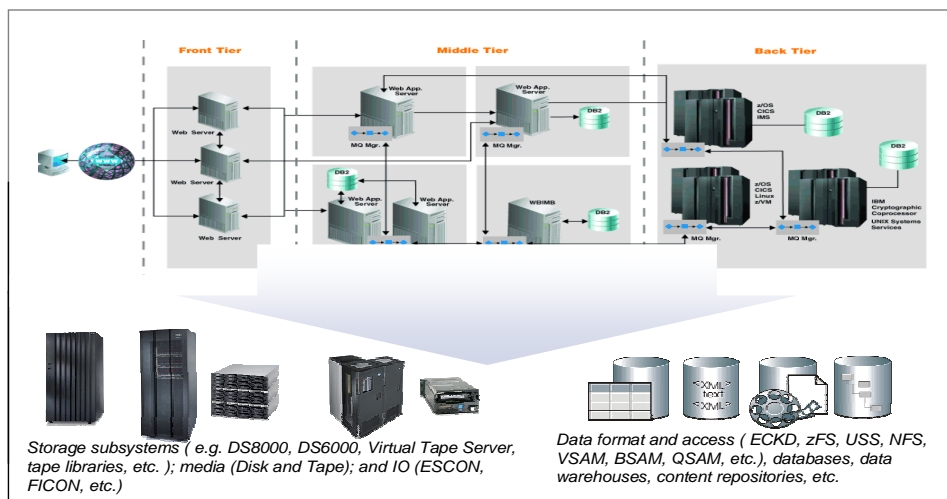

Figure 3 SOA Composite Application Operating Environment

technology provides the loose coupling and the synchronization of the master copy (single-source), mission-critical data hosted by the z/OS operating system. The example deployment shown spans multiple tiers comprised of multiple operating system and hardware platforms, and the application requires interoperability of a large variety of storage resources and data access methods. More potential failures and problems can occur due to the increased interactions with additional software components in the enterprise. IBM z/OS Storage Management works together with performance and availability monitoring of the information integration middleware that provides the operating environment for SOA information services. Storage views from different perspectives provide insight: the operating system view, the application view, the IO storage subsystem view, SMS managed data view, and so on. In addition, automation can help IT organizations help transfer knowledge to new IT staff despite the growing complexity of IT.

Rising Rate of Change

Changing business requirements rapidly create the need for new storage space. Market demands for new or existing application workloads to support new business offerings contribute to a high rate of change associated with storage infrastructure. Analytical information from management tools ensures high availability and high utilization of disk or tape storage resources for existing workloads during peak periods of change. Both data retention and virtualization management capabilities help IT organizations address space requirements by providing insight into the impact of changes to storage infrastructure, data retention policies, and more. IBM z/OS Storage Management helps manage information at both the "service" and "application" granularities due to its ability to understand and communicate the business impact at many levels: disk and tape storage systems, z/OS operating system subsystems, DFSMS automation, migrate and recall policies, and so on. A comprehensive management solution ensures that businesses can respond to market opportunities with agility, using new application architecture patterns such as SOA.

Figure 1 shows that 80% of IT problems are not detected by IT staff until reported by end users. Storage management provides information that can be used to decrease the time needed to diagnose the root cause of IT problems, and decrease the time needed to make the corrective changes. IBM z/OS Storage Management helps organizations manage service delivery problems reported by users, as well as plan and prepare for planned changes to IT infrastructure to decrease the number of incidents reported by end users. Performance and availability monitoring provides impact analysis information such as which servers, applications, or storage resources are affected in a proposed change. Other tools help ensure that all necessary changes are made to the IT infrastructure in order to maintain compliance: backup, migration and recall, expiration, allocation policy, and so on. Storage management also monitors the environment after a new application is deployed (or after an IT corrective action is performed) to ensure that the change does not create adverse effects and that data has been correctly located.

Comprehensive IBM System z Storage Management Strategy

The IBM System z Storage Management strategy is based on the **IBM Service Management** strategy that ensures businesses can deliver high quality, cost effective business services that bridge silos of people, technology, processes, and information (See Figure 4) with increased IT operational efficiency and effectiveness. Service Management encompasses the management of processes, tactics, and best practices needed to deliver storage requirements and to facilitate information services excellence.

The IBM Service Management strategy provides investment protection by leveraging operational management tools already deployed in an existing IT environment. Deploying and populating the IBM Tivoli CCMDB with operational data is the first step taken by organizations that want to begin adopting best practice automation for managing IT Infrastructure. This places IT organizations in a good position to leverage new IBM Process Management products that emerge in the marketplace. Business value is provided regardless of the adoption rate of managing services by and IT organization.

IBM z/OS Storage Management Blueprint

As previously stated, transforming IT organizations to manage a service-based workload is challenging. IBM Service Management helps organizations manage their complex infrastructure within a virtualized environment (where it is hard to trace specific IT resources to a given business service) and retools that organization's focus to operate with a business service delivery view. The IBM System z Storage Management strategy consists of three management layers shown in the figure:

- Process Management
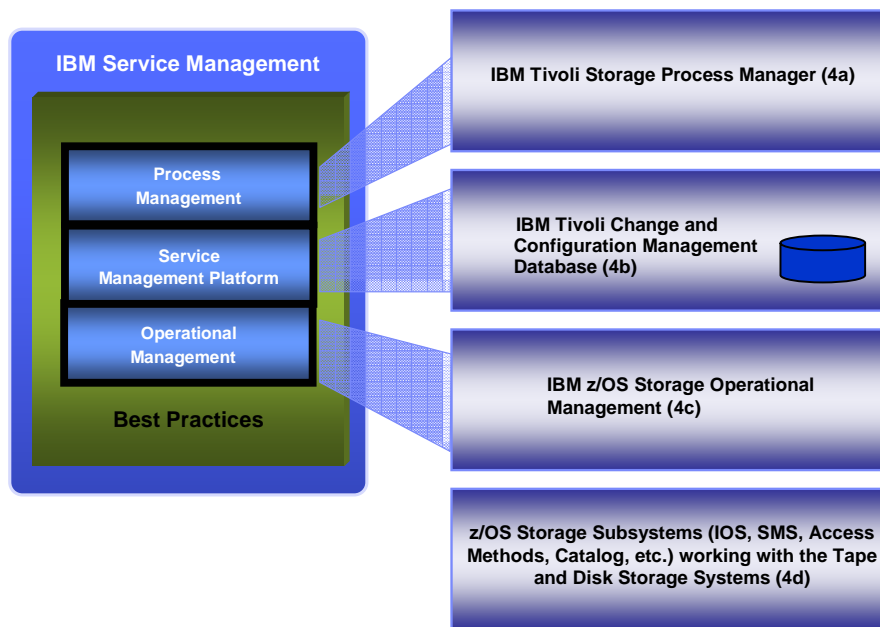- Service Management Platform
- Operational management

Figure 4 IBM System z Storage Management Blueprint

The **Process Management** layer (4a) is a set of pre-defined process solutions with adapters that integrate with operational management products to automate process workflows. The IBM Storage Process Manager (SPM) currently provides process based storage management for distributed operating system platforms. Other process management products will leverage the ability of storage operational management to help organizations understand both the impact of storage space requirements for new application services and to understand what is required to keep these services continuously running.

The **Service Management Platform** layer (4b) is composed of IBM Tivoli Change and Configuration Management Database (IBM Tivoli CCMDB), a logical database that consists of many real-time databases that provides critical information about IT infrastructure resources, such as their basic configuration, relationships, and service levels. IBM Tivoli CCMDB connects to the workflows from the process management layer, so a business can integrate information and share it across multiple tools, people, and processes. For example, the IBM Tivoli Monitoring Services Discover Library Adapter (DLA) discovers z/OS data from the OMEGAMON family of management products and populates the CCMDB to enable impact analysis and improve incident management.

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Detail about the **Operational Management** layer (4c) that provides broad z/OS storage management capabilities is in the next section of this paper.

The **z/OS Storage Subsystems** (4d) provide the basis for z/OS Operational Storage Management. System Managed Storage (SMS) is used by organizations to lower the total cost of ownership by managing more and more data with the same number of system programmers and storage administrators. The z/OS I/O components (IOS, SMS, Access Methods, Catalog, and so on) working with the Tape and Disk Storage Systems provide unmatched support for storage hardware needs, and have a long track record of stability, manageability, performance, scalability, and availability. The z/OS operating system supports disk storage systems such as the DS8000, DS6000 and ESS; tape storage systems such as virtual tape server and tape libraries; storage media such as disk and tape; IO channel configurations such as ESCON and FICON; data format and access methods such as CKD/ECKD, VSAM, BSAM, QSAM, zFS, HFS, NFS, and so on; and databases, data warehouses, and content repositories.

IBM z/OS Storage Operational Management

Figure 5 provides more detail about the IBM z/OS Storage Operational Management (See 4c in Figure 4) domains that are based on industry standard nomenclature for market segments:

- Infrastructure Management
- Business Continuity
- Lifecycle and Retention

Each box in the figure contains the z/OS and z/VM IBM Storage Management products for a particular operational storage management domain. IBM will continue to invest and enhance existing operational management offerings to provide the broadest and deepest domain-specific, operational management capabilities that are unmatched in the industry. Note that automation provided by DFSMS appears in each one of these categories. DFSMS performs the "heavy lifting" required for critical data management and provides the ability to scale to an organization's growing needs with an unparalleled quality of service and availability. Providing data management leadership, DFSMS concepts and implementation are the basis for many open industry standards.

Infrastructure Management operational management offerings empower administrators to become more efficient by managing a broad range of devices such as switches, tape, removable media, storage servers, and more. Monitoring, problem determination, and performance optimization are some of the functions that administrators perform for System z storage, and over time will coordinate with distributed storage management.   The virtual management of devices, data sets, and file systems improves the flexibility of the storage infrastructure. Virtualization helps increase IT operational flexibility by optimizing resource utilization and enabling IT organizations to be responsive in making changes required to dynamically deploy information services.

IBM z/OS Storage Management in this category helps organizations address multiple management challenges:

- Rising rate of change is controlled by minimizing the number of configuration changes needed.
- Increased flexibility in how changes are made decrease labor costs and operational risk.
- Storage management automation lowers labor costs.
- Performance and availability monitoring lowers operational risk.
- Simplified user interfaces hide complexity to decrease time and skills needed to diagnose problems.
- Impact analysis information is created to help IT staff make better decisions.

Business Continuity operational management offerings minimize operational risk by ensuring that business data is backed up and can be recalled based on recovery objectives. Increasingly, there are wider varieties of technologies available for meeting recovery time and point objectives and a greater business need for maintaining continuity of business services including disaster recovery. These tools help administrators organize and manage storage resources to meet the business continuity requirements of an increasingly complex and demanding storage environment.

IBM z/OS Storage Management maintains business continuity as new storage is added to the IT infrastructure or new space is created. Monitoring and the management of backup and archiving procedures ensures that organizations can respond to rapid change and growing complexity. IBM z/OS Storage Management is a vital piece of z/OS business continuity solutions, providing unmatched reliability, availability, and scalability in the industry.

Infrastructure Management

IBM Data Facility Product (DFSMSdfp)　　IBM Tivoli OMEGAMON XE for Storage v4.1　　IBM Tivoli Advanced Catalog Managment v1.1 *NEW*　　IBM Tivoli Allocation Optimizer v1.2

IBM Removable Media Manager (DFSMSrmm)　　IBM Tape Manager for z/VM v1.2　　IBM Tivoli Tape Optimizer v1.2

Allows administrators to manage data and a broad range of devices such as switches, tape, removable media and storage servers

Business Continuity

IBM Data Set Services (DFSMSdss)　　IBM Backup and Restore Manager for z/VM v1.2　　IBM Tivoli Advanced Backup & Recover for z/OS v1.1 *NEW*　　IBM z/OS Global Mirror v1.1

Minimizes operational risk by ensuring business data meets backup and recovery objectives

Lifecycle and Retention

IBM Hierarchical Storage Manager (DFSMShsm)　　IBM Tivoli Advanced Audit for DFSMShsm v1.1 *NEW*　　IBM Archive Manager for z/VM v1.1

Helps control storage growth and control costs for data requiring long retention periods.

IBM z/OS Storage Operational Management (4c)

 Figure 5 IBM z/OS Storage Operational Management

Lifecycle and Retention (5c) operational management offerings leverage Hierarchical Storage Management (HSM) to help control both storage growth and the costs associated with the global regulatory environment (that requires the storing, bookkeeping, and compliance of data for long periods), by using backup, archive, migration, and recall management capabilities. Archive functions also help with the performance and maintenance of applications under the more demanding compliance of added security, audit and government requirements.

IBM z/OS Storage Management in the business continuity and the data retention categories help address multiple storage management challenges:

- Operational risk is mitigated by ensuring data can be automatically recovered to maintain continuity in the event of a failure.
- Growing volume and variety of data challenges are minimized using HSM.
- Labor costs are decreased by relying on SMS automation help IT staff optimize the creation of new space for applications, movement of data from disk to tape, and data expiration management.

IBM System z Storage Management Future Directions

There are three major focus areas that define the future direction of IBM System z Storage Management (See Figure 6):

- Unify System z Storage Portfolio
- Integrate System z and Open Storage Management
- Expand Storage Management with IBM Service Management

Unify System z Storage Portfolio.

The **Unify System z Storage Portfolio** initiative provides a common look and feel to simplify the user experience. A single interface protects investments in the training of IT operations staff.   The Tivoli Enterprise Portal (TEP) technology will provide the single user interface. It is a proven technology and is currently implemented in the Tivoli OMEGAMON family of products. TEP provides enterprise event-

Figure 6 IBM System z Storage Management Future Directions

management, policy-based automation, threshold management, and analytical analysis. Leveraging both new and existing TEP skills ensures investment protection of an IT organizations because TEP will play a central role in storage management for System z and distributed platforms. An example scenario for using TEP is an IT operator noticing a storage performance issue using OMEGAMON XE for Storage. Rather than switch and open another user interface, the operator can instead directly navigate and link into another operational management product's specific view (based on data from OMEGAMON XE for Storage). Additional problem analysis can be then performed using data displayed in this view and potentially, corrective steps taken using a "take action" button.

Integrate System z and Open Storage Management

Businesses cite the requirement to increase interactions between IT organizations that have a distributed systems focus and IT organizations with a System z focus. The **Integrate System z and Open Storage Management** initiative addresses this requirement by creating more management connections between these platforms over time. As previously noted, service delivery is challenging because a deeper understanding of IT is required. This deeper understanding of IT will continue to be provided by IBM System z Storage Management across platform and technology silos.

IBM Tivoli CCMDB (see Figure 4) will be used to increase data sharing among operational management products as it provides:

- An enterprise view of its resources, for example, storage, server and switch hardware; OS platforms; business applications; management applications; and middleware
- The discovery of relationships between resources and an enormous amount of associated configuration data

IBM Tivoli CCMDB will be populated with System z storage data to provide a foundation from which IT organizations can place business controls around System z configuration values. With additional System z impact analysis capabilities, operational risk is reduced. This approach will also enable common, cross-enterprise reporting of utilization and statistics across mainframe and distributed storage in support of capacity planning, performance management, and problem determination in a shared open and z/OS storage environment.

This initiative offers innovative ways to increase the synergy between Open and System z Storage Management. Over time, open storage management products such as the TotalStorage Productivity Center will be enhanced to include support for the z/OS operating environment to provide an end-to-end storage business continuity and disaster recovery scenarios. Also, over time the role of OMEGAMON XE for Storage will be expanded into an administrative and operational storage management hub with additional capabilities to dynamically launch into other operational management offerings and to increase operational data sharing.

Expand Storage Management with IBM Service Management

IBM intends to enhance process-based solutions to include support for System z storage and systems management operational management offerings. An initial focus area is the Storage Process Manager (SPM, see Figure 4) that automates the various tasks surrounding storage management in both Open and System z environments, optimizing investments in technology, people, and business processes. Pre-defined processes and adapters will integrate with System z operational management products to help businesses implement and automate operational best practices in their IT organizations.

For example, a process that is well suited for SPM could be an IT operational process that requires interaction between several people in different organizations, such as a z/OS system programmer, a DS8000 storage subsystem administrator, and a compliance officer. An SPM process, based on best practices, would segment the work required into separate tasks done by each person, obtain the required approvals for each task, use operational management automation where appropriate, and track the entire process until completion.

Note that other process management offerings such as Capacity Planning and Service Continuity will also be considered for enhancement to include interaction with System z storage operational management products.

Summary

IBM provides a rich set of System z Storage Management solutions to help IT organizations address today's enterprise challenges. Organizations benefit from a comprehensive management solution to satisfy business demands such as information availability, operational stability, increased productivity, and the reduction of risk while maintaining continuity of business services.

IBM System z Storage Management provides a solid basis for organizations to address current IT challenges, to ensure that System z is an integral part of an Information on Demand business, and that z/OS data is deployed in a Service Oriented Architecture in conjunction with other types of systems.

Transforming IT organizations to manage a service-based workload is challenging. IBM Service Management helps organizations manage their complex infrastructure within a virtualized environment (where it is hard to trace specific IT resources to a given business service) and retools that organization's focus to operate with a business service delivery view. The IBM System z Storage Management strategy is providing investment protection with continual enhancements of each management layer:

- Process Management
- Service Management Platform
- Operational management

IBM has defined focus areas that continue to help IT organizations address today's enterprise challenges. The focus areas that define the future direction of IBM System z Storage Management are:

- **Unify System z Storage Portfolio** with simpler user interfaces and a common look and feel to help reduce labor training costs and decrease problem diagnose time
- **Integrate System z and Open Storage Management** to increase business agility to respond to the growing variety and volume of data, as well as utilize impact analysis information to optimize the deployment of storage for new services
- **Expand Storage Management with IBM Service Management** capabilities such as impact analysis and change control that lower overall operational risk and ensure high storage availability for services in a rapidly changing, more complex IT environment

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Where to Get More Information

IBM's Software Migration Project Office (SMPO) helps clients migrate to some of the industry's leading database, and z/OS, and OS/390 systems management from IBM and Tivoli software. More information on how to get started can be found at **http://www-306.ibm.com/software/solutions/softwaremigration/**
Information about when to get details about IBM System z Storage Management portfolio is below.

z/OS and zVM Storage Operational Management

Infrastructure Management

DFSMSdfp information:
http://www.ibm.com/servers/storage/software/sms/dfp/index.html.

OMEGAMON XE for Storage information:
http://www.ibm.com/software/tivoli/products/omegamon-xe-storage/

IBM Tivoli Advanced Catalog Management v1.1 information:
http://www.ibm.com/servers/storage/software/toolkit/mainstar/crplus.html

IBM Tivoli Allocation Optimizer for z/OS (ITAO) information:
http://www.ibm.com/software/tivoli/products/allocation-optimizer-zos

DFSMSrmm information:
http://www.ibm.com/servers/storage/software/sms/rmm/index.html

IBM Tivoli Tape Optimizer on z/OS (ITTO) information:
http://www.ibm.com/software/tivoli/products/tape-optimizer-zos/

IBM Tape Manager for z/VM information:
http://www.ibm.com/software/stormgmt/zvm/tape/

IBM Tivoli Automated Tape Allocation Manager for z/OS (ATAM) information:
http://www.ibm.com/software/tivoli/products/automated-tape-alloc-mgr-zos/

IBM TotalStorage Productivity Center (TPC) information:
http://www.ibm.com/servers/storage/software/center/index.html

IBM TotalStorage SAN Volume Controller (SVC) information:
http://www.ibm.com/software/info/ecatalog/en_US/products/N193726V86942Y63.html

Business Continuity

DFSMSdss information:
http://www.ibm.com/servers/storage/software/sms/dss/index.html

IBM Tivoli Advanced Backup and Recovery v1.1 information:
http://www.ibm.com/servers/storage/software/toolkit/mainstar/drutilities.html

IBM Backup and Restore Manager for z/VM v1.2 information:
http://www.ibm.com/software/stormgmt/zvm/backup

IBM z/OS Global Mirror v1.1 information:
http://www.ibm.com/services/us/index.wss/offering/its/a1022703

IBM TotalStorage Productivity Center for Replication (TPC-R) information:
http://www.ibm.com/servers/storage/software/center/replication/index.html

IBM Geographically Dispersed Parallel Sysplex (GDPS) information:
http://www.ibm.com/systems/z/gdps/

Lifecycle and Retention

IBM Hierarchical Storage Manager (DFSMShsm) information:
http://www.ibm.com/servers/storage/software/sms/hsm/index.html

IBM Tivoli Advanced Audit for DFSMShsm v1.1 information:
http://www.ibm.com/servers/storage/software/toolkit/mainstar/fastaudit.html

IBM Archive Manager for z/VM information:
http://www.ibm.com/software/stormgmt/zvm/archive/

IBM Tivoli Storage Manager (TSM) information:
http://www.ibm.com/software/info/ecatalog/en_US/products/E106002V31956M55.html,
http://www.ibm.com/software/info/ecatalog/en_US/products/B106003K22276G08.html

System z Service Management Platform

IBM Tivoli Change and Configuration Management Database information:
http://www.ibm.com/software/tivoli/products/ccmdb/

System z Process Storage Management

IBM Tivoli Storage Process Manager information:
http://www.ibm.com/software/tivoli/products/storage-process-mgr/

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