

MVS Storage Management (MVSS) Project Opening and Keynote

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Session 8029

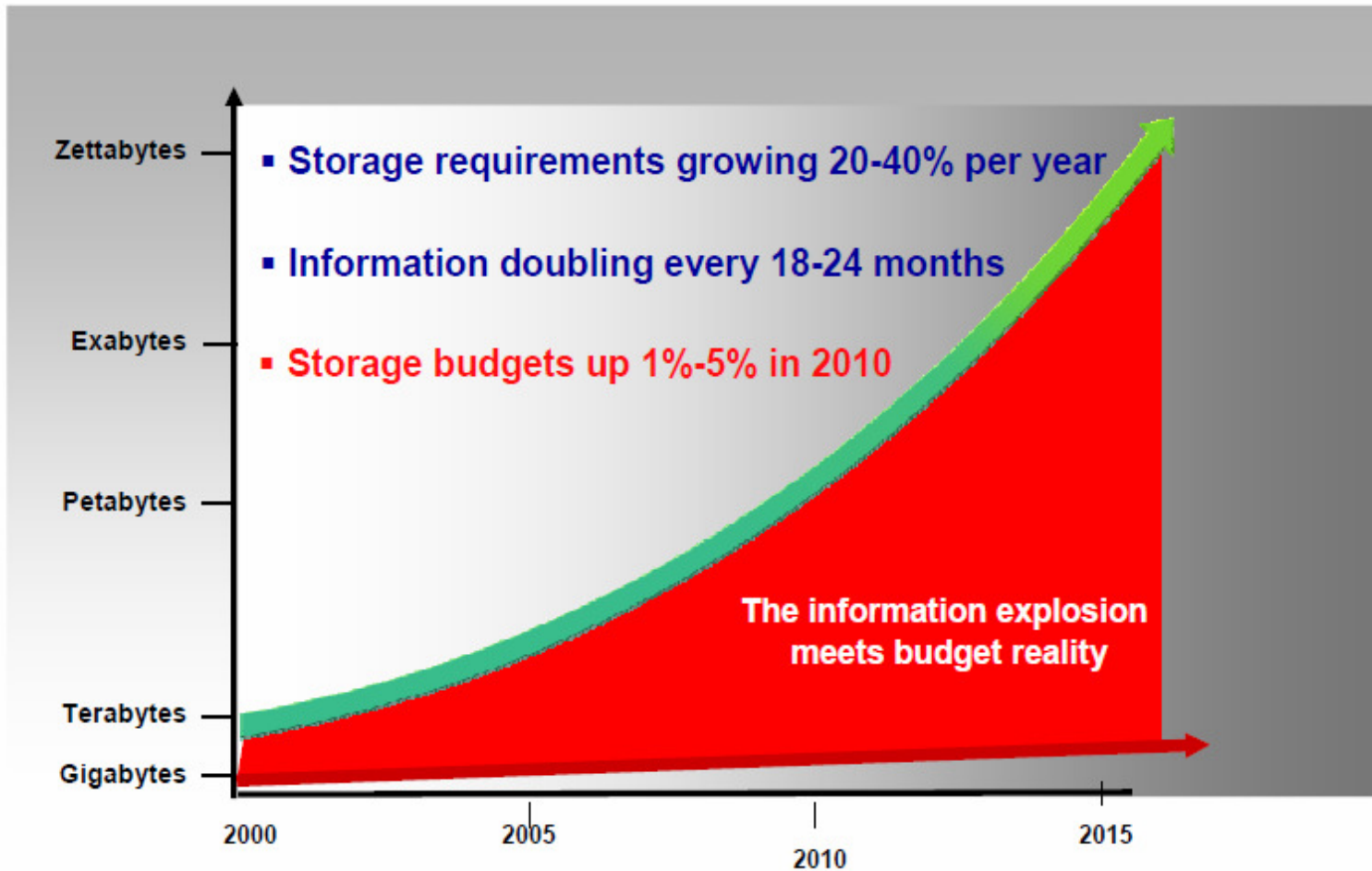


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Smarter Systems are Creating an Information Explosion



“It doesn’t matter if the economy is good or the economy is awful, data growth never abates. It is the one constant thing that we deal with.”

— Steve Duplessie, senior analyst, Enterprise Strategy Group, February 2009

The Information Challenge



I have to store it:

Compliance

I want to store it:

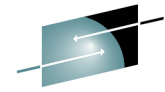
Business Value

I can't store it:

Budget

IBM Strategy For Addressing Information Explosion

System z® & Storage - securely storing information and mitigating business risks



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Technology • Connections • Results

IBM's Smarter Planet Vision



The world has become flatter and smaller. Now it must become smarter.

let's build a smarter planet

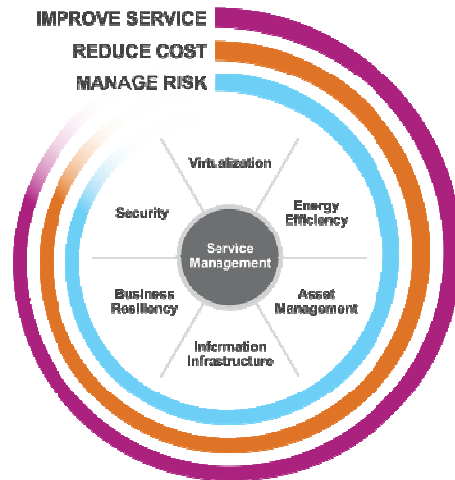
Four major IBM initiatives

Dynamic Infrastructure

New Intelligence

Green & Beyond

Smart Work



IBM Information Infrastructure Strategy

Innovative, Integrated, Available Today

Manage information more effectively and mitigate information risks with a dynamic infrastructure that efficiently and securely stores, protects and optimizes access to information



Information Compliance

Reduce reputation risks and audit deficiencies - 63% IT executives rate compliance with regulations a top challenge



Information Availability

Deliver continuous and reliable access to information - Downtime costs can amount up to 16% of revenue in some industries.



Information Retention

Support information retention policies - Average legal discovery request can cost organizations from \$150k to \$250k.

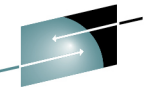


Information Security

Protect and enable secure sharing of Information - 84% of security breaches come from internal sources.

IBM Information Infrastructure for System z[®] & Storage

Information infrastructure to satisfy the world's most demanding clients



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Enterprise Tape Systems



TS1130
Controller



TS7700



TS7680

Advanced tape automation and drives



TS3500
Library



TS3400
Library



TS1130
Drive

Solutions support System z[®] as well as major open system platforms

Advanced Management tools for automated data management

Virtualization to help reduce TCO and improve operational efficiencies

Designed to provide enterprise class reliability to help support continuous operations

Enterprise Disk Systems



DS8000[®]



SAN Volume
Controller

IBM SAN Offerings

Fabric switches

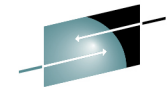


Enterprise directors

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IBM System Storage™ & System z®

A winning combination



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Technology • Connections • Results

Collaborating to support the growth and protection of mission critical information

Heterogeneous Enterprise Disk Systems

- IBM System Storage™ DS8700
- IBM System Storage™ Easy Tiers
- IBM System Storage™ Advisor Tool
- DS8000 z/OS Distributed Data Backup
- System z Discovery and Auto-Configuration (zDAC)
- Softek Transparent Data Migration Facility (TDMF) for z/OS, v5.2
- Disk Encryption
- Solid State Drives
- Remote Pair FlashCopy
- High Performance FICON + Multi Track
- z/OS Global Mirror Incremental Resync
- Extended Address Volumes
- Basic HyperSwap™
- Extended Distance FICON®
- z/OS Global Mirror enabled for zIIP
- PAV and HyperPAV
- PPRC Manager and FlashCopy Manager
- Geographically Dispersed Parallel Sysplex™ (GDPS®)



SAN Volume Controller (z/Linux)

- SAN Volume Controller virtualization appliance

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Enterprise Tape Systems

- IBM System Storage™ TS7680 ProtecTIER® Deduplication Gateway for System z®
- IBM Virtualization Engine TS7700 4 site support
- IBM Virtualization Engine™ TS7700 R1.7
- IBM System Storage TS3500 Tape Library High Density Frames
- IBM System Storage™ Tape Encryption



Continuing server + storage tradition with zEnterprise™ System

“A system is the server plus its storage”



IBM zEnterprise™ System

zEnterprise™ System positioning

- Leveraging operational advantage through *integration* of superior technologies
- Optimizing business advantage through *integration* of information and applications
- Realizing organizational advantage through *integration* of IT resources and processes



IBM Storage enables zEnterprise™ System

- Leadership in transaction processing performance
- Leadership in business continuity
- Leadership in backup and archiving
- Leadership in data deduplication
- Leadership in security



IBM System Storage™

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IBM System Storage DS8700





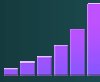


Enterprise Disk Systems for Business Critical Applications



Collaborative development with IBM System z offers advanced and often unique storage capabilities for mainframe systems



Support for all zEnterprise™ System data

- Proven**  Builds on 50+ years of enterprise class innovation & tens of thousands of systems sold
- Performance**  Architected for highest total throughput; innovative caching algorithms; solid-state drive optimization
- Resiliency**  Designed for 24x7 environments with higher than Five-9's availability
- Information Availability**  Fastest critical application replication performance at any distance
- Scalability & Flexibility**  High scalability and optimized drive tiering
- Security**  Advanced access control and full disk encryption
- Cost Advantage**  Outstanding TCO and investment protection with cross-generational interoperability, scalability, and capacity optimization

DS8700 is Optimized for the zEnterprise™ System



- **DS8700 is optimized for consolidating mixed workloads**
 - **Easy Tier** feature for smart data placement with SSDs
 - **z/OS Distributed Data Backup** can consolidate multiplatform data backup/restore
 - Innovative caching algorithms provide efficient use of cache memory (Intelligent Write Caching, Sequential Adaptive Replacement Cache, Adaptive Multi-stream Pre-fetch)
 - Comprehensive set of I/O measurements reported via RMF™ for management of mixed workloads
- **DS8700 is optimized for zEnterprise “plug and play”**
 - DS8700 supports **System z Discovery and Auto-Configuration (zDAC)**
 - Automatic discovery of new and changed storage devices
 - I/O measurements allow Dynamic CHPID Management to make optimal configuration decisions
 - Self-describing capability can help identify single points of failure
- **DS8700 and zHPF: optimized for scale, performance and resilience**
 - **Full zHPF Multi-track support** for transfer sizes of over 2 MB
 - DB2 Table Scans and Utilities now convertible to zHPF
 - Reduces query times and elapsed times for utilities
 - Complements **Extended Addressability Volumes (EAV)** with performance and scalability
 - Enhances system resilience by better being able to handle workload spikes



DS8000 Solid-State Drive Option

New Tier-0 drives for high priority, time-sensitive applications



Key benefits

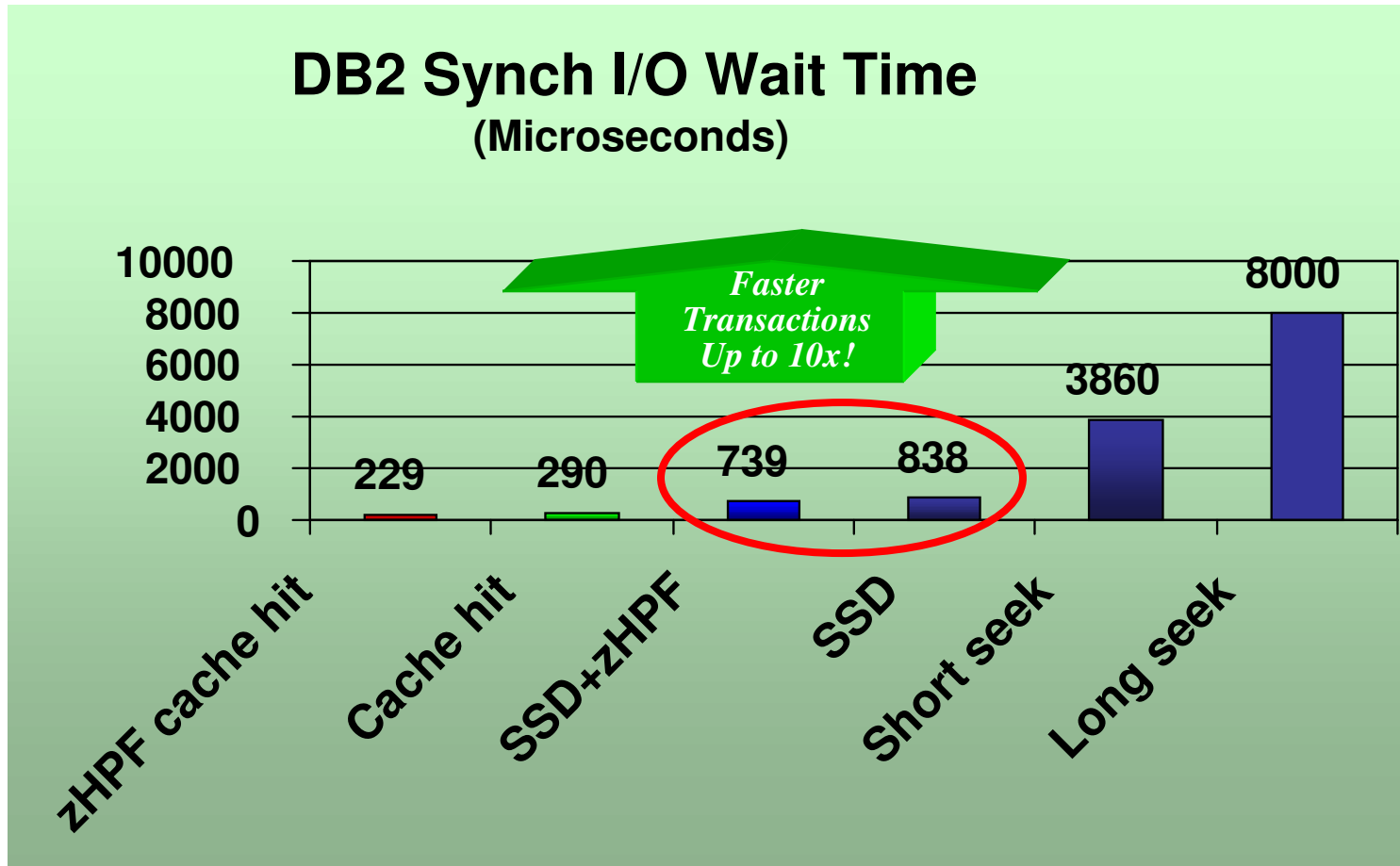
- **Delivering increased performance for transactional applications, including...**
 - Online Banking / ATM / Currency Trading
 - Point-of-Sale Transactions / Processing
 - Real-time data mining
 - Any application where performance is critical
 - Faster data replication and recovery from outages
- **Footprint reduction / Capacity optimization**
 - SSDs enable clients to optimize capacity utilization since a small number of SSDs can replace large amounts of underutilized spinning drives



Information Availability

DS8000 SSD Performance Testing

DB2 Sync I/Os Running on z/OS

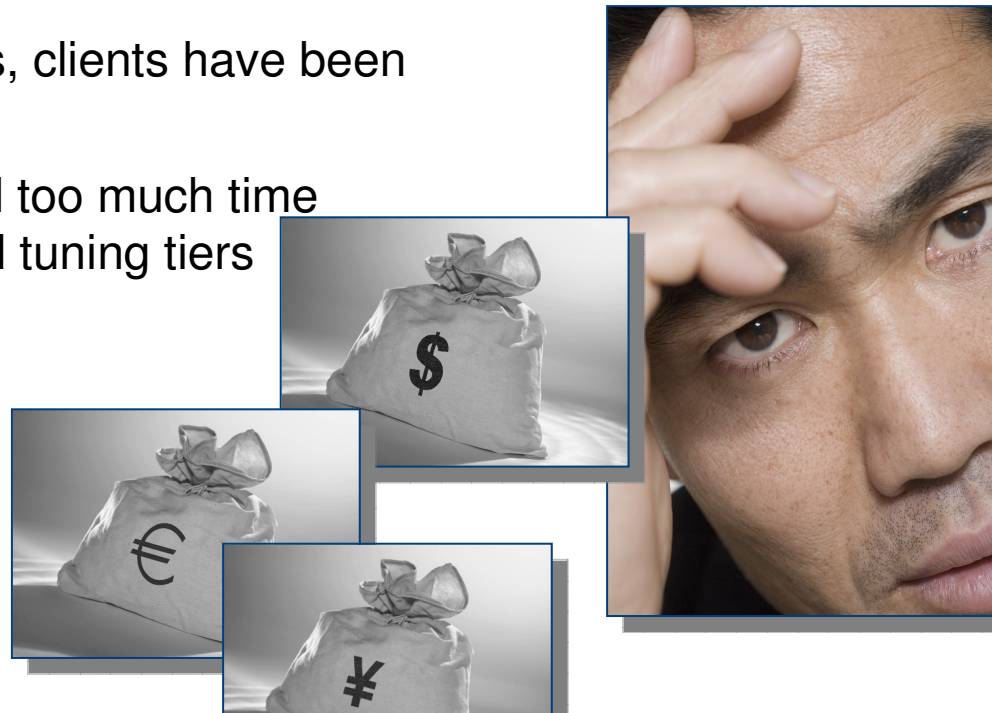


Client challenges with SSD

Inefficient use of a very expensive asset is difficult to justify



- SSDs are considerably more expensive than traditional disks
- Without optimization tools, clients have been over-provisioning them
- And administrators spend too much time monitoring, reporting, and tuning tiers



Result: Many clients feel they can't afford solid-state storage yet

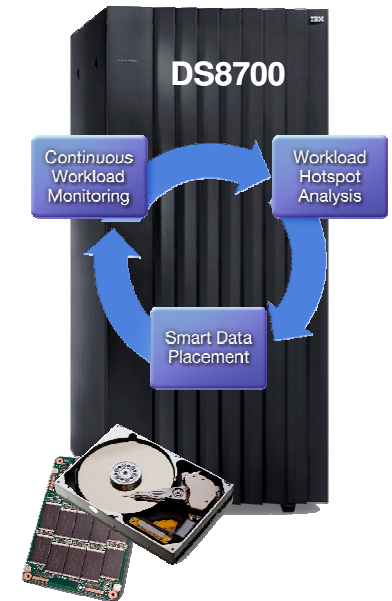
Smart data placement with Easy Tier

Addressing client spending in tiered storage build-out



- **Benefits go beyond performance**

- Optimizes SSD deployments by migrating only hottest data to SSDs
- Assures clients that they are not overspending on expensive SSDs unnecessarily
- Reduces administrative effort and costs by automating data placement
- Can 'right size' storage infrastructure AND server infrastructure for a greener data center
 - Higher performance with 50% of the footprint and 40% energy consumption
- Flexibility to migrate full volumes manually or extents automatically to meet needs
- New tooling enables clients to see exactly how much their existing workloads can benefit from how many SSDs; *no more guessing!*
- Additional performance benefit with zHPF



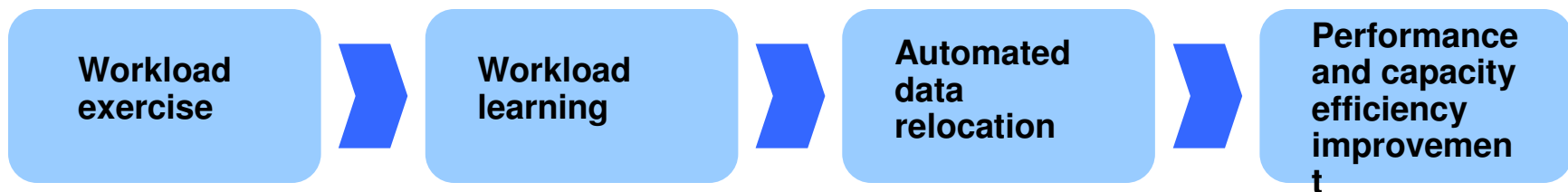
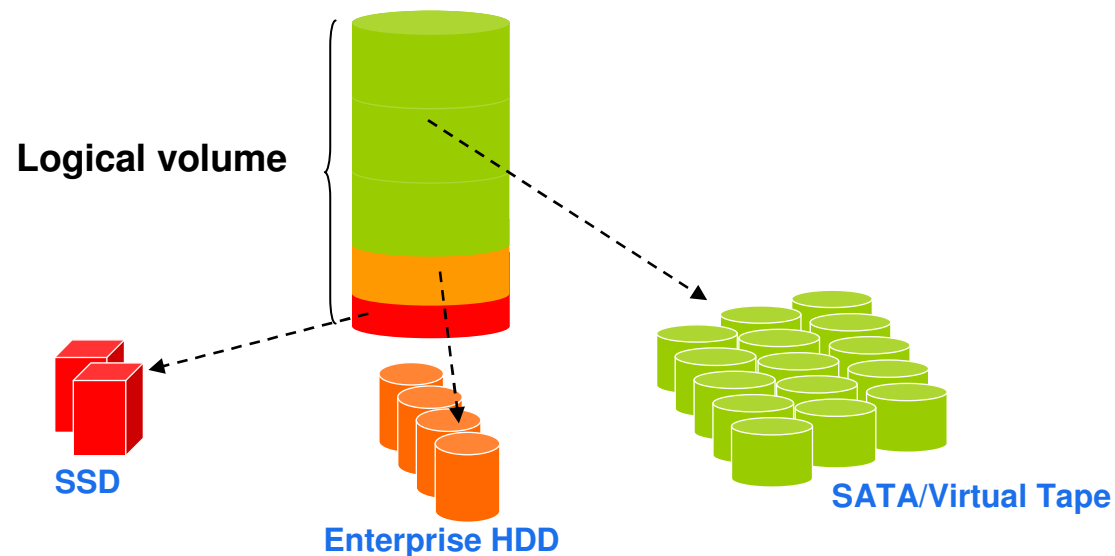
Information Availability

What is Easy Tier?

Core concept: Hybrid Volume



Definition: ability to place fine grain of data (below LUN level) to the right place at the right time based on the policies of data requirements on performance, reliability, cost, energy consumption and replication.



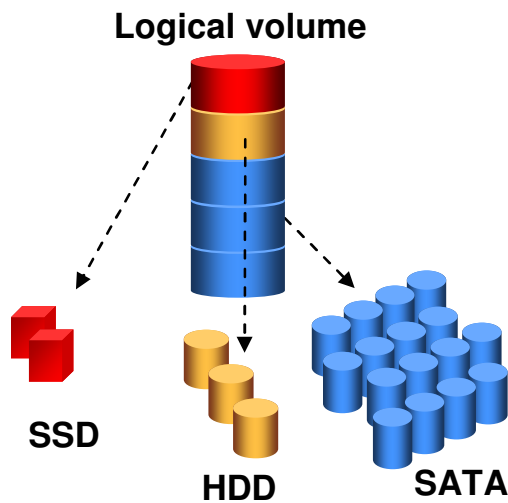
Smart data placement with Easy Tier

- Smart data placement with no manual tuning
- First ever Storage Performance Council (SPC-1) benchmark submission with SATA and SSD technology

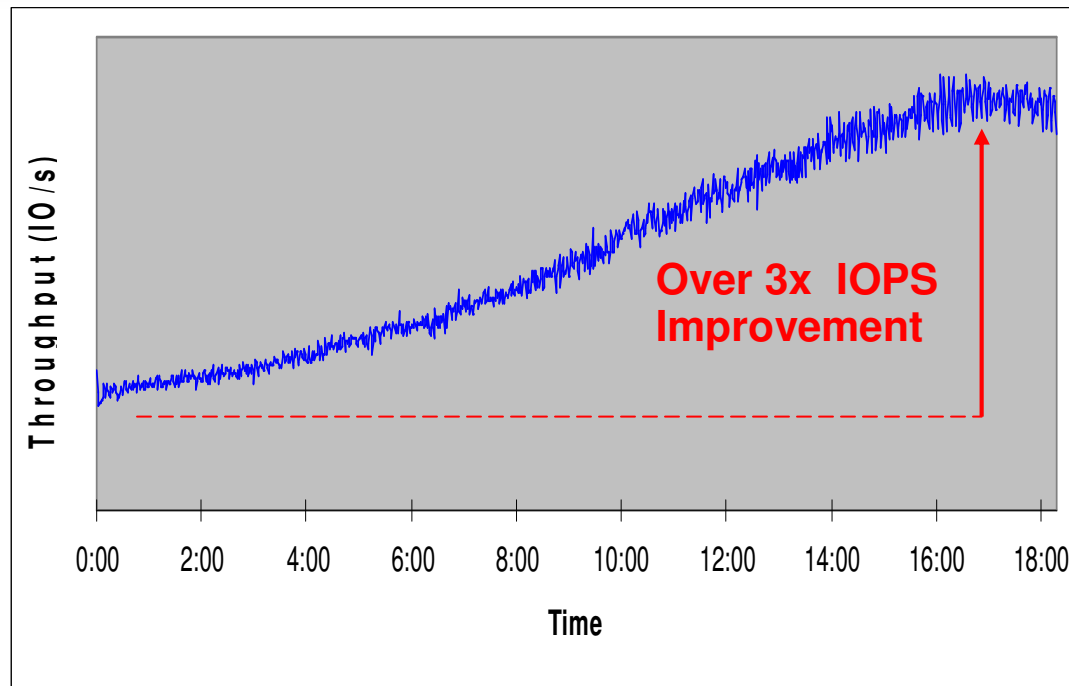
Increase of
over **3X!**

Easy Tier

No manual tuning!!



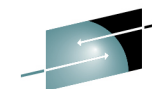
System configuration: 2.3 TB
SSD + 96 TB SATA



Source: Storage Performance Council, April 2010: http://www.storageperformance.org/results/benchmark_results_spc1#a00092

IBM Storage Tier Advisor Tool

Providing guidance with current workloads



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IBM System Storage™ DS8000

System Summary

The data is collected from Tue Dec 08 01:20:55 PST 2009 to Tue Dec 08 09:23:55 PST 2009

Total Volumes Monitored	4
Total Capacity Monitored	416G
Hot Data Capacity (% of Total)	61G (14.6%)
Capacity Allocated on SSD/Total SSD Capacity	0G/146G
Estimated Migration Time	2 hours
Random I/O Percentage (Random of Total)	100% (3162056 of 3162056)
Data Validity	Valid
System State	Latest Warmstart: No Warmstart Latest Failback: No Failback

Recommended SSD Configuration*1

SSD Configuration	Predicted Performance Improvement*2
Take Advantage of Existing SSD Spare Capacity(RAID 5)*3	35%~ 55%
Add 1 New 73G SSD Rank Pair(s) (RAID 5)*3	54%~ 74%

*1 The recommended SSD configuration is only the suggested SSD capacity to add or to take advantage of the existing S resource, for detailed physical configuration, please consult IBM service team.
*2 The predicted performance improvement is the possible response time reduction at the backend in a balanced system configuration, and it may vary with different system workload and configuration.
*3 Assume the rank pair will be configured as RAID5 (6+P+S), and the equivalency capacity is 876G.

Summary Report

Volume Heat Distribution on LPAR SF75FK840ESS01

- Calculates amount of Hot Data Capacity and estimates migration time to move hot data to SSDs

- Provides guidance on how current workload can benefit from existing and additional SSDs
- ROI can be determined by rate of performance change
- Recommendation can change over time

DS8700 Enhancement and System z Data Protection

Consolidating multiplatform data protection environments onto System z



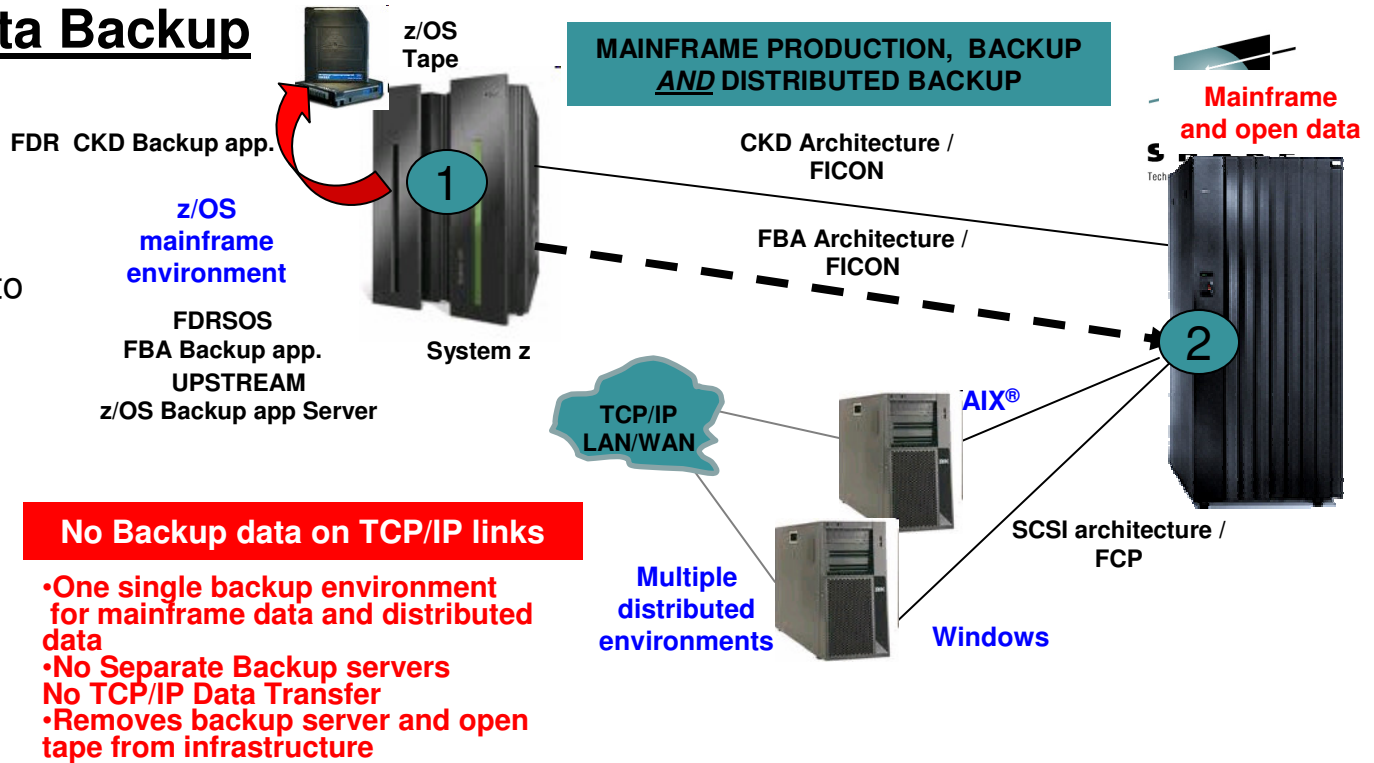
z/OS Distributed Data Backup can help clients consolidate hundreds of distributed backup servers onto one managed by System z

- **New DS8000 z/OS Distributed Data Backup can reduce IT infrastructure and management costs**
 - Enables consolidation of mainframe and open backup onto one managed by System z
 - LAN-free backup
 - Requires Innovation Data Processing backup software
- **No-charge Licensed Function Indicator (Feature Code #0714); Function Authorization indicator (Feature Code #7094)**
- **Prerequisites:**
 - Installation of the FICON Attachment feature #7091 and Function Authorization #0703
 - Microcode bundle: 75.15.xx.xx
 - Requires Innovation Data Processing application running on System z
- **Plant install / field install: Both**

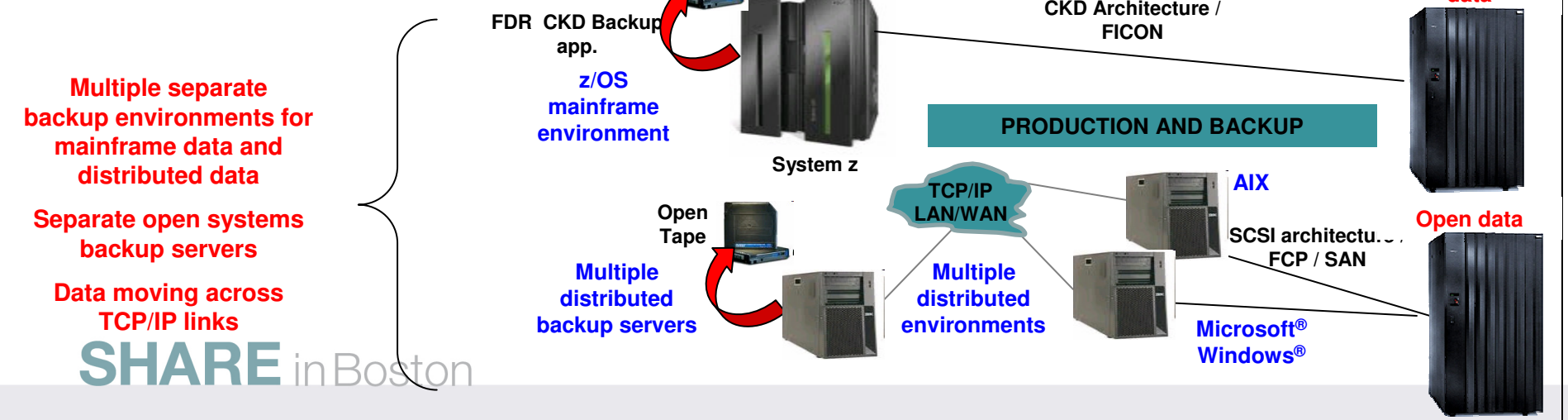


z/OS Distributed Data Backup

- 1 FDRSOS on Systems z takes non-disruptive backup from copy of open system volumes & puts backup data to z-attached tape, disk or ProtecTIER VTL for dedup
- 2 open volumes now have two connections one for production read/write (from distributed servers) and the other for backup read/write (from z)



Prior to z/OS Distributed Data Backup



DS8700 Enhancement and System z Simplification

Simplifying deployment of DS8700 for System z environments



z/OS Discovery and Auto-Configuration can configure a disk system in as little as a few minutes

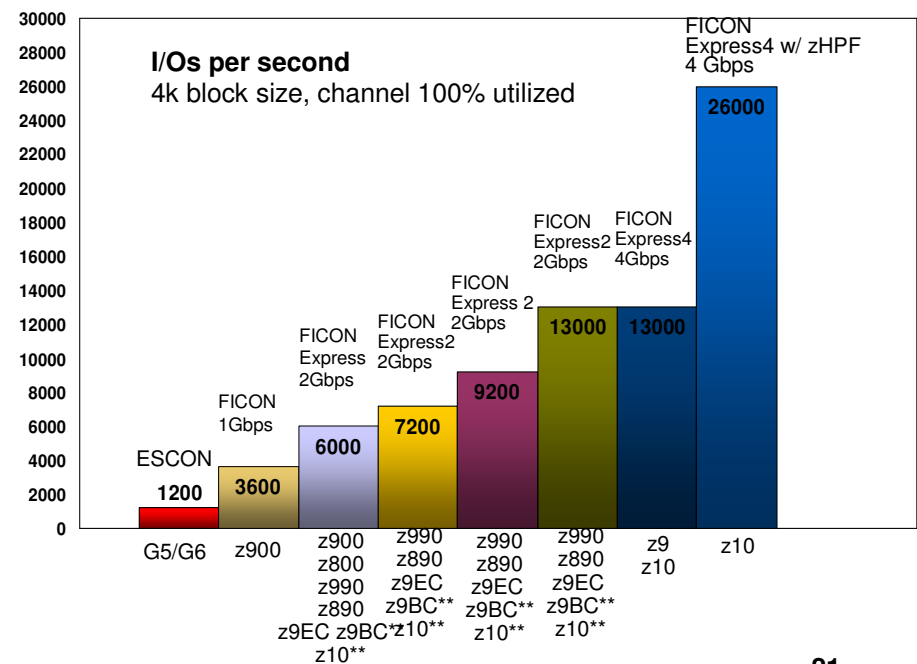
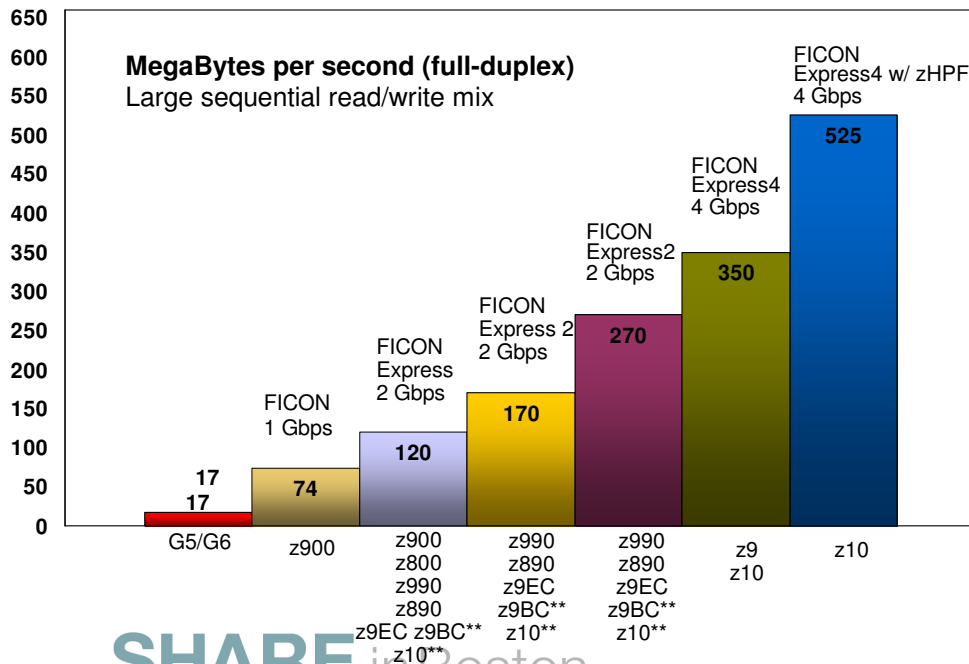
- New z/OS discovery and auto-configuration (zDAC) can simplify deployment of DS8700 with System z
 - Can perform discovery for a single system or for all the systems in a sysplex that support zDAC
 - Discovery does not alter existing configuration
- Can help simplify the configuration and reduce the complexity and setup time for new and changed disk and tape I/O configurations
- Can save time by suggesting configurations that align with best practices for system and data availability, as well as with the I/O policies that clients set
- No Licensed Function or Function Authorization Indicators
 - Works with all IBM System Storage DS8000™ series

High Performance FICON for System z (zHPF)

DS8000 can double the throughput for System z environments



- **High Performance FICON for System z can double data throughput**
 - I/Os per second can increase by up to 100% for small data transfers of OLTP and other workloads
 - Large sequential workloads of both read and write operations can also show great performance improvement
- **Extension to zHPF multitrack operations - removing the 64k byte data transfer limit**
 - Extended zHPF support to multitrack operations (for example reading 16x4k bytes/IO), but limiting transfers to 64k worth of data in a single operation (July 2009)
- ★ **With zEnterprise 196 extended zHPF support of multitrack operations to include even larger data transfers**
 - Fully support multiple tracks of data and removing the 64k byte data transfer limit



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* Some complex channel programs can not be converted to zHPF protocol

** Carry forward only

IBM Information Infrastructure can help mainframe clients support new information-driven workloads more effectively

Data Mobility, On-line Data Migration

- Migrate data on-line, across platforms with little or no downtime.
- New support for extended remote copy (XRC), Hyperswap, and TCP/IP Communication in a Multi Sysplex environment.
- **Enhanced** Hyperswap support.
- **Enhanced** Softek Transparent Data Migration Facility (TDMF) for z/OS.

Multi-Site Tape Virtualization

- Improve resiliency and security by electronically replicating virtual tape volumes to remote sites.
- **Enhanced** IBM Virtualization Engine TS7700.
 - Coordinate up to 4 sites for enhanced resiliency capability.
- **Expanded** IBM System Storage™ TS3500 now stores more cartridges on less floor space. Up to 20,000 slots per library.

End-to-End Data Deduplication

- Optimize storage utilization for mainframe tape processing to reduce costs and improve service levels.
- **New** IBM System Storage™ TS7680 Deduplication Gateway for System z.
 - Reduced storage infrastructure costs
 - Improved tape application performance
 - Batch processing window relief
 - Simplified storage management

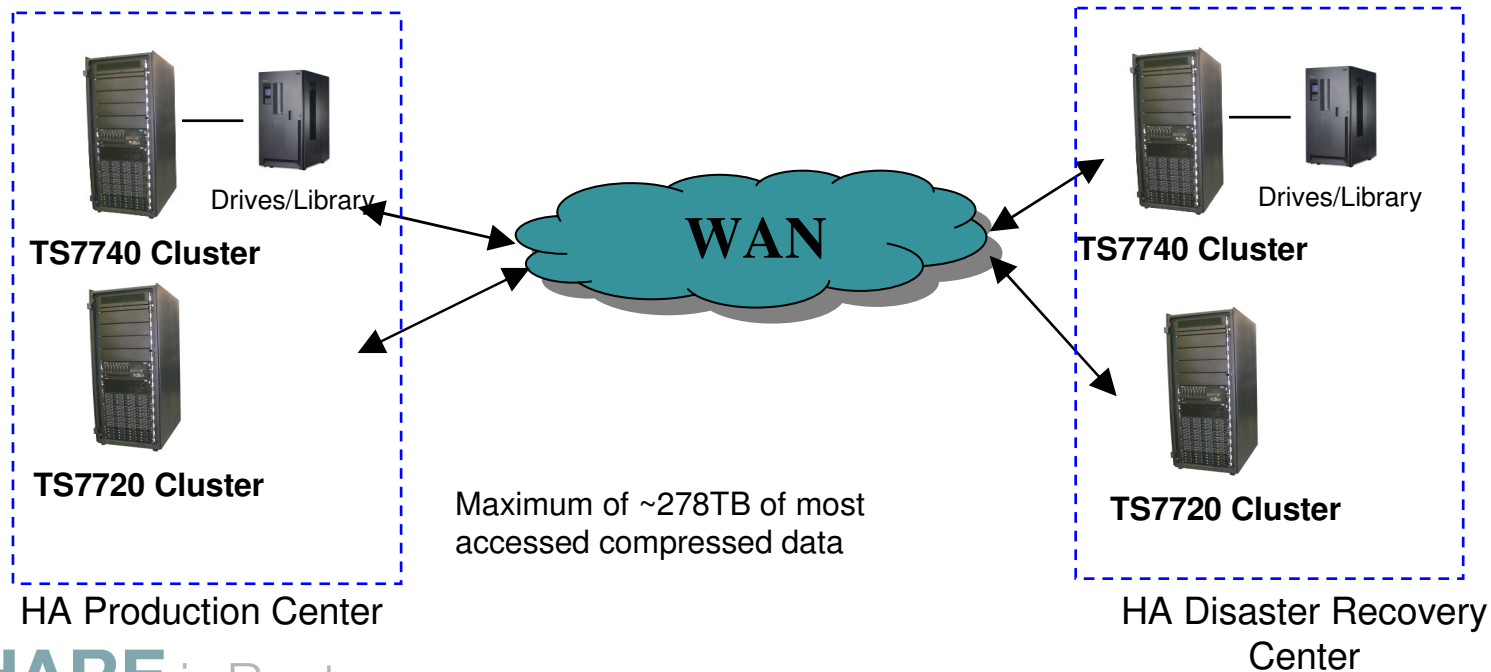


TS7700 Four-Way Grid Configuration

High Availability and High Performance



- High availability, high performance for all data through remote access
- Higher cache hit percentage with production cache size of ~278TB
- Helps improve sequential file data availability and recoverability
- Redundant components of the TS7700 grid configuration can be separated, making it an excellent option for remote backup and recovery
- TS7700 cluster is compatible with GDPS and is well suited for the tape workload because of its remote dual copy capability
- Entire cluster can be used in a local environment to help improve data availability and recoverability



TS7700 R1.7 Content Summary



- GA June 4, 2010
- ★ **Disk Cache Capacity Improvements**
 - New Cache Controller
 - TS7740 max capacity increases by 100%
 - TS7720 max capacity increases by > 600%
- ★ **TS7720 Cache Expansion Storage Frame**
 - Memory Upgrade
 - Selective Write Protect for Disaster Recovery Testing
 - Enhanced Grid Removal Policies

TS7700 Disk Cache Capacity Improvements

- **New TS7720 cache controller**
 - Machine Type 3956 Model CS8
 - Supports 2 TB SATA drives
 - Feature Code 7114
 - Capacity can be added in single drawer increments
 - Up to seven drawers
 - *Each XS7 provides ~24TB usable capacity when attached to CS8*
 - *TS7720 maximum base frame capacity ~163TB*
 - Minimum configuration requires one CS8 and one XS7

- **New TS7740 cache controller**
 - Machine Type 3956 Model CC8
 - Supports 600GB FC drives
 - Feature Code 7123
 - One, two and four drawer configurations
 - **Each drawer provides up to 7TB usable capacity**
 - **TS7740 maximum capacity ~ 28TB**

- **New drawers can be added to existing TS7720 and TS7740 configurations**
 - All drives within a drawer must be the same capacity
 - Existing machine must be an upgrade candidate
 - TS7720 3956-CS7 with only 40TB versus 70TB
 - TS7740 3956-CC7 with only one or two drawers versus four drawers
 - TS7740 3956-CC6 type configurations are not compatible with new drawers



TS7720 Cache Expansion Frame

★ Increases maximum TS7720 usable capacity to ~441TB

- Configuration requirements
 - Two 3956 CS8 controllers
 - 0 to 10 XS7 cache drawers
 - *Must use 2TB drives*
 - **Minimum frame capacity ~40TB**
 - **Maximum frame capacity ~ 278TB**
 - R1.7 level code
 - Features for 3957 Model VEA
 - # 3461 or 9461 (16GB memory expansion)
 - # 5240 (two additional dual port HBAs)
- Can be added to existing TS7720 configurations
 - Base frame must be full (all six XS7 must be installed)



TS7680 ProtecTIER Deduplication Gateway for System z

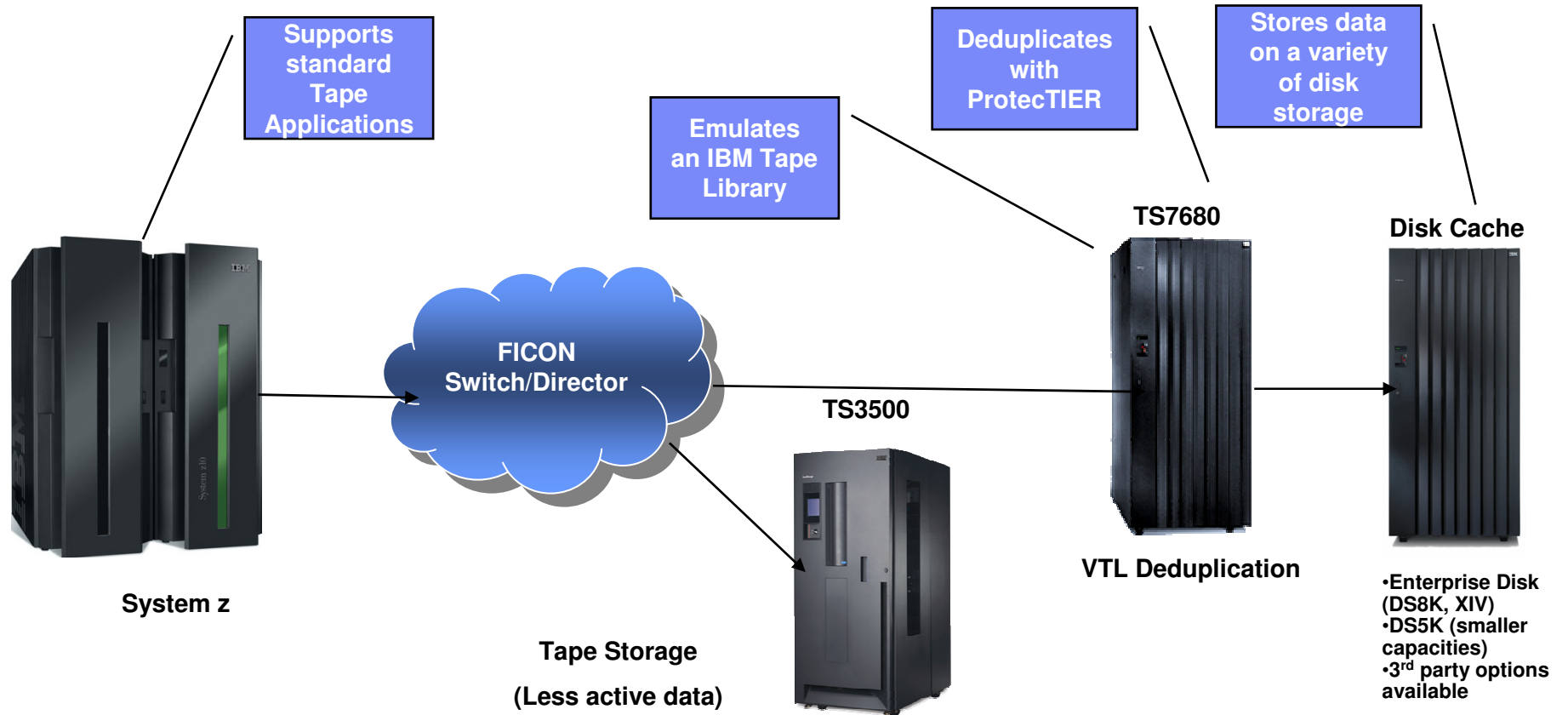


- Features
 - High performance
 - High speed inline deduplication
 - Highly scalable
 - Up to 1PB physical storage capacity
 - Flexible disk cache options
 - Supports a variety of IBM disk storage and other selected 3rd party disk
 - Enterprise-class solution
 - Leverages IBM tape, disk and ProtecTIER technologies
 - Highly available
 - Clustered configuration for redundancy thru automatic server & controller failover
- Business Value
 - Reduced storage infrastructure costs
 - Improved tape application performance
 - Batch processing window relief
 - Simplified storage management



Information Retention

End to End Data Deduplication for System z



Comprehensive solution builds on IBM z/OS, tape, tape virtualization and ProtecTIER deduplication



TS7680 ProtecTIER® Deduplication Gateway for System z®

Native IP Replication



- Announced July 20th, 2010
 - Designed to allow users to maintain full copies of the logical volumes at the remote site, while transmitting only unique data that does not already exist in the remote repository
 - Transmit only deduplicated data to the target cluster
 - Significantly reduce the network bandwidth required to copy the data from the source cluster to the target cluster
 - Allow configurable replication to DR site
 - Initiate replication before volume is unloaded
 - Make volumes visible to both sites at the same time
- Potential benefits
 - Greatly reduce network bandwidth requirements
 - Lower overall disaster recovery costs
 - Eliminate requirement for transportation of tape media



IBM Information Infrastructure for Storage Virtualization

SAN Volume Controller for Linux on z, z/VSE and z/VM



- **Client Value**

- Improves storage utilization and reduces storage growth
- Reduces power and cooling requirements helping make data centers more “green”
- Boosts performance and simplifies storage management for IBM and non-IBM disk
 - Improve storage administration productivity by up to 2x
- Redundant architecture supports enterprise-class availability
 - Non-disruptive upgrades of both hardware and software
- Supports non-disruptive data movement

- **What’s new with SVC Version 5**

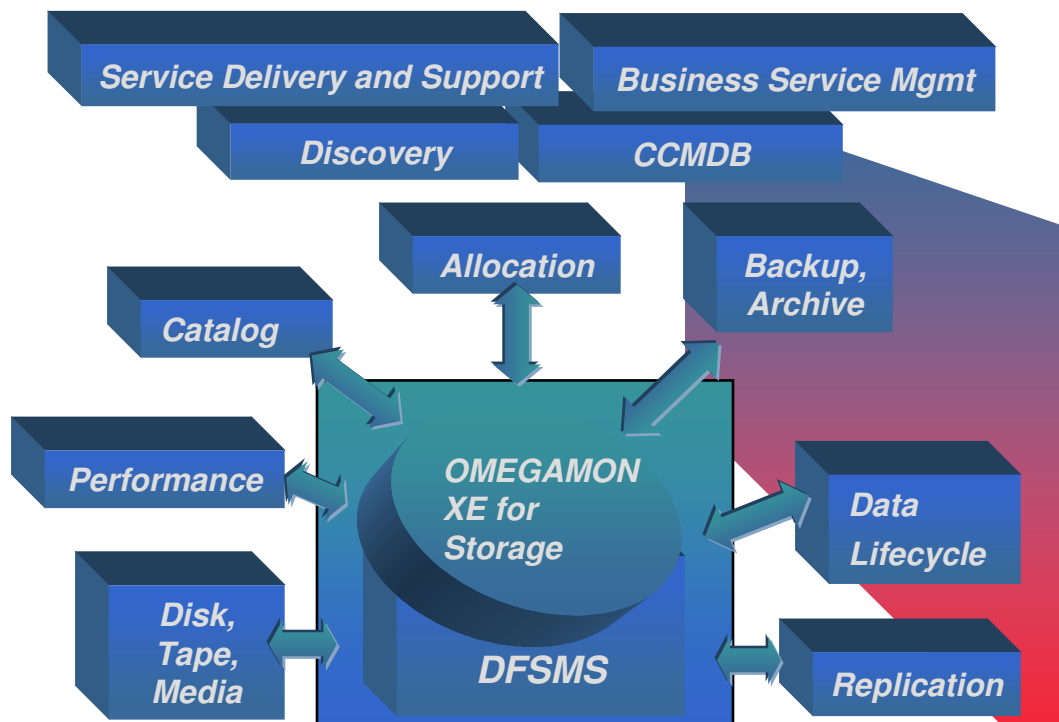
- First storage virtualization system with Integrated support for solid-state drives
- New server hardware improves SVC throughput up to 2x
- SVC now supports iSCSI server attachment
- 8Gbps FC support enables higher SAN throughput.
- Maximum cache size triples to 24GB per engine
- Support for multiple remote mirror locations and increased remote mirror capacity
- New Reverse FlashCopy function enables almost instant recovery from disk backups

***Outstanding performance,
flexibility, and high availability
while controlling storage TCO***



Information Availability

IBM z/OS® Storage Management Ecosystem Portfolio



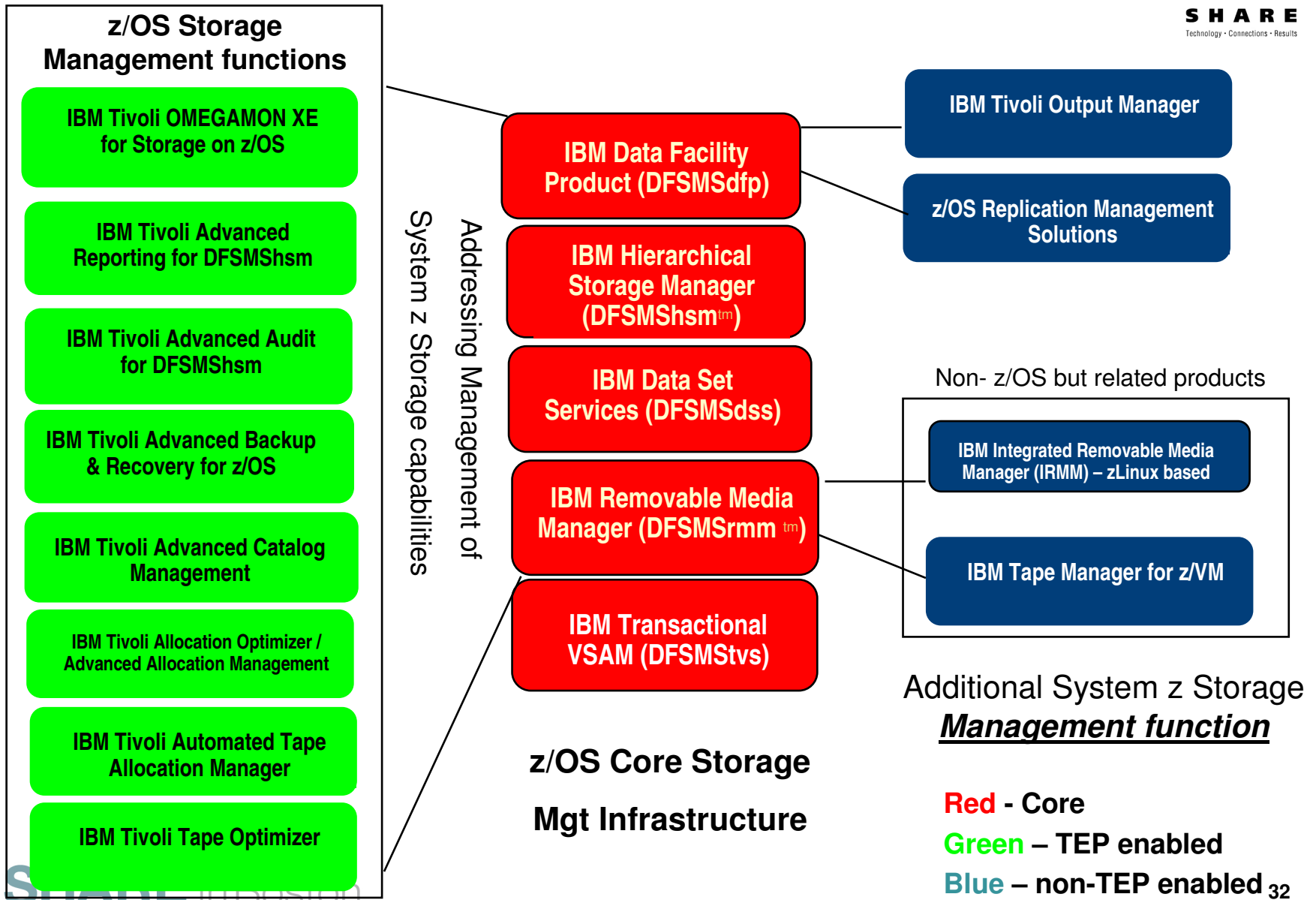
Visibility: View storage capacity, utilization, performance and resource configuration to optimize use and availability.
Control: Control storage management costs by more effectively leveraging capacity and tiering of information storage resources
Automation: Automate data protection and retention based on policies. Automate provisioning or configuration changes and automate data migration.

DFSMS provides the infrastructure for the z Storage Management portfolio of products

Infrastructure Management				
IBM Data Facility Product (DFSMSdfp)	IBM Tivoli OMEGAMON XE for Storage	IBM Tivoli Advanced Catalog Management for z/OS	IBM Tivoli Tape Optimizer	
IBM Removable Media Manager (DFSMSrmm)	Softek Transperant Data Migration Facility (TDMF)	Softek Logical Data Migration Facility (zDMF)	IBM Tivoli Allocation Optimizer	
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 z/OS Global Mirror	IBM Backup and Restore Manager for z/VM	IBM Tivoli Advanced Backup & Recovery for z/OS	IBM TPC for Replication for System z
Minimizes operational risk by ensuring business data meets backup and recovery objectives				
Lifecycle and Retention				
IBM Hierarchical Storage Manager (DFSMSHsm)	IBM Tivoli Advanced Reporting for DFSMSHsm	IBM Tape Manager for z/VM		
IBM Tivoli Advanced Audit for DFSMSHsm	IBM Tivoli Automated Tape Allocation Manager	IBM Archive Manager for z/VM		
Helps control storage growth and control costs for data requiring long retention periods.				

Legend:
 STG (DFSMS) Products
 ICING Products
 OMEGAMON Products
 GTS Mobility Products
 TPC Products

The z/OS® Storage Management Ecosystem



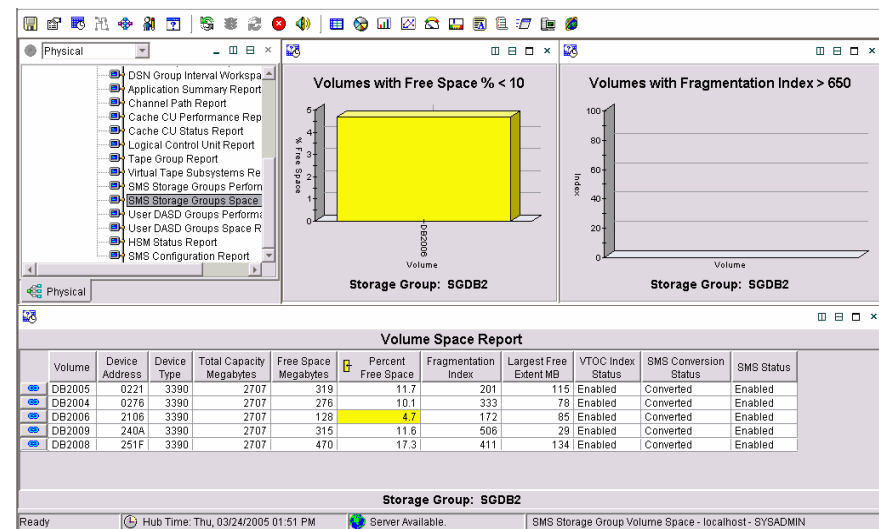
OMEGAMON XE® for Storage on z/OS® v4.2.0

New Enhancements – GA'd Dec 2008



- Major extensions to the Storage Toolkit to both:
 - Online
 - Batch
- Support for DFSMSrmm™**
- Integration to other zStorage tools
- Reports for the Tivoli Common Reporting (TCR) initiative
- Support for TS7700 (IBM Virtual Tape Library)
- DASD Volume Users
- Additional DFSMShsm™ function and attributes**
- Currency and Exploitation of new z/OS features

OMEGAMON XE for Storage is the strategic partner product to the DFSMS family – it's the GUI and Dashboard to that environment.



OMEGAMON XE[®] for Storage on z/OS[®] v4.2.0

New Toolkit enhancements



- JCL Tailoring and submission via GUI interface (Flexibility)
- Edit JCL job
- Submit user JCL (with variable substitution)
- GUI dialogs for IDCAMS request
- GUI dialogs for DFSMSrmm requests
- Modify GUI created requests
- Rerun requests with new resources or previous execution
- Security validation based on ID used to sign on to TEP

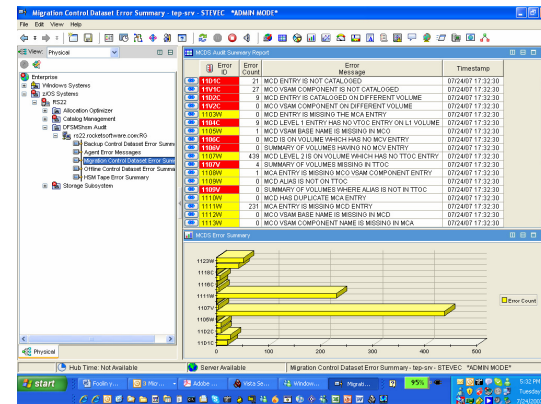
- **For more on OMXE for Storage**
 - **Session 7522: What's New With OMEGAMON XE for Storage, Wednesday at 3PM**

IBM Tivoli Advanced Audit for DFSMSHsm

V2.3 GA April 30, 2010



- Audits, repairs, and ensures integrity of the DFSMSHsm environment, including tape
 - Be able to detect and repair issues from media degradation
- Automates data collection and corrective actions
- Proactive notification and alerts to critical problems which can be expertly resolved before a system outage occurs
- Can find and correct 100% of DFSMSHsm errors
- Prove integrity of DFSMSHsm environment
- Operates many times faster than native DFSMSHsm commands, without performance impact on DFSMSHsm
- Ease-of-Use and performance permits regular rather than periodic audits
- TEP Interface makes it much easier to detect and diagnose problems – even linking to other products.
- **For more on Advanced Audit and Reporting**
 - **Session 8026: Hints and Tips for Improving Your DFSMSHsm Environment, Tuesday at 3 PM**



NEW V2.3 Highlights:

- Added expert guidance, including detailed recommended corrective actions for all reported DFSMSHsm errors, to the help system
- New automatic fix options can help activate a set of pre-determined, IBM-supplied automatic fixes for specified DFSMSHsm errors
- Added new Global Summary History Database
- Increased control of max number of volumes spanned by control data set (CDS) extraction files during any audit(1 to 256 volumes, previous max of 5 volumes)
- Provide additional error messages
- New CLIST provides the ability to use the ISPF interface without the started task being active if you do not want to keep the started task running

IBM Tivoli Advanced Reporting for DFSMSHsm

■ Provides Detailed HSM Reporting Capability

• Daily Health Reports

- DFSMS Mounted Volumes
- DFSMSHsm Managed Volumes
- DFSMSHsm Space Management
- DFSMSHsm Automatic Backup
- DFSMSHsm Autodump Activities

• Automatic Spreadsheet Charting

• Ad-hoc reporting

- Fast and highly interactive
- Easily find areas of concern

• Perform “what-if” analysis

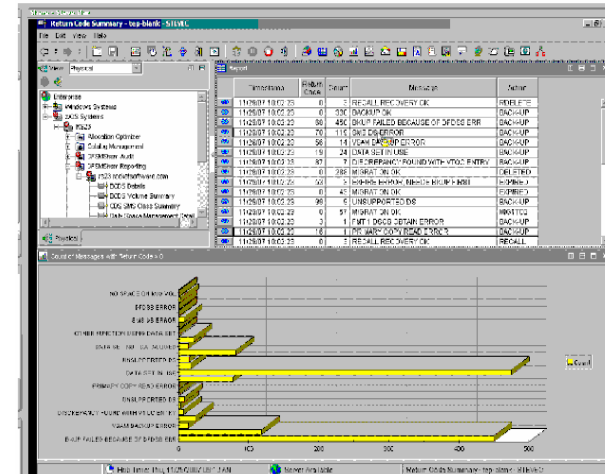
- Migration thresholds
- Recycle percent valid

• “Plans” Feature makes new reports simple to create and save

- Provides filtering logic so you can drill down

• Automated command generation

- Allows wrapping action commands around listed data sets
- Go from “Now I know what to do” to “I’ve already done it”
- Add your own customized commands to the command library



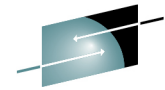
■ Integration with OMEGAMON XE for Storage and other System z Storage solution components via TEP interface

- Simplifies identifying, researching and correcting problems
- Captures Expert Knowledge

■ Also - Easy-to-Use ISPF User Interface

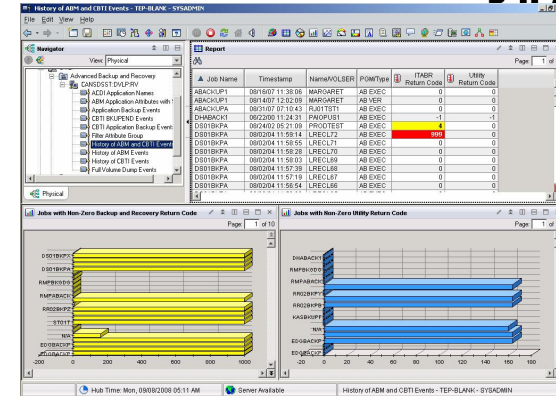
IBM Tivoli Advanced Backup & Recovery for z/OS

V2.2 GA March 19, 2010



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- **Single Toolset to automatically:**
 - Identify critical application data
 - Track & Validate Backups
 - Where they are
 - Currency
 - Supporting removable or non-removable media types
 - Recover **Fast** from Disasters or Local Outages
 - Either at Local or DR site
 - From one central location
 - With one simple process
 - Eliminates guesswork and manual processes
 - Provides assurance that data needed for the business to be resilient and compliant is protected and can be recovered from any type of outage, with documented evidence of the recoverability
 - Easy to use TEP interface makes it easy to stay on top of backup status and spot problems before they cause outages!

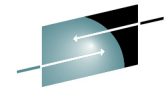


NEW V2.2 Highlights:

- Users of IBM Tivoli Monitoring can:
 - View backup information at a glance
 - Initiate backup and recovery functions from a single GUI by leveraging Tivoli Enterprise Portal (TEP)
- Track DB2® database image copies to help ensure they are synchronized with related datasets used in composite applications
- Users of distributed platform backup and replication tools, such as IBM Tivoli Storage Manager and IBM Tivoli Storage Productivity Center, can:
 - Use extended capabilities of IBM Tivoli OMEGAMON® Dashboard Edition to help create a consolidated view of backup status across platforms

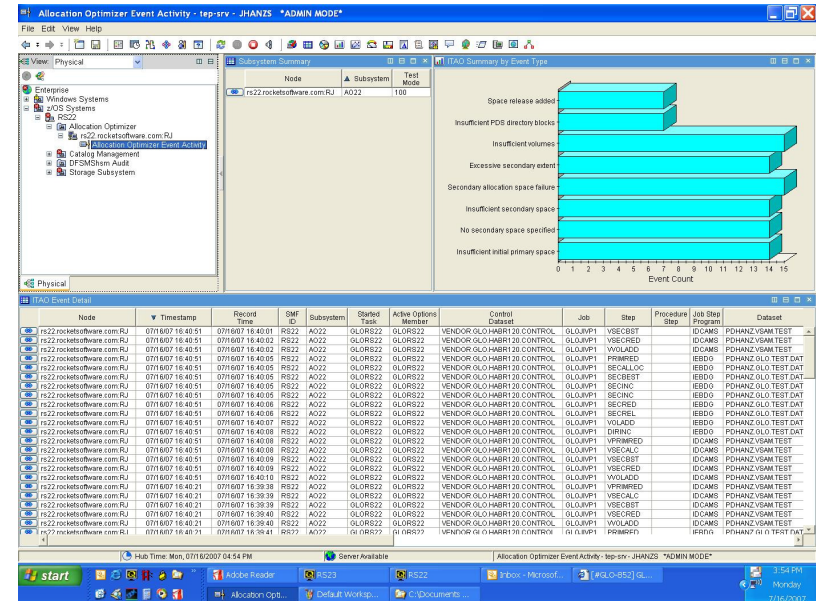
IBM Tivoli Advanced Allocation Management V3.1

Announced September 2009



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Technology • Connections • Results

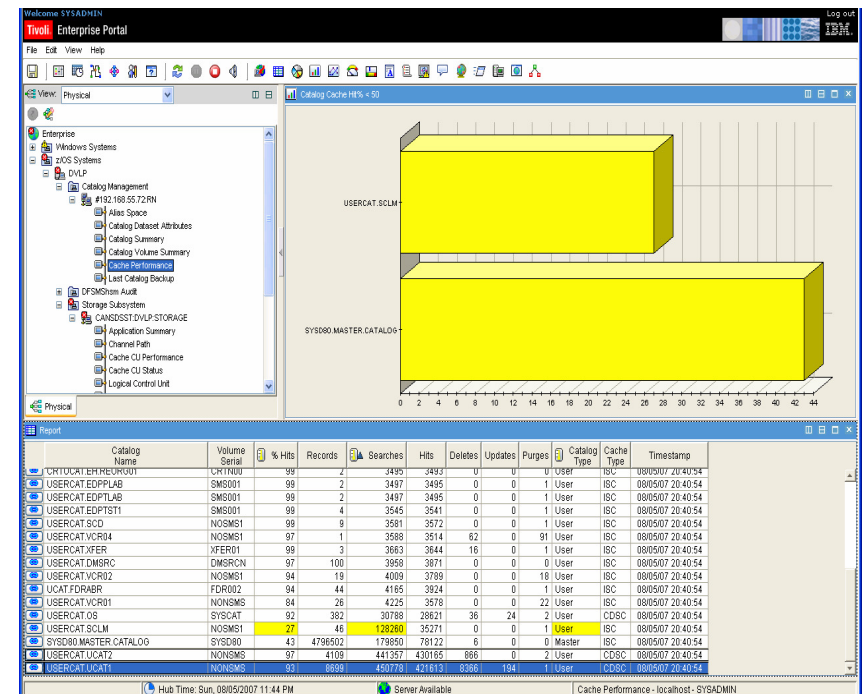
- **New** significant functional offering of Tivoli Allocation Optimizer
 - Minimizes the risk of task failure due to space issues
 - Enhances productivity and data availability of highly-available and mission-critical computing environments
- Provides many more options, which give greater control over customization
 - Advanced volume selection, which permits centralized control of DASD usage both at initial allocation and end of volume processing
 - Enhanced allocation management, which permits centralized control of allocation attribute usage
 - Ability to enforce site installation standards by forcing an allocation to fail when the selection criteria in a RULEDEF have been met
 - Continuation of processing even when the current rule definition encounters a match, which provides enhanced processing flexibility and allows the ability to customize processing to fit customer requirements



Tivoli Enterprise Portal (TEP) Enabled

IBM Tivoli Advanced Catalog Management for z/OS

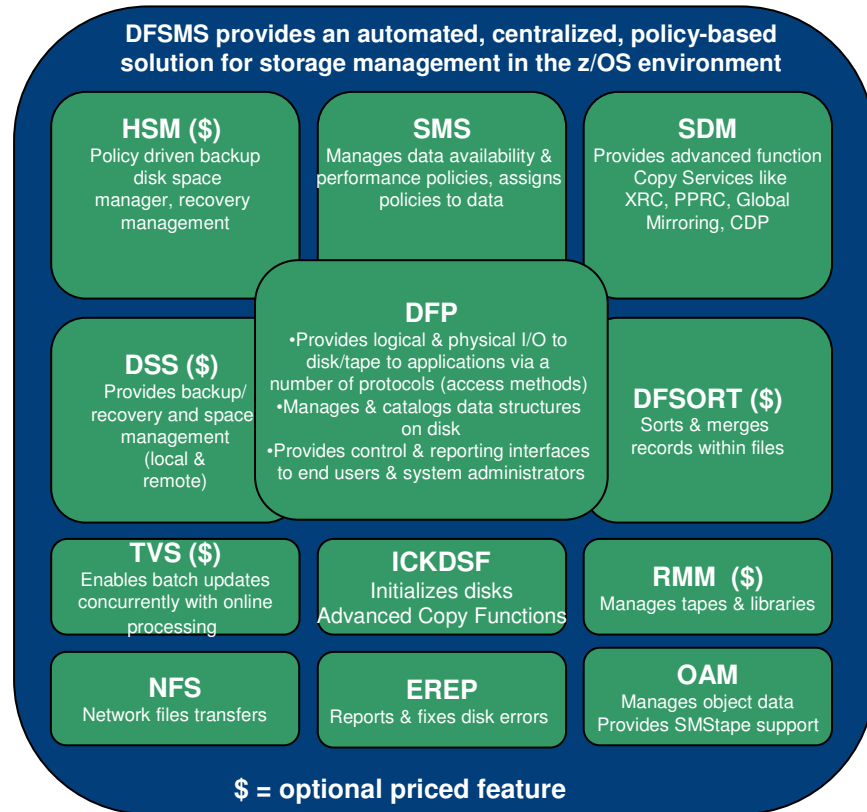
- Provides powerful, safe, reliable, and easy ICF catalog and VSAM backup and *fast* forward recovery
- Protects a catalog's complex structural integrity, alerts for potential errors, and reduces recovery time
- Reduces application down-time by permitting catalog maintenance while open
- Allows “what-if” simulation to preview effects of actions
- Easy-to-use interface improves staff productivity
- TEP Integration makes it easier to detect, diagnose, and correct problems involving catalogs
- **For more on Advanced Catalog Management**
 - **Session 8027: ICF Catalog Synchronization at the DR Site Using Catalog Recovery Plus, Thursday at 8 AM**



DFSMS™: Providing System Managed Storage on z/OS®



DFSMS is the standard methodology worldwide for managing enterprise data and storage on the z/OS platform



Information Compliance

- Ability to cope with increased security and compliance requirements



Information Availability

- Improved storage administrator productivity and simplified management of the z/OS environment
- Increased data storage capacity and scalability to cope with explosive growth of data volumes and database sizes
- Seamless, reliable, performance-sensitive data sharing
- Support for deployment of new processors/systems while exploiting their capabilities efficiently
- Point-in-time copy, fast replication, and continuous data mirroring functions while preserving consistency
- High Availability with simpler, faster, and more reliable recovery operations



Information Retention

- Data availability at all levels of the storage hierarchy
- Long standing provider of critical data management functions



Information Security

- Improved Security with Exclusive media encryption capability, integration with z/OS Key Management

z/OS® DFSMS™ V1.11 Highlights

(September 2009)

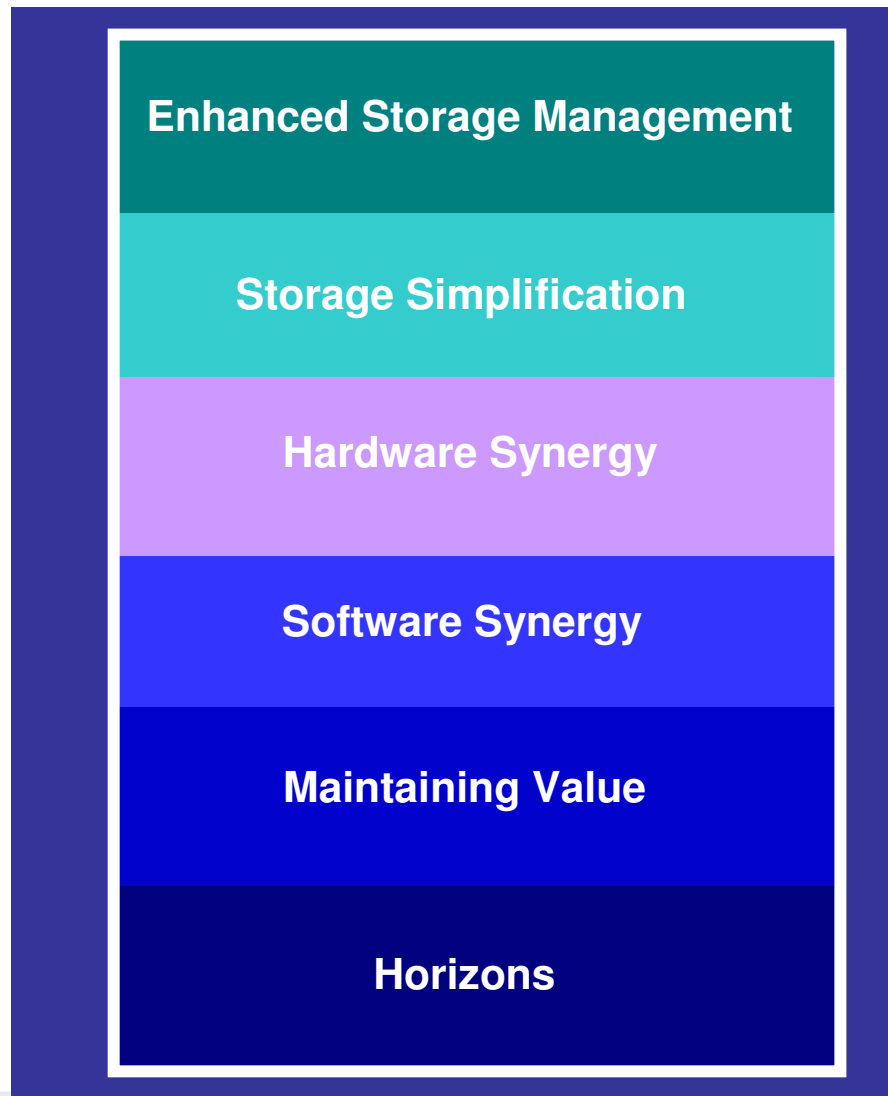
- **Ease of Use**
 - DFSMSrmm Enhancements
 - Catalog HealthCheck Enhancement
 - IDCAMS Delete Masking
 - DFSMS DADSM Enhancement
 - NFS Client Message Globalization
- **Application Integration**
 - DFSMSdfp Enhancements
 - NFS Server Symbolic Links
- **Scalability and Performance**
 - Extended Address Volumes (EAV) – Support non-VSAM data types
 - DS8000® Dynamic Volume Expansion Enhancements
 - OAM Scalability – 2GB Tape objects
 - DFSMSrmm Enhancements
 - VSAM SMB Enhancements
 - NFS Server File Delegation
- **Optimization & Management Capabilities**
 - DFSMShsm Fast Replication Enhancements
 - DFSMShsm ML1 Enhancements
 - DFSMShsm Backup Copy Retention Period
 - OAM Archive Retention Enhancements
 - SMS Dataset Separation by Volume
 - SMS Volume Selection Enhancements
 - DFSMS Open/Close/End-of Volume Enhancements
 - DFSMSrmm Enhancements
- **Security**
 - NFS Elimination of mvslogin and mvslogout for RPCSEC_GSS
 - NFS RPCSEC_GSS V4 Client Security
- **Availability**
 - NFS Delay Detection Interval
- **Serviceability**
 - VSAM Serviceability Enhancements
 - NFS Serviceability Enhancements

z/OS® DFSMS™ V1.12 Highlights

(September 2010)

- **Ease of Use**
 - SMS Healthchecker Enhancements
 - DFSMSrmm Simplified Monitoring & Management
 - ISMF COPY Storage Group Enhancements
 - Catalog zFS Data Set Enhancements
 - Catalog Partial Release Enhancements
 - Catalog DEFINE RECATALOG Enhancements
 - PDSE EMPTY Command
 - PDSE Message Enhancements
- **Application Integration**
 - SDM Support of ATTREXX Interface
- **Optimization & Management Capabilities**
 - DFSMS IMBED/REPLICATE Removal
 - DFSMS Fast Reverse Restore Enhancements
 - DFSMSrmm TS7700 Reporting Enhancements
 - PDSE Verification Tool
 - SMS Storage Group Mgmt & Volume Selection Enhancements
 - IDCAMS DCOLLECT Enhancements
 - IDCAMS GDG Enhancements
- **Availability**
 - VSAM KSDS CA Reclaim
 - DFSMSrmm Active and Queued Task Management
- **Scalability, Performance, & Constraint Relief**
 - EAV Additional Data Set Support
 - DFSMSrmm EAV Exploitation
 - DFSMS Support for XTIOU and Uncaptured UCBs
 - OAM Object Storage & Retrieval (OSR) Enhancements
 - Extended Addressable Catalogs
 - VSAM RLS Striping
 - DFSMSdss Larger Block Support for DUMP, COPYDUMP, and RESTORE
 - DFSMSShsm Dump Tape Recovery Enhancements
 - DFSMSShsm Space Management Performance
 - Catalog CAS Contention Detection
 - DFSMSShsm Dump Stacking
- **For more on DFSMS R12 Overview**
 - **Session 8051: What's New in DFSMS Overview, Monday at 3 PM**

DFSMS Futures*



- **Enhanced Storage Management**
 - Archiving
 - Disk Tiers
 - Continuous Data Protection w/DB2
 - Enterprise Tape Mgmt
- **Storage Simplification**
 - Storage Provisioning
 - Plug and Play
- **Hardware Synergy**
 - Virtual / Native Tape
 - Disk, Solid State Devices
- **Software Synergy**
 - DB2, IMS, CICS, CM
 - Tivoli
 - NFS
- **Maintaining Value**
 - Customer requirements
 - Scaling, performance
- **Horizons**
 - zFuture
 - Expanded zIIP support
 - Open Data and Devices

System Storage™ and System z®

An exceptional combination for today's business environment



System z and System Storage combine together to provide:

- Full range of innovative yet reliable storage systems to enable complete server and storage solutions
- High performing, efficient technology and functions
- Low Total Cost of Ownership and excellent investment protection
- Technology designed for infrastructure simplification and consolidation
- Compatible features which improve business efficiency and management
- Technology designed for round the clock availability with best of breed disaster recovery and backup solutions
- World-class support and service



SHARE in Boston

Sources for more information

- Information about [DFSMS](#) and components
 - <http://www-03.ibm.com/systems/storage/software/sms/index.html>
- Information about [DFSORT](#)
 - <http://www-01.ibm.com/support/docview.wss?rs=0&uid=isg3T7000077>
- Information about [IBM TotalStorage Productivity Center for Replication](#)
 - <http://www-03.ibm.com/systems/z/advantages/resiliency/eventdriven/tpc.html>
- Information about [IBM System Storage Disk](#) systems
 - <http://www-03.ibm.com/systems/storage/disk/enterprise/index.html>
- Information about [IBM System Storage Tape](#) systems
 - http://www-03.ibm.com/systems/storage/tape/?cm_re=masthead-_-products-_-stg-tape
- Additional Information
 - [Redbooks](#)
 - <http://www.redbooks.ibm.com/>
 - z/OS V1R8 DFSMS Technical Update (SG24-7435-00)
 - [Techdocs](#)
 - <http://www-03.ibm.com/support/techdocs/atmastr.nsf/Web/TechDocs>

Thank you!



- **IBM's commitment to the mainframe helps deliver:**

- Extreme scalability, and availability
- Reduced costs and simplified IT infrastructure
- High performance and energy efficient technologies
- a resilient and security rich system



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DFSMSdss	geoManager*	OS/390*	VisualAge*
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