IBM Tivoli Storage Infrastructure Management Solutions

IBM z/OS storage management overview

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Agenda

- **Storage challenges**
- **Traditional IBM System z Storage Infrastructure**
- **OMEGAMON XE for Storage on z/OS:**
  - TEP interface
  - Storage capabilities
  - Integration for full Tivoli power
- **Key Tivoli zStorage solutions**
- **IBM's System z Storage Management Future Directions**

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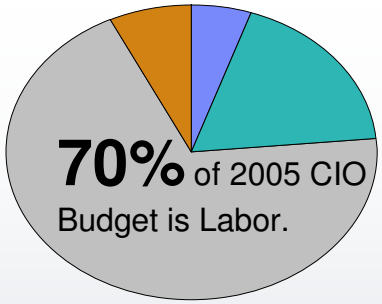
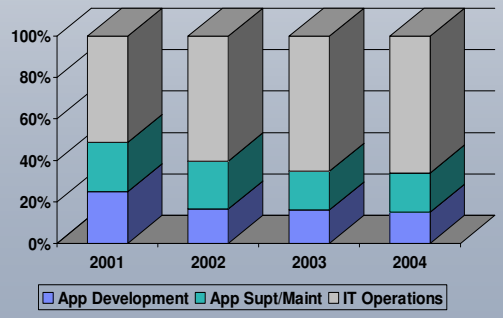
Storage Management Challenges



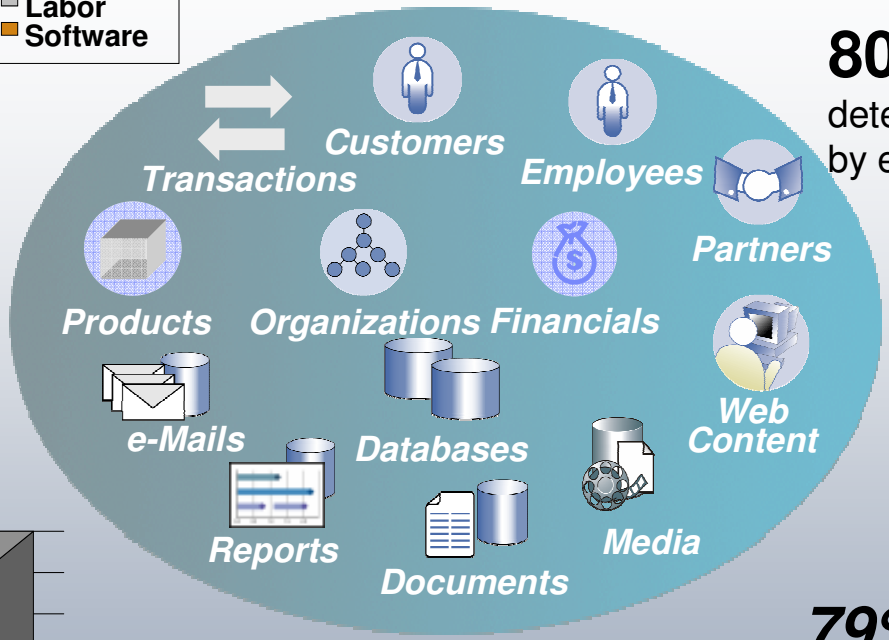
Source: Tivoli Commissioned IDC Study 1Q05

Operations labor cost is largest and faster growing part of CIO budgets today

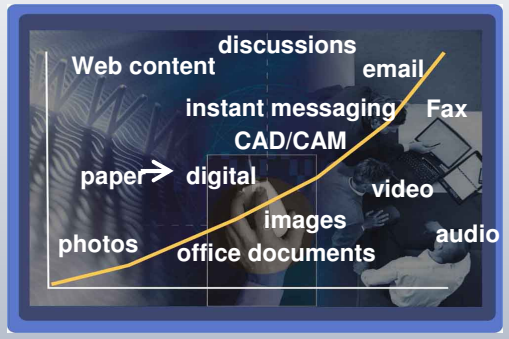


Source: Gartner Group, IT Spending & Staffing surveys

37% *CGR Disk Storage Growth '96-'07*



80% of IT problems are not detected by IT staff until reported by end users



60%+ *of CEOs: Need to do a better job capturing and understanding information rapidly in order to make swift business decisions*

79% *of companies: have 2 + repositories… (25%: have 15 +) used to store data from a large variety of information sources*

Sources: IBM & Industry Studies, Customer Interviews

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Common issues in z/OS Storage Management

- Space – What's available at the Group, Volume and Dataset levels?
- Performance – Where are the slowdowns?
- Storage resources – Cache, Shared DASD, I/O subsystem, tape devices, etc.
- Applications – Are throughput problems related to DASD?
- Which logical volumes share physical disk media? – Challenges with hardware issues
- DFSMShsm – Did the maintenance cycle run well last night, Which user is generating recalls, what do I do about my HSM errors, why are there so many of them?
- Auditing and correcting DFSMShsm is time, labor and system resource intensive
- ICF Catalog – Are the catalogs and other VSAM files backed up for forward recovery, are they clean up, and do they utilize cache effectively?
- Allocations – These secondary allocation abends are killing my monthly batch cycle
- Tape – System A is always waiting on tape drives, what can we do?

- Resource constraints – Need to automate routine storage tasks to increase productivity

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Traditional IBM System z Storage Infrastructure: DFSMSxxx offerings - System z Storage Capability

Provides storage, data, program, and device management functions and DFSMS Copy Services capabilities

An optional feature providing backup, recovery, migration, space management functions as well as disaster recovery

An optional feature providing data movement, copy, backup, and space management functions

An optional feature providing management functions for removable media such as tape cartridges and 3420 reels

Provides, via the System Data Mover component, a comprehensive disaster recovery solution for the z/OS environment

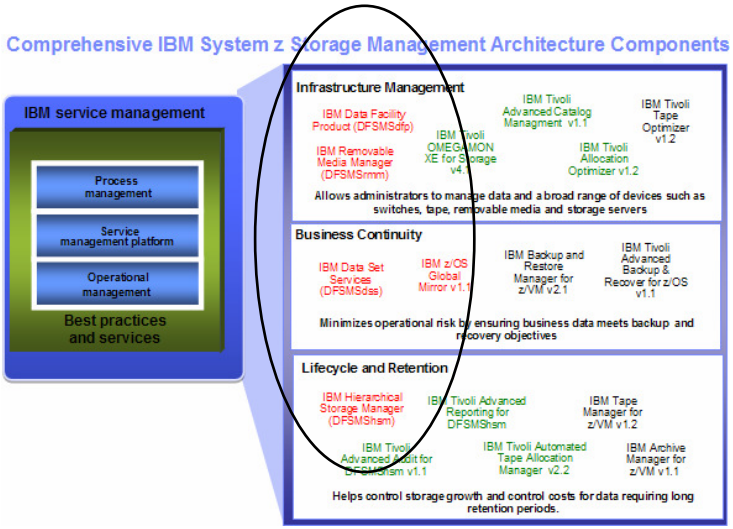
IBM Data Facility Prodcut (DFSMSdfp)

IBM Hierarchical Storage Manager (DFSMShsm)

IBM Data Set Services (DFSMSdss)

IBM Removable Media Manager (DFSMSrmm)

IBM z/OS Global Mirror



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Traditionally IBM thought of as a provider of zStorage Infrastructure

- **IBM Hardware**
  - Traditional DASD storage devices, e.g. DS8000, DS6000, etc.
  - Offline storage devices, e.g. tape drives, VTS, etc.
- **Software for allocation, backup & recovery of data**
  - DFSMSdfp: Creation and allocation of datasets
  - DFSMShsm: Provides backup and recovery of datasets
  - DFSMSdss: Provides backup and recovery of logical volumes
  - DFSMSrmm: Provides offline storage library capability
- **But what about managing these basic capabilities in the zStorage environment?**

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IBM Tivoli Storage Infrastructure Management Solutions

IBM Tivoli OMEGAMON XE for Storage

9/3/2008

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OMEGAMON XE for Storage's User Interface (TEP)

- **Browser based access to data**
- **Capability of creating alerts using logic as opposed to just threshold setting**
- **Ability to see alerts and associated information about the problem from the same interface**
- **Reflex automation capabilities (take action)**
- **Provide information about a situation through the Expert Advise feature**
- **Integrate your OMEGAMON alerts with other systems information from OMEGAMON monitors using DE**
- **Dynamic Workspace Linking**
- **Built-in TN3270 interface**
- **Built-in Browser interface**
- **Real-time, near term and long term history**

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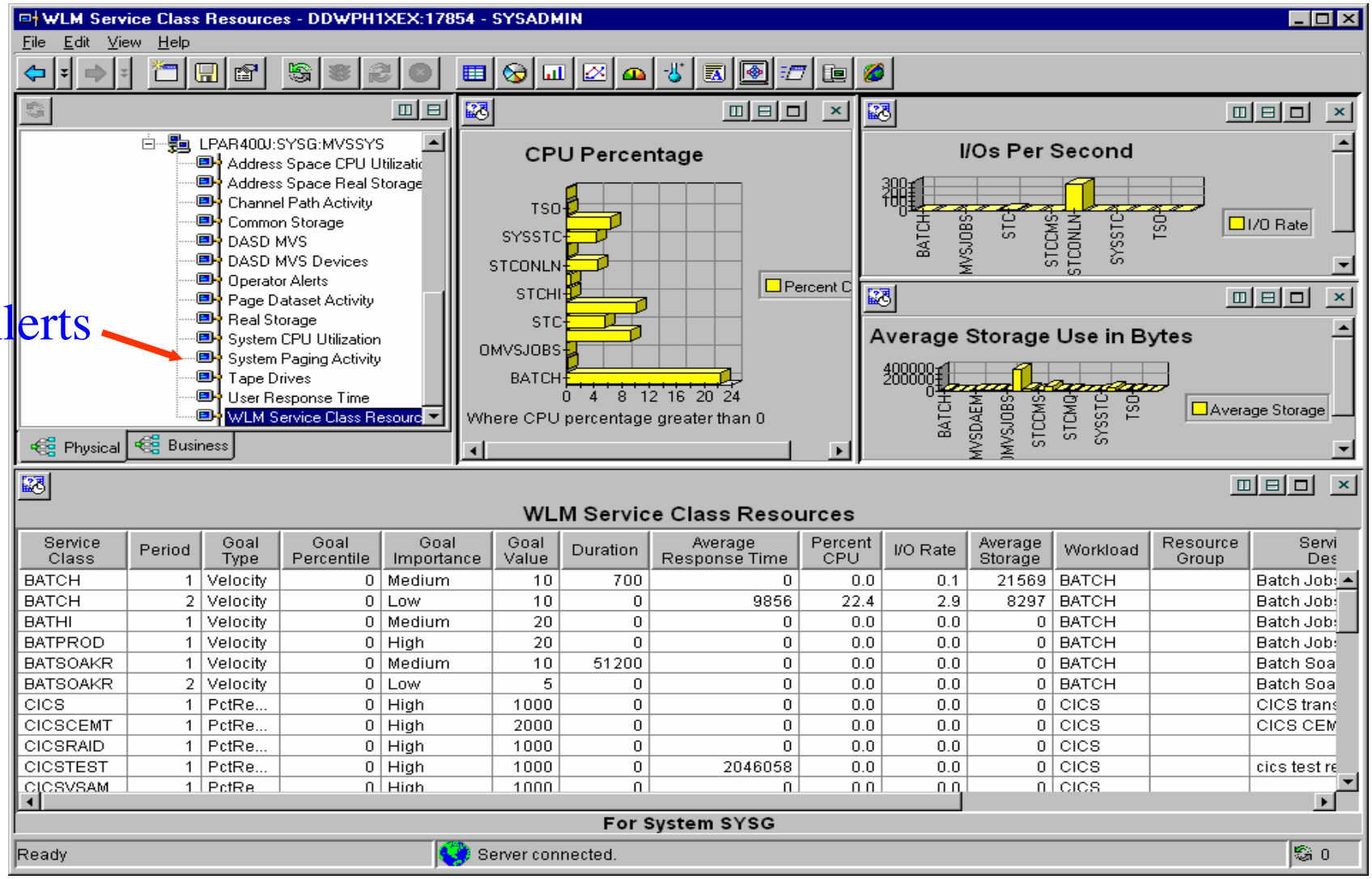
Tivoli OMEGAMON XE Interface



Service Class	Period	Goal Type	Goal Percentile	Goal Importance	Goal Value	Duration	Average Response Time	Percent CPU	I/O Rate	Average Storage	Workload	Resource Group	Servi Des
BATCH	1	Velocity	0	Medium	10	700	0	0.0	0.1	21569	BATCH		Batch Jobs
BATCH	2	Velocity	0	Low	10	0	9856	22.4	2.9	8297	BATCH		Batch Jobs
BATHI	1	Velocity	0	Medium	20	0	0	0.0	0.0	0	BATCH		Batch Jobs
BATPROD	1	Velocity	0	High	20	0	0	0.0	0.0	0	BATCH		Batch Jobs
BATSOAKR	1	Velocity	0	Medium	10	51200	0	0.0	0.0	0	BATCH		Batch Soa
BATSOAKR	2	Velocity	0	Low	5	0	0	0.0	0.0	0	BATCH		Batch Soa
CICS	1	PctRe...	0	High	1000	0	0	0.0	0.0	0	CICS		CICS trans
CICSCEMT	1	PctRe...	0	High	2000	0	0	0.0	0.0	0	CICS		CICS CEM
CICSRAID	1	PctRe...	0	High	1000	0	0	0.0	0.0	0	CICS		
CICSTEST	1	PctRe...	0	High	1000	0	2046058	0.0	0.0	0	CICS		cics test re
CICSVSAM	1	PctRe	0	High	1000	0	0	0.0	0.0	0	CICS		

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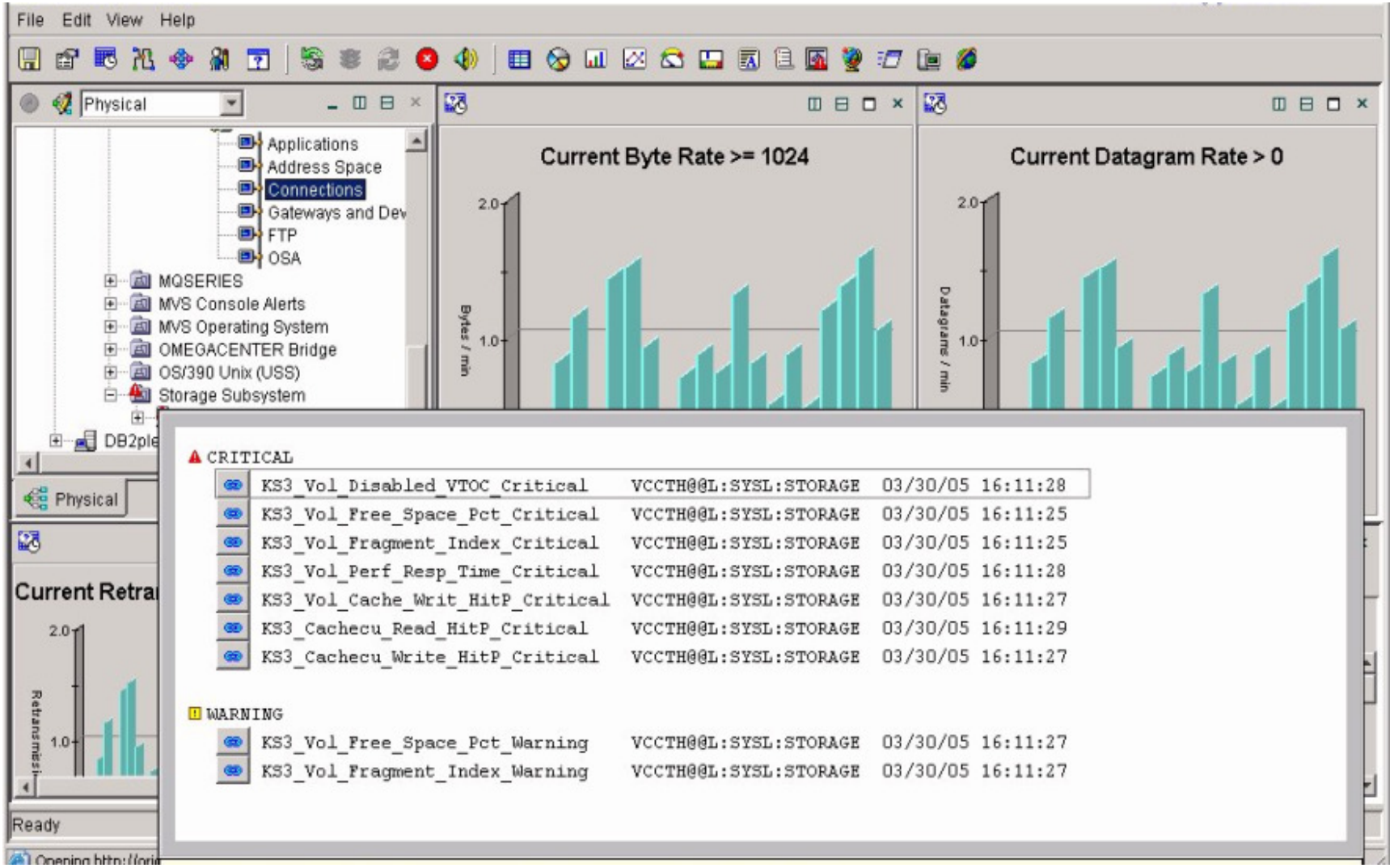
OMEGAMON XE for Storage Alert



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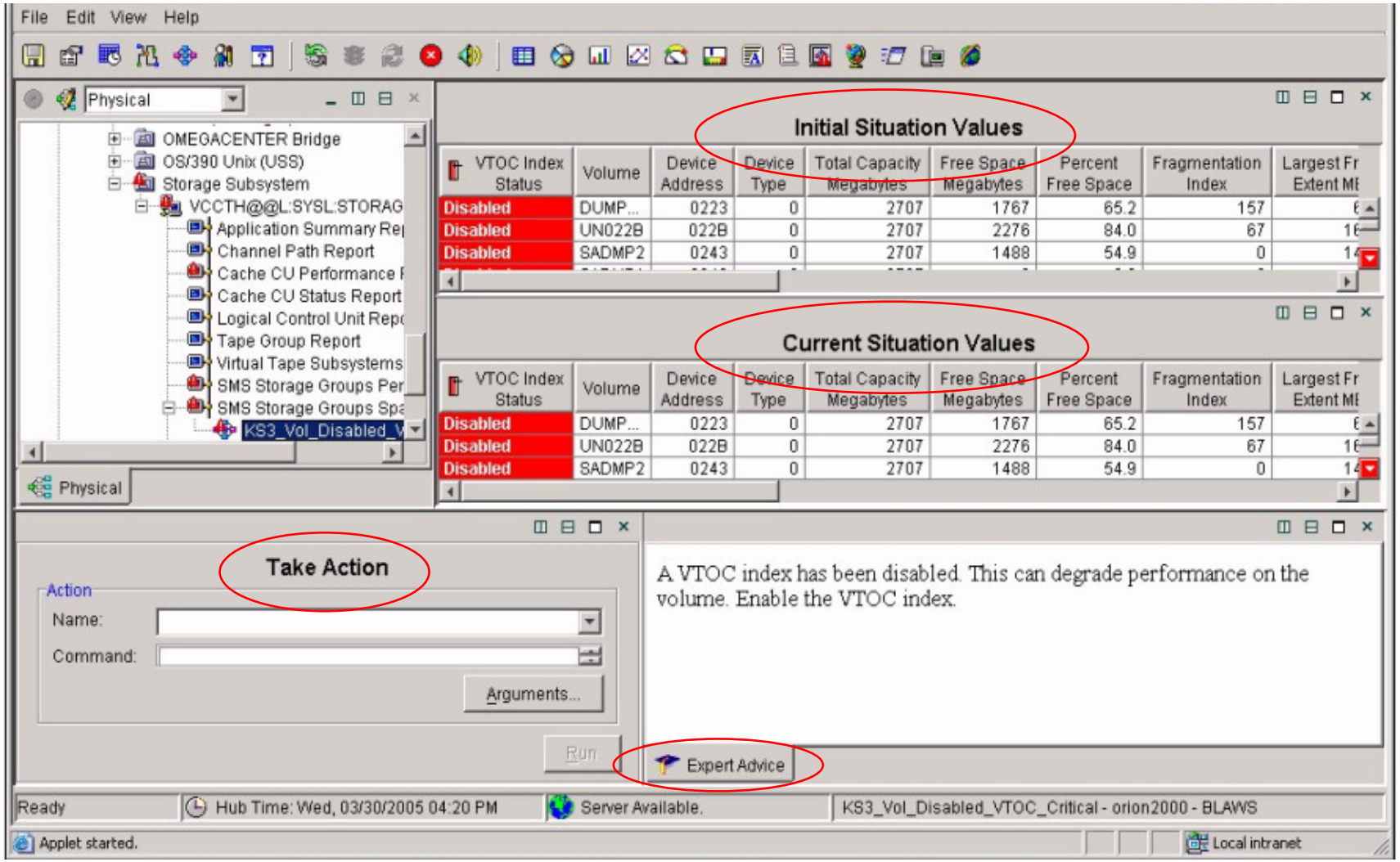
Events, details, get Expert advice and Take Action



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IBM Tivoli OMEGAMON XE for Storage

- **A mainframe STORAGE monitor, real-time and historical**
- **XE user interface, comes with the CUA UI component**
- **A wide breadth of mainframe storage information:**
  - Space (storage groups or user groups … define your own)
  - Performance (storage groups or user groups … define your own)
  - Tape / VTS
  - CACHE
  - Channels (FICON)
  - Control Units
  - DFSMShsm (View your HSM queues, control Datasets, etc.)
  - DFSMShsm/DFSMSdss online toolkit
  - SMS constructs
  - DS8000 support
  - Ability to see all logical volumes on a physical disk
  - Powerful applications view
  - Powerful dataset view and action capability
  - Integration capabilities from TEP interface (Launch to TPC in v4.1.0)

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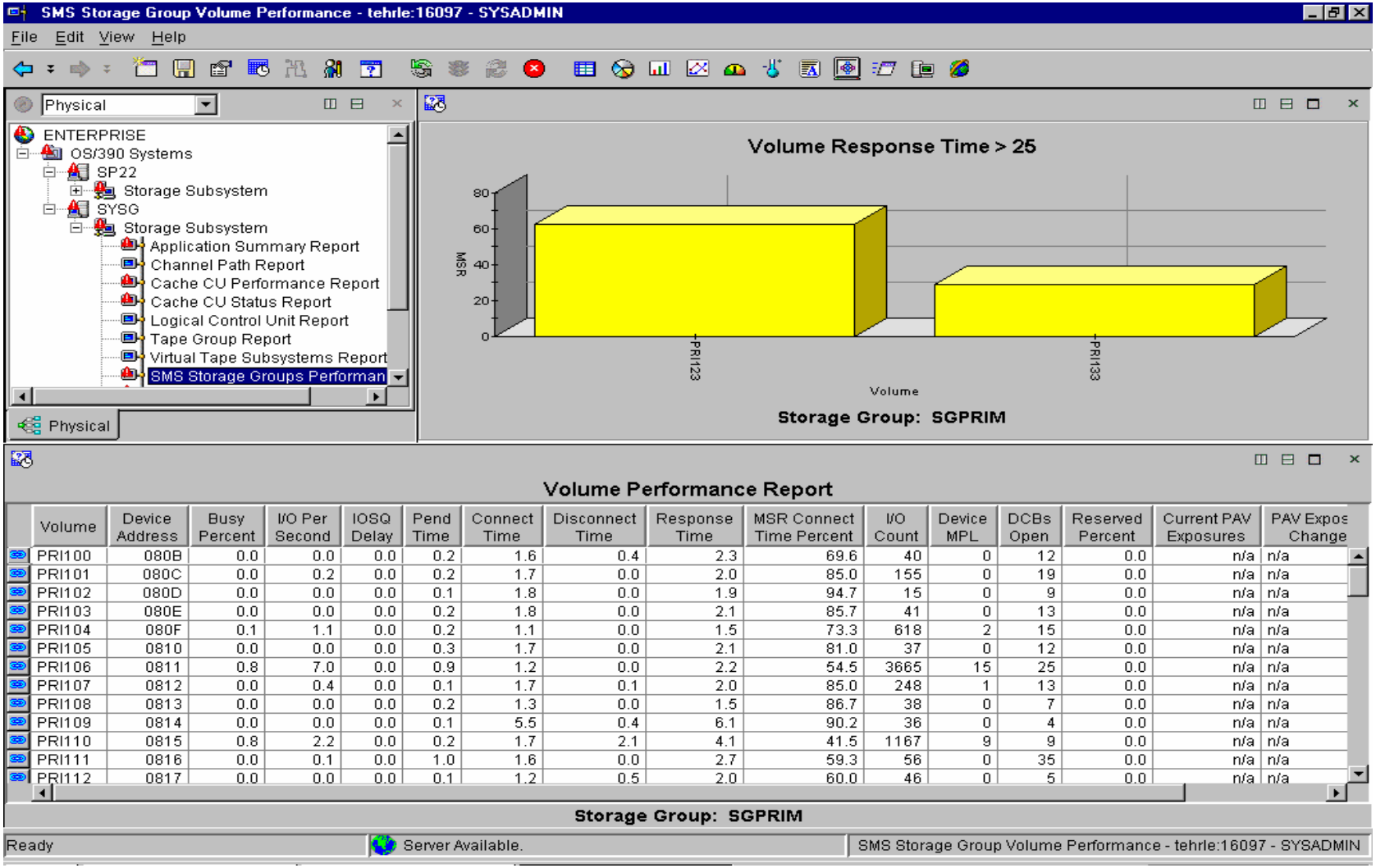
Volume Performance



Volume	Device Address	Busy Percent	I/O Per Second	IOSQ Delay	Pend Time	Connect Time	Disconnect Time	Response Time	MSR Connect Time Percent	I/O Count	Device MPL	DCBs Open	Reserved Percent	Current PAV Exposures	PAV Expos Change
PRI100	080B	0.0	0.0	0.0	0.2	1.6	0.4	2.3	69.6	40	0	12	0.0	n/a	n/a
PRI101	080C	0.0	0.2	0.0	0.2	1.7	0.0	2.0	85.0	155	0	19	0.0	n/a	n/a
PRI102	080D	0.0	0.0	0.0	0.1	1.8	0.0	1.9	94.7	15	0	9	0.0	n/a	n/a
PRI103	080E	0.0	0.0	0.0	0.2	1.8	0.0	2.1	85.7	41	0	13	0.0	n/a	n/a
PRI104	080F	0.1	1.1	0.0	0.2	1.1	0.0	1.5	73.3	618	2	15	0.0	n/a	n/a
PRI105	0810	0.0	0.0	0.0	0.3	1.7	0.0	2.1	81.0	37	0	12	0.0	n/a	n/a
PRI106	0811	0.8	7.0	0.0	0.9	1.2	0.0	2.2	54.5	3665	15	25	0.0	n/a	n/a
PRI107	0812	0.0	0.4	0.0	0.1	1.7	0.1	2.0	85.0	248	1	13	0.0	n/a	n/a
PRI108	0813	0.0	0.0	0.0	0.2	1.3	0.0	1.5	86.7	38	0	7	0.0	n/a	n/a
PRI109	0814	0.0	0.0	0.0	0.1	5.5	0.4	6.1	90.2	36	0	4	0.0	n/a	n/a
PRI110	0815	0.8	2.2	0.0	0.2	1.7	2.1	4.1	41.5	1167	9	9	0.0	n/a	n/a
PRI111	0816	0.0	0.1	0.0	1.0	1.6	0.0	2.7	59.3	56	0	35	0.0	n/a	n/a
PRI112	0817	0.0	0.0	0.0	0.1	1.2	0.5	2.0	60.0	46	0	5	0.0	n/a	n/a

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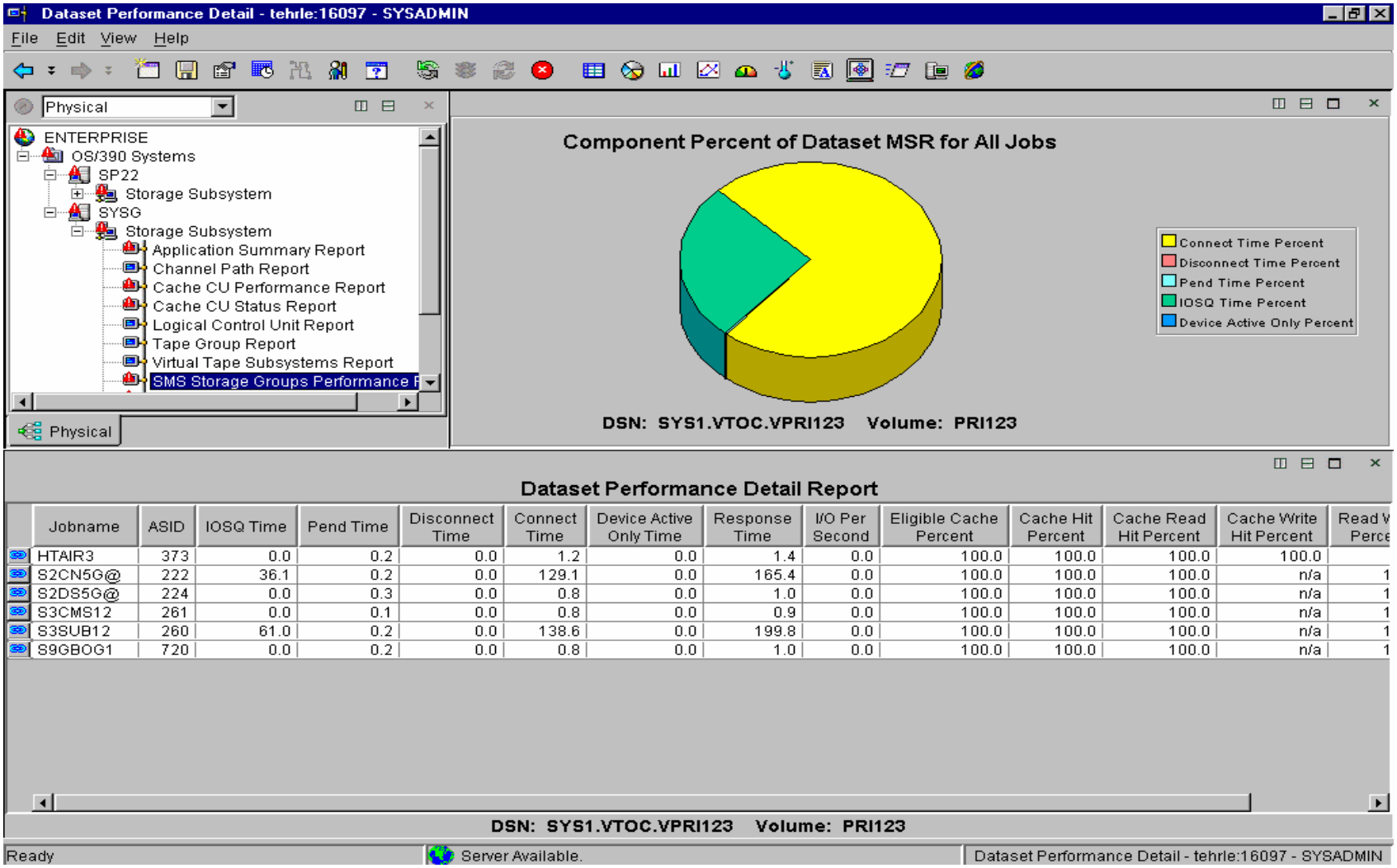
Down to Dataset level information



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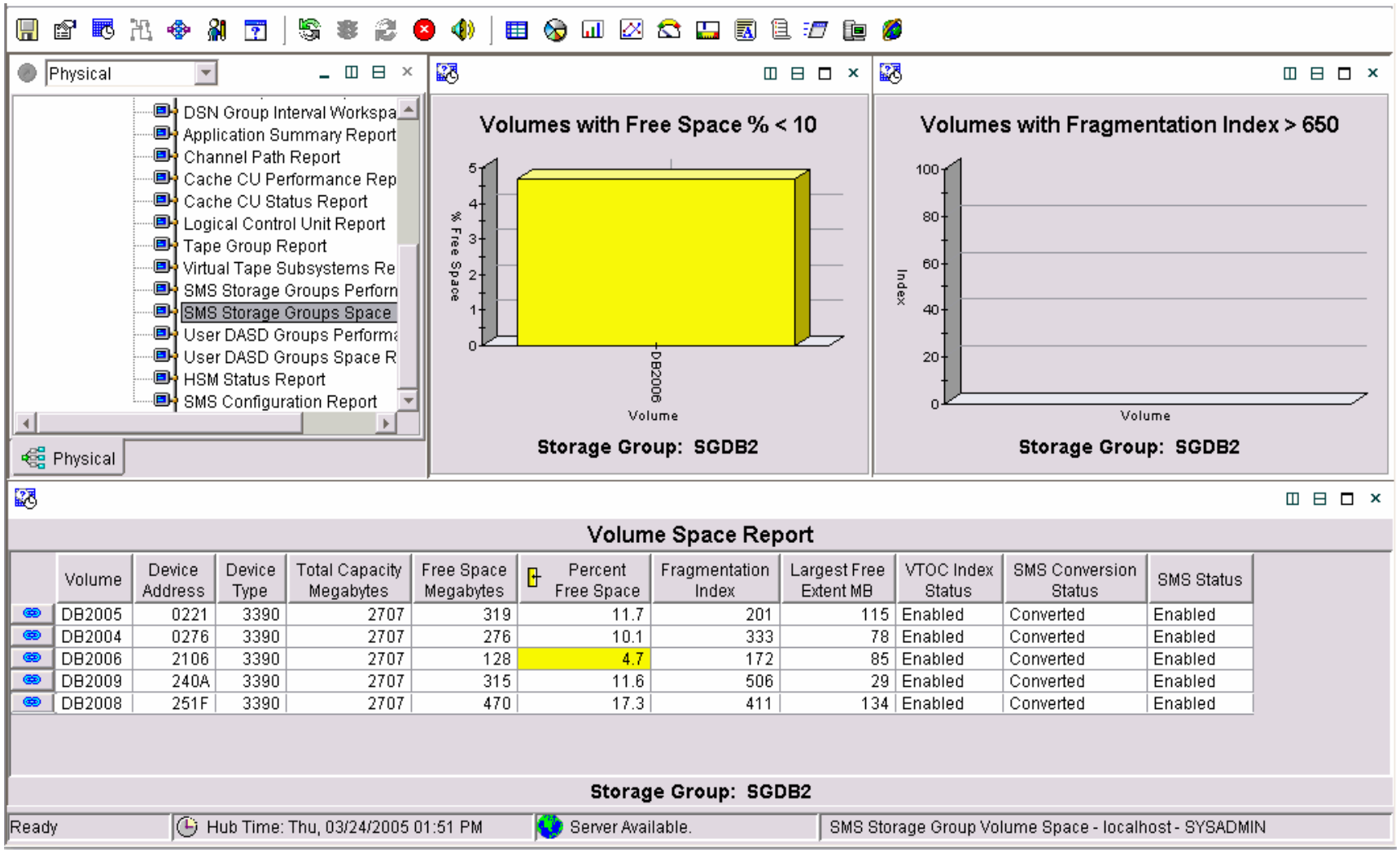
Space Problem? Volume Getting Full



Volume	Device Address	Device Type	Total Capacity Megabytes	Free Space Megabytes	Percent Free Space	Fragmentation Index	Largest Free Extent MB	VTOC Index Status	SMS Conversion Status	SMS Status
DB2005	0221	3390	2707	319	11.7	201	115	Enabled	Converted	Enabled
DB2004	0276	3390	2707	276	10.1	333	78	Enabled	Converted	Enabled
DB2006	2106	3390	2707	128	4.7	172	85	Enabled	Converted	Enabled
DB2009	240A	3390	2707	315	11.6	506	29	Enabled	Converted	Enabled
DB2008	251F	3390	2707	470	17.3	411	134	Enabled	Converted	Enabled

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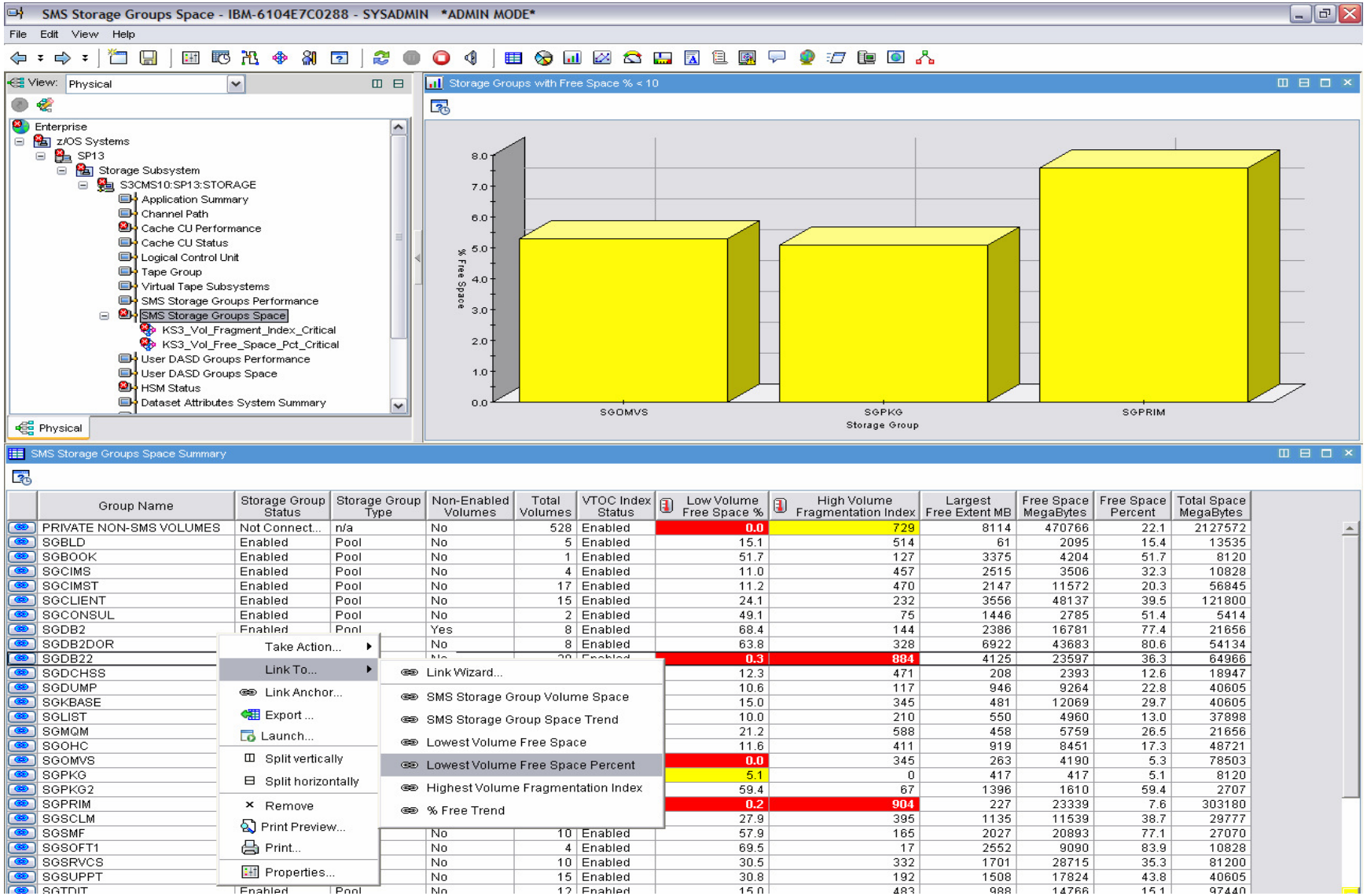
Problem Identification



Group Name	Storage Group Status	Storage Group Type	Non-Enabled Volumes	Total Volumes	VTOC Index Status	Low Volume Free Space %	High Volume Fragmentation Index	Largest Free Extent MB	Free Space MegaBytes	Free Space Percent	Total Space MegaBytes
PRIVATE NON-SMS VOLUMES	Not Connect...	n/a	No	528	Enabled	0.0	729	8114	470766	22.1	2127572
SGBLD	Enabled	Pool	No	5	Enabled	15.1	514	61	2095	15.4	13535
SGBOOK	Enabled	Pool	No	1	Enabled	51.7	127	3375	4204	51.7	8120
SGCIMS	Enabled	Pool	No	4	Enabled	11.0	457	2515	3506	32.3	10828
SGCIMST	Enabled	Pool	No	17	Enabled	11.2	470	2147	11572	20.3	56845
SGCLIENT	Enabled	Pool	No	15	Enabled	24.1	232	3556	48137	39.5	121800
SGCONSUL	Enabled	Pool	No	2	Enabled	49.1	75	1446	2785	51.4	5414
SGDB2	Enabled	Pool	Yes	8	Enabled	68.4	144	2386	16781	77.4	21656
SGDB2DOR			No	8	Enabled	63.8	328	6922	43683	80.6	54134
SGDB22						0.3	884	4125	23597	36.3	64966
SGDCHSS						12.3	471	208	2393	12.6	18947
SGDUMP						10.6	117	946	9264	22.8	40605
SGKBASE						15.0	345	481	12069	29.7	40605
SGLIST						10.0	210	550	4960	13.0	37898
SGMQM						21.2	588	458	5759	26.5	21656
SGOHC						11.6	411	919	8451	17.3	48721
SGOMVS						0.0	345	263	4190	5.3	78503
SGPKG						5.1	0	417	417	5.1	8120
SGPKG2						59.4	67	1396	1610	59.4	2707
SGPRIM						0.2	904	227	23339	7.6	303180
SGSCLM						27.9	395	1135	11539	38.7	29777
SGSMF			No	10	Enabled	57.9	165	2027	20893	77.1	27070
SGSOFT1			No	4	Enabled	69.5	17	2552	9090	83.9	10828
SGSRVCS			No	10	Enabled	30.5	332	1701	28715	35.3	81200
SGSUPPT			No	15	Enabled	30.8	192	1508	17824	43.8	40605
SGTDIT	Enabled	Pool	No	12	Enabled	15.0	483	988	14766	15.1	97440

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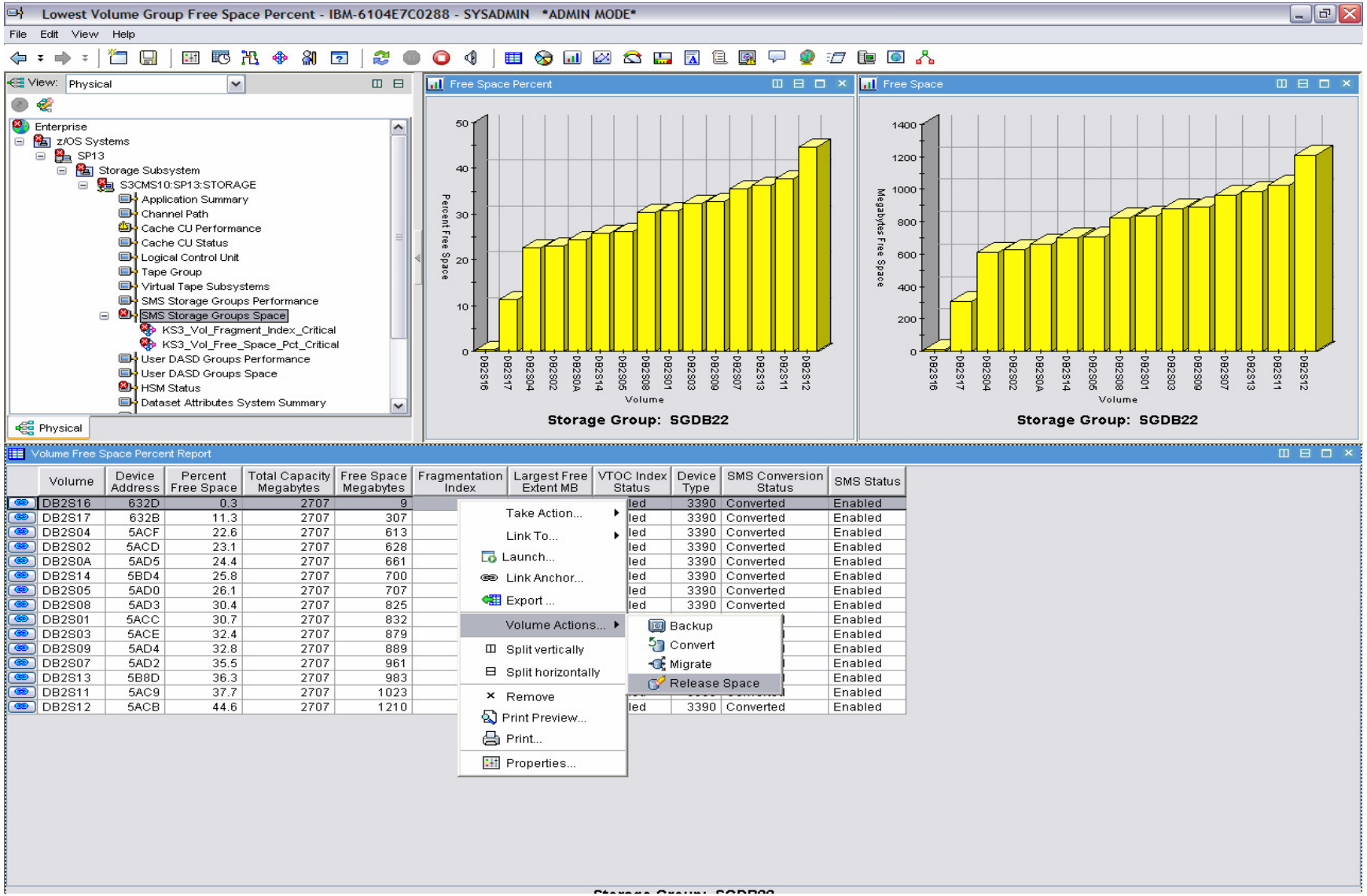
Problem Resolution



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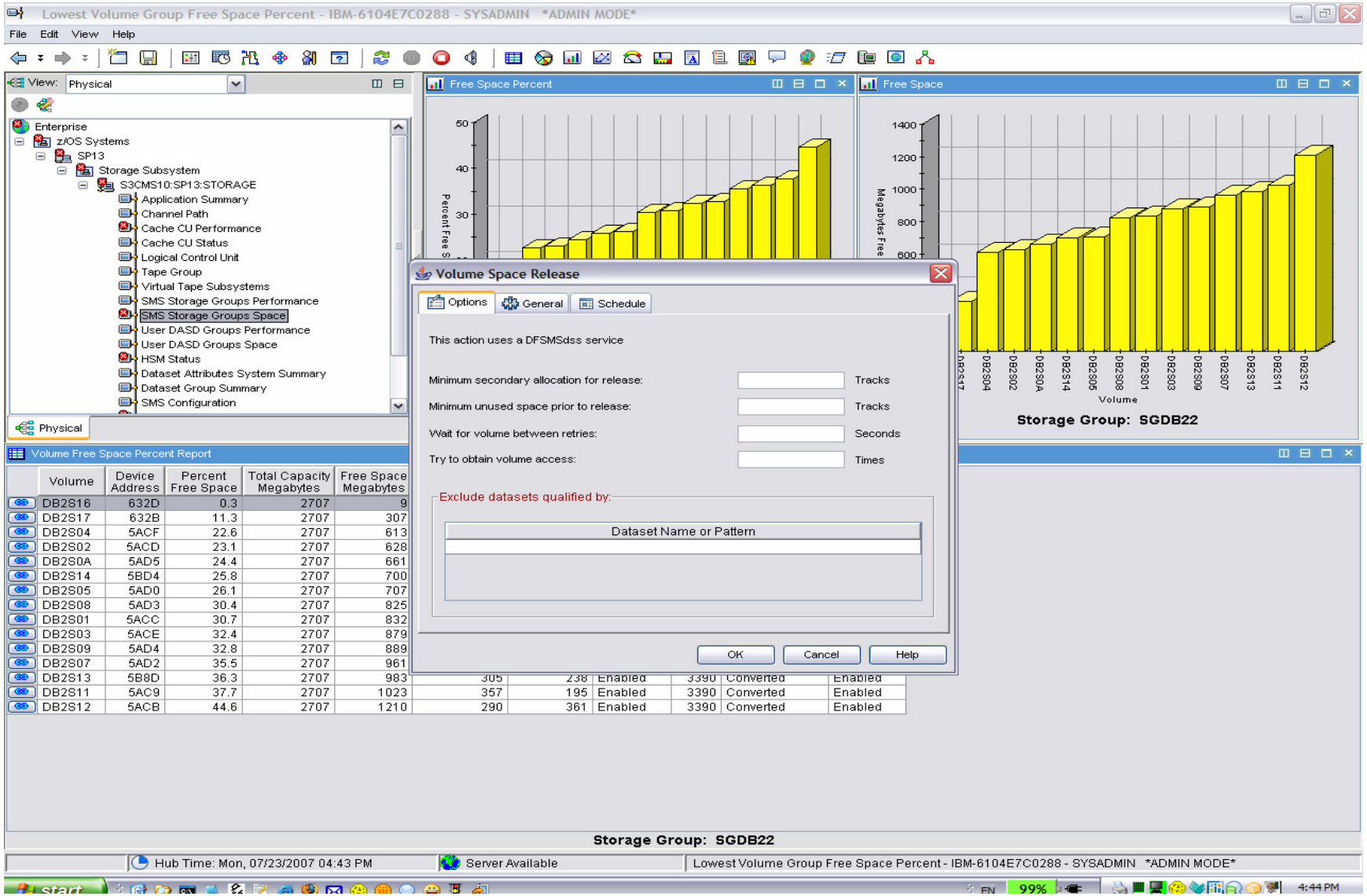
Problem Resolution



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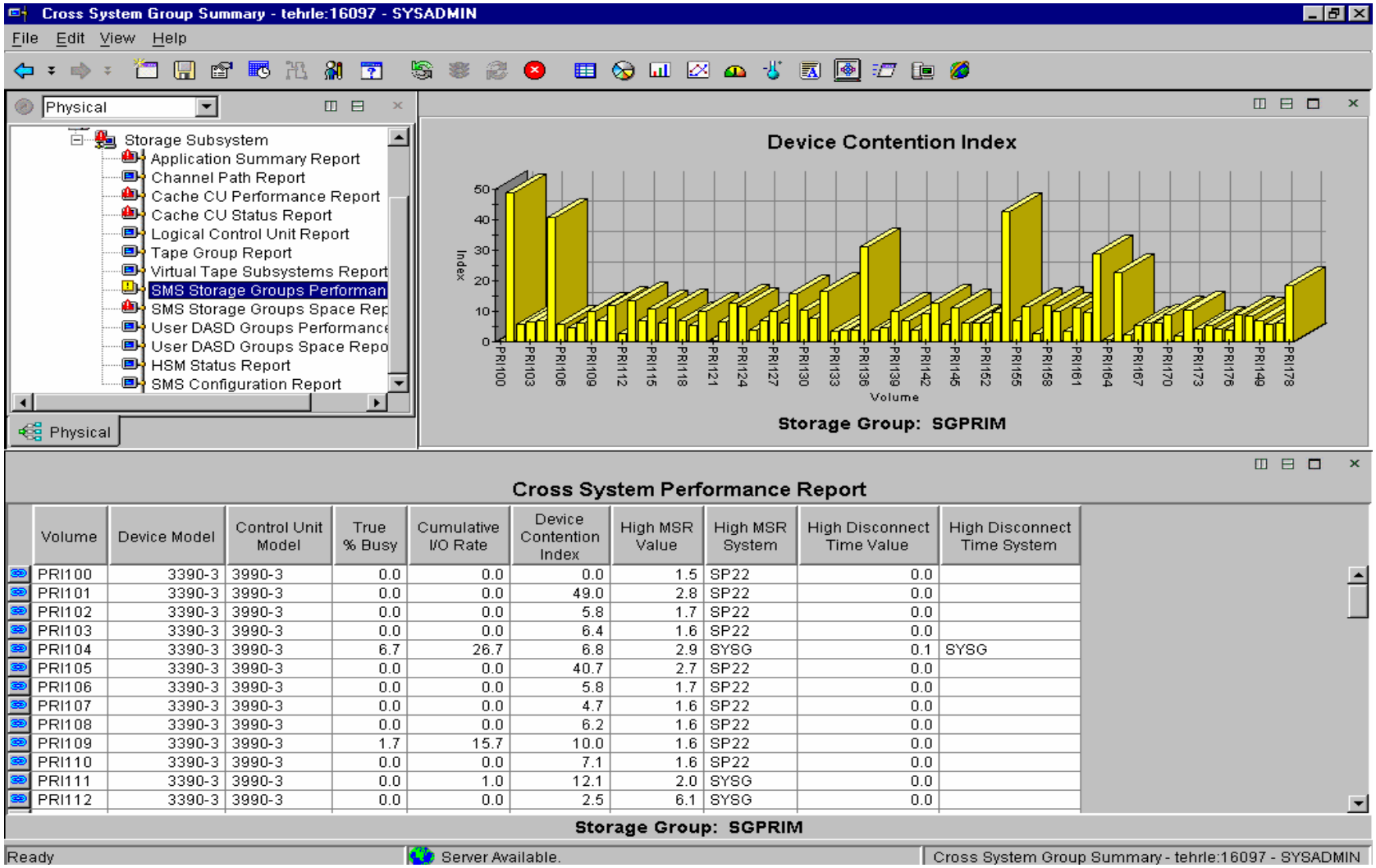
Shared DASD?
Look for cross system information



Volume	Device Model	Control Unit Model	True % Busy	Cumulative I/O Rate	Device Contention Index	High MSR Value	High MSR System	High Disconnect Time Value	High Disconnect Time System
PRI100	3390-3	3990-3	0.0	0.0	0.0	1.5	SP22	0.0	
PRI101	3390-3	3990-3	0.0	0.0	49.0	2.8	SP22	0.0	
PRI102	3390-3	3990-3	0.0	0.0	5.8	1.7	SP22	0.0	
PRI103	3390-3	3990-3	0.0	0.0	6.4	1.6	SP22	0.0	
PRI104	3390-3	3990-3	6.7	26.7	6.8	2.9	SYSG	0.1	SYSG
PRI105	3390-3	3990-3	0.0	0.0	40.7	2.7	SP22	0.0	
PRI106	3390-3	3990-3	0.0	0.0	5.8	1.7	SP22	0.0	
PRI107	3390-3	3990-3	0.0	0.0	4.7	1.6	SP22	0.0	
PRI108	3390-3	3990-3	0.0	0.0	6.2	1.6	SP22	0.0	
PRI109	3390-3	3990-3	1.7	15.7	10.0	1.6	SP22	0.0	
PRI110	3390-3	3990-3	0.0	0.0	7.1	1.6	SP22	0.0	
PRI111	3390-3	3990-3	0.0	1.0	12.1	2.0	SYSG	0.0	
PRI112	3390-3	3990-3	0.0	0.0	2.5	6.1	SYSG	0.0	

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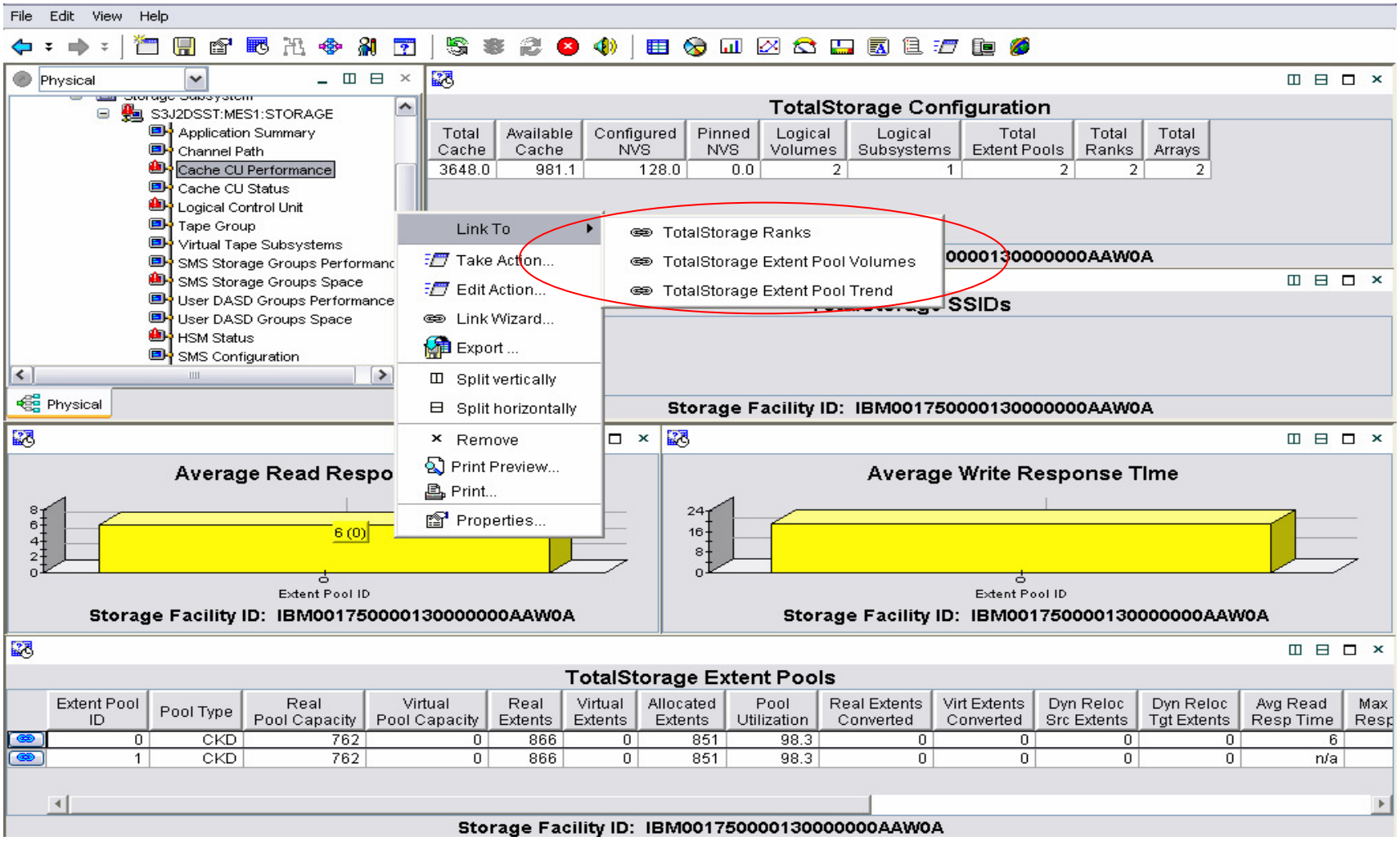
TotalStorage Extent Pools



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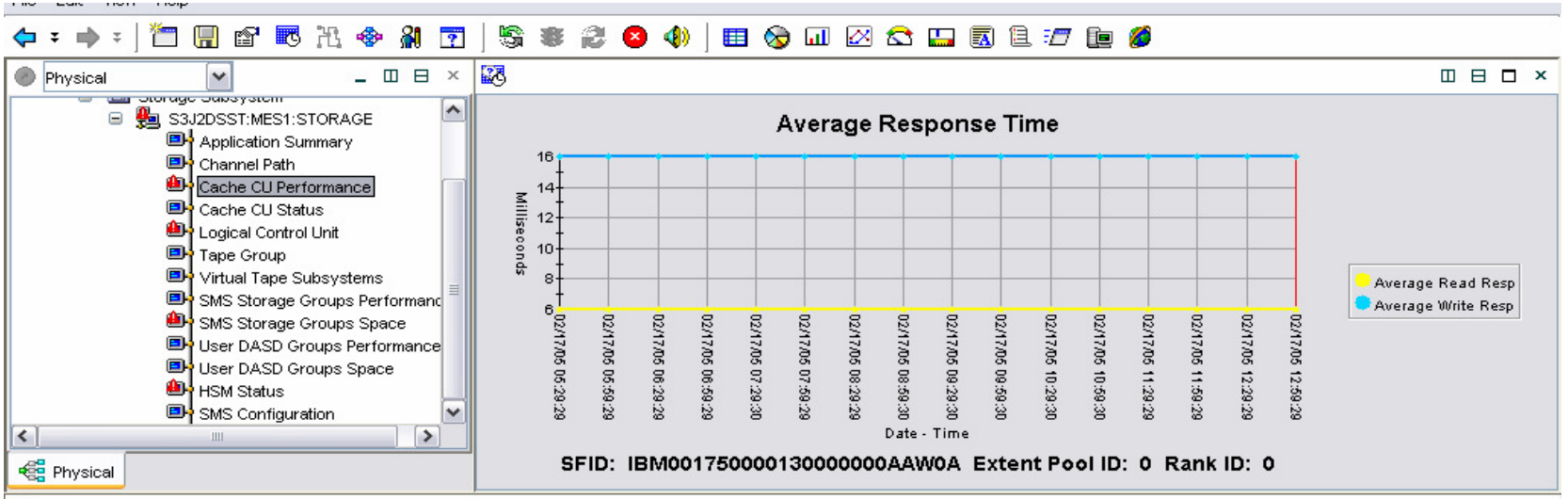
Historical Trending



TotalStorage Ranks Trend

Time Stamp	Bytes Read Per Sec	Total Bytes Read	Bytes Written Per Sec	Total Bytes Written	Read Ops Per Sec	Total Read Ops	Write Ops Per Sec	Total Write Ops	Total Read Resp	Average Read Resp	Total Write Resp	Avera Write R
02/17/05 05:29:29	12505.6	21061888	15449.6	26007424	275.0	463038	13.1	22101	2689568	6	350560	
02/17/05 05:59:29	12556.8	21144064	15513.6	26112256	276.1	464841	13.2	22257	2647840	6	355088	
02/17/05 06:29:29	12544.0	21127296	15488.0	26083968	275.8	464478	13.1	21994	2715296	6	350896	
02/17/05 06:59:29	12505.6	21057792	15449.6	26012672	274.9	462945	13.5	22745	2583168	6	360560	
02/17/05 07:29:30	12544.0	21118592	15488.0	26070784	275.7	464286	13.1	22038	2672336	6	348064	
02/17/05 07:59:29	12544.0	21117824	15488.0	26083584	275.7	464265	13.6	22892	2622528	6	365600	
02/17/05 08:29:29	12518.4	21086848	15449.6	26018688	275.3	463590	13.0	21909	2624784	6	351568	
02/17/05 08:59:30	12544.0	21132032	15500.8	26109184	275.9	464577	13.4	22560	2641888	6	355088	
02/17/05 09:29:30	12531.2	21108736	15475.2	26051200	275.6	464070	13.0	21874	2690768	6	351904	
02/17/05 09:59:30	12531.2	21093888	15449.6	26019456	275.4	463743	13.1	21984	2644688	6	355184	
02/17/05 10:29:30	12544.0	21115136	15488.0	26089344	275.6	464208	13.4	22528	2635280	6	353648	
02/17/05 10:59:30	12544.0	21124352	15500.8	26099072	275.8	464415	13.5	22762	2618528	6	360464	
02/17/05 11:29:29	12531.2	21094912	15462.4	26030592	275.4	463761	13.2	22235	2643968	6	358080	
02/17/05 11:59:29	12505.6	21064320	15449.6	26010496	275.0	463095	13.2	22246	2665808	6	351872	
02/17/05 12:29:29	12544.0	21128704	15488.0	26090624	275.8	464505	13.2	22188	2637872	6	350176	

SFID: IBM0017500001300000000AAW0A Extent Pool ID: 0 Rank ID: 0

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When using Tivoli OMEGAMON XE for Storage

- **Alerts provide enhanced capability in problem determination, reducing mean-time to resolution**
- **Just some of the alerts you can create to monitor (situations):**
  - Storage Group and volume space conditions
  - Response times for critical volumes
  - Response times for datasets of critical applications
  - Disabled Volume VTOC indexes
  - DFSMShsm Queues
  - Long tape mounts
  - Many more
- **Build custom work spaces, specifically addressing problems and the environment**
- **Utilize take action to reduce problem resolution time**
- **Integration of your alerts for faster recognition of critical applications experiencing slow downs or problems**
- **Leverage integration and interoperability**

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OMEGAMON XE for Storage on z/OS v4.1.0 *Highlights at a Glance*

- **New HyperPAV support**
- **New storage toolkit for DFSMShsm and DFSMSdss for storage administration functions in the TEP interface provide capability to quickly create commands or schedule actions to maintain and administer DASD storage.**
- **New dataset attribute database allows versatile and granular reporting capabilities at the dataset level that you can administer via the new storage toolkit function.**
- **Dynamic Workspace Linking (DWL) to OM XE on z/OS (integration!)**
- **New problem solving workspaces adding to your problem determination capabilities – Intelligent situation analysis**
- **Top 10 reports**
- **Integration:**
  - **DWL to other OMEGAMON XE**
  - **Tivoli Storage Management offerings:**
    - Navigation to/from IBM Tivoli Advanced Catalog Management for z/OS
    - Navigation to/from IBM Tivoli Advanced Audit for DFSMShsm
    - Navigation to/from IBM Tivoli Advanced Reporter for DFSMShsm
  - ***Launch of TotalStorage Productivity Center (TPC)***
- **Storage Toolkit now able to cancel active HSM requests**
- **Navigation from Cross System Volume workspace to Dataset Summary on another z/OS image**

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HyperPAV Support

- **New LCU Metrics**
  - Maximum number of I/Os queued
  - Percent of I/Os that couldn't start because no alias was available
- **New Volume Metric**
  - Average number of aliases utilized
- **New Control Unit Metrics**
  - The number of I/Os that couldn't start because a HyperPAV alias wasn't available
  - The percent of I/Os that couldn't start because a HyperPAV alias wasn't available
  - The number of HyperPAV I/O requests
  - The maximum number of HyperPAV aliases in use at one time for the control unit
  - The maximum number of HyperPAV aliases in use at one time by a single base volume
  - The maximum number of I/O requests queued

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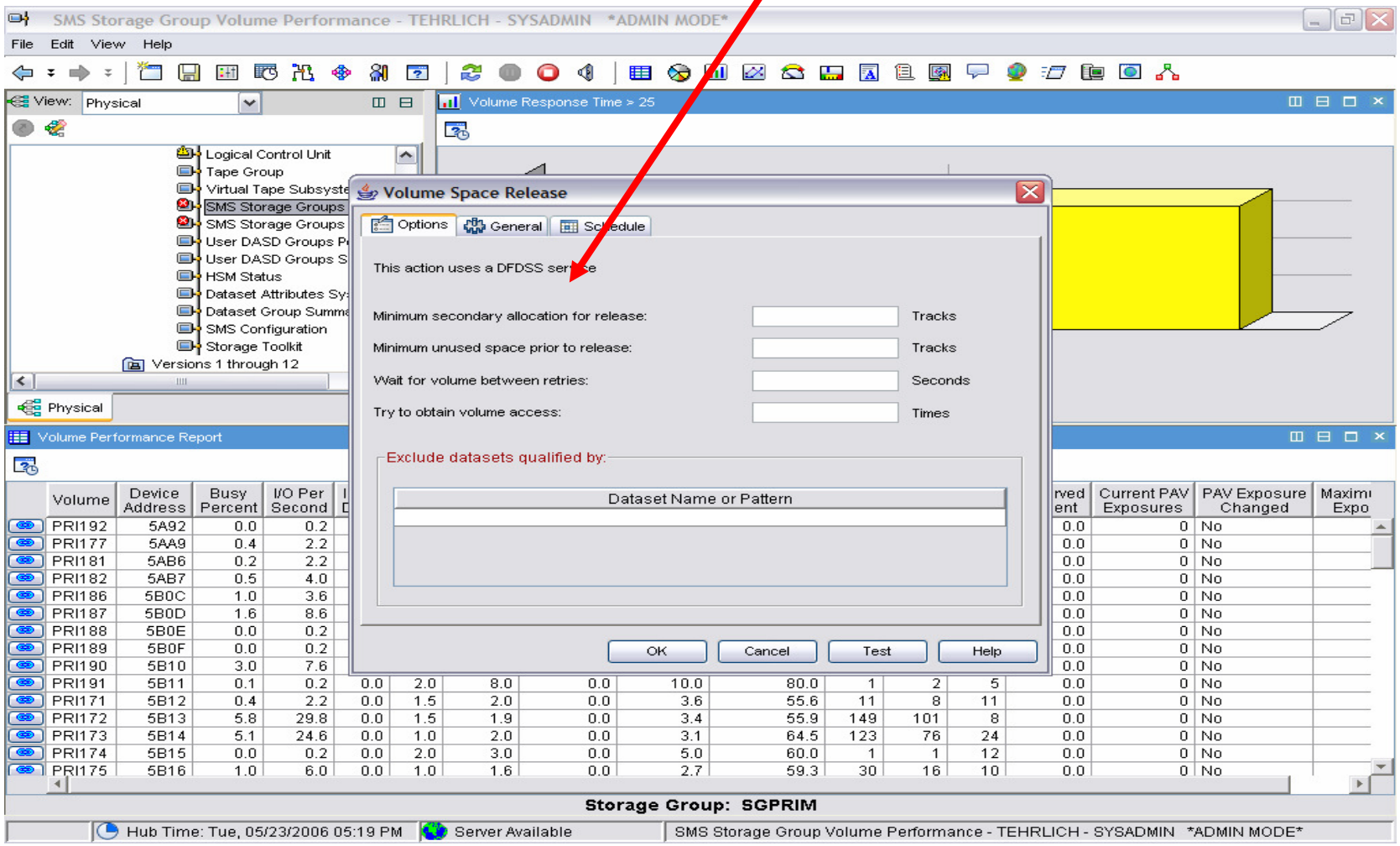
Toolkit - Create a Volume Request

Select a request and choose options



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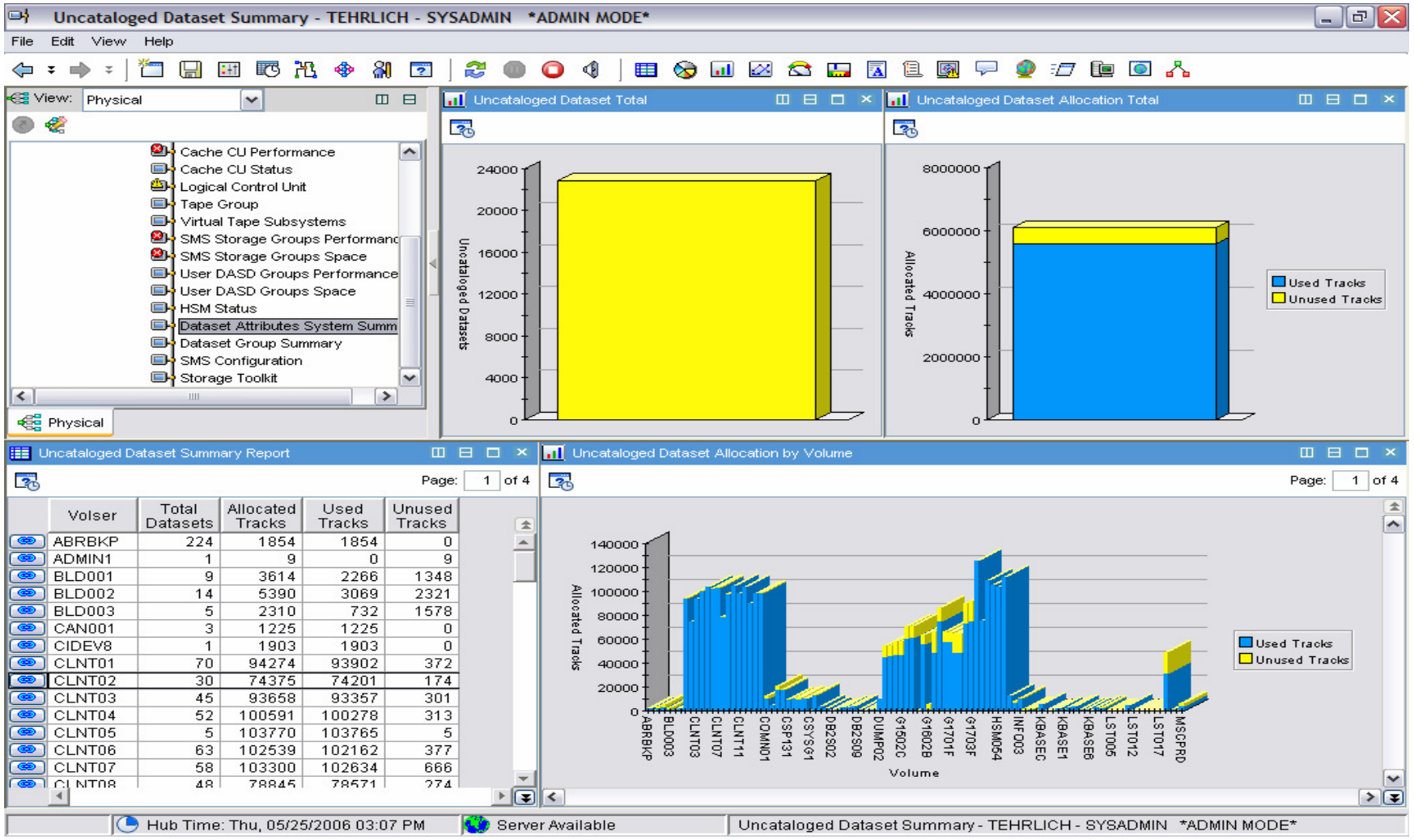
Dataset Attribute DB: Build Custom Lists of Data Sets e.g Uncataloged DS Summary



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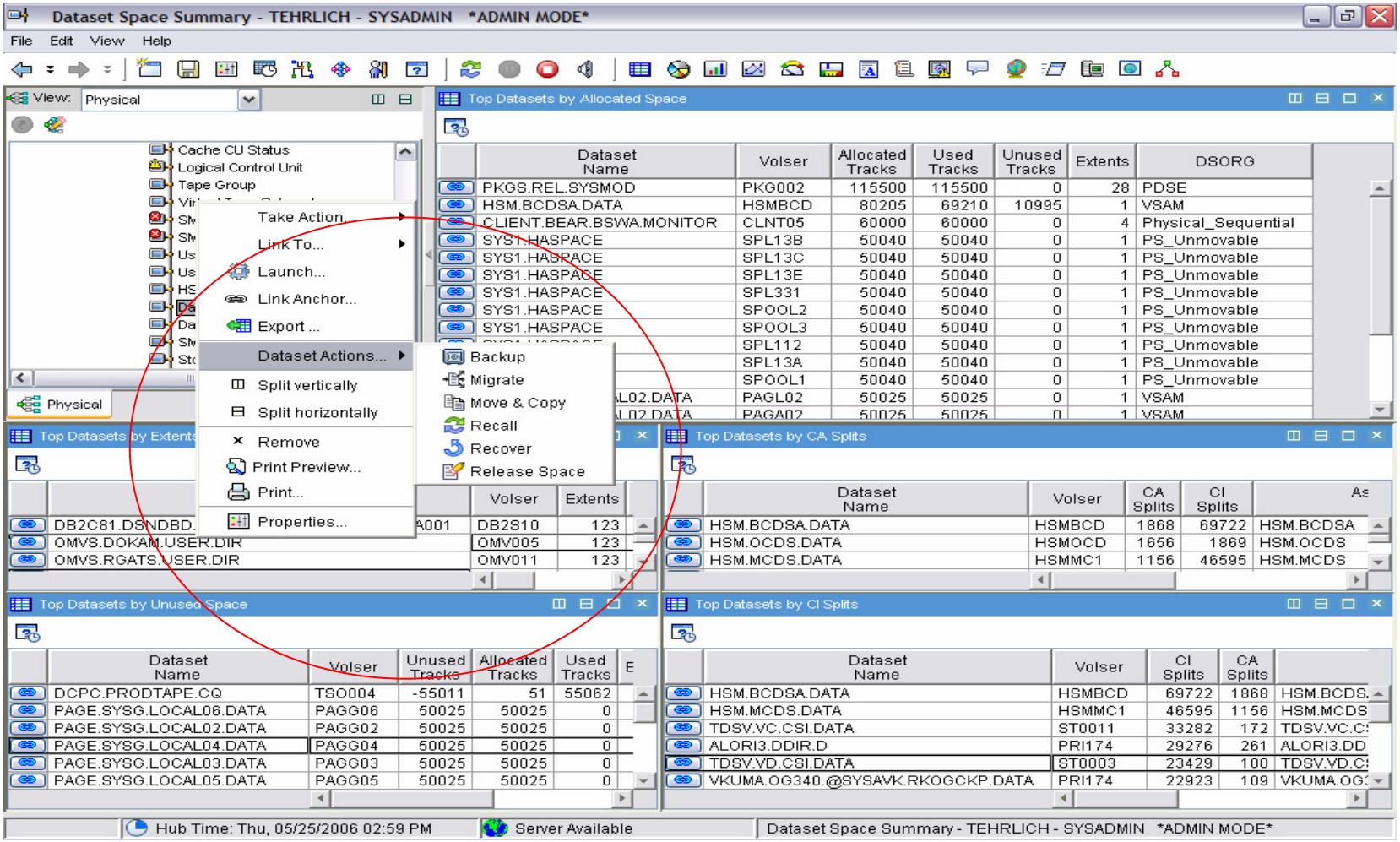
Dataset Attribute DB and leveraging of Storage Toolkit



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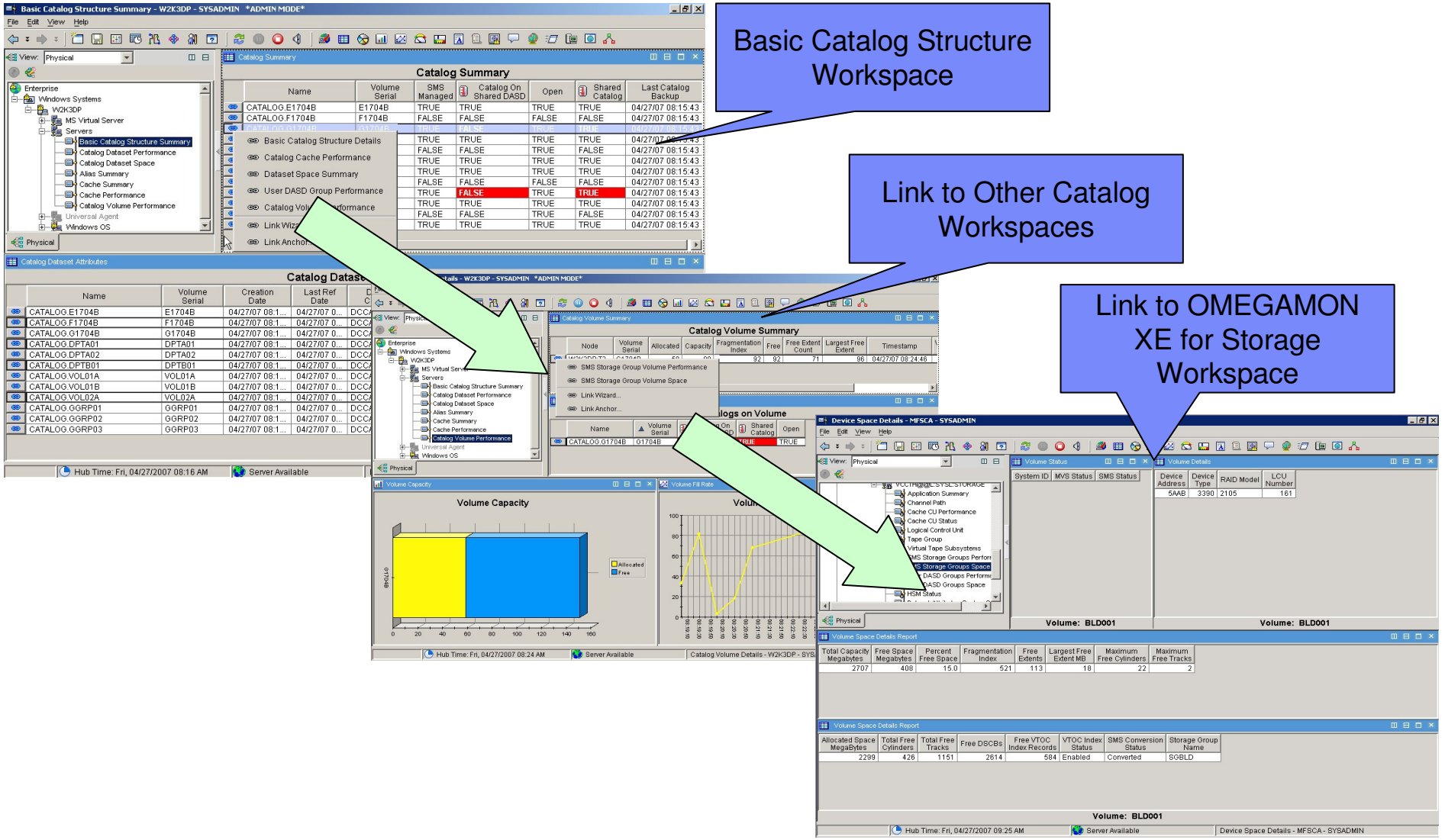
Dynamic Workspace Linking in zStorage Management



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Next Steps 4.2.0 OMEGAMON XE for Storage on z/OS

- Major extensions to the Storage Toolkit
- Support for DFSMSrmm
- Support for TS7700 (IBM vts)
- DASD Volume Users
- Dynamic Workspace Linking to:
  - **IBM Tivoli Advanced DFSMShsm Reporter (AHR)**
  - **IBM Tivoli Advanced DFSMShsm Audit (AHA)**
  - **IBM Tivoli Advanced Catalog Management (ACM)**
  - **IBM Tivoli Allocation Optimizer (AO)**
- Additional DFSMShsm function and attributes
- Currency and Exploitation of new z/OS features
- Reports for the Tivoli Common Reporting initiative
- Message standardization

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Next Steps 4.2.0 OMEGAMON XE for Storage on z/OS

Storage Toolkit Extensions

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

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Cross product link scenario (XE Storage -> ACM)
Number of Extents Exceeded Scenario

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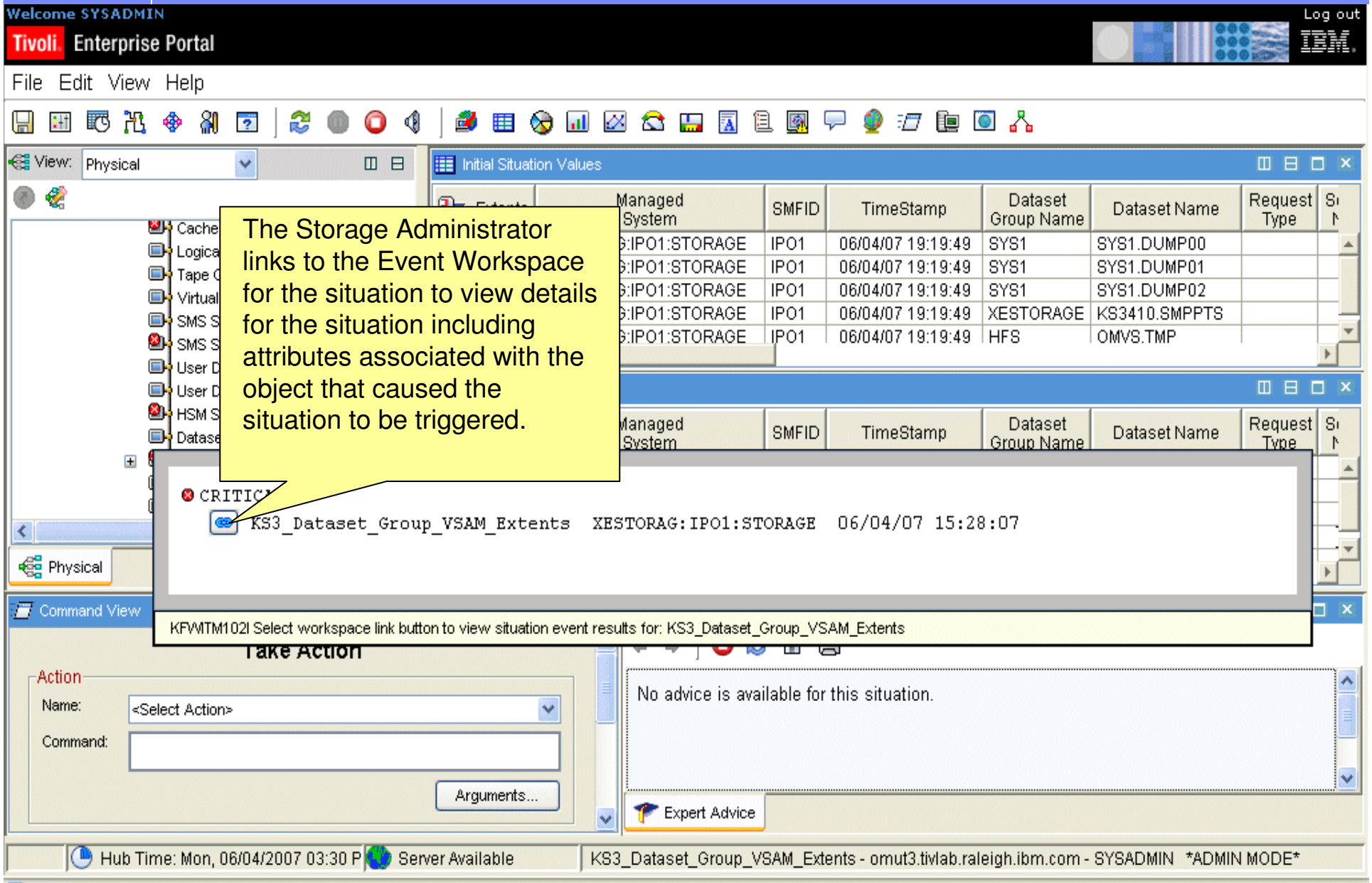

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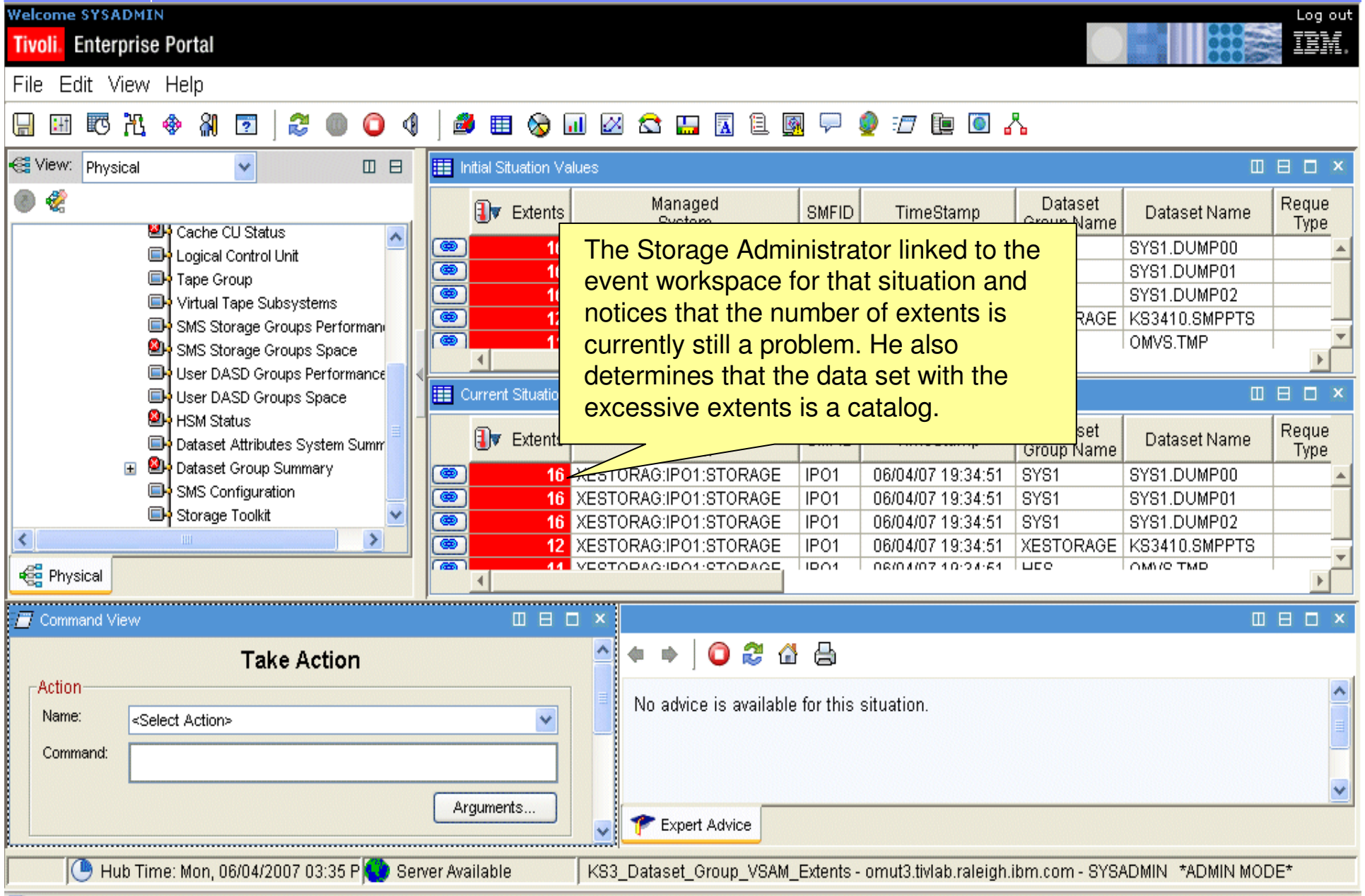

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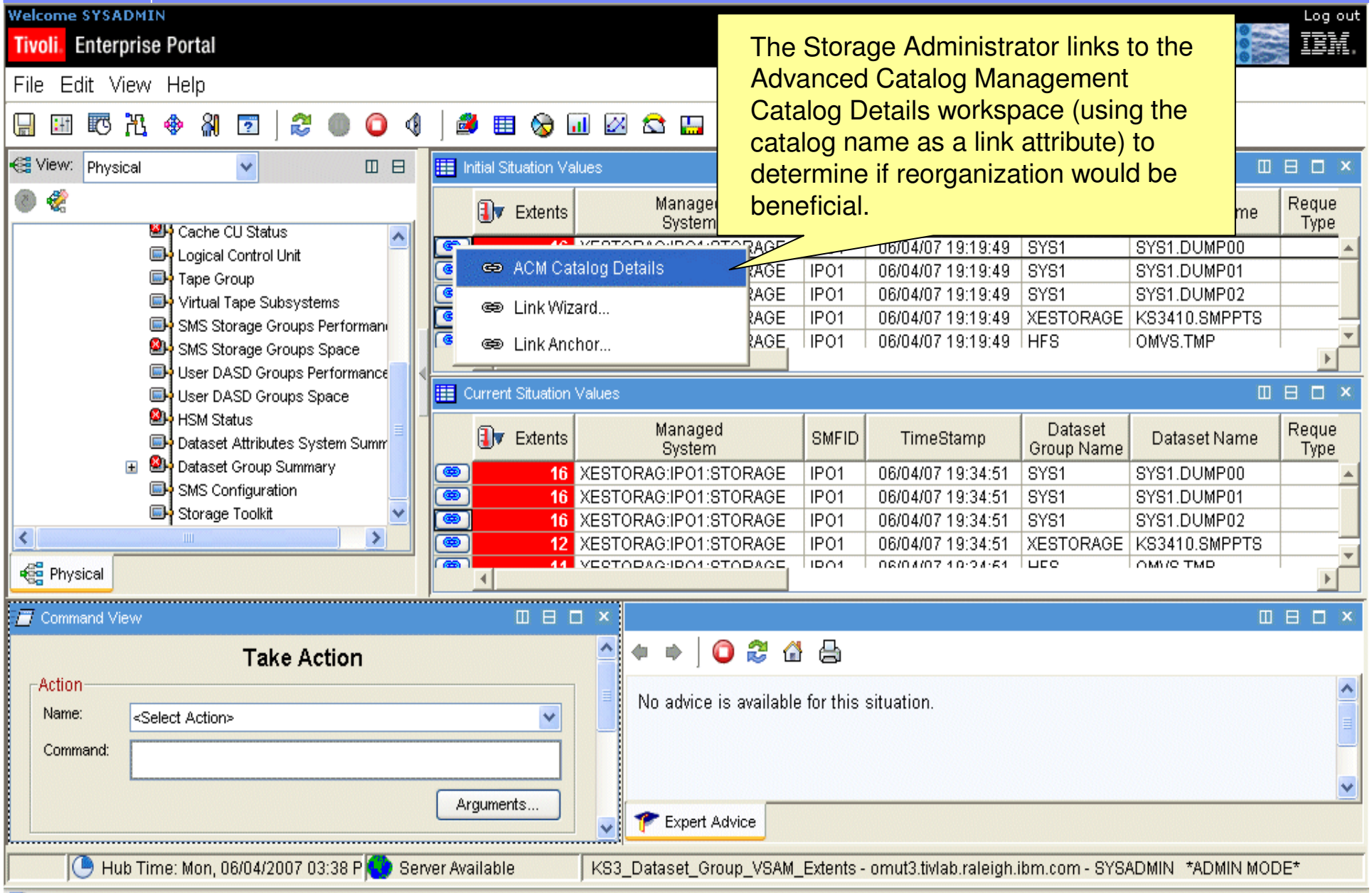

The Storage Administrator links to the Advanced Catalog Management Catalog Details workspace (using the catalog name as a link attribute) to determine if reorganization would be beneficial.

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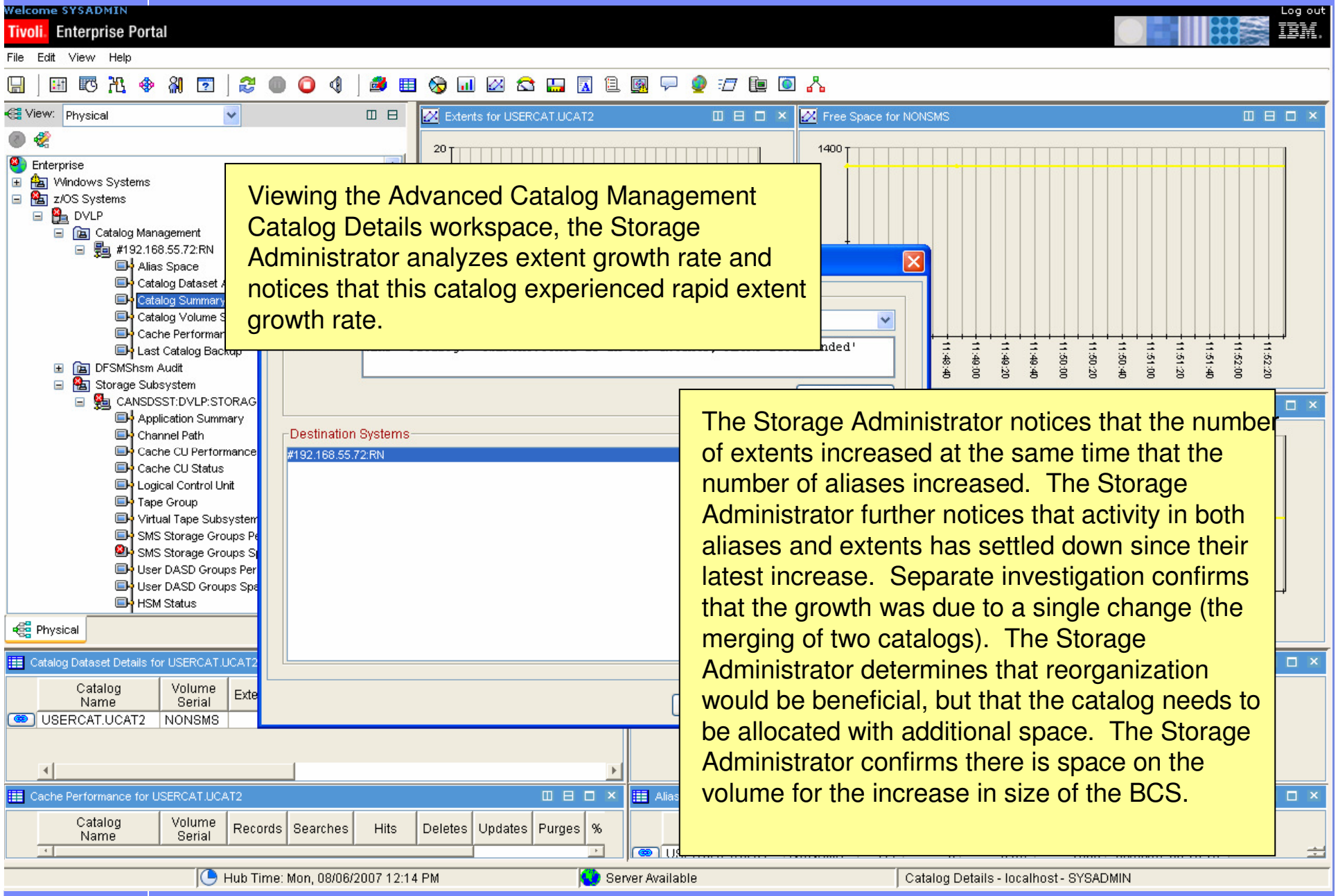

Viewing the Advanced Catalog Management Catalog Details workspace, the Storage Administrator analyzes extent growth rate and notices that this catalog experienced rapid extent growth rate.

The Storage Administrator notices that the number of extents increased at the same time that the number of aliases increased. The Storage Administrator further notices that activity in both aliases and extents has settled down since their latest increase. Separate investigation confirms that the growth was due to a single change (the merging of two catalogs). The Storage Administrator determines that reorganization would be beneficial, but that the catalog needs to be allocated with additional space. The Storage Administrator confirms there is space on the volume for the increase in size of the BCS.

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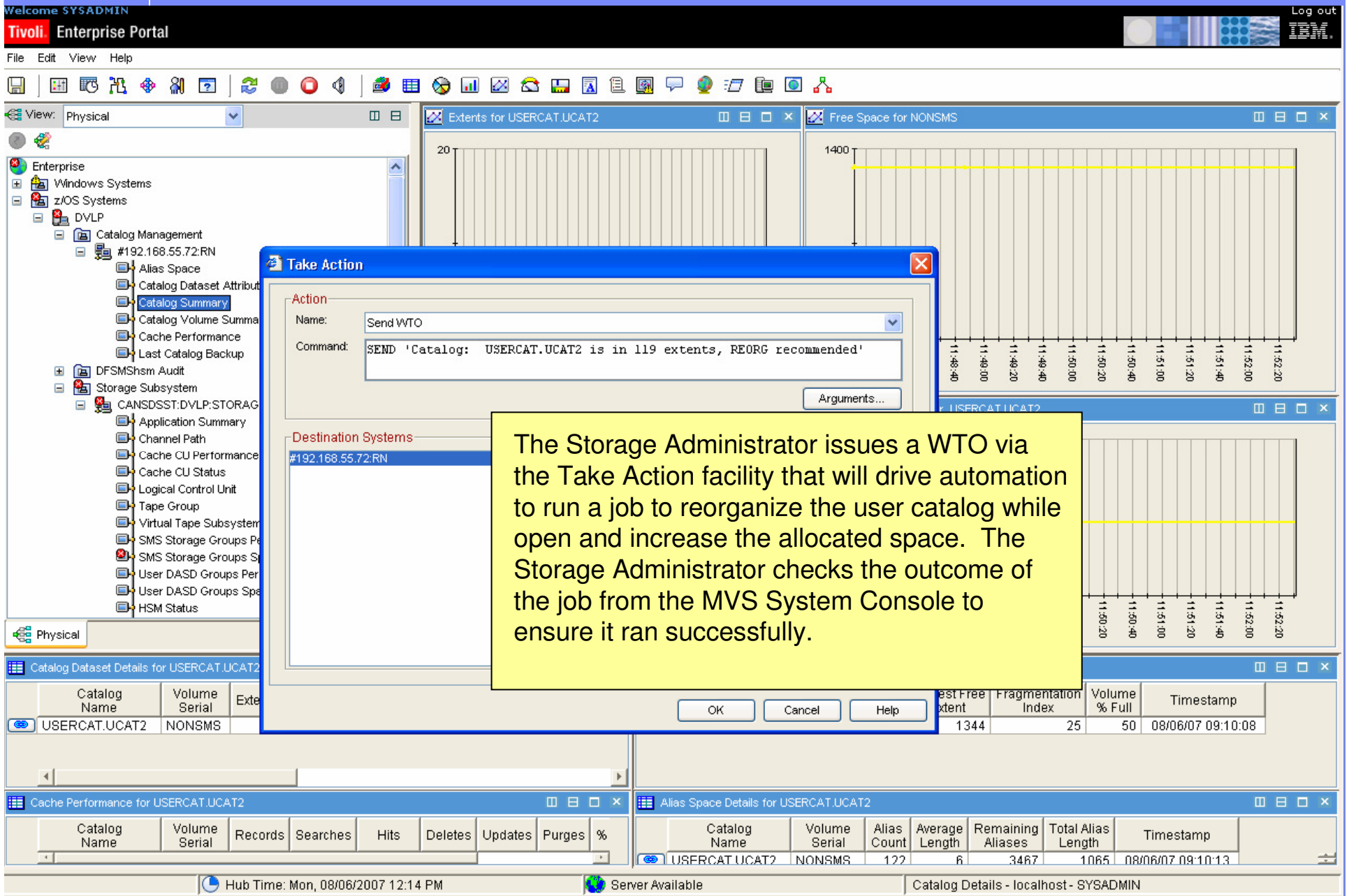

The Storage Administrator issues a WTO via the Take Action facility that will drive automation to run a job to reorganize the user catalog while open and increase the allocated space. The Storage Administrator checks the outcome of the job from the MVS System Console to ensure it ran successfully.

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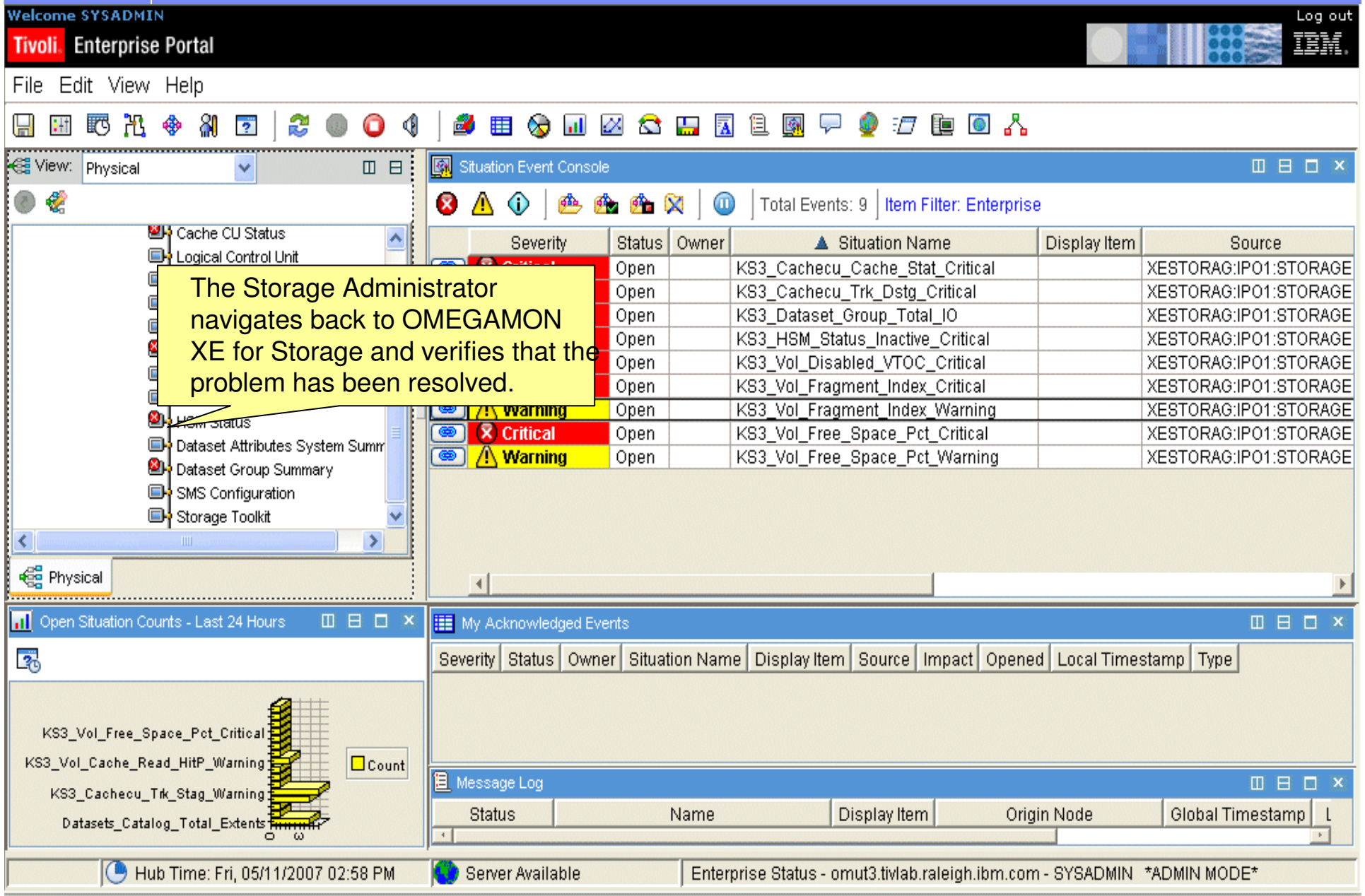

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Addressing zStorage Management

- **In 2004 IBM/Tivoli acquired Candle and the OMEGAMONs**
- **2004 to 2007 IBM/Tivoli introduce new Storage Management solutions for System z**
- **From these actions a rich and full range additional capability in the zStorage management segment have been delivered and available today!**
  - Availability management
  - Performance management
  - zStorage administration capability
  - Management capability of vital zStorage Management subsystems
  - Critical catalog management capability
  - Extended capability in the offline storage area

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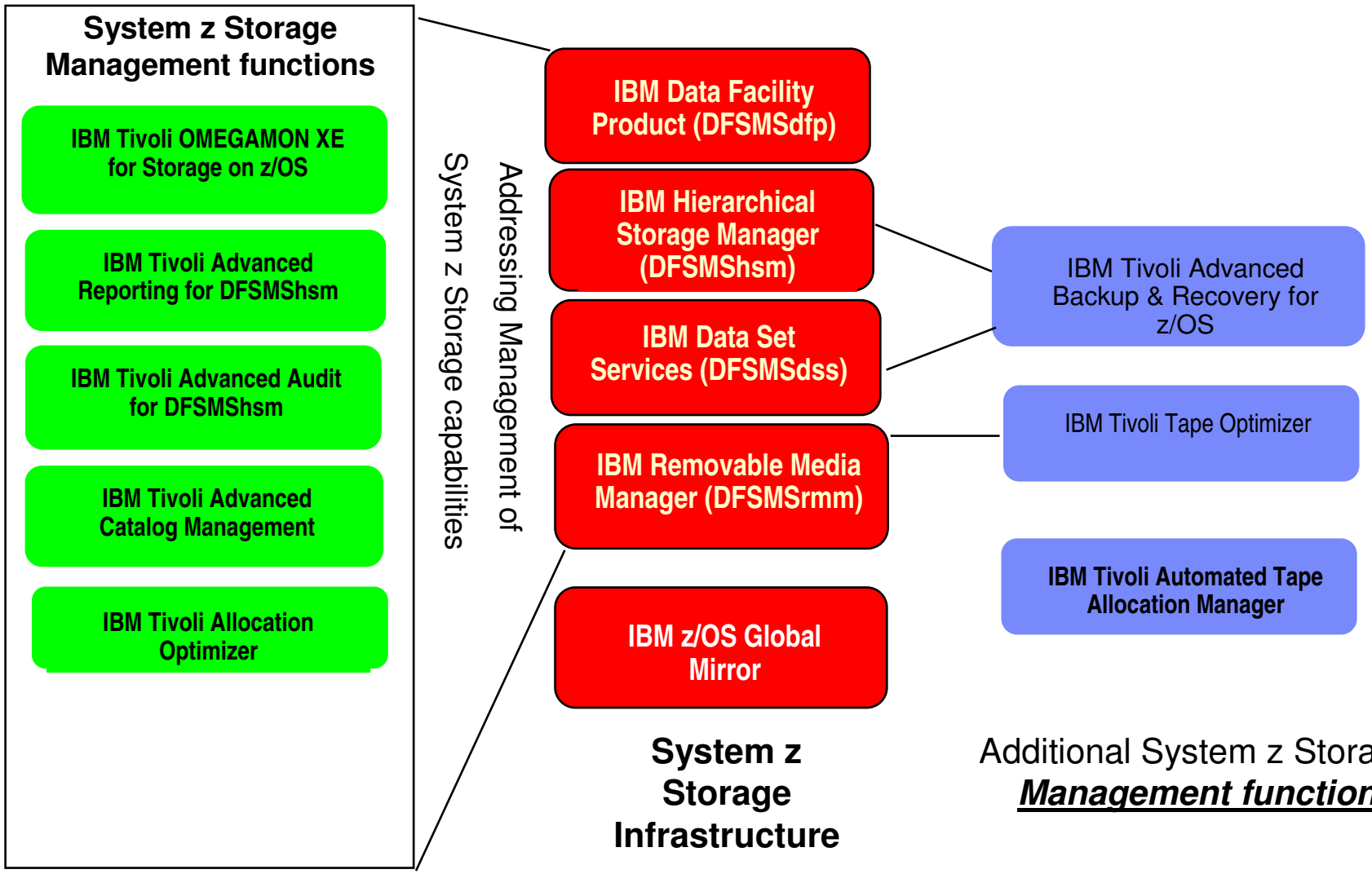
System z Storage Management Solutions: Added Capability



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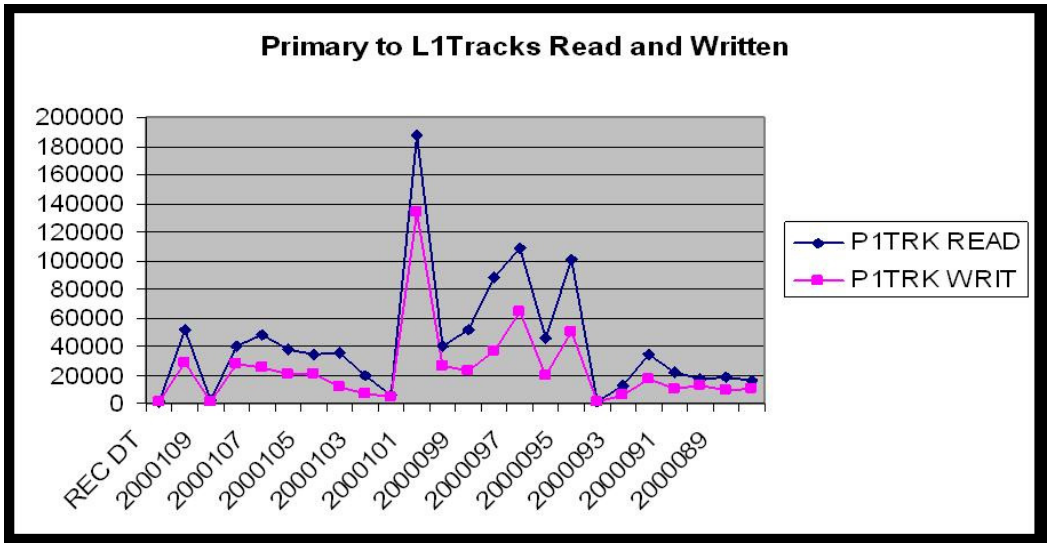
IBM Tivoli Advanced Reporting for DFSMShsm

- **Provides Detailed HSM Reporting Capability**
  - Daily Health Reports
    - Provides reports for:
      - 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
      - Drive the view to the area of concern
      - Look around, Act on what you see
  - 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



- **Easy-to-Use ISPF User Interface**

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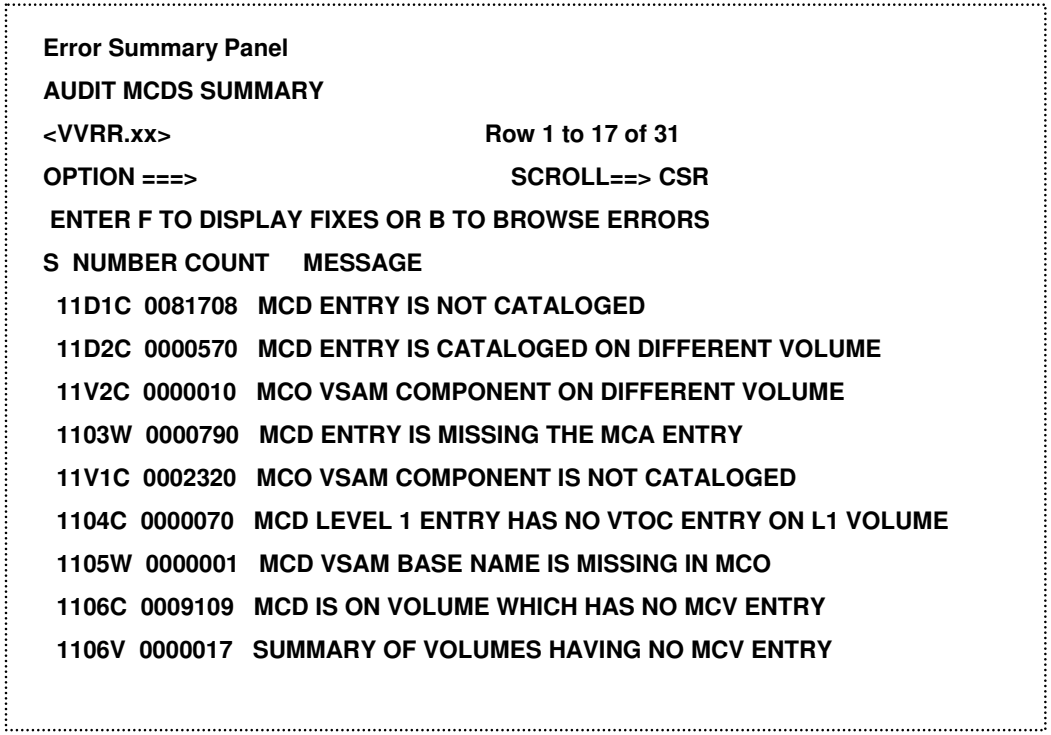
IBM Tivoli Advanced Audit for DFSMShsm

- Audits, repairs, and ensures integrity of the DFSMShsm environment, including tape.
- Automates data collection and corrective actions
- Proactive notification and alerts to critical problems which can be expertly resolved before a system outage occurs
- Finds and can 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



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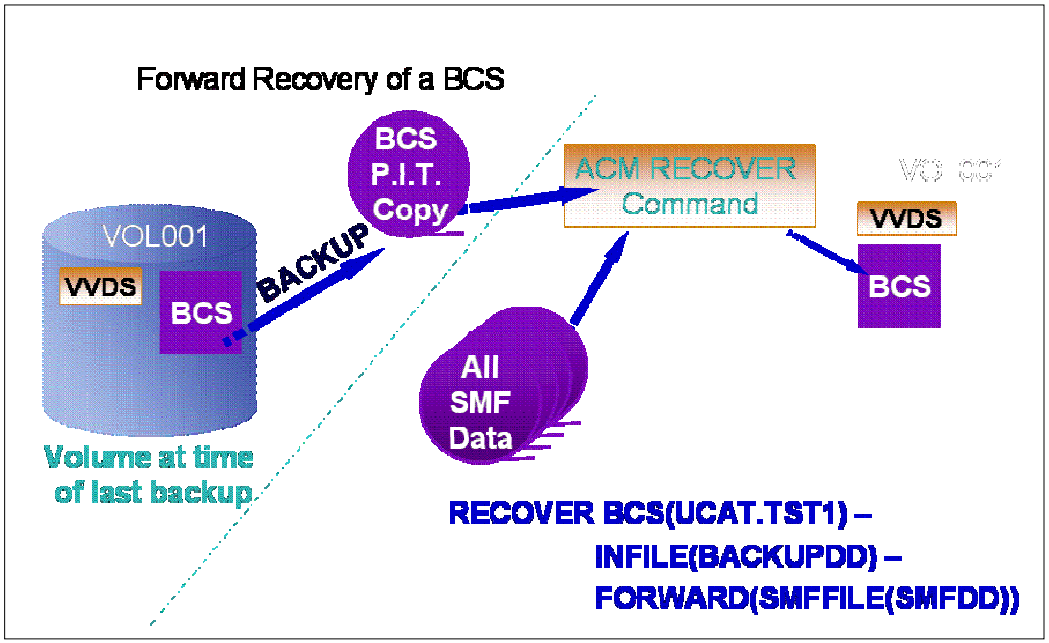
IBM Tivoli Advanced Catalog Management for z/OS

- **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**



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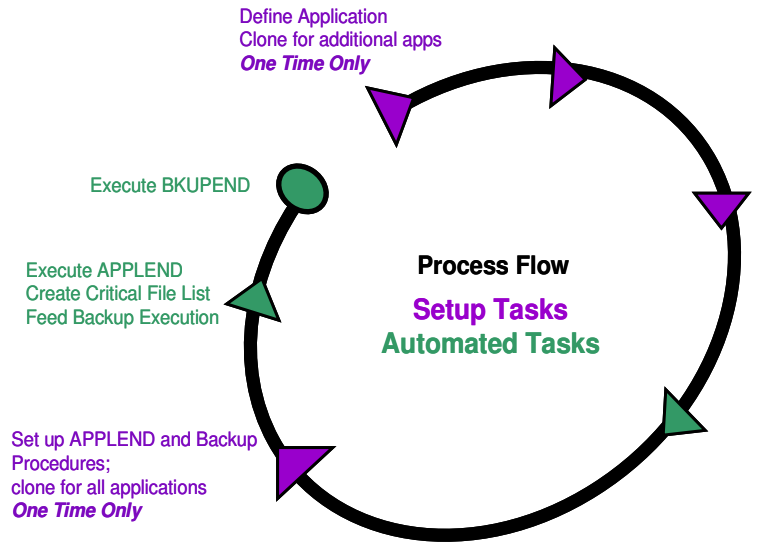
IBM Tivoli Advanced Backup & Recovery for z/OS

- 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 the 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



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IBM Tivoli Allocation Optimizer for z/OS

Allocation Optimizer:

- Enables users to avoid and recover from X37 type abends such as B37, D37, and E37 abends
- Handles all DASD data sets, both SMS and non SMS-managed (VSAM and non-VSAM). Used with SMS, ***all*** unsuccessful DASD allocations are eligible for recovery
- Maximizes use of the current volume before attempting to allocate additional volumes - dynamically adjusting catalog and control blocks only when an extent is needed
- Limits fragmentation of a data set on a single volume and across multiple volumes, preserving valuable catalog space and memory-based control block storage

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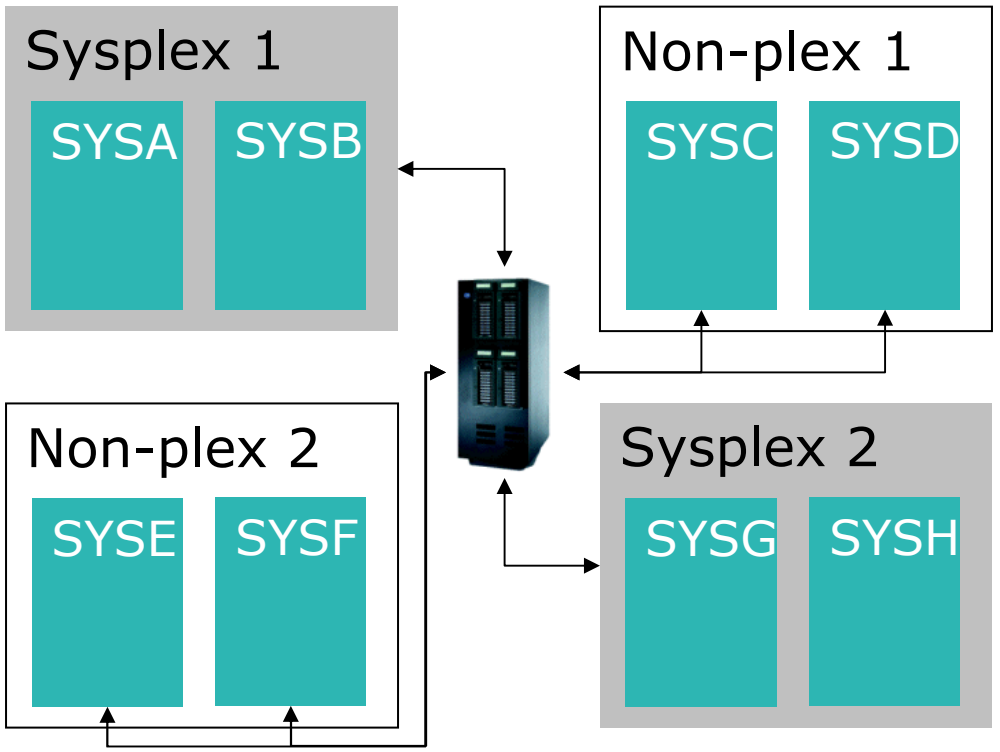
IBM Tivoli Automated Tape Allocation Manager for z/OS

- **Automated Tape Allocation Manager (ATAM):**
  - Enables customers to share existing tape devices between multiple images: sysplex, nonplex, multiple standalone in any combination including legacy devices such as 3420
- **Improves Operational Efficiency:**
  - Maximize the use of existing tape devices
  - Reduce operational overhead
  - Minimize backlogs of job requests
  - Improve the ROI on tape hardware investments
  - Support hardware acquisition decisions
  - Architecture**:** Since ATAM operates at the Hardware Level, it exploits the fact that an autoswitchable device can only be online and allocated to one system at a time
  - Availability: Single Point of Control without the Single Point of Failure – ATAM does not need to coordinate device allocation information through a shared control file
  - Responds automatically and directly to user/job resource requests
  - Responds to requests at “machine speed” instead of “operator speed”
  - Real-time and historical reporting – built-in



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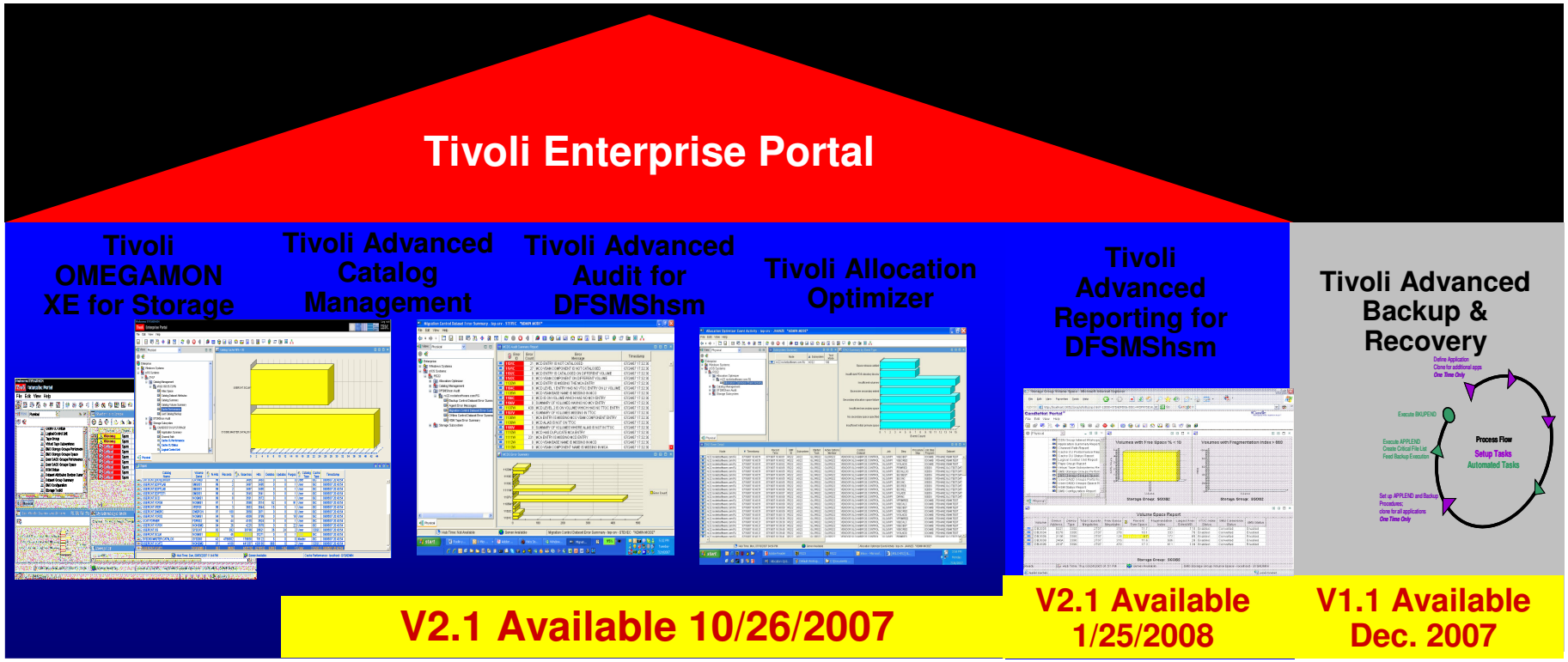
IBM Tivoli Integrated System z Storage Management

IBM's System z Storage Management Provides:

- Powerful Integration of related System z Storage information via the Tivoli Enterprise Portal (TEP)
- Robust Tools for monitoring and managing System z Storage
- Dynamic linking and capability to take action directly from the TEP
- Standardize System z Storage Toolset - Reduce dependency on zStorage Management 'gurus'
- Simpler maintenance & upgrade – all use standard IBM SMP/E packaging
- Reduce usage of System z Resources – reduce cost and energy usage



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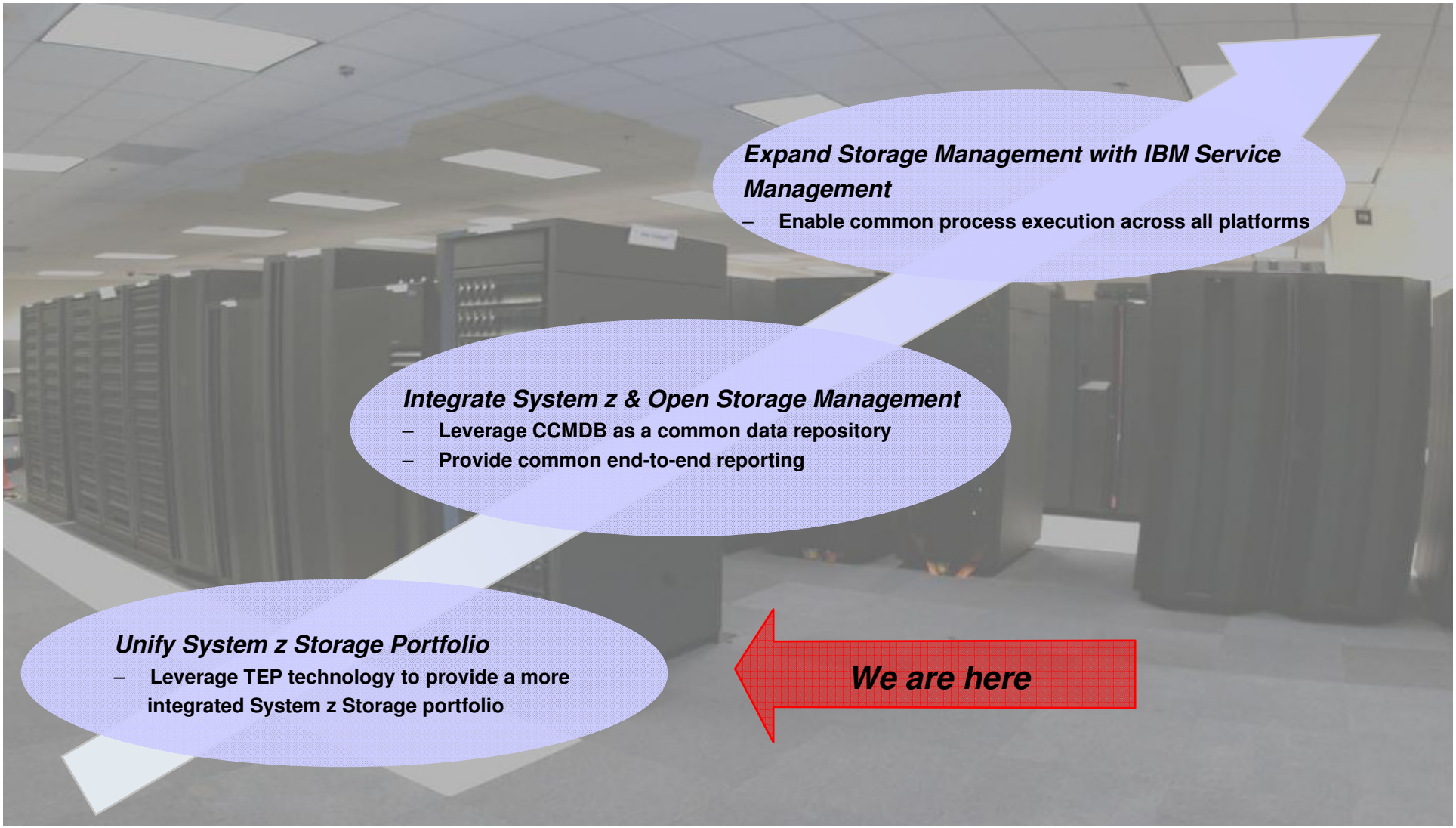
IBM's System z Storage Management Future Directions



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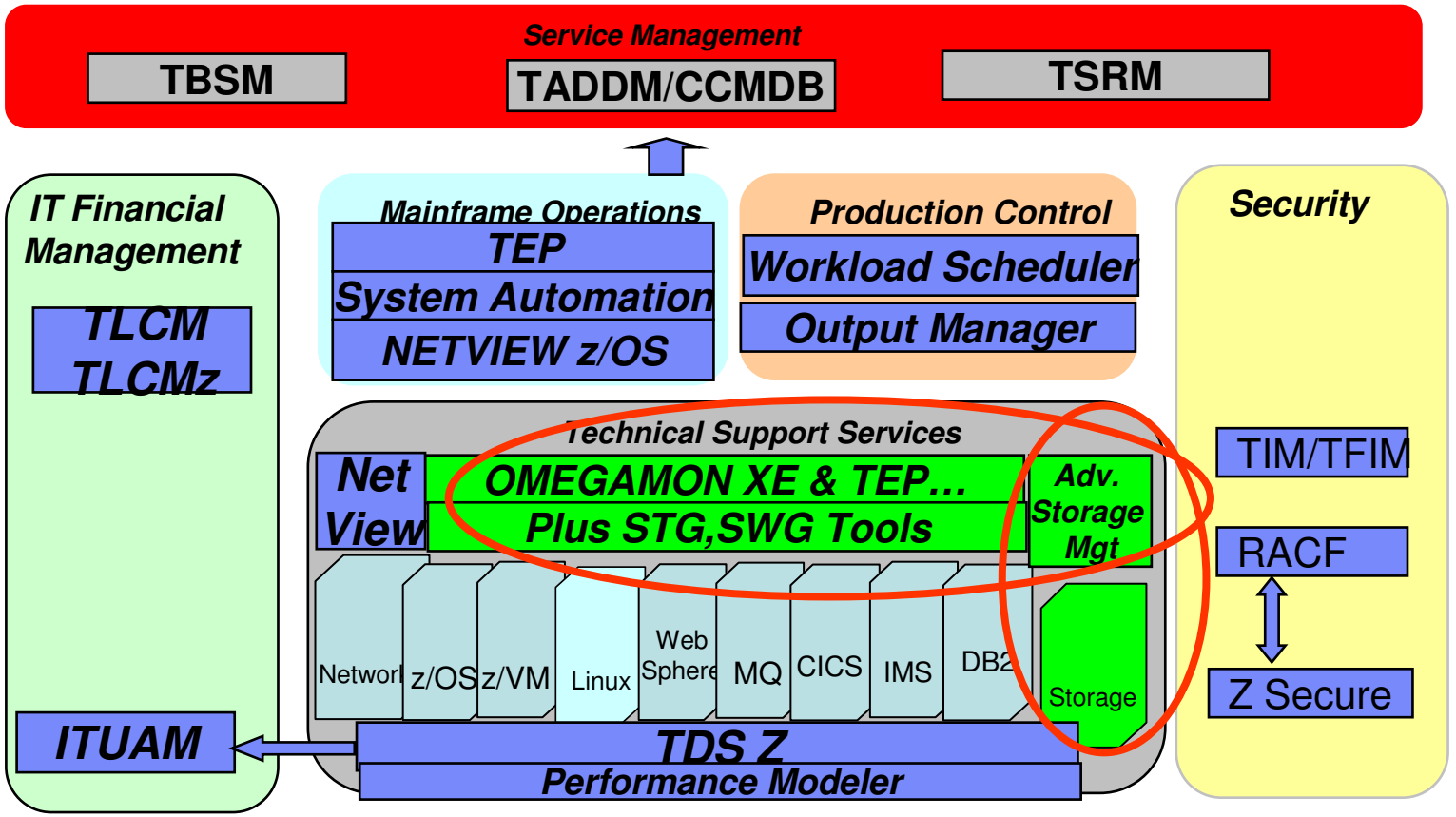
z Storage Management Integrates with Service Management Center for System z



zStorage Management portfolio feeds detailed event, workload, discovery and automation to the Service Management Center for System z and ISM

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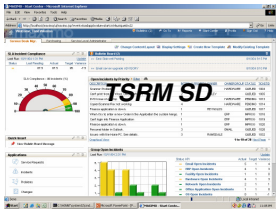
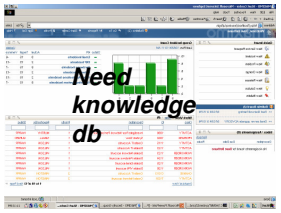
Incident and Problem Management Demo Flow

Jane, a Help Desk Operator has been assigned to a new work assignment – mainframe trouble tickets. A bit worried due to her lack of z skills, she decides to get a cup of coffee and cancel lunch plans.

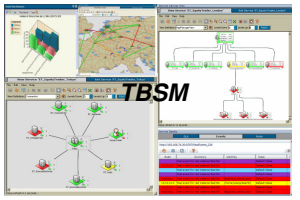
Actually, automation has started working this incident for Jane. Behind the scenes threshold violations in TEP IT Ops dashboard have been turned into events and trouble tickets in her service desk.



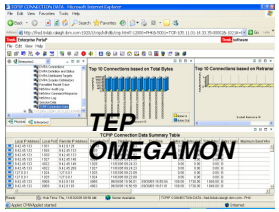
Jane's personalized start center includes incidents. A high priority incident alerts her that users are having difficulty connecting to a z/OS based application.



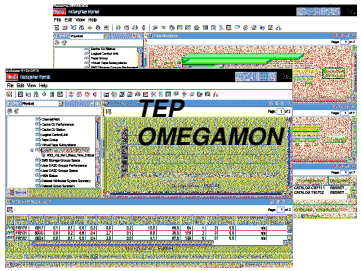
Jane searches the knowledge database in service desk. It advises her to go to business service dashboard to isolate the problem.



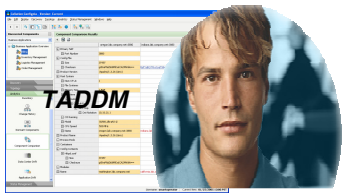
Jane launches in context from service desk to the appropriate business event view. Using the service desk knowledge database it instructs her to perform a drill down analysis with IT Ops Dashboard.



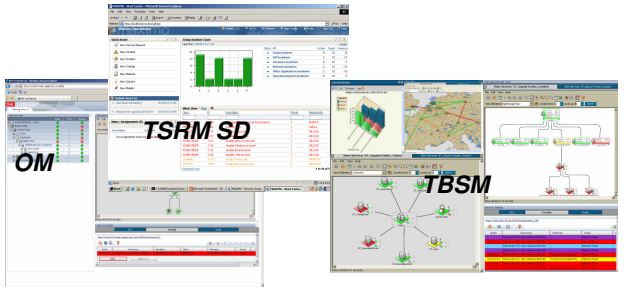
Jane first looks at network, storage and server z/OS resources associated with the application to further isolate the problem. Network availability and performance looks ok. Next storage is examined and reveals an out of space condition.



Jane launches into the TEP Storage performance workspace and identifies the linkage between the volume with the out of space condition and the physical disk.



Jane decides to contact storage Sys Prog for help to remediate. Tom views the workspaces to identify the data sets on the volume. IT views of discovered configuration and configuration drift is a studied.



Tom determines to remediate the problem he must migrate some datasets off the volume. Tom uses Storage Toolkit to issue and track commands. Jane updates incident to the resolve state.

Jane also notices the business view has returned to green status.

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System z Storage Management Solution working together and providing value

- zStorage Solutions:
  - **IBM Tivoli OMEGAMON XE for Storage on z/OS**
  - **IBM Tivoli Advanced Reporting for DFSMShsm**
  - **IBM Tivoli Advanced Audit for DFSMShsm**
  - **IBM Tivoli Advanced Catalog Management**
  - **IBM Tivoli Allocation Optimizer**

  - **IBM Tivoli Automated Tape Allocation Manager**
  - **IBM Tivoli Tape Optimizer**
  - **IBM Tivoli Advanced Backup and Recovery Manager for z/OS**

- What Value does this bring to you:
  - **Consolidated zStorage Management capability**
    - **Total zStorage Management capability**
    - **Same look and feel**
    - **Integration for leveraging synergy**
    - **Highly customizable to precise site specifications**
    - **Reduced cost in training and ability to do more with less**
    - **Reduced time to problem identification and resolution**
    - **Future consolidated end-to-end solution (Enterprise breadth)**
    - **Important integration to Service Management Center for System z**

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Questions ????

Thank You!

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