



**zOSEM**  
*(z Awesome)*  
**Operating System/Environment  
Manager**  
**Release 6.1**

*Evaluation Guide*

***Improving Management & Cost Effectiveness of z/OS Enterprise Servers***



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# Management Summary

The cost of providing medium to large-scale z/OS Enterprise Server Environments can be anywhere between 15 million and 150 million dollars per year.

**zOSEM** makes it much easier for installations to manage these resources and to control how they are used.

**zOSEM** is an essential tool for maximizing the return on investment in z/OS technologies and for enabling management to achieve the on-going objectives of:

-  Improving manageability
-  Improving system throughput and service levels
-  Reducing hardware costs
-  Reducing software license costs

**zOSEM** can allow you to achieve total annual savings equivalent to its purchase cost. In fact, **zOSEM** can be cost justified with throughput improvements of as little as 1% - a small fraction of the potential throughput gains.

If you use HSM for DASD storage management, **zOSEM** may well be cost-justifiable by the HSM Optimization feature alone.

In addition, **zOSEM** is user friendly and can be used by both technical and operations staff alike.

**zOSEM** is installed at over 60 sites in the USA across a wide range of industry sectors.

**zOSEM** was voted IBM ISV Solution of the month for June 2001.

# Benefits

## Improving Manageability

**zOSEM** simplifies the task of managing z/OS complexes by:

### *Simplifying the Enforcement of Standards*

**zOSEM** enables you to easily define, modify and enforce your installation standards and operating rules, without any programming effort on the part of your staff, simply by setting parameters via a user-friendly online interface. Changes can be applied dynamically or deferred to the next IPL.

### *Simplifying Software Upgrades*

**zOSEM** can greatly reduce or even eliminate the need to re-work and re-test installation exits. **zOSEM**'s built in functions can typically replace 95% of locally developed system modifications and exits.

**zOSEM** also can avoid the need to make manual JCL changes and to IPL systems when implementing new versions of program products. Evaluation and testing of new software products is also easier.

### *Simplifying System and Data Center Consolidation*

By reducing or even eliminating the need to retain in-house installation exits, **zOSEM** allows you to position systems prior to integrating their workloads. In addition to making the task of workload integration much easier, this also simplifies the processes of system build and rollout.

### *Providing a Dynamic Operating Environment*

**zOSEM** provides the ability to dynamically change your operational environment to suit specific workload profiles. For example, you may define a set of standards and rules that are to be enforced during daytime online processing and a totally separate set that are to be enforced during the overnight batch period. Any mix of **zOSEM** controls can be activated and de-activated dynamically without the need for an IPL.

### *Enhancing Storage Management*

**zOSEM** helps you to maintain error free migration and recall operations by providing extensive reports that allow your storage management personnel to quickly gain an insight into HSM operations.

## ***Facilitating Accounting & Charge-back***

**zOSEM** enables you to enhance your accounting and charge-back processes by allowing easy definition, validation and modification of accounting standards and account numbers. It can insert up to 32 characters of Job Accounting information into the catalogue for DFSMS managed datasets to be included by IDCAMS DCOLLECT when dataset information is collected for primary DASD, the MCDS and the BCDS for DFSMSHsm environments.

## ***Improving Security & Integrity***

**zOSEM** enables you to improve your system's overall security and integrity by ensuring users are authorized to access resources specified in job JCL parameters.

## ***Restricted Password Control***

**zOSEM** augments the limited capability of RACF's SETROPTS to control the content of passwords. Restricted password control provides the following options:

Prevent the use of the RACF USER ID anywhere in the password

Require the use of a minimum number of alpha, numeric and/or special (#, @, \$) characters in the password

Prevent the use of the RACF User Name or segments of the name anywhere in the password.

Allows the creation of a table of words, word fragments or masks that are to be excluded from the password.

## **Improving System Throughput and Service Levels**

**zOSEM** controls contribute to improved system throughput and services levels.

### ***Improving System Throughput***

**zOSEM** provides a range of features for improving system throughput by optimizing the utilization of system resources. These include facilities for improving your control over resources such as job classes, sysout classes, writers, virtual storage, dataspace, hyperspaces and much more.

Dynamic job routing can also contribute to improved system throughput by routing important workloads to less congested processors or by routing non-production workloads (e.g. compiles etc.) to less critical processors.

**zOSEM** job routing provides the ability to route jobs based upon a much granular set of criteria/job attributes than that provided by standard z/OS facilities.

**zOSEM** can automatically handle resource overruns (e.g. Job/Step CPU time, sysout lines/pages and wait times) without operator intervention being required, thus ensuring that workload processing continues to completion and avoiding expensive and time-consuming reruns.

**zOSEM** can also be used to reserve scarce hardware resources for specific jobs or a range of jobs ensuring that critical jobs run when they need to.

If you are using HSM for data migration, the use of **zOSEM** recall optimization, prioritization, quick delete and early recall (done during JES2 Job conversion) features can also improve system throughput by drastically reducing or even removing HSM recall wait times.

### ***Ensuring Resource Availability***

**zOSEM** enables you to ensure mission critical work receives the resources it needs when required and prevents misuse of resources by unauthorized users.

**zOSEM** can optionally prevent a Job from starting execution until all required datasets are available, resolving dataset name conflicts. This stops Jobs from waiting on an initiator when all the datasets are not available.

### ***Increasing System Availability***

**zOSEM** helps you to improve system availability by avoiding the need to IPL the system when modifying installation standards and rule definitions. In addition **zOSEM** enables the dynamic refreshing of Supervisor Call (SVC) modules and RACF controls tables and exits.

### ***Improving Responsiveness***

**zOSEM** improves your responsiveness to user requirements by reducing the time needed to modify or define new rules and implement new versions of operating system software and program products.

## **Reducing Hardware Costs**

**zOSEM** controls can help to reduce hardware costs by:

### ***Delaying CPU Upgrades***

Improvement gains in system throughput and the ability to offload specific workloads to less critical or less busy processors enables you to delay CPU upgrades.

Additionally, significant processor and I/O reduction can be achieved with the HSM Optimizer which provides a much higher level of granularity of control than that provided with the standard HSM product.

Less frequent processor upgrades also result in software license savings.

### ***Reducing the Number of Required Tape Devices***

**zOSEM** reduces your tape device requirements by enabling dynamic tape sharing between multiple non SYSPLEX z/OS LPARS. This reduces throughput delays for critical jobs due to tape drive contention and the use of manual procedures to move tape drives between the z/OS LPARS.

## ***Improving DASD Utilization***

**zOSEM** enables you to reduce DASD storage for first level archive space (i.e. Migration Level-1) in HSM environments. This means that DASD space can be used more effectively.

## ***Reducing the Number of Required Special Devices***

**zOSEM** allows you to reduce or avoid duplication of special hardware devices by dynamically routing jobs to processors where the devices are attached.

## **Reducing Software License Costs**

**zOSEM** controls can help to reduce software license costs by:

### ***Reducing Software License Requirements***

The ability to dynamically route jobs via **zOSEM** using a very granular set of routing criteria makes it easier to restrict the licensing of software to specific processors.

Furthermore, the delaying of processor upgrades facilitated by improved system throughput and the more efficient utilization of system resources can postpone MIP-related increases in software licenses.

### ***Facilitating Product Removal***

**zOSEM** enables you to remove products such as CA-MIM ALLOC and BMC's Mainview Auto Operator Tapeshare Facility by providing built in tape sharing facilities. This alone can justify its cost.

**zOSEM** enables you to remove products such as HSM Reporter and Easy HSM by providing extensive HSM reporting facilities.

### ***Facilitating JES3 to JES2 Migration***

**zOSEM** provides you with a migration path from JES3 to JES2 by including most of the workload routing functionality of JES3 eliminating the additional license cost for JES3 and the need for any JES3 supporting software.

# Feature & Benefits Matrix

<b>zOSEM FEATURE BENEFITS</b>					
	<b>Benefits</b>				
	<b>Improved Mgmt.</b>	<b>Improved Throughput &amp; Service Levels</b>	<b>Reduced Hardware Costs</b>	<b>Reduced Software Costs</b>	<b>Reduced HR Costs</b>
<b>Features</b>					
<i>Base Environment Manager</i>	✓	✓			✓
<i>Job Resource Routing Controls</i>	✓	✓	✓	✓	✓
<i>Virtual Storage Controls</i>	✓	✓	✓		✓
<i>Tape Usage Controls</i>	✓	✓	✓		
<i>System Command Controls</i>	✓	✓	✓	✓	
<i>Concurrent Job Execution Controls</i>	✓	✓	✓	✓	✓
<i>Print Output Extension Controls</i>	✓	✓	✓	✓	✓
<i>Device Allocation Controls</i>	✓	✓	✓	✓	
<i>TIME Controls</i>	✓	✓	✓	✓	✓
<i>Dynamic STEPLIB Insertion</i>	✓				✓
<i>TSO submitted JOB Controls</i>	✓	✓	✓	✓	
<i>RACF Controls</i>	✓	✓			
<i>WTO Controls</i>	✓	✓			✓
<i>TAPE Sharing Controls</i>	✓	✓	✓		✓
<i>JCL Parameter Controls</i>	✓	✓	✓	✓	
<i>Job/Step Statistics</i>	✓	✓			
<i>HSM Optimization Controls</i>	✓	✓	✓	✓	✓
<i>DASD Allocation Controls</i>	✓	✓	✓	✓	✓
<i>HSM Reports</i>	✓	✓			✓

# Cost Justification

By simplifying the management of z/OS resources and improving your control over how they are used, **zOSEM** enables you to achieve **annual** savings that are in excess of its purchase price.

If the cost of providing your z/OS resources is in the region of 10 million dollars per 1,000 MIPS annually, throughput improvements of as little as 1% will achieve this.

This is a small fraction of potential throughput gains with bottom line savings, being reflected in delayed hardware upgrades and avoidance of software license increases.

In fact, if you are using HSM it is likely that **zOSEM**, will be cost justified by the HSM Optimization feature alone.

Furthermore, the support costs (Project Time and personnel) for upgrading system software, consolidating data centers and building standard systems can be reduced by **zOSEM**. This is of particular significance if your business involves in-sourcing or out-sourcing services.

In addition to the major cost benefits mentioned above, **zOSEM** may be able to deliver additional savings, for example:

- ✚ If you are using CA-MIM ALLOC, the comparable **zOSEM** controls may well allow its removal with consequent savings in annual maintenance costs.
- ✚ If you are using products such as SAS, FILEAID, FOCUS or CA-Easytrieve, **zOSEM** routing controls may enable you to run these products on fewer processors or on smaller machines, again with consequent savings in MIPS related license and annual maintenance costs.
- ✚ Similarly, if you have need of specialized hardware **zOSEM** routing may reduce the number of devices needed.
- ✚ If you are using JES3, the comparable controls in **zOSEM** could allow you to move to JES2 with consequent savings on JES3 and JES3 support software costs.
- ✚ If you are currently maintaining your own controls and exits, the staff involved can be freed for other work.
- ✚ **zOSEM** can eliminate significant manual JCL changes for upgrades or new software packages.

# User References

**zOSEM** has users of the product across diverse industry sectors including banking and finance, retail, government, manufacturing, insurance, publishing and pharmaceuticals. Outsourcing companies also use **zOSEM** to consolidate systems and simplify software upgrades.

Below is a list of the principle reasons cited by customers for acquiring **zOSEM**, ranked in their order of importance.

- ✚ Standards Enforcement
- ✚ EXIT Removal and simplified upgrades ✚ Resource Routing
- ✚ HSM Optimization/Reporting
- ✚ System consolidation/Data Center mergers ✚ Tape Sharing
- ✚ Exit Management
- ✚ Job accounting/charge-back ✚ Software license reduction
- ✚ Automating Job Prioritization/Service Level Improvement ✚ LE/370 implementation
- ✚ JES3 to JES2 migration
- ✚ Parallel Sysplex and Data Sharing implementation ✚ Resource usage extensions

## Sample User Comments:

### Wachovia Bank

Wachovia is the fourth largest banking company in the U.S.

#### Quotes:

- ✚ "...JES2 Upgrade Lag is Standard Operating Practice in OS/390 World"
- ✚ "...one hurdle with system upgrades is the requirement to update not only the operating system, but also the Job Entry Subsystem (JES2)
- ✚ "...upgrading to OS/390 version 2.4 had gone smoothly, but JES2 upgrades are always more tricky"
- ✚ "...JES2 upgrades have always followed six to twelve months behind operating system upgrades"
- ✚ "...estimated that nearly six months of a system programmer's time would be required to move from one version of the Job Entry System to the next"
- ✚ "... enables us to keep our JES2 up to date with our operating system environments across eight production machines, plus four development environments, with only two systems programmers"
- ✚ "...by limiting the use of software to a select number of processors, it is possible to reduce software maintenance bills significantly"

- ✚ "...we have been able to eliminate our customized JES2 Source Code, eliminate our macro JES2 Macro changes and significantly pare down the total number of JES2 EXITS"
- ✚ "...plus, we are able to keep our JES2 up-to-date with our operating system upgrades"

## CITY AND COUNTY OF SAN FRANCISCO

The City and County of San Francisco provides multiple services to more than 2,500 end users. These include a court management system for the judiciary, resource management, accounting, standards and statistics for city hall, and a 911 emergency calling system for the police department.

### Quotes:

- ✚ "...doing the upgrade would take an enormous amount of system programming time. Our MVS environment had many customized system exits that would need to be completely rewritten for a new environment"
- ✚ "...based on our previous experience with the product, we knew it would save us three months of system programming time, at the very least"
- ✚ "... the value of the **zOSEM** tool suite did not end with the migration. **zOSEM** also enabled the Department to simplify its environment by eliminating third party data mover software and to standardize on IBM's own hierarchical storage management (HSM) platform"

## MAJOR FOOD RETAILER

One of the world's largest food retailers operating over 1,500 stores in the United States and Canada. The System Technology Department provides services to over 5,000 end users throughout the organization.

### Quotes:

- ✚ "...we were looking at three to four years to upgrade because of the man hours that would be required to implement standard exit points for the systems before we migrated to a vanilla environment"
- ✚ "...vendor suggested to deploy **zOSEM** in order to eliminate from the project plan, the man hour allocations required for exit upgrades. Using **zOSEM**, no user exits were required, since the product provided the functions required by the applications running on the mainframe"
- ✚ "...within three months, the project was already ahead of schedule"
- ✚ "...the success of the three migrations provided the company with an application environment that has become a standard within the organization"
- ✚ "...with **zOSEM**, the company realized a three to four year time savings across multiple migrations"

## LARGE PAYMENT PROCESSING COMPANY

A large processor of payments for domestic and international users of credit, debit, commercial and private-label cards.

### Quotes:

- ✚ "...the product was installed in two hours and we were using it in five hours"
- ✚ "...immediately saw that it was a great time saver. Fixing an exit mod didn't require an assembler programmer; a junior systems programmer could do the work"
- ✚ "...the product is now used in migrations and application program testing prior to migration"
- ✚ "...the cost benefit argument was made as soon as we looked at what it would cost to do the work without **zOSEM**"
- ✚ "...as a bonus, the **zOSEM** product not only helps to speed migration, but can also be put to use to improve application development and testing efforts and to aid in managing day-to-day operational tasks"

## InfoCrossing (formerly MCRB SERVICE BUREAU)

MCRB Service Bureau in Chatsworth, CA. supports more than 100 customers with outsourced processing.

### Quote:

- ✚ "...MCRB continues to use **zOSEM** to support customers involved in the upgrade and testing of systems. The product provides support for „The Mellon Bank Modifications“ that each customer has made to his existing Job Entry Subsystem (JES2) in a multiple LPAR environment"

## UNISYS

The CCF Data Center within the Federal Systems Division of Unisys Corporation provides claims processing services for state and federal medical insurance.

### Quotes:

- ✚ "...**zOSEM** was acquired a year ago to facilitate the integration of existing claims processing systems into the consolidated mainframe platform at the CCF Data Center"
- ✚ "...we used the product to generate reports on performance and to identify EXIT points taken by coders who wrote the systems we were consolidating. Then we analyzed the exits and either revised them for use with the latest JES2 or retained the function using Extended Functions supported by **zOSEM**"

- ✚ "...zOSEM created another important capability for Unisys: there is often confusion in consolidation scenarios. Different groups of people whose applications are being consolidated have different ways of doing things. We realized that zOSEM could be harnessed to help us to establish and enforce some control policies"
- ✚ "...provides a way to enforce regions and job class rules that is pretty easy to set up with zOSEM and very reliable"

# zOSEM Features in Detail

## Base Environment Manager

### *Management Summary*

The Base Environment Manager populates the most commonly used system installation exit points (i.e. z/OS, JES2, JES3, TSO, SMF, RACF, DFP, Allocation, SAF (Security Access Facility) and HSM) with its own parameter-driven functions and can be used to manage existing exit code or a combination of **zOSEM's** built in functions.

The facilities provided by the Base Environment Manager allow you to dynamically activate, modify and de-activate system installation exists without the need to IPL the system and provides full recovery capability in the event of installation exit malfunction.

### *Details*

The **zOSEM** Base Environment Manager enables you to have a standard operating environment, whether on a single processor or on multiple processors, by allowing the installation exit modules to exist outside of the operating system. The required controls can be implemented quickly and smoothly and reliability exposures, availability interruptions and system modification problems can also be avoided while maintaining a vanilla operating system.

Variations from the standard IBM-supplied environment, such as those provided by program products or user-written control functions, no longer require an IPL or to be applied by the System Modification Program Extended (SMP/E). Loading or reloading any of these exits can now be done via the **zOSEM** ISPF dialogue.

The Base Environment Manager provides dynamic loading and reloading of all supported z/OS Exits. Exit points can be enabled and disabled dynamically and where appropriate, limited to specific jobnames. In addition, the dynamic adding, loading and refreshing of Supervisor Call (SVC) modules and RACF control tables are also supported. This provides an installation with a Quality Assurance or testing environment not previously available.

### *Base Features*

- ✚ Automatic Management of Exits with predefined names Allocation, DFP, HSM, ISPF, JES2, JES3, RACF, SMF, SAF and TSO
- ✚ Eliminates the need to IPL to refresh LPA modules that are managed by
- ✚ **zOSEM** Allocation, DFP, HSM, ISPF, JES2, JES3, RACF, SMF, SAF and TSO
- ✚ Error Recovery for Exit abends (ESTAE and FRR as appropriate)
- ✚ Backup Exit programs specified to automatically switch to if an Exit program abends

- ✚ Security Interface to an External Security Manager (e.g. RACF, CA-TOPSECRET, CA-ACF2) to allow access to **zOSEM** functions and Resources
- ✚ ISPF interface for Exit Management ✚ Query Interface to display Exit Status
- ✚ Up to 255 Independent Exit programs per exit point ✚ Jobname limiting for each Exit program
- ✚ Valid / Good Return code checking
- ✚ Disabling Return code checking (to remove an Exit program from execution)
- ✚ Default Return code
- ✚ TSO Notify support for Exit programs thatabend
- ✚ Loading of Exits from LINKLIBs, JOBLIB, STEPLIB or private authorized load library
- ✚ SVC dumps for Exit program abends
- ✚ Loading of Exit programs in either CSA or ECSA depending on RMODE/AMODE addressability
- ✚ Dynamically Reload / Disable individual Exit programs
- ✚ Dynamically Reload **zOSEM** Controller Programs without an IPL

### ***List of Exits Supported***

DFP Exits	HSM Exits
ISPF Installation Wide Exits	JES2 and JES3 Exits
RACF Exits	System Management Facilities (SMF) Exits
TSO/E Exits	Security Access Facility (SAF) Exits

### ***Online Interface***

Allows you to:

- ✚ Enable or disable a particular Exit point
- ✚ Define active user exits and what those Exits are
- ✚ Set, enable or disable **zOSEM** Extended Functions (assuming that the exit point has optional functions)
- ✚ Define up to three jobname masks per exit to limit the effect of the associated user exit, if LIMIT checking is applicable to the Exit point
- ✚ Provide an optional description for each of the relevant user Exits which could be used to document the author and the date the user Exit was installed or modified

# Job Resource Routing & Classing Controls

## Management Summary

**zOSEM** Job Routing Controls allow you to define and enforce Job Routing rules between processors in a Sysplex, based upon user defined resource names and their availability.

Job Routing Controls enhance those provided as standard by JES2 and Workload Manager (WLM) to improve workload balancing and make better use of hardware resources in a Parallel Sysplex environment. Job Routing Controls can also be used to reduce or control software-licensing costs by routing jobs to processors or Defined Capacity LPARS (requires z/OS 1.4 or above) where products are licensed. Throughput is improved by routing jobs to processors where resources are available. Job throughput is improved as delays or re-runs due to resource unavailability are avoided. As controls are dynamic, effort for manually changing JCL is eliminated.

## Details

Job Routing Controls provide the capability to select the z/OS images in a Multi Access Spool environment (MAS) where jobs will execute. Jobs can also be routed to other z/OS systems via dynamic insertion of NJE routing information.

Jobs can be routed to specific z/OS images in a MAS environment where the resources reside or where the installation manager requires them to execute. Routing may be controlled by statements placed within the job JECL containing **zOSEM** recognized parameters, or by specifying routing control information through the online interface.

There is a maximum of 127 routes per job. This is a combination of JCL statements and **zOSEM** Automated Routing.

This function is used to:

- ✚ Override the specified Job Class or Priority specified on the Job Card ✚  
Assign an **zOSEM** Automated Resource for Job Routing
- ✚ Change the Workload Manager Service Class ✚ Change the requested NJE node
- ✚ Change the Workload Manager scheduling environment

Based on the following parameters defined in the Job JCL:

DDNAME(mask), Dataset Name (mask), Job Class, Job Name(mask), Program Name(mask), RACF Group, Unit Name(mask), Userid(mask), WLM Service Class, Program Execution Parm(mask), member name(mask) Submitting Job Name(mask), Submitting Program Name(mask) and Submitting Job Type (STC, TSU, JOB)

By converting any SCHENV=name JECL statement to an **zOSEM** Resource statement, **zOSEM** allows automatic conversion of Scheduling Environments to **zOSEM** Routes. This provides an easy method to move away from Workload Manager Scheduling Environments to the flexible and easily changed **zOSEM** Resource Routing. To facilitate implementation of **zOSEM** Job Routing, **zOSEM** can automatically change SYSAFF JECL statements to SYSAFF=ANY to avoid the need to remove system affinity statements from existing JCL.

## Virtual Storage Controls

### *Management Summary*

**zOSEM** Virtual Storage Controls allow you to define and enforce rules for the use of the different types of virtual storage allocations.

Eliminates JCL Changes for OS/390 upgrades or maintenance and prevents job failures due to virtual storage shortages and resulting wastage of CPU resources.

### *Details*

**zOSEM** allows the installation to define up to 32 different defaults or overrides Virtual Storage Controls based on Jobclass, Jobname and Program Name including usage of:

- ✚ Region below the 16MB line
- ✚ Getmain below the line
- ✚ Region above the line
- ✚ Getmain above the line
- ✚ Hiperspace/Dataspace default size, total size, number per address space
- ✚ Above the Bar (z/OS in 64 bit mode only)
- ✚ Virtual Storage Controls protect production jobs from storage related abnormal terminations (S106, S80A abends).

## Tape Usage Controls

**zOSEM** Tape Usage Controls allow you to define and enforce rules that control the number of tape drive resources allocated to a job.

Manages scarce tape drive resources, controls hardware costs for tape drives, and helps meet service level objectives.

You can control tape usage by JOBCLASS specifying maximum Total Tapes and/or Maximum by type of tape (e.g. 3420, 3480, 3490, 3590 and 3490-VTS).

## System Command Controls

### *Management Summary*

**zOSEM** Command Controls allow you to define and enforce rules that control who can submit jobs containing JES2 and z/OS commands.

Protects the integrity of the system by preventing unauthorized changes to the status of system resources that may compromise the throughput of production/high priority jobs.

### *Details*

**zOSEM** can be set to verify that users are authorized to submit jobs that contain operating system commands or JES2 commands. The user can be limited to specified commands only, all commands, or can be precluded from submitting jobs with any operating system or JES2 commands.

## End User Job Execution Controls

### *Management Summary*

**zOSEM** End User Execution Controls allow you to limit the number of jobs that can run concurrently in any one system or MAS based on the submitter's USERID.

These controls prohibit End Users from executing excessive numbers of jobs simultaneously and limit excessive numbers of any job type from monopolizing processor resources or causing system degradation.

### *Details*

Allows you to limit the number of jobs that can run concurrently in an SMF ID, an LPAR, a single MVS image, in a Multi Access Spool (MAS) or in an entire sysplex using up to 32 user defined rule sets based on:

Userid	Jobclass
Jobname	Time of day
Day of week	

## Program Name Execution Controls

### *Management Summary*

**zOSEM** Program Name Execution Controls allow you to limit the number of jobs that can run concurrently in any one system or MAS based on Program Name.

These controls prohibit Multiple CPU intensive Programs from monopolizing processor resources or causing system degradation.

## ***Details***

Allows you to limit the number of jobs that can run concurrently in an SMF ID, an LPAR, a single MVS image, in a Multi Access Spool (MAS) or in an entire Sysplex based on the Program Name.

## **Print Output Extension Controls**

### ***Management Summary***

**zOSEM** SYSOUT Extension Controls allow the installation to define and enforce rules that govern the amount of output generated by batch jobs.

Improves throughput and service levels by preventing production failures due to exceeding output limits and controls CPU resources by avoiding re-runs. Prevents unauthorized jobs from generating large amounts of output and filling up spooling resources.

### ***Details***

Allow extensions for generated output for up to 32 user defined rule sets based on:

Jobname Program Name Job class

SYSOUT class values set in the JES2 Initialization parameters ESTLNCT, ESTPAGE and ESTBYTE

As defined by an external security system

SYSOUT Extension Controls protects Production Jobs from abnormal terminations due to exceeding limits for generated output (S722 Abends).

## **Device Allocation Controls**

### ***Management Summary***

**zOSEM** Allocation Controls allow you to reserve specified device(s) for use by specified jobs.

Improves throughput and service levels by ensuring jobs needing these devices execute when required.

### ***Details***

Allows you to:

-  Restrict device allocation and define how device unavailability is handled by Job or Jobname(masks)
-  Restrict the console operator from making the device available with a VARY device command

- ✚ Automatically replies to make the device available for an authorized Job or Jobname(masks)
- ✚ Automatically varies the device offline when the authorized Job or Jobname (mask) has completed

## Time Controls

### *Management Summary*

**zOSEM** Time Controls allow the installation to define and enforce rules for the amount of processor and waiting time allocated to jobs.

Improves throughput and service levels by preventing production re-runs due to exceeding JOB/Step time limits and preventing unauthorized jobs from consuming excessive amounts of CPU time or tying up resources waiting for others.

### *Details*

Provide options for enforcing CPU time limitations, extending CPU time, Job wait time and TSO wait time by Jobclass, Jobname, Jobname mask, Program Name, Program Name mask, TSO userid, terminal id mask, days of the week or as defined in an external security system. Additionally, wait time can be extended for slow tape mounts, tape mount messages reissued to the operator console and notification messages sent to the operator console for tape mount failures. Time Controls protect Production Jobs from time exceeding abnormal terminations (S322 and S522 abends).

## Dynamic STEPLIB Insertion

### *Management Summary*

**zOSEM** Dynamic STEPLIB insertion facility allows you to dynamically insert, modify or replace STEPLIB concatenations during z/OS ATTACH processing prior to Programs starting during z/OS step initialization.

Assists in the migration to new versions of program products (e.g. LE/370) without JCL changes. Improves responsiveness to new requirements and avoids manual intervention for JCL changes.

### *Details*

The Dynamic STEPLIB option allows you to modify or replace existing STEPLIB DD statements or to add a new STEPLIB DD based on Job Class, Job Name(mask), Userid (mask), Step Name or Program Name(mask). You may optionally fail the job if any of the specified libraries for the STEPLIB are unavailable, or allow the job to continue without changing the existing STEPLIB specification.

## Dynamic TSO STEPLIB

### *Management Summary*

This function gives the ability to Dynamically change the TSO STEPLIB concatenation.

### *Details*

The STEPLIB or any other ISPF DDNAME can be dynamically re- allocated based on an application requirements through the use of the **zOSEM** OS\$LIB command in both a REXX EXEC or CLIST.

## RACF Controls

### *Management Summary*

**zOSEM** RACF Controls allow you to dynamically update RACF security tables.

Improves system availability, service levels and responsiveness to new requirements by allowing the refresh of RACF objects without the need to restart the entire complex.

### *Details*

Allows you to refresh the RACF ICHRIN03, ICHRDSNT and ICHRRCDE and ICHRFR01 tables without IPL.

## TSO Submitted JOB Controls

### *Management Summary*

**zOSEM** TSO submitted JOB Controls allow you to define and enforce installation standards for TSO submitted jobs.

Improves throughput and service levels by ensuring TSO jobs run in authorized execution classes and improves accountability by ensuring Jobname standards for TSO submitted jobs are respected.

### *Details*

Allows you to:

-  Enforce TSO submitted Jobs by Jobclass to be USERID of the submitting user
-  Add NOTIFY parameter to TSO submitted Jobs by Jobclass
-  Control submission of MVS Commands and/or JES2 Commands embedded in Jobs by TSO users

- ✚ Enhance NOTIFY information returning the highest return code from the job to the user
- ✚ NOTIFY user at job start

## WTO Controls

**zOSEM** WTO Controls allow monitoring of user specified Data Definition (DD) names for specific messages, to allow appropriate action by an automated operations package.

Provides potential to improve use of Human Resources by eliminating operator intervention.

## TAPE Sharing Controls

**zOSEM** Tape Sharing Facility allows you to automatically share tape drives across systems without operator intervention.

- ✚ Eliminates operator responses for REPLY DEVICE NAME or CANCEL for shortage of tape drives
- ✚ Eliminates manual operator tasks
- ✚ Controls moving tape drives between LPARS or Sysplex(es)
- ✚ Manages scarce tape drive resources
- ✚ Controls hardware costs for tape drives
- ✚ Improves throughput and service levels by optimizing tape drive availability.

## JCL Parameter Controls

### *Management Summary*

**zOSEM** JCL Parameter Controls allow you to enforce JCL rules that control access to resources defined on JCL parameters.

- ✚ Improves throughput and service levels by controlling who has access to system resources
- ✚ Ensures valid accounting of used resources for capacity planning, service level reporting and charge-back
- ✚ Prevents misuse of resources and charging to the wrong user.

## Details

Allows you to define and enforce, either using **zOSEM** or an external security system such as RACF, JCL rules that control access to resources defined on the following JCL parameters:

- ✚ Account number controls allow the account number field to be verified as valid and optionally resource checked utilizing an external security system such as RACF, ACF2 or TOPSECRET to ensure that a user has access to that account number
- ✚ Job class controls cause RACF, ACF2 or TOPSECRET to resource check a Jobclass for user access
- ✚ Job name controls cause **zOSEM** Environment Manager to determine if a Jobname has access to a Jobclass and/or certain Jobnames are excluded from a Jobclass
- ✚ SYSOUT controls check access to parameters including:
  - SYSOUT Class
  - FLASH
  - CHARS
  - FORM
  - WRITER
  - DESTINATION
  - MSGCLASS
  - FCB
  - UCS
  - Copy Mods for 3800
- ✚ Tape Usage by JOBCLASS specifying maximum Total Tapes and/or Maximum by type of tape (e.g. 3420, 3480, 3490, 3590 and 3490-VTS)
- ✚ Other JCL controls check access to parameters including:
  - ADDRSPC
  - PROTECT
  - PERFORM
  - SUBSYS
  - DDNAMES
  - DPRTY
  - PRTY

## Job/Step Statistics

### *Management Summary*

**zOSEM** provides extensive information relating to jobs handled by the system. This can include an estimated charge for running the job.

Provides information for accounting and charge back and improves service to users by providing them with more information about job execution.

### *Details*

**zOSEM** provides the following information relating to job execution:

- ✚ Enhanced NOTIFY returning the highest return code from the job to the user
- ✚ Job end WTO in JESLOG for highest step end condition code ✚ NOTIFY user when job starts
- ✚ Step end WTO in JESLOG with step condition code

- ✚ Step end statistics including I/Os by DDNAME in JES Messages ✚ Job end statistics in JES Messages
- ✚ Estimated job costs
- ✚ Customization of step end statistics flower box including Customer Description
- ✚ WTOR option by Jobclass for operator cancelled Jobs ✚ Highlighted WTO option by Jobclass for abended Jobs
- ✚ RACF, ACF2 or TOPSECRET support for TSO users to submit jobs with Jobnames other than their TSO userid prefix.

## HSM Optimization Controls Management Summary

**zOSEM** provides an easy to use DFSMShsm (HSM) Optimizer that can dramatically improve performance in both SMS and non-SMS storage environments. The **zOSEM** HSM Optimizer:

- ✚ Reduces the manpower associated with managing HSM
- ✚ Improves use of hardware by reducing HSM CPU and I/O consumption
- ✚ Reduces the size of the ML1 Storage Pool
- ✚ Assists in reducing data set thrashing
- ✚ Improves throughput by ensuring production jobs have the highest priority for HSM recall and recovery activities

### **Details**

The HSM Optimizer allows more precise control of HSM migration and backup. HSM, as supplied by IBM in both SMS and non-SMS environments, provides a limited set of specifications in determining which datasets will or will not be migrated or backed up. Complete volumes may be excluded, datasets may be excluded from migration and a residency factor (the number of days since last reference) may be specified. The HSM Optimizer in contrast, allows multiple residency specifications, the dataset size as a factor at migration time versus allocation time in DFSMS and a relationship between a dataset's size and specification in a dataset name list.

### **zOSEM HSM Optimizer provides:**

- ✚ Prioritization of HSM recalls, recovers based on userid, Jobname, time of day, day of week and dsname (mask)
- ✚ Optionally recall datasets at JES2 Job conversion time and optionally prevent Job execution until the migrated datasets have been recalled
- ✚ A default DSORG for all datasets during allocation so that HSM can manage all datasets
- ✚ Global rules for Migration from Primary volumes to Migration Level 1 for SMS environments based on dataset size at migration time

- ✚ Global rules for Migration from Migration Level 1 to Migration Level 2 for SMS environments based on dataset size at migration time
- ✚ Global rules for Direct Migration from Primary volumes to Migration Level 2 for SMS environments based on dataset size at migration time
- ✚ Elimination of HSM Error messages by allowing simple lists of dataset name(s) or dataset name mask(s) to be entered for exception processing. i.e. Exclude dataset name(s) or dataset name mask(s) for datasets that are always open during HSM daily migration or backup processing
- ✚ Automatic de-fragmentation of Primary volumes based on fragmentation index, time of day, day of week, and volume serial for non-SMS and SMS environments
- ✚ Direct Migration from Primary volumes to Migration Level 2 based on dataset size and/or dataset name at migration time versus SMS at allocation time
- ✚ Migration from Primary volumes to Migration Level 1 refused for datasets based on dataset size and/or dataset name at migration time versus SMS at allocation time
- ✚ Migration from Migration Level 1 to Migration Level 2 refused for datasets based on dataset size and/or dataset name at migration time versus SMS at allocation time
- ✚ Excluding of datasets from HSM back up in a non-SMS or SMS environment
- ✚ Optimum Re-blocking of recalled datasets, and exclusion of datasets to be Re-blocked based on dataset size and/or dataset names
- ✚ Residency specified at the dataset level for non-SMS environments

### ***Quick Delete***

**zOSEM** Quick Delete function specifies that any files coded with a retention setting of DELETE, the Dataset is migrated and the program name is IEFBR14 will be deleted by **zOSEM**. No HSM RECALL will be performed. Instead an HDELETE will be generated thereby avoiding wasting hardware resources on unnecessary recalls.

## **DASD Allocation Controls & QuickPool**

### ***Management Summary***

**zOSEM** DASD Allocation Controls allow you to define and enforce DASD dataset allocation standards for non-VSAM datasets. QuickPool allows you to define and enforce dynamic pooling rules for non-VSAM datasets and for VSAM dataset placement.

Reduces storage and processing overhead. Provides a good bridge to DFSMS operations. Reduces effort to manage DASD storage. Provides accounting information at dataset and catalog level.

## ***Details***

The Control DASD allocation function controls whether:

- ✚ Absolute track allocation will be allowed
- ✚ Allocation requests for contiguous space will be honoured ✚ ALX allocation requests will be allowed
- ✚ MXIG allocation requests will be allowed ✚ Single-level dataset names will be allowed ✚ ISAM datasets will be allowed
- ✚ Unmovable datasets can be created
- ✚ RACF automatic dataset protection is in effect ✚ RACF discrete profiles are allowed

QuickPool provides dynamic pooling for non-VSAM datasets and enforces VSAM dataset placement as defined by the pooling rules. Specific features include:

- ✚ Dataset Name Standards enforcement
- ✚ Warn Mode with messages written in the JES log
- ✚ Dynamic masking for defining dataset name groups ✚ Dynamic masking for defining volume name groups ✚ DFSMS migration aid
- ✚ Makes DASD usage information available for accounting purposes by storing account number information into the Format1 DSCB for non-VSAM files

## **HSM Reports**

### ***Management Summary***

**zOSEM** provides an extensive set of reports that help to maintain error free migration and recall operations in the SMS storage environment. Reports detail the performance of the HSM component in non-DFSMS and DFSMS environments. With **zOSEM** HSM reports, you can reduce the manual effort for storage management activities. They allow storage management personnel to quickly gain an insight into HSM operations and helps them to be more responsive to user requirements.

### ***Details***

The HSM SMF Function Statistic Records (FSR), Volume Statistic Records (VSR), Daily Statistic Records (DSR), Migration Control Dataset (MCDS), Backup Control Dataset (BCDS) and HSM Primary Volume VTOCS are utilized. A database of the latter records is maintained to provide both daily and historical reporting.

Specific features and reports include:

## ***Dynamic date selection***

- ✚ Summary and Detail HSM Error Reports by Function, Return and Reason code
- ✚ Dataset Activity Report details excessive Migration and Recall of datasets
- ✚ Primary Volume Summary Report:
  - Available space
  - Space releasable
  - Last Backup date/time
  - Last Migration date/time
  - Last Dump date/time
  - Summary of volume utilization by DSORG
  - Type of Volume SMS or HSM
- ✚ Primary Volume Detail Report:
  - Dataset Name
  - DSORG
  - Type of allocation (CYL, TRK, Megabytes, Kilobytes)
  - Space allocated
  - Space used
  - Space releasable
  - Number of extents
  - DFSMS managed
- ✚ Activity Summary Report utilizing the DSRs for the reporting period:
  - Number of datasets migrated to ML1 and ML2
  - Number and percent of datasets that failed migration to ML1 and ML2
  - Number of datasets recalled from ML1 and ML2
  - Number and percent of datasets that failed recall from ML1 and ML2
  - Number of datasets backed up
  - Number and percent of datasets that failed backup
- ✚ Volume Summary Report utilizing the VSRs for the reporting period:
  - Volume Utilization including minimum, maximum and average
  - Fragmentation Index including minimum, maximum and average
  - Number of datasets migrated
  - Number of datasets recalled
  - Number of datasets backed up
  - Number of datasets recovered
  - Date/time of last volume dump

- ✚ Detail Dataset Movement Reports:
  - Primary to ML1
  - ML1 to ML2
  - Primary to ML2 ○ ML1 to Primary ○ ML2 to Primary
- ✚ Summaries of Dataset movement by size and age of dataset:
  - Primary to ML1
  - ML1 to ML2
  - Primary to ML2 ○ ML1 to Primary ○ ML2 to Primary
- ✚ Summary and Detail Reports on Migration Control Dataset (MCDS) by Age
- ✚ Summary and Detail Reports on Backup Control Dataset (BCDS) by Age
- ✚ ISPF Interface for all report specifications

# Arranging a demonstration

A live demonstration of **zOSEM** can be given for those who require a more in-depth understanding of how the **zOSEM** interface works and can be tailored to cover areas of specific interest.

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