TRIDENT SERVICES
Solutions for z/OS & Enterprise Servers

zOSEM

Operating System Environment Manager
Release 6.2

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zOSEM OVERVIEW

z/Operating System Environment Manager is one solution for total system management of z/OS, the goal is to simplify and modernize how we manage z/OS.

z/OSEM offers a methodology and ISPF interface to provide today's data center a proactive solution to the challenges of fewer systems programmers. It also offers an opportunity to make the task of managing system environments an administrative one, rather than a technical programming issue. The z/Operating System Environment Manager makes it much easier for installations to manage system resources and to control how they are used.

Driven by an easy-to-use ISPF interface, z/OSEM, with more than 200 robust features, provides dynamic controls in the many key OS areas.

zOSEM provides a multitude of features for improved control, throughput and processing efficiency in a z/OS enterprise server environment. Throughput management is implemented using the complete set of enterprise standards control functions described herein. The time and expense of developing, testing and implementing system modifications is eliminated, no JES2 source modifications are required. All **zOSEM** functions are supported by standard JES2, SMF, DFSMShsm, RACF, ISPF, ALLOC, TSO exit points and macros. There is no longer a need for production IPL's when adding or modifying exits or SVC's. Security interfaces to RACF, CA-ACF2 or CA-TOPSECRET are provided to allow access to all **zOSEM** controls. All **zOSEM** control options are accessible via ISPF interfaces, and **zOSEM** controls can be implemented immediately or deferred to the next IPL. **zOSEM** supports z/OS versions as early as 1.12.

Job Routing & Job Classing Controls

zOSEM's powerful job routing function allows job routing between CPU's in a JES2 MAS based on defined resource names (Subsystems like DB2 or IMS) and their availability (up or down). Use the $QA (add Resource) and $QD (delete Resource) commands to manage resource availability on each system running **zOSEM** Job Routing. The routing may be controlled by JECL statements placed within the Job or by assigning routing control information through the **zOSEM** Job Routing Controls functions ISPF interface.

Note: There may be a maximum of 127 routes per job. This is a combination of JECL statements and **zOSEM's** automated routing.

- This function may also be used to change the Job Class, JES2 Job Priority, WLM Service Class, WLM Scheduling Environment and NJE Node that is specified in the JCL.
- **zOSEM** provides full support for the Mellon Bank Modifications JECL control cards and Operator commands. The $HASP message numbers produced by the **zOSEM** implementation of the Mellon Modifications may also be changed. This feature is provided for customers who would like to see the original Mellon message numbers. Although the original Mellon Bank

Modifications had reused IBM message numbers, the **zOSEM** implementation tries to avoid this where possible. This feature allows you to specify the message number you want to appear for selected messages.

- **zOSEM** allows for Step Level Routing based on:

Account	Account1	Account2	Account3
Account4	Account5	Account6	Account7
Account8	DDNAME	Dataset Name	Dataset Name Member
Execute Parm	Perform	Program Name	Tape Unit
Unit Name			

- **zOSEM** allows automatic routing of the following:
  - Set Job Resource Routing allows automatic routing of jobs
  - Set JOB CLASS allows overriding specified Job Class
  - Set JES2 Job Priority allows overriding specified JES2 Job Priority
  - Set Service Class allows overriding WLM assigned or specified Service Class
  - Set Job Scheduling Environment (SCHENV) allows overriding specified SCHENV
  - Set NJE Node

Utilizing the following selection criteria:

Account	Account1	Account2	Account3
Account4	Account5	Account6	Account7
Account8	DDNAME	Dataset Name	DSN Member
Execute Parm	Job Class	Job Name	Job Time
Member	Perform	Program Name	RACF Group
Scheduling Env	WLM Service Class	Source Name	Source Node
Source Program	Source System	Source Type	System Affinity
Tape Unit	Unit Name	User ID	

- Automatically Convert Scheduling Environment to **zOSEM** Route:
  Allows you to easily move away from Workload Manager Scheduling Environments to the flexible and easily changed **zOSEM** Resource Routing by converting any SCHENV=name JECL statement to a **zOSEM** Resource statement.
- Automatically Change SYSAFF JECL statements to SYSAFF=ANY:
  Allows use of **zOSEM's** Job Routing without the need to remove system affinity statements from your JECL.

Dataset Name Conflict Resolution

The Dataset Name Conflict Resolution function prevents jobs from being selected until all needed datasets are available. This prevents a job from taking an initiator when it is actually unable to run because datasets are already in use by another job or user. TSO send messages may

optionally be issued to operators, the job owner and/or owner of the dataset.

Job Limiting Controls

zOSEM's End User Computing Job Scheduling and Limiting options allows limiting the number of jobs that a User can be running concurrently in an LPAR, a single MVS image and/or in a JES2 MAS using user defined policies based on:

Userid Jobclass Jobname Time of day Day of week

zOSEM's Program Name Execution Limiting 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.

HSM Through-Put Controls for Batch Job Processing

zOSEM's HSM Quick Delete function specifies that any files coded with a (DISP=) setting of DELETE and the program name is IEFBR14 will be deleted by **zOSEM**. No DFSMShsm RECALL will be performed. Instead a HDELETE will be issued to DFSMShsm.

zOSEM's HSM Early Batch Recall function will cause DFSMShsm to recall needed datasets while the job waits in the input queue. The options are (1) issue recall and let the job start; (2) Only recall datasets in the first step before the job starts; (3) Only recall Tape datasets before the job starts; (4) Recall all datasets and wait for all datasets before letting the job start.

zOSEM's HSM Prioritize DFSMShsm recalls allows **zOSEM** to place recall requests in the DFSMShsm recall queue based on requesting userid, jobname mask, time of day, day of week, and dataset name (mask).

Dynamic STEPLIB

zOSEM's dynamic STEPLIB control function assists in the migration to LE/370 and any new version of most program products like FILE/AID, SAS, etc. The STEPLIB option allows you to modify or replace existing STEPLIB DD statements or add a new STEPLIB DD based on job class, job name, user ID, step name or program name. You may optionally fail the job if any of the specified libraries for the STEPLIB are unavailable, or you may allow the job to continue without changing the existing STEPLIBs.

Catalog Account Controls

zOSEM's Catalog Account Controls function can be used to place up to 32 bytes of JOB or STEP accounting information into the catalog record for a newly created VSAM dataset or SMS-managed non-VSAM dataset. Additionally, the Job's User ID is placed into the Owner field of the catalog record. Neither of these fields is overridden if the information has already been

provided.

ACF2 Non-cancel
zOSEM can override the ACF2 non-cancel user attribute to allow **zOSEM** to enforce its controls.

RACF Restricted Password Control
This function 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

Dynamic TSO STEPLIB Command
This function gives the ability to Dynamically change the TSO STEPLIB concatenation based on an application need through the use of a **zOSEM** OS$LIB command in both a REXX EXEC or CLIST.

Job Controls
All JCL selection parameters can be masked (i.e. jobname, ddname, dsn) simplifying selection criteria. Job Controls provide options for Region Size, Hiperspace, Dataspace, Step end statistics, Job end statistics, Surrogate password processing, use of certain functions during TSO submit processing, correction of NOT CATALOGED 2 conditions and restriction of devices to certain Jobnames.

- Virtual Storage controls provide user defined virtual storage controls for region, hiperspace and data space based on JOBCLASS, JOBNAME (mask) and Program Name (mask):
  - Region Below the line (16 Megabyte)
  - Getmain Below the line (16 Megabyte)
  - Region Above the line (16 Megabyte)
  - Getmain Above the line (16 Megabyte)
  - Hiperspace Default Size
  - Hiperspace Total Size
  - Hiperspace Total Spaces
  - MEMLIMIT or Above the Bar (only available on z/OS in 64 bit mode)
- **zOSEM**'s Region Control values for region size and GETMAIN limit value below the line may be specified as a negative value. This means that the job will be given all available space below the line minus the value specified.
- SYSOUT Extension support for OUTLIM parameter provided for unlimited user defined policies based on:
  Jobname Program Name Jobclass SYSOUT class

- Read access to a user defined external security resource

- SYSOUT Extension support for JES2 Parameters ESTLNCT, ESTPAGE and ESTBYTE provided for unlimited user defined policies based on:
  - Jobname, Program Name, Jobclass and SYSOUT class.
  - Read access to a user defined external security resource
- Correction of NOT CATALOGED 2 conditions specified by Jobclass options including:
  - Uncatalog and delete the improper dataset and catalog the new dataset
  - Uncatalog the improper dataset and catalog the new dataset
  - Cancel the Job with a JCL error
- Device Restriction Controls:
  - Restricts device allocation and usage by Jobname or by Jobname masks
  - Restricts the console operator from making the device available with a VARY device command
  - Automatic REPLY to make the device available for an authorized Job or Jobname mask
- Surrogate Password processing provides:
  - Password insertion in the Job card for NJE processed Jobs for TSO users
  - Password insertion in the Job card for Jobs submitted by authorized Jobs, Started Tasks and/or users that may submit Jobs for other users
- Enforce TSO submitted Job Names to contain 1 – 7 characters of the submitters USERID
- Automatically Add NOTIFY parameter to TSO submitted Jobs
- Control submission of z/OS Commands and/or JES2 Commands imbedded in Jobs by TSO users

Job/Step Statistics

- 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 their job is starting
- Step end WTO in JESLOG with step condition code
- Step end statistics including CPU for General processors, ZIPS, ZAPS and Service Units
- I/O Counts 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

Estimated Cost

The Estimated Cost function of **zOSEM** can be used to calculate an approximate charge for running each step of a job and an approximate total cost of running the job. The costs are presented in the "flower box" produced by requesting **zOSEM**'s STEP/JOB-end statistics.

JCL Controls

JCL Controls allow installations to control various JCL parameters utilizing an external table with

zOSEM's Environment Manager and/or utilize RACF, CA-ACF2 or CA-TOPSECRET for checking whether users have access to a particular resource:

- Account Number controls allow Job Accounting Number(s) to be verified as valid and optionally resource checked, utilizing an External Security Manager to determine that a User has access to that Job Accounting Number
- JOBCLASS controls cause the External Security Manager to resource check a JOBCLASS for User access
- JOBNAME controls cause **zOSEM** to determine if a JOBNAME has access to a JOBCLASS, and/or a certain JOBNAMES are excluded from a JOBCLASS
- SYSOUT parameters including:

SYSOUT Class	DESTINATION	FLASH	MSGCLASS
CHARS	FCB		FORM
UCS	WRITER		Copy Mods for 3800

- Other JCL Controls including:

ADDRSPC	DDNAMES	PROTECT	DPRTY
PERFORM	PRTY	SUBSYS	

Tape Usage

Tape Usage by JOBCLASS specifying maximum Total Tapes and/or Maximum by type of tape (e.g. 3400, 3480, 3490, 3490-VTS and 3590)

RACF Controls

zOSEM's RACF Tables Reload Selection panel displays the three RACF Tables available to be reloaded.

- ICHRIN03 Table refresh without IPL
- ICHRRCDE Table refresh without IPL
- ICHRFR01 RACF Router Exit refresh without IPL

TIME Controls

zOSEM's Time Controls provides the option of enforcing CPU time limitations, extending CPU time, JOB wait time, and TSO wait time as well as controlling by job class the insertion of a missing time parameter, overriding the time specified on the jobcard, or canceling the job if job time is greater than the JES2 time value. The Time Control function also allows jobs to be cancelled instead of having their time parameter adjusted and then failing in a S322 ABEND.

- Insert a missing time parameter
- Reset the jobcard's time parameter to match JES2 Job Class definitions, or optionally cancel the job.
- Re-issue Tape mount messages to Operator Console
- Check for Tape mount failures and send notification messages to Operator Console

- Extend SMF wait time for TSO users by USERID and/or Terminal ID mask for certain days of the week and time of day (good for session managers)
- Max job/step CPU time extended for user defined policies based on:
  Jobclass Jobname Jobname mask Program Name
  - Program Name mask Read access to an external security resource

- SMF Wait time extended for user defined policies based on:
  Jobclass Jobname Jobname mask Program Name
  - Program Name mask Read access to an external security resource

ISPF Dataset Name Controls

zOSEM provides **ISPF File Prefix Controls** which allow you to specify a specific prefix for ISPF log, list and temporary datasets in a multiple system environment. Users have the ability to insert system names to provide unique identities in a SYSPLEX environment.

Tape Share Controls

zOSEM's Tape Share Controls allows you to define tape drives to **zOSEM** which will then control the devices by automatically issuing the VARY commands needed to put the drive offline on one system and online on the system where it is needed. No operator intervention is required.

WTO Controls

zOSEM's WTO Controls function allows **zOSEM** to monitor user specified DD names for specific messages. When found, the message is written to the system console to allow appropriate action by either the operator or an automated operations package. The DD name to be monitored may be limited to specific job names and/or program names.

HSM Optimizer

The HSM Optimizer allows you to more precisely control DFHSM migration and backup. DFHSM 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.

- Prioritize DFSMShsm recalls, recovers based on userid, jobname, time of day, day of week, dsname (mask).
- Provide a default DSORG for all datasets allocation so that DFHSM can manage all datasets
- Global policies for Migration from Primary volumes to Migration Level 1 for DFSMS environments based on dataset size at migration time

- Global policies for Migration from Migration Level 1 to Migration Level 2 for DFSMS environments based on dataset size at migration time
- Global policies for Direct Migration from Primary volumes to Migration Level 2 for DFSMS environments based on dataset size at migration time
- Eliminates DFHSM 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 DFHSM daily migration or backup processing
- Automatic defragmentation of Primary volumes based on fragmentation index, time of day, day of week, and volume serial for Non-SMS and DFSMS environments
- Direct Migration from Primary volumes to Migration Level 2 based on dataset size and/or dataset name at migration time versus DFSMS 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 DFSMS 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 DFSMS at allocation time
- Exclude datasets from DFHSM back up in a Non-SMS or DFSMS environment
- Optimum Re-blocking of recalled datasets, and exclusion of datasets to be Re-blocked based on dataset size and/or dataset names
- Disk Residency specified at the dataset level for Non-SMS environments

HSM Optimizer Report System

HSM Report System provides over 40 reports detailing the performance of the DFHSM component in both a Non-SMS and DFSMS environment. Information using the DFHSM SMF Function Statistic Records (FSR), Volume Statistic Records (VSR), and the Daily Statistic Records (DSR). A database of the DFHSM SMF records is maintained to provide both daily and historical reporting.

Report 01 **Migration Detail** **(Primary – ML1)**	A detailed list of migration events (Primary to ML1) sequenced in date & time order.
Report 02 **Migration Delay Summary** **(Primary – ML1)**	Summary of migration events (Primary to ML1) segmented by dataset size
Report 03 **Migration Age Summary** **(Primary – ML1)**	Summary of migration events (Primary to ML1) segmented by dataset age. This "age" is the number of days that a dataset was resident on Primary storage before it was migrated.
Report 04 **Migration Detail** **(ML1 – ML2)**	A detailed list of migration events (ML1 to ML2) sequenced in date & time order.
Report 05 **Migration Delay Summary**	Summary of migration events (ML1 to ML2) segmented by dataset size.

(ML1 – ML2)	
Report 06 **Migration Age Summary** **(ML1 – ML2)**	Summary of migration events (ML1 to ML2) segmented by dataset age. This "age" is the number of days that a dataset was resident on ML1 before it was migrated.
Report 07 **Migration Detail** **(Primary – ML2)**	A detailed list of migration events (Primary to ML2) sequenced in date & time order.
Report 08 **Migration Delay Summary** **(Primary – ML2)**	Summary of migration events (Primary to ML2) segmented by dataset size.
Report 09 **Migration Age Summary** **(Primary – ML2)**	Summary of migration events (Primary to ML2) segmented by dataset age. This "age" is the number of days that a dataset was resident on Primary storage before it was migrated.
Report 10 **Recall Detail** **(ML1 – Primary)**	A detailed list of recall events from ML1 sequenced in date & time order.
Report 11 **Recall Delay Summary** **(ML1 – Primary)**	Summary of recall events (ML1 to Primary) segmented by dataset size.
Report 12 **Recall Age Summary** **(ML1 – Primary)**	Summary of recall events (ML1 to Primary) segmented by dataset age. This "age" is the number of days that a dataset was resident on ML1 before it was recalled.
Report 13 **Recall Detail** **(ML2 – Primary)**	A detailed list of recall events from ML2 sequenced in date & time order.
Report 14 **Recall Delay Summary** **(ML2 – Primary)**	Summary of recall events (ML2 to Primary) segmented by dataset size.
Report 15 **Recall Age Summary** **(ML2 – Primary)**	Summary of recall events (ML2 to Primary) segmented by dataset age. This "age" is the number of days that a dataset was resident on ML2 before it was recalled.
Report 16 **DFHSM DASD Volume Summary**	Summarizes activity on volumes under DFSMShsm control. The report is sequenced in volume serial number order.
Report 17 **Primary Dataset Activity**	A detailed list of each dataset's activity, with one line entry per dataset. The report is sequenced from the most active dataset to the least active. This report facilitates the identification of dataset "thrashing" (i.e. datasets that are being unnecessarily bounced between Pri- mary and Migration-level storage). Dataset activity is measured in terms of a **Movement**

	Index (also known as **Movements Per Day**). The calculation of the Movement Index is the average number of movements (i.e. migrations & recalls) that occurred to the dataset per day. This is measured over the most recent 30 days within the requested re- porting period.
Report 18 **DFHSM Error Detail**	Itemizes every DFSMShsm error for the requested reporting period.
Report 19 **DFHSM Error Summary**	Summarizes the DFSMShsm errors that occurred during the requested reporting period. The report is segmented by HSM function and errors within that function.
Report 20 **Activity Summary**	Provides a broad overview of the general DFSMShsm functions performed for the requested reporting period.
Report 21 **Migrated Dataset Summary**	Summarizes the migrated datasets based on the age of the dataset.
Report 22 **Dataset Backup Summary**	Presents a summary of DFSMShsm backups. The report is segmented by the age of the dataset and lists the number of backups by version within these segments.
Report 23 **Primary Volumes**	Provides a summary of the status of all DFSMShsm-managed DASD volumes. This status includes SMS storage group characteristics, the most recent HSM processing events, and the breakdown of resident datasets by dataset organization (DSORG).
Report 24 **Primary Volume Detail**	Lists all datasets that are resident on all DFSMShsm primary volumes. The report is sequenced by dataset name within primary volume serial number.
Report 25 **Primary Volume Date Reference Detail**	Lists all datasets that are resident on all DFSMShsm primary volumes. The report is sequenced by dataset reference date within primary volume serial number.
Report 26 **Migrated Dataset Detail (MCDS Sorted by DSN)**	Lists all datasets that are migrated (i.e. the datasets reside on ML1 or ML2). The report is sequenced in dataset name order.
Report 27 **Backed Up Dataset Detail (BCDS Sorted by DSN With XREF)**	Lists all backups that are being maintained. The report is sequenced in dataset name order and multiple backups for a dataset are sequenced in backup creation order. The report includes a cross-reference field which indicates the current location of the dataset.
Report 28 **Migrated Dataset Detail (MCDS Sorted by Date)**	Lists all datasets that are migrated (i.e. the datasets reside on ML1 or ML2). The report is sequenced in migration date & time order.
Report 29 **Backed Up Dataset Detail**	Lists all backups that are being maintained. The report is sequenced in backup date & time order.

(BCDS Sorted by Date With XREF)	The report includes a cross-reference field which indicates the current location of the dataset.
Report 30 **Backed Up Dataset Detail (BCDS Sorted by DSN No XREF)**	Lists all backups that are being maintained. The report is sequenced in dataset name order and multiple backups for a dataset are sequenced in backup creation order.
Report 31 **Backed Up Dataset Detail by Date**	Lists all backups that are being maintained. The report is sequenced in backup date & time order.
Report 32 **Recycle Detail**	A detailed list of recycle events sequenced in date & time order.
Report 33 **Recycle Delay Summary**	A summary of recycle events segmented by dataset size.
Report 34 **Recycle Age Summary**	A summary of recycle events segmented by dataset age.
Report 35 **Backup Detail**	A detailed list of backup events sequenced in date & time order.
Report 36 **Backup Delay Summary**	A summary of backup events segmented by dataset size.
Report 37 **Backup Age Summary**	A summary of backup events segmented by dataset age.
Report 38 **Recovery Detail**	A detailed list of recovery events sequenced in date & time order.
Report 39 **Recovery Delay Summary**	A summary of recovery events segmented by dataset size.
Report 40 **Recovery Age Summary**	A summary of recovery events segmented by dataset age.
Report 41 **Delete Detail**	A detailed list of deletion events sequenced in date & time order.
Report 42 **Delete Delay Summary**	A summary of deletion events segmented by dataset size.
Report 43 **Delete Age Summary**	A summary of deletion events segmented by dataset age.

QUICKPOOL DASD POOLING

zOSEM's QuickPool feature provides significant storage and processing savings and provides a good bridge to DFSMS operations. QuickPool provides dynamic pooling for non-VSAM datasets and enforces VSAM dataset placement as defined by the pooling policies. 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
- Optionally disallows RACF discrete profiles during dataset allocations

BASE ENVIRONMENT MANAGER

zOSEM's Base Environment Manager allows your installation to have a standard operating environment, whether on a single processor or multiple processors, by allowing all exit modules to exist outside of the operating system. Trying to stay vanilla is the very reason **zOSEM** was developed; you can now have the controls/products you need while still keeping a vanilla operating system without reliability exposure, availability interruptions, or system modification problems. Variations from the standard IBM supplied z/OS environment, such as those supplied by program products or user-written control functions, no longer require an IPL or system modification (SMP/E). Loading or reloading any of these exits can now be done via a TSO command (or ISPF dialogue).

Combining **zOSEM** and its associated Extended functions with z/OS results in an operating system environment that many installations take many months to obtain. The sample exits supplied with the server pack can easily be specified as user exits to **zOSEM**, or the Extended **zOSEM** Functions can provide all the functions that the sample exits from the server pack provide plus much more.

The basic **zOSEM** Function provides for the dynamic loading, and reloading of all IBM supported z/OS Exits. Exit points may be enabled and disabled dynamically; and, where appropriate, exit points may be limited to specific jobnames giving an installation a Quality Assurance or testing environment not previously available.

zOSEM Exit Functions

- Automatic Management of Exits Allocation, DFP, HSM, ISPF, JES2, RACF, SMF and TSO.
- Eliminates the need to IPL to refresh LPA modules that are managed by **zOSEM** Allocation, DFP, HSM, ISPF, JES2, RACF, SMF 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
- ISPF interface for Exit Management
- Query Interface to display Exit Status
- 255 Independent Exit programs per exit point
- Jobname limiting for each Exit program as appropriate
- Valid Return code checking
- Good Return code checking
- Disabling Return code checking (To remove an Exit program from execution)

- Default Return code
- TSO Notify support for Exit programs that abend
- 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 individual Exit programs
- Dynamically Reload **zOSEM** Controller Programs without an IPL
- Dynamically Disable individual Exit programs

List of Exits Supported

- DFSMS DFP Exits
- DFSMShsm Exits
- ISPF Installation Wide Exits
- JES2 Exits
- RACF Exits
- System Management Facilities (SMF) Exits
- Security Access Facility (SAF) Exits
- TSO/E Exits

Basic Exit Functions Menu

- Whether a particular exit point is enabled or disabled
- Whether or not there are active user exits, and what those exit names are
- 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
- An optional description for each of the specified user exits
  - Use the description field to document the author of the user exit, the date the user exit was installed or modified, etc.

Allocation Exits

IEFALLOD	Allocated/Offline Device Exit
IEFALLSW	Specific Waits Exit
IEFALLVE	Volume Enqueue Exit
IEFALLVM	Volume Mount Exit
IEFDB401	Allocation Input Validation Exit (SVC99)

Data Facility Product Exits (DFP)

IGGPRE00	DADSM Pre-processing for Allocate, Extend, Scratch, Partial Release and Rename
IGGPOST0	DADSM Post-processing for Allocate, Extend, Scratch, Partial Release and Rename

Data Facility Hierarchical Storage Manager Exits (DFHSM)

ARCADEXT	Data Set Deletion Exit
ARCBDEXT	Data Set Backup Exit
ARCBEEXT	ABARS Backup Error Exit
ARCCBEXT	Control Data Set Backup Exit
ARCCDEXT	Data Set Reblock Exit
ARCCREXT	ABARS Conflict Resolution Exit
ARCINEXT	Initialization Exit
ARCMDEXT	Data Set Migration Exit
ARCMMEXT	Second-Level Migration Data Set Exit
ARCMVEXT	Space Management Volume Exit
ARCM2EXT	ABARS Migration Level 2 Data Set Exit
ARCRDEXT	Recall Exit (Not valid for SMS Managed Data Sets)
ARCRPEXT	Recall/Recover Priority Exit
ARCSAEXT	Space Management and Backup Exit
ARCSKEXT	ABARS Data Set Skip Exit
ARCTDEXT	Tape Data Set Exit
ARCTVEXT	Tape Volume Exit

ISPF Exits

Exit 1	ISPF initialization
Exit 2	ISPF termination
Exit 3	SELECT service start
Exit 4	SELECT service end
Exit 5	TSO command start
Exit 6	TSO command end
Exit 7	LIBDEF service
Exit 8	RESERVE
Exit 9	RELEASE
Exit 10	Logical screen start
Exit 11	Logical screen end

Exit 12	ISPF/PDF service start
Exit 13	ISPF/PDF service end
Exit 14	SWAP logical screens
Exit 15	DISPLAY service start
Exit 16	Log, list, and temporary data set allocation

Job Entry System Two Exits (JES2)

Exit 0	Pre-initialization
Exit 1	Print/Punch Separators
Exit 2	Job JCL Statement Scan (JES2 main task)
Exit 3	Job Statement Accounting Field Scan (JES2 main task)
Exit 4	JCL and JES2 Control Statement Scan (JES2 main task)
Exit 5	JES2 Command Preprocessor
Exit 6	JES2 Converter exit (subtask)
Exit 7	Control block I/O (JES2)
Exit 8	Control Block Read/Write (user, subtask and FSS)
Exit 9	Output excession options
Exit 10	$WTO Screen
Exit 11	Spool Partitioning Allocation ($TRACK)
Exit 12	Spool Partitioning Allocation ($STRAK)
Exit 14	Job Queue Work Select - $QGET
Exit 15	Output Data Set/Copy Select
Exit 16	Notify
Exit 17	BSC RJE SIGNON/SIGNOFF
Exit 18	SNA RJE SIGNON/SIGNOFF
Exit 19	Initialization Statement
Exit 20	End of Input
Exit 21	SMF Record
Exit 22	Cancel/Status
Exit 23	FSS Job Separator Page (JSPA) Processing
Exit 24	Post-initialization
Exit 25	JCT Read
Exit 26	Termination/Resource Release
Exit 27	PCE Attach/Detach
Exit 28	Subsystem Interface (SSI) Job Termination
Exit 29	Subsystem Interface (SSI) End-of-Memory
Exit 30	Subsystem Interface (SSI) Data Set Open and RESTART
Exit 31	Subsystem Interface (SSI) Allocation
Exit 32	Subsystem Interface (SSI) Job Selection

Exit 33	Subsystem Interface (SSI) Data Set Close
Exit 34	Subsystem Interface (SSI) Data Set Unallocation
Exit 35	Subsystem Interface (SSI) End-of-Task
Exit 36	Pre-security Authorization Call
Exit 37	Post-security Authorization Call
Exit 38	TSO/E Receive Data Set Disposition
Exit 39	NJE SYSOUT Reception Data Set Disposition
Exit 40	Modifying SYSOUT Characteristics
Exit 41	Modifying Output Grouping Key Selection
Exit 42	Modifying a Notify User Message
Exit 43	APPC/MVS Transaction Program Select/Terminate/Change
Exit 44	JES2 Converter Exit (Main Task)
Exit 45	Pre-SJF Exit Request
Exit 46	Modifying an NJE data area before its transmission
Exit 47	Modifying an NJE data area before receiving the rest of the NJE job
Exit 48	Subsystem Interface (SSI) SYSOUT Data Set Unallocation
Exit 49	Job Queue Work Select - QGOT
Exit 50	End of Input
Exit 51	Job phase change exit ($QMOD)
Exit 52	Job JCL statement scan (JES2 user environment)
Exit 53	Job statement accounting field scan (JES2 user environment)
Exit 54	JCL and JES2 control statement scan (JES2 user environment)
Exit 55	NJE SYSOUT reception data set disposition
Exit 56	Modifying an NJE data area before its transmission
Exit 57	Modifying an NJE data area before receiving the reset of the NJE job
Exit 58	Subsystem interface (SSI) end-of-step
Exit 59	Post interpretation
Exit 60	JES2 converter exit (user)

JES2 User Defined Exit points 61-255

Resource Access Control Facility (RACF)

ICHCCX00	Command exit
ICHCNX00	Command exit
ICHDEX01	RACF password authentication
ICHFRX01	RACROUTE request=FASTAUTH preprocessing
ICHFRX02	RACROUTE request=FASTAUTH postprocessing
ICHPWX01	New password exit
ICHRCX01	RACROUTE request=AUTH preprocessing
ICHRCX02	RACROUTE request=AUTH postprocessing

ICHRDX01	RACROUTE request=DEFINE preprocessing
ICHRDX02	RACROUTE request=DEFINE postprocessing
ICHRIX01	RACROUTE request=VERIFY preprocessing
ICHRIX02	RACROUTE request=VERIFY postprocessing
ICHRLX01	RACROUTE request=LIST pre/postprocessing
ICHRLX02	RACROUTE request=LIST selection
ICHRSMFE	RACF report writer
IRRACX01	Common command exit
ICHRFX03	RACROUTE request=FASTAUTH preprocessing
ICHRFX04	RACROUTE request=FASTAUTH postprocessing

Security Access Facility Exits (SAF)

ICHRTX00	MVS Router
IRRSXT00	SAF Callable Services Router

System Management Facility Exits (SMF)

IEFACTRT	SMF Job/Step Termination Exit
IEFUJI	Job Initiation Exit
IEFUJP	Job Purge Exit
IEFUJV	Job Validation Exit
IEFUSI	Step Initiation Exit
IEFUSO	SYSOUT Limit Exit
IEFUTL	Time Limit Exit
IEFU29	SMF Dump Exit
IEFU29L	SMF Dump Exit for Logger
IEFU83	SMF Record Exit
IEFU84	SMF Record Exit
IEFU85	SMF Record Exit

Time Share Option Extended Exits (TSO/E)

ICQAMFX1	Application Manager Function Pre-initialization
ICQAMFX2	Application Manager Function Post-termination
ICQAMPX1	Application Manager Panel Pre-display
ICQAMPX2	Application Manager Panel Post-display
IEEVSNX0	OPER SEND subcommand Initialization

IEEVSNX1	OPER SEND subcommand Pre-display
IEEVSNX2	OPER SEND subcommand Pre-save
IEEVSNX3	OPER SEND subcommand Failure
IEEVSNX4	OPER SEND subcommand Termination
IKJADINI	ALTLIB Initialization
IKJADTER	ALTLIB Termination
IKJCNXAC	CONSOLE Activation
IKJCNXCD	CONPROFS Pre-display
IKJCNXCI	CONSPROF Initialization
IKJCNXCT	CONPROFS Termination
IKJCNXDE	CONSOLE Deactivation
IKJCNXPP	CONSOLE Pre-parse
IKJCNX50	CONSOLE 80% Message Capacity
IKJCNX64	CONSOLE 100% Message Capacity
IKJCT43I	EXEC Initialization
IKJCT43T	EXEC Termination
IKJCT44B	Add Installation-written CLIST Built-in Functions
IKJCT44S	Add Installation-written CLIST Statements
IKJEESXA	LISTBC Failure
IKJEESXB	LISTBC Termination
IKJEESX0	SEND Initialization
IKJEESX1	SEND Pre-display
IKJEESX2	SEND Pre-save
IKJEESX3	SEND Failure
IKJEESX4	SEND Termination
IKJEESX5	LISTBC Initialization
IKJEESX6	LISTBC Pre-display
IKJEESX7	LISTBC Pre-list
IKJEESX8	LISTBC Pre-read
IKJEESX9	LISTBC Pre-allocate
IKJEFD21	FREE Initialization
IKJEFD22	FREE Termination

IKJEFD47	ALLOCATE Command Initialization
IKJEFD49	ALLOCATE Command Termination
IKJEFF10	SUBMIT Command
IKJEFF53	OUTPUT, STATUS and CANCEL Commands
IKJEFLD1	Logon Authorized Pre-prompt
IKJEFLD2	LOGOFF
IKJEFLD3	LOGON post-prompt
IKJEFLN1	Logon Pre-display
IKJEFLN2	Logon Post-display
IKJEFXG1	Tailor PUTGET and GETLINE processing
IKJEFY11	OUTDES Initialization
IKJEFY12	OUTDES Termination
IKJEFY60	PRINTDS Initialization
IKJEFY64	PRINTDS Termination
IKJEGASI	TESTAUTH Subcommand Initialization
IKJEGAST	TESTAUTH Subcommand Termination
IKJEGAUI	TESTAUTH Initialization
IKJEGAUT	TESTAUTH Termination
IKJEGCIE	TEST Subcommand Initialization
IKJEGCTE	TEST Subcommand Termination
IKJEGMIE	TEST Initialization
IKJEGMTE	TEST Termination
IKJPRMX1	PARMLIB Initialization
IKJPRMX2	PARMLIB Termination
INMCZ21R	TRANSMIT/RECEIVE NAMES Data Set Pre-allocation
INMRZ01R	RECEIVE Initialization
INMRZ02R	RECEIVE Termination
INMRZ04R	RECEIVE Notification
INMRZ05R	RECEIVE Acknowledgment Notification
INMRZ06R	RECEIVE Pre-acknowledgment Notification
INMRZ11R	RECEIVE Data Set Pre-processing
INMRZ12R	RECEIVE Data Set Post-processing

INMRZ13R	RECEIVE Data Set Encryption
INMRZ15R	RECEIVE Post-prompt
INMRZ21R	RECEIVE Log Data Set Pre-allocation
INMXZ01R	TRANSMIT Startup
INMXZ02R	TRANSMIT Termination
INMXZ03R	TRANSMIT Encryption
INMXZ21R	TRANSMIT Log Data Set Pre-allocation
IRXINITX	REXX Pre-environment Initialization
IRXITMV	REXX Post-environment Initialization
IRXITTS	REXX Post-environment Initialization
IRXTERMX	REXX Environment Termination

Job Routing Resource Selections

Account	The account number to mask on the JOBCARD
ACCOUNT1-8	The first through the eight subparameter of the accounting information on the JOBCARD
DDNAME	The DDName or mask of any DD Statement
DSNAME	A dataset name mask
DSNMEMBER	A dataset and member name or mask
EXECPARM	A PARM field or mask found on an EXEC statement
JOBCLASS	The class of the job
JOBNAME	A job name or mask
JOBTIME	Time value from JOBCARD
MEMBER	The name of a member specified for a PDS, i.e. DSN=PROD.CNTL(ARCCMD), the name to specify here would be ARCCMD
PERFORM	A performance group for the job
PGMNAME	A program name or mask found on an EXEC statement
RACFGROUP	A RACF group or mask
SCHENV	The workload manager scheduling environment
SERVCLS	The workload manager service class
SRCNAME	The user ID or job name that submitted the job
SRCNODE	The JES2 node where the job was submitted
SRCPRGM	The program name that submitted the job
SRCSYS	The name of the system where the job was submitted
SRCTYPE	The source type, either JOB, TSU or STC
SYSAFF	The system ID used as a SYSAFF
TAPEUNIT	A count of the number of tape units used in the job. This count may

	be entered as a range, i.e., 1:14. Valid values are 0 to 999
UNITNAME	The name of a unit on a DD statement
USERID	The user ID associated with the job.

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