



OS/EM (Awesome)

Operating System/Environment Manager

Version 6.0

TRIDENT SERVICES

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OS/EM OVERVIEW

OS/EM provides a multitude of features for improved control, throughput and processing efficiency in a z/OS enterprise server processing 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 functions are supported by standard JES2, SMF, DFSMSHsm, RACF, ISPF, ALLOC, TSO exit points and macros. The need for production IPL's when adding or modifying exits or SVC's is also eliminated. Security interfaces to RACF, ACF2 or TOPSECRET are provided to allow access to all **OS/EM** controls. ISPF interfaces are also provided to set **OS/EM** control options. All **OS/EM** controls can be implemented immediately or deferred to the next IPL. **OS/EM** supports OS/390 2.7 through all supported releases of z/OS.

Job Routing & Job Classing Controls

OS/EM'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 OS/EM Job Routing. The routing may be controlled by JECL statements placed within the Job or by assigning routing control information through the **OS/EM** 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 **OS/EM** 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.
- ❖ **OS/EM** provides full support for the Mellon Bank Modifications JECL control cards and Operator commands. The \$HASP message numbers produced by the **OS/EM** 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 **OS/EM** implementation tries to avoid this where possible. This feature allows you to specify the message number you want to appear for selected messages.

- ❖ Job Resource Routing allows automatic routing of jobs based on:

DDNAME	Dataset Name	Job Class	Job Name
Program Name	RACF Group	Unit Name	Userid
WLM Service Class	Program Parm value	Job Time	Submitting Job Name
Submitting Program	Submitting Type	Member Name	SCHENV
Job Accounting Number			

- ❖ Set JOB CLASS allows overriding specified Job Class based on:

DDNAME	Dataset Name	Job Class	Job Name
Program Name	RACF Group	Unit Name	Userid
WLM Service Class	Program Parm value	Job Time	Submitting Job Name
Submitting Program	Submitting Type	Member Name	SCHENV
Job Accounting Number			

- ❖ Set JES2 Job Priority allows overriding specified JES2 Job Priority based on:

DDNAME	Dataset Name	Job Class	Job Name
Program Name	RACF Group	Unit Name	Userid
WLM Service Class	Program Parm value	Job Time	Submitting Job Name
Submitting Program	Submitting Type	Member Name	SCHENV
Job Accounting Number			

- ❖ Set Service Class allows overriding WLM assigned or specified Service Class based on:

DDNAME	Dataset Name	Job Class	Job Name
Program Name	RACF Group	Unit Name	Userid
WLM Service Class	Program Parm value	Job Time	Submitting Job Name
Submitting Program	Submitting Type	Member Name	SCHENV
Job Accounting Number			

- ❖ Set Job Scheduling Environment (SCHENV) allows overriding specified SCHENV based on:

DDNAME	Dataset Name	Job Class	Job Name
Program Name	RACF Group	Unit Name	Userid
WLM Service Class	Program Parm value	Job Time	Submitting Job Name
Submitting Program	Submitting Type	Member Name	SCHENV
Job Accounting Number			

- ❖ Set NJE Node based on:

DDNAME	Dataset Name	Job Class	Job Name
Program Name	RACF Group	Unit Name	Userid
WLM Service Class	Program Parm value	Job Time	Submitting Job Name
Submitting Program	Submitting Type	Member Name	SCHENV
Job Accounting Number			

- ❖ Automatically Convert Scheduling Environment to **OS/EM** Route:

Allows you to easily move away from Workload Manager Scheduling Environments to the

flexible and easily changed **OS/EM** Resource Routing by converting any SCHENV=name JECL statement to an **OS/EM** Resource statement.

- ❖ Automatically Change SYSAFF JECL statements to SYSAFF=ANY:

Allows use of **OS/EM** 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

OS/EM'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 rule sets based on:

Userid	Jobclass	Jobname	Time of day	Day of week
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OS/EM'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

OS/EM'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 **OS/EM**. No DFSMSHsm RECALL will be performed. Instead a HDELETE will be issued to DFSMSHsm.

OS/EM'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.

OS/EM's HSM Prioritize DFSMSHsm recalls allows **OS/EM** 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

OS/EM'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

OS/EM'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

OS/EM can override the ACF2 non-cancel user attribute to allow **OS/EM** 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 an OS/EM 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)
- ❖ **OS/EM**'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 up to 32 user defined rule sets 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 up to 32 user defined rule sets 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 MVS 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 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

Estimated Cost

The Estimated Cost function of **OS/EM** 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 **OS/EM**'s STEP/JOB-end statistics.

JCL Controls

JCL Controls allow installations to control various JCL parameters utilizing an external table with **OS/EM**'s Environment Manager and/or utilize RACF, ACF2 or 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 **OS/EM** 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

OS/EM'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

OS/EM'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 systems S322.

- ❖ 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 rule sets 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 rule sets based on:

Jobclass	Jobname	Jobname mask	Program Name
Program Name mask	Read access to an external security resource		

ISPF Dataset Name Controls

OS/EM 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

OS/EM's Tape Share Controls allows you to define tape drives to **OS/EM** 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

OS/EM's WTO Controls function allows **OS/EM** 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 rules for Migration from Primary volumes to Migration Level 1 for DFSMS environments based on dataset size at migration time
- ❖ Global rules for Migration from Migration Level 1 to Migration Level 2 for DFSMS environments based on dataset size at migration time
- ❖ Global rules 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 reports detailing the performance of the DFHSM component in both a Non-SMS and DFSMS environment utilizing 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.

- ❖ Dynamic Date Selection for Report Selection
- ❖ Summary DFHSM Error Report by Function, Return and Reason code
- ❖ Detail DFHSM Error Report by Function, Return and Reason code
- ❖ Dataset Activity Report details excessive Migration and Recall for 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 DFSMS or DFHSM
- ❖ 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 DSR records for the Reporting Period
 - Number of datasets migrated to ML1 and ML2
 - Number and percent datasets that failed migration to ML1 and ML2
 - Number of datasets recalled from ML1 and ML2
 - Number and percent 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 VSR records 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 Reports on Migration Control Dataset (MCDS) by Age
- ❖ Summary Reports on Migration Control Dataset (BCDS) by Age
- ❖ Detail Reports on Migration Control Dataset (MCDS) by Age
- ❖ Detail Reports on Migration Control Dataset (BCDS) by Age
- ❖ Extensive ISPF interface

QUICKPOOL DASD POOLING

OS/EM'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 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
- Optionally disallows RACF discrete profiles during dataset allocations

BASE ENVIRONMENT MANAGER

OS/EM'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 **OS/EM** 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 **OS/EM** 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 **OS/EM**, or the Extended **OS/EM** Functions can provide all the functions that the sample exits from the server pack provide plus much more.

The basic **OS/EM** 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.

OS/EM Exit Functions

- ❖ Automatic Management of Exits Allocation, DFP, HSM, ISPF, JES2, JES3, RACF, SMF and TSO.
- ❖ Eliminates the need to IPL to refresh LPA modules that are managed by **OS/EM** Allocation, DFP, HSM, ISPF, JES2, JES3, 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 **OS/EM** 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 **OS/EM** 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
- ❖ JES3 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 (DFP) Exits

IGGPREE00	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 (DFHSM) Exits

ARCADEXT	Data Set Deletion Exit
ARCBDEXT	Data Set Backup Exit
ARCBEEEXT	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 (JES2) Exits

IBM supported Exit points 0-49

Exit 0	Pre-initialization
Exit 1	Print/Punch Separators
Exit 2	Job Statement Scan
Exit 3	Job Statement Accounting Field Scan
Exit 4	JCL and JES2 Control Statement Scan
Exit 5	JES2 Command Preprocessor
Exit 6	Converter/Interpreter Text Scan
Exit 7	JCT Read/Write (JES2)
Exit 8	Control Block Read/Write (User)
Exit 9	Job Output Overflow
Exit 10	\$WTO Screen
Exit 11	Spool Partitioning Allocation (\$TRACK)
Exit 12	Spool Partitioning Allocation (\$STRAK)
Exit 13	TSO/E Interactive Data Transmission Facility Screening and Notification
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 (FSS)
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	Transaction Program Select/Terminate/Change
Exit 44	JES2 Converter Exit (Main Task)
Exit 45	Pre-SJF Exit Request
Exit 46	Transmitting a NJE Data Area
Exit 47	Receiving a NJE Data Area
Exit 48	Subsystem Interface (SSI) SYSOUT Data Set Unallocation
Exit 49	Job Queue Work Select

JES2 User Defined Exit points 50-255

Job Entry System Three (JES3) Exits

IBM supported Exit points

IATUX01	Reserved Name
IATUX02	Reserved Name
IATUX03	Examine of modify Converter/Interpreter Text created from JCL
IATUX04	Examine the Job Information from the JCL
IATUX05	Examine the Step Information from the JCL
IATUX06	Examine DD Statement Information from the JCL
IATUX07	Examine or Substitute Unit, Type and Volume Serial Information
IATUX08	Examine Setup Information
IATUX09	Examine Final Job Status, JST and JVT

IATUX10	Generate a Message
IATUX11	Inhibit Printing of the LOCATE Request or Response
IATUX14	Job Validation/Restart LOCATE Request or Response
IATUX15	Scan an Initialization Statement
IATUX16	Reserved Name
IATUX17	Define Set of Scheduler Elements
IATUX18	Check Input Authority Level for Consoles
IATUX19	Examine or Modify Data Temporary OSE
IATUX20	Examine or Modify Data Written on Job Header Pages
IATUX21	Create and Write Data Set Headers for Output Data Sets
IATUX22	Examine or Alter the Forms Alignment
IATUX23	Examine or Modify Data Written to Trailer Pages
IATUX24	Examine the Net-id and Devices Requested
IATUX25	Examine or Modify Volume Serial Number
IATUX26	Examine MVS Scheduler Control Blocks
IATUX27	Examine or Alter the JDAB, JCT and JMR
IATUX28	Examine the Accounting Information as Provided by the Job Statement
IATUX29	Examine the Accounting Information as Provided JCT, JDAB and JMR
IATUX30	Examine Authority Level for TSO/E Terminal Commands
IATUX31	Examine or Modify Destination or Message Text
IATUX32	Override the DYNALLDSN Initialization Statement
IATUX33	JES3 Control Statement and the JCL EXEC Statement Installation Exit
IATUX34	JCL DD Statement User Exit and the JCL EXEC Statement Installation Exit
IATUX35	Validity Check Network Commands
IATUX36	Collect Accounting Information
IATUX37	Modify the JES3 Networking Data Set Header
IATUX38	Change the SYSOUT Class for Networking Data Sets
IATUX39	Modify the Data Set Header for a SYSOUT Data Set
IATUX40	Modify Job Header
IATUX41	Determine the Disposition of Job Over JCL Limit
IATUX42	TSO/E Interactive Data Transmission Facility Screening and Notification
IATUX43	Modify Job Header Segments
IATUX44	Examine and Modify the JCL
IATUX45	Examine and Modify the Data Sent to an Output Writer FSS
IATUX46	Select Processors Eligible for Converter/Interpreter Processing

IATUX47	Reserved Name
IATUX48	Override Operator Modification of Output Data Sets
IATUX49	Override Address Selected for Converter/Interpreter Processing
IATUX50	Process User Defined BSIDMOD Codes for Converter/Interpreter
IATUX56	Authorize JES3 Commands Entered Through BDT
IATUX57	Select a Single WTO Routing Code for JES3 MGSROUTE
IATUX58	Modify Security Information Before JES3 Security Processing
IATUX59	Modify Security Information After JES3 Security Processing
IATUX60	Determine Action to take when a TSO/E User is Unable to Receive a Data Set
IATUX61	During MDS Processing, Choose Whether a Job Should be Cancelled or Sent to the Error Queue
IATUX62	Overrides the Decision to Accept a Tape or Disk Mount
IATUX66	Assigns Transmission Priority to a SNA/NJE Data Stream
IATUX67	Determines Action when Remote Data Set is Rejected by RACF
IATUX68	Modify Local NJE Job Trailers
IATUX69	Determine If a Message is to be Sent to the Jes3 Global Address Space
IATUX70	Perform Additional Message Processing
IATUX71	Modify a Tape Request Setup Message
ATUX72	Examine/Modify a Temporary OSE or an OSE Moved to Writer Queue

Resource Access Control Facility (RACF)

ICHCCX00	RACF password
ICHCNX00	RACF password
ICHDEX01	RACF password encryption
ICHPWX01	RACINIT SVC routine
ICHRCX01	RACHECK pre-processing
ICHRCX02	RACHECK post-processing
ICHRDX01	RACDEF pre-processing
ICHRDX02	RACDEF post-processing
ICHRFX01	FRACHECK pre-processing
ICHRFX02	FRACHECK post-processing
ICHRIX01	RACINIT pre-processing
ICHRIX02	RACINIT post-processing

ICHRLX01	RACLIST pre/post-processing
ICHRLX02	RACLIST selection
ICHRTX00	MVS router exit
IRRACX01	ACEE Compression/Decompression Exit
IRRACX02	ACEE Compression/Decompression Exit
IRREVX01	RACF Common Command Exit

Security Access Facility (SAF) Exits

ICHRTX00	MVS Router
IRRSXT00	SAF Callable Services Router

System Management Facility (SMF) Exits

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
IEFU83	SMF Record Exit
IEFU84	SMF Record Exit
IEFU85	SMF Record Exit

Time Sharing Option Extended (TSO/E) Exits

ICQAMFX1	Application Manager Function Pre-initialization
ICQAMFX2	Application Manager Function Post-termination
ICQAMPX1	Application Manager Panel Pre-display
ICQAMPX2	Application Manager Panel Post-display
IEEVSX0	OPER SEND subcommand Initialization
IEEVSX1	OPER SEND subcommand Pre-display
IEEVSX2	OPER SEND subcommand Pre-save
IEEVSX3	OPER SEND subcommand Failure
IEEVSX4	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