

IBM Education Assistance for z/OS V2R2

Item: SMFLIMxx support

Element/Component: System Management Facility (SMF)



Agenda

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Trademarks

- See url <http://www.ibm.com/legal/copytrade.shtml> for a list of trademarks.



Presentation Objectives

The objective of this presentation is to familiarize you with the new SMFLIMxx parmlib member and how it can be used to reduce the number of updates to the IEFUSI assembler exit.



Overview

Problem Statement / Need Addressed

- Customers currently have a way to:
 - Set REGION and MEMLIMIT values for jobs to ensure proper amounts of working storage are allocated for user program and system uses within an address space
 - Ensure runaway programs do not exhaust system resources
- IEFUSI exit includes many input and output parameters for codifying decisions about execution and storage
 - Customers need a way to specify policy rules about execution and storage amounts without the overhead of changing code.
 - Some customers would prefer to specify the amount of storage to reserve for system uses, and allow user programs to use the rest of the REGION.
 - i.e. the opposite of specifying REGION



Overview, continued

- Solution

- Provide support for a new parmlib member (**SMFLIMxx**) that allows the installation to set up job cancel decisions and region and MEMLIMIT values, based on the job and its environment

- Benefit / Value

- Reduce the need for updates to IEFUSI exit
- Shorten the amount of time needed to make operational changes
- Allow the installation to make more granular region/MEMLIMIT decisions when assembler code is not required.



Usage & Invocation

- New parmlib member for region/MEMLIMIT specifications typically done in IEFUSI exit
- Also allows for CANCEL action like IEFUSI, as well as overriding the cancel action from an IEFUSI exit
- Support includes:
 - IPL time parameter, SMFLIM=(xx,yy,zz,...)
 - Values activated at SMF initialization
 - SET SMFLIM=(xx,yy,zz) operator command
 - Includes syntax check option via “,C”
SET SMFLIM=(HA,HO,C)
Syntax is checked, messages issued, no system change made
 - DISPLAY SMFLIM command with keywords to locate relevant statements: JOBNAME=, NOJOBNAME, etc.



Usage & Invocation, continued

▪ SMFLIMxx syntax

- Allows multiple statements, each starting with keyword “REGION”
- Followed by set of filter keywords that indicate to which jobs/jobsteps to apply the settings
 - Filter keywords will allow wildcard characters to simplify definitions
- Followed by one or more settings to apply



Usage & Invocation, continued

- Syntax will consist of “filter keywords” that support wildcarding, such as:

JOBNAME(IEF*,SBJ*,)
STEPNAME(STEP*,ASM*,)
PGMNAME(ASMA90)

- ... and keywords of values to set when above filters “match”:

REGIONBELOW(4M)
REGIONABOVE(1G)
MEMLIMIT(15P)

EXECUTE(x) where 'x' can be one of

YES

– Override any earlier CANCEL

CANCEL

– Cancel the step (and job)

CANCELFROMIEFUSI

– Use the decision of IEFUSI

NOCHANGE

– Default



Usage & Invocation, continued

- Multiple values within a single keyword treated as OR'd
- Values across keywords AND'd together
- For example, previous page would be read:

IF JOBNAME starts with "IEF" or "SBJ" -AND-
STEPNAME starts with "STEP" or "ASM" - AND-
PGMNAME is "ASMA90"

Apply the REGION settings

- Plan to apply **all** rules in specification
 - Final set of values could come from application of several rules, most recent match wins for that keyword
- e.g. Could have a rule that specifies EXECUTE(CANCEL) for a general case and EXECUTE(YES) for some specific job



Usage & Invocation, continued

- Filter parms chosen from parameters available to IEFUSI and IEFUJI exits, (assuming some liberal passing of values in the exits):

JOBNAME(1-8 values)	JOBACCT(1-8 values)
STEPNAME(1-8 values)	STEPACCT(1-8 values)
PGMNAME(1-8 values)	USER(1-8 values)
JOBCLASS(1-8 values)	SUBSYS(1-8 values)
- SYSNAME is also a filter, to allow multiple systems' rules to coded in one member, if desired.
- Wildcard characters supported are:
 - '*', to match 0 or more
 - '?'. to match exactly 1 character
 - Plus one special one for STEPACCT/JOBACCT



Usage & Invocation, continued

STEPACCT and JOBACCT allow for multiple fields, multiple wildcards

- Example:

```
REGION JOBACCT((D2404P,POK,*),(:,FSH,*),(*,STL,HERMAN))
```

```
REGIONBELOW(4M) REGIONABOVE(1G) MEMLIMIT(4T)
```

- First set would match a job with JOB (D2404P,POK,JONES)
- Second set would match JOB (:FSH,SMITH) - Note that first field is required to be NULL
- Third set would match JOB (B7VB,STL,HERMAN)

- When extra parens are not used, matches only the first account field
- Some account specs can be long or variable
- Use '%' to indicate 'no matching on remaining fields'

Example:

```
REGION JOBACCT((D2404*,%)) ....
```

This would match the following:

```
JOB (D2404P,STL,'Extra data added by user') or JOB (D2404,FSH)
```



Usage & Invocation, continued

- Matching null values can be tricky, depending:
 - To match a job that does not specify accounting data at all,
e.g. “//JOB1 JOB CLASS=A,MSGCLASS=B, ...”
 - use one of these two forms:
 - JOBACCT()
 - JOBACCT(<other job acct strings>)i.e. null specification of a string with JOBACCT
 - To match when accounting keyword is present but data is null
e.g. “//JOB1 JOB (),CLASS=A,MSGCLASS=B, ...”
 - Use:
 - JOBACCT(())
 - JOBACCT((),<other job acct strings>)
 - Or put them together: JOBACCT(,())



Usage & Invocation, continued

- Result (output) keywords
- The following keywords are supported
 - REGIONABOVE - values 1M to 2G (or 2047M)
 - REGIONBELOW - values 1K to 16M (or 16383K)
 - SYSRESVABOVE - values 1M to 2G (or 2047M)
 - SYSRESVBELOW - values 1K to 16M (or 16383K)
 - MEMLIMIT - values up to 16384P supported
- Value specification is similar to MEMLIMIT in SMFPRMxx
 - 5 decimal digits, followed by 1 character unit
 - MEMLIMIT supports values with “M”, “G”, “T” and “P”
 - “...BELOW” keywords allow values with “M” and “K”
 - “...ABOVE” keywords allow values with “M” and “G”
- Not planned at this time:
 - Support for limits on data spaces/hiperspaces/shared memory



Usage & Invocation, continued

■ Use cases

- Cancel when no job accounting data specified
`REGION JOBACCT(,) EXECUTE(CANCEL)`
- Reserve 128M of ATL memory for system private when using programs that start with IEF
`REGION PGMNAME(IEF*) SYSRESVABOVE(128M)`
- All remaining storage will be available for user key program
- Limit all jobs to 8T of storage, except user SBJ
`REGION JOBNAME(*) MEMLIMIT(8T)`
`REGION JOBNAME(*) USERID(SBJ) MEMLIMIT(15P)`
- Set a standard storage configuration in all job steps with “STD” in third step accounting field
`REGION STEPACCT((*,*,STD,%)) REGIONBELOW(6M)`
`REGIONABOVE(1G)`



Interactions & Dependencies

- Software Dependencies
 - Will be enabled by an APAR after GA, APAR OA47062
- Hardware Dependencies
 - None
- Exploiters
 - There is no system exploitation of this function

- Messages:

When SMFLIMxx applies a limit, it will write a multi-line message to the joblog, indicating what changed and where the rule for it originated:

```
IEF043I Actions taken by SMFLIMxx parmlib policy for USI00011 USI00011
→ Step region below changed from 00000M to 00001M by policy - SMFLIMHA 0005
  Step region above changed from 00000M to 00001G by policy - SMFLIMHA 0006
```

```
IEF043I Actions taken by SMFLIMxx parmlib policy for KILLME STEP003
  Job cancelled - SMFLIMHA 0002 ←
```



Migration & Coexistence Considerations

- Optional: Update IEFUSI to remove
 - IEFUSI can be left as-is
 - SMFLIMxx will override its decisions as conditions warrant
 - IEFUSI can be updated to override SMFLIMxx in all or some cases:
 - New parameter bit (word 1, bit 4, pointed to from word 5 of the parameter list) will bypass SMFLIMxx
 - IEFUSI can be updated to remove all REGION/MEMLIMIT decisions
 - Be sure to leave in any processing required for other exits
 - e.g. values passed to other IEFUTL or IEFUSO
- Expectation is that IEFUSI can be updated at your convenience



Installation

- Look for availability of APAR OA47062 in 4Q 2015.



Presentation Summary

- A new SMFLIMxx parmlib member will support many functions that are currently implemented in exit IEFUSI
- Using a variety of SMFLIMxx filters, clients can simplify their REGION processing and more rapidly implement changes.
- Message IEF043I will be issued to the joblog when 1 or more SMFLIMxx rules match the environment and new REGION or MEMLIMIT values are set.
- SMF type 30 records will contain data about SMFLIMxx actions, as well as REGIONX JCL keyword usage.



Appendix

▪ Publications

- *z/OS MVS JCL Reference* SA23-1385
 - REGIONX
- *z/OS MVS System Messages Volume 8 (IEF-IGD)* SA38-0675
 - IEF043I message
- *Z/OS Initialization and Tuning Reference*
 - SMFLIMxx
- *z/OS MVS Installation Exits* SA23-1381
 - IEFUSI exit

▪ SYS1.SAMPLIB

- Updated IEEUSI (IEFUSI) sample exit

