



JES2 Product Update

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JES2 OS/390 Releases



- **JES2 OS/390 V1R3M0**
 - SYSOUT API (SSI 79)
 - Extended Status (SSI 80)
- **JES2 OS/390 V2R4M0**
 - WLM Batch Management
- **JES2 OS/390 V2R5M0**
 - OS/390 Print Server Support
 - Extended Status (SSI 80) SYSOUT Enhancements
- **JES2 OS/390 V2R7M0**
 - FICON support
- **JES2 OS/390 V2R8M0**
 - System-managed rebuild support for CKPT on CF

SAPI and Extended Status APARs



- JES2 and JES3 behave differently when returning a dataset on a SAPI PUT/GET request, and specifying the dataset is to be kept
 - JES2 will select the same JOE repeatedly.
 - ▶ Correct, but not useful
 - JES3 selects a new dataset.
 - ▶ Useful, but not correct
 - New return disposition "don't show to this thread again"
 - JES2 APAR **OW35104**
 - JES3 APARs **OW34753** and **OW35435**
 - BCP APAR **OW36019**

SAPI and Extended Status APARs



- JES3 SSI 80 Extended Status support is minimalistic
 - JES3 will fully support Extended Status
 - JES3 APAR **OW36022**
- No mechanism to re-select the same dataset again (in this or another thread)
 - Data set token added to returned information
 - JES2 APAR **OW35104**
 - JES3 APARs **OW34753** and **OW35435**
 - BCP APAR **OW36019**

What's the PSO* Problem?

* Process SysOut



- Performance
 - Most work is done in JES2 Main task or JES3 global, not in the application address space
- Inconsistencies
 - JES2 and JES3 supported differently
 - Conversational (Held for TSO) and "normal" (Held for XWTR) handled differently
- Only one thread per address space
- Capability
 - Insufficient selection criteria
 - Insufficient returned data set characteristics
 - Inadequate WAIT/POST logic

What does SAPI* Provide?

* [Sysout](#) [API](#)



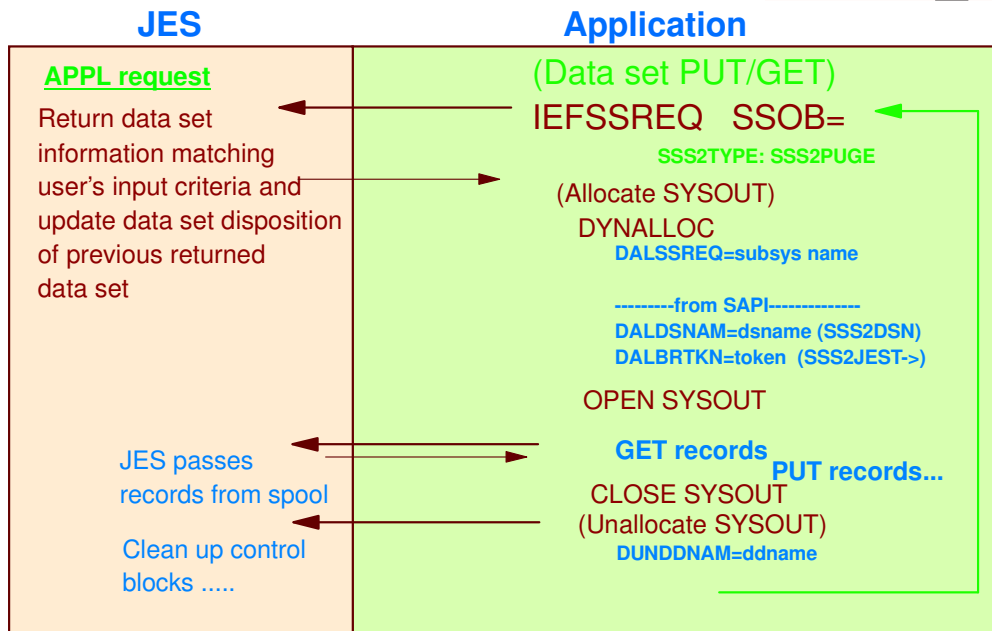
- Performance
 - Most work is done in application address space
- Inconsistencies
 - JES2 and JES3 supported consistently
 - Conversational and "normal" handled consistently
- Multiple threads per address space
- Capability
 - Same selection criteria as printers (and more!)
 - Many more data set characteristics returned
 - Additional request types

SAPI Functions - IEFSSREQ

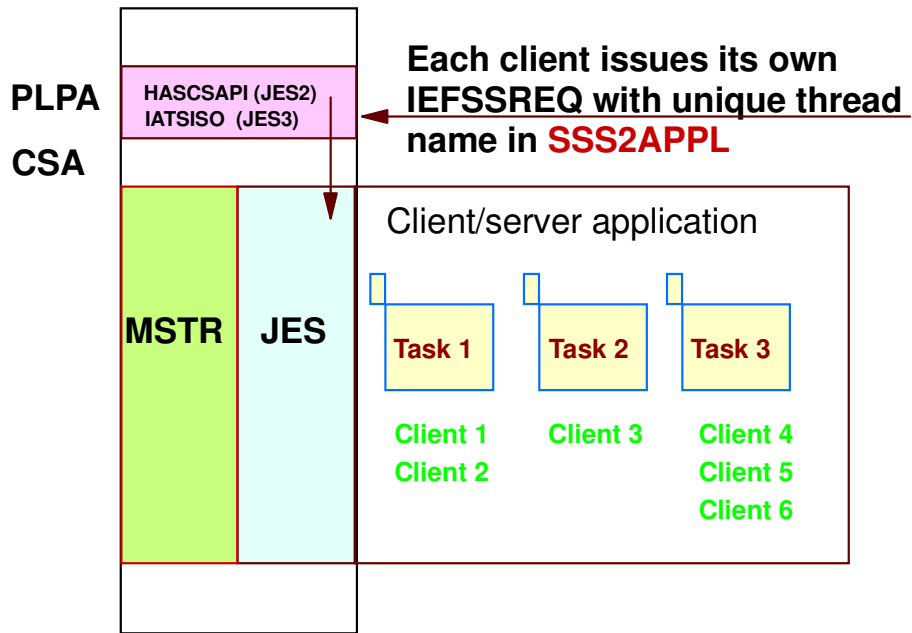


- SAPI supported application requests
 - **PUT/GET** requests
 - Similar to existing PSO function
 - Use **SSS2APPL** to provide thread name
 - **BULK MODIFY**
 - Data set disposition
 - **COUNT**
 - Number of schedulable elements (JOEs/OSEs)
- Wildcard values can be used - selected fields

Using the SAPI Interface



Multiple Requests per Address Space



Selection Criteria



Selection Criteria	PSO	SAPI
Hold Status	X	X
Destination (route code)	X	X
IP destinations (flag only)		X
Job Name	X	X
Job id	1	range
Job type (JOB/STC/TSU/APPC transaction)		X
Writer Name	X	X
Creator		X
PRMODE		4
Forms	1	8
Flash		X
FCB		X
UCS		X
Data set age		X
SYSOUT class	8	36
Line count (range)		X
Page count (range)		X

Selection Criteria



Selection Criteria	PSO	SAPI
Spool volumes (JES2 only)		X
Modify image (JES3 only)		X
Burst (flag only)		X
Printer translate table (CHARS) (JES3 only)		4
Data set token		X
Priority (JES2 only)		X

Wildcard Supported Fields



- Wildcard values
 - * - Multiple characters
 - ? - For a single character
- Selected fields
 - **SSS2JOBN** - job name
 - **SSS2CREA** - Creator userid
 - **SSS2PRMO** - Process modes (1-4)
 - **SSS2DEST** - Destination
 - **SSS2PGMN** - User writer name
 - **SSS2FORM** - Form number (1-8)

JES Information Returned



JES Provided Information	PSO	SAPI
Total Copy Count		X
Copy Groups		X
Job Name	X	X
Job Id	X	X
Job Creator		X
PRMODE		X
Destination	X	X
Writer Name	X	X
Forms	X	X
APPC Transaction Program name that created data set		X
Data set name	X	X
Segment id (JES2 only)		X
SYSOUT Class	X	X
Max LRECL	X	X
DSID		X
Output Group Name (JES2 only)	X	X
Burst (flag only)		X

JES Information Returned



JES Provided Information	PSO	SAPI
Line, Page, and Byte counts		X
Line, Page, and Byte counts are accurate (flag)		X
OPTCD=J (flag)		X
CPDS mode data (flag)		X
Proc, Step, and DD name	X	X
SJFREQ services token		X
SWBTU address		X
JES Token (MUST be passed during Allocation)		X
User supplied information (8 bytes)		X
FCB	X	X
UCS	X	X
CHARS		X
Modify Image		X
FLASH and FLASH copies		X
Data set availability date		X
Data set count		X

JES Information Returned



JES Provided Information	PSO	SAPI
Programmer name (JOB statement)		X
Job-level Room number (JES2 only)		X
Accounting string	X	X
Job execution node		X
Job member name (JES2 only)		X
Job submitting node		X
Time/Date on input processor	X	X
NJE Job and Data Set Headers, if they exist (JES2 only)		X
Data set token (new in OW36109)		★

PUT Requests - (SAPI)



- IAZSSS2 - SSOB extension for SYSOUT
 - **SSS2DSP1** - Data set disposition flags
 - ▶ **SSS2DKPE** - Keep data set ***
 - ▶ **SSS2RHLD** - Keep and make system hold
 - ▶ **SSS2RNPR** - Never return to this addrspc
 - ★ **SSS2DNPT** - Never return to this thread
 - ▶ **SSS2SHLD** - Hold data set
 - ▶ **SSS2DRLS** - Release data set
 - ▶ **SSS2CHKP** - Checkpoint data set position

***Note: If this flag is off - Data set is DELETED

PUT Requests - (SAPI)

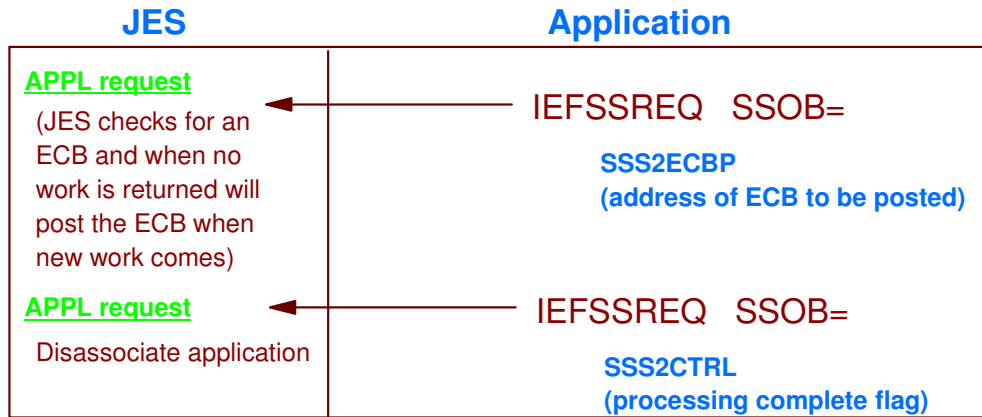


- IAZSSS2 - SSOB extension for SYSOUT
 - **SSS2DCLS** - Specify new class
 - **SSS2DDES** - Specify new destination
 - **SSS2DFOR** - Specify forms (1-8)
 - **SSS2DPGM** - Specify writer name
 - **SSS2CLFT** - Specify copies

SAPI Enhanced Functions



- WAIT for more work



SAPI Functions



- BULK MODIFY application requests
 - **IEFSSREQ SSS2TYPE:SSS2BULK**
 - Select SYSOUT data set(s) for modification
 - Using an input selection criteria
 - **SSS2UFLG** as follows:
 - **SSS2SETC** - Change class
 - **SSS2DELC** - Delete selected data sets
 - **SSS2ROUT** - Change destination of data sets
 - **SSS2RLSE** - Release "HOLD" data sets

SAPI Functions



- COUNT application requests
 - IEFSSREQ SSS2TYPE:SSS2COUN
 - Application passes selection criteria
 - JES returns for all schedulable JOE/OSE's
 - ▶ Total byte count
 - ▶ Total page count
 - ▶ Total line count
 - ▶ Total record count (JES3 only)

Extended Status SSI



- SSI 80 (Extended Status)
 - Returns job level information
 - Input is a set of filters that select jobs
 - Output in JES-independent format (similar to NJE header)
 - ▶ See JES3 APAR [OW36022](#)
 - Multiple requests can be done without returning storage
 - SSI call can be broadcast
 - In OS/390 R5, output level information can also be requested

SSI 80 Filters allowed



Filters allowed	JES2	JES3
Job Name	R3	R3
Job Phase	R3	R3
Job Type (JOB/STC/TSU/APPC)	R3	R3
Default Destination (CMDAUTH)	R3	R3*
Job id Range	R3	R3*
Original Job id	R3	R3*
Owning Userid	R3	R3*
SECLABEL	R3	R3*
Priority	R3	R3*
SPOOL volume	R3	
Job Hold	R3	R3*
OS/390 system name for active job	R3	R3*
Member name for active job	R3	
Origin node	R3	
Execution node	R3	
WLM Service Class	R4	R8*
Scheduling Environment	R4	R6*

* - full support in OW36022

SSI 80 Filters allowed



Filters allowed	JES2	JES3
SYSOUT class	R5	R5*
SYSOUT writer name	R5	R5*
SYSOUT hold status	R5	R5*
SYSOUT owner (creator)	R5	R5*
SYSOUT route code	R5	R5*
SYSOUT client token (data set token)	R5	R5

* - full support in OW36022

SSI 80 data returned



Data returned	JES2	JES3
Job Name	R3	R3
Job Phase	R3	R3
Job Type (JOB/STC/TSU/APPC)	R3	R3
Default Destination (CMDAUTH)	R3	R3*
Job id	R3	R3*
Original Job id	R3	R3*
Owning Userid	R3	R3*
SECLABEL	R3	R3*
Priority	R3	R3*
SPOOL volume	R3 (4)	
Job hold status	R3	R3*
Job class	R3	R3*
OS/390 system name for active job	R3	R3*
Member name for active job	R3	
Job key	R3	
Origin node	R3	
Execution node	R3	

* - full support in OW36022

SSI 80 data returned



Data returned	JES2	JES3
WLM Service class	R4	R8*
Scheduling environment	R4	R6*
Systems where scheduling environment is available	R4	R6*
System affinity	R4	
Job completion code	R4	?
Delay information	R4	?
Position on WLM queue	R4	
Estimated time to execution	R4	R8*?
Total queue time for job	R4	R8*?
Average queue time for service class	R4	R8*?
SYSOUT Owner (creator)	R5	R5*
SYSOUT SECLABEL	R5	R5*
SYSOUT Route code	R5	R5*
SYSOUT Page count	R5	R5*
SYSOUT Line count	R5	R5*
SYSOUT Byte count	R5	R5*
SYSOUT Record count	R5	R5*

* - full support in OW36022

SSI 80 data returned



Data returned	JES2	JES3
SYSOUT Flash	R5	R5*
SYSOUT Forms	R5	R5*
SYSOUT FCB	R5	R5*
SYSOUT UCS	R5	R5*
SYSOUT Writer name	R5	R5*
OS/390 system where SYSOUT is active	R5	R5*
Member name where SYSOUT is active	R5	
Device name on which SYSOUT is active	R5	R5*
SYSOUT OUTDISP	R5	R5*
SYSOUT Burst	R5	R5*
SYSOUT Creation time	R5	R5*
SYSOUT Client token (data set token)	R5	R5
SYSOUT Process mode (PRMODE)	R5	R5*
SYSOUT Printer translate table (CHARS)		R5*
SYSOUT MODIFY= data		R5*
SYSOUT priority	R5	R5*
SYSOUT group name	R5	

* - full support in OW36022

SSI 80 storage management



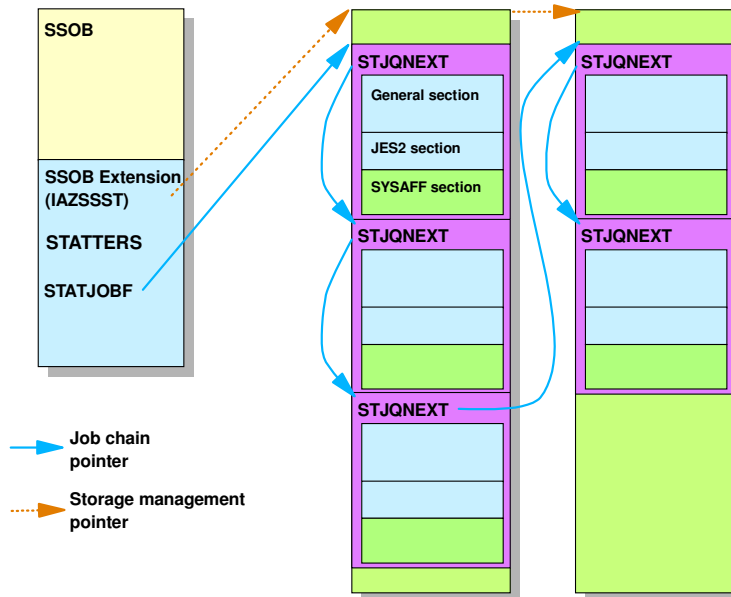
- Returned storage managed by SSI service
 - Storage obtained in 16K blocks (JES2) or 4K blocks (JES3)
 - Chain of cells maintained out of SSOB extension
 - Storage left over from one call can be used in subsequent calls
 - IEFSSREQ request to return all storage
 - **STATTYPE=STATMEM**

Returned data



- Each job uses a block of storage within a cell with the following:
 - Standard header
 - Fixed size job information prefix
 - 1 or more variable data sections
 - ▶ General (terse) section ([STATJQTR](#))
 - ▶ JES2 terse section ([STATJ2TR](#))
 - ▶ Member affinity section ([STATAFFS](#))
 - ▶ Scheduling data ([STATSCHD](#))
 - ▶ Scheduling systems ([STATSCHS](#))

Returned data (Job request)

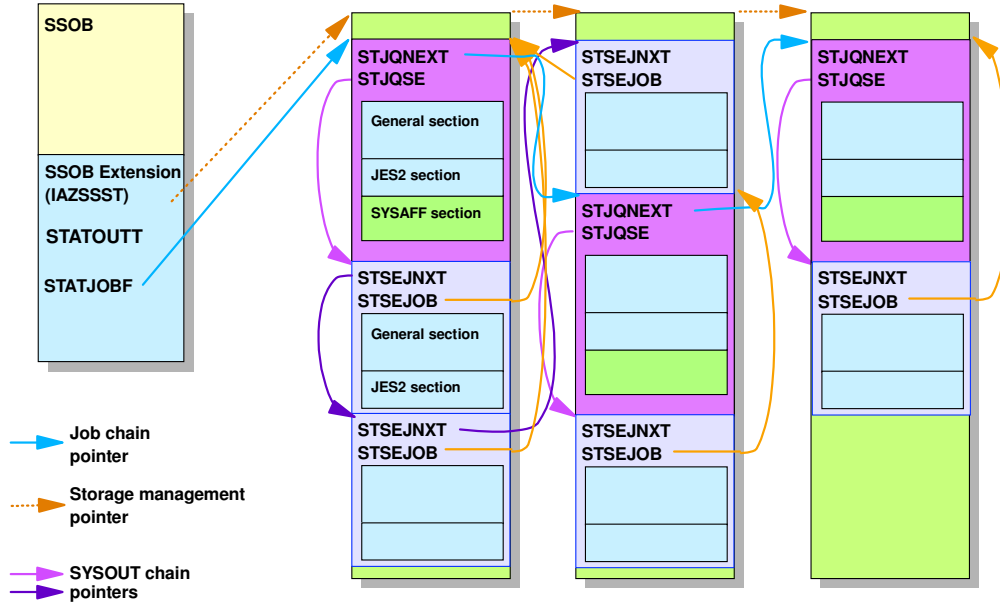


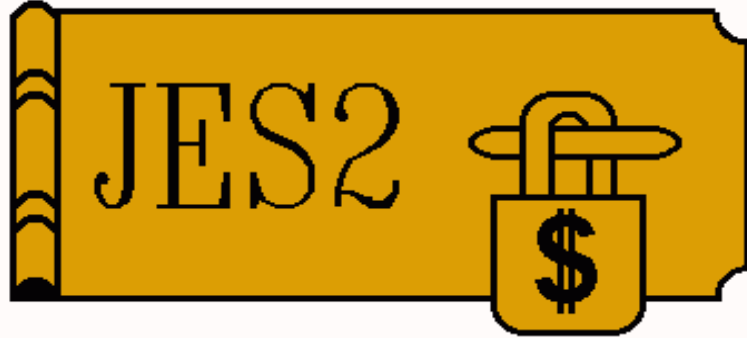
Returned data



- For SYSOUT requests, multiple cells may be obtained for each job
 - Job level data (as for job requests)
 - SYSOUT level data
 - ▶ Standard header
 - ▶ Fixed SYSOUT information
 - ▶ One or more variable sections
 - ▶ General (terse) section ([STATSETR](#))
 - ▶ JES2 terse data section ([STATSJ2T](#))
 - ▶ JES3 terse data section ([STATSJ3T](#))

Returned data (SYSOUT request)





OS/390 Release 7

JES2 R7 support Overview



- SPOOL and CKPT I/O updated to set required bits for FICON support
 - Not done for Local/RJE printers and punches
 - Due to nature of I/O, should not be an impact
- FSS I/O services removed, use \$CBIO services instead
 - This changes what exits are called
 - Gives I/O from FSS \$CBIO's serviceability
- Improved I/O error messages
 - **\$HASP291** has added information
 - New **\$HASP064** message for main task SPOOL errors

It may be useful to the audience for you to give some background to the changes that were made. Explain how it worked before and how it works now, e.g.

- In the previous release of this product, updates to the installation parameters needed to be placed in a sys1.parmlib member, with no way except an IPL of recognizing another different parmlib member. We received a number of customer complaints from this, not surprisingly, so in this release, we created command XXX to allow the operator to specify a different parmlib member dynamically and so avoid a re-IPL.

Tout the benefits of the changes! If you increased flexibility for the installation, make sure you bring it to their attention. Also, the audience needs to know the requirements for the use of the line item/component.

Remember that rationale for changes is very important and helps establish your credibility with your audience.

Note: If your changes are part of a staging attempt for future enhancement, make sure you state this. Indicate where your updates fit in this strategy and what your ultimate goal is.

JES2 R7 Exit Impact



- **\$BUFIO** and **\$BUFCHK** services deleted
 - Use **\$CBIO** instead
- **\$EXIT 8**
 - \$CBIO Read/write exit
 - Was not called for FSS I/O (\$BUFIO)
 - Since \$CBIO replaced \$BUFIO, exit is now called
 - New bit in XPL to identify FSS I/O (X008FSSM)
- **\$EXIT 25**
 - HASPFSSM JCT I/O exit
 - Not affected, still called for JCT I/O from FSS
 - Both exit 8 and exit 25 called for JCT I/O from FSS

\$HASP064 message



- \$HASP064 replaces \$HASP094 for spool I/O errors
- Includes additional information returned in IOBE

```

$HASP064 I/O ERROR ON device AT unit
        EXCP CC=cc, {IOS CC=cc,} CSW STATUS=stat, CSW COUNT=count
        IOB SENSE=sens
        [DEVICE SENSE=ssssssss sssssss sssssss sssssss]
        [          sssssss sssssss sssssss sssssss]
        SEEK ADDRESS = bbcchhr, MTR=mmttttrr
        { CURRENT CCW(S)          }
        { address1 = opwwwww,wwwwwww }
        {[address2 = opwwwww,wwwwwww]}
        { NO CURRENT CCW          }
  
```

\$D PCE command



- **\$D PCE** now uses \$SCAN
- Additional data displayed
 - Ended PCE counts
 - \$ACTIVE counts
 - Detail PCE information (not filterable)
- Filtering can be used
 - **\$D PCE(*), ENDED>0**
 - **\$D PCE(*), ACTIVE>0**
- **DETAILS** gives you for EACH PCE:
 - Current \$WAIT location, \$WAIT parm list, \$WAIT time
 - \$ACTIVE count, outstanding I/O count, current JOB, current exit

\$D PCE command



■ \$D PCE(CNVT),DETAILS

```
$HASP653 PCE (CNVT)  NAME=CNVT, WAIT=CCAN, XECB, MOD=HASPCNVT,  
$HASP653                SEQ=05961600, TIME=2000.052, 16:23:11,  
$HASP653                CURJOB=STC00006, ACTIVE=1  
$HASP653                NAME=CNVT, WAIT=CNVT, INHIBIT=NO,  
$HASP653                MOD=HASPCNVT, SEQ=02610000, TIME=2000.052,  
$HASP653                16:23:11
```

■ \$D PCE(PRT),DETAILS

```
$HASP653 PCE (PRT)  NAME=PRT32767, WAIT=UNIT, INHIBIT=NO,  
$HASP653                MOD=HASPPRPU, SEQ=08405000, TIME=2000.052,  
$HASP653                14:18:28  
$HASP653                NAME=PRT115, WAIT=FSS, INHIBIT=NO,  
$HASP653                MOD=HASPFSSP, SEQ=03364000, TIME=2000.052,  
$HASP653                14:18:28  
.  
.  
.
```

Ended PCEs



- Improved **\$HASP068** message:

```
$HASP068 PARTIAL RECOVERY SUCCESSFUL - xxx PCE ENDED  
JES2 CONTINUES WITHOUT desc. {nnnn OF mmmm xxx  
PCES REMAIN. }
```

- Updated PCE descriptions
 - Message book has new table of PCEs
- HASPTERM does not ask about recovery if PCE will be ended
 - Take dump, issue message, end PCE, no WTOR



OS/390 Release 8

System Managed Rebuild

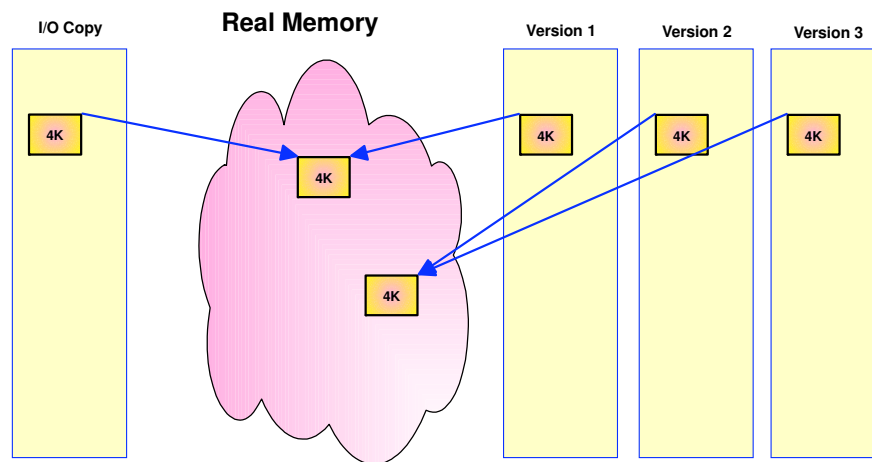


- Support of system managed rebuild for JES2 checkpoint on CF
 - MVS command ONLY
 - ▶ **SETXCF START,REBUILD,STRNAME=nnnn**
 - ▶ **SETXCF START,REBUILD,CFNAME=nnnn**
 - ▶ Can't be done if pre-R8 JES2 connected to checkpoint structure
 - All other error cases work as they did before
 - ▶ JES2 reconfiguration is used to recover errors
 - JES2 processing of structure moved to subtask
 - ▶ Prevents main task from being suspended by rebuild or terminated by CF error
 - ▶ No more interrupted CF writes when JES2 abends

Checkpoint performance



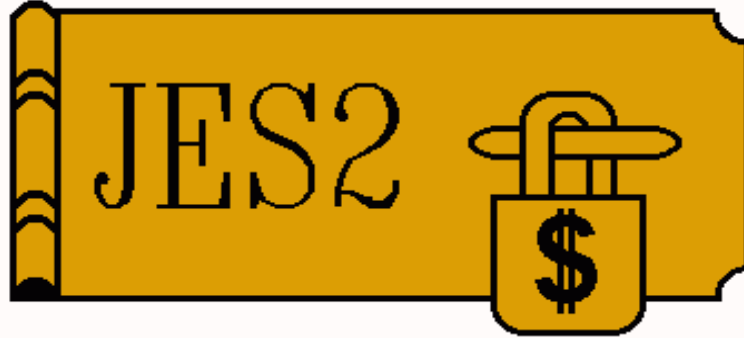
- IARVSERV performance for checkpoint versioning
 - Fewer calls made, eliminates linkage overhead



Serviceability



- JES2 dispatcher CTRACE
- Additional PERFDATA information
 - **\$D PERFDATA(PCESTAT)** now displays more specific information about where a PCE has \$WAITed
- \$DISTERRs "fixed"
 - No longer issue **\$HASP095** message
 - **\$HASP096** issued before **\$HASP088**
- **RECVOPTS(MAIN)** gets more reasonable default of **COUNT=2,INTV=1**
- **SPOOLDEF TGBPERVL=** gets more reasonable default of **255**



... And beyond

Compatibility



- New releases will not support coexistence with PRE-R4 mode
 - Must be **\$ACTIVATE**'d prior to migration
 - ▶ Note - most in-house testing is now done activated
 - **HASX05C** (command translation) treated as a true "sample exit"
 - ▶ Not automatically enabled
 - ▶ Service similar to other sample exits ("as is")
- Migration path from JES2 prior to R4:
 - Migrate to R4, R5, R7, or R8 JES2
 - **\$ACTIVATE**
 - Migrate to newest JES2
 - ... or ... **COLD START**