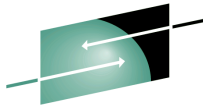


JES2 Project Opening

JES2 & SDSF Latest Status



SHARE
Technology • Connections • Results

- ▶ Current JES2 Releases
- ▶ Migration & Implementation Tips
- ▶ Recent Service, Publications, etc.



Session# **2652**

SHARE 99 Technical Conference - Summer 2002 - San Francisco

John Hutchinson - hutchjm@us.ibm.com

IBM Washington Systems Center, Gaithersburg, Maryland



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Other JES2 Sessions at this SHARE

Mon	1:30	2691	IBM Printing Update
	4:30	2655	JES2 Product Update
Tues	1:30	2661	Intro for New JES2 System Programmers
	9:30	2662	JES2 Exits & Internals Overview
	11:00	2663	Exploiting JES2 Life-of-Job Exits
	11:00	2695	InfoPrint Server Tips, Techniques & FAQs
	1:30	2698	FONTS: A Tutorial on the Dark Side of Printing
	4:30	2670	SDSF Product Update
	4:30	2795	What's New with InfoPrint Server?
Wed	9:30	2702	VPS Printing Update
	11:00	2657	JES2 Health Monitor
	11:00	2696	Printer's Digest Condensed AFP Tutorial - Part 1
	1:30	2697	Printer's Digest Condensed AFP Tutorial - Part 2
	1:30	2656	z/OS 1.2 JES2 Migration Considerations
	3:00	2668	z/OS 1.2 JES2 & SDSF User Experiences
	4:30	2669	Automated JES2 Initiator Management
Thur	9:30	2693	Where's my Report? SYSOUT Tracking with DRS & VPS
	1:30	2667	JES2 NJE & RJE over non-SDLC Links
	3:00	2659	JES2 Q & A
	3:00	2699	PSF Ver.3 Rel.3 Enhancements for Adv. Funct. Printing
	4:30	2653	JES2/SDSF Requirements Working

Current JES2 Releases



FMIDs, Birthdays & Obituaries

JES2 Rel.#	FMID	First Available	No Longer Available	End of Service
OS/390 R.8/9	HJE6608	9/99	9/00	3/2003
OS/390 R.10	HJE7703	9/00	3/02	9/2004
z/OS R. 1	HJE7703	3/01	10/01	3/2004
z/OS R. 2/3	HJE7705	10/01	9/02	10/2004
z/OS R. 4	HJE7707	9/02		

See <http://www.ibm.com/services/sl/products/java.html>
(requires JVM 1.3)

JES2/MVS Compatibility



JES2 Release:

OS/390 z/OS Release	Rel.8/9 HJE6608	Rel.10 & z/OS R.1 HJE7703	z/OS R.2 HJE7705	z/OS R.4 HJE7707
R.8	X			
R.9	X			
R.10	X	X		
z/OS R1	X	X		
z/OS R2	X	X	X	
z/OS R3	X	X	X	
z/OS R4	X	X	X	X

From Rel. 10 on, JES levels supported by a given OS/390 release will be the same as the JES levels that can coexist in a MAS.

See:

- ▶ http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/E0Z2B100/5.0
- ▶ http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/E0Z2B130/4.5
"z/OS Planning For Installation"

JES2 z/OS R. 1 (& OS/390 Rel. 10)



★ **Spool Management**

- ★ Fence to multiple Vols & by System

★ **Performance**

- ★ \$#GET/\$#POST for many local/remote idle Printers
- ★ SNA buffers up to 32K
- ★ HASPINIT load module loaded above the line

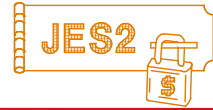
★ **Spool Browse Enhancements**

- ★ SVC 99, QSAM/BSAM Interface

★ **Serviceability enhancements**

- ★ Multi-member dumps
- ★ Tailored SVC dumps
- ★ ZAPJOB service
- ★ and more ...

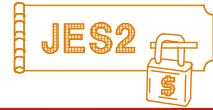
z/OS R.2 JES2



- ★ **Greater than 64K jobs support**
 - **JobID format changes**
- ★ **Dynamic PROCLIB support**
- ★ **INCLUDE initialization statement**
- ★ **Long running jobs JESLOG support** (Spin/Suppress)
- ★ **Large spool volume support** (64K trks anywhere on vol)
- ★ **Miscellaneous enhancements**
 - ★ Spool Read & Convert Device - new functions on SSI 71
 - ★ Dynamic NJE devices - \$ADD LINE n ,JTNUM= n ,STNUM= m
 - ★ \$TCKPT mode=DUAL/DUPLEX w/out all-member warm start
 - ★ \$DJQ,SPOOL for >32K track groups
 - ★ Termination changes - "Nag" message & PCE clean-up
 - ★ \$D PERFDATA(CKPTSTAT) - summary without \$TRACE(17)
 - ★ \$DPCE details filter

See 2655 "JES2 Product Update", Mon @ 4:30

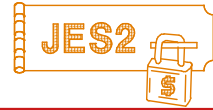
z/OS JES2 Rel. 2 Migration



- ◆ **From HJE6603 or earlier (pre-OS/390 R4)**
 - ★ Migrate to HJE6604-HJE6608 to avoid COLD start
- ◆ **From HJE6604 or HJE6605 (OS/390 R4 or R5)**
 - ★ No MAS coexistence
 - ★ \$ACTIVATE required to avoid COLD start
- ◆ **MAS coexistence from HJE6607-HJE7703 (R7-10)**
 - ★ APAR OW47328 needed on downlevel member
 - ★ \$ACTIVATE required on HJE6607-HJE6608
- ✗ **APPLCOPY gone - use ckpt versions (SSI 71)**
- ✗ **Sample Exit 5 no longer automatically loaded**

See 2656 "JES2 Migration", Wed @ 1:30

z/OS JES2 Rel. 2 Migration



■ **Coexistence Enforced!**

- ▶ JESXCF allows only supported JES2 releases to connect.
- ▶ Allowable JES-BCP combinations w/ z/OS R.2:
 - OS/390 Rel. 7
 - OS/390 Rel. 8/9
 - OS/390 Rel. 10 and z/OS Rel. 1
 - z/OS V1 Rel. 2
- ▶ JES2-JES2 coexistence in a MAS
 - Same combinations as above
 - JES2-JES2 migration/fallback considerations

JOBID format (z/R2)



- JOBID format changed based on upper limit of **JOBDEF RANGE=** high value
 - ▶ < 100,000 then format unchanged (**JOBnnnnn**)
 - ▶ >= 100,000 then format is **Jnnnnnnn**
 - **STCnnnnn** becomes **Snnnnnnn**
 - **TSUnnnnn** becomes **Tnnnnnnn**
- Note: transition period if job number range increased above 99,999 via \$T command
 - SPOOL and running jobs will have old format
 - Operator commands new format
 - SMF records could contain either format
 - Transition period also exists when decreasing range

See 2656 "JES2 Migration", Wed @ 1:30

Exit (& mod) Migration Considerations



- **JES2 can operate in two modes;**
 - ▶ Full function mode (z2) which is the default, or
 - ▶ Compatibility mode (R4)
 - ▶ Macros \$QJQE, \$#JOE, \$DOGJQE, \$JQEJNUM, \$JBIDBLD and Fields within control blocks such as the JQE are mode sensitive.
- **Pay Attention to the Documented Interfaces ..**
 - ▶ See "JES2 Data Areas" and "JES2 Exits" for data areas that:
 - Are used by two or more components
 - Are programming interfaces
 - Are needed for debugging or diagnosis
 - ▶ Beware of non-Programming Interfaces!!!

\$D PERFDATA service aid commands



(undocumented - intended for service personnel - subject to change)

- **\$D PERFDATA(INITSTAT)** - JES2 initialization routines
- **\$D PERFDATA(QSUSE)** - Checkpoint delays
- **\$D PERFDATA(PCESTAT)** - PCE detailed statistics
- **\$D PERFDATA(CPUSTAT)** - Summary of PCE stats
- **\$D PERFDATA(SAMPDATA)** - WLM init sampling data
- **\$D PERFDATA(EVENT)** - JES2 internal errors & delays
- **\$D PERFDATA(CKPTSTAT) - new with z/OS R.2**

```
$HASP660 CKPT PERFORMANCE STATISTICS - INTERVAL=13:31.725791,
$HASP660 AVGHOLD=0.425011,AVGDORM=4.920611,TOT$CKPT=54540,
$HASP660 WRITE-4K=17,WRITE-CB=1606,OPT$CKPT=33444,OPT4K=0,
$HASP660 IO=R1,COUNT=147,AVGTIME=0.014144,
$HASP660 IO=R2,COUNT=0,AVGTIME=0.000000,TOTAL4K=0,TOTALCB=93,
$HASP660 IO=PW,COUNT=147,AVGTIME=0.007197,TOTAL4K=82,TOTALCB=0,
$HASP660 IO=IW,COUNT=151,AVGTIME=0.006798,TOTAL4K=0,TOTALCB=573,
$HASP660 IO=FW,COUNT=148,AVGTIME=0.006470,TOTAL4K=17,TOTALCB=1033
```

<http://www.ibm.com/support/techdocs/atmastr.nsf/PubAllNum/W9744B>

z/OS Rel. 4 JES2 Enhancements



- JES2 Health Monitor
- End of Memory (EOM) processing
- HASP Access Method (HAM) I/O
- INCLUDE statement
- Default PARMLIB processing
- Recovery from bad JES2 CKPT
- //XMIT JCL support
- Miscellaneous changes

The major themes for this release are reducing outages and performance.

- A health monitor has been created for JES2 to help installations deal with cases when JES2 is not responsive.
- To deal with the EOM timer added by MVS in z/OS 1.2, JES2 added a timer of its own that prevented us from being canceled. With this release, we remove the timer and all waits in the EOM SSI code.
- Processing in HAM (HASP access method used to read and write data sets to SPOOL) has been enhanced to improve performance and reliability
- Based on customer response, the INCLUDE statement that was added in z/OS 1.2 has been enhanced in this release to allow use of the default PARMLIB concatenation and to have a default JES2 initialization member.
- Initialization processing was enhanced to not update JES2 checkpoint data sets until warm start processing has completed.
- The //XMIT card is now supported to transmit jobs to other nodes via NJE. Previously, this was only supported by JES3
- We also updated the data passed to FSSes (original LRECL) and WLM (more sampling data)
- There is a compatibility APAR (as usual) for this release. It applies to R8, R10, and z2. R4 and z2 modes of operation are still supported.

JES2 Health Monitor



Examine & Diagnose JES2 problems

Separate address space ("jes2MON")

- ▶ Started & Stopped with JES2
- ▶ Automatically restarted monitor if failure



Multiple Subtasks each performing single function

- ▶ Main task - starts and stops address space
- ▶ Sampler - samples JES2 TCB & resources usage
- ▶ Probe - examines samples & issues alerts
- ▶ Command - processes operator commands (SVC34)
 - \$JDMonitor, \$JDStop, \$JDStatus, \$JDJes, \$JDDetails, \$JDHistory

Message IDs are 4 digit (\$HASP9xxx) - Range is 9049-9302

- ▶ Listed in the "JES2 Messages" book under "Nine Hundreds"!

The monitor runs in a separate address space from JES2. The name is jesxMON where jesx is the name of the subsystem being monitored. There is one monitor address space per JES2 address space. Though it does not access any resources, you may want to define this new started task to your security product. The monitor starts as part of JES2 initialization processing. If JES2 comes down cleanly, the monitor is stopped. If JES2 is ABENDED, then the monitor remains active while the JES2 address space is down. On a hot start, if the monitor code was updated, then the monitor is automatically restarted. If the monitor fails for any reason, there is code in the JES2 address space to re-start it. It is done on a timer in case there is a problem starting the monitor.

The monitor itself is a set of subtasks in the monitor address space. Each subtask does a particular task. The subtasks are main, sampler, probe, and command.

Please note that messages from the monitor are the first to use 4 digit message ids. This was done to ensure that there will be enough messages for the JES2 address space messages. All monitor message are of the form \$HASP9xxx. Message ids of \$HASP9500 to \$HASP9999 will not be used by IBM/JES2 code.

EOM Enhancements



Problem:

- JES2 terminated (S30D) if it took too long to finish.
 - JES2's EOM WAITed for JES2 main task.
 - JES2 could be down, or waiting for the checkpoint
 - JES2 EOM could be ABENDED, losing resources

Solution (in JES2 EOM routines):

- Use the JES2 SJB (Subsystem Job Block) to represent an **executing** unit of work, **but nothing else**.
 - Don't queue SJBs in order to perform PSO
 - Don't wait for JES2 to update JQEs or finish Internal Reader Processing
- SJB is no longer part of PSO or STAC interface
- EOM processing now 2 stages
 - ✦ EOM SSI queues SJB on new queue to new JES2 PCE. The address space is released
 - ✦ EOM PCE/subtask finishes processing

End of memory occurs when an address space is being deleted (the memory is going away). JES2 gets control in an SSI to clean up any JES2 resources the address space may have owned when it terminated. The problem is that in z2, MVS added code to clean up services that were stuck in end of memory processing. JES2 could appear stuck because it waits for the JES2 address space before completing the clean up. Since JES2 may be down or unable to access the JES2 checkpoint, this can be a long wait. To prevent being ABENDED by the support added in z2, JES2 added a timer to make it appear JES2 is actively processing the request. This was always intended as a temporary solution.

HAM I/O Improvements



Problem

- ▶ HAM I/O is single record (except FSS)
- ▶ HAM code is old with RAS problems

Solution: "SPLIO"

- ▶ Uses multi-record I/O to read/write SYSIN/SYSOUT from/to SPOOL
- ▶ Uses EXCPVR to reduce overhead
- ▶ Improves overall RAS
- ▶ No external changes

HAM is the access method used to read and write data sets to SPOOL. It has been improved in this release to have better performance and greater RAS.

Enhanced INCLUDE Externals

Updates to INCLUDE initialization statement (new in z2) based on customer input

- ▶ Current syntax of the INCLUDE init statement

```
INCLUDE DSNAME=dsn,VOLSER=vol,UNIT=unit
```

- ▶ New syntax added in z4

```
INCLUDE MEMBER=member_a
```

```
INCLUDE PARMLIB_MEMBER=member_b
```

member_a should be in current parmlib data set being processed

member_b should be in default logical parmlib

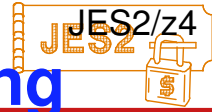
- Improvements in INCLUDE initialization statement

Read additional member from current data sets for init decks

Read member from the logical data set for init decks. Default logical parmlib will be SYS1.PARMLIB

- Key word MEMBER and also PARMLIB_MEMBER are mutually exclusive with the key words DSNAME or VOLSER or UNIT. If we try to include the PDS data set without the member name, it will issue HASP003 error message. So DSNAME should contain the member name if it is PDS. Also if we try to include the member from the current PS data set, it will issue the error message. INCLUDE PARMLIB_MEMBER will include only from the logical parmlib, what ever may be the current data set.

Default Parmlib processing



New start option (read from default PARMLIB)

Syntax of the PARM statement for new keyword

```
S JES2, PARM= ( ' MEMBER=mem1' ) or
```

```
S JES2, PARM= ( ' PARMLIB_MEMBER=mem1' )
```

- ▶ *mem1* should be the member of logical parmlib
- ▶ If no parmlib statement is specified, then it will process from the default HASxxxx member of logical parmlib (xxxx is sub system name)
 - For a JES2 subsystem, default member = HASJES2
 - IBM does not ship a default parmlib member

- Updated code will have following two function.
 - ▶ Read the init decks from default member of logical parmlib
 - ▶ Read the init deck from the member specified in the PARM statement of start JES2 command.
- Since MEMBER key word is mutually exclusive with the HASPPARM key word of PARM statement.
 - Init deck processing will go through the following logic
 - ▶ If MEMBER= specified, use it from logical parmlib data set
 - ▶ If HASPPARM= specified, then use that DD name
 - ▶ If the HASPPARM DD exists, then use that DD name
 - ▶ Otherwise use HASxxxx member from logical parmlib data set (where xxxx is system name)

Checkpoint Data Corruption



Problem

- ▶ Checkpoint data may be corrupted by hardware or software (IBM or user) errors ...
- ▶ Volumes used for checkpoint and SPOOL may be wrong (operator error)

Ongoing work to fix this . . .

- ▶ Checkpoint never written until warm start has completed.
- ▶ If there are too many (=10) Disastrous errors warm start asks the operator's opinion about continuing via HASP863

Problems have occurred over the years where an installation started with the wrong SPOOL or checkpoint volumes online (production on a test system or test on a production system). Also problems have occurred where only one checkpoint data set was bad. Typically, an installation notices this when they start to see thousands of error messages flood the screen. Often the system is stopped at that point to try and prevent problems. But it is too late. JES2 has already written some or all of the bad data to checkpoint.

New logic will ensure that

- Nothing is written to the checkpoint until warm start processing completes
- If more than 10 errors are encountered, the operator is given the option of not starting JES2 (before anything has been written)

// XMIT JCL card



- ▶ JES2 now supports the XMIT JCL card to route job execution to another node.

`//name XMIT DEST=nodename[.vmuserid]`

- Previously only supported by JES3
- /*XMIT, /*XEQ and /*ROUTE XEQ still supported
- SUBCHARS= keyword not supported (JCL error)

New \$HASP108 message

`$HASP108 jobname NON-VALID XMIT STMT - reason`

\$HASP119 message updated with new reason code

`$HASP119 job DELETED - INVALID XMIT CARD,RC=15`

- JECL XMIT statement is made available in the JCL format mainly because JES2 shops are attempting to reduce their use of /* JECL cards.
- There is currently no way to route job execution to another node without using JECL. Additionally, Shops with both JES2 and JES3 are confronted with another JCL incompatibility and must maintain two sets of JCL, or manually change JCL depending on where the input processing for the job is done.
- The different error descriptions for the message \$HASP108 are
 - ▶ DEST KEYWORD ERROR, RC=1
 - ▶ NO OPERAND SUPPLIED, RC=2
 - ▶ DEST= VALUE IN ERROR, RC=3
 - ▶ DELIMITER ERROR, RC=4
 - ▶ NON-VALID CONTINUATION, RC=5
 - ▶ UNEXPECTED KEYWORD DETECTED, RC=6
 - ▶ DEST KEYWORD MISSING, RC=7
 - ▶ DUPLICATE DEST KEYWORD, RC=8
 - ▶ DUPLICATE DLM KEYWORD, RC=9

Miscellaneous Changes



WLM Initiator balancing

- ▶ JES2 passes additional information to WLM to help determine where to start initiators
- ▶ Only works on members running z4 JES2

Blank truncation on FSS printers

- ▶ Original LRECL now passed over the FSS interface
- ▶ Allows FSS printers to pad out blanks that were deleted by JES2
- ▶ Requires FSS exploitation
- ▶ **JES2 no longer checks TSO logons for duplicate logons.** (Same ID can be logged onto multiple systems in the MAS/plex. "Not supported.")

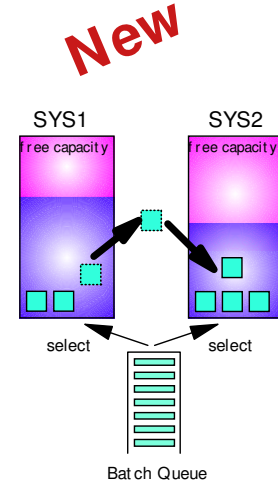
- WLM needed additional information to better determine where to start/stop initiators. This information is provided by the z4 level of JES2. For more details on how this works, refer to the WLM presentations and documentation.
- A problem has long existed with page mode (binary) data streams that are printed on FSS printer. If the installation selected blank truncation for the SYSOUT class, x'40' at the end of each record are removed so save space on SPOOL. The problem is that for binary data, the x'40' may not represent a blank. For external writers and SAPI devices, JES2 adds the blanks back in before passing the records across the interface. However, since FSS reads are locate mode, there is no way to insert the blanks back into the record. Also, the original record length was never passed to the FSS. That is what was corrected. The original record length is now passed to the FSS printer. It is up to the FSS printer to add any truncated blanks back into the record when it is printed. An updated FSS application may be needed to take advantage of this support.

WLM-Managed Initiators - z/OS Rel. 4

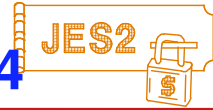


Enhanced Initiator Balancing:

- ▶ Balance distribution of initiators over sysplex members
- ▶ More aggressive reduction of initiators on heavily loaded systems (< 5% CPU capacity)
- ▶ Start of new initiators on systems with relaxed capacity (up to 5 initiators at once)
- ▶ Balancing evaluation done every 10 seconds
- ▶ WLM keeps enough initiators available for jobs with system affinity



Exit (& mod) Migration - Z/OS Rel. 4



Changes affecting user mods & exits:

- ▶ Control blocks moved into data spaces ...
 - \$PSO & certain fields in the \$SJB
 - Except for documented fields in the "JES2 Data Areas" and "JES2 Exits", don't expect others to be accessible...

- See "JES2 Migration" book



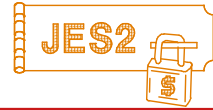
**SDSF
Update**

```
Display Filter View Print Options Help
-----
HOX7705 ----- SDSF PRIMARY OPTION MENU -----
COMMAND INPUT ==>                                SCROLL ==> CSR

DA   Active users                                INIT  Initiators
I    Input queue                                PR    Printers
O    Output queue                               PUN   Punches
H    Held output queue                         RDR   Readers
ST   Status of jobs                            LINE  Lines
                                           NODE  Nodes
LOG  System log                                SO    Spool offload
SR   System requests                          SP    Spool volumes
MAS  Members in the MAS
JC   Job classes                               ULOG  User session log
SE   Scheduling environments
RES  WLM resources
ENC  Enclaves
PS   Processes

END   Exit SDSF
```


Recent SDSF Releases



OS/390 R10 SDSF

- ▶ **Systems management in a MAS** (Requires MQSeries for OS/390)
 - ▶ MAS-wide display of Printers and Initiators
 - ▶ View in-core buffers for active jobs on other systems
 - ▶ Improved Management of WTORs - SR panel, RSYS cmd
- ▶ **Other enhancements:**
 - ▶ SDSF Server management (operator commands)
 - ▶ Web-based Configuration Assistant
 - ▶ Conditional processing of ISFPARMS

z/OS R1 SDSF

- ▶ Same as OS/390 Rel. 10 SDSF
- ▶ **Guide & Reference** and **Customization & Security** replaced by **SDSF Operation and Customization**, SA22-7670

z/SDSF (z/OS Release 2 SDSF)



- ▶ **Systems management in a MAS** (Requires MQSeries)
 - ★ MAS-wide display of Lines, Nodes, Rdrs, Puns, SO
- ▶ **z/OS JES2 Support:**
 - ★ >64K Jobs & Long-running Jobs (Spin joblogs)
- ▶ **New Panels:**
 - ★ Spool Volumes
 - ★ WLM Enclaves
 - ★ Processes (UNIX System Services)
- ▶ **Other enhancements:**
 - ★ Logger multi-block exploitation (performance)
 - ★ DA panel shows additional RMF fields for 64-bit virtual
 - + MemLimit, CPUCrit, STORCrit, RptClass, TRANACT, TRANRES
 - ★ MAS panel shows Comchar, JESName, SLevel, Type/Time
 - ★ Generated commands don't need/use Exit 5

See 2670 "SDSF Product Update", Tue @ 4:30



Spool Volumes panel

- ▶ MAS-wide display (does not require MQ)
- ▶ Access with "SP" command
 - Title line shows %util, active and free track groups

```

SDSF SPOOL DISPLAY SY1  4%  ACT  2170  FRE  2169  LINE 1-3 (3)
COMMAND INPUT ==>                                SCROLL ==> CSR
NP VOLUME Status      TGPct TGNum TGUse Command SAff Ext LoTrk HiTrk
SPOOL1 ACTIVE         36   175   64      ANY  00 0087 0293
SPOOL2 ACTIVE         32  1175   64      SYSA 01 0087 0A21
SPOOL3 ACTIVE          1  1995   37      ANY  02 000F 176F
  
```

- Action characters:
 - ▶ D, DL - Display
 - ▶ P, PC - Drain
 - ▶ S - Start
 - ▶ Z - Halt
 - ▶ J- **Display all jobs using the volume**



Enclaves panel

- Shows WLM Enclaves, Subsystem, CPU Time, etc.
- Sysplex - wide with MQ & SDSF Server
- Access with SDSF "ENC" command

```

SDSF ENCLAVE DISPLAY (ALL) ALL LINE 1-7 (9)
COMMAND INPUT ==> _ SCROLL==> CSR
NP TOKEN          SStype Status  SrvClass  Per PGN  RptClass ResGroup  CPU-Time
1800000005      DB2    ACTIVE  SYSCCLASS  1  2  ACLASS  AGROUP    1025.87
2800000104      IMS    ACTIVE  SYSCCLASS  2  4  BCLASS  BGROUP     75.17
12280000000    MQ     ACTIVE  ACLASSA    3  1  BCLASS  BGROUP    315.67
30300330005    MQ     ACTIVE  BCLASSB    4  2  BCLASS  AGROUP    923.11
32800000003    MQ     ACTIVE  SYSCCLASS  5  5  CCLASS  CGROUP    135.01
89000000026    MQ     ACTIVE  SYSCCLASS  5  5  CCLASS  CGROUP    231.14
99800000005    MQ     ACTIVE  TSYSCLAS  6  6  DCLASS  DGROUP     45.98
    
```

- Fixed field is a WLM-generated token
- Action characters:
 - "I" shows more Info
 - "M" shows all instances of multi-system enclaves



Process panel

- Access with **PS** command
- Displays Unix System Services data for address spaces
 - ▶ Similar to **D OMVS,A=ALL** command
 - ▶ Sysplex-wide, with MQ and SDSF server

```

SDSF PROCESS DISPLAY SY1      ALL      LINE 1-5 (10)
COMMAND INPUT ===>          SCROLL ===> CSR
PREFIX=*  DEST=(ALL)  OWNDER =*  SYSNAME=*
NP      JOBNAME  Status      Owner      State CPU-Time
BPXOINIT SWAPPED, RUNNING  SYSTASK  MRI      1.65
MQS1CHIN RUNNING          MQS      1R      11.04
MQS1CHIN RUNNING          MQS      1R      11.04
MQS1CHIN FILE SYS KERNEL WAIT  MQS      1F      11.04
KDMQDKJ  RUNNING          SYSTASK  HR      0.21
  
```

▶ **Action characters:**

- "D" Displays process, parent, state & time
(D OMVS,P=)
- "C" Cancel the process

z/OS R4 SDSF Enhancements



- JES2 Exploitations
 - ▶ Spool I/O interface used for in-core buffers
 - ▶ JES2 Recovery States (Rebuild, EOM) shown
- System Command extensions
- Minor usability enhancements
- Migration

See 2670 "SDSF Product Update", Tue @ 4:30

System Command Extension



Scrollable list of previous 10 commands

- ▶ Only unique commands
- ▶ Saved in ISPF profile
- ▶ Can be cleared with F11

Pop-up: (Full-screen allows insert)

System Command Extension

Type or complete typing a system command, then press Enter.

====> _____

====> _____

Place the cursor on a command and press Enter to retrieve it.

=> SETPROG APF,ADD,DDNAME=ISF.ISFLOAD More: +

=> S SDSF,M=01,P='FM,LC=H'

=> S PDMQ

=>

=>

F1=Help F5=FullScr F7=Backward F8=Forward F11=ClearLst F12=Cancel

Reply Command Pop-up



- Now shows the text of the reply message
 - ▶ Used from the SR display to reply to a message

Reply Command Extension

REPLY WITH VALID NCCF SYSTEM OPERATOR COMMAND_____

Complete the reply text, then press Enter.

====> R 51, _____

====> _____

====> _____

Minor Usability Enhancements



- **New values for Status column on I and ST**
 - ▶ EOM - job is end of memory processing
 - ▶ REBUILD - rebuild queue
- **Long form of the list action added to O, H, & ST**
- **Long form of display action for INIT, PR, RD, PU**
- **OffS column is added to the O, H and ST panels**
 - ▶ Displays offload devices if job or output offloaded
 - ▶ The devices shown in a list, similar to the JES displays
- **JCLim column on JC panel changed**
 - ▶ Max number of executing jobs for the jobclass
 - ▶ * (no limit) was shown in 10th byte of 10-byte col. Now shown in last byte of column width (default width now 5)

SDSF Migration/Coexistence



- Coexistence of SDSF in a sysplex with SDSF at a higher level requires service:
 - ▶ up to and including z/OS V1R4

SDSF Release	PTFs on that Release for Coexistence with Higher Levels
OS/390 V2R9	UQ29096, UQ53587, UQ53592
OS/390 V2R10	UQ53588, UQ53590, UQ53593
z/OS V1R1	UQ53588, UQ53590, UQ53593
z/OS V1R2 and higher	None

Using SDSF for WebSphere Operations

■ Display Active

```

SDSF DA SYSD SYSD PAG 0 SIO 17 CPU 75/ 75 LINE 1-8 (8)
COMMAND INPUT ====>
JOBNAME StepName JobID CPU% ECPU% SIO ECPU-Time Tran-Act
WSDEMNC TSDEMNC STC18268 0.01 0.00 0.00 19.09 151:33:49
WSINTFC TSINTFD1 STC18271 0.00 0.00 0.00 3.44 151:33:49
WSIVP2C TSIVP2C STC21290 0.21 0.07 0.00 1.38 5:28:36
WSIVP2S TSIVP2S STC21293 0.02 2.32 0.00 37.22 5:18:34
WSLDAPC TSLDAPC STC18267 0.00 0.00 0.00 3980.02 0:00:00
WSNAMGC TSNAMGD1 STC18270 0.00 0.00 0.00 4.00 151:33:49
WSSMGTC TSSMGTD1 STC18269 0.00 0.00 0.00 76.88 151:33:49
WSSMGTS TSSMGTS STC21325 0.00 0.00 0.00 2.76 0:54:47

```

Commands & Action Characters:

- ▶ To Start ("S") or Stop ("P") servers, use MVS commands on Command Line:
/s wsivp2c
- ▶ K ("kill") to MVS Cancel
- ▶ Z to MVS Force

Hints:

- ▶ Use Arrange to place all the interesting columns on the front panel
- ▶ Use Filters or Prefix to limit the rows displayed
- ▶ Sort on Jobname to keep the rows from jumping around

Using SDSF for WebSphere Operations

■ Enclaves

```
SDSF ENCLAVE DISPLAY  SYSD
ACTION=//-Block,=-Repeat,+Extend,I-Info,M-Match
NP  TOKEN                SStype Status   SrvClass CPU-Time
    240000142B           CB      ACTIVE   CBSLOW   2.65
    2800001441           CB      ACTIVE   CBFAST   0.01
    2000001449           CB      INACTIVE CBSLOW   0.00
    2C00001446           CB      INACTIVE CBSLOW   0.00
    3000001448           CB      INACTIVE CBDEF    0.00
```

■ Unix Processes

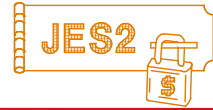
```
SDSF PROCESS DISPLAY  SYSD      ALL      LINE 1-9
ACTION=//-Block,=-Repeat,+Extend,C-Cancel,D-Display
NP  JOBNAME              PID ASIDX CPU-Time St-Time  State  Status
    TSDEMNC              67240145 020E   1.70  8:11:52 HR    RUNNING
    TSINTFC              67240155 0205   0.75  8:12:35 HR    RUNNING
    TSIVP2C              67240176 0063   3.35 11:59:33 HR    RUNNING
    TSIVP2S              67240213 01EE  17.17 15:22:57 HR    RUNNING
    TSNAMGC              84017355 020C   0.88  8:12:17 HR    RUNNING
    TSNAMGS              16908555 0061   1.27 14:13:42 HR    RUNNING
    TSSMGTG              84017359 020D   7.37  8:11:59 HR    RUNNING
    TSSMGTS              50462986 0062   3.34 14:03:02 HR    RUNNING
```

JES2 Service Information

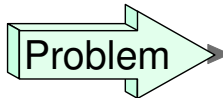
- **HiPer APARs (Hi Impact, or Pervasive)**
 - ▶ See PSP buckets for an up-to-date list
 - OS390Rxx / JES2
 - ZOSV1Rx / JES2
 - ▶ <https://techsupport.services.ibm.com/server/390.psp390>
(requires IBM Registration userid)

- **Other service of interest:**
 - ▶ Performance Improvements
 - ▶ Service Aids
 - ▶ New Function

Danger - Don't run out of BERTs!



- BERTs provide extensions to the Checkpoint for dynamic extensions to JQEs, CATs, etc.
 - CKPTSPACE BERTNUM defaults to 2X JOBNUM



Terrible things can happen if you run out!

Re-IPL, Cold start, etc.

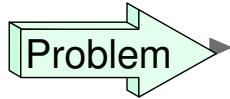


Increase your supply of BERTs

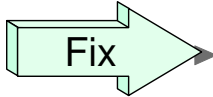
\$T CKPTSPACE,BERTNUM=**nnn**,BERTWARN=80

- ▶ **Apply fixes for the following APARs:**
 - **OW44400** - BERTWARN not updated (F006)
 - **OW41547** - HASPHOPE not assembled
 - **OW48246** - Elim. unnec. use of BERTs (F103)
 - **OW49431** - Prevents overlapping \$BERTTABs
- ▶ z/OS Rel. 2 provides the ALICE PCE
 - (Acquire Lock and Initiate Cleanup Executor)

OW49317 - Spool support for 3390-9



Spool data sets had to be within first 64K tracks of DASD volumes. (3390-9 has 150,255 tracks.)



Relative track addressing allows the spool space to be located anywhere on the volume.

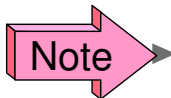
- "TT" in "MTTR" is relative to dataset origin.

- New init parm and display message:

```
SPOOLDEF RELADDR=NEVER|ASNEEDED|ALWAYS
```

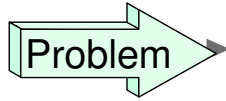
```
$D SPOOL,UNITDATA displays status of RELADDR
```

- ▶ OS/390 R10 - z/OS R2 (F112)

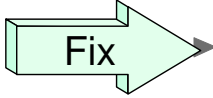


OW49373 (F112) provides SSI 71 mapping macros IAZSPLIO and changes to IAZSSJI

OW50781 - JES2 hangs after \$P JES2



Defects in IBM, ISV, or customer exits may prevent JES2 from freeing the \$HASP after \$HASP099 ALL AVAILABLE FUNCTIONS COMPLETE



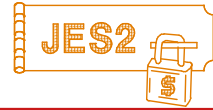
JES2 will take a dump if an active address space is found preventing JES2 from terminating after \$PJES2 (then issue \$P JES2,ABEND)

- ▶ OW49096 (F107) may also solve this problem
 - \$PJES2 tells RACF to do RETURN JOBID
- ▶ (local fix: issue \$P JES2,TERM - then IPL)
- ▶ OS/390 R10 & z/OS R1 & 2 (F111)



This may be caused by incorrect use of HSBUSER1 by exits which prevents JES2 from freeing the HASB.

OW46462 - More IPCS Enhancements



Problem → IPCS unable to display \$BERT(s)
– Manual calculations required ...

Fix → \$BERT data displayed (new IPCS panels)

- ▶ Additional error analysis routines & messages
- ▶ Enhanced control block formatting

- ▶ OS/390 R4 - R10 (F012)

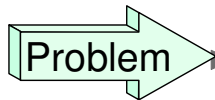
- ▶ See Doc APAR OW51125 for setup info.
missing from z/OS R2 "JES2 Migration" book

OW53089 - \$E Member Restart probs



- Problem** → In a mixed MAS (zR2 & OS/390), z2 systems erroneously set the QSEQUICK bit for pre-z2 systems that crash and are warm/hot-started.
- Warm start processing bypassed . . .
 - Jobs that were supposed to restart will not
 - Output on print Q will not be re-selected, etc.
- VerifyProb** → Issue \$DMEM(mmmm) from both systems (see if they match)
- LocalFix** → Warmstart with VER/REP statements in APAR
- Fix** → z/OS R2 (F204) - HiPer

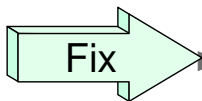
OW51990 - Hung Remotes in 64-bit mode



▶ RJE workstations hang when interrupted by inbound requests.

– (ONLY occurs in 64-bit mode.)

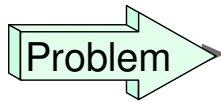
- ▶ **HIPER** - Loss of Function without notice
- ▶ **Also affects NJE** (transmitters & receivers)



▶ More intelligent checking for suspended DCTs

- ▶ OS/390 R7 - z/OS R2 (F201)

OW53863 - Fast Spool Garbage Collect'n



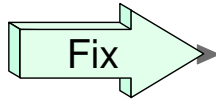
Problem

- TrackGroups marked "allocated" during spool space assignment if non-ownership not verified.
- Maybe caused by storage overlay of JES2 control blocks.
 - ▶ Not cleaned up until the weekly spool "garbage collection" (Sniffer).



Circumvention

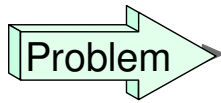
- Wait for the weekly spool garbage collection.
- ▶ Add more spool volumes.
 - ▶ All member warm start with SPOOL=VALIDATE.



Fix

- Oper Cmd to validate/recover TGs quickly
- \$TSPOODEF,GCRATE=FAST
 - ▶ Open

OW55693 - Coupling Facility Ckpt Delays



New

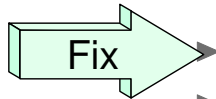
Excessive IXCQUERY requests and delays when MASDEF LOCKOUT - \$HASP263 occurs.

– May cause a member to hold checkpoint several seconds or minutes.

- ▶ Validate with PERFDATA showing long waits in CKPT PCE in HASPNUC at 99676000.



Tune Checkpoint performance, Use DASD, or Specify a higher values for MASDEF LOCKOUT= (default = 1000 = 10 seconds)



Cache info & don't \$WAIT on IXCQUERY

- ▶ Open

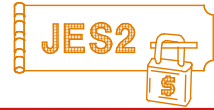
JES2 Performance APARs



Since PUT/RSU F101: (nothing recent)

- OW48163 - High CPU w/ spool fills + Fence=Y + Badtrack (F101)
- OW46645 - Spin PCE looping moving jobs to Output Q. (F101)
- OW47238 - High CPU cancelling Job with lots of Output (F103)
- OW47328 - Delays in job selection waiting for BERT (F103)
- OW48347 - High CPU activity with Exit 49 + WLM inits (F105)
- OW48575 - High Ckpt activity with JobList cmds + filter (F105)
- OW48755 - Ckpt lock held after \$ECKPTLOCK (F105)
- OW49165 - JES2 passes bad info to WLM for batch inits* (F105)
- OW50107 - High CPU after \$T JOBCLASS(x),MODE= (F108)
- OW50477 - Null Spin datasets unnec. sent thru unspun (F108)
- OW55693 - Checkpoint delays for coupling facility (Open)**

Survey Questions



What is your JES2 Release level?

JES2 Rel.#	Count	\$ACTIVATED ?	Last Share (3/2002)
OS/390 R.1/2		X	0 - x
OS/390 R.3		X	1 - x
OS/390 R.4	0		0 - 0
OS/390 R.5/6	0		4 - 2
OS/390 R.7	0		3 - 2
OS/390 R.8/9	6		7 - 4
OS/390 R.10/z1	20-9	X	21 - x
z/OS R2	9-4		5 - 3
z/OS R4	n/a		n/a

Appendix

- ▶ [OS/390 & z/OS JES2 Releases](#)
- ▶ [z/OS JES2 Library](#)
- ▶ [Softcopy Books](#)
- ▶ [other JES-related Books](#)
- ▶ [JES2 Education](#)
- ▶ [z/OS Web Sites](#)

OS/390 & z/OS JES2 Releases



OS/390 Release 1 - Spool Offload Enhancements

OS/390 Release 3 - SYSOUT API (SAPI)

OS/390 Release 4 - WLM Inits, SCHENV & Constraint Relief
▶ **\$ACTIVATE** required for new functions

OS/390 Release 5 - Open Print Server Support

OS/390 Release 7 - FiCon & New DASD Support

OS/390 Release 8 - CF Auto Rebuild for Checkpoint Structure

OS/390 Release 10 Spool Mgmt, Browse, ZAPJOB,...
▶ **\$ACTIVATE** required.

z/OS Release 2 - >64K jobs, Spool, Proclib, etc. relief ...

z/OS Release 4 - Health Monitor, Usibility, RAS, ...

See 2655 "JES2 Product Update", Mon @ 4:30

z/OS JES2 LIBRARY



SA22-7535 JES2 Introduction *

GA22-7538 JES2 Migration

SA22-7532 JES2 Initialization & Tuning Guide

SA22-7533 JES2 Initialization & Tuning Reference

SA22-7537 JES2 Messages

SA22-7526 JES2 Commands

SA22-7527 JES2 Commands Summary

SA22-7534 JES2 Installation Exits

SA22-7536 JES2 Macros

GA22-7531 JES2 Diagnosis

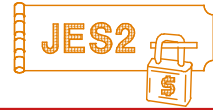
GA22-7528 JES2 Data Areas, V.1 \$A - \$E *

GA22-7529 JES2 Data Areas, V.2 \$F - \$O *

GA22-7530 JES2 Data Areas, V.3 \$P - \$X *

★ SoftCopy only (CD-ROM)

z/OS Softcopy Books



- **z/OS Softcopy Collection CD-ROMs**
 - z/OS Rel. 1 CD-ROMs: SK3T-4269 (Unlicensed)
 - ◆ available on tape (optional, no-charge feature)
 - Software Products: SK3T-4270
 - z/OS & S/W Products - DVD: SK3T-4271
 - Licensed z/OS CD-ROM: LK3T-4307
- **Softcopy site:**
<http://www.ibm.com/servers/eserver/zseries/softcopy>
- **Online books at:**
<http://www.ibm.com/servers/eserver/zseries/zos/bkserv>
- **JES2 PDF files at:**
<http://www.ibm.com/servers/eserver/zseries/zos/bkserv/r1pdf/jes2.html>
- **See what's new at:**
<http://www.ibm.com/servers/eserver/zseries/softcopy/whatsnew.htm>

Other JES2-Related Documents



- ▶ z/OS V1 R2 Implementation, SG24-6235
- ▶ OS/390 V2 R10 Implementation, SG24-5976
- ▶ OS/390 V2 R4 Implementation, SG24-2089
- ▶ MVS/ESA JES2 V.5 Implementation, GG24-4583
- ▶ VSE to OS/390 Migration Notebook, SG24-2043
- ▶ NJE Formats & Protocols, SC23-0070-3

- Deleted (obsolete) - save your old copies
 - ▶ ~~MVS/ESA JES2 Exit Coding, GG24-4127~~
 - ▶ ~~SDSF/RACF 1.9.2 Conversion, GG24-4085~~
 - ▶ ~~NJE with JES2 and Other Systems, GG22-9339-1~~
 - ▶ ~~OS/390 R.5 Implementation, SG24-5151~~
 - ▶ ~~JES2 MAS in Sysplex Environment, GG66-3263~~

IBM JES2 Education



- **JES2 for OS/390 Facilities & Implementation (ES710) - 4.5 days**
 - ▶ JES2 Facilities & Initialization
 - ▶ SDSF & Operations
 - ▶ Security Issues
 - ▶ Controlling JES2 Processes
 - ▶ Spool & Checkpoint Configurations
 - ▶ NJE & RJE (& SNA) Concepts & Implementation
 - ▶ JES2 Exits and Problem Determination

- **JES2 for OS/390 Operations (ES280) 2.5 days**
 - ▶ Start, Stop, Control JES2 processes and devices
 - ▶ JES2 and Workload Manager, and Sysplex
 - ▶ NJE, RJE, SNA, and OS/390 Print Server

z/OS Web Sites



z/OS Product Support - find everything from here!

- ▶ <http://techsupport.services.ibm.com/server/support>

Planning for Installation

- ▶ <http://www.ibm.com/servers/eserver/zseries/zos/installation/>

Publications (view, print, order books)

- ▶ <http://www.ibm.com/servers/eserver/zseries/zos/bkserv/>

SDSF home page

- ▶ <http://www.ibm.com/servers/eserver/zseries/zos/sdsf/>

Advanced Tech. Support (Flashes, White Papers, etc.)

- ▶ <http://www.ibm.com/support/techdocs>

Redbooks

- ▶ <http://www.redbooks.ibm.com>