

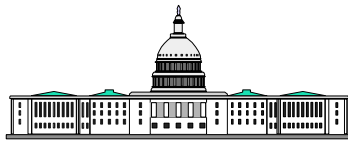
JES2 Project Opening & JES2 Latest Status



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



Session# **2652** - SHARE 94 Technical Conference - Winter 2000
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Other JES2 Sessions at SHARE 94

Mon	1:30	2655	JES2 Product Update
	3:00	2670	SDSF Product Update
Tues	11:00	2661	JES2/WLM Scheduling Environs & Batch Inits
	1:30	2549	Automatic JES2 Initiator Management (EWCP)
	1:30	2704	Infoprint Server for 390 - Basic I'faces & Xforms
	3:00	2705	Infoprint Server for 390 - PrintWay & NetSpool
Wed	8:00	2682	RMDS User Experiences
	11:00	2660	JES2 Short Subjects
	1:30	2658	JES2 Configuration & Tuning Tips
	3:00	2662	JES2 Job-Related Exits
	4:30	2700	Print Performance Tuning for JES Users
	6:00	2653	JES2/SDSF/RMDS Requirements Working
Thur	1:30	2657	JES2 Performance Topics
	3:00	2659	JES2 Q & A

Current JES2 Releases



Birthdays & Obituaries

JES2 Rel.#	FMID	First Available	No Longer Available	End of Service	Y2K Ready
MVS/SP 4.2	HJE4420	3/91	3/93	6/1999	No
MVS/SP 4.3	HJE4430	3/93	6/97	6/1999	No
MVS/SP 5.1	HJE5510	6/94	6/95	1/2001	Yes
MVS/SP 5.2	HJE5520	6/95		1/2001	Yes
OS/390 R.1/2	HJE6601	3/96	3/97	1/2001	Yes
OS/390 R.3	HJE6603	3/97	9/97	1/2001	Yes
OS/390 R.4	HJE6604	9/97	3/98	1/2001	Yes
OS/390 R.5/6	HJE6605	3/98	3/99	1/2001	Yes
OS/390 R.7	HJE6607	3/99	9/99	3/2002	Yes
OS/390 R.8/9	HJE6608	9/99		9/2002	Yes

OS/390 JES2 Releases



OS/390 Release 1

- ▶ Spool Offload Enhancements

OS/390 Release 3

- ▶ SYSOUT Application Programming Interface (SAPI)

OS/390 Release 4

- ▶ WLM Support for Batch Initiators & Resource Affinity Scheduling
- ▶ Command Enhancements & Constraint Relief: Nodes, RMTs, Lines, PRTs, Unnnnn, +64K Jobs (OW20844)

OS/390 Release 5

- ▶ Open Print Server Support

OS/390 Release 7

- ▶ FiCon (Fibre Connection) & New DASD Support

OS/390 Release 8

- ▶ CF Auto Rebuild for Checkpoint Structure

See 2655 "JES2 Product Update", Mon @ 1:30

JES2/MVS Compatibility



JES2 Releases:

MVS/SP... OS/390

MVS BCP Releases

	5.1.0	5.2.0	R 1/2	R 3	R 4	R 5/6	R 7	R 8/9	rX
MVS/SP 5.1.0	x								
MVS/SP 5.2.0	x	x							
OS/390 R.1	X	X	X						
OS/390 R.2	X	X	X						
OS/390 R.3	X	X	X	X					
OS/390 R.4	X	X	X	X	X				
OS/390 R.5	X	X	X	X	X	X			
OS/390 R.6	X	X	X	X	X	X			
OS/390 R.7	X	X	X	X	X	X	X		
OS/390 R.8	X	X	X	X	X	X	X	X	
OS/390 R.9	X	X	X	X	X	X	X	X	
OS/390 R.x					X	X	X	X	X

JES2 Migration APARs (coexistence)



Minimum APAR levels for these releases of JES2...

To share spool with these levels of JES2

	MVS/SP 5.1	MVS/SP 5.2	OS/390 Rel.1/2	OS/390 Rel.3	OS/390 Rel.4	OS/390 Rel.5/6	OS/390 Rel.7	OS/390 Rel.8/9
MVS/SP 5.2	OW09285							
OS/390 Rel.1/2	OW20011	OW20011						
OS/390 Rel.3	OW20491	OW20491	OW20491					
OS/390 Rel.4	OW26100	OW26100	OW26100	OW26100				
OS/390 Rel.5/6	OW29209	OW29209	OW29209	OW29209	OW29209			
OS/390 Rel.7	OW34853	OW34853	OW34853	OW34853	OW34853	OW34853		
OS/390 Rel.8/9	OW37454	OW37454	** Not Supt'd	** Not Supt'd	OW37454	OW37454	OW37454	
OS/390 rel. "x"	**	**	**	**	OW42299	OW42299	OW42299	OW42299

Caution: These APARs are for short-term migration, not long-term coexistence.

**** Note:** After OS/390 Release 8/9, only four consecutive levels of JES2 are supported for coexistence in the same MAS complex.



Y2000 JES2 Migration



What level of JES2 did you freeze for Y2K?

- ▶ OS/390 Rel. 4 or later? - Will share spool w/ Rel.8 & beyond
- ▶ OS/390 Rel. 1 or 3? - May not share spool w/ Rel. 8

JES2 releases available this year:

- ▶ OS/390 Release 8, 9, or 10

JES2 MAS Compatibility:

- ▶ n-3 levels of OS/390 **JES2** releases (*4 consecutive JES2s*)
 (Special exception for OS/390 Release 1 & Rel. 7 **)
 (Special exception for OS/390 Release 4 & Rel. 8/9 ***)

Examples: Unique JES2 Release of OS/390 (i.e., FMID)...

if N=...	5.1/5.2	R. 1/2	Rel. 3	Rel. 4	R. 5/6	Rel. 7	Rel. 8+	Rel."x"
N=R.5:	(OK)	N-3	N-2	N-1	N			
N=R.7:	(OK)	N-4**	N-3	N-2	N-1	N		
N=R.8:	(OK)			N-3	N-2	N-1	N	
N=R.'x':				N-4***	N-3	N-2	N-1	N

JES2 Migration Paths



Migrating from these releases of JES2...

	MVS/SP 5.1	MVS/SP 5.2	OS/390 Rel.1/2	OS/390 Rel.3	OS/390 Rel.4	OS/390 Rel.5/6	OS/390 Rel.7	OS/390 Rel.8/9	
To these levels of JES2.....	MVS/S P 5.2	Single Sys WS							
	OS/390 Rel.1/2	Single Sys WS	Single Sys WS						
	OS/390 Rel.3	Single Sys WS	Single Sys WS	Single Sys WS					
	OS/390 Rel.4	Single Sys WS	Single Sys WS	Single Sys WS	Single Sys WS				
	OS/390 Rel.5/6	Single Sys WS	Single Sys WS	Single Sys WS	Single Sys WS	Single Sys WS			
	OS/390 Rel.7	Single Sys WS	Single Sys WS	Single Sys WS	Single Sys WS	Single Sys WS	Single Sys WS		
	OS/390 Rel.8/9	Single Sys WS	Single Sys WS	SS WS **	SS WS **	Single Sys WS	Single Sys WS	Single Sys WS	
	OS/390 rel. "x"	COLD- START	COLD- START	COLD- START	COLD- START	Single Sys WS	Single Sys WS	Single Sys WS	Single Sys WS

**** Note:** OS/390 Releases 1 - 3 with the coexistence PTFs can migrate to OS/390 Rel. 8/9 with a single system warm start, but is not officially supported.



JES2 V2R4 Migration Highlights

JES2 V2R4 Installation

- ▶ OS/390 V2R4 BCP, Sysplex, HLASM 1.2
- ▶ Install PSP Maintenance - [RSU 9811](#) or later!
- ▶ Warm Start, Share Spool w/ JES2 V.5 & up

Storage & CPU Requirements

- ▶ Maximum Virtual Storage for Checkpoint
- ▶ Allow for Checkpoint Data Set Expansion (DASD, CF)
- ▶ More CPU cycles if from MVS/SP V.4 JES2

External changes - Job List & other Commands

Internal changes - Job Queue Services

\$ACTIVATE for new functions

- ▶ Must be \$ACTIVATED after OS/390 Release 9

System-Managed Structure Rebuild



- **Moving JES2 Checkpoint to another CF Structure with System Managed Rebuild**
 - ▶ Requires OS/390 JES2 V.2 Rel. 8 on all members
 - ▶ Requires CFCC level 8
 - ▶ Requires CFRM CDS to be upgraded to Rel. 8
 - ▶ Target CFs must be available in the CFRM Preference List
 - ▶ Structure must be on different Coupling Facility
 - ▶ Not used for recovery from failures (Reconfiguration Dialog used)

- **SETXCF START,RB,STRNAME=J2CKPT1,LOC=OTHER**
 - or
- **SETXCF START,RB,CFNAME=CF001**
 - ▶ Rebuild by Structure to manage the time Ckpt is unavailable.

Ckpt Structure Rebuild Experiences



- **SETXCF START,RB,STRNAME=J2CKPT1,LOC=OTHER**
 - ▶ IXC570I S-M REBUILD STARTED FOR STR. xxxxxxxx
 - ▶ IXC367I SETXCF START REBUILD REQUEST ACCEPTED
 - ▶ IXC571I S-M REBUILD FOR STR. xxxxxxxx COMPLETED STARTUP PHASE
 - ▶ IXC571I ... QUIESCE PHASE ...
 - ▶ IXC578I S-M REBUILD ALLOCATED STR. xxxxxxxx
 - ▶ IXC574I ALLOCATION INFORMATION ...
 - ▶ IXC571I ... ALLOCATION PHASE ...
 - ▶ IXC571I ... ATTACH PHASE ...
 - ▶ IXC572I ... xxxx SUBPHASE OF THE COPY PHASE..
 - ▶ IXC571I ... COPY PHASE ...
 - ▶ IXC579I NORMAL DEALLOCATION FOR xxxxxxxx ...
 - ▶ IXC577I S-M REBUILD COMPLETED ...
- **Elapsed time took 5-6 sec. for lightly loaded/small ckpt.**
 - ▶ Will be longer to release the Ckpt Lock & copy Larger Structures.
- **If longer than LOCKOUT, you may see ...**
 - ▶ \$HASP292 ... WAITING FOR RESPONSE FROM CF .. DURING REBUILD
 - ▶ \$HASP263 WAITING FOR ACCESS TO CKPT - STRUCTURE REBUILD IN PROCESS

\$D PERFDATA Enhancements



■ Summary Statistics for each PCE type (Rel.7)

▶ \$d perfddata (cpustat)

```
$HASP660 CPU PERFORMANCE STATISTICS -
$HASP660 INTERVAL=132:59:15.354714,CPU=18:22.275106,
$HASP660 PCENAME=NET.ST,CPU%=14.38,CPU=2:38.600190,TIME=2:53.806383,
$HASP660 QSUSE_TIME=1.674947,IOCOUNT=131892,CKPT_COUNT=16871,
```

■ Checkpoint info. for PCE types (OS/390 JES2 Rel.7 & 8)

▶ \$d perfddata (pce*), pcname=cnvt

```
$HASP660 PCE PERFORMANCE STATISTICS -
$HASP660 INTERVAL=335:49:11.242144,CPU=11:16.980764, <== Rel. 7
$HASP660 PCENAME=CNVT,TIME=0.137927,CPU=0.131061,CPU%=0.01,
$HASP660 QSUSE_TIME=0.088308,IOCOUNT=824,CKPT_COUNT=4711, <== Rel. 7
$HASP660 WAIT=IO,MOD=HASPNUC,SEQ=17000000
$HASP660 COUNT=412,AVGWAIT=0.004384,
$HASP660 POST=IO,COUNT=412,AVGWAIT=0.004384,
$HASP660 WAIT=CKPT,MOD=HASPNUC,SEQ=28410000,COUNT=28,
$HASP660 AVGWAIT=1.019279,CMOD=HASPJQS,CSEQ=46496600, <== Rel. 8
$HASP660 POST=RESOURCE,COUNT=28,AVGWAIT=1.019279,
```

■ Messages no longer terminated by CONDEF DISPMAX (R.7)

▶ No more ",L=Z" or \$HASP003 RC=57

JES2 Service Information

- Performance APARs
- HiPer APARs (Hi Impact, or Pervasive) listed below are out of date - see PSP buckets
- JES2 APARs of Interest since last year's SHARE

JES2 Performance APARs



Since PUT/RSU 9901:

- OW35585 - Purge processing hung or very slow (9903)
- OW37405 - WLM Initiator delay in starting work (9902 - WLM)
- OW37547 - \$OQ,ALL appears to hang JES2 (9906)
- OW37977 - \$DJ1-65534 locks up Comm PCE (9905)
- OW38493 - WLM initiators selection delays (9906) *
- OW38768 - High CPU Utilz. w/ \$DM or formatted Cmds (9906)
- OW39179 - RJE output selection w/large Queues (9908) *
- OW39201 - High CPU Utilz. w/ NJE Job Receiver (9907)
- OW39449 - \$DJQ,SPOOL displays excessive spool % (9906)
- OW39672 - \$QGET excessive overhead & slow (9908) *
- OW40371 - System delays with Purge Queue cmds (9906)
- OW41064 - High Checkpoint writes after jobs quiesced (0001)*
- OW42769 - Storage Leaks with SWB modify from SDSF *

1H99 HiPer APARs



Date-1999/	APAR #	Description	Applicable Releases
2/04	OW36311	\$Q20 in HASPJQS \$DOGJQE issued from \$FREJLOC	R4 - R7
2/12	OW36905	JES2 Private Storage fills up with JQAs after \$LJ command	R4 - R7
2/26	OW36026	HJE3307 Recovery Routines percolation errors	R7
3/22	OW37264	Loop in PRPU at PFCBSCAN hangs JES2	R3 - R7
3/31	OW34249	JES2 code in Consoles Addr. Space never Releases Storage (SP231)	ALL
4/08	OW38287	\$HASP050 Resource shortage of BUFEX	R7
4/09	OW37928	\$HASP268 Interrupted read after cancelling Ckpt Reconfig. Dialog	ALL
4/09	OW35953	Various errors including control block overlays	ALL
4/26	OW38396	\$HASP094 I/O error on SNA remote SNS 08210000 after OW36655	5.2 - R.1
4/26	OW38301	Looping in HASPTERM after multiple ABENDs in JES2 Addr. Space	R4 - R7
4/28	OW32964	\$Q01 Catastrophic Error after \$TJ to change Job Class	R4 - R7
5/13	OW38764	\$HASP119 Job Fails submitting Multiple Jobs to INTRDR	ALL
5/14	OW38926	NJE Path Manager loses connections	R7 - R8
5/20	OW37977	\$DJ1-65000 & \$HJ1-65000 hangs JES2	R4 - R8
5/27	OW38199	HASX05C \$OQ Cancels too many Output Groups	R4 - R8
6/15	OW38783	FSS ABEND 024 or FSS Simulator Loop	R7 - R8
6/30	OW37547	JES2 appears Hung when \$OQ,ALL issued	R4 - R8

Check [IBMLink](#), or [IBM Service](#) for the latest information

2H99 HiPer APARs



Date-1999/	APAR #	Description	Applicable Releases
7/30	OW39283	ABEND0F7 RCB0 from HASCSRJB during rebuild	ALL
8/02	OW39201	Loop in HASPRDR when NJE line restarted & JR active	ALL
8/26	OW40440	0C4 in \$DOGWSCQ (HASPXEQ) after OW38962 & \$SJ command	R4 - R8
8/26	OW39672	Performance degradation in \$DOGJQE (\$QGET)	R4 - R8
8/26	OW39179	RJE WS Performance with very large Queues in a single class	R4 - R8
9/10	OW39679	0C4 in HASPNST sending output to remote with 5-digit remote #	R4 - R8
9/10	OW39195	SAPI Bulk Modify, JOE's not selectable by eligible devices	R4 - R8
9/13	OW40910	\$Q07 JES2 CATASTROPHIC after OW31480	R4 - R8
10/07	OW40837	\$Z03 JES2 CATASTROPHIC during Spool Offload	R7
10/29	OW40224	\$BR3 ABEND after Successful Checkpoint Reconfiguration dialog	ALL
11/26	OW40758	ABENDs15F & 922 Initiator ABENDs after \$H & \$A & TYPRUN=HOLD	R4 - R8
11/26	OW40213	ABEND378 RC24 Processing \$PJES2 command	R3 - R8
11/26	OW38136	SYSZJES2 ENQ Awaiting SPOOL Space after ABEND 0E0 RC24	ALL
12/10	OW41734	ABEND \$J12 after OW35104 with \$#GET from BSC or SNA	R3 - R8
12/31	OW42078	0C4 in HASPJQS during warmstart after \$HASP483 JOBQ error	ALL

Check [IBMLink](#), or [IBM Service](#) for the latest information

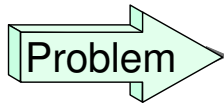
2000 HiPer APARs



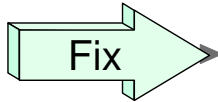
Date-2000/	APAR #	Description	Applicable Releases
1/03	OW40371	System delays with Purge commands	R4 - R8
1/05	OW41100	JES2 hangs in recovery waiting for I/O to quiesce after ABEND E00	ALL
1/14	OW42524	0C4 after CBIMPL12 remote msgs after OW41429	R4 - R8
1/28	OW42747	0C4 in HASPSXDV after \$TR2.RD1,S=xxx command	R4 - R8
1/28	OW42545	After OW35104,\$J12 if Printer fails SAF WRITER check	R3 - R8
1/28	OW41064	JES2 Member dominates Checkpt after Jobs Quiesced	R3 - R8
2/17	OW41729	Loop in HASCHAM near HCEP30 after OW34249	5.2 - R8

Check [IBMLink](#), or [IBM Service](#) for the latest information

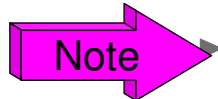
OW32920 - Un-\$ACTIVATE



\$ACTIVATE could not be reversed
– Cold start with a prior release required



'UNACTivate' allows return to pre-Rel.4 mode
– Cold-start
– All-member Warm-start
– All-member Hot-start
▶ **NEW MSGS:**
– \$HASP445 Unactivate Failed ...
– \$HASP895 \$ACTIVATE will FAIL/SUCCEED...
▶ **OS/390 R4/5 - PUT/RSU 9807**



Must be \$ACTIVATED after OS/390 R. 9 (9/00)
♦ See JES2 Short Subjects #2660 - Wed. 11:00

OW38962 - WLM Job Control Enhancements



Problem

Scheduling Environments & WLM Managed Initiators missing function:

- Can't change SchEnv after job submission
- No Default SchEnv by JOBCLASS
- Cannot run 'special jobs' when \$PXEQ

Fix

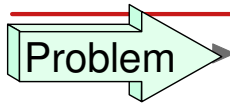
More control over SCHENV & \$SJ:

- \$TJob,SCHENV=nnnn (SCHENV =, to nullify)
- JOBCLASS(x) SCHENV=nnnn
- \$SJob eligible on local system even if \$PXEQ

✓ JES2 R4-R8 - PUT 9907

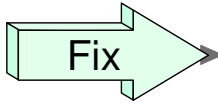
- + Apply fix OW40440 for 0C4 in \$DOGWSC
- + APAR OW41547 - HASPHOPE not assembled

OW39179 - RJE Work Selection



Delays & Overhead with RJE Printing

- Large output queues
- Many (Remote) Printers
- Unnecessary Calls to services when output doesn't match



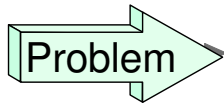
GTSCREEN - WSSETUP updated

- Skip inelligable JOEs (routejde)
- Skip \$#POST if no eligible devices
- More efficient linkage
- New \$TRACE(30) added to trace \$#POST performance

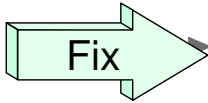
✓ JES2 R4-R8 - PUT 9908 (HiPer)

OW39672 - \$QGET Performance

JES2

**Problem****Delays & High overhead with \$QGET**

- Many Inits (7300) & Large Job Queues
- Unnecessary \$DOGJQE calls for busy JQEs

**Fix****\$DOGJQE call deferred**

- until "real" JQE attributes examined
- New \$TRACE(31) added to trace \$QGET performance

✓ **JES2 R4-R8 - PUT 9908 (HiPer)**

OW41855 - \$D MODULE Enhancements



Problem

\$D MODULE & \$D FSS missing information

- Level of JES2 (FMID, Version)
- Routines & Tables within Modules
- Address for setting SLIPs

Fix

\$D MODULE, LONG shows additional info:

- FMID, VERSION, UVERSION, LASTPTF
- ROUTINES, TABLES (& Addresses)

```
$dmodule (hascsisc) , long
$HASP468 MODULE (HASCISIC)
ADDRESS=05DAC000, ASSEMBLY=(11/17/99,16.04), ENVIRON=USER, EXITPTS=(),
FMID=HJE6607, IBMJES2=BASE, LASTAPAR=OW35104, LASTPTF=UW63920,
LENGTH=004130, LOADMOD=HASCISIC, MACLEVEL=6,
ROUTINES=(SSICSCAN=05DAC050, SSICSTAT=05DAC2E0, SSISTAT=05DAC760, ..
SPLEVEL=CHECK, TABLES=(), VERSION=OS 2.7.0, UVERSION=
```

- Filter on Routines: **\$d module,routines=\$post**

► **\$D FSS, LONG & \$D PRT** show additional info:

- FSSMADDR, FSSMLENG, FSSMAPAR, FSSMPTF

What is your JES2 Release?



JES2 Rel.#	Count	End of Service	Y2K Ready	Share w/R.8+
MVS/SP 4.2		6/99	No	No
MVS/SP 4.3		6/99	No	No
MVS/SP 5.1		1/2001	Yes	No
MVS/SP 5.2		1/2001	Yes	No
OS/390 R.1		1/2001	Yes	No
OS/390 R.3		1/2001	Yes	No
OS/390 R.4		1/2001	Yes	Yes
OS/390 R.5		1/2001	Yes	Yes
OS/390 R.7		3/2002	Yes	Yes
OS/390 R.8		9/2003	Yes	Yes

Appendix

JES2 Documentation

- ▶ [OS/390 JES2 Library](#)
- ▶ [Softcopy Books \(BookManager\)](#)
- ▶ [OS/390 Web Sites](#)
- ▶ [JES-related Books](#)

OS/390 V2R5 JES2 LIBRARY



GC28-1794	JES2 Introduction *
GC28-1797	JES2 Migration Notebook
SC28-1791	JES2 Initialization & Tuning Guide
SC28-1792	JES2 Initialization & Tuning Reference
GC28-1796	JES2 Messages
GC28-1790	JES2 Commands
GX22-0041	JES2 Commands Summary
SC28-1793	JES2 Installation Exits
SC28-1795	JES2 Macros
LY28-1086	JES2 Diagnosis
LY28-1096	JES2 Data Areas, V.1 \$A - \$E *
LY28-1097	JES2 Data Areas, V.2 \$F - \$O *
LY28-1098	JES2 Data Areas, V.3 \$P - \$X *

- ★ SoftCopy only (CD-ROM)
- ▶ All JES2 books are unlicensed
- ▶ JES2 Command Syntax in RR-track format

OS/390 Softcopy Books



- <http://www.s390.ibm.com/products/softcopy>
 - **OS/390 Online Collection**
 - ◆ CD-ROMs: SK2T-6700 (Unlicensed only)
 - ◆ Available on Tape (Optional, No-Charge)
 - **Licensed OS/390 Books**
 - ◆ OS/390 V.1 CD-ROM: LK2T-6702
 - ◆ OS/390 V.2 CD-ROM: LK2T-2499
 - **S/390 Rainbow Books Collection**
 - ◆ CD-ROM: SK2T-2177
 - ◆ 300+ Systems Center Technical Bulletins in BookManager and PDF formats
 - ◆ RedBooks (ITSC), Orange (WSC), Yellow (NS)
- ▶ All Updated Quarterly

Other JES2-Related Documents



- ▶ NJE Formats & Protocols, SC23-0070-3 *
- ▶ VSE to OS/390 Migration Notebook, SG24-2043 *
- ▶ DFW & Dual Copy - JES2 Spool & Checkpoint, GG66-3230
- ▶ NJE with JES2 and Other Systems, GG22-9339-1
- ▶ SDSF/RACF 1.9.2 Conversion, GG24-4085 (softcopy only)
- ▶ MVS/ESA JES2 Exit Coding, GG24-4127 (softcopy only)

- **Deleted (obsolete) - save your old copies ***
 - ▶ ~~OS/390 R.4 Implementation, SG24-2089~~
 - ▶ ~~OS/390 R.5 Implementation, SG24-5151~~
 - ▶ ~~JES2 MAS in Sysplex Environment, GG66-3263~~
 - ▶ ~~MVS Parallel Sysplex Config. Cookbk, SG24-4706~~
 - ▶ ~~MVS/ESA JES2 V.5 Implementation, GG24-4583~~

OS/390 Web Sites



OS/390 Coexistence, Migration, & Year 2000 info

- ▶ <http://www.s390.ibm.com/stories/year2000/coexist.html>

OS/390 Planning for Installation

- ▶ <http://www.s390.ibm.com/os390/installation>

OS/390 Publications (view, print, order books)

- ▶ <http://www.s390.ibm.com/os390/bkserv>

SDSF home page

- ▶ <http://www.s390.ibm.com/products/sdsf>

Advanced Tech. Support (Washington System Center)

- ▶ <http://www.ibm.com/support/techdocs> (Flashes, etc.)

Redbooks

- ▶ <http://www.redbooks.ibm.com>