JES2 Product Update and Latest Status
Updated February 6th 2013

Tom Wasik
IBM Rochester, MN

Tuesday 4:30PM
Session Number 13029
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Notes:
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.
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Agenda . . .

- JES2
  - Current JES2 Releases
  - Migration & Implementation Tips
  - Recent Service

- References
  - Documentation & Web Sites

- Other Presentation
  - 13026: JES2 Performance Considerations
    - Tuesday 1:30 PM (See charts online)
  - 13028: What are All These JES2 NJE Options? (The A-Zs of NJE)
    - Wednesday 11:00AM-12:15PM (Long session)
### Current JES2 Releases

**FMIDs, Birthdays & Obituaries**

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See [http://www-03.ibm.com/systems/z/os/zos/support/zos_eos_dates.html](http://www-03.ibm.com/systems/z/os/zos/support/zos_eos_dates.html)

* = projected...
## JES2/MVS Compatibility

### JES2 Release:

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IBM recommends the same level of z/OS & JES2 throughout your plex.

- JES levels must match z/OS level starting in z/OS 2.1,
- See "z/OS V1R13.0 Planning for Installation" Ch. 4 (GA22-7504)
  at [http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/e0z2b1c0/4.5.1](http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/e0z2b1c0/4.5.1)
JES2/MVS Compatibility

Statement of Direction

- z/OS 1.13 will be the last z/OS release that supports running a down level JES.
- As of z/OS 2.1, IBM only supports running the 2.1 JES on the 2.1 MVS
  - z/OS 1.13 and earlier will not be supported running on a z/OS 2.1 z/OS

- This does NOT affect what members can co-exist in a MAS
  - Just the mixing and matching of JES and MVS levels.

- New messages during initialization:
  WTO - JES2 level (HJExxxx) is not supported running on mvs_level
  WTOR - Reply "CONTINUE" to initialize JES2 in this unsupported environment, "TERM" to shut down JES2
z2 Checkpoint Mode

Statement of Direction

- z/OS 2.1 is planned to be the last release to support z2 checkpoint mode
  - $ACTIVATE LEVEL=Z2
- z11 checkpoint mode was introduced in z/OS 1.11
  - $ACTIVATE LEVEL=Z11
- Migrate to z11 mode if you have not already done so
  - See z/OS 1.11 presentation for information on impacts of z11 mode
## Survey Questions

**What is your JES2 Release level (are you $ACTIVATEd) ?**

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z/OS 2.1 Overview

- **Batch Modernization**
  - New JCL keywords
  - Limit jobs by MVS level
  - 8 Character job class
  - SAF checks for JOBCLASS access
  - Calling interpreter after converter
  - System symbols in batch jobs
  - Exporting symbols to runtime
  - New symbols services
  - Symbolic substitution in instream data sets
  - Symbols on INTRDR
  - Job Correlator support
  - Job Completion ENF 78

- **Other enhancements**
  - Job Modify SSI
  - Performance Updates
  - Miscellaneous changes
New JOB JCL keywords

**SYSTEMS=** – List of MVS system names where job can run
- Similar to SYSAFF but a list of MVS system names
  - Does not support independent more (IND)
- If poly-JES, then SYSTEMS refers to primary not secondary
- Binding to member number done at INPUT time
  - If JES2 member moves to new MVS SYSTEM, affinity follows JES2 member
- JES2 must have run on system to be valid
  - COLD starts will reset MVS system names

**SYSAFF=** – List of JES2 members where job can run
- Same as JECL JOBPARM SYSAFF=
  - Includes support for independent mode (IND)
- Preferred to using JECL
- SYSAFF and SYSTEMS are mutually exclusive
- SYSADD and SYSTEMS overrides JOBPARM SYSAFF=
New OUTPUT JCL Keywords

- **MERGE=YES** – Merge operands on all SYSOUT
  - Single default for JCL keywords
  - Provides base default for the job
  - Does not create new instance of a data set
  - Applies even if other OUTPUT card referenced
  - Replaces functions provided by various JECL statements

- **DDNAME=** – Forward pointing OUTPUT specification
  - Similar to DDNAME on JES3 //*FORMAT card
    - DDNAME= `ddname` or `step.ddname` or `proc.step.ddname`
  - Allows easy specification of OUTPUT cards to DD statement
  - One instance per matching OUTPUT card
    - If DDNAME matches, then DEFAULT=YES does not apply
    - Can be used with DD OUTPUT= specified OUTPUT cards (creates more instances)
    - If DDNAME= and DD OUTPUT= matches same OUTPUT card, creates 1 instance
New JCLLIB JCL Keyword

- **PROCLIB=** – Specifies the DDNAME of the PROCLIB concatenation to use
  - Same as JECL JOBPARM PROCLIB= statement
  - Preferred to using JECL
- **JCLLIB PROCLIB=** overrides JOBPARM PROCLIB=

- Static PROCLIBs displayed with $D PROCLIB
  - Can be “altered” by command (creates new concatenation)
Limiting Job Execution/Conversion by z/OS level

- New JCL only understood on new z/OS
- When detected, INPUT or CNVT set minimum z/OS
- Part of compatibility APAR for z/OS 2.1
- Required level displayed in $DJ command
- New reason added to $DJ DELAY=
- Added to extended status (z/OS 2.1 only)
  - New delay reason
  - Actual ECVT level needed (job terse call)
  - Calculation if job can execute updated (all releases)
Eight Character Job Class

- JES2 supports up to 8 character job class names
  - Similar to existing support in JES3
- JCL JOB card CLASS= will be expanded to support up to 8 characters
- Classes will be managed by $ADD/$DEL JOBCLASS command
- Existing commands updated to support 8 character job classes
- Any job classes can be set inactive (ACTIVE=NO)
  - Stops NEW jobs from specifying the job class
    - Does not affect existing jobs or job selection
  - Causes same error as undefined class
  - Applies to single and multi character classes
Job Class Groups

- Each job class can be in one group
- Group name and job classes must be unique
  - Cannot have a job class group with the same name as a job class
- Facilitates selecting on job classes
  - Inits and Offload Job Transmitters can specify either
    - 1-36 single character job classes
    - 1-8 multi (or single) character job classes or job class groups
- Selection from groups is done round robin
  - When a job is selected, the classes are rotated so the next select will start with the next job class in a group
- CLASS= parameter updated (command & init statement)
  - CLASS=ABCD – implies single character job classes A, B, C, D
  - CLASS=(ABCD) – implies 4 character job class or job class group ABCD
SAF Check to Use JOBCLASS

- New SAF check to control use of a JOBCLASS
- Will use a new entity in JESJOBS class
  - JOBCLASS.nodename.classname.jobname
  - Userid checked for access based on FACILITY class profiles
  - READ access to entity is required
- Will be activated by profiles in FACILITY class
  - Existence of FACILITY class profile activates check
    JES.JOBCLASS.OWNER
    - Checks if execution userid (owner) has access to entity
    JES.JOBCLASS.SUBMITTER
    - Checks if submitting userid has access to entity
    - Can perform both or neither check
- Additional check made when $T alters class
  - Verify either operator (submitter) or owner ID has access to entity
Interpreter After Converter

- Allows processing of OUTPUT JESDS= if job not executed
- More complete checking with TYPRUN=SCAN
- New option to call interpreter after conversion
  - JOBDEF INTERPRET=JES|INIT
  - Must be z11 mode and all members z/OS 2.1 before option takes effect
    - If down level joins MAS, revert to prior release processing

Converter/interpreter run in a separate address space

- No change if not calling interpreter
- CISUB_PER_AS= controls number of task per C/I address space
- EXIT 6 run in JES2 address space. No access to HCT.

- Migration impact to Exits 6 and 7
  - Exit 6 is now always user environment (R11 is HCCT)
  - Exit 8 not 7 always called to read/write IOTs for conversion
Converter Issues Input Error/Warning Messages

- Input phase detected errors currently written to JCLIN
  - Causes confusion for input detected errors
  - JCLIN data set becomes only print data set
- Input errors will now be passed to Converter
  - JECL assigned statement numbers
  - Added to standard message data set with other errors
  - Job will not be failed at input time but queued to converter
    - Will be forced to convert on the input member
  - Interpreter called to ensure OUTPUT JESDS= will be processed
- Consistent processing of JCL errors
  - JES2, Converter, and Interpreter error processed the same
System Symbol Substitution in BATCH Jobs

- Any system symbol (IEASYMxx) can be referred to in JCL
  - JOBLCASS SYSSYM=ALLOW|DISALLOW option
- Substitution occurs at conversion time

- Control conversion using scheduling environment
  - JOBDEF CNVT_SCHENV=IGNORE|HONOR
- Provides consistent conversion and execution symbols
- Can also use traditional affinity
  - JOB JCL and JOBPARM JECL
Exporting Symbols to Run Time Environment

- Makes JCL symbols available to running job
- `EXPORT SYMLIST=(xxx,yyy….)` JCL identifies symbols
- Subsequent SET statements are exported to run time
  - Only need to identify a symbol to export once
- Only one value of symbol per step
  - Last SET statement value is exported
New Symbol Services

- **JCL symbol service IEFSJSYM**
  - All exported symbols with value for step can be accessed
  - Access is READ ONLY, cannot be updated or deleted

- **JES symbol service IAZSYMBL**
  - Provides dynamic symbols at the step or TCB level
  - Symbols can be created/deleted/updated by runtime
    - Application variable symbols
    - Special system use symbols for passing data
  - Can access JCL symbols using this service
  - Symbol names can be 16 characters
  - Symbol values can be up to 4K
Symbolic Substitution in Instream Data Sets

- **SYMBOLS=** keyword on DD DATA or DD * JCL
  
  SYMBOLS=[ ( ] JCLONLY | EXEC SYS | CNV T SYS [ , DDname])

- **JCLONLY**  – Substitute **EXPORT**ed JCL symbols and current JES symbols
- **EXEC SYS**  – JCL plus system symbols from execution system
- **CNV T SYS**  – JCL plus system symbols from conversion system
  Consistent with system symbol substitution

- **DDname**  – DD name for LOG data set
- **Not specified**  – No substitution (default and current processing)

- **Valid for JES and Converter created instream data sets**
- **Substitution as records are read by application**
- **Blank elimination to try to make things fit**
  - Overflow if possible, I/O error if not
- **Log will track what was passed to application**
  - Original and substituted text available
  - DD name for LOG data set passed in
Passing Symbols on INTRDR

- JES or JCL symbols can be passed on INTRDR
- Become initial SET symbols for jobs submitted
  - Automatically exported
- **SYMLIST**= keyword identifies symbols to pass
  - Only symbols that obey JCL rules can be passed
  - Generics can be used to identify symbols (eg * or DSN*)
- Values extracted when JOB card is processed
- Values can be updated between jobs
New Job Correlator Function

- 64 byte unique identifier to track and manage jobs
  - 32 characters of system information
  - 32 characters of application data
  - "." delimiter between 2 sections
    - Last character in system section
- Specify application section using reserved JES symbol
  - SYS_CORR_USRDATA – 32 characters
  - Set before submitting job card
- Last submitted jobs correlator set in task level JES symbol
  - SYS_CORR_LASTJOB – 64 characters
- Correlator of current job set in step level JES symbol
  - SYS_CORR_CURRJOB – 64 characters
- JOBID of last job submitted at task level JES symbol
  - SYS_LASTJOBID – 8 characters
Using the Job Correlator

- Correlator can be used (with wildcards) for selection on:
  - Extended status SSI
  - SAPI SSI
  - JES2 job list command
- Returned on request job ID SSI
- Passed on ENF 58 (SYSOUT) and 70 (JOB)
- Address space correlator available using IAZXJSAB
  - From any address space
- Added to JMR
- Added to SMF records
New ENF 78 for Job Completion

- Multi system ENF issued when job is past execution
- Only issued if there is a notify value set for job
  - Set before job card is submitted
  - JES symbol SYS_JOB_NOTIFY - up to 4K bytes
- ENF data is similar to ENF 70
  - Job information, correlator
  - Job completion information
  - SYS_JOB_NOTIFY value
Job Modify SSI service

- New SSI to modify jobs
  - Unauthorized SSI to modify jobs and their characteristics
  - Input/Filters similar to Extended Status SSI
  - JESJOBS SAF checks to authorize user can affect changes
  - Requests can be synchronous or asynchronous

- Functions supported
  - Modify job characteristics ($T) – Hold a job ($H)
  - Release a job ($A)
  - Purge a job ($P)
  - Cancel a job ($C) – with options to purge and/or dump
  - Restart a job ($E) – with the cancel or step and hold options
  - SPIN a job ($T,SPIN) – with the optional DDNAME option
  - Change execution node ($R XEQ) – only if pre-execution
  - Start a job ($S)
Job Modify SSI Services SAF entities

- SAF entities checked for other requests
  - Requesting address space userid checked against entity names

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SAPI Performance Updates

• New search tree structures to improve SAPI processing
  • Improves search for output (JOEs) for SAPI selection
  • Improves SAPI search when new output is created
• Controlled by parameters on OUTDEF
  • SAPI_OPT=YES|NO controls selection optimization
  • WS_OPT=YES|NO controls SAPI selection performance
• Benefit requires selection on at least
  • QUEUE, ROUTECDE, OUTDISP
  • QUEUE, OUTDISP
  • ROUTECDE, OUTDISP
  • OUTDISP
Miscellaneous Changes

- Internal readers can be allocated from any address space
  - No need to get a JES environment to submit a job
- $D INITINFO - display initialization information command
  - Start command, Init decks used, STEPLIB concatenation
- JOBCLASS DSENQSHR=ALLOW|DISALLOW|AUTO
  - Supports ENQ downgrade changes
- Extended status output can be in 64 bit storage
- Extended status data set list can suppress duplicates
- SAPI returns data set number of passed data set
z/OS 2.1 Migration/Coexistence

- APAR OA36155 is needed for coexistence with 2.1
  - From JES2 z/OS 1.10 or z/OS 1.11 (with extended support)
  - From JES2 z/OS 1.12 or z/OS 1.13
- APAR also highly recommended for fall back as well
  - Jobs created on 2.1 may not be processed properly on earlier releases without OA36155

- Exit 6 (Converter internal text) must be updated
  - Now user environment (R11 is HCCT)
  - Must be in common storage
  - If running in JES2Clxx address space, then no HCT access
- Converter IOT read moved from exit 7 to exit 8
  - From JES2 to user environment
SHARE Requirements Satisfied by 2.1

SSSHARE018281 - OUTPUT JCL Not Honored
SSSHARE016034 - Converter Support for JECL cards and $HASP Messages
SSJES294003 - Provide for more than 36 JES2 job classes.
GGMVJS94002 - JES OUTPUT JESDS Processing When Job Fails Before Execution
SSJES299001 - JES2 command to display parmlib members used
SSJES297205 - JES2 does not provide job class protection
>10M Data Sets SPE

- JES2 currently supports up to 9,999,999 JES data sets per job
  - Data set name format limits number of characters
    userid.jobname.jobid.Dnnnnnnn.dsnname
  - Limit can be reached with long running job creating SPIN DSs
  - Dynamic allocation fails when limit is reached

- Solution is to allow nnnnnnnn to include characters
  - Does NOT impact values 1-9999999
  - New limit is 4,294,967,295
  - 10000000 and above will be alpha numeric (0-9 and A-Z)
  - 1-9999999 and BDPLQBB-999999E sort within each range
    - Cannot sort numeric and character

- New keyword to enable
  - OUTDEF DSLIMIT=10M|4B
- Shipped in OA38944
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<td>12/11/13</td>
<td>OA40790</td>
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The Perfect Storm

- **JES2 RED ALERT** – Draining and halting SPOOL volumes
- **OA36256** – Fixed a problem with JESXCF messaging
  - Messages went to wrong member name due to down level QSE
  - Changed tests so a $QSUSE was done to wait for latest QSEs
  - Delayed XCF member status information
  - Initializing member appears MVS-GONE for one JES2 dispatcher cycle
  - Exposes bug in HASPSPOL that messes up DASALOCS flags
    - Only for starting, draining and halting volumes
    - Members allocated to a CKPT volume
  - Causes HASPSPOL to make incorrect decisions
    - Thinks volume can be halted/drained prematurely
  - Real problems if/when a halting/draining volume is started ($S)
    - DYNALLLOC fails if a members DASALOCS bit is wrong
The Perfect Storm

- OA38016 – Fixes obscure problem when $S command fails
  - Only happens if $S command and some members need to allocate
  - “Should” never happen for draining volume
  - Rare for halting volume
  - If allocate fails, volume is REMOVED from the configuration
    - All data on the volume is lost
  - Problem was fixed in z/OS 1.13, APAR was rolling down fix

- Second problem with DEB for SPOOL volumes
  - If volume incorrectly drained or halted (due to OA36256 and $S problem) the DEB is not cleared
  - New volume starting on member will use OLD DEB and OLD VOLUME
    - Only on members affected by OA36256
  - Member using different physical volumes for same SPOOL
  - Also addressed by OA38016
The Perfect Storm

- OA39737 – Corrects XCF status problems
  - Removes $QSUSE for status updated
  - Member status is now blend of XCF status and $QSE status
  - Corrects problems causing DASALOCS to be bad
  - Adds DEBUG option to track member status changes via WTO

- What to do?
  - Back off OA36256 if possible
  - Apply OA38016 as soon as possible (fixes data loss problem)
  - Avoid Halting ($Z) or draining ($P) SPOOL volumes
    - If you want to drain, set SYSAFF=(-ANY) and wait for jobs to purge
    - Do $P when all jobs are off volume
  - If a $S fails with
    IKJ56246I DATA SET SYS1.HASPACE NOT ALLOCATED, FILE IN USE
    then hot start the member to correct the DASALOCS bits
  - Warning, JES2 can halt volumes at any time due to loss of connectivity
OA39337 – JES2 start fails with $HASP401

- In z/OS 1.13, the IHADVA size unintentionally increased from x’18’ to x’20’ bytes
- OA37764 restored the original x’18’ size of the IHADVA
- JES2 is sensitive to the size of the IHADVA
  - Used in data areas shared across modules
- JES2 PTF all used larger size
- Local re-assemblies could use smaller size if OA37764 applied
  - Caused inconsistent mappings resulting in errors and failed starts
- Overabundance of caution resulted in all PTFs shipping parts using IHADVA to be PEd.
  - Fix reworks code to not have dependency across modules
- Not a problem if you do not assemble JES2 locally or if you always assemble everything when anything changes
Performance APARs

- OA38935 – Reduce number of ENF70s and ENF58s
  - Also corrected problems with payload in ENFs
  - Added $TRACE points to trace ENFs sent and received
    - Useful if developing applications to use ENFs
- OA36382 – Eliminate extraneous job lock to improve SAPI performance
  - Major improvements if you have many SPIN data sets and multiple SAPI threads
  - PE – Output not selected after SAPI splits JOE – OA40499

- OA36328 – $TO commands to change DEST= can take a long time due to unnecessary subtask processing
Job and SYSOUT ENFs

- JES issues ENFs to notify JOB or SYSOUT events
  - Used by applications to track job or SYSOUT progress
    - ENF 58 – SYSOUT processing tracking
    - ENF 70 – JOB processing tracking

- Events creating ENFs include
  - Object create and delete
  - Selection and deselection
  - Phase or queue changes for jobs
  - Print progress via checkpoints for SYSOUT (upon request)

- Number of ENFs has increased in recent releases
  - Job level ENFs
  - High level ENFs for SYSOUT
  - SAPI application can request details for SYSOUT
Job and SYSOUT ENFs

- Intent of ENFs is to reduce “polling” for status
  - Push or event driven vs regular queries
  - Goal is to reduce overall system CPU needs
- Vendors are aware of capability
  - Not sure which have implemented listening to the ENFs
- ENFs are sent to all members of SYSPLEX (multi-system)
  - Cannot always predict where JOB/SYSOUT will be processed
  - Allows single application instance to monitor entire SYSPLEX
- Multiple JESPLEXes in SYSPLEX can increase total ENFs
  - Especially when jobs/SYSOUT sent to other JESPLEX for processing
    - ENFs for original instance and again for destination node
- May notice increased XCF traffic for ENF processing
  - Group associated with messaging is SYSENF
OA40901 – LINEx.ST improper JQE update

**Problem**
- NJE SYSOUT transmitter encounter error
  - Decides to hold job
  - Job is active on another process (OUTPUT)
  - NJE update does not have proper serialization
    - $Q14 ABEND results
  - Rare timing window

**Fix**
- JES2 z/OS 1.12 and 1.13
Problem
- Unknown overlay of JES2 HASB data area (CSA)
- Recovery of HASB results in $SJB removal
- But running address space still using $SJB
  - Double usage of $SJB is possible
- Various chaining problems can result
  - Loop in $SJB chain can require IPL to fix
- APAR correct recovery code and prevents loop
  - Does not address overlay

Fix
JES2 z/OS 1.12 and 1.13
OA40755 – CKPT reconfiguration hangs

Problem
- CKPT on CF is being reconfigured
  - During reconfiguration process, CF rebuild is done
    - Any system managed process could trigger this
  - Reconfiguration ends up waiting forever for subtask

Avoid!
- System managed process during CKPT reconfiguration

Fix
- JES2 z/OS 1.12 and 1.13 (Open)
Problem

• Checkpoint on DASD
  • I/O error reconfiguration occurs due to lost paths
    • Device old CKPT is on cannot be accessed
  • CLOSE processing for old data set fails
    • ABEND314 RSN4
  • JES2 terminates

Fix

JES2 z/OS 1.12 and 1.13 (open)
OA39972 – ABEND submitting job to RJE RDR

Problem
- Invalid job submitted via RJE (or card) RDR
  - Message $HASP125 SKIPPING FOR JOB CARD
  - Other invalid jobs will get an ABEND 0C4
  - 0C4 continue until valid job is submitted

Fix
JES2 z/OS 1.13
OA39891 – Segmented or spun output errors

Problem
• Job creates SYSOUT with SEGMENT= value or
  • SPIN data is spun (due to SPIN any support) and
  • Data set is referenced by OUTPUT cards then
    • If first segment prints and purges, then subsequent segment cannot be printed ($CBIO error)

Fix
• JES2 z/OS 1.13
Excessive multi system ENFs some with no useful data

- PSO issued ENF 58 when not requested
- JQS issued ENF 70 in cases where not needed
- Missing data in various ENF 58 and 70
- See APAR for list of issues fixed

- Added ENF 58 (43 & 44) and 70 (45 & 46) JES2 $TRACE ids
  - Send and receive ENFs respectively

Fix

JES2 z/OS 1.11, 1.12, 1.13
OA37835 – Track Group Recovery Improvements

Problem

- Unusual problem in disaster recovery
  - Seems to be related to PPRC and Flash Copy of SPOOL
  - Signature records (SPOOL ownership records) corrupted
  - Causes double allocation of SPOOL at target (recovery) site
- APAR makes SPOOL garbage collector more conservative
  - Examines data and signature record before reclaiming space
  - Could delay SPOOL recovery
- Original problem has been diagnosed and fix is in process
  - Fix number 264749, microcode release 6 and 7

Avoid!

- Flash Copy and PPRC of SPOOL

Fix

- JES2 z/OS 1.11, 1.12, 1.13
DOC APAR OA38750

- $HASP492 message indicates start process status
  
  $HASP492 JES2 MEMBER-N1M1 QUICK START HAS COMPLETED

- APAR OA24118 dealt with ABENDs during $E MEMBER
  
  - ABENDs caused the $E MEMBER processing to fail
  - New variant of $HASP492 was issued in this case
  
  $HASP492 JES2 MEMBER-N1M1 RESTART HAS FAILED

  - Variant is ONLY for RESTART ($E MEMBER) processing
    
    - Other starts just fail to complete and JES2 terminates

- Message update appeared in recent manuals
  
  - Not clear when HAS FAILED came out
  - Was a concern for automation

- DOC APAR clarified the message and variants

  - Ironically, automation was part of the reason for using the same message ID
    
    - It indicated that the process completed
OA39223 – JQE Overlay Prevents $ZAPJOB

Problem
- Unknown problem (exit?) overlays JQE node number
  - Input (JQEINPND) or Execution (JQEXEQND) node
  - Various ABENDs trying to access job
  - Attempt to $ZAPJOB fails with similar ABEND
  - $ZAPJOB should not fail
  - Code added to validate binary NJE node before using

Fix
- JES2 z/OS 1.11, 1.12, 1.13
Problem • The JES2 CKPT process (PCE) can hang
  • CKPT must be on CF
  • A system managed process has just completed
    • Such as a rebuild
  • The post of the CKPT on CF subtask is lost
  • CKPT PCE waiting for subtask, subtask waiting for PCE
  • Very small timing window
  • No CKPT work will happen (Start, logon, etc)
    • Hot start clears problem

Avoid! • System managed rebuild of CKPT CF structure

Fix • JES2 z/OS 1.11, 1.12, 1.13 - OPEN
OA38043 – Allow Null JOBCLASS QAFF=

Problem

- Can remove members from QAFF but list cannot be null
  - Wanted to shut down last member in QAFF but had to hold the jobclass instead of removing member
  - No good reason to disallow null list
  - Code that ensures list not null removed

Fix

- JES2 z/OS 1.11, 1.12, 1.13
OA38683 – $JOA Cleanup Problem

Problem

- PCE ABENDs owning BERT lock for a $JOA
  - Code in MISC PCE attempts clean up BERT lock
    - Uses wrong offset (offset from JQE) for BERT token
  - Result is various errors including $BR3
    - Errors could result in corruption of some existing BERTs
  - Problem in z11 mode only

- If you encountered the problem, expect to see errors on warm start (even with APAR on)
  - $DISterr at Label BERTERR
  - $HASP483 JES2 JOB QUEUE ERROR, RC=51

Fix

JES2 z/OS 1.11, 1.12, 1.13
Problem
• Loop in JES2 converter processing
  • Caused when job is $CJed while in converter
    • $CJ has to occur at an inopportune moment
      • Middle of JES2 chaining an SDB for a data set
  • Loops occurs due to additional validation during free

Avoid!
• $CJ of jobs in conversion (unless truly hung)

Fix
• JES2 z/OS 1.13
Problem
- Loop can occur if browsing SYSLOG as it is SPUN
  - Easy to re-create if writelog done from SDSF browse panel
  - TSO user in a never ending loop with an I/O in it

Avoid!
- WRITELOG from SDSF SPOOL Browse panel

Fix
- JES2 z/OS 1.11, 1.12, 1.13
Don’t Run Out of BERTs

• Don’t run out of BERTs
System z Social Media

- System z official Twitter handle:
  - @ibm_system_z

- Top Facebook pages related to System z:
  - Systemz Mainframe
  - IBM System z on Campus
  - IBM Mainframe Professionals
  - Millennial Mainframer

- Top LinkedIn Groups related to System z:
  - Mainframe Experts Network
  - Mainframe
  - IBM Mainframe
  - System z Advocates
  - Cloud Mainframe Computing

- Leading Blogs related to System z:
  - Evangelizing Mainframe (Destination z blog)
  - Mainframe Performance Topics
  - Common Sense
  - Enterprise Class Innovation: System z perspectives
  - Mainframe
  - MainframeZone
  - Smarter Computing Blog
  - Millennial Mainframer

- YouTube
  - IBM System z
Questions?

Session 13029

Questions?
z/OS 1.13 Overview

- Batch Modernization
  - Instream data in PROCs (cataloged and instream)
  - Controlling job return code
  - Spin and SPIN data set
  - Requeue job by command on a step boundary

- SPOOL Enhancements
  - Extend SPOOL data set
  - Greater flexibility on names and volumes
  - SPOOL Migration

- Enhanced SSIs
  - Completion of device SSI
z/OS 1.13 Instream Data in PROCs

- Instream data in PROCs and INCLUDEs
  - Simplifies writing JCL PROCs
    - No need for separate control data set
  - Support DD * and DD DATA in full in PROCs and INCLUDEs
    - Works with instream PROCs
    - No automatic generation of SYSIN DD * like JCL
  - Works for all users of PROC (batch and started tasks)
    - Job must run under JES2 (no MSTR subsystem)
  - Must convert on a z/OS 1.13 member
    - Can run on any level member
z/OS 1.13 Instream Data in PROCs

- Instream data in PROC example

```assembly
//HELLO   PROC
//STEP1   EXEC ASMHCLG         //C.SYSIN DD *
TEST     CSECT ,
STM   14,12,12(13)
BALR  12,0
USING *,12
ST   13,SAVAREA+4
LA   13,SAVAREA
SPACE 1
WTO  'Hello world!'
SPACE 1
L    13,SAVAREA+4
LM   14,12,12(13)
SR   15,15
BR   14
SPACE 1
SAVAREA DC 18F'0'
END
//L.TEST  DD DUMMY
//L.SYSXX DD *
//            PEND
```
z/OS 1.13 Job Return Code

- New job card operand to control job RC
  - JOBRC= MAXRC | LASTRC | (STEP, name.name)
    - MAXRC is existing processing (default)
    - LASTRC is return code of last step
    - (STEP, name.name) is return code of identified step
      - If step not executed, defaults to MAXRC

- Affects return code seen in
  - Extended status (eg SDSF)
  - ENF 70
  - HASP165 message
  - $DJ,CC= command

- JOBCLASS JOBRC= MAXRC|LASTRC to affect processing for all jobs in the job class

- Two additional error case return codes defined
  - CONVERTER ERROR – Conversion processing ABENDed processing the job
  - SYSTEM FAILURE – System crashed while job was running and job could not be restarted.
z/OS 1.13 Spin Any SPIN

- Added function to spin any spin data set
  - Similar to what was done for JESLOG
  - Applies to any data set allocated as SPIN
    - No application code/JCL change needed
  - Spin based on size, time, operator command
- Update to SPIN= DD operand
  - SPIN=(UNALLOC,option)
    - ‘hh:mm’ - Spin at specific time
    - ‘+hh:mm’ - Spin every hh:mm interval
    - nnn, nnnK, nnnM - Spin every nnn lines
    - NOCMND - Cannot be spun by command
    - CMNDONLY - Can be spun via operator command (default if no interval)
- $TJn,SPIN,DDNAME=name command added
z/OS 1.13 Requeue Job

- Remove job on step boundary
  - New STEP operand on $EJ command
    - Causes job to exit execution at end of current step
    - Optional HOLD operand makes job held
    - Job is requeued for execution
  - Job must be journaling (JOURNAL=YES on JOBCLASS)
  - Uses existing continue restart function of z/OS
    - Previously used to restart jobs after an IPL
  - Full syntax $EJxxx,STEP [,HOLD]
    - Full cross member support
z/OS 1.13 Extend SPOOL

- Command to extend SPOOL to adjacent free space
  - $TSPOOL(xxxxxx),SPACE=
    - SPACE= same as $S SPOOL
- SPACE is total size after expand is complete (NOT increment)
- Total size limited to architecture
  - JES2 limit is based on LARGEDS on SPOOLDEF
    - Allowed/Always limit is 1M tracks
    - Fail limit is 64K
  - DSCB format limits expansion into EAS storage
    - Should migrate to CYL_MANAGED=ALLOWED
    - Allocate SPOOL using DD EATTR = OPT to build format 8/9 DSCB
z/OS 1.13 SPOOL DSN/VOLSER

- Data set name for SPOOL can now be specified on $S SPOOL
  - SPOOLDEF DSNMASK limits values
  - Can have generics
  - Default is only SPOOLDEF DSNAME value allowed
  - Must be in z11 $ACTIVATE mode
- SPOOL volume prefix can now have generics
  - SPOOLDEF VOLUME= still 5 characters
  - If no generics, then prefix
  - If generics, then volume must match pattern
- New SPOOL initialization statement
  - Used on COLD start to locate SPOOL volumes
  - If present, only SPOOLs with initialization statements used
  - If SPOOL volume has generics, then SCAN is not done
  - UCB scan for SPOOL volumes only done if no SPOOL init stmts and no generics in VOLUME=
- Should not use until all members migrated to z/OS 1.13
z/OS 1.13 SPOOL Migration

- $M SPOOL command to move data off volume
  - Faster than $P SPOOL (Minutes not days)
  - Function enabled with OA36158 (PTF UA64366)
- Command works with active address spaces using volume
  - Less activity is better/faster but no need to IPL to stop active jobs
- Goal of SPOOL migration is to stop using SPOOL data set
  - It is NOT to eliminate the internal representation of the volume
  - Old data set can be deleted and SPOOL volume taken offline
- After a successful SPOOL migration
  - $DSPOOL still shows volume
  - $DJQ,SPOOL= still displays volume
  - New status is MAPPED
z/OS 1.13 SPOOL Migration

- Two forms of SPOOL migration, MOVE and MERGE
  - Move takes all data on an existing volume and moves it to a new one
    - Source must be INACTIVE ($Z SPOOL done)
      - *No active jobs on the volume*
    - Target cannot be currently an active SPOOL volume
    - Can specify space to create data set on target
    - At the end of move, old (source) volume does not exist
    - Target after a move is active
  - Merge takes all data on one volume and merges it onto free space on another volume
    - Most flexible migration option
    - Source can be in any state with active jobs/address spaces
      - *Less activity is good*
    - Results is a mapped volume that goes away when all jobs using it are deleted
      - *Similar to $P SPOOL but device is no longer in use*
z/OS 1.13 SPOOL Migration

- **MERGE Migration**:  
  - Copies an existing *Source Volume* to free space on a *Target Volume*:

  - **Pre-merge configuration**
    - SPOOL1: used space
    - SPOOL2: used space
    - Free space

  - **Merged configuration**
    - SPOOL1: used space
    - SPOOL2: used space (and Free space)

- Upon completion, the *Source Volume* becomes a *Mapped Volume*.
- Remains *MAPPED* until all jobs and SYSOUT that have space on the *Source Volume* are purged. It then goes away (no longer exists).
z/OS 1.13 SSI Enhancements

- SSI 82 – JES Property SSI
- Node information SSI – sub-function of JES properties SSI (SSI 82)
  - Enhanced to provide information from all active members of JES2 MAS
  - Available from MAS members starting from z/OS 1.11
    - Requires APAR OA35942 (760 – UA90569, 770 – UA90570)
- New function is exploited by SDSF
- For more information, see publication MVS Using the Subsystem Interface
z/OS 1.13 SSI Enhancements

- SSI 83 – Device information SSI
  - Enhanced to support all types of devices managed by JES2 (readers, punches, transmitters, receivers, lines, offload etc.)
  - Provides extensive filtering capabilities – e.g. by device state, device name, a variety of device attributes
  - Provides information about all devices managed by all active members of JES2 MAS
  - Device information is available from JES2 MAS members starting from z/OS 1.11 (requires coexistence APAR on z/OS 1.11 and 1.12)

- New function is exploited by SDSF
- For more information, see publication MVS Using the Subsystem Interface
z/OS 1.13 SSI Enhancements

- JES subsystem data set allocation support for XTIOT
  - Option on DYNALLOC request
    - S99TIOEX bit for authorized callers
    - S99DXACU bit supports all callers (unauthorized)
  - Moves allocations control blocks from 24 to 31 bit storage
- Relieves pressure on 24 bit storage
- Increases number of concurrent allocations
  - Reduces pressure on 24 bit TIOT
- Implications include not being able to find DD in TIOT
  - Could break applications looking into TIOT
  - Very unlikely
- Controlled by parmlib option
  - NON_VSAM_XTIOT=YES in DEVSUPxx
- Good ideas for use include
  - SPOOL data set browse, SPIN data set allocation
z/OS 1.13 Migration/Coexistence

- From JES2 z/OS 1.9 or 1.10
  - Can all member warm to z/OS 1.13
  - No coexistence support
  - Fall back implications
    - Some new data structures created by z/OS 1.13 JES2 may result in problems in z/OS 1.10 and prior
    - Prior to z/OS 1.10 may not be able to use SPOOL volumes with non-standard data set names
- From JES2 z/OS 1.11 or z/OS 1.12
  - COMPAT APAR OA31806 is needed on a z/OS 1.11, or z/OS 1.12 member to coexist in a MAS with z/OS 1.13
    - HJE7760 UA59434
    - HJE7770 UA59435
  - APAR also highly recommended for fall back as well
    - Some new data structures created by z/OS 1.13 JES2 may result in problems if OA31806 is not installed.
z/OS 1.13 JES2 SPOOL Migration Enabled

- z/OS 1.13 SPOOL migration function has been enabled
  - APAR OA36158 (PTF UA64366) closed February 24, 2012
- SPOOL migration page on the web
  - JES2 SPOOL Migration
- SHARE session
  - 10844: JES2 SPOOL: Defining, Managing, and Updating
    - Atlanta 2012 proceedings

JES2 spool migration

A JES2 spool migration moves an existing JES2 spool volume (an extent or data set) to a new spool volume, or merges an existing volume with another existing spool volume.

The following resources provide information to help you migrate spool volumes:

Spool migration FAQ
  - Spool migration frequently asked questions [PDF-0.23 MB]
  - z/OS V1R13 JES2 Migrating spool volumes documentation
    - JES2 Infocenter [HTML]

SHARE presentations on JES2 spool migration

- JES2 Product Update - SHARE, August 2011:
  - Overview of JES2 function added in z/OS V1.13 [PDF-0.93MB]
- z/OS 1.13 JES2 New Functions, Features, and Migration Actions - SHARE, August 2011
  - Technical details of the changes made in z/OS 1.13 JES2 [PDF-0.73MB]
- SHARE conference (Scheduled March 15, 2012)
  - JES2 SPOOL: Defining, Managing, and Updating [HTML]