IBM Education Assistance for z/OS V2R2

Item: JES3 OUTDISP support
Element/Component: JES3

Agenda

- Trademarks

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Trademarks

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

Presentation Objectives

- Review the z/OS JES3 V2R2 support of Output Disposition (OUTDISP) to enhance customer capability to manage sysout data sets.

Overview

- Problem Statement / Need Addressed
  - Support OUTDISP keyword on OUTPUT JCL statement same as JES2.
    - RFE 57119 / FITS MR1020084630 / SHARE SSJES397305
  - Support for Conditional SYSOUT Processing.
    - RFE 57100 / FITS MR1020084659 / SHARE SSSHARE015053

- Solution
  - JES3 will support the use of OUTDISP on the JCL OUTPUT statement, JES3 initialization SYSOUT statement, and various JES3 commands used to manage sysout data sets. Output disposition will also be supported within selected SSIs and for sysout data sets sent and received using Network Job Entry (NJE).

- Benefit / Value
  - DASD savings. Instead of cluttering up spool with test and development batch sysout, OUTDISP support will allow sysout to be purged or printed as necessary.

Usage & Invocation

- **Output disposition for JES3 sysout is optional**

- JES3 sysout is currently created without an output disposition and will continue to be created without one.
    - Sysout will have no output disposition or disposition of 'none'
    - i.e. nothing changes by default

- Output disposition can be optionally assigned for sysout:
    - **HOLD** = Hold the output. Output is not available to be processed until the disposition is changed to WRITE or KEEP. The output can be released for processing, such as with an SSI, which will change disposition to WRITE.
    - **LEAVE** = Hold the output. Output is not available to be processed until the disposition is changed to KEEP or WRITE. The output can be released for processing, such as with an SSI, which will change disposition to KEEP.
    - **WRITE** = Process the output then purge it.
    - **KEEP** = Process the output and then keep a copy of it on spool. After processing, the disposition of the output becomes LEAVE.
    - **PURGE** = Purge the output immediately.
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Usage & Invocation

- **How to specify output disposition**

- Using OUTDISP parameter on the OUTPUT JCL statement.
  - Generates and output descriptor for the output characteristics specified on the OUTPUT JCL statement.

- Using OUTDISP parameter of the TSO/E OUTDES command.
  - Used to create an output description used by the TSO/E ALLOCATE command.

- Using OUTADD macro.
  - Used to create an output description used with the DYNALLOC macro.

- Using OUTDISP parameter on JES3 SYSOUT initialization statement.

Usage & Invocation

- **The OUTDISP parameter**

- Used to specify the initial output disposition for sysout when created.
  - The initial output disposition is assigned when the sysout is processed by JES3 output service.

- The syntax is:
  - **OUTDISP=(normal disposition, abnormal disposition)**
    - or -
  - **OUTDISP=normal disposition**
  - The normal disposition subparameter specifies the disposition for the output if the job completes normally. If not specified, then the default is WRITE.
  - The abnormal disposition subparameter specifies the disposition for the output if the job does not complete successfully. If not specified, then the default is equivalent to normal disposition.

JCL examples

- //OUT1 OUTPUT OUTDISP=WRITE
  - Normal and abnormal output dispositions are both WRITE.

- //OUT2 OUTPUT OUTDISP=(KEEP,PURGE)
  - Normal output disposition is KEEP.
  - Abnormal disposition is PURGE.

- //OUT3 OUTPUT OUTDISP=(,PURGE)
  - Normal output disposition is WRITE.
  - Abnormal disposition is PURGE.

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SYSOUT initialization statement examples

- SYSOUT,CLASS=1,TYPE=PRINT,OUTDISP=WRITE,
    - Normal and abnormal output dispositions are both WRITE.

- SYSOUT,CLASS=2,TYPE=PRINT,OUTDISP=(KEEP,PURGE)
    - Normal output disposition is KEEP.
    - Abnormal disposition is PURGE.

- SYSOUT,CLASS=3,TYPE=PRINT,OUTDISP=(,PURGE)
    - Normal output disposition is WRITE.
    - Abnormal disposition is PURGE.

- SYSOUT,CLASS=4,HOLD=EXTWTR,OUTDISP=(KEEP,LEAVE)
    - Sysout class will be held for an external writer.
    - Normal output disposition is KEEP.
    - Abnormal disposition is LEAVE.

Usage & Invocation

- **Note:** JES3 handling of sysout in the following pages assume no other user, operator, or system holds apply to the sysout.

- For example, the DD JCL statement parameter HOLD=YES for JES3 results in a user hold which must be released by the operator.

Usage & Invocation

- **JES3 handling of sysout with no output disposition**

- No changes to existing behavior.

- When no sysout holds apply:
  - Output is placed on Q=WTR.
  - It is <u>not</u> made available via the TSO/E OUTPUT command.
  - After processing by a printer, the sysout is purged.

- When one or more sysout holds apply (e.g. EXTWTR =hold for an external writer, TSO = hold for a TSO user):
  - Output is placed Q=HOLD.
  - It is made available via the TSO/E OUTPUT command.
  - It is available for processing by an external writer using PSO or SAPI SSIs.
  - The sysout can be released to the writer service queue (Q=WTR) or purged.

Usage & Invocation

- **JES3 handling of sysout <u>not</u> held for an external writer with...**

- **...WRITE** output disposition:
  - Output is placed on Q=WTR.
  - It is <u>not</u> made available via the TSO/E OUTPUT command.
  - After processing by a printer/writer, the sysout is purged.

- **...KEEP** output disposition:
  - Output is placed on Q=WTR.
  - It is <u>not</u> made available via the TSO/E OUTPUT command.
  - After processing by a printer/writer, the disposition of the sysout will be changed to LEAVE and moved to Q=HOLD.

Usage & Invocation

▪ **JES3 handling of sysout <u>not</u> held for an external writer with...**

▪ **...HOLD** output disposition:
   – Output is placed Q=HOLD.
   – It is made available via the TSO/E OUTPUT command.
   – It can be released to the writer service queue (Q=WTR) or purged.
   – This is the same as HOLD=TSO for the JES3 sysout class.

▪ **...LEAVE** output disposition:
   – Output is placed on Q=HOLD.
   – It is made available via the TSO/E OUTPUT command.
   – It is <u>not</u> available for processing until the output disposition is changed to KEEP or WRITE.

▪ **...PURGE** output disposition:
   – The sysout will not be placed on any service queue and will be deleted.

Usage & Invocation

- **JES3 handling of sysout to be held for an external writer...**
  - Output is placed on Q=HOLD (data set held for external writer).

- **...with WRITE** output disposition:
  - It is <u>not</u> made available via the TSO/E OUTPUT command.
  - It is available for processing by an external writer using PSO or SAPI.
  - If released after processing, the sysout is purged (it is not moved to Q=WTR).
    - If no output disposition existed, output would have been moved to Q=WTR.

- **...with KEEP** output disposition:
  - It is <u>not</u> made available via the TSO/E OUTPUT command.
  - It is available for processing by an external writer using PSO or SAPI.
  - If released after processing, the disposition of the sysout will be changed to LEAVE and remain on Q=HOLD (data set is still held for external writer).

Usage & Invocation

- **JES3 handling of sysout to be held for an external writer...**
    - Output is placed on Q=HOLD (data set held for external writer).

- **...with HOLD** output disposition:
    - The output is made available via the TSO/E OUTPUT command.
    - It is <u>not</u> available for processing by an external writer until the output disposition is changed to KEEP or WRITE.
        - Override possible with new SAPI flag covered later.

- **...with LEAVE** output disposition:
    - The output is made available via the TSO/E OUTPUT command.
    - It is <u>not</u> available for processing by an external writer until the output disposition is changed to KEEP or WRITE.
        - Override possible with new SAPI flag covered later.

- **...PURGE** output disposition:
    - The sysout will not be placed on any service queue and will be deleted.

Usage & Invocation

- **JES3 commands**

- JES3 *INQUIRY,U command
  - OUTDISP= parameter added:
    - H|HOLD or K|KEEP or L|LEAVE or W|WRITE or N|NONE or ?
    - Displays the output disposition of selected data sets in the output queue (?), or displays information about data sets with the specified output disposition.

- JES3 *MODIFY,U command
  - OUTDISP= parameter added:
    - H|HOLD or K|KEEP or L|LEAVE or W|WRITE or N|NONE or ?
    - Displays the output disposition of selected data sets in the output queue (?), or displays information about data sets with the specified output disposition.
  - NOUTDISP= parameter added:
    - H|HOLD or K|KEEP or L|LEAVE or P|PURGE or W|WRITE.
    - Modifies the output disposition of the selected data sets.

Usage & Invocation

- **Process SYSOUT Data Sets Call (PSO) – SSI 1**

- In general, the PSO interface is stabilized and changes are limited to those that are necessary to maintain existing behavior.
    - IBM recommends that users utilize the more robust SSI79 SAPI interface for processing sysout. Therefore, any updates due to output disposition should not adversely affect existing behavior.

- To maintain complete compatibility with existing behavior, output disposition is ignored for sysout selection, delete requests (SSSODELC), and release requests (SSSORLSE).
    - Only change is that a release request may result in an update of the output disposition.

- See the appendix for more details.

Usage & Invocation

- **SYSOUT Application Program Interface (SAPI) – SSI 79**

- The SAPI has been updated with the addition of output disposition.
  - Updates are based upon existing support provided by JES2 so that applications will obtain similar behavior with JES3.

- Data set selection flags within input field SSS2SEL1 & SSS2SEL6 are used to determine from which queue the data sets are selected for GET processing.
  - Data set selection has been updated based upon the current output disposition of the data set.

- Data set return flags within output field SSS2RET5 indicate on which queue the returned data set resides.
  - Flags returned have been updated to reflect the the current output disposition of the returned data set.

Usage & Invocation

- **SYSOUT Application Program Interface (SAPI) – SSI 79 (*continued*)**

- SAPI disposition flags within input field SSS2DSP1 are an indication from the user as to what is to be done with the data set that is being PUT.
    - The final disposition of the data set is now based upon the SAPI disposition specified by the user and the current output disposition of the data set.

- Existing behavior of all flags is maintained for sysout data sets which do not have an output disposition (i.e. data sets created with an output disposition of none).

- See the appendix for more detail.

Usage & Invocation

- **Extended Status Function Call – SSI 80**

- JES3 will return the output disposition (STSTDISP) for sysout data sets that have an output disposition.

- Existing JES3 handling of sysout data set filters in STATSSL1 is unchanged (i.e. not affected by output disposition).

- JES3 added support for all sysout data set filters in STATSSL3.
    - Includes selection of data sets based upon output disposition.

- See the appendix for more detail.

Usage & Invocation

- **NJE header flags**

- JES3 added support for flags in the networking data set header which specify output disposition: NDHGF2HB & NDHGF2HA
    - See *z/OS Network Job Entry (NJE) Formats and Protocols* for flag descriptions.

- Flags are set for outgoing networked sysout data sets that have an output disposition.

- Flags are used to establish the output disposition of incoming networked sysout data sets.
    - Note that OUTDISP will always set for incoming NJE sysout.

- See the appendix for additional detail.

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Usage & Invocation

- **JES3 installation exits**

- Output disposition is maintained in the data set entries of the Output Service Element (OSE).
    - Available to installation exits which provide a pointer to the OSE.

- Two exits provide OSE data via a parameter list mapped by IATYSSX:
    - IATUX58 = Modify Security Information Before JES3 Security Processing
    - IATUX59 = Modify Security Information After JES3 Security Processing
    - Exits are used for PSO and SAPI processing.
    - IATYSSX has been updated to include the output disposition of the sysout data set.

Migration & Coexistence Considerations

- Complete JES3 OUTDISP support is available only with the JES3 global main and any CIFSSes at the V2R2 level.
    - OUTDISP related parameters are ignored or invalid at previous levels.

- JES3 release toleration APAR OA43563 is required for systems in the JESplex which are at JES3 V2R1 or V1R13.
    - Tolerates the OUTDISP parameter on the SYSOUT statement in the JES3 initialization stream.

Presentation Summary

- JES3 now provides support of Output Disposition for managing sysout.

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Appendix: Documentation

- JES3 documents updated:
    - *z/OS V2R2 JES3 Commands* (SA32-1008)
    - *z/OS V2R2 JES3 Initialization and Tuning Guide* (SA32-1003)
    - *z/OS V2R2 JES3 Initialization and Tuning Reference* (SA32-1005)
    - *z/OS V2R2 JES3 Messages* (SA32-1007)
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- MVS documents updated:
    - *z/OS V2R2 MVS Authorized Assembler Services Guide (SA23-1371)*
    - *z/OS V2R2 MVS JCL Reference* (SA23-1385)
    - *z/OS V2R2 MVS JCL User's Guide* (SA23-1386)
    - *z/OS V2R2 MVS Using the Subsystem Interface* (SA38-0679)
    - *V2R2 Network Job Entry (NJE) Formats and Protocols* (SA32-0988)

Appendix: Process SYSOUT Data Sets Call (PSO) – SSI 1

- No changes made to sysout selection based upon output disposition.
  - Output disposition is ignored for sysout selection to maintain complete compatibility with existing behavior.

- No changes made handling the delete request (SSSODELC) for sysout data sets selected from Q=WTR and Q=HOLD.
  - Output disposition is ignored for delete requests to maintain existing behavior.

Appendix: Process SYSOUT Data Sets Call (PSO) – SSI 1

- A release request (SSSORLSE) is honored only for sysout on Q=HOLD and can result in sysout being moved to Q=WTR.
  - Users can also change the sysout's destination when on Q=HOLD which can result in the sysout being moved to Q=WTR, Q=BDT, or Q=TCP.
  - Output disposition is ignored when sysout is moved from Q=HOLD to maintain existing behavior.
  - The only change made will be to update the sysout output disposition when sysout is moved from Q=HOLD to Q=WTR.
    - For example an output disposition of LEAVE will be updated to KEEP.

Appendix: SYSOUT Application Program Interface (SAPI) – SSI 79

- Data set selection flags are updated:
  - Selection flags within input field SSS2SEL1 are used to determine from which queue the data sets are selected for GET processing.
  - SSS2SHLD = select "hold for TSO" output (JES3)
    - JES3 selects data sets on Q=HOLD which are held for TSO.
    - No changes. Output disposition is ignored for selecting data sets.
  - SSS2SXWH = select "hold for XWTR" output (JES3)
    - JES3 selects data sets on Q=HOLD which are held for an external writer with output disposition of WRITE, KEEP, or none.
    - Also see new flag SSS2SHL2.
  - SSS2SHOL = select from the hold queue
    - Guarantees that any held data sets are selected by setting both flags SSS2SHLD and SSS2SXWH.
    - Will implicitly include new flag SSS2SHL2.

Appendix: SYSOUT Application Program Interface (SAPI) – SSI 79

- Data set selection flags (continued):
    - SSS2SWTR = select from the writer queue (JES3)
        - JES3 selects data sets on Q=WTR with output disposition of WRITE, KEEP, or none.
    - SSS2SAWT = select all output
        - JES3 selects all data sets regardless of queue and output disposition.
    - SSS2SHL2 = select "HOLD/LEAVE" output (JES3)
        - This is a new flag that is defined in SSS2SEL6.
        - JES3 selects data sets on Q=HOLD with output disposition of HOLD or LEAVE (i.e. override the HOLD/LEAVE output disposition).
        - When used with SSS2SWTR, JES3 then selects data sets on Q=HOLD which are held for an external writer with any output disposition.
        - SSSS2HL2 is ignored for SSS2SHLD and SSS2SAWT.

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Appendix: SYSOUT Application Program Interface (SAPI) – SSI 79

- Data set return flags are updated:
  - Flags within output field SSS2RET5 indicate on which queue the returned data set resides.
  - SSS2RHLV = data set on "hold for TSO" queue (JES3)
    - JES3 returns this flag when the data set is on Q=HOLD and is held for TSO.
    - No changes. Output disposition does not affect this return flag.
  - SSS2RXWH = data set on "hold for XWTR" queue (JES3)
    - JES3 returns this flag when the data set is on Q=HOLD and is not held for TSO.
    - Flag is not set if output disposition is HOLD or LEAVE (i.e. data set not available for processing).
    - Also see new flag SSS2RHL2.

Appendix: SYSOUT Application Program Interface (SAPI) – SSI 79

- Data set return flags (continued):
  - SSS2RHOL = data set on one of the held queues
    - Defined as including both SSS2RHLV and SSS2RXWH.
    - Updated to include new flag SSS2RHL2.
  - SSS2RWTR = data set on "writer" queue (JES3)
    - JES3 returns this flag when the data set is on Q=WTR.
    - No changes. Output disposition can be WRITE, KEEP, or none.
  - SSS2RHL2 = data set on hold queue with HOLD/LEAVE output disposition (JES3)
    - This is a new flag that will be defined in SSS2RET5.
    - JES3 returns this flag when the data set is on Q=HOLD, is not held for TSO, and has an output disposition of HOLD or LEAVE.

Appendix: SYSOUT Application Program Interface (SAPI) – SSI 79

- SAPI disposition flag handling is updated:
  - Flags in SSS2DSP1 are an indication from the user as to what is to be done with the data set that is being PUT.
  - The final disposition of the data set is based upon the SAPI disposition specified by the user and the current output disposition of the data set.
  - SSS2DKPE = keep the data set
    - When SSS2DKPE is on, the data set is kept and flag SSS2DHLD or SSS2DRLS affects the final disposition of the data set.
    - When SSS2DKPE is off, JES3 deletes the data set except when the data set output disposition is KEEP.
    - When the data set output disposition is KEEP, then JES3 places the data set on Q=HOLD with output disposition of LEAVE.

Appendix: SYSOUT Application Program Interface (SAPI) – SSI 79

- SAPI disposition flags (continued):
  - SSS2DHLD = hold the data set
    - JES3 places the data set on Q=HOLD and updates the output disposition:
      - Output dispositions of HOLD, LEAVE or none are unchanged.
      - WRITE is changed to HOLD, KEEP is changed to LEAVE.
  - SSS2DRLS = release the data set
    - JES3 updates the output disposition:
      - Output dispositions of WRITE, KEEP or none are unchanged.
      - HOLD is changed to WRITE, LEAVE is changed to KEEP.
    - JES3 places the data set on Q=WTR except for data sets which are held for external writer and have an output disposition.
      - Held for TSO or held for external writer flags are cleared.
    - Data sets held for external writer which have an output disposition will remain on Q=HOLD.
      - Held for TSO flag is cleared.

Appendix: SYSOUT Application Program Interface (SAPI) – SSI 79

- Table showing SAPI disposition and the resulting output disposition transition:

Initial SYSOUT data set output disposition	SAPI disposition in SSS2DSP1		
	SSS2DKPE off (Dispose)	SSS2DKPE+ SSS2DHLD (Hold)	SSS2DKPE+ SSS2DRLS (Release)
KEEP	LEAVE	LEAVE	KEEP
LEAVE	PURGE	LEAVE	KEEP
WRITE	PURGE	HOLD	WRITE
HOLD	PURGE	HOLD	WRITE

Appendix: Extended Status Function Call – SSI 80

- JES3 will return the output disposition (STSTDISP) for sysout data sets.
  - When the sysout data set has no output disposition, then no flag is set.
  - STSTDHLD = OUTDISP=HOLD
  - STSTDLVE = OUTDISP=LEAVE
  - STSTDWRT = OUTDISP=WRITE
  - STSTDKEP = OUTDISP=KEEP

- Existing JES3 handling of sysout data set filters in STATSSL1 is unchanged:
  - STATSSNH = JES3 will select any sysout on Q=WTR.
    - Sysout may have output disposition of WRITE, KEEP, or none.
  - STATSSHL = JES3 will select any sysout on Q=HOLD.
    - Sysout may have any output disposition or none.

# Appendix: Extended Status Function Call – SSI 80

- JES3 added support for sysout data set filters in STATSSL3:
    - STATSWRT = JES3 will select sysout with output disposition of WRITE or sysout on Q=WTR with no output disposition.
    - STATSHOL = JES3 will select sysout with output disposition of HOLD or sysout on Q=HOLD with no output disposition.
    - STATSKEP = JES3 will select sysout with output disposition of KEEP.
    - STATSLVE = JES3 will select sysout with output disposition of LEAVE.
    - STATSSNJ = JES3 will select all NJE sysout, regardless off output disposition, when STATSSNJ is set along with STATSWRT.
    - STATSSLC = JES3 will select sysout with a destination of the home node, "LOCAL", or "ANYLOCAL".
    - STATSSNT = JES3 will not select sysout with a destination of the home node, "LOCAL", or "ANYLOCAL".

Appendix: NJE header flags

- Flags in the networking data set header are used to specify output disposition for sysout data sets.
    - See *z/OS Network Job Entry (NJE) Formats and Protocols* for flag descriptions.

- Table of JES3 flag settings for outgoing networked sysout data sets:

Outgoing OUTDISP	Flag NDHGF1HD	Flag NDHGF2HB	Flag NDHGF2HA
None	0	0	0
None w/ HOLD=TSO	1	0	0
WRITE	0	0	0
HOLD	1	1	0
KEEP	1	0	1
LEAVE	1	1	1
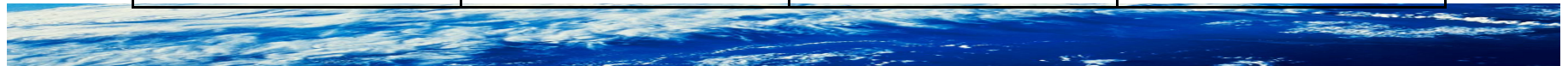
Appendix: NJE header flags

- Table showing initial output disposition JES3 will set for incoming networked sysout data sets:

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-
-

Flag NDHGF1HD	Flag NDHGF2HB	Flag NDHGF2HA	Assigned OUTDISP
0	0	0	WRITE
1	0	0	HOLD
1 or 0	1	0	HOLD
1 or 0	0	1	KEEP
1 or 0	1	1	LEAVE

  – Note that OUTDISP will always set for incoming NJE sysout.