WHAT'S ALL THE FUSS ABOUT JES3?

One Man's Experience With JES2 and JES3

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JES3 is a very complex MVS job entry subsystem (JES). It offers more to the MVS operating system user than JES2 offers, but for a price. Because JES3 has more control over devices and job control than JES2, it follows that the complexity of potential problems increases.

The purpose of this article is to help JES2 users better understand JES3. It is not intended to be a JES3 primer nor to be considered as an in-depth critique of JES. However, some knowledge of JES is helpful in understanding various technical references.

JES3 consoles and commands, and JES3 Network Job Entry (NJE) are addressed in this article. The JES3 Job and JCL control statements, and the vaunted Dependent Job Control (DJC) nets are of interest to most JES2 users. These areas, along with JES3 output control, are only briefly mentioned. Finally, the big question: Should a JES2 user convert to JES3? The arguments, both pro and con, are examined. See Figure 1.

Advantages of JES3

All JES3-managed devices must be defined in the JES3 initialization deck. This includes all tape and DASD devices. Even though this means more preparation, many potential conflicts are avoided.

Tape drive allocations are handled by the global JES3 system. It is impossible for two systems in a JES3 complex to share a nonshareable resource (i.e., a tape drive) if the drive is properly under JES3 control. This eliminates the double allocation headaches that some JES2 shops have.

JES3 provides data set integrity without GRS because it knows which jobs use which data sets and controls the job execution accordingly. However, care must be taken when defining the DYNALDSN JES3 INIT DECK statements. An enqueue on a bypassed data set can occur without any notification. This enqueue, as with any other, can back up the entire system. If this backup occurs on the JES3 global, then the whole JES3 complex is affected. Also, without a tool such as Omegamon and a good operations staff (or Candle Corporation's NETVIEW or AF/OPERATOR set up to detect these types of problems), identifying the problem is difficult.

Note: A GRS ring is recommended in a multisystem complex for an extra layer of data integrity.

Further advantages are that shared DASD reserve problems are seldom seen in a well-defined JES3 complex.

Also, there are fewer JES checkpoint problems as with JES2, since the JES3 global controls the workload distribution, and the local systems need not access the checkpoint.

Dynamic system interchange (DSI) is JES3's way to pass the baton from one system to another. If the global system develops a problem that cannot be fixed quickly, then a local system can take over the global function. In principle this sounds good; however, if a computer center has not prepared for and trained with the DSI procedure, problems can arise.

JES3 dynamic support programs (DSP) are operator utilities called directly from the JES3 console. JES2 has none, except the spool offload facility. JES3 has: (partial list)

— *Tape Label (TL)*: dynamically initializes and labels tapes and cassettes. Simple to use.

— *Deadline*: controls a job's scheduling priority to increase the probability of a job being completed by a given deadline.

— *Dump Job (DJ)*: spool offload facility.

— *Tape-to-Tape (TT)*: tape copy facility.

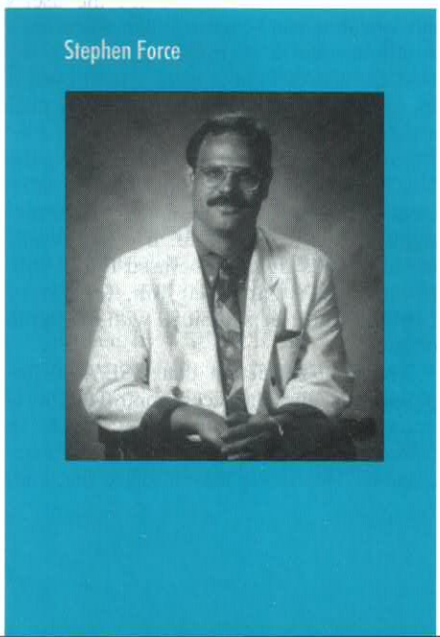
Disadvantages of JES3

There is no possibility for a test JES3 as a secondary subsystem. This means that either a test MVS system must be available, or there is adequate test time on the production system. And who can get enough test time from operations?

Also, an MVS IPL is always required to implement any JES3 initialization deck changes. A JES3 hot start does not obtain its data from the specified parameters. Rather, it gets it from the previous warm start information. This means that a complexwide IPL (global and all locals) is necessary.

An MVS IPL is almost always required after JES3 exit problems or other system problems. Several MVS problems can be solved by a JES hot start. However, for MVS problems in a JES3 complex to be solved, an MVS IPL is necessary. In a small to medium JES3 (one CPU) complex, this is not a major problem. But in a large JES3 complex (two or more CPUs), and if an MVS system is functioning as the global system, then the whole computer center is affected. What sense does it make if a looping job on the global MVS system affects the CICS or CADAM system on a completely different CPU?

An MVS/XA JES3 warm/hot start takes anywhere from five to 15 minutes of elapsed time until productive work can start. This is too long for most computer centers to wait. Fortunately, JES3 ESA starts quickly like JES2.



Most product install jobs (including IBM IPO and REFRESH packages) do not take JES3 into consideration. This means most product install job streams for JES3 users need to be closely examined and frequently modified.

Channel-to-channel (CTC) adapters are needed between the JES3 global and all local systems. Two are recommended for availability. These CTC adapters are quite expensive; however, when one has CTC adapters available, then a GRS ring can be implemented.

JES3 Consoles and Commands

JES3 commands are much more involved and complex than JES2 commands. For instance, the JES2 display initiator command $DI is in JES3 as *INQUIRY G SY1 G (or short form *I G SY1 G).

At least two consoles are needed to run JES3. Although the MVS master console can be used to issue JES3 commands and see JES3 messages, a dedicated JES3 console offers a much more attractive display (this console is similar to the NETVIEW/NCCF display). Information is easier to read and retain on the console as with JES2 (to stop the JES3 console from wrapping, just press enter). Also, there are no MVS WTO buffers for JES3 consoles.

A JES3 global system needs only one JES3 console. Therefore, in a data center with several CPUs linked together (global/local), one JES console, rather than several, needs to be monitored. However, a backup JES3 console is recommended for random access memory (RAS). Also, one MVS master console is needed for each MVS system in the data center.

JES3 can display job allocation requirements on a JES3 console. Because all JES3 jobs must go through the converter/interpreter (C/I) phase prior to initiation, all job requirements are immediately known. A JES3 *DISPLAY J=nnnn command, where nnnn is the desired job number, displays the console job allocation information.

JES3 console message suppression can be accomplished by MVS/MPF, JES3 exits, AF/OPERATOR (or other such automation tool) or NETVIEW.

A user cannot issue any MVS or JES3 commands from internal reader submitted jobs in JES3. This means that if a user wants to control her/his system from batch, another means must be found.

Network Job Entry (NJE)

No SNA support for JES3 NJE is possible without first installing IBM's Bulk Data Transfer (BDT). This means that only BSC links are available. This creates many problems for data centers that have invested heavily in their SNA networks. For example, a data center that is running its MVS system under VM/XA, and wants a NJE-to-RSCS link, can only communicate through a BSC virtual CTC. Even if ACF/VTAM is installed on both MVS and VM/XA, an SNA link is impossible without first installing BDT on MVS. Any one who has worked with BSC virtual CTCs can visualize the problems inherent in this situation. This is a systems programming and operations staff headache.

JES3 does not automatically notify users that a file has been sent to him over NJE from another node. A JES3 exit must be implemented to notify the receiving user.

Job and JES3 Control, JCL and JES3 DJC NETS

Advantages of C/I processing: Immediately after job submission, and prior to placement on the input queue, JES3 sends the job through the MVS convert (JCL to internal text) and interpret (internal text to MVS allocation control block construction) phases.

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This means that JES3 knows prior to job initiation what this job requires. This is another major advantage of JES3. One must not wait for a job to be initiated to see that a required data set is not found.

Once a job makes it through the JES3 C/I and allocation phase, it has a much better chance of successfully completing than it would with JES2.

JES3 DJC nets (inherent JES3 job control system) are a major reason several computer centers opt for JES3 rather than JES2. Anyone converting from either DOS or another vendor operating system can directly implement her/his production job streams into JES3 nets. This means all resources needed by production jobs, as well as run sequence, are known to JES3. Successfully run jobs release the subsequent jobs in the net only if successfully completed. This minimizes the possibility of jobs running out of sequence. However, DJC nets are not easy to understand and implement. Most JES3 computer centers opting for DJC nets use it in conjunction with other available production control products (OPC/A, DOROS, CA-7/11, etc).

Reference of a previously non-JCL defined (VSAM) data set is impossible. This means tasks using newly defined VSAM clusters must be split into two or more jobs.

Tape drive control, as mentioned previously in this article, is another advantage.

No premount of tapes is allowed in JES3 (automatic volume recognition (AVR)). Sometimes JES3 needs to be tricked to save on tape drive allocations, or jobs need to be broken into several smaller ones. JES3 job data set separation JCL is somewhat easier to understand than JES2. For example, the following sample job prints three copies of all job output except JOBDD3, which it sends over a NJE-RSCS link to VM user WCMS01.

JES3 job example:

```
//JOB1 JOB (ACCT),PGMRNAME,MSGCLASS=A
//*FORMAT PR,DDNAME=,COPIES=3
//*FORMATPR,DDNAME=JOBDD1,DEST=RSCS. WCMS01
//STEP1      EXEC PGM=PROGRAM
//SYSPRINT   DD SYSOUT=*
//JOBDD1     DD SYSOUT=*
//JOBDD2     DD SYSOUT=*
//JOBDD3     DD SYSOUT=A
//
```

JES2 job example:

```
//JOB1 JOB (ACCT),PGMRNAME,MSGCLASS=A
/*OUTPUT     XMIT DEST=RSCS.WCMS01
//STEP1      EXEC PGM=PROGRAM
//OUT1       OUTPUT JESDS=ALL,COPIES=3
//SYSPRINT   DD SYSOUT=*
//JOBDD1     DD SYSOUT=*
//JOBDD2     DD SYSOUT=*
//JOBDD3     DD SYSOUT=(A,,XMIT)
//
```

JES3 job classes can be up to eight bytes in length. JES2 can only be one byte. To use more than one byte in JES3, a //*MAIN CLASS= statement is necessary. JES3 jobs held up in allocation phase are not apparent to either the system operator nor the offending TSO user (if present). However, a data center automation tool such as AF/OPERATOR or NETVIEW can be tailored to perform this function, if desired.

In a large JES3 complex, tuning is necessary. Functional subsystem (FSS) for various JES3 functions (i.e., C/I), perhaps on a local system, is recommended.

JES3 Output Control

No SDSF, only FLASHER or another available product, such as TSO/E SPF 3.8 can be used in a pinch, but for a user who has used SDSF and must step back, it can be quite

▸ ▸ ▸ *FIGURE 1: Comparison Between JES2 and JES3*

	JES2	JES3
DASD and tape devices defined to and controlled by JES	no	yes
Tape drive allocation control	no	yes
Data set integrity	no	yes
Shared DASD reserve problems	sometimes	seldom
JES checkpoint problems	spool offload facility	several
Operator utilities called from console	yes	no
JES as secondary subsystem (test)	no	yes
MVS IPL needed to implement changes	sometimes	often
MVS IPL needed to solve JES problems	no	yes (but ESA is faster than XA)
CTC adapters needed	no	yes, if global/local JES3 system is desired
JES commands	short, simple	long, involved
Separate JES console needed	no	yes, if full functions are needed
Single console for total JES complex (multicomputer system)	no, unless special products installed	yes
MVS and JES2 commands from a batch job	yes	no
SNA NJE	yes	no
MVS interpreter processing prior to job initiation	no	yes
JES-inherent job scheduling and control system	no	yes
Backwards reference of a newly-defined VSAM data set	yes	no
Tape or cassette premount (AVR)	yes	no
Job class greater than 1 byte	no	yes, if specified on JES3 //*MAIN statement
Operator notified if a job is waiting on data sets	yes	no
PSF	yes	yes, but not well implemented

frustrating. IBM must come up with a better solution.

Printer Services Facility (PSF) — JES3 users cannot use default PAGEDEF and FORMDEF keyword parameters; it must supply both on JCL statement.

JES3 PSF/VTAM link is not clean — one VTAM APPL statement and ACBNAME per printer is needed.

Should You Convert From JES2 to JES3?

Converting from one system to another is always a large undertaking. Changing from JES2 to JES3 is no exception. Even though both JESes perform the same services for MVS, they were developed differently. Because of this, one must seriously consider the impact these differences will make on the company and its staff. JES3 can offer several advantages to a company that is totally committed to investing a lot of time, money and high-level managerial support.

Conversion Requirements

A conversion requires:

•complete retraining of programmers, operators, production control and systems programmers to learn the JES3 JCL and methodology;

•changing all production and test JCL to JES3 standards;

•jobs that submit MVS or JES2 commands in-stream need to find an alternative method;

•all jobs allocating VSAM data sets, which are referenced in later steps, need to be changed;

•retraining of the operations staff and systems programmers to learn the JES3 global and local functions and their impact on the operations procedures, since the operations philosophy is quite different;

•retraining of the operations staff and systems programmers to learn the completely different and more complex JES3 commands;

•to use SNA NJE, users must install the BDT product;

•a CTC adapter link between all JES3 global and local MVS systems;

•a separate JES3 console needs to be installed on the designated global MVS system;

•any JES2 exits need to be rewritten;

•no possibility to have a test JES as a secondary subsystem. A separate MVS test system is needed. Also, this test system cannot access the production spool. A NJE link must be established to link the test JES3 systems together; and

•JES systems programmers always need to be involved in hardware changes because the JES3 initialization deck must always reflect the current hardware configuration. JES3 allows little leeway for planning ahead.

The Solution

JES3 offers many attractive features; however, most complex JES2 computer centers have already solved most of the shortcomings of JES2 by either developing acceptable operating procedures or installing software and/or hardware solutions. JES3 DJC nets offer much to users, but again, most users have found solutions in one or more of the several excellent software products available.

When considering a JES3 conversion, a JES2 user should first ask a JES3 user what his/her experience has been. But, can experienced JES3 personnel be found? JES2 system programmers can learn JES3, but experience is the best teacher.

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