z/OS Extended Status and SPOOL Browse: User Experience (REVISITED)

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Acknowledgements

Thanks to **Richard Peurifoy** (TAMU), **David Jones** (IBM JES3), and **Tom Wasik** (IBM JES2) for their valuable contributions to this revised and enhanced presentation.

About the Speaker

- Texas A&M University '87 - Computer Science
- 25 years working with MVS technology
- 15+ years at SHARE
- 10+ years DPM in the JES3/EPS Project

- JES3 Committee Lead under MVS Core Technologies Project

About the Company

- **Texas A&M University** formed in 1876 as Texas' first public institution of higher learning
- 46,000 undergraduate and 8,500 graduate students
- 250 degree programs
- 10 colleges – 6th largest enrollment in nation.

- Two branch campuses (Galveston, Tx and Doha, Qatar) and overseas centers (Mexico, Costa Rica, and Italy)
- George Bush (Sr.) Presidential Library/School of Government

Our Environment

- IBM z10 BC

- z/OS v1.11, JES3 v1.11

- z/OS v1.12, JES3 v1.12 in "sandbox" for this presentation

- Who are our customers?

  - Budget/Payroll System (BPP)

  - System-wide Financials (FAMIS) – 20+ universities and state agencies

    - 28,000 faculty and staff

The Condition

A concurrent move to a new z/OS and JES is difficult!

- 13 JES local usermods

- 22 site-developed macros

- 4 local DSP programs

- 1 local FCT program

  - MUSAS (Wylbur) JES Spool interface

  - JES3 USERMOD required to implement - IATGRPT

- **We must clean this up! Let's start with DSPs!**

Local FCT

```
*------------------------------------------------------------------*
*         DEFINE LOCAL FCTS                                        *
*------------------------------------------------------------------*
TIJPFCT   IATYFCD ECFMASK=FF,ECFADD=IATGRJR,R14=IATGRJR,
              R15=IATGRJR,COND=80,DRVR=IATUMIJ,INISH=YES,
              PRTY=6,SUCC=FSFCT,NAME=TAMUIJP,PREV=GRSRFCT
```

Local DSPs

```
*------------------------------------------------------------------*
*          DEFINE LOCAL DSP ENTRIES                                *
*------------------------------------------------------------------*
OPERDSP   IATYDSD PRTY=1,XABLE=YES,MUCC=NO,DRVR=TAMDS77,NOREQ=1,
                  REQ=(CNS3277),MAXCT=2
IOSCREEN  IATYDSD PRTY=1,XABLE=YES,MUCC=NO,DRVR=TAMIOSC,NOREQ=1,
                  REQ=(CNS3277),MAXCT=2
JOBCARD   IATYDSD PRTY=1,XABLE=YES,MUCC=NO,DRVR=TAMUTJC
WTJ       IATYDSD PRTY=1,XABLE=YES,MUCC=NO,DRVR=TAMWTJB
* SPOOLCHK IATYDSD PRTY=5,XABLE=YES,MAXCT=1,REENT=NO,DRVR=MSPOL
* JES3ARTS IATYDSD PRTY=5,REENT=YES,XABLE=YES,NOREQ=1,
*                  REQ=(JS3ARTS),DRVR=U110DJ
* SAG ENTIRE SYSTEM SERVER
UQJ3      IATYDSD PRTY=10,XABLE=YES,DRVR=IATUQJ3
DMYDSP01  IATYDSD
DMYDSP02  IATYDSD
```

Out with the Old… DSPs

- Two DSPs may be awaiting requirements to be fulfilled

- **Output Status** DSP for print operators
- **Job Status** DSP for NOC operators
- Programs written pre OS/390 (ie. JES consoles, etc.)
- Handful of user code handed down throughout the years
- Susceptible to IBM's changing whims (of control blocks)!

The Old… TAMIOSC Screen

```
DEVICE    JOB   STATUS LIMIT FORMS    CARRIAGE  UCS
XEROX1          NO WTR <30K D100      8         PN
XEROX2          NO WTR <30K 1100      8         PN




FORMS      CARRIAGE  UCS  DEST      LINES
D1DR       8         PN   XEROX        72
```

Step One: Out with the Old… Technique

TAMIOSC

Printer Status

- Search FCT chain for printer
- Obtain device status, WTR status, and job name, if applicable

Output Totals by FORMS

- Search OSE chain and build table

The Old… TAMDS77 Screen

Step One: Out with the Old… Technique

TAMDS77

Spool Status

- Search SPB chain for used and total tracks

Main Processor Status

- Search MPC chain

Device Status

- Search SUP chain

Queue Status

- Search JQE chain (IATXJQE) by priority

Initiator Status

- Search RSQ for Job number, Job name, Step, Region, etc.

The Real Details of SSIs

- **Session 9719:**

   z/OS V1.13 JES3 Latest Status and New Features – Tuesday 9:30am

- **Session 9717:**

   z/OS 1.13 JES2 New Functions, Features, and Migration Actions – Tuesday 1:30pm

- **Session 9762:**

   Using the New JES2/JES3 SSIs in z/OS 1.13 – Friday 9:30am
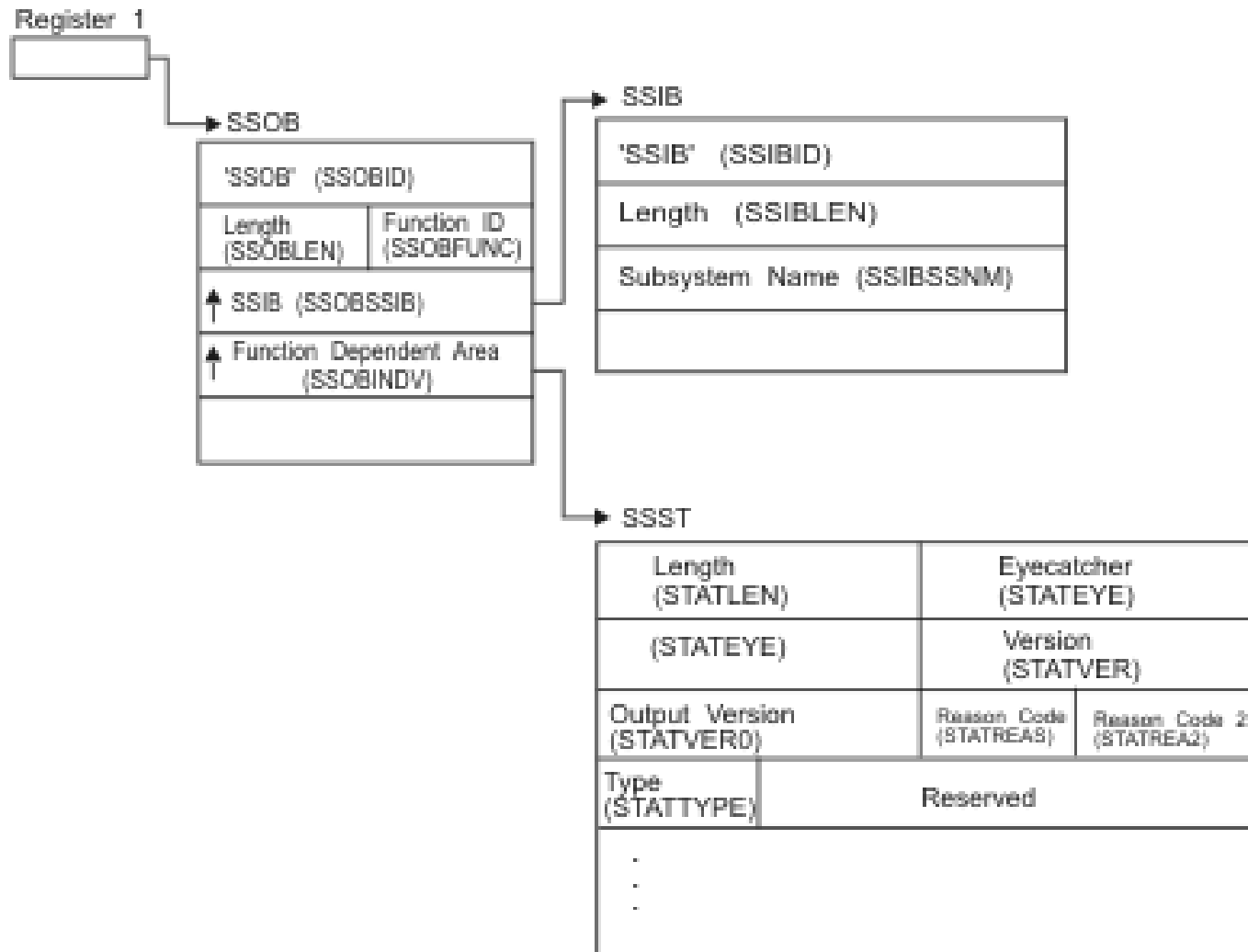
Extended Status (SSI 80)

- *z/OS V1.12.0 MVS Using the Subsystem Interface   (SA22-7642-10)*

- Detailed status information about jobs and SYSOUT in the JES queue

- JES neutral (with JES-specific area, where needed)

- Request Types (STATTYPE)
  - STATTERS   STATVRBO   STATMEM
  - STATOUTT   STATOUTV
  - STATDLST

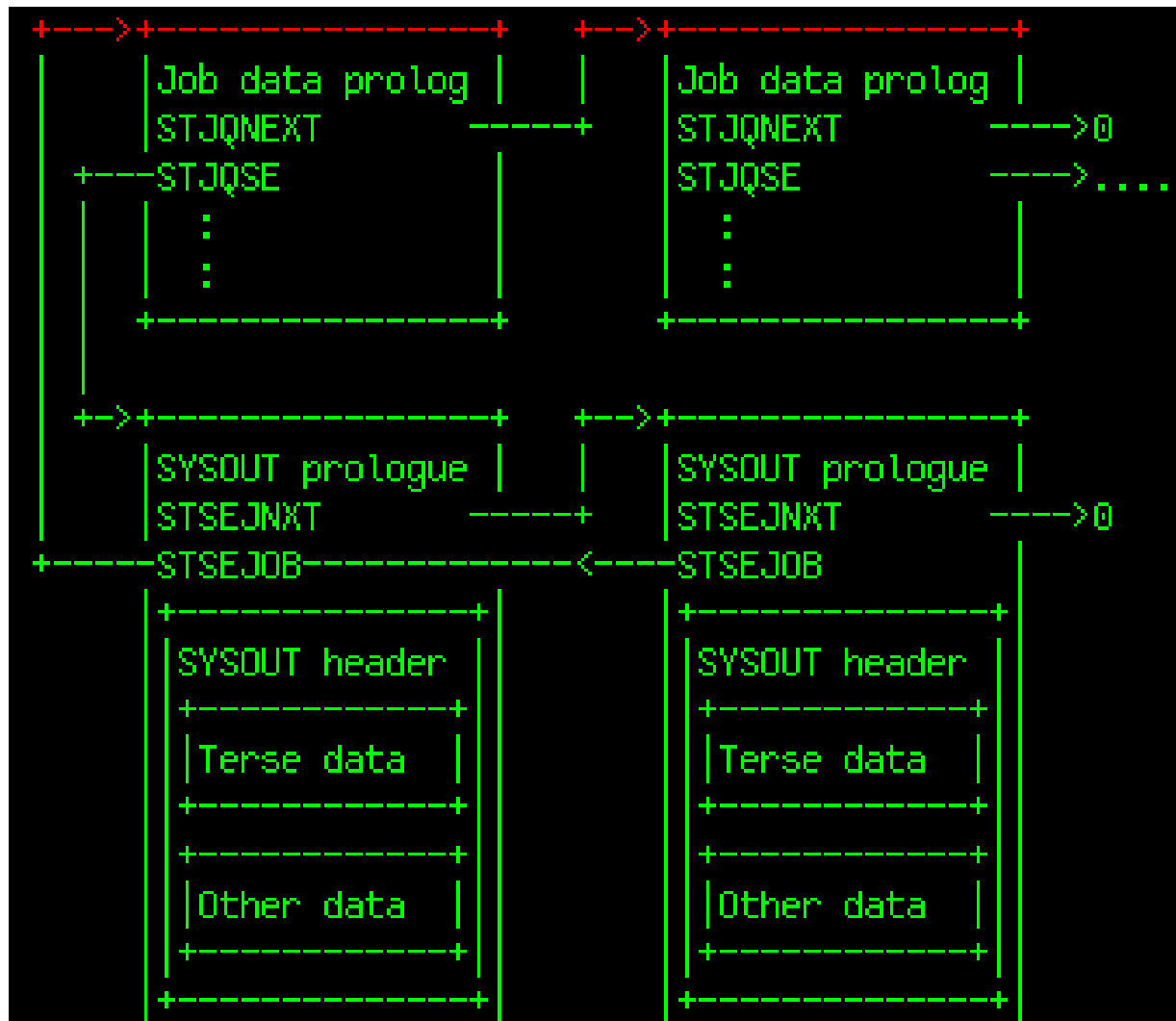# Extended Status (SSI 80)

- Numerous combinations of filters

- Returned info from multiple calls will chain together without intermediate STATMEM

- Four types of Data Elements returned
  - SJQE - Job Queue Element (chained from IAZSSST)
  - SJVE - Job Queue Verbose Element (chained from SJQE)
  - SOUT - SYSOUT Element (chained from SJQE)
  - SSVE - SYSOUT Verbose Element (chained from SOUT and SJQE)

Environment for SSI 80 Call

Register 1

SSOB

'SSOB' (SSOBID)	
Length (SSOBLEN)	Function ID (SSOBFUNC)
↑ SSIB (SSOBSSIB)	
▲ Function Dependent Area (SSOBINDV)	

SSIB

'SSIB' (SSIBID)
Length (SSIBLEN)
Subsystem Name (SSIBSSNM)

SSST

Length (STATLEN)		Eyecatcher (STATEYE)	
(STATEYE)		Version (STATVER)	
Output Version (STATVER0)		Reason Code (STATREAS)	Reason Code 2 (STATREA2)
Type (STATTYPE)	Reserved		
. . .			

Return for SSI 80 Call - STATOUTT

JES Properties (SSI 82)

- *z/OS V1.12.0 MVS Using the Subsystem Interface   (SA22-7642-10)*

- Obtain information about JES managed structures (SPOOL, initiators, job classes, etc.)

- JES neutral (with JES-specific area, where needed)

- Request Types (SSJPFREQ)
  - SSJPSPOD   SSJPSPRS
  - SSJPITOD   SSJPITRS
  - SSJPJCOD   SSJPJCRS

  Even More…

JES Device Information (SSI 83)

- *z/OS V1.12.0 MVS Using the Subsystem Interface (SA22-7642-10)*

- Obtain information on devices managed by JES (printers, readers, etc.) - *partial implementation for JES3*

- JESPLEX scoped

- JES neutral (with JES-specific area, where needed)

- Request Types (SSJDFREQ)
  - SSJDOBTD
  - SSJDRSTG

- JES3 1.12 ignores all filtering requests! (Fixed in 1.13)

Another Look at the TAMIOSC Screen

```
DEVICE      JOB   STATUS LIMIT FORMS     CARRIAGE  UCS
XEROX1            NO WTR <30K D100      8          PN
XEROX2            NO WTR <30K 1100      8          PN




FORMS       CARRIAGE  UCS  DEST      LINES
D1DR        8         PN   XEROX        72
```

Step Two: In with the New… Technique

<u>TAMIOSC</u>

Device Status for Printers – SSI 83

- SSJDFREQ=SSJDOBTD

Follow the bouncing chain!

- SSJDDGNM = 'XEROX'
- Search JDPHPRPU chain and build printer status table

Step Two: In with the New… Technique

TAMIOSC

Output Totals by FORMS – SSI 80

- STATTYPE=STATOUTT
- STATSEL3=STATSNHL (non held jobs)
- STATSSL1=STATSSDS & STATSDES='XEROX'
- STATSSL1=STATSSNH (non-SYSOUT held)
- Search STATJQ and STATSETR chain and build totals table

Another Look at the TAMDS77 Screen

```
SPOOL= 52%   IN SYSTEM=3408    7 AUG 09.219   16:23:34 A

IDLE INITS: NRM-17 ADAS- 3 ADAM- 0 ADAL- 2 BPPS- 3 BPPM- 1 BPPL- 2
            FAMS- 3 FAMM- 1 FAML- 1 SIMS- 3 SIMM- 1 SIML- 4
NUMB   NAME     STEP   REGION CLASS     PRC                    REL   HELD
56998 F12AFRPR STEP01    128K ADAMCLAS A              C/I       0     14
57314 INFOPAC0 REPTPROC    0K NRMCLAS A             ERROR       0      0
                                                 DUP NAME       0      0
                                                    SETUP       0      0
                                               ALLOCATION       0      0
                                                VOL UNAVL       0      0
                                                VOL MOUNT       0      0
                                                     MAIN      28      0
                                                   OUTPUT     886   2480
                                                    PURGE       0      0
                                                  BACKLOG       0      0

                               DEVICE   JOB   STATUS  LMT  FORMS
                               XEROX1         NO WTR  <30K D100
                               XEROX2         NO WTR  <30K 1100
```

Step Two: In With The New… Technique

TAMDS77

Spool Status – SSI82

- SSJPFREQ = SSJPSPOD
- Search SSPGENI chain and calculate spool usage

Main Processor Status – SSI 82

- SSJPFREQ = SSJPJXOD
- Search JPXGENI chains for processor status

Step Two: In With The New… Technique

TAMDS77

Initiator Status – SSI 82

- SSJPFREQ = SSJPITOD
- Search ITIGDIGI chain and parse needed info

Queue Status – SSI 80

- STATTYPE = STATTERS
- Search STATJQTR chain and count based on STTRPHAZ and STTRHOLD flags

Device Status - Same as TAMIOSC call

Out with the Old… FCT

History – Think "Early '70s"

- MUSAS **(Stanford Wylbur)** implemented with OS/VS2 SVS with HASP4
  - Approx. 1000+ users – students, faculty, staff, universities
- Moved to OS/VS2 MVS with JES3
- Use TSO facilities – **slow, single-threaded**
- 1st attempted fix: Create unique interface block to support multiple STATUS and OUTPUT threads – still too slow

Out with the Old… FCT

History –

- 2nd attempted fix: Write SSISERV interface to JES3 for FETCH and LOCATE (Dave Danaczek)
  - IATUMIJ (FCT)
  - IATUMLC (LOCATE)
  - IATUMPS (FETCH, RELEASE, CANCEL, PURGE, ALTER)
  - IATUMQU (SHOW JOBS/PRINT)

This is the same code we run today – 35+ year later!

Out with the Old… FCT

Wylbur FETCH

- User issues a Wylbur "fetch" output request
- JES3 finds FDB for each output dataset and tables back to Wylbur
- Wylbur builds the I/O block and the call to the JES3 spool
- Wylbur deblocks the returned output

Old Job Status - LOCATE

JOB 33783 TESTGRP AWAITING EXECUTION PRTY=5 SHIFT=1 GROUP IS OFF

JOB 33784 TESTCLAS AWAITING EXECUTION PRTY=5 SHIFT=1 CLASS IS OFF

JOB 33785 TESTVUN IN VOLUME UNAVAILABLE QUEUE

JOB 33786 TESTVUN AWAITING EXECUTION PRTY=5 SHIFT=1 DUPLICATE JOBNAME
RUNNING

JOB 33787 TESTMNT WAITING FOR VOLUME MOUNT PRTY=5 SHIFT=1

JOB 33788 TESTALLO WAITING FOR ALLOCATION PRTY=5 SHIFT=1

JOB 33789 TESTHOLD AWAITING EXECUTION PRTY=5 SHIFT=1 IN OPERATOR HOLD

JOB 33790 TESTWTR AWAITING PRINT   CL=A F=1100 D=XEROX   L=37

JOB 33791 TESTHOUT AWAITING PRINT HOLDOUT CL=A F=1100 D=XEROX   L=39

JOB 33792 TESTOUTH AWAITING PRINT   CL=A F=1100 D=XEROX   L=37

JOB 33793 TESTCC4 AWAITING PRINT HOLDOUT CL=A F=1100 D=XEROX   L=158
                   AWAITING PRINT HOLDOUT CL=G F=1100 D=XEROX   L=258

JOB 33794 TESTABS AWAITING PRINT HOLDOUT CL=A F=1100 D=XEROX   L=75

JOB 33795 TESTABU AWAITING PRINT HOLDOUT CL=A F=1100 D=XEROX   L=160
                   AWAITING PRINT HOLDOUT CL=G F=1100 D=XEROX   L=263

JOB 33796 TESTJCLE AWAITING PRINT HOLDOUT CL=A F=1100 D=XEROX   L=28

JOB 33797 TESTEXEC EXECUTING STEP G   ON T PRTY=5 SHIFT=1

Initial Findings

- TERSE call only provides some fields we need
- Some fields are blank
- QPOS field? Always zero
- If a job is ineligible to run, get code NO INFORMATION
- MAXCC set with Cond Code, Abend code, but not on JCL errors (UPDATE: bug in my code…)
- TERSE JOB returns all jobs, including those waiting print
- TERSE OUTPUT returns *only* jobs awaiting print

New Wylbur LOCATE

JOB01888 TESTJCLE Awaiting Output WTR   JCL ERR

JOB01891 TESTEXEC Execting   on D

JOB01875 TESTGRP   No Subchain

JOB01876 TESTCLAS No Subchain

JOB01877 TESTVUN   Unavailable Volumes

JOB01878 TESTVUN   No Subchain   Duplicate Jobname

JOB01879 TESTMNT   Awaiting Mount

JOB01880 TESTALLO Awaiting Allocation

JOB01881 TESTHOLD No Subchain   In Operator Hold

JOB01882 TESTWTR   Awaiting Output WTR   CC 0000

JOB01883 TESTHOUT Awaiting Output WTR   CC 0000

JOB01884 TESTOUTH Awaiting Output WTR   CC 0000   In Operator Hold

JOB01885 TESTCC4   Awaiting Output WTR   CC 0004

JOB01886 TESTABS   Awaiting Output WTR   AB S806

JOB01887 TESTABU   Awaiting Output WTR   AB U1234

What We Learned

- This looks promising!
- What we were able to work with is powerful and versatile
- Example program in the _SSI_ manual is a good starting point
  - Might clean up the CALL section….

- STATPERF (IAZSSST) isn't set for JES3!
  - Can't measure the cost of running the SSI
- Job Owner vs Job Submitter?

- Overall, TERSE call is good enough for wildcard Wylbur LOCATE, but VERBOSE is needed for more specific

Where Do We Go From Here?

- Look forward to full filtering support in all SSIs
- Continue with JES mod elimination and MUSAS modification

Questions?

Thanks for stopping by…

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