

# z/OS 2.3 Sysprog Goody Bag

Session 20778

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In this presentation, the verb “will” is often used often shorthand for “is intended to be design to”.

# Good Stuff in z/OS 2.3

- Improved real storage frame management
- Improved real storage resource management
- More Granular Crossover Management
- Improved Response Time Goal Management
- Improved WLM Sysplex Routing
- Progress on RMODE64 Roadmap
- JES2 Modernization – email
- JES2 Modernization – password phrase
- JES2 recognition of JES3 JECL
- Accessing SMF Data in Real-time
- Enhanced VTOC integrity
- TSO/E Modernization
- DFSort Performance
- Tempus Fugit (twice)
- Other Miscellany

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# z/OS v2.3 “Preview Announcement”

## *Usability and Skills*

z/OSMF Configuration Assistant enhancements for TCP/IP (import, dynamic updates, support for Disaster Recovery configurations), Sysplex Management stage I, Incident Log, Software Management, SMP/E improvements, z/OSMF always on, ...

## *Application Development*

z/OS UNIX System Services support for Years 2038, Year 2042 TOD Clock Issue, e-Mail notification for job completion, Web Enablement Toolkit Enhancements, ISPF Improvements, ...

## *Scalability & Performance*

RMODE 64, Open Data Set Constraint Relief, SMF Constraint Relief, SMF real-time APIs, VSAM RLS Constraint Relief, ...



## *Enhancing Security*

SAF Security Deployment Descriptor, Encrypting access methods, FIPS Mode for System SSL Services, Network Authentication Services Improvements, Audit Key Lifecycle Events & FIPS Mode Audit Trail, ...

## *Availability*

zFS dynamic attribute changes, SSL hardware auto-detect, HFS to zFS online migration tool, JES2 Resiliency – Spool management, ...

## *Systems Management*

JES3 to JES2 Migration aids, 8-Character TSO/E User IDs, BCPii Performance and constraint relief, VTOC Update SMF records, zFS Shrinking, KC4Z Improvements, zFS Improvements, ...

## *Networking*

SMC-D, 3270 Intrusion Detection Services, Improved reporting of Network Security Encryption protocol usage, AT-TLS Currency, ...

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## Dynamic Large Page Support

- Currently, the management of large (1MB) pages is rigid and requires the installation to guess how much is needed.
- With dynamic large page support in z/OS 2.3 the LFAREA system parameter will no longer describe a defined area of memory, but rather it will specify the maximum number of large frames that can be allocated.
- More memory will be available for pageable large page requests because there will no longer be the arbitrary limit of 1/8 of total memory.
- The implementation will make it easier to reconstitute large frames after they have been broken up to satisfy demand for 4K pages.
- The INCLUDE1MAFC system parameter will no longer be meaningful and will essentially be forced to YES.

## Memory Pools

- Currently, it is not possible to limit the amount of real storage used by a workload.
- In z/OS 2.3, WLM will provide a means to limit the amount of real storage allocated for a set of service classes.
- A Memory Limit resource group attribute will be introduced as a means to limit the total real memory allocated to address spaces classified into service classes associated with a resource group.
- The z/OS Real Storage Manager will enforce the limits.
- z/OS RMF will report on the new attribute.
- Rollback to 2.1 and 2.2 will be provided by APAR OA50845.

## Honor Priority by Service Class

- Specialty engine crossover is when zIIP-eligible work is run on general purpose processors.
- Currently, whenever z/OS sees an instantaneous backlog of specialty engine work and IFAHONORPRIORITY [or IIPHONORPRIORITY] is YES, it will dispatch eligible work on general purpose processors.
- This can cause unimportant work to consume the more expensive resources when delaying the work would have been acceptable.
- In z/OS 2.3, WLM will provide a new service class attribute so that crossover can be controlled at a service class granularity so that important work can be expedited while unimportant work can be delayed.
- As a default, a service class will be treated in accordance with the IEAOPTxx IFAHONORPRIORITY [or IIPHONORPRIORITY] value. Alternately, a value of YES or NO will be allowed for any service class.

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## Shorter WLM response time goals

- Currently, the minimum WLM response time goal is 15 ms.
- On modern processors, many types of transaction typically complete in much less than 15 ms, allowing the service class to consistently overachieve the stated goal.
- Overachieving service classes can be run at lower priority and become vulnerable to workload spikes.
- Work in such a service class can be delayed as the average response is allowed to rise toward the 15 ms goal.
- To remedy this, WLM will support goals as low as 1 ms.



## WLM routing for soft Capping Environments

- Currently, WLM Sysplex routing service base recommendations on the rolling 3 minute average of available and displaceable capacity.
- A system which currently has ample available capacity may be about to be capped due to Defined Capacity Limit or Group Capacity Limit making it a poor choice for the routing of additional work.
- In z/OS 2.3, WLM will adjust the estimate of available and displaceable capacity based on the estimate time until a capping action will be taken. The closer a system is to an expected capping, the more the estimated capacity will be reduced.
- This will reduce the occurrences of work being slowed because it was routed to a system that actually did not have sufficient capacity due to capping.
- WLM will provide an OPTxx parameter to allow an installation to state how far in advance they want an expected capping to influence routing recommendations.

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# Progress on RMODE64 Roadmap

- The supervisor support for running code above 2GB was provided some releases ago. But there was no way to load a normal executable module above the bar nor was support enabled for services to be invoked.
- It is planned that that support will be provided in z/OS 2.3.
- But that does not mean that any program can execute correctly above the bar. It depends on what services, if any, a program uses.
- If you think you want to create a program that will be loaded above 2GB, there are some compatibility concerns that you will need to be aware of.
- It is also planned that Java JITed code be able to reside above 2GB, simplifying the JVM and providing virtual storage constraint relief for address spaces that contain a lot of Java code.

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- JES2 support for email
  - An email address can be used in lieu of USERID.
  - Of course, the email address must be in the security product for verification and mapping.
  - The email address will be set into JCL symbol &SYSEMAIL.
- New NOTIFY JCL statement requests a completion message.
  - There can be up to 8 NOTIFY statements in a job or a job group
  - Not mutually exclusive with NOTIFY keyword on JOB statement.
  - The syntax of the NOTIFY statement:  

```
//name NOTIFY [EMAIL=address | USER=userid], TYPE=EMAIL|MSG,  
              WHEN=expression
```
- The NOTIFY keyword is now allowed on a JOBGROUP JCL statement

# JES2 Modernization – password phrases

- The PASSWORD= keyword on the JOB and JOBGROUP JCL statements will accept password phrases.
- A value longer than 8 characters will be treated as a password phrase. Password phrases will be 9 to 100 characters long.
- Both an old and a new values can be specified on PASSWORD=.
  - However, both values must be either passwords or password phrases. Combination of a password and a password phrase is not supported.
- Password values will not appear in a job log or other JES2 data sets.

# JES2 recognition of JES3 JECL

- The intention is to greatly reduce the JECL conversion needed to run jobs originally coded for the JES3 environment in a JES2 environment.
- The processing of `//*xxx` statements will be activated by:
  - `$T INPUTDEF, JES3JECL=PROCESS`
- The processing of each statement type will be controlled by:
  - `$T JECLDEF, JES3= (MAIN=PROCESS, DATASET=PROCESS, ...)`

# JES2 recognition of JES3 JECL

## Support that will be provided:

```
//*MAIN                Partially supported
.  Obsolete: ACMAIN, IORATE, LREGION, MSS, RINGCHK, TRKGRPS, TYPE
.  Supported: BYTES, CARDS, CLASS, HOLD, JOURNAL, LINES, ORG, PAGES, PROC, SYSTEM, USER
.  Not Supported: DEADLINE, EXPDCHK, FAILURE, FETCH, SETUP, SPART, THWSSEP, UPDATE
//*FORMAT              Partially supported
.  Ignored: PR/PU positional
.  Supported: DDNAME, CARRIAGE/FCB, CHARS, COMPACT, COPIES, DEST, EXTWTR, FLASH, FORMS, MODIFY, PRTY, STACKER, TRAIN
.  Not Supported: CHNSIZE, INT, OVFL, THRESHLD
//*ROUTE Not supported, job stream flushed
//*DATASET              Tolerated, but not supported
//*ENDDATASET          Required if /*DATASET used
//*PROCESS             Tolerated, but not supported
//*ENDPROCESS          Tolerated, but not supported
//*NETACCT             Fully supported
//*NET                 Partially supported
.  Supported: ID/NETID, ABCMP/AC, ABNORMAL, NORMAL, NETREL/NR, NHOLD/HC, NRCMP/PC, OPHOLD/OH, RELEASE/RL
.  Obsolete: DEVPOOL, DEVRELSE, RELSCHCT/RS
//*PAUSE Not supported, ignored if present
//*OPERATOR            Supported, but message text ends in 71, not 80
```

**Obsolete** means that a warning diagnostic is written, but is otherwise ignored.

**Not supported** means that an error message is generated and the job is given a JCL ERROR

## Generic tracking added in JES2 for JECL

- Similar to what was done in JES3 in z/OS 2.2 and will apply to both JES2 and JES3 JECL

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# Accessing SMF Data in Real-time

- Currently, SMF data can be accessed as it is written using the IEFU83/IEFU84/IEFU85 exits.
  - Requires authorized user exit code
  - No ability to limit processing to specific SMF record types
- z/OS 2.3 will provide new SMF Real-time Services
  - Define new “In-memory (INMEM) Resources” for specific records
  - Will be able to write any set of SMF records to a in-memory resource only
  - APIs will allow applications to access SMF data as it is buffered
    - Access by unauthorized programs will be policed via SAF
    - It will provide a Connect/Get/Disconnect model similar to traditional QSAM access
    - Potential use-cases include
      - Detect security violations in real-time
      - Real time monitoring of resource usage
      - Dynamic Job Scheduling based on current resource consumption
  - Support was rolled back to V2R1 and V2R2 via APAR OA49263

***NB. Not Supported when RECORDING(DATASET) is use.***

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## 8 Character TSO User IDs

- TSO/E will allow userids that are up to 8 characters long
  - Users in UADS still have 7 character restriction
- All commands that accept userids will accept 8 character userids/prefixes
  - except ACCOUNT sub-commands
- PROFILE PREFIX will accept 8 character PREFIX values
- New IKJTSOxx keyword to support activation
  - USERID MAX {(7)} | {(8)} on the LOGON statement
- Messages for 8 character IDs can only be stored in User Logs
  - If User Logs not activated then message will not be stored

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# Health Checker Enhancements

- To make it easier to share a single policy member across all the systems in a Sysplex:
  - V2R2 APAR OA49807 introduced the capability to provide **conditional phrases** for POLICY statements as well as other statements allowed in HZSPRMxx.

- Best described with an example:

```
WHEN(&SYSNAME. IN ('SY07','SY08','SY09'))
DO
  ADDREP POLICY UPDATE CHECK(OWNER1,CHECK1) INACTIVE
  REASON('Not needed on system 7,8, and 9') DATE(20150811)
WHEN(&SYSNAME. = 'SY08')
DO
  ADDREP POLICY UPDATE CHECK(OWNER2,CHECK2) INACTIVE
  REASON('Not needed on system 8') DATE(20150811)
END /* SY08 */
ADDREP POLICY UPDATE CHECK(OWNER3,CHECK3) INACTIVE
  REASON('Not needed on system 7,8, and 9') DATE(20150811)
END /* SY07, SY08, SY09 */
```

- Debug aid message in hardcopy log:

**HZS0118I** WHEN EVALUATED TO {TRUE|FALSE} IN PARMLIB MEMBER=HZSPRMxx ON LINE *n*

- A new CHECK command option will syntax check HZSPRMxx members before deploying

- Logging VTOC updates
  - z/OS 2.2 EXCP creates SMF type 42 subtype 27 records
  - In z/OS 2.3, DFSMS DADSM/CVAF will build SMF 42.27 record and include before and after DSCB images.
  - A new SMF type 42 subtype 28 record will log events that affect an entire volume.
- A new DFSMS CVAF interface will be provided to protect against accidental modification of critical fields
  - A new VALIDATE=YES/NO will be added to request the check.

- The Year 2038 issue is also known as the UNIX Y2K problem.
  - Times after 03:14:07 UTC on 19 Jan 2038 cannot be encoded.
  - All AMODE 31 C/C++ programs which use `time_t` directly or indirectly can be affected by the Year 2038 issue.
  - z/OS 1.9 provided some support for dates beyond 2038
  - z/OS 2.3 will provide uniform support for a 64-bit time value.
    - A 64-bit value can encode dates out to **292,277,026,596**
    - Some of the support may be provided via PTF
  - Needless to say, application changes may be required.

## TOD Clock wrap-around in 2042

- S/370 architecture defines an *epoch* to be 142 years and 8½ months.
  - The 64-bit TOD value can encode the times in one epoch.
  - The Standard Epoch starts 1 Jan 1900 at 00:00:00 a.m.
- ESA/390 extended the clock to 104 bits
  - This only increased the precision of the TOD.
  - The STCKE instruction stores an 8-bit epoch index in front of the 104-bit TOD clock value. It is currently always 0.
  - For dates in TOD clock format, dates after 2042 have a non-zero epoch index, creating 9-byte timestamps.
- Timestamps in APIs, record formats future expiration dates, and interval calculation may require remediation
- z/OS is starting the process in this release.

- DFSORT performance improvement
  - DFSORT generate code on the fly for some functions
  - The generated code would store into the same cache line as the code
  - Doing something that lets the processor think that an instruction in the i-cache may have been altered has gotten progressively more expensive with newer processors.
  - In z/OS 2.3 the generated code does a better job of separating data from code.
- DFSORT multiple record support for E15 and E35 exits
  - Linkage overhead can be reduced by providing DFSORT with multiple records through E15 and accepting multiple sorted records through E35.

- The Sub-Capacity Reporting Tool (SCRT) will be included as a component of z/OS
  - It will continue to be available as a web download
  - Also, SCRT will enable the generation of ISV-based reports
- To avoid running out of SMF record types, SMF will support up to 2048 unique record type values:
  - 0-127, 1152-2047 – IBM assigned
  - 128-1151 – available for non-IBM use
- Concurrently open datasets for DB2
  - DFSMSdfp VSAM enhancements are planned to provide improved performance and scalability for DB2 workloads by allowing the number of concurrent open data sets in a single address space to grow and by improving performance of data set close processing.
  - Target is 400,000 open data sets per address space

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