



IBM Software Group

## *TPF Users Group Spring 2006*

Various TPF Base Updates

Name : Michael Shershin  
Venue : SCP Subcommittee

**AIM Enterprise Platform Software**

IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

© IBM Corporation 2006

Any references to future plans are for planning purposes only. IBM reserves the right to change those plans at its discretion. Any reliance on such a disclosure is solely at your own risk. IBM makes no commitment to provide additional information in the future.

# Agenda

- Dump enhancements
  - ▶ ZSTAT DUMP HISTORY
  - ▶ ZSTAT DUMP SNAP HISTORY
  - ▶ Duplicate dump handling
  - ▶ Dump post processor
- Record hold table enhancements
- MAH Enhancements
- Improve time measurement for DLAYC / DEFRC
- ZSPER enhancements
- ZDECB enhancements
  - ▶ Filtering
  - ▶ User exit
  - ▶ Precision
- TOD Clock Validation
- Norm State Pool Reallocation details
- Other pools enhancements

# ZSTAT DUMP HISTORY

## ZSTAT DUMP SNAP HISTORY

- z/TPF APAR PJ30686
- Displays last 8 dumps or SNAPS
- Not saved across an IPL

### zstat dump history

CSMP0097I 16.35.53 CPU-B SS-BSS SSU-HPN IS-01 \_

STAT0030I 16.35.53 DUMP HISTORY DISPLAY

| SEQNUM | DUMP  | NUMBER | TRC  | PGM  | LOADSET | LNI     | ATA | TIME     | SS  | SSU | IS |
|--------|-------|--------|------|------|---------|---------|-----|----------|-----|-----|----|
| 9522   | OPR-I | ODECB0 | QDCA | CP   |         | 010000B |     | 09.54.49 | BSS | HPN | 01 |
| 9523   | OPR-I | ODECB0 | QDCA | CTAD | BASE    | 010000B |     | 09.54.54 | BSS | HPN | 01 |
| 9524   | CTL-I | 0000D9 | QSG5 | CP   |         | 010012B |     | 10.59.28 | BSS | HPN | 01 |
| 9525   | CTL-I | 064905 | CPS0 |      |         | 000000B |     | 11.13.28 | BSS | HPN | 01 |
| 9526   | CTL-I | 064905 | CPS0 |      |         | 000000B |     | 11.13.28 | BSS | HPN | 01 |
| 9527   | OPR-I | 007777 | QSG3 | CTIS | BASE    | 000000B |     | 11.14.40 | BSS | HPN | 01 |
| 9528   | OPR-I | 999999 | QSG3 | QSG3 | BASE    | 000000B |     | 11.15.06 | BSS | HPN | 01 |
| 9529   | OPR-I | 007777 | QSGA | CTIS | BASE    | 000000B |     | 12.56.13 | BSS | HPN | 01 |

END OF DISPLAY+

# Duplicate Dump Handling

- z/TPF APAR PJ30740
- Display contents of duplicate dump table
  - ▶ ZDSER DUPL
  - ▶ ZDSER SNAP DUPL
- Remove selected dumps from duplicate dump table
  - ▶ ZASER REMOVE
  - ▶ ZASER SNAP REMOVE
- Duplicate dumps are based on
  - ▶ memory address of dump
  - ▶ SERRC number
  - ▶ Trace name / Program name
  - ▶ Subsystem

## ZDSER DUPL Example

zdsr dupl

```
CSMP0097I 16.40.10 CPU-B SS-BSS SSU-HPN IS-01
DSER0020I 16.40.10 DUPL DISPLAY
DUMP NUMBER SS PGM ADDRESS
I000DECB5 BSS QDCA 000000000001D9FA
I000DECB0 BSS QDCA 0000000000013D3E
I000DECB0 BSS QDCA 00000003C9E6E1A4
I00007777 BSS QSG3 00000003CA6DE5E8 _
I00999999 BSS QSG3 00000003C87B5D34
I00007777 BSS QSGA 00000003CA6DE5E8
END OF DISPLAY+
```

## Dump post processor

- z/TPF APAR PJ30847
- Include the following line at the start of each post processed dump
  - ▶ START OF POST PROCESSING RUN
- Intended to assist automation

```
START OF POST PROCESSING RUN FOR DUMP 7223
```

```
START OF POST PROCESSING RUN FOR DUMP 7323
```

# Record Hold Table Enhancements

- z/TPF APAR PJ30682
- CTL-21 record hold table full has been eliminated
  - ▶ If all overflow entries are in use, system heap will be obtained to extent the RHT
    - New overflow entries in system heap block will be added to RHT chain of available overflows
- Hold table monitor
  - ▶ Identify file addresses in hold table whose ECB exited and hold table cleaned up was skipped
    - CE1HLD has been zeroed prior to exit
  - ▶ Do UNFRC on these file addresses

## Missing Attention Handler (MAH) Enhancements

- TPF 4.1 APAR PJ30852
- z/TPF APAR PJ31006
- MAH is always active
- Default timeout value is
  - ▶ 5 seconds for native TPF
  - ▶ 10 second under VM
  - ▶ ZSONS DISPLAY MAH
  - ▶ ZSONS ALTER MAH
- During MPLF reconnect, MAH will not
  - ▶ grant locks
  - ▶ allow purges to be considered to be complete
- If MPLF reconnect fails, locks will not be granted on the affected DASD subsystem



## Improve Time Measurement for DLAYC / DEFRC

- TPF 4.1 APAR PJ30352
- zTPF APAR PJ30632
- Time used to add to accumulator calculated by
  - ▶ Executing 10 DEFRCs and finding the lowest time
- Scenarios for adding time to the delay / defer accumulator will vary
  - ▶ DLAYC, DEFRC, or YIELD VCT executed
    - Predetermined time added to accumulator
  - ▶ LODIC returns "not enough resources" and DLAYC or DEFRC is executed
    - Time from end of LODIC to top of CPU loop is added to accumulator
  - ▶ DLAYC or DEFRC gives up control; on return LODIC returns "not enough resources" and DLAYC or DEFRC is executed
    - Total time ECB dispatched will be added to accumulator
  - ▶ YIELD READY executed
    - No time is added to accumulator

# ZSPER Enhancements

- z/TPF APAR PJ30738
- Trace alters of a specific memory location to a specific value
  - ▶ ZSPER STORE INTO-address.bytes MDATA-value
  - ▶ ZSPER STORE INTO-address.bytes MINSTR-instruction
  - ▶ ZSPER BRANCH INTO-address.bytes MINSTR-instruction
  - ▶ ZSPER INSTR RANGE-address.bytes MINSTR-instruction

# ZDECB Filtering Enhancement

- z/TPF APAR PJ30691
- Provide filtering capabilities on ZDECB
  - ▶ PGM-program\_name      NOPGM-program\_name
  - ▶ TRC-trace\_name        NOTRC-trace\_name
  - ▶ SSU-ssu\_name          NOSSU-ssu\_name
  - ▶ IS-istream\_number    NOIS-istream\_number
  - ▶ SVC-svc\_name          NOSVC-svc\_name
- User exits provided in UVXS
  - ▶ include\_ecb\_user\_exit()
    - ZDECB INCLUDE-value will be passed to user exit
  - ▶ get\_input\_msg\_user\_exit()

## ZDECBC Filtering Example

### zdecb 0 svc-fi whc

CSMP0097I 16.22.37 CPU-B SS-BSS SSU-HPN IS-01

DECBC0014I 16.22.37 DISPLAY ECB SUMMARY

| ECB ADDR | SSU | IS | PGM  | TRC | MIN  | SC | ORIGIN | I | H | DSP | SVC            |
|----------|-----|----|------|-----|------|----|--------|---|---|-----|----------------|
| 13911000 | HPN | 1  | XLAA | *   | XLAA | 0  | CXFR   | 1 | 1 | 1DC | FIWHC CC01E820 |

TOTAL 1

END OF DISPLAY+

### zdecb 0 pgm-comx

CSMP0097I 16.25.53 CPU-B SS-BSS SSU-HPN IS-01

DECBC0014I 16.25.53 DISPLAY ECB SUMMARY

| ECB ADDR | SSU | IS | PGM  | TRC  | MIN | SC | ORIGIN | I | H | DSP | SVC   |
|----------|-----|----|------|------|-----|----|--------|---|---|-----|-------|
| 13653000 | HPN | 2  | COMX | COMX | 999 | 24 | CXFR   | 1 |   | 0   | SAWNC |
| 137E2000 | HPN | 2  | COMX | COMX | 999 | 24 | CXFR   | 1 |   | 0   | SAWNC |
| 138F0000 | HPN | 2  | COMX | COMX | 999 | 24 | CXFR   | 1 |   | 0   | SAWNC |
| 13A8E000 | HPN | 2  | COMX | COMX | 999 | 24 | CXFR   | 1 |   | 0   | SAWNC |
| 13B2A000 | HPN | 10 | COMX | COMX | 999 | 23 | CXFR   | 1 |   | 0   | SAWNC |
| 13CEF000 | HPN | 2  | COMX | COMX | 999 | 24 | CXFR   | 1 |   | 0   | SAWNC |
| 13ECC000 | HPN | 2  | COMX | COMX | 999 | 24 | CXFR   | 1 |   | 0   | SAWNC |

TOTAL 7

END OF DISPLAY+

# ZDECBC Precision Enhancement

- z/TPF APAR PJ30803
- Displays of MILS, FIND, FILE, and GETF will summarize the numbers
  - ▶ If number = 5000, display as 5K
  - ▶ If number = 5000000, display as 5M
- Override summarizing
  - ▶ ZDECBC STAT PRECISION-
    - PRECISION-ALL
    - PRECISION-MILS
    - PRECISION-FIND
    - PRECISION-FILE
    - PRECISION-GETF

## ZDECBC Precision Examples

zdecb stat all nopgm-c

```
CSMP0097I 16.31.36 CPU-B SS-BSS SSU-HPN IS-01
DECB0014I 16.31.36 DISPLAY ECB SUMMARY
ECB ADDR  SSU IS  PGM      TRC MIN SC   MI LS   F4K F1MB  FIND  FILE
GETF
13932000 HPN    1 QSGJ      QSGJ 999 26     6K    0    0    0    0
0
13755000 HPN    1 XLAA * XLAA      0     0    0    0    1    0
0
TOTAL                2
END OF DISPLAY+
```

zdecb stat all nopgm-c precision-mils

```
CSMP0097I 16.31.53 CPU-B SS-BSS SSU-HPN IS-01
DECB0014I 16.31.53 DISPLAY ECB SUMMARY
ECB ADDR  SSU IS  PGM      TRC MIN SC   MI LS   F4K F1MB  FIND  FILE
GETF
13932000 HPN    1 QSGJ      QSGJ 999 44   6342    0    0    0    0
0
13BAE000 HPN    1 XLAA * XLAA      0     0    0    0    1    0
0
TOTAL                2
END OF DISPLAY+
```

## TOD Clock Validation

- z/TPF APAR PJ30869
- TPF 4.1 APAR PJ31088
- In restart compares processor TOD to other confirmed processors in the loosely couplex complex
  - ▶ STCK #1 on IPLing processor
  - ▶ SIPCC to all other processors in loosely coupled complex
  - ▶ STCK #2 on other confirmed processors
  - ▶ SIPCC to requesting processor
  - ▶ STCK #3 on requesting processor
  - ▶ Order must be: STCK #1 < STCK #2 < STCK #3
  - ▶ If order not met, warning message sent
    - CTDV0005W 10.15.41 TOD CLOCK ON CPU-x IS NOT IN SYNCH WITH TOD CLOCK ON CPU-y
- Intended to catch incorrectly configured LPARs when ETR offset support is used

## Norm State Pool Reallocation

- z/TPF APAR PJ30910
- Complex outage not needed to do a pool reallocation
  - ▶ If fallback is needed, complex outage is still required
- Function
  - ▶ Add new pool segments anywhere in configuration
  - ▶ Expand existing pool segments
  - ▶ Combine existing pool segments as long as first pool segment has a even multiple of 8000 addresses in it
  - ▶ Add new pool sections
  - ▶ Deactivate pool segments
  - ▶ Delete pool segments as long as they were previously deactivated
- Additional new function
  - ▶ Force reorder in core pool directory
  - ▶ Empty a pool directory
  - ▶ IPL no longer required for a change in pool set size to take effect
  - ▶ Validate DASD Format



## Norm State Pool Reallocation

- How does it work?
  - ▶ New record types are used for
    - Pool segment table
    - Directory records
    - Short term control records
  - ▶ New records are created with the new configuration
  - ▶ Changes to current directory records are shadow copied to new directory records
  - ▶ At time to use new configuration, use new records
  - ▶ If fallback needed, go back to old records
- Initialization
  - ▶ ZPOOL NORM INIT PDIR-SONRI PSEG-PSTXCUR  
STCCR-STCCR
    - One time command
    - If not initialized, restart will stop and prompt for this command
    - Restore procedures should be updated to include this command

## Norm State Pool Reallocation - Steps to do a reallocation

1. FCTB load
2. Validate DASD format
  - ▶ ZSVTT
3. Set control information
  - ▶ ZPOOL NORM ALTER PDIR-new\_dir PSEG-new\_pst STCCR-new\_stccr
4. Create new pool directories
  - ▶ ZPOOL NORM GENERATION CREATE
5. Copy status of currently in use directories
  - ▶ ZPOOL NORM GENERATION RECONFIGURE
6. Use new directories
  - ▶ ZPOOL NORM GENERATION UPDATE
7. Verify that you want to use new directories
  - ▶ ZPOOL NORM GENERATION ONLINE CONTINUE
8. Initialize pseudo directories (must be done before first Recoup run)
  - ▶ ZPOOL INIT PSDIR

## Norm State Pool Reallocation - Control functions

- Define new record types
  - ▶ ZPOOL NORM ALTER PDIR-new\_dir PSEG-new\_pst STCCR-new\_stccr
    - PDIR-new\_dir defines pool directory record type (current PDIR=SONRI)
    - PSEG-new\_pst defines pool segment table (current PSEG=PSTXCUR)
    - STCCR-new\_stccr defines short term control record (current STCCR=STCCR)
- Select next reorder usage
  - ▶ ZPOOL NORM ALTER NEXTDIR- SECTION-
    - NEXTDIR-NEXT uses next scheduled directory in section on next reorder
    - NEXTDIR-FIRST uses first directory in section on next reorder
    - NEXTDIR-NEW uses first new directory in section on next reorder
- Select whether to define new pools as available or in use
  - ▶ ZPOOL NORM ALTER FILL-
    - FILL-FULL defines new pools as available; this is the default
    - FILL-EMPTY defines new pools as in use
- Display settings
  - ▶ ZPOOL NORM DISPLAY

## Norm State Pool Reallocation - Fallback

- Fallback is to previous record types
  - ▶ Data in previous record types not changed since UPDATE command
- Steps to do a fallback
  1. All active processors in the loosely coupled complex must be in 1052 state
  2. Do the fallback
    - ZPOOL NORM GENERATION FALLBACK
  3. Verify that you want to fallback
    - ZPOOL NORM GENERATION ONLINE CONTINUE
  4. Empty directories that were in memory following completion of reallocation until cycle to 1052
    - ZPOOL EMPTY DIR-dir\_number SECTION-section\_name
  5. Run a reconcile
    - ZRFPC
  6. Cycle systems to norm
  7. Initialize pseudo directories (must be done before first Recoup run)
    - ZPOOL INIT PSDIR

## Norm State Pool Reallocation - use of FILL=EMPTY

- When to use ZPOOL NORM ALTER FILL=EMPTY
  - ▶ Consider the following case
    1. A pool reallocation is done to allocate new pool addresses.
    2. Some of the new pool addresses are dispensed.
    3. A fallback of the pool reallocation is done.
    4. Some of the new pool addresses remain in use.
    5. The problem with the pool reallocation is found and fixed.
    6. A subsequent pool reallocation is done.
      - Same new pool addresses allocated in Step 1 are allocated in Step 6.
      - Must protect the pool addresses dispensed in Step 2.
      - Use FILL=EMPTY.

## Norm State Pool Reallocation - Additional functions

- Display status of norm state pool reallocation
  - ▶ ZPOOL NORM GENERATION STATUS
- Abort norm state pool reallocation
  - ▶ ZPOOL NORM GENERATION ABORT
  - ▶ Restart at Step 3. Set control information
- Force a directory reorder
  - ▶ ZPOOL FORCE REORDER SECTION-pool\_section
- Empty a directory
  - ▶ ZPOOL EMPTY DIR-decimal\_directory\_nbr SECTION-pool\_section
  - ▶ ZPOOL EMPTY DIRX-hex\_directory\_nbr SECTION-pool\_section
- Change set size without requiring an IPL
  - ▶ ZGFSP SET pool size
- Display current in use PDIR, PSEG, STCCR
  - ▶ ZGFSP DSP

## Norm State Pool Reallocation - Examples

```
zpool norm alter pdi r-sonv0 pseg-pstv0 stccr-stcv0
```

```
CSMP0097I 13.00.02 CPU-B SS-BSS SSU-HPN IS-01  
POOL0010I 13.00.02 THERE ARE 2749 RECORDS ALLOCATED TO SONVO FILE TYPE+  
CSMP0097I 13.00.02 CPU-B SS-BSS SSU-HPN IS-01  
POOL0010I 13.00.02 THERE ARE 59 RECORDS ALLOCATED TO PSTVO FILE TYPE+  
CSMP0097I 13.00.02 CPU-B SS-BSS SSU-HPN IS-01  
POOL0010I 13.00.02 THERE ARE 24 RECORDS ALLOCATED TO STCVO FILE TYPE+  
CSMP0097I 13.00.02 CPU-B SS-BSS SSU-HPN IS-01  
POOL0009I 13.00.02 ALTER COMPLETED+
```

```
zpool norm alter nextdi r-first section-4d6a
```

```
CSMP0097I 13.09.02 CPU-B SS-BSS SSU-HPN IS-01  
POOL0009I 13.09.02 ALTER COMPLETED+
```

## Norm State Pool Reallocation - Examples

**zpool norm display**

```
CSMP0097I 13.15.31 CPU-B SS-BSS SSU-HPN IS-01
POOL0050I 13.15.31 Display of the Pool Control record:
NORM state pool reallocation is not active.
```

```
Current directory fill indicator is: INITIAL
New directory fill indicator is: FULL
Previous directory fill indicator is: INITIAL
```

```
—
Current      New      Previous
PDIR        #SONRI   #SONVO     null
PSEG        #PSTXCUR #PSTVO     null
STCCR       #STCCR   #STCVO     null
```

```
Not set: none
Use first: SLTA LLTA 4LTA 4DPA 4D6A
Use next:  SSTA SDPA LSTA LDPA 4STA SLTB SSTB SDPB LLTB LSTB
           : LDPB 4LTB 4STB 4DPB SLTC SDPC LLTC LDPC 4LTC 4DPC
           : SLTD SDPD LLTD LDPD 4LTD 4DPD 4D6B 4D6C 4D6D
Use new:   SSTC LSTC 4STC SSTD LSTD 4STD
```

End of display+



## Norm State Pool Reallocation - Examples

### zpool force reorder section-4d6b

CSMP0097I 13.17.14 CPU-B SS-BSS SSU-HPN IS-01

CYAY0010I 13.17.14 POOL REORDER COMPLETE+

CSMP0097I 13.17.14 CPU-B SS-BSS SSU-HPN IS-01

CYC00003I 13.17.14 POOL TYPE 4D6 DEVICE DEVB DIRECTORIES

2115 THRU 2115 COUNTS 1200 IN USE+

CSMP0097I 13.17.14 CPU-B SS-BSS SSU-HPN IS-01

CYC00003I 13.17.14 POOL TYPE 4D6 DEVICE DEVB DIRECTORIES

2116 THRU 2116 COUNTS 1200 IN USE+

### zpool empty dirx-490 section-4dpa

CSMP0097I 13.20.18 CPU-B SS-BSS SSU-HPN IS-01

CYAZ0020I 13.20.18 DIRECTORY EMPTY ENDED WITH NO ERRORS+

## Other Enhancements - CA / FC33

- z/TPF APAR PJ30810
- Allow CA and FC33 to be 4K in size
- Based on size defined in RIAT
- Record ID = CA, CYSRB is the son return block
  - ▶ 1055 bytes supported
    - Current size in TPF 4.1
    - Default
  - ▶ 4K supported
  - ▶ FARF6 supported
- Record ID = FC33, I80I8 houses the CA file addresses
  - ▶ 1055 bytes supported
    - Current size in TPF 4.1
    - Default
  - ▶ 4K supported
  - ▶ FARF6 is NOT supported

## Other Enhancements - Short term pool recycle message

- z/TPF APAR PJ30926
- Short term pool recycle messages includes additional information
  - ▶ Amount of time since the youngest directory was last used

```
CYC10006I 20.21.01 POOL TYPE SST DEVICE DEVA COUNTS      1100 IN USE
MOST RECENT DIRECTORY LAST USED          14 MINUTES AGO+
```

```
CYC10007I 20.21.40 POOL TYPE 4ST DEVICE DEVA COUNTS      360 IN USE
FIRST TIME THE DIRECTORY IS BEING USED SINCE LAST REALLOCATION+
```

## Trademarks

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

### Notes

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

This presentation and the claims outlined in it were reviewed for compliance with US law. Adaptations of these claims for use in other geographies must be reviewed by the local country counsel for compliance with local laws.