

SCP other System Enhancements

PJ46055 – Multiple Module Copy Enhancements

PJ46352 – Subsecond CRETC

PJ46055

Multiple Module Copy Enhancements

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Mark Lehrer

Problem Statement

Multiple-module copy

Multiple-module copy allows up to 20 copies to run simultaneously. In addition, there are controls that restrict the number of copies by complex, control unit, and processor. These controls were needed when this support was released 25 years ago. Because technology has advanced, these controls are too restrictive today.

After a DASD error, parts of the DASD subsystem might be running simplex. Current multiple-module controls extend risk of a complex outage when running simplex.

Pain Points

PJ46055 – Multiple Module Copy Enhancements

Prior to PJ46055, copying modules was restricted to:

- A maximum of 20 concurrent copies in the complex (COMPLEX).
- A maximum of 10 concurrent copies owned/operating on a single processor (PROCESSOR).
- A maximum of 10 concurrent copies operating on a single channel (CHANNEL).
- A maximum of 5 concurrent copies operating in a single logical DASD subsystem or LSS (CU).

Migration to a new DASD controller often involves copying hundreds of devices. Managing these copy sessions is time consuming.

A hardware failure may result in a large number of devices being in simplex mode until recovery (ZMCPY UP) completes. Minimizing recovery time is critical.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

The Copy Control Table has been updated to allocate 100 module copy entries.

- The new copy control table, in Keypoint V, does not intersect with the old location of the table.
- Customers can now modify the module copy limits up to system-defined maximums. The default limits are similar to the maximums prior to PJ46055.
- MCPY outputs were updated to account for the increased number of module copies.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

With PJ46055, the maximum module copy limits are:

- 100 concurrent copies in the complex (COMPLEX). Initialized default is 20.
- 100 concurrent copies owned/operating on a single processor (PROCESSOR). Initialized default is 20. This is different than the pre-PJ46055 maximum of 10.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

With PJ46055, the maximum module copy limits are (continued):

- A maximum of 100 concurrent copies operating in a single logical DASD subsystem or LSS (CU), or 14 if loosely coupled. Initialized default is 5 for HPO and 100 for non-HPO systems.
- The CHANNEL limit was removed. It has never been used in z/TPF.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

ZMCPY STATUS example output (pre-PJ46055)

```
CSMP0097I 14.49.00 CPU-B SS-BSS SSU-HPN IS-01
MCPY0290I 14.49.00 COPY 1 - ALL FILE COPY ACTIVE ON PROC B
FROM DVC MOD TO DVC MOD
      0DE5 0055      0D50 0113
CURRENT CCHH 025D 0004
CSMP0097I 14.49.00 CPU-B SS-BSS SSU-HPN IS-01
MCPY0290I 14.49.00 COPY 2 - ALL FILE COPY ACTIVE ON PROC B
FROM DVC MOD TO DVC MOD
      0DE6 0057      0D51 0114
CURRENT CCHH 014E 0005
CSMP0097I 14.49.00 CPU-B SS-BSS SSU-HPN IS-01
MCPY0290I 14.49.00 COPY 3 - ALL FILE COPY ACTIVE ON PROC B
FROM DVC MOD TO DVC MOD
      0DE7 0059      0D52 0115
CURRENT CCHH 033D 0007
```


Technical Details

PJ46055 – Multiple Module Copy Enhancements

ZMCPY STATUS example output:

```
MCPY0283I 11.43.10 MODULE COPY STATUS - TOTAL NUMBER OF COPIES IS 14
SLOT TYPE      STATUS
   1 COPY UP    ACTIVE   ON PROC B      7130 001F      7030 001E      1726 0002
   2 COPY UP    ACTIVE   ON PROC B      7131 0020      7031 0021      15D6 000E
   3 COPY UP    ACTIVE   ON PROC B      7132 0023      7032 0022      16F4 000C
   4 COPY UP    ACTIVE   ON PROC B      7033 0025      7133 0024      10F5 000B
   5 COPY UP    ACTIVE   ON PROC B      7034 0026      7134 0027      168E 000E
   6 COPY UP    ACTIVE   ON PROC B      7035 0029      7135 0028      12DE 000A
   7 COPY UP    ACTIVE   ON PROC B      7136 002B      7036 002A      12E9 0007
   8 COPY UP    ACTIVE   ON PROC B      7137 002C      7037 002D      10F3 000E
   9 COPY UP    ACTIVE   ON PROC B      7039 0031      7139 0030      0D96 0005
  10 COPY UP    ACTIVE   ON PROC B      703A 0032      713A 0033      12AD 000C
  11 COPY UP    ACTIVE   ON PROC B      703B 0035      713B 0034      0E20 000D
  12 COPY UP    ACTIVE   ON PROC B      713C 0037      703C 0036      12D5 000D
  13 COPY UP    ACTIVE   ON PROC B      713D 0038      703D 0039      10C6 0004
  14 COPY UP    ACTIVE   ON PROC B      703F 003D      713F 003C      0CED 000E
END OF DISPLAY
```

Technical Details

PJ46055 – Multiple Module Copy Enhancements

Coexistence/Migration Concerns

- For an L/C customer you cannot run module copies while in a coexistence environment (processors IPLed on PJ46055 and pre-PJ46055 images). The copy control tables are at two different locations in Keypoint V. Errors will occur.
- Since the copy control table is in a new location it will be initialized to default limits on the first IPL of the new support. Review these default limits and make updates.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

Loosely Coupled Concerns (CU limit)

To accommodate a maximum larger than 5 for the CU limit, additional changes were made:

- The ZBUFC ALLOCATE, ZBUFC ALLOCATE DISPLAY, and ZBUFC STATUS commands have been updated.
- The LOCKS parameter is now LOCKS1, to represent the lock space size for MPLF partition 1.
- New parameter LOCKS2 represents the lock space size for MPLF partition 2. The LOCKS2 parameter is set to an initial value of 0. A value of 0 is treated as a value of 5 to be compatible with processing before APAR PJ46055.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

ZBUFC ALLOCATE DISPLAY example output:

```
BUFC0001I 13.29.15 RC CONTROL UNIT CACHE ALLOCATIONS
```

```
CURRENT    RC381- 1,RC1055- 1,RC4096- 1,RCBUF- 1_
```

```
TARGET     RC381- 1,RC1055- 1,RC4096- 1,RCBUF- 1_
```

```
BUFC0002I 13.29.15 RCS CONTROL UNIT CACHE ALLOCATIONS
```

```
CURRENT    RCS381-25,RCS1055-25,RCS4096-25,RCSBUF-25,LOCKS1-255,LOCKS2- 14
```

```
TARGET     RCS381-25,RCS1055-25,RCS4096-25,RCSBUF-25,LOCKS1-255,LOCKS2- 14
```

Technical Details

PJ46055 – Multiple Module Copy Enhancements

ZBUFC STATUS example output (portion of display):

```
BUFC0004I 15.05.33 STATUS FOR DEVICE-7400 RCS SSID-2040
```

```
DEVICE COUNT - 64      STATISTICS COUNT/DEVICE - 4
CONFIGURED SS STORAGE - FFFFFFFF
AVAILABLE SS STORAGE  - 4E3FD000
PINNED SS STORAGE     - 00000000
OFFLINE SS STORAGE    - 00000000
CONFIGURED NVS STORAGE - 00000000
PINNED NVS STORAGE    - 00000000
```

```
CACHE ALLOCATION: (RECORD SLOT SIZES 1-3)
SIZE - TRACK      381      1055      4096
RATIO - 25         25         25         25
LOCKS1 - 255
LOCKS2 - 14
```

...

PJ46055 – Multiple Module Copy Enhancements

Extended-Measurement Word (EMW) Data

There have been several customer situations over the years where having access to the Extended-Measurement Word (EMW) data would have proven very useful in debugging. This data includes the components of the response time for the I/O (for example, device-connect time, function-pending time, etc.).

EMW data is always available; not just when multiple-module copy is running.

Prior to PJ46055 z/TPF did not save EMW data.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

With PJ46055, the Extended-Measurement Word (EMW) data is now saved during interrupt processing.

- The first level interrupt handler was updated to save the EMW data to the LDEV trace entry. This means that the EMW is available in dumps as well as in ZIOTR DISPLAY TRACE outputs.
- The DASD second level interrupt handler was updated to save the EMW data to the last 32 bytes of the IOB. The exception case is an asynchronous interrupt like attention as it does not have an associated IOB.

Technical Details

PJ46055 – Multiple Module Copy Enhancements

ZIOTR DISPLAY TRACE example output:

```
IOTR0010I 15.49.39 TRACE ENTRIES, SUBCHANNEL 00010033, LDEV 00000000012EAE00
*Event      *TOD Clock          *ISN  *CC  *SCSW / Return Address      *DORPRM
      *Macro Parameters
                                *Extended-Status Word
                                *Extended-Measurement Word
                                *Extended-Measurement Word (continued)
INT      CC04AD42 1CD13740 01      10C04007 03AA28A0 0C000000 0F8FE200
      SLIH-001BCFE6
                                00100002 00000000 00000000 00000000
                                000000F2 0000010D 00000000 00000000
                                00000000 00000000 00000000 00000000
SIOSC   CC04AD42 1C3D60C0 01      00 001C11C6      0F8FE200
      CCW CPA-03AA2878 KEY-1 LPM-F0
INT      CC04AD2D 7EA943A0 01      10C04007 03AA28A0 0C000000 0F925600
      SLIH-001BCFE6
                                00100001 00000000 00000000 00000000
                                000000C0 000000F9 00000000 00000000
                                00000000 00000000 00000000 00000000
SIOSC   CC04AD2D 7E46EE60 01      00 001C11C6      0F925600
      CCW CPA-03AA2878 KEY-1 LPM-F0
```


Technical Details

PJ46055 – Multiple Module Copy Enhancements

Main Storage Dump example output:

```
*COLLATED LDEVBK I/O TRACE ENTRIES
*Event  *SDA  *ALS  *SIW  *I/O-Old PSW / Macro Parameters      *TOD Clock      *ISN  *DORPRM
      *SCSW/ESW / Macro Return Address
      *EMW
SIOSC   8518  ----  3457  CCW CPA-03836478 CC-0 KEY-1 LPM-C0      D89C23CB B875CC00  0001  0F49F600
      00201418          00062054 10C04007
(Int)   8518  ----  3457  0704C001 80000000 00000000 00062054      D89C23CB B875BF3A  0001  0F49AC00
      10C04007 038364A0 0C000000 00800001 00000000 00000000 00000000 00000000
      00000082 000000D7 00000000 00000000 00000000 00000000 00000000 00000000
SIOSC   8513  ----  3452  CCW CPA-03833078 CC-0 KEY-1 LPM-C0      D89C23CB B872D22C  0001  0F42F600
      00201418          00062054 10C04007
(Int)   8513  ----  3452  0704C001 80000000 00000000 00062054      D89C23CB B8729308  0001  0F45D200
      10C04007 038330A0 0C000000 00400001 00000000 00000000 00000000 00000000
      00000106 000002EF 00000000 00000000 00000000 00000000 00000000 00000000
```

Technical Details

High Performance FICON (HPF) translation support

- We are actively working on enabling full track operations to use HPF in a follow on APAR.
- Preliminary testing shows **38-47% reduction in time** for multiple module copy to run using HPF.
- HPF for full track operations will also improve performance for commit log processing and system services that use commit log like MQ.

Value Statement

PJ46055 – Multiple module copy enhancements

A 5x increase in the number of concurrent copies!

Reduce risk of a complex outage when recovering from a DASD hardware failure.

Reduces time for DASD migration due to increased number of concurrent module copies.

Additional service time diagnostics for all devices is available.

➔ PJ46055 was available for download on December 4, 2020

Thank you

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PJ46362

Subsecond CRETC

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Michael Shershin

Problem Statement

Application monitors and policing routines need to do their processing in time increments of less than one second.

Pain Points

- Current CRETIC support only allows new ECBs to be created in second intervals.
- The control program (CP) has STIMC support that allows subsecond activations within the CP. This is not optimal for application monitors and policing routines.
- A long running ECB could be used. However, special handling is needed when programs are loaded via the E-type loader. This includes loading changes to the monitor or policing routines.

Technical Details

New CRETC option is available

- Specify time increment in milliseconds
 - Time interval is 1 to 1000 milliseconds
 - Over 1000 milliseconds is not allowed.

Technical Details

Example to create an ECB that enters QZZ0 in 100 milliseconds

Assembler:

```
CRETC I,QZZ0,TIMEINC=100
```

C language:

```
cretc(CRETC_MILLISECONDS, "QZZ0", 100, NULL);
```

```
cretc_level(CRETC_MILLISECONDS, "QZZ0", 100, NULL, D0);
```

Technical Details

Subsecond CRETCs have the same characteristics as traditional CRETCs with the following exceptions:

- Subsecond CRETC requests are put on the time dispatch list for the I-stream where the CRETC was issued.
- Subsecond CRETCs usage is monitored by the ECB Resource monitor.
 - Subsecond CRETCs are included in the CRET count.
 - Limits and actions can be set for CRET usage.

Value Statement

- Easily allow applications to enhance monitors and policing routines to run using time intervals of less than one second.
- No special logic is needed to handle changes that are installed by the E-type loader.

➔ PJ46362 was available for download on February 12, 2021

Thank you

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Virtual TPFUG Q&A

Summary of Q&A from the virtual TPFUG event:

Question	Answer
Q: Is an IPL required after the customer makes changes to the default MCPY values?	A: Mark Lehrer does not believe that an IPL is needed. However, he will verify. Chris Coughlin later added that ZMCPY SET does NOT require an IPL for the settings to take effect.
Q: I am seeing the Status changed for the mod copy, is there any change for Start/End of the mod copy as well?	A: The status message was changed to give a table display rather than having a large number of individual messages. The Start and End messages did not need these changes. Although, there was a change to allow for 3 digits for the MCPY copy slot number.