z/TPF EE V1.1
z/TPFDF V1.1
TPF Toolkit for WebSphere® Studio V3
TPF Operations Server V1.2

IBM Software Group

TPF Users Group Spring 2006

Performance Tool Enhancements

Name : Michael Shershin
Venue : Performance Task Force

AIM Enterprise Platform Software
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0
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Agenda

- Display of other LPAR utilizations
- Display of channel measurements on ESCON channels
- Display of device measurements
- Copy-on-write usage
- System heap usage
- CDC display of active traces and utilities
- Command to delete CDC TPFDF subfiles
- Future enhancements

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LPAR Utilizations - Data Reduction Report

```
LPAR UTILIZATION REPORT
        79 OBSERVATIONS

# of virtual CPUs      230
# of real CPUs          24
V/R =      9.58
```

LPAR	# CPUs	Utilization, %	Util vs CAP	% of machine
CF1	1	99.66	N/A	4.15
MVSESA2	5	6.13	N/A	1.27
TPFP1	16	0.21	N/A	0.14
TPFP8	4	99.65	N/A	16.60
VM1	5	59.80	N/A	12.45
XA1	8	41.39	N/A	13.79
TPFP11	1	99.67	N/A	4.15
TPFT15	1	99.66	N/A	4.15

(note: Report shortened to fit into presentation)

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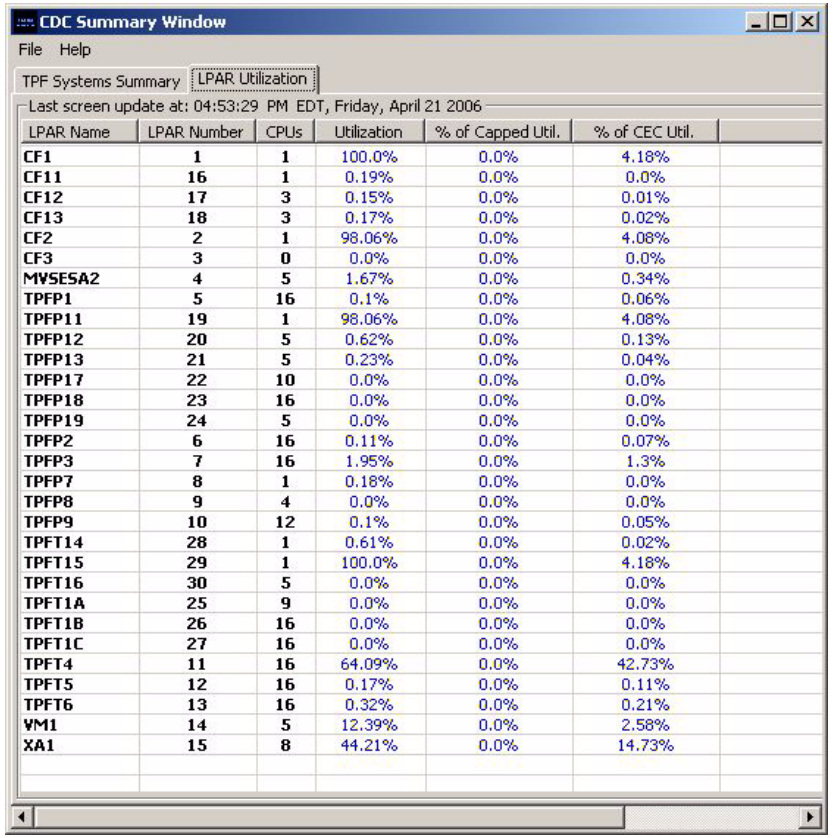
LPAR Utilization (cont.) - CDC Display



LPAR Name	LPAR Number	CPUs	Utilization	% of Capped Util.	% of CEC Util.
CF1	1	1	100.0%	0.0%	4.18%
CF11	16	1	0.19%	0.0%	0.0%
CF12	17	3	0.15%	0.0%	0.01%
CF13	18	3	0.17%	0.0%	0.02%
CF2	2	1	98.06%	0.0%	4.08%
CF3	3	0	0.0%	0.0%	0.0%
MVSESA2	4	5	1.67%	0.0%	0.34%
TPFP1	5	16	0.1%	0.0%	0.06%
TPFP11	19	1	98.06%	0.0%	4.08%
TPFP12	20	5	0.62%	0.0%	0.13%
TPFP13	21	5	0.23%	0.0%	0.04%
TPFP17	22	10	0.0%	0.0%	0.0%
TPFP18	23	16	0.0%	0.0%	0.0%
TPFP19	24	5	0.0%	0.0%	0.0%
TPFP2	6	16	0.11%	0.0%	0.07%
TPFP3	7	16	1.95%	0.0%	1.3%
TPFP7	8	1	0.18%	0.0%	0.0%
TPFP8	9	4	0.0%	0.0%	0.0%
TPFP9	10	12	0.1%	0.0%	0.05%
TPFT14	28	1	0.61%	0.0%	0.02%
TPFT15	29	1	100.0%	0.0%	4.18%
TPFT16	30	5	0.0%	0.0%	0.0%
TPFT1A	25	9	0.0%	0.0%	0.0%
TPFT1B	26	16	0.0%	0.0%	0.0%
TPFT1C	27	16	0.0%	0.0%	0.0%
TPFT4	11	16	64.09%	0.0%	42.73%
TPFT5	12	16	0.17%	0.0%	0.11%
TPFT6	13	16	0.32%	0.0%	0.21%
VM1	14	5	12.39%	0.0%	2.58%
XA1	15	8	44.21%	0.0%	14.73%

- LPAR utilization table added to the CDC summary window for easy access
- LPAR utilization table can be sorted by column:
  - LPAR Name
  - LPAR Number
  - Number of logical CPU's assigned to the LPAR
  - LPAR Utilization
  - % of Capped Utilization (0% if capping is disabled)
  - % of CEC Utilization
- Only available in z/TPF

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CDC Summary Window

File Help

TPF Systems Summary | LPAR Utilization

Last screen update at: 04:53:29 PM EDT, Friday, April 21 2006

LPAR Name	LPAR Number	CPUs	Utilization	% of Capped Util.	% of CEC Util.
CF1	1	1	100.0%	0.0%	4.18%
CF11	16	1	0.19%	0.0%	0.0%
CF12	17	3	0.15%	0.0%	0.01%
CF13	18	3	0.17%	0.0%	0.02%
CF2	2	1	98.06%	0.0%	4.08%
CF3	3	0	0.0%	0.0%	0.0%
MVSESA2	4	5	1.67%	0.0%	0.34%
TPFP1	5	16	0.1%	0.0%	0.06%
TPFP11	19	1	98.06%	0.0%	4.08%
TPFP12	20	5	0.62%	0.0%	0.13%
TPFP13	21	5	0.23%	0.0%	0.04%
TPFP17	22	10	0.0%	0.0%	0.0%
TPFP18	23	16	0.0%	0.0%	0.0%
TPFP19	24	5	0.0%	0.0%	0.0%
TPFP2	6	16	0.11%	0.0%	0.07%
TPFP3	7	16	1.95%	0.0%	1.3%
TPFP7	8	1	0.18%	0.0%	0.0%
TPFP8	9	4	0.0%	0.0%	0.0%
TPFP9	10	12	0.1%	0.0%	0.05%
TPFT14	28	1	0.61%	0.0%	0.02%
TPFT15	29	1	100.0%	0.0%	4.18%
TPFT16	30	5	0.0%	0.0%	0.0%
TPFT1A	25	9	0.0%	0.0%	0.0%
TPFT1B	26	16	0.0%	0.0%	0.0%
TPFT1C	27	16	0.0%	0.0%	0.0%
TPFT4	11	16	64.09%	0.0%	42.73%
TPFT5	12	16	0.17%	0.0%	0.11%
TPFT6	13	16	0.32%	0.0%	0.21%
VM1	14	5	12.39%	0.0%	2.58%
XA1	15	8	44.21%	0.0%	14.73%

I/O Measurements - Data Reduction Report

CHANNEL I/O REPORT
79 OBSERVATIONS

TYPE	CHPID	UTILIZATION, %	SHARED?
CNC	44	1.60	Y
CNC	77	1.10	Y
CNC	A8	1.10	Y
CNC	17	0.10	Y

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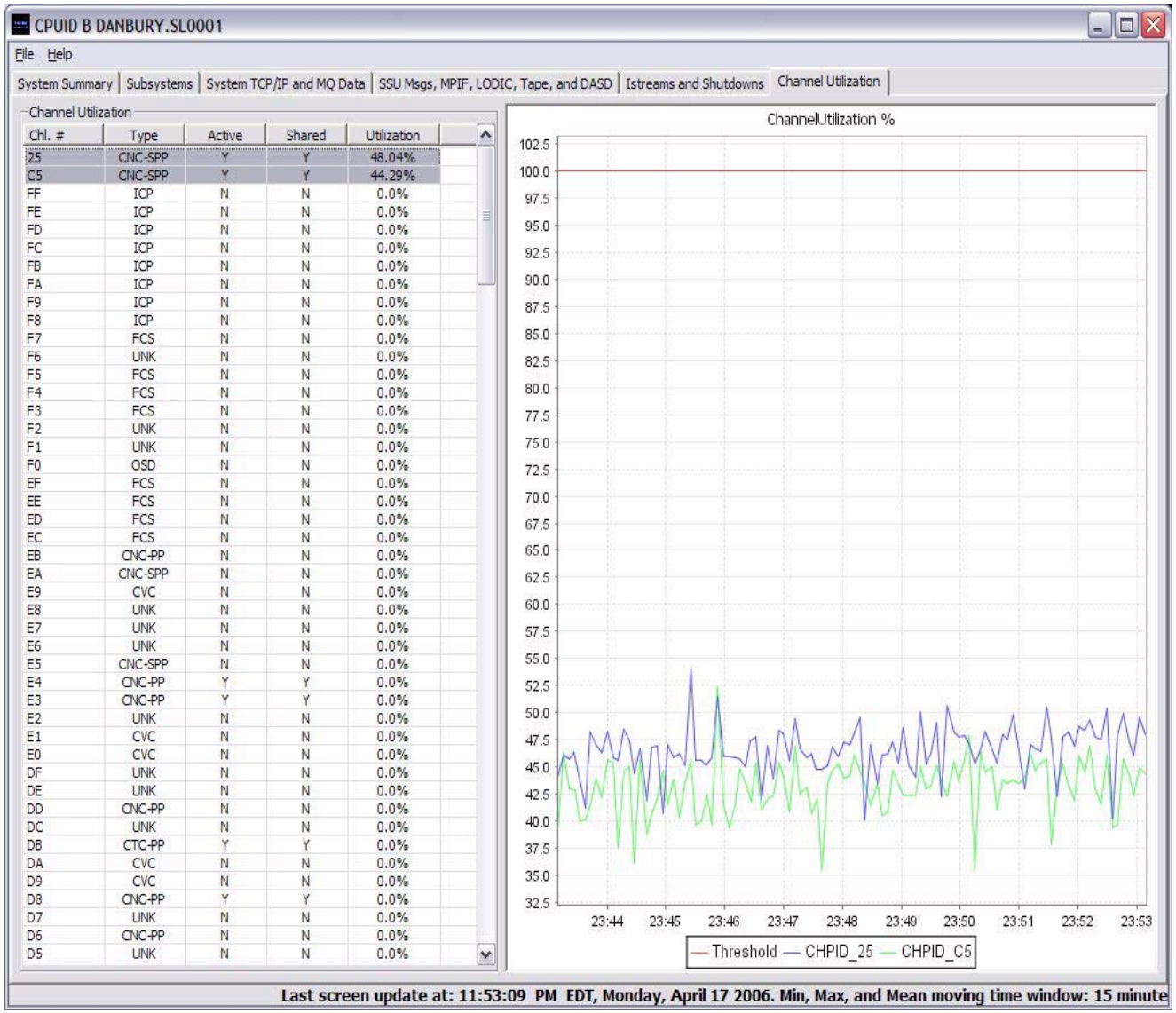
I/O Measurements (cont.) - CDC Display



- New Channel Utilization tab added to the detail view for an LPAR
- Channel Utilization table can be sorted by column
  - Channel # / CHPID
  - Channel Type
  - Channel Active
  - Channel Shared
  - Utilization
- By "single clicking" on an entry on the table, it is plotted on the chart
  - For multiple channels, hold down Ctrl while selecting the entries
  - Selected channels are saved off at application exit
- Only available on z/TPF

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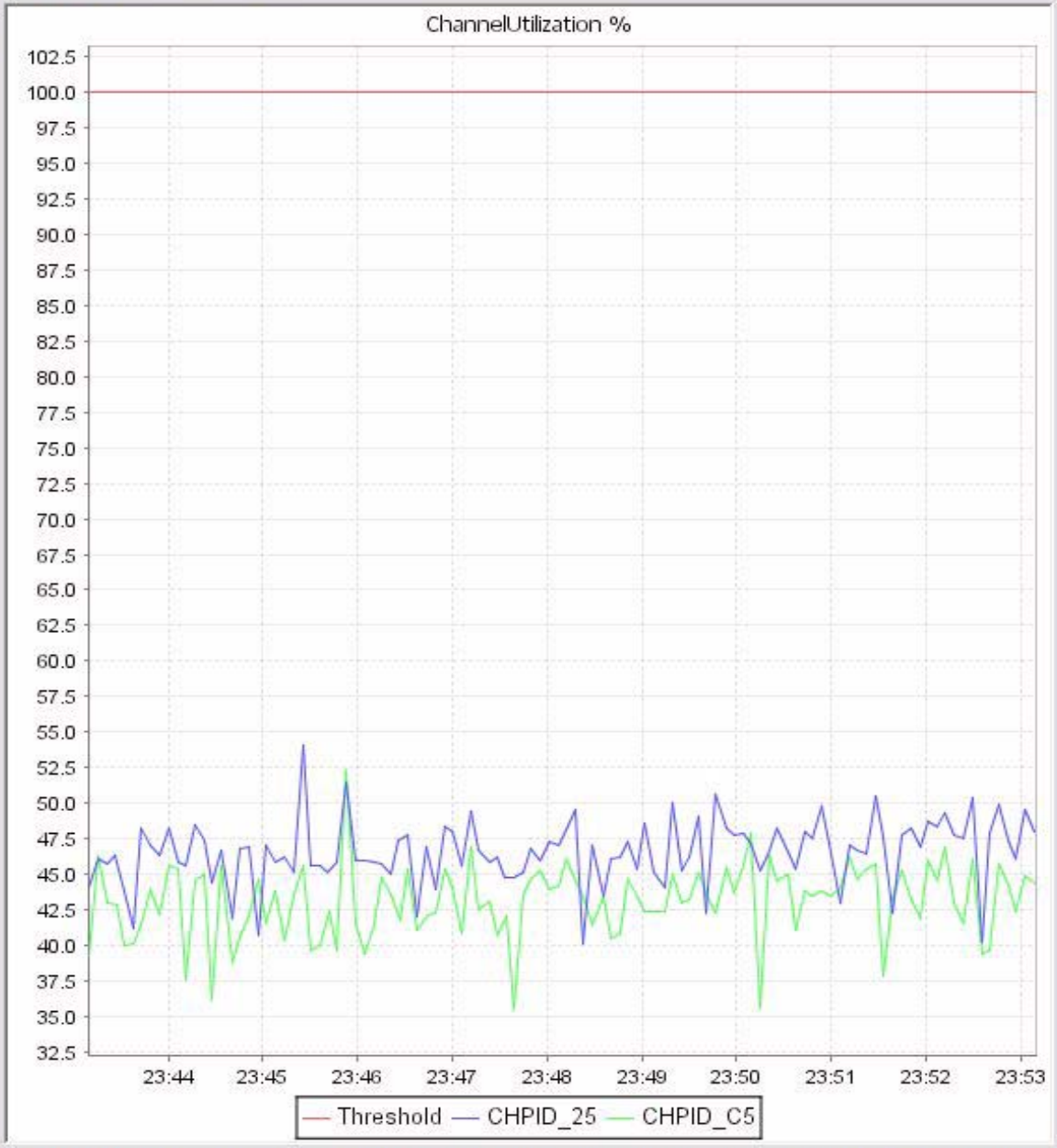
File Help

System Summary | Subsystems | System TCP/IP and MQ Data | SSU Msgs, MPIF, LODIC, Tape, and DASD | Istreams and Shutdowns | Channel Utilization

Channel Utilization

Chl. #	Type	Active	Shared	Utilization
25	CNC-SPP	Y	Y	48.04%
C5	CNC-SPP	Y	Y	44.29%
FF	ICP	N	N	0.0%
FE	ICP	N	N	0.0%
FD	ICP	N	N	0.0%
FC	ICP	N	N	0.0%
FB	ICP	N	N	0.0%
FA	ICP	N	N	0.0%
F9	ICP	N	N	0.0%
F8	ICP	N	N	0.0%
F7	FCS	N	N	0.0%
F6	UNK	N	N	0.0%
F5	FCS	N	N	0.0%
F4	FCS	N	N	0.0%
F3	FCS	N	N	0.0%
F2	UNK	N	N	0.0%
F1	UNK	N	N	0.0%
F0	OSD	N	N	0.0%
EF	FCS	N	N	0.0%
EE	FCS	N	N	0.0%
ED	FCS	N	N	0.0%
EC	FCS	N	N	0.0%
EB	CNC-PP	N	N	0.0%
EA	CNC-SPP	N	N	0.0%
E9	CVC	N	N	0.0%
E8	UNK	N	N	0.0%
E7	UNK	N	N	0.0%
E6	UNK	N	N	0.0%
E5	CNC-SPP	N	N	0.0%
E4	CNC-PP	Y	Y	0.0%
E3	CNC-PP	Y	Y	0.0%
E2	UNK	N	N	0.0%
E1	CVC	N	N	0.0%
E0	CVC	N	N	0.0%
DF	UNK	N	N	0.0%
DE	UNK	N	N	0.0%
DD	CNC-PP	N	N	0.0%
DC	UNK	N	N	0.0%
DB	CTC-PP	Y	Y	0.0%
DA	CVC	N	N	0.0%
D9	CVC	N	N	0.0%
D8	CNC-PP	Y	Y	0.0%
D7	UNK	N	N	0.0%
D6	CNC-PP	N	N	0.0%
D5	UNK	N	N	0.0%



Last screen update at: 11:53:09 PM EDT, Monday, April 17 2006. Min, Max, and Mean moving time window: 15 minute

I/O Measurements - Device Measurements

- To access device measurements
  - CINFC CMMIOMCB
  - Data dsect = IOMDB.MAC
    - iomflag1 = capability indicators
      - iomfeiombf (x'80') Extended-I/O-measurement-block facility
      - iomfeiomwfi (x'40') Extended-I/O-measurement-word facility installed
      - iomfeiomwfe (x'20') Extended-I/O-measurement-word facility enabled
      - iomficrmf (x'10') Initial-command-response-measurement facility
    - iomsmbt = subchannel-measurement-block table

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I/O Measurements - Device Measurements Example

```
zdtap /rtl
CSMP0097I 20.23.44 CPU-B SS-BSS  SSU-HPN  IS-01
COTE0002I 20.23.44 DTAP      - TAPE STATUS
ADDRESS   NAME   SSU    STATUS   TPIND    VOLSER  FORMAT    #BLOCKS LDR
 907F     RTL    BSS      AO    00 81 30  TV2281  38K2          883 LIB
END OF DISPLAY+
zdcnf cmmiomcb 0.30
CSMP0097I 20.26.04 CPU-B SS-BSS  SSU-HPN  IS-01 _
DCNF0010I 20.26.04 BEGIN DISPLAY
 000000001263000- C9D6D4C3 C2404040 01000030 00000000 IOMCB    ........
 000000001263010- F0800000 00000000 00000000 0161C000 0....... ...../..
 000000001263020- 00000000 0161D000 00000000 01A1D000 ...../.. .....~..
END OF DISPLAY - ZEROED LINES NOT DISPLAYED+
zdcor 185efc0.40
CSMP0097I 20.26.47 CPU-B SS-BSS  SSU-HPN  IS-01 _
DCOR0010I 20.26.47 BEGIN DISPLAY
 000000000185EFC0- 0000002E 0000002E 00000480 000000D5 ........ .......N
 000000000185EFD0- 0000143C 00000000 0000001A 00000000 ........ ........
 000000000185EFF0- 00000000 00000000 00000000 00000000 ........ ........
END OF DISPLAY - ZEROED LINES NOT DISPLAYED+
```


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Copy-on-Write - Data Reduction Report

```
SYSTEM SUMMARY REPORT
        79 OBSERVATIONS
COPY-ON-WRITE STATISTICS

OBSERVATION MINIMUM:  999424 BYTES IN USE,  244 4K FRAMES IN USE,  55.301 C-O-Ws/SEC
            MEAN: 1152393                   281                    63.765
         MAXIMUM: 1683456                   411                    93.151
```


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Copy-on-Write - Data Reduction Report

COPY-ON-WRITES BY PROGRAM MODULE

PROGRAM	#C_O_W	C-O-W/sec	CWREL%	CWCUM%
CFVS	4004	11.487	18.036	18.036
CISO	3742	10.735	16.856	34.892
CTIS	3522	10.104	15.865	50.757
CMQS	3522	10.104	15.865	66.622
CUIU	3363	9.648	15.149	81.771
CTBX	764	2.191	3.441	85.212
CENV	670	1.922	3.018	88.230
UENV	670	1.922	3.018	91.248
TOTALS:	22199	63.687		

CUT OFF AT 90 PERCENT

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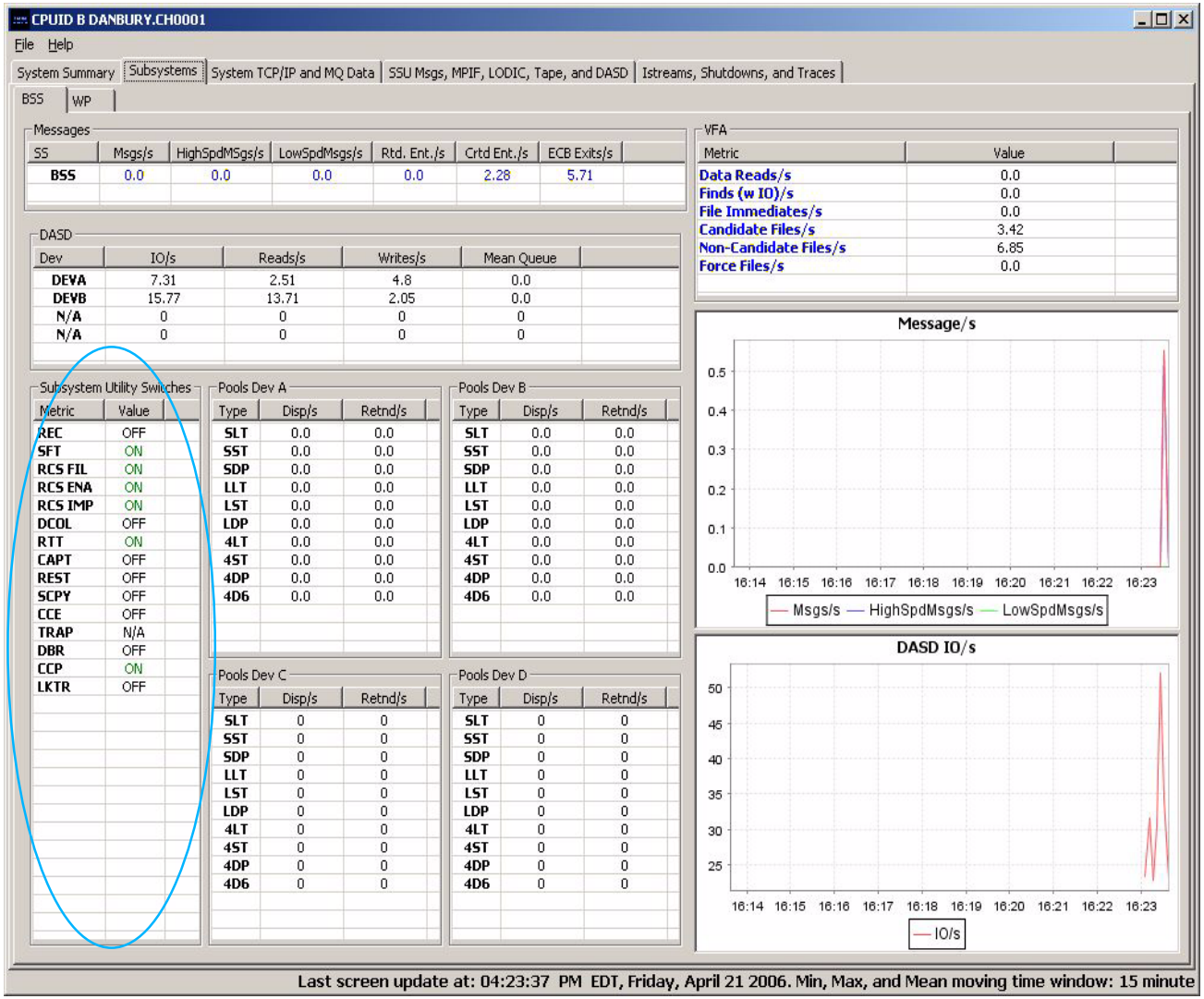
CDC Subsystem Lethal Utilities Display



- Available on TPF 4.1 and z/TPF
- A new table has been added to each subsystem tab
- Utilities that are on are noted so in GREEN
- If a utility is not available in either z/TPF or TPF 4.1, it is represented as N/A

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File Help

System Summary | Subsystems | System TCP/IP and MQ Data | SSU Msgs, MPIF, LODIC, Tape, and DASD | Istreams, Shutdowns, and Traces

BSS | WP

Messages

SS	Msgs/s	HighSpdMSgs/s	LowSpdMsgs/s	Rtd. Ent./s	Crtd Ent./s	ECB Exits/s
BSS	0.0	0.0	0.0	0.0	2.28	5.71

VFA

Metric	Value
Data Reads/s	0.0
Finds (w IO)/s	0.0
File Immediates/s	0.0
Candidate Files/s	3.42
Non-Candidate Files/s	6.85
Force Files/s	0.0

DASD

Dev	IO/s	Reads/s	Writes/s	Mean Queue
DEVA	7.31	2.51	4.8	0.0
DEVB	15.77	13.71	2.05	0.0
N/A	0	0	0	0
N/A	0	0	0	0

Subsystem Utility Switches

Metric	Value
REC	OFF
SFT	ON
RCS FIL	ON
RCS ENA	ON
RCS IMP	ON
DCOL	OFF
RTT	ON
CAPT	OFF
REST	OFF
SCPY	OFF
CCE	OFF
TRAP	N/A
DBR	OFF
CCP	ON
LKTR	OFF

Pools Dev A

Type	Disp/s	Retnd/s
SLT	0.0	0.0
SST	0.0	0.0
SDP	0.0	0.0
LLT	0.0	0.0
LST	0.0	0.0
LDP	0.0	0.0
4LT	0.0	0.0
4ST	0.0	0.0
4DP	0.0	0.0
4D6	0.0	0.0

Pools Dev B

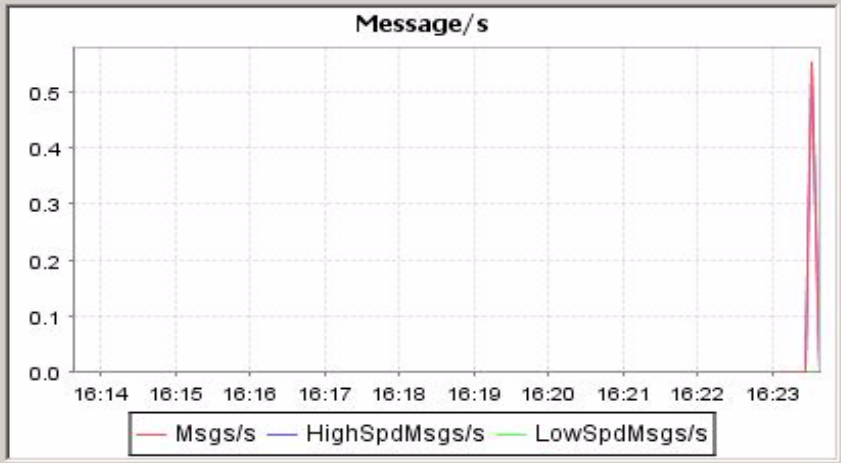
Type	Disp/s	Retnd/s
SLT	0.0	0.0
SST	0.0	0.0
SDP	0.0	0.0
LLT	0.0	0.0
LST	0.0	0.0
LDP	0.0	0.0
4LT	0.0	0.0
4ST	0.0	0.0
4DP	0.0	0.0
4D6	0.0	0.0

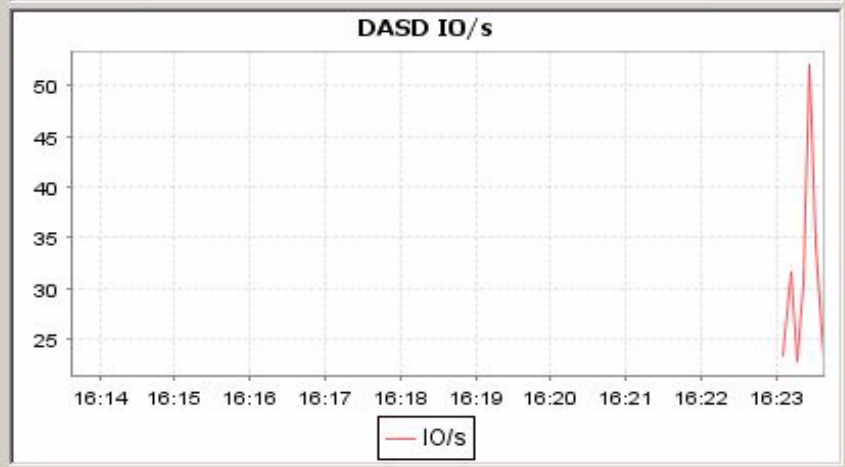
Pools Dev C

Type	Disp/s	Retnd/s
SLT	0	0
SST	0	0
SDP	0	0
LLT	0	0
LST	0	0
LDP	0	0
4LT	0	0
4ST	0	0
4DP	0	0
4D6	0	0

Pools Dev D

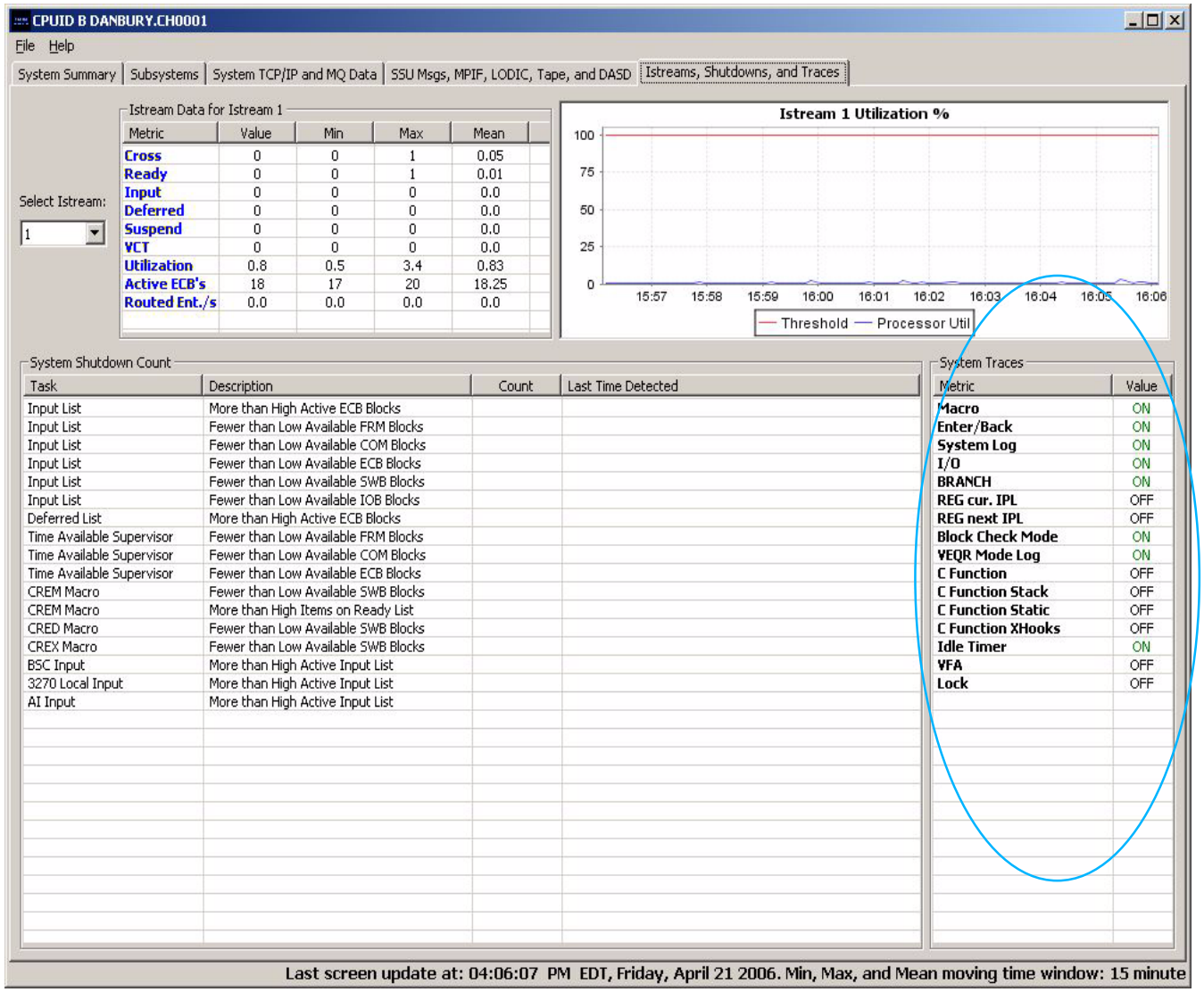
Type	Disp/s	Retnd/s
SLT	0	0
SST	0	0
SDP	0	0
LLT	0	0
LST	0	0
LDP	0	0
4LT	0	0
4ST	0	0
4DP	0	0
4D6	0	0





Last screen update at: 04:23:37 PM EDT, Friday, April 21 2006. Min, Max, and Mean moving time window: 15 minute

CDC System Traces



- Available on TPF 4.1 and z/TPF
- A new table has been added to the I-stream and Shutdown tab
- Traces that are on are noted so in GREEN
- If a trace is not available in either z/TPF or TPF 4.1, it is represented as N/A

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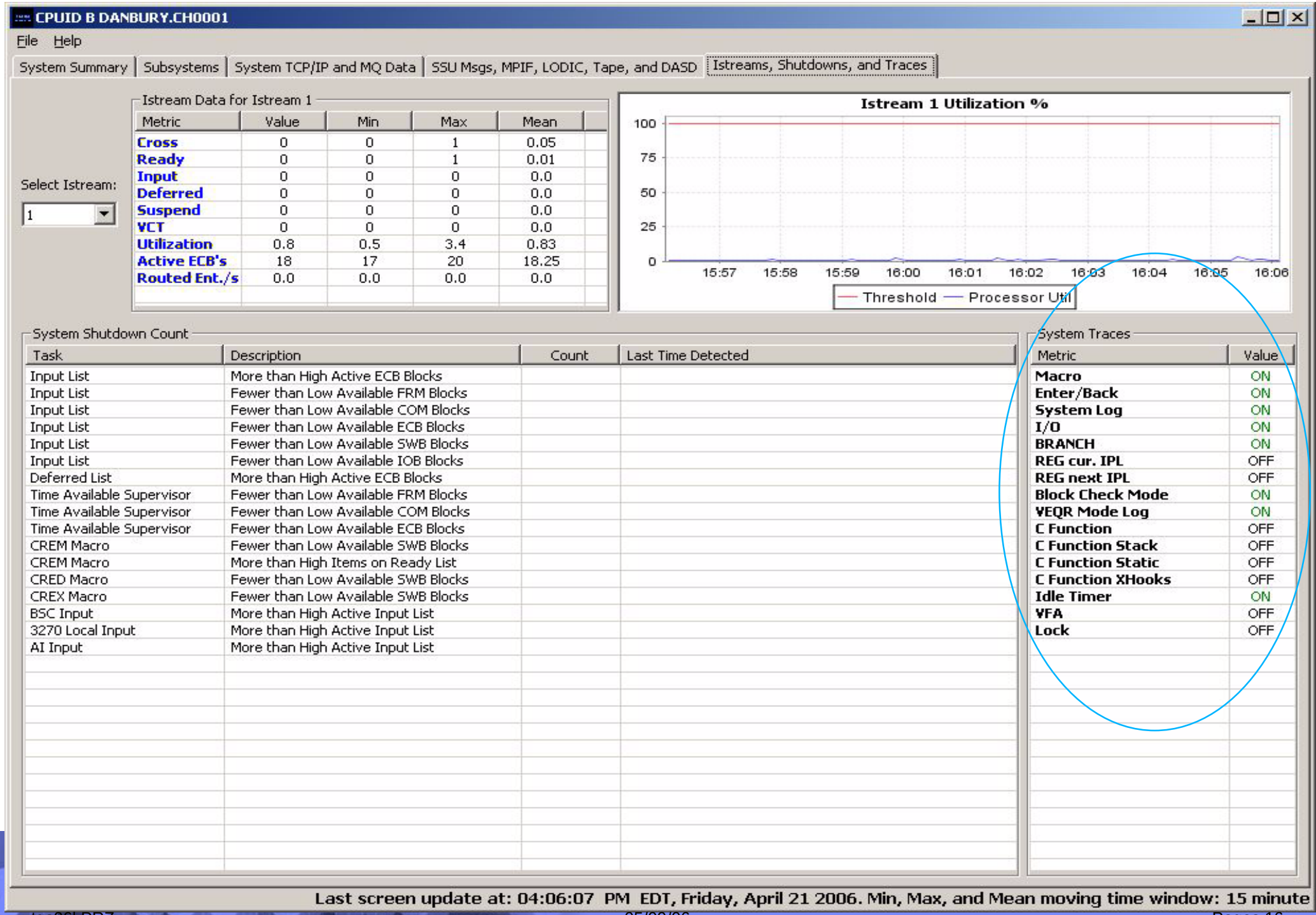
CPUID B DANBURY.CH0001
File Help
System Summary
Subsystems
System TCP/IP and MQ Data
SSU Msgs, MPIF, LODIC, Tape, and DASD
Istreams, Shutdowns, and Traces
Istream Data for Istream 1
Metric Value Min Max Mean
Cross 0 0 1 0.05
Ready 0 0 1 0.01
Input 0 0 0 0.0
Deferred 0 0 0 0.0
Suspend 0 0 0 0.0
VCT 0 0 0 0.0
Utilization 0.8 0.5 3.4 0.83
Active ECB's 18 17 20 18.25
Routed Ent./s 0.0 0.0 0.0 0.0
Select Istream:
1
Istream 1 Utilization %
100
75
50
25
0
15:57 15:58 15:59 16:00 16:01 16:02 16:03 16:04 16:05 16:06
Threshold
Processor Util
System Shutdown Count
Task Description Count Last Time Detected
Input List More than High Active ECB Blocks
Input List Fewer than Low Available FRM Blocks
Input List Fewer than Low Available COM Blocks
Input List Fewer than Low Available ECB Blocks
Input List Fewer than Low Available SWB Blocks
Input List Fewer than Low Available IOB Blocks
Deferred List More than High Active ECB Blocks
Time Available Supervisor Fewer than Low Available FRM Blocks
Time Available Supervisor Fewer than Low Available COM Blocks
Time Available Supervisor Fewer than Low Available ECB Blocks
CREM Macro Fewer than Low Available SWB Blocks
CREM Macro More than High Items on Ready List
CRED Macro Fewer than Low Available SWB Blocks
CREX Macro Fewer than Low Available SWB Blocks
BSC Input More than High Active Input List
3270 Local Input More than High Active Input List
AI Input More than High Active Input List
System Traces
Metric Value
Macro ON
Enter/Back ON
System Log ON
I/O ON
BRANCH ON
REG cur. IPL OFF
REG next IPL OFF
Block Check Mode ON
VEQR Mode Log ON
C Function OFF
C Function Stack OFF
C Function Static OFF
C Function XHooks OFF
Idle Timer ON
VFA OFF
Lock OFF
Last screen update at: 04:06:07 PM EDT, Friday, April 21 2006. Min, Max, and Mean moving time window: 15 minute

Command to delete CDC TPFDF subfiles

- ZCDCO RELFC ALG-CYYYYMMDD
  - Where:
    - C - CPUID
    - YYYY - Year
    - MM - Month
    - DD - Day
- This will delete the CDC TPFDF subfile for the CPUID and day specified
  - ZCDCO RELFC ALG-A20060506

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Future Enhancements

- I/O measurements for FICON channels
- LODIC shutdown based on processor utilization - design concepts
  - New API
    - Suspend until no longer in shutdown
    - In shutdown Yes / No
  - Classes
    - Define shutdown percentage
    - Multiple classes
  - Utilization determined 20 times per second
  - CDC to report number of intervals that the class would be shutdown
- Usage of preallocated ECB areas
  - Application stack usage
  - Thread stack usage
  - Preallocated 31-bit ECB heap usage
  - ECB private area usage

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Future Enhancements - Preallocation Application Stack Usage

```
TPF PREALLOCATED APPLICATION STACK STORAGE USAGE REPORT

   CLASS UPPER    FREQUENCY    PERCENT     FREQUENCY DIAGRAM  (SCALE = 7/1)
      LIMIT       OBSERVED     OF TOTAL

       0KB            126        8.29%    |****
      16KB            783       51.54%    |**********************************
      28KB            537       35.35%    |******************
      40KB             63        4.14%    |**
      52KB              2        0.13%    |*
      64KB              0        0.00%    |
      76KB              2        0.13%    |*
      88KB              4        0.26%    |*
     100KB              2        0.13%    |*
   > 100KB              0        0.00%    |
```


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Future Enhancements - ECB Thread Stack Usage

```
TPF THREAD STACK STORAGE USAGE REPORT

   CLASS UPPER    FREQUENCY    PERCENT     FREQUENCY DIAGRAM  (SCALE =  7/1)
      LIMIT       OBSERVED     OF TOTAL

      16KB             783       51.54%   |*********************************
      28KB             537       35.35%   |******************
      40KB              63        4.14%   |**
      52KB               2        0.13%   |*
      64KB               0        0.00%   |
      76KB               2        0.13%   |*
      88KB               4        0.26%   |*
     100KB               2        0.13%   |*
   > 100KB               0        0.00%   |
```


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Future Enhancements - Preallocated 31-bit ECB Heap Usage

```
TPF PREALLOCATED 31-BIT ECB HEAP STORAGE USAGE REPORT

   CLASS UPPER    FREQUENCY    PERCENT     FREQUENCY DIAGRAM  (SCALE =  7/1)
      LIMIT       OBSERVED     OF TOTAL

       0KB            126        8.29%    |****
      16KB            783       51.54%    |**********************************
      28KB            537       35.35%    |******************
      40KB             63        4.14%    |**
      52KB              2        0.13%    |*
      64KB              0        0.00%    |
      76KB              2        0.13%    |*
      88KB              4        0.26%    |*
     100KB              2        0.13%    |*
   > 100KB              0        0.00%    |
```


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Future Enhancements - ECB Private Area Frame Usage

```
TPF ECB PRIVATE AREA FRAME USAGE REPORT

MEAN TOTAL FRAMES USED DURING ECB LIFETIME                    9 4K FRAMES
DEFAULT STORAGE SIZE OF ECB PRIVATE AREA                      8 MB
ECBS REQUIRING EXTENSION OF ECB PRIVATE AREA                  0.19 %


   CLASS UPPER    FREQUENCY    PERCENT     FREQUENCY DIAGRAM  (SCALE = 46/1)
      LIMIT       OBSERVED     OF TOTAL

         0            3658       53.43%   |******************************
         1             643        9.39%   |****
         2             112        1.64%   |*
         3              88        1.29%   |*
       ...
         7             261        3.81%   |**
       ...
        16            1324       19.34%   |*********
        17              34        0.50%   |*
```


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