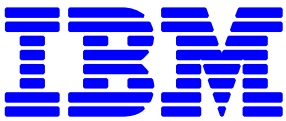

Addressing Common z/OS Problems

http://www.ibm.com/support/techdocs

Evan Haruta
z/OS Level 2 Support

Editted By
Riaz Ahmad
IBM Washington Systems Center

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IBM Washington Systems Center
Americas Advanced Tehnical Support

Overview

There are situations which may arise in a z/OS environment, some release-specific while others are independent of release, and exhibit themselves in a variety of different ways that have the potential to impact users, jobs, or throughput and the system. Some of the symptoms are relatively minor, including error messages. Others have greater impact on a z/OS system and may include system hangs, delays in throughput, or potentially a system outage.

The topics discussed in this paper can be identified and addressed as indicated in each topic section. The intent of this paper is to bring these issues to the forefront so that z/OS system programmers will be aware of them and also have the opportunity, if appropriate, to take the recommended actions in order to mitigate or prevent such situations from occurring. The recommendations outlined are within system programmer control and typically involve adjustment of certain system parameters, some found in parmlib members. Others may involve software/application configurations, changes to JCL or jobs, awareness of hardware, sysplex, dataset or other issues.

In addition the IBM Health Checker for z/OS in V1R7 may be used to assist in identifying certain of these specific issues, along with other issues which are not immediately discussed in this paper.

z/OS Common Problems

Contents:

Topic Format

External:

For each Topic discussed in this paper, there will be two sections, External and Actions. The External section will identify the external symptoms, messages, abends, errors, results, etc..... that may be encountered if this problem exhibits itself.

Action(s):

The Actions section will identify the actions which you can take to prevent the problem from occurring, reduce its impact, or correct errors associated with it.

MAXCAD - Exhaustion of Limit

External:

Many sites run with Common Area Dataspaces very close to the limit (MAXCAD).
The MAXCAD value (MAXimum Common Area Dataspaces) limit is defined in IEASYSxx.
Addition of new CADs may push system beyond the maximum limit.
Console Restructure introduced 3 new dataspaces.
If the MAXCAD factor is not large enough to accommodate new CADs, then the impact may include either not being able to IPL or the inability to start STCs or subsystems.
Other z/OS system components or OEM software may also introduce new CAD dataspaces.

Action(s):

Make sure that the MAXCAD value that you have defined (or defaulted to) in IEASYSxx is large enough to accommodate the three new common area dataspaces (CADs) created by the Consoles Enhancements or any other CADs that may have been added recently or may be added soon.

MAXCAD = 40 is a good value to increase to, from the current default of 25.
At V1R6 the default was increased so manual intervention would not be necessary.

Note - this did not make the R14 Migration Book, so DOC APAR OA10422 was opened.

To determine the in-use CAD count and MAXCAD from a dump:

- CVT +490 = RCE/RIT ptr.
- RIT +130 = free ASTE circular queue (link=x'40')
- CVT +364 = SVT ptr.
- SVT +9C = SVTMCADS = MAXCAD+2
- In-use CADs = SVTMCADS-2 - (Circular_Queue)
  = MAXCAD - (Circular_Queue)
- IP RUNC ADDR(____a1____) LINK(x'40') NULL(x'___a2___') EXEC((L x:x+80))
  A1 = RIT+130, a2 = RIT+134

.....OR .....

IP RSMDATA DSPACE ALL

Under the "S" column, if you have a "C" it is a SCOPE=COMMON dataspace.
Also, 'COMMON' count will be totalled at the bottom of report.

Documented in z/OS V1R5.0, V1R6.0 Migration Book - Chapter 5

ASM - Paging issues

External:

If the Common page data set is not large enough to accommodate the common (CSA) storage that gets paged out, a WAIT03C RSN=03 occurs. Similarly if the Local page data sets are not large or numerous enough to accommodate the local/private storage that gets paged out, a WAIT03C RSN=01 occurs. Both of these wait states indicate that there is insufficient Auxilliary Stoarge available for the paging that is occurring on the system.

Actions:

Make the Common page data set large enough to hold all allocated Common storage plus PLPA if you have PLPA overflowing into the Common page data set. Typically Performance teams will be involved to help identify typical CSA usage, historical paging rates and amounts, and unusually large spikes.

Relevant SYS1.PARMLIB(IEASYSxx) statements:
- CSA = (x000,y0000) ..... Determines how large CSA/ECSA is.
- PAGE = (SYS1.&PAGING..PLPA1, [PLPA page data set]
SYS1.&PAGING..COMMON1, [Common page data set]

Define enough Local page packs which are large enough to hold 'normal paging usage' plus a significantly large enough buffer. If heavy usage causes enough private storage to be paged out (more than the Locals can hold) then WAIT03C RSN=01 occurs.

Normal paging must be determined by performance analysis and using the RMF Paging Activity Report(s). Ensure that PAGTOTL is large enough so that additional packs can be added after IPL.

Relevant SYS1.PARMLIB(IEASYSxx) statements:
- PAGTOTL = 16
- PAGE = (SYS1.&PAGING..LOCAL1, [Local page data set]
SYS1.&PAGING..LOCAL2,L) [Local page data set]

Also be aware of paging rates. While an AUX storage shortage may not be imminent, delays in paging in/out of AUX can affect job/application performance.

It is recommended to keep page datasets on different volumes, or use PAV devices to allow multiple I/O's simultaneously. As a general rule, it is also better to have more page devices with fewer slots, than to have few page devices with large slot counts.

CSA Tracker

External:

When a CSA virtual storage shortage issue occurs, the 'tool of the trade' is CSA Tracker for diagnostics. If CSA Tracker was not active preceding the time of the error or outage, the ability to diagnose the problem is dramatically impeded.

Symptoms: ABEND878 RC=4, ABEND878 RC=8, ABEND80A

Actions:

Ensure that CSA Tracker is always active. It is on by default so do not turn it off.

Performance consideration? There is no evidence of any noticeable performance implications if CSA Tracker is turned on.

- Cost of not having Tracker active:
    - Having to recreate original outage to capture doc ($$$)

- Cost of explaining why Tracker was not active:
    - Havin to explain why Tracker was not active.

- Cost of having Tracker active:
    - Priceless.

Installing z/OS R6 and PTFs

External:

IEW2322I 1220 5 Include SMPWRK3 (CELQAWI) UQ88825 Seq # 000025

IEW2690E 3530 One or more field descriptors in GOFF RECORD 3 within member CELQAWI identified by DDNAME SMPWRK3 are not valid. ERRORID = 40.

IEW2307E 1032 Current Input module not included because of invalid data.

Actions:

You must use the z/OS R6 program Binder for installing z/OS R6 as well as z/OS R6 PTFs.

If you do not, PTF's problems will occur. Some may go on, some may not.

ServerPac - RECEIVE job

External: ABEND813-04

```
◆     ************** Top of Data *********************************
◆    J E S 2  J O B  L O G  --  S Y S T E M  A Q T S  --  N O

◆---- FRIDAY,    14 JAN 2005 ----
◆ ICH70001I HTSANG   LAST ACCESS AT 09:10:08 ON FRIDAY, JANUAR
◆ $HASP373 HTSANGRE STARTED - WLM INIT  - SRVCLASS WLMLONG  -
◆ IEF403I HTSANGRE - STARTED - TIME=09.42.54
◆ - ------------------------------------------------------------
◆ -                                      REGION        --- STEP
◆ - STEPNAME PROCSTEP PGMNAME     CC     USED      CPU TIME  E
◆ - STEP00            IDCAMS      00     204K   00:00:00.02
◆*IEF233A M 6DBA,R0030A,,HTSANGRE,STEP01
◆ IEC149I 813-04, IFG0195H, HTSANGRE, STEP01,INPUT7,6DBA,
    R0030A,SYS1.FQ000030.LOADLIB
◆ IEA995I SYMPTOM DUMP OUTPUT  312
◆ SYSTEM COMPLETION CODE=813  REASON CODE=00000004
◆  TIME=09.46.17  SEQ=38465  CPU=0000  ASID=01D4
◆  PSW AT TIME OF ERROR  075C1000   80C8B356  ILC 2  INTC 0D
```

Return Code 04 Explanation: An OPEN macro instruction was issued for a data set on magnetic tape, but the data set name on the header label did not match that in the JFCB.

Actions:

You must run the UPDATE or EUPDATE ServerPac job before Receiving your ServerPac order. Otherwise this fails the RECEIVE operation.

RECEIVE job contained this JCL which is no longer valid.

```
//* ************************************************************
//* *    LOADLIB  - ORDER RELATED  LOAD MODULES                 *
//* ************************************************************
//*
//INPUT7   DD  DSN=SYS1.FQ000030.LOADLIB,
//             DISP=SHR,LABEL=(7,SL),
//             UNIT=3490, VOL=(,RETAIN,SER=R0030A)
//OUTPUT7  DD  DSN=MVSBUILD.FQ000030.X.LOADLIB,
//             DISP=(NEW,CATLG,DELETE), VOL=SER=C99214,
//             BLKSIZE=0, UNIT=3390, SPACE=(TRK,(140,40,200))
```

These used to be load modules for the ServerPac order for the CustomPac dialog. Since the z/OS R6 restructure, they are no longer contained on the tape.

If you don't do an UPDATE, then it looks for them where they used to be, and then you see the open failure. You technically could use the lower binder (although not recommended) but in R6 you'll be caught. This time the job wiol fail if you don't. It is a difficult problem to diagnose. The OBJ can't be read by the previous level of the binder, so you see something like 'object deck is unreadable' - it may be interpreted as a PTF with garbage for OBJ. One clue is

that if GOFF is mentioned, that tells us that the OBJ is ok, but just that the binder can't read GOFF format.

USS - Centralized BRLM in a shared HFS Sysplex

External:

June 20 08:24:58 DIPB inetd. 17039366.: FOMN0066 inetd terminating.

Problem can be seen with other byte-range locking applications besides INETD (ie. Firewall, cron, Domino, DFSKERN, etc..) When they terminate as another system (which is the Centralized BRLM Server) is taken out of the shared HFS sysplex.

BPXN001I would be seen at the time of the problem, indicative that USS Partition Cleanup is in progress.

Actions:

Check for Centralized BRLM in shared HFS sysplex

D OMVS,O

BPXO043I 10.26.49 DISPLAY OMVS 007
OMVS 000E ACTIVE OMVS=(69)
Z/OS UNIX CURRENT CONFIGURATION SETTINS:
MAXTHREADS = 200 MAXTHREADTASKS = 50
PRIORITYPG VALUES: NONE
PRIORITYGOAL VALUES: NONE
MAXQUEUEDSIGS = 1000 SHRLIBRGNSIZE = 67108864
SYSCALL COUNTS = NO TTYGROUP = TTY
SYSPLEX == YES BLRM SERVER = SY3
LIMMSG = NONE
AU = /etc/authfile

Note: F BPXOINIT,FILESYS=DISPLAY,GLOBAL can also be used

The byte-range locking applications need to be restarted.

Migration to Distributed BRLM:
O OW48204, OW52293
z/OS R4 UNIX System Services Planning
OA09331 (Problems #9 , #10)

Consideration: Migration to Distributed BRLM requires that all systems in the shared HFS sysplex need to be recycled (eg. Rolling IPL)

BPXMCDS couple data format/definitions should be reviewed

GRS - GRS Ring Mode

External:

GRS not connecting in a non-sysplex environment when site tries to use SCTCs to connect between systems.

Actions:

GRS cannot use native SCTCs, must be genned as BCTCs, due to differences in architecture and different networking protocols.

GRS - ISGLOCK at DR site

External:

During a Disaster Recovery test at DR site, customer attempts to IPL in GRS Star mode with a newly formatted CFRM CDS. Since there is no active policy in a 'clean' CDS, attempts to connect to ISGLOCK fail.

Actions:

Format a new CFRM Couple Dataset and update the COUPLExx member with **CFRMPOL** keyword to ensure that a policy with ISGLOCK structure defined is started. For details see OW43278.

For example, to IPL in GRS=STAR mode for the first time with no prior active CFRM policy, it was necessary to IPL first in GRS=RING mode or GRS=NONE mode, then use the SETXCF START, POLICY command to activate a CFRM policy, then switch to GRS=STAR mode. With this APAR, it is now possible to IPL in GRS=STAR mode directly, without IPLing first in GRS=NONE or GRS=RING mode.

IOS - Configuring SCTC's

Externals:

Signaling problems between members of a sysplex.

- IOS552I Paths not physically available. Unable to vary devices online.
- IXC454I Signaling Connectivity cannot be established for systems. Unable to vary devices online.

Actions:

Gen SCTC's properly; see II10372.

Note: In order to establish proper communication from one image to another:
1) Use the pre-determine pair of CTC/CNC channels that will communicate.
2) Use devices on the CTC and CNC side that have matching UNITADD's (unit addresses), ie. 13 on the CTC side and 13 on the CNC side.
3) Use devices on the CNTLUNIT w/the CUADD that matches the target (opposite) partition number.

IOS - HMC Dynamic tab

External:

Sev Msg. ID Message Text
E IOS500I ACTIVATE RESULTS
ACTIVATE FAILED - ERROR MESSAGE(S) ISSUED
E REASON=0167, CCM COULD NOT ENTER CONFIGURATION MODE
DESCRIPTION=DYNAMIC I/O CONFIGURATION CAPABILITY DISABLED,
POR REQD
COMPID=SC1C3

Action:

Enabling the dynamic tab on the RESET profile on the HMC. This must be toggled on for dynamic to be enabled. If this tab has not been enabled, it cannot be done dynamically later after the system has been IPL'd. A POR must be done.

Reference: IOCP CTC Reference Guide

IOS - HCD Changing CF definitions

External:

After changing CF definitions (internal CF definitions as well as external) using HCD, the resulting definition for CF's may be unable to be brought online.

Action:

Always use SOFT=VALIDATE (which is the default) when issuing software activates from the HCD or Master console. XCFAS relies upon this.

JES2 - Adding to the JES2 Init Deck

Externals:

ABEND878 RC=10
$HASP095 JES2 Catastrophic Abend Code = 878 Rc=10
$HASP088 --- JES2 [SUBTASK] ABEND ANALYSIS

When adding to the JES2 Init Deck, an increased growth of private storage above 16M is likely to occur in the JES2 Asid. Addition of nodes, devices, etc.... Cause JES2 to obtain additional pvt storage.

Actions:

Specify REGION=0 for JES2 start up to allow maximum private storage.

Do not limit private storage for JES2 via SMF user exit, IEFUSI, or installation exit, IEALIMIT.

Logger - Storage exhaustion

External:

IXGLOGR asid abnormally terminates as a result of running out of storage. The storage was filled with extraneous LBCBs because BROWSE STARTs (IXBRWSE) were done without corresponding BROWSE ENDs.

Actions:

LBCB contro blocks are built when an IXGBRWSE START is initiated, in order to represent that particular Browse session/request.

The LBCB is cleaned up only when the IXGBRWSE END is issued to 'close out' the IXGBRWSE START that built it.

Solution: Ensure each IXGBRWSE START has a corresponding IXGBRWSE END.

Logger - - IXG002E

External:

IXG002E LOGR policy processing ended with RETCODE=00000008 RSNCODE=00000839

Return/Reason code indicate the use of a keyword that the Couple Dataset does not support.

Action:

Ensure the Logger Couple Dataset (CDS) Format level can handle the use of 'newer' keywords before using, eg. SMDUPLEX.

"**Setting up a Sysplex**" manual; Subtopic: C,2,3.1 DEFINE LOGSTREAM Keywords will indictae the minimum Formatter level required.

XCF - Signaling paths

External:

There is not a standard or expected message or external error that surfaces for signaling path problems/throughput.

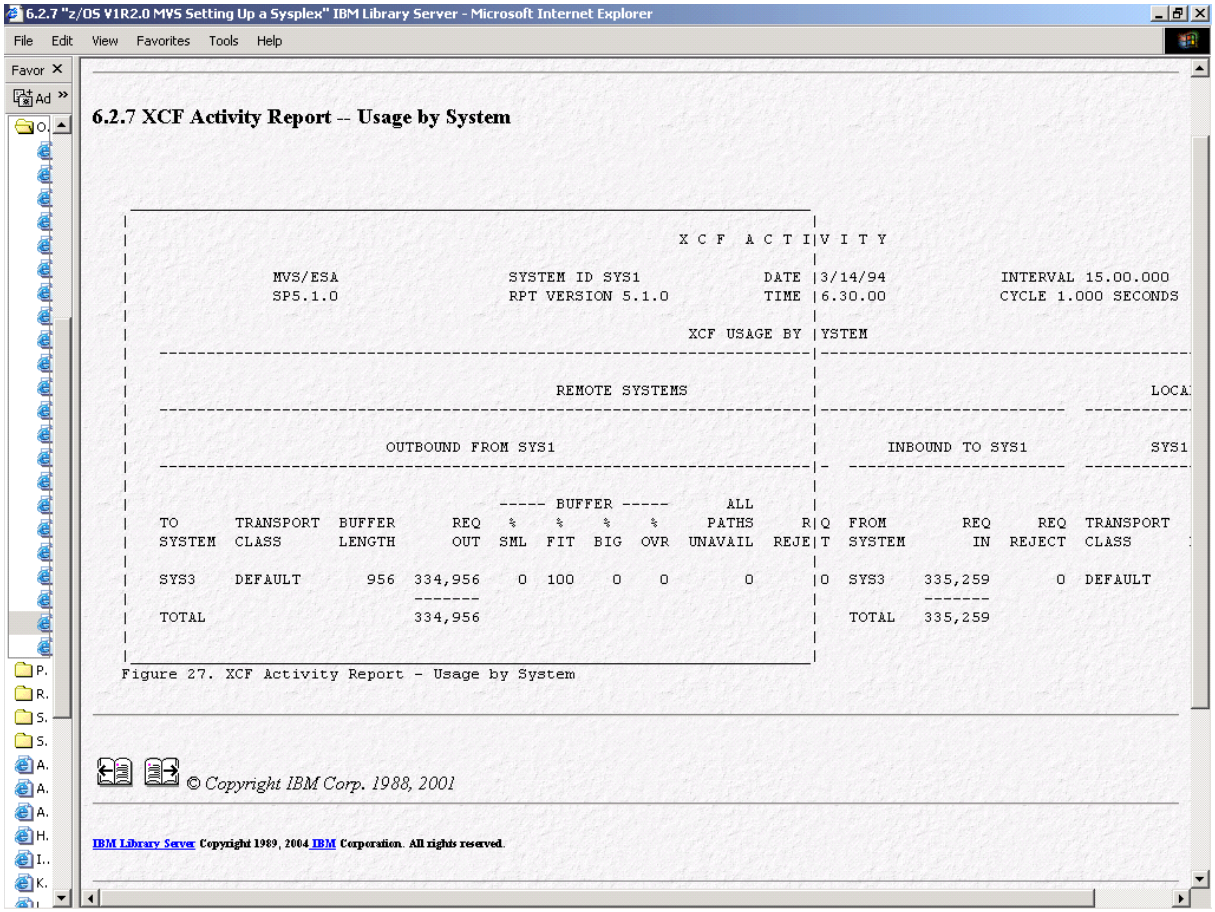
However, in some cases the IXC467I RESTART RSN: I/O APPARENTLY STALLED may appear.

The other symptoms will be more apparent to the individual applications that take advantage of signaling, so they may experience delays, poor performance/throughput, etc....

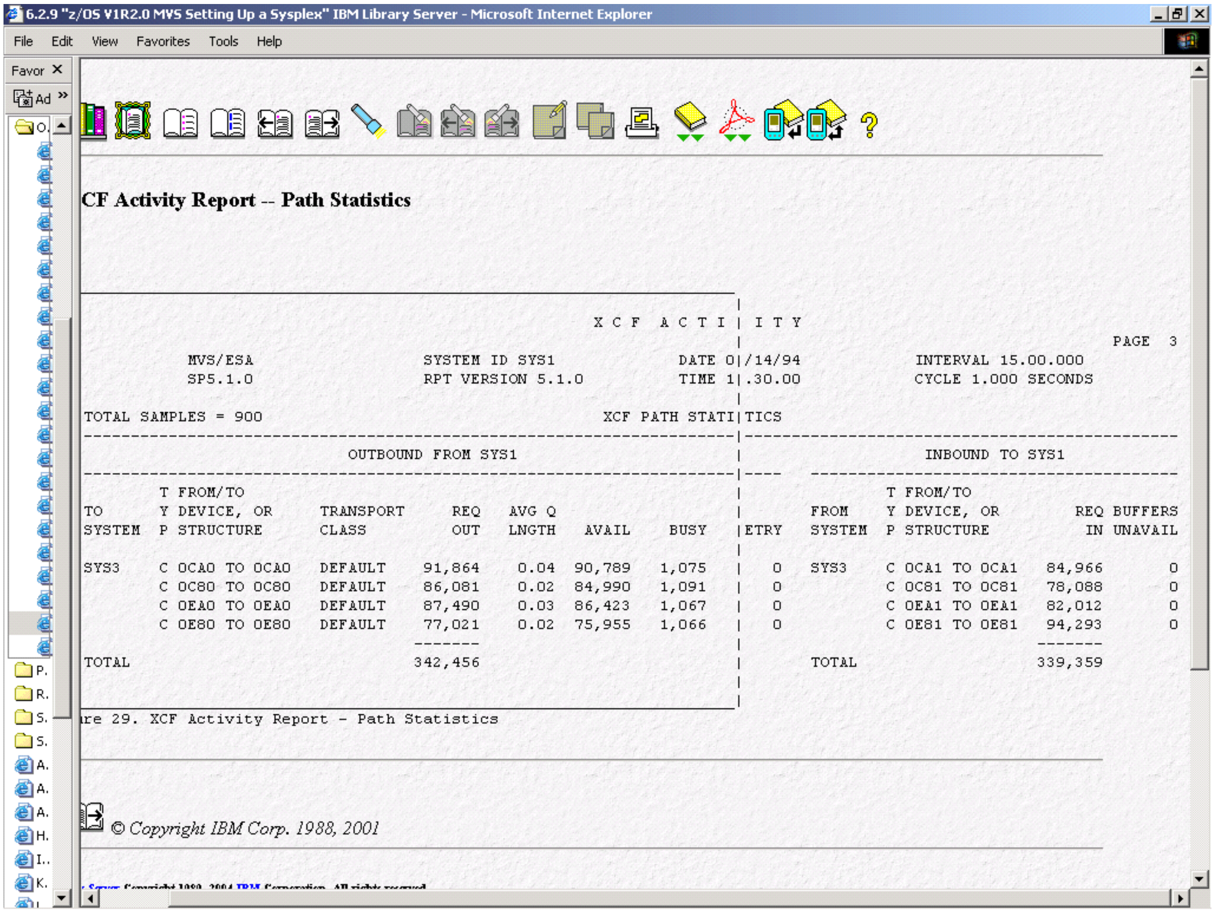
Actions:

Properly tun signaling paths. Check for REQ REJECT on outblund paths and BUFFERS UNAVAIL on inbound paths.

Performance analysis needs to be done using the RMF XCF Activity Reports. Reference



z/OS MVS Setting up a Sysplex, Chapter 6, Tuning a Sysplex.



6.2.9 "z/OS V1R2.0 MVS Setting Up a Sysplex" IBM Library Server - Microsoft Internet Explorer

CF Activity Report -- Path Statistics

```
                                                   X C F   A C T I | I T Y
                                                                   |                                    PAGE  3
           MVS/ESA                  SYSTEM ID SYS1             DATE 0|/14/94           INTERVAL 15.00.000
           SP5.1.0                  RPT VERSION 5.1.0          TIME 1|.30.00           CYCLE 1.000 SECONDS
                                                                   |
TOTAL SAMPLES = 900                                     XCF PATH STATI|TICS
-------------------------------------------------------------------|-------------------------------------------
                            OUTBOUND FROM SYS1                     |                  INBOUND TO SYS1
-------------------------------------------------------------------|----    -----------------------------------
        T FROM/TO                                                  |
TO      Y DEVICE, OR    TRANSPORT     REQ    AVG Q                 |        FROM     Y DEVICE, OR          REQ BUFFERS
SYSTEM  P STRUCTURE     CLASS         OUT    LNGTH    AVAIL    BUSY |ETRY    SYSTEM   P STRUCTURE            IN UNAVAIL
                                                                   |
SYS3    C 0CA0 TO 0CA0  DEFAULT    91,864     0.04   90,789   1,075 |   0    SYS3     C 0CA1 TO 0CA1   84,966       0
        C 0C80 TO 0C80  DEFAULT    86,081     0.02   84,990   1,091 |   0             C 0C81 TO 0C81   78,088       0
        C 0EA0 TO 0EA0  DEFAULT    87,490     0.03   86,423   1,067 |   0             C 0EA1 TO 0EA1   82,012       0
        C 0E80 TO 0E80  DEFAULT    77,021     0.02   75,955   1,066 |   0             C 0E81 TO 0E81   94,293       0
                                  -------                          |                                  -------
TOTAL                             342,456                          |        TOTAL                     339,359
                                                                   |
```

re 29. XCF Activity Report - Path Statistics

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In the above XCF Activity report, the number of "REQ REJECT" is 0 which indicates no instances of rejected requests for singaling.

In the Activity Report above, this indicates no problem since “BUFFERS UNAVAIL” is 0 for all cases, so there were no instances of unavailable buffers for signaling.

Health Checker

Run Health Checker and get acquainted with its output and recommendations. There are many things that it checks across system & sysplex boundaries, components, etc... Which will help to ensure that you do not run into problems which can be avoided.

It checks parameters, settings, configurations, etc... Which are not optimal or are non IBM recommended settings. Output and warnings come in different formats depending upon your preferences.

New integrated format for Health Checker at z/OS R7, now a system component.

Part of base z/OS

Preview: IBM z/OS V1.7 and z/OS.e V1.7: World-class computing for on demand business IBM United States Software Announcement 205-034

February 15, 2005