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Configuring Health Checker for z/OS Hands-on Lab

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Introduction

Hopefully you have some knowledge of the Health Checker and what it does. If not, then you will learn quickly.

Basically, the Health Checker is a Started Task and you are going to configure it, start it, and direct some operator commands to it, just like any other Started Task.

Have fun here and go back and try it on your own system!

Hardware and Software for this Lab

- Lenovo W520 Laptop w/8G of real, 4 Intel cores (i7-2860QM) (located off site)
- Internal Hard drive ½ TB + external ESATA drive 1.0 TB (both 7200 RPM)
- OpenSuse 11.4 Linux as the laptop OS
- IBM zPDT software with one CP license
- z/VM 6.1
- Up to 10 z/OS V1R11 virtual machines for this LAB

Agenda

Workstation Setup
- TN3270 #1 MVS Console
- TN3270 #2 TSO Terminal

- Edit Health Checker Started Task Procedure (HZSPROC)
- Allocate Health Checker persistent data set
- Setup Security rules
- Start the Health Checker address space
- Review the Checks
- Issue MVS commands
- Use SDSF Health Checker panels

Agenda

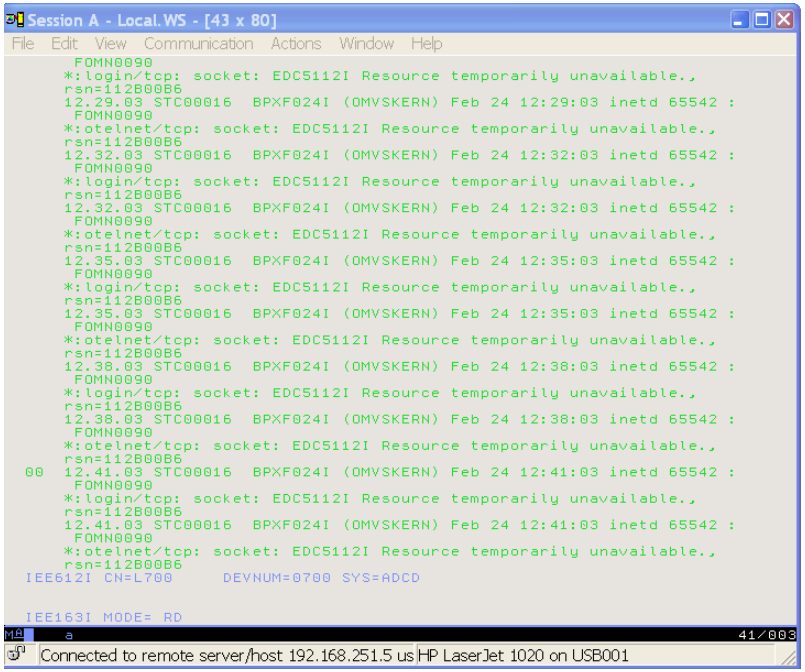
- Health Checker Log
- Temporarily altering a specific Health Check
- Permanently altering a specific Health Check
- Review the details of a specific Health Check
- Stopping the Health Checker address space
- References
- Questions for the presenter

Workstation Setup

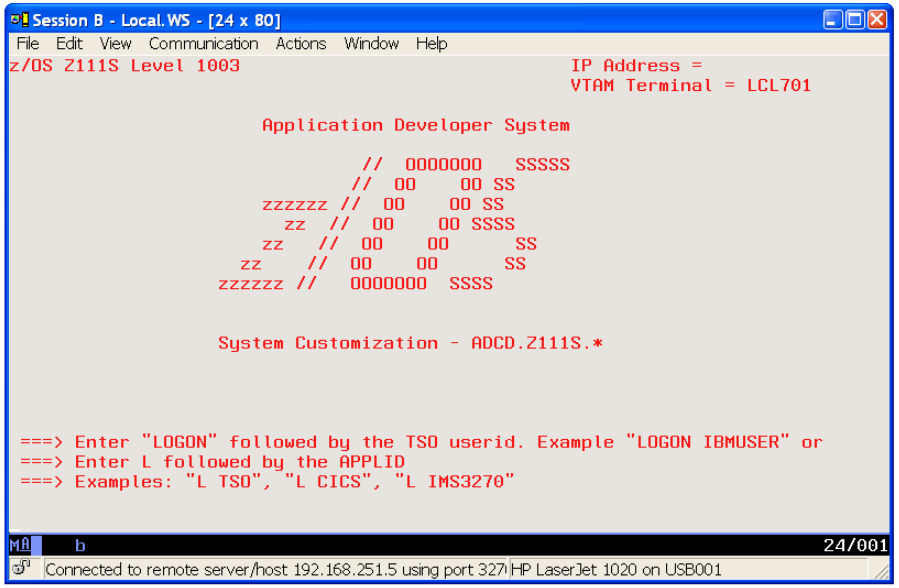
- You have your own z/OS Virtual Machine - ZSHRx
  The x value will be given to you by the instructor.
  Write it down here: ____
- Make sure you have two 3270 sessions open on the workstation with a z/VM Logo.
  - On the first z/VM session, type ZSHRx for the userid and SHRx for the password.
  - On the other z/VM session, skip down to the command field and type DIAL ZSHRx.
- The next slide will show what you should see.

Workstation Setup

MVS Console



TSO terminal

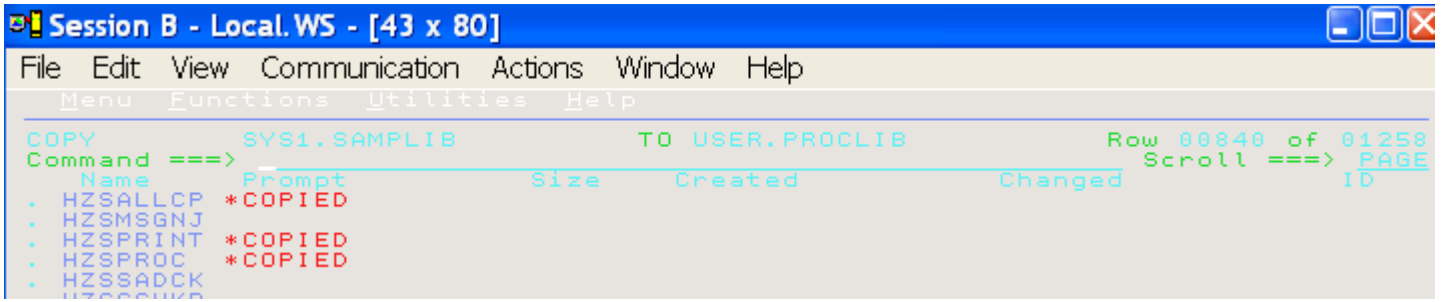


Health Checker Configuration

On the TSO Terminal

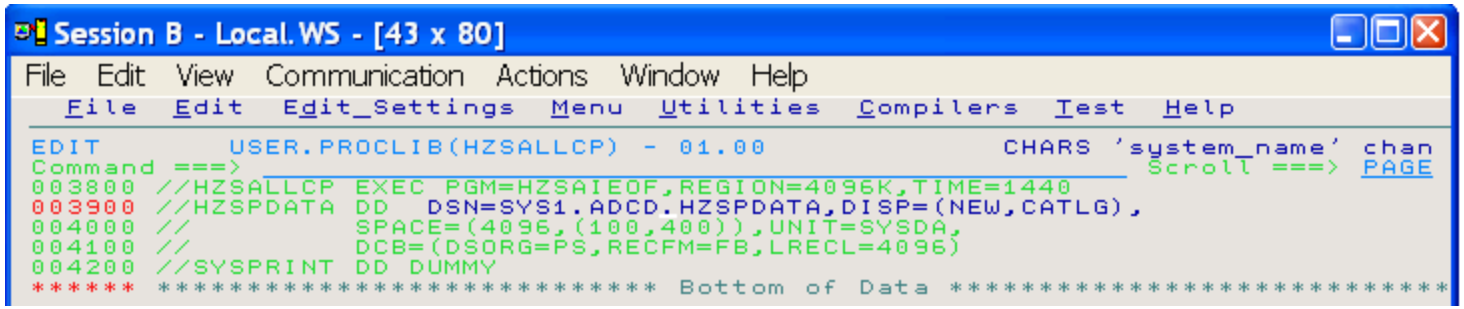
- Type TSO and hit Enter
- On the Logon Screen
  - ADCDMST is the USERID
  - SHRx is the Password,
    where x is the value given to you

Copy members HZSALLCP, HZSPRINT, and HZSPROC from SYS1.SAMPLIB to USER.PROCLIB



Allocate the HZSPDATA dataset

- Edit member HZSALLCP in USER.PROCLIB
  - Change Line //HZSPDATA ‘system_name’ to ‘ADCD’
  - The result should look like:



- Submit the JOB and check the output with SDSF.

SDSF can be accessed via the “M” option on the ISPF Primary Option Menu

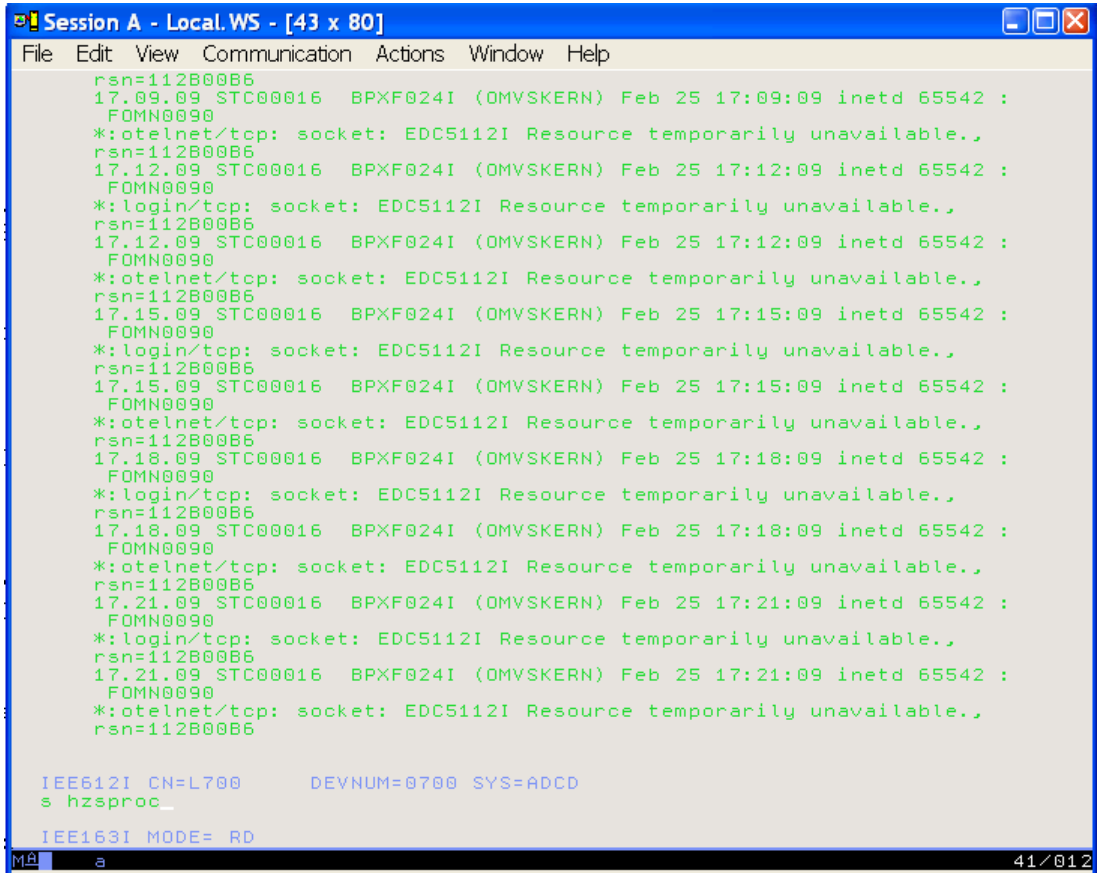
Security Setup

The RACF definitions for the Health Checker and SDSF have been built for you for this lab. Since the lab system is your own sandbox we are going to let the user ADCDMST do just about everything. For your systems back home you really need to review the security definitions carefully.

- Submit member BATHCK in USER.PROCLIB to do the RACF definitions for the Health Checker.
- Review the output from BATHCK for success.
- Submit member BATSDSF in USER.PROCLIB to do the RACF definitions for SDSF. The EXEC issued by this job is based on member ISFRAC which can be found in ISF.SISFEXEC.
- Review the output from BATSDSF for success.

Starting the Health Checker

Use the MVS Console to start the Health Checker.



Health Checker Messages on the Console

Note the critical Health Checks are shown in red. These indicate that these messages will remain on the console until deleted.

```
 IGWPH0101E Check PDSE_SMSPDSE1,the restartable SMSPDSE1
 address space is not active.
*17.57.26 STC00018 *HZS0003E CHECK(IBMXCF,XCF_CDS_SPOF):
*IXCH0242E One or more couple data sets have a single point of failure.
 17.57.26 STC00018  HZS0002E CHECK(IBMASM,ASM_PLPA_COMMON_SIZE):
 ILRH0105E PLPA/Common page data set size is below recommended value
 17.57.26 STC00018  HZS0001I CHECK(IBMASM,ASM_NUMBER_LOCAL_DATASETS):
 ILRH0101E Number of local page data sets is below recommended value
 17.57.25 STC00018  HZS0002E CHECK(IBMXCF,XCF_TCLASS_CLASSLEN):
 IXCH0420E Transport class definitions do not provide sufficient size
 segregation.
 17.57.26 STC00018  HZS0001I CHECK(IBMRSM,RSM_REAL):
 IARH101E V=R Storage is Defined
 17.57.29 STC00018  HZS0001I CHECK(IBMCSV,CSV_LNKLST_SPACE):
 CSVH0980E Some LNKLST sets include data set(s) allocated with
 secondary space defined.
*17.57.30 STC00018 *HZS0003E CHECK(IBMRACF,RACF_SENSITIVE_RESOURCES):
*IRRH204E The RACF_SENSITIVE_RESOURCES check has found one or
*more potential errors in the security controls on this system.
 18.00.10 STC00016  BPXF024I (OMVSKERN) Feb 25 18:00:10 inetd 65542 :
  FOMN0090
 *:login/tcp: socket: EDC5112I Resource temporarily unavailable.,
 rsn=112B00B6
```

Displaying Check Details on the Console using the MVS Modify Command

Let's look at the details for the first one by entering:

```
f hzsproc,display,checks,check=(IBMXCF,XCF_CDS_SPOF),details
```

```
CHECK(IBMXCF,XCF_CDS_SPOF)
 STATE: ACTIVE(ENABLED)                STATUS: EXCEPTION-HIGH
 EXITRTN: IXCHCADC
 LAST RAN: 02/25/2011 17:57    NEXT SCHEDULED: 02/25/2011 18:57
 INTERVAL: 1:00
 EXCEPTION INTERVAL: SYSTEM
 SEVERITY: HIGH
 WTOTYPE: CRITICAL EVENTUAL ACTION
 SYSTEM DESCCODE: 11
 THERE ARE NO PARAMETERS FOR THIS CHECK
 REASON FOR CHECK:  Ensure that couple data sets are configured
                    without single points of failure.
 MODIFIED BY: N/A
 DEFAULT DATE: 20070730
 ORIGIN: HZSADDCK
 LOCALE: HZSPROC
 DEBUG MODE: OFF  VERBOSE MODE: NO
```

More Modify Commands

The reason for the check is that your Couple Datasets are all on the same volume. You may issue a D XCF,COUPLE command on the MVS console and see that the datasets are all on SBRES2.

Separation of the Couple Datasets is critical for a production system, but this is your sandbox with a limited number of DASD volumes available. Let's say you want to keep the check as a reminder, but don't want it to clutter up your console. You can change the check's WTO options so the message will not remain in red on the console.

Issue the command:

```
f hzsproc,update,check=(IBMXCF,XCF_CDS_SPOF),wtotype=informational
```

This won't take effect until the check runs again, but we can run it now by this command:

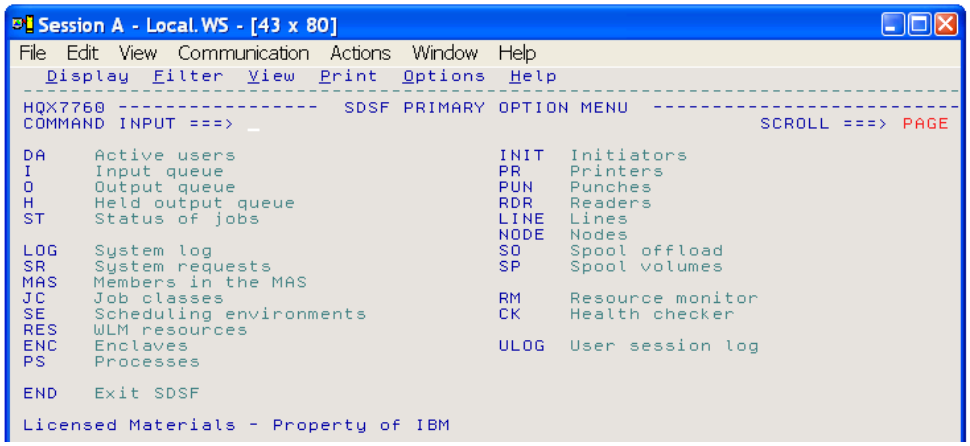
```
f hzsproc,run,check=(IBMXCF,XCF_CDS_SPOF)
```

Take a look at the MVS Console now and you will see the check is no longer red.

Using SDSF to Control the Health Checker

SDSF is the spool output processor on this system. You may use a different software product on your system back home. If you do, then check the documentation for that software to see how it supports the Health Checker.

To access SDSF select the “M” option on the ISPF Primary Option Menu and then select “5” to enter SDSF.



SDSF CK Command

1. Enter “CK” to view the Health Check Panel. This shows all of the active Health Checks.
2. Press PF1 to get the Health Check Help Panel.
3. Enter “2” to view the CK command syntax.
4. Press ENTER to view the format of the CK command.

```
                HELP: Health Checker Panel -- CK Command     Panel 2 of 3
COMMAND INPUT ===>

    Format:  CK (category|E|EH|EM|EL|EN|D|ALL)
          with no parameters displays active checks.
          category shows only checks for that category. The value
             can include * (any string of characters) or %
             (any single character).
          E displays all exception checks, with these variations:
            EH - exception-high
            EM - exception-medium
            EL - exception-low
            EN - exception-none
          D displays deleted checks.
          ALL displays deleted as well as active checks.
```

Display only Checks with Exceptions using SDSF “CK E” Command

1. Press PF3 to return to the previous panel.
2. Enter “CK E” on the command line. This will list just the Health Checks with Exception Status.

```
SDSF HEALTH CHECKER DISPLAY  ADCD                          LINE 1-19 (19)
COMMAND INPUT ===> _                                        SCROLL ===> PAGE
NP    NAME                              CheckOwner        State             Status
      ASM_NUMBER_LOCAL_DATASETS         IBMASM            ACTIVE(ENABLED)   EXCEPTIO
      ASM_PLPA_COMMON_SIZE              IBMASM            ACTIVE(ENABLED)   EXCEPTIO
      CEE_USING_LE_PARMLIB              IBMCEE            ACTIVE(ENABLED)   EXCEPTIO
      CNZ_AMRF_EVENTUAL_ACTION_MSGS     IBMCNZ            ACTIVE(ENABLED)   EXCEPTIO
      CNZ_CONSOLE_ROUTCODE_11           IBMCNZ            ACTIVE(ENABLED)   EXCEPTIO
      CSV_LNKLST_SPACE                  IBMCSV            ACTIVE(ENABLED)   EXCEPTIO
      CSVTAM_VIT_DSPSIZE                IBMCS             ACTIVE(ENABLED)   EXCEPTIO
      PDSE_SMSPDSE1                     IBMPDSE           ACTIVE(ENABLED)   EXCEPTIO
      RACF_IBMUSER_REVOKED              IBMRACF           ACTIVE(ENABLED)   EXCEPTIO
      RACF_SENSITIVE_RESOURCES          IBMRACF           ACTIVE(ENABLED)   EXCEPTIO
      RACF_TAPEVOL_ACTIVE               IBMRACF           ACTIVE(ENABLED)   EXCEPTIO
      RACF_TEMPDSN_ACTIVE               IBMRACF           ACTIVE(ENABLED)   EXCEPTIO
      RACF_UNIXPRIV_ACTIVE              IBMRACF           ACTIVE(ENABLED)   EXCEPTIO
      RSM_REAL                          IBMRSM            ACTIVE(ENABLED)   EXCEPTIO
      RTM_IEAVTRML                      IBMRTM            ACTIVE(ENABLED)   EXCEPTIO
      TSOE_USERLOGS                     IBMTSOE           ACTIVE(ENABLED)   EXCEPTIO
      USS_MAXSOCKETS_MAXFILEPROC        IBMUSS            ACTIVE(ENABLED)   EXCEPTIO
      XCF_CDS_SPOF                      IBMXCF            ACTIVE(ENABLED)   EXCEPTIO
      XCF_TCLASS_CLASSLEN               IBMXCF            ACTIVE(ENABLED)   EXCEPTIO
```

SDSF CK Command / Syntax

Enter “CK EH” to show only the Health Checks with high-severity Exceptions.

```
SDSF HEALTH CHECKER DISPLAY  ADCD                          LINE 1-2 (2)
COMMAND INPUT ===>                                          SCROLL ===> PAGE
NP    NAME                              CheckOwner        State              Status
      RACF_SENSITIVE_RESOURCES          IBMRACF           ACTIVE(ENABLED)    EXCEPTIO
      XCF_CDS_SPOF                      IBMXCF            ACTIVE(ENABLED)    EXCEPTIO
```

1. Press PF1 to view the HELP Panel.
2. Enter “3” to get the syntax of the Action Characters.

```
Action characters that can be entered in the NP column
by authorized users are:

     //     Block repeat; type // on the first row and
            another // on the last row to be processed
     =      Repeat previous action character or overtype
     +      Expand the NP column.  (Use RESET to reset.)
     A      Activate
     D      Display
     DL     Display long
     DP     Display policies
     DPO    Display policies that are outdated and not applied
     DS     Display status
     E      Refresh
     H      Deactivate
```

SDSF Health Check Line Commands

Enter “DL” on the line with XCF_CDS_XPOF.
DL means “Display Long”.

```
SDSF HEALTH CHECKER DISPLAY  ADCD                          LINE 1-2 (2)
COMMAND INPUT ===>                                          SCROLL ===> PAGE
NP    NAME                          CheckOwner       State              Status
      RACF_SENSITIVE_RESOURCES      IBMRACF          ACTIVE(ENABLED)    EXCEPTIO
DL_   XCF_CDS_SPOF                  IBMXCF           ACTIVE(ENABLED)    EXCEPTIO
```

SDSF Display Check Details

You should see the following output. Note how this looks very much like the MVS Console output of:

```
f hzsproc,display,checks,check=(IBMXCF,XCF_CDS_SPOF),details
```

```
HZS0201I 23.59.55 CHECK DETAIL      109
CHECK(IBMXCF,XCF_CDS_SPOF)
 STATE: ACTIVE(ENABLED)               STATUS: EXCEPTION-HIGH
 EXITRTN: IXCHCADC
 LAST RAN: 02/28/2011 23:10    NEXT SCHEDULED: 03/01/2011 00:10
 INTERVAL: 1:00
 EXCEPTION INTERVAL: SYSTEM
 SEVERITY: HIGH
 WTOTYPE: CRITICAL EVENTUAL ACTION
 SYSTEM DESCCODE: 11
 THERE ARE NO PARAMETERS FOR THIS CHECK
 REASON FOR CHECK:  Ensure that couple data sets are configured
                    without single points of failure.
 MODIFIED BY: N/A
 DEFAULT DATE: 20070730
 ORIGIN: HZSADDCK
 LOCALE: HZSPROC
 DEBUG MODE: OFF   VERBOSE MODE: NO
```

SDSF CK Command Scrolling

1. On the command line Enter “CK EH” again to view those checks.
2. You can scroll to the right using PF11 to view more information about the checks. Press PF11 three times and you will see “TOType” on the header line. Type “1” in the Command Input and press PF10 to scroll back one column and you should see this:

```
SDSF HEALTH CHECKER DISPLAY  ADCD                          LINE 1-2 (2)
COMMAND INPUT ===> _                                        SCROLL ===> PAGE
NP    NAME                          WTOType    ModifiedBy              PolicyStatus
      RACF_SENSITIVE_RESOURCES      CRITICAL
      XCF_CDS_SPOF                  INFO       MODIFY COMMAND
```

Note the indication that our earlier MVS console Modify Command changed the WTOType.

Temporary Check Alteration and Running using SDSF

1. Press PF11 a few times while you look at the information that is displayed. Note that the green fields are input fields that you are allowed to change.
2. Press PF10 to scroll back to the left until you return to the WTOType field.
3. Overtype the INFO with CRITICAL and Press Enter.

```
SDSF HEALTH CHECKER DISPLAY  ADCD                          LINE 1-2 (2)
COMMAND INPUT ===> _                                     SCROLL ===> PAGE
NP    NAME                                WTOType   ModifiedBy          Pol
      RACF_SENSITIVE_RESOURCES            CRITICAL
      XCF_CDS_SPOF                        CRITICAL  MODIFY COMMAND
```

Just as in the MVS console command the WTOType has been changed, but it won't take effect until the next time the check runs. You can run it now by typing an "R" in the NP field next to the check and Press Enter. Now look at the MVS Console and you will again see the messages for that Health Check in red.

Printing Health Check Results via a Batch JOB

The HZSPRNT utility may be used to print the results of Health Checks with a batch job.
Go back and Edit USER.PROCLIB again.

1. Select member HZSPRINT.
2. Scroll down to the //HZSPRINT EXEC PGM=HZSPRNT line.
3. You have several options to use; most are commented out.
4. Let's print all of the Health Checks that have Exceptions.
5. Change the data to look like this:

```
//HZSPRINT EXEC PGM=HZSPRNT,TIME=1440,REGION=0M,
//    PARM=('CHECK(*,*)','EXCEPTIONS')
```

Submit the job.
Review the output with SDSF.

Making Permanent Modifications to Checks

We are going to make the temporary change that we made earlier to the WTOTYPE a permanent change.
Create a new member, HZSPRM01, in USER.PARMLIB with the following contents:

```
EDIT       USER.PARMLIB(HZSPRM01) - 01.02                Columns 00001 00072
Command ===> _____________________________________________ Scroll ===> PAGE
****** ***************************** Top of Data ******************************
000001 ADDREPLACE POLICY STMT(POL1) UPDATE,
000002 CHECK(IBMXCF,XCF_CDS_SPOF),
000003 WTOTYPE(INFORMATIONAL),
000004 REASON('CHANGE WTO'),
000005 DATE('20110228')
****** **************************** Bottom of Data ****************************
```

Making Changes to Checks Permanent: Adding new Parmlib Member

Activate the new member using the Health Checker Modify Command on the MVS Console using this command:

```
f hzsproc,add,parmlib=01
```

You should see the following response:

```
00- 22.07.22            F HZSPROC,ADD,PARMLIB=01
    22.07.22 STC00028   HZS0403I ADD PARMLIB PROCESSING HAS BEEN COMPLETED
IEE612I CN=L700     DEVNUM=0700 SYS=ADCD
_
IEE163I MODE= RD
```

Making Changes to Checks Permanent: Updating the Health Checker Proc

To make the Health Checker use this new Parmlib Member in addition to the default HZSPRM00 member when the Health Checker is restarted, the PROC must be updated. Edit HZSPROC in USER.PROCLIB and change the HZSPARM value from 00 to (00,01). See below:

```
000038 //*************************************************************/
000039 //HZSPROC  PROC HZSPRM='(00,01)'
000040 //HZSSTEP  EXEC   PGM=HZSINIT,REGION=0K,TIME=NOLIMIT,
000041 //       PARM='SET PARMLIB=&HZSPRM'
000042 //HZSPDATA DD   DSN=SYS1.&SYSNAME..HZSPDATA,DISP=OLD
```

Now let's stop and restart the Health Checker to make sure the change is permanent.

Stopping the Health Checker

On the MVS Console Enter “P HZSPROC”.
Watch the Health Checker wait for all the Checks to terminate prior to ending.

Restart the Health Checker and Verify the Change

On the MVS Console Enter “S HZSPROC”.
Wait a few seconds for the Checks to complete.
Let’s look at the details to verify that our change worked by entering:

```
f hzsproc,display,checks,check=(IBMXCF,XCF_CDS_SPOF),details
```

```
22.25.30           f hzsproc,display,checks,check=(IBMXCF,XCF_CDS_SPOF),
 details
22.25.30 STC00028  HZS0201I 22.25.30 CHECK DETAIL     498
CHECK(IBMXCF,XCF_CDS_SPOF)
 STATE: ACTIVE(ENABLED)              STATUS: EXCEPTION-HIGH
 EXITRTN: IXCHCADC
 LAST RAN: 03/01/2011 21:56    NEXT SCHEDULED: 03/01/2011 22:56
 INTERVAL: 1:00
 EXCEPTION INTERVAL: SYSTEM
 SEVERITY: HIGH
 WTOTYPE: INFORMATIONAL
 SYSTEM DESCCODE: 12
 THERE ARE NO PARAMETERS FOR THIS CHECK
 REASON FOR CHECK:  Ensure that couple data sets are configured
                    without single points of failure.
 MODIFIED BY: STMT(POL1)
 REASON FOR UPDATE: CHANGE WTO
 DEFAULT DATE: 20070730  USER DATE: 20110228
 ORIGIN: HZSADDCK
 LOCALE: HZSPROC
 DEBUG MODE: OFF  VERBOSE MODE: NO
12I CN=L700      DEVNUM=0700 SYS=ADCD
```

Free Time

If you have time go back to the HZSPRINT output and look at the RACF Sensitive Resource Check. This type of check contains reports in addition to the normal check output. These are important checks that show potential integrity exposures.

Feel free to look at some of the other Health Checks.

Reference: BATHCK JOB

```
EDIT       USER.PROCLIB(BATHCK) - 01.00              Columns 00001 00072
Command ===>                                          Scroll ===> PAGE
****** ***************************** Top of Data ******************************
000100 //BATHCK   JOB   (),
000200 //         CLASS=A,
000300 //         MSGCLASS=X,
000400 //         MSGLEVEL=(1,1),
000500 //         NOTIFY=&SYSUID,
000600 //         TIME=1440
000610 //*
000620 //*  SETUP AUTHORIZATIONS FOR HEALTH CHECKER
000630 //*
000640 //S1    EXEC PGM=IKJEFT01
000800 //SYSPRINT DD SYSOUT=*
000900 //SYSTSPRT DD SYSOUT=*
001000 //SYSTERM  DD DUMMY
001100 //SYSUADS  DD DSN=SYS1.UADS,DISP=SHR
001200 //SYSLBC   DD DSN=SYS1.BRODCAST,DISP=SHR
001300 //SYSTSIN  DD *
001400 RDEFINE XFACILIT HZS.** UACC(NONE)
001500 PERMIT HZS.** CLASS(XFACILIT) ID(ADCDMST) ACCESS(CONTROL)
001600 PERMIT HZS.** CLASS(XFACILIT) ID(IBMUSER) ACCESS(CONTROL)
001700 SETROPTS REFRESH RACLIST(XFACILIT)
****** **************************** Bottom of Data ****************************
```

Reference: BATSDSF JOB

```
EDIT       USER.PROCLIB(BATSDSF) - 01.02            Columns 00001 00072
Command ===>                                        Scroll ===> PAGE
****** ***************************** Top of Data ******************************
000100 //BATSDSF  JOB   (),
000200 //        CLASS=A,
000300 //        MSGCLASS=X,
000400 //        MSGLEVEL=(1,1),
000500 //        NOTIFY=&SYSUID,
000600 //        TIME=1440
000610 //*
000620 //*  SETUP AUTHORIZATIONS FOR SDSF
000630 //*
000700 //S1    EXEC PGM=IKJEFT01
000800 //SYSPRINT DD SYSOUT=*
000802 //SYSTSPRT DD SYSOUT=*
000803 //SYSTSIN DD *
000804  EX 'ADCDMST.EXEC(ISFRAC)' L
****** ***************************** Bottom of Data ***************************
```

Reference List

1. IBM Health Checker for z/OS User's Guide
2. Exploiting the IBM Health Checker for z/OS Infrastructure (IBM Redpaper – see www.redbooks.ibm.com)
3. Configuring the z/OS UNIX Health Checks and Exploiting UNIX REXX Functions (a very good introduction to the Health Checker in general – see SHARE proceedings from 2008 San Jose)
4. Lots more on Google

Follow Up

If you have any questions and you wish to contact me:

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I will be happy to try to answer any questions!