IBM Systems and Technology Group

The RACF® Checks for the IBM® Health Checker for z/OS®

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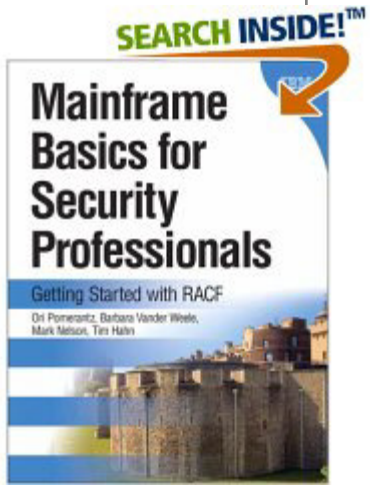

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Agenda

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- The Health Check
- The RACF Health Checks
- Check “Philosophy”
- Check Output
- Installation-Defined RACF Checks
- New RACF Checks
- References

The IBM Health Checker for z/OS

- **What is the IBM Health Checker for z/OS?**
  - **Originally a tool developed by IBM International Technical Support Organization (ITSO) to address common configuration and setup errors**
    - 15-20% of system outages attributed to setup and configuration
    - Implemented as a batch job, with 37 checks in 2003
    - Delivered as a web download
  - **With z/OS V1R7, the IBM Health Checker for z/OS was integrated into z/OS**
    - Implemented as a started task
    - 55 checks with z/OS V1R1; with z/OS V1R10 130+ checks!
    - Rolled back to z/OS V1R4 as a web download
    - Checks are shipped with components
    - Installations and vendors can write checks
    - Extensive SDSF support
  - **Starting with z/OS V2.1, the Health Checker for z/OS starts automatically**

Structure of the IBM Health Checker for z/OS

- **The IBM Health Checker for z/OS consists of:**
  - A managing address space (the “backbone”)
  - The Health Checks
    - Written by individual components (such as RACF, UNIX® System Services)
    - ISVs and Installations can write their own checks
      - Can be written in System REXX, stating with z/OS V1R9
  - A utility (HZSPRINT) for collecting check output
- **A check is identified by a:**
  - 1-32 character check name, examples of which are:
    - CSV_APF_EXISTS
    - GRS_CONVERT_RESERVES
    - RACF_IBMUSER_REVOKED
  - 1-16 character check owner
    - The owner for an IBM-supplied check begins with IBM, for example:
      - IBMCSV, IBMGRS, and IBMRACF

The Health Check

- **Each check (usually) represents a single “best practice”, which comes from:**
  - Product documentation
  - The z/OS System Test organization
  - The z/OS Service Team
  - The Parallel Sysplex Availability Checklist
  - ITSO Redbooks
  - Washington System Center Flashes
- **When migrating to a new release of z/OS, you can use the IBM migration checks to help you analyze your system and identify activities to complete when migrating.**

The Health Check…

- **Associated with each check is information about its execution:**
  - Execution state:
    - ACTIVE or INACTIVE
  - How often the check runs
    - ONETIME, hh:mm
  - The severity of the check, which influences how check output is issued
    - HIGH, MEDIUM, LOW, NONE
  - WTOTYPE
    - CRITICAL, EVENTUAL, INFORMATIONAL, HARDCOPY, NONE
- **Some checks accept parameters which direct the processing of the check or set thresholds**
- **Check information is set by the check writer, but can be changed by the installation by:**
  - Policy statements in the HZSPRMxx member of PARMLIB
  - MVS MODIFY Command (F HC ….)

Health Checks

- **The IBM Health Checker for z/OS is dynamic. That is, health checks:**
  - Are separately packaged and shipped
  - Do not have to be predefined
    - Check writers must merely register with the HZSADDCHECK MVS dynamic exit point
  - Can be added after the startup of the Health Checker “backbone”
  - Can have their characteristics changed by either MVS command or PARMLIB
  - Do not execute if the IBM Health Checker for z/OS is not active
- **IBM is adding new checks in new releases and in the service stream**
  - To get the most recent checks, use the Enhanced Preventative Service Planning (PLP) tool

Health Checks…

- **MVS components have shipped over 130 checks:**
  - Consoles
  - Contents Supervision
  - GRS
  - RACF
  - Resource Recovery Services (RRS)
  - SDUMP
  - z/OS UNIX System Services
  - Virtual Storage Management
  - Real Storage Management
  - XES/XCF

The RACF Health Checks

- **RACF ships these Health Checks:**
  - **RACF_GRS_RNL**
    - Checks to see if any of the RACF ENQ names are on a GRS resource name exclusion list which changes the scope of the RACF ENQ
    - Defaults: Severity(High) Interval(08:00)
  - **RACF_SENSITIVE_RESOURCES**
    - Looks at the current APF data sets, PARMLIB, the System REXX data sets, LINKLIST, and the RACF database data sets and flags those that are improperly protected
      - Are not found on the indicated volume
      - Are improperly protected
    - Examines key system general resources
    - Severity(High) Interval(08:00)

The RACF Health Checks…

- **RACF_IBMUSER_REVOKED**
  - Verifies that the user ID IBMUSER is revoked
  - Defaults: Severity(Medium), Interval(24:00)
- **RACF_<class-name>_ACTIVE**
  - Verifies that the class <class-name> is active
    - Check is performed for FACILITY, OPERCMDS, TAPEVOL, TEMPDSN, TSOAUTH, UNIXPRIV
  - Defaults: Severity(Medium), Interval(24:00)

The RACF Health Checks…

- **ICHAUTAB checks:**
  - For over 20 years, IBM has recommended not using the RACF Authorized Caller Table (ICHAUTAB)
  - RACF introduces a new check to verify that ICHAUTAB is not being used
    - **RACF_ICHAUTAB_NONLPA** raises a SEV(MED) exception if a non-LPA resident ICHAUTAB is found
      - Severity(Medium), Interval(24:00)
    - The existing **RACF_SENSITIVE_RESOURCES** raises a SEV(HIGH) exception if an LPA-resident ICHAUTAB is found
- **The "installation-defined resource" check which allows you to define the resources that you want to check**
- **New checks with V1.13:**
  - RACF_AIM_STAGE
  - RACF_UNIX_ID
  - ZOSMIGV2R1_DEFAULT_UNIX_ID
- **New check with V2.1:**
  - RACF_CERTIFICATE_EXPIRATION

Check Output

- **The output of a check consists of:**
  - Write to Operator messages (WTO)s, which are written with the routing codes and descriptor codes associated with the check
  - Messages written to the Health Check message buffer, which can be:
    - Kept in storage (most recent check invocation only)
    - Written to a log stream
- **Check output can be processed with:**
  - SDSF, using the “CK” panels
  - Using the HZSPRINT utility

Check "Philosophy"

- **Checks which are not applicable to the current environment place themselves in a "not applicable" status and will not run unless triggered.**
- **Health Checks raise exceptions and make recommendations, *but they do not automatically take any actions***
  - You must review the recommendation and ensure that it is appropriate for your environment
- **When an exception is found, Health Checks present the entire message information, including the "explanation", "systems programmer response", etc., along with pointers to relevant documentation.**
- **Checks which find no exception clearly state that no exception was found.**

Sample “No Exception” Output

```
 SDSF OUTPUT DISPLAY RACF_OPERCMDS_ACTIVE          LINE 0
 COMMAND INPUT ===>
********************************* TOP OF DATA ***************
CHECK(IBMRACF,RACF_OPERCMDS_ACTIVE)
START TIME: 04/08/2009 12:48:12.764702
CHECK DATE: 20051111  CHECK SEVERITY: MEDIUM
CHECK PARM: OPERCMDS


IRRH228I The class OPERCMDS is active.

END TIME: 04/08/2009 12:48:12.767783  STATUS: SUCCESSFUL
******************************** BOTTOM OF DATA *************
```

Sample “Not Applicable to the Current Environment” Output

```
 SDSF OUTPUT DISPLAY RACF_GRS_RNL                    LINE 0       COLUMNS
 COMMAND INPUT ===>                                              SCROLL =
********************************* TOP OF DATA ************************
CHECK(IBMRACF,RACF_GRS_RNL)
START TIME: 04/08/2009 12:48:12.575714
CHECK DATE: 20040703  CHECK SEVERITY: HIGH

IRRH201I The RACF_GRS_RNL check cannot be executed in a GRS=NONE
environment.

HZS1003E CHECK(IBMRACF,RACF_GRS_RNL):
THE CHECK IS NOT APPLICABLE IN THE CURRENT SYSTEM ENVIRONMENT.

END TIME: 04/08/2009 12:48:12.767433  STATUS: ENV N/A
******************************** BOTTOM OF DATA **********************
```

Sample Check Exception Output

```
START TIME: 11/10/2004 10:13:10.341622  IBMRACF, RACF_GRS_RNL
OWNER DATE: 20040703

                          RACF_GRS_RNL Report

 S Major    Minor                Type  QName    Rname              Type
 - -------- -------------------- ----- -------- ------------------ ----
 E SYSZRACF SETROPTS             SERNL SYSZRACF SETROPTS           SPEC
 E SYSZRAC2 IRRCRV05             SERNL SYSZRAC2 IRRCRV05           SPEC

* High severity Exception *

IRRH202E   One or more RACF ENQ names were found in a GRS Resource Name
    List.

  Explanation:
    The RACF RACF_GRS_RNL check has detected that a RACF resource
    is covered by an entry in the specified GRS resource name list
    (RNL). RACF resource names should not be in either the system
    inclusion RNL (SIRNL) or the system exclusion RNL (SERNL).

  System Action:
    The check continues processing. There is no effect on the system.
...
 IBMRACF Reason: None of the RACF ENQ names should be in RNLs.
  Check parameters: N/A

END TIME: 01/08/2005 20:47:54.819710         STATUS: EXCEPTION-HIGH
```

Updated SDSF Primary Option Panel

```
Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
HQX7720 -----------------  SDSF PRIMARY OPTION MENU  --------------------------

DA     Active users                      INIT   Initiators
I      Input queue                       PR     Printers
O      Output queue                      PUN    Punches
H      Held output queue                 RDR    Readers
ST     Status of jobs                    LINE   Lines
                                         NODE   Nodes
LOG    System log                        SO     Spool offload
SR     System requests                   SP     Spool volumes
MAS    Members in the MAS
JC     Job classes                       RM     Resource monitor
SE     Scheduling environments           CK     Health checker
RES    WLM resources

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COMMAND INPUT ===> ck                                    SCROLL ===> PAGE
 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

SDSF Check Selection Panel

```
 Display  Filter  View  Print  Options  Help
------------------------------------------------------------------------------
SDSF HEALTH CHECKER DISPLAY  RACFR17                    LINE 11-27 (50)
NP   NAME                              CheckOwner       State               Status
     CNZ_TASK_TABLE                    IBMCNZ           ACTIVE(ENABLED)     SUCCES
     CSV_APF_EXISTS                    IBMCSV           ACTIVE(ENABLED)     EXCEPT
     CSV_LNKLST_NEWEXTENTS             IBMCSV           ACTIVE(ENABLED)     SUCCES
     CSV_LNKLST_SPACE                  IBMCSV           ACTIVE(ENABLED)     EXCEPT
     GRS_CONVERT_RESERVES              IBMGRS           ACTIVE(DISABLED)    ENV N/
     GRS_EXIT_PERFORMANCE              IBMGRS           ACTIVE(ENABLED)     SUCCES
     GRS_MODE                          IBMGRS           ACTIVE(DISABLED)    ENV N/
     GRS_SYNCHRES                      IBMGRS           ACTIVE(ENABLED)     SUCCES
     RACF_GRS_RNL                      IBMRACF          ACTIVE(DISABLED)    ENV N/
S    RACF_SENSITIVE_RESOURCES          IBMRACF          ACTIVE(ENABLED)     EXCEPT
     RSM_AFQ                           IBMRSM           ACTIVE(ENABLED)     SUCCES
     RSM_HVSHARE                       IBMRSM           ACTIVE(ENABLED)     SUCCES
     RSM_MAXCADS                       IBMRSM           ACTIVE(ENABLED)     SUCCES
     RSM_MEMLIMIT                      IBMRSM           ACTIVE(ENABLED)     EXCEPT
     RSM_REAL                          IBMRSM           ACTIVE(ENABLED)     EXCEPT
     RSM_RSU                           IBMRSM           ACTIVE(ENABLED)     SUCCES
     SDUMP_AUTO_ALLOCATION             IBMSDUMP         ACTIVE(ENABLED)     EXCEPT
COMMAND INPUT ===>                                              SCROLL ===> PAGE
 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP      F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

SDSF Browse Check Output Panel

```
  Display  Filter  View  Print  Options  Help
------------------------------------------------------------------------------
SDSF OUTPUT DISPLAY RACF_SENSITIVE_RESOURCES      LINE 0       COLUMNS 02- 81
COMMAND INPUT ===>                                            SCROLL ===> PAGE
******************************** TOP OF DATA ********************************
CHECK(IBMRACF,RACF_SENSITIVE_RESOURCES)
START TIME: 10/05/2005 14:49:19.609483
CHECK DATE: 20040703  CHECK SEVERITY: HIGH

                          APF Dataset Report

 Data Set Name                            Vol    UACC Warn ID*  User
 ---------------------------------------- ------ ---- ---- ---- ----
 ASM.SASMMOD1                             ZDR17B Read No   ****
 ATC.V2R1M4.AUTHLIB                       DRVPSL
 CBC.SCBCCMP                              ZDR17B
 CBC.SCCNCMP                              ZDR17B None No   ****
 CBC.SCLBDLL                              ZDR17B None No   ****
 CBC.SCLBDLL2                             ZDR17B None No   ****
 CEE.SCEERUN                              ZDR17B None No   ****
 CEE.SCEERUN2                             ZDR17B None No   ****
 CRAIGJ.VTAMLIB                           D94RF2 Read No   ****
 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

SDSF Browse Check Output Panel …

```
 Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF OUTPUT DISPLAY RACF_SENSITIVE_RESOURCES      LINE 87      COLUMNS 02- 81
COMMAND INPUT ===>                                           SCROLL ===> PAGE
                        RACF Dataset Report

S Data Set Name                              Vol    UACC Warn ID*  User
- ------------------------------------------ ------ ---- ---- ---- ----
  RACFDRVR.RACF317                           RDB317 None No   ****

* High Severity Exception *

IRRH204E The RACF_SENSITIVE_RESOURCES check has found one or
more potential errors in the security controls on this system.

  Explanation:  The RACF security configuration check has found one or
    more potential errors with the system protection mechanisms.

  System Action:  The check continues processing. There is no effect on
    the system.


  Operator Response:  Report this problem to the system security administrator and
the and the system auditor.
```

SDSF Browse Check Output Panel …

```
 Display  Filter  View  Print  Options  Help
------------------------------------------------------------------------------
SDSF OUTPUT DISPLAY RACF_SENSITIVE_RESOURCES      LINE 105     COLUMNS 02- 81
COMMAND INPUT ===>                                            SCROLL ===> PAGE

 System Programmer Response:  Examine the report that was produced by
   the RACF check. Any data set which has an "E" in the "S" (Status)
   column has excessive authority allowed to the data set. That
   authority may come from a universal access (UACC) or ID(*) access
   list entry which is too permissive, or if the profile is in WARNING
   mode. If there is no profile, then PROTECTALL(FAIL) is not in
   effect. Any data set which has a "V" in the "S" (Status) field is
   not on the indicated volume. Remove these data sets from the list
   or allocate the data sets on the volume. Any data set which has an
   "M" in the "S" (Status) field has been migrated.

   The APF_LIBS check provides additional analysis of the non-RACF
   aspects of your APF list.

   If the "S" field contains an "E" or is blank, then blanks in the
   UACC, WARN, and ID(*) columns indicate that there is no RACF
 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP      F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

SDSF Browse Check Output Panel …

```
 Display  Filter  View  Print  Options  Help
------------------------------------------------------------------------------
SDSF OUTPUT DISPLAY RACF_SENSITIVE_RESOURCES      LINE 120     COLUMNS 02- 81
COMMAND INPUT ===>                                            SCROLL ===> PAGE

   If the "S" field contains an "E" or is blank, then blanks in the
   UACC, WARN, and ID(*) columns indicate that there is no RACF
   profile protecting the data set. Data sets which do not have a RACF
   profile are flagged as exceptions, unless SETROPTS PROTECTALL(FAIL)
   is in effect for the system.

   If a valid user ID was specified as a parameter to the check, that
   user's authority to the data set is checked. If the user has an
   excessive authority to the data set, that is indicated in the USER
   column. For example, if the user has ALTER authority to an
   APF-authorized data set, the USER column contains ">Read" to
   indicate that the user has more than READ authority to the data set.

 Problem Determination:  See the RACF System Programmer's Guide and
   the RACF Auditor's Guide for information on the proper controls for
   your system.

 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

SDSF Browse Check Output Panel …

```
 Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF OUTPUT DISPLAY RACF_SENSITIVE_RESOURCES      LINE 138     COLUMNS 02- 81
COMMAND INPUT ===>                                           SCROLL ===> PAGE
 Source:
   RACF System Programmer's Guide
   RACF Auditor's Guide

 Reference Documentation:
   RACF System Programmer's Guide
   RACF Auditor's Guide

 Automation:  None.

 Check Reason:  Sensitive resources should be protected.

END TIME: 10/05/2005 14:49:49.545336  STATUS: EXCEPTION-HIGH
****************************** BOTTOM OF DATA ********************************
```

```
 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

z/OS Console Messages from Health Checks

```
  *RACFR17 *HZS0015E PROBLEM WITH HZSPDATA DATA SET:
   *DD NOT DEFINED
   *RACFR17 *10 HZS0013A SPECIFY THE NAME OF AN EMPTY HZSPDATA DATA SET
    $HASP003         SPECIFICATION
    RACFR17  $HASP646 12.0000 PERCENT SPOOL UTILIZATION
    RACFR17  HZS0001I CHECK(IBMCSV,CSV_APF_EXISTS):
    CSVH0957E Some problem(s) were found with data set(s) in the APF list.
   *RACFR17 *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.
00  RACFR17  $HASP003 RC=(52),                                          C
    $HASP003 RC=(52),S1-999  - NO SELECTABLE ENTRIES FOUND MATCHING
    $HASP003         SPECIFICATION
    RACFR17  $HASP003 RC=(52),                                          C
    $HASP003 RC=(52),T1-999  - NO SELECTABLE ENTRIES FOUND MATCHING
    $HASP003         SPECIFICATION
    RACFR17  $HASP650 Q,Q=W     INVALID OPERAND OR MISPLACED OPERAND
    RACFR17  $HASP893 VOLUME(SPOOL1)                                    C
    $HASP893 VOLUME(SPOOL1)  STATUS=ACTIVE,SYSAFF=(ANY),TGNUM=175,
    $HASP893                 TGINUSE=21,TRKPERTGB=3,PERCENT=12
    RACFR17  $HASP646 12.0000 PERCENT SPOOL UTILIZATION

IEE612I CN=C3E0S17  DEVNUM=03E0 SYS=RACFR17
```

Getting Check Output Using HZSPRINT

- **The HZSPRNT utility extracts check output from either the in-storage buffers or the logstream**
  - PARM= allows filtering based on check owner and check name:

```
//MARKNHC3 JOB 'D5202P,?','M.NELSON',MSGLEVEL=(1,1),NOTIFY=&SYSUID,
//         CLASS=A,MSGCLASS=H,REGION=19M
//RACFCKS  EXEC PGM=HZSPRNT,PARM='CHECK(IBMRACF,*)'
//SYSOUT   DD SYSOUT=*,DCB=LRECL=256
```

  - … shows all of the checks which have “IBMRACF” as the owner

Authorization Checking

- **The IBM Health Checker for z/OS performs authorization checks in the XFACILIT class**
  - The eXtended FACILITy class
    - Member class for the GXFACILI class
    - Resource name of up to 246 characters
    - Shared POSIT value with the FACILITY class
  - The resource names that are checked, depending on the type of output which is being accessed are:
    - READ authority to HZS.sysname.QUERY
    - READ authority to HZS.sysname.check-owner.QUERY
    - READ authority to HZS.sysname.check-owner.MESSAGES
    - READ authority to HZS.sysname.check-owner.check-name.MESSAGES
  - See “Setting up security for the HZSPRNT utility” in the “IBM Health Checker for z/OS User’s Guide” for details.

Installation

- **The steps for installing the IBM Health Checker for z/OS are:**
  1. Allocate the HZSPDATA data set
     - HZSPDATA is used to save data between executions of a check
  2. Create the RACF definitions
     - Assign the Health Checker started task a user ID which has UID(0), HOME('/') and PROGRAM('bin/sh')
       - With z/OS V1R12, you can use BPX.SUPERUSER instead of UID(0)
     - Give the user ID above UPDATE authority to the HZSPDATA data set and READ authority to the PARMLIB data sets
     - If you are using a log stream for the check output define the LOGSTRM resources required to allow the Health Checker to connect and write to the log stream.
  3. Start the Health Checker address space

Installation-Defined RACF Health Checks in z/OS V1R10

- **The current RACF checks examine key elements of the z/OS infrastructure, but:**
  - The checks look at the resources IBM thinks are important
    - Unless you wrote your own check you can't examine the protection of your data resources
- **With z/OS V1R10, you can check the protection of the resources you want simply by defining profiles and registering your check with the IBM Health Checker for z/OS**

Installation-Defined RACF Health Checks…

- **Defining your own resource check takes these three steps:**

1. Defining a RACF profile in the new RACFHC general resource class. This profile contains the list of resources that you want to check

2. Define a PARMLIB entry that defines your check using the IBM Health Checker for z/OS Dynamic Registration

3. Activate your PARMLIB entry

Installation-Defined RACF Health Checks…

- **The RACFHC class contains profiles which have the resources you want to check. The RDEFINE command to add a profile is:**

```
RDEFINE RACFHC MY_RESOURCE_LIST
     ADDMEM(DATASET/PROD.VALUABLE.DATA/ZDR17B/NONE
            DATASET/SEC.FILING.FORMS//NONE
            RACFHC/MY_RESOURCE_LIST//NONE)
```

- **The ADDMEM field defines the resources that you want checked. The format is:**

`className/resourceName/volume/maximumPublicAccess`

  - `className` is any valid RACF class
  - `resourceName` is a resources name within the class
  - `Volume` is the volume serial for a DATASET resource, otherwise no value should be specified
  - `maximumPublicAccess` is the access level which if exceeded results in an exception. Valid values are NONE, READ, UPDATE, and CONTROL.

Installation-Defined RACF Health Checks…

- **In addition to defining resources in the ADDMEM value, you can specify one or more IBM-defined report sets. These report sets are:**
  - IRR_APFLIST: APF data set list
  - IRR_LINKLIST: Current link list data set list
  - IRR_PARMLIB: Current PARMLIB data set list
  - IRR_RACFDB: Data sets which comprise the RACF data base
  - IRR_SYSREXX: System REXX data set
  - IRR_ICHAUTAB: ICHAUTAB entries

- **Sample profile definition for a pre-defined set of resources**

```
RDEFINE RACFHC MY_SYSTEM_STUFF
     ADDMEM(DATASET/SYS1.SAMPLIB//READ
     IRR_APFLIST
     IRR_RACFDB)
```

Installation-Defined RACF Health Checks…

- **A Health Checker PARMLIB statement is used to define your check, set its characteristics (such as the interval, severity), and associate the check with the RACFHC profile which contains the resources you want checked**

```
ADD CHECK(USER01,MY_INSTALLATION_HEALTH_CHECK)
     CHECKROUTINE(IRRHCR00)
     MESSAGETABLE(IRRHCM00)
     ENTRYCODE(100)
     PARM('USER(USER01)  RESOURCELIST(MY_RESOURCE_LIST)')
     DATE(yyyymmdd)
     REASON('My sensitive resources')
     GLOBAL
     ACTIVE
     SEVERITY(HIGH)
     INTERVAL(08:00)
```

Installation-Defined RACF Health Checks…

- **The final step is to activate your check. After adding it to a member (HZSPRMMN in this example) activate the PARMLIB entry using the MVS modify command for the Health Checker address space:**

```
F HC,ADD,PARMLIB=MN
```

- **Your check is now registered with the IBM Health Checker for z/OS!**

```
Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF HEALTH CHECKER DISPLAY  RACFR1B                    LINE 38-53 (92)
NP   NAME                              CheckOwner       State              Status
     MY_INSTALLATION_HEALTH_CHECK      USER01           ACTIVE(ENABLED)    EXCEPT
     PDSE_SMSPDSE1                     IBMPDSE          ACTIVE(ENABLED)    EXCEPT
     RACF_FACILITY_ACTIVE              IBMRACF          ACTIVE(ENABLED)    SUCCES
     RACF_GRS_RNL                      IBMRACF          ACTIVE(DISABLED)   ENV N/
```

Installation-Defined RACF Health Checks…

```
CHECK(USER01,MY_INSTALLATION_HEALTH_CHECK)
START TIME: 02/27/2008 16:16:22.678052
CHECK DATE: 20070425  CHECK SEVERITY: HIGH
CHECK PARM: USER(USER01)  RESOURCELIST(MY_RESOURCE_LIST)


                  Resource List from MY_RESOURCE_LIST

S Resource Name                    Class    Vol    UACC Warn ID*  User
- -------------------------------- -------- ------ ---- ---- ---- ----
V PROD.VALUABLE.DATA               DATASET  ZDR17B
E SEC.FILING.FORMS                 DATASET  FNC001 None Yes  ****
V PUBLIC.REPORTS                   DATASET  REGVOL
  MY_RESOURCE_LIST                 RACFHC          None No   ****

* High Severity Exception *

...
...
...
```

z/OS V1.13: Health Check – AIM Stage

- **The RACF_AIM_STAGE Health Check examines your application identity mapping (AIM) setting and flags as an exception if you are at a stage less than stage 3.**
  - Stage 0: No AIM support; only mapping profiles are used
  - Stage 1: Mapping profiles are used; alternate index created and managed, but not used
  - Stage 2: Alternate index create, managed, and used; mapping profiles maintained.
  - Stage 3: Only alternate index maintained and used. Mapping profiles deleted.
- **Moving from each stage requires the execution of the IRRIRA00 utility.**
- **AIM stage 2 or stage 3 is needed for certain RACF functions**

z/OS V1.13: Health Check – AIM Stage (OK)

```
  Display  Filter  View  Print  Options  Search  Help
 -------------------------------------------------------------------------------
 SDSF OUTPUT DISPLAY RACF_AIM_STAGE                LINE 0       COLUMNS 02- 81
 COMMAND INPUT ===>                                            SCROLL ===> HALF
****************************** TOP OF DATA ***********************************
CHECK(IBMRACF,RACF_AIM_STAGE)
START TIME: 05/11/2012 14:36:29.892717
CHECK DATE: 20110101  CHECK SEVERITY: MEDIUM

IRRH500I The RACF database is at the suggested stage of application
identity mapping (AIM). The database is at AIM stage 03.

END TIME: 05/11/2012 14:36:29.893680  STATUS: SUCCESSFUL
****************************** BOTTOM OF DATA ********************************
```

z/OS V1.13: Health Check – AIM Stage (Exception)

```
   Display  Filter  View  Print  Options  Search  Help
 -------------------------------------------------------------------------------
 SDSF OUTPUT DISPLAY RACF_AIM_STAGE                LINE 0       COLUMNS 02- 81
 COMMAND INPUT ===>                                            SCROLL ===> HALF
********************************* TOP OF DATA ***********************************
CHECK(IBMRACF,RACF_AIM_STAGE)
START TIME: 05/17/2012 16:42:53.891503
CHECK DATE: 20110101  CHECK SEVERITY: MEDIUM

* Medium Severity Exception *

IRRH501E The RACF database is not at the suggested stage of application
identity mapping (AIM). The database is at AIM stage 00.

  Explanation:  The RACF_AIM_STAGE check has determined that the RACF
    database is not at the suggested stage of application identity
    mapping (AIM). Your system programmer can convert your RACF database
    using the IRRIRA00 conversion utility. See z/OS Security Server RACF
    System  Programmer's Guide for information about running the
    IRRIRA00 conversion utility.

  F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
  F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

z/OS V1.13: Health Check – UNIX ID

- **The RACF_UNIX_ID Health Check determines whether RACF will automatically assign unique z/OS UNIX System Services identities when users without OMVS segments use certain UNIX services**
  - If you are not relying on RACF to assign UIDs and GIDs, the check informs you that you must continue to assign z/OS UNIX identities
  - If you are relying on the BPX.DEFAULT.USER support, the check issues an exception
  - If you are relying on the BPX.UNIQUE.USER support, the check will verify requirements and indicate if any exceptions are found
    - FACILITY class profile BPX.UNIQUE.USER must exist
    - RACF database must be at Application Identity Mapping (AIM) stage 3
    - UNIXPRIV class profile SHARED.IDS must be defined
    - UNIXPRIV class must be active and RACLISTed
    - FACILITY class profile BPX.NEXT.USER must be defined and its APPLDATA field must contain valid ID values or ranges
      - Note: The check only lists the APPLDATA content, it does not validate it.

z/OS V1.13: Health Check – UNIX ID (OK)

```
  Display  Filter  View  Print  Options  Search  Help
 ------------------------------------------------------------------------------
 SDSF OUTPUT DISPLAY RACF_UNIX_ID                    LINE 0       COLUMNS 02- 81
 COMMAND INPUT ===>                                             SCROLL ===> HALF
********************************* TOP OF DATA ***********************************
CHECK(IBMRACF,RACF_UNIX_ID)
START TIME: 05/18/2012 13:56:53.321238
CHECK DATE: 20110101  CHECK SEVERITY: MEDIUM

IRRH504I RACF is not enabled to assign UNIX IDs when users or groups
that do not have OMVS segments use certain z/OS UNIX services. If you
choose not to define UNIX IDs for each user of UNIX functions, you can
enable RACF to automatically generate unique UNIX UIDs and GIDs for you.

END TIME: 05/18/2012 13:56:53.322242  STATUS: SUCCESSFUL
******************************** BOTTOM OF DATA *********************************
```

```
  F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=IFIND     F6=BOOK
  F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

z/OS V1.13: Health Check – UNIX ID (OK)

```
********************************* TOP OF DATA ***********************************
CHECK(IBMRACF,RACF_UNIX_ID)
START TIME: 05/18/2012 14:12:18.914396
CHECK DATE: 20110101  CHECK SEVERITY: MEDIUM

IRRH502I RACF attempts to assign unique UNIX IDs when users or groups
that do not have OMVS segments use certain z/OS UNIX services.

Requirements for this support:

S Requirement
- ------------------------------------------------------------------------
  FACILITY class profile BPX.UNIQUE.USER is defined
  RACF database is at the required AIM stage:
    AIM stage = 03
  UNIXPRIV class profile SHARED.IDS is defined
  UNIXPRIV class is active
  UNIXPRIV class is RACLISTed
  FACILITY class profile BPX.NEXT.USER is defined
  BPX.NEXT.USER profile APPLDATA is specified (not verified):
    APPLDATA = 1000/100

IRRH506I The RACF UNIX identity check has detected no exceptions.

END TIME: 05/18/2012 14:12:18.921241  STATUS: SUCCESSFUL
```

z/OS V1.13: Health Check – UNIX ID (Exception)

```
  Display  Filter  View  Print  Options  Search  Help
 -------------------------------------------------------------------------------
 SDSF OUTPUT DISPLAY RACF_UNIX_ID                  LINE 0       COLUMNS 02- 81
 COMMAND INPUT ===>                                            SCROLL ===> HALF
********************************* TOP OF DATA ***********************************
CHECK(IBMRACF,RACF_UNIX_ID)
START TIME: 05/17/2012 16:45:01.400010
CHECK DATE: 20110101  CHECK SEVERITY: MEDIUM

IRRH502I RACF attempts to assign unique UNIX IDs when users or groups
that do not have OMVS segments use certain z/OS UNIX services.

Requirements for this support:

S Requirement
- ------------------------------------------------------------------------
  FACILITY class profile BPX.UNIQUE.USER is defined
E RACF database is not at the required AIM stage:
    AIM stage = 00
E UNIXPRIV class profile SHARED.IDS is not defined
E UNIXPRIV class is not active
E UNIXPRIV class is not RACLISTed
E FACILITY class profile BPX.NEXT.USER is not defined

* Medium Severity Exception *

IRRH503E RACF cannot assign unique UNIX IDs when users or groups that
do not have OMVS segments use certain z/OS UNIX services. One or more
requirements are not satisfied.

  Explanation:  The RACF UNIX identity check has determined that you
    want RACF to assign unique UNIX IDs when users or groups without
    OMVS segments use certain z/OS UNIX services. However, RACF is not
    able to assign unique UNIX identities for z/OS UNIX services because
    one or more of the following requirements are not satisfied:
```

z/OS V1.13: Health Check – UNIX ID (Exception)

```
********************************* TOP OF DATA **********************************
CHECK(IBMRACF,RACF_UNIX_ID)
START TIME: 05/18/2012 14:22:52.066301
CHECK DATE: 20110101  CHECK SEVERITY: MEDIUM

* Medium Severity Exception *

IRRH505E The BPX.DEFAULT.USER profile in the FACILITY class
indicates that you want RACF to assign shared default UNIX
IDs when users or groups that do not have OMVS segments use
certain z/OS UNIX services.

  Explanation:  The RACF UNIX identity check has found the
    BPX.DEFAULT.USER profile in the FACILITY class. The presence of this
    profile indicates an intent to have RACF assign shared default UNIX
    UIDs and GIDs when users without OMVS segments access the system to
    use certain UNIX services.
  Reference Documentation:
    z/OS Security Server RACF Security Administrator's Guide

  Automation:  None.

  Check Reason:  Unique UNIX identities are recommended.

END TIME: 05/18/2012 14:22:52.067783  STATUS: EXCEPTION-MED
```

z/OS V1.13: Health Check – Default UNIX ID

```
   Display  Filter  View  Print  Options  Search  Help
 -------------------------------------------------------------------------------
 SDSF OUTPUT DISPLAY ZOSMIGV2R1_DEFAULT_UNIX_ID    LINE 0       COLUMNS 02- 81
 COMMAND INPUT ===>                                           SCROLL ===> HALF
******************************** TOP OF DATA ********************************
CHECK(IBMRACF,ZOSMIGV2R1_DEFAULT_UNIX_ID)
START TIME: 05/11/2012 14:38:04.920543
CHECK DATE: 20110101  CHECK SEVERITY: LOW

IRRH504I RACF is not enabled to assign UNIX IDs when users or groups
that do not have OMVS segments use certain z/OS UNIX services. If you
choose not to define UNIX IDs for each user of UNIX functions, you can
enable RACF to automatically generate unique UNIX UIDs and GIDs for you.

END TIME: 05/11/2012 14:38:04.921996  STATUS: SUCCESSFUL
****************************** BOTTOM OF DATA ******************************
```

- **This is a migration check!**
  - Note the name: ZOSMIGV2R1.....This check is to prepare you to identify issues when you migrate to z/OS V2.1
  - Shipped INACTIVE; you activate when you start your V2.1 migration planning

z/OS V1.13: Health Checks

- **These three new health checks (two “best practice” and one “migration”) are shipped in APAR OA37164**
  - V1.12: PTF UA64936
  - V1.13: PTF UA64937

z/OS V2.1: Certificate Expiration

- **The RACF_CERTIFICATE_EXPIRATION health check finds the certificates in the RACF database expired or about to expire**
  - Expiration window is an installation-defined value with a default of 60 days.
  - Valid expiration window values are 0-366 days
- **For each certificate, the check displays:**
  - The certificate “owner” ('SITE', 'CERTAUTH', or 'ID(user_id)')
  - The certificate label
  - The end date
  - The trust status
  - The number of rings to which the certificate is connected
- **The check only flags as exceptions those certificates which are TRUSTED.**

z/OS V2.1: Certificate Exception (OK)

```
CHECK(IBMRACF,RACF_CERTIFICATE_EXPIRATION)
START TIME: 01/23/2012 08:10:01.603497
CHECK DATE: 20111010  CHECK SEVERITY: MEDIUM

                    Certificates Expiring in 60 Days

S Cert Owner   Certificate Label                 End Date   Trust Rings
- ------------ -------------------------------- ---------- ----- -----

IRRH277I No exceptions are detected. Expired certificates that are not
trusted or are associated with only a virtual key ring are not
exceptions.
```

z/OS V2.1: Certificate Exception (Exception)

```
CHECK(IBMRACF,RACF_CERTIFICATE_EXPIRATION)
START TIME: 02/28/2013 09:23:37.747549
CHECK DATE: 20111010  CHECK SEVERITY: MEDIUM

                  Certificates Expiring within 60 Days

S Cert Owner    Certificate Label                  End Date   Trust Rings
- ------------ ------------------------------- ---------- ----- -----
E CERTAUTH      VERISIGN CLASS 1 INDIVIDUAL       2008-05-12 Yes    0
E ID(MARKN)     MARK-001                          2012-11-11 Yes    0
E ID(MARKN)     MARK0001                          2012-11-05 Yes    0
  ID(CERTAUTH)  START_OFF_M001__END_OFF_M001       2012-01-25 No     0
  ID(MARKN)     START_OFF_M001__END_OFF_M001       2012-01-25 No     0
  ID(SITE)      START_OFF_M001__END_OFF_M001       2012-01-25 No     0
  CERTAUTH      START_OFF_M365__END_OFF_M001       2012-01-25 No     0
  ID(CERTAUTH)  START_OFF_M365__END_OFF_M001       2012-01-25 No     0
  CERTAUTH      ICP-Brasil CA                      2011-11-30 No     0
  CERTAUTH      MICROSOFT ROOT AUTHORITY - 01      2002-12-31 No     0
  CERTAUTH      VERISIGN CLASS 3 PUBLIC            2004-01-07 No     0
  CERTAUTH      VERISIGN CLASS 2 PUBLIC            2004-01-06 No     0

* Medium Severity Exception *

IRRH276E One or more certificates expired or are expiring within
the warning period.
```

z/OS V2.1: Certificate Exception (Exception)

```
The RACF_CERTIFICATE_EXPIRATION check lists each certificate that
   has an ending date prior to the current date or that has an ending
   date that is prior to the current date adjusted by the warning
   period that the installation has specified as a parameter to the
   RACF_CERTIFICATE_EXPIRATION check. If a parameter is not specified,
   a default warning period of 60 days is used.

   Only certificates that are marked as trusted result in exceptions.
   These certificates have an "E" in the "S" (Status) column. The trust
   status of the certificate is shown in the "Trust" column. The number
   of key rings to which the certificate is connected (other than the
   virtual key ring) is shown in the "Rings" column.

   Use the RACDCERT LIST command to list complete information about any
   certificate. The RACDCERT command syntax is:

           RACDCERT CERTAUTH     LIST(LABEL('label-name'))
                                  or
           RACDCERT SITE         LIST(LABEL('label-name'))
                                  or
           RACDCERT ID(user-id)  LIST(LABEL('label-name'))


   See z/OS Security Server RACF Security Administrator's Guide and the
   z/OS Security Server RACF Command Language Reference for more
   information about digital certificates.

 System Action:  The check continues processing. There is no effect on the system.
```

z/OS V2.1: RACF_SENSITIVE_RESOURCES

- **RACF is planning on updating the RACF_SENSITIVE_RESOURCES check to check these new "static" resources names:**
  - BPX.DEBUG/FACILITY
  - BPX.WLMSERVER/FACILITY
  - IEAABD.DMPAKEY/FACILITY
  - MVS.SLIP/OPERCMDS
  - SUPERUSER.PROCESS.GETPSENT/UNIXPRIV
  - SUPERUSER.PROCESS.KILL/UNIXPRIV
  - SUPERUSER.PROCESS.PTRACE/UNIXPRIV

z/OS V2.1: RACF_SENSITIVE_RESOURCES

- **RACF is planning on updating the RACF_SENSITIVE_RESOURCES to check these new "dynamic" resources names:**
  - CSVAPF.*data_set_name*/FACILITY, excluding
    - CSVAPF.MVS.SETPROG.FORMAT.DYNAMIC
  - CSVDYLPA.ADD.*module_name*/FACILITY
  - CSVDYNEX.*exit_name.function.modname*/FACILITY, *excluding*
    - CSVDYNEX.*LIST*
    - CSVDYNEX.*exit_name.*RECOVER
    - CSVDYNEX.exit_name.CALL
  - CSVDYNL.*lnklstname. Function*/FACILITY*excluding*
    - CSVDYNL.*lnklstname*.DEFINE CSVDYNL.*lnklstname.*UNDEFINE)
- **No validation is performed on the dynamic portion of these resource names (for example *data_set_ name, module_name,lnklstname*)**

References

- **IBM Health Checker for z/OS User's Guide (SA22-7994)**
  - http://www.ibm.com/servers/eserver/zseris/zos/hchecker/
- **Exploiting the IBM Health Checker for z/OS Infrastructure**
  - http://www.redbooks.ibm.com/abstracts/redp4590.html?Open
- **IBM Education Assistant**
  - http://www.ibm.com/software/info/education/assistant/
- **The IBM Health Checker for z/OS web site**
  - http://www.ibm.com/systems/z/os/zos/hchecker/
- **A list of all of the IBM-supplied checks** can be found at:
  - http://wwwibm.com/systems/z/os/zos/hchecker/check_table.html
- ***"An apple a day…. keeps the PMRs away! An overview of the IBM Health Checker for z/OS"***
  - z/OS Hot Topics, Issue 13, August 2005, available at http://www.ibm.com/servers/eserver/zseries/zos/bkserv/hot_topics.html
- "***RACF and the IBM Health Checker for z/OS***"
  - ibid
- ***"Personalize your RACF Checking with the IBM Health Checker for z/OS"***
  - z/OS Hot Topics, Issue 19, August 2008, available at http://www.ibm.com/servers/eserver/zseries/zos/bkserv/hot_topics.html