


IBM Systems and Technology Group




RACF Utilities for Auditors

RACF-2008
Session SAS09
June 2008

Mark Nelson, CISSP®
z/OS® Security Server (RACF®) Design and Development
IBM® Poughkeepsie
markan@us.ibm.com

© 2006 IBM Corporation

IBM Systems and Technology Group



Trademarks

- **These terms are trademarks of the IBM Corporation in the United States, other countries, or both:**
 - DB2
 - DFSORT
 - IBM
 - MVS
 - OS/390
 - RACF
 - z/OS
- **CISSP is a registered certification mark of the International Information Systems Security Certification Consortium, Inc.**
- **SAS is a trademark of the SAS Institute**
- **UNIX is a registered trademark in the United States, other countries, or both and is licensed exclusively through the X/Open Company Limited.**

© 2006 IBM Corporation

Agenda

- **What is Auditing?**
- **RACF Cross Reference Utility (IRRUT100)**
- **RACF Database Unload Utility (IRRDBU00)**
- **RACF Remove ID Utility (IRRRID00)**
- **RACF Report Writer (RACFRW)**
- **RACF SMF Data Unload Utility (IRRADU00)**
- **RACF Health Checks**
- **Summary**

What is Auditing?

- **Verification of compliance with the Installation Security Policy, by examining:**
 - Procedures and policies
 - Access rules
 - Physical access
 - User identification
 - Event data
 - Etc.
- **Looking at both successful (allowed) and unsuccessful (denied) events, looking for patterns**

RACF Utilities for Auditors

The RACF Cross Reference Utility (IRRUT100)

RACF Cross-Reference Utility (IRRUT100)

- **Searches live RACF database looking for references to user IDs and group IDs that you specify**
 - Standard and conditional access lists
 - NOTIFY, OWNER
 - Data set high level qualifiers
- **Results are limited to your scope of authority**
 - System SPECIAL/AUDITOR sees all
 - Group-SPECIAL/AUDITOR yields those references that are within the scope of authority of the group
 - Users can see references to their own user profile
- **Uses**
 - Find references to a known ID
 - ID deletion
 - ID reassignment

IRRUT100 Invocation

```
//JOBNAME  JOB  JOB CARD. . . . .
//IRRUT100 EXEC PGM=IRRUT100
//SYSUT1   DD   UNIT=SYSDA, SPACE=(TRK,(5,1))
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD   *
MARKN
/*
```

IRRUT100 Output

Occurrences of MARKN

```
In standard access list of general resource profile SDSF      ISFCMD.ODSP.READER.* (G)
In standard access list of general resource profile SDSF      ISFCMD.ODSP.PUNCH.* (G)
In standard access list of general resource profile SDSF      ISFCMD.ODSP.PRINTER.* (G)
In notify field of general resource profile JESSPOOL &RACLNDE.MARKN.** (G)
Owner of JESSPOOL &RACLNDE.MARKN.** (G)
In standard access list of general resource profile ACCTNUM 263680
In standard access list of dataset profile USER01.RACFICE.* (G)
Owner of connect profile JAYMON/RACFWWW
Owner of connect profile GENEK/RACFWWW
Owner of connect profile DECKERC/RACFWWW
In access list of group WEBDEV
In access list of group RACFWWW
Owner of group RACFWWW
In access list of group BWVA
In access list of group $D09A
User entry exists
```

Notes on Using IRRUT100

- **Note that IRRUT100:**

- ▶ Works only with the current RACF database
- ▶ Reads each profile in the RACF database to find a reference causing record-level serialization
- ▶ Doesn't search resource names, other than data set HLQ

When to Use IRRUT100

- **When should you use IRRUT100?**

- ▶ When you know exactly what IDs you are interested in
- ▶ When you need to see the absolutely most current data
- ▶ When the impact of running the utility is small

RACF Utilities for Auditors

The RACF Database Unload Utility (IRRDBU00)

RACF Database Unload Utility (IRRDBU00)

- **What does the RACF Database Unload Utility do?**
 - ▶ Decomposes a restructured RACF database into a set of "flat" records
 - ▶ Suitable for viewing using an editor, reporting using DFSORT or equivalent, or up-loading to a relational data manager, such as DB2
 - ▶ Uses either an active (primary or back-up) RACF database or a copy
- **IRRDBU00 requires UPDATE to the input RACF database**

IRRDBU00 Record Format

- **Relational representation of the RACF database, suitable for a DBMS load utility**
- **Conventions used in unloading the data:**
 - All fields unloaded, with the exception of encrypted and "reserved for IBM" fields
 - Fields decoded and presented in a readable format
 - Example: UACC is output as "READ," "UPDATE," "ALTER," or "CONTROL" rather than as a binary field
 - One record type per segment and per repeat group
 - Identified by a 4 byte record type
 - Each record contains a "name" field which identifies the profile being described

IRRDBU00 Output

Rec Type	User ID	Created	Owner	ADSP	Spec	Oper	Rvkd	GRP- ACC	Pwd Int	Pwd Last Changed
-----1-----	-----2-----	-----3-----	-----4-----	-----5-----	-----6-----	-----7-----	-----8-----					
0200	irrcerta	1999-08-19	irrcerta	NO	NO	NO	YES	NO	000			
0200	irrmulti	2000-05-05	irrmulti	NO	NO	NO	YES	NO	000			
0200	irrsitec	1999-08-19	irrsitec	NO	NO	NO	YES	NO	000			
0200	IBMUSER	1994-11-04	IBMUSER	NO	YES	YES	NO	NO	030	2004-03-01		
0200	MARK	2003-10-11	MARKN	NO	YES	YES	NO	NO	030	2003-10-11		
0200	PUBLIC	1997-08-04	IBMUSER	NO	NO	NO	NO	NO	030			
0200	SMITH	1995-04-10	IBMUSER	NO	NO	NO	NO	NO	030			
0200	WOLENSKY	2002-08-12	IBMUSER	NO	YES	NO	NO	NO	030			
0200	SYSADM	1995-04-10	IBMUSER	NO	YES	NO	NO	NO	030			
0200	SYSADMN	2000-05-05	IBMUSER	NO	YES	NO	NO	NO	030			
0200	SYSLOGD	2000-02-16	IBMUSER	NO	YES	NO	NO	NO	030			
0200	TCPIP	2000-02-16	IBMUSER	NO	YES	NO	NO	NO	030			
0200	WEBADM	1997-08-04	IBMUSER	NO	NO	NO	NO	NO	030			
0200	WEBSRV	1997-08-04	IBMUSER	NO	NO	NO	NO	NO	030			
0200	XYZZY	2004-02-11	MARKN	NO	NO	NO	NO	NO	030			

IRRDBU00 Invocation

```
//USERX      JOB   Job card. . .
//UNLOAD     EXEC  PGM=IRRDBU00,PARM=NOLOCK
//INDD1      DD      DISP=SHR, DSN=SYS1.RACFDB.PART1.COPY
//OUTDD      DD      DISP=SHR, DSN=SYS1.RACFDB.FLATFILE
//SYSPRINT   DD      SYSOUT=*
```

IRRDBU00 Notes

- **The RACF Certificate ‘anchor IDs’ are unloaded.**
- **If you are processing your data using DFSORT or DB2, you must add the length of the record descriptor word (4) to each of the field offsets.**
- **If your database is split, can process all parts or each part separately.**
- **Uses the enhanced generic naming (EGN) setting and class descriptor table (CDT) from the execution system.**
- **IRRDBU00 does not interpret the data in the data base.**
- **Three PARM= values are supported:**
 - PARM=LOCK, which locks the input database until the utility finishes unloading
 - PARM=UNLOCK, which unlocks the input database and does not unload any records
 - PARM=NOLOCK, which unloads the input database without locking

When to Use IRRDBU00

- **Use IRRDBU00 when:**

- ▶ You want to create tailored reports on your RACF user, group, and access control definitions,
- ▶ You want to perform a detailed analysis of the contents of the RACF database, or when
- ▶ Working with an off-loaded copy of the RACF data is OK.

RACF Utilities for Auditors

The RACF Remove ID Utility
(IRRRID00)

The RACF Remove ID Utility (IRRRID00)

- A RACF utility which finds references to IDs and creates the commands to remove those references
- Uses the output of the RACF Database Unload Utility (IRRDBU00) as input (not the RACF database)
- You can supply a list of IDs to search for. If you don't, IRRRID00 searches for all "residual" IDs
- Created commands must be reviewed and edited if necessary
- Requires READ authority to the IRRDBU00 output to create commands
- Normal RACF authorities required to execute the commands that are created

IRRRID00 Invocation

```
//JOBNAME      JOB      Job Card.....
//STEP1       EXEC     PGM=IRRRID00
//SYSPRINT    DD       SYSOUT=*
//SYSOUT      DD       SYSOUT=*
//SORTOUT     DD       UNIT=SYSALLDA, SPACE=(CYL,(5,5))
//SYSUT1      DD       UNIT=SYSALLDA, SPACE=(CYL,(3,5))
//INDD        DD       DISP=OLD,DSN=USER01.IRRDBU00.DATA
//OUTDD       DD       DISP=OLD,DSN=USER01.IRRRID00.CLIST
//SYSIN       DD       DUMMY No SYSIN data requests a residual search
```

IRRRID00 Output

```

/*****/
/*
/* The RACF Remove ID Utility (IRRRID00) was executed on          */
/* 2007-03-15 at 09:00:01.                                       */
/*
/* This file contains RACF commands that can be used to          */
/* identify references to user IDs and group IDs. Residual        */
/* references on an access list are deleted with the PERMIT        */
/* command. For all other references, commands are created to    */
/* change the reference to another value. The default value       */
/* is ?id. This allows all references to a particular ID to      */
/* be easily changed to another value using a text editor.       */
/*
/*****/

/*****/
/*
/* The INDD data set has been scanned for all names that do      */
/* not have a user or group id defined for them in INDD. This    */
/* list of names has been formatted and sorted into the          */
/* SORTOUT data set.                                             */
/*****/

```

IRRRID00 Output

```

CONNECT  BILL      GROUP (ACFDEV )      OWNER (?MARKN  )
ALTDSD   'DASDDEF.VCE313S'  GENERIC  OWNER (?MARKN  )
PERMIT   D12*      CLASS (DASDVOL )  ID (MARKN  ) DELETE
PERMIT   111111    CLASS (DASDVOL )  ID (MARKN  ) DELETE
PERMIT   22222    CLASS (DASDVOL )  ID (BRUCE  ) DELETE
/*****/
/* The following commands delete profiles. You must review      */
/* these commands, editing them if necessary, and then remove    */
/* the EXIT statement to allow the execution of the commands.    */
/*****/

EXIT
DELDSD   'D69A.BRUCE.TEXT'  VOLUME (TS0018)  NOSET
DELDSD   'D69A.MARKN.*'
/*****/
/* IRRRID00 has successfully completed                          */
/*****/

```

IRRRID00 Messages to SYSPRINT

```
IRR68001I No IDs were found in the SYSIN data set. A search for all
residual references is being performed.
IRR68019I IRRRID00 has searched 10000 records and processed 0 records.
IRR68019I IRRRID00 has searched 20000 records and processed 0 records.
IRR68019I IRRRID00 has searched 30000 records and processed 0 records.
IRR68019I IRRRID00 has searched 40000 records and processed 0 records.
IRR68019I IRRRID00 has searched 50000 records and processed 0 records.
IRR68019I IRRRID00 has searched 60000 records and processed 0 records.
IRR68019I IRRRID00 has searched 70000 records and processed 0 records.
IRR68019I IRRRID00 has searched 80000 records and processed 0 records.
IRR68019I IRRRID00 has searched 84907 records and processed 0 records.
IRR68019I IRRRID00 has searched 84907 records and processed 10000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 20000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 30000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 40000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 50000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 60000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 70000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 80000 records.
IRR68019I IRRRID00 has searched 84907 records and processed 84907 records.
IRR68004I IRRRID00 found 3734 references
IRR68011I The utility has successfully completed
```

When to Use IRRRID00

- **When should you use IRRRID00?**
 - When you want to "clean-up" your RACF database and remove residual authorities
 - When you want to find and remove the authorities of an ID
 - When you want to change the ownership of RACF profiles

Agenda

- **What is Auditing?**
- **RACF Cross Reference Utility (IRRUT100)**
- **RACF Database Unload Utility (IRRDBU00)**
- **RACF Remove ID Utility (IRRRID00)**
- **RACF Report Writer (RACFRW)**
- **RACF SMF Data Unload Utility (IRRADU00)**
- **Summary**
- **Questions**

The RACF Report Writer (RACFRW)

- **What is the RACF Report Writer?**
 - ▶ A RACF utility which creates reports and summary statistics from the security-relevant SMF data
 - ▶ Three phase process:
 - Command and subcommand processing
 - Record selection
 - Report generation
 - ▶ Process SMF type 20 (job initiation) type 30 (common address work data) type 80 (access events) type 81 (RACF initialization) type 83 (data sets affected by SECLABEL)
 - ▶ Requires READ authority to the SMF data
 - ▶ Functionally stabilized at the RACF 1.9.2 level
 - Only 'basic information is presented for UNIX Systems Services events

When to use the RACF Report Writer

- **When should you use the RACF Report Writer?**

- ▶ When you want to look at single events
- ▶ When your selection criteria is simple (time, User ID, Group ID, system name, event type)

RACF Utilities for Auditors

The RACF SMF Unload Utility
(IRRADU00)

RACF SMF Data Unload Utility (IRRADU00)

▪ What is the RACF SMF Data Unload Utility?

- ▶ A RACF utility that translates the security relevant audit information into a set of records that can be imported to a relational data base management system, such as SQL/DS, DB2 or SAS.
- ▶ One record type per event type
- ▶ Processes SMF type 30, 80, 81, and 83 records
- ▶ Primary users are the system auditor and security administrator
- ▶ Requires READ authority to the SMF data

Rationale for IRRADU00

- **Auditors traditionally focus on "failure" events; The majority of data fraud is done by people authorized to the data and functions that are the targets of the fraud.**
- **Analysis of security audit data is a semi-structured problem; Auditors require advanced data analysis tools.**
- **Existing reporting tools are insufficient; Key problems are:**
 - ▶ Lack of record selectivity
 - ▶ Lack of tailor-ability of report format
 - ▶ Non-standard nature of analysis commands
- **Customers are writing their own SMF extract utilities.**
- **Existing inquiry/analysis/reporting tools enjoy wide acceptance; Every installation has at least one report generation/inquiry tool.**

What does IRRADU00 Produce?

- “Flat file” relational representation of the security relevant audit data, suitable for export to a relation data base management system (RDBMS) or browsing
- One record type per event code
- All data is decoded
- Commands are translated into command format
- Event codes and event code qualifiers have meaningful values:
 - ACCESS for resource access, JOBINIT for logon, job initiation, ADDUSER, ALTUSER, DELUSER, etc. for the RACF commands
 - SUCCESS for success, INVPSWD for incorrect password, etc.

Invoking IRRADU00

```

//USERX    JOB    Job Card...
//UNLOAD   EXEC   PGM=IFASMFDP
//DUMPIN   DD     DISP=SHR,DSN=USER01.SMFDATA
//DUMPOUT  DD     DUMMY
//OUTDD    DD     DISP=SHR,DSN=USER01.SMFDATA.IRRRID00
//SYSPRINT DD     SYSOUT=*
//ADUPRINT DD     SYSOUT=*
//SYSIN    DD     *
           USER2 (IRRADU00)   USER3 (IRRADU86)
           DATE (2004001,2004123)
           START (0800)
           END (1700)
           SID (SYS1)
/*

```


Notes on Invoking IRRADU00

■ Invoked as exits to the SMF Dump Utility (IFASMFDP)

- RACF SMF Data Unload modules invoked through the USER2 and USER3 exit points
- IFASMFDP can be used to provide data, time, system ID, and record type selection
- Can be executed against off-line copies of your SMF data or your live SMF data set
 - Note that SMF buffers records before writing them

IRRADU00 Output

Event Type	Event Qualifier	Time	Date	SMF SYSID	Viol	User Dfnd	Warn	User ID	Group ID	NRML Auth	SPEC Auth	...
1	2	3	4	5	6	7	8	9	10	11	12	13
JOBINIT	PWDEXPR	11:31:04	1994-11-28	IM13	YES	NO	NO	IBMUSER	SYS1	NO	NO	...
ACCESS	SUCCESS	15:48:52	1993-11-12	IM13	NO	NO	NO	IBMUSER	SYS1	NO	NO	...
ADDS	SUCCESS	15:12:48	1994-02-15	R190	NO	NO	NO	MARKN	SYS1	NO	YES	...
ADDGROUP	SUCCESS	14:06:48	1994-02-15	R190	NO	NO	NO	MARKN	SYS1	NO	YES	...
ADDUSER	SUCCESS	14:01:08	1994-02-15	R190	NO	NO	NO	MARKN	SYS1	NO	YES	...
ALTGROUP	INSAUTH	12:36:05	1994-05-04	IM13	NO	NO	NO	IBMUSER	SYS1	NO	YES	...
CONNECT	SUCCESS	14:15:38	1994-02-15	R190	NO	NO	NO	MARKN	SYS1	NO	YES	...
PASSWORD	SUCCESS	09:07:39	1994-06-02	R190	NO	NO	NO	MARKN	SYS1	NO	YES	...
REMOVE	INSAUTH	16:23:57	1994-05-13	IM13	NO	NO	NO	IBMUSER	SYS1	NO	YES	...
REMOVE	KEYWVIOL	16:23:57	1994-05-13	IM13	NO	NO	NO	IBMUSER	SYS1	NO	YES	...
GENERAL	008	19:50:10	1994-06-13	IM13	NO	NO	NO	TESTER1	SYS1	NO	NO	...
DIRSRCH	SUCCESS	22:06:25	1993-10-17	J80	NO	NO	NO	OMSIGGD	SYS1	YES	NO	...
CHAUDIT	NOTAUTHU	13:03:17	1994-02-11	IM13	YES	NO	NO	MEGA	KINGS	YES	NO	...
CHOWN	NOTAUTHU	15:40:37	1993-09-29	3090	YES	NO	NO	IBMUSER	SYS1	YES	NO	...
UNLINK	SUCCESS	15:40:50	1993-09-29	3090	NO	NO	NO	IBMUSER	SYS1	YES	NO	...
CHKPRIV	NOTAUTHU	14:20:24	1993-09-29	3090	YES	NO	NO	IBMUSER	SYS1	YES	NO	...
JOBINIT	INVPWD	22:58:35	1993-11-30	R190	YES	NO	NO	MARKN	SYS1	NO	NO	...
ACCESS	WPROTALL	18:05:24	1993-12-01	R190	NO	NO	YES	MARKN	SYS1	NO	YES	...

Notes on IRRADU00 Output

- **Base portion (columns 1-282) are the same for all RACF type 80 records.**
- **If you are processing your data using DFSORT or DB2, you must add the length of the record descriptor word (4) to each of the field offsets.**
- **“Unknown” event code and event code qualifiers are unloaded as numeric values.**

Using DB2 to Process IRRADU00 Data

- **Loading IRRADU00 data to DB2 provides a robust data mining environment for your log data.**
- **Example: Find all of the data set accesses made to data sets whose name begins with "PAYROLL." that were made before 8:00 AM and after 4:59 PM. Ignore all of the requests made by the user OPERBKUP.**

```
SELECT      *          FROM    USER01.ACCESS
WHERE       (HOUR(SMF80_TIME_WRITTEN) <8 OR
            HOUR(SMF80_TIME_WRITTEN) >16)
AND        SMF80_EVT_USER_ID^= 'OPERBKUP'
AND        ACC_RES_NAME LIKE 'PAYROLL.%'
```

When to Use IRRADU00

- **When should you use IRRADU00?**
 - ▶ When you have complex selection criteria
 - ▶ When you want to create tailored reports
 - ▶ When you want to look at trends of events

What Samples are Shipped with RACF?

- **Sample JCL for:**
 - ▶ IRRDBU00
 - ▶ IRRADU00
 - ▶ IRRRID00
 - ▶ DFSORT's ICETOOL
- **Sample SQL create tablespace and create table statements for IRRDBU00 and IRRADU00**
- **DBMS Load Utility control statements for DB2 Load Utility for IRRDBU00 and IRRADU00**
- **Sample queries for IRRADU00 and IRRDBU00 output**

RACF Utilities for Auditors

Using The DFSORT ICETOOL Utility

Using the DFSORT ICETOOL Utility

- **IBM's DFSORT product contains a simple yet powerful report generation tool, ICETOOL**
- **ICETOOL adds an easy-to-use reporting facility to DFSORT's powerful record selection and ordering capabilities**
- **ICETOOL can easily be used with RACF's SMF unload utility (IRRADU00) and database unload utility (IRRDBU00) output**
- **30+ sample reports are shipped in 'SYS1.SAMPLIB(IRRICE)'**

What SMF RACFICE Reports are in RACFICE?

- Events associated with a specific user
- User IDs with excessive incorrect passwords
- Terminals with excessive incorrect passwords
- Accesses allowed due to WARNING mode profiles
- Accesses allowed because the user has OPERATIONS
- Users who are using Automatic Command Direction
- Users who are directing command explicitly
- User who log on with LOGON BY
- RACLINK audit records
- Users who are using password synchronization
- Access violations

Sample RACFICE Report: Output

```

- 1 -          User IDs With Extraordinary Global Authorities          98/12/29

User ID      User Name          Special  Operations  Auditor
-----      -
GLBAUDIT    #####            NO      NO          YES
GLBOPER     #####            NO      YES         NO
GLBSPEC     #####            YES     NO          NO
IBMUSER     YES              YES     YES         YES
MARKN       #####            YES     YES         YES
SPECUSR     #####            YES     YES         YES
UAUDR$Y     AUDITOR          NO      NO          YES
UOPER$Y     OPERATIONS       NO      YES         NO
USPEC$Y     SPECIAL          YES     NO          NO

```

Sample RACFICE Report: SORT Keywords

```

SORT FIELDS=(10,8,CH,A)
INCLUDE COND=( (44,1,CH,EQ,C'Y',OR,
               49,1,CH,EQ,C'Y',OR,
               390,1,CH,EQ,C'Y') ,AND,
               5,4,CH,EQ,C'0200' )
OPTION      VLSHRT

```

Sample RACFICE Report: ICETOOL Keywords

```

*****
* Name: UGLB *
* *
* Find all of the user IDs which have extraordinary RACF privileges, *
* such as SPECIAL, OPERATIONS, and AUDITOR at the global level. *
*****
SORT FROM(DBUDATA) TO(TEMP001) USING(RACF)
DISPLAY FROM(TEMP001) LIST(PRINT) -
PAGE -
TITLE('User IDs With Extraordinary Global Authorities') -
DATE(YMD/) -
TIME(12:) -
BLANK -
ON(10,8,CH) HEADER('User ID') -
ON(79,20,CH) HEADER('User Name') -
ON(44,4,CH) HEADER('Special') -
ON(49,4,CH) HEADER('Operations') -
ON(390,4,CH) HEADER('Auditor')

```

Sample RACFICE Report: JCL Keywords

```
//MARKNICE JOB 'M.NELSON P385', NOTIFY=&SYSUID, CLASS=A,
//          REGION=0M, MSGCLASS=H
//-----
//UNLOAD   EXEC PGM=IRRDBU00, PARM=NOLOCKINPUT
//SYSPRINT DD SYSOUT=*
//INDD1   DD DISP=SHR, DSN=RACFDRVR.RACF260
//OUTDD   DD DISP=(NEW,PASS), SPACE=(CYL,(5,1)), UNIT=SYSALLDA,
//          LRECL=5096, RECFM=VB, BLKSIZE=0, DSN=USER01.IRRDBU00
//-----
//REPORT   EXEC PGM=ICETOOL
//TOOLMSG  DD DUMMY
//PRINT    DD SYSOUT=*
//DFSMSG   DD DUMMY
//DBUDATA  DD DISP=(SHR,DELETE), DSN=USER01.IRRDBU00
//TEMP001  DD DISP=(NEW,DELETE), SPACE=(CYL,(5,1,0)), UNIT=SYSALLDA
//TOOLIN   DD *
<icetool control statements>
/*
//RACFCNTL DD *
<sort keywords>
/*
```

RACF Utilities for Auditors



The IBM Health Checker for z/OS

- **Starting with z/OS V1R7 (rolled back to z/OS V1R4), IBM introduced the IBM Health Checker for z/OS, an infrastructure for IBM and vendor “health checks”**
- **RACF contains a number of checks that are of interest to auditors:**
 - RACF_SENSITIVE_RESOURCES
 - RACF_<class-name>_ACTIVE
 - FACILITY, OPERCMDS, TAPEVOL, TEMPDSN, TSOAUTH, UNIXPRIV
 - RACF_IBMUSER_REVOKED
 - RACF_ICHAUTAB_NONLPA
 - ... starting with z/OS V1R10, you can define your own check that validates resources of your choice!
- **Output easily viewable from SDSF**

RACF Support for the IBM Health Checker for z/OS

- **The RACF_SENSITIVE_RESOURCES check:**
 - Looks at the current APF data sets, parmlib data sets, SYSREXX data set (V1R9 and later), and the RACF database data sets and flags those those that are improperly protected:
 - Are not found on the indicated volume
 - Are protected by a profile with:
 - a UACC greater than READ(APF) or NONE(RACF DB)
 - ID(*) greater than READ (APF) or NONE(RACF DB)
 - WARNING mode set
 - No RACF profile and PROTECTALL(FAIL) not in effect
 - (Optional): Specified user ID has UPDATE(APF) or READ(RACFDB) or greater access
 - Looks for ICHAUTAB modules



Getting into the IBM Health Checker for z/OS (SDSF)

Display Filter View Print Options Help

 HQX7750 ----- 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		

Licensed Materials - Property of IBM

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



Getting into the IBM Health Checker for z/OS (SDSF)

Display Filter View Print Options Help

 SDSF HEALTH CHECKER DISPLAY RACFR1A LINE 38-52 (96)

NP	NAME	CheckOwner	State	Status
	IXGLOGR_STRUCTUREFULL	IBMXGLOGR	ACTIVE (DISABLED)	ENV N/
	PDSE_SMSPDSE1	IBMPDSE	ACTIVE (ENABLED)	EXCEPT
	RACF_FACILITY_ACTIVE	IBMRACF	ACTIVE (ENABLED)	SUCCESS
	RACF_GRS_RNL	IBMRACF	ACTIVE (DISABLED)	ENV N/
	RACF_IBMUSER_REVOKED	IBMRACF	ACTIVE (ENABLED)	EXCEPT
	RACF_ICHAUTAB_NONLPA	IBMRACF	ACTIVE (ENABLED)	SUCCESS
	RACF_OPERCMDS_ACTIVE	IBMRACF	ACTIVE (ENABLED)	EXCEPT
S	RACF_SENSITIVE_RESOURCES	IBMRACF	ACTIVE (ENABLED)	EXCEPT
	RACF_TAPEVOL_ACTIVE	IBMRACF	ACTIVE (ENABLED)	EXCEPT
	RACF_TEMPDSN_ACTIVE	IBMRACF	ACTIVE (ENABLED)	EXCEPT
	RACF_TSOAUTH_ACTIVE	IBMRACF	ACTIVE (ENABLED)	SUCCESS
	RACF_UNIXPRIV_ACTIVE	IBMRACF	ACTIVE (ENABLED)	EXCEPT
	RSM_AFO	IBMRSM	ACTIVE (ENABLED)	SUCCESS
	RSM_HVSHARE	IBMRSM	ACTIVE (ENABLED)	SUCCESS
	RSM_MAXCADS	IBMRSM	ACTIVE (ENABLED)	SUCCESS

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

RACF_SENSITIVE_RESOURCES Sample

START TIME: 01/08/2005 20:47:54.701509 IBMRACF,
 RACF_SENSITIVE_RESOURCES
 OWNER DATE: 20040703

APF Dataset Report

S Data Set Name	Vol	UACC	Warn	ID*	User
E SYS1.LINKLIB	ZDR17B	Read	No	Ctrl	
SYS1.SVCLIB	ZDR17B	****	****	****	
ISPF350.ISPLOAD	PRODAL	Read	No	****	
ISPF350.ISPLFA	PRODAL	Read	No	****	
ISPF350.ISKLOAD	PRODAL	Read	No	****	
ISPF350.ISRLFA	PRODAL	Read	No	****	
ISPF350.LPALIB	PRODAL	Read	No	****	
FARRELL.TEST.TOOLS.LOAD	D94001	****	****	****	

RACF Dataset Report

S Data Set Name	Vol	UACC	Warn	ID*	User
RACFDRVR.RACF317	RDB317	****	****	****	

* High severity Exception *

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

Explanation:

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

What's on the z/OS Console?

```
RACFR1A HZS0001I CHECK(IBM CNZ, CNZ_CONSOLE_ROUTCODE_11):
  CNZHF0005I One or more consoles are configured to receive messages
  intended only for programmers.
RACFR1A HZS0001I CHECK(IBM CSV, CSV_LNKLST_SPACE):
  CSVH0980E Some LNKST sets include data set(s) allocated with
  secondary space defined.
RACFR1A HZS0001I CHECK(IBM CSV, CSV_APF_EXISTS):
  CSVH0957E Problem(s) were found with data sets in the APF list.
00 *RACFR1A *HZS0003E CHECK(IBM RACF, RACF_SENSITIVE_RESOURCES):
  *IRRH204E The RACF_SENSITIVE_RESOURCES check has found one or
  *more potential errors in the security controls on this system.
IEE612I CN=C3E0S1A  DEVNUM=03E0 SYS=RACFR1A

IEE163I MODE= RD
```

Where are These Utilities Documented?

- **RACF Cross Reference Utility (IRRUT100)**
 - RACF Security Administrator's Guide
- **RACF Database Unload Utility (IRRDBU00)**
 - RACF Security Administrator's Guide
 - RACF Macros and Interfaces
- **RACF Remove ID Utility (IRRRID00)**
 - RACF Security Administrator's Guide
- **RACF Data Security Monitor (DSMON)**
 - RACF Auditor's Guide
- **RACF Report Writer (RACFRW)**
 - RACF Auditor's Guide
- **RACF SMF Data Unload Utility (IRRADU00)**
 - RACF Auditor's Guide and RACF Macros and Interfaces
- **The IBM Health Checker for z/OS**
 - IBM Health Checker for z/OS User's Guide
- **DFSORT ICETOOL Utility**
 - DFSORT Application Programming Guide

Summary

Utility	Authority Required	Comments
IRRUT100	<ul style="list-style-type: none"> • None for own ID • SPECIAL/AUDITOR or GROUP-SPECIAL/AUDITOR for other IDs 	Have to know the ID your looking for Finds references, does not remove or create commands
IRRDBU00	Update to the input RACF DB (may be a copy)	Easy input to report tools for tailored reports and complex analysis
IRRRID00	Read input to	Must review output before executing the generated commands
IRRADU00	Read to the input SMF data	Easy input to report tools for tailored reports and complex analysis
Health Checks	Read to either XFACILIT resource <ul style="list-style-type: none"> - HZS.owner.checkname.MESSAGES or - HZS.owner.MESSAGES 	The IBM Health Checker for z/OS may already be running at your installation

Agenda

- **What is Auditing?**
- **RACF Cross Reference Utility (IRRUT100)**
- **RACF Database Unload Utility (IRRDBU00)**
- **RACF Remove ID Utility (IRRRID00)**
- **RACF Report Writer (RACFRW)**
- **RACF SMF Data Unload Utility (IRRADU00)**
- **RACF Health Checks**
- **Summary**

Disclaimer

The information contained in this document is distributed on as "as is" basis, without any warranty either express or implied. The customer is responsible for use of this information and/or implementation of any techniques mentioned. IBM has reviewed the information for accuracy, but there is no guarantee that a customer using the information or techniques will obtain the same or similar results in its own operational environment.

In this document, any references made to an IBM licensed program are not intended to state or imply that only IBM's licensed program may be used. Functionally equivalent programs that do not infringe IBM's intellectual property rights may be used instead. Any performance data contained in this document was determined in a controlled environment and therefore, the results which may be obtained in other operating environments may vary significantly. Users of this document should verify the applicable data for their specific environment.

It is possible that this material may contain references to, or information about, IBM products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that IBM intends to announce such IBM Products, programming or services in your country.

IBM retains the title to the copyright in this paper as well as title to the copyright in all underlying works. IBM retains the right to make derivative works and to republish and distribute this paper to whomever it chooses.