

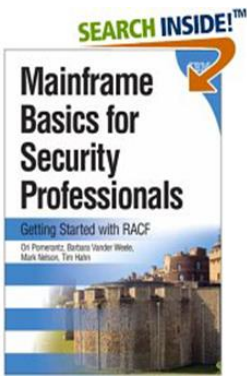


IBM® Z

RACF® Utilities for Auditors (and Friends!)

RACF Users Group of New England
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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**

- **Does your security policy cover the proper configuration of the operating system?**

Vanguard Integrity Professionals Critical Assessment Findings in Mainframe Environments

%	Misconfiguration	Impact
75%	Excessive Number of User ID's with no Password Interval	Severe
61%	Inappropriate Usage of z/OS UNIX Superuser Privilege, UID = 0	Severe
54%	Improper Use or Lack of UNIXPRIV Profiles	High
54%	Sensitive Data Sets with UACC Greater than NONE	High
54%	Critical Data Sets with UACC Greater than READ	Severe
53%	Started Task IDs are not Defined as PROTECTED IDs	High
47%	Excessive Access to the SMF Data Sets	High
46%	Excessive Access to APF Libraries	Severe
46%	Excessive Access to z/OS UNIX File System Data Sets	High
40%	RACF Database is not Adequately Protected	Severe

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

- **Authorization required**
 - ▶ **Pre z/OS V2.2: UPDATE to the input RACF database**
 - ▶ **z/OS V2.2 and later: READ if PARM=NOLOCKINPUT specified, UPDATE otherwise**

IRRDDBU00 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
- **All records of a particular type have the same format.**
- **The record types from the same type of profile are interspersed.**

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	2018-02-09	irrcerta	NO	NO	NO	YES	NO	000			
0200	irrmulti	2018-02-09	irrmulti	NO	NO	NO	YES	NO	000			
0200	irrsitec	2018-02-09	irrsitec	NO	NO	NO	YES	NO	000			
0200	ADRIAN	2018-02-09	IBMUSER	NO	YES	YES	NO	NO	030			
0200	ANDREW	2018-03-06	IBMUSER	NO	NO	NO	NO	NO	030			
0200	BPXROOT	2018-03-06	IBMUSER	NO	NO	NO	NO	NO	030			
0200	DNNNNNN	2018-04-30	MARKN	NO	NO	NO	NO	NO	030			
0200	FRED	2018-05-05	MARKN	NO	NO	NO	NO	NO	030			
0200	IBMUSER	2018-02-09	IBMUSER	NO	YES	YES	NO	NO	030	2018-02-0		
0200	MARKN	2018-02-09	IBMUSER	NO	YES	YES	NO	NO	030	2018-04-2		
0200	NOTAUTH	2018-02-09	IBMUSER	NO	NO	NO	NO	NO	030			
0200	USER0001	2018-02-09	MARKN	NO	NO	NO	NO	NO	030			
0200	USER0002	2018-02-09	MARKN	NO	NO	NO	NO	NO	030			
0200	USER0003	2018-02-09	MARKN	NO	NO	NO	NO	NO	030			
0200	USER0004	2018-02-09	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
/* 2017-03-15 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(RACFDEV )      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

```
IRR680011 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 (2018001,2018365)
  START (0800)
  END (1700)
  SID (SYS1)
/*
```


Notes on Invoking IRRADU00

- **Invoked as exits to the SMF Dump Utility (IFASMFDL/IFASMFDL)**

- ▶ RACF SMF Data Unload modules invoked through the USER2 and USER3 exit points
- ▶ IFASMFDL/IFASMFDL 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-----	+
SETROPTS	SUCCESS	22:14:45	2018-04-28	IM13	NO	NO	NO	IBMUSER	SYS1	NO	YES
ALTUSER	SUCCESS	22:14:46	2018-04-28	IM13	NO	NO	NO	IBMUSER	SYS1	NO	YES
ALTUSER	SUCCESS	22:14:47	2018-04-28	IM13	NO	NO	NO	IBMUSER	SYS1	NO	YES
ACCESS	SUCCESS	22:24:19	2018-04-28	IM13	NO	NO	NO	MARKN	SYS1	YES	NO
ACCESS	SUCCESS	22:24:19	2018-04-28	IM13	NO	NO	NO	MARKN	SYS1	YES	NO
ACCESS	SUCCESS	22:00:58	2018-04-29	IM13	NO	NO	NO	MARKN	SYS1	YES	NO
ACCESS	SUCCESS	22:00:58	2018-04-29	IM13	NO	NO	NO	MARKN	SYS1	YES	NO
SETROPTS	SUCCESS	10:40:15	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
ADDUSER	SUCCESS	10:40:16	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
ADDUSER	SUCCESS	10:40:17	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
ADDS	SUCCESS	10:40:17	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
ADDS	SUCCESS	10:40:17	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
PERMIT	SUCCESS	10:40:18	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
PERMIT	SUCCESS	10:40:18	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
SETROPTS	SUCCESS	10:41:46	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
DELDSD	SUCCESS	10:41:46	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
DELDSD	SUCCESS	10:41:46	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
DELUSER	SUCCESS	10:41:46	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
DELUSER	SUCCESS	10:41:47	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
ADDUSER	SUCCESS	10:41:47	2018-04-30	IM13	NO	NO	NO	MARKN	SYS1	NO	YES
ADDUSER	SUCCESS	10:41:47	2018-04-30	IM13	NO	NO	NO	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
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(TEMP0001) USING(RACF)
DISPLAY FROM(TEMP0001) 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  
//TEMP0001  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

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, CSFSERV/CSFKEYS (OA44496 for V2.1), JESJOBS/JESSPOOL (OA48174 for V2.1 and V2.2)
 - ▶ RACF_IBMUSER_REVOKED
 - ▶ RACF_ICHAUTAB_NONLPA
 - ▶ RACF_ENCRYPTION_ALGORITHM (OA45608 for V2.1)
 - ▶ RACF_PASSWORD_CONTROLS (OA45606 for V2.1)
 - ▶ RACF_BATCHALL_RACF (OA48714 for V2.1 and V2.2)
 - ▶ RACF_AUDIT_CONTROLS (V2.3)
- **You can define your own check that validates resources of your choice merely by defining RACF profiles and making a simple change to PARMLIB member HZSPRMxx**
- **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, ICSF CKDS, PKDS and TKDS (with OA44496 for V2.1) and the RACF database data sets and flags 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		

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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

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 IBMIXGLOGR ACTIVE (DISABLED) ENV N/
PDSE_SMSPDSE1 IBMPDSE ACTIVE (ENABLED) EXCEPT
RACF_FACILITY_ACTIVE IBMRACF ACTIVE (ENABLED) SUCCES
RACF_GRS_RNL IBMRACF ACTIVE (DISABLED) ENV N/
RACF_IBMUSER_REVOKED IBMRACF ACTIVE (ENABLED) EXCEPT
RACF_ICHAUTAB_NONLPA IBMRACF ACTIVE (ENABLED) SUCCES
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) SUCCES
RACF_UNIXPRIV_ACTIVE IBMRACF ACTIVE (ENABLED) EXCEPT
RSM_AFQ IBMRSM ACTIVE (ENABLED) SUCCES
RSM_HVSHARE IBMRSM ACTIVE (ENABLED) SUCCES
RSM_MAXCADS IBMRSM ACTIVE (ENABLED) SUCCES
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: 01/08/2017 20:47:54.701509 IBMRACTF,
 RACF_SENSITIVE_RESOURCES
 OWNER DATE: 20140703

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.ISPLPA	PRODAL	Read	No	****	
ISPF350.ISRLOAD	PRODAL	Read	No	****	
ISPF350.ISRLPA	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 LNKLST 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	Pre z/OS V2R2: UPDATE to the input RACF DB (may be a copy) z/OS V2R2: READ if PARM=NOLOCK, UPDATE otherwise	Easy input to report tools for tailored reports and complex analysis
IRRRID00	READ to the output of IRRDBU00	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
DFSORT ICETOOL	Read to its input (IRRDBU00 or IRRADU00)	Extremely flexible record selection, high performance
RACF Health Checks	READ to either XFACILIT resource - HZS.owner.checkname.MESSAGES or - HZS.owner.MESSAGES	The IBM Health Checker for z/OS should already be running at your installation

Using these Tools to See if you have a “Top Ten” Issue

- **IRRUT100 is of limited value**
- **IRRDBU00 and IRRADU00 are of great value when used with DFSORT/ICETOOL or System REXX**
 - ▶ Users with no password interval
 - ▶ Started task users not defined as protected IDs (see ftp://public.dhe.ibm.com/s390/zos/racf/pdf/share_2016_08_irrxut_il_health_check.pdf for a sample System REXX Health Check)
- **‘SYS1.SAMPLIB’ has a set of sample ICETOOL reports:**
 - ▶ SUPU: Users with UID(0) Assigned
 - ▶ UADS: Data sets with a UACC > NONE

Using these Tools to See if you have a “Top Ten” Issue...

- **The IBM-shipped RACF_SENSITIVE_RESOURCE health checks is of immense value**
 - ▶ Excessive access to APF libraries
 - ▶ Excessive access to RACF, RRSF, ICSF, PARMLIB data set(s)
 - ▶ Improper user or Lack of UNIXPRIV profiles

- **The Installation-Defined RACF Health Checks are of immense value**
 - ▶ Excessive access to SYS1 data sets
 - ▶ Excessive access to z/OS UNIX[®] file system data sets

.... All that you have to do is define a few RACF profiles with the data set names and make a small change to PARMLIB member HZSPRMxx

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**

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RACF® Utilities for Auditors (and Friends!)

RACF Users Group of New England
15 May 2018

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