

32

RACF



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update

RACF Update

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Fiona Hewitt

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RACF in focus – facility class

‘RACF in focus’ is a regular column focusing on specific aspects of RACF. Here, we focus on profiles found in the facility class.

The RACF general resource facility class provides controls for a wide variety of functions and resources in OS/390, and IBM itself uses it to protect a range of functions, from Unix System Services to storage management.

In this sense, therefore, it’s different from other general resource classes: while most protect one specific area, or one specific type of resource, this one protects a miscellaneous and assorted group of resources that don’t have anything in common, or don’t have a home anywhere else.

Although many of the services protected by the facility class are MVS-type resources, conceptually you can have other resources as well. In addition, at your installation, there may even be third-party products using this class to protect their own resources, not to mention home-grown applications.

The following examples illustrate the diversity of protection provided by the facility class. Note that these examples deal only with IBM-provided uses.

STORAGE ADMINISTRATION

Many storage administration functions in OS/390 require RACF protection. These are grouped under the facility class, and all have profiles beginning with STGADMIN. The second qualifier of these profiles further narrows down the specific storage product being protected. Thus,

- STGADMIN.ADR.** profiles protect DFDSS functions
- STGADMIN.IDC.** profiles protect IDCAMS functions
- STGADMIN.IGD.** profiles protect SMS functions
- And so on.

UNIX SYSTEM SERVICES

Unix System Services (previously known as Open Edition MVS) also uses facility class profiles. These all begin with BPX. For example:

- BPX.DAEMON
- BPX.FILEATTR.APF
- BPX.FILEATTR.PROGCTL
- BPX.SUPERUSER.

The profiles provide RACF protection for Unix resources.

RACF

There are some profiles in the facility class that provide protection for RACF functions. These begin with IRR. For example, the profile IRR.LISTUSER specifies who can list – without special powers such as Special or Auditor – the user profiles of other users.

The profile IRR.PASSWORD.RESET enables, say, Help Desk staff to reset user passwords. IBM provided this additional method a few years ago so that the installation didn't have to give the Help Desk staff more powerful attributes such as Special or Group Special.

OTHERS

There are many more. There's a profile in this class that provides tape BLP (Bypass Label Processing) protection. It's called ICHBLP. There are profiles that protect the Distributed Computing Environment (DCE). And so on. IBM keeps adding more profiles in this category as the need arises.

ADMINISTRATION OF FACILITY CLASS PROFILES

RACF administrators attempting to effectively manage these profiles need to understand a number of diverse areas. For

example, it's tricky to ensure that all facility class profiles are properly defined and have the appropriate access. If your installation is decentralized, you may want to consider delegating some of the administration duties to people who are closer to the function or feature that's being protected, and who are therefore more qualified to determine the access requirements. For example, the Unix System Services folk could do the administration work for their set of profiles. This could mean maintaining access lists only. Or it could even include adding or deleting profiles. The Storage Administration group could do the same for profiles related to their area of expertise.

Decentralizing by function in this way will simplify your job. But remember that, even if you choose to delegate, you'll still need to keep tabs on the overall picture by having a general understanding of what these profiles can do. This, together with adequate auditing of changes to these profiles, will help ensure you have this area under control.

DOCUMENTATION

You may wonder where all these profiles are documented. Well, because of their wide use, there is no single place, and you may have to look in several different places. The section entitled 'Planning for Profiles in the Facility Class' in the *RACF Security Administrator's Guide* is a good starting point. You may have to borrow Storage Administration manuals in order to understand STGADMIN profiles and so on.

THIRD-PARTY PRODUCTS

If you're evaluating third-party products, and security for them falls under the facility class, make sure their profiles don't conflict with conventions and standards already in place. A good way to do this is to make sure their product name is part of the profile description.

AUDITING

Auditing of facility profiles can be difficult. One thing you can do

is ensure that there are no runaway general profiles (those that have ** in them) with wide-open access that may inadvertently allow wide-ranging access. For example, it would be inadvisable to have a profile called STGADMIN.** with Universal Access of READ.

SUMMARY

We've touched on many profiles, or groups of profiles, in the facility class, but, because of their very nature, we can't cover them all. IBM may introduce new ones as it sees fit. A careful review and judicious delegation of authority is the best way to provide a secure RACF environment.

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RACF macros and exits

This article is intended for systems programmers and software developers who require some basic knowledge of RACF macros and exits. An earlier article (RACF Update Issue 31, pp 29-40) looked in detail at RACF control blocks and SAF and RACF customizable modules.

RACF macros come in two flavours:

- *Independent system macros*, one per RACF service invoked by an SVC call. These types of RACF macro are available only to 24-bit callers. When a resource manager issues one of these macros, they invoke RACF directly and bypass the SAF interface.
- *The RACROUTE REQUEST= macro*, which is available to both 24- and 31-bit callers, and provides greater service and enhance-ments. A RACROUTE request requires a standard register save area of 18 words. Register 13 must point to this save area when issuing the RACROUTE request.

Independent system macros	RACROUTE REQUEST=
RACINIT	VERIFY & VERIFYX
RACHECK	AUTH
FRACHECK	FASTAUTH
RACDEF	DEFINE
RACLIST	LIST
RACXTRT	EXTRACT
RACSTAT	STAT
	AUDIT
	DIRAUTH
	SIGNON
	TOKENBLD
	TOKENMAP
	TOKENXTR

Figure 1: Correspondence between the two macro types

Function	Independent macro	RACROUTE
Authentication		
Create, change, or delete an ACEE. Validate a userid, password, or group	RACINIT	REQUEST=VERIFY
Authorization	RACHECK	REQUEST=AUTH
	FRACHECK	REQUEST=FASTAUTH
	RACDEF	REQUEST=DEFINE
Check RACF status	RACSTAT	REQUEST=STAT
Pre-LOAD resource profile	RACLIST	REQUEST=LIST
Extract or update files in a RACF profile	RACXTRT	REQUEST=EXTRACT
Auditing without a resource check		REQUEST=AUDIT
Create a TOKEN		REQUEST=TOKENBLD
Hash or de-hash a TOKEN		REQUEST=TOKENMAP
Copy TOKEN		REQUEST=TOKENXTR
Mandatory access checking		REQUEST=DIRAUTH
Sign-on processing		REQUEST=SIGNON

Figure 2: Macros by function

Note that it's recommended that the RACROUTE macro be issued to use the SAF int_Bface, instead of the independent macros.

This section deals with just a subset of the RACROUTE macros and parameters that are available, as they are too numerous to cover in this article. Please refer to the *RACF RACROUTE Macro Reference* for more detailed information.

Figure 1 shows the correspondence between the two macro types, while Figure 2 outlines the macros by function.

ICHEINTY ICHEACTN and ICHETEST macros

Another set of RACF macros are the ICHEINTY, ICHEACTN, and ICHETEST macros. These macros allow direct RACF database access but require a thorough knowledge of RACF database templates and database. IBM's recommendation is to use RACXTRT or RACROUTE=EXTRACT, although at times I have found these macros to be very useful and straightforward. Some excellent examples can be found in the *RACF Macros and Interfaces* manual.

SAF router parameter list

For each RACROUTE macro call, a SAF router parameter list (SAFP) is created. The SAFP precedes the RACF service parameter list and contains the offset, not the address, of the RACF service parameter list. The SAFP also contains the RACF return code and reason code and the SAF return code and reason code. The SAFP is normally initialized via

```
RACROUTE REQUEST=, . . . . MF=L
```

or when a copy of the MF=L is copied to a dynamic work area. The SAFP is mapped by the ICHSAFP macro.

The following code illustrates how to set up the SAFP in a re-entrant Assembler routine:

```
        MVC          RACINIT_E, RACINIT_L Copy the RACINIT  
        RACROUTE REQUEST=VERIFY,
```



```

ENVIR=CREATE,
RELEASE=7703,
WORKA=(R5),
MF=(E, RACINIT_E)

```

```

RACINIT_L      RACROUTE REQUEST=VERIFY,
                ENVIR=CREATE,
                RELEASE=7703,
                WORKA=*-*,
                MF=L
RACINIT_LLEN   EQU      *-RACINIT_L

WORK          DSECT
RACINIT_E     DS        XL(RACINIT_LLEN)

```

SAF work area

For each RACROUTE call, SAF requires a work area (SAFW). It is 512 (x'200') bytes long and is set via the RACROUTE WORKA= keyword. Although the SAF work area doesn't have to be initialized, it's good programming practice to do so.

The following code illustrates how to set up the SAFW in a re-entrant Assembler routine:

```

                MVC      RACINIT_E, RACINIT_L      Copy the RACINIT
                RACROUTE REQUEST=VERIFY,
                ENVIR=CREATE,
                RELEASE=7703,
                WORKA=SAFWA,      <=====
                MF=(E, RACINIT_E)

RACINIT_L      RACROUTE REQUEST=VERIFY,
                ENVIR=CREATE,
                RELEASE=7703,
                WORKA=*-*,      <=====
                MF=L
RACINIT_LLEN   EQU      *-RACINIT_L

WORK          DSECT
RACINIT_E     DS        XL(RACINIT_LLEN)
SAFWA        DS        XL512

```

Note that on the MF=E execute form of the RACROUTE parameter, the WORKA= parameter must be specified or a 0C4 abend will occur. It's not sufficient to have the WORKA= on the MF=L forms.

Determine RACF status

One extremely useful RACROUTE macro is the RACROUTE REQUEST=STAT macro. This determines whether RACF is active, and will optionally determine whether a given resource class is defined to RACF. If a resource class is defined to RACF, the macro also determines whether the class is active.

L	R8, 16(0)	CVT @
USING	CVTMAP, R8	@ The CVT
L	R9, CVTRAC	@ Of the RACF CVT
USING	RCVT, R9	@ The RCVT
L	R7, RCVTCDTL	Length for CNST + CNSX Entry
GETMAIN	RU, LV=(7)	Get the Required Storage
LR	R6, R1	Storage Address
RACROUTE	REQUEST=STAT, CLASS=' MYCLASS' , COPY=(R6) , COPYLEN=(R7) , WORKA=SAFWORK, RELEASE=7703, MF=S	

*

USING	CNST, R2	Copy Area
USING	CNSX, R3	@ CNSX
ICHPCNST	Class Descriptor Table

Note that the RCVTCDTL field of the RCVT contains the length needed to hold both a CNST and a CNSX entry.

Function	RACROUTE parameter
To suppress messages	MSGSUPP=
To capture messages	MSGRTRN= The address of the ICH408I message is placed in the router parameter list.
To control the subpool used for capturing messages	MSGSP=

Figure 3: Parameters available on RACROUTE macro to control messages

RACROUTE RELEASE= Value

Always ensure that the release number specified on the RACROUTE RELEASE=.,MF=L macro creates a parmlist area large enough to handle MF=M and MF=E parameters.

RACROUTE message processing

There are a number of parameters on the RACROUTE macro to control message processing (see Figure 3), for example to:

- Suppress any message
- Suppress messages and issue your own message
- Store and then issue a message using SVC34
- Extract information from messages.

Message processing applies only to the following RACROUTE calls:

- REQUEST= VERIFY (RACINIT)
- REQUEST= AUTH (RACHECK)
- REQUEST= DEFINE (RACDEF)

The following example illustrates addressability to the RACF ICH408I message:

```
*-----*
MVC      RACINIT_E,RACINIT_L      Copy the RACINIT
RACROUTE REQUEST=AUTH,
        ENTITY=(R6),
        CLASS=(R7),
        WORKA=(SAFWA),
        RELEASE=7703,
        MSGRTRN=YES,
        MSGSUPP=YES,
        MSGSP=78,
        MF=(E,RACAUTH_E)
LTR      R15,R15                  RACROUTE OK?
BZ      AUTHOK                    y,
LA      R4,RACAUTH_E             Pointer to router's parameter list
USING   SAFP,R                   Addressability to the SAF Parameter List
ICM     R3,B'1111',SAFPMSAD      @ of the ICH408I Message
BZ      NO_MESS
```

```

PROC_MSG DS 0H
*-----*
* SAFPMASD points to an area that contains *
* *
* First word, length of the message buffer *
* Second word, address of the next message or zero *
* Beginning in the third word, the message in the form of a WTO list. *
* *
*-----*

NO_MESS DS 0H
AUTHOK DS 0H
RETURN DS 0H
*-----*

Work Areas
*-----*

RACAUTH_L RACROUTE REQUEST=AUTH,
          CLASS=*-*,
          ENTITY=*-*,
          RELEASE=7703,
          WORKA=*-*,
          MF=L
RACAUTH_LLEN EQU *-RACAUTH_L
*
WORK DSECT
RACINITE DS XL(RACAUTH_LLEN)
SAFWA DS XL512
*-----*

Mapping Macros
*-----*

ICHSAFP

```

RACROUTE parameter differences

When coding RACROUTE parameters, watch out for the following coding differences between requests:

- A CLASS parameter needs a length for the REQUEST=AUTH, but must not have one for REQUEST=FASTAUTH.
- A USERID parameter needs a length field for a REQUEST=VERIFY, but must not have one for REQUEST=AUTH.

- The ACEE parameter for REQUEST=VERIFY points to a fullword that contains the address of the ACEE, but REQUEST=AUTH has the ACEE parameter pointing directly to the ACEE.

RACROUTE recommendations

IBM recommends using the ENTITYX rather than ENTITY. For a full explanation for this recommendation, please refer to the *RACF RACROUTE Macro Reference* manual.

RACROUTE return codes

RACROUTE stores the RACF return and reason code in the first two words of the SAF work area. The ICHSAFP mapping macro is required to access the return codes.

- SAFPRRET – RACF return code
- SAFPRREA – RACF reason code.

When processing returns from the RACROUTE call, the return codes can be processed as follows:

- R15 contains the SAF (RACROUTE) return code.
- The RACF return and reason codes can be found in the first two words of the SAF parameter list.
- The SAF return code can also be found in the SAF parameter list.

Note that the meaning of the SAF and RACF return and reason codes is not the same for all RACROUTE calls.

RACROUTE examples

The following example validates a userid and password:

```
RACROUTE      REQUEST=VERI FY,
               ENVI R=CREATE,
               USER=USERI D,
               PASSWRD=PASSWORD,
               WORKA=(R5),
```

```

APPL=APPLID,
RELEASE=7703,
STAT=ASIS,
LOG=ASIS,
MF=(E,RACINITL)

```

```

USERID      DC      AL1(7), CL7' USER001'
PASSWORD    DC      AL1(7), CL7' LETITBE'
APPLID      DC      CL8' APPL'

```

The following example validates a userid with no password check:

```

RACROUTE    REQUEST=VERIFY,
            ENVIR=CREATE,
            USER=USERID,
            PASSCHK=NO,
            WORKA=(R5),
            APPL=APPLID,
            RELEASE=7703,
            STAT=-NONE,
            LOG=NONE,
            MF=(E,RACINITL)

```

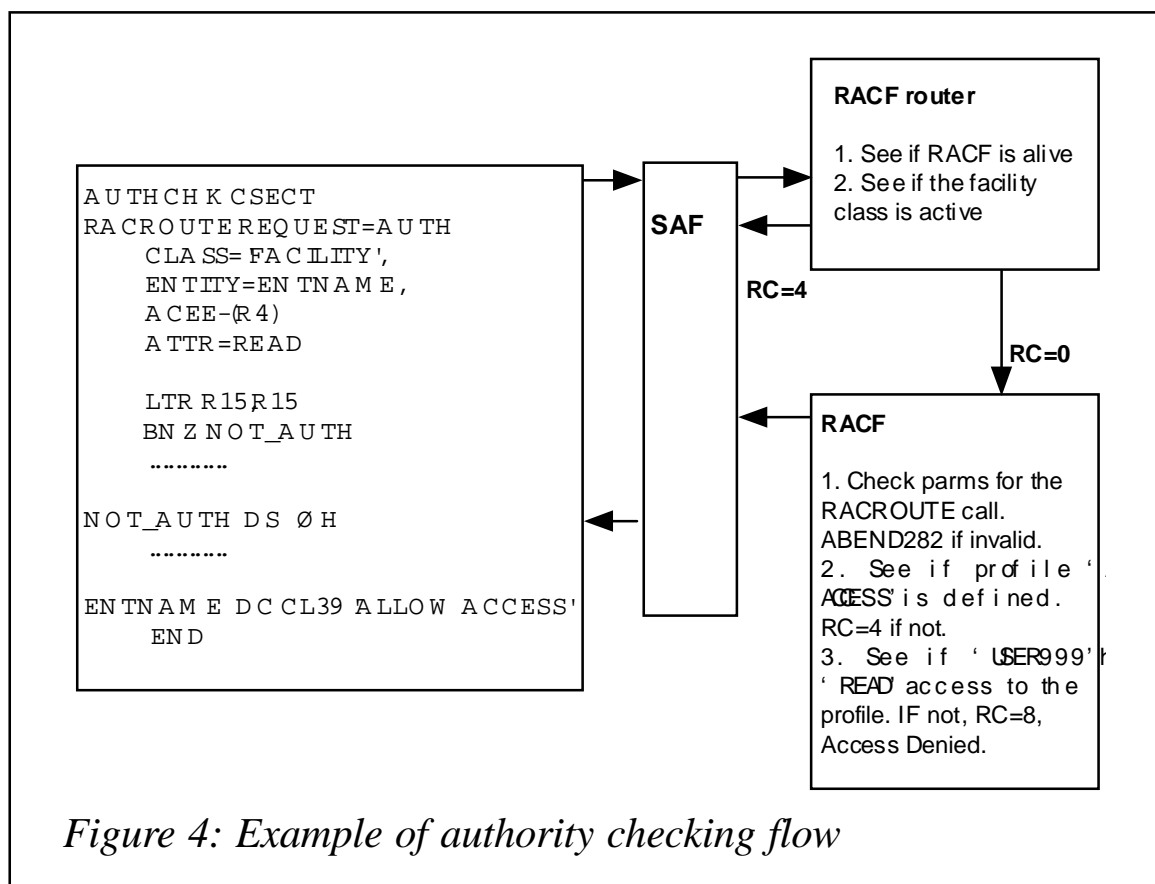


Figure 4: Example of authority checking flow

```

USERID  DC      AL1(7), CL7' USER001'
APPLID  DC      CL8' APPL'

```

The following example invokes a RACF authorization check:

```

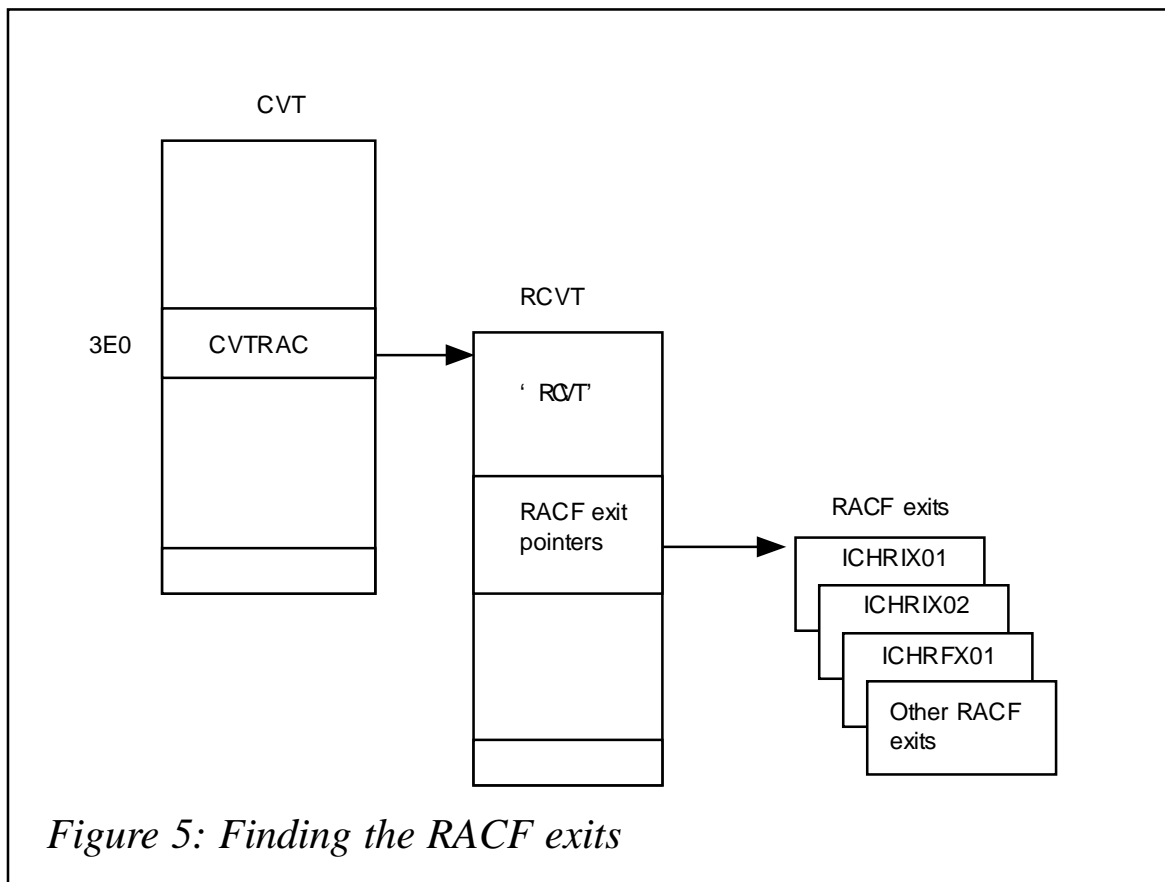
L          R4, ASXBSENV          ACEE
RACROUTE  REQUEST=AUTH,
          CLASS=FAC,
          ENTITY=ENT,
          ACEE=(R4),
          WORKA=(R5),
          RELEASE=7703,
          MF=(E, RACAUTH_L)

FAC        DC      AL(L' FACILITY)
FACILITY   DC      CL8' FACILITY'
ENT        DC      AL(L' MYENT)
MYENT      DC      CL16' MY. FACILITY. TEST'

```

Example of authority checking flow

An example of authority checking flow is shown in Figure 4. The program AUTHCHK calls RACF through the SAF interface to



Exit	RACROUTE REQUEST=	Environment	Exit function
ICHRIX01 ICHRIX02	VERIFY VERIFYX	RACINIT	Determine that a userid and password are correct. The ICHRIX01 exit is called from one of the following environments: <ul style="list-style-type: none"> • LOGON • JES VERIFYX processing • Job start • Job end • CICS CSSN.
ICHRCX01 ICHRCX02	AUTH	RACHECK	Check that a user is authorized to a resource. The IHRCX01 exit is called every time RACHECK is called. For example, IHRCX01 could prevent unauthorized access for the RACF commands ALTDSO, PERMIT, and/or RALTER.
ICHRFX01 ICHRFX02	FASTAUTH	FRACHECK	Check authorization for RACLISTED-created profiles.
ICHRDX01 ICHRDX02	DEFINE	RACDEF	Define, change, or delete profiles. The RACDEF exit gets control when the RACDEF SVC is called, when ALLOCATE creates new datasets, and when RACDEF not RACHECK is called to determine whether a resource is RACF protected.
ICHPWX01		RACINIT ALTUSER PASSWORD	New password processing exit. This exit can be used to enforce installation standards for passwords. The exit is called from: <ul style="list-style-type: none"> • RACINIT • ALTUSER command • PASSWORD command.
ICHRLX01 ICHRLX02	LIST	RACLIST	Build in-storage copies of resource profiles.

Figure 6: Pre-processing and post-processing RACF exits

see whether USER999 can access a sensitive resource or sensitive KEY 0 storage.

RACF EXITS

RACF provides a number of exits that allow an installation to meet special requirements without making direct modifications to RACF. RACF exits are provided with the following RACF functions:

- User identification
- User verification
- Automatic profile creation and deletion
- Resource command manipulation
- User command manipulation
- Group profile command manipulation.

RACF exits must be located in the LPA and must be re-entrant and refreshable. If an exit is modified, the system must be re-IPL'd for the modifications to take effect. RACF currently has no mechanism for enabling or disabling exits. Several RACF exits have a pre-processing and a post-processing entry, which provides examination of the input before RACF processes it, and after RACF has finished, so that the exit can override the RACF result.

During RACF initialization, RACF loads the exit routines and places the address of each exit routine in the RACF Communication Vector Table (RCVT).

Figure 5 shows how to find the RACF exits, while Figure 6 lists the most-often-used pre-processing and post-processing RACF exits.

RACF exit flow

When a RACROUTE REQUEST=VERIFY macro is issued, the SAF interface module ICHSFR00 will get control. It will then pass

control to the RACF router module ICHRFR00, which will in turn pass control to the RACINIT RACF module. The RACINIT module will pass control to the RACINIT exits ICHRIX01 and ICHRIX02.

RACF exit considerations

An important consideration when coding RACF exits is not to use a WAIT macro or call a routine that uses the WAIT macro. Any code that has a WAIT macro may cause the issuing task to stop functioning.

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Validating RACF information

Information in the RACF database, such as userids, groups, and access lists, needs to be reviewed periodically. This article describes a review process that will eliminate many of the concerns of security managers and internal auditors. The process involves preparing reports that are sent out to appropriate individuals, in most cases managers and supervisors, for review and validation. Once the information is validated, any changes required are carried out by the security administrators.

Note that the reporting methods described here are based on the assumption that your site has no RACF add-on products; note also that the reporting capabilities of these products may simplify some of the reporting required for this project.

WHY VALIDATE RACF INFORMATION?

During the normal business day, security administrators are busy performing the normal functions of granting and removing security access and don't have time to do any clean-up activities. At the same time, management may be looking at the bottom line of getting the work done with as few resources as possible. This can lead to several undesirable scenarios, not to mention security exposures.

Here are the main reasons why RACF information needs to be validated:

- *Obsolete userids.* Once-valid userids defined in the RACF database may now be obsolete because the person has left the company, or because the person doesn't need a userid anymore. This can happen even when there's a mechanism in place for the security department to be notified of employee terminations, transfers, and resignations. Usually, in a busy day, a security administrator's priority is to grant new accesses and create new userids, not delete obsolete ones. New userids that aren't created will draw immediate attention,

whereas old userids not deleted will seldom be noticed!

- *Obsolete groups.* RACF groups created at one time may no longer be required, either because the company has been re-organized, or because the special reason the group was created no longer applies.
- *Obsolete profiles.* Entire RACF profiles can become obsolete over time. This can happen when new dataset naming standards are introduced; datasets and their underlying RACF profiles may no longer be required because the project they belonged to has been cancelled or has been completed; or software products may have been retired from use. Yet another instance is when profiles may have started out more granular, but can now be simplified.

An example of this situation is as follows. Imagine that the following profiles exist for the PAYROLL application:

- 1 PAYROLL.PROJ1.**
- 2 PAYROLL.PROD.DEPT1.**
- 3 PAYROLL.PROD.**
- 4 PAYROLL.PRD1.**
- 5 PAYROLL.JAN11.SNAP.**

This level of granularity may not be required any more, and profile numbers 2 and 4 may have become obsolete.

CICS transactions defined to RACF can also become obsolete when CICS regions are retired for whatever reason.

In all these cases, the underlying RACF profiles become obsolete. But they may not have been cleaned up, either because no-one in the security department was notified, or because things 'fell through the cracks' because of on-going administration activities.

- *Inappropriate access.* Access specified as per access lists in RACF profiles may not be valid any more. Access may

have been granted at one point – with due approvals, no doubt – to some sensitive data because it was needed for a specific reason, and for a specific time only. This may not be required any more because the person no longer performs that function. Alternatively, the person may now have moved to a new position in the company. Unless you intervene, this situation can introduce serious security exposures.

A periodic review of the contents of the RACF database also offers the opportunity to consolidate some of the profiles and access lists so that the information is specified in a simple, concise manner. For example, imagine that several individuals belonging to the same group have been granted access to a profile. It may now make more sense, still keeping security in mind of course, to provide access at the group level. This would replace several individual entries in the access list with a single entry for the group. This will reduce the security administration effort on an on-going basis.

An indirect benefit of this project is that it will help better identify and validate owners and reviewers for various pieces of RACF information. Inevitably, some reports will come back marked ‘not my area’! For these, identifying correct owners will be helpful on an on-going basis, when the time comes for granting access and receiving approvals.

STAFF RESOURCES REQUIRED

The security administrator will play an important role, both in defining the reporting requirements and in performing the additional security clean-up activities that such projects inevitably generate.

A clerical person or a junior security administrator will be needed. This person will do the numerous mailings and track the progress of reports returned, send out follow-up mail, and so on.

Most importantly, someone with report writing skills will be required to produce the necessary reports.

REVIEWERS AND OWNERS/CUSTODIANS

Most installations already have lists that specify owners or custodians for RACF groups and profiles. These people would probably be managers, supervisors, or project leaders in different areas of the company. If no list of this kind exists, it's a good idea to develop one, to assign review and ownership responsibility. These lists also form the basis for approvals whenever on-going security changes are requested. The lists, of course, require periodic maintenance to reflect changed owners, and so on.

RACF INFORMATION VALIDATION PROCESS

The RACF information validation process involves listing all userids, groups, and profiles in the RACF database. These lists are then converted into rudimentary reports, and sent out to the appropriate owners with a cover letter stating the reason for the communication, the action required from them, and the date by which the report must be returned to the security department. A sample cover letter is shown in Appendix 1.

Any changes to the information must be duly signed by the owner or reviewer. It's the job of the security administrator to make sure the letters are sent out, to receive the replies, and to follow up if no response is received by the target date.

The following reports can be generated using the SAS programming language, or any other language at the disposal of the report writer. In some cases, ISPF edit functions will suffice to produce a presentable report.

The userid report

The userid report lists each personal (as opposed to functional or batch) userid, together with information such as the userid's special attributes (operations, special, audit) and all the groups to which the userid belongs. These reports are then sent out to the managers to whom the individuals report. The managers need to verify that all the userids are valid, that they work for them, and that the special attributes, if any, are still valid. If there

are any changes, these should be marked on the reports and returned to the security administrator.

The userid report can be created by listing all userids in batch and 'messaging' the data using either ISPF edit or some programming language.

The RACF command is:

```
LI STUSER *
```

Make sure you have sufficient RACF authority to list all users.

A sample userid report is shown in Appendix 2.

The group report

For each RACF group, a report is generated to show which userids belong to that group. The 'owner' of each group verifies the accuracy of the userids belonging to their respective groups.

One way to create the group report is to use the RACF unload database as input to a program. Another way is to list all groups in batch and input this list to a program.

The RACF command is:

```
LI STGRP *
```

Make sure you have sufficient RACF authority to list all groups.

A sample group report is shown in Appendix 3.

The dataset profile report

For each dataset profile, the dataset profile report identifies the groups and userids in its access list, the level of access (none, execute, read, update, alter), and general information related to the profile, such as Universal Access and logging information for the profile.

The report can be created by listing all dataset profiles and 'messaging the listing', using ISPF editor, or by extracting the dataset profile information from the RACF unload database using a program.

A sample dataset profile report is shown in Appendix 4.

The resource profile report

The resource profile report is very similar to the dataset profile report, the major difference being that the resource class to which the profile belongs is also shown.

A sample resource profile report is shown in Appendix 5.

The started procedures report

The started procedures report will probably be a single report, to be reviewed by a single person such as the resident system programmer. In some installations, the report may need to be reviewed by more than one person. It will identify all started tasks defined to RACF. The special attributes granted to each started procedure need to be listed and validated. In addition, since started procedures can create security exposures, they should be reviewed for their existence in the first place (that is, do we still require this started procedure?).

The started procedures report can be produced by listing all members in the STARTED class.

A sample started procedures report is shown in Appendix 6.

The batch userid report

The batch userid report is similar to the userid report, except that these are batch userids, used by batch jobs (test, development, and production). Since they may have wide-ranging security powers, and since some of them handle critical production batch processes, they need to be tightly controlled. The in-house scheduler package often uses these userids to submit batch jobs.

In most installations, they will be reviewed by the Manager of the Production Support Department.

A sample batch userid report is shown in Appendix 7.

SENDING OUT THE REPORTS AND TRACKING PROGRESS

It's extremely important to track the progress of the reports. Inevitably, not all reports will come back duly signed, and some may require follow-up action. Without proper tracking, the security administrator will lose sight of which reports have come back and which have not. Also, as reports come in, the security administrator needs to make the changes indicated by the reviewers.

Ideally, the various reports should not be sent out all at once, so as not to inundate the reviewers (and security administrators) with tons of paperwork. Security administrators should also be prepared to answer any questions from the report reviewers.

HOW OFTEN TO REVIEW

How often you review depends on factors such as company policy, the nature of the company's business, the resources available for such a project, and the pressure exerted by the internal auditors. In most cases, an annual review should be adequate.

CONCLUSION

Once this project is completed, the information contained in the RACF database will more accurately reflect the organization's requirements. The information will be accurate for a while, and gradually inaccuracies will creep in. That's when it's time to do another review!

Appendices

APPENDIX 1 – SAMPLE COVER LETTER

This is a sample cover letter, to be sent out with all reports. Since there's just one cover letter for all reports, the security administrator

will need to circle the number to which the letter applies.

To: Manager

Payroll Department

14 May 2003

Re: RACF Information Validation Project

Information Security Department is conducting its yearly review and validation of all information contained in the RACF database. Attached please find:

1. The Userid Reports for users that belong in your department.
2. The Group Reports for RACF groups for which you are responsible.
3. The Dataset Profile Reports for dataset profiles under your ownership.
4. The Resource Profile Reports for resource profiles under your ownership.
5. The Started Procedures Report for which you are responsible.
6. The Batch Userid Report for batch userids for which you are responsible.

Please review these reports, and return them to the security department by: 20 June 2003. Your co-operation in this matter will be very much appreciated.

APPENDIX 2 – SAMPLE USERID REPORT

RACF Information Validation Project: Userid Report 14 May 2003

Userid: USER099 Name: John Doe
Special Attributes: OPERATIONS, GROUP-SPECIAL
Default Group: PAYROLL
Other Groups Connected to: ACCT, SYSPROG

APPENDIX 3 – SAMPLE GROUP REPORT

RACF Information Validation Project: Group Report 14 May 2003

Group Name: PAYROLL
Superior Group: ADMIN Owner: PAYMGR
Userids belonging to this group:
USER090
USER123

.....

APPENDIX 4 – SAMPLE DATASET PROFILE REPORT

RACF Information Validation Project: Dataset Profile Report 14 May 2003

Dataset Profile: PAYROLL.*.NEW.**

Universal Access: READ

Logging Options: Log all updates

Access List:

Group/Userid	Access Level
PAYROLL	UPDATE
USER300	READ
USER001	NONE

APPENDIX 5 – SAMPLE RESOURCE PROFILE REPORT

RACF Information Validation Project: Resource Profile Report 14 May 2003

Resource Class: CICSTRN1 Profile Name: TRN1

Universal Access: NONE

Logging Options: No Logging

Access List:

Group/Userid	Access Level
PAYROLL	READ
USER300	UPDATE
USER001	ALTER

APPENDIX 6 – SAMPLE STARTED PROCEDURES REPORT

RACF Information Validation Project: Started Procedures Report 14 May 2003

Started Procedure Name: Special Attributes:

NETPN OPERATIONS

SCHEDPRD NONE

DFHSM OPERATIONS

.....

.....

APPENDIX 7 – SAMPLE BATCH USERID REPORT

RACF Information Validation Project: Batch Userid Report

14 May 2003

Batch Userid: PAYPROD Name: Production Payroll Batch
Special Attributes: GROUP-OPERATIONS
Default Group: PAYROLL Other Groups Connected to: FINANCE

Dinesh Dattani (dddattani@rogers.com)
Security Consultant (Canada)

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Displaying the status of RACF userids

This article follows on from the previous one in this issue (pp 18-26), and looks specifically at ways in which common userid maintenance tasks can be accomplished. The program presented provides a comprehensive userid status report to help you keep your RACF database properly maintained.

Maintaining the contents of a RACF database is a constant challenge. Some common userid maintenance tasks include:

- Adding a userid for a new employee.
- Deleting a userid (and other access related data) for a departing employee.
- Suspending a userid for an employee on temporary leave.
- Creating a short-term userid for a consultant or an employee temporarily assigned to another job function.
- Altering userid access capabilities because an employee has changed departments.

But what happens to your RACF database if the employee on temporary leave doesn't return to active employment? What happens to the userid for a departing employee that was revoked when they left, but wasn't immediately deleted? What happens ...?

Over time, it's not hard to see how some things could get lost in the shuffle. It would clearly be helpful to be able to get a comprehensive userid status report on a regular basis so that a cross-check could be made against a userid and its assigned access capabilities. The program presented provides at least some of this useful information.

The USERLIST program reads through an entire RACF database and provides an output record for each defined userid that indicates the following:

- The userid (eg JSMITH).
- The user name (eg John Smith).
- The assigned attributes (eg ADSP, SPEC, OPER, GRPACC, AUD, PROT, OID).
- The password expiry status (eg CURRENTLY EXPIRED, NOT REQUIRED, EXPIRES IN *nn* DAYS, NEVER EXPIRES).
- The userid revoke status (eg REVOKED, NOT REVOKED).
- The defined RACF segments (eg CI, DC, DF, LA, NV, OM, OP, OV, TS, WA).

The information in this report allows a RACF administrator to ask questions like the following:

- Why does a userid have a defined TSO segment, but no password requirement?
- Should a userid with a CICS or TSO segment have a password that never expires?
- Should a particular userid have AUDIT, OPERATOR, or SPECIAL attributes?
- That person left months ago – why is the userid still in the database?

CREATING THE LOAD MODULE

The USERLIST program needs to be assembled with your Assembler H or High Level Assembler. The resulting object module should be linked using the following job:

```
//j obname JOB ...
//IEWL EXEC PGM=HEWLH096, PARM=' XREF, LIST, MAP'
//SYSPRINT DD SYSOUT=*
//SYSUT1 DD UNIT=SYSDA, SPACE=(CYL, (2, 1))
//OBJECT DD DSN=your.object.pds, DISP=SHR
//SYSLMOD DD DSN=an.auth.dataset, DISP=SHR
//SYSLIN DD *
        INCLUDE OBJECT(USERLIST)
        ENTRY USERLIST
        SETCODE AC(1)
        NAME USERLIST(R)
```

Note the requirement for APF authorization.

RUNNING THE USERLIST UTILITY

Once you've assembled and linked the USERLIST utility, you're ready to display the status of the userids defined to your RACF database. The following sample job can be used to run the USERLIST utility:

```
//j obname JOB ...
//USERLIST EXEC PGM=USERLIST
//STEPLIB DD DSN=an.auth.dataset, DISP=SHR
//SYSPRINT DD SYSOUT=*
```

The USERLIST program can run in two modes. It can be used to list every userid defined to the RACF database. This is accomplished by specifying no program parameter, as in the above sample job. It can also be used to list only those userids that belong to a particular RACF group. You would do this by specifying a group name parameter value. For example:

```
//j obname JOB ...
//USERLIST EXEC PGM=USERLIST, PARM=' GROUPNAME(SYS1)'
//STEPLIB DD DSN=an.auth.dataset, DISP=SHR
//SYSPRINT DD SYSOUT=*
```

In the above example, USERLIST would produce a report for all userids connected to the SYS1 RACF group.

The USERLIST utility will produce output in the SYSPRINT DD. Example output will look something like the following:

```

Userid  User Name  Attributes  PWD Expiry  Status  Revoke  Status  Defined  Segments
-----
AUDIT1  AUDITOR 1   AUD        NEVER EXPIRES      NOT REVOKED  TS
OPER1   OPERATOR 1   OPER       EXPIRES IN 45 DAYS NOT REVOKED  CI,NV,OP,TS
OPER2   OPERATOR 2   OPER       CURRENTLY EXPIRED  REVOKED      CI,NV,OP,TS
TEST1   TEST USER1  OPER,SPEC  EXPIRES IN 15 DAYS NOT REVOKED  CI,OM,TS
TEST2   TEST USER2  NONE       CURRENTLY EXPIRED  NOT REVOKED  CI,DC,DF,OM,OP+

```

USERLIST will check for the existence of all RACF segments except the KERBEROS segment, the Lotus Notes segment, and the NDS segment. As space is limited in the output record, if a userid has more segment definitions than space allows, a plus sign (+) will be displayed at the end of the defined segment list for that userid.

The USERLIST utility can be run on a regular basis to make sure that RACF userid maintenance is not falling through the cracks.

USERLIST

USERLIST CSECT

USERLIST AMODE 31

USERLIST RMODE 24

DCB'S NEED 24-BIT ADDRESSES

```

*****
*
* The USERLIST utility can be used to list all userids defined to
* your racf database.  Optionally, it can be used to list only
* those userids that belong to the group specified in the
* GROUPNAME program parm.
*
* USERLIST directs its output to the SYSPRINT DD which has DCB
* characteristics of LRECL=133, DSORG=PS, RECFM=F(B),
* BLKSIZE=multiple of 133.
*
* USERLIST should be linked into an authorized library with
* AC(1).
*
* USERLIST can end with the following return codes:
*
* 0:  USERID LIST HAS BEEN CREATED
* 4:  THE RCVT FOR RACF WAS NOT LOCATED
* 8:  THE SPECIFIED GROUPNAME IS NOT DEFINED TO RACF
* 12: A PROGRAM PARM WAS DETECTED BUT NOT RECOGNIZED AS
*     GROUPNAME(grpname)
*

```

```

* 16: A PROGRAM PARM WAS DETECTED BUT THE LENGTH DID NOT          *
* CORRESPOND TO A VALID GROUPNAME(grpname) PARAMETER           *
*                                                                 *
*****
PRINT GEN
STM R14,R12,12(R13)      SAVE THE REGISTERS
LR R12,R15              COPY MODULE BASE ADDRESS
LA R11,4095(,R12)       SET SECOND BASE ...
LA R11,1(,R11)          REGISTER ADDRESS
USING USERLIST,R12,R11  SET ADDRESSABILITY
LR R10,R13              SAVE OLD SAVEAREA ADDRESS
LR R2,R1                SAVE INCOMING PARM ADDRESS
STORAGE OBTAIN,LENGTH=WALEN GET SOME WORKING STORAGE
LR R13,R1               COPY THE ADDRESS
LR R0,R13              AGAIN
L R1,=A(WALEN)         SET THE LENGTH
LR R14,R13             SET SOURCE ADDRESS TO TARGET
XR R15,R15             SET FILL BYTE
MVCL R0,R14            CLEAR THE STORAGE
ST R10,4(,R13)         SAVE OLD SAVEAREA ADDRESS
USING WORKAREA,R13     WORKING STORAGE ADDRESSABILITY
*****
L R1,16                GET CVT ADDRESS
USING CVT,R1           SET ADDRESSABILITY
L R6,CVTRAC            GET RCVT ADDRESS
USING RCVT,R6         SET ADDRESSABILITY
CLC RCVTID(4),=C'RCVT' RACF?
BNE RETURN4           NO - RETURN
MVC SAVEPINV(1),RCVTPINV SAVE THE RACF PASSWORD INTERVAL
DROP R1,R6
LR R1,R2               RELOAD INCOMING PARM ADDRESS
*****
*
* EXTRACT INCOMING PARM DATA. VALID PARM DATA IS AS FOLLOWS:  *
*
* - NO PARAMETER                                               *
* - LIST ALL USERIDS ALPHABETICALLY (INCLUDING USER NAME)     *
* - FOR EXAMPLE:                                              *
* //USERLIST EXEC PGM=USERLIST                                *
* //STEPLIB DD DSN=authorized.load.library,DISP=SHR           *
* //SYSPRINT DD SYSOUT=*                                       *
*
* - 'GROUPNAME(GRPNAME)'                                       *
* - LIST ALL USERIDS (INCLUDING USER NAME) THAT ARE DEFINED   *
* TO GROUP 'GRPNAME'                                           *
* - FOR EXAMPLE:                                              *
* //USERLIST EXEC PGM=USERLIST,PARM='GROUPNAME(MVSGRP)'      *
* //STEPLIB DD DSN=authorized.load.library,DISP=SHR           *
* //SYSPRINT DD SYSOUT=*                                       *
*

```



```

*****
LR      R8, R1                SAVE PARM ADDRESS
L       R9, 0(, R9)           GET ADDRESS OF PARM
CLC     0(2, R9), =H' 0'     ANY PARAMETER?
BE      FULLLIST             NO - DO A FULL LIST
CLC     0(2, R9), =H' 12'    IS TOTAL LENGTH OK?
BL      RETURN16             NO - SET RETURN CODE & EXIT
CLC     0(2, R9), =H' 19'    IS TOTAL LENGTH OK?
BH      RETURN16             NO - SET RETURN CODE & EXIT
XR      R7, R7               CLEAR COUNT REGISTER
ICM     R7, B' 0011', 0(R9)  SAVE THE LENGTH
LA      R9, 2(, R9)          POINT TO DATA
LA      R8, 0(R7, R9)        POINT PAST DATA
BCTR    R8, 0                POINT TO LAST BYTE
CLC     0(10, R9), =C' GROUPNAME(' GROUPNAME PARAMETER?
BNE     RETURN12             NO - RETURN
CLI     0(R8), C' )'         PROPER FORMAT?
BNE     RETURN12             NO - RETURN
S       R7, =F' 11'         SUBTRACT PARAPHANALIA LENGTH
STH     R7, GRPNMLEN        SAVE LENGTH
BCTR    R7, 0                REDUCE BY ONE FOR EX
MVC     GRPNAME(8), =8C' '   INITIALIZE GROUP NAME FIELD
LA      R9, 10(, R9)         POINT TO GROUP NAME
EX      R7, GRPNMVC          SAVE THE GROUP NAME
B       GRPLIST              LIST USERIDS IN GROUP
FULLLIST EQU *
*****
*
* NO PROGRAM PARM HAS BEEN DETECTED SO WE WILL PERFORM A SEARCH
* FOR EACH USERID DEFINED TO THE RACF DATABASE.
*
*****
OPEN    (SYSPRINT, OUTPUT), MODE=31 OPEN OUTPUT DATASET
PUT     SYSPRINT, HDR1A      WRITE HEADER1
PUT     SYSPRINT, HDR2A      WRITE HEADER2
XC      XUID(4), XUID        CLEAR XUID LENGTH AREA
MVC     XUID(2), =H' 8'      SET DATA LENGTH
MVC     XUID+4(8), =8C' '    SET STARTING UID
MODESET MODE=SUP, KEY=ZERO
UIDLOOP EQU *
XC      RACWORK(256), RACWORK CLEAR RACROUTE . . .
XC      RACWORK+256(256), RACWORK+256 WORKAREA STORAGE
MVC     ROUTWRK1(ROUTLEN1), RACROUT1 COPY RACROUTE PARM MODEL
RACROUTE REQUEST=EXTRACT, X
        TYPE=EXTRACTN, X
        ENTIT YX=XUID, X
        FIELDS=FLDLIST1, X
        RELEASE=1. 9. 2, X
        SUBPOOL=1, X
        WORKA=RACWORK, X

```

```

MF=(E,ROUTWRK1)
LTR R15,R15 EXTRACT OK?
BZ LISTOK YES - PROCESS DATA
ST R15,RETCODE SAVE THE RETURN CODE
MVC RACF_RC(8),ROUTWRK1 COPY RACF RTN/RSN CODES
MODESET MODE=PROB,KEY=NZERO
B LISTDONE WE' RE DONE
LISTOK EQU *
*****
*
* A USERID WAS EXTRACTED. MOVE THE DATA INTO AN OUTPUT BUFFER AND *
* WRITE THE RECORD. *
*
* USE THE DOOUTPUT ROUTINE FOR THIS PURPOSE. R1 SHOULD CONTAIN *
* THE EXTRACT BUFFER ADDRESS. THE BUFFER IS RELEASED BY DOOUTPUT. *
*
*****
MVC SAVEUID(8),XUID+4 COPY THE USERID
BAL R14,DOOUTPUT CREATE NECESSARY OUTPUT
B UIDLOOP PROCESS NEXT USERID
LISTDONE EQU *
MODESET MODE=PROB,KEY=NZERO
CLOSE (SYSPRINT),MODE=31 CLOSE OUTPUT DATASET
B RETURNØ WE' RE DONE
GRPLIST EQU *
*****
*
* A 'GROUPNAME(grpname)' PROGRAM PARM WAS DETECTED. ATTEMPT TO *
* FIRST LOCATE THE USERID INFORMATION FOR USERIDS DEFINED TO THIS *
* GROUP. *
*
*****
OPEN (SYSPRINT,OUTPUT),MODE=31 OPEN OUTPUT DATASET
MODESET MODE=SUP,KEY=ZERO
XC RACWORK(256),RACWORK CLEAR RACROUTE ...
XC RACWORK+256(256),RACWORK+256 WORKAREA STORAGE
MVC ROUTWRK3(ROUTLEN3),RACROUT3 COPY RACROUTE PARM MODEL
RACROUTE REQUEST=EXTRACT, X
TYPE=EXTRACT, X
ENTITY=GRPNAME, X
FIELDS=FLDLIST2, X
RELEASE=1.9.2, X
SUBPOOL=1, X
WORKA=RACWORK, X
MF=(E,ROUTWRK3)
LTR R15,R15 EXTRACT OK?
BZ GROUPOK YES - PROCESS USERIDS
ST R15,RETCODE SAVE SAF RETURN CODE
MVC RACF_RC(8),ROUTWRK3 COPY RACF RTN/RSN CODES
MODESET MODE=PROB,KEY=NZERO

```

```

MVC   GRPMSG+6(8), GRPNAME      MOVE GRP NM INTO OUTPUT RECORD
PUT   SYSPRINT, GRPMSG          WRITE THE RECORD
CLOSE (SYSPRINT), MODE=31      CLOSE OUTPUT DATASET
B     RETURN8                   GROUP WASN' T LOCATED
GROUPOK EQU *
ST    R1, EXTSAVE               SAVE EXTRACT AREA ADDRESS
PUT   SYSPRINT, HDR1A          WRITE HEADER1
PUT   SYSPRINT, HDR2A          WRITE HEADER2
*****
*
*   THE SPECIFIED GROUP WAS LOCATED.  WE NOW NEED TO EXTRACT THE
*   INFORMATION ABOUT EACH OF THE USERIDS.
*
*****
L     R6, EXTSAVE               GET EXTRACT AREA ADDRESS
USING EXTWKEA, R6              SET ADDRESSABILITY
XR    R5, R5                    CLEAR R5
ICM   R5, B' 0011', EXTWOFF    GET DATA OFFSET
LA    R5, 0(R5, R6)            SET ADDRESS
CLC   0(4, R5), =F' 0'        ANYTHING TO DO?
BE    RELEXTA1                 NO - RELEASE EXTRACT W/A
L     R9, 0(, R5)              GET DATA LENGTH
LA    R9, 4(R9, R5)            POINT PAST END OF DATA
LA    R5, 4(, R5)              POINT TO FIRST USERID ENTRY
*****
*
*   SORT THE USERID LIST.
*
*****
ST    R5, UIDSTART             SAVE STARTING ADDRESS
ST    R9, UIDEND               SAVE ENDING ADDRESS
LR    R7, R5                   COPY STARTING ADDRESS
LR    R8, R5                   COPY STARTING ADDRESS
SRTOUTLP EQU *
CR    R7, R9                   END OF DATA?
BNL   SRTEND                   YES - SORT IS DONE
SRTINLP EQU *
CR    R8, R9                   END OF DATA?
BNL   SRTNEXT0                YES - SORT NEXT ENTRY
CLC   0(12, R7), 0(R8)        ENTRY SWAP REQUIRED?
BNH   SRTNEXTI                NO - LOOK AT NEXT ENTRY
MVC   TEMPENT(12), 0(R7)      SAVE CURRENT ENTRY
MVC   0(12, R7), 0(R8)        MOVE OVER LOWER ENTRY
MVC   0(12, R8), TEMPENT      COPY BACK MOVED ENTRY
SRTNEXTI EQU *
LA    R8, 12(, R8)            POINT TO NEXT ENTRY
B     SRTINLP                  CHECK IT OUT
SRTNEXT0 EQU *
LA    R7, 12(, R7)            POINT TO NEXT ENTRY
LR    R8, R7                   COPY IT

```

```

      B      SRTOUTLP          CHECK IT OUT
SRTEND EQU *
*****
      L      R5, UI DSTART      LOAD STARTING ADDRESS
      L      R9, UI DEND       LOAD ENDING ADDRESS
GRPUSRL1 EQU *
      CR     R5, R9             END OF DATA?
      BNL   RELEXTA1          YES - RELEASE EXTRACT W/A
      LA    R7, 4(, R5)       POINT TO USERID
*****
*
*   EXTRACT THE USERID SPECIFIC INFORMATION.
*
*****
      XC     RACWORK(256), RACWORK      CLEAR RACROUTE ...
      XC     RACWORK+256(256), RACWORK+256 WORKAREA STORAGE
      MVC    ROUTWRK2(ROUTLEN2), RACROUT2 COPY RACROUTE PARM MODEL
      RACROUTE REQUEST=EXTRACT,
                                         X
              TYPE=EXTRACT,              X
              ENTITY=(R7),                X
              FIELDS=FLDLIST1,            X
              RELEASE=1.9.2,              X
              SUBPOOL=1,                  X
              WORKA=RACWORK,              X
              MF=(E, ROUTWRK2)
      LTR   R15, R15           EXTRACT OK?
      BZ    USEROK           YES - PROCESS USERID INFO
      B     GRPUSRN1          CHECK NEXT USERID
USEROK EQU *
*****
*
*   A USERID WAS EXTRACTED.  MOVE THE DATA INTO AN OUTPUT BUFFER AND
*   WRITE THE RECORD.
*
*   USE THE DOOUTPUT ROUTINE FOR THIS PURPOSE.  R1 SHOULD CONTAIN
*   THE EXTRACT BUFFER ADDRESS.  THE BUFFER IS RELEASED BY DOOUTPUT.
*
*****
      MVC    SAVEUID(8), 0(R7)          COPY THE USERID
      BAL   R14, DOOUTPUT              CREATE NECESSARY OUTPUT
*****
GRPUSRN1 EQU *
      LA    R5, 12(, R5)              POINT TO NEXT USERID ENTRY
      B     GRPUSRL1                  GO CHECK THINGS OUT
RELEXTA1 EQU *
*****
*
*   RELEASE THE GROUP EXTRACT BUFFER.
*
*****

```

```

L      R6, EXTSAVE                GET EXTRACT AREA ADDRESS
XR     R8, R8                     CLEAR R8
XR     R9, R9                     CLEAR R9
IC     R9, 0(, R6)               SAVE THE SUBPOOL VALUE
ICM    R8, B' 0111' , 1(R6)      SAVE W/A LENGTH
STORAGE RELEASE, LENGTH=(R8), ADDR=(R6), SP=(R9)
MODESET MODE=PROB, KEY=NZERO
CLOSE (SYSPRINT), MODE=31        CLOSE OUTPUT DATASET
B      RETURN0                   WE' RE DONE
*****
RETURN0 EQU *
L      R10, 4(, R13)
LR     R1, R13
STORAGE RELEASE, LENGTH=WALEN, ADDR=(R1)
LR     R13, R10
LM     R14, R12, 12(R13)
XR     R15, R15
BR     R14
*****
RETURN4 EQU *
L      R10, 4(, R13)
LR     R1, R13
STORAGE RELEASE, LENGTH=WALEN, ADDR=(R1)
LR     R13, R10
LM     R14, R12, 12(R13)
LA     R15, 4
BR     R14
*****
RETURN8 EQU *
MVC    DBL2(4), RETCODE          GET SAF RETURN CODE
BAL    R14, HEXCNVT             CONVERT TO READABLE
MVC    ERRMSG1+16(8), DBL1      MOVE INTO MESSAGE
MVC    DBL2(4), RACF_RC         GET RACF RETURN CODE
BAL    R14, HEXCNVT             CONVERT TO READABLE
MVC    ERRMSG1+35(8), DBL1     MOVE INTO MESSAGE
MVC    DBL2(4), RACF_RSN       GET RACF REASON CODE
BAL    R14, HEXCNVT             CONVERT TO READABLE
MVC    ERRMSG1+55(8), DBL1     MOVE INTO MESSAGE
ERRMSG1 WTO 'SAF RC: XXXXXXXX RACF RC: XXXXXXXX RACF RSN: XXXXXXXX
           ', ROUTCDE=(1), DESC=(6)
L      R10, 4(, R13)
LR     R1, R13
STORAGE RELEASE, LENGTH=WALEN, ADDR=(R1)
LR     R13, R10
LM     R14, R12, 12(R13)
LA     R15, 8
BR     R14
*****
RETURN12 EQU *
L      R10, 4(, R13)

```

```

LR    R1, R13
STORAGE RELEASE, LENGTH=WALEN, ADDR=(R1)
LR    R13, R10
LM    R14, R12, 12(R13)
LA    R15, 12
BR    R14
*****
RETURN16 EQU    *
L     R10, 4(, R13)
LR    R1, R13
STORAGE RELEASE, LENGTH=WALEN, ADDR=(R1)
LR    R13, R10
LM    R14, R12, 12(R13)
LA    R15, 16
BR    R14
*****
HEXCNVT EQU    *
UNPK  DBL1(9), DBL2(5)           UNPACK THE VALUE
NC    DBL1(8), =8X'0F'          TURN OFF HIGH NIBBLE
TR    DBL1(8), =C'0123456789ABCDEF' MAKE THINGS READABLE
BR    R14                       RETURN
*****
DOOUTPUT EQU    *
STM   R0, R15, SVAREA02        SAVE REGISTERS
XC    SEGDATA(SEGDATAL), SEGDATA CLEAR SEGMENT DATA SAVE AREA
XR    R6, R6                   CLEAR R6
ICM   R6, B'0011', 4(R1)       GET DATA OFFSET
AR    R6, R1                   CALCULATE DATA ADDRESS
SVFLD1 EQU    *
ICM   R15, B'1111', 0(R6)      GET DATA LENGTH
MVC   SAVENAME(20), 4(R6)      COPY THE USERNAME
SVFLD2 EQU    *
LA    R6, 4(R15, R6)           POINT TO FLAG1
ICM   R15, B'1111', 0(R6)      GET DATA LENGTH
LTR   R15, R15                 ANY DATA?
BZ    SVFLD3                   NO - CHECK NEXT FIELD
MVC   SAVEFLG1(1), 4(R6)       SAVE FLAG1
SVFLD3 EQU    *
LA    R6, 4(R15, R6)           POINT TO FLAG2
ICM   R15, B'1111', 0(R6)      GET DATA LENGTH
LTR   R15, R15                 ANY DATA?
BZ    SVFLD4                   NO - CHECK NEXT FIELD
MVC   SAVEFLG2(1), 4(R6)       SAVE FLAG2
SVFLD4 EQU    *
LA    R6, 4(R15, R6)           POINT TO FLAG3
ICM   R15, B'1111', 0(R6)      GET DATA LENGTH
LTR   R15, R15                 ANY DATA?
BZ    SVFLD5                   NO - CHECK NEXT FIELD
MVC   SAVEFLG3(1), 4(R6)       SAVE FLAG3
SVFLD5 EQU    *

```

	LA	R6, 4(R15, R6)	POINT TO FLAG4
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD6	NO - CHECK NEXT FIELD
	MVC	SAVEFLG4(1), 4(R6)	SAVE FLAG4
SVFLD6	EQU	*	
	LA	R6, 4(R15, R6)	POINT TO FLAG5
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD7	NO - CHECK NEXT FIELD
	MVC	SAVEFLG5(1), 4(R6)	SAVE FLAG5
SVFLD7	EQU	*	
	LA	R6, 4(R15, R6)	POINT TO FLAG6
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD8	NO - CHECK NEXT FIELD
	MVC	SAVEFLG6(1), 4(R6)	SAVE FLAG6
SVFLD8	EQU	*	
	LA	R6, 4(R15, R6)	POINT TO FLAG7
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD9	NO - CHECK NEXT FIELD
	MVC	SAVEFLG7(1), 4(R6)	SAVE FLAG7
SVFLD9	EQU	*	
	LA	R6, 4(R15, R6)	POINT TO FLAG8
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD1Ø	NO - CHECK NEXT FIELD
	MVC	SAVEFLG8(1), 4(R6)	SAVE FLAG8
SVFLD1Ø	EQU	*	
	LA	R6, 4(R15, R6)	POINT TO PASSINT
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD11	NO - CHECK NEXT FIELD
	MVC	SAVEPWDI (1), 4(R6)	SAVE PASSINT
SVFLD11	EQU	*	
	LA	R6, 4(R15, R6)	POINT TO PASSDATE
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD12	NO - CHECK NEXT FIELD
	MVC	SAVEPWDD(3), 4(R6)	SAVE PASSDATE
SVFLD12	EQU	*	
	LA	R6, 4(R15, R6)	POINT TO LJDATE
	I CM	R15, B' 1111' , Ø(R6)	GET DATA LENGTH
	LTR	R15, R15	ANY DATA?
	BZ	SVFLD13	NO - CHECK NEXT FIELD
	MVC	SAVELJD(3), 4(R6)	SAVE LJDATE
SVFLD13	EQU	*	

	XR	R7, R7	CLEAR R7

```

XR      R8, R8                      CLEAR R8
I CM    R7, B' 0111' , 1(R1)        GET STORAGE LENGTH
I CM    R8, B' 0001' , 0(R1)        GET SUBPOOL
STORAGE RELEASE, LENGTH=(R7), ADDR=(R1), SP=(R8)
MVI     OUTREC, C' '                SET FILL CHARACTER
MVC     OUTREC+1(132), OUTREC        CLEAR THE AREA
MVC     OUTREC+UIDOFF(8), SAVEUID    COPY THE USERID
MVC     OUTREC+UNMOFF(20), SAVENAME COPY THE USER NAME
MVI     PREVATTR, OFF               SET ATTRIBUTE FLAG OFF
LA      R2, OUTREC+ATTOFF           SET OUTPUT AREA ADDRESS
*****
ATTR1   EQU      *
TM      SAVEFLG1, X' 80'            ADSP?
BZ      ATTR2                       NO - CHECK NEXT ATTRIBUTE
TM      PREVATTR, ON                PREVIOUS ATTRIBUTE?
BZ      NOSEP1                      NO - NO SEPARATOR REQUIRED
MVI     0(R2), C' , '              SET SEPARATOR VALUE
LA      R2, 1(, R2)                POINT PAST SEPARATOR
NOSEP1  EQU      *
MVC     0(4, R2), =C' ADSP'        SET ATTRIBUTE VALUE
LA      R2, 4(, R2)                POINT PAST VALUE
MVI     PREVATTR, ON               SET FLAG ON
*****
ATTR2   EQU      *
TM      SAVEFLG2, X' 80'            SPECIAL?
BZ      ATTR3                       NO - CHECK NEXT ATTRIBUTE
TM      PREVATTR, ON                PREVIOUS ATTRIBUTE?
BZ      NOSEP2                      NO - NO SEPARATOR REQUIRED
MVI     0(R2), C' , '              SET SEPARATOR VALUE
LA      R2, 1(, R2)                POINT PAST SEPARATOR
NOSEP2  EQU      *
MVC     0(4, R2), =C' SPEC'        SET ATTRIBUTE VALUE
LA      R2, 4(, R2)                POINT PAST VALUE
MVI     PREVATTR, ON               SET FLAG ON
*****
ATTR3   EQU      *
TM      SAVEFLG3, X' 80'            OPERATIONS?
BZ      ATTR4                       NO - CHECK NEXT ATTRIBUTE
TM      PREVATTR, ON                PREVIOUS ATTRIBUTE?
BZ      NOSEP3                      NO - NO SEPARATOR REQUIRED
MVI     0(R2), C' , '              SET SEPARATOR VALUE
LA      R2, 1(, R2)                POINT PAST SEPARATOR
NOSEP3  EQU      *
MVC     0(4, R2), =C' OPER'        SET ATTRIBUTE VALUE
LA      R2, 4(, R2)                POINT PAST VALUE
MVI     PREVATTR, ON               SET FLAG ON
*****
ATTR4   EQU      *
TM      SAVEFLG5, X' 80'            GRPACC?
BZ      ATTR5                       NO - CHECK NEXT ATTRIBUTE

```


	TM	PREVATTR, ON	PREVIOUS ATTRIBUTE?
	BZ	NOSEP4	NO - NO SEPARATOR REQUIRED
	MVI	Ø(R2), C', '	SET SEPARATOR VALUE
	LA	R2, 1(, R2)	POINT PAST SEPARATOR
NOSEP4	EQU	*	
	MVC	Ø(6, R2), =C' GRPACC'	SET ATTRIBUTE VALUE
	LA	R2, 6(, R2)	POINT PAST VALUE
	MVI	PREVATTR, ON	SET FLAG ON

ATTR5	EQU	*	
	TM	SAVEFLG6, X' 8Ø'	AUDITOR?
	BZ	ATTR6	NO - CHECK NEXT ATTRIBUTE
	TM	PREVATTR, ON	PREVIOUS ATTRIBUTE?
	BZ	NOSEP5	NO - NO SEPARATOR REQUIRED
	MVI	Ø(R2), C', '	SET SEPARATOR VALUE
	LA	R2, 1(, R2)	POINT PAST SEPARATOR
NOSEP5	EQU	*	
	MVC	Ø(3, R2), =C' AUD'	SET ATTRIBUTE VALUE
	LA	R2, 3(, R2)	POINT PAST VALUE
	MVI	PREVATTR, ON	SET FLAG ON

ATTR6	EQU	*	
	TM	SAVEFLG7, X' 4Ø'	PROTECTED?
	BZ	ATTR7	NO - CHECK NEXT ATTRIBUTE
	TM	PREVATTR, ON	PREVIOUS ATTRIBUTE?
	BZ	NOSEP6	NO - NO SEPARATOR REQUIRED
	MVI	Ø(R2), C', '	SET SEPARATOR VALUE
	LA	R2, 1(, R2)	POINT PAST SEPARATOR
NOSEP6	EQU	*	
	MVC	Ø(4, R2), =C' PROT'	SET ATTRIBUTE VALUE
	LA	R2, 4(, R2)	POINT PAST VALUE
	MVI	PREVATTR, ON	SET FLAG ON

ATTR7	EQU	*	
	TM	SAVEFLG7, X' 8Ø'	OID?
	BZ	ATTR8	NO - CHECK IF ANY ATTRIBUTE
	TM	SAVEFLG8, X' 8Ø'	OID?
	BZ	ATTR8	NO - CHECK IF ANY ATTRIBUTE
	TM	PREVATTR, ON	PREVIOUS ATTRIBUTE?
	BZ	NOSEP7	NO - NO SEPARATOR REQUIRED
	MVI	Ø(R2), C', '	SET SEPARATOR VALUE
	LA	R2, 1(, R2)	POINT PAST SEPARATOR
NOSEP7	EQU	*	
	MVC	Ø(3, R2), =C' OID'	SET ATTRIBUTE VALUE
	LA	R2, 3(, R2)	POINT PAST VALUE
	MVI	PREVATTR, ON	SET FLAG ON

ATTR8	EQU	*	
	TM	PREVATTR, ON	ANY ATTRIBUTES?
	BO	PWDEXP	YES - CHECK PWD EXPIRY

```

MVC      Ø(4, R2), =C' NONE'          SET ATTRIBUTE VALUE
*****
PWDEXP   EQU      *
          TM      SAVEFLG7, X' CØ'      PASSWORD REQUIRED?
          BZ      PWDEXPØ              YES - CHECK OUT VALUES
          MVC     OUTREC+EXPOFF(9), =C' PROTECTED' SET A DEFAULT
          TM      SAVEFLG8, X' 8Ø'      OID?
          BO      PWDEXP3              YES - PASSWORD NOT REQUIRED
          B       RVKCHK                CHECK REVOKED STATUS
PWDEXPØ  EQU      *
          CLI     SAVEPWDI , X' FF'     PASSWORD NEVER EXPIRES?
          BE      PWDEXP2              YES - SET NEVER EXPIRES MSG
          CLC     SAVEPWDD(3), =X' ØØØØØF' PASSWORD EXPIRED?
          BE      PWDEXP1              YES - SET PASSWORD EXPIRED MSG
          MVC     PWDINTVL(1), SAVEPWDI SAVE PASSWORD INTERVAL
          CLI     SAVEPWDI , X' ØØ'     ANYTHING IN BASE SEGMENT?
          BE      GBLEXP                NO - USE RACF GLOBAL EXPIRY
          CLC     SAVEPINV(1), SAVEPWDI GLOBAL VALUE LESS?
          BL      GBLEXP                YES - USE GLOBAL EXPIRY
          B       GETDATE              GET THE CURRENT DATE
GBLEXP   EQU      *
          MVC     PWDINTVL(1), SAVEPINV SET INTERVAL TO GLOBAL VALUE
GETDATE  EQU      *
          TIME    DEC                   GET CURRENT TIME AND DAY
          STCM    R1, B' Ø111' , CURRDATE SAVE IT
*****
          LA      R15, YRTBL           GET YEAR TABLE ADDRESS
          LA      R14, YRTBLEND        GET YEAR TABLE ADDRESS END
YRLOOP   EQU      *
          CR      R15, R14             END OF TABLE?
          BNL     PWDEXP4              YES - SOMETHINGS GOOFY
          CLC     Ø(1, R15), CURRDATE  A YEAR MATCH?
          BE      YRMATCH              YES - GO ON
          LA      R15, 3(, R15)        GET ADDR OF NEXT YEAR ENTRY
          B       YRLOOP              TRY AGAIN
YRMATCH  EQU      *
          ST      R15, YRTBLENT        SAVE YEAR TABLE ENTRY ADDRESS
          MVI     DATEWRK1, 2Ø         ASSUME 21ST CENTURY
          MVI     DATEWRK2, 2Ø         ASSUME 21ST CENTURY
          MVC     DATEWRK1+1(1), CURRDATE COPY CURRENT YEAR
          MVC     DATEWRK2+1(1), SAVEPWDD COPY PASSWORD CHANGE YEAR
          CLI     DATEWRK1+1, 7Ø       YEAR GREATER THAN 7Ø?
          BNH     CHKPWDYR            NO - CHECK PASSWORD YEAR
          MVI     DATEWRK1, 19         MOVE BACK TO 2ØTH CENTURY
CHKPWDYR EQU      *
          CLI     DATEWRK2+1, 7Ø       YEAR GREATER THAN 7Ø?
          BNH     YRCOMPR             NO - COMPARE THE YEAR VALUES
          MVI     DATEWRK2, 19         MOVE BACK TO 2ØTH CENTURY
YRCOMPR  EQU      *
          CLC     DATEWRK1(2), DATEWRK2 SAME YEAR?

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	BE	SAMEYEAR	YES - PROCESS SAME YEAR
	CLC	DATEWRK1(2), DATEWRK2	PREVIOUS YEAR?
	BH	PREVYEAR	YES - PWD LAST ALTERED DIF YR
	B	PWDEXP4	WORKING WITH TIME FORWARD DATA
SAMEYEAR	EQU	*	
	MVC	DBL2(3), CURRDATE	COPY CURRENT DATE
	SP	DBL2(3), SAVEPWDD(3)	SUBTRACT PWD CHANGE DATE
	B	CALCEXP	GO CALCULATE EXPIRY DAYS
PREVYEAR	EQU	*	
	L	R15, YRTBLENT	GET YEAR TABLE ENTRY ADDRESS
	S	R15, =F' 3'	BACK UP ONE YEAR
	C	R15, =A(YRTBL)	STILL A VALID TABLE ENTRY?
	BL	PWDEXP4	NO - ISSUE A MESSAGE
	CLC	Ø(1, R15), SAVEPWDD	A YEAR MATCH?
	BNE	PWDEXP1	NO - PASSWORD IS EXPIRED
	MVC	DBL2(3), Ø(R15)	COPY YEAR END DAY
	SP	DBL2(3), SAVEPWDD(3)	SUBTRACT PWD CHANGE DATE
	MVC	DBL1(2), CURRDATE+1	COPY CURRENT YEAR DAY
	AP	DBL2(3), DBL1(2)	ADD TOGETHER
CALCEXP	EQU	*	
	XC	DBL1(8), DBL1	CLEAR A WORK AREA
	MVC	DBL1+5(3), DBL2	# OF DAYS SINCE PWD CHANGE
	CVB	R1, DBL1	CONVERT TO BINARY
	C	R1, =F' 256'	MORE THAN 256? Ø2Ø523
	BNL	PWDEXP1	YES - PWD IS EXPIRED Ø2Ø523
	STCM	R1, B' ØØØ1', PWDDAYS	SAVE PWD CHANGE DAYS
	CLC	PWDDAYS(1), PWDI NTVL	EXPIRED?
	BNL	PWDEXP1	YES - ISSUE A MESSAGE
	XR	R1, R1	CLEAR R1
	XR	R14, R14	CLEAR R14
	IC	R1, PWDI NTVL	GET PWD CHANGE INTERVAL
	IC	R14, PWDDAYS	GET # OF DAYS SINCE PWD CHANGE
	SR	R1, R14	CALCULATE DAYS 'TIL EXPIRY
	CVD	R1, DBL2	CONVERT TO DECIMAL
	UNPK	DBL1(8), DBL2(8)	UNPACK THE VALUE
	OI	DBL1+7, X' FØ'	MAKE IT READABLE
	MVC	OUTREC+EXPOFF(19), =C' EXPIRES IN xxx DAYS'	
	MVC	OUTREC+EXPOFF+11(3), DBL1+5	MOVE IN # OF DAYS
	B	RVKCHK	CHECK REVOKED STATUS

PWDEXP1	EQU	*	
	MVC	OUTREC+EXPOFF(19), =C' CURRENTLY EXPIRED '	
	B	RVKCHK	CHECK REVOKED STATUS
PWDEXP2	EQU	*	
	MVC	OUTREC+EXPOFF(19), =C' NEVER EXPIRES '	
	B	RVKCHK	CHECK REVOKED STATUS
PWDEXP3	EQU	*	
	MVC	OUTREC+EXPOFF(19), =C' NOT REQUIRED '	
	B	RVKCHK	CHECK REVOKED STATUS
PWDEXP4	EQU	*	

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MVC   OUTREC+EXPOFF(19), =C' UNKNOWNN      '
B     RVKCHK                                CHECK REVOKED STATUS
*****
RVKCHK EQU  *
MVC   OUTREC+RVKOFF(11), =C' NOT REVOKED'
TM    SAVEFLG4, X' 80'                      REVOKED?
BNO   NORVK                                NO - DON'T CHANGE MESSAGE
MVC   OUTREC+RVKOFF(11), =C' REVOKED      '
NORVK EQU  *
*****
LA    R5, SEG_TBL                          GET SEGMENT TABLE ADDRESS
LA    R2, OUTREC+SEGOFF                     SET OUTPUT AREA ADDRESS
MVI   PREVATTR, OFF                         SET FLAG OFF
MODESET MODE=SUP, KEY=ZERO
SEGLoop EQU  *
C     R5, =A(SEG_TBL)                       END OF TABLE?
BNL   SEGLooPE                             YES - END OF SEGMENT LOOP
*****
*
*   DETERMINE DEFINED SEGMENTS FOR THIS USERID.
*
*****
XC    RACWORK(256), RACWORK                 CLEAR RACROUTE ...
XC    RACWORK+256(256), RACWORK+256        WORKAREA STORAGE
MVC   ROUTWRK2(ROUTLEN2), RACROUT2        COPY RACROUTE PARM MODEL
L     R7, 0(, R5)                           GET FIELD LIST ADDRESS
LA    R8, 4(, R5)                           GET SEGMENT NAME ADDRESS
RACROUTE REQUEST=EXTRACT,
      TYPE=EXTRACT,
      ENTITY=SAVEUID,
      FIELDS=(R7),
      SEGMENT=(R8),
      RELEASE=1.9.2,
      SUBPOOL=1,
      WORKA=RACWORK,
      MF=(E, ROUTWRK2)
LTR   R15, R15                              EXTRACT OK?
BNZ   SEGNEXT                               NO - CHECK NEXT SEGMENT
LR    R6, R1                                SAVE EXTRACT AREA ADDRESS
LA    R15, OUTREC+131                       SET MAX ADDRESS
CR    R2, R15                              AT THE END?
BH    NOSEG                                YES - DON'T DO ANYTHING
TM    PREVATTR, ON                          PREVIOUS SEGMENT DETECTED?
BNO   NOSEP                                NO - SEPARATOR NOT REQUIRED
MVI   0(R2), C' , '                          SET SEPARATOR
LA    R2, 1(, R2)                            SKIP PAST SEPARATOR
NOSEP EQU  *
OI    PREVATTR, ON                          SET PREVIOUS SEGMENT FLAG ON
CR    R2, R15                              AT THE END?
BH    PLUSSIGN                               YES - INDICATE MORE SEGMENTS

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MVC      Ø(2, R2), 12(R5)          MOVE IN SEGMENT INDICATOR
LA       R2, 2(, R2)              SKIP PAST
B        NOSEG                    KEEP GOING
PLUSSIGN EQU *
MVI      Ø(R2), C' +'
LA       R2, 1(, R2)              SET MORE SEGMENTS INDICATOR
NOSEG    EQU *                    SKIP PAST SEPARATOR
XR       R8, R8                   CLEAR R8
XR       R9, R9                   CLEAR R9
IC       R9, Ø(, R6)              SAVE THE SUBPOOL VALUE
ICM      R8, B' Ø111', 1(R6)      SAVE W/A LENGTH
STORAGE RELEASE, LENGTH=(R8), ADDR=(R6), SP=(R9)
SEGNEXT  EQU *
LA       R5, 16(, R5)             NEXT SEGMENT TABLE ENTRY
B        SEGLOOP                  GO CHECK IT OUT
SEGLOOP  EQU *
MODESET  MODE=PROB, KEY=NZERO
PUT      SYSPRINT, OUTREC         WRITE A RECORD
LM       RØ, R15, SVAREAØ2       LOAD REGISTERS
BR       R14                      RETURN
*****
GRPNMVC  MVC      GRPNAME(*-*), Ø(R9)
*****
SYSPRINT DCB      MACRF=(PM), LRECL=133, DSORG=PS, DDNAME=SYSPRINT
*****
HDR1A    DC       C' Userid      User Name          Attributes      '
HDR1B    DC       C'                PWD Expiry Status  Revoke Status  De'
HDR1C    DC       CL(133-(L' HDR1A+L' HDR1B))' fined Segments '
HDR2A    DC       C' -----
HDR2B    DC       C' -----
HDR2C    DC       CL(133-(L' HDR2A+L' HDR2B))' -----'
UIDOFF   EQU      Ø
UNMOFF   EQU      1Ø
ATTOFF   EQU      32
EXPOFF   EQU      68
RVKOFF   EQU      89
SEGOFF   EQU      1Ø4
GRPMSG   DC       CL133' Group xxxxxxxx not located in security product DB.'
*****
RACROUT1 RACROUTE REQUEST=EXTRACT,                                X
          TYPE=EXTRACTN,                                          X
          CLASS=' USER' ,                                         X
          RELEASE=1. 9. 2,                                         X
          MF=L
ROUTLEN1 EQU      *-RACROUT1
*****
RACROUT2 RACROUTE REQUEST=EXTRACT,                                X
          TYPE=EXTRACT,                                          X
          CLASS=' USER' ,                                         X
          RELEASE=1. 9. 2,                                         X

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MF=L
ROUTLEN2 EQU *-RACROUT2
*****
RACROUT3 RACROUTE REQUEST=EXTRACT, X
          TYPE=EXTRACT, X
          CLASS=' GROUP' , X
          RELEASE=1. 9. 2, X
          MF=L
ROUTLEN3 EQU *-RACROUT3
*****
FLDLIST1 DC F' 12'
          DC C' PGMNAME'
          DC C' FLAG1 ' ADSP
          DC C' FLAG2 ' SPECIAL
          DC C' FLAG3 ' OPERATIONS
          DC C' FLAG4 ' REVOKE
          DC C' FLAG5 ' GRPACC
          DC C' FLAG6 ' AUDITOR
          DC C' FLAG7 ' bit 1 on - PROTECTED
          DC C' FLAG8 ' OID
          DC C' PASSINT ' USERS PASSWORD CHANGE INTERVAL
          DC C' PASSDATE' USERS LAST PASSWORD CHANGE DATE
          DC C' LJDATE ' USERS LAST LOGON DATE Ø=PWDEXP
*****
FLDLIST2 DC F' 1'
          DC C' USERID '
*****
SEGTBL DS ØD
        DC A(FLDLSTØ1), CL8' CI CS' , CL4' CI '
        DC A(FLDLSTØ2), CL8' DCE' , CL4' DC'
        DC A(FLDLSTØ3), CL8' DFP' , CL4' DF'
        DC A(FLDLSTØ5), CL8' LANGUAGE' , CL4' LA'
        DC A(FLDLSTØ7), CL8' NETVIEW' , CL4' NV'
        DC A(FLDLSTØ9), CL8' OMVS' , CL4' OM'
        DC A(FLDLST1Ø), CL8' OPERPARM' , CL4' OP'
        DC A(FLDLST11), CL8' OVM' , CL4' OV'
        DC A(FLDLST12), CL8' TSO' , CL4' TS'
        DC A(FLDLST13), CL8' WORKATTR' , CL4' WA'
SEGTBLE EQU *
*****
FLDLSTØ1 DC F' 5' , CL8' OPI DENT' , CL8' OPCCLASS' , CL8' OPPRTY'
          DC CL8' TIMEOUT' , CL8' XRFSSOFF'
FLDLSTØ2 DC F' 5' , CL8' DCENAME' , CL8' HOMECCELL' , CL8' HOMEUID'
          DC CL8' UID' , CL8' DCEFLAG'
FLDLSTØ3 DC F' 4' , CL8' DATAAPPL' , CL8' DATACLAS' , CL8' MGMTCLAS'
          DC CL8' STORCLAS'
FLDLSTØ4 EQU * RESERVED FOR KERBEROS SEGMENT
FLDLSTØ5 DC F' 2' , CL8' USERNL1' , CL8' USERNL2'
FLDLSTØ6 EQU * RESERVED FOR LOTUS NOTES SEGMENT
FLDLSTØ7 DC F' 8' , CL8' IC' , CL8' CONSNAME' , CL8' CTL' , CL8' MSGRECVR'

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DC      CL8' OPCLASS' , CL8' DOMAINS' , CL8' NGMFADMN' , CL8' NGMFVSPN'
FLDLST08 EQU *
RESERVED FOR NDS SEGMENT
FLDLST09 DC F' 9' , CL8' UID' , CL8' HOME' , CL8' PROGRAM' , CL8' ASSIZE'
DC      CL8' CPUTIME' , CL8' FILEPROC' , CL8' MMAPAREA' , CL8' PROCUSER'
DC      CL8' THREADS'
FLDLST10 DC F' 15' , CL8' OPERALTG' , CL8' OPERAUTH' , CL8' OPERAUTO'
DC      CL8' OPERCMDS' , CL8' OPERDOM' , CL8' OPERKEY' , CL8' OPERLEVL'
DC      CL8' OPERLOGC' , CL8' OPERMFRM' , CL8' OPERMGID' , CL8' OPERMON'
DC      CL8' OPERMSCP' , CL8' OPERROUT' , CL8' OPERSTOR' , CL8' OPERUD'
FLDLST11 DC F' 4' , CL8' UID' , CL8' HOME' , CL8' PROGRAM' , CL8' FSROOT'
FLDLST12 DC F' 14' , CL8' TACCNT' , CL8' TCOMMAND' , CL8' TDEST' , CL8' THCLASS'
DC      CL8' TJCLASS' , CL8' TLPROC' , CL8' TLSIZE' , CL8' TMCLASS'
DC      CL8' TMSIZE' , CL8' TSCLASS' , CL8' TUDATA' , CL8' TUNIT'
DC      CL8' TSOSLABL' , CL8' TRBA'
FLDLST13 DC F' 9' , CL8' WAACCNT' , CL8' WAADDR1' , CL8' WAADDR2' , CL8' WAADDR3'
DC      CL8' WAADDR4' , CL8' WABLDG' , CL8' WADEPT' , CL8' WANAME'
DC      CL8' WAROOM'

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YRTBL   DS      ØD
YR1997  DC      P' 97365'
YR1998  DC      P' 98365'
YR1999  DC      P' 99365'
YR2000  DC      P' 0366'
YR2001  DC      P' 1365'
YR2002  DC      P' 2365'
YR2003  DC      P' 3365'
YR2004  DC      P' 4366'
YR2005  DC      P' 5365'
YR2006  DC      P' 6365'
YR2007  DC      P' 7365'
YR2008  DC      P' 8366'
YR2009  DC      P' 9365'
YR2010  DC      P' 10365'
YR2011  DC      P' 11365'
YR2012  DC      P' 12366'
YR2013  DC      P' 13365'
YR2014  DC      P' 14365'
YR2015  DC      P' 15365'
YR2016  DC      P' 16366'
YR2017  DC      P' 17365'
YR2018  DC      P' 18365'
YR2019  DC      P' 19365'
YR2020  DC      P' 20366'
YR2021  DC      P' 21365'
YR2022  DC      P' 22365'
YR2023  DC      P' 23365'
YR2024  DC      P' 24366'
YRTBLEND DC     3X' FF'

```

LTORG ,

```

*****
WORKAREA DSECT
SAVEAREA DS      18F
SVAREA02 DS      18F
RETCODE  DS      F
RACF_RC  DS      F
RACF_RSN DS      F
EXTSAVE  DS      F
ROUTWRK1 DS      CL(ROUTLEN1)
ROUTWRK2 DS      CL(ROUTLEN2)
ROUTWRK3 DS      CL(ROUTLEN3)
XUI D    DS      ØD
          DS      F
          DS      CL8
*****
RACWORK  DS      ØD
          DS      CL512
DBL1     DS      2D
DBL2     DS      2D
UIDSTART DS      F
UIDEND   DS      F
TEMPENT  DS      CL12
SAVEUID  DS      CL8
SEGDATA  DS      ØD
SAVENAME DS      CL2Ø
SAVEFLG1 DS      XL1
SAVEFLG2 DS      XL1
SAVEFLG3 DS      XL1
SAVEFLG4 DS      XL1
SAVEFLG5 DS      XL1
SAVEFLG6 DS      XL1
SAVEFLG7 DS      XL1
SAVEFLG8 DS      XL1
SAVEPWDI DS      XL1
SAVEPWDD DS      XL3
SAVELJD  DS      XL3
SEGDATA1 EQU    *-SEGDATA
PWDINTSV DS      F
YRTBLENT DS      F
SAVEPINV DS      XL1
PWDINTVL DS      XL1
PWDDAYS  DS      XL1
CURRDATE DS      XL3
DATEWRK1 DS      XL2
DATEWRK2 DS      XL2
PREVATTR DS      XL1
ON        EQU    1
OFF       EQU    Ø
OUTREC   DS      CL133
GRPNAME  DS      CL8

```



```
GRPNMLEN DS H
WALEN EQU *-WORKAREA
R0 EQU 0
R1 EQU 1
R2 EQU 2
R3 EQU 3
R4 EQU 4
R5 EQU 5
R6 EQU 6
R7 EQU 7
R8 EQU 8
R9 EQU 9
R10 EQU 10
R11 EQU 11
R12 EQU 12
R13 EQU 13
R14 EQU 14
R15 EQU 15
IRRPRXTW
ICHPRCVT
CVT DSECT=YES
END
```

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Pentland Utilities review: part 2 – the rest

Part 1 of this article reviewing Nigel Pentland's DOS/Windows-based RACF utilities (*RACF Update* 31, February 2003, pp 14-28) concentrated on the following categories:

- History
- Set-up and use
- General reports
- User ID reports
- Group reports.

In this second, and final, part, we focus on the remaining utilities:

- Dataset reports

- General resource profile reports
- CICS reports.

You can download a copy of these utilities from Nigel's Web site, located at <http://www.nigelpentland.co.uk>. You can also find them on the CBTTAPE and the CBTTAPE CD. There are currently 72 utilities in all (see Appendix A for a full list).

Before we continue the review, I'd again like to take this opportunity to thank Nigel Pentland; first, for developing these utilities and, second, for reviewing the draft of these articles to make sure there weren't any obvious mistakes.

I'd also like to reiterate that this review covers my own experience and opinion of the various utilities; your view of the Pentland Utilities may be quite different from mine, based on your own experience. But if you've never used these utilities, here's a chance to get an idea of what you're missing.

DATASET REPORTS

The 12 Pentland programs that deal with dataset profiles are as follows (note: an asterisk next to the program name means that it generates JCL):

- *RACF07*. List dataset access
- *RACF23**. List/migrate dataset profiles
- *RACF42*. List discrete profiles with ALTER access
- *RACF56**. List all DATASET and JESSPOOL with UACC > NONE
- *RACF58**. List all profiles with NOTIFY set specified ID or ALL
- *RACF59*. List all profiles with non-default audit attributes
- *RACF61**. Grant access to some profiles with prefix for ID and access

- *RACF68*. Process DSMON output to check APF DATASET profiles
- *RACF71*. List dataset access (quick with no names)
- *RACF80**. List discrete dataset profiles and JCL to convert (except DFHSM)
- *RACF89*. Report on profiles with SECURITY in installation data
- *RACF90**. List/re-create all dataset profiles.

RACF 07 is a quite detailed listing of all dataset profiles beginning with a certain prefix. You define that prefix in the command line. So, if you type the following command:

```
RACF07 SYS
```

you'll get a listing of every single dataset profile beginning with SYS. It also gives you the IDs, names, and access levels of each user or group attached to the profile(s).

Note that when using this kind of high-level qualifier, you'll get a very large listing and it will take quite some time to generate. However, this can be very useful, especially for system files or other sensitive programs or data stored on DASD.

RACF 23 is similar, in that you get dataset profiles starting with a prefix. However, this goes further and generates the JCL to recreate each profile, including the PERMIT commands for each user or group at their existing level. The JCL even includes the installation data (nice touch, Nigel). The HTML output isn't quite as readable as RACF07, but its true value is in the JCL generation.

RACF 42 searches out all the DISCRETE profiles with ALTER access. DISCRETE and ALTER are a bad combination, because, if a user has ALTER access, they have full administrative capabilities over the profile. This covers not only dataset profiles but general resource and CICS profiles as well.

RACF 56 lists all dataset and JESSPOOL profiles with a UACC

greater than NONE. It also creates two JCL packets. The first grants access to a user ID, which you specify in the command line, to all of the profiles at their current UACC level. The second alters the UACC of all the profiles to NONE. This can be quite helpful if you're trying to keep your entire facility at a UACC=NONE state, and simplifies the maintenance of the database. However, the [ignore] option that Nigel has included after the user ID doesn't seem to make an operational difference to the utility, so proceed with caution if using that particular statement.

(Comment from Nigel Pentland: "Guess this is a case of the ignore option not being properly explained. The ignore option only affects the raw text output file RACF56 [no suffix], which is a list of the dataset profiles. This list can then be used as input for RACFJCL or similar for further processing." Thanks for the clarification, Nigel.)

RACF 58 lists all of the profiles (dataset and general resource) with NOTIFY set, or those with a specific user ID set to notify. This is quite nice for determining who is being informed of actions against datasets, transactions, etc. It also generates JCL to remove all of the NOTIFY flags. This is a good thing to check on every once in a while, to determine whether your system is trying to notify a non-existent user ID.

RACF 59 shows all the dataset profiles with non-default audit attributes. I rather like this one because it lets me know what sensitive dataset profiles are being audited, and whether they're being audited effectively. It also has the added bonus of showing any user IDs with the UAUDIT function switched on. This lets you know who you should be keeping an eye on, and clues you in on whether you should expand that list (Note: expand that list with caution. The more UAUDITs you use, the more system resources you're consuming. Don't go wild and UAUDIT everyone.)

RACF 61 creates JCL to grant access to some profiles with a given prefix for a specified ID (user or group). It excludes from the list and the JCL any profiles where the ID already has the authority level requested. The syntax for the command is

```
RACF61 PREFIX ID ACCESS
```

and it runs quite quickly, even if you're using an HLQ such as SYS. It's very simple, but quite effective if you need to give a user or group a certain level of authority over a large number of files with the same HLQ.

RACF 68 uses two input files – the IRRDBU00 flatfile and the DSMON output file – and generates a listing of all the fully-qualified APF-authorized libraries. It then identifies all of the fully-qualified dataset profiles which match the APF list, and flags any dataset profiles that are not (yet) fully qualified. Since APF-authorized libraries need added protection, it's better to not use asterisked profiles. (You'll note that I don't say generic – it's my opinion that all profiles should be generic, even the fully-qualified ones; no profiles should be discrete.) When you review the list, you can then create fully-qualified dataset profiles for those libraries that currently lack them. Very slick.

RACF 71 is pretty much the same as RACF07, except that it lacks the user names. It's designed to run faster than RACF07, and that's just what it does. Personally, I don't mind the extra processing time if it makes a more comprehensive and understandable report, but that's just me.

RACF 80 is a personal favourite in the dataset utility realm. It seeks out all DISCRETE dataset profiles, and creates the JCL to convert them to generic. Since I don't like to see discrete profiles (see above), this is a great tool. I find that the report is especially helpful, since my first instinct is to review it for anyone with ALTER access. The JCL that's generated simply deletes the profile and recreates it as a generic, with all of the access authorities still intact. I can't begin to tell you the number of problems this little gem has averted in my operation.

RACF 89 was a utility I requested from Nigel some years back (yes, folks, he does take requests – when he's got the time and when he thinks there will be widespread appeal). It seeks out any profiles (dataset, GenRes, CICS, everything except user IDs) with the word SECURITY somewhere in the installation data, to help keep track of those profiles identified with the Security department. The only drawback to this one is that you have to

include that keyword into the profile's Installation Data (which I hope you're doing out there). Nigel, here's a thought: perhaps you could modify this utility to allow the user to specify the keyword for the search. That way, if some company used terms like 'confidential', 'secret', 'restricted', etc, they could tailor it for their own uses.

RACF 90 is a system recovery dream. It generates JCL to re-create each and every dataset profile you've got. That can be a real lifesaver, especially if you have a large system or lots of profiles. On one LPAR I worked on, that JCL ran over 64,000 lines. Do you even want to think about trying to recreate that by hand? Yikes! There's one drawback to the utility, however: it appears to truncate the installation data. However, this is a minor issue if you're trying to recreate thousands of profiles.

GENERAL RESOURCE PROFILE REPORTS

There are 20 Pentland programs that deal with general resource profiles (which can include CICS, but are more generic):

- *RACF12*. List general resource access
- *RACF19*. List general resource class pair
- *RACF20**. List/migrate (add) prefixed profile pairs
- *RACF25**. List/migrate (delete) prefixed profile pairs
- *RACF28*. List general resource class pair (initial letter)
- *RACF30*. List STARTED profiles
- *RACF32*. List all profiles with WARNING set
- *RACF48**. List/migrate (add) non-prefixed to prefixed profile pairs
- *RACF49**. List/migrate (delete) non-prefixed profile pairs
- *RACF51*. List prefixed profile pairs (friendly format)
- *RACF58**. List all profiles with NOTIFY set specified ID or ALL

- *RACF59*. List all profiles with non-default audit attributes
- *RACF62**. Grant access to some profiles with prefix for ID and access
- *RACF64**. List/migrate (add) non-prefixed to non-prefixed profile pairs
- *RACF65*. List general resource class
- *RACF67**. Set/clear NOTIFY on prefixed general resource class pair
- *RACF72*. Summary breakdown of general resource profiles
- *RACF85**. List/migrate (add) both prefixed and non-prefixed profile pairs
- *RACF89*. Report on profiles with SECURITY in installation data
- *RACF91**. List general resource class pair with JCL to re-create profile.

RACF 12 generates a list of all general resource profiles with a certain prefix. For example, if you wanted to list all the MQ queue profiles for development systems, and all of them were prefixed with 'D', you would enter the command

```
RACF12 MQQUEUE D
```

to get the listing. It does have one slightly weird quality, however, in that the HTML output seems to indent itself bit by bit from the left as you go down the report. I have no idea why. (*Comment from Nigel Pentland: "Without the strange looking indents it becomes a lot less readable, honest!"*) It's still quite readable though, and gives you a list of the user IDs and names. This is similar to the RACF07 report for dataset profiles, and is quite useful.

RACF 19 lists general resource profiles for a member-class and group-class that you specify. If you were listing all CICS profiles, that would be TCICSTRN and GCICSTRN respectively. The

listing is quite detailed, and can be quite large (depending on how many profiles and transactions you have, of course), but is very readable and easy to decipher.

RACF 20 allows you to recreate profiles for a member-class, group-class, and prefix. The JCL is quite detailed (full installation data again – hooray!) and the report identifies all the user IDs and groups. It would be a bit nicer if it could include the name as well as the ID, but that's just my personal viewpoint.

RACF 25 is similar to RACF20, except that the JCL is for deleting access to the general resource profiles. This is helpful if you're cleaning up old profiles that are no longer in use. Actually, you can use RACF20 and RACF25 together. Rename the profiles in the RACF20 JCL to the new name, and then run RACF25 to remove conflicts between old and new.

RACF 28 lists general resource class-pairs and the initial letters of the member class. I like using this for CICS profiles where the transaction starts with a specific letter such as C (generally used for IBM-supplied transactions). You can extend the search parameters so that you can find profiles and access lists for specific transactions, like the ever-popular CEMT (a risky transaction to throw around).

RACF 30 shows all STARTED class profiles that contain any STDATA details. It's similar to what you get in the DSMON 'RACF Started Procedures Table Report', but is more readable and more convenient.

RACF 32 shows all general resource profiles with the WARNING attribute set. This makes finding those (hopefully) few profiles much easier.

RACF 48 works a lot like RACF20, but for non-prefixed general resource profile pairs. The syntax for this is

```
RACF48 MEMBER-CLASS GROUP-CLASS MEMBER-PREFIX GROUP-PREFIX
```

I've not worked with this one as much as others, but it does enable you to create a new member and group prefix from an existing set of profiles.

RACF 49 is similar to RACF25, but again for non-prefixed general resource profile pairs. It generates the JCL to delete all of the profiles. However, if you're using this for CICS, it removes the profiles but not the specific CICS transactions.

RACF 51 is a kind of super-duper version of RACF20, RACF25, RACF48, and RACF49. It lists prefixed profile pairs in a much more readable format (although it doesn't generate any JCL).

RACF 58 and **RACF 59** were mentioned up in the dataset section, so we won't go over them again here.

RACF 62 grants access to some general resource profiles with a prefix for the ID and the level of access. You can do a cheat on this one and generate the report and JCL for all the profiles, as long as you put a fictitious group name here. This is similar to the former RACF26 report, which was, sadly, discontinued when Nigel upgraded the package (see my description in the 'Commentary' section below). It's a limited function utility (for special needs and situations), but it's efficient and works pretty well.

RACF 64 is similar to RACF48 and RACF51 in structure. It's generally a likeable bit of code, and its only real drawback is that it doesn't include specific transactions if you're trying to recreate CICS profiles. Ah, well, there are other utilities that do that. Also, the report is a bit sparse.

RACF 65 is a real kicker. It lists a general resource class in excellent detail. It doesn't produce any JCL, but is a great report. My only gripe (and it's a very minor one) is that it would be better if the order were reversed, so that the user/group list was at the top of the section with the member list immediately below it. Like I said, a very minor complaint. Other than that, it's a great report.

RACF 67 will either set or clear the NOTIFY flag on a series of prefixed general resource class pairs. If you include a user ID as the last parameter, the JCL will be created to set all the profiles to notify that ID. If you omit the ID, the JCL created sets NONOTIFY to all the profiles. The report isn't all that detailed, though. It just lists the profiles – nothing else.

RACF 72 is a summary report that gives you a breakdown of all the general resource profiles in your flatfile. It's a bit of an extension of RACF01, which summarizes all the records. It's a nifty bit of code to help you identify all the different classes you have within the GenRes environment.

RACF 85 is really another RACF64, but it allows you to generate the list and JCL without the need for a prefix.

RACF 89 was mentioned back in the dataset section, so we won't bother with it again here.

RACF 91 is the Rolls-Royce of general resource profile JCL generators. It gives you all the profiles, transactions, authorities, etc. The report is also very readable. It's a very good way to have a JCL back-up of your general resource profiles (and is similar in concept to what RACF90 does for dataset profiles).

You may have noticed that some of the items above seem to be repeats, or have only vague differences between them. I believe that this was intentional on Nigel's part. He apparently developed these different reports for different specific needs or requests, hence the similarities. And I must say that it's nice to have a choice of format – much better than being stuck with only one option.

CICS REPORTS

There are six Pentland programs that deal specifically with CICS resource profiles:

- *RACF16*. List CICSTRN profiles
- *RACF22*. List of TCICSTRN transactions with descriptions
- *RACF33*. List CICSTRN profiles sorted by TRANCODE
- *RACF34*. List of duplicate CICSTRN profiles
- *RACF35*. Compare prefixed CICSTRN profiles
- *RACF37*. List CICSTRN profiles and members for a group or user.

RACF 16 is a fast little CICS report generator, but it pumps out some large data. It includes all the transactions, users, groups, and even the installation data. The only problem it raises is the size of the report. Don't get me wrong, though, that's not the utility's fault. You see, I work in an organization that operates like this: "Welcome to XYZ Corp. Here's your ID badge, here's your desk, here's your terminal, and here's your own personalized CICS region". When you have more than 30 CICS regions in a single LPAR, and are covering well over 25,000 transaction profiles, the report is bound to get a little crowded! But, to Nigel's credit, the report actually makes some sense out of a really messed up CICS structure.

RACF 22 can give you a list of all the CICS profiles with installation data. Not bad as it stands, but a couple of things could be improved. First, it all comes out lower case (I've no idea why). Second, and this is a complaint I've made before, I think it would be more helpful if the output were in Courier font, and the data was parsed to look like the output on a terminal. Just my opinion, folks.

RACF 33 is one of my two favourite utilities (RACF 34 is the other one). It creates a report sorted by CICS transaction, so you can see where all of your CEMTs and CEDAs and all your other transactions are located (as well as in which CICS regions). The report includes the installation data (nice touch!). It's extremely helpful to your RACF admin staff when they're trying to look up a transaction to see in which regions it resides. Besides, this way they don't constantly have to type the command `RLIST TCICSTRN regionname.transactionID RESG` in TSO to search for the location of a specific transaction.

RACF 34 goes one better. It finds duplicate entries of the same transaction in the same CICS region. This is really important to know so that you don't end up with access authority conflicts on a transaction.

A word of warning about RACF33 and RACF34. They're great utilities, but they take a very long time to run. Of course, I'm

running Windows on a Celeron 300 MHz processor (does anybody out there remember when 300 MHz was considered fast?) so it takes quite a while just to start NotePad.exe. Generally, if you're going to run these jobs, do them overnight. Start them up before you leave the office, shut down every other program and/or utility, kill the screen saver, turn off the screen, and pray that they're finished by the time you return the following morning. Better yet, start them up at the beginning of your weekend. This isn't a complaint, by the way. The complexity of the reports and the sorting and recursive nature of the processing mean that they're bound to take a long time. And the results are worth the wait.

Oh, and one other thing. If your shop's like mine, and your number of CICS regions feels like infinity minus 2, expect the RACF33 report to be BIG. On one of my LPARs, the report runs about 7 megabytes. Compare that with the size of the flatfile that spawned it, which is 18 megabytes. Ouch!

RACF 35 is used to compare member/group profiles from two different systems. This is quite helpful if you want to compare prefixed profiles between development and test, or test and production. It doesn't generate any JCL, but it does give you a good idea of where the differences are between systems.

RACF 37 is our final contestant. It's a cross-reference report, similar to RACF11 for user IDs and groups, and far better than IRRUT100. It shows all of the transaction profiles (and transactions) available to a specific user ID, and at what level of access. The JCL generated is just a series of PERMIT commands for that user ID to the various profiles. This is a nice addition, especially if you want to clone that access for another ID or group.

Once again, let me remind you that you can use many of the general resource utilities in the section above to handle CICS reporting and JCL generation. These last six utilities were built specifically for CICS, however, and aren't meant to handle non-CICS profiles.

COMMENTARY

In the first article, I mentioned that Nigel jettisoned 24 of the old utilities when he upgraded his code from DOS 16-bit to Windows 32-bit. Some were repetitive, some were too situation-specific, and some just didn't work all that well. Some, however, were ones that I rather liked (and luckily, I kept a back-up copy of them – sneaky, aren't I?). I'd like to share my thoughts on them with you, in the hope that Nigel will resurrect them in a future release.

RACF17 was virtually the same as RACF16, except that it handled CCICSCMD and VCICSCMD profiles instead of TCICSTRN and GCICSTRN. Yes, I know I could run RACF16 with the different parameters, but hey, I'm lazy. I don't want to have to go and rename the files. A separate report would be rather nice to have.

RACF26 was a little gem that granted access to all profiles in a class/group-class pair. This was a really nice thing to run from time to time, just to make sure you had the JCL available to fix a major screw-up. The support staff got too much access in the short term, no doubt, but when they're in headless chicken mode, you don't want to argue.

RACF27 was the way to reverse RACF26. Remember, once the panic subsides, your support staff have to return to real life, as does your system.

RACF29 would remove redundant access authorities to dataset and general resource profiles. In other words, if the UACC was READ, it would remove any profiles that also had READ. Nigel said in his description of the utility at the time that it never managed to develop into what he intended. Well, maybe not, Nigel, but it did have the advantage of actually working.

RACF39 and **RACF40** were similar in function to RACF33 and RACF34, except once again they were for the CCICSCMD/VCICSCMD class pair instead of TCICSTRN/GCICSTRN. Same reason here for renewal as for RACF17 – I'm lazy.

RACF54 and **RACF55** would generate a combined list of user

IDs and names from two flatfiles, and then annotate them. I liked being able to show management a list of all the users at one time. If you do ever revive this one, Nigel, perhaps you can format it so that it lists a separate column for each LPAR's ID, to show where people are on LPAR-1 or LPAR-2 or both.

CONCLUSION

In general, most people look at free utilities with a jaded eye. It's the 'you get what you pay for' attitude, I suppose. And granted, these aren't the fancy, on-line, real-time, processing reports that you get with RACF add-on reporting packages. But then again, they're not meant to be. For something that's free, these utilities offer a whole lot of value. Value in saved time, saved effort, and discovery of security problems or conflicts you may not have even thought of before.

Nigel, you could probably have sold this collection of utilities and made a bit of cash. Instead, you made them freely available to the worlds of security and audit. So from all of us who use and value this collection of programming gems, a big THANK YOU!

Doc Farmer
Manager and Senior IS Security Analyst
(Middle East)

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Appendix A: Summary of all Pentland Utilities

U=User ID, G=Group, D=Dataset, R=General Resource, C=CICS, X=General Function

Utility	U	G	D	R	C	X	Key	Key words
RACF00						–		Pre-processor
RACF01	–	–	–	–	–	–		Summary
RACF02	–						JCL	Non-existent user IDs
RACF03		–						Group tree
RACF04		–					JCL	All groups

Utility	U	G	D	R	C	X	Key	Key words
RACF05	_						JCL	Expired user IDs
RACF06		_					JCL	List group
RACF07			_					Dataset (mask)
RACF08	_						TEXT	User ID(s) (not-HTML)
RACF09	_						JCL	User IDs (mask)
RACF10								Discontinued
RACF11	_	_					JCL	XREF (JCL to grant)
RACF12				_				General resources (mask)
RACF13								Discontinued
RACF14								Discontinued
RACF15								Discontinued
RACF16					_			List member/group class
RACF17								Discontinued
RACF18	_						TEXT	All user IDs (not-HTML)
RACF19				_				General resource
RACF20				_			JCL	General resource – re-create – prefixed
RACF21	_	_					JCL	XREF (JCL to remove)
RACF22					_			Member class installation data
RACF23			_				JCL	Dataset – re-create – prefixed
RACF24	_						JCL	Revoked user IDs
RACF25				_			JCL	General resource – delete – prefixed
RACF26								Discontinued
RACF27								Discontinued
RACF28				_				General resource (prefix.mask)
RACF29								Discontinued
RACF30				_				STARTED
RACF31								Discontinued
RACF32				_				WARNING
RACF33					_			Sorted member/group class pair
RACF34					_			Duplicate member/group class pair
RACF35					_			Compare member/group class pair
RACF36	_	_					JCL	Compare group
RACF37				_			JCL	XREF – member/group class pair
RACF38	_							Audit report

Utility	U	G	D	R	C	X	Key	Key words
RACF39								<i>Discontinued</i>
RACF40								<i>Discontinued</i>
RACF41								<i>Discontinued</i>
RACF42			–					<i>discrete ALTER</i>
RACF43								<i>Discontinued</i>
RACF44								<i>Discontinued</i>
RACF45								<i>Discontinued</i>
RACF46	–						JCL	<i>Delete user IDs</i>
RACF47		–					JCL	<i>Change group</i>
RACF48				–			JCL	<i>General resource – re-create – non-prefixed</i>
RACF49				–				<i>General resource – delete – non-prefixed</i>
RACF50	–							<i>Connected groups</i>
RACF51				–				<i>General resource friendly format</i>
RACF52	–	–						<i>OwnerID</i>
RACF53		–						<i>List group</i>
RACF54								<i>Discontinued</i>
RACF55								<i>Discontinued</i>
RACF56			–				JCL	<i>UACC</i>
RACF57								<i>Discontinued</i>
RACF58			–	–			JCL	<i>Notify</i>
RACF59			–	–				<i>Audit attributes</i>
RACF60								<i>Discontinued</i>
RACF61			–				JCL	<i>Dataset – grant access – prefixed</i>
RACF62				–			JCL	<i>General resource – grant access – prefixed</i>
RACF63								<i>Discontinued</i>
RACF64				–			JCL	<i>General resource – re-create – non-prefixed</i>
RACF65				–				<i>General resource</i>
RACF66	–							<i>Listuser</i>
RACF67				–			JCL	<i>Notify</i>
RACF68			–					<i>APF</i>
RACF69	–	–					JCL	<i>Revoked connections</i>
RACF70		–						<i>Count connections</i>

Utility	U	G	D	R	C	X	Key	Key words
RACF71			–					<i>Dataset (mask)</i>
RACF72				–				<i>Summary (general resources)</i>
RACF73	–							<i>Connected groups</i>
RACF74								<i>Discontinued</i>
RACF75	–						TEXT	<i>List group (non-HTML)</i>
RACF76	–						JCL	<i>List group</i>
RACF77	–						JCL	<i>Connections</i>
RACF78								<i>Discontinued</i>
RACF79	–						JCL	<i>User IDs</i>
RACF80			–				JCL	<i>Discrete dataset</i>
RACF81								<i>Discontinued</i>
RACF82	–							<i>Annotate</i>
RACF83								<i>Discontinued</i>
RACF84	–							<i>User IDs</i>
RACF85				–			JCL	<i>General resource</i>
RACF86	–						JCL	<i>LIMBO</i>
RACF87		–						<i>GID</i>
RACF88	–							<i>UID</i>
RACF89			–	–				<i>SECURITY</i>
RACF90			–				JCL	<i>Dataset</i>
RACF91				–			JCL	<i>General resource – re-create</i>
RACF92	–						JCL	<i>User IDs (detailed)</i>
RACFAWK	–	–	–	–	–	–	–	<i>Ad-hoc (non-HTML)</i>
RACFDIAG							–	<i>Database diagnostic</i>
RACFJCL	–	–	–	–	–	–	JCL	<i>JCL generator (similar to CLIST)</i>

RACF news

EKC has announced its new EKC Personal Access List (E-PAL), offering fast assignment of dataset or resource access without impacting current user access, security implementation, or established security policy.

E-PAL is designed to control additional access for special projects, or temporary access for consultants, without any modifications to IBM RACF profiles. All access granted under E-PAL may be broader, or more restrictive, than what is otherwise permitted. SMF records are produced, and a program to report successful access, as well as access denied, is provided.

URL: <http://www.ekcinc.com/SalesPDF/epalprodannouncement.pdf>

* * *

BMC Software has upgraded its signature access control and provisioning solution, CONTROL-SA, adding:

- More deployment and workflow options
- Extended enterprise offerings
- A virtual directory with LDAP interface.

It has also announced that its management GUI will soon be viewable as either an MMC-based console or via a Web browser.

URL: http://www.bmc.com/news_events/

* * *

CA has announced that eTrust Web Access control is now available on mainframe Linux, enabling organizations deploying Linux and open source technology to take advantage of Linux platforms for critical enterprise applications.

URL: <http://www3.ca.com/press/PressRelease.asp?CID=38915>

* * *

Consul and Janus Risk Management have announced a partnership that leverages Consul's security audit and management software with Janus' enterprise security methodologies to offer corporations a comprehensive security event management solution.

URL: <http://www.consul.com/index.php3?cid=563>

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xephon