



IBM Systems Group

RACF Update

Kentucky-Ohio-Indiana RACF Users Group
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Agenda

z/OS® V1R9 RACF Update

- Password Phrase enhancement
- Kerberos AES support
- Java® RACF User and Group administration interface
- Writable SAF Keyring support
- PKI Updates

z/OS Release 10

- Custom fields
- Password phrase exploitation
- More granularity in allowing password reset
- Enhanced RACF Health Checks

RACF for z/VM®

Setting the Stage

z/OS V1R8 RACF

- **RACF Support for DB2® Version 9**
 - ▶ Roles, trusted context, enhancements to RACROUTE REQUEST=FASTAUTH
- **IRRUT200 and IRRUT400 Enhancements**
 - ▶ PARM=ACTIVATE, checking for active data sets
- **Enhancements to the RACF Health Checks**
 - ▶ New checks (class active, IBMUSER revoked, added PARMLIB, link list, and general resources to RACF_SENSITIVE_RESOURCES check)
- **Virtual Key Rings**
 - ▶ Eliminates the need to have every certificate authority certificate in every user's key ring

Setting the Stage...

z/OS V1R8 RACF...

- **Group Change Logging**

- ▶ Extends RACF's change logging (to LDAP) from just changes to user profile information to group and group connection information

- **Password Phrases**

- ▶ Allow the use of 14-100 character password phrases

- **Remote Authorization and Audit Services (EIM)**

- ▶ Two new services which allow a remote application to use IBM Tivoli Directory Server (the new z/OS LDAP) to check a users authorization and to remotely create audit records to SMF

- **PKI Services Enhancements**

- ▶ Multiple PKI services daemons
- ▶ Support for the simple certificate enrolment protocol (SCEP)

z/OS V1R9 RACF Update

Password Phrase Enhancement

Password Phrase Support Enhancements

- **With z/OS V1R8, password phrases could be from 14-100 characters in length. There was no support for a password or password phrase from 9 to 13 characters in length**
 - ▶ This presents an interoperability issue with some other platforms
- **With z/OS V1R9, password phrases from 9 to 13 characters are allowed only if an ICHPWX11 password phrase exit is coded which accepts the shorter phrase.**
 - ▶ If ICHPWX11 is not present at all, the minimum acceptable password phrase length remains 14.
- **A sample ICHPWX11 exit is provided which is coded to utilize the System REXX facility.**

Kerberos AES support

Kerberos AES support

- **z/OS's Kerberos has been extended to support the AES encryption algorithm.**
 - ▶ This increases compatibility between z/OS Kerberos and implementations of Kerberos on other systems for improved interoperability.

- **These functions are designed to support RFCs:**
 - ▶ RFC3962 — Advanced Encryption Standard (AES) Encryption for Kerberos 5
 - ▶ RFC2025 — The Simple Public-Key GSS-API Mechanism (SPKM)
 - ▶ RFC2253 — UTF-8 String Representation of Distinguished Names
 - ▶ RFC2459 — X.509 Public Key Infrastructure
 - ▶ RFC2847 — LIPKEY — A Low Infrastructure Public Key Mechanism Using SPKM

Java RACF user and group administration interface

Java RACF User and Group administration interface

■ **New Java interfaces**

- ▶ Allow administration and querying of users, groups and user-group connection information via JAVA API calls.
- ▶ These APIs internally call the z/OS LDAP (ISS or ITDS) server to perform the functions.
- ▶ This makes these APIs callable from applications running on or off the z/OS platform.

Writeable SAF keyring and certificate support

Writeable SAF Keyring and Certificate support

- **R_datalib SAF callable services updated to allow programs to perform additional certificate functions.**
 - ▶ Keyrings may now be created and deleted
 - ▶ Certificates can be added and deleted to RACF
 - ▶ Certificates can be added and deleted from keyrings

- **Prior to this support, the only way to perform these functions was via the RACF RACDCERT TSO command.**

PKI updates

PKI updates

- ▶ Certificates containing 2-byte UTF-8 characters which can be mapped to code page 1047 characters are supported.
- ▶ The use of SDBM credential for the LDAP administrator in PKI Services is allowed.
- ▶ The maximum limit of the certificate validity period will be changed from 3650 days (10 years) to 9999 days (approx. 27 years).
- ▶ Automated certificate renewal can send renewal certificates via e-mail when the expiration dates for older certificates are approaching.
- ▶ New e-mail notification for the PKI administrator is provided for pending certificate requests.

RACF for z/VM Update

What's in a Name?

- **RACF Security Server feature Function Level 530 (FL530) for z/VM V5.3**

- **Mixed case passwords**
 - ▶ SETROPTS command used to enable mixed case, and to define expanded password quality rules

- **Password phrase support**
 - ▶ 9-100 character authenticator with few character restrictions
 - ▶ Immediate support for LOGON, FTP, TELNET
 - ▶ Sample exit uses REXX for quality rules
 - ▶ Can force use of password phrases by deleting passwords
 - ▶ Existing SETROPTS PASSWORD options apply to phrases
 - HISTORY, REVOKE, INTERVAL, WARNING

RACF for z/VM 5.3 ...

■ **Support for (new) z/VM LDAP server**

- ▶ Query, update RACF user and group profiles via SDBM backend
- ▶ Clients (e.g.Linux) can authenticate to LDAP using RACF password
- ▶ Remote authorization and auditing services
- ▶ Logging of LDAP server events in SMF DATA file

■ **SMF Unload utility (RACFADU) updated**

- ▶ Support for LDAP server and client auditing
- ▶ Output available in XML format

RACF for z/VM 5.3 ...

- **Support for (new) CP FOR command**
 - ▶ Allows user to run a command under another user's authority
 - ▶ Requires LOGON BY (SURROGAT class) authority

- **Support for new subcodes of DIAGNOSE X'88'**
 - ▶ Allows a server to validate a client's password or phrase
 - Server must have VMCMD class authority
 - ▶ Can check for client LOGON BY authority to a target

- **Various user-related improvements**
 - ▶ NOPASSWORD users, NOEXPIRED keyword, improved audit of password changes, ALTUSER adds current password to history

z/OS Release 10 RACF

z/OS V1R10: Password Phrase Exploitation

■ Password Phrase exploitation

- ▶ TSO/E
- ▶ z/OS UNIX® rlogin, BPX1PWD, BPX1SEC, BPX1TLS
- ▶ z/OS UNIX su and passwd commands
- ▶ z/OS Kerberos
- ▶ z/OS LDAP for z/OS SDBM backend
- ▶ OpenSSH (IBM Ported Tools for z/OS)

z/OS V1R10: Password Reset Granularity

- **More granularity for Password Reset and LISTUSER**
 - ▶ Before V1R10: The FACILITY resource IRR.PASSWORD.RESET allowed password resets for users without the SPECIAL, OPERATIONS, AUDITOR, or PROTECTED attribute. Access to the IRR.LISTUSER resource allowed the listing of a USER profile base segment.

- **With V1R10, the authority to reset a password can be granted based on profile ownership or group-tree ownership using FACILITY class profiles:**
 - ▶ IRR.PWRESET.OWNER.owner-of-user
 - Grants authority based on the user or group that owns the user
 - ▶ IRR.PWRESET.TREE.owner-of-group-tree
 - Grants authority based on group tree scope
 - That is, if “owner of group tree” owns the user being reset, or owns a group that owns the user, or owns a group that owns a group that ...

z/OS V1R10: Password Reset Granularity...

- **With V1R10, the authority to issue the LISTUSER command can be granted based on profile ownership or group-tree ownership using FACILITY class profiles:**
 - ▶ IRR.LU.OWNER.owner-of-user
 - Grants authority based on the user or group that owns the user
 - ▶ IRR.LU.TREE.owner-of-group-tree
 - Grants authority based on group tree scope

- **Users can be excluded password reset or LISTUSER with “exclusion” profiles:**
 - ▶ IRR.PWRESET.EXCLUDE.*excluded-user*
 - ▶ IRR.LU.EXCLUDE.*excluded-user*

z/OS V1R10: Custom Fields

- **With Custom Fields you can create your own fields in the RACF database by defining profiles!**
 - ▶ No assembler programming required
 - ▶ No ICHEINTY, RACROUTE experience required!

- **You define the contents of the fields**
 - ▶ Field name (1-8 characters)
 - ▶ Field Type: Character, Numeric, Hexadecimal, Flag (Yes/No)
 - ▶ Heading for LISTUSER or LISTGRP command
 - ▶ Help text
 - ▶ Maximum field length
 - ▶ For character fields: Character restrictions for first and remaining characters, Mixed case or uppercase
 - ▶ For numeric fields: Minimum value, Maximum value

- Other field customization can be performed in a field validation exit (IRRVAF01) which is under the control of the MVS dynamic exit facility

z/OS V1R10: Custom Fields...

- **Custom fields for USER and GROUP profiles**
 - ▶ Field semantics (names and data formats) defined as profiles in the new CFIELD general resource class
 - ▶ New CSDATA segments in USER and GROUP profiles hold the data
 - ▶ FIELD class (“field level access”) can be used to control access
 - ▶ Can be processed from
 - RACF commands
 - RACF ISPF panels
 - LDAP SDBM
 - R_admin
 - RACROUTE REQUEST=EXTRACT
 - ICHEINTY

z/OS V1R10: Custom Fields...

- **The profile name in CFIELD class defines the field name**
 - ▶ `USER.CSDATA.<field_name>`
 - ▶ `GROUP.CSDATA.<field_name>`

- **CFDEF (Custom Field DEFinition) segment for CFIELD class profiles defines the characteristics of the field**
 - ▶ Keyword is on RDEFINE, RALTER, RLIST commands
 - ▶ Sub-operands define the custom field attributes

```

RDEFINE CFIELD USER.CSDATA.HOMEADDR CFDEF (TYPE (CHAR) MAXLEN (200)      +
      FIRST (ANY) OTHER (ANY)      MIXED (YES)                          +
      LISTHEAD ('HOME ADDRESS = `')                                     +
      HELP ('EMPLOYEE HOME ADDRESS, UP TO 200 CHARACTERS. INCLUDE STREET +
      ADDRESS, CITY, STATE, ZIP CODE, COUNTRY.')
```

z/OS V1R10: Custom Fields...

- **CSDATA (CuStom DATA) segment for USER and GROUP profiles**
 - ▶ Keyword is on ADDUSER, ALTUSER, LISTUSER, ADDGROUP, ALTGROUP, LISTGRP commands
 - ▶ Sub-operands are YOUR custom fields!
 - `ALTUSER SHANNON CSDATA(HOMEADDR('14 Main Street, Anywhere, NY 12345, USA'))`

- **The LISTUSER command shows**

```
LU SHANNON NORACF CSDATA
```

```
USER=SHANNON
```

```
CSDATA INFORMATION
```

```
-----
```

```
HOME ADDRESS = 14 Main Street, Anywhere, NY 12345, USA
```

```
READY
```

- **RACF panels can be used with Custom Fields**

z/OS V1R10: Custom Fields...

.....
 RACF - USER PROFILE SERVICES ENTER REQUIRED FIELD

SELECT ONE OF THE FOLLOWING:

- 1 ADD Add a user profile
- 2 CHANGE Change a user profile
- 3 DELETE Delete a user profile
- 4 PASSWORD Change your own password and related information
- 5 AUDIT Monitor user activity (Auditors only)

D or 8 DISPLAY Display profile contents
 S or 9 SEARCH Search the RACF data base for profiles

ENTER THE FOLLOWING INFORMATION:

USER ==>> SHANNON Userid

OPTION ==>> 2

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

z/OS V1R10: Custom Fields...

.....

RACF - CHANGE USER SHANNON

OWNER _____ Userid or group name

USER NAME _____

DEFAULT GROUP _____ Group name

_ Change PASSWORD related information

s Add or Change OPTIONAL information

TO ASSIGN A USER ATTRIBUTE, ENTER YES, TO CANCEL, ENTER NO

___ GROUP ACCESS

___ ADSP

___ OIDCARD

___ NO-PASSWORD

___ SPECIAL

___ OPERATIONS

___ AUDITOR

___ RESTRICTED

CHANGE OR DELETE THE MODEL PROFILE USED FOR USER DATA SETS (OPTIONAL):

NEW MODEL _____

DELETE ___ YES if no model is to be used

COMMAND ==>

F1=HELP

F2=SPLIT

F3=END

F4=RETURN

F5=RFIND

F6=RCHANGE

F7=UP

F8=DOWN

F9=SWAP

F10=LEFT

F11=RIGHT

F12=RETRIEVE

z/OS V1R10: Custom Fields...

.....
 RACF - CHANGE USER SHANNON

COMMAND ===>

To add or change the following information, enter any character.

_ CLASS AUTHORITY	_ KERB PARAMETERS
_ INSTALLATION DATA	_ LDAP PROXY PARAMETERS
_ SECURITY LEVEL or CATEGORIES	_ ENTERPRISE IDENTITY MAPPING
_ SECURITY LABEL	s CSDATA PARAMETERS
_ LOGON RESTRICTIONS	
_ NATIONAL LANGUAGES	
_ DFP PARAMETERS	
_ TSO PARAMETERS	
_ OPERPARM PARAMETERS	
_ CICS PARAMETERS	
_ WORK ATTRIBUTES	
_ OMVS PARAMETERS	
_ NETVIEW PARAMETERS	
_ DCE PARAMETERS	
_ OVM PARAMETERS	
_ LNOTES PARAMETERS	

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

z/OS V1R10: Custom Fields...

```

. . . . .
      Set Custom Fields for  USER  SHANNON                ROW 1 TO 1 OF 1
COMMAND INPUT ===>                                     SCROLL ===> PAGE
    
```

Delete ALL CSDATA information (NOCSDATA) ___ YES or blanks.

Select one or more custom fields. Use d to delete, h for help,
 u to undo changes made during this session, or x to set/edit a field.
 Hit ENTER to continue.

SEL	FieldName	Description	Value
			-----+-----1-----+-----2-
s	HOMEADDR	HOME ADDRESS	14 Main Street, Anywh
***** Bottom of data *****			

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

z/OS V1R10: Custom Fields...

```
.....  
                                RACF - CUSTOM KEYWORD DATA for SHANNON  
COMMAND ===>                                SCROLL ===> PAGE  
Field Name:  HOMEADDR  
Description: HOME ADDRESS  
14 Main Street, Anywhere, NY, 12528, USA_____
```

(Enter changes. Hit ENTER to save, PF3 to CANCEL)

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

z/OS V1R10: Custom Fields...

.....
RACF HELP

CUSTOM FIELD INFORMATION

Field: HOMEADDR

EMPLOYEE HOME ADDRESS, UP TO 200 CHARACTERS. INCLUDE STREET ADDRESS, CITY, STATE, ZIP CODE, COUNTRY.

The first character must be of type ANY.
All other characters must be of type ANY.

OPTION ==>

F1=HELP

F2=SPLIT

F3=END

F4=RETURN

F5=RFIND

F6=RCHANGE

F7=UP

F8=DOWN

F9=SWAP

F10=LEFT

F11=RIGHT

F12=RETRIEVE

z/OS V1R10: RACF Health Checks

■ RACF Health Check Enhancements:

▶ ICHAUTAB checks:

- For over 20 years, IBM has recommended not using the RACF Authorized Caller Table (ICHAUTAB)
- RACF introduces a new check to verify that ICHAUTAB is not being used
 - RACF_ICHAUTAB_NONLPA raises a SEV(MED) exception if a non-LPA resident ICHAUTAB is found
- The existing RACF_SENSITIVE_RESOURCES raises a SEV(HIGH) exception if an LPA-resident ICHAUTAB is found

z/OS V1R10: RACF Health Checks...

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

z/OS V1R10: RACF Health Checks...

- **Defining your own resource check takes these three steps:**
 1. Defining a RACF profile in the new RACFHC general resource class. This profile contains the list of resources that you want to check
 2. Define a PARMLIB entry that defines your check using the IBM Health Checker for z/OS Dynamic Registration
 3. Activate your PARMLIB entry

z/OS V1R10: RACF Health Checks...

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

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

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

```
className/resourceName/volume/maximumPublicAccess
```

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

z/OS V1R10: RACF Health Checks...

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

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

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

z/OS V1R10: RACF Health Checks...

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

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


z/OS V1R10: RACF Health Checks...

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

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

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

```
Display  Filter  View  Print  Options  Help
```

```
-----
```

NP	NAME	CheckOwner	State	Status
	MY_INSTALLATION_HEALTH_CHECK	USER01	ACTIVE (ENABLED)	EXCEPT
	PDSE_SMSPDSE1	IBMPDSE	ACTIVE (ENABLED)	EXCEPT
	RACF_FACILITY_ACTIVE	IBMRACF	ACTIVE (ENABLED)	SUCCESS
	RACF_GRS_RNL	IBMRACF	ACTIVE (DISABLED)	ENV N/

```
-----
```

z/OS V1R10: RACF Health Checks...

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

Resource List from MY_RESOURCE_LIST

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

* High Severity Exception *

...
...
...

z/OS V1R10: PKI Services

- **RACDCERT: Allow 4096 bit RSA keys through software**
- **PKI services – additional Distinguished Name attribute types**