



IBM Systems

RACF Custom Fields

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Why do we need Custom Fields?

- Shortage of fields in RACF database to store installation-specific data
 - Only one DATA keyword for each profile type – 255 characters
 - USRCNT repeat group could not be used with RACF commands
- Customer requirements answered:
 - MR00074748 – Provide for installation segment option in RACF
 - MR0707035325 – Installation (Customer) Customizable Segments – partially satisfied
 - MR0526067810 - Segment on All Profiles for Installation Usage – partially satisfied



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!
- **Custom fields for USER and GROUP profiles**
 - Field semantics (names and data formats) defined as profiles in the CFIELD general resource class with the CFDEF segment
 - 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



Custom Fields – Preview of the Results

- List the Custom Fields in a USER profile
 - LISTUSER ANDREW CSDATA NORACF
USER=ANDREW
CSDATA INFORMATION
EMPLOYEE SERIAL NUMBER = 256400
HOME ADDRESS = 14 Main Street, Anywhere, IN 01234
- List the Custom Fields in a GROUP profile
 - LISTGRP TELLER CSDATA NORACF
GROUP=TELLER
CSDATA INFORMATION
DEPARTMENT NUMBER = D09A40
MANAGER NAME = Jay Smith

Overview – What's in a Custom Field?

What can be customized?

- Keyword 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
 - Control format or content of a field

Usage & Invocation – All About Custom Fields

- RACF Command Changes
- Define a Custom Field
- Activate Custom Fields
- Put Data in a Custom Field
- Authorization to Define a Custom Field
- Authorization for CSDATA
- Multiple System Considerations
- Related Enhancements



RACF Command Changes

- CFIELD class
 - Profile name defines the keyword name
 - `USER.CSDATA.HOMEADDR`
 - `GROUP.CSDATA.DEPTNUM`
- CFDEF (Custom Field DEfinition) segment for CFIELD class profiles
 - Keyword is on RDEFINE, RALTER, RLIST commands
 - Sub-operands define the custom field attributes
 - `RDEFINE CFIELD USER.CSDATA.HOMEADDR CFDEF (TYPE(CHAR) MAXLENGTH(100) FIRST(ANY) OTHER(ANY) MIXED(YES))`
- 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 ANDREW CSDATA (HOMEADDR ('13 Lucky Lane, Anywhere, IL 12345'))`

CFIELD profile format:
profile-type.CSDATA.keyword-name



Define a Custom Field

STEP 1 - Define custom field attributes with CFDEF segment in CFIELD profiles

- Define a numeric field as an employee serial number

```
RDEFINE CFIELD USER.CSDATA.EMP SER UACC(NONE) +
CFDEF (TYPE(NUM) +
MAXLENGTH(8) +
FIRST(NUMERIC) OTHER(NUMERIC) +
HELP('EMPLOYEE SERIAL NUMBER, 6-8 DIGITS') +
MINVALUE(100000) +
MAXVALUE(99999999) +
LISTHEAD('EMPLOYEE SERIAL = '))
```

CFIELD profile format:
profile-type.segment-name.keyword-name

- Define a character field as a department number

```
RDEFINE CFIELD GROUP.CSDATA.DEPT UACC(NONE) +
CFDEF (TYPE(CHAR) +
MAXLENGTH(10) +
FIRST(ALPHANUM) OTHER(ALPHANUM) +
HELP('DEPARTMENT NUMBER, UP TO 10 CHARACTERS') +
MIXED(NO) +
LISTHEAD('DEPARTMENT NUMBER = '))
```

Activate Custom Fields

STEP 2 – Put customized fields into effect

- Activate the CFIELD class
 - SETROPTS CLASSACT(CFIELD)
- Use IRRDPI00 command to check and update the fields


```
ALLOCATE FILE(SYSUT1) DATASET('SYS1.SAMPLIB(IRRDPSDS)') SHR
IRRDPI00 CHECK
IRRDPI00 UPDATE
IRRDPI00 LIST (USER CSDATA)
IRRDPI00 LIST (GROUP CSDATA)
```

What custom fields are defined on my system?

 - In previous releases, it just built Dynamic Parse Tables from IRRDPSDS dataset
 - Enhanced to also:
 - Read custom field definitions from CFDEF segments of CFIELD profiles
 - Update Dynamic Parse Tables with custom field attributes

Put Data in a Custom Field

STEP 3 – Put data in the custom fields

- Use the new custom field keywords
 - ALTUSER ANDREW CSDATA (EMPSER(256400)
HOMEADDR('14 Main Street, Anywhere, IL 01234'))
 - ALTGROUP TELLER CSDATA (DEPT(D09A40))
MANAGER('Jay Smith')

CFIELD profile:
USER.CSDATA.EMPSE
- List the results
 - LISTUSER ANDREW CSDATA NORACF
USER=ANDREW
CSDATA INFORMATION
EMPLOYEE SERIAL NUMBER = 256400
HOME ADDRESS = 14 Main Street, Anywhere, IL 01234
 - LISTGRP TELLER CSDATA NORACF
GROUP=TELLER
CSDATA INFORMATION
DEPARTMENT NUMBER = D09A40
MANAGER NAME = Jay Smith

CFIELD profile:
GROUP.CSDATA.DEPT

Headers are from the LISTHEAD keyword in CFDEF segment

Authorization to Define a Custom Field

STEP 4 (Optional) – Authorize certain users or groups to view and define custom field definitions and attributes

- For commands, FIELD profiles *CFIELD.CFDEF.templatefield* are used to control who can specify CFDEF fields on a CFIELD profile definition
 - READ access – allows a user to view a CFDEF field in CFIELD profile
 - UPDATE access – allows a user to view and update a CFDEF field in a CFIELD profile
- Examples
 - Allow all users to view custom field definitions


```
RDEFINE FIELD CFIELD.CFDEF.* UACC(READ)
SETROPTS RACLIST(FIELD) REFRESH
```
 - Allow USERADM to define and alter custom field definitions


```
ALTUSER USERADM CLAUTH(CFIELD)
PERMIT CFIELD.CFDEF.* CLASS(FIELD) ID(USERADM)
ACCESS(UPDATE)
SETROPTS RACLIST(FIELD) REFRESH
```

Standard FIELD
class authorization

Authorization for CSDATA

STEP 5 (Optional) – Authorize certain users or groups to update the data in the custom field

- For commands, FIELD profile *profile-type.CSDATA.keyword* will be used to control field level access checking for the custom field
 - READ access – allows a user to view a CSDATA field in each USER or GROUP profile
 - UPDATE access – allows a user to view and update a CSDATA field in each USER or GROUP profile
 - &RACUID can be on the access list to allow a user to access CSDATA fields in his/her own USER profile (not applicable to GROUP profiles)

'Almost' standard
FIELD class
authorization

Authorization for CSDATA...

STEP 5 continued...(Optional) – Authorize certain users or groups to update the data in the custom field

Examples

- Allow all users to view and update their own ADDR1, ADDR2, ADDR3 custom fields


```
RDEFINE FIELD USER.CSDATA.ADDR* UACC(NONE)
PERMIT USER.CSDATA.ADDR* CLASS(FIELD) ID(&RACUID)
ACCESS(UPDATE)
```
- Allow the HR group to view and update each user's EMPSER custom fields


```
RDEFINE FIELD USER.CSDATA.EMPSEER UACC(NONE)
PERMIT USER.CSDATA.EMPSEER CLASS(FIELD) ID(HR)
ACCESS(UPDATE)
```
- Allow the HR group to view and update each group's DEPT custom field


```
RDEFINE FIELD GROUP.CSDATA.DEPT UACC(NONE)
PERMIT GROUP.CSDATA.DEPT CLASS(FIELD) ID(HR) ACCESS(UPDATE)
```

RACF Panel Enhancements

- Handle CFDEF segment on RDEFINE/RALTER/RLIST
 - Panels show the default values for each custom field type
 - RALTER panels show existing values and allow you to overwrite and change the values
- Handle CSDATA segment on ADDUSER/ALTUSER/LISTUSER
 - Field names are primed from existing CFIELD profiles and can be updated by typing over the existing value
- Handle CSDATA segment on ADDGROUP/ALTGROUP/LISTGRP
 - Field names are primed from existing CFIELD profiles and can be updated by typing over the existing value



RACF Panel Enhancements

```

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

```



RACF Panel Enhancements...

```

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      ___ SPECIAL
___ ADSP              ___ OPERATIONS
___ OIDCARD           ___ AUDITOR
___ NO-PASSWORD      ___ 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

```



RACF Panel Enhancements...

```

RACF - CHANGE USER SHANNON
COMMAND ==>

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

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

```



RACF Panel Enhancements...

```

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- >
_ ACTIVE      IS EMPLOYEE ACTIVE?                     YES
_ EMPSER      EMPLOYEE SERIAL                         256400
x HOMEADDR    HOME ADDRESS                             14 Main Street, Anywher
_ HOMEPHON    HOME PHONE NUMBER
***** 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

```



IBM
HELP

RACF Panel Enhancements...

RACF - CUSTOM KEYWORD DATA for SHANNON

COMMAND ==> SCROLL ==> PAGE

Field Name: HOMEADDR

Description: HOME ADDRESS

14 Main Street, Thisplace, CA, 12345, USA_____

↑

Can overwrite in this field

(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

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IBM
HELP

RACF Panel Enhancements...

RACF HELP CUSTOM FIELD INFORMATION

Field: HOMEADDR

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

↑

Help text is from the
HELP keyword in
CFDEF segment

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

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RACF Panel Enhancements...

```

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
---	ACTIVE	IS EMPLOYEE ACTIVE?	YES
---	EMPSE	EMPLOYEE SERIAL	256400
---	HOMEADDR	HOME ADDRESS	14 Main Street, Thispla
---	HOMEPHON	HOME PHONE NUMBER	

```

***** 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

```



Session Summary

- Using Custom Fields, you can:
 - Use the RDEFINE command with the CFDEF segment to create a profile in the CFIELD class which will represent a RACF keyword
 - Use the IRRDPI00 command to activate the keyword for RACF commands
 - Use the new keyword to store installation data in the CSDATA segment of a USER or GROUP profile

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Any Questions

?

- Contents of Appendix
 - Publication references
 - Command syntax
 - Format of custom fields in the RACF database
 - FAQs

Appendix

▪ Publications

fSA22-7683 Security Server RACF Security Administrator's Guide

f Entire chapter on "Defining and using custom fields"

fSA22-7687 Security Server RACF Command Language Reference

f RDEFINE, RALTER, RLIST commands – CFDEF segment and keywords

f ADDUSER, ADDGROUP, ALTUSER, ALTGROUP, LISTUSER, LISTGRP commands – CSDATA segment and keywords

fSA22-7681 Security Server RACF System Programmer's Guide

f Custom field validation exit IRRVAF01

fGA22-7689 Security Server RACF Callable Services

f R_admin updates for CFDEF and CSDATA segments

fSA22-7683 Security Server RACF Macros and Interfaces

f RACF Database unload (IRRDBU00) updates for CFDEF and CSDATA segments

Field Attributes for Each Type of Custom Field

Field Attribute \ Field Type	Character	Flag	Hexadecimal	Numeric
Keyword name	1-8 characters	1-8 characters	1-8 characters	1-8 characters
Heading for list output	1-40 characters	1-40 characters	1-40 characters	1-40 characters
Help text for keyword	1-255 characters	1-255 characters	1-255 characters	1-255 characters
Maximum length	1-1100 characters	3	1-512 hex characters	1-10 numbers
Maximum value	N/A	N/A	N/A	0 to 2 147 483 647
Minimum value	N/A	N/A	N/A	0 to 2 147 483 647
Characters allowed	Choose restrictions for first and remaining characters. Choose mixed case or not.	'YES' or 'NO'	Numbers 0-9 and letters A-F	Numbers 0-9

RDEFINE Syntax for CFDEF Segment

- Define a custom field and its attributes with CFDEF segment in CFIELD profiles

CFIELD profile examples:
USER.CSDATA.HOMEADDR
GROUP.CSDATA.DEPTNUM

```
RDEFINE CFIELD profile-type.CSDATA.keyword-name
CFDEF(
TYPE( CHAR | FLAG | HEX | NUM)
MAXLENGTH(nnn)
FIRST(ALPHA | ALPHANUM | ANY | NONATABC | NONATNUM | NUMERIC)
OTHER( ALPHA | ALPHANUM | ANY | NONATABC | NONATNUM | NUMERIC)
HELP('help-text')
MINVALUE(nnn)
MAXVALUE(nnn)
MIXED ( YES | NO )
LISTHEAD('list-heading-text' )
```

Type of field

RALTER Syntax for CFDEF Segment

- Change attributes of a custom field with CFDEF segment in CFIELD profiles
 RDEFINE CFIELD profile-type.CSDATA.keyword-name
 CFDEF(
 MAXLENGTH(nnn)
 FIRST(ALPHA | ALPHANUM | ANY | NONATABC | NONATNUM | NUMERIC)
 OTHER(ALPHA | ALPHANUM | ANY | NONATABC | NONATNUM | NUMERIC)
 HELP('help-text')
 MINVALUE(nnn) | NOMINVALUE
 MAXVALUE(nnn) | NOMAXVALUE
 MIXED (YES | NO)
 LISTHEAD('list-heading-text')
)
- Cannot change TYPE
- Cannot remove TYPE, MAXLENGTH, FIRST, OTHER, HELP, MIXED, or LISTHEAD

CSDATA Segment Syntax for USER Profiles

- CSDATA segment keyword on ADDUSER, ALTUSER, LISTUSER
 - ADDUSER ANDREW
 CSDATA (custom-keyword1 (custom-keyword1-value)
 custom-keyword2 (custom-keyword2-value))
 *NOTE: number of keywords per command is limited to 85
 - ALTUSER ANDREW
 CSDATA (custom-keyword1 (custom-keyword1-value)
 custom-keyword2 (custom-keyword2-value))
 - LISTUSER ANDREW CSDATA NORACF
- NOCSDATA keyword on ALTUSER
 - ALTUSER ANDREW NOCSDATA

CSDATA Segment Syntax for GROUP Profiles

- CSDATA segment keyword on ADDGROUP, ALTGROUP, LISTGRP
 - ADDGROUP TELLER
CSDATA (custom-keyword1 (custom-keyword1-value)
custom-keyword2 (custom-keyword2-value))
*NOTE: number of keywords per command is limited to 85
 - ALTGROUP TELLER
CSDATA (custom-keyword1 (custom-keyword1-value)
custom-keyword2 (custom-keyword2-value))
 - LISTGRP TELLER CSDATA NORACF
- NOCSDATA keyword on ALTGROUP
 - ALTGROUP TELLER NOCSDATA

Custom Fields in RACF Database

Fields are stored in CSDATA segment of USER or GROUP profile in CSDATA repeat group.

Field type is saved in database along with the data.

Repeat group is limited to 65535 bytes.

CSKEY (custom field name)	CSTYPE (custom field type)	CSVALUE (custom field value)
EMPSEER	Numeric (X'02')	x'000000FF'
ACTIVE	Flag (X'03')	x'01' for YES or x'00' for NO
CODE	Hex (X'04')	x'F0C1C2C3'
ADDRESS	Character (X'01')	'13 TRICIA BLVD, HIGHLAND' (x'F1F340...')

FAQs

- How many custom fields can I define?
 - There is no set limit for the number of custom fields defined in an installation
 - The region size may need to be increased in any JCL which runs the IRRDPI00 UPDATE command


```
EXEC PGM=IKJEFT01,REGION=2M,PARM='IRRDPI00 UPDATE'
```

 - Sample IRRDPTAB procedure shipped by RACF in SYS1.SAMPLIB was updated
 - There is a 64K limit on the size of data in the CSDATA segment for a particular USER or GROUP profile

FAQs...

- I defined a custom field, but when I try to use it, I get this error message:
 - ALTUSER ANDREW CSDATA (RETIRED(NO))
 - IKJ56702I INVALID OPERAND, RETIRED
 - This means the keyword is not defined to RACF. Some possible reasons:
 - You did not issue the IRRDPI00 UPDATE command
 - The CFIELD class was not active when you issued the IRRDPI00 UPDATE command
 - Your keyword name does not match the 3rd qualifier of the CFIELD profile name
 - The custom field was defined with attributes that are inconsistent with its data type. (You may have received error messages on the RDEFINE command or the IRRDPI00 UPDATE command.)
- I defined a custom field, but when I try to use it I get this error message:
 - ALTUSER SHANNON CSDATA (ADDRESS('Highland, NY'))


```
IRR52119I Keyword name abbreviation ADDRESS is ambiguous.
```
 - This is caused because you have another keyword that starts with the same letters, for example ADDRESS1
 - You will need to define a new CFIELD profile and delete the old one

FAQs...

- How can I delete a custom field if I don't use it anymore?
 1. Delete any occurrence of the keyword in USER and GROUP profiles (use DB Unload to help find the occurrences)
 - ALTUSER SHANNON CSDATA(NOEMPCODE)
 2. Delete the definition of the keyword
 - RDELETE CFIELD USER.CSDATA.EMPCODE
- What happens if I delete the definition of a keyword without deleting all occurrences of that keyword?
 - You will still be able to list the CSDATA fields in the USER and GROUP profiles
 - You will not be able to change the field contents
 - You will not be able to delete the field contents
 - You can still delete the entire CSDATA segment
 - You can re-define the field if needed