



IBM Systems

RACF: z/OS V1R10 Functions

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 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...

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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, IL 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)
```

 - 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
```

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)

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.EMPSE* UACC(NONE)
PERMIT USER.CSDATA.EMPSE* 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          _ 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
```

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
    
```

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_____
_____

(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
    
```


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

IEA Assistant:

<http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>

z/OS V1R10 Publications available online:

<http://www-03.ibm.com/systems/z/os/zos/bkserv/r10pdf/>

Any Questions

?

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



Appendix

■ Publications

*f*SA22-7683 *Security Server RACF Security Administrator's Guide*

f Entire chapter on "Defining and using custom fields"

*f*SA22-7687 *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

*f*SA22-7681 *Security Server RACF System Programmer's Guide*

f Custom field validation exit IRRVAF01

*f*GA22-7689 *Security Server RACF Callable Services*

f R_admin updates for CFDEF and CSDATA segments

*f*SA22-7683 *Security Server RACF Macros and Interfaces*

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

z/OS V1R10 Publications available online:

<http://www-03.ibm.com/systems/z/os/zos/bkserv/r10pdf/>



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)
EMPSE	Numeric (X'02')	x'000000FF'
ACTIVE	Flag (X'03')	x'01' for YES or x'00' for NO
CODE	Hex (X'04')	x'FOC1C2C3'
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