



## RACF Access Control Module Guide





**RACF Access Control Module Guide**

**Note**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 107.

**First Edition (March 2004)**

This edition applies to Version 8 of IBM DB2 Universal Database for z/OS (DB2 UDB for z/OS), 5625-DB2, and to any subsequent releases until otherwise indicated in new editions. Make sure you are using the correct edition for the level of the product.

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# Contents

<b>About this document</b> . . . . .	vii
Who should use this document . . . . .	vii
Where to find more information . . . . .	vii
Accessibility . . . . .	vii
How to send your comments. . . . .	viii
<b>Chapter 1. Overview</b> . . . . .	1
RACF checking for DB2 resources . . . . .	1
Multilevel security . . . . .	2
The DB2 access control authorization exit point . . . . .	2
The default DB2 exit routine . . . . .	2
When the RACF access control module is invoked . . . . .	2
When the RACF access control module is bypassed . . . . .	3
<b>Chapter 2. Planning</b> . . . . .	5
Mapping out the implementation tasks: A task roadmap . . . . .	5
Identifying skill requirements . . . . .	5
Migrating to the RACF access control module . . . . .	6
Choosing the RACF access control module customization options . . . . .	7
Choosing the class scope . . . . .	8
Choosing the class name root and suffix . . . . .	9
Choosing the error option . . . . .	9
Customizing the number of exit work area cells . . . . .	9
Planning RACF security for DB2 . . . . .	10
<b>Chapter 3. Installing the RACF access control module</b> . . . . .	11
Steps for installing the RACF access control module . . . . .	11
Steps to test if your exit routine is active . . . . .	12
Using RACF informational messages. . . . .	13
<b>Chapter 4. Defining classes for the RACF access control module (optional)</b> 15	
Defining class names for DB2 objects . . . . .	15
Defining class names for DB2 objects in single-subsystem scope . . . . .	16
Defining class names for DB2 objects in multiple-subsystem scope . . . . .	17
Defining class names for administrative authorities. . . . .	18
Defining class names for DB2 administrative authorities in single-subsystem scope . . . . .	18
Defining class names for DB2 administrative authorities in multiple-subsystem scope . . . . .	19
<b>Chapter 5. Protecting DB2 objects</b> . . . . .	21
DB2 object types . . . . .	21
Defining resource names for DB2 objects . . . . .	22
Using generic RACF profiles . . . . .	22
DB2 object types and object names . . . . .	23
Long object names . . . . .	23
Privilege names . . . . .	24
<b>Chapter 6. Protecting DB2 administrative authorities.</b> . . . . .	25
Defining resource names for administrative authorities . . . . .	25
DB2 administrative authorities and object names . . . . .	25
<b>Chapter 7. Making your new RACF resources effective</b> . . . . .	27

If the class was not active . . . . .	27
If the class was active and RACLISTed . . . . .	27
If the class was active but not RACLISTed. . . . .	27
<b>Chapter 8. Debugging the RACF access control module . . . . .</b>	<b>29</b>
Dump titles for the RACF access control module . . . . .	29
Using the content of XAPLDIAG . . . . .	29
Parameter list for the access control authorization routine . . . . .	31
<b>Chapter 9. Auditing for the RACF access control module . . . . .</b>	<b>33</b>
Example of resource checking . . . . .	33
Using log string data . . . . .	34
Examples for setting audit controls for DB2 . . . . .	36
Example 1 . . . . .	36
Example 2 . . . . .	36
<b>Chapter 10. Special considerations . . . . .</b>	<b>39</b>
Matching schema names . . . . .	39
Materialized query tables . . . . .	40
DB2 data sharing . . . . .	40
PUBLIC* . . . . .	40
Implicit privileges of ownership . . . . .	40
CREATETMTAB privilege . . . . .	41
CREATE VIEW privilege . . . . .	42
CREATE ALIAS privilege . . . . .	42
"Any table" privilege . . . . .	42
"Any schema" privilege . . . . .	42
UPDATE and REFERENCES authorization on DB2 table columns . . . . .	43
The XAPLDIAG output parameter . . . . .	43
DB2 aliases for system-directed access. . . . .	43
Considerations for remote and local resources . . . . .	43
DB2 GRANT statements . . . . .	43
DB2 object names with blank characters . . . . .	44
DB2 object names with special characters . . . . .	44
Authority checking for all packages in a collection . . . . .	44
AUTOBIND requests for user-defined functions . . . . .	45
Identity used for authorization checks . . . . .	45
When DB2 cannot provide an ACEE . . . . .	46
Authorization ID, ACEE relationship . . . . .	46
Invalid or inoperative plans and packages . . . . .	46
Dropping views. . . . .	46
Caching of EXECUTE on plans . . . . .	47
Caching of EXECUTE on packages and routines . . . . .	47
Caching of dynamic SQL statements . . . . .	47
Resolution of user-defined functions . . . . .	47
Initialization . . . . .	47
Failure to initialize. . . . .	48
Return codes and reason codes from initialization . . . . .	48
Deferring to native DB2 authorization. . . . .	48
Removing the RACF access control module . . . . .	48
Common problems and considerations . . . . .	49
<b>Appendix A. XAPLFUNC reference . . . . .</b>	<b>51</b>
Initialization (XAPLFUNC = 1) . . . . .	51
Initialization return and reason codes. . . . .	52
Authorization checking (XAPLFUNC = 2) . . . . .	53

Authorization return and reason codes . . . . .	53
FASTAUTH return code translation . . . . .	54
Termination (XAPLFUNC = 3) . . . . .	55
Termination return and reason codes . . . . .	55
<b>Appendix B. Supplied RACF resource classes for DB2 . . . . .</b>	<b>57</b>
<b>Appendix C. Authorization processing examples . . . . .</b>	<b>59</b>
Example 1: Allowing access (auditing for failures) . . . . .	59
Setup . . . . .	59
Profile checking . . . . .	59
Final result . . . . .	60
Example 2: Allowing access (auditing for all attempts) . . . . .	60
Setup . . . . .	60
Profile checking . . . . .	60
Final result . . . . .	61
Example 3: Denying access . . . . .	61
Setup . . . . .	61
Profile checking . . . . .	61
Final result . . . . .	62
Example 4: Deferring to DB2. . . . .	62
Setup . . . . .	62
Profile checking . . . . .	62
Final result . . . . .	62
Example 5: Allowing access (multiple-subsystem scope). . . . .	63
Setup . . . . .	63
Profile checking . . . . .	63
Final result . . . . .	63
Example 6: Allowing access (single-subsystem scope) . . . . .	64
Setup . . . . .	64
Profile checking . . . . .	64
Final result . . . . .	64
<b>Appendix D. RACF authorization checking reference. . . . .</b>	<b>65</b>
How to use this reference . . . . .	67
Usage notes . . . . .	68
Buffer pool privileges. . . . .	68
DB2 privileges . . . . .	68
Collection privileges . . . . .	68
DB2 administrative authorities . . . . .	69
DB2 privileges . . . . .	69
Database privileges . . . . .	69
DB2 administrative authority . . . . .	69
DB2 privileges . . . . .	70
Java archive (JAR) privileges . . . . .	74
DB2 privileges . . . . .	74
Package privileges . . . . .	75
DB2 privileges . . . . .	75
Plan privileges . . . . .	77
DB2 privileges . . . . .	77
Schema privileges. . . . .	78
DB2 privileges . . . . .	78
Sequence privileges . . . . .	80
DB2 privileges . . . . .	80
Storage group privileges . . . . .	82
DB2 privileges . . . . .	82

Stored procedure privileges . . . . .	82
DB2 privileges . . . . .	82
System privileges . . . . .	84
DB2 administrative authorities . . . . .	84
DB2 privileges . . . . .	85
Table privileges . . . . .	90
DB2 privileges . . . . .	90
Tablespace privileges . . . . .	97
DB2 privileges . . . . .	97
User-defined distinct type privileges . . . . .	98
DB2 privileges . . . . .	98
User-defined function privileges . . . . .	98
DB2 privileges . . . . .	98
View privileges . . . . .	100
DB2 privileges. . . . .	100
<b>Appendix E. DB2 RACF access control module messages . . . . .</b>	<b>103</b>
<b>Notices . . . . .</b>	<b>107</b>
Trademarks. . . . .	108
<b>Index . . . . .</b>	<b>109</b>



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## About this document

This document contains information about planning, installing, and implementing the RACF<sup>®</sup> access control module, a sample exit routine called DSNXRAC, that ships with DB2 Universal Database<sup>™</sup> for z/OS<sup>®</sup> Version 8. You can replace the default DB2<sup>®</sup> exit routine at the access control authorization exit point (DSNX@XAC) with the RACF access control module to use RACF, in addition to DB2, for authorization checking of access to DB2 objects, authorities, commands, and utilities.

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## Who should use this document

Use this document as a guide to the task of planning, installing, and implementing the RACF access control module. The skills required include MVS<sup>™</sup> system programming, DB2 administration, and RACF administration. The participants for this task should include those who are knowledgeable in the current security structure and policies in place for both DB2 and RACF at your installation.

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## Where to find more information

The following resources are available through the Internet.

- Online library for DB2 Universal Database for z/OS Version 8:  
<http://www.ibm.com/software/data/db2/zos/v8books.html>
- DB2 home page:  
<http://www.ibm.com/software/data/db2/zos/>
- Online library for z/OS Security Server RACF:  
<http://www.ibm.com/servers/eserver/zseries/zos/bkserv/>
- RACF home page:  
<http://www.ibm.com/servers/eserver/zseries/zos/racf/>

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## Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products. The major accessibility features in z/OS products, including DB2 UDB for z/OS, enable users to:

- Use assistive technologies such as screen reader and screen magnifier software
- Operate specific or equivalent features by using only a keyboard
- Customize display attributes such as color, contrast, and font size

Assistive technology products, such as screen readers, function with the DB2 UDB for z/OS user interfaces. Consult the documentation for the assistive technology products for specific information when you use assistive technology to access these interfaces.

Online documentation for Version 8 of DB2 UDB for z/OS is available in the DB2 Information Center, which is an accessible format when used with assistive technologies such as screen reader or screen magnifier software. The DB2 Information Center for z/OS solutions is available at the following Web site:  
<http://publib.boulder.ibm.com/infocenter/db2zhelp>.

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## How to send your comments

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- Send your comments from the Web at <http://www.ibm.com/servers/eserver/zseries/zos/webqs.html>.
- Complete the readers' comment form at the back of the book and return it by mail, by fax (845-432-9405 for the United States and Canada), or by giving it to an IBM<sup>®</sup> representative.

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## Chapter 1. Overview

The RACF access control module allows you to use RACF in addition to DB2 authorization checking for DB2 objects, authorities, commands, and utilities. You can activate the RACF access control module at the DB2 access control authorization exit point (DSNX@XAC), where you can replace the default DB2 exit routine.

The RACF access control module requires DB2 Version 8, or later, and z/OS Version 1 Release 3, or later, and is supplied as an assembler source module in the DSNXRAC member of *prefix.SDSNSAMP*. Support for earlier DB2 versions was supplied in the IRR@XACS member of SYS1.SAMPLIB and was called the *DB2 RACF external security module*.

The RACF access control module:

- Receives control from the DB2 access control authorization exit point (DSNX@XAC) to handle DB2 authorization checks
- Provides a single point of control for RACF and DB2 security administration
- Provides the ability to define security rules before a DB2 object is created
- Allows security rules to persist when a DB2 object is dropped
- Provides the ability to protect multiple DB2 objects with a single security rule using a combination of RACF generic, grouping, and member profiles
- Eliminates the DB2 *cascading revoke*
- Preserves DB2 privileges and administrative authorities
- Provides flexibility for multiple DB2 subsystems with a single set of RACF profiles
- Allows you to validate a user ID before giving it access to a DB2 object.

RACF support for the RACF access control module includes:

- A set of general resource classes in the RACF module ICHRRCDX (the supplied portion of the RACF class descriptor table). These classes are used when you implement the RACF access control module using the default values.
- A set of router table entries in the RACF module ICHRRFR0X (the supplied portion of the SAF router table).

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## RACF checking for DB2 resources

Each DB2 command, utility, and Structure Query Language (SQL) statement is associated with a set of privileges, authorities, or both.

Authority checking performed by the RACF access control module simulates DB2 authority checking:

- DB2 object types *map to* RACF class names
- DB2 privileges *map to* RACF resource names for DB2 objects
- DB2 authorities *map to* the RACF administrative authority class (DSNADM) and RACF resource names for DB2 authorities
- DB2 security rules *map to* RACF profiles

The RACF access control module checks the RACF profiles corresponding to that set of privileges and authorities.

See Chapter 10, “Special considerations,” on page 39 and Appendix D, “RACF authorization checking reference,” on page 65 for more information.

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## Multilevel security

Multilevel security is a security policy that allows the classification of data and users based on a system of hierarchical security levels combined with a system of non-hierarchical security categories. You can improve the security of your DB2 applications when you add RACF security labels to DB2 objects or row-level security on a multilevel-secure system. Implementing multilevel security requires the use of z/OS Version 1 Release 5, or later, and is a system-wide endeavor. See *z/OS Planning for Multilevel Security*, GA22-7509 for details.

This document does not address the use of DB2 and the RACF access control module in a multilevel-secure environment.

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## The DB2 access control authorization exit point

DB2 provides an exit point so you can install the RACF access control module to allow RACF to perform DB2 authorization checking for SQL statements and DB2 commands and utilities, or you can choose to provide your own routine for the DB2 access control authorization exit point. This document describes how to implement only the supplied RACF access control module. For more information about providing your own routine for the DB2 access control authorization exit point, see *DB2 Administration Guide*.

## The default DB2 exit routine

The default DB2 exit routine at the DSNX@XAC exit point returns a code to the DB2 authorization module indicating that an installation-defined access control authorization exit routine is not available. DB2 then performs native authorization checking and does not attempt to invoke this exit routine again. The default DB2 exit routine called DSNX@XAC is in library *prefix.SDSNLOAD*. The source code for the default DB2 exit routine is in the DSNX@XAC member of *prefix.SDSNSAMP*. The DB2 installation process puts the results of the assembly into *prefix.SDSNEXIT*.

By contrast, the RACF access control module is provided in DSNRXAC member of *prefix.SDSNSAMP* and provides access control using a combination of RACF and DB2 checking. You can easily alter the DB2 installation process by modifying the DSNTIJEX job to assemble the RACF access control module, rather than the default DB2 exit routine.

## When the RACF access control module is invoked

The RACF access control module is invoked in three instances:

- At DB2 startup.

When DB2 starts, the RACF access control module is invoked to allow the external authorization checking application to perform any required setup prior to authorization checking. An example of a required setup task is loading authorization profiles into storage. DB2 uses the reason code that the exit routine sets during startup to determine how to handle exception situations. (See *DB2 Administration Guide* for details.)

- When an authorization check is to be performed for a privilege.

At the point when DB2 would access security tables in the catalog, to check authorization on a privilege, the RACF access control module is invoked. The exit routine is only invoked if none of the prior invocations have indicated that the exit routine must not be called again.

- At DB2 shutdown.

When DB2 is stopping, the RACF access control module is invoked to let the external authorization checking application perform its cleanup before DB2 stops.

## **When the RACF access control module is bypassed**

In the following situations, the RACF access control module is not called to check authorization:

- The user has installation SYSOPR (when sufficient for the privilege being checked) or installation SYSADM authority. This authorization check is made strictly within DB2.
- DB2 security has been disabled (N0 was specified in the USE PROTECTION field of installation panel DSNTIPP).
- DB2 cached the authorization information from a prior check.
- From a prior invocation of the RACF access control module, the routine had indicated that it should not be called again.
- DB2 GRANT statements.



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## Chapter 2. Planning

Implementing the RACF access control module involves the interaction of RACF, DB2 and z/OS system software, each with its own required skills. Therefore, it is important to understand the task at hand, organize the appropriate team members, and plan your implementation together.

This chapter provides the information you need to determine the tasks to be performed, identify the skills required, recognize decisions that should be made as a team, and understand how each choice you make affects DB2 authorization processing.

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### Mapping out the implementation tasks: A task roadmap

Table 1 shows the subtasks, participants, and associated procedures for implementing the RACF access control module.

**Before you begin:** Important decisions that you make during planning (Subtask 1) will be implemented during Subtasks 2–5.

*Table 1. Task roadmap for implementing the RACF access control module*

Subtask	Participants	Associated procedure
1. Plan your RACF access control module implementation.	DB2 administrator, RACF administrator, and MVS programmer	See Chapter 2, "Planning."
2. Install and customize the RACF access control module.	MVS programmer	See Chapter 3, "Installing the RACF access control module," on page 11.
3. (Optional) Define RACF classes for your DB2 resources, such as DB2 objects and administrative authorities.	MVS programmer	See Chapter 4, "Defining classes for the RACF access control module (optional)," on page 15.
4. Define RACF resources to protect your DB2 objects.	RACF administrator	See Chapter 5, "Protecting DB2 objects," on page 21.
5. Define RACF resources to protect the DB2 administrative authorities.	RACF administrator	See Chapter 6, "Protecting DB2 administrative authorities," on page 25.
6. Activate the RACF classes for your DB2 resources and administrative authorities.	RACF administrator	See Chapter 7, "Making your new RACF resources effective," on page 27.
7. Restart the DB2 subsystem.	DB2 administrator	—

---

### Identifying skill requirements

Organizing your team involves incorporating a variety of skill sets and may require you to include people from different disciplines if you work in a large organization. These skills are identified in terms of the roles or job titles of the people who specialize in those skills. For example, a task requiring MVS system skills is referred to as a task for the MVS programmer. If some of your team members have multiple skills, you may require fewer individuals to complete your team.

Your team for planning and implementing the RACF access control module should include the following members:

- MVS programmer
- RACF administrator

- DB2 administrator

The following table lists the team members, tasks, and required skills for planning and implementing the RACF access control module.

Table 2. Roles, tasks, and skills for the implementation team

Role	Tasks	Required skills	Useful references
MVS programmer	<ul style="list-style-type: none"> <li>• Install (customize, assemble, and link-edit) the RACF access control module</li> <li>• Define the RACF classes for use with DB2</li> </ul>	<ul style="list-style-type: none"> <li>• TSO skills</li> <li>• JCL knowledge</li> <li>• Assembler programming</li> </ul>	<ul style="list-style-type: none"> <li>• <i>z/OS Security Server RACF Macros and Interfaces</i></li> <li>• <i>z/OS Security Server RACF System Programmer's Guide</i></li> <li>• <i>DB2 Installation Guide</i></li> <li>• <i>DB2 Administration Guide</i></li> <li>• (optional) <i>z/OS Planning for Multilevel Security</i></li> </ul>
RACF administrator	<ul style="list-style-type: none"> <li>• Plan RACF classes for use with DB2</li> <li>• Define RACF resources to protect DB2 objects and administrative authorities</li> <li>• Activate the RACF classes for DB2</li> </ul>	<ul style="list-style-type: none"> <li>• RACF administration</li> <li>• RACF commands, such as the following: <ul style="list-style-type: none"> <li>– ADDGROUP</li> <li>– ADDUSER</li> <li>– RALTER</li> <li>– RDEFINE</li> <li>– PERMIT</li> <li>– SETROPTS</li> </ul> </li> <li>• TSO skills</li> </ul>	<ul style="list-style-type: none"> <li>• <i>z/OS Security Server RACF Security Administrator's Guide</i></li> <li>• <i>z/OS Security Server RACF Command Language Reference</i></li> <li>• (optional) <i>z/OS Planning for Multilevel Security</i></li> </ul>
DB2 administrator	<ul style="list-style-type: none"> <li>• Plan the DB2 objects and administrative authorities to protect</li> <li>• Restart the DB2 subsystem</li> </ul>	<ul style="list-style-type: none"> <li>• DB2 basic operations</li> <li>• DB2 commands and authorization requirements</li> <li>• System and basic database administration</li> </ul>	<ul style="list-style-type: none"> <li>• <i>DB2 Administration Guide</i></li> <li>• <i>DB2 SQL Reference</i></li> <li>• <i>DB2 Data Sharing: Planning and Administration</i></li> </ul>

## Migrating to the RACF access control module

When migrating from DB2 internal security to the RACF access control module, you do not need to migrate protection of all DB2 objects at once. You can begin using the RACF access control module before defining profiles to protect all DB2 object types. Consider adding the WARNING option of RDEFINE and RALTER commands when you protect DB2 objects. The use of warnings might ease your migration by allowing you see ICH408I messages that identify profiles that would fail a request.

**Note:** If the WARN option is added to a resource that is requested by a user with a DB2 administrative authority, such as SYSADM, DBADM or in some cases, SYSCTRL, that normally allows the user to access the object, the user can ignore the WARNING message.

When the RACF access control module determines that there is no administrative authority profile and no profile to protect a particular DB2 object (or the class corresponding to a particular DB2 resource is not active), it will defer to DB2 for authority checking.

For example, suppose only the set of RACF profiles to protect DB2 tables has been defined and the classes for all other object types have not been made active. In this



case, the RACF access control module performs profile checking for DB2 tables, views, and indexes and it defers to DB2 for authority checking of other object types, such as plans, packages, and databases.

**Guideline:** All DB2 administrative authorities should be defined with UACC(NONE) before you activate the RACF access control module. You can then selectively authorize specific users at a higher level by executing the PERMIT command.

---

## Choosing the RACF access control module customization options

This section describes the customization options and corresponding class name formats related to the RACF access control module. Customizing the RACF access control module is optional. It is required *only* when you do not use the default values.

Using the default values allows the RACF access control module to use the classes in the class descriptor table (CDT) supplied by IBM. (See Appendix B, “Supplied RACF resource classes for DB2,” on page 57.) When you modify the customization options from their default values, you might need to define classes in the installation-supplied class descriptor table.

The RACF access control module uses the values &CLASSOPT, &CLASSNMT, and &CHAROPT to determine the format of the class names and resource names it will construct to protect the DB2 objects. The decisions you make about changing or keeping these defaults should be well understood before you complete “Steps for installing the RACF access control module” on page 11.

**Restriction:** Each option that you specify in the RACF access control module applies to the entire DB2 subsystem using the module. This means that the &CLASSOPT, &CLASSNMT, and &CHAROPT values you select apply to all classes used by that DB2 subsystem. If you have multiple DB2 subsystems and need to apply different values across subsystems, install the RACF access control module separately on each subsystem, each with its own set of processing options.

Table 3. Set symbols and values

Set symbol	Description	Default value	See...
&CLASSOPT	Specifies the class scope option. <b>Valid values:</b> <b>1</b> Single-subsystem scope <b>2</b> Multiple-subsystem scope	<b>2</b>	“Choosing the class scope” on page 8
&CLASSNMT	Specifies the class name <i>root</i> , which is characters 2–5 of the class name, and is used only when you also specify &CLASSOPT 2. (When you specify &CLASSOPT 1, the DB2 subsystem name or, if data sharing, the DB2 group attachment name, is used as the class name <i>root</i> .) <b>Rule:</b> This value must be 1–4 characters long.	<b>DSN</b>	“Choosing the class name root and suffix” on page 9
&CHAROPT	Specifies the class name <i>suffix</i> , which is the last character of the class name for installation-defined classes. <b>Valid values:</b> 0–9, #, @, \$, or a blank character ( ' ').	<b>1</b>	“Choosing the class name root and suffix” on page 9
&ERROROPT	Specifies the action to take in the event of an initialization or authorization error. <b>Valid values:</b> <b>1</b> Native DB2 authorization is used. This is the default. <b>2</b> The DB2 subsystem is requested to stop.	<b>1</b>	“Choosing the error option” on page 9

Table 3. Set symbols and values (continued)

Set symbol	Description	Default value	See...
&PCELLCT	Specifies the number of primary work area cells	50	"Customizing the number of exit work area cells" on page 9
&SCELLCT	Specifies the number of secondary work area cells	50	"Customizing the number of exit work area cells" on page 9
&SERVICELEVEL	For IBM use only		

The default values for all customization options as shipped with the RACF access control module are shown in Figure 1.

```

GBLC  &CLASSNMT,&CHAROPT,&CLASSOPT
      GBLA  &PCELLCT,&SCELLCT
&CLASSOPT  SETC  '2'    1 - Use Single Subsystem Class Scope
*                                     Classification Model I
*                                     (One set of classes for EACH subsys)
*                                     2 - Use Multi-Subsystem Class Scope
*                                     Classification Model II
*                                     (One set of classes for ALL subsys)
&CLASSNMT  SETC  'DSN'  DB2 Subsystem Name (Up to 4 chars)
&CHAROPT   SETC  '1'    One character suffix (0-9, #, @ or $)
&ERROROPT  SETC  '1'    1 - Use Native DB2 authorization
*                                     2 - Stop the DB2 subsystem
&PCELLCT   SETA  50     Primary Cell Count
&SCELLCT   SETA  50     Secondary Cell Count

```

Figure 1. Default values for installation options

## Choosing the class scope

The system programmer can alter the &CLASSOPT field of the modifiable assembler source statement in the RACF access control module to select the desired scope for the DB2 classes that will protect DB2 objects and privileges.

&CLASSOPT value	Scope	Classification model
1	Single-subsystem scope	1
2	Multiple-subsystem scope	2

**Note:** This is the default.

When you select *single-subsystem scope*, you are choosing to define a separate set of classes for each DB2 subsystem that uses the RACF access control module. In general, you cannot use the classes in the supplied class descriptor table (ICHRRCDX) in single-subsystem scope.

When you select the *multiple-subsystem scope*, you are choosing to share a set of classes across all DB2 subsystems using RACF access control module, rather than defining a separate set for each. In multiple-subsystem scope, you can use the classes in the supplied class descriptor table (ICHRRCDX). This scope generally requires less administrative effort to set up and is the scope that most installations choose.

One general resource class is associated with each DB2 object type. You can define up to two classes for each object type and set them up as associated members or grouping classes. The list of supported DB2 objects and class abbreviations is defined in Table 4 on page 22. If only one class is used for an object, it must be defined with the member prefix. An additional class is used to support DB2 administrative authorities. The format of the class names of DB2 objects depends on the classification model you use.

### **System considerations**

When you choose single-subsystem scope and need to add a new DB2 subsystem or upgrade the RACF access control module to support a new DB2 object type, you must IPL your MVS system to install the new RACF classes in the RACF class descriptor table and RACF router table.

When you choose multiple-subsystem scope, you can avoid the need to IPL because you might not need to install new RACF classes. You can dynamically define new RACF resources to protect DB2 objects using existing classes. See *z/OS Security Server RACF Security Administrator's Guide* for details about defining and activating protection for RACF resources.

If you define new RACF resources to protect DB2 objects in a class that was not active at the time your DB2 subsystem was started, you need to restart the DB2 subsystem to activate the new resources. If the class was active at startup time, then you can dynamically activate the new resources using the TSO **SETROPTS RACLIST REFRESH** command for the class. See Chapter 7, "Making your new RACF resources effective," on page 27.

## **Choosing the class name root and suffix**

Once a class scope is selected, the system programmer can use the `&CHAROPT` and `&CLASSNMT SET` symbols to alter the default naming conventions for the resource classes and profiles you use to protect DB2 objects and administrative authorities.

## **Choosing the error option**

Set the `&ERROROPT` value to choose which action you want the system to take in the event of an initialization or authorization error. If you do not set this option or allow it to default to `&ERROROPT 1`, native DB2 authorization is used in the event of an error.

If you select `&ERROROPT 2`, you can request the DB2 subsystem to stop when one of the following events occurs:

- An initialization error, such as when there are no active RACF classes found for the initializing DB2 subsystem.
- The exit routine abends, causing the accumulated number of exit routine abends to exceed the threshold specified during installation (`AUTH EXIT LIMIT`).
- DB2 receives an unexpected return code (`EXPLRC1`) from the RACF access control module.

## **Customizing the number of exit work area cells**

When you invoke the RACF access control module, it uses CPOOL cells as a work area to contain local variables. When you invoke the RACF access control module for initialization, it allocates a primary pool of work area cells to be used on authorization requests. Each time the RACF access control module is invoked for an authorization request, it obtains a cell and returns it when processing completes.

If there are no more cells available, it uses a secondary pool of cells. You can control the number of cells allocated in the primary and secondary cell pools with the &PCELLCT and &SCELLCT SET symbols.

**Guideline:** Use the &PCELLCT and &SCELLCT default values.

---

## Planning RACF security for DB2

The most significant part of the planning process is planning to expand RACF protection and administration to DB2 subsystem resources. Plan to cover the following tasks.

1. Examining the current RACF environment, including the user group structure, resource naming conventions, and use of grouping classes.
2. Examining the DB2 objects, looking for naming conventions and other similarities in resource names that you can exploit with generic RACF profiles.
3. Examining the GRANT authorizations in place for DB2 objects to see which RACF user groups you can define, or exploit, to reduce the RACF authorizations you must create using the RACF PERMIT command.
4. Planning which DB2 objects and administrative authorities to protect, determining access requirements, and incorporating the new subsystem resources into the current RACF structure.
5. Considering the use of RACF variables to facilitate resource naming conventions for DB2 resources.
6. Integrating new DB2 users into the RACF user structure and delegating RACF group and class authorities.

---

## Chapter 3. Installing the RACF access control module

The RACF access control module is an assembler source module that resides in the DSNXRAC member of the *prefix.SDSNSAMP* library. Before your installation can use RACF to protect DB2 objects and authorities, you need to install the RACF access control module. To install the RACF access control module for a DB2 subsystem, you will copy, customize as needed, assemble, and link-edit the module into the DB2 exit library (*prefix.SDSNEXIT*).

You can modify the way the RACF access control module works by customizing several assembler SET symbols located in the top of the source data set. The default values for all customization options as shipped with the RACF access control module are shown in Figure 1 on page 8. For details about deciding to keep or change the default values, see “Choosing the RACF access control module customization options” on page 7.

Multiple DB2 subsystems can share the same copy of the RACF access control module as long as they use the same customization options. When subsystems require different options, you must install additional copies of the RACF access control module.

After you install the RACF access control module, it will become active the next time the DB2 subsystem is restarted when at least one RACF class associated with the DB2 subsystem is active at the time of the restart. Before restarting DB2, be sure that your implementation team has already defined appropriate RACF resources in the active DB2 classes or else your installation might cause unintended DB2 authorization failures or exposures.

---

### Steps for installing the RACF access control module

**Before you begin:** You must have MVS system programming skills to complete this procedure. In Step 3, you can optionally customize the RACF access control module to modify several important authorization processing options. For details, see “Choosing the RACF access control module customization options” on page 7. Be sure to consult your implementation team to find out which customization options are needed, if any. In addition, you may wish to have *DB2 Installation Guide* available as a reference.

1. Verify that you have the current version of the RACF access control module, including all required maintenance, such as APAR OA05967 for z/OS Version 1 Release 3 and z/OS Version 1 Release 4 installations.
  2. Locate the DSNXRAC member (containing the RACF access control module) in the *prefix.SDSNSAMP* library and copy it to a private library.
  3. Optionally, customize your private copy of the RACF access control module by modifying the assembler SET options from their default values. The options you use in this step will affect DB2 authorization processing so use the values chosen by your implementation team. See “Choosing the RACF access control module customization options” on page 7.
-

4. Use the DB2 installation job DSNTIJEX to assemble and link-edit the RACF access control module into the APF-authorized DB2 exit load library (*prefix.SDSNEXIT*). If you use another target library, you might have to change the STEPLIB or JOBLIB concatenations in the DB2 startup procedures. For information about using the DB2 installation jobs, see *DB2 Installation Guide*.
    - a. Modify Step 3 (JEX0003) of DSNTIJEX to point to the library containing your customized version of DSNXRXAC and then run it.
    - b. If you have two or more DB2 subsystems and you want to use different assembler SET options for each subsystem (or you just want to have separate exit load libraries), repeat Step 4a for each DB2 subsystem.
- 

After you complete these steps, the RACF access control module will be initialized the next time the DB2 subsystem is started. The initialization function will succeed and the RACF access control module will become active only if DB2 resource classes are active at the time of the restart. If the RACF access control module is active, DB2 will invoke RACF for authority checking.

You can determine whether the DB2 will perform DB2 authorization checks by reviewing the IRR9 $nnx$  messages and any DSNX210I message you receive during DB2 initialization.

**Guideline:** If you receive the IRR912I message during initialization, your exit routine is not active and native DB2 authorization checking will be used.

---

## Steps to test if your exit routine is active

You can perform the following steps to cause an authorization failure to test if your exit routine is active:

1. Choose a DB2 table on which to execute a SELECT statement and choose an authorization ID to perform the SELECT. The authorization ID must *not* own the table and have *none* of the following access authorizations:
    - DB2 administrative authority (SYSADM, installation SYSADM, DBADM, SYSOPER, installation SYSOPER, and, in some cases, SYSCTRL)
    - DB2 SELECT privilege on the chosen table
    - RACF authorization for the SELECT privilege on the chosen table.
  2. Use the authorization ID to execute a SELECT statement on the table. The SELECT statement should fail.
  3. Review the resulting ICH408I information messages related to DB2 resources and examine the RACF return code.
- 

When you complete this test, you will know if RACF is performing DB2 authorization checking. If it is, the RACF access control module is active. Also, you might check the DB2 trace facility. The DB2 trace record IFCID 314 is only generated when the RACF access control module is active.

---

## Using RACF informational messages

Once you successfully activate the RACF access control module and DB2 invokes RACF for authorization checking, you can use the information found in messages IRR908I through IRR911I to see how it is set up for a particular subsystem. These messages identify the:

- Version and length of the RACF access control module
- DB2 subsystem name or, if data sharing, the DB2 group attachment name
- DB2 FMID (for example, HDRE810 for DB2 Version 8) or APAR number associated with the module
- Options used for the module

For example, &ERROROPT specifies the correct action to be taken for DB2 initialization and authorization errors.

**Note:** The MVS programmer sets these options. For detailed information, see “Choosing the RACF access control module customization options” on page 7.

- Classes that the module is trying to use
- Classes for which a RACROUTE request was successful.

These messages are routed only to the system log and occur only at DB2 initialization time, not during authorization checking. Therefore, these messages are issued regardless of whether any authorization checks have been made, are issued even when DB2 initialization fails.





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## Chapter 4. Defining classes for the RACF access control module (optional)

Defining classes for the RACF access control module is optional. It is required *only* when you do not use the defaults.

When you change the &CLASSOPT or &CLASSNMT assembler SET symbols from their default values, you need to define your own classes in the installation-defined class descriptor table (CDT). If you define your own classes, you must also define corresponding entries in the RACF router table. (For details on defining classes and router table entries, see *z/OS Security Server RACF System Programmer's Guide*.)

It is not necessary to define classes for DB2 objects and administrative authorities that are not protected by the RACF access control module. To see which DB2 classes are protected, see Appendix B, "Supplied RACF resource classes for DB2," on page 57.

You can define classes for DB2 objects and you can define classes for administrative authorities. See the formats for these class names in:

- "Defining class names for DB2 objects"
- "Defining class names for administrative authorities" on page 18

When using the single-subsystem scope, the RACF access control module builds class names dynamically by concatenating the DB2 subsystem name, or group attachment name, with the object type. As a result, multiple DB2 subsystems can use the same copy of the RACF access control module. However, you must create an installation-defined set of classes for each subsystem.

When using the multiple-subsystem scope, the RACF access control module builds class names dynamically by concatenating the &CLASSNMT with the object type. As a result, any DB2 subsystem with the same &CLASSNMT can use the same copy of the RACF access control module. You may create an installation-defined set of classes for each subsystem or you may choose to use the supplied classes instead.

### Restrictions:

1. If you choose to use installation-defined classes, you must use installation-defined classes with all objects for the same copy of the RACF access control module. You cannot mix classes supplied by IBM and installation-defined classes. To use both types, you must use different versions of the RACF access control module.
2. RACF expects that installation-defined classes have the same class descriptor table attributes as the corresponding DB2 classes supplied by IBM. (For a list of these attributes, see *z/OS Security Server RACF Macros and Interfaces*.)

---

## Defining class names for DB2 objects

In the supplied class descriptor table (ICHRRCDX), two classes are defined for each DB2 object type (except for the DB2 view object which shares classes with the table object), so that each object type has an associated member class and an associated grouping class. See Appendix B, "Supplied RACF resource classes for DB2," on page 57 for a list of the supplied RACF classes associated with each DB2 object type. (For general information about using member and grouping RACF

classes, see *z/OS Security Server RACF Security Administrator's Guide*.) Table 4 on page 22 lists the supported DB2 objects and class abbreviations.

Installations defining their own classes can also define two classes for each object type if member and grouping classes are desired. If only one class is defined for each object type, the class name must begin with M (*not* G).

The actual format of the class names of DB2 objects depends on the classification model being used.

**Note:** The default name for the DB2 administrative authorities class is DSNADM. You can define an additional RACF class. See Chapter 6, "Protecting DB2 administrative authorities," on page 25.

## Defining class names for DB2 objects in single-subsystem scope

When you select this model, the RACF access control module inserts the DB2 subsystem name, or group attachment name, when it constructs RACF class names. The classes that you define must follow this format:

*ayyyxxz*

where:

- a* is M for member class or G for grouping class
- yyyy* is the DB2 subsystem name or, if data sharing, the DB2 group attachment name (from XAPLGPAT)
- xx* is the type of DB2 object (See Table 4 on page 22 for valid values for each DB2 object.)
- z* is the &CHAROPT value (The default is 1.)

In single-subsystem scope, the class names of the DB2 object classes contain the DB2 subsystem name or DB2 group attachment name but the profile names of resources in those classes do not. Therefore, in single-subsystem scope, you must define a separate class name for each subsystem that will use the RACF access control module. See Figure 2 on page 17.

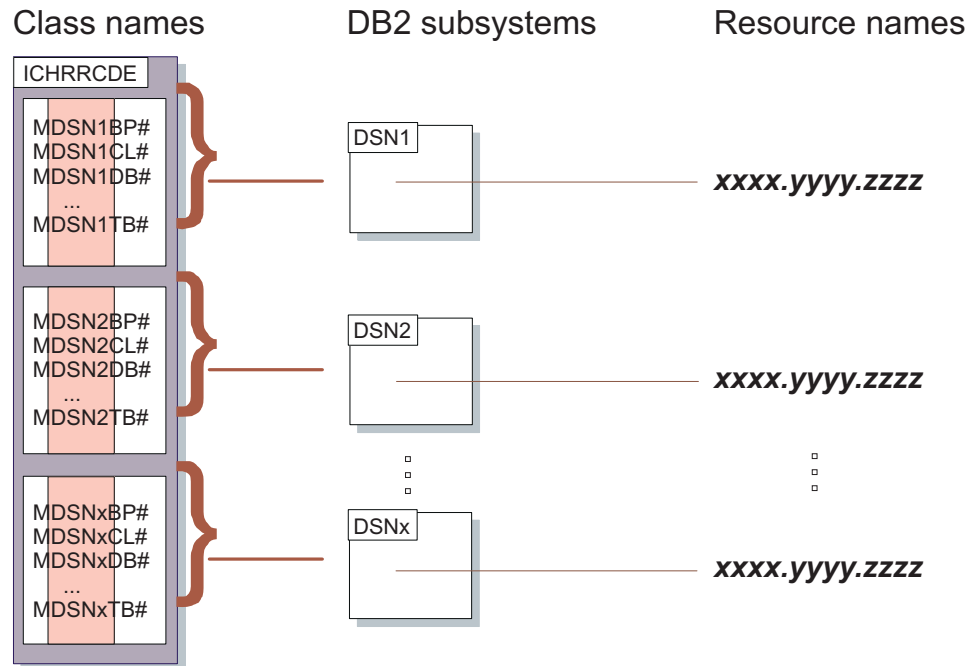


Figure 2. Single-subsystem scope classes

When you use the single-subsystem scope, you cannot use the classes provided in the supplied class descriptor table (ICHRRCDX) unless you are using the default DB2 subsystem name DSN and have altered the &CHAROPT variable in the RACF access control module to be a blank character (' '). However, in single-subsystem scope, you must still define a separate class name for every other subsystem that will share the RACF access control module.

When you define your own classes, you can define two classes for each object type if member and grouping classes are desired. If only one class is defined for each object type, the class name must begin with M (*not* G).

## Defining class names for DB2 objects in multiple-subsystem scope

When you select this model, the RACF access control module places the DB2 subsystem name in the resource name. Class names that you define must have this format:

*abbbbxxz*

where:

*a* Is M for member class or G for grouping class

*bbbb* Is the &CLASSNMT value (the default value is DSN)

*xx* Is the type of DB2 object (see Table 4 on page 22 for valid values)

*z* Is the &CHAROPT value (ignored if &CLASSNMT='DSN')

In multiple-subsystem scope, profile names of resources in the DB2 object classes are prefixed with the DB2 subsystem name, or group attachment name, but the class names are not. See Figure 3 on page 18.

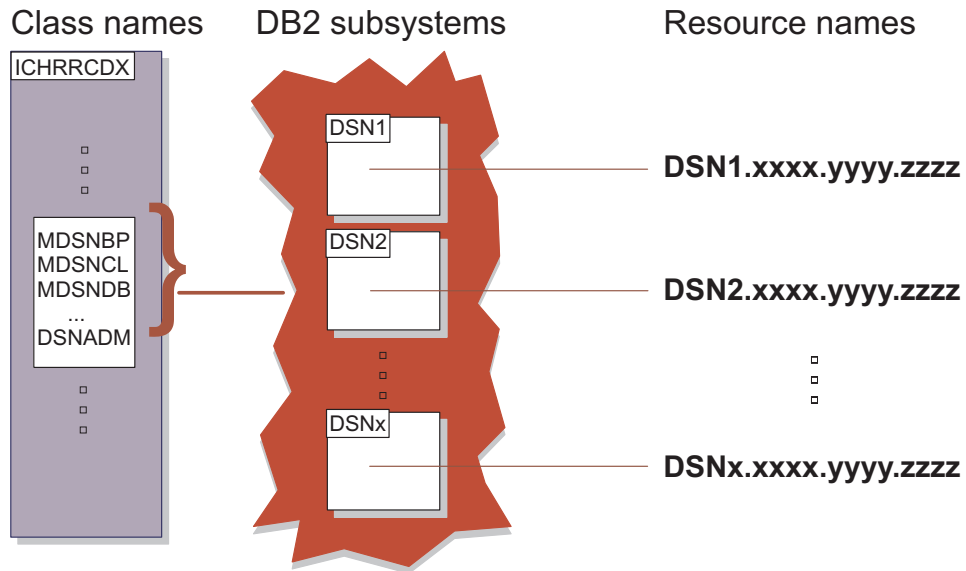


Figure 3. Multiple-subsystem scope classes

If you use the multiple-subsystem scope and the default &CLASSNMT value (DSN), you can use the classes provided in the supplied class descriptor table (ICHRRCDX). Any subsystem sharing the RACF access control module can share the same set of classes. You do not need to define a separate set of classes for each subsystem.

You can change &CLASSNMT if you do not want to use the default (DSN) value. However, if you set &CLASSNMT to a value other than DSN, you must define classes in the class descriptor table (CDT). You can define two classes for each object type if both member and grouping classes are desired. If only one class is defined for each object type, the class name must begin with M (not G).

## Defining class names for administrative authorities

The DB2 administrative authority class (named DSNADM, by default) allows RACF security administrators to create profiles that are suffixed with specific DB2 administrative authorities, to allow users to access certain resources for specified DB2 subsystems or groups. The format is dependent on the scope (&CLASSOPT) specified.

### Defining class names for DB2 administrative authorities in single-subsystem scope

When you select &CLASSOPT 1, the RACF access control module places the DB2 subsystem name, or group attachment name, in the administrative authority class name. Define administrative authority class names in single-subsystem scope using this format:

*yyyyADMz*

where:

<i>yyyy</i>	Is the DB2 subsystem name or, if data sharing, the DB2 group attachment name (from XAPLGPAT)
<b>ADM</b>	Is the designation for administrative authority classes
<i>z</i>	Is the &CHAROPT value (the default value is 1)

In single-subsystem scope, the class names of the DB2 administrative authority classes contain the DB2 subsystem name, or DB2 group attachment name, but the profile names of resources in those classes do not. Therefore, in single-subsystem scope, you must define a separate class name for each subsystem that will use the RACF access control module.

When you select single-subsystem scope, you cannot use the DB2 administrative authority class called DSNADM that is provided in the supplied class descriptor table (ICHRRCDX). You must define your own class in the class descriptor table (CDT), unless you use the default DB2 subsystem name DSN and have altered the &CHAROPT variable in the RACF access control module to be a blank character (' '). However, in single-subsystem scope, you must still define a separate class name for every other subsystem that will share the RACF access control module.

## Defining class names for DB2 administrative authorities in multiple-subsystem scope

When you select &CLASSOPT 2 or allow it to default, the RACF access control module does not use the DB2 subsystem name or group attachment name in the class name for administrative authorities. Define administrative authority class names in multiple-subsystem scope using this format:

*yyyyADMz*

where:

*yyyy*                   Is the &CLASSNMT value (the default value is DSN)

**ADM**                   Is the designation for administrative authority classes

*z*                        Is the &CHAROPT value, which is ignored if &CLASSNMT is set to DSN

In multiple-subsystem scope, profile names of resources in the DB2 administrative authority class are prefixed with the DB2 subsystem name, or DB2 group attachment name, but the class name does not. Therefore, installations using multiple-subsystem scope and the default &CLASSNMT value (DSN) can use the default DB2 administrative authority class (DSNADM) provided in the supplied class descriptor table (ICHRRCDX). Any subsystem sharing the RACF access control module can share the same class. A separate class does not need to be defined for each DB2 subsystem.

If you set &CLASSNMT to a value other than DSN, you must define a DB2 administrative authority class in the class descriptor table (CDT).



---

## Chapter 5. Protecting DB2 objects

The resources that apply to a particular invocation of the RACF access control module depend on the input object type (XAPLTYPE) and the privilege being checked (XAPLPRIV). The object types and the names of their associated privileges are shown in Appendix D, “RACF authorization checking reference,” on page 65. See the DB2 macro DSNXAPRV in *prefix.SDSNMACS* to find the numeric XAPLPRIV values (used by the RACF access control module) that correspond to the privilege names.

The RACF access control module constructs general resource class and profile names for DB2 objects based on the options you specified using the assembler SET symbols:

SET symbol	Default value	Description
&CLASSOPT	2	Specifies the classification model
&CLASSNMT	DSN	Specifies the class name root
&CHAROPT	1	Specifies the class name suffix

The &CLASSOPT, &CLASSNMT, and &CHAROPT options specify the format of the class names and resource profile names used by the RACF access control module. These options are global for each DB2 subsystem, and must be the same for all classes. Each instance of the RACF access control module can only be set up to process one classification model or the other, but not both. See “Choosing the RACF access control module customization options” on page 7 for more information.

If your installation is using the default values for these options, you can use the classes in the supplied class descriptor table (ICHRRCDX). Additional classes do not need to be defined.

Security administrators must define the RACF resources to protect DB2 objects using names that correspond to the format required by the options set in the RACF access control module. The formats for the resource profile names are described in “Defining resource names for DB2 objects” on page 22.

---

### DB2 object types

Each authorization request has an associated DB2 object type. DB2 provides the object type as a 1-character abbreviation in the XAPLTYPE field. This abbreviation is used by the RACF access control module in conjunction with the code for the requested privilege (see *DB2 Administration Guide*) to determine which checking to perform.

A non-valid XAPLTYPE or XAPLPRIV passed to the RACF access control module during authorization checking will cause the RACF access control module to return a return code of 4 (“RACF access not determined; perform DB2 access checking”).

Table 4 on page 22 lists the DB2 objects, the DB2 abbreviations used in the XAPL, and the abbreviations used in the RACF general resource grouping and member class names (GDSNxx and MDSNxx):

Table 4. DB2 object abbreviations

DB2 object	DB2 object abbreviation	RACF class abbreviation
Buffer pool	B	BP
Collection	C	CL
Database	D	DB
Java™ archive (JAR)	J	JR
Package	K	PK
Plan	P	PN
Schema	M	SC
Sequence	Q	SQ
Storage group	S	SG
Stored procedure	O	SP
System	U	SM
Table or index	T	TB
Table space	R	TS
User-defined distinct type	E	UT
User-defined function	F	UF
View	V	TB

---

## Defining resource names for DB2 objects

The RACF access control module builds resource names depending on the classification model being used.

For single-subsystem scope, the general format for resource name is:

*[object-name.]privilege-name*

For multiple-subsystem scope, the general format for resource name is:

*DB2-subsystem.[object-name.]privilege-name*

or, if data sharing,

*DB2-group-attachment-name.[object-name.]privilege-name*

For multiple-subsystem scope, the RACF access control module obtains the DB2 subsystem name, or group attachment name, from XAPLGPAT.

The RACF access control module uses resource names that are based on the object names and the associated privilege names. See “DB2 object types and object names” on page 23 and “Privilege names” on page 24.

## Using generic RACF profiles

You can define a RACF resource that protects one or more DB2 objects that have the same security requirements by using generic RACF profiles. Using generic profiles allows you to exploit naming conventions and greatly reduce the number of RACF profiles you must define. Most generic profiles contain one or more masking characters to replace one or more characters or qualifiers of a resource name. See *z/OS Security Server RACF Security Administrator's Guide* for complete details.



## DB2 object types and object names

The RACF access control module constructs the RACF resources name using information passed in various fields (XAPLOBJN, XAPLOWNQ, XAPLREL1, and XAPLREL2). The content of these fields depends on the input object type, XAPLTYPE.

Table 5 defines the object name qualifiers used in RACF resource names for each DB2 object type:

Table 5. DB2 object name qualifiers for RACF resources

DB2 object	Object name qualifiers
buffer pool	<i>bufferpool-name</i>
collection	<i>collection-ID</i>
database	<i>database-name</i>
Java archive (JAR)	<i>schema-name.JAR-name</i>
package	<i>collection-ID.package-ID</i> <i>collection-ID</i> <i>owner</i>
plan	<i>plan-name</i> <i>owner</i>
schema	<i>schema-name</i> <i>schema-name.function-name</i> <i>schema-name.procedure-name</i> <i>schema-name.type-name</i>
sequence	<i>schema-name.sequence-name</i>
storage group	<i>storage-groupname</i>
stored procedure	<i>schema-name.procedure-name</i>
system	<i>owner</i> (BINDAGENT only)
table, index	<i>table-owner.table-name</i> <i>table-owner.table-name.column-name</i>
table space	<i>database-name.table-space-name</i>
user-defined distinct type	<i>schema-name.type-name</i>
user-defined function	<i>schema-name.function-name</i>
view	<i>view-owner.view-name</i>

**Note:** The format of the DB2 object name qualifiers is defined by DB2. For more information, see *DB2 SQL Reference*.

## Long object names

Some DB2 objects can have names containing up to 128 characters. Because RACF profile names are limited to 246 characters, the RACF access control module might truncate the schema name portion of the profile name to 100 characters when you use long object names. For example, consider the RACF profile name for the USAGE privilege on a JAR object:

*DB2-subsystem.schema-name.JAR-name.USAGE*

The schema name and JAR name can each contain a maximum of 128 characters. If the DB2 subsystem name is four characters, the length of the profile name would

reach 268 characters and exceed the maximum name length unless the RACF access control module truncates schema name to 100 characters.

When you use long object names, consider schema name truncation to avoid unintended results, especially when you also use discrete RACF profiles. If truncation occurs, a single discrete profile might inadvertently protect multiple similarly named resources—if the first 100 characters of the schema names are the identical *and* the qualified object names, such as JAR name, subsystem name, and privilege name, are also identical.

## Privilege names

The RACF access control module constructs the DB2 resource name using the DB2 privilege name as the lowest-level qualifier (RACF profile-name suffix) in the resource name. Each explicit privilege used as a low-level qualifier corresponds to one of the explicit privilege names that DB2 uses for a particular object. For a complete reference of all valid privilege names that can be used in a resource name for each DB2 object, see the tables in Appendix D, “RACF authorization checking reference,” on page 65.

**Tip:** You can authorize a user for one or more privileges on a DB2 object by defining a generic RACF profile using an asterisk (\*) in place of the privilege name and then permitting the user to the generic profile. However, if a more specific generic profile or a discrete profile also protect the same privilege or set of privileges, RACF will use those profiles to control access rather than the less specific generic profile.

See “DB2 GRANT statements” on page 43 for an example of using a generic character in place of the privilege name. (In contrast with SQL, in RACF a single asterisk (\*) matches characters within the scope of a single qualifier.)

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## Chapter 6. Protecting DB2 administrative authorities

The RACF access control module supports the DB2 concept of administrative authorities. DB2 administrative authorities often include privileges that are not explicit, have no name, and cannot be specifically granted. For example, the ability to terminate any utility job is included in the SYSOPR authority.

During authorization checking, if a user is not permitted access to the object through the object's resource profile, subsequent checks are made to determine if the user has been permitted access to system resources through their administrative authorities. These checks are made using profiles in the DB2 administrative authority class. The default name of this class is DSNADM.

*DB2 Administration Guide* documents the set of privileges that each DB2 administrative authority provides. The administrative authorities that apply to a particular invocation of the RACF access control module, depend on the input object type (XAPLTYPE) and the privilege being checked (XAPLPRIV). They are detailed in Appendix D, "RACF authorization checking reference," on page 65.

Like the names used to protect DB2 objects, the general resource class and profile names used to protect DB2 administrative authorities depend on the options specified with the assembler SET symbols.

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### Defining resource names for administrative authorities

The RACF access control module builds the resource names for administrative authorities based on the classification model you selected.

For single-subsystem scope, the format for DB2 administrative authority resources is:

*[object-name.]authority-name*

For multiple-subsystem scope, the general format is:

*DB2-subsystem.[object-name.]authority-name*

or, if data sharing,

*DB2-group-attachment-name.[object-name.]authority-name*

For multiple-subsystem scope, the DB2 subsystem name or DB2 group attachment name is obtained from XAPLGPAT. The object name used depends on the DB2 administrative authority. See Table 6 on page 26.

### DB2 administrative authorities and object names

The RACF access control module constructs the RACF resource name using information passed in various fields (XAPLOBJN, XAPLOWNQ, XAPLREL1, or XAPLREL2). The content of these fields depends on the input object type, XAPLTYPE.

Table 6 on page 26 lists the DB2 administrative authorities and the associated RACF object qualifiers:

Table 6. DB2 administrative authorities and object qualifiers

<b>Administrative authority</b>	<b>RACF object qualifier</b>
DBADM	<i>database-name</i>
DBCTRL	<i>database-name</i>
DBMAINT	<i>database-name</i>
PACKADM	<i>collection-ID</i>
SYSADM	—
SYSCTRL	—
SYSOPR	—

**Note:** The format of the DB2 object names is defined by DB2. For more information, see *DB2 SQL Reference*.

---

## Chapter 7. Making your new RACF resources effective

If your DB2 subsystem was up and running when you defined your new DB2 objects and administrative authorities in Chapter 5, “Protecting DB2 objects,” on page 21 and Chapter 6, “Protecting DB2 administrative authorities,” on page 25, your new resource definitions are not in effect until you take explicit steps to make them effective. In order to be effective, the new RACF resource definitions must be read into storage for RACF access list checking.

Depending on whether the resource classes where you defined the new resources were active and RACLISTed at the time your DB2 subsystem was started, you will execute different sets of commands to put your resource definitions in effect, as shown below.

---

### If the class was not active

When you define new RACF resources to protect DB2 objects in a class that was not active at DB2 startup time, you need to stop the DB2 subsystem, activate and RACLIST the class, and then restart the DB2 subsystem to read the new profiles into storage and allow the new resource definitions to become effective.

**Example:**

From the MVS console, issue the following command:

```
-STOP DB2
```

Issue the following RACF commands:

```
SETROPTS CLASSACT(classname)  
SETROPTS RACLIST(classname)
```

From the MVS console, issue the following command:

```
-START DB2
```

---

### If the class was active and RACLISTed

When the class was active and RACLISTed at DB2 startup time, then you can dynamically refresh all the profiles in storage for this class and allow the new resource definitions to become effective by issuing the following RACF command. In this case, you do not need to restart the DB2 subsystem after you execute the RACLIST command.

**Example:**

Issue the following RACF command:

```
SETROPTS RACLIST(classname) REFRESH
```

---

### If the class was active but not RACLISTed

When the class was active but not RACLISTed at DB2 startup time, you need to stop the DB2 subsystem, RACLIST the class, and then restart the DB2 subsystem to read the new profiles into storage and allow the new resource definitions to become effective.

**Example:**

From the MVS console, issue the following command:

```
-STOP DB2
```

Issue the following RACF command:

```
SETR0PTS RACLIST(classname)
```

From the MVS console, issue the following command:

```
-START DB2
```

---

## Chapter 8. Debugging the RACF access control module

You can use IFCID 0314 to provide a trace record of the parameter list on return from the RACF access control module. Activate this trace by turning on performance trace class 22. See *DB2 Command Reference* for information about the DB2 performance trace.

You can correlate IFCID 0314 records and RACF SMF records by timestamp to determine which SMF record is associated with each IFCID record.

For more information about debugging the RACF access control module, see *DB2 Administration Guide*.

---

### Dump titles for the RACF access control module

The RACF access control module generates the following dump titles:

```
COMPON=DB2,COMPID=5740DRE00,ISSUER=DSNX@FRR,MODULE=DSNX@XAC,  
ABEND=S0sss,REASON=NONE      ,L=zzzzzzzz
```

```
COMPON=DB2,COMPID=5740DRE00,ISSUER=DSNX@FRR,MODULE=DSNX@XAC,  
ABEND=S0sss,REASON=aaaaaaaa,L=zzzzzzzz
```

```
COMPON=DB2,COMPID=5740DRE00,ISSUER=DSNX@FRR,MODULE=DSNX@XAC,  
ABEND=Uuuuu,REASON=NONE      ,L=zzzzzzzz
```

```
COMPON=DB2,COMPID=5740DRE00,ISSUER=DSNX@FRR,MODULE=DSNX@XAC,  
ABEND=Uuuuu,REASON=aaaaaaaa,L=zzzzzzzz
```

where:

sss is the system abend code

uuuu is the user abend code

aaaaaaaa is the abend reason code

zzzzzzzz is the module length

---

### Using the content of XAPLDIAG

The RACF access control module returns a parameter, XAPLDIAG, that DB2 and other program products can use to trap and obtain diagnostic information. When the RACF access control module issues the RACROUTE REQUEST=FASTAUTH macro for authorization checking, depending on the AUDIT options used with the check, the module can record the resulting SAF return code, RACF return code, and RACF reason code in XAPLDIAG. Each invocation of the RACF access control module can issue multiple RACROUTE REQUEST=FASTAUTH macros, but the module evaluates each return code generated and determines the single correct return code to send to DB2. (See “Authorization return and reason codes” on page 53.)

The RACF access control module can store up to 20 sets of return codes from RACROUTE REQUEST=FASTAUTH macros in XAPLDIAG, allowing the results of a specific RACROUTE REQUEST=FASTAUTH macro to be determined.

The XAPL parameter list can be captured using DB2 trace record IFCID 314. In addition, the return code and corresponding reason code (EXPLRC1 and

EXPLRC2) for authorization failures are captured in DB2 trace record IFCID 140. The DB2 trace facility is documented in *DB2 Command Reference*.

The content of XAPLDIAG depends on the return code and reason code from the RACF access control module.

- If EXPLRC1=4 and ECPLRC2=14 (decimal), the ALESERV failed and the module made no RACROUTE REQUEST=FASTAUTH checks. In this case the first word of XAPLDIAG contains the non-zero ALESERV return code.
- Otherwise, each word of XAPLDIAG can contain a SAF return code, RACF return code, and RACF reason code corresponding to a non-zero return code from a RACROUTE REQUEST=FASTAUTH macro. Information related to non-zero return codes is stored in XAPLDIAG beginning with the first word until information related to all non-zero return codes has been stored, or until the XAPLDIAG area has filled. XAPLDIAG contains 20 words, allowing information related to 20 FASTAUTH requests to be stored for an invocation of the RACF access control module. If more than 20 FASTAUTH requests are issued, only the first 20 sets of return codes are stored.

DBADM authorization checking for the CREATE VIEW privilege may result in more than 20 FASTAUTH requests because a CREATE VIEW request may reference tables, or a combination of tables and views, from multiple databases. DB2 passes the names of all the databases referenced in the CREATE VIEW using a database list pointed to by XAPLDBSP. If SYSCTRL or SYSADM authorization checking does not grant the CREATE VIEW privilege and the XAPLCRVW field indicates that DBACRVW is enabled, the RACF access control module checks the user's DBADM authorization for each database in the list. The result of each DBADM check is placed in the XAPLDBDA field associated with each database. The RACF access control module updates XAPLDBDA with the following codes:

- Y** Access to the database is allowed.
- N** Access to the database is not allowed.
- U** RACF was unable to return a decision. This occurs when the FASTAUTH request returns a SAF return code of X'04'.

The database list pointed to by XAPLDBSP is made up of four-word database information structures mapped by the XAPLDBS macro.

```
XAPLDBNP DS F PTR TO NEXT DATABASE INFORMATION STRUCTURE
XAPLDBNM DS CL8 DATABASE NAME
XAPLDBDA DS CL1 'Y' - IS DBADM
XAPLRV5 DS CL3 RESERVED - UNUSED
```

Although DBADM checks may be done for multiple databases, only the results of the first 20 FASTAUTH requests are stored in XAPLDIAG. The results of all DBADM checking for each database is contained in the XAPL parameter list and is available using DB2 trace record IFCID 314.

The RACF access control module truncates the SAF return codes and RACF return codes to one byte, and the RACF reason code to two bytes, before storing them in XAPLDIAG. The format of each word in XAPLDIAG is:

*xyyzzzz*

where:

<i>xx</i>	is the 1-byte SAF return code
<i>yy</i>	is the 1-byte RACF return code
<i>zzzz</i>	is the 2-byte RACF reason code



For a list of the RACF return codes and reason codes and their meanings, see the RACROUTE REQUEST=FASTAUTH section of *z/OS Security Server RACROUTE Macro Reference*.

For additional information on common problems that can occur as a result of adding installation-defined classes to the class descriptor table (CDT) for DB2 objects, see “Common problems and considerations” on page 49.

## Parameter list for the access control authorization routine

Figure 4 shows how the parameter list points to other information.

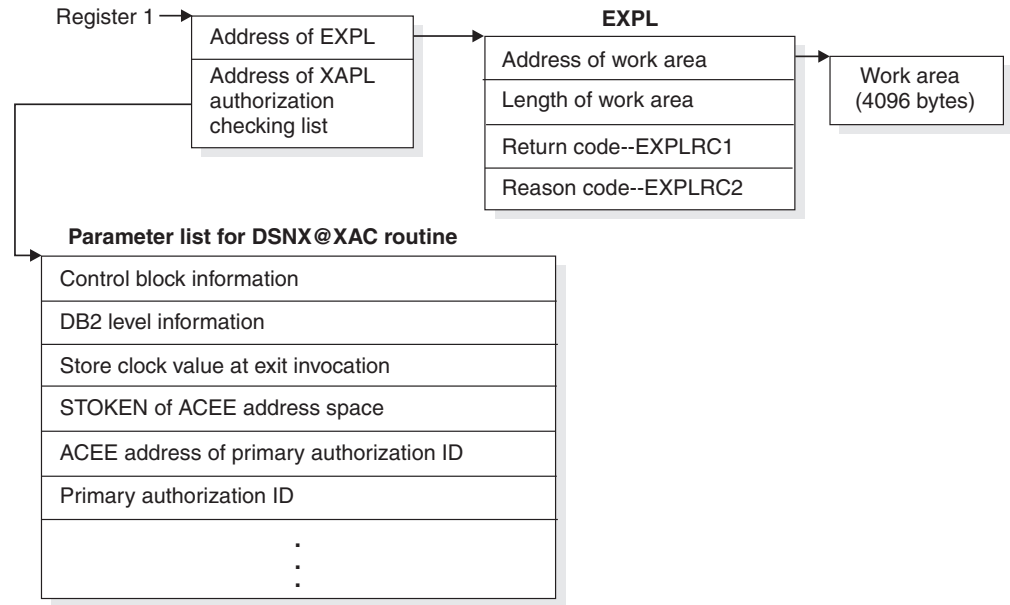


Figure 4. How an authorization routine's parameter list points to other information

The work area (4096 bytes) is obtained once during the startup of DB2 and only released when DB2 is shut down. The work area is shared by all invocations of the RACF access control module. See *DB2 Administration Guide* for exit-specific parameter information.



---

## Chapter 9. Auditing for the RACF access control module

The RACF access control module allows you to use RACF resource profiles to check authorization for DB2 privileges and authorities. With these profiles, which represent the various DB2 privileges, you can use the RACF auditing tools to extract the information you need.

You can use the SMF data unload utility or the RACF report writer to extract and format the SMF records. When the RACF access control module uses a RACROUTE REQUEST=FASTAUTH request to create an audit record, the record contains log string data that includes additional diagnosis information described in “Using log string data” on page 34. You can use the log string information to link DB2 trace record IFCID 314 and a corresponding RACF SMF record.

In addition, you can use the RACF informational messages. For more information, see “Using RACF informational messages” on page 13.

---

### Example of resource checking

The following example shows the series of RACF resources that are checked when a user issues the SELECT statement.

When RACF checks authorization, the requestor must own the object or have at least READ access to one of the following profiles:

Profile name	Class	Note
<i>subsystem.table-name.table-owner</i> .SELECT	MDSNTB	Gives access to the table
<i>subsystem.database-name</i> .DBADM	DSNADM	Gives access to the database that holds the table
<i>subsystem</i> .SYSCTRL	DSNADM	Bypassed for user tables
<i>subsystem</i> .SYSADM	DSNADM	—

RACF produces an SMF record for a failure only after checking the entire list of profiles and the requestor fails to meet any of the requirements. RACF does not produce an audit record if:

- The requestor meets any of the requirements and access is granted, or
- The RACF access control module returns the authority checking responsibility to DB2.

If DB2 objects were defined to RACF using the WARNING option, you will see ICH408I messages that identify those profiles that would fail a request and the requested access will be allowed.

If the WARN option is added to a resource that is requested by a user with a DB2 administrative authority, such as SYSADM, DBADM or in some cases, SYSCTRL, that normally allows the user to access the object, the user can ignore the WARNING message.

An audit record is produced for the first resource that has auditing indicated by the covering profile and receives a return code of 8.

RACF produces an SMF record for a success when the requestor indicates that should be preformed.

For a list of the RACF classes, see Appendix B, “Supplied RACF resource classes for DB2,” on page 57. For a full list of each RACF resource checked for each privilege, see Appendix D, “RACF authorization checking reference,” on page 65.

---

## Using log string data

The log string data consists of information that can help you audit DB2 successfully. DB2 uses the XAPL parameter list (DSNDXAPL macro) to pass log string information to the RACF access control module. The LOGSTR= parameter of the RACROUTE REQUEST=FASTAUTH request contains the input portion of XAPL and does the following:

- Identifies the RACF access control module request that caused RACF to create the audit record. The RACF profile causing the audit record to be cut could be a profile that provides a DB2 administrative authority and might not identify the specific DB2 resource being accessed. The log string data contains values from the XAPL parameter list that are necessary to identify that unique request from the RACF access control module.
- Links SMF type 80 records with DB2 IFCID 314 records. Each invocation of the RACF access control module might produce an SMF type 80 record. DB2 might produce a DB2 IFCID 314 record in addition to the SMF type 80 records cut by RACF. You can determine that the records were cut for the same RACF access control module request if the LOGSTR\_TIME and LOGSTR\_USER values in the SMF type 80 record match the XAPLSTCK and XAPLUPRM values in the IFCID 314 request. The RACF access control module uses these time and user values created from the log string data to link the RACF and DB2 information.

Table 7 shows the ordered information included in log string data. A blank space separates each field, as indicated in the table.

*Table 7. Information contained in log string data*

Log string data	Length	XAPL field name	Description
LOGSTR_DATA	DS 0CL241		
LOGSTR_TIME	DS CL8	XAPLSTCK	Time
	DS CL1		
LOGSTR_USER	DS CL8	XAPLUPRM	User
	DS CL1		
LOGSTR_SUBSYSTEM	DS CL4	XAPLGPAT	Subsystem name, or if data sharing, DB2 group attachment name
	DS CL1		
LOGSTR_OBJTYPE	DS CL1	XAPLTYPE	Object type
	DS CL1		

Table 7. Information contained in log string data (continued)

Log string data	Length	XAPL field name	Description
LOGSTR_FLAGS	DS 0CL16	XAPLFLG1	<p><b>Flags:</b> The flags in this field are declared as BL1. The field is translated to CL16 in the LOGSTR data field and contains one character for each bit with a blank character between each one.</p> <ul style="list-style-type: none"> <li>• If the bit is on, Y is inserted.</li> <li>• If the bit is off, N is inserted.</li> <li>• Reserved bits are left blank.</li> </ul>
LOGSTR_SECNDRY_ID	DS CL1		Secondary ID (Y or N)
	DS CL1		
LOGSTR_USERTAB	DS CL1		User table (Y or N)
	DS CL1		
LOGSTR_AUTOBIND	DS CL1		Autobind authority check (Y or N)
	DS CL1		
LOGSTR_DBCRTVW	DS CL1		DBADM authority to create views for others (Y or N)
	DS CL1		
LOGSTR_RDRW	DS CL1		Read/write request (Y or N)
	DS CL1		
LOGSTR_NOAUDIT	DS CL1		Suppress failure records (Y or N)
	DS CL5		
LOGSTR_OBJNAME	DS CL20	XAPLOBJN	Object name: This is the first 20 bytes of the XAPLOBJN field.
	DS CL1		
LOGSTR_OBJOWNER	DS CL20	XAPLOWNQ	Object owner or qualifier: This is the first 20 bytes of the XAPLOWNQ field.
	DS CL1		
LOGSTR_REL1	DS CL20	XAPLREL1	Related information 1: This is the first 20 bytes of the XAPLREL1 field.
	DS CL1		
LOGSTR_REL2	DS CL20	XAPLREL2	Related information 2: This is the first 20 bytes of the XAPLREL2 field.
	DS CL1		
LOGSTR_PRIV	DS CL3	XAPLPRIV	Privilege
	DS CL1		
LOGSTR_SOURCE	DS CL1	XAPLFROM	Source of the request
	DS CL1		
LOGSTR_CLASS	DS CL8		Class name
	DS CL1		
LOGSTR_ENTY	DS CL100		Entity name: This is the first resource checked for a specific request.

---

## Examples for setting audit controls for DB2

The RACF access control module attempts to produce an audit record after checking the list of profiles.

### Example 1

In this example, user ROGERM wants to use the SQL SELECT statement to retrieve information from table ICH in database DSNDB04 on the DB2 subsystem named DSN. The owner of the table is LOVES. (Refer to Appendix D, “RACF authorization checking reference” for the summary of table checking for the privilege “SELECT” on page 95.)

1. Does ROGERM own the table?

Because ROGERM does not own the table, the table name qualifier passed from DB2 does not match the user ID. In this case, RACF does not check a profile, so no audit record is written.

2. Does ROGERM have SELECT authority?

RACF checks DSN.LOVES.ICH.SELECT in classes MDSNTB and GDSNTB. ROGERM does not have the required SELECT authority. If ROGERM doesn't meet any of the other requirements, this is the “first failing resource.”

3. Does ROGERM have database administrator authority?

RACF checks DSN.DSNDB04.DBADM in class DSNADM. ROGERM does not have this authority.

4. Does ROGERM have system administrator authority?

RACF checks DSN.SYSADM in class DSNADM. ROGERM does not have this authority.

Because ROGERM has none of the required authorities, RACF produces SMF records relating to the first failure it encountered. Although ROGERM didn't own the table, no profiles were checked and failures were not audited. Therefore, the first failing resource is DSN.LOVES.ICH.SELECT. RACF produces an audit record for this resource and identifies it in message DSN408I. The data is contained in the log string information and can be used in a report.

### Example 2

In this example, user ROGERM issues a START DATABASE(DSNDB04) request for DB2 subsystem DSN. (Refer to Appendix D, “RACF authorization checking reference” for the summary of database checking for the privilege “STARTDB” on page 73.)

1. Does ROGERM have STARTDB authority?

RACF checks DSN.DSNDB04.STARTDB in classes MDSNDB and GDSNDB. ROGERM does not have the required STARTDB authority. If ROGERM doesn't meet any of the other requirements, this is the “first failing resource.”

2. Does ROGERM have database maintenance authority?

RACF checks DSN.DSNDB04.DBMAINT in class DSNADM. ROGERM does not have the required DBMAINT authority.

3. Does ROGERM have database control authority?

RACF checks DSN.DSNDB04.DBCTRL in class DSNADM. ROGERM does not have the required DBCTRL authority.

4. Does ROGERM have database administrator authority?

RACF checks DSN.DSNDB04.DBADM in class DSNADM. ROGERM does not have the required DBADM authority.

5. Does ROGERM have system control authority?  
RACF checks DSN.SYSCTRL in class DSNADM. ROGERM does not have this authority.
6. Does ROGERM have system administrator authority?  
RACF checks DSN.SYSADM in class DSNADM. ROGERM does not have this authority.

Because ROGERM has none of the sufficient authorities, RACF produces SMF records relating to the failure. The failure record is written for resource DSN.DSNDB04.STARTDB, which was the first failing resource. The log string information can help you to determine what ROGERM wanted to do. It includes the object type, object name, and privilege, which you can use in a report.





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## Chapter 10. Special considerations

Matching schema names . . . . .	39
Materialized query tables . . . . .	40
DB2 data sharing . . . . .	40
PUBLIC* . . . . .	40
Implicit privileges of ownership . . . . .	40
CREATETMTAB privilege . . . . .	41
CREATE VIEW privilege . . . . .	42
CREATE ALIAS privilege . . . . .	42
"Any table" privilege . . . . .	42
"Any schema" privilege . . . . .	42
UPDATE and REFERENCES authorization on DB2 table columns . . . . .	43
The XAPLDIAG output parameter . . . . .	43
DB2 aliases for system-directed access . . . . .	43
Considerations for remote and local resources . . . . .	43
DB2 GRANT statements . . . . .	43
DB2 object names with blank characters . . . . .	44
DB2 object names with special characters . . . . .	44
Authority checking for all packages in a collection . . . . .	44
AUTOBIND requests for user-defined functions . . . . .	45
Identity used for authorization checks . . . . .	45
When DB2 cannot provide an ACEE . . . . .	46
Authorization ID, ACEE relationship . . . . .	46
Invalid or inoperative plans and packages . . . . .	46
Dropping views . . . . .	46
Caching of EXECUTE on plans . . . . .	47
Caching of EXECUTE on packages and routines . . . . .	47
Caching of dynamic SQL statements . . . . .	47
Resolution of user-defined functions . . . . .	47
Initialization . . . . .	47
Failure to initialize . . . . .	48
Return codes and reason codes from initialization . . . . .	48
Deferring to native DB2 authorization . . . . .	48
Removing the RACF access control module . . . . .	48
Common problems and considerations . . . . .	49

In certain instances, the RACF authorization checking done by the RACF access control module is different from the authorization checking done by DB2. These instances are described in this section, along with other DB2 authorization considerations.

---

### Matching schema names

Certain privileges associated with schema objects (such as user-defined functions, user-defined distinct types, and stored procedures), can be given if the user identity *matches* the schema name. The schema name is a short SQL identifier used as a qualifier in the name of schema objects and creates a logical grouping of these objects. It is often, but not always, a DB2 authorization ID. For applicable privileges, RACF access control module will look for a match on schema name before checking RACF profiles.

For authorization checking of the CREATEIN schema privilege, the RACF access control module first checks to see if the user identity in fields XAPLUCHK and

XAPLUPRM matches the schema name in XAPLOBJN. If those two fields are equal, the RACF access control module allows the access. For all other schema privileges, the RACF access control module first checks to see if the user identity in XAPLUCHK matches the schema name in XAPLOWNQ. If those two fields are equal, the RACF access control module allows the access. In each case, when the RACF access control module allows access, it returns a return code 0 in EXPLRC1 and reason code 14 in EXPLRC2, and no further checking occurs. If the RACF access control module does not allow the access, profile checking occurs. See Appendix D, “RACF authorization checking reference,” on page 65 for details.

**Restriction:** On multilevel-secure systems with RACF SETROPTS MLS option active, the schema match check is not performed.

---

## Materialized query tables

When a materialized query table is created, a create view (CRTVUAUTT) authorization check is performed. The CRTVUAUTT check is used to determine whether the creator of a materialized query table can provide the required SELECT privileges on base tables to the owner of the materialized query table. If the owner of the materialized query table has the required privileges, then the CRTVUAUTT authorization check proves redundant. However, the check is performed before the owner of the materialized query table's privileges are determined. Therefore, if the materialized query table owner holds the necessary privileges and the creator of the materialized query table does not, the CRTVUAUTT check can produce unwanted error messages. To suppress these unwanted error messages, XAPLFSUP is turned on to indicate that the RACF access control module should suppress these messages.

---

## DB2 data sharing

The RACF access control module can be used with DB2 data sharing. When DB2 has been configured for data sharing, it will pass the RACF access control module the name of the DB2 data sharing group name in place of the DB2 subsystem name. As a result, class names and profile names must be defined with the DB2 data sharing group name in place of the DB2 subsystem name. To use the RACF access control module in this environment, all systems in the DB2 data sharing group must share the same RACF database.

For more information on DB2 data sharing, see *DB2 Data Sharing: Planning and Administration*.

---

## PUBLIC\*

The RACF access control module does not directly support use of the DB2 authorization name PUBLIC\*, which means PUBLIC AT ALL LOCATIONS and is the DB2 value that represents all users in the network. However, you can define a resource profile using generic characters in multiple-subsystem scope in place of the DB2 subsystem name, with the appropriate UACC level for the object. This profile would then allow all users from all subsystems to access the resource as desired.

---

## Implicit privileges of ownership

When the user is the owner of a DB2 object, the user may have some implicit privileges, but not all privileges associated with the object. The RACF access control module supports certain implicit privileges of ownership for the following DB2 objects and associated privileges.

Table 8. DB2 objects and privileges associated with implicit ownership

DB2 object	Owner field	Implicit privileges
Java archive (JAR)	XAPLREL1	USAGE
Package	XAPLREL1	BIND, COMMENT ON, and COPY
Plan	XAPLOWNQ	BIND and COMMENT ON
Schema	XAPLREL1	ALTERIN, COMMENT ON, and DROPIN
Sequence	XAPLREL1	ALTER, COMMENT ON, and USAGE
Stored procedure	XAPLREL1	DISPLAY, EXECUTE, START, and STOP
Table	XAPLOWNQ	All privileges except CREATE SYNONYM, DROP SYNONYM, and CREATE VIEW
User-defined distinct type	XAPLREL1	USAGE
User-defined function	XAPLREL1	DISPLAY, EXECUTE, START, and STOP
View	XAPLOWNQ	COMMENT ON and DROP

To check authorization for the privileges associated with implicit ownership, the RACF access control module first checks to see if XAPLUCHK or XAPLUPRM matches the value passed in the owner field. (See Table 8 for the name of the field that DB2 uses to pass owner information for each object type.) If either of these two fields are equal, the RACF access control module authorizes access and returns a return code 0 in EXPLRC1 and reason code 13 in EXPLRC2. If this check fails, a check is made to see if XAPLUCHK equals the owner field (“does the current SQL ID equal the owner of the object?”). If these two fields are equal, access is allowed. If this check fails, profile checking will occur.

**Restriction:** On multilevel-secure systems with RACF SETROPTS MLS option active, the ownership check is not performed.

---

## CREATETMTAB privilege

In DB2, the DBMAINT, DBCTRL, and DBADM administrative authorities are sufficient for the CREATETMTAB privilege. However, with the RACF access control module, a user must have at least *one* of the following privileges or authorities:

1. The CREATETMTAB privilege
2. The CREATETAB privilege
3. SYSCTRL authority
4. SYSADM authority

For the exact class and resource names, see Appendix D, “RACF authorization checking reference,” on page 65.

---

## CREATE VIEW privilege

If the installation option DBADM CREATE AUTH on panel DSNTIPP (ZPARM DBACRVW) is set to YES during DB2 installation, users with DBADM privilege for a database may be allowed to create views for others. See *DB2 Administration Guide* for information about other privileges required to create a view.

When a view is based on tables or a combination of tables and views from more than one database, the view creator must have DBADM for at least one database that contains a table referenced in the view.

If SYSCTRL or SYSADM authorization checking does not allow the CREATE VIEW privilege, and the XAPLCRVW field indicates that DBACRVW is enabled, the RACF access control module checks the user's DBADM authorization for each database in the list. The result of each DBADM check is placed in the XAPLDBDA field associated with each database. See Chapter 8, "Debugging the RACF access control module," on page 29 for information about capturing the results from the RACF access control module.

---

## CREATE ALIAS privilege

If the installation option DBADM CREATE AUTH on panel DSNTIPP (ZPARM DBACRVW) is set to YES during DB2 installation, users with DBADM or DBCTRL privilege for a database may be allowed to create aliases for others. See *DB2 Administration Guide* for information about other privileges required to create an alias.

If SYSCTRL or SYSADM authorization checking does not allow the CREATE VIEW privilege, and the XAPLCRVW field indicates that DBACRVW is enabled, the RACF access control module checks the user's DBADM and DBCTRL authorization for the database. The result of each DBADM and DBCTRL check is placed in the XAPLDBDA field associated with each database. See Chapter 8, "Debugging the RACF access control module," on page 29 for information about capturing the results from the RACF access control module.

---

## "Any table" privilege

In DB2, the UPDATE or REFERENCES privilege for a specific column is sufficient to allow the "any table" privilege. When the RACF access control module is invoked for the "any table" privilege, having the UPDATE privilege or the REFERENCES privilege is not sufficient to provide the user with the "any table" privilege.

---

## "Any schema" privilege

RACF does not perform authorization checks looking for "all privileges on all schemas" as DB2 does for the CREATEIN, ALTERIN, DROPIN, and COMMENT ON privileges on schemas; nor does RACF look for "all privileges on all stored procedures" as DB2 does for the EXECUTE privilege for stored procedures. Note that RACF generic profiles can be used to define protection for sets of similarly named schemas and stored procedures. RACF variables and RACF grouping profiles may be used for the protection attributed of schemas and stored procedures that are not similarly named.

---

## UPDATE and REFERENCES authorization on DB2 table columns

The RACF access control module handles UPDATE and REFERENCES authorizations associated with columns by first checking for access to the entire table (example: *table.UPDATE*) and if not permitted, then to each individual column (example: *table.column.UPDATE*).

When performing an authorization check on a column privilege, the RACF access control module informs DB2 if access is allowed because it is allowed on the whole table or through an individual column. In DB2, this check is performed using fields UPDATECOLS and REFCOLS. The RACF access control module returns a value to DB2 in output field XAPLONWT.

When performing the authorization check on the entire table and authorization is given to the requestor, the RACF access control module returns a blank ( ' ') in the output field XAPLONWT and sends a return code of 0.

If the authorization is given for a particular column or set of columns using a generic profile, the RACF access control module returns an asterisk (\*) in output field XAPLONWT and sends a return code of 0. DB2 provides the column name included in XAPLREL1 to the RACF access control module.

---

## The XAPLDIAG output parameter

The output parameter XAPLDIAG is used to contain return codes and reason codes. When a RACROUTE REQUEST=FASTAUTH check fails to grant access, the RACF access control module records the failing SAF return code, RACF return and reason codes in XAPLDIAG. Each word of XAPLDIAG contains a FASTAUTH SAF return code (1 byte), the RACF return code (1 byte) and the RACF reason code (2 bytes), from left to right. All return codes and reason codes are shown in hexadecimal. In this way, DB2 or other programs have a way to trap and obtain diagnostic information.

See Chapter 8, “Debugging the RACF access control module,” on page 29 for more information.

---

## DB2 aliases for system-directed access

RACF applies protection to the base object, not to a DB2 alias. This is because DB2 authorization checks are made using the base object name, not the alias. By the time the RACF access control module is passed the object name, it has already been resolved from the alias name to the base name.

---

## Considerations for remote and local resources

The RACF entity check is always performed for local resources. Remote resources are always checked by the remote DB2. This also occurs when binding an application that accesses remote resources.

---

## DB2 GRANT statements

The RACF access control module provides RACF authorization checking of all privileges for all DB2 objects listed in “Privilege names” on page 24. However, the RACF access control module does not call RACF for DB2 **GRANT** statement checking but instead defers to DB2 authorization checking. When RACF is called by

the RACF access control module, it does not use DB2 authorizations given using DB2 **GRANT** statements but uses only the resources you defined to RACF.

Structured Query Language (SQL) allows authorities to be held with the WITH GRANT option, which allows users to GRANT those privileges to others. The RACF access control module does not provide this support.

SQL supports the GRANT ALL privilege for any DB2 object. When you use the RACF access control module, you can issue a generic RACF **PERMIT** command to provide the equivalent support. The following command authorizes a user to all DB2 privileges on a DB2 table.

**Example:**

```
PERMIT DB2-subsystem.table-owner.table-name.* CLASS (MDSNTB) ID(userid) ACCESS(READ)
```

---

## DB2 object names with blank characters

In DB2, it is possible to use delimited identifiers to create DB2 object names containing blank characters. However, RACF resource names cannot contain blank characters. As a result, when the RACF access control module encounters a DB2 object name containing blank characters, it will translate the blank characters to underscores (`_`, X'6D') before performing security checking. To protect DB2 objects containing blanks, you must define RACF profiles that will match an underscore (either explicitly or via generics) in place of the blank characters.

---

## DB2 object names with special characters

In DB2, it is possible to use delimited identifiers to create DB2 object names containing any character in the EBCDIC syntactic character set. However, RACF does not allow the use of commas, semicolons, or parentheses in resource names. To protect DB2 objects containing these characters (or any other characters that are not allowed by the RACF command processors), you need to define RACF profiles containing generic characters that will match the unsupported characters.

---

## Authority checking for all packages in a collection

The naming convention for DB2 package objects is:

```
subsystem-name.collection-ID.package-ID.privilege-name
```

When a DB2 user tries to perform an operation on all packages in a collection, DB2 may pass an asterisk (\*) to the RACF access control module in place of *package-ID*. To ensure consistent results between the RACF access control module and the RACF command processors (SEARCH and RLIST), the asterisk (\*) in the resource name should match the asterisk (\*) in the profile name.

For example, in DB2, you can BIND a plan using all of the packages from a given collection. When that plan is subsequently executed, DB2 will check the user's authority to execute all packages in the collection by passing an asterisk (\*) in place of the collection name. For example, suppose the following DB2 commands are issued for subsystem DSN:

```
BIND PACKAGE (DSNTEP2) MEMBER(DSNTEP2) ACT(REP) ISO(CS)
BIND PLAN(DSNTEP42) PKLIST(DSNTEP2.*) ACT(REP) ISO(CS)
RUN PROGRAM(DSNTEP2) PLAN(DSNTEP42) -
```



When DB2 gets to the execution step, it invokes the RACF access control module to check the user's authority to EXECUTE package DSNTEP2.\*, where the asterisk (\*) means all packages in the collection.

The RACF access control module checks the user's authority to resource:

```
DSN.DSNTEP2.*.EXECUTE      (in class MDSNPK)
```

The RACF profile name protecting this resource should contain a single asterisk (\*) to match the asterisk (\*) in the resource name.

---

## AUTOBIND requests for user-defined functions

RACF fails all authorization checks associated with AUTOBIND requests for user-defined functions. That is, when:

- XAPLAUTO (in XAPLFLG1) is non-zero,
- XAPLTYPE indicates a function ("F"), and
- XAPLPRIV is 64 (EXECUTE)

then a return code 8 and reason code 17 are returned, and no resource check is performed. This causes the AUTOBIND request to fail. A manual REBIND is then required.

---

## Identity used for authorization checks

The RACF access control module receives user identification information in the XAPL (DSNXAPL) parameter list that is passed by DB2. In the XAPL, the RACF access control module receives:

- a pointer to the input ACEE that represents the identity of the requester (XAPLUPRM).
- the 1–8-character user ID of the requester (XAPLUPRM).

**Note:** The XAPLUPRM value is used for all RACF authorization checking, although RACF actually checks the input ACEE itself to determine this identity. The identity represented by the ACEE is the same as the user ID passed in XAPLUPRM.

- the 1–128-character authorization ID (XAPLUCHK) that DB2 uses for the authorization check. The XAPLUCHK may contain a value that is not a RACF user ID or group, and it may differ from the XAPLUPRM.

While the RACF access control module uses the XAPLUCHK and XAPLUPRM values to perform ownership checks, it performs all access authorization checks using only XAPLUPRM.

It is possible for the XAPLUCHK value to be different from the user ID (XAPLUPRM) represented in the ACEE pointed to by XAPLACEE. For example, this can occur when a BIND request is issued and the binder is not the owner of the plan or package. The RACF access control module is invoked to determine whether the binder is authorized to do the BIND. If this check is successful, it is then invoked to check the binder's authorization to access each DB2 resource accessed in the plan or package. For the BIND check, XAPLUPRM and XAPLUCHK have the authorization ID of the binder. However, for the subsequent checks on the DB2 resources accessed in the plan or package, XAPLUPRM still has the authorization ID of the binder, but XAPLUCHK now has the authorization ID of the plan or package owner. For the BIND to succeed, the binder must have authorization to bind this plan or package, and be authorized to access all DB2

resources accessed in it. DB2 authorization performs the subsequent checks on the owner of the plan/package and not the binder.

---

## When DB2 cannot provide an ACEE

Sometimes DB2 cannot provide an ACEE. For example, if you are not using external security in CICS® (for example, SEC=NO is specified in the DFHSIT), CICS does not pass an ACEE to the CICS attachment facility. When DB2 does not have an ACEE, it passes zeros in the XAPLACEE field. If this happens, your routine can return a 4 in the EXPLRC1 field, and let DB2 handle the authorization check.

### Restrictions:

1. The ACEE address is not passed for IMS™ transactions.
2. The ACEE address is passed for CICS transactions, when available. If you implement the DB2 CICS attachment facility and CICS is configured to use an external security manager, such as RACF, DB2 passes the ACEE address, if available.
3. The ACEE address is passed for DB2 commands, when available. If the master console is used, DB2 does not pass the ACEE address because an ACEE is not available. However, if the user signs on to an MVS operator console, DB2 passes the ACEE address, if available.

---

## Authorization ID, ACEE relationship

XAPL has two authorization ID fields, XAPLUPRM (the primary authorization ID) and XAPLUCHK (the authorization ID that DB2 uses to perform the authorization). These two fields might have different values.

The ACEE passed in XAPLACEE is that of the primary authorization ID, XAPLUPRM.

---

## Invalid or inoperative plans and packages

In DB2, when a privilege required by a plan or package is revoked, the plan or package is invalidated. If you use an authorization access control routine, it cannot tell DB2 that a privilege is revoked. Therefore, DB2 cannot know to invalidate the plan or package.

If the revoked privilege was EXECUTE on a user-defined function, DB2 marks the plan or package inoperative instead of invalid.

If a privilege that the plan or package depends on is revoked, and if you want to invalidate the plan or package or make it inoperative, you must use the SQL GRANT statement to grant the revoked privilege and then use the SQL REVOKE statement to revoke it.

---

## Dropping views

In DB2, when a privilege required to create a view is revoked the view is dropped. Similar to the revocation of plan privileges, such an event is not communicated to DB2 by the authorization checking routine.

If you want DB2 to drop the view when a privilege is revoked, you must use the SQL statements GRANT and REVOKE.



---

## Caching of EXECUTE on plans

The results of authorization checks on the EXECUTE privilege are not cached when those checks are performed by the exit routine.

---

## Caching of EXECUTE on packages and routines

The results of authorization checks on the EXECUTE privilege for packages and routines are cached (assuming that package and routine authorization caching is enabled on your system). If this privilege is revoked in the exit routine, the cached information is not updated to reflect the revoke. You must use the SQL GRANT and REVOKE statements to update the cached information.

---

## Caching of dynamic SQL statements

Dynamic statements can be cached when they have passed the authorization checks (assuming that dynamic statement caching is enabled on your system). If the privileges that this statement requires are revoked from the authorization ID that is cached with the statement, then this cached statement must be invalidated. If the privilege is revoked in the exit routine this does not happen, and you must use the SQL statements GRANT and REVOKE to refresh the cache.

---

## Resolution of user-defined functions

The create timestamp for the user-defined function must be older than the bind timestamp for the package or plan in which the user-defined function is invoked. If DB2 authorization checking is in effect, and DB2 performs an automatic rebind on a plan or package that invokes a user-defined function, any user-defined functions that were created after the original BIND or REBIND of the invoking plan or package are not candidates for execution.

If you use an access control authorization exit routine, some user-defined functions that were not candidates for execution before the original BIND or REBIND of the invoking plan or package might become candidates for execution during the automatic rebind of the invoking plan or package. If a user-defined function is invoked during an automatic rebind, and that user-defined function is invoked from a trigger body and receives a transition table, the form of the invoked function that DB2 uses for function selection includes only the columns of the transition table that existed at the time of the original BIND or REBIND of the package or plan for the invoking program.

---

## Initialization

To indicate the function to be performed, DB2 passes one of three function codes to the RACF access control module—for initialization, authorization checking, or termination. For general information about initialization and termination information, see Chapter 1, “Overview,” on page 1.

Any DB2 classes you want to use must be active during RACF access control module initialization (XAPLFUNC=1). You cannot activate a DB2 class later and expect the RACF access control module to perform authorization checking against it, because the class will not be RACLISTed. RACLISTing is only done during initialization of the RACF access control module.

To start using DB2 classes that were not previously RACLISTed during initialization, you will need to stop and restart DB2.

Once the DB2 subsystem has initialized, the following command needs to be issued to affect profile changes for classes being used by the RACF access control module:

```
SETROPTS RACLIST(classname) REFRESH
```

The following informational messages are issued for each initialization: IRR908I, IRR909I, IRR910I, and IRR911I.

**Note:** The classes listed in message IRR911I may be a valid subset of the classes listed in message IRR910I. The RACF access control module is programmed to RACLIST all supported DB2 classes. Message IRR910I lists the DB2 classes for which the RACF access control module has initiated RACLIST. However, message IRR911I lists only the DB2 classes that were successfully RACLISTed. In order to be successfully RACLISTed, a DB2 class must be active and contain at least one profile. Therefore, there are valid circumstances where the list of classes contained in IRR911I will be a subset of those listed in IRR910I.

## Failure to initialize

If the RACF access control module fails to initialize for any reason, messages IRR900A, IRR901A, IRR902A, and IRR903A are issued to the security console. If this occurs, you can do the following:

1. Check that the DB2 classes are active, and that there is at least one profile defined in each class.
2. Examine RACROUTE REQUEST=LIST return and reason codes to determine why RACLISTing of classes is failing in the RACF access control module.
3. Check if any other required resources (GETMAIN, for example) are obtainable.

## Return codes and reason codes from initialization

Return codes from the RACF access control module are returned in the DB2-supplied EXPL field EXPLRC1. Reason codes from the RACF access control module are returned in the DB2-supplied EXPL field EXPLRC2. See Appendix A, "XAPLFUNC reference," on page 51 for the meanings of the return and reason codes from the initialization of the RACF access control module.

## Deferring to native DB2 authorization

Deferring to native DB2 authorization may or may not require removal of the RACF access control module. A return code of 4 from the RACF access control module indicates that DB2 should defer to DB2 security checking for that particular authorization check.

## Removing the RACF access control module

If the RACF access control module is removed, DB2 reverts to using native DB2 authorization, in which authority is determined by DB2 catalogs.

In addition, you may need to:

1. Inactivate any classes related to the DB2 processing
2. Make the necessary GRANTs in DB2

---

## Common problems and considerations

Common problems that could occur as a result of defining special classes in the class descriptor table (CDT) follow:

- A class is not defined in the CDT.  
This results in a return code of 4 (profile not found) from the RACF access control module.
- If class is defined in the static CDT, there is incorrect linkage editor procedures from the CDT.
- If class is defined in the static CDT, it is link-edited properly but a re-IPL has not occurred to pick up the changes.
- If class is defined in the dynamic CDT, the CDTINFO class was not RACLISTed or refreshed to pick up the changes.
- Single-subsystem scope class names are being used and a new subsystem is using the RACF access control module before classes for the subsystem have been defined.
- Messages IRR900A, IRR901A, IRR902A, and IRR903A are issued because the RACF access control module could not initialize correctly.
  1. Check to see if DB2 classes are active.
  2. Determine if and why RACLISTing of classes is failing in the module by examining RACROUTE REQUEST=LIST return and reason codes.
  3. Check to see if any other required resources (such as GETMAIN, for example) are obtainable.



---

## Appendix A. XAPLFUNC reference

DB2 calls the RACF access control module using the following function codes. Table 9 shows the purpose and timing of each function call.

Table 9. XAPLFUNC codes and corresponding functions

Function code	Time of call	Purpose
XAPLFUNC=1	DB2 initialization	Create in-storage profiles and indicate what action DB2 should take if the RACF access control module abends or fails to initialize.
XAPLFUNC=2	DB2 authorization	Check DB2 objects and authorities.
XAPLFUNC=3	DB2 termination	Delete in-storage profiles.

**Unsupported function codes:** If the RACF access control module receives a XAPLFUNC function code other than 1, 2 or 3, the RACF access control module sends a return code of 12 to the caller.

When a return code of 12 is received:

- Native DB2 authorization is used if &ERROROPT 1 or the level of DB2 is below DB2 Version 7.
- The DB2 subsystem stops if &ERROROPT 2 and the level of DB2 is DB2 Version 7 or later.

---

### Initialization (XAPLFUNC = 1)

When the RACF access control module is called with XAPLFUNC function code of 1, it issues a RACROUTE REQUEST=STAT request to determine if RACF is active. If RACF is not active, the RACF access control module returns to DB2 with a return code of 12. If RACF is active, the RACF access control module builds the class names, as specified by the assembler SET symbols, and performs a RACROUTE REQUEST=LIST,CLASS=*classname* for each new DB2-related class.

#### Attention

- If you override &CLASSNMT or use the single-subsystem scope, the RACF access control module uses only installation-defined classes.
- If you use the multiple-subsystem scope with the default &CLASSNMT, the RACF access control module uses classes supplied by IBM.

See *z/OS Security Server RACF Security Administrator's Guide* for a list of DB2 classes supplied by IBM.

The RACROUTE REQUEST=LIST,ENVIR=CREATE,GLOBAL=YES request brings profiles to a data space for that particular DB2 or allows a subsequent DB2 to use those in-storage profiles.

If no DB2-related classes were active, a failure occurs and the RACF access control module ends with a return code of 12.

**Note:** The following are not failures:

- A class is not active (SAF RC=4, RACF RC=10)

- A class is not defined (SAF RC=4, RACF RC=8)

If a class is not active or does not exist for an object or authority, the RACF access control module defers to DB2 for authorization checking and ends with a return code of 4.

If *one* request fails, the *entire* initialization fails. When this happens, the RACF access control module cleans up all the resources and ends with a return code of 12.

If you want to use DB2 classes for authorization against DB2 objects, the classes must be active when the subsystem is started.

Failures during initialization processing are indicated by a return and reason code pair and a message.

## Initialization return and reason codes

The following return and reason codes are shown in decimal notation.

<b>Return code</b>	<b>Meaning</b>
<b>0</b>	Initialization successful.
	<b>Reason code    Meaning</b>
	<b>0</b> Installation option &ERROROPT was set to 1. Therefore, native DB2 authorization is used in the event of an error.
	<b>16</b> Installation option &ERROROPT was set to 2. Therefore, the DB2 system is requested to stop in the event of an error on a subsequent authorization check.
<b>12</b>	Initialization unsuccessful; don't call RACF access control module again.
	<b>Reason code    Meaning</b>
	<b>1</b> An input DB2 subsystem ACEE was not provided. Installation option &ERROROPT was set to 1. Therefore, native DB2 authorization will be used.
	<b>2</b> RACF is not active. Installation option &ERROROPT was set to 1. Therefore, native DB2 authorization will be used.
	<b>3</b> RACROUTE REQUEST=LIST,ENVIR=CREATE failure. Installation option &ERROROPT was set to 1. Therefore, native DB2 authorization will be used.
	<b>4</b> No active DB2 classes. Installation option &ERROROPT was set to 1. Therefore, native DB2 authorization will be used.
	<b>10</b> Incorrect XAPL level. The value of XAPLLVL is less than V8R1M0. Installation option &ERROROPT was set to 1. Therefore, native DB2 authorization will be used.
	<b>12</b> Input DB2 subsystem ACEE was not valid. Installation option &ERROROPT was set to 1.

Therefore, native DB2 authorization will be used.  
DB2 authorization will be used.

16

An initialization error occurred. Installation option &ERROROPT was set to 2. Therefore, the DB2 subsystem is requested to stop.

---

## Authorization checking (XAPLFUNC = 2)

The RACF access control module requires an input ACEE to perform authority checking. When an input ACEE (XAPLACEE) is not provided to the RACF access control module, it defers to DB2 for authority checking (EXPLRC1 set to 4). See *DB2 Administration Guide* for the requests for which the input ACEE (XAPLACEE) is set to zero. For these requests, authority checking must be implemented using the DB2 GRANT and REVOKE statements. RACF profiles defined for these requests will *not* be used.

The RACF access control module performs FASTAUTH checks during authorization according to the rules described in Appendix D, “RACF authorization checking reference,” on page 65. In DB2, there is no concept of negative access level. RACF access control module processing ends when FASTAUTH returns a return code of 0 or the list of checks for the request has been exhausted. Failure audit records are only created for the first failing resource. All audit records associated with the same invocation of the RACF access control module contain the same LOGSTR data. See Appendix C, “Authorization processing examples,” on page 59 for examples.

## Authorization return and reason codes

The following return and reason codes are shown in decimal notation.

Return code	Meaning
-------------	---------

0	Access permitted
---	------------------

Reason code	Meaning
-------------	---------

0	Access permitted by FASTAUTH checking.
---	--

13	Access permitted by implicit privilege of ownership.
----	--

14	Access permitted because current SQL ID matches schema name.
----	--

4	Unable to determine; perform DB2 authorization checking
---	---

Reason code	Meaning
-------------	---------

0	Input class (XAPLTYPE) not active.
---	------------------------------------

11	Input ACEE (XAPLACEE) not provided.
----	-------------------------------------

14	The ALET could not be created for cross memory ACEE.
----	--

15	Input privilege code (XAPLPRIV) or input class (XAPLTYPE) not defined to the RACF access control module.
----	--

16	Input privilege code (XAPLPRIV) does not contain any rules.
----	---

8	Access denied
---	---------------

Reason code	Meaning
-------------	---------

0	Access denied.
17	Autobind indicator (XAPLAUTO) is not zero, indicating AUTOBIND was requested. Manual REBIND is required.

## FASTAUTH return code translation

Each time the RACF access control module is invoked, it may in turn invoke RACROUTE REQUEST=FASTAUTH multiple times. If one of the FASTAUTH requests completes with a return code of zero, the return code passed back to DB2 will be zero. If none of the FASTAUTH requests complete with a return code of zero, the collection of return codes from FASTAUTH must be translated into a single resultant return code. Return code translation can be summarized as follows:

If all object resource checks result in a return code of 4 and none of the DSNADM checks result in a return code of 0, the RACF access control module passes back a return code of 4.

If at least one object resource check results in a return code of 8 and none of the DSNADM checks result in a return code of 0, the RACF access control module passes back a return code of 8.

If no object resource profiles are checked and all of the DSNADM checks result in a return code of 8, the RACF access control module will pass back a return code of 8. Otherwise, if no object resources are checked and the DSNADM checks result in a mix of 4s and 8s, the RACF access control module passes back a return code of 4.

All failing SAF/RACF return codes and RACF reason codes are placed in the output parameter field in XAPLDIAG, to be returned to DB2. This information is then available to DB2, SQL, or other programs to obtain diagnostic information from it.

Table 10 illustrates the method used to do this translation.

Table 10. FASTAUTH return code translation

Return code from object profile	Return code from ADM profile	Output return code
—	All 4s	04
—	All 8s	08
—	Mix	04
All 4s	All 4s	04
All 4s	All 8s	04
All 4s	Mix	04
All 8s	All 4s	08
All 8s	All 8s	08
All 8s	Mix	08
Mix	All 4s	08
Mix	All 8s	08
Mix	Mix	08

**Note:** *Mix* indicates a variety of 4 and 8 return codes.



---

## Termination (XAPLFUNC = 3)

When the RACF access control module uses XAPLFUNC function code 3, it issues a RACROUTE REQUEST=LIST,ENVIR=DELETE,GLOBAL=YES request. The classes that were previously brought into storage during DB2 initialization are deleted.

Failures during termination processing are indicated by a return and reason code pair and a message.

### Termination return and reason codes

The following return and reason codes are shown in decimal notation.

<b>Return code</b>	<b>Meaning</b>
--------------------	----------------

<b>0</b>	Termination successful
----------	------------------------

<b>8</b>	Termination failure
----------	---------------------

<b>Reason code</b>	<b>Meaning</b>
--------------------	----------------

<b>1</b>	Input DB2 subsystem ACEE was not provided.
----------	--

<b>7</b>	RACROUTE REQUEST=LIST,ENVIR=DELETE failure.
----------	---

<b>12</b>	Input DB2 subsystem ACEE was not valid.
-----------	---



## Appendix B. Supplied RACF resource classes for DB2

The following RACF classes for DB2 objects and administrative authorities are supplied in the class descriptor table (CDT).

Table 11. Resource classes for DB2 objects and administrative authorities

<b>Class name</b>	<b>Description</b>
DSNADM	DB2 administrative authority class
DSNR	Controls access to DB2 subsystems
GDSNBP	Grouping class for DB2 buffer pool privileges
GDSNCL	Grouping class for DB2 collection privileges
GDSNDB	Grouping class for DB2 database privileges
GDSNJR	Grouping class for Java archive files (JARs)
GDSNPK	Grouping class for DB2 package privileges
GDSNPN	Grouping class for DB2 plan privileges
GDSNSC	Grouping class for DB2 schemas privileges
GDSNSG	Grouping class for DB2 storage group privileges
GDSNSM	Grouping class for DB2 system privileges
GDSNSP	Grouping class for DB2 stored procedure privileges
GDSNSQ	Grouping class for DB2 sequences
GDSNTB	Grouping class for DB2 table, index, or view privileges
GDSNTS	Grouping class for DB2 tablespace privileges
GDSNUF	Grouping class for DB2 user-defined function privileges
GDSNUT	Grouping class for DB2 user-defined distinct type privileges
MDSNBP	Member class for DB2 buffer pool privileges
MDSNCL	Member class for DB2 collection privileges
MDSNDB	Member class for DB2 database privileges
MDSNJR	Member class for Java archive files (JARs)
MDSNPK	Member class for DB2 package privileges
MDSNPN	Member class for DB2 plan privileges
MDSNSC	Member class for DB2 schema privileges
MDSNSG	Member class for DB2 storage group privileges
MDSNSM	Member class for DB2 system privileges
MDSNSP	Member class for DB2 stored procedure privileges
MDSNSQ	Member class for DB2 sequences
MDSNTB	Member class for DB2 table, index, or view privileges
MDSNTS	Member class for DB2 tablespace privileges
MDSNUF	Member class for DB2 user-defined function privileges
MDSNUT	Member class for DB2 user-defined distinct type privileges



---

## Appendix C. Authorization processing examples

- Examples 1 through 4 show authority checks performed on tables using supplied classes for multiple-subsystem scope (&CLASSOPT 2).
- Example 5 shows authority checks performed on tables using installation-defined classes for multiple-subsystem scope (&CLASSOPT 2).
- Example 6 shows authority checks performed on tables using installation-defined classes for single-subsystem scope (&CLASSOPT 1).

---

### Example 1: Allowing access (auditing for failures)

This example shows how the RACF access control module allows access to a DB2 object (a table) based on a DB2 administrative authority profile. Auditing is activated for failures.

In this example, user ID MIKEJ is trying to alter a table called BDA0828.EMP in database JBW2000.

#### Setup

- Classification model (&CLASSOPT): 2
- Class name root (&CLASSNMT): DSN
- Class name suffix (&CHAROPT): 1  
This is the default value, but it is not used with supplied classes.
- DB2 subsystem name: VHH1
- **Profiles:**
  - Defined in the MDSNTB class:  
**VHH1.BDA0828.EMP.ALTER**
    - AUDIT (FAILURES (READ))
    - UACC (NONE)
  - Defined in the DSNADM class:  
**VHH1.SYSADM**
    - AUDIT (FAILURES (READ))
    - UACC (NONE)
    - ID (MIKEJ) ACCESS (READ)
- User ID MIKEJ has SYSADM authority.

#### Profile checking

RACF checks the following resources:

1. VHH1.BDA0828.EMP.ALTER in class MDSNTB  
**Results:**
  - Access is denied (return code 8).
  - No failure message (ICH408I) is issued.
  - No audit records are created.
2. VHH1.JBW2000.DBADM in class DSNADM  
**Results:**
  - No profile is found (return code 4).
  - No failure message (ICH408I) is issued.
  - No audit records are created.
3. VHH1.SYSADM in class DSNADM  
**Results:**

- Access is granted (return code 0).
- No failure message (ICH408I) is issued.
- No audit records are created.

## Final result

The RACF access control module sends a return code of 0 to DB2.

---

## Example 2: Allowing access (auditing for all attempts)

This example shows how the RACF access control module allows access to a DB2 object (a table) based on a DB2 administrative authority profile. Auditing is activated for all access attempts.

In this example, user ID MIKEJ is trying to alter a table called BDA0828.EMP in database JBW2000.

## Setup

- Classification model (&CLASSOPT): 2
- Class name root (&CLASSNMT): DSN
- Class name suffix (&CHAROPT): 1  
This is the default value, but it is not used with supplied classes.
- DB2 subsystem name: VHH1
- **Profiles:**
  - Defined in the MDSNTB class:
    - VHH1.BDA0828.EMP.ALTER**
    - AUDIT(ALL(READ))
    - UACC(NONE)
    - ID(MIKEJ) ACCESS(NONE)
  - Defined in the DSNADM class:
    - VHH1.SYSADM**
    - AUDIT(ALL(READ))
    - UACC(NONE)
    - ID(MIKEJ) ACCESS(READ)
- User ID MIKEJ has SYSADM authority.

## Profile checking

RACF checks the following resources:

1. VHH1.BDA0828.EMP.ALTER in class MDSNTB
  - Results:**
    - Access is denied (return code 8).
    - No failure message (ICH408I) is issued.
    - No audit records are created.
2. VHH1.JBW2000.DBADM in class DSNADM
  - Results:**
    - No profile is found (return code 4).
    - No failure message (ICH408I) is issued.
    - No audit records are created.
3. VHH1.SYSADM in class DSNADM
  - Results:**
    - Access is granted (return code 0).

- No failure message (ICH408I) is issued.
- An audit record is created, which includes the following log string data:
  - The VHH1.BDA0828.EMP.ALTER profile name
  - Input parameters identifying the request from DB2.

## Final result

The RACF access control module sends a return code of 0 to DB2.

---

## Example 3: Denying access

This example shows how the RACF access control module denies access to a DB2 object (a table). Auditing is activated for all access attempts.

In this example, user ID MIKEJ is trying to alter a table called BDA0828.EMP in database JBW2000.

## Setup

- Classification model (&CLASSOPT): 2
- Class name root (&CLASSNMT): DSN
- Class name suffix (&CHAROPT): 1  
This is the default value, but it is not used with supplied classes.
- DB2 subsystem name: VHH1
- Profile:
  - Defined in the MDSNTB class:
 

```
VHH1.BDA0828.EMP.ALTER
- AUDIT(ALL(READ))
- UACC(NONE)
- ID(MIKEJ) ACCESS(NONE)
```
- User ID MIKEJ has SYSADM authority.

## Profile checking

RACF checks the following resources:

1. VHH1.BDA0828.EMP.ALTER in class MDSNTB  
**Results:**
  - Access is denied (return code 8).
  - No failure message (ICH408I) is issued.
  - No audit records are created.
2. VHH1.JBW2000.DBADM in class DSNADM  
**Results:**
  - No profile is found (return code 4).
  - No failure message (ICH408I) is issued.
  - No audit records are created.
3. VHH1.SYSADM in class DSNADM  
**Results:**
  - No profile is found (return code 4).
  - No failure message (ICH408I) is issued.
  - No audit records are created.
4. VHH1.BDA0828.EMP.ALTER in class MDSNTB  
**Results:**
  - Access is denied (return code 8).

- Failure message (ICH4081) is issued.
- An audit record is created, which includes the following log string data:
  - The VHH1.BDA0828.EMP.ALTER profile name
  - Input parameters identifying the request from DB2.

## Final result

The RACF access control module sends a return code of 8 to DB2.

---

## Example 4: Deferring to DB2

This example shows how the RACF access control module defers to native DB2 authorization checking because the DB2 object (a table) is not protected by RACF.

In this example, user ID MIKEJ is trying to alter a table called BDA0828.EMP in database JBW2000.

## Setup

- Classification model (&CLASSOPT): 2
- Class name root (&CLASSNMT): DSN
- Class name suffix (&CHAROPT): 1  
This is the default value, but it is not used with supplied classes.
- DB2 subsystem name: VHH1
- **Profiles:**
  - Defined in the MDSNTB class:  
**VHH1.BDA0828.EMP.ALTER**
  - Defined in the DSNADM class:  
**VHH1.SYSADM**  
- AUDIT(ALL(READ))
- User ID MIKEJ has SYSADM authority.

## Profile checking

RACF checks the following resources:

1. VHH1.BDA0828.EMP.ALTER in class MDSNTB  
**Results:**
  - No profile is found (return code 4).
  - No failure message (ICH4081) is issued.
  - No audit records are created.
2. VHH1.JBW2000.DBADM in class DSNADM  
**Results:**
  - No profile is found (return code 4).
  - No failure message (ICH4081) is issued.
  - No audit records are created.
3. VHH1.SYSADM in class DSNADM  
**Results:**
  - No profile is found (return code 4).
  - No failure message (ICH4081) is issued.
  - No audit records are created.

## Final result

The RACF access control module sends a return code of 4 to DB2.



---

## Example 5: Allowing access (multiple-subsystem scope)

This example shows how the RACF access control module allows access to a DB2 object (a table) based on a DB2 administrative authority profile. The installation has defined classes MSLH1TB1 and SLH1ADM1. Auditing is activated for all access attempts.

In this example, user ID MIKEJ is trying to alter a table called BDA0828.EMP in database JBW2000.

### Setup

- Classification model (&CLASSOPT): 2
- Class name root (&CLASSNMT): SLH1
- Class name suffix (&CHAROPT): 1
- DB2 subsystem name: VHH1
- **Profiles:**
  - Defined in the MSLH1TB1 class:  
**VHH1.BDA0828.EMP.ALTER**
    - AUDIT(ALL(READ))
    - UACC(NONE)
  - Defined in the SLH1ADM1 class:  
**VHH1.SYSADM**
    - AUDIT(ALL(READ))
    - UACC(NONE)
    - ID(MIKEJ) ACCESS(READ)
- User ID MIKEJ has SYSADM authority.

### Profile checking

RACF checks the following resources:

1. VHH1.BDA0828.EMP.ALTER in class MSLH1TB1

**Results:**

- Access is denied (return code 8).
- No failure message (ICH408I) is issued.
- No audit records are created.

2. VHH1.JBW2000.DBADM in class SLH1ADM1

**Results:**

- No profile is found (return code 4).
- No failure message (ICH408I) is issued.
- No audit records are created.

3. VHH1.SYSADM in class SLH1ADM1

**Results:**

- Access is granted (return code 0).
- No failure message (ICH408I) is issued.
- An audit record is created, which includes the following log string data:
  - The VHH1.BDA0828.EMP.ALTER profile name
  - Input parameters identifying the request from DB2.

### Final result

The RACF access control module sends a return code of 0 to DB2.

---

## Example 6: Allowing access (single-subsystem scope)

This example shows how the RACF access control module allows access to a DB2 object (a table) based on a DB2 administrative authority profile. The installation has defined classes MVHH1TB1 and VHH1ADM1. Auditing is activated for all access attempts.

In this example, user ID MIKEJ is trying to alter a table called BDA0828.EMP in database JBW2000.

### Setup

- Classification model (&CLASSOPT): 1
- Class name root (&CLASSNMT): DSN  
This is the default value, but it is not used in single-subsystem scope.
- Class name suffix (&CHAROPT): 1
- DB2 subsystem name: VHH1
- **Profiles:**
  - Defined in the MVHH1TB1 class:  
**VHH1.BDA0828.EMP.ALTER**
    - AUDIT(ALL(READ))
    - UACC(NONE)
  - Defined in the VHH1ADM1 class:  
**SYSADM**
    - AUDIT(ALL(READ))
    - UACC(NONE)
    - ID(MIKEJ) ACCESS(READ)
- User ID MIKEJ has SYSADM authority.

### Profile checking

RACF checks the following resources:

1. BDA0828.EMP.ALTER in class MVHH1TB1  
**Results:**
  - Access is denied (return code 8).
  - No failure message (ICH408I) is issued.
  - No audit records are created.
2. JBW2000.DBADM in class VHH1ADM1  
**Results:**
  - No profile is found (return code 4).
  - No failure message (ICH408I) is issued.
  - No audit records are created.
3. SYSADM in class VHH1ADM1  
**Results:**
  - Access is granted (return code 0).
  - No failure message (ICH408I) is issued.
  - An audit record is created, which includes the following log string data:
    - The VHH1.BDA0828.EMP.ALTER profile name
    - Input parameters identifying the request from DB2.

### Final result

The RACF access control module sends a return code of 0 to DB2.

## Appendix D. RACF authorization checking reference

How to use this reference . . . . .	67
Usage notes . . . . .	68
Buffer pool privileges. . . . .	68
DB2 privileges . . . . .	68
USE . . . . .	68
Collection privileges . . . . .	68
DB2 administrative authorities . . . . .	69
PACKADM . . . . .	69
DB2 privileges . . . . .	69
CREATE IN . . . . .	69
Database privileges . . . . .	69
DB2 administrative authority . . . . .	69
DBCTRL . . . . .	69
DB2 privileges . . . . .	70
CREATETAB. . . . .	70
CHANGE NAME QUALIFIER . . . . .	70
CREATETS . . . . .	70
DISPLAYDB . . . . .	70
DROP . . . . .	71
IMAGCOPY, MERGECOPY, MODIFY RECOVERY, QUIESCE . . . . .	71
RECOVERDB, REPORT . . . . .	71
REORG . . . . .	72
REPAIR, RUN REPAIR UTILITY . . . . .	72
REPAIR DBD . . . . .	72
RUN CHECK UTILITY, STATS . . . . .	73
STARTDB. . . . .	73
STOPDB . . . . .	73
TERM UTILITY. . . . .	74
TERM UTILITY ON DATABASE. . . . .	74
Java archive (JAR) privileges . . . . .	74
DB2 privileges . . . . .	74
USAGE . . . . .	74
Package privileges . . . . .	75
DB2 privileges . . . . .	75
BIND . . . . .	75
COMMENT ON. . . . .	75
COPY . . . . .	76
DROP . . . . .	76
EXECUTE . . . . .	76
All package privileges (PACKADM or SYSADM). . . . .	76
All package privileges (PACKADM, SYSADM, or SYSCTRL) . . . . .	77
Plan privileges . . . . .	77
DB2 privileges . . . . .	77
BIND . . . . .	77
COMMENT ON. . . . .	78
EXECUTE . . . . .	78
Schema privileges. . . . .	78
DB2 privileges . . . . .	78
ALTERIN . . . . .	78
CHANGE NAME QUALIFIER . . . . .	79
COMMENT ON. . . . .	79
CREATEIN . . . . .	79
DROPIN . . . . .	80

Sequence privileges . . . . .	80
DB2 privileges . . . . .	80
ALTER . . . . .	80
COMMENT ON . . . . .	81
USAGE . . . . .	81
Storage group privileges . . . . .	82
DB2 privileges . . . . .	82
DROP, ALTER . . . . .	82
USE . . . . .	82
Stored procedure privileges . . . . .	82
DB2 privileges . . . . .	82
DISPLAY . . . . .	82
EXECUTE . . . . .	83
START . . . . .	83
STOP . . . . .	84
System privileges . . . . .	84
DB2 administrative authorities . . . . .	84
SYSADM . . . . .	84
SYSCTRL . . . . .	84
DB2 privileges . . . . .	85
ALTER BUFFERPOOL . . . . .	85
BINDADD . . . . .	85
BINDAGENT . . . . .	85
CANCEL   START   STOP DDF, DISPLAY   START   STOP RLIMIT . . . . .	85
CREATEALIAS . . . . .	86
CREATEDBA . . . . .	86
CREATESG . . . . .	86
CREATETMTAB . . . . .	86
DISPLAY, DISPLAY BUFFERPOOL . . . . .	87
DISPLAY ARCHIVE . . . . .	87
MONITOR1 . . . . .	87
MONITOR2 . . . . .	88
RECOVER BSDS . . . . .	88
RECOVER INDOUBT . . . . .	88
SET ARCHIVE . . . . .	88
STOPALL . . . . .	89
STOSPACE UTILITY . . . . .	89
TRACE . . . . .	89
USE ARCHIVE LOG . . . . .	89
Table privileges . . . . .	90
DB2 privileges . . . . .	90
ALTER . . . . .	90
ALTER INDEX, DROP INDEX . . . . .	90
CHANGE NAME QUALIFIER . . . . .	91
COMMENT ON, COMMENT ON INDEX, DROP . . . . .	91
CREATE SYNONYM . . . . .	91
CREATE VIEW . . . . .	91
DELETE . . . . .	92
DROP ALIAS . . . . .	92
DROP SYNONYM . . . . .	92
INDEX . . . . .	93
INSERT . . . . .	93
LOAD . . . . .	93
LOCK TABLE . . . . .	94
REFERENCES . . . . .	94
REFRESH . . . . .	94

RENAME TABLE . . . . .	95
SELECT . . . . .	95
TRIGGER . . . . .	96
UPDATE . . . . .	96
Any of the table privileges . . . . .	96
Tablespace privileges . . . . .	97
DB2 privileges . . . . .	97
DROP, ALTER . . . . .	97
USE . . . . .	97
User-defined distinct type privileges . . . . .	98
DB2 privileges . . . . .	98
USAGE . . . . .	98
User-defined function privileges . . . . .	98
DB2 privileges . . . . .	98
DISPLAY . . . . .	98
EXECUTE . . . . .	99
START . . . . .	99
STOP . . . . .	100
View privileges . . . . .	100
DB2 privileges. . . . .	100
COMMENT ON . . . . .	100
DELETE . . . . .	100
DROP . . . . .	101
INSERT . . . . .	101
REGENERATE VIEW . . . . .	101
SELECT . . . . .	102
UPDATE . . . . .	102
"Any table" authority . . . . .	102

---

## How to use this reference

This appendix includes information about the RACF authorization checking through the RACF access control module for the following DB2 objects:

- B** Buffer pools
- C** Collections
- D** Databases
- E** User-defined distinct types
- F** User-defined functions
- J** Java archives (JARs)
- K** Packages
- M** Schemas
- O** Stored procedures
- P** Application plans
- Q** Sequences
- R** Tablespaces
- S** Storage groups
- T** Tables
- U** Systems
- V** Views

The sections that follow outline the series of authorization checks that occur in the RACF access control module to determine if the requesting user is authorized to use a particular DB2 privilege against a particular DB2 object type. If any authorization check in the series is successful, the privilege is granted. For examples of authorization processing in the RACF access control module, see Appendix C, "Authorization processing examples," on page 59.

In order to perform authorization checks, the RACF access control module uses the values passed with the following parameters to determine the DB2 object types and privileges:

**XAPLTYPE** DB2 object type

**XAPLPRIV** DB2 privilege

**Restriction:** The sections that follow show only the *name* of each DB2 privilege passed with the XAPLPRIV parameter. The RACF access control module uses a numeric XAPLPRIV value. See the DB2 macro DSNXAPRV in *prefix.SDSNMACS* to find the numeric value associated with each DB2 privilege name.

## Usage notes

The following notes apply to each resource name format shown in each table of this appendix.

1. The resource name formats shown in this appendix are applicable only if you are in multiple-subsystem scope (&CLASSOPT 2) and are not using DB2 data sharing.
2. If you are using DB2 data sharing in multiple-subsystem scope (&CLASSOPT 2), substitute *DB2-group-attachment* for *DB2-subsystem* in each resource name format shown in this appendix.
3. If you are using single-subsystem scope (&CLASSOPT 1), exclude *DB2-subsystem* from each resource name format shown in this appendix.

---

## Buffer pool privileges

**Resources:** Buffer pools

**Resource type:** B

## DB2 privileges

### USE

XAPLPRIV value: **USEAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.buffer-pool-name</i> .USE	MDSNBP or GDSNBP
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes.”

---

## Collection privileges

**Resources:** Collections

**Resource type:** C

## DB2 administrative authorities

### PACKADM

XAPLPRIV value: **PKADMAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.collection-ID.PACKADM</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## DB2 privileges

### CREATE IN

XAPLPRIV value: **CRTINAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.collection-ID.CREATEIN</i>	MDSNCL or GDSNCL
<i>DB2-subsystem.collection-ID.PACKADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## Database privileges

**Resources:** Databases

**Resource type:** D

## DB2 administrative authority

### DBCTRL

XAPLPRIV value: **DBCTLAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## DB2 privileges

### CREATETAB

XAPLPRIV value: **CRTTBAUT**

The user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.database-name</i> .CREATETAB	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name</i> .DBMAINT	DSNADM
<i>DB2-subsystem.database-name</i> .DBCTRL	DSNADM
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### CHANGE NAME QUALIFIER

XAPLPRIV value: **QUALAUT**

The user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.database-name</i> .DBCTRL	DSNADM
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### CREATETS

XAPLPRIV value: **CRTTSAUT**

The user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.database-name</i> .CREATETS	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name</i> .DBMAINT	DSNADM
<i>DB2-subsystem.database-name</i> .DBCTRL	DSNADM
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### DISPLAYDB

XAPLPRIV value: **DSPDBAUT**



The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.DISPLAYDB</i>	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name.DBMAINT</i>	DSNADM
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.DISPLAY</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **DROP**

XAPLPRIV value: **DROPAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.DROP</i>	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **IMAGCOPY, MERGECOPY, MODIFY RECOVERY, QUIESCE**

XAPLPRIV values: **IMCOPAUT, MERGEAUT, MODAUT, QUIESAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.IMAGCOPY</i>	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name.DBMAINT</i>	DSNADM
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **RECOVERDB, REPORT**

XAPLPRIV values: **RECDBAUT, REPRTAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.RECOVERDB</i>	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## REORG

XAPLPRIV value: **REORGAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.REORG</i>	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## REPAIR, RUN REPAIR UTILITY

XAPLPRIV values: **REPARAUT, DIAGAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.REPAIR</i>	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## REPAIR DBD

XAPLPRIV value: **RDBDAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**One of these resources:****In class:**

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**RUN CHECK UTILITY, STATS**

XAPLPRIV values: **CHECKAUT, STATSAUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name</i> .STATS	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name</i> .DBMAINT	DSNADM
<i>DB2-subsystem.database-name</i> .DBCTRL	DSNADM
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**STARTDB**

XAPLPRIV value: **STARTAUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name</i> .STARTDB	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name</i> .DBMAINT	DSNADM
<i>DB2-subsystem.database-name</i> .DBCTRL	DSNADM
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**STOPDB**

XAPLPRIV value: **STOPAUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name</i> .STOPDB	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name</i> .DBMAINT	DSNADM
<i>DB2-subsystem.database-name</i> .DBCTRL	DSNADM
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**One of these resources:**

**In class:**

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## TERM UTILITY

XAPLPRIV value: **TERMAUT**

The user must have sufficient authority to:

**One of these resources:**

**In class:**

*DB2-subsystem.SYSOPR*

DSNADM

*DB2-subsystem.SYSCTRL*

DSNADM

*DB2-subsystem.SYSADM*

DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## TERM UTILITY ON DATABASE

XAPLPRIV value: **TERMDAUT**

The user must have sufficient authority to:

**One of these resources:**

**In class:**

*DB2-subsystem.database-name.DBMAINT*

DSNADM

*DB2-subsystem.database-name.DBCTRL*

DSNADM

*DB2-subsystem.database-name.DBADM*

DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## Java archive (JAR) privileges

**Resources:** Java archives (JARs)

**Resource type:** J

## DB2 privileges

### USAGE

XAPLPRIV value: **USAGEAUT**

Does the user own the Java archive (JAR)?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

**One of these resources:**

**In class:**

*DB2-subsystem.schema-name.JAR-name.USAGE*

MDSNJR or GDSNJR

*DB2-subsystem.SYSADM*

DSNADM

**One of these resources:**

**In class:**

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## Package privileges

**Resources:** Packages

**Resource type:** K

## DB2 privileges

### **BIND**

XAPLPRIV value: **BINDAUT**

Does the user own the package?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

**One of these resources:**

**In class:**

---

*DB2-subsystem.collection-ID.package-ID*.BIND

MDSNPK or GDSNPK

---

*DB2-subsystem.owner*.BINDAGENT

MDSNSM or GDSNSM

---

*DB2-subsystem.collection-ID*.PACKADM

DSNADM

---

*DB2-subsystem*.SYSCTRL

DSNADM

---

*DB2-subsystem*.SYSADM

DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### **COMMENT ON**

XAPLPRIV value: **COMNTAUT**

Does the user own the package?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

**One of these resources:**

**In class:**

---

*DB2-subsystem*.SYSCTRL

DSNADM

---

*DB2-subsystem*.SYSADM

DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## COPY

XAPLPRIV value: **COPYAUT**

Does the user own the package?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.collection-ID.package-ID.COPY</i>	MDSNPK or GDSNPK
<i>DB2-subsystem.owner.BINDAGENT</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.collection-ID.PACKADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## DROP

XAPLPRIV value: **DROPAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.collection-ID.PACKADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## EXECUTE

XAPLPRIV value: **CHKEXEC**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.collection-ID.package-ID.EXECUTE</i>	MDSNPK or GDSNPK
<i>DB2-subsystem.collection-ID.PACKADM</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## All package privileges (PACKADM or SYSADM)

XAPLPRIV value: **ALLPKAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.collection-ID.PACKADM</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **All package privileges (PACKADM, SYSADM, or SYSCTRL)**

XAPLPRIV value: **SUBPKAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.PACKADM</i> The user has authority to all collections.	DSNADM
<i>DB2-subsystem.collection-ID.PACKADM</i> The user has authority to <i>collection-ID</i> .	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## **Plan privileges**

**Resources:** Application plans

**Resource type:** P

## **DB2 privileges**

### **BIND**

XAPLPRIV value: **BINDAUT**

Does the user own the plan?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLOWNQ parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.plan-name.BIND</i>	MDSNPN or GDSNPN
<i>DB2-subsystem.owner.BINDAGENT</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## COMMENT ON

XAPLPRIV value: **COMNTAUT**

Does the user own the plan?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLOWNQ parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## EXECUTE

XAPLPRIV value: **CHKEXEC**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.plan-name.EXECUTE</i>	MDSNPN or GDSNPN
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## Schema privileges

**Resources:** Schemas

**Resource type:** M

## DB2 privileges

### ALTERIN

XAPLPRIV value: **ALTINAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the object?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.object-name.ALTERIN</i>	MDSNSC or GDSNSC



**One of these resources:****In class:**

---

*DB2-subsystem.SYSCTRL*

---

DSNADM

---

*DB2-subsystem.SYSADM*

---

DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**CHANGE NAME QUALIFIER**XAPLPRIV value: **QUALAUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.SYSCTRL*

---

DSNADM

---

*DB2-subsystem.SYSADM*

---

DSNADM

**Notes:**

1. No RACF audit record or ICH408I message is generated for a failure related to this privilege. RACF will audit successes, if specified.
2. *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**COMMENT ON**XAPLPRIV value: **COMNTAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the object?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.schema-name.object-name.ALTERIN*

---

MDSNSC or GDSNSC

---

*DB2-subsystem.SYSCTRL*

---

DSNADM

---

*DB2-subsystem.SYSADM*

---

DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**CREATEIN**XAPLPRIV value: **CREINAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOBJN parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.CREATEIN</i>	MDSNSC or GDSNSC
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **DROPIN**

XAPLPRIV value: **DRPINAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the object?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.object-name.DROPIN</i>	MDSNSC or GDSNSC
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## **Sequence privileges**

**Resources:** Sequences

**Resource type:** Q

## **DB2 privileges**

### **ALTER**

XAPLPRIV value: **ALTERAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the sequence?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.sequence-name.ALTERIN</i>	MDSNSC or GDSNSC
<i>DB2-subsystem.schema-name.sequence-name.ALTER</i>	MDSNSQ or GDSNSQ
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## COMMENT ON

XAPLPRIV value: **COMNTAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the sequence?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.sequence-name.ALTERIN</i>	MDSNSC or GDSNSC
<i>DB2-subsystem.schema-name.sequence-name.ALTER</i>	MDSNSQ or GDSNSQ
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## USAGE

XAPLPRIV value: **USAGEAUT**

Does the user own the sequence?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.sequence-name.USAGE</i>	MDSNSQ or GDSNSQ
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## Storage group privileges

**Resources:** Storage groups

**Resource type:** S

## DB2 privileges

### DROP, ALTER

XAPLPRIV values: **DROPAUT, ALTERAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### USE

XAPLPRIV value: **USEAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.storage-groupname.USE</i>	MDSNSG or GDSNSG
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## Stored procedure privileges

**Resources:** Stored procedures

**Resource type:** O

## DB2 privileges

### DISPLAY

XAPLPRIV value: **DISPAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the stored procedure?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.procedure-name.DISPLAY</i>	MDSNSP or GDSNSP
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## EXECUTE

XAPLPRIV value: **CHKEXEC**

Does the user own the stored procedure?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.procedure-name.EXECUTE</i>	MDSNSP or GDSNSP
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## START

XAPLPRIV value: **STRTAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the stored procedure?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## STOP

XAPLPRIV value: **STPAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the stored procedure?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## System privileges

**Resources:** Systems

**Resource type:** U

## DB2 administrative authorities

### SYSADM

XAPLPRIV value: **SYSAAUTH**

The user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### SYSCTRL

XAPLPRIV value: **SYSCAUTH**

The user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## DB2 privileges

### ALTER BUFFERPOOL

XAPLPRIV value: **CHKALTBP**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### BINDADD

XAPLPRIV value: **BINDAAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.BINDADD</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### BINDAGENT

XAPLPRIV value: **BNDAGAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.owner.BINDAGENT</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### CANCEL | START | STOP DDF, DISPLAY | START | STOP RLIMIT

XAPLPRIV values: **CHKSTART, CHKSTOP, CHKDSPL, CHKDDF**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## CREATEALIAS

XAPLPRIV value: **CRTALAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.CREATEALIAS</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** DBADM and DBCTRL authorities can be used to allow a user to create aliases. See “CREATE ALIAS privilege” on page 42 for more information.

<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## CREATEDBA

XAPLPRIV value: **CRTDBAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.CREATEDBA</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.CREATEDBC</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## CREATESG

XAPLPRIV value: **CRTSGAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.CREATESG</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## CREATETMTAB

XAPLPRIV value: **CRTTMAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.CREATETMTAB</i>	MDSNSM or GDSNSM
<i>DB2-subsystem.CREATETAB</i>	MDSNDB or GDSNDB



**One of these resources:****In class:**

---

*DB2-subsystem.SYSCTRL*DSNADM

---

*DB2-subsystem.SYSADM*DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**DISPLAY, DISPLAY BUFFERPOOL**XAPLPRIV values: **CHKDISPL, CHKDSPBP**

The user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.DISPLAY*MDSNSM or GDSNSM

---

*DB2-subsystem.SYSOPR*DSNADM

---

*DB2-subsystem.SYSCTRL*DSNADM

---

*DB2-subsystem.SYSADM*DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**DISPLAY ARCHIVE**XAPLPRIV value: **DARCHAUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.DISPLAY*MDSNSM or GDSNSM

---

*DB2-subsystem.ARCHIVE*MDSNSM or GDSNSM

---

*DB2-subsystem.SYSOPR*DSNADM

---

*DB2-subsystem.SYSCTRL*DSNADM

---

*DB2-subsystem.SYSADM*DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**MONITOR1**XAPLPRIV value: **MON1AUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.MONITOR1*MDSNSM or GDSNSM

---

*DB2-subsystem.MONITOR2*MDSNSM or GDSNSM

---

*DB2-subsystem.SYSCTRL*DSNADM

---

*DB2-subsystem.SYSADM*DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## MONITOR2

XAPLPRIV value: **MON2AUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .MONITOR2	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## RECOVER BSDS

XAPLPRIV value: **CHKBSDS**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .BSDS	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## RECOVER INDOUBT

XAPLPRIV value: **CHKRECOV**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .RECOVER	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSOPR	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## SET ARCHIVE

XAPLPRIV value: **SARCHAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .ARCHIVE	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSOPR	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## STOPALL

XAPLPRIV value: **CHKSUBSY**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .STOPALL	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSOPR	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## STOSPACE UTILITY

XAPLPRIV value: **STOAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .STOSPACE	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## TRACE

XAPLPRIV value: **CHKTRACE**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .TRACE	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSOPR	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## USE ARCHIVE LOG

XAPLPRIV value: **ARCHAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem</i> .ARCHIVE	MDSNSM or GDSNSM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

One of these resources:

In class:

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## Table privileges

**Resources:** Tables

**Resource type:** T

### Note about SYSCTRL

The SYSCTRL administrative authority does not apply to user tables. DB2 turns on bit 7 of the XAPLFLG1 field for a user table. If this bit is on, the RACF access control module bypasses checking for the SYSCTRL authority. This allows RACF processing to model DB2 processing.

## DB2 privileges

### ALTER

XAPLPRIV value: **ALTERAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

**One of these resources:**

**In class:**

---

*DB2-subsystem.table-owner.table-name*.ALTER

MDSNTB or GDSNTB

---

*DB2-subsystem.database-name*.DBADM

DSNADM

---

*DB2-subsystem*.SYSCTRL

DSNADM

---

*DB2-subsystem*.SYSADM

DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### ALTER INDEX, DROP INDEX

XAPLPRIV values: **ALTIXAUT, DRPIXAUT**

Does the user own the index?

If so, XAPLUPRM or XAPLUCHK must match the index name qualifier passed from DB2.

If not, the user must have sufficient authority to:

**One of these resources:**

**In class:**

---

*DB2-subsystem.database-name*.DBADM

DSNADM

---

*DB2-subsystem*.SYSCTRL

DSNADM

**One of these resources:****In class:**

---

*DB2-subsystem.SYSADM*

---

DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**CHANGE NAME QUALIFIER**XAPLPRIV value: **QUALAUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.database-name.DBCTRL*

---

DSNADM

---

*DB2-subsystem.database-name.DBADM*

---

DSNADM

---

*DB2-subsystem.SYSCTRL*

---

DSNADM

---

This check is bypassed for user tables.

---

*DB2-subsystem.SYSADM*

---

DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**COMMENT ON, COMMENT ON INDEX, DROP**XAPLPRIV values: **COMNTAUT, CMTIXAUT, DROPAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.database-name.DBADM*

---

DSNADM

---

*DB2-subsystem.SYSCTRL*

---

DSNADM

---

*DB2-subsystem.SYSADM*

---

DSNADM

---

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**CREATE SYNONYM**XAPLPRIV value: **CRTSYAUT**

There are no authorization checks (return code 4).

**CREATE VIEW**XAPLPRIV value: **CRTVUAUT**

The user must have sufficient authority to:

**One of these resources:****In class:**

---

*DB2-subsystem.SYSCTRL*

---

DSNADM

---

This check is bypassed for user tables.

---

*DB2-subsystem.SYSADM*

---

DSNADM

---

**One of these resources:****In class:**

**Note:** DBADM authority can be used to allow a user to create views. See “CREATE VIEW privilege” on page 42 for more information.

<i>DB2-subsystem.DB2-database-name-1.DBADM</i>	DSNADM
<i>DB2-subsystem.DB2-database-name-2.DBADM</i>	DSNADM
⋮	⋮
<i>DB2-subsystem.DB2-database-name-n.DBADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**DELETE**

XAPLPRIV value: **DELETAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

**One of these resources:****In class:**

<i>DB2-subsystem.table-owner.table-name.DELETE</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
This check is bypassed for user tables.	
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**DROP ALIAS**

XAPLPRIV value: **DRPALAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

**One of these resources:****In class:**

<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**DROP SYNONYM**

XAPLPRIV value: **DRPSYAUT**

There are no authorization checks (return code 4).

## INDEX

XAPLPRIV value: **INDEXAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.table-owner.table-name</i> .INDEX	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## INSERT

XAPLPRIV value: **INSRTAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.table-owner.table-name</i> .INSERT	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
This check is bypassed for user tables.	
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## LOAD

XAPLPRIV value: **LOADAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name</i> .LOAD	MDSNDB or GDSNDB
<i>DB2-subsystem.database-name</i> .DBCTRL	DSNADM
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM

One of these resources:	In class:
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## LOCK TABLE

XAPLPRIV value: **LOCKAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.table-owner.table-name.SELECT</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## REFERENCES

XAPLPRIV value: **REFERAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.table-owner.table-name.REFERENCES</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.ALTER</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.column.REFERENCES</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## REFRESH

XAPLPRIV value: **RFRSHAUT**

Does the user own the table?



If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i> This check is bypassed for user tables.	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## RENAME TABLE

XAPLPRIV value: **RNTABAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.DBMAINT</i>	DSNADM
<i>DB2-subsystem.database-name.DBCTRL</i>	DSNADM
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## SELECT

XAPLPRIV value: **SELCTAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.table-owner.table-name.SELECT</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i> This check is bypassed for user tables.	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**One of these resources:****In class:**

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**TRIGGER**

XAPLPRIV value: **TRIGAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

**One of these resources:****In class:**

<i>DB2-subsystem.table-owner.table-name</i> .TRIGGER	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name</i> .ALTER	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
This check is bypassed for user tables.	
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**UPDATE**

XAPLPRIV value: **UPDTEAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

**One of these resources:****In class:**

<i>DB2-subsystem.table-owner.table-name</i> .UPDATE	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.column</i> .UPDATE	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name</i> .DBADM	DSNADM
<i>DB2-subsystem</i> .SYSCTRL	DSNADM
This check is bypassed for user tables.	
<i>DB2-subsystem</i> .SYSADM	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

**Any of the table privileges**

XAPLPRIV value: **ANYTBAUT**

Does the user own the table?

If so, XAPLUPRM or XAPLUCHK must match the table name qualifier passed from DB2.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.table-owner.table-name.REFERENCES</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.ALTER</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.INDEX</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.SELECT</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.INSERT</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.DELETE</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.table-owner.table-name.UPDATE</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
This check is bypassed for user tables.	
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

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## Tablespace privileges

**Resources:** Tablespaces

**Resource type:** R

## DB2 privileges

### DROP, ALTER

XAPLPRIV values: **DROPAUT, ALTERAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### USE

XAPLPRIV value: **USEAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.database-name.tablespace-name.USE</i>	MDSNTS or GDSNTS
<i>DB2-subsystem.database-name.DBADM</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM

**One of these resources:***DB2-subsystem.SYSADM***In class:**

DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## User-defined distinct type privileges

**Resources:** User-defined distinct types

**Resource type:** E

## DB2 privileges

### USAGE

XAPLPRIV value: **USAGEAUT**

Does the user own the user-defined distinct type?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

**One of these resources:***DB2-subsystem.schema-name.type-name.USAGE**DB2-subsystem.SYSADM***In class:**

MDSNUT or GDSNUT

DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## User-defined function privileges

**Resources:** User-defined functions

**Resource type:** F

## DB2 privileges

### DISPLAY

XAPLPRIV value: **DISPAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the user-defined function?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.function-name.DISPLAY</i>	MDSNUF or GDSNUF
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## EXECUTE

XAPLPRIV value: **CHKEXEC**

Does the user own the user-defined function?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.schema-name.function-name.EXECUTE</i>	MDSNUF or GDSNUF
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## START

XAPLPRIV value: **STRTAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the user-defined function?

If so, XAPLUPRM or XAPLUCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## STOP

XAPLPRIV value: **STPAUT**

Does the user match the schema name?

If so, XAPLUPRM or XAPLUCCHK must match the schema name passed from DB2 by the XAPLOWNQ parameter.

If not, does the user own the user-defined function?

If so, XAPLUPRM or XAPLUCCHK must match the owner name passed from DB2 by the XAPLREL1 parameter.

If not, the user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.SYSOPR</i>	DSNADM
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

---

## View privileges

**Resources:** Views

**Resource type:** V

## DB2 privileges

### COMMENT ON

XAPLPRIV value: **COMNTAUT**

Does the user own the view?

If so, XAPLUPRM or XAPLUCCHK must match the view name passed from DB2 by the XAPLOWNQ parameter.

If not, the user must have sufficient authority to:

One of these resources:	In class:
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

### DELETE

XAPLPRIV value: **DELETAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.view-owner.view-name.DELETE</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **DROP**

XAPLPRIV value: **DROPAUT**

Does the user own the view?

If so, XAPLUPRM or XAPLUCHK must match the view name passed from DB2 by the XAPLOWNQ parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **INSERT**

XAPLPRIV value: **INSRTAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.view-owner.view-name.INSERT</i>	MDSNTB or GDSNTB
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## **REGENERATE VIEW**

XAPLPRIV value: **ALTERAUT**

Does the user own the view?

If so, XAPLUPRM or XAPLUCHK must match the view name passed from DB2 by the XAPLOWNQ parameter.

If not, the user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.SYSCTRL</i>	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## SELECT

XAPLPRIV value: **SELCTAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.view-owner.view-name</i> .SELECT	MDSNTB or GDSNTB
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## UPDATE

XAPLPRIV value: **UPDTEAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.view-owner.view-name</i> .UPDATE	MDSNTB or GDSNTB
<i>DB2-subsystem.view-owner.view-name.column-name</i> .UPDATE	MDSNTB or GDSNTB
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.

## “Any table” authority

XAPLPRIV value: **ANYTBAUT**

The user must have sufficient authority to:

<b>One of these resources:</b>	<b>In class:</b>
<i>DB2-subsystem.view-owner.view-name</i> .SELECT	MDSNTB or GDSNTB
<i>DB2-subsystem.view-owner.view-name</i> .INSERT	MDSNTB or GDSNTB
<i>DB2-subsystem.view-owner.view-name</i> .UPDATE	MDSNTB or GDSNTB
<i>DB2-subsystem.view-owner.view-name</i> .DELETE	MDSNTB or GDSNTB
<i>DB2-subsystem.SYSCTRL</i> This check is bypassed when bit 7 of XAPLFLG1 is on.	DSNADM
<i>DB2-subsystem.SYSADM</i>	DSNADM

**Note:** *DB2-subsystem* may not be required, or may be substituted by *DB2-group-attachment*, at your DB2 installation. See “Usage notes” on page 68.



---

## Appendix E. DB2 RACF access control module messages

---

**IRR900A** RACF/DB2 EXTERNAL SECURITY MODULE FAILED TO INITIALIZE FOR DB2 SUBSYSTEM *subsystem-name* BECAUSE CLASS *classname* COULD NOT BE RACLISTED. RACROUTE RETURN CODE *return\_code*, RACF RETURN CODE *return\_code*, REASON CODE *reason\_code*.

**Explanation:** The RACF access control module initialization function for DB2 subsystem *subsystem-name* attempted to RACLIST class *classname* using RACROUTE REQUEST=LIST,ENVIR=CREATE,GLOBAL=YES. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem. The RACROUTE request failed with the return and reason codes provided in the message text. The return and reason codes are shown in hexadecimal format.

**System Action:** See System Action for message IRR912I or IRR913I.

**Operator Response:** Contact the system programmer.

**System Programmer Response:** Use the RACROUTE return code and RACF return and reason codes to determine the cause of the failure. After you correct the problem, restart DB2.

**Destination:** Descriptor code is 2. Routing codes are 1 and 9.

---

**IRR901A** RACF/DB2 EXTERNAL SECURITY MODULE FAILED TO INITIALIZE FOR DB2 SUBSYSTEM *subsystem-name* BECAUSE NO ACTIVE DB2 RELATED CLASSES WERE FOUND.

**Explanation:** The RACF access control module initialization function for subsystem *subsystem-name* determined that no classes for the indicated DB2 subsystem are active. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

**System Action:** See System Action for message IRR912I or IRR913I.

**Operator Response:** Contact your security administrator.

**Security Administrator Response:** Activate the desired classes for the indicated DB2 subsystem and restart DB2.

**Destination:** Descriptor code is 2. Routing codes are 1 and 9.

---

**IRR902A** RACF/DB2 EXTERNAL SECURITY MODULE FAILED TO INITIALIZE FOR DB2 SUBSYSTEM *subsystem-name* BECAUSE THE INPUT ACEE WAS {MISSING | NOT VALID}.

**Explanation:** The RACF access control module initialization function for subsystem *subsystem-name* determined that the input DB2 subsystem ACEE was either not valid or missing. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

**System Action:** See System Action for message IRR912I or IRR913I.

**Operator Response:** Contact the DB2 system programmer.

**System Programmer Response:** Contact the IBM support center.

**Destination:** Descriptor code is 2. Routing codes are 1 and 9.

---

**IRR903A** RACF/DB2 EXTERNAL SECURITY MODULE FAILED TO INITIALIZE FOR DB2 SUBSYSTEM *subsystem-name* BECAUSE RACF WAS NOT ACTIVE.

**Explanation:** The RACF access control module initialization function for subsystem *subsystem-name* determined that RACF is not active on this system. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

**System Action:** See System Action for message IRR912I or IRR913I.

**Operator Response:** Contact the RACF system programmer.

**Problem Determination:** Issue the RVARY LIST command to determine RACF status.

**System Programmer Response:** Determine why RACF is inactive. After you correct the problem, activate RACF and restart DB2.

**Destination:** Descriptor code is 2. Routing codes are 1 and 9.

---

**IRR904I**      **RACF/DB2 EXTERNAL SECURITY MODULE INITIALIZED WITH WARNINGS FOR DB2 SUBSYSTEM** *subsystem-name* **BECAUSE A DEFAULT ACEE COULD NOT BE CREATED. RACROUTE RETURN CODE** *return\_code*, **RACF RETURN CODE** *return\_code*, **REASON CODE** *reason\_code*.

**Explanation:** The RACF access control module initialization function for subsystem *subsystem-name* attempted to create a default ACEE to use in subsequent authority checking when no ACEE is provided. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

The attempt to create the ACEE using RACROUTE REQUEST=VERIFY,ENVIR=CREATE failed with the return and reason codes provided in the message text. The return and reason codes are shown in hexadecimal format.

**System Action:** Processing continues and the RACF access control module is used for subsequent authority checking if DB2 provides an ACEE. If no ACEE is provided, requests are deferred to DB2.

**Operator Response:** Contact the DB2 system programmer.

**System Programmer Response:** Use the RACROUTE return code and RACF return and reason codes to determine the cause of the failure. After you correct the problem, restart DB2.

**Destination:** Descriptor code is 12. Routing codes are 2, 9, and 10.

---

**IRR905I**      **RACF/DB2 TERMINATION FUNCTION COMPLETED WITH WARNINGS FOR DB2 SUBSYSTEM** *subsystem-name* **BECAUSE CLASS** *classname* **COULD NOT BE UN-RACLISTED. RACROUTE RETURN CODE** *return\_code*, **RACF RETURN CODE** *return\_code*, **REASON CODE** *reason\_code*.

**Explanation:** The RACF access control module termination function for subsystem *subsystem-name* attempted to delete RACLISTed profiles for class *classname*. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

The attempt to delete the profiles using RACROUTE REQUEST=LIST,ENVIR=DELETE failed with the return and reason codes provided in the message text. The return and reason codes are in hexadecimal format.

**System Action:** The termination function continues processing. Resources are cleaned up when processing completes. This does not impact RACF authorization

checking when DB2 is restarted.

**Operator Response:** Contact the DB2 system programmer.

**System Programmer Response:** Use the RACROUTE return code and the RACF return and reason codes to determine the cause of the failure.

**Destination:** Descriptor code is 12. Routing codes are 2, 9, and 10.

---

**IRR906I**      **RACF/DB2 TERMINATION FUNCTION COMPLETED WITH WARNINGS FOR DB2 SUBSYSTEM** *subsystem-name* **BECAUSE THE DEFAULT ACEE COULD NOT BE DELETED. RACROUTE RETURN CODE** *return\_code*, **RACF RETURN CODE** *return\_code*, **REASON CODE** *reason\_code*.

**Explanation:** The RACF access control module termination function for the subsystem *subsystem-name* attempted to delete the default ACEE used by the RACF access control module. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

The attempt to delete the ACEE using RACROUTE REQUEST=VERIFY,ENVIR=DELETE failed with the return and reason codes provided in the message text. The return and reason codes are in hexadecimal format.

**System Action:** The termination function continues processing and resources are cleaned up when processing completes. This does not impact RACF authorization checking when DB2 is restarted.

**Operator Response:** Contact the DB2 system programmer.

**System Programmer Response:** Use the RACROUTE return code and the RACF return and reason codes to determine the cause of the failure. After you correct the problem, restart DB2.

**Destination:** Descriptor code is 12. Routing codes are 2, 9, and 10.

---

**IRR907I**      **RACF/DB2 TERMINATION FUNCTION COMPLETED WITH WARNINGS FOR DB2 SUBSYSTEM** *subsystem-name* **BECAUSE THE INPUT ACEE WAS {MISSING | NOT VALID}.**

**Explanation:** The RACF access control module termination function for the subsystem *subsystem-name* determined that the input DB2 subsystem ACEE was either not valid or missing. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

**System Action:** For exit termination, the RACF access control module is not able to complete its termination function. This should not impact RACF

authorization checking when DB2 is restarted.

**Operator Response:** Contact the DB2 system programmer.

**System Programmer Response:** Contact the IBM support center.

**Destination:** Descriptor code is 12. Routing codes are 2, 9, and 10.

---

**IRR908I**      **RACF/DB2 EXTERNAL SECURITY  
MODULE FOR DB2 SUBSYSTEM**  
*subsystem-name* **HAS A MODULE  
VERSION OF** *module-version* **AND A  
MODULE LENGTH OF** *module-length*.

**Explanation:** The RACF access control module initialization function for subsystem *subsystem-name* has determined the version and length of the RACF access control module for subsystem *subsystem-name*. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem. *module-version* is the FMID or APAR number associated with the module. *module-length* is the hexadecimal length of all CSECTs contained in the module.

**System Action:** The RACF access control module continues.

**Destination:** Descriptor code is 4. Routing codes are 9 and 10.

---

**IRR909I**      **RACF/DB2 EXTERNAL SECURITY  
MODULE FOR DB2 SUBSYSTEM**  
*subsystem-name* **IS USING OPTIONS:**  
**&CLASSOPT=** *classopt* **&CLASSNMT=**  
*classnmt* **&CHAROPT=** *charopt*  
**&ERROROPT=** *erroropt* **&PCELLCT=**  
*pcellct* **&SCCELLCT=** *scellct*

**Explanation:** The RACF access control module initialization function for subsystem *subsystem-name* lists the options that are being used for the RACF access control module. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem. For an explanation of the options, see *z/OS Security Server RACF System Programmer's Guide*.

**System Action:** The RACF access control module continues.

**Destination:** Descriptor code is 4. Routing codes are 9 and 10.

---

**IRR910I**      **RACF/DB2 EXTERNAL SECURITY  
MODULE FOR DB2 SUBSYSTEM**  
*subsystem-name* **INITIATED RACLIST  
FOR CLASSES: {***classname-list* **| \*  
NONE \*}**

**Explanation:** The RACF access control module initialization function for DB2 subsystem *subsystem-name* issued a RACROUTE REQUEST=LIST,GLOBAL=YES macro for classes *classname-list* as defined in the object table in the RACF access control module. If \* NONE \* is displayed, an error occurred before the initialization function could issue RACROUTE REQUEST=LIST for any class. If this is DB2 data sharing, *subsystem-name* is the group attach name. Otherwise, it is the DB2 subsystem.

**System Action:** The RACF access control module continues.

**Destination:** Descriptor code is 4. Routing codes are 9 and 10.

---

**IRR911I**      **RACF/DB2 EXTERNAL SECURITY  
MODULE FOR DB2 SUBSYSTEM**  
*subsystem-name* **SUCCESSFULLY  
RACLISTED CLASSES: {***classname-list* **|  
\* NONE \*}**

**Explanation:** The RACF access control module initialization function for DB2 subsystem *subsystem-name* lists the classes for which the RACROUTE REQUEST=LIST,GLOBAL=YES macro was successful. If \* NONE \* is displayed, no classes were RACLISTed successfully. See message IRR910I to determine which classes the RACF access control module attempted to use. The class list displayed in IRR911I might be a valid subset of the classes listed in message IRR910I. See *z/OS Security Server RACF Security Administrator's Guide* for more information about initializing the RACF access control module.

**System Action:** The RACF access control module continues.

**Destination:** Descriptor code is 4. Routing codes are 9 and 10.

---

**IRR912I**      **NATIVE DB2 AUTHORIZATION IS  
USED.**

**Explanation:** RACF is not being used to control access to DB2 resources. This message is preceded by other messages that describe why RACF is not being used for access control decisions.

**System Action:** None. All subsequent access control decisions are made by DB2 using DB2's native security mechanism.

**Operator Response:** Follow the Operator Response for the message that preceded this message.

**Destination:** Descriptor code is 2. Routing codes are 1 and 9.

---

**IRR913I DB2 SUBSYSTEM TERMINATION REQUESTED.**

**Explanation:** RACF has requested that the DB2 subsystem be terminated. This message is preceded by another message which describes why this request has been made.

**System Action:** RACF has requested that the DB2 subsystem terminate.

**Operator Response:** Follow the Operator Response for the message that preceded this message.

**Destination:** Descriptor code is 2. Routing codes are 1 and 9.

---

**IRR914I DSNX@XAC has been invoked with a DB2 VxRxMx parameter list**

**Explanation:** RACF access control module was invoked from a DB2 Version 8 system. However, the parameter list that was passed was for another version of DB2. This mismatch of DB2 version and level of the RACF access control module is not allowed.

**System Action:** If RACF access control module has installation option &ERROROPT 2 specified, then the DB2 subsystem is asked to terminate. If installation option &ERROROPT 1 was specified, then the DB2 subsystem is asked to use native DB2 authorization. In either case, the exit is not called again.

**System Programmer Response:** DB2 Version 8 must be executed with the DSNX@XAC that was shipped with DB2 Version 8. The DB2 V8-shipped version must be assembled with the DB2 Version 8 macros, link edited, and installed in a library which is accessible to your DB2 subsystem. DB2 Version 7 and DB2 Version 6 must be executed with the RACF/DB2 external security module that was shipped by RACF in SYS1.SAMPLIB(RACF/DB2 external security module). This code must be assembled with the DB2 macros of the correct DB2 release, link edited, and installed in a library which is accessible to your DB2 subsystem.

**Destination:** Descriptor code is 2. Routing codes are 1 and 9.

---

**IRR915I EXPLRC1 = xxx, EXPLRC2 = xxx, XAPLPRIV = xxxx**

**Explanation:** RACF access control module has been instructed (either by a zap or by changing the assembler source) to display the return and reason code (EXPLRC1 and EXPLRC2) that is returned to DB2 along with the DB2 privilege code (XAPLPRIV) for the request. For DB2 initialization and termination, XAPLPRIV will be xxx.

**System Action:** None. This message is a diagnostic informational message.

**System Programmer Response:** None. This message is only issued if RACF access control module has been specifically altered to display the return, reason, and privilege codes. This should only be done under the guidance of the IBM service team.

**Destination:** Descriptor code is 4. Routing codes are 9 and 10.

---

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# Index

## Special characters

&CHAROPT 7, 21  
&CLASSMNT 7, 21  
&CLASSOPT 7, 21  
&ERROROPT 7

## A

access control module  
    See RACF access control module  
ACEE address 46  
administrative authorities 25  
    DB2  
        DSNADM class 18  
aliases, DB2 43  
assembler SET symbols  
    &CHAROPT 7, 21  
    &CLASSMNT 7, 21  
    &CLASSOPT 7, 21  
    &ERROROPT 7  
audit controls  
    RACF access control module 36  
auditing  
    checking DB2 authorization 33  
    RACF access control module 33  
authority checking  
    by RACF access control module 1  
    for all packages in a collection 44  
authorization  
    deferring to DB2 native 48  
authorization access control module  
    See RACF access control module  
authorization checking  
    examples 59  
    for DB2 resources 67  
    RACF access control module 53  
        FASTAUTH return code translation 54  
        reason codes 53  
        return codes 53  
AUTOBIND requests 45

## B

blank characters in DB2 object names 44

## C

class names  
    defining your own 15  
    supplied by IBM 57  
classes  
    defining your own 15  
    using the supplied DSNADM class 18  
CREATE ALIAS privilege 42  
CREATE VIEW privilege 42  
CREATETMTAB privilege 41

## D

data sharing, DB2 40  
DB2  
    administrative authorities 25  
        DSNADM class 18  
    aliases 43  
    allowing access to object, examples  
        auditing for all attempts 60  
        auditing for failures 59  
        multiple-subsystem scope 63  
        single-subsystem scope 64  
    authority checking  
        for all packages in a collection 44  
    AUTOBIND request 45  
    data sharing 40  
    deferring to, example 62  
    denying access to object, example 61  
    general resource classes 57  
    GRANT ALL 44  
    native authorization, deferring to 48  
    objects  
        class names 15  
        names with blank characters 44  
        names with special characters 44  
        object name qualifiers 23  
        protecting 21  
        types 21  
    privilege names 24  
    privileges  
        "any schema" 42  
        "any table" 42  
        CREATE ALIAS 42  
        CREATE VIEW 42  
        CREATETMTAB 41  
        of ownership, implicit 40  
        REFERENCES 43  
        UPDATE 43  
    PUBLIC\* user ID 40  
    resource names 22, 25  
    resources  
        authorization checking 67  
        local 43  
        remote 43  
    table columns  
        REFERENCE authorization 43  
        UPDATE authorization 43  
        WITH GRANT option 44  
DB2 access control authorization exit (DSNX@XAC) 1  
DB2 RACF external security module  
    See RACF access control module  
DSNADM class  
    and DB2 administrative authorities 18  
    description 57  
DSNDXAPL macro 34  
DSNR class  
    description 57  
DSNX@XAC exit, load module 1

DSNXAPRV macro 68  
DSNXRXAC member of *prefix.SDSNSAMP* 1, 11  
DSNXSXAC member of *prefix.SDSNSAMP* 2  
dump title descriptions  
    RACF access control module 29

## E

exit routine  
    determining if active 12  
external security module  
    See RACF access control module

## G

GDSNBP class  
    description 57  
GDSNCL class  
    description 57  
GDSNDB class  
    description 57  
GDSNJR class  
    description 57  
GDSNPK class  
    description 57  
GDSNPN class  
    description 57  
GDSNSC class  
    description 57  
GDSNSG class  
    description 57  
GDSNSM class  
    description 57  
GDSNSP class  
    description 57  
GDSNSQ class  
    description 57  
GDSNTB class  
    description 57  
GDSNTS class  
    description 57  
GDSNUF class  
    description 57  
GDSNUT class  
    description 57  
general resource classes  
    for DB2 objects 15, 57  
GRANT ALL 44

## I

IFCID (instrumentation facility component identifier)  
    IFCID 0314 29  
implicit ownership, associated DB2 privileges 40  
initialization  
    RACF access control module  
        description 47  
        reason codes 52  
        return codes 52  
IRR@XACS member of SYS1.SAMPLIB 1

## L

LOGSTR  
    RACF access control module 34  
    using data 34

## M

macros  
    DSNDXAPL 34  
    DSNXAPRV 68  
    XAPLDBS 30  
matching schema names 39  
materialized query tables 40  
MDSNBP class  
    description 57  
MDSNCL class  
    description 57  
MDSNDB class  
    description 57  
MDSNJR class  
    description 57  
MDSNPK class  
    description 57  
MDSNPN class  
    description 57  
MDSNSC class  
    description 57  
MDSNSG class  
    description 57  
MDSNSM class  
    description 57  
MDSNSP class  
    description 57  
MDSNSQ class  
    description 57  
MDSNTB class  
    description 57  
MDSNTS class  
    description 57  
MDSNUF class  
    description 57  
MDSNUT class  
    description 57  
messages 103  
multilevel security 2

## N

Notices 107

## O

object  
    names 23  
    types 21  
operator messages 103  
output parameters  
    XAPLDIAG 43



## P

### parameters

- XAPLACEE 45, 46
- XAPLCRVW 42
- XAPLDBDA 42
- XAPLDBSP 30
- XAPLDIAG 30, 43
- XAPLFSUP 40
- XAPLGPAT 16, 18, 22, 25
- XAPLONWT 43
- XAPLPRIV 21, 35
- XAPLTYPE 21, 34

### privilege names 24

### privileges

- “any schema” 42
- “any table” 42
- CREATE ALIAS 42
- CREATE VIEW 42
- CREATETMTAB 41
- implicit ownership 40
- REFERENCES 43
- UPDATE 43

PUBLIC\* user ID 40

## R

### RACF

- authorization checking
  - for DB2 resources 67

### RACF access control module

- allowing access to DB2 object, examples

- auditing for all attempts 60
- auditing for failures 59
- multiple-subsystem scope 63
- single-subsystem scope 64

- assembling and link-editing 12

- auditing 33

- authority checking 1

- authorization checking

- description 53
- examples 59
- FASTAUTH return code translation 54
- for DB2 resources 67
- reason codes 53
- return codes 53

- checking authorization 33

- class scope 8

- classification models 8

- customizing 7

- deferring to DB2, example 62

- defining classes for 15

- denying access to DB2 object, example 61

- description 1

- diagnostic information 29

- dump titles 29

- functions 51

- initialization

- description 47, 51
- reason codes 52
- return codes 52

### RACF access control module *(continued)*

- installing 11
- messages 103
- migrating to 6
- multiple-subsystem scope 8
- overview 1
- prerequisites 1
- removing 48
- resource checking example 33
- setting audit controls 36
- single-subsystem scope scope 8
- termination
  - description 55
  - reason codes 55
  - return codes 55
- using log string data 34
- using RACF for authorization checking 1
- XAPLDIAG output parameter 29
- XAPLFUNC function codes 51

### RACF reason codes

- in the RACF access control module 29

### RACF return codes

- in the RACF access control module 29

### RACROUTE REQUEST=FASTAUTH macro

- diagnosing failures 29

### reason codes

- RACF access control module
  - authorization checking 53
  - initialization 52
  - termination 55

### REFERENCE authorization

- on DB2 table columns 43

- removing RACF access control module 48

### resource class

- DB2 class names 57
- defining for RACF access control module 15

- resource names 22, 25

### resources

- authorization checking 67
- local 43
- remote 43

### return codes

- RACF access control module
  - authorization checking 53
  - initialization 52
  - termination 55
- translation
  - FASTAUTH 54

## S

### SAF return codes

- in the RACF access control module 29

- schema names 39

### SDSNSAMP library

- DSNXRXAC member 1, 11

- DSNXSXAC member 2

- RACF access control module 11

- special characters in DB2 object names 44

- system operator messages 103

## T

termination

- RACF access control module
  - reason codes 55
  - return codes 55

## U

- UPDATE authorization
  - on DB2 table columns 43
- user IDs
  - PUBLIC\* 40
- user-defined function
  - AUTOBIND request 45

## W

- WITH GRANT option 44

## X

- XAPLACEE parameter 45, 46
- XAPLCRVW parameter 42
- XAPLDBDA parameter 42
- XAPLDBS macro 30
- XAPLDBSP parameter 30
- XAPLDIAG parameter 29, 30, 43
- XAPLFSUP parameter 40
- XAPLFUNC parameter
  - authorization checking 53
  - function codes 51
  - initialization 47, 51
  - termination 55
- XAPLGPAT parameter 16, 18, 22, 25
- XAPLONWT parameter 43
- XAPLPRIV parameter 21, 35
- XAPLTYPE parameter 21, 34

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