DB2 for OS/390
Version 5

Reference for Remote DRDA Requesters and Servers

SC26-8964-01

Note!

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

First Edition (June 1997)

This edition applies to Version 5 of IBM DATABASE 2 Server for OS/390 (DB2 for OS/390), 5655-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.

Specific changes are indicated by a vertical bar to the left of a change. A vertical bar to the left of a figure caption indicates that the figure has changed. Editorial changes that have no technical significance are not noted.

This softcopy version is based on the printed version of the book, and includes the changes indicated in the printed version by vertical bars. Additional changes made to this softcopy version of the manual since the hardcopy manual was published are indicated by the hash (#) symbol in the left-hand margin.

Contents

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Programming Interface Information

This book is intended to help you to write programs that communicate with IBM DATABASE 2 Server for OS/390 (DB2 for OS/390) by means of the commands of distributed data management (DDM).

This book documents General-use Programming Interface and Associated Guidance Information provided by DB2 for OS/390.

General-use programming interfaces allow the customer to write programs that obtain the services of DB2 for OS/390.

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DRDA
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Introduction

This chapter contains specific information about this book.

Who Should Read This Book

This book is intended for people who are implementing an application requester (AR) or an application server (AS) that communicates with DB2 at the first, second, or third levels of Distributed Relational Database Architecture (DRDA). This can be either:

- A DRDA AR that connects to a DB2 AS, or
- A DRDA AS that services applications at a DB2 DRDA AR.

DRDA supports DDM as follows:

- DRDA level 1 supports DDM level 3.
- DRDA level 2 supports DDM level 4.
- DRDA level 3 supports DDM level 5.

What You Should Know

Before using this book, you should have a good understanding of DRDA and Distributed Data Management (DDM).

What This Book Is About

This book explains:

- What DDM commands DB2 uses. For each DDM command, a table summarizes whether the DB2 application requester (AR) and the DB2 application server (AS) support the command parameters.
- How an accounting system can track DRDA access to DB2.
- How an AR can request data from a DB2 data sharing group.

Where to Find More Information

The DDM commands described in this book supplement the information in the following Open Group Technical Standard publications:

- *DRDA Volume 1: Distributed Relational Database Architecture (DRDA), ISBN 1-85912-295-7*
- *DRDA Volume 3: Distributed Database Management (DDM) Architecture, ISBN 1-85912-206-X*

The DDM Manager Level (MGRLVL) requirements for the DRDA levels are defined in *DRDA Volume 1: Distributed Relational Database Architecture (DRDA)*.

Summary of Changes to This Book

This edition includes four new DDM commands:

- “The ACCSEC Command” on page 8
- “The SECCHK Command” on page 27
- “The SYNCCTL Command” on page 28
- “The SYNCRSY Command” on page 29

Updates to commands are marked with revision bars.

Information about sending accounting or monitoring data to DB2 in the SQLSTT instance variable of the EXCSQLSET command is added to “Accounting for Distributed Data” on page 31.

DB2 Distributed Data Management (DDM) Command Support

This chapter describes the DDM commands and command parameters, command data objects, and reply data objects that DB2 supports for DRDA level 1, DRDA level 2, and DRDA level 3.

An application requester (AR) using DRDA to connect to an application server (AS) uses a subset of *distributed data management* (DDM) as part of the underlying architecture of DRDA. DDM is the data connectivity language used for data interchange among like or unlike systems and is independent of a particular system's hardware architecture and its operating system.

Command data and reply data objects are defined by DDM; however, their structure is defined by the Formatted Data Object Content Architecture (FD:OCA).

Figure 1 illustrates the relationship between DDM and other architectures composing DRDA.

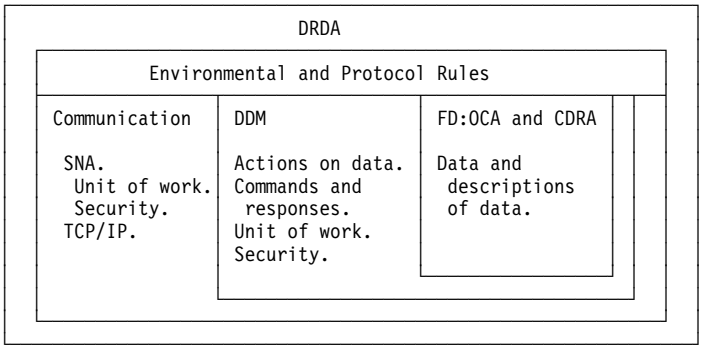


Figure 1. DDM's Relationship to DRDA and Other Architectures. FD:OCA is the Formatted Data Object Content Architecture, and CDRA is the Character Data Representation Architecture.

DRDA is defined in terms of rules and usage of four underlying architectures:

- Communication in DRDA can use multiple network transport protocols. DB2 uses the following transport protocols:
  - SNA LU 6.2: Allows the specification of security requirements between the application and the relational database. Additional security requirements, such as OSF DCE (Open Software Foundation Distributed Computing Environment) that cannot be specified using SNA LU6.2, are specified using DDM commands and responses. SNA LU 6.2 also specifies the token (LUWID) that correlates the application process at the AR and the agent process at the AS. All commands and data are sent by way of SNA LU 6.2 conversations.
  - TCP/IP: All security and LUWID requirements are specified using DDM commands and responses. All commands and data are sent by way of TCP/IP sockets.
- Distributed Data Management (DDM) defines the syntax and semantics of all commands sent from an AR to an AS and all reply messages sent from an AS to an AR.

- Formatted Data Object Content Architecture describes the syntax and semantics of all command data objects sent from an AR to an AS and all reply data objects sent from an AS to an AR.
- Character Data Representation Architecture specifies the representation of character data sent within a command data object from an AR to an AS and character data sent within a reply data object from an AS to an AR.

How to Read the Tables

A DDM command can have associated with it:

Parameters (known as instance variables in DDM)
Command data objects
Reply messages
Reply data objects.

These commands and their associated objects and messages map to actions taken by a relational database management system:

- SQL requests are sent to the AS as DDM commands.
- Application host variable descriptions and values are sent to the AS as DDM command data.
- The results of an SQL request are returned to the AR via DDM reply messages and DDM reply data objects.
- Descriptions of data returned to the application and the data itself are returned from the AS to the AR in DDM reply data objects.

If a particular command has any of the above objects associated with it, those objects are described in separate tables under the heading of that command.

DB2 supports all of the commands listed in this book with one exception. DB2 never sends the “interrupt RDB request” command (INTRDBRQS). If this command is received by the DB2 AS, DB2 returns a “command-not-supported” message (CMDNSPRM).

For all the tables, the “**Required?**” column indicates whether the item is required by DRDA. The meanings of the “AR” and “AS” columns are described in the sections below.

Commands

The meanings of the columns for commands are:

The **AR** column indicates how the DB2 application requester supports the parameter:

Y means that DB2 sends it to the AS.

N means that DB2 does *not* send it to the AS.

I means that DB2 ignores it (when in a reply from the AS).

S means that DB2 supports a subset of DRDA options. The options are listed below the parameter in capital letters; Y means DB2 supports it and N means that DB2 does not send it.

The **AS** column indicates how the DB2 application server supports the code point or parameter:

Y means that DB2 recognizes and processes it.

N means that DB2 rejects it.

I means that DB2 ignores it if received.

S means that DB2 allows the parameter, depending on its value. The options are listed below the parameter in capital letters; Y means DB2 supports it and N means that DB2 rejects it.

Command Data Objects

The meanings of the columns for command data objects are:

The **AR** column indicates how the DB2 AR supports the parameter:

Y means that DB2 sends it to the AS.
N means that DB2 does *not* send it to the AS.

The **AS** column indicates how the DB2 AS supports the parameter:

Y means that DB2 receives and processes it.
I means that DB2 ignores the parameter.

Reply Data Objects

The meanings of the columns for reply data objects are:

The **AR** column indicates how the DB2 AR supports the parameter:

Y means that DB2 recognizes and processes it.
I means that DB2 ignores it.

The **AS** column indicates how the DB2 AS supports the parameter:

Y means that DB2 sends it to the AR.
N means that DB2 does *not* send it to the AR.

Reply Messages

DDM reply messages fall into two classes. One class represents the reply messages returned in response to the normal processing of a DDM command. The other class contains reply messages returned in response to an error detected by the AS during the processing of a DDM command.

Normal Situation

The normal message response is described under each DDM command that has a possible reply message. The meanings of the columns for reply messages are:

The **AR** column indicates how the DB2 AR supports the message:

Y means that DB2 always supports the receipt of any instance variable defined as valid for any DDM reply message.

N means that DB2 does *not* receive the message from the AS.

The **AS** column indicates how the DB2 AS supports the message:

Y means that DB2 sends it to the AR.
N means that DB2 does *not* send it to the AR.

Error Situation

The DB2 AS can generate any of the following DDM reply messages if it fails to process a DDM command:

AGNPRMRM	MGRLVLRM	QRYPOPRM
BGNBNDRM	OBJNSPRM	RDBACCRM
CMDCHKRM	OPNQFLRM	RDBNACRM
CMDNSPRM	PKGBNARM	RSCLMTRM
CMDVLTRM	PKGBPARM	SQLERRRM
DSCINVRM	PRCCNVRM	SYNTAXRM
DTAMCHRM	PRMNSPRM	VALNSPRM
MGRDEPRM	QRYNOPRM	

The DB2 AS never sends any of the following DDM reply messages:

CMDATHRM	TRGNSPRM	RDBATHRM

RDBNFNRM is returned on:

- EXCSAT in releases prior to Version 5
- ACCSEC and SECCHK in Version 5.

The ACCRDB Command

The ACCRDB command means “access relational database,” and it establishes a path to a named relational database.

Table 1. ACCRDB Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database)	Y	Y	Y
Rdbacccl (access manager class)	Y	Y	Y
Typdefnam (data type definition name)	Y	Y	Y
Typdefovr (data type definition override)	Y	Y	Y
Prdid (product specific identifier)	Y	Y	Y
Rdbalwupd (rdb to allow updates)	Y	Y	N
Prddta (product specific data)	Y	Y	N
Note: See “Accounting for Distributed Data” on page 31 for more information.			
Sttstrdel (string delimiter) STRDELAP STRDELDQ DFTPKG	Y Y Y N	Y Y Y Y	N
Sttdecdel (decimal delimiter) DECDELPRD DECDELCMA DFTPKG	S Y Y N	Y Y Y Y	N
Crrtkn (correlation token)	Y	Y	N
Trgdftrt (target default values return)	N	Y	N

There are no command data objects or reply objects as defined by DRDA for ACCRDB.

Table 2. ACCRDBRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Prdid (product identifier)	Y	Y	Y
Typdefnam (data type definition name)	Y	Y	Y
Rdbinttkn (RDB interrupt token)	Y	N	N
Crrtkn (correlation token)	Y	Y	N
Srvdgn (server diagnostic information)	Y	Y	N
Pkgdftcst (package default character subtype)	Y	N	N
Usrid (user ID at the target system)	Y	N	N
Srvlst (server list)*	Y	Y	N

Note: Srvlst is supported by DRDA level 3 only.

The ACCSEC Command

The ACCSEC command means “access security.” It initializes the security mechanism used to validate the users identity.

Table 3. ACCSEC Command Instance Variables

Instance Variable	AR	AS	Required?
Secmgrnm (security manager name)	N	I	N
Secmec (security mechanism)	Y	Y	Y
Rdbnam (target RDB)	Y	Y	N
Sectkn (security token)	N	Y	N

There are no command data objects defined by DRDA for ACCSEC.

ACCSECRD reply object for ACCSEC command

There is only one reply data object defined as valid for ACCSEC. This is the ACCSECRD reply data object. This table lists instance variables for this object, because some are optional and not supported as a requester.

Table 4. ACCSECRD reply object instance variables

Instance variable	AR	AS	Required?
Sectkn (security token)	N	Y	N
Secmec (security mechanism)	Y	Y	Y
Secchkcd (security check code)	N	Y	N

There are no DDM reply messages returned as a result of normal processing of the ACCSEC command.

The BGNBND Command

The BGNBND command means “begin bind,” and it starts the process of binding a package into a particular relational database.

Table 5. BGNBND Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamct (package name and consistency token)	Y	Y	Y
Vrsnam (package version name)	Y	Y	N
Bndchkexs (bind existence checking)	Y	Y	N
Pkgrplopt (package replacement option)	Y	Y	N
Pkgathopt (package authorization option)	Y	Y	N
Pkgathrul (package authorization rules) OWNER REQUESTER	Y Y Y	Y Y Y	N
Sttstrdel (statement string delimiter)	Y	Y	N
Sttdecdel (statement decimal delimiter)	Y	Y	N
Sttdatfmt (date format of statement)	Y	Y	N
Stttimfmt (time format of statement)	Y	Y	N
Pkgisolvl (package isolation level) ISOLVLRR ISOLVLALL ISOLVLCS ISOLVLCHG ISOLVLNC	S Y Y Y Y Y	Y Y Y Y Y Y	Y
Dgrioprl (degree of I/O parallelism)	Y	Y	N
Bndcrtctl (bind creation control) BNDCHKONL BNDERRALW BNDNERALW	S N Y Y	Y Y Y Y	N
Bndexpopt (bind explain option)	Y	Y	N
Pkgownid (package owner identifier)	Y	Y	N
Rdbrlsopt (RDB release option)	Y	Y	N
Dftrdbcol (default RDB collection identifier)	Y	Y	N
Title (brief description of package)	N	I	N
Qryblkctl (query block protocol control)	Y	Y	N
Pkgdftcst (default character subtype) CSTSYDFT CSCTBITS CSTSBCS CSTMBCS	N N N N N	S Y I I I	N
Pkgdftcc (package default CCSID)	N	Y	N
Pkgrplvrs (replaced package version name)	Y	Y	Y
Decprc (decimal precision)	N	Y	N

Table 6. BGNBND Command Data Objects

Command Data Object	AR	AS	Required?
Bndopt (bind option)*	Y	Y	N

Note: Bndopt is supported by DRDA level 3 only.

Table 7. Reply Objects for BGNBND Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 8. RDBUPDRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The BNDSQLSTT Command

The BNDSQLSTT command means “bind SQL statement,” and it binds an SQL statement to a package.

Table 9. BNDSQLSTT Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamcsn (package name, consistency token and section number)	Y	Y	Y
Sqlsttnbr (source application statement number)	Y	Y	N
Bndsttasm (bind statement assumptions)	Y	Y	N

Table 10. BNDSQLSTT Command Data Objects

Command Data Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlstt (SQL statement to be bound in the AS package)	Y	Y	Y
Sqlsttvrb (description of each variable)	Y	Y	N

Table 11. Reply Objects for BNDSQLSTT command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 12. RDBUPDRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The CLSQRY Command

The CLSQRY command means “close query,” and it terminates a query. It corresponds to a CLOSE.

Table 13. CLSQRY Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamcsn	Y	Y	Y

There are no command data objects defined by DRDA for CLSQRY.

Table 14. Reply Objects for CLSQRY Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

There are no DDM reply messages returned as a result of normal processing of the CLSQRY command.

The CNTQRY Command

The CNTQRY command means “continue query,” and it is a request to resume a query that was interrupted.

Table 15. CNTQRY Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamcsn (package name, consistency token and section number)	Y	Y	Y
Qryblksz (query block size)	Y	Y	Y
Maxblkext (maximum number of additional query blocks)*	N	I	N

Note: Maxblkext is supported by DRDA level 3 only.

There are no command data objects defined by DRDA for CNTQRY.

Table 16. Reply Objects for CNTQRY Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	N
Qrydta (query answer set data)	Y	Y	N

Table 17. ENDQRYRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	N
Srvdgn (server diagnostic information)	Y	N	N

The DRPPKG Command

The DRPPKG means “drop package,” and it deletes a named package from a relational database instance.

Table 18. DRPPKG Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnam (package grouping name and identifier)	Y	Y	Y
Vrsnam (version name)	Y	Y	N

There are no command data objects defined by DRDA for DRPPKG.

Table 19. Reply Objects for DRPPKG Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 20. RDBUPDRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The DSCRDBTBL Command

The DSCRDBTBL command means “describe table,” and it is a request for a description of the RDB table named in the SQLTBLNAM command data object being returned to the requester.

Table 21. DSCRDBTBL Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N

Table 22. DSCRDBTBL Command Data Objects

Command Data Object	AR	AS	Required?
Typdefnam (data type definition name)	N	Y	N
Typdefovr (data type definition override)	N	Y	N
Sqltblnam (SQL table name)	Y	Y	Y

Table 23. Reply Objects for DSCRDBTBL Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	N
Sqldard (SQLDA reply data)	Y	Y	Y

There are no DDM reply messages returned as a result of normal processing of the DSCRDBTBL command.

The DSCSQLSTT Command

The DSCSQLSTT command means “describe SQL statement,” and it is a request for definitions of the columns of the result table of a prepared or bound statement and the names and labels of those columns. DB2 never sends a DSCSQLSTT command.

Table 24. DSCSQLSTT Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamcsn (package name, consistency token and section number)	N	Y	Y

There are no command data objects defined by DRDA for DSCSQLSTT.

Table 25. Reply Objects for DSCSQLSTT Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	N
Sqldard (SQLDA reply data)	Y	Y	Y

There are no DDM reply messages returned as a result of normal processing of the DSCSQLSTT command.

The ENDBND Command

The ENDBND command means “end bind.” It indicates that no more BIND commands will be sent, and the package is now complete.

Table 26. ENDBND Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamct (package name and consistency token)	Y	Y	Y
Maxsctnbr (maximum section number)	Y	Y	N

There are no command data objects defined by DRDA for ENDBND.

Table 27. Reply Objects for ENDBND Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 28. RDBUPDRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The EXCSAT Command

The EXCSAT means “exchange server attributes,” and it is the first DDM command sent from a requester to a server. The requester communicates the minimum level of support which it requires from the server.

Table 29. EXCSAT Command Instance Variables

Instance Variable	AR	AS	Required?
Extnam (external name)	Y	Y	N
Mgrlvlls (manager level list)	Y	Y	N
Spvnam (supervisor name)	N	N	N
Srvclsnm (server class name)	Y	Y	N
Srvnam (server name)	Y	Y	N
Srvrlslv (server release level)	Y	Y	N

There are no command data objects defined by DRDA for EXCSAT.

EXCSATRD Reply Object for the EXCSAT Command

There is only one reply data object defined as valid for EXCSAT. This is the EXCSATRD reply data object. This table lists instance variables for this object, because they are optional and can vary.

Table 30. EXCSATRD Reply Object Instance Variables

Instance Variable	AR	AS	Required?
Extnam (external name)	Y	Y	N
Mgrlvlls (manager level list)	Y	Y	N
Srvclsnm (server class name)	Y	Y	N
Srvnam (server name)	Y	Y	N
Srvrlslv (server release level)	Y	Y	N

There are no DDM reply messages returned as a result of normal processing of the EXCSAT command.

The EXCSQLIMM Command

The EXCSQLIMM command means “execute SQL statement immediate,” and it executes the single SQL statement sent with the command.

Table 31. EXCSQLIMM Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamcsn (package name, consistency token and section number)	Y	Y	Y

Table 32. Command Data Objects for EXCSQLIMM Command

Command Data Object	AR	AS	Required?
Typdefnam (data type definition name)	N	Y	N
Typdefovr (data type definition override)	N	Y	N
Sqlstt (SQL statement)	Y	Y	Y

Table 33. Reply Objects for EXCSQLIMM Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 34. ENDUOWRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Uowdsp (unit of work disposition)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	N
Srvdgn (server diagnostic information)	Y	Y	N

Table 35. CMMRQSRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Cmmtyp (commitment request type)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

Table 36. RDBUPDRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The EXCSQLSTT Command

The EXCSQLSTT command means “execute SQL statement,” and it executes a previously bound SQL statement.

Table 37. EXCSQLSTT Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Prcnam (stored procedure name)	Y	Y	N
Pkgnamcsn (package name, consistency token and section number)	Y	Y	Y
Outexp (output expected)	Y	Y	N
Maxrslcnt (maximum number of result sets)(1) -1	S Y	Y Y	N
Maxblkext (maximum number of additional query blocks)(1)	N	I	N
Qryblksz (query block size)	N	Y	Y
Rslsetflg (result set flag)	Y	Y	N
Rdbcmtok (commit by AS is allowed)(2)	N	Y	N

Notes:

1. Maxrslcnt and Maxblkext are supported by DRDA level 3 only.
2. Rdbcmtok is supported by DRDA level 2 only.

Table 38. Command Data Objects for the EXCSQLSTT Command

Command Data Object	AR	AS	Required?
Typdefnam (data type definition name)	N	Y	N
Typdefovr (data type definition override)	N	Y	N
Sqldta (SQL program variable data)	Y	Y	N
Prcnam (stored procedure name)	Y	Y	N

Table 39. Reply Objects for EXCSQLSTT Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	N
Sqldtard (SQL data reply data)	Y	Y	N
Sqlcinrd (SQL column information reply data)	Y	Y	N
Sqlrslrd (query result set returned by stored procedure)*	Y	Y	N
Qrydsc (query answer set description)*	Y	Y	N
Qrydta (query answer set data)*	Y	Y	N

Note: Sqlrslrd, Qrydsc, and Qrydta are supported by DRDA level 3 only.

Table 40. ENDUOWRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Uowdsp (unit of work disposition)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	N
Srvdgn (server diagnostic information)	Y	Y	N

Table 41. CMMRQSRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Cmmtyp (commitment request type)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

Table 42. RDBUPDRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

Table 43. RSLSETRM Reply Message Instance Variables for DRDA level 3 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Pkgsnlst (package section list)	Y	Y	N
Srvdgn (server diagnostic information)	Y	Y	N

Table 44. OPNQRYRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Qryprctyp (query protocol type)	Y	Y	Y
Sqlcsrhld (hold cursor position)	Y	Y	N
Srvdgn (server diagnostic information)	Y	N	N

Table 45. ENDQRYRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	N
Srvdgn (server diagnostic information)	Y	N	N

The OPNQRY Command

The OPNQRY command means “open query,” and it is a request to begin the query process. It is sent as a result of an SQL OPEN statement.

Table 46. OPNQRY Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamcsn (package name, consistency token and section number)	Y	Y	Y
Qryblksz (query block size)	Y	Y	Y
Qryblkctl (query block protocol control)	N	Y	N
Maxblkext (maximum number of additional query blocks)*	N	I	N

Note: Maxblkext is supported by DRDA level 3 only.

Table 47. Command Data Objects for OPNQRY Command

Command Data Object	AR	AS	Required?
Typdefnam (data type definition name)	N	Y	N
Typdefovr (data type definition override)	N	Y	N
Sqldta (input variable data)	Y	Y	N

Table 48. Reply Objects for OPNQRY Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	N
Qrydsc (query answer set description)	Y	Y	Y
Qrydta (query answer set data)	Y	Y	N

Table 49. OPNQRYRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Qryprctyp (query protocol type)	Y	Y	Y
Sqlcsrhld (hold cursor position)	Y	Y	N
Srvdgn (server diagnostic information)	Y	N	N

Table 50. ENDQRYRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	N
Srvdgn (server diagnostic information)	Y	N	N

The PRPSQLSTT Command

The PRPSQLSTT means “prepare an SQL statement,” and it dynamically binds a single SQL statement to a section number in an existing package in a relational database instance.

Table 51. PRPSQLSTT Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnamcsn (package name, consistency token and section number)	Y	Y	Y
Rtnsqlda (specifies if SQLDA should be returned)	Y	Y	N

Table 52. Command Data Objects for PRPSQLSTT Command

Command Data Object	AR	AS	Required?
Typdefnam (data type definition name)	N	Y	N
Typdefovr (data type definition override)	N	Y	N
Sqlstt (SQL Statement)	Y	Y	Y

Table 53. Reply Objects for PRPSQLSTT Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	N
Sqldard (SQLDA reply data)	Y	Y	N

There are no DDM reply messages returned as a result of normal processing of the PRPSQLSTT command.

The RDBCMM Command

The RDBCMM command means “commit transaction,” and it commits the current unit of work.

Table 54. RDBCMM Command Instance Variable

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	Y	Y	N

There are no command data objects defined by DRDA for RDBCMM.

Table 55. Reply Objects for RDBCMM Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 56. ENDUOWRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Uowdsp (unit of work disposition)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	N
Srvdgn (server diagnostic information)	Y	Y	N

Table 57. CMDVLTRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The RDBRLLBCK Command

The RDBRLLBCK command means, “roll back transaction,” and it rolls back (backs out) the current unit of work.

Table 58. RDBRLLBCK Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	Y	Y	N

There are no command data objects defined by DRDA for RDBRLLBCK.

Table 59. Reply Objects for RDBRLLBCK Command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 60. ENDUOWRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Uowdsp (unit of work disposition)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	N
Srvdgn (server diagnostic information)	Y	Y	N

Table 61. CMDVLTRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The REBIND Command

The REBIND command results in the rebind of an existing package at the server. No SQL statements are sent with REBIND. The SQL statements must have been bound previously at the server.

Table 62. REBIND Command Instance Variables

Instance Variable	AR	AS	Required?
Rdbnam (name of remote database as in ACCRDB)	N	Y	N
Pkgnam (package name)	Y	Y	Y
Vrsnam (package version name)	Y	Y	N
Pkgathrul (package authorization rules)	Y	Y	N
OWNER	Y	Y	
REQUESTER	Y	Y	
Pkgisolvl (package isolation level)	S	Y	Y
ISOLVLRR	Y	Y	
ISOLVLALL	Y	Y	
ISOLVLCS	Y	Y	
ISOLVLCHG	Y	Y	
ISOLVLNC	Y	Y	
Bndexpopt (bind explain option)	Y	Y	N
Pkgownid (package owner identification)	Y	Y	N
Rdbrlsopt (RDB release option)	Y	Y	N
Bndchkexs (bind existence checking)	Y	Y	N
Dftrdbcol (default RDB collection identifier)	Y	Y	N
Dgrioprl (degree of I/O parallelism)	Y	Y	N

Table 63. REBIND Command Data Objects

Command Data Object	AR	AS	Required?
Bndopt (bind option)	Y	Y	N

Table 64. Reply Objects for REBIND command

Reply Object	AR	AS	Required?
Typdefnam (data type definition name)	Y	N	N
Typdefovr (data type definition override)	Y	N	N
Sqlcard (SQLCA reply data)	Y	Y	Y

Table 65. RDBUPDRM Reply Message Instance Variables for DRDA Level 2 Only

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Rdbnam (relational database name)	Y	Y	Y
Srvdgn (server diagnostic information)	Y	Y	N

The SECCHK Command

The SECCHKRM command means “security check.” It sends information to the target security manager to authenticate the user.

Table 66. SECCHK Command Instance Variables

Instance Variable	AR	AS	Required?
Secmgrnm (security manager name)	Y	Y	N
Secmec (security mechanism)	Y	Y	Y
Password (password)	Y	Y	N
Usrid (user ID at the target system)	Y	Y	N
Rdbnam (target RDB)	Y	Y	N
Sectkn (security token)	N	Y	N

Table 67. SECCHK Command Data Objects

Command Data Object	AR	AS	Required?
Sectkn (security token)	Y	Y	N

Table 68. Reply Objects for SECCHK Command

Reply Object	AR	AS	Required?
Sectkn (security token)	Y	Y	N

Table 69. SECCHKRM Reply Message Instance Variables

Instance Variable	AR	AS	Required?
Svrcod (severity code)	Y	Y	Y
Secchkcd (security check code)	Y	Y	Y
Svcerrno (security service error number)	Y	Y	N
Srvdgn (server diagnostic information)	Y	Y	N

The SYNCCTL Command

The SYNCCTL command means “sync point control.” It conveys sync point information to the target.

Table 70. SYNCCTL Command Instance Variables

Instance Variable	AR	AS	Required?
Synctype (sync point operation type)	Y	Y	Y
Rlsconv (release conversation)	Y	Y	N
Uowid (unit of work identifier)	Y	Y	N
Forget (forget reply required)	Y	Y	N

Table 71. SYNCLOG Data Object for SYNCCTL Command

Data Object	AR	AS	Required?
Rdbnam (RDB associated with log)	Y	Y	Y
Lognam (log name)	Y	Y	Y
Logtstmp (log time stamp)	Y	Y	Y
Snaaddr (resync SNA address)	Y	Y	N
IPaddr (resync TCP/IP address)	Y	Y	N
Tcphost (fully qualified host domain name)	Y	Y	N
Cnntkn (connection token)	Y	Y	Y

Table 72. SYNCCRD Reply Object for SYNCCTL Command

Reply Object	AR	AS	Required?
Synctype (sync point operation type)	Y	Y	Y
Synclog (sync point log)	Y	Y	N

There are no DDM reply messages returned as a result of normal processing of the SYNCCTL command.

The SYNCRSY Command

The SYNCRSY command means “sync point resync.” It resolves indoubt units of work between sync point managers.

Table 73. SYNCRSY Command Instance Variables

Instance Variable	AR	AS	Required?
Rsynctyp (resync operation type)	Y	Y	Y
Uowid (unit of work identifier)	Y	Y	N
Uowstate (unit of work state)	Y	Y	N

Table 74. Command Data Objects for SYNCRSY Command

Command Data Object	AR	AS	Required?
Synclog (sync point log)	Y	Y	N

Table 75. SYNCRRD Reply Object for SYNCRSY Command

Reply Object	AR	AS	Required?
Rsynctyp (resync operation type)	Y	Y	Y
Uowid (UOW identifier)	Y	Y	Y
Uowstate (UOW state)	Y	Y	Y

There are no DDM reply messages returned as a result of normal processing of the SYNCRSY command.

Accounting for Distributed Data

To enable an accounting system or a monitoring system to track DRDA access to a DB2 application server (AS), the application requester (AR) can send accounting and monitoring data to DB2. There are two ways to send the data:

- Send an accounting identifier string in the PRDDTA instance variable of the ACCRDB command to the DB2 AS with each application's connect request. The format of the accounting string in PRDDTA is described below.
- Send accounting or monitoring identifier strings in the SQLSTT instance variable of the EXCSQLSET command to the DB2 AS. This is not limited to connect requests. The format of the accounting and monitoring string information in SQLSTT is described in “Format of SQLSTT” on page 34.

Macro DSNDQMDA maps the accounting record. For a detailed description of the fields in this record, refer to this mapping macro in the data set library DSN510.SDSNMACS.

Format of PRDDTA

The data in the PRDDTA instance variable must be in one or more repeating groups of:

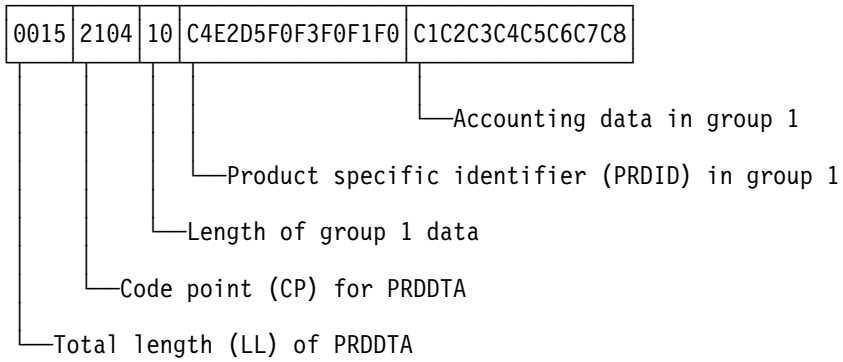
L One-byte length of the data that follows. The length can be zero if no data follows for this group.

Data Data for length L.

If the length of all repeating groups equals the total length of PRDDTA, DB2 assumes that the **first** group is accounting data.

Figure 2 on page 32 shows an example of one group and Figure 3 on page 33 shows an example of four repeating groups. All values are expressed in hexadecimal.

The PRDDTA data is:



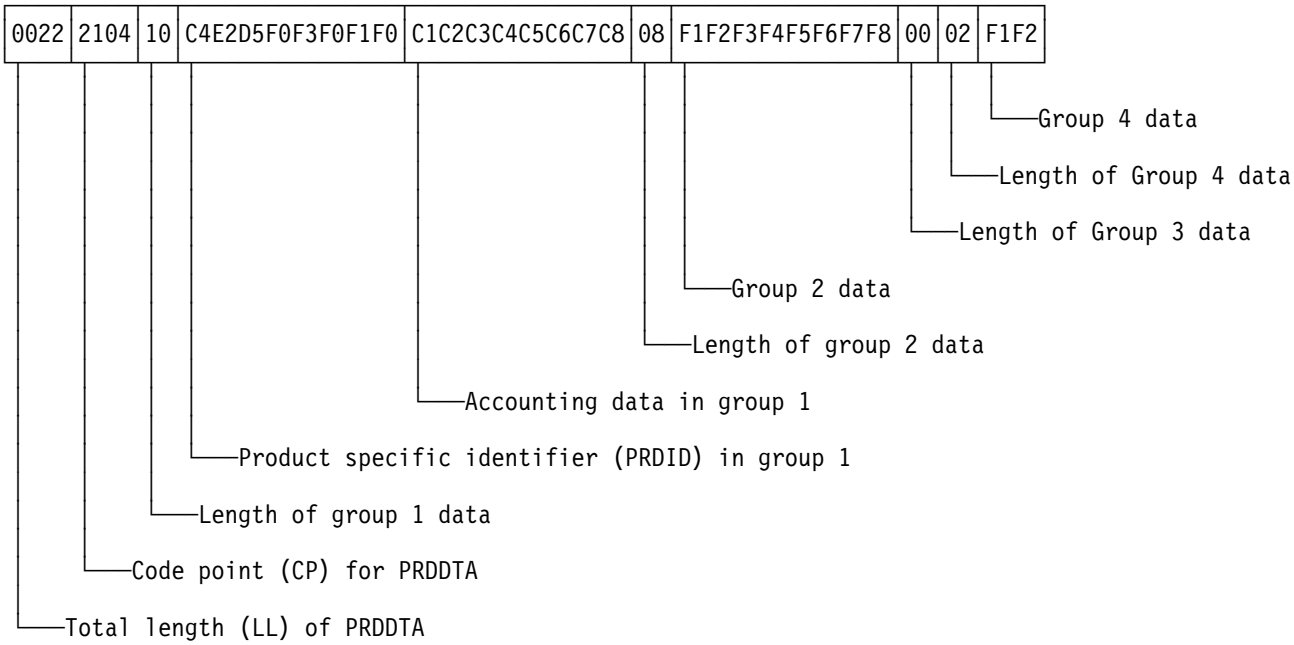
The length of the PRDDTA is calculated by adding all the parts:

```
 02  bytes of LL
 02  bytes of CP
 01  byte length for group 1
 10  bytes of data in group 1
 --
 15  Total length of PRDDTA
```

Because the sum of the parts equals LL, DB2 assumes that the
first group (the only group in this case) contains accounting data.

Figure 2. Example of One Group in PRDDATA

The PRDDTA data is:



The length of the PRDDTA is calculated by adding all the parts:

```
 02  bytes of LL
 02  bytes of CP
 01  byte length for group 1
 10  bytes of data in group 1
 01  byte length of group 2
 08  bytes of data in group 2
 01  byte length for group 3
 00  bytes of data in group 3
 01  byte length for group 4
 02  bytes of data in group 4
 --
 22  Total length of PRDDTA
```

Because the sum of the parts equals LL, DB2 assumes that the
first group contains accounting data.

Figure 3. Example of Four Repeating Groups in PRDDATA

Format of SQLSTT

DB2 server systems allow requester systems to influence certain accounting and monitoring information using the EXCSQLSET command. DB2 server systems have implemented the concepts of:

- End user user IDs
- End user workstation names
- End user application names
- Accounting data

The PRDDTA instance variable can also influence this information. However, PRDDTA only allows the accounting data to be sent when the connection is first established, whereas the EXCSQLSET command allows the accounting data to be sent at any time.

Much of this information is externalized in various forms in a DB2 system. For example:

- The DSNV437I message of the DISPLAY THREAD command report
- THREAD-INFO data in various messages such as DSNT375I
- The QWHC trace record correlation header
- The QMDA section of DB2 accounting trace records

The EXCSQLSET command is sent in conjunction with one or more SQLSTT instance variables. The format of the SQLSTT determines the information to be sent as follows:

- End user user ID

  To set the end user user ID, SQLSTT should contain the string `SET CLIENT USERID` followed by the user ID in single quotes. DB2 accepts a user ID of up to 16 characters and truncates any characters that exceed that length. For example:

  ```
  SET CLIENT USERID 'my_eu_userid'
  ```

- End user workstation name

  To set the end user workstation name, SQLSTT should contain the string `SET CLIENT WRKSTNNAME` followed by the workstation name in single quotes. DB2 accepts a name of up to 18 characters and truncates any characters that exceed that length. For example:

  ```
  SET CLIENT WRKSTNNAME 'my_eu_wstationname'
  ```

- End user application name

  To set the end user application name, SQLSTT should contain the string `SET CLIENT APPLNAME` followed by the application name in single quotes. DB2 accepts a name of up to 32 characters and truncates any characters that exceed that length. For example:

  ```
  SET CLIENT APPLNAME 'my_eu_applname'
  ```

- Accounting information

  To set the accounting information, SQLSTT should contain the string `SET CLIENT ACCTNG` followed by the accounting information in single quotes. DB2 accepts up to 255 characters and truncates any characters that exceed that

length. DB2 also assumes that the first 8 characters of accounting information are a product identifier (PRDID). For example:

```
SET CLIENT ACCTNG 'DSN05010my_acctng_info'
```

A comma (,) is used to delimit string information. Hexadecimal string values can be represented by `X'hh'`. For example:

```
SET CLIENT ACCTNG 'DSN05010my_accntg_info',X'0004','ABCD'
SET CLIENT ACCTNG 'DSN05010','my_accntg_info',X'0004','ABCD'
SET CLIENT ACCTNG 'DSN05010','my_accntg_info',X'00',X'04','AB','CD'
```

Distributing Work in a Data Sharing Group

DB2 uses the Sysplex transaction program, an LU6.2 TPN (Transaction Program Name), to allow DRDA requesters and DB2 private protocol requesters to determine which DB2 servers are currently active within the DB2 data sharing group. The TPN returns a list of DB2 server NETID.LUNAME values that are weighted based on the available capacity at each DB2 server. This allows the requester to distribute future requests for DB2 threads across the available DB2 servers in the group on the basis of capacity.

The LU6.2 parameters and messages for invoking this transaction are described here.

Requirements: The Sysplex transaction program requires MVS/ESA Version 5 Release 2 or subsequent releases.

Allocating a Conversation to the Sysplex Transaction Program

The parameters used to allocate an LU6.2 conversation to the Sysplex transaction program are:

- TPN — X'03F0F3C2' (TPN prefix X'03'' and TPN suffix C'03B').
- SECURITY(NONE)
- SYNC_LEVEL(NONE)
- CONVERSATION_TYPE(BASIC)

Format of Input Message

The format of the Sysplex transaction program input message is:

Offset	Length	Description
0	2	Length of the input message, including the 2-byte length field. The value of this field is 4 (X'0004').
2	2	Type of input message. The only defined value at this time is X'F0F0', which indicates the requester wants to receive the NETID.LUNAMEs of the DB2 subsystems in the DB2 group.

Format of Reply Message

The format of the DB2 Sysplex transaction program reply message is:

Offset	Length	Description
0	2	Length of the reply message, including the 2-byte length field. The value of this field is 22+(*n*×18), where *n* is the number of members in the data sharing group.
2	2	Type of reply message. The only defined value at this time is X'F0F1', which indicates this is a reply message containing a list of DB2 server NETID.LUNAME values.
4	18	The location name of the DB2 server. This value is returned by the server as a verification aid to the requester. In this way, the requester can detect cases where the Sysplex transaction program was directed to the wrong NETID.LUNAME because of errors in the communication directory or CDB entries.
22	n ×18	*n* occurrences of the following: **NETID** VTAM network name of the DB2 server group. This is 8 characters, padded on the right with blanks. **LUNAME** VTAM LU name of the DB2 server group. This is 8 characters, padded on the right with blanks. **Weight** A 2-byte integer containing the weighting factor for the server identified by NETID.LUNAME. This number controls the proportion of LU6.2 conversations directed to the server identified by NETID.LUNAME. The value X'FFFF' is reserved, indicating that the server is not part of a data sharing group. How the weighting factor works: Assume the value of *n* is 2. Weight 1 is 4. Weight 2 is 1. With these values, 80% of the LU6.2 conversations should be directed to the first NETID.LUNAME and 20% should be directed to the second NETID.LUNAME. The entries in the list are ordered by the weighting factor, with the greatest weight listed first. The value of *n* is always less than or equal to 32.

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SX26-3842	Reference Summary
SC26-8965	Release Guide
SC26-8966	SQL Reference
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GC26-8971	What's New?

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