SYBASE®

Configuration Guide

Replication Server®

12.6

WINDOWS

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Contents

About This Book

Audience

This guide is for System Administrators or other qualified installers who are familiar with their system's environment, networks, disk resources, and media devices.

How to use this book

This book explains how to:

- Set up and configure a replication system
- Start and stop a Replication Server®
- Upgrade or downgrade Replication Server software

Replication Server version 12.6 works on these platforms:

- Windows 2000/2003

Use this book with *Replication Server Installation Guide for Windows* to install and set up Replication Server.

The information in this book is organized as follows:

- Chapter 1, "Preparing to Install and Configure Replication Server" describes what you need to know and do before you install Replication Server. Worksheets help you organize the installation information.
- Chapter 2, "Configuring Replication Server and Adding Databases with rs_init" explains how to install Replication Servers and add databases to your replication system.
- Chapter 3, "Upgrading or Downgrading an Existing Replication Server" describes how to upgrade from an earlier version of Replication Server. It also explains how to downgrade your replication system to revert to an earlier version.
- Chapter 4, "Using Password Encryption" describes how to use rs_init to enable password encryption for a Replication Server. It also explains how to alter passwords in configuration files.
- Chapter 5, "Secure Sockets Layer" describes how to to enable SSL for a Replication Server.

- Chapter 6, “Starting or Stopping a Replication Server” explains how to begin using Replication Server.
- Chapter 7, “Configuring the RSM Server” explains how to configure the Replication Server Manager (RSM) Server for use by an RSM Client.
- Chapter 8, “Installing and Implementing Heterogeneous Datatype Support” explains how to install the Heterogeneous Datatype Support (HDS) feature in Replication Server.
- Appendix A, “Worksheets” includes the Replication Server Installation Worksheet, which can be used to collect and record the information you need to install and configure a Replication Server, and the Database Setup Worksheet, which can be used to collect and record the information you need to add a database to your replication system.
- Appendix B, “Using rs_init with Resource Files” explains how to run rs_init in batch mode using resource files.
- Appendix C, “Sample Replication System” explains how to set up a simple replication system using the pubs2 database provided with Sybase® Adaptive Server®. This exercise is a good introduction to Replication Server.

Related documents

The Sybase Replication Server documentation set consists of the following:

- The release bulletin for your platform – contains last-minute information that was too late to be included in the books.

  A more recent version of the release bulletin may be available on the Word Wide Web. To check for critical product or document information that was added after the release of the product CD, use the Sybase Technical Library.
- *Installation Guide* for your platform – describes installation and upgrade procedures for all Replication Server and related products.
- *What’s New in Replication Server?* – describes the new features in Replication Server version 12.6 and the system changes added to support those features.
- *Administration Guide* – contains an introduction to replication systems. This manual includes information and guidelines for creating and managing a replication system, setting up security, recovering from system failures, and improving performance.

- *Configuration Guide* for your platform – describes configuration procedures for all Replication Server and related products, and explains how to use the rs_init configuration utility.
- *Design Guide* – contains information about designing a replication system and integrating heterogeneous data servers into a replication system.
- *Getting Started with Replication Server* – provides step-by-step instructions for installing and setting up a simple replication system.
- *Heterogeneous Replication Guide* – describes how to use Replication Server to replicate data between databases supplied by different vendors.
- *Reference Manual* – contains the syntax and detailed descriptions of Replication Server commands in the Replication Command Language (RCL); Replication Server system functions; Sybase Adaptive Server commands, system procedures, and stored procedures used with Replication Server; Replication Server executable programs; and Replication Server system tables.
- *System Tables Diagram* – illustrates system tables and their entity relationships in a poster format. Available only in print version.
- *Troubleshooting Guide* – contains information to aid in diagnosing and correcting problems in the replication system.
- Replication Server plug-in help, which contains information about using Sybase Central™ to manage Replication Server.

For information about specific Windows commands, see your Windows 2000 or Windows 2003 documentation, or the Windows 2000/2003 online help.

Other sources of information

Use the Sybase Getting Started CD, the Sybase Technical Library CD and the Technical Library Product Manuals Web site to learn more about your product:

- The Getting Started CD contains release bulletins and installation guides in PDF format, and may also contain other documents or updated information not included on the Technical Library CD. It is included with your software. To read or print documents on the Getting Started CD you need Adobe Acrobat Reader (downloadable at no charge from the Adobe Web site, using a link provided on the CD).
- The Technical Library Product Manuals Web site is an HTML version of the Technical Library CD that you can access using a standard Web browser. In addition to product manuals, you will find links to EBFs/Updates, Technical Documents, Case Management, Solved Cases, newsgroups, and the Sybase Developer Network.

To access the Technical Library Product Manuals Web site, go to Product Manuals at http://www.sybase.com/support/manuals/.

Sybase certifications on the Web

Technical documentation at the Sybase Web site is updated frequently.

❖ **Finding the latest information on product certifications**

1 Point your Web browser to Technical Documents at http://www.sybase.com/support/techdocs/.

2 Select Products from the navigation bar on the left.

3 Select a product name from the product list and click Go.

4 Select the Certification Report filter, specify a time frame, and click Go.

5 Click a Certification Report title to display the report.

❖ **Creating a personalized view of the Sybase Web site (including support pages)**

Set up a MySybase profile. MySybase is a free service that allows you to create a personalized view of Sybase Web pages.

1 Point your Web browser to Technical Documents at http://www.sybase.com/support/techdocs/.

2 Click MySybase and create a MySybase profile.

Sybase EBFs and software maintenance

❖ **Finding the latest information on EBFs and software maintenance**

1 Point your Web browser to the Sybase Support Page at http://www.sybase.com/support.

2 Select EBFs/Maintenance. Enter user name and password information, if prompted (for existing Web accounts) or create a new account (a free service).

3 Select a product.

4 Specify a time frame and click Go.

5 Click the Info icon to display the EBF/Maintenance report, or click the product description to download the software.

Conventions

This section describes the stylistic and syntactic conventions used in this book.

Style conventions Syntax statements (displaying the syntax and options for a command) are printed as follows:

alter user *user*
set password *new_passwd*
[verify password *old_passwd*]

Examples that show the use of Replication Server commands are printed as follows:

```
alter user louise
 set password hFE5t
 verify password hFE5t
```

Command names, command option names, program names, program flags, keywords, configuration parameters, functions, and stored procedures are printed as follows:

- Use alter user to change the password for a login name.
- Variables, parameters to functions and stored procedures, and user-supplied words are in italics in syntax and in paragraph text, as follows:

  The set password *new_passwd* clause specifies a new password.
- Names of database objects, such as databases, tables, columns, and datatypes, are in italics in paragraph text, as follows:

  The base_price column in the Items table is a money datatype.
- Names of replication objects, such as function-string classes, error classes, replication definitions, and subscriptions, are in italics.

Syntax conventions Syntax formatting conventions are summarized in Table 1. Examples combining these elements follow.

Table 1: Syntax formatting conventions

Key	Definition
variable	Variables (words standing for values that you fill in) are in italics.
{ }	Curly braces mean you must choose at least one of the enclosed options. Do not include braces in the command.
[ ]	Brackets mean you may choose or omit enclosed options. Do not include brackets in the command.
|	Vertical bars mean you may choose no more than one option (enclosed in braces or brackets).
,	Commas mean you may choose as many options as you need (enclosed in braces or brackets). Separate your choices with commas, to be typed as part of the command. Commas may also be required in other syntax contexts.
( )	Parentheses are to be typed as part of the command.
. . .	An ellipsis (three dots) means you may repeat the last unit as many times as you need. Do not include ellipses in the command.

Obligatory Choices •Curly braces and vertical bars – choose only one option.

```
{red | yellow | blue}
```

- Curly braces and commas – choose one or more options. If you choose more than one, separate your choices with commas.

```
{cash, check, credit}
```

Optional choices •One item in square brackets – choose it or omit it.

```
[anchovies]
```

- Square brackets and vertical bars – choose none or only one.

```
[beans | rice | sweet_potatoes]
```

- Square brackets and commas – choose none, one, or more options. If you choose more than one, separate your choices with commas.

```
[extra_cheese, avocados, sour_cream]
```

Repeating elements An ellipsis (...) means that you may repeat the last unit as many times as you need. For the alter function replication definition command, for example, you can list one or more parameters and their datatypes for either the add clause or the add searchable parameters clause:

alter function replication definition *function_rep_def*
{deliver as '*proc_name*' |
add *@parameter datatype*[, *@parameter datatype*]... |
add searchable parameters *@parameter*[, *@parameter*]... |
send standby {all | replication definition} parameters}

If you need help

Each Sybase installation that has purchased a support contract has one or more designated people who are authorized to contact Sybase Technical Support. If you cannot resolve a problem using the manuals or online help, please have the designated person contact Sybase Technical Support or the Sybase subsidiary in your area.

CHAPTER 1

Preparing to Install and Configure Replication Server

This chapter helps you organize the information you need to install Replication Server software and set up a replication system.

Sybase recommends that you first read this manual to plan your replication system before installing Replication Server. Version 12.6 of Replication Server, however, comes with a sample Replication Server that that you can install during the installation process. For this reason, you can begin installing Replication Server immediately, and return to this manual to configure your Replication Server after installation. To use the sample Replication Server, see *Replication Server Installation Guide for Windows* to begin installation.

Note After you have completed the worksheets, refer to *Replication Server Installation Guide for Windows* to install your Replication Server software.

Planning the replication system

Answer these questions before you begin to install and configure the software.

Where is the primary data?

Determine which Adaptive Server databases contain the data you want to replicate to other databases.

Note Although this document refers to Adaptive Server databases, the Heterogenous Datatype Support (HDS) translation feature allows you to select non-Adaptive Server databases for use with Replication Server.

Where will you replicate the data?

Determine the Adaptive Server databases where Replication Server will maintain copies of the data.

What Replication Servers will you need?

When you design a replication system, you decide how many Replication Servers will be installed, which databases they will manage, and where (on which machine) they will execute.

A Replication Server can manage one or more databases. One Replication Server is adequate for some replication systems. Other systems require a Replication Server at each geographic site to manage all of the databases at that site. Still others require multiple Replication Servers at each site to handle many databases or heavy transaction volumes.

When you upgrade Replication Servers, you can “phase in” the upgrades and install 12.6 Replication Servers initially only at certain sites. Consider the timing of such upgrades with care, and assess each site’s need for the new Replication Server features.

Where is the Replication Server System Database for each Replication Server?

Replication system data is stored in a dedicated Adaptive Server database called the Replication Server System Database (RSSD). The RSSD is created when the Replication Server is installed. Before you begin the installation, decide which Adaptive Server will store the RSSD for the Replication Server and the devices on which the database and its log will be stored. You can create the Adaptive Server database devices during installation, but you should identify their physical disk location before you install the Replication Servers.

Where is the initial disk partition for each Replication Server?

Replication Server stores messages, such as replicated transactions, on disk in stable queues. Disk space for the queues is allocated from disk partitions you create. Disk partitions are Windows disk files.

You must allocate a disk partition of at least 20MB for each Replication Server you install. You can add more partitions later if necessary. Check each partition to make sure that it is available and that the Windows System Administrator can write to it. To use an operating disk for a partition, create an empty file. Verify that there is enough space on the file system for Replication Server to extend the disk partition file to full partition size.

Note Before you can use Sybase Central™ to create a Replication Server partition, you must create the physical file on your Windows system. Do not use the partition for any other purpose, such as file systems, swap space, or Adaptive Server devices.

Allocate the entire partition to the Replication Server. If you allocate only a portion of the partition to Replication Server, you cannot use the remainder for any other purpose. Allow read/write permissions on the partition only if the user must have permission to start Replication Server.

Which Replication Server is the ID Server?

The first Replication Server you install is the ID Server. It must be running when you install new Replication Servers or add databases to the replication system.

The ID Server assigns a unique site ID to each Replication Server and a unique database ID to each database in the replication system. It also maintains replication system version information.

Which databases require replication agents?

A replication agent retrieves transactions from a database log, and passes them to the replication system via the Replication Server that manages the database.

Note RepAgent™ is the replication agent for Adaptive Server version 11.5 or later, and requires version 11.5 or later of Replication Server. Replication Server and Adaptive Server support the Log Transfer Manager (LTM) for SQL Server databases and pre-11.5 Replication Servers. See Appendix B, “LTM for SQL Server,” in the *Replication Server Administration Guide* for more information about the LTM.

There is one replication agent per database. Because the replication agent is configured when a database is set up for replication, you must know whether a replication agent is required before you add a database to the replication system. A user database requires a replication agent if:

- The database holds primary data that is replicated to other databases managed by the same or different Replication Servers.

- The Replication Server manages a database that is a source of replicated stored procedure execution.

  You can replicate a stored procedure execution from a primary to replicate databases or from a replicate to a primary database. The RepAgent retrieves the procedure call information from the database transaction log. See the *Replication Server Administration Guide* for details.

- The database is the active database in a warm standby application; therefore, it must also have a RepAgent. The RepAgent is needed only when you switch to the standby database. See the *Replication Server Administration Guide* for details.

An RSSD requires a replication agent if the Replication Server using that RSSD has a route to another Replication Server; for example:

- The Replication Server manages primary data that is replicated to databases managed by other Replication Servers.
- The Replication Server manages a database that is a source of replicated stored procedure execution.
- The Replication Server is an intermediate site in an indirect route.

An RSSD does not require a RepAgent if the replication system has only one Replication Server.

Which databases require warm standby?

Replication Server can maintain a warm standby database for an Adaptive Server or SQL Server database. If the active database fails, clients can switch to the standby database with little interruption.

To set up a warm standby application, you must perform some tasks in the Replication Server before and after you add databases to the replication system. Read Chapter 13, “Managing Warm Standby Applications” in the *Replication Server Administration Guide* before you install Replication Server.

Using the Replication Server Installation Worksheet

Make copies of the worksheet in “Replication Server Installation Worksheet” on page 112 in Appendix A, “Worksheets.” Use the copies to record information as you read the rest of this section. Keep the copies so you can use them if you want to reconfigure your replication system.

The program used to configure Replication Server software is called rs_init. The sections on the worksheets correspond to the rs_init menus, so you can enter information from the worksheets directly into rs_init. See "Using rs_init" on page 25.

See the *Replication Server Design Guide* for guidelines on configuring character sets, languages, and sort orders in your replication system.

See the *Replication Server Administration Guide* for more information about login names for replication system components.

See *Replication Server Installation Guide for on Windows* for information about software installation procedures and requirements.

Completing the worksheet

Fill out each section of the installation worksheet.

rs_init supplies default values for most of the items on the worksheets in "Replication Server Installation Worksheet" on page 112 and "Database Setup Worksheet" on page 115. Many of the defaults are constructed from values that you enter. For example, if you enter "TOKYO_RS" for the Replication Server name, rs_init names the log file *TOKYO_RS.log*. You can accept the displayed value or enter something else.

To use the rs_init defaults, complete the required items on the worksheet, which are marked with an asterisk (*). When you run rs_init, copy the default values from the menu to the worksheet so that you have a complete record of the configuration.

Replication Server reserves identifiers that begin with "rs_". Do not use names that begin this way for Adaptive Servers, Replication Servers, database objects, or login names. See the *Replication Server Reference Manual* for other restrictions.

The first eight characters of the Adaptive Server and Replication Server server names must be unique on your network.

Release directory

The release directory—also called the installation directory—is where you install Replication Server software. As with version 12.0, Replication Server creates a new directory structure that allows you to use multiple versions of some components. See the *Replication Server Installation Guide* for more information.

You can install Replication Server version 12.6 in the existing directory structure of Replication Server version 12.0 and later.

Usually, Replication Server is installed in the same *%SYBASE%* directory as other Sybase software. This allows the products to share common files and simplifies management of the interfaces file (*sql.ini*) used by all servers and by client programs.

❖ **Installing SQL Server 11.0.x or Adaptive Server 11.5.1 and later, and Replication Server 12.6 in the same directory**

You must install the products in the following order:

1 SQL Server 11.0.x or Adaptive Server 11.5.1 or later

2 Replication Server 12.6

3 All required Emergency Bug Fixes (EBFs)

❖ **Choosing a Sybase installation directory**

1 Find a drive with at least 650MB of free space.

2 If this is the first Sybase software you are installing on your computer, select a path for the release directory. The installation program performs these steps when it sets the default release directory:

- If the SYBASE variable exists, it sets the default release directory to the directory SYBASE points to.
- If the SYBASE variable does not exist, but the Registry entry *HKEY_LOCAL_MACHINE\Software\Sybase\Setup\Sybase* exists, it sets the default release directory to the directory specified by the Registry.
- If neither the SYBASE variable nor the Registry entry exists, the installation program creates the default release directory by concatenating the drive name of the system disk with `\SYBASE`. For example, if the system drive is C, then the default directory is *C:\SYBASE*.

3 Record the Sybase release directory on your worksheet.

Using more than one release directory If you do not install Replication Server in the same directory with other Sybase software, you must:

- Set the SYBASE environment variable to point to the correct release directory before you start each Sybase program.

Note Replication Server uses a directory structure that installs all Replication Server files in a directory called *REP-12_6*, which you can set with the %SYBASE_REP% environment variable.

- Set the PATH variable so that it will use the correct DLL versions.
- Keep an up-to-date copy of *sql.ini* in each release directory, or use command line options to specify the correct *sql.ini* file when you start each Sybase program.

Replication Server information

This section explains how to complete the "Replication Server information" section of the worksheet:

- **Replication Server name** *Required* – enter a name for the Replication Server. The name must be unique in the replication system.

  The name is not case-sensitive; however, if the Replication Server is part of a multiplatform replication system, make sure the same case is used in all instances.

Warning! The first eight characters of Adaptive Server, Replication Server, and LTM server names must be unique on your network.

- **Is this Replication Server the ID Server?** *Required* – select Yes if you are installing the ID Server or No if you are not. See "ID Server information" on page 13 for more information.
- **Replication Server error log** Enter the path for the Replication Server error log file. Replication Server writes informational and error messages to this text file.
- **Replication Server configuration file** Enter the path for the Replication Server configuration file, which contains parameters that Replication Server reads at start-up. For more information, refer to the *Replication Server Administration Guide*.

- **Replication Server password encryption** Select Yes if you want passwords to be encrypted in the Replication Server configuration file and in the RSSD, and No if you do not want encrypted passwords.

  Warning! If you do not encrypt passwords, anyone with the required permissions can look at the passwords in the configuration files and in the RSSD rs_users system table.

- **Replication Server character set** Enter the character set that the Replication Server will use. You can specify any Sybase-supported character set that is available for your language.

  For replication to work properly, the character set used by the Replication Server should match the character set used by the data servers and RepAgents it controls. Additionally, it should be compatible with the character sets of the other Replication Servers in the system.

  By default, rs_init configures Replication Server with the native character set for your platform. Additional information about character sets is available in the *Adaptive Server Configuration Guide*.

  The character sets in the English language version of Replication Server include:

  - cp437 (Code Page 437) – character set used in IBM PCs.
  - cp850 (Code Page 850) – IBM/Microsoft Multilingual Character Set, used in IBM PCs.
  - deckanji – DEC Kanji Code for JIS-X0208.
  - eucgb – EUC GB encoding for Simplified Chinese character sets.
  - eucjis – extended UNIX Code for JIS-X0201 and JIS-X0208.
  - eucksc – (Code Page 949) EUC KSC Korean encoding.
  - gb18030 – GB 18030-2000 standard for Chinese characters, established by the government of the People's Republic of China.
  - iso15 – similar to iso_1.
  - iso_1 (ISO-8859/1) – 8-bit character set for many systems. This is the default for Adaptive Server with Sun, NCR System 3000, Silicon Graphics IRIX, Digital OpenVMS, and IBM RISC System 6000 AIX.
  - mac – default Macintosh character set.
  - roman8 – Hewlett-Packard character set.

- roman9 – the same as roman8, except for codepoint 0xBA, previously treated as the universal currency symbol, now representing the euro currency symbol.
- sjis (Shift-JIS) – IBM/Microsoft Code for JIS-X0201 and JIS-X02081.
- utf8 – an ASCII-preserving encoding method for Unicode.

The Chinese language includes these character sets:

- eucgb
- gb18030
- utf8

The Japanese language includes these character sets:

- deckanji
- eucjis
- sjis
- utf8

The Korean language includes these character sets:

- eucksc
- utf8

The French, German, Portuguese, and Spanish languages include these character sets:

- cp437
- cp850
- iso15
- iso_1
- mac
- roman8
- roman9
- utf8

When you create a subscription, Replication Server copies the requested data from the primary database to the replicate database in a process known as subscription materialization. During subscription materialization, the primary data server converts character data to the replicate Replication Server's character set. Make sure that the replicate Replication Server's character set, if it is different from the primary data server's character set, is installed at the primary data server.

Similarly, when you create a route, make sure that the character set of the destination Replication Server is installed at the data server of the source Replication Server's RSSD.

- **Replication Server language** Enter the language Replication Server should use to print messages to the error log and to clients. It can be any language that is compatible with the character set you will install.

  By default, rs_init configures Replication Server to print messages in U.S. English.

  Other available languages are Chinese, French, German, Japanese, Korean, Portuguese, and Spanish. rs_init uses the same identifiers for language names that Adaptive Server uses.

  If the language for the Replication Server and the language for its connected data servers are different, the language for the Replication Server must be installed at the data servers. This lets the data servers return messages to Replication Server in the configured language and recognize and format dates for the configured language.

  For example, the date format "01/02/99" is equivalent to "January 2, 1999" in us_english but "February 1, 1999" in french. Data servers can format the date correctly only if Replication Server's configured language is installed.

- **Replication Server sort order** Enter the sort order for the Replication Server. Sort order controls what rows of a table belong in a subscription that has a where clause involving character data. It also controls how identifiers you enter are recognized with regard to case sensitivity, accents, and so forth.

  You can specify any Sybase-supported sort order that is compatible with your character set. For replication to work properly, all sort orders in your replication system should be the same.

By default, rs_init configures Replication Server with the binary sort order. Available sort orders vary, depending on the character set you plan to install. Sort orders are located in the Sybase release directory in the directory *charsets/charset_name*, where *charset_name* is the name of the character set.

See the *Replication Server Design Guide* for guidelines on configuring languages, character sets, and sort orders in your replication system.

Replication Server security information

This section explains how to fill out the "Replication Server security information" section of the worksheet. See Chapter 7 "Managing Replication Security" in the *Replication Server Administration Guide* for more information on security, and Chapter 5, "Secure Sockets Layer" on page 67 in this book for information specific to configuring SSL.

- **Enable network security** *Required* – select Yes to enable external network security, and No if you are not.
- **Type of security system** If you are enabling network security, you are prompted to select DCE or Kerberos.
- **Login name** Enter the name of the primary user that will be making the secure connections. Sybase recommends that you use the name of the Replication Server as the principle user name.
- **Keytab file name** Enter the full path to the location of the keytab file .
- **Use SSL security** Select Yes to use Secure Sockets Layer (SSL) security, and No if you are not.
- **SSL identity file** Enter the full path to the location of the SSL identity file.
- **SSL private key password** Enter the private key password. The default password is `password`.

Replication Server interfaces information

Use the "Replication Server interfaces information" section of the worksheet to record information that defines the network port where Replication Server listens for connections. Each entry in the interfaces file (*sql.ini* in the *ini* subdirectory of the Sybase release directory) is called a **listener service**.

- **Network driver** *Required* – check the box next to the type of network you want to use: Windows Sockets, Named Pipes, or NWLink IPX/SPX.
- **Connection information** *Required* – your entry depends on your choice of network driver. Table 1-1 lists the formats for each network driver.

Table 1-1: Connection information syntax

Protocol	Syntax

Windows Sockets TCP/IP	Two formats:
	`computer_name,port_number`
	`ip_address,port_number`
	where:
	• *computer_name* – is the name of your machine.
	• *ip_address* – is the IP address.
	• *port_number* – is a number between 1025 and 65535 that is unique on the machine.
	Examples:
	`FASTCAR,8877`
	`130.214.30.25,8877`

Named Pipes	"\pipe" is a required prefix to all pipe names. *identifier_1* and *identifier_2* are unique names that conform to the eight-character MS-DOS naming convention. *identifier_2* is optional; however, each pipe name should be uniquely defined. Server pipes can only be local.
	`(Local) \pipe\identifier_1\[identifier_2]`
	`(Remote) \\computer_name\pipe\identifier_1\`
	`[identifier_2]`
	Example (local):
	`\pipe\sybase\tokyo`
	Example (remote):
	`\\FASTCAR\pipe\sybase\sydney`

NWLink IPX/SPX	Three formats:
	`computer_name`
	`net_number, node_number, socket_number`
	`computer_name, socket number`
	where:
	• *computer_name* – is the name of the machine.
	• *net_number* and *node_number* – are obtained from the network.
	• *socket_number* – is in hexadecimal.
	Example:
	`FASTCAR`
	`16,1,83BD`
	`FASTCAR,83BD`

ID Server information

One Replication Server in a replication system is the ID Server. In addition to the usual Replication Server tasks, the Replication Server acting as the ID Server assigns a unique ID number to every Replication Server and database in the replication system. The ID Server also maintains version information for the replication system. Otherwise, the ID Server is like any other Replication Server.

When you install a new Replication Server or add a database to your replication system, the ID Server must be running. This allows the new Replication Server, or the Replication Server that manages the new database, to log in and retrieve an ID number. The ID Server must also be running whenever you create a route.

You must install the ID Server before you install any other Replication Server. If you have only one Replication Server, that server is also the ID Server. If you are installing for the first time, the Replication Server is the ID Server. If you are adding a Replication Server to an existing replication system, you must know the name of the Replication Server in the system that is the ID Server.

Warning! The ID Server is critical to your replication environment, and is difficult to move once it has been installed. Plan your installation carefully.

- **ID Server name** *Required* – if the Replication Server you are installing is the ID Server, rs_init assigns an ID Server name identical to this Replication Server name.

  If you are installing a new Replication Server in an existing Replication Server domain, enter the name of the Replication Server that is acting as the ID Server.

- **ID Server user** If the Replication Server you are installing is the ID Server, enter the login name that other Replication Servers will use to connect with this ID Server. rs_init uses the Replication Server name as the ID Server name.

  If you are installing a new Replication Server to an existing Replication Server domain, copy the ID Server User name from the worksheet you completed when you created the ID Server.

- **ID Server password** If the Replication Server you are installing is the ID Server, enter the password for the ID Server user.

If you are adding a new Replication Server to an existing Replication Server domain, copy the ID Server password from the worksheet you completed when you created the ID Server.

Note The "Starting Replication Server ID" and "Starting Database ID" worksheet items apply only to the ID Server. If you are not installing the ID Server, skip to "Replication Server System Database information" on page 15.

- **Starting Replication Server ID and starting database ID** These two configuration parameters allow you to specify separate ranges of Replication Server ID numbers and database ID numbers that an ID Server will assign. Specifying the ranges is not required, but makes it easier to merge replication systems later.

  Some organizations have multiple independent replication systems. Each replication system has its own ID Server, which assigns unique IDs to its Replication Servers and databases. Since the ID Server determines member Replication Servers and databases in a replication system, one replication system in an organization with multiple replication systems is also called an ID Server domain.

  No special steps are required to set up multiple ID Server domains. Every Replication Server or database belongs to one replication system and has a unique ID number in that ID Server domain.

  If you decide to merge ID Server domains into one replication system, the task is easier if no two Replication Servers or databases in the organization have the same ID. To establish unique IDs, allocate non-overlapping ranges of ID numbers to the ID Servers at installation.

  An ID Server assigns ID numbers sequentially. Separate ranges of values are maintained for databases and Replication Servers. The default ranges are shown in Table 1-2.

Table 1-2: Database and Replication Server default ID number ranges

Object type	Minimum ID number	Maximum ID number
Database	101	16777215
Replication Server	16777216	33554431

Minimum values for each ID Server must be within the ranges specified. For example, if your organization has three separate ID Server domains, you could set the minimum ID numbers as shown in Table 1-3.

Table 1-3: Example ID number allocation for ID Server domains

ID Server domain	Starting database ID	Starting Replication Server ID
Finance division	101	16777216
Manufacturing division	100101	16877216
Sales division	200101	16977216

This arrangement provides the ID Server in each domain at least 100,000 ID numbers for databases and 100,000 ID numbers for Replication Servers. You need not set a maximum value, since it is unlikely that you will install more than 100,000 Replication Servers or add more than 100,000 databases to a replication system.

See the *Replication Server Administration Guide* for more information about adding replication system domains.

Replication Server System Database information

Replication Server maintains its system tables in its system database. You can choose to set up a Replication Server System Database (RSSD) in an Adaptive Server Enterprise database, or an Embedded Replication Server System Database (ERSSD) in an Adaptive Server Anywhere database. Use the information in this section to complete the "Replication Server System Database" section of the worksheet.

If you want an RSSD with Adaptive Server Enterprise, see "Adaptive Server Enterprise RSSD information" on page 16. If you want an ERSSD with Adaptive Server Anywhere, see "Adaptive Server Anywhere Embedded RSSD information."

Adaptive Server Anywhere Embedded RSSD information

If you want an ERSSD, enter the following. See Chapter 4, "Managing a Replication System" in the Replication Server Administration Guide for more information on value requirements for Embedded RSSDs. All fields are required.

- **ERSSD name** Enter the name of the ASA server that will hold the system database for the Replication Server.
- **ERSSD database file directory** Enter the directory for the ASA server database file.
- **ERSSD transaction log directory** Enter the directory for the ASA server transaction log.
- **ERSSD backup directory** Enter the directory for the ASA server backup files.

- **ERSSD error log directory** Enter the directory for the ASA server error log file.

Note rs_init automatically fills these fields with default values on the same device. However for better performance and recoverability, put the ERSSD database directory, ERSSD transaction log directory, and ERSSD backup directory on separate devices.

Adaptive Server Enterprise RSSD information

If you want an RSSD using Adaptive Server Enterprise, enter the following:

- **RSSD SQL Server (Adaptive Server) name** *Required* – enter the name of the Adaptive Server that will hold the system database for the Replication Server.
- **RSSD name** Enter the name of the database where the Replication Server system tables will be stored.
- **Will RSSD be replicated?** *Required* – select Yes if the RSSD for the Replication Server requires a RepAgent or LTM, and No if it does not. See "Which databases require replication agents?" on page 3 for more information.
- **Allow HA failover for RSSD connections?** Select Yes if you want RSSD connections to fail over to an alternative Adaptive Server, and No if you do not.

  See *What's New in Replication Server 12.6* for more information on the HA failover feature.
- **Create RSSD** *Required* – select Yes if you want rs_init to create the system database.

  Select No if the system database already exists or if you want to create it yourself.

  If the database already exists, it should be dedicated to this Replication Server. The database must have at least 10MB for data and 10MB for log space.
- **SA user** Enter the login name for the "sa" user for the Adaptive Server that will hold the RSSD. The default is "sa."
- **SA password** *Required* – enter the "sa" password for the Adaptive Server that will hold the RSSD. rs_init uses the "sa" login name to create user login names and the system tables in the RSSD.

- **Primary user** Enter the login name for the RSSD's primary user. Replication Server uses this login name for system table updates. rs_init creates the primary user.
- **Primary password** Enter the password for the RSSD's primary user.
- **Maintenance login** Enter the name of the maintenance user for the RSSD. Replication Server uses this login name to perform operations on the system tables that are replicated from other sites. rs_init creates the maintenance user for you and adds the maintenance user to the RSSD.
- **Maintenance password** Enter the password for the RSSD maintenance user.

Adaptive Server Enterprise RSSD device information

If you do not want rs_init to create the RSSD, skip this section. Go to "Disk partition information" on page 19.

If you selected Yes for "Create RSSD," read this section and complete the "RSSD Device Information" section of the worksheet.

The RSSD device is the Adaptive Server database device where rs_init creates the Replication Server RSSD. Table 1-4 lists the database size value that rs_init uses to create the RSSD, based on the Adaptive Server logical page size. Therefore, choose a database device, other than the default master device, that has the minimum amount of space required. Use sp_helpdevice to list the available devices.

Table 1-4: RSSD database and log size values based on Adaptive Server logical page size

Logical page size	Minimum size of RSSD database	Minimum size of RSSD log
2K	14MB	15MB
4K	18MB	15MB
8K	24MB	16MB
16K	40MB	16MB

Select one of the following if the Adaptive Server does not have a device available for the RSSD:

- Add a device and record the information on your worksheet

- Have rs_init create the device when it installs Replication Server

Note If the Adaptive Server is not on the local machine, you must create the device yourself. rs_init incorrectly evaluates the local machine's file system instead of the remote machine's file system when it validates the path name and disk space requirements of the device.

If you want rs_init to create the device, verify that the Windows System Administrator account can create the file you specify and that there is sufficient disk space for the file. Execute sp_configure devices in Adaptive Server to verify that the value for devices is high enough to allow you to add a new device. See the *Adaptive Server System Administration Guide* for information about device requirements.

Use the information in this section to complete the "RSSD device information" section of the worksheet:

- **Size of the RSSD database** Enter the size, in megabytes, of the data portion. See Table 1-4 on page 17 to determine the appropriate size of your RSSD database.
- **RSSD device name** *Required* – enter the name of the Adaptive Server logical device where you want to create the RSSD. If the device already exists, it must have enough space available to create the new database.
- **Create the RSSD device** *Required* – select Yes if you want rs_init to create the RSSD data device on the Adaptive Server database device.

  Select No if the RSSD data device exists, or if you will create it before you run rs_init.
- **RSSD device physical name** If you want rs_init to create the RSSD device, enter the physical device name for the database device on which you want to store the RSSD.

  In Windows, the physical name is the name of the disk file.

  If you do not want rs_init to create the RSSD data device, leave this entry blank.
- **RSSD device size** If you want rs_init to create the RSSD device, enter the capacity, in megabytes, of the physical device. The device size must be at least the size you specified for the data portion of the RSSD database.

  If you do not want rs_init to create the RSSD device, leave this entry blank.

- **Size of the RSSD log** Enter the size, in megabytes, for the RSSD database log. See Table 1-4 on page 17 to determine the appropriate size of your RSSD log.

  Note Sybase recommends that you store the RSSD log on a device other than the master device, and on a different device from the RSSD database.

- **RSSD log device name** *Required* – enter the logical name for the device you want rs_init to use for the RSSD log.
- **Create the RSSD log device** *Required* – select Yes if you want rs_init to create the RSSD log device in Adaptive Server.

  Select No if the device exists or if you will create it before you run rs_init.
- **RSSD log device physical name** If you want rs_init to create the RSSD log device, enter the physical device name for the device.

  This is a Windows file name.

  If you do not want rs_init to create the RSSD log device, or if you are using a single device for both the RSSD and its log (this is not recommended), leave this field blank.
- **RSSD log device size** If you want rs_init to create the RSSD log device, enter the capacity, in megabytes, of the physical device. The device size must be at least the size you specified for the RSSD log.

  If you do not want rs_init to create the RSSD log device, or if you are using a single device for both the RSSD and its log (this is not recommended), leave this field blank.

Disk partition information

Replication Server uses disk partitions for stable queues, which temporarily store the data it receives and sends.

On Windows, Replication Server uses operating system files for partitions.

The minimum partition size is 20MB. You can add more partitions after the Replication Server is installed.

Use the information in this section to complete the "Disk partition information" section of the worksheet:

- **Disk partition path** *Required* – enter the name of the physical disk device or the full path name of a file to be used for the disk partition. If you use an operating system file, there must be enough space on the file system for Replication Server to extend the file to the size you specify. You must have already created the operating system file.

- **Logical identifier for disk partition** *Required* – enter a logical identifier for the partition. This name is used in commands and in Replication Server messages to identify the disk partition. See the *Replication Server Administration Guide* for more information.
- **Size of disk partition** Enter the size, in megabytes, of the disk partition. The partition must be at least 20MB.
- **Start value for partition** This value prevents Replication Server from using the beginning of a raw disk partition. It is required if your operating system stores information, such as configuration maps, at the beginning of the disk partition. Enter the number of megabytes Replication Server should ignore. For example, if you enter 1, Replication Server will not use the first megabyte of the raw disk partition.

Remote site connections information

The "Remote site connections information" section of the worksheet defines a login name for other Replication Servers to use when logging in to this Replication Server. rs_init creates this login after installing the Replication Server.

- **Replication Server login name** Enter the login name that other Replication Servers will use to connect to this Replication Server.
- **Replication Server password** Enter a password for the Replication Server login name.

Database RepAgent information

See "Planning the replication system" on page 1 for more information about when an RSSD requires a RepAgent.

Use the information in this section to complete the "Database Replication Agent information" section of the worksheet:

- **RepAgent name** Enter the name of the RepAgent.
- **RS user** Enter the login name that the RSSD Replication Agent will use to connect to the Replication Server.
- **RS password** Enter a password for the RS user login name.

Completing the Database Setup Worksheet

Make a copy of "Database Setup Worksheet" on page 115 for each database you plan to add to the replication system.

Each primary or replicate database in your replication system is managed by a Replication Server. The database may also require a replication agent. See "Which databases require replication agents?" on page 3 for more information.

See the *Replication Server Design Guide* for guidelines on configuring character sets, languages, and sort orders in your replication system.

See the *Replication Server Administration Guide* for more information about login names for replication system components.

Replication Server information

Use the information in this section to complete the "Replication Server information" section of the worksheet, which identifies the Replication Server that will manage the database. The Replication Server must be installed and running before you can add the database to the replication system:

- **Replication Server name** *Required* – enter the name of the Replication Server that will manage the database.
- **RS SA user** *Required* – enter the Replication Server System Administrator (RS SA) login name (usually "sa").
- **RS SA password** *Required* – enter the password for the RS SA user.

Replication Server interfaces information

Copy the information for the Replication Server interfaces information section from "Replication Server Installation Worksheet" on page 112 you completed for the Repliction Server that will manage this database. Since the Replication Server is already installed, you do not have to enter this information again unless you run rs_init in a release directory that uses a different *sql.ini* file.

- **Network driver** *Required* – check the box next to the type of network the Replication Server uses: Windows Sockets, Named Pipes, or NWLink IPX/SPX.
- **Connection information** *Required* – copy the connection information for the Replication Server from "Replication Server Installation Worksheet" on page 112.

Database information

The "Database information" section of the worksheet identifies the database you are adding to the replication system:

- **SQL Server (Adaptive Server) name** *Required* – enter the name of the Adaptive Server where the database resides.
- **SA user** Enter the "sa" login name for the Adaptive Server managing the database.
- **SA password** Enter the password for the SA user login name.
- **Database name** Enter the name of the database.

- **Will the database be replicated?** *Required* – select Yes if the database requires a replication agent, and No if it does not. See "Which databases require replication agents?" on page 3 for more information.
- **Maintenance user** Enter a login name for Replication Server to use when updating replicated data. This user must be granted all permissions necessary to maintain the replicated data. rs_init creates this login, if it does not already exist, and grants the necessary permissions.
- **Maintenance password** Enter the password for the maintenance user.
- **Is this a physical connection for an existing logical connection?**

  Select Yes if you are adding an active or standby database for a warm standby application, and No if you are not.

  See the instructions for setting up warm standby databases in the *Replication Server Administration Guide*.

Logical connection information

Complete the "Logical connection information" section of the worksheet *only* if you are adding a database that is part of a warm standby database application.

Note Setting up a warm standby application requires that you perform additional tasks in the Replication Server before and after you use rs_init to add the databases to the replication system. See Chapter 13, "Managing Warm Standby Applications," in the *Replication Server Administration Guide*.

- **Is this an active connection or standby connection?** *Required* – select Active if you are adding the active database for the warm standby application.

  Select Standby if you are adding the standby database for the warm standby application.
- **Logical DS name** *Required* – enter the name of the logical data server for the logical connection. You must have already created it using create logical connection.
- **Logical DB name** *Required* – enter the name of the logical database for the logical connection. You must have already created it using create logical connection.

  Complete the rest of the items in this section only if you checked standby in response to "Is this an active connection or standby connection?"
- **Active DS name** *Required* – enter the name of the data server with the active database. Enter the actual data server name, not the logical data server name defined for the warm standby database pair.

- **Active DB name** *Required* – enter the name of the active database. Enter the actual database name, not the logical database name defined for the warm standby database pair.
- **Active DB SA user** *Required* – enter the login name of the System Administrator for the active database's data server. Replication Server uses this login name to set up warm standby applications.
- **Active DB SA password** *Required* – enter the password for the active data server's System Administrator login name.
- **Initialize standby using *dump* and *load*?** *Required* – select Yes if you plan to initialize the standby database with the contents of the active database with the dump and load commands

  Select No if you plan to initialize the standby database with the bcp utility, or if you do not need to initialize the standby database.
- **Use dump marker to start replicating to standby?** *Required* – select Yes if transactions will be executed in the active database while the standby database is initialized, and No if they are not.

Database RepAgent information

Complete the "Database RepAgent information" section of the worksheet if the database requires a RepAgent, and you selected Yes for "Will the database be replicated?"

- **RepAgent name** Enter the name of the RepAgent.
- **RS user** Enter the Replication Server login name that the RepAgent will use to connect to the Replication Server.

  The default RS user login name and password for this database RepAgent is the default login name and password for the RS user for the RSSD RepAgent, which you noted in the section titled "RSSD RepAgent" on "Replication Server Installation Worksheet" on page 112. If you want this user to use a different login name and password, you must first create the user in the Replication Server and grant it connect source permission.
- **RS password** Enter the password for the RS user login name.

Warning! If you do not encrypt passwords, anyone with the required permission can view them in the configuration file.

Database Log Transfer Manager information

Complete the "Database Log Transfer Manager information" section of the worksheet only if you are adding a database that can run only with an LTM (as opposed to a RepAgent):

- **LTM name** *Required* – enter the name of the Log Transfer Manager.

- **RS user** Enter a login name that the RSSD RepAgent will use to connect to the Replication Server.
- **RS password** Enter a password for the Replication Server user login name.
- **LTM admin user** Enter the login name of the administrator for the active database's data server.
- **LTM admin password** Enter the password for the data server's administrator login name.
- **LTM error log** Enter the path for the LTM error log file. Replication Server writes informational and error messages to this text file.
- **LTM configuration file** Enter the path for the LTM configuration file.
- **LTM password encryption** Select Yes if you want passwords to be encrypted in the LTM configuration file, and No if you do not.
- **LTM language** Enter the language the LTM should use to print messages to the error log. It can be any language that is compatible with the character set you will install. See "Replication Server language" on page 10 for more information.
- **LTM character set** Enter the character set that the LTM will use. You can specify an Sybase-supported character set that is available for your language. See "Replication Server character set" on page 8 for more information.
- **LTM sort order** Enter the sort order for the LTM. See "Replication Server sort order" on page 10 for more information.

LTM interfaces information

Complete if you selected Yes for "Will the database be replicated?" and the database can run only with an LTM (as opposed to a RepAgent).

- **Network driver** Check the box next to the type of network the Replication Server uses: Windows Sockets, Named Pipes, or NWLink IPX/SPX.
- **Connection information** Copy the connection information for the Replication Server from "Replication Server Installation Worksheet" on page 112.

CHAPTER 2

Configuring Replication Server and Adding Databases with *rs_init*

This chapter explains how to use the rs_init utility to configure Replication Server and to add databases to your replication system.

You need the worksheet in "Replication Server Installation Worksheet" on page 112. Each section of the worksheet corresponds to a window or a menu in rs_init. You will enter the information from the worksheet into rs_init.

Using *rs_init*

rs_init is a utility used to configure Replication Server and add databases to a replication system. You can use rs_init interactively or with a resource file.

Using *rs_init* interactively

rs_init in interactive mode is easier to use than a resource file. The interactive mode provides command keys and menu prompts to help you make selections and move between windows. rs_init rejects invalid entries and displays warnings or error messages when you make improper selections. If you make a mistake, you can change your entry and continue with the installation session.

Note Before you can use Sybase Central to create a Replication Server partition, you must create the physical file on your Windows system. Do not use the partition for any other purpose, such as file systems, swap space, or Adaptive Server Enterprise devices.

In interactive mode, these command buttons help you make selections and move between dialog boxes:

Command button	Action
Continue	Accept the values currently listed in the dialog box and move to the next dialog box.
Back	Exit the current dialog box or prompt and return to the previous dialog box.
Exit	Quit rs_init and return to the shell prompt.
Help	Display an online help window.

rs_init with a resource file

If you plan to install multiple Replication Servers and many of the rs_init values are similar, using resource files to install, configure, upgrade, or downgrade may save time. See Appendix B, “Using rs_init with Resource Files” for more information.

A resource file is an ASCII-formatted file that contains configuration information for rs_init. Instead of entering configuration variables during an interactive rs_init session, you edit the resource file, then type that file name on the rs_init command line.

Starting *rs_init*

This section provides instructions on how to start rs_init. Enter the information from "Replication Server Installation Worksheet" on page 112 based on the preparation you did in Chapter 1, "Preparing to Install and Configure Replication Server."

❖ **Preparing to start *rs_init***

1 Log in to Windows using the Replication Server System Administrator's account.

2 Double-click the Replication Server Configuration icon in the Sybase for Windows dialog box. You see the RS_Init dialog box, which allows you to:

- Install a new Replication Server – see "Configuring a new Replication Server" on page 27.
- Add a database to your replication system – see "Adding a database to the replication system" on page 33.
- Upgrade or downgrade your software – see Chapter 3, "Upgrading or Downgrading an Existing Replication Server."
- Enable password encryption for a Replication Server or alter passwords in configuration files – see Chapter 4, "Using Password Encryption."

Configuring a new Replication Server

This section explains how to configure a new Replication Server using rs_init. To use these instructions, you need the completed "Replication Server Installation Worksheet" on page 112. If you have not completed the worksheet, read Chapter 1, "Preparing to Install and Configure Replication Server" and complete it before you continue.

❖ **Configuring a new Replication Server**

1 Open the RS_Init dialog box, and select Configure a Server Product, then choose Continue. You see the Configure Server Products dialog box.

2 Select Replication Server.

3 Select Install a New Replication Server.

You see a list of tasks you must complete to install a new Replication Server.

Note The Install a New Replication Server option lets you configure a new replication server, not install additional software.

Select each task and complete its windows until the status of each task is "Complete."

❖ **Entering Replication Server information**

1 In the New Replication Server window, select Replication Server Information. You see the Replication Server Name window.

2 Enter the name you recorded in the "Replication Server Information" section of the worksheet, then click Continue. You see the Replication Server Information window.

3 Select each item on the Replication Server Information window and enter the value you recorded on your worksheet. If you use a default value, record it on your worksheet.

To change a default value, select it and click Continue. You see a dialog box for that option.

In some configurations, if you set Replication Server's language before you set its character set, you receive an error message. To avoid this, set the character set before you set the language.

If the Replication Server Interfaces Information item is "Incomplete," select it and click Continue. You see an interfaces file editor dialog box. Follow the instructions in "Editing the interfaces file," next, to add a listener service for Replication Server.

4 Click Continue to save the information and return to the New Replication Server dialog box.

Editing the interfaces file

The interfaces file contains network address information for each Adaptive Server, Replication Server, and LTM in your replication system.

To reach the interfaces file screen, select Replication Server Interfaces Information from the Replication Server Information screen.

Select Start | Programs | Sybase | Dsedit to edit the interfaces file.

See the *Open Client/Server Configuration Guide* for more information on dsedit.

Note Sybase recommends that if you are using Replication Server 12.6 with network-based security, you use the directory services of your network security mechanism to register Replication Servers, Adaptive Servers, and gateway software. See the documentation that comes with your network security mechanism for details.

❖ **Entering ID Server information**

The ID Server is a Replication Server that registers all Replication Servers and databases in a replication system. It assigns and maintains ID numbers for these components and maintains version information for the entire replication system.

When you:

- Configure the ID Server, you determine the login name and password (ID Server User/Password) that all Replication Servers use to log in to the ID Server.
- Install a Replication Server that is not the ID Server, copy the ID Server Name, ID Server User, and ID Server Password from the worksheet you completed for the ID Server.

To complete the ID Server Information dialog box:

1 From the New Replication Server window, select ID Server Information.

2 If the Replication Server you are installing is not the ID Server, you see the ID Server Name dialog box. Enter the name of the ID Server for the replication system, then click Continue. You see the ID Server Information dialog box.

Note If the Replication Server you are configuring is the ID Server, the ID Server Information dialog box appears.

The Starting Replication Server ID and Starting Database ID appear only when you configure the ID Server.

3 Complete the ID Server Information window with the information from the “ID Server” section of your worksheet.

If you do not make entries for the Starting Replication Server ID and starting database ID, the default ranges are used, as shown in Table 1-2 on page 14.

4 Click Continue to save your changes and return to the New Replication Server dialog box.

RSSD information

Before you can enter your Replication Server System Database information, you must determine if you want an RSSD, or an embedded RSSD.

In the Replication Server System Database Choice screen, the first line asks, "Do you want Replication Server System Database embedded?" Select:

- No – if you do not want an Embedded RSSD. This is the default value, and assumes you are creating a regular Replication Server System Database with Adaptive Server Enterprise. The second line on the screen appears as:

```
2. Replication Server Database on ASE    INCOMPLETE
```

  Select line 2 to go to the Replication Server System Database screen, and follow the steps in "Entering Replication Server System Database information" on page 31 to complete the information about your RSSD.

- Yes – if you want an Embedded RSSD using Adaptive Server Anywhere. The text on the second line changes to:

```
2. Embedded Replication Server System Database   INCOMPLETE
```

  Select line 2 to go to the ERSSD Name screen, and follow the steps in "Entering Embedded Replication Server System Database information," next.

❖ **Entering Embedded Replication Server System Database information**

1 In the ERSSD Name screen, enter the name of your Adaptive Server Anywhere server, and press Ctrl+A to accept the name. The Embedded Replication Server System Database screen appears.

2 You see the following options in the Embedded Replication Server System Database screen, each filled with a default value:

- ERSSD Database Directory
- ERSSD Transaction Log Directory
- ERSSD Backup Directory
- ERSSD Error Log Directory
- ERSSD Interface Information

Select each item to change the default value to the value you recorded on your worksheet from "Replication Server Installation Worksheet" on page 112. See Chapter 4, "Managing a Replication System" in the *Replication Server Administration Guide* for more information on value requirements for embedded RSSDs.

3 Press Ctrl+A to accept the values and return to the Replication Server System Database Choice screen.

4 Press Ctrl+A to return to the New Replication Server screen.

❖ **Entering Replication Server System Database information**

1 In the New Replication Server window, select Replication Server System Database, then click Continue.

2 Complete the dialog box with the information from your worksheet. If you use a default value, copy it from the dialog box to your worksheet.

For "RSSD will be replicated," select Yes if you will have more than one Replication Server in your environment. Otherwise, select No.

3 Choose Continue to accept the values. You see the New Replication Server dialog box.

❖ **Entering RSSD device information**

If you selected Yes for Create RSSD in the Replication Server System Database window, you see a new option, RSSD Device Information, on the New Replication Server window.

Warning! If you selected No for Create RSSD in the Replication Server System Database window, you must already have created the RSSD. Skip this section and go to "Entering disk partition information" on page 31.

---

1 From the New Replication Server dialog box, select RSSD Device Information, then choose Continue.

2 Complete the window using information from your worksheet. If you use a default value, copy it from the window to your worksheet.

3 Click Continue to save your entries and return to the New Replication Server window.

❖ **Entering disk partition information**

In Windows, operating system files are used as disk partitions for stable queues. If such a file does not already exist, rs_init creates it.

1 From the New Replication Server window, select Disk Partition.

Click Continue.

2 Complete the window using the information you recorded on your worksheet.

You can add more partitions after Replication Server is installed. See the *Replication Server Design Guide* for help in determining how much space you need.

3 Click Continue to accept the values and return to the New Replication Server window.

❖ **Entering remote site connections information**

rs_init completes the Remote Site Connections window with default values based on the Replication Server name you entered.

To view or change any of these values:

1 From the New Replication Server window, select Remote Site Connections.

Click Continue.

2 Complete the window using the information on your worksheet. If you use a default value, copy it to the "Remote site connections" section of the worksheet.

3 Click Continue to save your changes and return to the New Replication Server window.

❖ **Entering RSSD RepAgent information**

If an RSSD RepAgent is required, complete these steps:

1 In the New Replication Server window, select Replication Server System Database. Enter the Adaptive Server database server name, and the database name for the RSSD.

2 Select the RSSD to be replicated.

3 Click OK to save your changes.

4 Select Database Replication Agent. Enter the RSSD Replication Server user name, and the Replication Server password from your worksheet.

Note Where necessary, rs_init uses the settings established for the Replication Server when configuring an RSSD RepAgent or LTM.

5 Click Continue to save this information.

❖ **Completing the Replication Server configuration**

When the status of each task in the New Replication Server window is "Complete," follow these steps to complete the configuration.

1 At the prompt that asks if you want to execute Replication Server tasks now:

- Select Yes to have rs_init configure the new Replication Server.
- Select No to return to the New Replication Server window, where you can modify values in any of the windows.

Status messages display while rs_init sets up the Replication Server. If errors occur, use the error messages that display to correct the information in the configuration windows or to modify your environment.

When the configuration is complete, rs_init displays the message "Configuration completed successfully."

2 Click Continue.

3 Click OK to return to the Configure Replication System window.

Note If you are configuring other Replication Servers on the same computer, go back to "Configuring a new Replication Server" on page 27 and repeat the procedure for each additional Replication Server.

4 Click OK to quit rs_init.

You can find out more about the progress of the installation by looking at the rs_init log files, which are stored in the *init\logs* subdirectory of the *%SYBASE_REP%* directory.

Adding a database to the replication system

Each primary or replicate database in a replication system is managed by a Replication Server.

Follow the steps below to add a database to the replication system. To use these instructions, you need the completed "Database Setup Worksheet." If you have not completed the worksheet, read Chapter 1, "Preparing to Install and Configure Replication Server" and complete it before you continue.

❖ **Adding a database to the Replication System**

From the RS_INIT menu, select Configure a Server Product.

Click Continue.

5 Select Replication Server. You see the Configure Replication System window.

6 Select Add a Database to the Replication System, then click Continue. You see the status of each part of the installation with "Incomplete" or "Complete."

Select Replication Server Information.

Click Continue.

7 Enter the name of the Replication Server from your worksheet. Click Continue to save your changes.

8 Complete the window, using the information you recorded on your worksheet, then click Continue.

If the status of Replication Server Interfaces Information is "Incomplete," select it, then click Continue. You see an interfaces file editor dialog box. Follow the instructions in "Editing the interfaces file" on page 28 to add an entry for the Replication Server.

9 Click Continue to save your changes and return to the Add Database to Replication System window.

❖ **Completing database information**

Follow these steps to add a database.

1 In the Add Database to Replication System window, select Database Information, then click Continue.

2 Complete the window, using the information you recorded on the worksheet. If you use a default value, copy it from the window to your worksheet. The label refers to Adaptive Server as "SQL Server."

Note The password you specify in this step must be valid to log in to Replication Server as "sa". You cannot change the password in rs_init by specifying a different password in this window. To change the Replication Server sa password, log in to the Replication Server after installation and change the password using the alter user command.

---

3 A RepAgent is required if you are adding a primary database, a database that is a source of replicated stored procedure execution, or the active or standby database for a warm standby application. Choose Yes for "Will the Database Be Replicated?"

For this step, a database requires a RepAgent if:

- It contains primary data.
- It is part of a warm standby application.
- Applications execute replicated stored procedures in it.

See "Planning the replication system" on page 1 for more information about when a database requires a RepAgent.

4 If you are adding the active or standby database for a warm standby application:

a Choose Yes for "Is This a Physical Connection for Existing Logical Connection?"

b Specify the additional information in the Logical DB Setup window. See "Logical connection information" on page 35 for details.

5 Click Continue to save your changes, then go to "Completing the configuration" on page 36.

❖ **Logical connection information**

This section describes entries you make in the Logical Connection Information window when you add an active or standby database for a warm standby application.

Read Chapter 13, "Managing Warm Standby Applications" in the *Replication Server Administration Guide* before performing the steps described in this section.

Before you use rs_init to add a database for a warm standby application, you must create the logical connection in the Replication Server.

1 If you selected Yes for "Is This a Physical Connection for Existing Logical Connection?" in the Database Information window, Logical Database Setup selections appear. You must specify logical connection parameters.

In the Database Information window, select Logical DB Setup, then choose Continue.

The Logical Connection Information window appears. When you choose "active" for the first item, only these items appear:

- Logical DS Name
- Logical DB Name

2 Complete the Logical Connection Information window, using the information you recorded on your worksheet. If you use a default value, copy it from the window to your worksheet.

3 Click Continue to save your changes, and rs_init returns you to the Database Information window.

❖ **Completing the configuration**

1 If the Database Information window indicates that there are incomplete tasks on the Add Database to Replication System window, select each one and complete the required information.

When all tasks are "Complete," click Continue. A message asks if you want to execute the configuration.

2 Messages appear on the window as the configuration is performed. The messages show the progress of the configuration and do not require any action.

Do not interrupt the configuration. Most configurations require several minutes (sometimes longer) to complete.

When the configuration is complete, rs_init displays "Configuration completed successfully."

3 Click OK to return to the Configure Replication System dialog box.

Note To add other databases to the replication system, go to "Adding a database to the replication system" on page 33, and repeat the procedure for each database.

4 Click Exit to quit rs_init.

You can find out more about the progress of the installation by looking at the current rs_init log file. rs_init log files are stored in the *init\logs* subdirectory of the *%SYBASE_REP%* directory.

CHAPTER 3

Upgrading or Downgrading an Existing Replication Server

This chapter explains how to upgrade a Replication Server to version 12.6 and how to commit to that version. It details how to upgrade SQL Server databases in your replication system to Adaptive Server databases. It also tells you how to downgrade a Replication Server to an earlier software version.

Preparing to upgrade

This section provides information on what to do before you start the upgrade process.

❖ **Before upgrading to Replication Server 12.6**

1 Back up your replication system.

2 Use rs_helpsub to validate all subscriptions. If you do not validate all subscriptions before upgrading, the upgrade fails and you cannot start Replication Server again.

3 Shut down all Replication Servers, RSM Servers, and LTMs.

4 Read the release bulletin for your platform for special installation instructions.

5 Install Replication Server, following the instructions in the *Replication Server Installation Guide for Windows*.

6 Read the release bulletin for your platform for special upgrade instructions.

Overview

Before you can restart Replication Servers and LTMs with Replication Server version 12.6, you must upgrade the RSSDs so that they are compatible with the new executable programs. You may also need to upgrade your user databases.

❖ **Upgrading to Replication Server version 12.6**

1 Upgrade the RSM Servers.

2 Upgrade the RSSDs.

3 Upgrade primary, replicate, and standby user databases.

4 If you have already upgraded SQL Server databases to Adaptive Server 12.6, upgrade LTMs to RepAgents. See “Upgrading RepAgent threads in Adaptive Server databases” on page 49.

5 Restart the Adaptive Servers and Replication Servers, as well as LTMs if you are still using SQL Server databases.

6 Decide whether to set the replication site version to the new version. If you do, the new features are available, but you cannot downgrade to an earlier version.

Upgrading to Replication Server 12.6

This section describes how to upgrade to Replication Server 12.6, first by upgrading your RSM Servers, and then upgrading your Replication Servers. You must upgrade the RSM Servers if you are maintaining a mixed-version replication system. See "Mixed-version replication systems" on page 48 for more information.

Note Sybase recommends that you upgrade RSM Servers before you upgrade Replication Servers. To upgrade routes for mixed-version support, you need the latest RSM Servers.

❖ **Upgrading from RSM version 12.5 and later to RSM 12.6**

If you have a version of RSM that is earlier than 12.5, you must first upgrade RSM to version 12.5 to perform these steps.

1 Make backup copies of the RSM Server configuration files and *scripts\rsmxxxx.sql* files, in case you need to downgrade in the future.

2 Update the configuration files, then update the RUN file. See "Upgrading from RSM version 11.5.x" on page 91.

3 Start a new RSM Server.

A message in the log prompts that the RSSD procedures need to be upgraded; the RSM Server stays up.

4 Issue the command to load new RSSD procedures through the RSM Client, or through the RSM Server command if you are scripting multiple upgrades.

❖ **Upgrading to Replication Server 12.6 from an earlier version**

1 Back up your current installation.

If you plan to install the Replication Server software in a directory other than an existing Sybase version directory, make sure that the *interfaces* file is accessible. See *Replication Server Installation Guide* for instructions.

2 Install the new Replication Server software from media. See *Replication Server Installation Guide* for instructions.

3 Upgrade the RSSD for each Replication Server. See "Upgrading an RSSD" on page 40.

4 Upgrade each user database that is managed by an upgraded Replication Server. See “Upgrading a user database in a replication system” on page 42.

5 Upgrade RepAgents for Adaptive Server 12.6 databases. See “Upgrading RepAgent threads in Adaptive Server databases” on page 49.

❖ **Upgrading an RSSD**

Complete these steps in the order shown in this section to upgrade an RSSD based on the information from the “Replication Server Installation Worksheet” on page 112 for the Replication Server you are upgrading. Upgrading an RSSD may add new Replication Server system tables, add new rows or columns to existing tables, or install new stored procedures.

Note To upgrade RSSD procedures from Sybase Central, select the Replication Server icon, then choose File | Upgrade RSSD Procedures. See the Sybase Central online help for further instructions.

---

1 Verify that the Adaptive Servers with RSSDs, Replication Servers, and RepAgent that you are upgrading are running.

2 Enter the name of the Replication Server with the RSSD you are upgrading.

3 Select Configure a Server Product.

4 Select Replication Server.

Then choose Continue.

5 Select Upgrade an Existing Replication Server.

Then choose Continue.

6 Complete the Upgrade Existing Replication Server screen with the information from the “Replication Server Installation Worksheet” on page 112 for the Replication Server you are upgrading.

a Enter the name of the Replication Server with the RSSD you are upgrading.

b Enter the login name for the RS SA user. The default value is “sa.”

c Enter the password for the “sa” user on the Replication Server.

d Enter the name of the Adaptive Server or SQL Server that contains the RSSD for the Replication Server.

e Enter the name of the RSSD.

f Enter the login name for the "sa" user on the system Adaptive Server or SQL Server. The default value is "sa."

g Enter the Adaptive Server or SQL Server "sa" user password.

h Select No if the RSSD has a RepAgent. Select Yes only if the RSSD has an LTM. If you select Yes, and it is an Adaptive Server or SQL Server database:

- Enter the name of the RSSD LTM.
- Enter the login name of the LTM system administrator.
- Enter the password for the LTM system administrator. Press Ctrl+A to save your changes. rs_init displays the message:

```
Execute the Replication Server tasks now?
```

7 Choose Continue to continue the RSSD upgrade.

If the Replication Server is running, rs_init shuts it down.

rs_init displays informational messages as it loads the upgrade script into the RSSD. When the upgrade is complete, rs_init displays these messages:

```
RSSD successfully upgraded from old_rel_no to
new_rel_no. Replication Server 'rs_name' can now be
restarted. Task to upgrade the RSSD succeeded.
Configuration completed successfully.
```

where:

- *old_rel_no* – is the Replication Server version from which you are upgrading.
- *new_rel_no* – is Replication Server version 12.6.
- *rs_name* – is the name of the Replication Server.

Press Return after each message. You see the Configure Replication System screen.

8 Select OK. You see the message "Replication server '*name*' can now be restarted."

9 Select OK. You see the RS_Init window.

10 Select OK. You see the message "Configuration completed successfully."

11 If you have more Replication Servers to upgrade, go back to "Upgrading to Replication Server 12.6" on page 39 and repeat the procedure.

12 If you installed the new Replication Server software in a different directory from the previous version, modify the runserver files for the Replication Servers and LTMs so that they use the programs in the new version directory.

13 Restart the Replication Server, and the LTMs that are associated with it, using the appropriate executables for the new version.

For instructions on downgrading an RSSD to an earlier version, see "Downgrading to an earlier version" on page 58.

If an upgrade fails

If a Replication Server upgrade fails because of an error, restart the old Replication Server against the RSSD and fix any problem that may have caused the error. After you fix the problem, re-run the upgrade. You can do this multiple times until the upgrade succeeds.

Note You cannot start a new Replication Server against a partially-upgraded RSSD.

Upgrading a user database in a replication system

This section describes how to upgrade a user database in the replication system. A user database can be a primary user database, a replicate database, or a standby database.

Note Upgrading a user database may add special tables used by the Replication Server.

❖ **Upgrading a user database in a replication system**

1 Start rs_init.

2 Select Upgrade a Database in a Replication System from the Configure Replication System screen, then choose Continue.

3 Complete the screen with the information from the "Database Setup Worksheet" for the upgraded Replication Server.

a Enter the name of the Adaptive Server that manages the database you are upgrading.

b Enter the name of the database you are upgrading.

c Enter the login name for the "sa" user on the Adaptive Server that manages the database that you are upgrading. The default value is "sa."

d Enter the Adaptive Server "sa" user password.

e Enter the login name for the maintenance user on the Adaptive Server or SQL Server that manages the database that you are upgrading. The default is "*database*_maint," where "*database*" is the name of the database you are upgrading.

Select Continue. rs_init performs the upgrade.

4 If you have more Replication Servers or databases to upgrade, go back to "Upgrading to Replication Server 12.6" on page 39 and repeat the procedure.

Committing a local site to a new version level

After you upgrade a Replication Server and its user databases, you must decide whether to commit to the new Replication Server version level.

Note You cannot create, alter, and drop replication definitions until you set the Replication Server *site version* to 1200 or higher.

❖ **Committing to the new version level**

1 Set the system version.You do not need to set the system version if it is 1102 or higher.

2 Set the site version for each upgraded Replication Server.

3 Upgrade routes for which the upgraded Replication Server is the source or destination server, and the site versions of the source and destination servers are at 1260 or higher.

4 After you upgrade routes, back up the upgraded RSSDs.

5 Committing to the new version level and upgrading routes are two separate procedures.

Setting the replication system version

After you upgrade and install Replication Servers and user databases in your replication system to a new version level, you can set the system version to match the earliest software version.

The system version is the lowest version of Replication Server allowed in the system. For example, if your replication system version is 1151, you cannot use or install a Replication Server that is earlier than version 11.5.1.

When all Replication Servers in the replication system are at version 12.6 or later, follow these steps to set the system version to 1260:

1 Log in to the ID Server.

2 Execute this command:

```
sysadmin system_version, 1102
```

Restrictions

Note these restrictions for the system version:

- If the system version is less than 1102, new features that were introduced in later versions, including features of version 12.6, are not available. For this reason, Sybase recommends that you set the system version to 1102 or higher.
- Even if all your Replication Servers are at version 12.6, you do not have to set the system version higher than 1102. If you do, you forego the possibility of downgrading and installing another Replication Server that is earlier than version 12.6.
- When you upgrade all Replication Servers to at least version 11.0.2, you can set the system version to at least 1102.
- Once the system version is set to 1102, the availability of new features is determined by the site version setting. Thus it is not necessary to set the system version higher than 1102.

System version and software version

Table 3-1 illustrates the relationship between the software version number and the system version number. Note especially the ability to use the full capabilities of version 12.6 when the system version is at 1102.

Table 3-1: Relationship between software version and system version

Replication Server software version	System version 1102 and higher
12.6	Full capability when site version is set to 1260.
12.5	Full capability when site version is set to 1250.
12.1	Full capability when site version is set to 1210.
12.0	Full capability when site version is set to 1200.
11.5	Full capability when site version is set to 1150.
11.0.2/11.0.3	Full capability.

New features of version 12.6 are available only when the system version is at least 1102 and the site version is set to 1260.

If a software version is supported with full capability at a given system version, you can install new Replication Servers of that software version. See “Setting the Replication Server site version” on page 45 for more information.

For more information about new features, see *What’s New in Replication Server?* for version 12.6 and the release bulletin for Replication Server version 12.6.

If you are upgrading from version 11.0.x to 12.6, see *What’s New in Replication Server?* and the release bulletins for Replication Server versions 11.5 through 12.1 for information on the features that became available after 11.0.x.

Upgrading from version 11.0.2 or 11.0.3

As Table 3-1 on page 45 shows, if you are upgrading from Replication Server version 11.0.2 or 11.0.3, and the system version is already set to 1102 or 1103, you do not need to set the system version to begin using new features in 12.6.

You must set the site version for Replication Servers that require it, and to upgrade routes. Information needed for the new features cannot be propagated to other sites until the corresponding routes are upgraded. See “Setting the Replication Server site version” on page 45 and “Upgrading routes” on page 47 for details.

Setting the Replication Server site version

After you upgrade Replication Server version 12.6 and its user databases, and set the system version to 1102 or higher, you must set the Replication Server site version to the new software version level before you can use the new Replication Server features.

Refer to *What's New in Replication Server?* and the Replication Server release bulletin for more information about new features.

Downgrade restriction

Once you set the replication system version to a new level, you cannot downgrade any Replication Servers in the replication system below that version level or install a Replication Server below that version level.To return to an earlier software version, you must reinstall all Replication Servers and re-create your replication applications.

If you do not want to use new features that depend on the site version, do not set the Replication Server site version after the upgrade. Then you can downgrade to an earlier version if needed.

Note create, alter, and drop replication definitions are not allowed until you set the Replication Server site version to 1200 or higher.

❖ **Setting the Replication Server site version to the 12.6 Replication Server version**

1 Log in to the current Replication Server.

2 Execute this command:

```
sysadmin site_version, 1260
```

The Replication Server release bulletin may instruct you to set the site version to a more recent version level.

Note Once you have set the Replication Server site version, you cannot downgrade the Replication Server. To return to an earlier software version, you must reinstall the Replication Server and re-create any aspects of your replication applications that pertain to that Replication Server.

Backing up the RSSD

After you upgrade a Replication Server, set its site version to 1260, and perform route upgrades to the relevant routes, use the Adaptive Server commands dump database or dump transaction to back up the RSSD.

If you have a current backup, you can restore the RSSD with the Adaptive Server commands load database or load transaction to avoid potential problems from loading an RSSD that corresponds to an earlier version level. After you load the backup, all queued messages from other Replication Servers can be recognized by this Replication Server and RSSD.

If you restore the RSSD from a backup performed before you set the site version, messages that the RSSD cannot accept might arrive at the Replication Server.

Upgrading for character set conversion

To use the character set conversion features introduced in Replication Server version 11.0.2, set your system version to version 11.0.2 and verify that the primary Replication Server is aware of the system version.

To do this, follow these steps after you upgrade the system version at the ID Server:

- Execute sysadmin system_version at each primary Replication Server:

  ```
  sysadmin system_version
  ```

  This forces Replication Server to check the latest value of the system version.

- Verify that the command displays 1102, the system version number representing version 11.0.2.

When this command is executed, subsequent updates at the primary database can undergo character set conversion.

Using new features in version 12.6

You can use new Relication Server features that interact with other Replication Servers only if all these things are true:

- The system version has been set to 1102.
- The site version for both Replication Servers has been set to the current version.
- The routes between the Replication Servers have been upgraded.

See “Setting the replication system version” on page 44 and “Upgrading routes” on page 47 for more information.

For example, Replication Servers with a site version set to version 12.6 can create replication definitions for tables containing unicode datatype. Such replication definitions are distributed to other Replication Servers with site versions that are at the same version level or higher. Replication Servers of earlier versions do not receive information about these replication definitions.

Upgrading routes

The route version is the lower of the two site version numbers of the route’s source and destination Replication Servers.

Replication Server version 12.6 or later uses route version information to determine which data to propagate to other sites. Information necessary for 12.6 features is not propagated to other sites until the corresponding route versions are upgraded to 1260.

After you upgrade to Replication Server 12.6 and set the site version to 1260, you must upgrade each route for which this Replication Server is a source or destination, and the site versions of the source and destination are at 1150 or higher. How you upgrade routes depends on how you use Replication Server; in particular, if you have a *mixed-version replication system*.

Mixed-version replication systems

In a replication system that includes Replication Server versions 11.0.2 through 12.6, and for which the site version is set to its software release level and the system version is 1102, each Replication Server can use all the features of its release. Such a system is called a **mixed-version system**.

In a mixed-version system, interaction between Replication Servers of different version levels is limited, and information associated with new features may not be available to Replication Servers of earlier versions. Replication Servers of the same version can exchange full information about the software features they support.

From the following choices, select the upgrade option that best suits your situation.

RSM Server and RSM Client

If you use both the RSM Server and the RSM Client, use the RSM Client to upgrade routes. For a full explanation of RSM Client, see the Replication Server online help in Sybase Central.

No RSM Client, new features not yet implemented at source Replication Server

If you do not have an RSM Client, and if none of the new features have been introduced to the source Replication Server, enter this command at the source Replication Server command line, where *destination_replication_server* is the name of the destination Replication Server of the route you are upgrading:

```
sysadmin fast_route_upgrade destination_replication_server
```

The command is rejected if the route version was below 1260 and upgraded to 1260 or higher, and if a replication definition created at the source Replication Server shows:

```
rs_objects.minivers >= 1260
```

If the command is rejected because new features have been introduced to the source Replication Server, see "No RSM Client, new features at source Replication Server," next.

No RSM Client, new features at source Replication Server

If the previous command is rejected because new features have been introduced to the source Replication Server, follow these instructions.

- Start the RSM Server.
- Add all the Replication Servers for which you are upgrading routes to the RSM Server.
- Make sure all the Replication Servers are up and running.
- Use the RSM Server route_upgrade_status command to determine which routes need to be upgraded.
- Use route_upgrade for routes that need to be upgraded.
- Use route_upgrade_status again to verify upgraded routes.
- Check the RSM Server log file for further information about route upgrades.
- If a route upgrade fails, correct the problem and use route_upgrade_recovery to recover and upgrade the route.

See Chapter 5, "Managing Routes," in the *Replication Server Administration Guide* for more information about routes. For a full description of the route upgrade commands, see Chapter 3, "Replication Server Commands," in the *Replication Server Reference Guide*.

Upgrading RepAgent threads in Adaptive Server databases

If the primary databases managed by the upgraded Replication Server are Adaptive Server 11.5 or later, you must upgrade to RepAgent threads before you can use the new features.

Note If you are upgrading to RepAgent directly from a pre-11.0 version of Replication Server to version 11.5 or later, make sure that mixed-mode transactions are not active during the upgrade. Mixed-mode transactions contain both applied commands (insert, delete, update, and applied functions) and request functions.

❖ **Upgrading RepAgent threads**

1 Make sure the Replication Server and Adaptive Server versions are both 11.5.

2 Stop the LTM.

3 Convert the LTM configuration file to SQL commands.

4 Set up the RepAgent. See "Setting Up RepAgent" in Chapter 3 in the *Replication Server Administration Guide* for details.

5 If RepAgent threads are not enabled in the Adaptive Server, enable the RepAgent threads feature:

```
sp_addserver servername, local
go
sp_configure "enable rep agent threads", 1
go
```

6 Enable the RepAgent for the database:

```
sp_config_rep_agent db_name, enable,
   "rs_servername", "rs_username", "rs_password"
```

where:

- *db_name* – is the name of the database (same as the SQL_server LTM configuration option).
- *rs_servername* – is the name of the Replication Server (same as the RS LTM configuration option).
- *rs_username* – is the user name to log in to Replication Server (same as the RS_user LTM configuration option).
- *rs_password* – is the password to log in to Replication Server (same as the RS_pw LTM configuration option).

7 Configure the RepAgent, if the default configuration is not appropriate. Consult the LTM configuration file and LTM run files, to determine what needs to be changed. For each configuration option that needs to be changed, use the following command:

```
sp_config_rep_agent db_name, "option", "value"
```

For instance, to set retry timeout to 30, enter:

```
sp_config_rep_agent db_name, "retry timeout","30"
```

The RepAgent configuration options and their equivalent LTM configuration options are in Table 3-2. Also see Chapter 3 of the *Replication Server Administration Guide* for details on the new options.

Table 3-2: Mapping old configuration file parameters/options to 12.6

Old LTM configuration file	New RepAgent parameter/option
RS_source_db	connect_database (recovery mode only)
RS_source_ds	connect dataserver (recovery mode only)
SQL_user	Obsolete
SQL_pw	
SQ_pw_enc	
RS	rs servername
RS_user	rs username
RS_pw	rs password
RS_pw_enc	Obsolete
SQL_database	connect database
SQL_server	connect dataserver
LTM_admin_user	Obsolete
LTM_admin_pw_enc	
LTM_admin_pw	
LTM_language	Obsolete
LTM sortorder	
retry	retry timeout
scan_retry	Obsolete
batch_sz	
skip_ltl_cmd_err	skip_ltl_errors
maint_cmds_to_skip	Obsolete
print_sproc_warning	
New RepAgent-specific options	fade timeout
	scan batch size
	scan timeout
Old command line option	**New RepAgent option**
-A	send maint xacts to replicate
-W	send warm standby xacts

For the rs_name, rs_username, and rs_password parameters, the options can be directly modified using the following command, where *option* is rs servername, rs username, and rs password, respectively:

```
sp_config_repagent db_name, "option", value
```

Source data server database defaults to connect database can be overridden by setting connect dataserver.

8 Start the RepAgent using sp_start_rep_agent. After starting the RepAgent for a database once with sp_start_rep_agent, it starts automatically every time the data server is rebooted. The command to start the RepAgent is:

```
sp_start_rep_agent db_name
```

Upgrading SQL Server databases to Adaptive Server databases

If you are upgrading SQL Server databases in your replication system to Adaptive Server 12.5.1, use the database upgrade procedure as follows.

1 Suspend transaction processing and replication system activities.

2 Drain transaction logs for primary databases.

3 Drain the RSSD transaction log.

4 Disable the log truncation point.

Warning! Sybase strongly recommends you perform a dump database and dump transaction before executing the steps below.

❖ **Suspending transaction activity in the databases and suspending replication**

Complete the following tasks before upgrading version 4.9.x or 10.0.x SQL Servers in your replication system to Adaptive Server 12.5.1.

Before you upgrade databases to Adaptive Server, suspend transaction activity in the databases and suspend replication.

Note Replication includes the creation and dropping of both routes and subscriptions.

1 Verify that the subscriptions you are creating with the create subscription command, with primary data in the databases being upgraded, have reached a “valid” state at the primary Replication Server.

Do not upgrade while the above subscriptions are being created.

Make sure no users create subscriptions for the data in the database you are upgrading until the upgrade procedure is finished.

2 Run rs_helproute in each Replication Server System Database (RSSD) being upgraded to determine each RSSD's status.

The status of all routes should be "Active." See Chapter 5, "Managing Routes" in the *Replication Server Administration Guide* to resolve route problems.

3 Shut down the applications that are using the databases you are upgrading.

4 Use the admin who command in Replication Server to identify the existing Data Server Interface (DSI) connections to the data server being upgraded.

5 Suspend all DSI connections to non-RSSD databases you are upgrading by using the following command for each database:

```
suspend connection to dataserver.database
```

6 Leave the DSI connections for the RSSDs running.

❖ **Draining transaction logs for primary databases**

For each primary database you are upgrading, follow these steps to ensure that the Replication Server completely processes the pre-upgrade log.

1 Wait for all remaining transactions to be replaced.

2 Run this Replication Server command:

```
admin who, sqm
```

Find the entry that corresponds to the inbound queue for this database by looking for the Info field for the queue_number, queue_type entry. For an inbound queue, the queue type is 1. Note the last segment:block entry for the queue.

3 Open the queue dump file by executing the following Replication Server command, where *file_name* is the name of the dump file you will dump to:

```
sysadmin dump_file, "file_name"
```

4 Use isql to update one row in a single replicated table in the primary database:

```
update table set column = column
   where key = unique_value
```

The update command helps to track whether all modifications to the replicated database have been sent to the Replication Server.

If you have Replication Server version 11.0 or later, choose a table that does not use the replicate minimal columns clause, or use the alter replication definition command...replicate all columns command to change the replication definition before updating the row. If you alter the replication definition, be sure to change it back after you complete this upgrade procedure.

5 In the primary Replication Server, execute the admin who, sqm command until the last segment:block entry for the inbound queue changes.

6 Execute the following Replication Server command to dump the last block of the inbound queue to the dump file you created in step 3:

```
sysadmin dump_queue, queue_number, queue_type,
   last_seg, block, 1
```

Use the *queue_number*, *queue_type*, *last_seg*, and *block* values found in the output of the admin who, sqm command in step 5.

7 Examine the dump file to make sure it contains the transaction corresponding to the update you performed in step 4 (you can use Notepad to examine the file).

8 Repeat steps 5 through 7 until the transaction corresponding to the update is in the dump file. After draining the transaction logs, do not allow any other activity in the databases. If activity does occur, you need to redrain the logs.

Manually draining the RSSD transaction log

Manually drain the transaction log of each primary RSSD in the data server you are upgrading.

If Replication Server has routes to other Replication Servers, you must make sure that Replication Server processes all transactions in the RSSD transaction log before you upgrade the databases.

You can make sure the transaction log is completely processed by creating a replication definition in the primary Replication Server and then watching for it to appear in the replicate Replication Server's RSSD. When the replication definition is in the replicate RSSD, the log is fully processed.

❖ **Creating a replication definition for ensuring that the RSSD log is processed**

1 Log in to the primary Replication Server.

2 Create a temporary replication definition:

```
create replication definition rep_def_name
   with primary at dataserver.database
   (column_a int)
   primary key (column_a)
```

The data server and database names must be valid, but the replication definition does not have to reference an actual table.

3 Log in to the replicate RSSD.

4 Execute the following query to see whether the replication definition has arrived from the primary RSSD:

```
select * from rs_objects
   where objname = "rep_def_name"
```

When the replication definition has arrived in the replicate RSSD, the RSSD transaction log has been drained.

❖ **Disabling the LTM truncation point**

When you upgrade a primary database, the LTM must not be running and the LTM truncation point should be turned off for the duration of the upgrade.

1 Shut down the LTMs for the databases you are upgrading.

2 Shut down Replication Servers for the RSSDs you are upgrading.

3 In each primary RSSD, execute the following commands to turn off the LTM truncation point:

```
1> use database
2> go
1> dbcc settrunc ("ltm", "ignore")
2> go
```

If the dbcc settrunc command fails because the server "context" is reserved, execute the following commands to allow SQL Server to recognize that the LTM is disconnected:

```
1> begin tran
2> commit tran
3> go 500
```

Then turn off the LTM truncation point:

```
dbcc settrunc ("ltm", "ignore")
```

Repeat step 3 for each primary database and each primary RSSD.

4 Use Sybase Central to shut down the servers.

❖ **Draining each replicated primary**

Manually drain the transaction log of each replicated primary in the data server you are upgrading.

1 Note the timestamp of the last log page:

```
1> use database
2> go
1> dbcc traceon (3604)
2> go
```

Trace output is sent to the terminal.

```
1> select root from sysindexes where name = "syslogs"
2> go
```

The value returned is the last log page.

```
1> dbcc page (database, last_log_pageid, 0)
2> go
```

The timestamp is a 6-byte hexadecimal number. Save this value for reference in step 3.

2 Append to the log:

```
1> use database
2> go
1> begin tran
2> commit tran
3> go 500
```

3 Check the LTM truncation point:

```
1> use database
2> go
1> dbcc gettrunc
2> go
```

The value in the ltm_trunc_page column is the LTM truncation point.

```
1> dbcc traceon (3604)
2> go
```

Trace output is sent to the terminal.

```
1> dbcc page (database, ltm_trunc_page, 0)
2> go
```

Note the timestamp. Continue with this step until the timestamp of the LTM truncation page is greater than the timestamp value you saved.

Shut down the LTM for this replicated database, and then disable the LTM truncation point.

```
1> use database
2> go
1> dbcc settrunc ("ltm", "ignore")
2> go
```

Suspend the connection to the RSSD databases from Replication Server.

```
1> suspend connection to dataserver.database
2> go
```

❖ **Restoring replication after upgrade**

1 Zero out the locator in the RSSD for each replicated primary.

2 Using isql, connect to the RSSD and execute the following commands:

```
1> use RSSD
2> go
1> rs_zeroltm dataserver, RSSD
2> go
```

3 Set the LTM truncation point to "valid" in each replicated primary. Using isql, connect to the replicated primary database, and execute the following commands:

```
1> use database
2> go
1> dbcc settrunc ("ltm", "valid")
2> go
```

❖ **Shutting down Replication Servers and LTMs**

- Shut down Replication Servers and LTMs for the database you are upgrading.

❖ **Granting replication roles (upgrading from 10.0.x only)**

- Grant the replication_role to each login account that the LTM uses to scan logs from SQL Server by using the following command:

```
sp_role "grant", replication_role, login_name
```

❖ **Upgrading pre-11.0 SQL Server to Adaptive Server**

- Execute the *logmon.server_name* script to reenable replication. Your SYBASE environment variable should be set to the new Adaptive Server. You are prompted for the RSSD name, RSSD server name, RSSD username, and RSSD password.

Downgrading to an earlier version

Downgrading is reversing to an earlier version of the software. You cannot downgrade an RSSD after you set the site version for the Replication Server or the replication system version to version 12.6.

To revert to an earlier software version after:

- The *site* version for a Replication Server has been set to the new version, you must reinstall the Replication Server.
- The *system* version has been set to the new version, you must reinstall all of the Replication Servers in the replication system.

❖ **Downgrading to an earlier software version**

1 Read the Replication Server release bulletin for information about downgrading your software. In particular, find out if an RSSD downgrade is required to return to the earlier version.

Note If an RSSD downgrade is not required, you do not have to perform these steps. Reinstall the earlier software version following the instructions in *Replication Server Installation Guide for Windows*.

2 Back up your system.

If you are downgrading to a directory other than the existing Sybase version directory, make sure the appropriate *sql.ini* file is accessible.

3 Back up the RSSD for the Replication Server you plan to downgrade.

4 Log in as the System Administrator.

5 Verify that the Adaptive Servers with the RSSDs and the Replication Servers you plan to downgrade are running.

6 In the Sybase for Windows group window, double-click the Replication Serer Configuration icon. You see the RS_Init window.

7 Select Configure a Server Product, then choose Continue.

8 Select Replication Server, then choose Continue.

9 Select Downgrade RSSD for an Existing Replication Server, then choose Continue.

10 Complete the Downgrade RSSD for Replication Server screen with the information from the “Replication Server Installation Worksheet” on page 112 for the Replication Server you are downgrading.

a Enter the name of the Replication Server whose RSSD you are downgrading.

b Enter the login name for the Replication Server "sa" user. The default value is "sa."

c Enter the password for the Replication Server "sa" user.

d Enter the name of the Adaptive Server that contains the Replication Server's RSSD.

e Enter the name of the RSSD.

f Enter the login name for the system Adaptive Server's "sa" user. The default value is "sa."

g Enter the Adaptive Server "sa" user password.

11 Select Continue to save your changes. rs_init displays the message:

```
Execute the Replication Server tasks now?
```

12 Select Yes to continue.

Informational messages display as rs_init loads the downgrade script into the RSSD. When the downgrade is complete, you see these messages, :

```
RSSD successfully downgraded to rel_no.
Replication Server 'rs_name' can now be restarted.
Task to downgrade the RSSD succeeded. Configuration
completed successfully.
```

where:

- *rel_no* – is the first message is the Replication Server version from which you are downgrading.
- *rs_name* – is the name of your Replication Server.

13 Select OK. You see the message:

```
Replication Server "name" can now be restarted
```

14 Select OK. You see the message:

```
Configuration completed successfully.
```

15 Select OK. You see the Setup window.

16 Select Exit to quit rs_init.

17 Log in to each user database managed by the Replication Server and execute this command:

```
dbcc settrunc("ltm", "begin")
```

18 Shut down all Replication Servers, RepAgents, and Adaptive Servers on this machine.

19 When you downgrade to an earlier software version, you must install the earlier software. Read the release bulletin for the earlier version of Replication Server. Then refer to the installation or configuration guide for that version for installation instructions.

20 Restart the Replication Servers, Adaptive Servers, and RepAgents.

Downgrading a RepAgent to an LTM

This section applies only if you are downgrading to Replication Server version 11.5 or earlier.

❖ **Downgrading a RepAgent to an LTM**

1 Stop the RepAgent for the database:

```
sp_stop_rep_agent db_name
```

This is an asynchronous command, so the RepAgent may not stop right away. Use sp_sho to detect when the RepAgent has finally shut down.

2 Disable the RepAgent with the command:

```
sp_config_rep_agent db_name, disable, "preserve secondary truncpt"
```

Warning! You must specify the preserve secondary truncpt parameter to prevent losing any replicated data.

3 Start the LTM using the LTM run files.

Downgrade restrictions

- To revert to an earlier software version after the site version or system version for a Replication Server has been set to the new version, you must reinstall the Replication Server.
- If you plan to downgrade in a directory other than the existing Sybase version directory, make sure that the interfaces file is accessible.

If necessary, downgrade the RSSD for each Replication Server you are downgrading. You must downgrade the RSSD using the pre-downgrade—that is, the most recent—version of rs_init.

CHAPTER 4

Using Password Encryption

This chapter explains how to use rs_init to enable password encryption for a Replication Server and change passwords in configuration files.

Overview

When you enable password encryption for a Replication Server, passwords are stored and transmitted in encrypted format. The passwords specified with create user or alter user are encrypted in the rs_users and rs_maintusers system tables in the RSSD.

When you use rs_init to administer passwords in your replication system, you can:

- Specify during installation that a Replication Server should use encryption.
- Enable encryption for a Replication Server. See “Enabling password encryption for a Replication Server” on page 64 for instructions.
- Change an encrypted password in a Replication Server configuration file. See “Altering an encrypted password for a Replication Server” on page 65 for instructions.

Note Once you have encrypted passwords using rs_init, they cannot be decrypted.

Enabling password encryption for a Replication Server

In this procedure, rs_init creates a new configuration file that contains encrypted passwords for the Replication Server. rs_init encrypts the passwords in the rs_users and rs_maintusers system tables.

❖ **Enabling password encryption**

1 In the Sybase for Windows group window, double-click the Replication Server Configuration icon. You see the RS_Init window.

2 Select Configure a Server Product, then choose Continue. You see the Configure Server Products window.

3 Select Replication Server and choose Continue. You see the Configure Replication System window.

4 Select Enable Password Encryption for a Replication Server, then choose Continue.

5 Complete the screen as follows.

   a Enter the name of the Replication Server for which you want to enable password encryption.

   b Enter the login name for the Replication Server "sa" user.

   c Enter the password for the Replication Server "sa" user.

   d Enter the full path for the Replication Server's configuration file.

6 Choose Continue to save your changes. You see:

```
Execute the Replication Server tasks now?
```

7 Select Yes to enable encryption.

   rs_init shuts down the Replication Server and encrypts the passwords in the Replication Server configuration file and in the rs_users and rs_maintusers system tables.

   When encryption is complete, rs_init displays:

```
Replication Server 'rs_name' can now be restarted.
```

8 Choose OK. rs_init displays:

```
Configuration tasks completed successfully.
```

9 Choose OK. You see the Configure Replication System dialog box.

10 Choose Exit to quit rs_init.

11 Restart the Replication Server and any connected RepAgents.

12 Delete the backup of the Replication Server configuration file.

Note The backup file contains unencrypted passwords, so you should remove that file to protect your replication system security. However, you may first want to make a hard copy or offline backup of the file and store it in a safe place.

The backup file has the same name as the Replication Server configuration file, but the extension is changed to a three-digit number such as "001." The file with the highest extension number is the most recent backup file.

Altering an encrypted password for a Replication Server

Follow the steps in this section to change an encrypted password in a Replication Server configuration file.

If password encryption is not enabled, you can use a text editor to change passwords in the configuration file.

Note The steps in this procedure:

- Do not apply to the embedded RSSD password. To change the embedded RSSD password, use the alter user command. To change the embedded RSSD maintenance user password, user the alter connection command.
- Change the password that is in the configuration file, but not the password for the login name. Before you run this procedure, change the password for the login name. For Adaptive Server login names, use the Transact-SQL® sp_password system procedure. For Replication Server login names, use the RCL alter user command.

❖ **Altering an encrypted password**

1 In the Sybase for Windows group window, double-click the Replication Server Configuration icon.

You see the RS_INIT menu.

2 Select Configure a Server Product, then select Continue.

3 Select Replication Server, then select Continue.

4 Select Alter a Replication Server Configuration File Password, then select Continue.

5 Complete the screen as follows.

   a Enter the name of the Replication Server whose configuration file you want to update.

   b Enter the login name for the Replication Server "sa" user.

   c Enter the password for the Replication Server "sa" account.

   d Enter the full path name for the Replication Server configuration file.

   e Enter the parameter for the password you want to alter. The parameters for the password are:

      - *RSSD_primary_pw_enc* – for the RSSD primary user.
      - *RSSD_maint_pw_enc* – for the RSSD maintenance user.
      - *ID_pw_enc* – for the ID Server user name.

   f Enter the new password you want to use.

6 Select Continue to save your changes. rs_init displays:

```
Execute the Replication Server tasks now?
```

7 Select Yes.

rs_init shuts down the Replication Server, then records the new password in the Replication Server configuration file. When that process is complete, rs_init displays this message:

```
Configuration completed successfully.
```

8 Choose OK. You see the Configure Replication System window.

9 Choose Exit to quit rs_init.

10 Restart the Replication Server.

CHAPTER 5

Secure Sockets Layer

This chapter discusses how to set up the Secure Sockets Layer (SSL) Advanced Security option for Replication Server.

SSL is an industry standard for sending wire- or socket-level encrypted data over secure network connections. See Chapter 7, “Managing Replication Server Security” in the *Replication Server Administration Guide* for detailed information on the SSL security option.

Setting up SSL services

Before setting up SSL services on Replication Server:

- Register the feature license in the SySAM license manager. See the *Replication Server Installation Guide* for instructions.
- Review the SSL Plus user documentation and documentation for any third-party SSL security software you are using.

❖ Setting up SSL services on Replication Server

The following steps are described in detail in the rest of this chapter.

1 Add the SSL driver to the Open Client/Server driver configuration file.

2 Modify the Open Client/Server trusted roots file to include trusted CA certificates.

3 Obtain a certificate from a trusted CA for each Replication Server accepting SSL connections.

4 Create the identity file that concatenates a certificate and its private key.

5 Use rs_init to enable SSL on Replication Server and to add an encrypted SSL password to the Replication Server configuration file.

Note You can enable and disable SSL on Replication Server using configure replication server and the use_ssl option.

6 Create an SSL entry in the Replication Server interfaces file, NT registry, or directory service.

7 Restart Replication Server.

Adding the SSL driver to the driver configuration file

Replication Server uses the *libtcl.cfg* file to map security mechanism names to security driver file names. The default location is *%SYBASE%\%SYBASE_OCS%\ini\libtcl.cfg*

SSL driver names are listed in the [FILTERS] section of *libtcl.cfg*. They have this form:

```
[FILTERS]
filter = driver
```

where:

- *filter* – specifies the local name for the security mechanism.
- *driver* – is the file name for the driver. A sample entry for SSL is:

```
[FILTERS]
ssl = libfssl.so
```

For more information about configuring *libtcl.cfg* for security drivers, see the "Configuring libtcl.cfg" in Chapter 7, "Managing Replication Server Security" in the *Replication Server Administration Guide*.

Adding trusted CA certificates to the trusted roots file

The list of known and trusted CAs is maintained in the trusted roots file:

%SYBASE%\ini\trusted.txt

The System Administrator adds and deletes CAs using a standard ASCII-text editor. The trusted roots file is similar in format to a certificate file.

By default, Replication Server recognizes these third-party CAs:

- Thawte
- Entrust
- Baltimore
- VeriSign
- RSA

Obtaining a certificate for each SSL-enabled Replication Server

The System Administrator installs server certificates and private keys for the Replication Server installation. The System Administrator can get a server certificate using third-party tools provided with an existing public-key infrastructure already in use in the customer environment. Each Replication Server acting as a server in an SSL-enabled connection must have a certificate issued by a trusted CA.

Most third-party PKI vendors have utilities to generate certificates and private keys.

If you request a certificate from a third-party vendor, and that certificate is in PKCS#12 format, use the certpk12 utility to convert the certificate into a format understood by Replication Server.

Sybase Adaptive Server provides the certreq and certauth utilities to test the certificate request tool and to verify that the authentication methods are working on your server. See Chapter 9, “Security Administration” in *Adaptive Server Enterprise System Administration Guide* for more information.

Creating an identity file

The System Administrator must create an identity file that is understood by the SSL Plus software. The identity file contains the concatenation of a certificate and its corresponding encrypted private key.

The name and default location of the identity file is the following, where *servername* is the name of the server as specified at start-up:

%SYBASE%\%SYBASE_REP%\certificates\servername.crt

To place the identity file in another location, you must specify the alternate location in the RS_ssl_identity entry in the configuration file.

To make a successful connection, the common name in the certificate must match the Replication Server name in the directory service.

Client certificates are not supported.

Adding an encrypted password to the configuration file

Use rs_init to specify an SSL password that decodes the identity file private keys. This password is stored as the RS_ssl_pw entry in the Replication Server configuration file where it need not be sent over the network.

You must use rs_init to add or change an encrypted SSL password. It is stored as RS_ssl_pw_enc in the Replication Server configuration file.

Creating SSL entries in the directory service

The Replication Server directory service—such as the interfaces file, the NT Registry, or an LDAP server—defines the server address and port numbers, and determines security protocols that are enforced for client connections. Replication Server implements the SSL protocol as a filter that is appended to master and query lines in the directory service.

All attempts to connect to a master or query entry in a directory service with an SSL filter must support the SSL protocol. For example, suppose a primary Replication Server (SYBSRV1) and a replicate Replication Server (SYBSRV2) use the Transport Layer Interface (TLI) and the SSL protocol for communication.

Replication Server can also be configured to accept SSL connections and, at the same time, have other connections that accept clear text or use security mechanisms such as DCE and Kerberos. To support both SSL and other connection protocols, you must use multiple interfaces files.

The interfaces file master line entries allow SYBSRV1 to listen for both SSL and clear-text connections. To make sure that SYBSRV1 sends queries to SYBSRV2 using SSL, there must be a single query entry in the interfaces file for SYBSRV1. To allow SYBSRV1 to send queries to other servers using a different protocol, you must use a separate interfaces file.

Enabling REP_SSL on Replication Server

You can enable REP_SSL using rs_init; you can enable or disable REP_SSL using configure replication server with the use_ssl option.

To use configure replication server, enter:

```
configure replication server
   set use_ssl to 'on'
```

Set use_ssl to "off" to disable SSL. By default, SSL is not enabled on Replication Server. When use_ssl is off, Replication Server does not accept SSL connections.

use_ssl is a static option. You must restart Replication Server after you change its value.

CHAPTER 6

Starting or Stopping a Replication Server

This chapter explains how to start and shut down a Replication Server.

Using the Services Manager

You can use the Services Manager to start and stop Replication Servers, RSM Servers, and Adaptive Servers. The Services Manager provides a visual indication of the server status.

Note Before you can use the Services Manager, you must shut down the server using isql and restart it using the Services Manager. See "Stopping a Replication Server using isql" on page 75 for instructions.

❖ **Using Services Manager to start and stop a Replication Server**

1. Select Start | Programs | Services Manager. You see the Services Manager window.
2. From the Services list box, select the type of server you want to view. The available choices depend on the Sybase products you have installed.
3. From the Server list box, select the name of the server you want to view.
4. To start the server, double-click Start/Continue, or the green light.

To shut down the server, double-click Stop, or the red light.

Note Pause, the yellow (center) light, is not currently implemented.

Starting a Replication Server

When you install a new Replication Server to your replication system, rs_init creates a runserver file in the Sybase installation directory. The runserver file is an executable script that contains the complete command line required to start a Replication Server.

The runserver file name is constructed based on the name of the server, truncated to eight characters, if necessary, and a *.bat* extension. For example, for a Replication Server named ROME_RS, the runserver file is named *run_rome.bat*.

See the *Replication Server Reference Manual* for detailed descriptions of the repserver commands.

Start-up sequence for servers

Start servers in this order:

1 Adaptive Servers

2 Replication Servers

3 RSM Servers

Note This sequence is important because of connection dependencies between the servers.

Starting servers at system boot

In a production system, you must start Adaptive Servers, Replication Servers, and LTMs whenever your machine reboots. To do this, see your System Administrator.

❖ **Configuring a new server to start at system start-up**

1 Choose Start | Settings | Control Panel.

2 From the Control Panel, double-click the Services icon.

3 From the Server list box, select the server that you want to start at system start-up.

4 Click Startup.

5 In the Server dialog box, select Automatic in the Startup Type box.

6 Choose OK.

The server you selected will start at system start-up.

Stopping a Replication Server using isql

To stop a Replication Server or RSM Server using isql:

1 Use isql to log in to the Replication Server as the System Administrator:

```
isql -Usa -Psa_password -Sservername
```

2 Enter:

```
1> shutdown
2> go
```

CHAPTER 7

Configuring the RSM Server

Before you can use Replication Server Manager (RSM) Server to manage Replication Server systems, you must configure the RSM Server for use by the Replication Server plug-in to Sybase Central, and then start the RSM Server.

Overview

This section descriptions the procedures for installing and configuring RSM.

❖ **Installing and configuring the RSM Server**

1 Verify that the *%SYBASE%\ini* directory includes a *sql.ini* file that contains an entry for each server you want RSM to manage, as well as an entry for the RSM Server. Use dsedit to create and modify interfaces files. See the *Replication Server Administration Guide* and the *Replication Server Installation Guide for Windows* for more information.

If you are installing an RSM Server for the first time, see “Setting up an RSM Server domain” on page 89.

The installation process distributes files into specific directories under the RSM installation directory according to these rules:

- If the directory does not exist, the installation process creates it.

- If existing configuration files have the same path name, the installation process overwrites the existing files.

  Note Existing files have the same path name only if you are reinstalling RSM Server. You should back up your existing files if you do not want to overwrite them.

  During an initial installation, a new component directory is created, and files are written to the new component directory. They do not overwrite the files in the existing component directory.

RSM Server also requires additional support files, such as the connectivity libraries. For a complete list of the required directories and files, see the platform-specific release bulletin.

Note If you are converting from a version of RSM earlier than 12.0, copy all configuration files from the existing configuration directory to *%SYBASE%\%SYBASE_RSM%\admin\config*.

2 Use rsmsetup to provide configuration information about directories and files. You can also use rsmsetup to create a RUN file to start an RSM Server. See “RSM Server RUN file” on page 93.

3 If you are configuring a new RSM installation, see “Configuring a new RSM Server 12.5 installation” on page 88.

4 Configure the RSM Server, and start it. See “Starting an RSM Server” on page 92.

RSM Server configuration directory and files

Table 7-1 lists the RSM configuration files in an RSM Server configuration directory. The rsmsetup utility converts all file names to uppercase. RSM Server uses these files to store the information used to manage a replication system. By default, the files reside in *%SYBASE%\%SYBASE_RSM%\admin\config*. You can specify another location for the configuration directory and files using rsmsetup. See “Using the RSM Server Setup dialog box” on page 80 for more information.

Table 7-1: RSM configuration files

File name	Contents
<*SERVERNAME*>.*EVENTS.RSM*	Paths and names of server event scripts.
<*SERVERNAME*>.*LOGFILES.RSM*	Path and name of each server error log that RSM Server monitors.
<*SERVERNAME*>.*RSM.CFG*	Configuration parameters that control how RSM Server collects information from other servers.
<*SERVERNAME*>.*SERVERS.RSM*	Names, associated login information, and other server-specific information about the servers in the domain that the RSM Server manages.
<*SERVERNAME*>.*USERS.RSM*	RSM Server login information.

Create and modify RSM configuration files using rsmgen. See "Configuring and setting up a new RSM Server" on page 79 for more information.

Configuring and setting up a new RSM Server

RSM Server requires configuration information to manage a replication system. This information is stored in a collection of files in the configuration directory at *%SYBASE%\%SYBASE_RSM%\admin\config*.

rsmsetup is a utility that you use to create a configuration definition for RSM Server and, optionally, to create a *.BAT* file that contains all the configuration settings needed to run the RSM Server you are creating. rsmsetup is located in *%SYBASE%\%SYBASE_RSM%\install*. You should always run rsmsetup, whether you are creating an RSM Server for the first time, upgrading an RSM Server, or modifying an RSM Server.

To run rsmsetup, choose Start | Programs | Sybase | RSM Server Setup, or double-click *rsmsetup.exe* in the *%SYBASE%\%SYBASE_RSM%\install* directory.

The RSM Server Setup dialog box opens.

Using the RSM Server Setup dialog box

Use the RSM Server Setup dialog box to create, modify, or delete a configuration definition for an RSM Server. The following sections describe each dialog box.

Note The following directories must exist before you run rsmsetup:

- Component directory
- Configuration directory
- Sybase directory

If they do not exist, rsmsetup does not create or modify the specified RSM Server.

RSM Server Setup dialog box fields

The fields on the RSM Server Setup dialog box are:

- **RSM Server Name** A new or existing RSM Server. Enter a new name or select a server name from the drop-down list of servers that already exist in your replication system.
- **Sybase Directory** The path used for the *SYBASE* directory. By default, this is the value of the SYBASE environment variable. If SYBASE has not been set, rsmsetup sets this field to the name of the rsmsetup parent directory.

  When you change a value, rsmsetup verifies that:

  - The RSM executable *rsmsrvr* exists in *%SYBASE%\%SYBASE_RSM%\bin*.
  - The required configuration files exist in *%SYBASE%\%SYBASE_RSM%\sample\rsm*.

  Configuration files for an RSM Server are usually in the *%SYBASE_RSM%* directory structure. Therefore, if you use rsmsetup to change the default values for the *%SYBASE_RSM%* directory, rsmsetup changes the path name of the interfaces file and the configuration directory. However, once you manually change the path and name of the interfaces file or the configuration directory, they are not automatically updated if you then change the *%SYBASE_RSM%* directory.

- **Component Directory** The path used for the RSM Server directory. By default, this value is set to the value of the %SYBASE_RSM% environment variable. This value is a relative directory path that points to a subdirectory in the Sybase directory where RSM Server is installed.
- **Interfaces File** The path and name of the interfaces file. Enter *%SYBASE%\ini\sql.ini*, which is the typical location for the interfaces file, or enter another location. Leave this field blank if you are using LDAP services. When you enter this value, rsmsetup determines whether the *sql.ini* file exists and whether it contains an entry for the RSM Server you are creating or updating.

  If the interfaces file does not contain an entry for the RSM Server, rsmsetup displays a warning message that you must add an entry for the RSM Server in the *sql.ini* file. For more information about entries in *sql.ini* files, see the *Replication Server Administration Guide* and the installation guide for your platform.
- **Batch File** The path and name of a batch (BAT) or RUN file used to start the RSM Server. Use it only to start the RSM Server at the console rather than as an NT service. See “Starting an RSM Server” on page 92 for more information about starting an NT service.

  This batch file is created by rsmsetup in the format *run_servername.bat*. By default, the path and name of the batch file is *%SYBASE%\%SYBASE_RSM%\%install\RUN_rsm_servername.bat*.

  When you change this value, rsmsetup verifies that it can create the batch file. If a batch file with the same name exists, you are prompted either to enter a new file name or to overwrite the existing file. If rsmsetup cannot create the batch file, you see an error message.
- **RSM Server Error Log** The name of the error log for the RSM Server you specified. Enter a new name, or accept the default name of *server_name.log* that appears when you create a new RSM Server name.
- **Configuration Directory** The path of the RSM Server configuration directory that contains configuration files for RSM Server. If you are configuring a new RSM Server, you can enter a new path or accept the default path of *%SYBASE%\%SYBASE_RSM%\admin\config*. This directory must already exist.

- **Parameters File** The path and name of the parameters file for the specified RSM Server. The parameters file sets the values of configuration parameters that control how the RSM Server behaves. If you do not enter a complete path, rsmsetup assumes this file resides in the specified configuration directory. If you enter a new server name (that is, the file does not exist), the software creates the file using the information you entered in the RSM Server Language, RSM Server Char Set, and RSM Server Sort Order fields. If you enter the name of an existing server, the software modifies the parameter file according to the changes you made in the RSM Server Language, RSM Server Character Set, and RSM Server Sort Order fields.
- **RSM Server Language** The language in which the RSM Server prints messages to its log. Messages are returned in the same language. The default is English. You can also specify French, German, or Japanese.
- **RSM Server Character Set** The character set used by the RSM Server. The default value is iso_1.
- **RSM Server Sort Order** The sort order used by the RSM Server. The default is binary.
- **Users File** The name of the *users* file. If you are configuring a new RSM Server, you can enter a new path or accept the default name of *server_name.users.rsm*. If you do not enter a complete path, rsmsetup assumes this file resides in the specified configuration directory.
- **Servers File** The name of the RSM Server domain file. If you are configuring a new RSM Server, you can enter a new path or accept the default name of *server_name.servers.rsm*. If you do not enter a complete path, rsmsetup assumes this file resides in the specified configuration directory.
- **Logfiles File** The name of the error log file for the RSM Server you specified. If you are configuring a new RSM Server, you can enter a new path or accept the default name of *<server_name>.logfiles.rsm*. If you do not enter a complete path, rsmsetup assumes this file resides in the specified configuration directory.
- **Events File** The name of the events file for the RSM Server you specified. If you are configuring a new RSM Server, you can enter a new path or accept the default name of *server_name.events.rsm*. If you do not enter a complete path, rsmsetup assumes this file resides in the specified configuration directory.
- **NT User Name** A valid NT login. When the RSM Server is started as an NT Service, the RSM Server uses this user name to access network files.

- **NT Password** The password for the User Name specified above.
- **Confirm NT Password** A prompt to type the NT password again for confirmation.
- **DCE Keytab File** The absolute directory path and file name of the DCE security server's keytab file. Leave this field blank if you are not using DCE external security services.
- **Status** A display of the progress of the RSM Server setup.

RSM Server Setup buttons

The buttons on the RSM Server Setup dialog box are:

- **... (browse)** Displays a directory and file selection dialog box. Use to select a path and file for the corresponding setup option.
- **Create/Modify** Creates or modifies the configuration definition for an RSM Server using the options you entered. Modify displays when you enter an existing RSM server.
- **Close** Closes the RSM Server Setup dialog box.
- **Delete** Removes the current RSM Server configuration definition and its supporting files.
- **Default** Resets the values for the configuration definition to the initial values.
- **Interfaces** Starts dsedit. Opens the dsedit window and the Select Directory Service dialog box. Use dsedit to create and modify entries in the interfaces file.
- **Help** Displays help for the RSM Server setup program.

Creating a new RSM Server

When you create a new RSM Server, rsmsetup automatically enters information for each configuration option, based on the server name you enter. rsmsetup also enters Registry information for each configuration option based on the server name you enter.

1 Double-click the RSM Setup icon in the Sybase program group. In the RSM Server Setup dialog box, rsmsetup enters information in the Sybase Directory and Configuration Directory fields.

2 Enter an RSM Server name in the RSM Server Name field. rsmsetup enters a value for each remaining field.

3 You can accept the values rsmsetup enters, or change them. To change the default value, enter new text in the field or use the browse button at the right of each field to display a directory and file selection box.

4 If you do not enter a complete path, rsmsetup assumes this file resides in the specified configuration directory.

5 Click Create. rsmsetup creates the new RSM Server. You see information about the progress of the process in the Status box.

Specifying a language with *rsmsetup*

You can specify the language using the rsmsetup command line -l flag. The valid parameters are “english,” “japanese,” “chinese,” “french,” and “korean.” If you do not specify a language on the command line, rsmsetup uses the language information the user has specified to NT.

If you are using an English-language version of Replication Server on a non-English operating system, you must specify “english” using the rsmsetup command line -l flag.

Modifying an existing RSM Server

When you modify the name of an RSM Server that has already been configured, rsmsetup automatically enters Registry information for each configuration option based on the existing server name you enter.

When you modify the name of an RSM Server that has already been configured, rsmsetup automatically enters Registry information for each configuration option based on the existing server name you enter.

Note Direct upgrades from RSM versions earlier than 11.5 are not supported.

❖ **Modifying an RSM Server**

1 Choose Start | Programs | Sybase | RSM Server Setup. The RSM Server Setup dialog box opens. rsmsetup enters information in the Sybase Directory, Interfaces File, and Configuration Directory fields.

2 Enter the name of the RSM Server you want to modify in the RSM Server Name field, or select the RSM Server from the drop-down list. rsmsetup enters a value for each remaining field.

3 You can accept or change the default values. To change the default value, enter new text in the field, or use the browse button at the right of each field to display a directory and file selection box.

4 Click Modify. A confirmation dialog box opens.

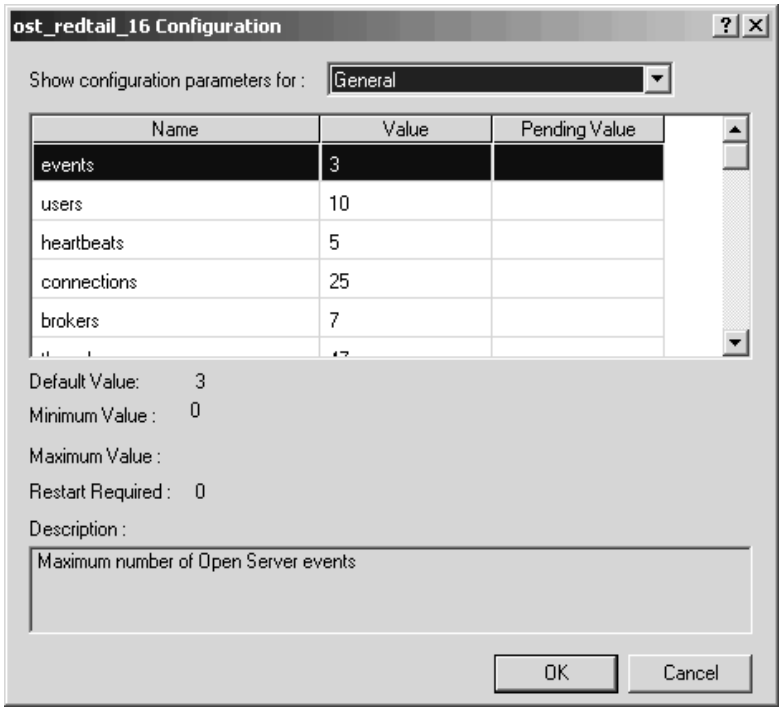
5 Select "Yes" to modify the RSM Server or "No" to return to the RSM Server Setup dialog box.

6 When you select "Yes," rsmsetup modifies the RSM Server. You see information about the progress of the process in the Status box.

Modifying parameters

You can configure RSM Server using the Server Configuration dialog box in the Replication Server plug-in to Sybase Central.

Figure 7-1: The RSM Server Configuration dialog box



The Server Configuration dialog box enables you to change the current value of a parameter. When you click OK, Sybase Central sends changes to the RSM Server.

❖ **Accessing the configuration dialog box**

1 Log in to the RSM Server from Sybase Central.

2 Right-click the RSM Server icon.

3 Select the Configure menu option.

The Server Configuration dialog box displays a list of parameters. For each parameter, the following information displays:

- The name of the parameter.
- The current value of the parameter.
- The default value of the parameter.
- A description of the parameter.

- The category to which the parameter belongs. This is used to limit the amount of parameters that display simultaneously, and to group similar parameters.
- The pending value of the parameter. This is the value to which the Current Value parameter is set when the server is restarted or when you click OK on the Server Configuration dialog box. The Pending Value field becomes empty when the Value parameter is changed.
- The minimum and maximum range to which a parameter can be set.
- Whether the server must be restarted before the new value takes effect.

Note Some pending values do not take effect until RSM Server is restarted. These values remain displayed in the Pending Value column of the Server Configuration dialog box until you restart RSM Server.

Table 7-2 lists some of the important configuration parameters, their default values, and explanations where necessary. You can set additional parameters using through the Server Configuration dialog box.

Table 7-2: Configuration parameters and default values

Parameter	Default value	Explanation
users	10	Maximum number of RSM Server users allowed.
connections	25	Maximum number of outgoing connections from the RSM Server. Sybase recommends that you use 1.5 to 2 times the number of servers managed in the domain.
brokers	7	Number of threads dedicated to pinging the managed servers. Sybase recommends that you use 0.75 to 1 times the number of servers managed in the domain.
memory	20	Maximum amount of memory (in megabytes) that the RSM Server can use.

❖ **Changing the current value of a parameter**

1. Right-click the server you want to configure.
2. Select Configure from the pop-up menu.
3. The Server Configuration dialog box opens.
4. Double-click a parameter value in the Pending Value column.
5. When the value highlights, type in the new value, or, if the values in the Pending Value are restricted, select a value from the drop-down list.
6. Click OK.

The value in the Pending Value column takes effect immediately, unless a restart of the server is required for the value to change. Once the new value takes effect, it displays in the Value column. If the value is out of bounds according to the Minimum Value or the Maximum Value, you receive an error message.

7 Restart the server to allow any new parameter values that depend on restarting the server to take effect.

If there are no errors, the current Value parameter is set when the server is restarted (or when you click OK on the Server Configuration dialog box if changing the value does not require a server restart). The Pending Value parameter field becomes empty when the current Value parameter is changed.

Deleting an RSM Server

When you delete an existing RSM Server, rsmsetup removes the configuration directory for that RSM Server and any Registry entries it made when you created that RSM Server.

❖ **Deleting an RSM Server:**

1 Choose Start | Programs | Sybase | rsmsetup.

The RSM Server Setup dialog box opens. rsmsetup enters information in the Sybase Directory, Interfaces File, and Configuration Directory fields.

2 Enter the name of the RSM Server you want to delete in the RSM Server Name field, or select the RSM Server from the drop-down list.

rsmsetup enters a value for each remaining field.

3 Click Delete.

rsmsetup deletes the configuration definition.You see information about the progress of the process in the Status box.

Configuring a new RSM Server 12.5 installation

Before you can use RSM Server and Sybase Central to manage a replication system, you must:

- Start RSM Server. See “Starting an RSM Server” on page 92.
- Connect to RSM Server from Sybase Central. See “Connecting to an RSM Server manually” in the Replication Server plug-in help.

To complete the RSM configuration, use Sybase Central wizards and dialog boxes to:

- Change the password for the “sa” user to a non-NULL password.
- Modify the RSM Server logins to control which commands Sybase Central can issue.
- In the RSM Server domain, identify the Adaptive Servers, Replication Servers, RSM Servers, Open Servers, Sybase Replication Agents, and non-Sybase data servers that the RSM Server will manage.
- Modify RSM Server properties to define how RSM Server communicates with servers and clients, including setting the maximum number of users and connections.
- Set monitoring intervals that control the collection of information about error log files, connections, routes, partitions, and queues.
- Configure remote error log monitoring if an RSM Server is to monitor remote error logs.

Setting up an RSM Server domain

Generally, Sybase recommends that you use the Sybase Central Add Server wizard to set up the Replication Server domain. However, in certain situations, you might prefer to use the following commands. For example, if you are setting domains for 30 servers, it may be easier to write a script using these commands than to use Sybase Central, so you can avoid having to issue each command to the RSM Server separately.

If you are installing an RSM Server for the first time and are using it to upgrade routes, define the RSM Server domain to include the Adaptive Servers and Replication Servers you want the specific RSM Server to manage.

- To add a Replication Server to the domain, enter:

```
repserver name createobj login pwd use security_settings
security_mechanism security_settings RSSD_Server
RSSD_database RSSD_user RSSD_user_pwd RSSD_dbo
RSSD_dbo_pwd log_file_path_name
```

- To add an Adaptive Server to the domain:

```
sqlserver name createobj login pwd
use_security_settings security_mechanism security_settings
log_file_path_name
```

where:

- *name* – is the name of the server you are adding.
- *login* – is your login name.
- *pwd* – is your password.
- *RSSD_Server* – is the name of the RSSD Server you are defining.
- *RSSD_database* – is the name of the RSSD.
- *RSSD_user* – is the login name for the RSSD.
- *RSSD_user_pwd* – is the password for the RSSD.
- *RSSD_dbo* – is the database owner for the RSSD.
- *RSSD_dbo_pwd* – is the password for the RSSD database owner.
- *log_file_path_name* – is the path name for the log file.

Be sure you have enough log space in the RSSD before you execute repserver createobj, which loads RSM stored procedures into the corresponding RSSD.

Performance recommendation

The *RSM.cfg* file includes the configuration parameter for the maximum number of outgoing RSM Server connections. This parameter limits the total number of concurrent connections the RSM Server can initiate with all other servers that it manages in its domain.

Note You can configure the maximum number of outgoing RSM Server connections through Sybase Central as well. See the Replication Server plug-in help for more information.

Configure the RSM Server so that:

- The number of connections is at least three times the number of RSM Server broker threads (also in the *RSM.cfg* file).

- The number of users is set to at least three times the number of users expected to use the RSM Server concurrently.

If an Adaptive Server with many managed databases or RSSDs has a number of inactive connections open from the RSM Server and you want to reduce this number, reduce the number of broker threads in the RSM Server; however, doing so adversely affects RSM Server performance.

Upgrading from RSM version 11.5.x

If you are upgrading your RSM Server from version 11.5.x or later to version 12.x, the conversion is done automatically at installation time. However, the directory structure for RSM 12.x is quite different from the directory structure for RSM 11.5.x. If you are upgrading from 11.5.x:

1 Copy all 11.5.x configuration files from *rep_1151\admin\config* to *%SYBASE%\%SYBASE_RSM%\admin\config*.

2 Copy the 11.5.x RUN file from *rep_1151\install* to *%SYBASE%\%SYBASE_RSM%\install*.

3 Edit the RUN file and make appropriate changes for file names and directories. See “RSM Server RUN file” on page 93 for more information.

4 Add 5MB to the log and data segments of the 11.5.x RSSD (space requirements for 12.x are higher). See the release bulletin for your platform for information about changes and new features in the current version of Replication Server.

5 Start the 12.x RSM Server from the 12.x directory structure. See “Starting an RSM Server” on page 92 for more information.

6 Add the 12.x RSM Server to the 12.x Sybase Central environment. See the installation guide for your platform for more information.

7 Upgrade the RSM stored procedures from 11.5x to 12.5. See the Replication Server plug-in help for more information.

Note Direct upgrades from RSM versions earlier than 11.5 are not supported. If you are installing RSM version 12.5 at a site that uses RSM version 11.0.x, you must upgrade first to version 11.5, then to version 12.5. See the upgrade information that came with your earlier version of RSM.

Starting an RSM Server

Before you start RSM Server, make sure that:

- The *sql.ini* file contains an entry for the RSM Server and for each server you want the RSM to manage. See the *Replication Server Installation Guide for Windows* for information about the interfaces file.
- The login you use to start RSM Server has read and write access to RSM Server configuration files.
- The login has access to an interfaces file that contains an entry for the RSM Server and an entry for each server you want the RSM to manage.
- If you are upgrading from an earlier version of RSM, you must upgrade RSM stored procedures. To upgrade stored procedures from Sybase Central, select "Upgrade RSSD Stored Procedures." See the Replication Server plug-in online help for more information.

There are three ways to start an RSM Server.

❖ **Starting RSM Server from the command line**

- To start an RSM Server, enter the RUN file name at the command line prompt:

```
%SYBASE%\%SYBASE_RSM%\install\RUN_servername
```

❖ **Starting RSM Server from the Start menu**

1. Choose Run from the Start menu.
2. Enter:

```
%SYBASE%\%SYBASE_RSM%\install\RUN_servername
```

3. Click OK.

❖ **Starting RSM Server using Administrative Tools Services**

1. Double-click the Control Panel icon.
2. In the Control Panel, double-click the Services icon.
3. In the Services window, select the RSM Server you want to start. RSM Servers are listed as the following, where *servername* is the name of the RSM Server:

```
Sybase RSMServer_servername
```

4. Click Start to start the selected RSM Server.

RSM Server RUN file

An RSM Server RUN file is used to start an RSM Server and to provide configuration information for that server.

Create the RUN file (*.BAT*) using rsmsetup. See "Using the RSM Server Setup dialog box" on page 80 for more information about using rsmsetup.

After you generate a RUN file, you can use it to start the RSM Server. See "Starting an RSM Server" on page 92 for more information.

Stopping an RSM Server

This section explains how to stop an RSM Server. When you stop an RSM Server, all Sybase Central connections and in-process commands are terminated.

There are three ways to stop an RSM Server:

- Use the Administrative Tools Services program.
- Use the isql shutdown command.
- Use the Shutdown menu item on the Sybase Central RSM Server icon.

When you stop an RSM Server, it:

- Stops managing replication system servers
- Writes the following message to the RSM Server error log:

  ```
  RSM Server rsmserver_name exiting.
  ```

- Disconnects all Sybase Central and isql sessions
- Terminates

Warning! Before you stop an RSM Server, make sure that there are no Sybase Central sessions (because of server events, latency graphs, or materializations) connected to that server. If a Sybase Central session is connected when you stop an RSM Server, requests from that session cannot be completed. See the Replication Server plug-in help for more information.

❖ **Stopping an RSM Server using Administrative Tools Services**

1 Double-click the Control Panel icon.

2 Double-click the Services icon.

3 In the Services window, select the RSM Server you want to stop.

RSM Servers are listed as the following, where *servername* is the name of the RSM Server:

```
Sybase RSMServer_servername
```

4 Click Stop to stop the selected RSM Server.

Note This sequence works only if the RSM Server was started using Administrative Tools Services.

❖ **Stopping an RSM Server using *isql***

1 Log in to RSM Server using isql:

```
isql -U<username> -P<password> -S <servername>
```

2 Shut down RSM Server.

3 At the isql prompt, enter:

```
shutdown
```

A disconnected isql session (including your session that issued the shutdown command) displays the following message:

```
DB-LIBRARY error:

   Unexpected EOF from SQL Server.
```

❖ **Stopping an RSM Server using Sybase Central**

1 Right-click the RSM Server icon in Sybase Central.

2 Select Shutdown.

CHAPTER 8

Installing and Implementing Heterogeneous Datatype Support

This chapter describes how to install and implement the heterogeneous datatype support (HDS) feature in Replication Server version 12.6.

Introduction

The heterogeneous datatype support (HDS) feature in Replication Server version 12.6 supports replication into a non-Sybase replicate database. It requires:

- Replication Server system tables (rs_lastcommit and rs_info) created in the non-Sybase database, that support Replication Server functions such as rs_get_lastcommit and rs_get_charset.
- Function strings that:
  a Replace certain language command and stored procedure invocations from the replicate Replication Server, then
  b Produce operations in the replicate database that emulate the behavior of the commands and stored procedures that would exist in a Sybase Adaptive Server Enterprise (ASE) replicate database
- Non-Sybase datatypes that do not map directly to Replication Server datatypes (or Sybase ASE datatypes), which must be translated to the appropriate datatypes for replication into the replicate database.

HDS components installed with Replication Server

The default installation of Replication Server version 12.6 includes the following HDS components:

- Function-string classes for each supported database
- Datatype classes
- Replication Server native datatype *literal descriptor* rows in the RSSD rs_datatype table
- The Replication Server datatype translation engine

See the *Replication Server Administration Guide* for a list of function-string classes and datatype classes.

HDS components installed separately

To use HDS, install the following components after installing Replication Server version 12.6:

- Datatype definitions
- Replication Server support objects in the replicate database
- Replication Server function strings
- Class-level translations for non-Sybase datatypes

Datatype definitions

Datatype definitions assign a unique datatype ID to each datatype, and describe the attributes of each non-Sybase datatype, such as delimiters, length, scale, precision, minimum and maximum values, as well as how it is represented using native Replication Server datatypes. Replication Server uses datatype definitions to:

- Identify datatypes
- Convert datatypes into native datatypes for internal handling (if necessary)
- Translate datatypes to other datatypes

Replication Server support objects

Replication Server relies on a replicate database to maintain some of the operational data that Replication Server needs to replicate to that database.

HDS accommodates the Replication Server replicate database requirements by creating two tables in the replicate database:

- rs_info – stores the character set and sort order used by the database. The Replication Server maintenance user ID must have select permission on this table.
- rs_lastcommit – is used by the replicate Replication Server to record information about the most recent replicated operations committed in the replicate database. Because this table is both read and updated by the replicate Replication Server, the Replication Server maintenance user ID must have both insert and update permission on this table.

Replication Server function strings

Function strings allow users to customize the database operations sent by the replicate Replication Server to the replicate database. HDS uses function strings to replace invocations of stored procedures and certain database commands that the replicate Replication Server sends to the replicate database.

The function strings required to support HDS are installed in the RSSD of the replicate Replication Server. Sample scripts are provided for this purpose.

Class-level translations for non-Sybase datatypes

HDS provides default datatype-to-datatype mappings, called **class-level translations**.

HDS provides a function-string class for each supported database server. The class-level translations are specific to each function-string class that supports a non-Sybase replicate database.

HDS installation overview

Install and set up HDS in Replication Server version 12.6 with the following eight steps:

1 “Installing Replication Server database support objects” on page 98

2 “Installing datatype definitions” on page 100

3 “Installing class-level translations” on page 102

4 “Installing function strings” on page 105

5 “Creating a replicate database connection” on page 107

6 “Creating replication definitions” on page 109

7 “Creating subscriptions” on page 110

8 “Marking primary tables” on page 110

Once you complete all these steps, you can begin replicating transactions to a non-Sybase replicate database.

HDS installation and setup procedure

The following sections provide detailed step-by-step procedures for installing and setting up HDS in Replication Server version 12.6.

Installing Replication Server database support objects

There are two parts to installing the Replication Server database support objects in the non-Sybase replicate database:

- Set up the replicate database gateway server (for example, DirectConnect for Informix) to properly handle Replication Server communication with the replicate database.

  Replication Server requires a database gateway to communicate with a non-Sybase replicate database. The database gateway "translates" the Sybase Open Client/Open Server protocol to ODBC or to the native communication protocol of the non-Sybase database.

- Create the Replication Server replicate database support objects in the replicate database, required to allow Replication Server to operate in a replicate database.

❖ **Configuring the replicate database gateway server to support Replication Server operations**

1 Log in to the database gateway server with a user ID with sa permission in the database gateway server.

2 For databases other than Oracle, set the value of the TransactionMode property to long to give Replication Server control over transaction commits.

  For the DirectConnect for Oracle database gateway, set the value of the autocommit property to 0 (zero) to give Replication Server control over transaction commits in Oracle.

3 Set the value of the SQLTransformation property to passthrough so that the database gateway does not perform any SQL language transformations.

4 Set the value of the TargetDecimalSeparator property to correspond with the non-Sybase database server localization settings, if needed.

❖ **Creating Replication Server database objects**

Execute a SQL script at the database gateway to create the Replication Server replicate database support objects in the replicate database. The script creates the tables in the replicate database required to support Replication Server operations.

Database object creation sample scripts are provided for each non-Sybase database supported by HDS. The following are the databases supported by HDS in Replication Server version 12.6, and the database object creation sample script for each non-Sybase database:

Database	Script
Adaptive Server Anywhere	hds_asa_setup_for_replicate.sql
DB2	hds_db2_setup_for_replicate.sql
Informix	hds_informix_setup_for_replicate.sql
Microsoft SQL Server	hds_msss_setup_for_replicate.sql
Oracle	hds_oracle_setup_for_replicate.sql
UDB	hds_udb_setup_for_replicate.sql

You must execute the appropriate script for your replicate database type.

To create the Replication Server replicate database support objects in the non-Sybase replicate database:

1 Refer to the comments in the appropriate script file for information on the permissions required for the database objects created by the script.

2 Log in to the database gateway server host, or a machine that has a network connection to the database gateway server host machine, using a user ID with adequate permission in the replicate database to create tables in that database.

Note In this procedure, isql is used as the Open Client application to access the database gateway. You can use any Open Client application to access the database gateway.

3 Use the following command at the operating system prompt to execute the database object creation script:

```
isql -Uuser -Ppw -Sservice -iscript_name
```

where:

- *user* – is the user ID with table creation permission in the replicate database.
- *pw* – is the password for the user ID.
- *service* – is the name of the database gateway service configured to communicate with the replicate database.
- *script_name* – is the name of the database object creation script file that you edited.

Installing datatype definitions

You must execute a SQL script in the RSSDs of both the primary Replication Server and the replicate Replication Server to install datatype definitions. The script inserts in the RSSD rs_datatype table datatype definitions for the replicate database datatypes.

❖ **Installing datatype definitions in the RSSD**

Sample installation scripts are provided for each non-Sybase database supported by HDS. The following databases are supported by HDS in Replication Server version 12.6, and the datatype definition installation script for each database.

Table 8-1: Datatype definition installation scripts

Database	Script
Adaptive Server Anywhere	hds_asa_udds.sql
DB2	hds_db2_udds.sql
Informix	hds_informix_udds.sql
Microsoft SQL Server	hds_msss_udds.sql
Oracle	hds_oracle_udds.sql
UDB	hds_udb_udds.sql

You must execute the appropriate script for your replicate database type.

1 Find the script you need for your replicate database, then edit the script by adding the following command line after the initial comments, where *rssd* is the name of the RSSD database:

```
use rssd
```

2 Log in to the RSSD data server or a machine with a network connection to the RSSD host machine using a user ID with owner permission in the RSSD database.

Note In this procedure, isql is used as the Open Client application to access the RSSD database. You can use any Open Client application to access the RSSD database.

3 Use the following command at the operating system prompt to execute the datatype definition installation script:

```
isql -Uuser -Ppw -Sserver -Drssd -iscript_name
```

where:

- *user* – is the user ID with owner permission in the RSSD.
- *pw* – is the password for the user ID.
- *server* – is the server name of the RSSD host machine.
- *rssd* – is the database name of the RSSD.
- *script_name* – is the name of the datatype definition installation script file that you edited.

Note You must repeat this procedure for both the primary Replication Server RSSD and the replicate Replication Server RSSD. You can also install datatype definitions in any other Replication Server RSSD in your replication system with no performance penalty.

Installing class-level translations

Class-level translations specify the datatype translations to be performed on primary database datatypes handled by the primary Replication Server (published datatypes), based on the function-string class associated with the database connection to the replicate database.

You need to run a script if the primary database is Sybase Adaptive Server Enterprise (ASE) and the replicate database is a non-Sybase database. You must run a second script if both the primary and replicate databases are non-Sybase database. This second script creates class-level translations from the non-Sybase primary datatypes to the non-Sybase replicate datatypes.

Replication Server requires the class-level translations that translate from Sybase ASE datatypes to the non-Sybase datatypes of the replicate database to process the non-Sybase datatypes correctly in the same way it processes Sybase ASE datatypes.

Each non-Sybase database supported by HDS has class-level translations defined to support that database.

To install class-level translations, execute one or more SQL scripts in the RSSD of the replicate Replication Server.

Class-level translation installation sample scripts are provided for each database supported by HDS. Table 8-2 lists the databases supported by HDS in Replication Server version 12.6 and the class-level translation installation sample script for each database.

Table 8-2: Class-level translation installation scripts

Databases	Script
Sybase ASE to Sybase ASA	hds_clt_ase_to_asa.sql
Sybase ASA to Sybase ASE	hds_clt_asa_to_ase.sql
Sybase ASA to DB2	hds_clt_asa_to_db2.sql
Sybase ASA to Informix	hds_clt_asa_to_informixsql
Sybase ASA to Microsoft SQL Server	hds_clt_asa_to_msss.sql
Sybase ASA to Oracle	hds_clt_asa_to_oracle.sql
Sybase ASA to UDB	hds_clt_asa_to_udb.sql
DB2 to Sybase ASA	hds_clt_db2_to_asa.sql
DB2 to Sybase ASE	hds_clt_db2_to_ase.sql
DB2 to Informix	hds_clt_db2_to_informix.sql
DB2 to Microsoft SQL Server	hds_clt_db2_to_msss.sql
DB2 to Oracle	hds_clt_db2_to_oracle.sql
DB2 to UDB	hds_clt_db2_to_udb.sql
Sybase ASE to Informix	hds_clt_ase_to_informix.sql
Informix to Sybase ASA	hds_clt_informix_to_asa.sql
Informix to Sybase ASE	hds_clt_informix_to_ase.sql
Informix to DB2	hds_clt_informix_to_db2.sql
Informix to Microsoft SQL Server	hds_clt_informix_to_msss.sql
Informix to Oracle	hds_clt_informix_to_oracle.sql
Informix to UDB	hds_clt_informix_to_udb.sql
Sybase ASE to Microsoft SQL Server	hds_clt_ase_to_msss.sql
Microsoft SQL Server to Sybase ASA	hds_clt_msss_to_asa.sql
Microsoft SQL Server to Sybase ASE	hds_clt_msss_to_ase.sql
Microsoft SQL Server to DB2	hds_clt_msss_to_db2.sql
Microsoft SQL Server to Informix	hds_clt_msss_to_informix.sql
Microsoft SQL Server to Oracle	hds_clt_msss_to_oracle.sql
Microsoft SQL Server to UDB	hds_clt_msss_to_udb.sql
Sybase ASE to Oracle	hds_clt_ase_to_oracle.sql
Oracle to Sybase ASA	hds_clt_oracle_to_asa.sql
Oracle to Sybase ASE	hds_clt_oracle_to_ase.sql
Oracle to DB2	hds_clt_oracle_to_db2.sql
Oracle to Informix	hds_clt_oracle_to_informix.sql
Oracle to Microsoft SQL Server	hds_clt_oracle_to_msss.sql
Oracle to UDB	hds_clt_oracle_to_udb.sql
Sybase ASE to UDB	hds_clt_ase_to_udb.sql
UDB to Sybase ASA	hds_clt_udb_to_asa.sql

Databases	Script
UDB to Sybase ASE	hds_clt_udb_to_ase.sql
UDB to DB2	hds_clt_udb_to_db2.sql
UDB to Informix	hds_clt_udb_to_informix.sql
UDB to Microsoft SQL Server	hds_clt_udb_to_msss.sql
UDB to Oracle	hds_clt_udb_to_udb.sql

Note Class-level translations are not supplied for Sybase ASE datatypes to Microsoft SQL Server datatypes (or Microsoft SQL Server datatypes to Sybase ASE datatypes) because Microsoft SQL Server datatypes are directly compatible with Sybase ASE datatypes and require no translation. The files *hds_clt_ase_to_msss.sql* and *hds_clt_msss_to_ase.sql* contain only comments to that effect.

You must execute the appropriate scripts for your primary and replicate database types.

❖ **Installing class-level translations**

1 Find the script you need for your replicate database in Table 8-2, then edit the scripts for the databases you want to use as either the primary or replicate database by adding the following command line after the initial comments and before the first line of code in the script files, where *rssd* is the name of the RSSD database:

```
use rssd
```

You must perform this step for each class-level translations installation script you need to execute for the primary and replicate database types.

2 Log in to the RSSD data server or a machine with a network connection to the RSSD host machine, using a user ID with owner permission in the RSSD database to execute the datatype definition installation script.

Note isql is used as the Open Client application to access the RSSD database in this step. You can use any Open Client application to access the RSSD database.

3 Execute each class-level translations installation script for each class-level translations installation script you need to execute for the primary and replicate database types:

```
isql -Uuser -Ppw -Sserver -Drssd -iscript_name
```

where:

- *user* – is the user ID with owner permission in the RSSD.
- *pw* – is the password for the user ID.
- *server* – is the server name of the RSSD host machine.
- *rssd* – is the database name of the RSSD.
- *script_name* – is the name of the class-level translations installation script file that you edited.

Installing function strings

To use a non-Sybase replicate database, function strings must:

1 Replace stored procedure and certain language command invocations that the replicate Replication Server normally sends to a Sybase ASE replicate database, and

2 Produce operations in the non-Sybase replicate database that emulate the behavior of the Replication Server stored procedures in a Sybase ASE replicate database.

A function-string class is defined for each supported database server; the function strings required to support the replicate database reside in the function-string class for that database. In the case of a non-Sybase database, these function strings replace the default Sybase ASE function strings that would be used by the replicate Replication Server if it were replicating into a Sybase ASE database.

You execute a SQL script in the RSSD database to install the function strings that support a non-Sybase replicate database.

❖ **Installing HDS function strings in the replicate Replication Server**

Function-string installation sample scripts are provided for each database supported by HDS. The following databases are supported by HDS in Replication Server version 12.6, and the function-string installation sample script for each database:

Database	Script
ASA	hds_asa_funcstrings.sql
DB2	hds_db2_funcstrings.sql
Informix	hds_informix_funcstrings.sql
Microsoft SQL Server	hds_msss_funcstrings.sql
Oracle	hds_oracle_funcstrings.sql
UDB	hds_udb_funcstrings.sql

Note Do not install the DB2 function strings provided with Replication Server version 12.6 if you already have a DB2 database configured as a replicate database with an earlier version of Replication Server. Instead, continue using the earlier versions with Replication Server version 12.6 and its HDS feature. The 12.6 version function strings may not be compatible with earlier versions.

You must execute the appropriate script for your replicate database type.

1 Find the function-string script you need, then edit the function-string installation sample script for the database you want to use as a replicate database by adding the following command line after the initial comments and before the first line of code in the script file, where *rssd* is the name of the RSSD database:

```
use rssd
```

2 Log in to the RSSD data server or a machine with a network connection to the RSSD host machine, using a user ID with owner permission in the RSSD database to execute the function string installation script.

Note isql is used as the Open Client application to access the RSSD database in this step. You can use any Open Client application to access the RSSD database.

3 Execute the function-string installation script with the following:

```
isql -Uuser -Ppw -Sserver -Drssd -iscript_name
```

where:

- *user* – is the user ID with owner permission in the RSSD.
- *pw* – is the password for the user ID.
- *server* – is the server name of the RSSD host machine.

- *rssd* – is the database name of the RSSD.
- *script_name* – is the name of the function string installation script file that you edited.

4 After you execute the SQL script to install the function strings, you must shut down and restart the replicate Replication Server to refresh its function-string cache.

- Log in to the replicate Replication Server with a user ID with sa permission in the Replication Server to shut down the Replication Server.
- At the isql prompt, enter:

```
shutdown
```

- After Replication Server shuts down, restart the replicate Replication Server by invoking the Replication Server executable program:

```
repsrvr
```

Creating a replicate database connection

After you have installed datatype definitions, Replication Server database objects, function strings, and class-level translations, you must create a database connection to the replicate database. Replication Server uses database connections to specify how it connects to a database and how it handles the information it sends to and receives from the database.

To create a database connection for a non-Sybase replicate database, log in to the replicate Replication Server and execute a database connection script that invokes the Replication Server create connection to command.

❖ **Creating a database connection for a non-Sybase replicate database**

Sample scripts are provided for each non-Sybase database supported by HDS. The following databases are supported by HDS in Replication Server version 12.6 and the database connection sample script for each database:

Database	Script
ASA	hds_asa_connection_sample.sql
DB2	hds_db2_connection_sample.sql
Informix	hds_informix_connection_sample.sql
Microsoft SQL Server	hds_msss_connection_sample.sql
Oracle	hds_oracle_connection_sample.sql

Database	Script
UDB	hds_udb_connection_sample.sql

Find the sample script you need in the table, then edit the database connection sample script for the database you want to use as a replicate database.

1 Modify create connection to to specify the name of the database gateway server and database name of the replicate database:

```
create connection to rbds.rdb
```

where:

- *rdbs* – is the service name of the database gateway for the replicate database.
- *rdb* – is the database name of the replicate database, in the format *service.database*.

2 Modify set username to specify the user ID of the Replication Server maintenance user for the replicate database, where *rs_maint_user* is the user ID of the Replication Server maintenance user for the replicate database:

```
set username rs_maint_user
```

3 Modify set password to specify the password of the Replication Server maintenance user for the replicate database, where *rs_maint_user_ps* is the password of the replicate Replication Server maintenance user for the replicate database:

```
set password rs_maint_user_ps
```

Note The Replication Server maintenance user ID must be granted update permission on the replicate database.

4 Modify [with log transfer on] [, dsi_suspended] to set up the database connection for the intended use of the database.

If the database is to be used as a bidirectional database (both a primary and a replicate), enable only the log transfer on option:

```
with log transfer on
```

If the database is to be used as a primary database only, enable both the log transfer on option and the dsi_suspended option:

```
with log transfer on, with dsi_suspended
```

If the database is to be used as a replicate database only, enable only the log transfer off option:

```
with log transfer off
```

5 With a user ID with sa permission in the replicate Replication Server to execute the database connection script, log in to the Replication Server host machine or a machine with a network connection to the replicate Replication Server host machine.

Note In this procedure, isql is used as the Open Client application to access the replicate Replication Server. You can use any Open Client application to access the replicate Replication Server.

6 At the operating system prompt, enter:

```
isql -Uuser -Ppw -Sserver -Drepsvr -iscript_name
```

where:

- *user* – is the user ID with sa permission in the replicate Replication Server.
- *pw* – is the password for the user ID.
- *server* – is the name of the replicate Replication Server host machine.
- *repsvr* – is the server name of the replicate Replication Server.
- *script_name* – is the name of the database connection script file that you edited.

Note After you create the Replication Server database connection to the replicate database, verify the database side of the connection by using the user ID and password you specified for the Replication Server maintenance user, and logging in to the replicate database and selecting data from tables in the database.

Creating replication definitions

No special procedure is required to create replication definitions for the primary tables when you use HDS in Replication Server version 12.6 to replicate transactions to a non-Sybase replicate database.

See Chapter 8, “Managing Replicated Tables” in the *Replication Server Administration Guide* for instructions.

Creating subscriptions

No special procedure is required to create subscriptions when you use HDS in Replication Server version 12.6 to replicate transactions to a non-Sybase replicate database.

See Chapter 8, “Managing Replicated Tables” in the *Replication Server Administration Guide* for instructions.

Marking primary tables

No special procedure is required to mark the primary tables for replication when you use HDS in Replication Server version 12.6 to replicate transactions to a non-Sybase replicate database.

See Chapter 8, “Managing Replicated Tables” in the *Replication Server Administration Guide* for instructions.

For more information about creating a subscription, see the *Adaptive Server Enterprise System Administration Guide* or the appropriate *Replication Agent Administration Guide*.

APPENDIX A

Worksheets

This appendix contains the Replication Server Installation Worksheet, and the Database Setup Worksheet.

Replication Server Installation Worksheet

Make a copy of this worksheet for each Replication Server you install. Fill out the worksheet as you read Chapter 1, “Preparing to Install and Configure Replication Server.”

Required worksheet items are marked with an asterisk (*). rs_init has default values for items that are *not* marked. To use a default value, leave the unmarked item blank and fill it in on the worksheet when you run rs_init.

Release directory

Release directory:

Replication Server information

Replication Server name:*		
Is this Replication Server the ID Server?*	Yes	No
Replication Server error log:		
Replication Server configuration file:		
Replication Server password encryption:	Yes	No
Replication Server character set:		
Replication Server language:		
Replication Server sort order:		

Replication Server security information

Enable network security?*	Yes	No
If Yes, security system:	dce	csfkrb5
If Yes, login name:		
If Yes, keytab file name:		
Use Secure Sockets Layer (SSL) security?	Yes	No
If Yes, SSL identity file:		
If Yes, SSL private key password (default is `password`):		

Replication Server interfaces information

Network driver:* ____ Windows Sockets ____ Named Pipes ____ IPX/SPX
Connection information:*

ID Server information

ID Server name:*
ID Server user:
ID Server password:
Starting Replication Server ID:
Starting database ID:

Replication Server System Database choice

Will RSSD be embedded (default is no)?	Yes	No

Embedded Replication Server System Database information

Complete if you selected Yes for "Will RSSD be embedded?"

Embedded RSSD name:*
Embedded RSSD database file directory:*
Embedded RSSD transaction log directory:*
Embedded RSSD backup directory:*
Embedded RSSD error log directory:*

Replication Server System Database information

RSSD SQL Server (Adaptive Server) name:*		
RSSD name:		
Will RSSD be replicated?*	Yes	No
Allow HA Failover for RSSD connections?	Yes	No
Create RSSD:*	Yes	No
SA user:		
SA password:*		
Primary user:		
Primary password:		
Maintenance login:		
Maintenance password:		

RSSD device information

Size of the RSSD database:		
RSSD device name:*		
Create the RSSD device:*	Yes	No
RSSD device physical name:		
RSSD device size:		
Size of the RSSD log:		
RSSD log device name:*		
Create the RSSD log device:*	Yes	No
RSSD log device physical name:		
RSSD log device size:		

Disk partition information

Disk partition path:*
Logical identifier for disk partition:*
Size of disk partition:
Start value for partition:

Remote site connections information

Replication Server login name:
Replication Server login name:
Replication Server password:

RSSD RepAgent information

Complete if you selected Yes for "Will RSSD be replicated?"

RepAgent name:
RS user:
RS password:

Database Setup Worksheet

Make a copy of this worksheet for each database you add to the replication system. Fill out the worksheet as you read Chapter 1, "Preparing to Install and Configure Replication Server." Refer to the information on the worksheet when you use rs_init to add the database to your replication system.

Required worksheet items are marked with an asterisk (*). rs_init has default values for items that are *not* marked. To use the default values, leave the unmarked items blank and fill them in on the worksheet when you run rs_init.

Replication Server information

Replication Server name:*	
RS SA user:*	
RS SA password:*	

Replication Server interfaces information

Network driver:*	____ Windows Sockets	____ Named Pipes	____ IPX/SPX
Connection information:*			

Database information

SQL Server (Adaptive Server) name:*		
SA user:		
SA password:		
Database name:		
Will the database be replicated?*	Yes	No
Maintenance user:		
Maintenance password:		
Is this a physical connection for an existing logical connection?	Yes	No

Logical connection information

Complete if you selected Yes for "Is this a physical connection for an existing logical connection?"

Is this an active connection or a standby connection?*	Active	Standby
Logical DS name:*		
Logical DB name:*		

Complete the rest of the items in this section only if you selected "Standby" in response to "Is this an active connection or standby connection?"

Active DS name:*		
Active DB name:*		
Active DB SA user:*		
Active DB SA password:*		
Initialize standby using dump and load?*	Yes	No
Use dump marker to start replicating to standby?*	Yes	No

Complete the following three sections if you selected Yes for "Will the database be replicated?"

Database RepAgent information

RepAgent name:
RS user:
RS password:

Complete the following two sections if the database can run only with an LTM (as opposed to a RepAgent).

Database Log Transfer Manager information

LTM name:*		
RS user:		
RS password:		
LTM admin user:		
LTM admin password:		
LTM error log:		
LTM configuration file:		
LTM password encryption:	Yes	No
LTM language:		
LTM character set:		
LTM sort order:		

LTM interfaces information

Network driver:* ____ Windows Sockets ____ Named Pipes ____ IPX/SPX
Connection information:*

APPENDIX B

Using *rs_init* with Resource Files

This appendix explains how to use rs_init resource files. It also lists the rs_init command line options.

Using resource file templates

Instead of using rs_init interactively, you can use a resource file to install, configure, upgrade, or downgrade a Replication Server. Resource files are text files that you can modify with any text editor that can save ASCII format files. To create a resource file, copy and edit a template file supplied with the Replication Server software. Then execute rs_init with the -r command line option, specifying the resource file that rs_init is to use for input.

Sybase supplies several resource file templates for Replication Server. Each template contains the attributes that are valid for a certain rs_init operation.

The following are the Replication Server resource file templates. The templates are located in subdirectories of the *init* subdirectory of the Sybase installation directory:

Table B-1: Resource file templates for Replication Server

Template name	Description
install.rs	Configure a new Replication Server.
setupdb.rs	Add a database to the replication system.

Template name	Description
upgr.rs	Upgrade an RSSD for a Replication Server. Use this template after installing new Replication Server software.
upgrdb.rs	Upgrade a user database that is already part of a replication system.
downgr.rs	Downgrade an RSSD for a Replication Server. Use this template before reinstalling the previous Replication Server software release.
eers.rs	Enable password encryption for a Replication Server.
eeltm.rs	Enable password encryption for an LTM.
updrscf.rs	Alter a password in a Replication Server configuration file.
updltmcf.rs	Alter a password in an LTM configuration file.

Using resource files for rs_init

This section explains how to prepare a resource file for rs_init.

❖ **Using resource files for rs_init**

1 From Table B-1, find the resource file template you want to use in.

2 Make a copy of the template you want to use and rename it to distinguish it from the original. For example:

```
copy install.rs install.rsx
```

Note You must have read and write permissions on the copy of the resource file template that you want to edit. You may need to grant write permission to yourself as the file owner.

3 Use a text editor to edit the new resource file.

For example, enter:

```
edit install.rsx
```

See “Editing a resource file” on page 119 for instructions.

4 When you have finished editing the resource file, start rs_init from the operating system prompt, using the -r flag (see Table B-2 on page 120) to specify your resource file. For example:

```
%SYBASE%\REP_12.0\install\rs_init -r install.rsx
```

Warning! If you try to start a resource file session with an input file that is not an edited copy of one of the resource file templates, rs_init fails upon validation of the input file.

Editing a resource file

Resource files list the attributes to be defined during an rs_init session and the values for these attributes. Attribute entries are in this format:

```
product_name.attribute:value
```

where:

- *product_name* – is either sybinit or rs.
- *attribute* – is an item for which you are supplying information, such as a server name or network protocol.
- *value* – is the value you want to assign to the attribute.

Resource file entries can be only one line long (80 characters).

rs_init does not recognize end-of-line characters, carriage returns, or backslashes.

rs_init ignores blank lines and lines that begin with a pound sign (#).

If you do not enter a valid value for every required attribute, rs_init returns an error when you try to use the resource file.

If a Sybase-defined default value exists for an attribute, you can specify the default with the special value USE_DEFAULT.

Certain resource file attributes can take lists of values. Attributes that can accept lists of values end with "_list." Use commas to separate values. For example:

```
rs.rs_rs_network_protocol_list:tcp,ipx
```

If you use a resource file to upgrade or modify a Replication Server, you can use the UNCHANGED value to indicate that a particular attribute should remain unchanged.

You cannot use the USE_DEFAULT or the UNCHANGED value for required attributes with a null default value, except for attributes that specify passwords. If you enter USE_DEFAULT or UNCHANGED for attributes that specify passwords, rs_init uses a NULL password.

Using rs_init command line options

After you have edited your resource file, start rs_init from the operating system prompt:

```
rs_init resource_file_name [-option] [parameter]
```

where:

- *option* – is the letter specifying a command line option.
- *parameter* – is any valid parameter for that option.

You can specify more than one command line option. For a resource file session, you must specify the -r option and the resource file name. Table B-2 lists the available options for a resource file. You can also use some of these options in an interactive rs_init session.

Table B-2: rs_init command line options

Flags	Parameters	Explanation
-a	n/a	Validates the resource file and exits without performing the configuration task. Without the -a flag, rs_init validates the resource file and continues the product configuration. You must use the -r flag with the -a flag.
-c	See "Replication Server information" on page 7 for a list of character sets.	Specifies the character set used for all messages and prompts. The -c flag forces rs_init to use a particular character set. Otherwise, rs_init uses your system's default character set.
-e	n/a	Records information about the user's environment and exits. Information is written to the log file. Without the -e flag, rs_init records user environment information and continues the product configuration.
-h	n/a	Prints out usage message (help) and exits.

Flags	Parameters	Explanation
-l	French, German, Japanese, Portuguese, Spanish, Chinese, Korean	Specifies the language used for all messages and prompts. The -l flag forces rs_init to use a particular language. Without this option, rs_init uses U.S. English.
-log	Path and file name of log file	Lets the user specify location of the session log file. Without the -log flag, rs_init uses the default log location (*%SYBASE$\init\log*).
-r	Path and file name of resource file	Specifies that rs_init is to take input from the listed resource file. Use this flag in noninteractive sessions to configure new server products, upgrade existing server products, or modify existing server products.
-s	Path of Sybase release directory	Specifies the Sybase release directory. If you do not use the -s flag, rs_init assumes that the Sybase release directory is the current directory.
-T IGNORE_WARNINGS	n/a	Entering certain values for some attributes causes rs_init to exit with a warning. (rs_init exits, for instance, if you specify an operating system file for the location of the master device.) Invoking an rs_init resource file session with the -T IGNORE_WARNINGS flag allows the rs_init session to continue.
-v	n/a	Prints the rs_init version string and exits.

Sample Replication Server resource file

This section contains a sample resource file for enabling password encryption for a Replication Server. Your resource file will have different values for many of the attributes, but will otherwise be similar to the sample.

```
############################################################
#                   RESOURCE TEMPLATE
#
# This file contains a list of configuration attributes
# for Sybase Replication Server. This is the template for
# configuring a new Replication Server. DO NOT EDIT THIS FILE.
# Copy the template to another file and edit that.
#
# Syntax of the resource file is:
#
#         product_name.attribute:value
#
# Attributes with a value of USE_DEFAULT will use the Sybase
```

```
# defaults for this platform.
#
# NOTES:
#   Generic attributes are prefaced by "sybinit." The
#   only generic attributes are "release_directory" and "product."
#
############################################################


############################################################
#         RELEASE LOCATION
#
sybinit.release_directory: c:\sybase
# The product that you wish to configure.  Possible values are:
#         rs
#
sybinit.product: rs


#################################################################
# REPLICATION SERVER ATTRIBUTES
#

# This operation installs a new Replication Server.
rs.rs_operation: rs_install


#################################################################
# ID SERVER INFORMATION
#
# Name of the ID Server
rs.rs_idserver_name: IDRS

# Is the ID Server the same as the Replication Server that is being
# installed ? Default is no
rs.rs_id_server_is_rs_server: yes

# Login that other Replication Servers will use to connect with
# the ID Server. Default is <rs_idserver_name>_id_user.
rs.rs_idserver_user: USE_DEFAULT

# Password for the ID Server user. Default is <rs_idserver_name>_id_passwd
rs.rs_idserver_pass: USE_DEFAULT

# The next two attributes should be set only when installing an ID Server
# and there are multiple ID Server domains
```

```
# First ID used for Replication Servers in this ID Server domain
rs.rs_start_rs_id: USE_DEFAULT

# First ID used for databases in this ID Server domain
rs.rs_start_db_id: USE_DEFAULT

############################################################
# REPLICATION SERVER INFORMATION
#

# Replication Server name
rs.rs_name: NYRS

# Will the Replication Server manage databases with primary data,
# submit asynchronous transactions, or serve as an intermediate
# site in an indirect route ? Default is no
rs.rs_requires_ltm: no

# Will the Replication Server(11.0 or higher) manage databases with
# primary data, submit asynchronous transactions, or serve as an
# intermediate site in an indirect route ? Default is yes
rs.rs_needs_repagent: yes

# Locations of the errorlog and config file for the Replication Server.
# The default names of these files are <rs_name>.log and <rs_name>.cfg
# respectively.
# The default directory in which these files are located is the current
# working directory on Unix platforms, and in %SYBASE%\install on PC platforms.
rs.rs_rs_errorlog: USE_DEFAULT
rs.rs_rs_cfg_file: USE_DEFAULT

# Character set to be used by this Replication Server (and the RSSD LTM
# if needed)
rs.rs_charset: USE_DEFAULT

# Language to be used by this Replication Server (and the RSSD LTM if needed)
rs.rs_language: USE_DEFAULT

# Sort order to be used by this Replication Server (and the RSSD LTM if needed)
rs.rs_sortorder: USE_DEFAULT

############################################################
# REPLICATION SERVER SYSTEM DATABASE CHOICE
#
```

```
# Is this an embedded rssd
rs.rs_rssd_embedded: no

#################################################################
# EMBEDDED REPLICATION SERVER SYSTEM DATABASE INFORMATION
# The following only applies if embedded RSSD is chosen
#

# erssd name
rs.rs_erssd_name: rep_erssd

# embedded rssd database directory
rs.rs_erssd_database_dir: /database

# embedded rssd transaction log directory
rs.rs_erssd_translog_dir: /translog

# embedded rssd backup directory
rs.rs_erssd_backup_dir: /backup

# embedded rssd error log directory
rs.rs_erssd_errorlog_dir: /errorlog

#################################################################
# REPLICATION SERVER SYSTEM DATABASE INFORMATION
# The following only applies if embedded RSSD is not chosen

# Name of the SQL Server that will manage the Replication Server's
# system database.
rs.rs_rssd_sqlsrvr: NYDS

# Name of the database where the Replication Server system tables
# will be stored. Default is <rs_name>_RSSD
rs.rs_rssd_db: USE_DEFAULT

# Do you want the RSSD connections to allow HA failover? Default is no
rs.rs_rssd_ha_failover: no

# Do you want rs_init to create the system database ? Default is no
rs.rs_create_rssd: no

# sa login for the system SQL Server - default is sa
rs.rs_rssd_sa_login: USE_DEFAULT

# sa password for the system SQL Server - default is NULL
rs.rs_rssd_sa_pass:
```

```
# Name of the RSSD primary user. Default is <rs_rssd_db>_prim
rs.rs_rssd_prim_user: USE_DEFAULT

# Password for the RSSD primary user. Default is <rs_rssd_db>_prim_ps
rs.rs_rssd_prim_pass: USE_DEFAULT

# Name of the RSSD maintenance user. Default is <rs_rssd_db>_maint
rs.rs_rssd_maint_user: USE_DEFAULT

# Password for the RSSD maintenance user. Default is <rs_rssd_db>_maint_ps
rs.rs_rssd_maint_pass: USE_DEFAULT

# The dbo_user and dbo_password attributes are not used by default. They
# should be used only if the RSSD requires an LTM and the log should be
# scanned by someone other than rs_rssd_sa_login. This user should already
# exist in the database.

# Name of the Database Owner for the RSSD
rs.rs_rssd_dbo_user: USE_DEFAULT

# Password for the database owner
rs.rs_rssd_dbo_pass: USE_DEFAULT

################################################################
# REPLICATION SERVER SYSTEM DATABASE DEVICE INFORMAITON
# The following only applies if embedded RSSD is not chosen
# (USED ONLY IF RS_INIT IS TO CREATE THE RSSD)

# Size of the system database in MB. Default and minimum is 10
rs.rs_rsdddb_size: 10

# Size of the log for the system databas in MB. Default and minimum is 10
rs.rs_rssd_log_size:10

# Name of the device on which the system database is to be created
# Default is master
rs.rs_rssd_db_device_name: dbdev

# Do you want rs_init to create this device for the system database ?
# Default is no
rs.rs_create_rssd_database_dev: no

# Physical pathname of the device for the system database
rs.rs_rssd_db_device_path: /work/dev1
```

```
# Size of the device for the system database
rs.rs_rssddb_device_size: 10

# Name of the device on which the log for the system database is to
# be created
rs.rs_rssd_log_device_name: logdev

# Do you want rs_init to create this device for the log for the system
# database ? Default is no
rs.rs_create_rssd_log_dev: no

# Physical pathname of the device for the log for the system database
rs.rs_rssd_log_device_path: /work/dev2

# Size of the device for the log for the system database
rs.rs_rssd_log_device_size:10


################################################################
# DISK PARTITION INFORMATION
#

# Full path name of a raw disk partition for the Replication Server
rs.rs_diskp_name: /work/dev3

# Logical identifier name for the raw disk partition for the Replication
# Server
rs.rs_diskp_lname: part1

# Size, in megabytes, of the raw disk partition.Default is 20.
rs.rs_diskp_size: 20

# The offset, in megabytes, at which the Replication Server should begin
# writing in the raw disk partition. Default is 0
rs.rs_diskp_vstart: 0

################################################################
# REMOTE SITE CONNECTION INFORMATION
#

# Replication Server login name that other Replication Servers
# will use to connect with this Replication Server
# Default is <rs_name>_rsi
rs.rs_rs_user: USE_DEFAULT

# Password for the Replication Server login name
```

```
# Default is <rs_name>_rsi_ps
rs.rs_rs_pass: USE_DEFAULT

################################################################
# SYSTEM DATABASE LOG TRANSFER MANAGER INFORMATION
# (IF RSSD NEEDS LTM)

# Name of the RSSD LTM. Default is <rs_rssd_sqlsrvr>_<rs_name>_RSSD_ltm.
rs.ltm_name: NY_LTM

# Replication Server login name that the log transfer manager
# will use when connecting to the Replication Server
# Default is <rs_name>_ltm
rs.rs_ltm_rs_user: USE_DEFAULT

# Password for the login name for the log transfer manager
# Default is <rs_name>_ltm_ps
rs.rs_ltm_rs_pass: USE_DEFAULT

# Login name for the user who will start and shutdown the log
# transfer manager for the Replication Server system database
# Default is sa
rs.rs_ltm_admin_user: USE_DEFAULT

# Password for the admin user - default is NULL
rs.rs_ltm_admin_pass: USE_DEFAULT

################################################################
# ID SERVER INTERFACES INFORMATION
# These attributes are valid only for Unix platforms. On PC platforms,
# adding interface file entries through resource files is not supported.
# rs.do_add_id_server must be no on these platforms.
#

# Add ID Server to interfaces file? Default is no
rs.do_add_id_server: USE_DEFAULT

# Connect retry count; number of times client tries to connect
# to ID Server before giving up
rs.rs_id_server_connect_retry_count: USE_DEFAULT

# Connect retry delay time (in seconds); amount of time client
# waits between each connection attempt
rs.rs_id_server_connect_retry_delay_time: USE_DEFAULT

# Notes associated with ID Server interfaces file entry
```

```
rs.rs_id_server_notes: Default Sybase Configuration

# Protocol for ID Server network listener
rs.rs_id_server_network_protocol_list: tcp

# Name of host for ID Server
rs.rs_idserver_hostname: herbie

# Port numbers for network listener
rs.rs_idserver_port: 5002

################################################################
# REPLICATION SERVER INTERFACES INFORMATION
# These attributes are valid only for Unix platforms. On PC platforms,
# adding interface file entries through resource files is not supported.
# rs.do_add_replication_server must be no on these platforms.
#

# Add Replication Server to interfaces file?
rs.do_add_replication_server: no

# Connect retry count; number of times client tries to connect
# to Replication Server before giving up
rs.rs_rs_connect_retry_count: USE_DEFAULT

# Connect retry delay time (in seconds); amount of time client
# waits between each connection attempt
rs.rs_rs_connect_retry_delay_time: USE_DEFAULT

# Notes associated with Replication Server interfaces file entry
rs.rs_rs_notes: Default Sybase Configuration

# Protocol for Replication Server network listener
rs.rs_rs_network_protocol_list: tcp

# Name of host for Replication Server
rs.rs_rs_hostname:  herbie

# Port numbers for network listener
rs.rs_rs_port: 5005

################################################################
# LOG TRANSFER MANAGER INTERFACES INFORMATION - IF RSSD HAS LTM
# These attributes are valid only for Unix platforms. On PC platforms,
# adding interface file entries through resource files is not supported.
# rs.do_add_ltm must be no on these platforms.
```

```
# Add Log Transfer Manager to interfaces file?
rs.do_add_ltm: no

# Connect retry count; number of times client tries to connect
# to Log Transfer Manager before giving up
rs.rs_ltm_connect_retry_count: USE_DEFAULT

# Connect retry delay time (in seconds); amount of time client
# waits between each connection attempt
rs.rs_ltm_connect_retry_delay_time: USE_DEFAULT

# Notes associated with Log Transfer Manager interfaces file entry
rs.rs_ltm_notes: Default Sybase Configuration

# Protocol for Log Transfer Manager network listener
rs.rs_ltm_network_protocol_list: tcp

# Name of host for Log Transfer Manager
rs.rs_ltm_hostname:  herbie

# Port numbers for network listener
rs.rs_ltm_port: 5000

#################################################################
# REPLICATION SERVER SECURITY INFORMATION
# These attriibutes apply to the security features available
# for the replication server. This option is only available
# on Solaris and NT.

# Enable external network security
rs.rs_network_security_enable: no

# Type of network security for the Replication Server, choices
# are "dce" or "csfkrb5",
rs.rs_network_security_system: USE_DEFAULT

# Login name for the user who will principle user, this
# login name will be used for all secure connections, Sybase
# recommends the name of the Replication Server as the
# principle user name.
rs.rs_principal_user_name: USE_DEFAULT

# Full path to the location of keytab file
rs.rs_keytab_file: USE_DEFAULT
```

```
# Use Secure Socket Layer(ssl) security
rs.rs_use_ssl: no

# Full path to the location of the ssl identity file
rs.rs_ssl_identity_file: USE_DEFAULT

# Password for the ssl private key
rs.rs_ssl_pkey_password: USE_DEFAULT

# end of resource file
```

APPENDIX C

Sample Replication System

This appendix describes a sample replication system and the steps needed to set it up.

The replication system replicates the changes made to two tables in the pubs2 database from one Adaptive Server to another Adaptive Server.

You can set up this example as an introduction to using Replication Server or to test your replication system installation.

Note The application architecture for this example is similar to the decision-support model described in the *Replication Server Design Guide*.

Description of the Sample replication system

The goal of this replication system is to replicate all changes made to the authors and titles tables in the pubs2 database in one Adaptive Server to the same tables in the pubs2 database in another Adaptive Server.

The replication system has two Adaptive Servers:

- A primary Adaptive Server, named TOKYO_DS in the example, holds the RSSD for the primary Replication Server and the primary pubs2 database.
- The replicate Adaptive Server, named SYDNEY_DS in the example, holds the RSSD for the replicate Replication Server and the replicate pubs2 database.

The replication system has two Replication Servers:

- A primary Replication Server, named TOKYO_RS, manages the primary pubs2 database.
- A replicate Replication Server, named SYDNEY_RS, manages the replicate pubs2 database.

The replication system has two RepAgents:

- A RepAgent for the primary RSSD runs in the ASE TOKYO_RSSD and transfers the RSSD log to the primary Replication Server.
- A RepAgent for the primary pubs2 database runs in the ASE TOKYO_PUBS2 and transfers the pubs2 log to the primary Replication Server.

Setting up the example

This section outlines the tasks for setting up the replication system.

- "General setup tasks" on page 132 explains how to install the servers and databases used in the example. These instructions may refer you to other chapters in this guide, or to other books.
- "Establishing replication" on page 134 explains how to set up replication between the pubs2 databases in the two Adaptive Servers.

❖ General setup tasks

If you already have Adaptive Servers or Replication Servers installed, you can use them for the example. Substitute the names of your servers throughout the instructions.

You must choose the machines where each server will execute. You must also locate disk space for Adaptive Server database devices and Replication Server partitions.

1 Install the primary Adaptive Server, TOKYO_DS.

   - The Adaptive Server must have room on its database devices for a 2MB pubs2 database, a 10MB RSSD, and at least 10MB for logs.

2 Install the replicate Adaptive Server, SYDNEY_DS.

   - The Adaptive Server must have room on its database devices for a 2MB pubs2 database, a 10MB RSSD, and at least 10MB for logs.

3 Install the pubs2 database in the primary Adaptive Server:

```
isql -Usa -Psa_passwd -STOKYO_DS < \
      %SYBASE%\%SYBASE_REP%\scripts\installpubs2
```

4 Install the pubs2 database in the replicate Adaptive Server:

```
isql -Usa -Psa_passwd -SSYDNEY_DS < \
      %SYBASE%\%SYBASE_REP%\scripts\installpubs2
```

5 Complete Appendix A, "Worksheets" for the primary Replication Server (TOKYO_RS).

- Create the RSSD for TOKYO_RS in the TOKYO_DS Adaptive Server.
- The RSSD requires a RepAgent.

6 Complete Appendix A, "Worksheets" for the replicate Replication Server (SYDNEY_RS).

- Create the RSSD for SYDNEY_RS in the SYDNEY_DS Adaptive Server.
- The RSSD does not require a RepAgent.

7 Complete "Database Setup Worksheet" on page 115 for the primary pubs2 database.

- The database is in Adaptive Server TOKYO_DS.
- The database is managed by the TOKYO_RS Replication Server.
- The database requires a RepAgent.

8 Complete "Database Setup Worksheet" on page 115 for the replicate pubs2 database.

- The database is in Adaptive Server SYDNEY_DS.
- The database is managed by the SYDNEY_RS Replication Server.
- The database does not require a RepAgent.

9 Log in to the machine where the primary Replication Server will execute. Run rs_init and install Replication Server TOKYO_RS using the worksheet you completed in step 5.

10 Log in to the machine where you installed the primary Replication Server. Run rs_init and add the primary pubs2 database to the replication system using the worksheet you completed in step 7.

11 Log in to the machine where the replicate Replication Server will execute. Run rs_init and install Replication Server SYDNEY_RS using the worksheet you completed in step 6.

12 Log in to the machine where you installed the replicate Replication Server. Run rs_init and add the replicate pubs2 database to the replication system using the worksheet you completed in step 8.

❖ **Establishing replication**

To create a route from the primary Replication Server to the replicate Replication Server:

1 Log in to the primary Replication Server as "sa":

```
isql -Usa -STOKYO_RS
```

2 Enter the create route command:

```
create route to SYDNEY_RS
   set username SYDNEY_RS_rsi
   set password SYDNEY_RS_rsi_ps
go
```

Note Find the user name and password for the create route command in the "Remote Site Connections" section of the Replication Server Installation Worksheet for the replicate Replication Server.

3 Create a login account in the primary Adaptive Server for the user who will create the replication definitions and subscriptions. In this example, the login name is "repsys." Add the user to the pubs2 databases and grant the user select permissions for the tables to replicate.

```
isql -Usa -STOKYO_DS
      sp_addlogin repsys, repsys_ps
      go

      use pubs2
      go

      sp_adduser repsys
      go

      grant select on authors to repsys
      grant select on titles to repsys
      go
      quit
```

4 Add the “repsys” user to the two Replication Servers and grant create object permission to the user. The “repsys” user must have the same login name and password in the two Replication Servers and the primary Adaptive Server:

```
isql -Usa -STOKYO_RS
      create user repsys
      set password repsys_ps
      go

      grant create object to repsys
      go
      quit

isql -Usa -SSYDNEY_RS
      create user repsys
      set password repsys_ps
      go

      grant create object to repsys
      go
      quit
```

5 Create replication definitions for the authors and titles tables:

```
isql -Urepsys -Prepsys_ps -STOKYO_RS
      create replication definition authors
      with primary at TOKYO_DS.pubs2
      with all tables named 'authors'
       (
          au_id varchar(11),
          au_lname varchar(40),
          au_fname varchar(20),
          phone char(12),
          address varchar(40),
          city varchar(20),
          state char(2),
          country varchar(12),
          postalcode char(10)
       )
      primary key (au_id)
      searchable columns (state, postalcode)
      go

      create replication definition titles
      with primary at TOKYO_DS.pubs2
      with all tables named 'titles'
```

```
(
   title_id varchar(6),
   title varchar(80),
   type char(12),
   pub_id char(4),
   price money,
   advance money,
   total_sales int,
   notes varchar(200),
   pubdate datetime,
   contract bit
)
primary key (title_id)
searchable columns (type, pub_id)
go
```

6 Set replication to "on" for the authors and titles tables in the primary pubs2 database:

```
isql -Usa -STOKYO_DS
      use pubs2
      go

      sp_setreptable authors, true
      go

      sp_setreptable titles, true
      go
```

7 In the replicate pubs2 database, grant permissions on the authors and titles tables to the maintenance user:

```
isql -Usa -SSYDNEY_DS

      use pubs2
      go

      grant select, insert, delete, update
      on authors to pubs2_maint
      grant select, insert, delete, update
      on titles to pubs2_maint
      go
```

Note You can find the maintenance user in the "Database information" section of the Database Setup Worksheet you completed for the replicate pubs2 database.

8 In the replicate Replication Server, create subscriptions for the authors and titles tables:

```
isql -Urepsys -Prepsys_ps -SSYDNEY_RS

      create subscription authors_sub
      for authors
      with replicate at SYDNEY_DS.pubs2
      without materialization
      go

      create subscription titles_sub
      for titles
      with replicate at SYDNEY_DS.pubs2
      without materialization
      go
```

Note Since data is already at the replicate database, this example uses the create subscription without materialization option. For other methods, see Chapter 3, Replication Server Commands, in the *Replication Server Reference Manual*.

Testing and troubleshooting the replication system

Replication should now be established for the authors and titles tables. Here are some ways to test and troubleshoot the replication system:

- Log in to the replicate pubs2 database and select the data from the titles and authors tables. If the rows exist in the tables, the subscriptions were created and materialized successfully.
- If rows are not appearing in the replicate tables, execute the check subscription command in each of the Replication Servers:

  ```
  check subscription authors_sub
     for authors
     with replicate at SYDNEY_DS.pubs2
  ```

  The check subscription command reports the status of the subscription. If the status is not “valid” in both the primary and replicate Replication Servers, then either the subscription has not finished materializing or an error has occurred.

The authors and titles tables are very small. If there are no configuration problems, they should not take more than a few seconds to materialize. If you do not see the results quickly, you can assume that an error has occurred.

- Log in to the primary pubs2 database and execute some insert, update, and delete SQL commands against the authors and titles tables. Then log in to the replicate pubs2 database and verify that your modifications appear in the replicate tables. If rows are not appearing in the replicate tables, execute the check subscription command in each of the Replication Servers.
- Check the error logs for the primary and replicate Replication Servers for error messages. The most common problems are:
  - Failure to log in to the primary Adaptive Server. The user who creates the subscription in the replicate Replication Server must have the same login name and password in the primary Adaptive Server and the primary Replication Server.
  - Missing permissions in the primary database. The user who creates the subscription must be a user in the primary database and must have select permission in the primary table.
  - Missing permissions in the replicate database. The maintenance user must have select, insert, update, and delete permissions on the tables in the replicate database.
  - A Replication Server or Adaptive Server has stopped running. Try logging in to each of the servers. Restart any servers that are not running.

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