

SYBASE®

What's New

Replication Server®

15.0.1

DOCUMENT ID: DC36431-01-1501-01

LAST REVISED: February 2007

Copyright © 1992-2007 by Sybase, Inc. All rights reserved.

This publication pertains to Sybase software and to any subsequent release until otherwise indicated in new editions or technical notes. Information in this document is subject to change without notice. The software described herein is furnished under a license agreement, and it may be used or copied only in accordance with the terms of that agreement.

To order additional documents, U.S. and Canadian customers should call Customer Fulfillment at (800) 685-8225, fax (617) 229-9845.

Customers in other countries with a U.S. license agreement may contact Customer Fulfillment via the above fax number. All other international customers should contact their Sybase subsidiary or local distributor. Upgrades are provided only at regularly scheduled software release dates. No part of this publication may be reproduced, transmitted, or translated in any form or by any means, electronic, mechanical, manual, optical, or otherwise, without the prior written permission of Sybase, Inc.

Sybase, SYBASE (logo), ADA Workbench, Adaptable Windowing Environment, Adaptive Component Architecture, Adaptive Server, Adaptive Server Anywhere, Adaptive Server Enterprise, Adaptive Server Enterprise Monitor, Adaptive Server Enterprise Replication, Adaptive Server Everywhere, Advantage Database Server, Afaia, Answers Anywhere, Applied Meta, Applied Metacomputing, AppModeler, APT Workbench, APT-Build, APT-Edit, APT-Execute, APT-Translator, APT-Library, ASEP, Avaki, Avaki (Arrow Design), Avaki Data Grid, AvantGo, Backup Server, BayCam, Beyond Connected, Bit-Wise, BizTracker, Certified PowerBuilder Developer, Certified SYBASE Professional, Certified SYBASE Professional Logo, ClearConnect, Client-Library, Client Services, CodeBank, Column Design, ComponentPack, Connection Manager, Convoy/DM, Copernicus, CSP, Data Pipeline, Data Workbench, DataArchitect, Database Analyzer, DataExpress, DataServer, DataWindow, DataWindow .NET, DB-Library, dbQueue, Dejima, Dejima Direct, Developers Workbench, DirectConnect Anywhere, DirectConnect, Distribution Director, Dynamic Mobility Model, e-ADK, E-Anywhere, e-Biz Integrator, E-Whatever, EC Gateway, ECMAP, ECRTP, eFulfillment Accelerator, EII Plus, Electronic Case Management, Embedded SQL, EMS, Enterprise Application Studio, Enterprise Client/Server, Enterprise Connect, Enterprise Data Studio, Enterprise Manager, Enterprise Portal (logo), Enterprise SQL Server Manager, Enterprise Work Architecture, Enterprise Work Designer, Enterprise Work Modeler, eProcurement Accelerator, eremote, Everything Works Better When Everything Works Together, EWA, ExtendedAssist, Extended Systems, ExtendedView, Financial Fusion, Financial Fusion (and design), Financial Fusion Server, Formula One, Fusion Powered e-Finance, Fusion Powered Financial Destinations, Fusion Powered STP, Gateway Manager, GeoPoint, GlobalFIX, iAnywhere, iAnywhere Solutions, ImpactNow, Industry Warehouse Studio, InfoMaker, Information Anywhere, Information Anywhere Suite, Information Everywhere, InformationConnect, InstaHelp, Intelligent Self-Care, InternetBuilder, iremote, iScript, Jaguar CTS, jConnect for JDBC, KnowledgeBase, Legion, Logical Memory Manager, Irlite, M2M Anywhere, Mach Desktop, Mail Anywhere Studio, Mainframe Connect, Maintenance Express, Manage Anywhere Studio, MAP, M-Business Anywhere, M-Business Channel, M-Business Network, M-Business Suite, MDI Access Server, MDI Database Gateway, media.splash, Message Anywhere Server, MetaWorks, MethodSet, mFolio, Mirror Activator, ML Query, MobiCATS, MobileQ, MySupport, Net-Gateway, Net-Library, New Era of Networks, Next Generation Learning, Next Generation Learning Studio, O DEVICE, OASiS, OASiS logo, ObjectConnect, ObjectCycle, OmniConnect, OmniQ, OmniSQL Access Module, OmniSQL Toolkit, OneBridge, Open Biz, Open Business Interchange, Open Client, Open ClientConnect, Open Client/Server, Open Client/Server Interfaces, Open Gateway, Open Server, Open ServerConnect, Open Solutions, Optima++, Partnerships that Work, PB-Gen, PC APT Execute, PC DB-Net, PC Net Library, Pharma Anywhere, PhysicalArchitect, Pocket PowerBuilder, PocketBuilder, Power++, Power Through Knowledge, power.stop, PowerAMC, PowerBuilder, PowerBuilder Foundation Class Library, PowerDesigner, PowerDimensions, PowerDynamo, Powering the New Economy, PowerScript, PowerSite, PowerSocket, Powersoft, PowerStage, PowerStudio, PowerTips, Powersoft Portfolio, Powersoft Professional, PowerWare Desktop, PowerWare Enterprise, ProcessAnalyst, Pylon, Pylon Anywhere, Pylon Application Server, Pylon Conduit, Pylon PIM Server, Pylon Pro, QAnywhere, Rapport, Relational Beans, RemoteWare, RepConnector, Report Workbench, Report-Execute, Replication Agent, Replication Driver, Replication Server, Replication Server Manager, Replication Toolkit, Resource Manager, RFID Anywhere, RW-DisplayLib, RW-Library, SAFE, SAFE/PRO, Sales Anywhere, Search Anywhere, SDF, Search Anywhere, Secure SQL Server, Secure SQL Toolset, Security Guardian, ShareLink, ShareSpool, SKILLS, smart.partners, smart.parts, smart.script, SOA Anywhere Trademark, SQL Advantage, SQL Anywhere, SQL Anywhere Studio, SQL Code Checker, SQL Debug, SQL Edit, SQL Edit/TPU, SQL Everywhere, SQL Modeler, SQL Remote, SQL Server, SQL Server Manager, SQL SMART, SQL Toolset, SQL Server/CFT, SQL Server/DBM, SQL Server SNMP SubAgent, SQL Station, SQLJ, Stage III Engineering, Startup.Com, STEP, SupportNow, S.W.I.E.T. Message Format Libraries, Sybase Central, Sybase Client/Server Interfaces, Sybase Development Framework, Sybase Financial Server, Sybase Gateways, Sybase Learning Connection, Sybase MPP, Sybase SQL Desktop, Sybase SQL Lifecycle, Sybase SQL Workgroup, Sybase Synergy Program, Sybase Virtual Server Architecture, Sybase User Workbench, SybaseWare, Syber Financial, SyberAssist, SybFlex, SybMD, SyBooks, System 10, System 11, System XI (logo), SystemTools, Tabular Data Stream, The Enterprise Client/Server Company, The Extensible Software Platform, The Future Is Wide Open, The Learning Connection, The Model For Client/Server Solutions, The Online Information Center, The Power of One, TotalFix, TradeForce, Transact-SQL, Translation Toolkit, Turning Imagination Into Reality, UltraLite, UltraLite.NET, UNIBOM, Unilib, Uninull, Unisep, Unistring, URK Runtime Kit for UniCode, Viafone, Viewer, VisualWriter, VQL, WarehouseArchitect, Warehouse Control Center, Warehouse Studio, Warehouse WORKS, Watcom, Watcom SQL, Watcom SQL Server, Web Deployment Kit, Web.PB, Web.SQL, WebSights, WebViewer, WorkGroup SQL Server, XA-Library, XA-Server, XcelleNet, XP Server, XTNDAccess and XTNDConnect are trademarks of Sybase, Inc. or its subsidiaries. 11/06

Unicode and the Unicode Logo are registered trademarks of Unicode, Inc.

All other company and product names used herein may be trademarks or registered trademarks of their respective companies.

Use, duplication, or disclosure by the government is subject to the restrictions set forth in subparagraph (c)(1)(ii) of DFARS 52.227-7013 for the DOD and as set forth in FAR 52.227-19(a)-(d) for civilian agencies.

Sybase, Inc., One Sybase Drive, Dublin, CA 94568.

Contents

About This Book	vii	
CHAPTER 1	New Features in Replication Server Version 15.0.1	1
	Configuration and tuning enhancements	1
	Monitor and counter enhancements.....	2
	Dynamic SQL for enhanced Replication Server performance.....	4
	Master database replication	6
	rs_subcmp enhancement.....	7
	Schema comparison	9
	Manual data reconciliation	12
CHAPTER 2	System Changes in Replication Server 15.0.1	15
	Configuration parameters.....	15
	Dynamic configuration parameters.....	15
	Database connection parameters	16
	Replication Server configuration parameters	16
	rs_subcmp configuration parameters	16
	RCL commands	18
CHAPTER 3	New Features in Replication Manager 15.0.1	19
	Support for dynamic configuration	19
	Support for heterogeneous data servers.....	20
	Non-Sybase data servers support.....	20
	Replication Agents and Mirror Replication Agents support	21
	Replication Manager plug-in enhancements	21
CHAPTER 4	New Features in Replication Server Version 15.0.....	23
	Support for longer identifiers	23
	New datatype: bigint.....	24
	New unsigned integer datatypes	25
	New Unicode datatype: unitext	26
	Replicating computed columns	27

- Replicating encrypted columns 28
- Replicating partitioned tables 28
- Larger disk partitions 30
- Larger text and image size 31
- Embedded Replication Server System Database (ERSSD) enhancement 31
- New password encryption algorithm 32
- Mixed-version enhanced support 33
- New interface for monitors and counters 34
- Support for isolation levels 35
- Bidirectional replication support for DDL in MSA 37
- Batching of commands for non-ASE servers 37
- SySAM license management 38

- CHAPTER 5 System Changes in Replication Server 15.0 41**
 - Configuration parameters 41
 - Replication Server parameters 41
 - Database connection parameters 42
 - RCL commands 43
 - System tables 44
 - System stored procedures 45
 - Function strings 45
 - Datatypes 46

- CHAPTER 6 New Features in Replication Manager 15.0 47**
 - New user interface features 47
 - Two-tier management solution 47
 - Three-tier management solution 48
 - Replication Manager plug-in replaces Replication Server plug-in 48
 - Online help 48
 - Visual monitoring of status 49
 - Event Log pane 49
 - Background processing 50
 - Replication Manager logging enhancement 50
 - Script editors 51
 - Replication Manager features supported 52
 - Support for new datatypes 52
 - Support for DirectConnect 52
 - Replication support 53
 - Routes 53
 - Troubleshooting tools 54
 - Connection status hide options 57

	Warm standby wizards	58
	Thread management	61
CHAPTER 7	Introducing Replication Monitoring Services.....	63
	Introducing Replication Monitoring Services	63
	Monitoring servers in the replication environment.....	64
	Software requirements and compatibilities.....	65
	Installation	65
	Starting and stopping RMS	65
	Connecting to RMS in Sybase Central.....	66
	Monitoring a replication environment using RMS.....	67
	Adding and dropping servers for monitoring in Sybase Central	67
	Viewing monitored objects in Sybase Central	69
	Setting configuration parameters for monitored replication objects	69
	Monitoring a logical group of servers	70
	Suspending or resuming components in the replication	
	environment.....	71
	Shutting down monitored servers.....	72
	Generating rollup status for servers	72
	Generating latency and heartbeat information	73
	Adding event triggers	73
CHAPTER 8	New Features in Replication Server Version 12.6.....	75
	Multi-Site availability (MSA)	75
	Support for symmetric multiprocessors (SMP).....	76
	The embedded RSSD (ERSSD)	78
	Performance enhancements	78
	Better management of empty transactions.....	78
	Internal commit control for parallel processing.....	78
	New Replication Server configuration parameters	79
	New database configuration parameters.....	79
	Changed database configuration parameters	80
	date and time datatypes.....	81
	Support for sending encrypted passwords.....	81
	New bulk materialization method	82
	Chinese character set (GB18030) support.....	83
CHAPTER 9	System Changes in Replication Server 12.6	85
	Configuration parameters.....	85
	Replication Server parameters.....	85
	Database connection parameters	86

RCL commands	87
System stored procedures	88
Function strings	88
System tables	89
Keywords	89
Index	91

About This Book

Audience

This book is intended for customers who are installing and using Replication Server® 15.0.1 and the subsequent EBFs.

How to use this book

This book describes the new Sybase® Replication Server and Replication Manager version 15.0.1 features.

This book also provides information about the features and system changes in Replication Server versions 15.0 and 12.6.

- Chapter 1, “New Features in Replication Server Version 15.0.1,” describes the Replication Server version 15.0.1 features.
- Chapter 2, “System Changes in Replication Server 15.0.1,” describes new and changed commands, configuration parameters, and so on in Replication Server version 15.0.1.
- Chapter 3, “New Features in Replication Manager 15.0.1,” describes new features introduced in Replication Manager version 15.0.1.
- Chapter 4, “New Features in Replication Server Version 15.0,” describes the Replication Server version 15.0 features.
- Chapter 5, “System Changes in Replication Server 15.0,” describes new and changed commands, stored procedures, configuration parameters, system tables, keywords, and so on in Replication Server version 15.0.
- Chapter 6, “New Features in Replication Manager 15.0,” describes the new features introduced in Replication Manager version 15.0.
- Chapter 7, “Introducing Replication Monitoring Services,” introduces the new component in Replication Server 15.0. The Replication Monitoring Services is a middle-management layer for monitoring large and complex replication environments.
- Chapter 8, “New Features in Replication Server Version 12.6,” describes new and changed commands, stored procedures, configuration parameters, system tables, keywords, and so on in Replication Server version 12.6.

-
- Chapter 9, “System Changes in Replication Server 12.6,” describes the Replication Server 12.6 features.

Related documents

The Sybase Replication Server documentation set consists of:

- 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 Sybase Product Manuals Web site. To check for critical product or document information that was added after the release of the product CD, use the Getting Started CD.

- *Installation Guide* for your platform – describes installation and upgrade procedures for all Replication Server and related products.
- *What’s New in Replication Server?* (this book) – describes the new features in Replication Server versions 15.0 and 15.0.1 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 Manager plug-in help, which contains information about using Sybase Central™ to manage Replication Server.

Other sources of information

Use the Sybase Getting Started CD, the SyBooks™ CD, and the Sybase 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 SyBooks CD. It is included with your software. To read or print documents on the Getting Started CD, you need Adobe Acrobat Reader, which you can download at no charge from the Adobe Web site using a link provided on the CD.
- The SyBooks CD contains product manuals and is included with your software. The Eclipse-based SyBooks browser allows you to access the manuals in an easy-to-use, HTML-based format.

Some documentation may be provided in PDF format, which you can access through the PDF directory on the SyBooks CD. To read or print the PDF files, you need Adobe Acrobat Reader.

Refer to the *SyBooks Installation Guide* on the Getting Started CD, or the *README.txt* file on the SyBooks CD for instructions on installing and starting SyBooks.

- The Sybase Product Manuals Web site is an online version of the SyBooks CD that you can access using a standard Web browser. In addition to product manuals, you will find links to EBFs/Maintenance, Technical Documents, Case Management, Solved Cases, newsgroups, and the Sybase Developer Network.

To access the Sybase 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 Click Certification Report.
- 3 In the Certification Report filter select a product, platform, and timeframe and then click Go.

-
- 4 Click a Certification Report title to display the report.

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

- 1 Point your Web browser to Availability and Certification Reports at <http://certification.sybase.com/>.
- 2 Either select the product family and product under Search by Base Product; or select the platform and product under Search by Platform.
- 3 Select Search to display the availability and certification report for the selection.

❖ **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. If prompted, enter your MySybase user name and password.
- 3 Select a product.
- 4 Specify a time frame and click Go. A list of EBF/Maintenance releases is displayed.

Padlock icons indicate that you do not have download authorization for certain EBF/Maintenance releases because you are not registered as a Technical Support Contact. If you have not registered, but have valid information provided by your Sybase representative or through your support contract, click Edit Roles to add the “Technical Support Contact” role to your MySybase profile.

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

Conventions

The following style conventions are used in this book:

- In a sample screen display, commands you should enter exactly as shown are in:

`this font`

- In a sample screen display, words that you should replace with the appropriate value for your installation are shown in:

this font

- In the regular text of this document, the names of files and directories appear in italics:

/usr/w/sybase

- The names of programs, utilities, procedures, and commands appear in this type:

`bcp`

The conventions for syntax statements in this manual are as follows:

Table 1: Syntax conventions

Key	Definition
command	Command names, command option names, utility names, utility flags, and other keywords are in Arial.
<i>variable</i>	Variables, or words that stand for values that you fill in, are in italics.
{ }	Curly braces indicate that you choose at least one of the enclosed options. Do not include braces in your option.
[]	Brackets mean choosing one or more of the enclosed options is optional. Do not include brackets in your option.
()	Parentheses are to be typed as part of the command.
	The vertical bar means you can select only one of the options shown.
,	The comma means you can choose as many of the options shown as you like, separating your choices with commas to be typed as part of the command.

Accessibility features

This document is available in an HTML version that is specialized for accessibility. You can navigate the HTML with an adaptive technology such as a screen reader, or view it with a screen enlarger.

Replication Server HTML documentation has been tested for compliance with U.S. government Section 508 Accessibility requirements. Documents that comply with Section 508 generally also meet non-U.S. accessibility guidelines, such as the World Wide Web Consortium (W3C) guidelines for Web sites.

Note You might need to configure your accessibility tool for optimal use. Some screen readers pronounce text based on its case; for example, they pronounce ALL UPPERCASE TEXT as initials, and MixedCase Text as words. You might find it helpful to configure your tool to announce syntax conventions. Consult the documentation for your tool.

For information about how Sybase supports accessibility, see Sybase Accessibility at <http://www.sybase.com/accessibility>. The Sybase Accessibility site includes links to information on Section 508 and W3C standards.

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.

New Features in Replication Server Version 15.0.1

This chapter describes the new features introduced in Replication Server 15.0.1. Several enhancements have been made to enable more efficient configuration and tuning of Replication Server.

Topic	Page
Configuration and tuning enhancements	1
Monitor and counter enhancements	2
Dynamic SQL for enhanced Replication Server performance	4
Master database replication	6
rs_subcmp enhancement	7
Schema comparison	9
Manual data reconciliation	12

Configuration and tuning enhancements

Replication Server 15.0.1 now supports dynamic configuration, which simplifies Replication Server customization and performance tuning by:

- Providing the ability to some of the Replication Server configuration parameters to handle dynamic modification of values.
- Introducing admin config, a Replication Command Language (RCL) that retrieves the server, connection, logical connection, and route parameters and their runtime values.

Configuring dynamic parameters

Several Replication Server configuration parameters are changed to dynamic, allowing you to change their values using the configure replication server command. You no longer need to restart the Replication Server for the new values to take effect. Table 1-1 lists the dynamic configuration parameters.

Table 1-1: Dynamic configuration parameters

init_sqm_write_delay	init_sqm_write_max_delay
memory_limit	num_concurrent_subs
queue_dump_buffer_size	sqm_recover_segs
sqm_warning_thr_ind	sqm_warning_thr1
sqm_warning_thr2	sqt_max_cache_size
sqt_init_read_delay	sqt_max_read_delay
sts_cachesize	sts_full_cache_system_table_name

Use the new admin config command to retrieve the values of these parameters.

admin config

admin config lets you retrieve the values of the configuration parameters used to customize and tune the Replication Server. In Replication Server 15.0.1, these parameters are categorized as:

- Server parameters
- Connection parameters
- Logical connection parameters
- Route parameters

Syntax

The admin config syntax is:

```
admin config [,"connection" |,"logical_connection" |,"route" ] [,server
[,database]] [,configuration_name]
```

See Chapter 3, “Replication Server Commands” of the *Replication Server Reference Manual*, for detailed information in using admin config command.

Monitor and counter enhancements

The process of monitoring the counters that provide performance information has been improved in Replication Server 15.0.1. Sampling and saving statistics to the RSSD now runs asynchronously, allowing you to execute other Replication Server commands or terminate the session while the sampling continues in the background.

You can check the progress of asynchronous commands to prevent overlaps. When a command is denied due to overlapping, you can cancel the commands in progress to execute another command.

Enhanced *admin stats* command The *admin stats* command has been modified. The modified command syntax is:

```
admin { stats | statistics } [, sysmon | "all"
    | module_name [, inbound | outbound] [, display_name] ]
    [, server[, database] | instance_id]
    [, display |, save [, obs_interval] ]
    [, sample_period]
```

The behavior for the *save* parameter with a *sample_period* has also changed. The *admin stats* returns the session immediately. Its original *num_obs* option has been changed to *obs_interval*, which can be a numeric value in seconds, or a quoted time format string hh:mm[:ss].

Example To start sampling and saving statistics to the RSSD for one hour and thirty minutes at 20-second intervals, enter:

```
admin stats, "all", save, 20, "01:30:00"
```

cancel command The new command syntax also supports the *cancel* option, which stops the currently running command.

```
admin { stats | statistics } , cancel
```

Note For multiple observation intervals (*obs_interval*), the data that is saved at the time of cancellation is not deleted.

Replication Server checks the unfinished command to avoid corrupted sampling. If there is any command in progress, running either in the background or in other user sessions, the following commands cannot be executed:

- *admin stats* with any variation of *save*. For example:

```
admin stats, "all", save, 30
```

- *admin stats* with a sampling period. For example:

```
admin stats, "all", display, 120
```

- Commands that resets counters. For example:

```
admin stats, reset
```

When a command is denied, the following error message is returned, and *admin stats* with the *cancel* option is required to stop the unfinished command before executing another command.

```
Admin command failed. Existing command is currently in
progress
```

Commands that display current statistics of your session are allowed to be executed even if there is another command in progress. For example:

```
admin stats, sqm, inbound, display
```

Checking the status of asynchronous commands

The output of the existing `admin stats, status` command has been modified to include the status of the sampling command:

```
1> admin stats, status
2> go
Command in progress, sampling period 00:30:00, time
elapsed 00:02:32
```

```
Sybase Replication Server Statistics Configuration
=====
Configuration                Default                Current
-----
stats_sampling                off                   on
stats_show_zero_counters      off                   off
stats_reset_rssd              on                    on
```

Keeping previously saved data in RSSD

Replication Server 15.0.1 has a new configuration parameter, `stats_reset_rssd`, which allows you to optionally keep the old sampling data in RSSD by setting its value to off. By default, `stats_reset_rssd` is turned on.

```
configure replication server
set stats_reset_rssd to {"on", "off"}
```

See Chapter 3, “Replication Server Commands” of the *Replication Server Reference Manual*, for detailed information in using `admin stats` command.

Dynamic SQL for enhanced Replication Server performance

Dynamic SQL in Replication Server enhances replication performance by allowing Replication Server Data Server Interface (DSI) to prepare dynamic SQL statements at the target user database and to execute them repeatedly. Instead of sending SQL language commands to the target database, only the literals are sent on each execution, thereby eliminating the overheads brought by SQL statement syntax checks and optimized query plan builds.

You can use dynamic SQL in a user database connection for a language command if:

- The command is insert, update, or delete.
- There are no text, image, unitext, or java columns in the command.
- There are no NULL values in the where clause of an update or delete command.
- There are no more than 255 parameters in the command:
 - insert commands can have no more than 255 columns.
 - update commands can have no more than 255 columns in the set clause and where clause combined.
 - delete commands can have no more than 255 columns in the where clause.
- The command does not use user-defined function strings.

Setting up the configuration parameters to use dynamic SQL

Configure dynamic SQL at a server or a connection level by issuing the following commands:

```
configure replication server
set { dynamic_sql |
      dynamic_sql_cache_size |
      dynamic_sql_cache_management }
to value

alter connection to server.db
set { dynamic_sql |
      dynamic_sql_cache_size |
      dynamic_sql_cache_management }
to value
```

The server-level configurations provide the default values for the connections created or started in the future. For database level configurations:

- `dynamic_sql` – turns dynamic SQL on or off for a connection. Other dynamic SQL related configuration parameters take effect only if this parameter is set to on.
- `dynamic_sql_cache_size` – tells the Replication Server how many database objects may use the dynamic SQL for a connection. This parameter is provided to limit the resource demand on the data server.

- `dynamic_sql_cache_management` – manages the dynamic SQL cache for a connection. Once the dynamic SQL statements reaches `dynamic_sql_cache_size` for a connection, it either stops allocating new dynamic SQL statements if the value is fixed, or keeps the most recently used statements and deallocates the rest to make room for the new statements if the value is mru.

Limitations

Dynamic SQL has these limitations:

- If a table is replicated to a standby or MSA connection using an internal replication definition and dynamic SQL is enabled for the connection, any new replication definition for the table should define the column order consistent with the column order in the primary database. Otherwise, the existing prepared statements may be invalidated, and may require the standby or MSA connection to be restarted.
- Dynamic SQL requires ASE or DirectConnect 12.6.1 ESD#2 for UDB as target database.

Master database replication

The Adaptive Server RepAgent thread now supports master database replication in Adaptive Server 15.0, ESD#2 and later. The master database can be replicated using warm standby with any version of Replication Server that supports warm standby, including Replication Server version 12.0 and later.

In addition, the master database can be replicated using multi-site availability (MSA) with any version of Replication Server that supports MSA.

Replication of the master database is limited to DDL commands and system procedures used to manage logins and roles.

The supported DDL commands and system procedures are:

- `alter role`
- `create role`
- `drop role`
- `grant role`
- `revoke role`
- `sp_addlogin`

- `sp_displaylevel`
- `sp_droplogin`
- `sp_locklogin`
- `sp_modifylogin`
- `sp_password`
- `sp_passwordpolicy`
- `sp_role`

rs_subcmp enhancement

In Replication Server 15.0.1, `rs_subcmp` uses a hash algorithm to improve its performance. Hash algorithm compresses the data in primary and replicated tables. The compressed data is then fetched by `rs_subcmp`.

Instead of taking the entire row of data during comparison between the primary table and replicated table, `rs_subcmp` now transfers only the compressed data of each data row from the primary or replicated tables, and then verifies or reconciles inconsistencies between them.

With the hash algorithm, the amount of data to be transferred from the primary and replicated tables to `rs_subcmp` is reduced, decreasing the total running time of `rs_subcmp`.

New command line
and configuration file
parameters

Table 1-2 and Table 1-3 describe parameters that are new to `rs_subcmp` that support the use of the hash algorithm.

Table 1-2: New command line parameters for hash algorithm

Parameter	Description
-h	Perform faster comparison.
-H	Normalize data when using hash algorithm across different platforms or character sets.

Table 1-3: New configuration file parameters for hash algorithm

Parameter	Description
FASTCMP	The same as command line parameter -h. The syntax is: FASTCMP = Y N Values are: Y – perform fast comparison using compressed data. N (default) – perform normal comparison as before.
HASH_OPTION	The same as command line parameter -H. The syntax is: HASH_OPTION = <i>lsb</i> <i>msb</i> <i>unicode</i> <i>unicode_lsb</i> <i>unicode_msb</i> If this parameter does not exist in the configuration file, by default, rs_subcmp uses the native byte order and character set.

Limitation

The enhanced rs_subcmp requires ASE 15.0.2 or later and cannot handle case sensitive comparison. It also cannot handle text, untext, or image datatypes and does not allow you to specify the precision for the float datatype (maximum precision is used).

Note Sybase suggests to set the ASE parameter default data cache to 128M or higher to get a better comparison performance.

Example

Example 1: To instruct rs_subcmp to get the compressed data and reconcile any inconsistencies between the primary and replicated tables, enter:

```
rs_subcmp [-h] [...]
```

Example 2: To instruct rs_subcmp to normalize data when using hash algorithm, enter the following command, where options can be *lsb*, *msb*, *unicode*, *unicode_lsb*, and *unicode_msb*:

```
rs_subcmp [-h -H options] [...]
```

Table 1-4 describes the string options to use with rs_subcmp.

Table 1-4: rs_subcmp string options

Option	Description
<i>lsb</i>	All byte-order dependent data is normalized to lsb-first (little-endian) before data compression.
<i>msb</i>	All byte-order dependent data is normalized to msb-first (big-endian) byte order before data compression.
<i>unicode</i>	Character data is normalized to unicode (UTF-16) before data compression.

Note UTF-16 string looks very much like an array of short integers and is byte-order dependent, thus Sybase suggests that you use *lsb* and *msb* in conjunction with *unicode* for platform independence. For example, use *unicode_lsb* or *unicode_msb*.

See Chapter 7, “Executable Programs” of the *Replication Server Reference Manual*, for more information on using these parameters with *rs_subcmp*.

Schema comparison

In Replication Server 15.0.1, the *rs_subcmp* function has been expanded to include schema comparison between tables and databases. This is useful in comparing schema between two databases that may have the same data but different schemas.

Table 1-5 and Table 1-6 enumerate the schema types and subtypes supported by *rs_subcmp*.

Table 1-5: Schema types supported by rs_subcmp

Type	Description
A	All aliases in the database.
D	All defaults in the database.
E	All user-defined datatypes in the database.
G	All groups in the database.
R	All rules in the database.
T	All user tables in the database. Includes table elements such as indexes, keys, constraints, and triggers.
U	All users in the database.
V	All views in the database.
P	All procedures in the database.

Table 1-6: Schema sub-types supported by rs_subcmp

Type	Description
c	Constraint
d	Bind default
f	Foreign key
g	Grant
i	Index
m	Procedure mode
p	Primary key
r	Bind rule
t	Trigger

The command line and configuration file parameter set has been expanded to support the rs_subcmp schema comparison. Table 1-7 describes the new rs_subcmp command line parameters.

Table 1-7: Command line parameters for schema comparison

Parameter name	Description	Valid values
-x	comparison flag	0 (default) – data comparison. 1 – database schema comparison. 2 – table schema comparison.
-X	filter flag	If the value starts with “+”, only the schema types are selected for comparison, and subtypes are ignored. Otherwise, the schema types and sub types are both unselected and not used for comparison.
-l	interface file	Interface file location.

Table 1-8 describes the new configuration file parameters.

Table 1-8: Configuration file parameters for schema comparison

Item name	Description	Valid values
SCHEMAFLAG	comparison flag	0 (default) – data comparison. 1 – database schema comparison. 2 – table schema comparison.
FILTER	filter flag	If the value starts with “+”, only the schema types are selected for comparison, and sub-types are ignored. Otherwise, the schema types and subtypes are both unselected and not used for comparison.
IFILE	interface file	Interface file location.

Examples

Example 1. Compares all schemas between two databases using the *config.cfg* file:

```
rs_subcmp -f config.cfg
```

The configuration file contains the following:

```
PDS = PASE
RDS = R2ASE
PDB = pubs2
PTABLE = authors
RTABLE = authors
PUSER = sa
RUSER = sa
PPWD =
RPWD =
SCHEMAFLAG = 1
```

Example 2. Compares schema between two databases without a configuration file:

```
rs_subcmp -Spds -srds -Dpdb -drdb -Usa -usa -Psa_pwd
          -psa_pwd -x1
```

Example 3. Compares schema of two databases excluding index, trigger, and datatype:

```
rs_subcmp -Spds -srds -Dpdb -drdb -Usa -usa -Psa_pwd
          -psa_pwd -x1 -XitD
```

Example 4. Compares all table schemas and user schemas:

```
rs_subcmp -Spds -srds -Dpdb -drdb -Usa -usa -Psa_pwd
          -psa_pwd -x1 -X+TU
```

Report and reconciliation files

A report file which details the comparison result between two tables or two databases is created after every schema comparison. The report file is named *reportPROCID.txt*. If inconsistencies exist, *rs_subcmp* creates a reconciliation script named *reconcilePROCID.sql*. The report file and the reconciliation script are saved in the same directory where you issued the *rs_subcmp*.

Manual data reconciliation

The enhanced *rs_subcmp* command now supports manual reconciliation of inconsistent data through the creation of a reconciliation file. This allows you to verify the reconciliation statements before execution.

New *rs_subcmp* parameters

Replication Server 15.0.1 introduces two new parameters for this feature. Table 1-9 describes these parameters.

Table 1-9: New parameters for *rs_subcmp* manual reconciliation

Parameter	Description
-g	A command line parameter indicating to <i>rs_subcmp</i> to create a reconciliation file.
RECONCILE_FILE	A configuration file parameter. Values are: Y – create a reconciliation file. N (default) – do not create a reconciliation file.

Limitation

The reconciliation file's SQL statements cannot contain text, unitext, or image, data.

See Chapter 7, “Executable Programs” of the *Replication Server Reference Manual*, for more information on using these parameters with `rs_subcmp`.

System Changes in Replication Server 15.0.1

This chapter describes system changes introduced with Sybase Replication Server version 15.0.1.

Topic	Page
Configuration parameters	15
RCL commands	18

Configuration parameters

This section summarizes new and changed configuration parameters for Replication Server 15.0.1.

Dynamic configuration parameters

Table 2-1 lists the configuration parameters that changed to dynamic.

Table 2-1: Dynamic configuration parameters

init_sqm_write_delay	init_sqm_write_max_delay
memory_limit	num_concurrent_subs
queue_dump_buffer_size	sqm_recover_segs
sqm_warning_thr_ind	sqm_warning_thr1
sqm_warning_thr2	sqt_max_cache_size
sqt_init_read_delay	sqt_max_read_delay
sts_cachesize	sts_full_cache_system_table_name

Database connection parameters

Table 2-2 describes the new database connection parameters.

Table 2-2: New configuration parameters

Parameter	Description
dynamic_sql	Turns dynamic SQL feature on or off for a connection. On – dynamic SQL is enabled for a connection. Off (default) – dynamic SQL is disabled for a connection.
dynamic_sql_cache_size	Tells the Replication Server how many database objects may use the dynamic SQL statement for a connection. Minimum: 1 Maximum: 65536 Default: 20
dynamic_sql_cache_management	Manages the dynamic SQL cache for a Data Server Interface executor thread. Values: mru (default) – keeps most recently used statements and deallocates the rest to allocate new dynamic statements when dynamic_sql_cache_size is reached. fixed – Replication Server stops allocating the new dynamic statements once dynamic_sql_cache_size is reached.

Replication Server configuration parameters

Table 2-3 describes new Replication Server configuration parameter that are stored in the rs_config system table and can be set using configure replication server

Table 2-3: New Replication Server parameter for rs_config table

Parameter	Description
stats_reset_rssd	Specifies whether the existing statistics data tables should be truncated before a new sampling starts. Default: On

rs_subcmp configuration parameters

Table 2-4 lists the rs_subcmp new command-line parameters.

Table 2-4: rs_subcmp new command line parameters

Parameter	Description
-g	Data reconciliation script flag that creates data reconciliation script.

Parameter	Description
-h	Instructs rs_subcmp to perform faster comparison.
-H	Instructs rs_subcmp to normalize the data when using hash algorithm for cross platform or different character sets situation.
-l	Specifies the name and location of the interfaces file to search.
-x	A comparison flag. 0 (default) – data comparison 1 – database schema comparison 2 – table schema comparison
-X	A filter flag. If the value starts with “+” only the schema types are selected for comparison, and the sub-types are ignored. Otherwise, the schema types and subtypes are both unselected and used for comparison.

Table 2-5 lists the rs_subcmp new configuration file parameters.

Table 2-5: rs_subcmp new configuration file parameters

Parameter	Description
SCHEMAFLAG	Comparison flag 0 (default) – data comparison 1 – database schema comparison 2 – table schema comparison
FILTER	Filter flag If the value starts with “+” only the schema types are selected for comparison, and the sub-types are ignored. Otherwise, the schema types and sub-schema types are both deselected and will not be used for comparison.
IFILE	Specifies the name and location of the interfaces file to search.
RECONCILE_FILE	Data reconciliation script flag Y – creates data reconciliation script N (default) – do not create data reconciliation script
FASTCMP	Identical to command line parameter -h. The syntax is: FASTCMP = Y N Values are: Y – Do fast comparison using compressed data N (default) – Do normal comparison as before
HASH_OPTION	Identical to command line parameter -H. The syntax is: HASH_OPTION = <i>lsb</i> <i>msb</i> <i>unicode</i> <i>unicode_lsb</i> <i>unicode_msb</i> If this parameter does not exist in the configuration file, by default, rs_subcmp will use the native byte order and character set.

RCL commands

Table 2-6 summarizes new RCL commands.

Table 2-6: New RCL commands

Command	Description
admin config	Retrieves Replication Server parameters such as global connection, logical connection, and route parameters.
admin stats, cancel	Cancels the currently running asynchronous commands.

Table 2-7 summarizes changed RCL commands.

Table 2-7: Changed RCL commands

Commands	Description
admin stats, dsi	Has been changed to display dynamic SQL related monitor and counter information.
admin stats, status	Output now includes the status of the currently running command.

New Features in Replication Manager 15.0.1

This chapter describes the Replication Server 15.0.1 features supported by Replication Manager.

Topic	Page
Support for dynamic configuration	19
Support for heterogeneous data servers	20

Support for dynamic configuration

The Replication Manager (RM) plug-in has been modified to support the dynamic configuration feature of Replication Server 15.0.1. Versions of Replication Server earlier than 15.0.1 do not support dynamic configuration.

This feature allows the RM to dynamically retrieve all parameters that can be configured for the Replication Server, including the parameters for connections and routes.

Enhanced properties dialog box

To support dynamic configuration, the Parameters tab of the Properties dialog box in RM has been enhanced to accurately display the parameter status information returned by the Replication Server. It includes:

- The Status field replaces the Restart Required field in RM 15.0. Its associated text field now has a wider range of information. The remaining fields and functions of the properties dialog box remain the same.

- The parameter information in the Run Value column may now contain the value “<server default>”. This may be used for parameters in the connections, logical connections, and routes to indicate that a parameter at that component level has not been set, and the Replication Server default value will be used. These types of parameters can have a default setting at the server level, or can have the parameter set for an individual connection, logical connection, or route.
- There may be some parameters for which the legal values are considered nonstandard so the Legal values field may be left blank. This is usually due to a parameter that may contain a textual setting and a numerical setting. In these cases, the Explanation field may contain further information regarding legal values for the parameter.

Support for heterogeneous data servers

The RM plug-in now supports heterogeneous data servers, which provides you the ability to create connections, replication definitions, and subscriptions for non-Sybase data servers. Non-Sybase data servers include Oracle, Microsoft SQL Server, and IBM UDB.

Note This version of RM does not support IBM DB2 data servers or Replication Agents, although Sybase provides a replication solution for IBM DB2 on mainframe.

Non-Sybase data servers support

To provide support for heterogeneous data servers, the RM displays the databases, tables, and stored procedures for non-Sybase data servers in a two-tier environment, the same as in the ASE data servers.

See Chapter 3, “Managing Replication Server with Sybase Central” of the *Replication Server Administration Guide Volume 1*, for more information about two- and three-tier management solutions.

The RM allows you to create, update, and delete both primary and replicate connections. It also allows you to create, update, and delete databases, tables, and function replication definitions and subscriptions. The RM user interface for non-Sybase data servers is identical to the current ASE server interface.

For non-Sybase data servers, the RM uses Replication Agents and DirectConnect to communicate with the data servers and to act as an interface for the RM. The RM uses an interface server to retrieve the metadata from the data servers. The Replication Agent serves as the interface server for the primary data servers, while DirectConnect serves as the interface server for the replicate data servers.

The interface server is not necessarily the server used to replicate data in the environment. For example, when defining an Oracle server that will be both a primary and a replicate data server, you only identify a Replication Agent as the interface server. This Replication Agent can be used to extract transactions from the Oracle server but a DirectConnect may also be needed to replicate data to the Oracle server. Also, if you are replicating from a Microsoft SQL Server, you can identify a Replication Agent as the interface server, but may require several Replication Agents to replicate data from several databases.

Replication Agents and Mirror Replication Agents support

In version 15.0.1, the RM provides the ability to initialize the Sybase Replication Agent and displays its performance statistics in a two-tier environment. Additionally, the connection associated with the Replication Agent is displayed in the tree view hierarchy upon clicking the Replication Agent.

The RM also provides a feature that tests the connection between the primary data server and the Replication Agent, and the connection between the Replication Agent and the Replication Server.

The context menu for the Replication Agent now provides commands to test connections, display statistics, and initialize the Replication Agent. In the Sybase Central object tree, right-click the Replication Agent icon to display the context menu.

Replication Manager plug-in enhancements

To provide heterogeneous support, the following items have been modified in the RM:

- The Add Server wizard to add non-Sybase data servers to a two-tier environment.
- The Add Connection wizard to create connections to non-Sybase databases.
- The Replication Agent context menu provides commands to initialize the agent, displays performance statistics, and tests network connections.
- The tree view hierarchy displays the connection associated with the Replication Agent under the actual agent.
- The Create Replication Definition dialog to create replication definitions for tables in a non-Sybase database. You can use user-defined datatypes to define non-Sybase datatypes.

New Features in Replication Server Version 15.0

This chapter describes the new features introduced with Replication Server 15.0.

Topic	Page
Support for longer identifiers	23
New datatype: bigint	24
New unsigned integer datatypes	25
New Unicode datatype: unitext	26
Replicating computed columns	27
Replicating encrypted columns	28
Replicating partitioned tables	28
Larger disk partitions	30
Larger text and image size	31
Embedded Replication Server System Database (ERSSD) enhancement	31
New password encryption algorithm	32
Mixed-version enhanced support	33
New interface for monitors and counters	34
Support for isolation levels	35
Bidirectional replication support for DDL in MSA	37
Batching of commands for non-ASE servers	37
SySAM license management	38

Support for longer identifiers

The limit of 30 bytes for selected database and replication object names (identifiers) is extended to 255 bytes for Replication Server version 15.0. Longer identifiers are supported for these objects:

- Tables.

- Columns.
- Stored procedures.
- Parameters – for Replication Server functions and Adaptive Server stored procedures.
- Functions – for function replication definitions.
- Function strings.
- Replication definitions – including table replication definitions, function replication definitions, and database replication definitions.
- Publications.
- Articles.

All other database and replication object identifiers, login names and passwords, transaction names, subscription names, database names, and server names retain the existing 30-byte limit.

Parameter names for Replication Server functions and Adaptive Server stored procedures are the only identifiers that can begin with the @ character.

- Replication Server function parameter names can be as many as 256 bytes including the @ character.
- Adaptive Server stored procedure parameter names can be as many as 255 bytes including the @ character.

Note rs_subcmp supports long identifiers for both table and column names.

Limitation

The create function, alter function, and drop function commands do not support long identifiers. The name of the function and the parameters of these commands cannot exceed 30 bytes.

New datatype: *bigint*

Replication Server 15.0 adds support for the *bigint* datatype. *bigint* is a fixed-width, 8-byte datatype. Like *int*, *smallint*, and *tinyint*, *bigint* is a signed integer datatype. *bigint* can hold whole numbers between -2^{63} and $+(2^{63} - 1)$.

Table 4-1 describes the range and storage size for all integer datatypes.

Table 4-1: Signed integer datatypes

Integer datatypes	Range	Storage (bytes)
bigint	Whole numbers between -2^{63} and $+(2^{63} - 1)$, inclusive (-9,233,372,036,854,775,808 and +9,233,372,036,854,775,807)	8
int	Whole numbers between -2^{31} and $+(2^{31} - 1)$, inclusive (-2,147,483,648, and +2,147,483,647)	4
smallint	Whole numbers between -2^{15} and $+(2^{15} - 1)$, inclusive (-32,768 and +32,767)	2
tinyint	Positive whole numbers between 0 and 255, inclusive	1

Mixed-version issues

To fully support bigint, the primary and replicate Replication Server must have a site version of 15.0, and the LTL version must be 700. If the LTL version is less than 700 at connect-source time, RepAgent converts bigint columns to numeric.

Note rs_subcmp supports the new bigint datatype.

New unsigned integer datatypes

Replication Server version 15.0 supports four new unsigned integer datatypes. You can use these unsigned datatypes in the same way as their signed equivalents:

- unsigned tinyint – tinyint
- unsigned smallint – smallint
- unsigned int – int
- unsigned bigint – bigint

Signed integers are whole positive or negative numbers. Unsigned integers are only whole positive numbers. The storage sizes of the signed and unsigned integers datatypes are the same. Table 4-2 shows the range of positive numbers supported for each unsigned datatype.

Table 4-2: Unsigned integer datatypes

Integer datatypes	Range	Storage (bytes)
unsigned bigint	Whole numbers between 0 and 18,446,744, 073, 709,551,615, inclusive	8
unsigned int	Whole numbers between 0 and 4,294,967,295, inclusive	4

Integer datatypes	Range	Storage (bytes)
unsigned smallint	Whole numbers between 0 and 65535, inclusive	2
unsigned tinyint	Positive whole numbers between 0 and 255, inclusive	1

Mixed-version issues To fully support the unsigned integer datatypes, the primary and replicate Replication Server must have a site version of 15.0, and the LTL version must be 700.

If the LTL version is less than 700 at connect-source time, RepAgent makes these datatype conversions:

- unsigned bigint → numeric
- unsigned int → numeric
- unsigned smallint → int
- unsigned tinyint → tinyint

Replication definitions created with unsigned integer datatypes are not sent to Replication Servers version 12.5.x and earlier. If a replication definition is subscribed by Replication Server version 12.5.x, it cannot be altered to add unsigned integer columns.

Note rs_subcmp supports the new unsigned integer datatypes.

New Unicode datatype: *unitext*

Replication Server version 15.0 adds support for the *unitext* datatype. *unitext* is a variable-width, nullable Unicode datatype. Although independent of the text datatype, *unitext* mirrors its behavior, and can be used wherever text is used.

Like the data in the other Unicode datatypes—*unichar* and *univarchar*—*unitext* data is encoded in UTF-16, which is essentially a 2-byte, fixed-width encoding of Unicode. *unitext* can hold as many as 1,073,741,823 Unicode characters, or the equivalent of 2,147,483,647 bytes. *unitext* has no connection to the default character set ID or the default sort order.

The main advantage of Unicode datatypes is efficiency. The UTF-16 character types are approximately 33% more space efficient than UTF-8 for Asian characters.

Mixed-version issues To fully support unitext, the primary and replicate Replication Server must have a site version of 15.0, the route version must be 15.0, and the LTL version must be 700. If the LTL version is less than 700 at connect-source time, RepAgent converts unitext columns to image.

Note rs_subcmp supports the new unitext datatype.

Replicating computed columns

Computed columns allow you to create an expression and place the result of the expression in a table column. A computed column is:

- **Materialized** – when its value is computed for each insert or update. Materialized computed columns are stored in the same way as regular columns.
- **Virtual** – when its value is computed only when referenced in a query. Virtual computed columns are not stored in the table or index page.

A computed column expression is:

- **Deterministic** – when its value is the same each time it is evaluated.
- **Nondeterministic** – when its value may be different each time it is evaluated (for example, a date stamp).

Replication Server replicates materialized computed columns in DML statements in the same way it replicates other columns; it does not replicate virtual computed columns.

The replication of computed columns is supported by function strings. In Replication Server version 15.0, the class-level function string `rs_set_dml_on_computed` is applied at the replicate database DSI when a connection is established. It issues `set dml_on_computed "on"` after the use database statement. If the replicate Adaptive Server is version 12.5.x or earlier, the command is ignored.

Since Replication Server does not distinguish between computed and regular columns, there are no changes to the syntax for creating or altering replication definitions.

When creating or altering replication definitions for tables containing:

- Deterministic columns – you can choose whether to include those columns in the replication definition. Since deterministic columns always realize the same value, you can create the replication definition without them and allow each replicated insert and update to compute values at the replicate database.
- Nondeterministic columns – you must include nondeterministic computed columns in the replication definition to ensure that the primary and replicate databases remain synchronized.

rs_subcmp support for
computed columns

rs_subcmp supports comparison and reconciliation of materialized computed columns; it does not support virtual columns.

If the supported Adaptive Server provides the set `dml_on_computed` “on” command, `rs_subcmp` inserts and updates deterministic and nondeterministic materialized columns as regular columns.

Replicating encrypted columns

Replication Server 15.0 supports replication of encrypted columns in Adaptive Server 15.0. Similar to Adaptive Server, Replication Server does not support encrypted columns that contain text and image data.

Replication Server replicates encrypted data as well as the encryption keys. For more information about this feature, see the *New Features Adaptive Server Enterprise 15.0 with Encrypted Columns*.

Note `rs_subcmp` supports replication of encrypted columns in Adaptive Server.

Replicating partitioned tables

In Replication Server 15.0, partitioned tables introduced in Adaptive Server Enterprise 15.0 are replicated in a way that is similar to nonpartitioned tables. The `rs_truncate` system function in LTL, and the `rs_truncate` function and function string in Replication Server have been extended to support partitioned tables.

rs_truncate changes
in LTL

In LTL, the rs_truncate function has been extended to include partition names, as shown in the following syntax:

```
distribute command_tags applied [owner=owner_name]
table.rs_truncate [partition_name,
[partition_name]...] yielding
```

You must assign a *partition_name* for each partition specified in the truncate table partition command.

rs_truncate function
changes in
Replication Server

In Replication Server, the rs_truncate function has been extended to accept parameters to support a new truncate table partition command, shown as follows:

```
truncate table table_name partition partition_name
```

When a truncate partition command is issued, the RepAgent sends the following LTL:

```
applied [owner=owner_name] table_name.rs_truncate,
partition_name _yd
```

rs_truncate function
string changes in
Replication Server

The partition names are passed as parameters to the rs_truncate function. The rs_truncate function string accepts position-based function-string parameters. The following is a position-based variable that specifies the parameter position in the function, in the LTL command:

```
?n!param?
```

A sample function string for rs_truncate with the position-based variable is as follows:

```
truncate table publishers partition ?1!param?,
?2!param?
```

Examples

Example 1: To replicate truncate table partition as a delete command, alter the function string in the following way:

```
alter function string publisher.rs_truncate
for rs_sqlserver_function_class
output language
'begin transaction
if (?1!param? = '') /* NO parameter */
delete publisher
if (?1!param? = 'A')
delete publishers where c1 < 1000
if (?1!param? = 'B')
delete publishers where c1 >= 1000
commit transaction'
```

Example 2: To not to truncate table partitions at the replicate server, alter the function string to do nothing if there is a parameter, in the following way:

```
alter function string publisher.rs_truncate
for rs_sqlserver_function_class
output language
'if (?!param? = '') delete publisher'
```

Mixed-version issues

For the RepAgent to send an `rs_truncate` applied subcommand with parameters, the site version must be 15.0 and the LTL version must be 700. If the LTL version is below 700, RepAgent skips the `rs_truncate` portion of the distribute command.

To replicate the `rs_truncate` function with a parameter to the replicate Replication Server, the route version must be 1500. If the route version is lower than 1500, the `rs_truncate` command with the parameter is skipped.

Larger disk partitions

Replication Server version 15.0 extends the maximum disk partition size from 2GB to 1TB. The new limit is applicable after the Replication Server site version is updated to 15.0.

Two new RCL commands support larger disk partitions:

- `create partition` – makes a partition available to Replication Server. This command replaces the existing `add partition` command. `add partition` is still supported, for backward compatibility with earlier versions. The syntax and usage of the two commands are identical. The command name has been changed to be consistent with other Replication Server command names.
- `alter partition` – increases the size of a partition. The syntax is:

```
alter partition logical_partition_name [ expand [ size = size ] ]
```

For example, to increase the size of the logical partition `p2` by 50MB, enter:

```
alter partition p2 expand size = 50
```

Larger text and image size

In Replication Server 15.0, the `rs_subcmp` utility extends the maximum text and image size from 32KB to 2GB. You can specify the new value as length in kilobytes, doing either of:

- Using the `-L text_image_length_in_kilobytes` parameter to set the new text and image length in kilobytes. For example, to set the new length to 64KB, enter:

```
rs_subcmp -L 64 -f subcmp.cfg
```

- Providing the new value for text and image length to the parameter `TXT_IMG_LEN` in the configuration file. Start `rs_subcmp` using the modified configuration file:

```
rs_subcmp -f subcmp.cfg
```

subcmp.cfg file includes the following configuration parameter and its value:

```
TXT_IMG_LEN = 64
```

Note If the value is specified both in the command line and the configuration file, the value in the command line overwrites the value in the configuration file.

Embedded Replication Server System Database (ERSSD) enhancement

ERSSDs were introduced in Replication Server version 12.6. For more information, see Chapter 8, “New Features in Replication Server Version 12.6.”

You can create a route from a Replication Server with an ERSSD, as long as both the source and the destination servers are version 15.0 or later.

To create a route from Replication Server with an ERSSD, use the `create route` command. Verify that the Replication Agent™ name is in the Replication Server interfaces file; an ERSSD Replication Agent is started as an open server during `create route`. If the Replication Agent name does not appear in the interfaces file, the command fails.

The default ERSSD Replication Agent name is *erssd_name_ra*. To replace the default name with that of your Replication Agent server, enter:

```
configure replication server
set erssd_ra to <value>
```

Note Sybase provides ERSSD in Adaptive Server Anywhere (ASA) as an option, as well as continues to support the traditional RSSD in Adaptive Server® Enterprise.

New password encryption algorithm

Replication Server 15.0 uses the FIPS-certified Advanced Encryption Standard (AES) algorithm to encrypt new Replication Server user passwords. The AES algorithm uses the 128-bit encryption key and can be obtained from the Certicom Security Builder library.

Migrating existing encrypted passwords

Use the information in Table 4-3 to migrate existing encrypted passwords in the Replication Server configuration file, and the *rs_users* and *rs_maintusers* tables.

Table 4-3: Commands to encrypt passwords in new algorithm

To	Command
Migrate existing user passwords to the new algorithm	<pre>alter user user set password password</pre> <p>where:</p> <ul style="list-style-type: none"> • <i>user</i> is the login name of the existing user. • <i>password</i> is the existing password you want to encrypt using the new algorithm.
Migrate existing database maintenance user passwords to the new algorithm	<pre>alter connection to data_server.database set password to password</pre> <p>where <i>password</i> is the existing password you want to encrypt using the new algorithm.</p>
Migrate existing route user passwords to the new algorithm	<pre>alter route to dest_replication_server set password to passwd</pre> <p>where:</p> <ul style="list-style-type: none"> • <i>dest_replication_server</i> is the name of the kdestination Replication Server. • <i>passwd</i> is the existing password you want to encrypt using the new algorithm.
Migrate existing user passwords in the configuration file to the new algorithm	Use <code>rs_init</code> to encrypt the passwords using the new algorithm.

Mixed-version issues

To fully support the new password encryption algorithm, both the Replication Server and the `rs_init` utility must have a site version of 15.0. If the site version is lower than 15.0, an error message displays and encryption is disabled.

Mixed-version enhanced support

In mixed-version environments, interaction between Replication Servers of different versions is restricted to the capabilities of the oldest version. Information associated with new features may not be available to Replication Servers of earlier versions.

Features in the new version, when sent to downstream Replication Servers of earlier versions, can break the multi-site availability (MSA) replication and must be filtered out. In Replication Server 15.0, mixed-version support has been enhanced to provide a mechanism in which the later-version feature data is filtered out by the primary Replication Server before sending it out to the downstream Replication Servers of earlier versions.

New configuration parameter

To enable the primary Replication Server to block certain new feature commands not supported by earlier versions of Replication Server, a new Replication Server configuration parameter, `dist_stop_unsupported_cmd`, is available for all server and connection-level commands.

Replication Server commands that include the new configuration parameter are described in Table 4-4.

Table 4-4: Modified commands for Mixed-version support

Replication Server command	Syntax
<code>configure replication server</code>	<code>configure replication server set dist_stop_unsupported_cmd to [on off]</code>
<code>alter connection</code>	<code>alter connection srv.db set dist_stop_unsupported_cmd to [on off]</code>
<code>alter logical connection</code>	<code>alter logical connection lsrv.ldb set dist_stop_unsupported_cmd to [on off]</code>

By default, `dist_stop_unsupported_cmd` is set to off. When this parameter is set to on, DIST suspends itself if a command cannot be sent to some destination Replication Servers. You have to resume the DIST by skipping the entire transaction or by resetting this parameter to off.

When the parameter is set to off, the distributor (DIST) thread skips the newer commands to earlier version Replication Servers.

New interface for monitors and counters

Replication Server 15.0 provides a new, simpler interface for monitoring the counters that provide performance information. By default, all counters are inactive until you turn them on using either:

- The `admin stats` (admin statistics) command, which activates counters for a specific time period, or
- The Replication Server configuration parameter `stats_sampling`, which is a toggle that activates or deactivates counters.

Using `admin stats`, you can specify which counter statistics to report, whether to display those statistics on the screen or save them to the RSSD, and how many seconds to collect the statistics. `admin stats` lets you specify statistics for:

- Individual counters
- Individual modules
- The `sysmon` counters, which are a set of counters Sybase has identified as those most valuable for monitoring performance
- All counters

Viewing statistics on screen provides a point-in-time benchmark. Saving statistics to the RSSD lets you accumulate data, so you can see changes in statistics over time, and perform averages and other calculated values. You can specify a sampling period and the number of observations during that sampling period.

When you turn on counter activity using `stats_sampling`, the counters stay active until you turn them off.

New `admin stats` options are:

- `admin stats, backlog` – reports the current backlog in the inbound and outbound stable queues.
- `admin stats, { tps | cps | bps }` – reports throughput in transactions per second, commands per second, or bytes per second.
- `admin stats, status` – reports configuration information for counters.

Support for isolation levels

Isolation levels let you control the degree to which data can be accessed by other users during a transaction. With version 15.0, Replication Server decouples isolation levels and serialization methods for the replicate data server, and enables all isolation levels for replicate data servers that Replication Server supports. In versions earlier than 15.0, Replication Server supported only isolation level 3.

Through the use of custom function strings, Replication Server supports all isolation levels the replicate data servers may use. Support is not limited to the ANSI standard only.

Each isolation level specifies the types of actions that are not permitted while concurrent transactions are processing. Higher levels include the restrictions imposed by lower levels.

You can set the isolation level with the database configuration parameter `dsi_isolation_level`. The ANSI standard levels supported by Adaptive Server are:

- 0 – ensures that data written by one transaction represents the actual data.
- 1 – prevents dirty reads and ensures that data written by one transaction represents the actual data.
- 2 – prevents nonrepeatable reads and dirty reads, and ensures that data written by one transaction represents the actual data.
- 3 – prevents phantom rows, nonrepeatable reads, and dirty reads, and ensures that data written by one transaction represents the actual data.

The default value is the current transaction isolation level for the target data server.

For example, to select isolation level 2 for the Replication Server connection to the TOKYO_DS data server and pubs2 database, enter:

```
alter connection to TOKYO_DS.pubs2
set dsi_isolation_level to '2'
```

In versions earlier than 15.0, you set isolation level 3 and the serialization method at the same time:

```
alter connection to TOKYO_DS.pubs2
set dsi_serialization_method to 'isolation_level_3'
```

With version 15.0, the equivalent is:

```
alter connection to TOKYO_DS.pubs2
set dsi_serialization_method to 'wait_for_start'

alter connection to TOKYO_DS.pubs2
set dsi_isolation_level to '3'
```


Bidirectional replication support for DDL in MSA

You can configure multi-site availability (MSA) to set up a two-way replication of data definition language (DDL) transactions between two Adaptive Server databases.

In version 15.0, bidirectional DDL replication support in MSA environments is supported only for non-warm standby databases.

Replication Server 15.0 supports this bidirectional replication using a new configuration parameter `dsi_replication_ddl`. When `dsi_replication_ddl` is set to on, DSI sends set replication off to the replicate database, which instructs it to mark the succeeding DDL transactions available in the system log not to be replicated. Therefore, these DDL transactions are not replicated back to the original database, which enables the DDL transactions replication in bidirectional MSA replication environment.

❖ Setting up bidirectional replication

- 1 Create a bidirectional MSA replication environment. For steps, see Chapter 12, “Managing Replicated Objects Using Multi-Site Availability,” in the *Replication Server Administration Guide Volume 1*.
- 2 Grant “set session authorization” privilege to a maintenance user on the destination database, as shown in the following example:

```
grant set session authorization to maint_user
```

- 3 In the destination database, set `dsi_replication_ddl` to on to enable bidirectional DDL replication, as shown in the following example:

```
alter connection to dataserver.database set dsi_replication on
```

- 4 Replicate DDL transactions.

Batching of commands for non-ASE servers

Replication Server 15.0 allows you to batch commands for non-ASE database servers. By batching commands, you may be able to achieve improved performance in Replication Server.

New function strings	Support for command batching to non-ASE servers is achieved through the use of two function strings, <code>rs_batch_start</code> and <code>rs_batch_end</code> . These function strings store the SQL translation needed for marking the beginning and end of command batches. Use of these function strings is not necessary for Adaptive Server Enterprise or any other data server where the function strings <code>rs_begin</code> and <code>rs_commit</code> already support the needed functionality.
New DSI connection parameter	A DSI connection parameter, <code>use_batch_markers</code> , is used to control the processing of the two function strings, <code>rs_batch_start</code> and <code>rs_batch_end</code> . You can set <code>use_batch_markers</code> with <code>alter connection</code> and <code>configure connection</code> commands. If <code>use_batch_markers</code> is set to on the function strings <code>rs_batch_start</code> and <code>rs_batch_end</code> are executed. The default is off.
New DSI configuration parameters	<p>DSI must be correctly configured for batching of commands to the replicate data server. There are three DSI configuration parameters to consider for each connection that will be batching commands:</p> <ul style="list-style-type: none">• <code>batch</code>• <code>batch_begin</code>• <code>use_batch_markers</code> <p>For more information about configuring DSI for non-ASE data servers, see Chapter 5, “Replication Server Issues,” in the <i>Replication Server Heterogeneous Replication Guide</i>.</p>

SySAM license management

The Sybase Software Asset Management (SySAM) implementation has changed for this version of Replication Server. The changes include:

- Asset management and reporting tools are provided with SySAM version 2.0. These tools allow you to monitor license usage and compliance.
- A single installation method supports all editions of Replication Server.
- SySAM configuration is no longer optional.
- Flexible SySAM configuration options.
- SySAM licenses are no longer shipped along with order fulfillment. You must obtain license certificates from the Sybase Product Download Center (SPDC).

- SySAM license keys include information about the support plan you purchased. You must update these licenses whenever you renew your support plan.
- Licensing policies are strictly and consistently enforced.
- Replication Server can function under grace periods if cannot obtain a license. These grace periods allow you reasonable time to respond to the issues causing license failure. During the grace period, the Replication Server continues to function normally. However, the Replication Server or any of its features, will shut down at the end of the grace period if licensing issues remain unresolved.
- You can receive real-time e-mail notifications about licensing events.
- Licenses issued from SPDC include information about the host machine where the licenses will be deployed. These licenses cannot be used on another machine without being reissued from SPDC.

Note Replication Server 15.0 does not require the REP_SSL license, as SSL now comes as a part of the basic REP_SERVER license.

These changes affect the Replication Server installation and configuration process. For pre-installation and SySAM installation information, see the *Replication Server Installation Guide* for your platform.

Plan your SySAM deployment before installing Replication Server.

System Changes in Replication Server 15.0

This chapter describes system changes introduced with Sybase Replication Server version 15.0.

Topic	Page
Configuration parameters	41
RCL commands	43
System tables	44
System stored procedures	45
Function strings	45
Datatypes	46

Configuration parameters

This section summarizes new and changed configuration parameters for Replication Server 15.0.

Replication Server parameters

Table 5-1 describes new Replication Server configuration parameters that are stored in the `rs_config` system table and can be set using `configure` replication server.

Table 5-1: New Replication Server parameters for `rs_config` table

Parameter	Description
<code>errsd_backup_interval</code>	Interval between backups of database and log. Specified as “nn hours” or “nn minutes” or “nn seconds.” Default: 24 hours.

Parameter	Description
errsd_backup_path	Location of stored backup files. Should be a full directory path. Configuring this path causes immediate backup. Default: Same directory as the transaction log mirror; initial value specified in rs_init.
errsd_backup_start_time	Time the backup starts. Specified as: “hh:mm AM” or “hh:mm “M” using a 12-hour clock, or “hh:mm” using a 24-hour clock. Default: 01:00 AM.
errsd_backup_start_date	Date the backup begins. Specified as “MM/DD/YYYY.” Default: current date.
errsd_ra	Configures Replication Agent name, to create a route from the current site to another Replication Server. This server name must exist in the interfaces name. <i>errsd_name_ra</i>

Table 5-2 describes changed Replication Server configuration parameters that are stored in the rs_config system table and can be set using configure replication server.

Table 5-2: Changed Replication Server parameters for rs_config table

Parameter	Description
stats_daemon_sleep_time	Parameter not supported in this version.
send_enc_pw	Renamed to send_enc_pw. The description remains the same, which is as follows: Ensures that Replication Server makes client connections to the RSSD with an encrypted password. Values are on and off (the default).
stats_flush_rssd	Parameter not supported in this version.
stats_reset_afterflush	Parameter not supported in this version.

Database connection parameters

Table 5-3 describes the new database connection configuration parameters.

Table 5-3: New configuration parameters

Parameter	Description
dsi_ignore_commit_order	Removes restrictions when a transaction is submitted or committed to the replicate database.

Parameter	Description
dsi_isolation_level	<p>Specifies the isolation level for transactions. ANSI standard and Adaptive Server supported values are:</p> <ul style="list-style-type: none"> • 0 – ensures that data written by one transaction represents the actual data. • 1 – prevents dirty reads and ensures that data written by one transaction represents the actual data. • 2 – prevents nonrepeatable reads and dirty reads, and ensures that data written by one transaction represents the actual data. • 3 – prevents phantom rows, nonrepeatable reads, and dirty reads, and ensures that data written by one transaction represents the actual data. <hr/> <p>Note Replication Server support is not limited to ANSI standard values only.</p>
dsi_replication_ddl	Specifies whether or not to replicate the DDL transactions in the transaction log.
dsi_rs_ticket_report	Specifies whether or not to invoke function string rs_ticket_report.
stats_show_zero_counters	Specifies whether or not to display counters with zero observations since the last reset.

Table 5-4 describes changed database configuration parameter.

Table 5-4: Changed database configuration parameter

Parameter	Description of enhancements
dsi_serialization_method	Option isolation_level_3 is not supported in this version.

RCL commands

Table 5-5 summarizes new RCL commands.

Table 5-5: New RCL commands

Command	Description
admin stats	Displays information and statistics about Replication Server counters. Replaces admin statistics.
admin stats, backlog	Displays the current backlog in the Replication Server stable queues.
admin stats, reset	Resets all counters that can be reset. Replaces admin statistics, reset.
admin stats, status	Displays the flushing status for all counters.
admin stats, {tps cps bps}	Displays throughput in terms of transactions per second, counts per second, or bytes per second.
alter partition	Changes the size of a partition.
create partition	Makes a partition available to Replication Server. Replaces add partition.

Command	Description
sysadmin erssd	Displays current values for the ERSSD backup time, backup interval, and backup location.

Table 5-6 describes changed RCL commands.

Table 5-6: Changed RCL commands

Command	Description of changes
admin stats_config_connection	Command not supported in this version.
admin stats_config_module	Command not supported in this version.
admin stats_config_route	Command not supported in this version.
admin stats, flush status	Command not supported in this version.
admin statistics, flush_status	Command not supported in this version.
admin stats_intrusive_counter	Command not supported in this version.
alter connection	<ul style="list-style-type: none"> New options: <ul style="list-style-type: none"> dsi_isolation_level – specifies the isolation level for transactions dist_stop_unsupported_cmd – used for mixed-version environments. Changed option: dsi_serialization method – isolation_level_3 option deleted.
alter logical connection	Enhanced to include a new parameter, dist_stop_unsupported_cmd, for mixed-version environments.
configure replication server	

System tables

Table 5-7 describes system table changes.

Table 5-7: Altered system tables

System table	Description
rs_articles	New minvers column describes minimum Replication Server version required to support this article.
rs_funcstrings	New minvers column describes the minimum Replication Server version required to support this function.
rs_publications	New minvers column describes minimum Replication Server version required to support this publication.

System table	Description
rs_statdetail	<p>Provides new options:</p> <ul style="list-style-type: none"> • counter_obs – specifies observed counter value. • counter_total – specifies the total counter value for the run or observation period. • counter_last – specifies the last observed counter value for the run or observation period. • counter_max – specifies the maximum counter value for the run or observation period.

System stored procedures

Table 5-8 describes new system stored procedures.

Table 5-8: New system stored procedures

System procedure	Description
rs_dump_stats	Extracts Replication Server statistics collected in the RSSD by admin stats to a comma-delimited format.
rs_ticket	Is executed at the primary database. rs_ticket sends a ticket to the primary Replication Server through rs_marker. If the replicate Replication Server is configured to process rs_ticket, Replication Server calls rs_ticket_report at the replicate database.
rs_ticket_report	Processes a ticket sent by the Replication Server. If at the Replication Server dsi_rs_ticket_report is on and a rs_ticket is received from the primary database, the Replication Server executes rs_ticket_report stored procedure at the replicate database.

Function strings

Table 5-9 describes new function strings.

Table 5-9: New function strings

Function string	Description
rs_batch_end	Specifies the SQL statements required to mark the end of a batch of commands. This function string is used with rs_batch_start.
rs_batch_start	Specifies the SQL statements required in addition to the rs_begin statements to mark the beginning of a batch of commands.
rs_repl_on	Sets replication on in Adaptive Server for a database connection.

Function string	Description
rs_set_ciphertext	Enables set cipher string on, which enables replication of encrypted columns for database connections.
rs_set_dml_on_computed	Enables the replication of materialized computed columns.
rs_set_isolation_level	Passes the isolation level for transactions to Adaptive Server.
rs_ticket_report	Invokes the replicate database stored procedure rs_ticket_report.

Table 5-10 describes changed function strings.

Table 5-10: Changed function strings

Function string	Description of changes
rs_set_isolation_level_3	Function string not supported in this version.
rs_truncate	Includes support for the truncate table partition command.
rs_writetext	Includes support to modify unitext data in a replicate database.

Datatypes

Table 5-11 describes new datatypes.

Table 5-11: New datatypes

Datatype	Description and range
bigint	Fixed-width, signed, 8-byte datatype. Holds whole numbers between -263 and $+(263 - 1)$, inclusive.
unsigned bigint	Unsigned integer datatype. Holds whole numbers between 0 and 18,446,744, 073, 709,551,615, inclusive.
unsigned int	Unsigned integer datatype. Holds whole numbers between 0 and 4,294,967,295, inclusive.
unsigned smallint	Unsigned integer datatype. Holds whole numbers between 0 and 65535, inclusive.
unsigned tinyint	Unsigned integer datatype. Holds whole numbers between 0 and 255, inclusive.
unitext	Variable-width, nullable Unicode datatype coded in UTF-16. Used as text datatype.

New Features in Replication Manager 15.0

This chapter describes new features in the 15.0 version of the Replication Manager, a plug-in to Sybase Central.

Topic	Page
New user interface features	47
Replication Manager features supported	52

New user interface features

The Replication Manager supports several new interface features that promote ease-of-use and productivity.

Two-tier management solution

Replication Manager can manage replication environments by connecting directly to servers in the environment without communicating through a management server layer. This two-tier management solution lets you manage small, simple replication environments with fewer than ten servers.

To set up a replication environment in Sybase Central, you select the servers contained in the environment from a drop-down list, which is derived from the local interfaces file, then provide a user name and password that the Replication Manager uses to connect to these servers. These passwords are encrypted when stored in the Sybase Central repository.

Three-tier management solution

If you are managing a large or complex replication environment, you might want to install the Replication Monitoring Services (RMS) server. In a three-tier management solution, RMS server is a middle-management layer that monitors the status of the servers and other components in the replication environment. Replication Manager connects to the servers in the environment through RMS.

The Replication Manager provides the client interface that displays the information provided by RMS.

For more information about RMS and its functionality, see Chapter 7, “Introducing Replication Monitoring Services.”

Replication Manager plug-in replaces Replication Server plug-in

With Replication Server 15.0, the Replication Manager plug-in replaces the Replication Server plug-in as the complete management tool for developing, managing, and monitoring a Sybase Replication Server environment for a two-tier management solution.

In earlier versions, the Sybase Central Replication Server Manager included a Replication Server plug-in and a Replication Server Manager Server (RSM Server) as the software tools to monitor, analyze, troubleshoot, and administer a replication system.

The Replication Server plug-in included a graphical user interface (GUI) integrated with Sybase Central. The Replication Manager plug-in has an interface that is similar to the Replication Server plug-in, but that runs within the Sybase Central, Java Edition framework.

In addition, Replication Manager does not require the RSM Server to manage servers in a replication environment. It communicates directly with the Replication Server and Adaptive Servers in a two-tier management solution.

Online help

Online help for Replication Manager is now available. The online help contains extensive topic-level help that provides a quick reference for all Replication Manager concepts and tasks.

Select Help from the Sybase Central main menu and then select Replication Manager online help.

Visual monitoring of status

The state of each object displays on the object icon, in the parent object Details list, and on the Properties dialog box for that object. You can monitor the status of servers, connections, routes, and queues.

Using the Details list

When you select an object in the left pane that contains subcomponents or function components, one or more tabs display in the right pane of the Sybase Central window with lists of information. For most objects, a single tab called “Details” displays, which contains a list of general information about the object.

The Details list displays:

- Subcomponents, which are other replication or database objects that are contained in another object.
- Function components, which are components that invoke a wizard when double-clicked. For example, the Add Connection object is a function component that invokes the Add Connection wizard.

Event Log pane

Replication Manager displays an event log in a pane at the bottom of the Sybase Central window. The event log displays:

- Component state changes for connections, routes, and queues
- Server availability changes
- Background thread completion
- RMS event trigger execution

Note For more information about RMS and event triggers, see Chapter 7, “Introducing Replication Monitoring Services.”

To display or hide the event log, select Event Log from the View menu.

Background processing

Several tasks performed by Replication Manager can be very time-consuming, such as creating a subscription that also materializes the table. These tasks are now performed in the background, allowing Sybase Central to continue to function. When you start a time-consuming task, Replication Manager displays a message window indicating that a process is running. You can click Stop Process in this window to stop the process.

Note The process continues even if the Background Process window is closed.

When a background task completes, the Replication Manager places an event entry in the event log.

Using the Background Processes dialog box

To see the status of a background process, you can open the Background Processes dialog box, which displays a list of all of the currently running background threads.

To access the Background Processes dialog box, select Search | Background Processes. The Background Processes dialog box opens, displaying the following:

- Process – the name of the process.
- Start time – the start time of the process.
- Status – the status of the process.

Replication Manager logging enhancement

Replication Manager now uses the Sybase Central message logging feature to provide a log of all commands sent by the Replication Manager to any server. Because the log may contain passwords (for example, passwords are needed to create a connection, and these passwords are saved in the log), the Replication Manager provides the ability to turn off command logging.

❖ Turning command logging on and off

- 1 Right-click the Replication Manager object (at the top of the tree).
- 2 Select Properties.

- 3 In the Replication Manager properties dialog box, select Write SQL Commands to Log.

To turn logging off, return to the Replication Manager properties dialog box and unselect the Write SQL Commands to Log check box.

Warning! Turning on command logging can fill up the Sybase Central log, causing it to crash. If you turn command logging on, monitor the log closely.

Script editors

Replication Manager provides two script editors, the Replication Command Language (RCL) script editor and the Structured Query Language (SQL) script editor. These editors operate the same way, except the RCL script editor highlights RCL keywords while the SQL script editor highlights SQL keywords.

You can use the script editor to view generated RCL commands, which include syntax to create connection and configuration parameters that can be used to create connections outside the Replication Manager.

With the script editors, you can:

- Select several Replication Server objects and generate RCL for all objects selected.
 - Edit and save the generated RCL script.
 - Load an RCL script from a file and add it to the current script.
 - Resubmit an RCL script to Replication Server.
- ❖ **Accessing the script editor**
- 1 Select the Replication Server object for which you want to generate RCL.
 - 2 Right-click that object.
 - 3 Select Generate RCL from the context menu. The RCL Script Editor opens and contains the commands needed to create the object.

Replication Manager features supported

This section describes the Replication Server 15.0 features that the Replication Manager also supports.

Support for new datatypes

Replication Manager supports the following new datatypes supported by Replication Server 15.0:

- bigint
- unsigned integer datatypes
 - unsigned tinyint
 - unsigned smallint
 - unsigned int
 - unsigned bigint
- unitext

For more details of the datatypes supported by Replication Server 15.0, see Chapter 4, “New Features in Replication Server Version 15.0.”

Support for DirectConnect

In version 15.0, the Replication Manager manages a component that represents a Sybase DirectConnect™ data access server. The DirectConnect server acts as an Open Server gateway by converting the Open Client/Server protocol used by Replication Server to the native communication protocol used by the non-Sybase replicate database.

In Sybase Central, the DirectConnect data access server is managed as any other object in the replication environment. The Replication Manager displays the state on the icon of the DirectConnect data access server and on the parent object's Detail list. The state of the server reflects whether the server is available and the state of the back-end data servers.

Limitations

In version 15.0, the Replication Manager neither displays the error log nor sets configuration parameters for DirectConnect.

Replication support

Replication Server provides replication at the database, table, and stored procedure levels. Replication Manager allows you to create a replication definition for a database, a table, or a stored procedure. Note that a replication definition for a stored procedure is called a function replication definition. You can create, alter, and delete function replication definitions and function subscriptions.

For more information about creating, altering, and deleting replication definitions and subscriptions, see the Replication Manager online help.

Routes

A route is a one-way message stream from a source Replication Server to a destination Replication Server. Routes carry replication data. You can use Replication Manager to manage routes.

For more information on managing routes using Replication Manager, see the Replication Manager online help.

Upgrading routes

With Replication Server 15.0, you can upgrade routes using the Replication Manager. In earlier versions, the RSM Server provided the route upgrade capability.

The Replication Manager displays a set of all routes in the Replication Server that are eligible to be upgraded. You can select one single route at a time for upgrade. Upon selection of a route, the Replication Manager runs the upgrade process in the background and reports any errors or warnings in the event log.

The new route upgrade implementation provides the following additional functionalities:

- Canceling a route upgrade process – the ability to cancel a route upgrade process. However, canceling can leave the replicate Replication Server in an unstable state.
- Recovering from an unsuccessful upgrade – a recovery procedure to reset the replicate RSSD. An unsuccessful upgrade can result from either an abnormal termination of the upgrade process or a cancellation of the upgrade process.

❖ **Upgrading a route using Replication Manager**

- 1 In the object tree, select a Replication Server object.
- 2 Right-click the Replication Server object and select Upgrade Route. A dialog box lists all the routes that can be upgraded.
- 3 From the list, select a route and click the Upgrade button.

A background process starts, which on completion indicates whether the upgrade is successful or not.

Limitations

The route upgrade implementation has these limitations:

- You cannot currently upgrade multiple routes at the same time.
- Route upgrade is supported only in an environment domain using the two-tier solution.

Troubleshooting tools

Occasionally, an environment stops replicating data. This can happen when a transaction is not formatted correctly, or when a server generates an error. To troubleshoot the situation, you can view the Replication Server queue data and exceptions log.

Accessing the exception log

Use the exceptions log to troubleshoot a problem with replication.

❖ **Using the exceptions log**

When a transaction is not processed because of a SQL error, you can:

- 1 Issue a resume command with a skip transaction clause to the queue.
- 2 Right-click the connection and select View Exceptions.

The View Exceptions dialog box displays the exceptions log in the Exceptions Log table.
- 3 View the skipped transaction and the erroneous SQL in the exceptions log.
- 4 Filter the display of the exceptions log by selecting the columns in the table: Origin Data Server, Origin Database, and Previous Hours.
- 5 To see the command language associated with a transaction, select it from the Exceptions Log table. The Command Editor text box displays the SQL commands in the transaction.

- 6 Edit the transaction in the text box.
- 7 To resubmit the transaction to the replicate data server, select Resubmit.

Accessing queue data

Data that is passed between servers (Adaptive Server, Replication Server, and so on) is stored in stable queues within Replication Server. The Replication Manager displays the statistics of queue usage and displays the content of the queues.

Using the View Queue Data dialog box

The View Queue Data dialog box lets you filter and sort the data from a queue as an aid in troubleshooting transactions in the queue. You can also edit, delete, or undelete a given command, or purge the first transaction in the queue.

The View Queue Data dialog box contains the following fields:

- Filter fields, which let you select the type of filters that the Replication Manager uses to display data from the queue. These filters include:
 - Column
 - Column value
 - Segment
 - Starting block
 - Number of blocks displayed
 - Number of rows displayed
 - Whether to start at the first active segment or not
 - Whether to include all data to the end of the segment
 - Whether to include all rows or not
 - Whether you want to show deleted data
 - Whether to view all data to the end of the queue
- General buttons, which let you:
 - Display the queue data with the current filters
 - Close the dialog box
 - Purge the first transaction from the queue

- Edit transactions
- Delete transactions
- Undelete transactions
- Group transactions, which returns the Queue Data scrolling list display back to grouped transactions
- Queue Data scrolling list, which contains rows of data from the current queue. Each column contains specific information about the command and transaction contained in each row. For example, to sort the queue data by a specific column, select that column name. The Queue Data scrolling list refreshes, sorting the data according to that column. An arrow displays next to the column name to show that you have sorted the data by that column. The columns you can sort by include:
 - Segment
 - Transaction Name
 - Command
 - Origin Site
 - Origin Commit Time
 - Origin User
 - Transaction ID
 - Origin QID

Note You can only delete, undelete, or purge queue transactions when Replication Server is in standalone mode. For more information, see Chapter 3, “Managing Replication Server with Sybase Central,” in the *Replication Server Administration Guide Volume 1*.

❖ **Viewing queue data**

- 1 Right-click the queue whose data you want to view.
- 2 Select View Data. The View Queue Data dialog box opens.
- 3 To filter data shown, select one of the filter fields.

For more information, see “Using the View Queue Data dialog box” on page 55.

- 4 To sort the data, select segment, transaction, origin, size, status, commit time, or user.

Connection status hide options

You can hide (or filter out) the status of connections if you do not want to see the connection status either on the individual connection icon or as part of the rollup status for Replication Server.

Because the filtering state of the connection status is stored locally by the Replication Manager, different instances of the Replication Manager do not share filtering states. For example, if you create a connection using one instance of the Replication Manager, and then set the Replication Agent status to “hide” for that connection, another Sybase Central plug-in instance monitoring the same environment does not filter the connection status because the filtering information is available only to the original Replication Manager instance.

In addition, any connection created outside of Sybase Central (by `rs_init` or from the command line) is not filtered automatically by the Replication Manager. You must set the filtering manually from within Sybase Central.

Filtering connection status in warm standby environments

If you are creating a warm standby environment, the Replication Manager automatically sets the filtering state for the active Data Server Interface (DSI) thread and standby RepAgent thread connections. You must set filtering for the physical connection manually by selecting one of the connection status hide options from the context menu.

Using connection status hide options

The options for hiding connection status are as follows:

- Hide the State of the Replication Agent – hides the state of the Replication Agent thread in the Details list, on the Connection Properties dialog box, and in the rollup status for the Replication Server to which that Replication Agent thread is connected.
- Hide the State of the DSI Thread – hides the state of the DSI thread in the Details list, on the Connection Properties dialog box, and in the rollup status for the Replication Server to which the DSI thread is associated.

❖ **Hiding connection status**

- 1 Right-click the connection whose status you want to hide.
- 2 Select Hide Connection Status from the drop-down menu.
A dialog box shows options for hiding the connection status.
- 3 Select an option.

The state for that connection now reads “Hidden.” The state on the Connection Properties dialog box and in the rollup status for the Replication Server is also hidden. The Event Log records this change.

Warm standby wizards

To create a warm standby environment, you must create the following components in order:

- A logical connection
- A connection to the active database
- A connection to the standby database

Previously, these steps were only part of the Configure Replication Environment wizard, which enables you to build a warm standby environment in one step. With this version of Replication Manager, you can use a separate wizard for each step in the process, which lets you drop and re-create connections as needed.

The three wizards are:

- Add Logical Connection – add a logical connection whether you are basing this connection on an existing physical connection or not.
- Add Active Database – add an active database connection to an existing logical connection.
- Add Standby Database – add a standby database to an existing logical connection that already has an active database connection.

Using the Add Logical Connection wizard

Using the Add Logical Connection wizard, you can add a logical connection whether you are basing this connection on an existing physical connection or not.

❖ Creating a logical connection

- 1 In the tree view, select the Logical Connection folder under the Replication Server object.
- 2 In the Details view, double-click Add Logical Connection. The Add Logical Connection wizard starts.
- 3 On the Convert Existing Connection wizard page, verify that the Use an Existing Connection as the Active Connection check box is not selected.
- 4 Enter the database name and data server name for the logical connection.
- 5 Review the summary information for the logical connection.
- 6 If everything looks correct, click Finish. Otherwise, click Back to return to an earlier page in the wizard and change the logical connection information. Then return to the final wizard page and click Finish.

Replication Manager creates the logical connection object.

Note You must create the connections to the active and standby databases before you have a working warm standby environment. For more information, see “Using the Add Active Database wizard” on page 59 and “Using the Add Standby Database wizard” on page 60.

Using the Add Active Database wizard

Using the Add Active Database wizard, you can add an active database connection to an existing logical connection.

❖ Creating an active database connection

- 1 In the Details view, right-click the logical connection object you created using the Add Logical Connection wizard.
- 2 Select Add Active Database. The Add Active Database wizard starts.
- 3 Select the active server and active database.
- 4 Select the Replication Server that will manage the database connections.
- 5 Enter the user name and password of the maintenance user.
- 6 Select the user name and password that the RepAgent will use to connect to Replication Server.

If the RepAgent user does not exist, the wizard creates one for you and gives it a default name and password. Accept the defaults, or enter your own values.

- 7 Select the Enable all objects in the active database check box to enable database objects.
- 8 Review the summary information about the replication environment.
- 9 If everything looks correct, click Finish. Otherwise, click Back to return to an earlier page in the wizard and change the replication environment information. Then return to the final wizard page and click Finish.

Replication Manager creates the active database connection.

Using the Add Standby Database wizard

Using the Add Standby Database wizard, you can add a standby database to an existing logical connection which already has an active database connection.

❖ Creating a standby database connection

- 1 In the Details view, right-click the logical connection object you created using the Add Logical Connection wizard.
- 2 Select Add Standby Database. The Add Standby Database wizard starts.
- 3 Select the standby server and standby database.
- 4 Select the Replication Server that will manage the database connections.
- 5 Enter the user name and password of the maintenance user.
- 6 Select the user name and password that the RepAgent will use to connect to Replication Server.

If the RepAgent user does not exist, the wizard creates one for you and gives it a default name and password. Accept the defaults, or enter your own values.

- 7 Select the materialization method.
- 8 Select one of the following options:
 - Initialize Standby Database with Dump Load, which initializes the standby database with the current data dump from the active database.
 - Use Dump Marker in Transaction Log, which replicates transactions that are executed between the time the active database is enabled and the time the data is dumped.

- 9 Review the summary information about the replication environment.
- 10 If everything looks correct, click Finish. Otherwise, click Back to return to an earlier page in the wizard and change the replication environment information. Then return to the final wizard page and click Finish.

Replication Manager creates the standby database connection.

Note Before you use your warm standby environment, resume the DSI thread on the replicate database connection, if necessary.

Thread management

Replication Manager displays the state of the threads in the Replication Server. If the thread is directly related to another Replication Server component, such as a connection, route, or queue, then the thread component is represented in Sybase Central by the related component and its features. For example, the Replication Agent thread (RepAgent) or DSI threads are represented by the associated connection component. The DSI EXEC thread, however, is not represented by another component.

Using thread context menus

The Thread context menus give you access to the menus of a related component, if a related component exists for a particular thread. For example, if you right-click a DIST thread, the context menu displays Connection and Copy. If you select Connection, a context submenu displays, showing you the commands from the connection context menu.

Note Some thread objects are not related to a component and, therefore, do not give access to a submenu. For example, if you right-click a DSI EXEC thread, the context menu displays only the Copy command.

The following table shows the mapping of thread objects to related components:

Thread	Related component
DSI	Connection
DIST	
REP AGENT	

Thread	Related component
SQM	Queue
SQT	
RSI	Route
USER	User

Viewing the Details list and other thread information

When you select the Threads folder in the left pane, the Details list and tab display, as well as several other tabs. These other tabs give you access to additional information about each type of thread, as follows:

- DIST – displays information about distributor threads.
- DSI – displays information about DSI threads.
- RSI – displays information about RSI threads.
- SQM – displays information about SQM threads.
- SQT – displays information about SQT threads.

See the *Replication Server Administration Guide Volume 1* for more information about Replication Server threads.

Using thread information

You can copy information about a thread from any of the thread information lists to the system clipboard. The columns of data in each list are separated by tabs so that you can paste the columns directly into a columnar format such as a spreadsheet.

❖ Copying thread information

- 1 Right-click the thread in the right pane.
- 2 Select Copy.
- 3 Go to the destination file and paste the information as you would any text.

For example, if you select the DIST thread number 19 for a Replication Server called “myRepServer,” then select Copy from the menu and paste that information into a file, the results look similar to the following:

```
19 Awaiting Wakeup 102 myRepServer.emb2 102 P Normal 0 1 0 21787 43856 0 0 0 14
```

Introducing Replication Monitoring Services

This chapter introduces a new Replication Server 15.0 component called the Replication Monitoring Services (RMS). RMS is the new middle-management monitoring layer that replaces the existing Replication Server Manager and provides monitoring services for large and complex replication environments.

Name	Page
Introducing Replication Monitoring Services	63
Monitoring a replication environment using RMS	67

Introducing Replication Monitoring Services

Replication Monitoring Services (RMS) replaces the functionality of the existing Replication Server Manager Server (RSM Server). RMS monitors the servers and components in a replication environment, provides the ability to control the flow of data in the replication environment, and sets the configuration parameters.

RMS functionality is available through the Replication Manager plug-in to Sybase Central and the command line API. Replication Manager provides commands to create, modify, or delete replication objects, while RMS provides an API to monitor, manage, and configure the replication environment.

RMS is applicable only for a three-tier management solution.

Three-tier management solution

A three-tier management solution is for large and complex replication environments consisting of ten or more Replication Servers. The Replication Manager connects to the servers in the environment through RMS. RMS provides the monitoring capabilities for the replication environment.

RMS monitors the status of servers and other components in the replication environment, and the Replication Manager plug-in provides the client interface that displays the status information provided by the RMS.

Table 7-1 lists the features supported in the Replication Server Manager, a component in the earlier versions, and in the Replication Monitoring Services, the new component in version 15.0.

Table 7-1: Difference in features supported in RSM and RMS

Feature	Replication Server Manager	Replication Monitoring Services
Allows you to manage, monitor, and configure replication system components	X	X
Monitors the availability of servers and the state of all connections and routes	X	X
Manages a warm standby environment	X	X
Supports multi-site availability		X
Supports the Embedded RSSD	X	X
Provides support for SSL and network-based security (DCE/Kerberos) security between servers in a replication environment	X	
Runs on Microsoft Windows platforms as well as all UNIX platforms supported by Replication Server		X
Provides a server-centric view of the replication environment	X	X
Enables administration of a logical group of servers		X
Sets configuration parameters of Replication Servers, Replication Agents, the Adaptive Server Enterprise Replication Agent thread (RepAgent), connections, and routes	X	X
Monitors the latency and the state and performance of a replication path	X	X
Provides commands to create, alter, and delete replication objects	X	
Provides logging and tracing of server commands	X	X
Generates a rollup status for Replication Servers and Adaptive Servers	X	X
Executes user-defined scripts for events in the replication environment	X	X

Monitoring servers in the replication environment

Using RMS, you can monitor the following servers in your replication environment:

- Adaptive Server Enterprise
- Adaptive Server Anywhere and IQ

- Replication Agent
- Mirror Replication Agent
- DirectConnect
- Open Server
- Replication Server
- Remote RMS servers

Software requirements and compatibilities

Replication Monitoring Services requires the following software:

- JRE version 1.4.2.03
- Sybase Unified Agent Framework (UAF) version 1.5.0.97
- jConnect™ for JDBC™ version 6.0

Installation

You can use InstallShield to install the Replication Monitoring Services component at the same time you install Replication Server.

If you specify a Typical or Full installation when you install Replication Server 15.0, InstallShield automatically installs the Replication Monitoring Services component along with Sybase Central and Replication Manager.

Starting and stopping RMS

RMS is a Java application built using the Sybase Unified Agent Framework (UAF). To start or stop RMS you must start or stop UAF.

❖ Starting RMS

- 1 Navigate to the Replication Server installation directory, *%SYBASE%* on Windows, or *\$SYBASE* on UNIX.
- 2 Set the environment variables by executing *SYBASE.bat* (Windows) or by sourcing *SYBASE.csh* (UNIX).

- 3 Change to the `%SYBASE_UA%bin` directory (Windows) or the `$SYBASE_UA/bin` directory (UNIX).
- 4 In Windows, execute `agent.bat` or add this command to run Unified Agent (UA) in the background. Similarly on UNIX, execute `agent` or add this command to run UA in the background.

❖ **Stopping RMS**

- 1 Navigate to the Replication Server installation directory, `%SYBASE%` on Windows, or `$SYBASE` on UNIX.
- 2 Set the environment variables by executing `SYBASE.bat` (Windows) or by sourcing `SYBASE.csh` (UNIX).
- 3 Stop RMS:

- If an Adaptive Server Unified Agent is running, enter one of these commands:

```
shutdown [-port rmi-port] [-U username]  
          [-P password]
```

Or

```
shutdown [-port rmi-port] [-user username]  
          [-password password]
```

where:

- *rmi-port* value is 9999.
- *username* and *password* are the values configured for the UA.
- If RMS is the only Unified Agent running, enter `shutdown.bat` (Windows) or `shutdown` (UNIX).

Connecting to RMS in Sybase Central

To connect to RMS in Sybase Central:

- 1 Select the Connect icon from the toolbar. The Connect to a Replication Domain window opens.
- 2 Select the RMS Server radio button.
- 3 Enter the user name and password required to connect to RMS.
- 4 Select RMS from the list of servers in the drop-down list or click the Options button to provide the connection information for the RMS.

5 Enter a server name, host, and port number.

6 Click OK.

The RMS server is added to the object tree in Sybase Central.

Monitoring a replication environment using RMS

To monitor a replication environment, you must set up a RMS domain. This domain consists of the servers in your environment you want to monitor using the RMS. In a three-tier management solution, the Replication Manager connects to the RMS, which then connects to the various servers in your replication environment.

To set up the RMS domain and monitor servers in this domain, you can either:

- Use the Replication Manager plug-in graphical interface, or
- Use command line API

In a three-tier replication environment, you can perform some monitoring through Replication Manager, and additional monitoring through the RMS API at the command line.

The following sections provide information on how to monitor RMS using the Replication Manager plug-in and the API. For those tasks for which you can use both interfaces, only the Replication Manager plug-in is described in detail, while the name of API is identified. For those tasks that can be performed using only the API, detailed API information is given.

Adding and dropping servers for monitoring in Sybase Central

Add and drop servers in a three-tier environment in the same way as in a two-tier environment.

Adding a server

The servers that you add for monitoring in a three-tier solution can be from anywhere in your network. This allows you to monitor replication systems that are distributed worldwide.

You can use Replication Manager wizard to add a server to a RMS domain. Depending on the type of server you are adding (Adaptive Server, Replication Server, RepAgent, Open Server™, Sybase Replication Agents, DirectConnect), the wizard prompts for different information.

Before you add a server, have this information available:

- The server's name.
- The type of server you are adding.
- The user name and password used to administer the server. The login must have System Administrator privileges on the server.
- Replication Server only – the user name and password of the RSSD primary user.

To add servers to the RMS server folder in Sybase Central:

- 1 Select the RMS.
- 2 Select File | New | Servers, or double-click the Add Servers icon in the right pane of the main window.
- 3 Enter the required information in the wizard dialog boxes.

The servers are added to the Sybase Central viewer under the RMS server in the object tree.

API command to add server to monitor

Use `add server` to add a server to be monitored by RMS. For detailed information about this API, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Dropping a server

To drop a server from the RMS domain:

- 1 Select the server you want to drop.
- 2 Do one of the following:
 - Click the Delete icon from the toolbar.

- Right-click the selected server and select Delete from the context menu.

Note Although Sybase Central removes the server from the RMS server folder, the server is not actually removed from your replication system. Therefore, the server name may still appear in the dialog boxes because there are routes or database connections associated with it.

API command to drop server from being monitored

Use `drop server` to drop a server that is being monitored by RMS. For detailed information about this API, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Viewing monitored objects in Sybase Central

Viewing monitored objects in Replication Manager is the same as viewing objects in a two-tier environment.

In the object tree, double-click or expand the RMS icon to view the replication objects managed by RMS. Under RMS, you can view the monitored servers and its components such as connections, routes, queues, and threads. When you select a particular replication object such as the Routes folder, you can view the list of created routes. You can manage these replication objects using Replication Manager.

Setting configuration parameters for monitored replication objects

You can set the configuration parameters for the following replication objects monitored by RMS:

- Replication Server
- Replication Agent thread
- Remote RMS server
- Database connections and logical connections
- Routes

To set the configuration properties of an object, in Replication Manager

- 1 Select the object and choose File | Properties. The property sheet for the object opens.

- 2 Select the parameters tab in the Properties dialog box. The Parameters page displays a list of all configuration parameters for the selected server or component.
- 3 Select the parameter you want to modify and click the Edit Parameter button.
- 4 In the Edit dialog, enter the new parameter and click OK.
- 5 You can modify any other parameter in the list. When you are finished, click OK in the Properties dialog box.

API commands to set configuration parameters

RMS API commands to set configuration parameters for the replication objects are:

- `configure server` – returns configuration parameter information for a Replication Server or Replication Agent, or sets the value of a specified configuration parameter. `configure server` also retrieves and sets RMS-specific parameters.
- `configure component` – returns configuration parameters for a component or sets the value of the configuration parameter specified.
- `configure RMS` – returns the configuration parameter information for the RMS, or sets the value of a specified RMS configuration parameter

For detailed information about these APIs, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Monitoring a logical group of servers

RMS enables you to define a set of servers as a logical group and monitor the group as a single entity. You can have many logical groups in your replication environment. The servers in a group can belong to different logical groups. However, all servers in one logical group must be of the same type. For example, you can have one logical group of all Replication Servers and another for all Adaptive Servers. When you issue any command to a group, it affects all the servers contained in this logical group.

You can delete logical groups. When you delete a logical group, only the group is deleted, not the servers within the group.

RMS also returns a rollup status for each group or each server in a group. Roll-up status shows the lowest status reported, for example, if any server in a group is not UP, then the group status is reported as SUSPECT.

API commands to create/delete/list logical groups

RMS API commands to manage logical groups are:

- create group – defines a logical group of servers.
- delete group – deletes a logical group that was added using the create group command.
- get group – returns a result set that contains either a list of the groups and a rollover status for each group or for each server.

For detailed information about these APIs, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Suspending or resuming components in the replication environment

You can suspend or resume the following monitored components in the replication environment:

- RepAgent in Adaptive Server
- Replication Agent and DSI connection in Replication Server
- Routes
- Queues (resume only)
- Replication in a Replication Agent

In Sybase Central, select the monitored connection or route from the RMS Server folder in the object tree:

- To suspend a monitored connection or route, select the connection or route object from the RMS Server folder and select Suspend from the context menu.
- To resume a monitored connection or route, select the connection or route object from the RMS Server folder and select Resume from the context menu.

API commands to suspend/resume replication components

RMS API commands to suspend or resume components in the replication environment are:

- suspend *component* – suspends a component in a specified server.
- suspend *replication* – suspends replication in a Replication Agent.
- resume *component* – resumes a component in a specified server.
- resume *replication* – resumes replication in a Replication Agent.

For detailed information about these APIs, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Shutting down monitored servers

RMS enables you to shut down any monitored Replication Server, Replication Agent, or Mirror Replication Agents.

In Sybase Central, select the monitored server or RMS in the object tree and select Shutdown from the context menu. To shut down a group of servers, select the logical group folder and select Shutdown All from the context menu.

API command to shut down Replication Server, group, or RMS

Use shutdown *server* to shut down one or more, or group of monitored Replication Servers or RMS. For detailed information about this API, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Generating rollup status for servers

The RMS status shows the lowest status reported, for example, if the status of any server in the list is not UP, then the status for the RMS is reported as SUSPECT.

For example, the status of the Adaptive Server reflects the status of its Replication Agent threads. If any of the monitored Replication Agent threads in the Adaptive Server are not UP, then the state of the Adaptive Server is set to SUSPECT.

For more information about RMS server and component states, see Appendix C, “RMS Server and Component States,” in the *Replication Server Reference Manual*.

API commands to view rollup status information

RMS API commands to view rollup status information and the various server states are:

- get servers – returns a list of servers that are monitored by the RMS, and the status of the RMS environment.
- get status description – retrieves the list of status descriptions for a server or component.

For detailed information about these APIs, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Generating latency and heartbeat information

The RMS heartbeat feature uses the stored procedure `rs_ticket` to generate latency information, which is the amount of time it takes for a transaction to move from the primary database to the replicate database. You can use this information to monitor Replication Server performance, module heartbeat, replication health, and table-level quiesce.

At a specified interval, RMS executes `rs_ticket` at the primary database. The generated latency information is stored in a table in the replicate database. You can use RMS to set up the heartbeat process to retrieve the latency information from the replicate database.

For more information about `rs_ticket` and its functionality, see Chapter 6, “Adaptive Server Stored Procedures,” in the *Replication Server Reference Manual*.

API commands to monitor heartbeat

RMS API commands to monitor heartbeat are:

- `get heartbeat` – retrieves a list of the heartbeat processes that have been defined in the RMS.
- `get heartbeat ticket` – retrieves a set of tickets from the `rms_ticket_history` table, for the heartbeat process and date and time range specified.
- `start heartbeat` – sets up and starts a heartbeat process from a specified primary connection to a specified replicate connection.
- `stop heartbeat` – stops the heartbeat process between the primary and replicate databases. Optionally truncates the `rms_ticket_history` table.

For detailed information about these APIs, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

Adding event triggers

Replication Monitoring Services is designed to monitor the replication environment. When something happens in your environment, server and component status changes. These changes are displayed in the event log. RMS allows you to create event triggers to monitor these changes.

Event triggers notify you when some events occur in the replication environment. RMS executes the script when the specified event occurs. For example, a user can set up a script to be notified with an e-mail message when a connection suspends. You can create an event trigger for any server or component that the RMS monitors.

❖ **Creating an event trigger for a Replication Server**

- 1 In the object tree, select the Replication Server.
- 2 On the right side of the desktop, select the event log pane.
- 3 Double-click the Add Server Event Trigger icon.
- 4 Select the status change that will trigger the event.
- 5 As an option, enter a “Wait before executing” value. This notifies RMS to wait for the event to change before executing the trigger.
- 6 To execute a trigger at each monitoring interval, rather than only once, select “Execute at Each Interval.”
- 7 Enter the name of the script for RMS to execute when the event occurs.
- 8 Click OK. The new event displays in the Event Log pane.

API commands to
add/drop/get triggers

RMS API commands for trigger-related tasks are:

- `add event trigger` – sets up a trigger, such as a process or a script, that is executed by the RMS when a specific event occurs.
- `drop event trigger` – removes a trigger that the RMS is monitoring.
- `get triggers` – displays information about the triggers that are monitored by the RMS.

For detailed information about these APIs, see Chapter 9, “Replication Monitoring Services API,” in the *Replication Server Reference Manual*.

New Features in Replication Server Version 12.6

This chapter describes the new features introduced with Sybase Replication Server version 12.6 and 12.5 EBF.

Topic	Page
Multi-Site availability (MSA)	75
Support for symmetric multiprocessors (SMP)	76
The embedded RSSD (ERSSD)	78
Performance enhancements	78
date and time datatypes	81
Support for sending encrypted passwords	81
New bulk materialization method	82
Chinese character set (GB18030) support	83

Multi-Site availability (MSA)

MSA extends Replication Server replication capabilities and can make the process of setting up a replication system both faster and easier.

Some of the features that MSA provides include:

- A simple replication methodology that requires only one replication definition for the primary database and only one subscription for each subscribing database.
- A replication filtering strategy that lets you choose whether or not to replicate individual tables, transactions, functions, system stored procedures, and data definition language (DDL).
- Replication of DDL to any replicate database—including non-warm standby databases.
- Replication to multiple replicate sites—for standby as well as nonstandby databases.

You can overlay MSA scenarios onto your existing replication structure. The procedures for implementing MSA are similar to those you already use to replicate to warm standby or replicate databases.

Database replication

When you use table and function replication, you describe each piece of data that is to be replicated using individual table and function replication definitions and subscriptions. This methodology allows you to transform data and provides fine-grained control over the information being entered in the replicate database. However, you must mark each table or function to be replicated, create a replication definition for each replicated table or function, and create subscriptions for each replication definition at each replicate database.

MSA lets you identify specific database objects: tables, functions, transactions, DDL, and system stored procedures in a single replication definition. You can choose to replicate the entire database; or you can choose to replicate—or not replicate—specific tables, functions, transactions, DDL, and system stored procedures in that database. If you do not need to replicate partial tables, MSA can provide replication while affording the advantages of simple setup and maintenance.

When the replicate is a warm standby database

In the non-MSA warm standby scenario, changes to the primary database are copied directly to the warm standby database without alteration. This methodology allows replication of DDL. To change or qualify the data sent, you must add table and function replication definitions. Each primary database can have one, and only one, standby database.

MSA provides all the features of traditional Sybase warm standby. In addition, MSA:

- Enables replication to multiple standby databases
- Provides the option to replicate or not replicate specific database objects

MSA supports the use of logical connections.

Support for symmetric multiprocessors (SMP)

Replication Server 12.6 lets you run Replication Server on either symmetric multiprocessor (SMP) or single-processor platforms. Replication Server's multithreaded architecture supports both hardware configurations.

On a single processor platform, Replication Server threads run serially. On a multiprocessor platform, Replication Server threads can run in parallel, thereby improving performance and efficiency.

Replication Server support for multiple processors is based on Open Server™ support for multiple processors. Both servers use the POSIX thread library on UNIX platforms and the WIN32 thread library on Windows NT platforms. For detailed information about Open Server support for multiple processing machines, see the *Open Server Server-Library/C Reference Manual*.

When Replication Server is in single-processor mode, a server-wide mutual exclusion lock (mutex) enforces serial thread execution. Serial thread execution safeguards global data, server code, and system routines, ensuring that they remain thread-safe.

When Replication Server is in multiprocessor mode, the server-wide mutex is disengaged and individual threads use a combination of thread management techniques to ensure that global data, server code, and system routines remain secure.

Configuring SMP

To enable SMP on a multiprocessor machine, use configure replication server with the `smp_enable` option. For example:

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

Monitoring thread status

You can verify Replication Server thread status using these commands and procedures:

- `admin who` – provides information on all Replication Server threads
- `admin who_is_up` or `admin who_is_down` – lists Replication Server threads that are running, or not running.
- `sp_help_rep_agent` – provides information on the RepAgent thread and the RepAgent User thread. This is an Adaptive Server stored procedure.

Monitoring performance

Replication Server provides monitors and counters for monitoring performance. See Chapter 15, “Using Counters to Monitor Performance,” in the *Replication Server Administration Guide Volume 2*.

See the *Replication Server Administration Guide* for more information about increasing Replication Server performance using SMP.

The embedded RSSD (ERSSD)

Replication Server can run either on an Adaptive Server Replication Server System Database (RSSD) or on an embedded RSSD (ERSSD). ERSSD is designed for users who do not want to manage the Replication Server RSSD in Adaptive Server. Replication Server is easier to install and manage with ERSSD. If you select embedded RSSD when you install Replication Server, ERSSD is automatically installed, configured, and started in the background. It is self-maintained. Backup procedures are automatic and pre-configured.

Limitations

Currently, you cannot create a route originating from Replication Server with ERSSD. Nor can you migrate between RSSD and ERSSD.

To use the ERSSD, you must select it when you install Replication Server. For more details, see the *Replication Server Installation Guide* and the *Replication Server Administration Guide*.

Performance enhancements

Replication Server 12.6 includes new performance enhancements. See Chapter 16, “Performance Tuning,” in the *Replication Server Administration Guide Volume 1* for detailed information about these enhancements.

Better management of empty transactions

Transactions that contain only a begin and a commit statement can degrade the performance of warm standby connections. To enhance performance, these transactions are now deleted from the inbound queue as they are read.

To further enhance performance, Sybase recommends that you also tune your application to eliminate as many of these empty transactions as possible.

Internal commit control for parallel processing

To resolve conflicting updates when using parallel processing, Replication Server must maintain transaction commit order and resolve commit consistency deadlocks.

Replication Server introduces a new method to maintain commit control using the function string `rs_dsi_check_thread_lock`. Replication Server uses `rs_dsi_check_thread_lock` to check whether the current DSI executor thread is blocking another replicate database process. This new method handles commit control within Replication Server thus requiring less network I/O than other methods, and may result in the rollback of only one transaction instead of many.

New database connection parameters used with internal commit control are:

- `dsi_commit_check_locks_intrvl`
- `dsi_commit_check_locks_max`
- `dsi_commit_control`

New Replication Server configuration parameters

You can use new Replication Server configuration parameter to fine-tune Replication Server performance.

- `sqt_init_read_delay` – the amount of time an SQT thread sleeps while waiting for an SQM read before checking for new instructions in its command queue.
- `sqt_max_read_delay` – the maximum amount of time an SQT thread sleeps while waiting for an SQM read before checking for new instructions in its command queue.

New database configuration parameters

You can use new database connection configuration parameters to fine-tune Replication Server performance.

- `dsi_commit_check_locks_intrvl` – specifies the number of milliseconds (ms) the DSI executor thread waits between executions of the `rs_dsi_check_thread_lock` function string. Used with parallel DSI.
- `dsi_commit_check_locks_max` – specifies the maximum number of times a DSI executor thread checks whether it is blocking other transactions in the replicate database before rolling back its transaction and retrying it. Used with parallel DSI.

- `dsi_commit_control` – specifies whether commit control processing is handled internally by Replication Server using internal tables (on) or externally using the `rs_threads` system table (off). Used with parallel DSI.

Changed database configuration parameters

The database connection parameters `dsi_serialization_method` and `dsi_partitioning_rule` have changed.

`dsi_serialization_method` specifies how and when parallel DSI threads can start. It includes these new or changed options:

- `no_wait` – specifies that a transaction can start as soon as it is ready—without regard to the state of other transactions.
- `wait_for_start` – specifies that a transaction can start as soon as the transaction scheduled to commit immediately before it has started. Replaces the `none` option. When used with the `origin` partitioning parameter, this option replaces the `single_transaction_per_origin` serialization method.
- `isolation_level_3` – is the same as `wait_for_start`, except that DSIs will specify isolation level 3 when connecting to the replicate database.
- `wait_for_commit` – specifies that a transaction can start only when the previous transaction is ready to commit.
- `none` – maintained for backward compatibility. Replaced by `wait_for_start`.
- `single_transaction_per_origin` – maintained for backward compatibility. Replaced by `dsi_serialization_method` set to `wait_for_start` and `dsi_partitioning_rule` set to `origin`.

`dsi_partitioning_rule` specifies the partitioning rules the DSI uses to partition transactions among available parallel DSI threads. It includes these new options:

- `origin` – specifies that transactions with the same origin must be serialized when applied to the replicate database.
- `origin_sessid` – specifies that transactions with the same origin *and* the same process ID (SPID in Adaptive Server) must be serialized when applied to the replicate database. The LTL version must be 600 or later.

Sybase recommends that you try setting `dsi_partitioning_rule` to `origin_sessid`, time as this setting may provide the most efficient partitioning.

date and time datatypes

There are two new datatypes, date and time, in Replication Server. These datatypes extend the existing datetime and smalldatetime datatypes, providing date and time columns to replicate and standby databases. Both are fixed-width 4-byte datatypes that support rs_subcmp, and mixed-version environments.

Replication Server version 12.6 with date and time datatype support is backward-compatible with earlier versions of Adaptive Server. However, earlier versions of Adaptive Server do not recognize date and time, and thus can send only datetime and smalldatetime data.

The new columns generated by date and time datatypes allow you to replicate date and time data to both standby and replicate databases. These columns can be part of the primary key in a replication definition, and are searchable columns in a replication definition. You can use date and time columns in the where clause of define subscription, create subscription, or create article. In the same way, the date and time columns are searchable parameters in a function replication definition, again used in the where clause of define subscription, create subscription, or create article.

Table 8-1: Range and storage needs for date/time datatypes

Datatype	Range	Storage needed
date	January 1, 0001 to December 31, 9999	4
time	12:00:00 AM to 11:59:59.999 PM	4
smalldatetime	January 1, 1900 to June 6, 2079; 12:00:00AM to 11:59:59.999 PM	4
datetime	January 1, 1753 to December 31, 9999; 12:00:00AM to 11:59:59.999 PM	8

Support for sending encrypted passwords

Replication Server 12.6 supports the -X option in isql that sends encrypted passwords through the network when making a client connection.

To ensure that all Replication Server client connections—except the first connection to the RSSD—send encrypted passwords, set the Replication Server configuration parameter `send_enc_password` to `on`. For example, enter:

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

To ensure that all Replication Server client connections, *including* the first connection to the RSSD, send encrypted passwords, set the configuration parameter `RS_enc_pw` to `on` in the `rs_name.cfg` file using a text editor.

If `RS_enc_pw` is `on`, all Replication Server connections to the RSSD send encrypted passwords, even if `send_enc_password` is `off`.

New bulk materialization method

Replication Server 12.6 supports a new bulk materialization method for copying or moving a database from a source Adaptive Server to a destination Adaptive Server without shutting down the source Adaptive Server. The Adaptive Server `quiesce database ... to manifest_file` and `mount` commands let you quiesce the server and copy or move the database.

To use this bulk materialization method, both the source and destination database servers must be Adaptive Server version 12.5.1 or later.

You can use `quiesce database ... to manifest_file` to generate all the data storage information and then use `mount` to mount the data to a new database—see Chapter 10, “Managing Subscriptions,” in the *Replication Server Administration Guide*. You can use `quiesce database ... to manifest_file` and `mount` when you add a warm standby database—see Chapter 13, “Managing Warm Standby,” in the *Replication Server Administration Guide Volume 1*.

For information about `mount` and `unmount`, see Chapter 22, “Database Mount and Unmount,” in the *Adaptive Server Enterprise System Administration Guide*.

Chinese character set (GB18030) support

Replication Server supports all character sets supported by Adaptive Server Enterprise. Accordingly, Replication Server 12.6 supports the Chinese character set (GB18030).

System Changes in Replication Server 12.6

This chapter describes system changes introduced with Sybase Replication Server version 12.6 and 12.5 EBF.

Topic	Page
Configuration parameters	85
RCL commands	87
System stored procedures	88
Function strings	88
System tables	89
Keywords	89

Configuration parameters

This section summarizes new and changed configuration parameters for Replication Server 12.6.

Replication Server parameters

Table 9-1 describes new Replication Server configuration parameters stored in the *rs_config* system table.

Table 9-1: New Replication Server parameters for *rs_config* table

Parameter	Description
smp_enable	Enables SMP on Replication Server on a multiprocessor machine.
send_enc_password	Enables encrypted password to be sent through the network for all Replication Server client connections, except the first connection to the RSSD.

Parameter	Description
sqt_init_read_delay	The length of time an SQT thread sleeps while waiting for an SQM read before checking to see if it has been given new instructions in its command queue. With each expiration, if the command queue is empty, SQT doubles its sleep time up to the value set for sqt_max_read_delay. Default: 2000 ms
sqt_max_read_delay	The maximum length of time an SQT thread sleeps while waiting for an SQM read before checking to see if it has been given new instructions in its command queue.

Table 9-2 describes new Replication Server configuration parameters stored in the *rs_name.cfg* file.

Table 9-2: New Replication Server parameters for *rs_name.cfg* file

Parameter	Description
RS_enc_pw	Enables encrypted password to be sent through the network for all Replication Server client connections, including the first connection to the RSSD.

Database connection parameters

Table 9-3 describes the new database connection configuration parameters.

Table 9-3: New configuration parameters

Parameter	Description
dsi_commit_check_locks_intrl	The number of milliseconds (ms) the DSI executor thread waits between executions of the <i>rs_dsi_check_thread_lock</i> function string. Default: 1000ms (1 second) Minimum: 0 Maximum: 86,400,000 ms (24 hours)
dsi_commit_check_locks_max	The maximum number of times a DSI executor thread checks whether it is blocking other transactions in the replicate database before rolling back its transaction and retrying it. Used with parallel DSI. Default: 200 Minimum: 1 Maximum: 1,000,000

Parameter	Description
dsi_commit_control	Specifies whether commit control processing is handled internally by Replication Server using internal tables (on) or externally using the rs_threads system table (off). Default: off
rep_as_standby	When rep_as_standby is on, table subscriptions replicate tables marked by sp_reptostandby. For rep_as_standby on to succeed, the RepAgent parameters send_maint_xacts to replicate must be false and send_warm_standby_xacts must be true. Default: off

Table 9-4 describes changed configuration parameters.

Table 9-4: Changed database configuration parameters

Parameter	Description of enhancements
dsi_partitioning_rule	Provides new options: <ul style="list-style-type: none"> origin – specifies that transactions with the same origin must be serialized when applied to the replicate database. origin_sessid – specifies that transactions with the same origin and the same process ID must be serialized when applied to the replicate database.
dsi_serialization_method	Provides new options: <ul style="list-style-type: none"> no_wait – specifies that a transaction can start as soon as it is ready. Replaces the none option. wait_for_start – specifies that a transaction can start as soon as the transaction scheduled to commit immediately before has started.

RCL commands

This section summarizes new and changed RCL commands for Replication Server 12.6.

Table 9-5 describes new commands.

Table 9-5: New Transact-SQL® commands

Command	Description
alter database replication definition	Changes a database replication definition.

Command	Description
create database replication definition	Creates a replication definition that describes a database or database objects for replication.
drop database replication definition	Deletes a database replication definition.

Table 9-6 describes changed commands.

Table 9-6: Changed commands

Command	Description of enhancements
activate subscription	Starts the distribution of updates from the primary to the replicate database and sets the database subscription status to ACTIVE.
check subscription	Checks the materialization status of a subscription to a database replication definition.
create subscription	Creates a subscription for a database replication definition.
define subscription	Defines a subscription for a database replication definition.
drop subscription	Drops a subscription for a database replication definition.
validate subscription	Sets the status of a database subscription to VALID.

System stored procedures

Table 9-7 describes new stored procedures.

Table 9-7: New system stored procedures

System procedure	Description
rs_helpdbrep	Displays information about database replication definitions associated with the current Replication Server.
rs_helpdbsub	Displays information about database subscriptions associated with the replicate Replication Server.

Function strings

Table 9-8 describes new function strings.

Table 9-8: New function strings

Function string	Description
rs_dsi_check_thread_lock	Checks whether the current DSI executor thread is blocking another replicate database process. Used during parallel processing.

System tables

Table 9-9 describes new system tables.

Table 9-9: New system tables

System table	Description
rs_dbreps	Stores all information about database replication definitions except name sets. It is replicated to all sites with a version number of 12.6 or later.
rs_dbsubsets	Stores the name sets for database replication definitions. It is replicated to all sites with a version number of 12.6 or later.

Keywords

There are three new keywords in Replication Server 12.6:

- functions
- osid
- procedures
- transactions

Index

A

- activate subscription command 88
- Adaptive Server Anywhere (ASA)
 - ERSSD support 32
- Adaptive Servers
 - communication through Replication Manager 48
- adding event triggers in Replication Manager 73
- adding servers to RMS server 67
- admin config 2
- alter database replication definition command 87
- alter partition command 30

B

- background processes
 - running in background 50
 - stopping a background process 50
 - viewing in Background Processes dialog box 50
- Background Processes dialog box 50
- batching of commands
 - for non-ASE servers 37
 - using DSI connection and configuration parameters 38
 - using function strings 38
- bulk materialization 82

C

- character set
 - Chinese (GB18030) 83
- check subscription command 88
- Chinese character set support 83
- commit control
 - internal 78
- computed columns
 - materialized 27
 - replicating 27

- virtual 27
- configuration parameters
 - dynamic_sql 5, 16
 - dynamic_sql_cache_management 6, 16
 - dynamic_sql_cache_size 5, 16
 - setting with Replication Manager 69
 - stats_reset_rssd 4, 16
 - stats_sampling 35
- connection status
 - filtering in warm standby environments 57
 - hide options 57
- conventions, document style x
- counter statistics
 - displaying on screen 35
 - optionally keeping in RSSD 4
 - reporting 35
 - saving to RSSD 35
- create database replication definition command 88
- create partition command 30
- create route command 31
- create subscription command 88

D

- database connection parameter
 - dsi_ignore_commit_order 42
 - dsi_isolation_level 43
 - dsi_replication_ddl 43
 - dsi_rs_ticket_report 43
 - dsi_serialization_method 43
 - dynamic_sql 16
 - dynamic_sql_cache_management 16
 - dynamic_sql_cache_size 16
 - stats_show_zero_counter 43
- datatype
 - bigint 24, 46
 - date, time 81
 - unitext 26, 46
 - unsigned 25

Index

- unsigned bigint 46
- unsigned int 46
- unsigned smallint 46
- unsigned tinyint 46
- datatypes
 - supported by Replication Manager 52
- date, database 81
- define subscription command 88
- Details list 49
- dialog boxes
 - Background Processes 50
 - Connection Properties 57
 - View Queue Data 55
- drop database replication definition command 88
- drop subscription command 88
- dropping servers from RMS server 68
- dsi_commit_check_locks_intrvl configuration parameter 86
- dsi_commit_check_locks_max configuration parameter 86
- dsi_commit_control configuration parameter 87
- dsi_partitioning_rule configuration parameter 87
- dsi_serialization_method configuration parameter 87
- dynamic parameters
 - configuring 1
- dynamic SQL
 - configuration parameters setup 5
- dynamic SQL parameters 2, 15

E

- editors
 - RCL script editor 51
 - SQL script editor 51
- Embedded Replication Server System Database
 - routing 31
- Embedded Replication Server System Database (ERSSD)
 - 31, 78
 - creating route from 31
- embedded Replication Server System Database (ERSSD)
 - limitations 78
- empty transactions 78
- encrypted passwords
 - sending 82
- enhancements

- configuration and tuning 1
- for Replication Server performance 4
- monitor and counter 2
- Replication Manager plug-in 21
- rs_subcmp 7

ERSSD

- See* Embedded Replication Server System Database

Event Log pane 49

- displaying or hiding 49
- viewing events 49

event triggers

- adding in Replication Manager 73
- creating in RMS 73

exceptions log

- troubleshooting 54
- viewing 54

F

function string

- rs_batch_end 45
- rs_batch_start 45
- rs_dsi_check_thread_lock 79
- rs_repl_on 45
- rs_set_ciphertext 46
- rs_set_dml_on_computed 27, 46
- rs_set_isolation_level 46
- rs_set_isolation_level_3 46
- rs_ticket_report 46
- rs_truncate 46
- rs_writetext 46

H

hash algorithm

- command line parameters 8
- configuration file parameters 8

I

- internal commit control 78

isolation level

- kinds of 36

setting 36

J

Java JRE

compatibility with Replication Monitoring Services 65

jConnect for JDBC

compatibility with Replication Monitoring Services 65

K

keywords

functions 89
procedures 89
transactions 89

L

license management
with SySAM 38

list

details 49

log

event 49

longer identifiers 23

M

manual data reconciliation 12

master database

supported DDL commands 6

message logging

disabling 50

enabling 50

mixed-version

enhanced support for 33

monitoring of status 49

monitoring replication environment

for three-tier environment 63

using heartbeat and latency information 73

using Replication Manager graphical interface 67

using RMS 67

using RMS API 67

monitoring replication environment using RMS 67

monitoring status

in Details list 49

replication objects 49

visual display 49

mount command 82

multiprocessors

enabling 77

monitoring 77

multi-site availability (MSA) 75

multithreaded architecture 76

N

new features

Replication Manager 15.0 47

Replication Manager 15.0.1 19

Replication Server 15.0 1, 23

Replication Server 15.0.1 1

O

online help

in Replication Manager plug-in 48

invoking 49

P

parallel processing 76

empty transactions 78

internal commit control 78

password encryption

Advanced Encryption Standard algorithm 32

FIPS-certified 32

for maintenance user passwords 33

for route user passwords 33

for user passwords 33

for user passwords in configuration file 33

POSIX thread library 77

Q

queue data
 troubleshooting 55
 viewing 55
 quiesce database command 82

R

RCL command
 admin config 18
 admin statistics, flush_status 44
 admin stats 3, 43
 admin stats, {tps | tps | bps} 43
 admin stats, backlog 43
 admin stats, cancel 18
 admin stats, dsi 18
 admin stats, flush status 44
 admin stats, reset 43
 admin stats, status 4, 18, 43
 admin stats_config_connection 44
 admin stats_config_module 44
 admin stats_config_route 44
 admin stats_intrusive_counter 44
 alter connection 44
 alter logical connection 44
 alter partition 43
 configure replication server 44
 create partition 43
 sysadmin errsd 44
 rep_as_standby configuration parameter 87
 replicating
 database objects 76
 encrypted columns 28
 master database 6
 partitioned tables 28
 to standby databases 76
 Replication features
 supported by Replication Manager 52
 Replication Manager
 adding event triggers 73
 new features 19
 new features 15.0 47
 support of Replication Server/Replication features 52
 using to set configuration parameters 69
 Replication Monitoring Services
 accessing using Replication Manager or API 67
 adding servers 67
 compatibilities 65
 connecting to 66
 description 63
 dropping servers 68
 in three-tier management solution 63
 installing 65
 monitoring logical group of servers 70
 monitoring replication environment 67
 setting configuration parameters 69
 shutting down monitored servers 72
 software requirements 65
 starting and stopping 65
 suspending/resuming components 71
 using Unified Agent Framework 65
 viewing monitored objects 69
 Replication Server
 communication through Replication Manager 48
 configuring using Replication Manager 69
 dynamic configuration 1
 function strings 45
 RCL new commands 43
 system tables changes 44
 Replication Server configuration parameters
 errsd_backup_interval 41
 errsd_backup_path 42
 errsd_backup_start_time 42
 errsd_backup_start_date 42
 errsd_ra 42
 send_enc_pw 42
 stats_daemon_sleep_time 42
 stats_flush_rssd 42
 stats_reset_afterflush 42
 Replication Server features
 supported by Replication Manager 52
 Replication Server System Database (RSSD) 78
 RMS
 See Replication Monitoring Services
 routes
 upgrading 53
 rs_dbreps system table 89
 rs_dbsubsets system table 89
 rs_dsi_check_thread_lock function string 79, 89
 RS_enc_pw configuration parameter 86
 rs_helpdbrep system procedure 88

rs_helpdbsub system procedure 88

rs_subcmp

- configuration file parameters 17
- parameters for manual reconciliation 12
- schema sub-types 10
- schema types 10
- string options 9

S

sampling data

- optionally keeping in RSSD 4

schema comparison 9

- command line parameters 11
- configuration file parameters 11

send_enc_password configuration parameter 81, 85

send_enc_pw configuration parameter 42

setting configuration parameters

- using Replication Manager 69

smp_enable configuration parameter 85

software compatibilities of Replication Monitoring Services 65

software requirements for Replication Monitoring Services 65

sqt_init_read_delay configuration parameter 86

sqt_max_read_delay configuration parameter 86

starting and stopping RMS 65

stats_reset_rssd 4, 16

status monitoring using RMS 49

stored procedure

- rs_dump_stats 45
- rs_ticket 45
- rs_ticket_report 45

support

- contacting Sybase Technical Support xii
- dynamic configuration 19
- for DirectConnect 52
- for heterogeneous data servers 20
- for non-Sybase data servers 20
- for Replication Agents and Mirror Replication Agents 21

symmetric multiprocessors (SMP) 76

syntax conventions xi

system tables

- rs_articles 44

rs_dbrep 89

rs_dbsubsets 89

rs_funcstrings 44

rs_publications 44

rs_statdetail 45

T

threads

- in Replication Server 61
- using context menu 61
- viewing details 62

three-tier management solution 63

time, database 81

transactions

- empty 78

two-tier management solution 47, 48

U

unsigned datatypes 25

- unsigned bigint 25
- unsigned int 25
- unsigned smallint 26
- unsigned tinyint 26

user documentation, for Replication Server viii

user interface features, Replication Manager 47

V

validate subscription command 88

visual monitoring of status 49

W

warm standby

- adding active database connection 59
- adding logical connection 58
- adding standby database connection 60
- filtering connection status 57
- wizards in 58

WIN32 thread library 77

Index

wizards

- Add Active Database 59
- Add Logical Connection 58
- Add Standby Database 60