



Navigating the Documentation for
Sybase® Adaptive Server™ Enterprise

Adaptive Server™

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About This Book

This book helps you figure out how to use Adaptive Server to accomplish particular tasks. It links you to concepts and syntax in the documentation that are relevant for each task.

This book contains the following chapters:

- Chapter 1, “Starting, Stopping, and Configuring Adaptive Server”
- Chapter 2, “Creating and Maintaining Databases”
- Chapter 3, “Setting Database-Wide Options”
- Chapter 4, “Backing Up and Restoring Databases”
- Chapter 5, “Managing Logins, Users, Groups, Roles, and Resources”
- Chapter 6, “Defining and Using Datatypes”
- Chapter 7, “Creating and Maintaining Tables”
- Chapter 8, “Using Parallel Processing”
- Chapter 9, “Auditing and Monitoring Server Activity”
- Chapter 10, “Retrieving and Manipulating Data”
- Chapter 11, “Using Defaults and Rules”
- Chapter 12, “Error Handling and Messages”
- Chapter 13, “Using Global Variables to Get Information”
- Chapter 14, “Using System and Catalog Stored Procedures to Get Help”
- Chapter 15, “Managing Languages, Character Sets, and Sort Orders”
- Chapter 16, “Managing Database Devices, Segments, and Thresholds”
- Chapter 17, “Setting Session-Wide Options”
- Chapter 18, “Using Stored Procedures and Triggers”
- Chapter 19, “Managing Transactions”
- Chapter 20, “Creating and Using Views”
- Chapter 21, “Sending and Receiving Email (Windows NT Only)”
- Chapter 22, “Using Component Integration Services”

How to Use This Book

Each chapter begins with a list of related tasks. For example, the chapter “Starting, Stopping, and Configuring Adaptive Server” includes such tasks as “Starting and Stopping Adaptive Server,” “Displaying Current Configuration Parameter Values,” and “Configuring Backup and Recovery.”

Each task consists of a table of activities. Each activity is associated with the concepts and syntax used to accomplish the activity. The format of the task table is:

Activity	Concept	Syntax
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Expand your browser if all three columns do not display evenly.

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1. Connect to the Sybase home page: www.sybase.com.
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If You Need Help

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1

Starting, Stopping, and Configuring Adaptive Server

This section contains information about the following tasks:

- Starting and Stopping Adaptive Server 1-2
- Displaying Current Configuration Parameter Values 1-2
- Configuring Backup and Recovery 1-2
- Configuring Cache Management 1-3
- Configuring Metadata Caches 1-3
- Configuring Disk I/O 1-4
- Configuring Languages, Character Sets, and Sort Orders 1-4
- Configuring the Lock Manager 1-5
- Configuring Memory Use 1-5
- Configuring Network Communications 1-6
- Configuring Operating System Resources 1-6
- Configuring Physical Memory Resources 1-7
- Configuring SMP Processors 1-7
- Configuring Server Administration 1-7
- Configuring for Two-Phase Commit Transactions 1-9
- Configuring User Environments 1-11
- See Also 1-11

Starting and Stopping Adaptive Server

Start an Adaptive Server	Starting and Stopping Adaptive Server	dataserver, startserver
Stop an Adaptive Server after any executing statements complete	Shutting Down Adaptive Server	shutdown
Stop an Adaptive Server immediately	Shutting Down Adaptive Server	shutdown with nowait

Displaying Current Configuration Parameter Values

Display current values for configuration parameters	Using sp_configure	sp_configure
Determine which parameters are displayed by sp_configure	User-Defined Subsets of the Parameter Hierarchy: Display Levels	sp_displaylevel

Configuring Backup and Recovery

Specify how many days tapes are protected from overwrite	Protecting Backup Tapes from Being Overwritten	sp_configure "tape retention in days"
Specify recovery speed in minutes	Setting the Recovery Interval	sp_configure "recovery interval in minutes"
Specify recovery isolation mode as "database" or "page".	Isolating Suspect Pages	
Specify whether verbose recovery messages are displayed	Determining Whether Messages Are Displayed During Recovery	sp_configure "print recovery information"

Configuring Cache Management

Specify how long to keep index pages in cache	Index Trips Through the Cache number of index trips	<code>sp_configure "number of index trips"</code>
Specify how long to keep OAM pages in cache	number of oam trips	<code>sp_configure "number of oam trips"</code>
Specify memory allocated to procedure cache	Procedure Cache Sizing procedure cache percent	<code>sp_configure "procedure cache percent"</code>
Determine memory available for data, index, and log pages	The Data Cache total data cache size	<code>sp_configure "total data cache size"</code>

Configuring Metadata Caches

Before You Start

- | | | |
|--|--|----------------------------|
| 1. Understand how metadata caches work. | Open Databases, Open Indexes, and Open Objects | |
| 2. Plan for the size of the metadata cache settings. | Using <code>sp_helpconfig</code> to Get Help on Configuration Parameters | <code>sp_helpconfig</code> |

To Configure Metadata Caches

Configure a cache for databases.	number of open databases	<code>sp_configure "number of open databases"</code>
Configure a cache for indexes.	number of open indexes	<code>sp_configure "number of open indexes"</code>
Configure a cache for database objects.	number of open objects	<code>sp_configure "number of open objects"</code>

Optional Tasks

Configure the index hash spinlock ratio.	open index hash spinlock ratio	<code>sp_configure "open index hash spinlock ratio"</code>
Configure the index hash spinlock ratio.	open index spinlock ratio	<code>sp_configure "open index spinlock ratio"</code>
Configure the object spinlock ratio.	open object spinlock ratio	<code>sp_configure "open object spinlock ratio"</code>

To Monitor Metadata Caches After Configuration

Monitor the metadata caches on a regular basis.	Using <code>sp_monitorconfig</code> to Find Metadata Cache Usage Statistics	<code>sp_monitorconfig</code>
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Configuring Disk I/O

Determine whether Adaptive Server runs with asynchronous I/O	allow sql server async i/o	sp_configure "allow sql server async i/o"
Specify number of disk I/O control blocks allocated	disk i/o structures	sp_configure "disk i/o structures"
Specify maximum number of database devices	number of devices	sp_configure "number of devices"
Determine whether server searches for unused pages	page utilization percent	sp_configure "page utilization percent"

Configuring Languages, Character Sets, and Sort Orders

Specify the default character set	Changing the Default Character Set	sp_configure "default character set id"
Specify the default language for system messages	Software Messages	sp_configure "default language id"
Specify the default sort order	Changing the Default Sort Order	sp_configure "default sortorder id"
Specify how many languages can be held in cache	number of languages in cache	sp_configure "number of languages in cache"

Configuring the Lock Manager

Specify how many address locks are protected by a spinlock	address lock spinlock ratio	sp_configure "address lock spinlock ratio"
Specify delay in milliseconds before deadlock checking	Delaying Deadlock Checking	sp_configure "deadlock checking period"
Specify number locks transferred between server and engine	freelock transfer block size	sp_configure "freelock transfer block size"
Specify maximum number of locks available in an engine	max engine freelocks	sp_configure "max engine freelocks"
Specify number of locks available for all users and engines	Reducing Lock Contention	sp_configure "number of locks"
Specify number of page lock structures protected per spinlock	page lock spinlock ratio	sp_configure "page spinlock ratio"
Specify number table lock structures protected per spinlock	table lock spinlock ratio	sp_configure "table lock spinlock ratio"

Configuring Memory Use

Determine size of Adaptive Server executable	How Much Memory to Configure	sp_configure "executable code size"
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Configuring Network Communications

Enable connections to remote servers	Allowing Remote Access	<code>sp_configure "allow remote access"</code>
Specify default network packet size, in bytes, for all users	Changing Network Packet Sizes	<code>sp_configure "default network packet size"</code>
Specify maximum network packet size in bytes	Changing Network Packet Sizes	<code>sp_configure "max network packet size"</code>
Specify how many network listeners can be open at one time	Configure Multiple Network Listeners	<code>sp_configure "max number network listeners"</code>
Specify the maximum number of remote connections	Controlling the Number of Active Remote Connections	<code>sp_configure "number of remote connections"</code>
Specify the maximum number of remote logins	Controlling the Number of Active User Connections	<code>sp_configure "number of remote logins"</code>
Specify how many remote sites can access server at one time	Controlling the Number of Remote Sites	<code>sp_configure "number of remote sites"</code>
Specify the number of pre-read packets	Controlling Number of Pre-read Packets	<code>sp_configure "remote server pre-read packets"</code>
Enable/disable TCP packet batching	Set tcp no delay on TCP Networks	<code>sp_configure "tcp no delay"</code>

Configuring Operating System Resources

Limit outstanding asynchronous disk I/O requests per engine	max async i/os per engine	<code>sp_configure "max async i/o's per engine"</code>
Limit outstanding asynchronous disk I/O requests per server	max async i/os per server	<code>sp_configure "max async i/o's per server"</code>
Specify starting address for server's shared memory region	shared memory starting address	<code>sp_configure "shared memory starting address"</code>

Configuring Physical Memory Resources

Specify maximum additional memory for large packets	additional network memory	sp_configure "additional network memory"
Prevent swapping of Adaptive Server pages to disk	lock shared memory	sp_configure "lock shared memory"
Specify the memory, in 2K units, allocated for Adaptive Server	How Much Memory to Configure	sp_configure "total memory"

Configuring SMP Processors

Specify the maximum number of online engines	max online engines	sp_configure "max online engines"
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Configuring Server Administration

Allow triggers to fire other triggers	allow nested triggers	sp_configure "allow nested triggers"
Allow updates to system tables	allow updates to system tables	sp_configure "allow updates to system tables"
Specify the maximum number of auditing records	The Audit Queue	sp_configure "audit queue size"
Specify the time interval before moving accounting information	Getting Information About Usage: Chargeback Accounting	sp_configure "cpu accounting flush interval"
Limit milliseconds a task can run before time slice error	time slice	sp_configure "cpu grace time"
Specify the default database size	Default Database Size and Devices	sp_configure "default database size"
Specify the initial fullness of index pages	default fill factor percent	sp_configure "default fill factor percent"
Limit percent increase in database writes by housekeeper task	housekeeper free write percent	sp_configure "housekeeper free write percent"
Specify percentage of IDENTITY column values held in cache	identity burning set factor	sp_configure "identity burning set factor"
Specify number of sequential values reserved per process	identity grab size	sp_configure "identity grab size"

Specify the number of disk I/Os before flushing	i/o accounting flush interval	sp_configure "i/o accounting flush interval"
Limit server tasks run before checking for I/O completions	i/o polling process count	sp_configure "i/o polling process count"
Specify threshold for number of page locks per command	lock promotion HWM	sp_configure "lock promotion hwm"
Limit alarm structures allocated for waitfor commands	number of alarms	sp_configure "number of alarms"
Limit mailbox structures for intertask communications	number of mailboxes	sp_configure "number of mailboxes"
Limit message structures for intertask communications	number of messages	sp_configure "number of messages"
Specify the maximum number of open databases	number of open databases	sp_configure "number of open databases"
Specify the maximum number of open objects	number of open objects	sp_configure "number of open objects"
Specify number of extents allocated per trip to page manager	housekeeper free write percent	sp_configure "number of pre-allocated extents"
Specify how many buffers can hold pages from input tables	number of sort buffers	sp_configure "number of sort buffers"
Include or exclude deadlock information from error log	print deadlock information	sp_configure "print deadlock information"
Limit engine loops before relinquishing CPU	runnable process search count	sp_configure "runnable process search count"
Limit number of partition groups allocated	partition groups	sp_configure "partition groups"
Specify ratio of spinlocks to internal partition caches	partition spinlock ratio	sp_configure "partition spinlock ratio"
Specify size of automatically created IDENTITY columns	size of auto identity column	sp_configure "size of auto identity"
Specify length of clock tick in microseconds	sql server clock tick length	sp_configure "sql server clock tick length"
Specify number of milliseconds a task can run	time slice	sp_configure "time slice"
Determine the Adaptive Server version number	upgrade version	sp_configure "upgrade version"

Configuring for Two-Phase Commit Transactions

Before You Start

- | | |
|---|--|
| 1. Understand two-phase commit transactions. | See the installation or configuration guide for your platform. |
| 2. Understand the system configuration changes made for two-phase commit. | See the installation or configuration guide for your platform. |

If Installing a New Server

- | | | |
|---------------------------------|---|--|
| Configure for two-phase commit. | See the installation guide for your platform or the online help for the installation utility. | On UNIX, <code>sybsetup</code> and/or <code>srvbuild</code> located in <code>\$\$SYBASE/bin</code> .
On NT, click the Two Phase Commit button in the Configure Adaptive Server window of the Server Config utility. |
|---------------------------------|---|--|

(UNIX) If Configuring an Existing Server not previously configured for two-phase commit		
1. Create the data and log devices for <i>sybssystemdb</i> .	See the configuration guide for your platform.	disk init
2. Create the <i>sybssystemdb</i> database on the devices created above.	See the configuration guide for your platform.	create database
3. Execute the installcommit script.	See the configuration guide for your platform.	On UNIX, installcommit located in <i>SSYBASE/scripts</i> .
(UNIX) If Configuring an Existing Server previously configured for two-phase commit		
Scenario 1: Existing server configured for two-phase commit with <i>spt_committab</i> in <i>master</i> and no <i>sybssystemdb</i> database.		
1. Create the data and log devices for <i>sybssystemdb</i> .	See the configuration guide for your platform.	disk init
2. Create the <i>sybssystemdb</i> database on the devices created above.	See the configuration guide for your platform.	create database
3. Execute the installcommit script.	See the configuration guide for your platform.	On UNIX, installcommit located in <i>SSYBASE/scripts</i> .
4. Update any user written backup/recovery, application, or stored procedure to point to the new database.	See the configuration guide for your platform.	Use a text editor.
(UNIX) If Configuring an Existing Server previously configured for two-phase commit		
Scenario 2: Existing server configured for pre-11.5 two-phase commit with <i>spt_committab</i> in <i>sybssystemdb</i> .		
Execute the installcommit script to modify pre-11.5 two-phase commit stored procedures to point to <i>sybssystemdb</i>	See the configuration guide for your platform.	On UNIX, installcommit located in <i>SSYBASE/scripts</i> .

Configuring User Environments

Specify the maximum number of local connections	number of user connections	<code>sp_configure "number of user connections"</code>
Specify number of cache protectors per task	permission cache entries	<code>sp_configure "permission cache entries"</code>
Specify size of stack guard area in bytes	stack guard size	<code>sp_configure "stack guard size"</code>
Specify size of stack in bytes	stack size	<code>sp_configure "stack size"</code>
Specify maximum duration of passwords	systemwide password expiration	<code>sp_configure "systemwide password expiration"</code>
Specify number of bytes in each user's user log cache	user log cache size	<code>sp_configure "user log cache size"</code>
Specify number of user log caches per user log spinlock	user log cache spinlock ratio	<code>sp_configure "user log cache spinlock ratio"</code>

See Also

For related information, see the following task.

Establishing Execution Priorities 3-4

2

Creating and Maintaining Databases

This section contains information about the following tasks:

- Building the System Databases 2-2
- Creating a User Database 2-2
- Adding Space to a Database 2-4
- Identify the Current Database 2-4
- Changing the Database Owner (“dbo”) 2-4
- Checking Database Consistency 2-5
- Maintaining Source Text for Compiled Objects 2-8
- Getting Help on Databases 2-8
- Moving the Transaction Log to Its Own Device 2-8
- Renaming a Database 2-8
- Removing a Database from a Server 2-9
- See Also 2-9

Building the System Databases

Build the system databases	Step Two: Build a New Master Device	buildmaster (UNIX & OpenVMS) bldmastr (Windows NT)
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Creating a User Database

Steps	Concepts	Commands
Before You Start		
1. Check a potential database name for validity.	Identifiers	valid_name
2. Verify that you have permission to create a database.	Permissions for Managing User Databases	
3. Estimate the size of storage space your database will require.	“Determining or Estimating the Sizes of Tables and Indexes”	
4. Plan for the distribution of databases and database objects for balanced I/O across disks.	Controlling Physical Data Placement	
To Create the Database		
1. Use the <i>master</i> database.		use master

2. Issue the create database command.	Using the create database Command	create database
3. Specify space and devices; or Specify default database devices for the server.	Assigning Space and Devices to Databases Designating Default Devices	sp_diskdefault
4. Create a database with a log segment on a separate device from data segments.	Placing the Transaction Log on a Separate Device	create database...log on
5. Determine the default size for databases in megabytes.	default database size	sp_configure
To Complete the Task		
1. Backup the <i>master</i> database so that you can restore information about the new database if <i>master</i> is later damaged.	Using the Dump and Load Commands	dump database
2. Set database options that control certain aspects of database behavior, such as log or transaction behavior.	“Setting Database Options”	
Optional Tasks		
Bind the database to existing data caches	“Configuring Data Caches”	sp_helpcache sp_bindcache
Specify the log I/O size for the transaction log	“Configuring Data Caches”	sp_logiosize

Adding Space to a Database

Allocate additional space to a database	Using the alter database Command	alter database, sp_dbremap
Find out how much space is used by database objects	Checking the Amount of Space Used	sp_spaceused

Identify the Current Database

Find a database's ID number	Getting Help on Databases	db_id()
Find the name of the current database	Getting Help on Databases	db_name()

Use a Different Database

Find out whether the database is available for public use	Viewing the Options on a Database	sp_helpdb
Make the database available for public use	Bringing the Databases Online	online database
Use a different database	Choosing a Database: use	use

Changing the Database Owner ("dbo")

Find out who owns the database	Getting Help on Databases	sp_helpuser dbo
Specify a new database owner	Changing Database Ownership	sp_changedbowner

Checking Database Consistency

To check database consistency

Setting Up and Using dbcc checkstorage	dbcc checkstorage
dbcc checkdb	dbcc checkdb
dbcc checktable	dbcc checktable
Checking Consistency of System Tables	dbcc checkcatalog
dbcc checkalloc	dbcc checkalloc
dbcc tablealloc	dbcc tablealloc
dbcc indexalloc	dbcc indexalloc
Using sp_indsuspect to Find Corrupt Indexes	sp_indsuspect

Setting Up and Using *dbcc checkstorage*

Before You Start

1. Understand how dbcc checkstorage works.	dbcc checkstorage
2. Understand how configuration affects performance.	Configuring Adaptive Server for dbcc checkstorage
3. Understand resource requirements.	Planning Resources
4. Read the entire procedure for creating <i>dbccdb</i> .	Creating the dbccdb Database

To create *dbccdb*

1. Obtain recommendations for database size, devices (if <i>dbccdb</i> does not exist), workspace sizes, cache size, and the number of worker processes for the target database.	Planning Resources	use master sp_plan_dbccdb
2. If necessary, adjust the number of worker processes that Adaptive Server uses.	Configuring Worker Processes	sp_configure number of worker processes memory per worker process
3. Create a dbcc named cache (optional).	Setting Up a dbcc Named Cache	sp_cacheconfig
4. Configure a 16K I/O buffer pool.	Configuring a 16K I/O buffer pool	sp_poolconfig
5. If <i>dbccdb</i> already exists, drop it and all associated devices before creating a new <i>dbccdb</i> database.	Creating the dbccdb Database	drop database
6. Initialize disk devices for the <i>dbccdb</i> data and the log.	Creating the dbccdb Database	disk init
7. Create <i>dbccdb</i> on the data disk device.	Creating the dbccdb Database	create database
8. Add disk segments (optional).	Segments for Workspaces	use dbccd sp_addsegment
9. Populate the <i>dbccdb</i> database and install dbcc stored procedures.	dbcc Stored Procedures	isql -Usa -P -i \$SYBASE/scripts/installdbccdb

10. Create the workspaces.	dbccdb Workspaces	sp_dbcc_createws
11. Update configuration values.	Updating the dbcc_config Table	sp_dbcc_updateconfig max worker processes dbcc named cache scan workspace text workspace OAM count threshold IO error abort linkage error abort
To use dbcc checkstorage		
1. Run the dbcc checkstorage command.	dbcc checkstorage	dbcc checkstorage
2. Generate a report from dbccdb to see the results.	Generating Reports from dbccdb	sp_dbcc_configreport sp_dbcc_differentialreport sp_dbcc_faultreport sp_dbcc_fullreport sp_dbcc_statisticsreport sp_dbcc_summaryreport
To reconfigure dbccdb		
1. Reevaluate the configuration of dbccdb and Adaptive Server for the target database.	Maintaining dbccdb	sp_dbcc_evaluatedb
2. If necessary, change the configuration.	Configuring Worker Processes Setting Up a dbcc Named Cache	sp_configure sp_cacheconfigsp_poolconfig
3. Update the configuration values in the dbcc_config table.	dbcc_config	sp_dbcc_updateconfig
To remove obsolete data from dbccdb		
Delete results of dbcc checkstorage operations for the target database from dbccdb.	Cleaning Up dbccdb	sp_dbcc_deletehistory
Delete all information about the specified database from dbccdb.	Cleaning Up dbccdb	sp_dbcc_deletedb
To perform consistency checks on dbccdb		
Run dbcc checkstorage on dbccdb, using dbccalt as the storage database.	Performing Consistency Checks on dbccdb	dbcc checkstorage

Maintaining Source Text for Compiled Objects

To verify the existence of the source text of compiled objects

	Verifying and Encrypting Source Text	<code>sp_checksource</code> <code>sp_helptext</code> <code>dbcc checkcatalog</code>
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To encrypt the source text of compiled objects

	Verifying and Encrypting Source Text	<code>sp_hidetext</code>
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Getting Help on Databases

Get help on databases	Getting Help on Databases, Database Device Names and Options	<code>sp_helpdb</code>
List the databases on an Adaptive Server	Getting Help on Databases	<code>sp_databases</code>

Moving the Transaction Log to Its Own Device

Move the transaction log to a separate device	Moving the Transaction Log to Another Device	<code>sp_logdevice</code>
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Renaming a Database

Check a potential database name for validity	Identifiers	<code>valid_name</code>
Rename a database	Renaming Tables and Other Objects	<code>sp_renamedb</code>

Removing a Database from a Server

Remove a damaged database	Dropping a Damaged Database	dbcc dbrepair
Remove an intact database	Using the drop database Command	drop database

See Also

For related information, see the following task.

Isolating Suspect Pages 4-4

3

Setting Database-Wide Options

This section contains information about the following tasks:

- Listing Current Database Option Settings 3-2
- Putting New Settings into Effect 3-2
- Setting Options That Affect Backup and Recovery 3-2
- Setting Options That Affect bcp, select into, and writetext 3-2
- Setting Options That Affect Checkpoints 3-2
- Setting Options That Affect IDENTITY Columns 3-3
- Specifying the Default Null Type for a Database 3-3
- Specifying Whether Users Can Update the Database 3-3
- Setting Options That Affect Thresholds 3-3
- Setting Options That Affect Transaction Management 3-3
- Establishing Execution Priorities 3-4
- See Also 3-4

Listing Current Database Option Settings

List database options and their current settings	Viewing the Options on a Database	<code>sp_helpdb</code>
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Putting New Settings into Effect

Put new option settings into effect	Changing Database Options	<code>checkpoint</code>
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Setting Options That Affect Backup and Recovery

Abort transactions when the log becomes full	<code>abort tran on log full</code>	<code>sp_dboption "abort tran on log full"</code>
Checkpoint database automatically after recovery	<code>no chkpt on recovery</code>	<code>sp_dboption "no chkpt on recovery", "false"</code>
Truncate the log automatically after checkpoints	<code>trunc log on chkpt</code>	<code>sp_dboption "trunc log on chkpt"</code>

Setting Options That Affect *bcp*, *select into*, and *writetext*

Allow fast <code>bcp</code> in a database	<code>select into/bulkcopy/pllsort</code>	<code>sp_dboption "select into/bulkcopy"</code>
Allow <code>select into</code> on permanent tables	<code>select into/bulkcopy/pllsort</code>	<code>sp_dboption "select into/bulkcopy"</code>
Allow <code>writetext</code> in a database	<code>select into/bulkcopy/pllsort</code>	<code>sp_dboption "select into/bulkcopy"</code>

Setting Options That Affect Checkpoints

Clear the transaction log after automatic checkpoints	<code>trunc log on chkpt</code>	<code>sp_dboption "trunc log on chkpt"</code>
Perform automatic checkpoints after recovery	<code>no chkpt on recovery</code>	<code>sp_dboption "no chkpt on recovery"</code>

Setting Options That Affect IDENTITY Columns

Automatically create an IDENTITY column in new tables	auto identity	sp_dboption "auto identity"
Include IDENTITY columns in indexes for all tables	identity in nonunique index	sp_dboption "identity in nonunique index", true

Specifying the Default Null Type for a Database

Set the default null type for columns	allow nulls by default	sp_dboption "allow nulls by default"
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Specifying Whether Users Can Update the Database

Lock users out of a database	dbo use only	sp_dboption "dbo use only"
Set single-user mode	single user	sp_dboption "single user"
Prohibit updates to a database	read only	sp_dboption "read only"

Setting Options That Affect Thresholds

Disable nonlog thresholds	no free space acctg	sp_dboption "no free space acctg"
List database options and their current settings	sp_helpdb	sp_helpdb

Setting Options That Affect Transaction Management

Abort transactions when the log is full	abort tran on log full	sp_dboption "abort tran on log full"
Allow data definition language in transactions	ddl in tran	sp_dboption "ddl in tran"

Establishing Execution Priorities

Before You Start

Understand how execution priorities works	Algorithm for Successfully Distributing Engine Resources
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To associate an object with an execution class

Bind the object to the class	Types of Execution Classes	<code>sp_bindexclass</code>
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To create a user-defined execution class

Define attributes for a new execution class name	User-Defined Execution Classes	<code>sp_addexclass</code>
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See Also

For related information, see the following task.

[Isolating Suspect Pages 4-4](#)

4

Backing Up and Restoring Databases

This section contains information about the following tasks:

- Adding a Backup Server to an Adaptive Server 4-2
- Getting Help on Backup Servers 4-2
- Starting and Stopping Backup Servers 4-2
- Backing Up a Database After a Device Failure 4-2
- Backing Up a Database When Its Transaction Log Is Full 4-3
- Performing Routine Backups of User Databases 4-3
- Isolating Suspect Pages 4-4
- Restoring User Databases from Backups 4-5
- Restoring Backups of Release 10.x Databases 4-6
- Trimming a Database's Transaction Log 4-6

Adding a Backup Server to an Adaptive Server

Choose a valid name for the Backup Server	Identifiers	Identifiers
Enable Adaptive Server to communicate with Backup Server	Configuring Your Server for Remote Access	<code>sp_configure "allow remote access"</code>
Add or change a Backup Server	Step Five: Check Your Backup Server <code>syssservers</code> Information	<code>sp_addserver</code>

Getting Help on Backup Servers

Get help on Backup Servers	Communicating with the Backup Server	<code>sp_helpserver</code>
List the Backup Servers running on the local machine	Step Six: Verify That Your Backup Server Is Running	<code>showserver</code>

Starting and Stopping Backup Servers

Start a Backup Server	Starting and Stopping Backup Server	<code>backupserver, startserver</code>
Find out the name of the Backup Server	Step Five: Check Your Backup Server <code>syssservers</code> Information	<code>sp_helpserver</code>
Stop a Backup Server after active dumps and loads complete	Shutting Down a Backup Server	<code>shutdown</code>
Stop a Backup Server immediately	Using <code>nowait</code> on a Backup Server	<code>shutdown with nowait</code>

Backing Up a Database After a Device Failure

Back up a database after its database device fails	Copying the Log After a Device Failure	<code>dump transaction with no_truncate</code>
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Backing Up a Database When Its Transaction Log Is Full

Copy and trim log without recording transaction	Truncating a Log That Has No Free Space	dump transaction with no_log
Make backup after trimming log	Dangers of Using with truncate_only and with no_log	dump database

Performing Routine Backups of User Databases

Add a device for backup and recovery to an Adaptive Server	Adding a Backup Device	sp_addumpdevice
Allow a user other than the owner to back up and restore the database	Designating Responsibility for Backups	sp_role "grant" oper_role
Make a backup copy of the entire database, including transaction log	Dump and Load Command Syntax	dump database
Make a backup copy of the transaction log (between full database dumps) then trim it	Dump and Load Command Syntax	dump transaction
Reply to Backup Server prompts while backing up the database	Responding to Volume Change Requests	sp_volchanged

Isolating Suspect Pages

Before You Start

Choose how recovery behaves when it detects data corruption	Fault Isolation During Recovery
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To Configure Recovery Fault Isolation (RFI)

1. Set the RFI mode.	Configuring Recovery Fault Isolation	sp_setsuspect_granularity
2. Set the threshold for escalating the RFI mode to database if the RFI mode is page.	Raising the Number of Suspect Pages Allowed	sp_setsuspect_threshold

To List Offline Pages

List databases with suspect pages	Getting Information About Offline Databases and Pages	sp_listsuspect_db
List suspect pages in a database	Getting Information About Offline Databases and Pages	sp_listsuspect_page

To Force Offline Pages Online

Force specific suspect pages online	Bringing Offline Pages Online	sp_forceonline_page
Force all the suspect pages in a database online	Bringing Offline Pages Online	sp_forceonline_db

Restoring User Databases from Backups

Create an empty database into which you will load receive the backup	Restoring the Entire Database: load database	create database for load, alter database for load
Make sure you have the right tape; Find out which backup files are on the tape	Using the Special Load Options to Identify Dump Files	load database with listonly, load transaction with listonly
Restore the database from the most recent backup	Loading the Database	load database
Reply to Backup Server prompts while restoring the database	Responding to Volume Change Requests	sp_volchanged
Restore the transaction logs in the order made	Loading the Transaction Logs	load transaction
Make the database available for public use	Bringing the Databases Online	online database

Restoring Backups of Release 10.x Databases

Create an empty database to load the backup into	Re-Creating the Databases	create database for load
Add additional space to the new database	Assigning Space and Devices to Databases	alter database for load
Load the release 10.x database	Dump and Load Command Syntax	load database
Upgrade the database to current Adaptive Server version	How to Upgrade a Dump to Adaptive Server Release 11.5.x	online database
Determine which object names are currently reserved words	New Reserved Words Reserved Words	sp_checkreswords
Find procedures, triggers, and views that depend on these objects	Identifying Dependent Objects with sp_depends	sp_depends
Copy definitions of dependent objects to file	Renaming Dependent Objects	defncopy
Print definitions of dependent objects	Viewing the Source Text of a Procedure with sp_helptext	sp_helptext
Remove dependent objects from database	Dropping Stored Procedures	drop procedure, drop trigger, drop view
Choose new, valid names for the objects	Renaming Objects Referenced by Procedures	sp_rename
Re-create dependent objects	Examples of Creating and Using Stored Procedures	create procedure, create trigger, create view
Back up the database after re-creating dependent objects	Dump and Load Command Syntax	dump database

Trimming a Database's Transaction Log

Move the transaction log to its own device	Moving the Transaction Log to Another Device	sp_logdevice
Trim the transaction log without making a copy	Using the Special dump transaction Options	dump transaction with truncate_only
Trim a transaction log after with truncate_only option fails	Truncating a Log That Has No Free Space	dump transaction with no_log
Back up the database after trimming the transaction log	Dump and Load Command Syntax	dump database

5

Managing Logins, Users, Groups, Roles, and Resources

This section contains information about the following tasks:

- Creating New User Accounts 5-2
- Getting Information About Users 5-2
- Managing Passwords 5-2
- Using Groups 5-3
- Using System Roles 5-4
- Using User-defined Roles
- Manipulating Roles
- Using Mutual Exclusivity of Roles
- Using Role Hierarchies
- Getting Information About Roles
- Using Aliases 5-7
- Changing the Characteristics of a Login 5-7
- Impersonating Another User 5-7
- Managing User Permissions 5-7
- Managing Remote Users 5-8
- Monitoring User Activity 5-8
- Creating and Managing Resource Limits and Time Ranges 5-9
- Preventing a User from Accessing the Server 5-10
- See Also 5-10

Creating New User Accounts

Create an Adaptive Server login	Adding Logins to Adaptive Server	sp_addlogin
Add an Adaptive Server login as a user in the current database	Adding Users to Databases	sp_adduser

Getting Information About Users

Get information about a database user or all users	Getting Information About Database Users	sp_helpuser
Confirm that a login is a database user or alias	System Functions That Return Database Information	valid_name
Get help on login accounts	Getting Information About Login Accounts	sp_displaylogin
Get help on local users	Getting Reports on Users and Processes	sp_who
Find out a database user's ID number	Finding User Names and IDs	user_id
Find out the current user's name	Finding User Names and IDs	user, user_name
Find out the name of an Adaptive Server login	Finding User Names and IDs	suser_name
Find out the server user ID of an Adaptive Server login	Finding User Names and IDs	suser_id

Managing Passwords

Add or change a password for an Adaptive Server login	Changing Passwords	sp_password
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Using Groups

Find out what permissions are assigned to a group	Reporting Permissions on Database Objects or Users	sp_helpprotect
Remove permissions from a group	Granting and Revoking Permissions on Database Objects	revoke
Grant permissions to a group	Granting and Revoking Permissions on Database Objects	grant
Create a group in the current database	Creating Groups	sp_addgroup
List the groups in the current database	Getting Information About Users	sp_helpgroup
List the members of a group	Getting Information About Users	sp_helpgroup
Remove users from a group or change a user's group	Changing a User's Group Membership	sp_changegroup
Remove the group from the current database	Dropping Groups	sp_dropgroup

Using System Roles

Assign a system role to an Adaptive Server login	Granting and Revoking Roles	sp_role
Get information about system roles	Viewing Information About System Roles	show_role
Confer permissions on a role	Granting and Revoking Permissions on Database Objects	grant
Find out what permissions are granted to a role	Reporting Permissions on Database Objects or Users	sp_helprotect
Get help on permissions	Reporting Permissions on Database Objects or Users	sp_helprotect
Verify that a user has a required role	Checking for Roles in Stored Procedures	proc_role
Activate or deactivate a role for a session	Activating and Deactivating Roles	set role
Display a user's currently active roles	Displaying Information About Roles	show_role
Revoke a role from an Adaptive Server login	Revoking Roles	revoke
Revoke permissions from a role	Granting and Revoking Permissions on Database Objects	revoke

Using User-defined Roles

Create a user-defined role.	Creating a Role	create role
Define mutual exclusivity of roles.	Defining and Changing Mutual Exclusivity of Roles	alter role
Assign permissions to roles.	Granting Access to Database Objects	grant
Assign roles to users.	Granting Roles	grant role
Activate roles at login.	Setting Up Default Activation at Login	sp_modifylogin

Manipulating Roles

Add a password to a role	Adding and Removing Passwords from a Role	alter role
Delete a password from role	Adding and Removing Passwords from a Role	alter role
Change activation of role at login	Setting Up Default Activation at Login	sp_modifylogin
Activate a role	Activating and Deactivating Roles	set role <i>role_name</i> on
Alter number of active roles allowed per session	Configuring User-Defined Roles	sp_configure max_roles_enabled
Deactivate a role	Activating and Deactivating Roles	set role <i>role_name</i> off
Revoke permission from roles	Granting and Revoking Roles	revoke
Revoke a role from a user	Revoking Roles	revoke role
Drop a user-defined role from Adaptive Server	Dropping a User-defined Role	drop role

Using Mutual Exclusivity of Roles

Declare roles as mutually exclusive	Defining and Changing Mutual Exclusivity of Roles	alter role...membership activation
Check roles for mutual exclusivity	Determining Mutual Exclusivity	mut_excl_roles
Disallow concurrent activation of two roles	Role Hierarchies and Mutual Exclusivity	alter role...activation
Disallow concurrent grant of two roles	Role Hierarchies and Mutual Exclusivity	alter role...membership

Using Role Hierarchies

Declare a role to contain another role	Defining and Changing a Role Hierarchy	grant
Check to see if a role contains another role	Viewing User Roles in a Hierarchy	role_contain
Display role hierarchy related to current user's roles	Determining Role Activation Displaying Login Account Information	sp_activeroles sp_displaylogin
Display role hierarchy of a specified role	Displaying a Role Hierarchy	sp_displayroles

Getting Information About Roles

To Display Information About

The role ID of a role name	Finding a Role ID	role_id system function
The role name of a role ID	Finding a Role Name	role_name system function
System roles	Viewing Information About System Roles	show_role system function
Role hierarchies and roles that have been granted to a user or users	Displaying a Role Hierarchy	sp_displayroles system procedure
Whether one role contains another role in a role hierarchy	Viewing User Roles in a Hierarchy	role_contain system function
Whether two roles are mutually exclusive	Determining Mutual Exclusivity	mut_excl_roles system function
Roles that are active for the current session	Determining Role Activation	sp_activeroles system procedure
Whether you have activated the correct role to execute a procedure	Checking for Roles in Stored Procedures	proc_role system function
Logins, including roles that have been granted	Displaying Login Account Information	sp_displaylogin system procedure
Permissions for a user, group, or role	Checking Permissions	sp_helprotect system procedure

Using Aliases

Create an alias in the current database for a server login	Adding Aliases	sp_addalias
List the Adaptive Server logins mapped to an alias	Getting Information About Aliases	sp_helpuser
Remove an alias from the current database	Dropping Aliases	sp_dropalias

Changing the Characteristics of a Login

Change a login's default database or language	Changing User Defaults	sp_modifylogin
Rename a login	Changing User Defaults	sp_modifylogin

Impersonating Another User

Temporarily impersonate another database user	Using Aliases in Databases	setuser
Create an alias in the current database for a server login	Adding Aliases	sp_addalias
Remove an alias from the current database	Dropping Aliases	sp_dropalias

Managing User Permissions

Grant permissions to a user, group, or role	Granting and Revoking Permissions on Database Objects	grant
Get help on permissions	Reporting Permissions on Database Objects or Users	sp_helpprotect
Revoke permissions from a user, group, or role	Granting and Revoking Permissions on Database Objects	revoke

Managing Remote Users

Allow remote logins	Allowing Remote Access	sp_configure "allow remote access"
Add a remote login to execute local stored procedures	Mapping Users' Server IDs	sp_addremotelogin
Display or change remote server option settings	Password Checking for Remote Users	sp_remotoption
Get help on remote server logins	Getting Information About Remote Logins	sp_helpremotelogin
Remove a remote login from the local server	Adding Remote Logins	sp_dropremotelogin
Require password verification from remote logins	Password Checking for Remote Users	sp_remotoption "trusted"
Remove a remote server and its logins	Dropping Remote Servers	sp_dropserver...droplogin

Monitoring User Activity

Audit a login's object access and command batches	The Audit System	sp_audit
Close the accounting period and report system usage	Initiating a New Accounting Interval	sp_clearstats
Report system usage	Displaying Current Accounting Totals	sp_reportstats
List the processes run by an Adaptive Server login	Getting Reports on Users and Processes	sp_who

Creating and Managing Resource Limits and Time Ranges

Before You Start

1. Plan for resource limits.	Planning Resource Limits
2. Identify users and limits.	Identifying Users and Limits
3. Understand limit types.	Understanding Limit Types
4. Understand time ranges.	Defining Time Ranges

To Create a Named Time Ranges and Resource Limit

1. Enable resource limits.	Enabling Resource Limits allow resource limits	<code>sp_configure</code>
2. Create a named time range.	Defining Time Ranges	<code>sp_add_time_range</code>
3. Create a resource limit.	Creating a Resource Limit	<code>sp_add_resource_limit</code>

To Manage Named Time Ranges and Resource Limits

Get information on existing resource limits	Getting Information on Existing Limits	<code>sp_help_resource_limit</code>
Modify a named time range	Modifying a Named Time Range	<code>sp_modify_time_range</code>
Modify a resource limit	Modifying Resource Limits	<code>sp_modify_resource_limit</code>
Drop a named time range	Dropping a Named Time Range	<code>sp_drop_time_range</code>
Drop a resource limit	Dropping Resource Limits	<code>sp_drop_resource_limit</code>

Preventing a User from Accessing the Server

Remove a user from the current database	Dropping Users	sp_dropuser
Remove an alias from the current database	Dropping Aliases	sp_dropalias
List locked logins	Locking or Dropping Adaptive Server Login Accounts	sp_locklogin
Lock or unlock an Adaptive Server login	Locking or Dropping Adaptive Server Login Accounts	sp_locklogin
Remove a login from Adaptive Server	Dropping Login Accounts	sp_droplogin
Remove a remote login from the local server	Adding Remote Logins	sp_dropremotelogin

See Also

For related information, see the following task:

Establishing Execution Priorities 3-4

6

Defining and Using Datatypes

This section contains information about the following tasks:

- [Getting Information About Datatypes](#) 6-2
- [Converting Data to Another Datatype or Format](#) 6-3
- [Creating User-Defined Datatypes](#) 6-4
- [Finding a Column's Datatype](#) 6-4
- [Renaming a User-Defined Datatype](#) 6-4
- [Removing a User-Defined Datatype from a Database](#) 6-5

Getting Information About Datatypes

Get help on system datatypes	Getting a Report with <code>sp_help</code>	<code>sp_datatype_info</code>, <code>sp_help</code>
Read about system datatypes	Using System-Supplied Datatypes	System and User-Defined Datatypes
Read about exact numeric types	Exact Numeric Types: Integers, Exact Numeric Types: Decimal Numbers	Exact Numeric Datatypes
Read about approximate numeric types	Approximate Numeric Datatypes	Approximate Numeric Datatypes
Read about datatypes for monetary values	Money Datatypes	Money Datatypes
Read about datatypes for dates and times	Date and Time Datatypes	Date/time Datatypes
Read about the <i>timestamp</i> type	The timestamp Datatype	timestamp Datatype
Read about character types	Character Datatypes	Character Datatypes
Read about datatypes for binary values	Binary Datatypes	Binary Datatypes
Read about the <i>bit</i> type	The bit Datatype	bit Datatype
Read about the <i>sysname</i> type	The sysname Datatype	sysname Datatype
Read about <i>text</i> and <i>image</i> types	Selecting text and image Values	text and image Datatypes
Read about user-defined datatypes	Creating User-Defined Datatypes	User-Defined Datatypes

Converting Data to Another Datatype or Format

Convert one datatype to another	Using the General Purpose Conversion Function: <code>convert</code>	convert
Convert a date to another date format	Converting Date and Time Information	convert
Convert an angle from degrees to radians	Mathematical Functions	radians
Convert an angle from radians to degrees	Mathematical Functions	degrees
Find the ASCII code for the first character in an expression	String Functions Used for Character Strings or Expressions	ascii
Find the character with a specified ASCII code	String Functions Used for Character Strings or Expressions	char
Convert a floating point number to a character string	String Functions Used for Character Strings or Expressions	str
Find the integer equivalent of a hexadecimal string	Converting Hexadecimal Data	hexpoint
Find the hexadecimal equivalent of an integer	Converting Binary-Like Data	inttohex
Convert a string from uppercase to lowercase	String Functions Used for Character Strings or Expressions	lower
Convert a string from lowercase to uppercase	String Functions Used for Character Strings or Expressions	upper

Creating User-Defined Datatypes

Get information about user-defined datatypes	Creating User-Defined Datatypes	User-Defined Datatypes
Get information about columns with system-generated values	Using IDENTITY Columns	alter table create table
Get information about column null types	Allowing Null Values	create table
Check a potential datatype name for validity	Identifiers	valid_name
Create a user-defined datatype	Creating User-Defined Datatypes	sp_addtype
Create a default	Creating Defaults	create default
Bind the default to the user-defined datatype	Binding Defaults	sp_bindefault
Unbind the default from the user-defined datatype	Unbinding Defaults	sp_unbindefault
Create a rule	Creating Rules	create rule
Bind the rule to the user-defined datatype	Binding Rules	sp_bindrule
Unbind the rule from the user-defined datatype	Unbinding Rules	sp_unbindrule

Finding a Column's Datatype

Find a column's datatype	Getting a Report with sp_help , Listing Tables, Columns, and Datatypes	sp_help , sp_columns
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Renaming a User-Defined Datatype

Choose a valid datatype name	Identifiers	valid_name
Identify datatype names that are reserved words	Transact-SQL Keywords	sp_checkreswords
Rename a datatype	Renaming Tables and Other Objects	sp_rename

Removing a User-Defined Datatype from a Database

Remove a user-defined datatype from the current database

Dropping a User-Defined Datatype

sp_droptype

7

Creating and Maintaining Tables

This section contains information about the following tasks:

- Using IDENTITY Columns 7-2
- Creating a Table from Scratch 7-2
- Using an Existing Table to Create a New Table 7-3
- Adding Constraints, Defaults, Rules, and Keys to a Table 7-4
- Adding a Column to a Table 7-6
- Renaming a Column 7-6
- Renaming a Table 7-7
- Checking Table Consistency 7-7
- Determining Column Datatype, Length, and Value 7-8
- Giving Others Permission to Use a Table 7-8
- Identifying Tables 7-9
- Creating and Maintaining a Table's Indexes 7-9
- Manipulating Data 7-10
- Monitoring Table Size 7-11
- Limiting the Number of Rows per Page 7-11
- Moving a Table or an Index to Another Segment 7-11
- Partitioning a Table for Better Insert Performance 7-12
- Removing a Table from a Database 7-12

Using IDENTITY Columns

General information about IDENTITY columns	Using IDENTITY Columns	alter table create table
Specify the percentage of column values held in cache	identity burning set factor	sp_configure "identity burning set factor"
Specify number of sequential values reserved per process	identity grab size	sp_configure "identity grab size"
Specify size of automatically created IDENTITY columns	size of auto identity column	sp_configure "size of auto identity column"
Include an IDENTITY column in indexes to new tables	identity in nonunique index	sp_dboption "identity in nonunique index", true
Include an IDENTITY column with a unique, nonclustered index to new tables	unique auto_identity index	sp_dboption, "unique auto_identity index", true
Allow explicit inserts into an IDENTITY column	Explicitly Inserting Data into an IDENTITY Column	set identity_insert on
Automatically create an IDENTITY column in new tables	auto identity	sp_dboption "auto identity", true
Find the last value inserted into an IDENTITY column for the current session	Checking IDENTITY Values with @@identity	select @@identity

Creating a Table from Scratch

Create a schema in the current database	Using create schema for Cross-Referencing Constraints	create schema
Check potential names for validity	Identifiers	valid_name
Allow delimited identifiers	Delimited Identifiers	set quoted_identifier on
Create a new table	Creating Tables	create table
Back up the database that contains the new table	Dump and Load Command Syntax	dump database

Using an Existing Table to Create a New Table

Check a potential table name for validity	Identifiers	valid_name
Allow delimited identifiers	Delimited Identifiers	set quoted_identifier on
Allow the use of the select into command in the database	select into/bulkcopy/pllsort	sp_dboption "select into/bulkcopy/pllsort"
Put new option setting into effect	Changing Database Options	checkpoint
Create a table and populate with existing data	Creating New Tables from Query Results: select into	select into
Disallow the use of the select into command in the database	select into/bulkcopy/pllsort	sp_dboption "select into/bulkcopy/pllsort"
Put new option setting into effect	Changing Database Options	checkpoint
Back up the database that contains the new table	Dump and Load Command Syntax	dump database

Adding Constraints, Defaults, Rules, and Keys to a Table

Add, change, or remove a table constraint	Defining Integrity Constraints for Tables	alter table
Add a user message to a database that displays whenever the constraint is violated	Creating Messages for print and raiserror	sp_addmessage, sp_bindmsg
Find out what message is associated with a constraint	Using sp_helpconstraint to Find a Table's Constraint Information	sp_helpconstraint
Create a default	create default Syntax	create default
Bind the default to a column	Binding Defaults	sp_bindefault
Unbind the default from a column	Unbinding Defaults	sp_unbindefault
Create a rule that determines acceptable values	create rule Syntax	create rule
Bind the rule to a column	Binding Rules	sp_bindrule
Unbind the rule from a column	Unbinding Rules	sp_unbindrule
List potential common keys	Determining Which Table Columns to Join	sp_helpjoins
Define a common key	Determining Which Table Columns to Join	sp_commonkey
Get help on common keys	Using Clustered or Nonclustered Indexes	sp_helpkey

Use logical primary keys

Create a logical primary key	Specifying Unique and Primary Key Constraints	alter table, create table
Define a logical primary key	Specifying Unique and Primary Key Constraints	sp_primarykey
Get help on logical primary keys	Using Clustered or Nonclustered Indexes	sp_pkeys, sp_helpkey
Create a trigger to enforce a logical primary key	Using Triggers to Maintain Referential Integrity	create trigger
Remove a logical primary key definition from a table	Dropping Constraints and Key Definitions	sp_dropkey

Using logical foreign keys

Define a logical foreign key	Specifying Unique and Primary Key Constraints	sp_foreignkey
Get help on logical foreign keys	Using Clustered or Nonclustered Indexes	sp_fkeys, sp_helpkey
Create a trigger to enforce a logical foreign key	Using Triggers to Maintain Referential Integrity	create trigger
Remove a logical foreign key definition from a table	Dropping Constraints and Key Definitions	sp_dropkey

Adding a Column to a Table

List views, procedures, triggers that depend on the table	Identifying Dependent Objects with <code>sp_depends</code>	<code>sp_depends</code>
Store definitions of dependent objects in a file	Renaming Dependent Objects	<code>defncopy</code>
Print definitions of dependent objects	Viewing the Source Text of a Procedure with <code>sp_helptext</code>	<code>sp_helptext</code>
Drop dependent objects	Dropping Stored Procedures, Dropping Triggers, Dropping Views	<code>drop procedure</code> , <code>drop trigger</code> , <code>drop view</code>
Check a potential column name for validity	Identifiers	<code>valid_name</code>
Allow delimited identifiers during the session	Delimited Identifiers	<code>set quoted_identifier on</code>
Add the new column to the table	Changing Table Structures: <code>alter table</code>	<code>alter table</code>
Re-create dependent objects	Creating and Executing Stored Procedures, Creating Triggers, Creating Views	<code>create procedure</code> , <code>create trigger</code> , <code>create view</code>
Back up the database that contains the new table	Dump and Load Command Syntax	<code>dump database</code>

Renaming a Column

Identify column names that are reserved words	Transact-SQL Keywords	<code>sp_checkreswords</code>
Check a potential column name for validity	Identifiers	<code>valid_name</code>
Allow delimited identifiers during the session	Delimited Identifiers	<code>set quoted_identifier on</code>
Find a column's name from its ID	System Functions That Return Database Information	<code>col_name()</code>
Rename a column	Renaming Tables and Other Objects	<code>sp_rename</code>

Renaming a Table

Identify table names that are reserved words	Transact-SQL Keywords	sp_checkreswords
Check a potential table name for validity	Identifiers	valid_name
Allow delimited identifiers	Delimited Identifiers	set quoted_identifier on
Identify dependent objects	Identifying Dependent Objects with sp_depends	sp_depends
Copy definitions of dependent objects to a file	Renaming Dependent Objects	defncopy
Print definitions of dependent objects	Viewing the Source Text of a Procedure with sp_helptext	sp_helptext
Rename a table	Renaming Tables and Other Objects	sp_rename
Remove dependent objects from the database	Dropping Stored Procedures, Dropping Triggers, Dropping Views	drop procedure, drop trigger, drop view
Re-create dependent objects	Creating and Executing Stored Procedures, Creating Triggers, Creating Views	create procedure, create trigger, create view
Back up the database that contains the table	Dump and Load Command Syntax	dump database

Checking Table Consistency

Check the consistency of a table	dbcc checktable	dbcc checktable
Check the integrity of page allocations	dbcc tablealloc	dbcc tablealloc
Identify suspect indexes	Using sp_indsuspect to Find Corrupt Indexes	sp_indsuspect

Determining Column Datatype, Length, and Value

Find out the datatypes of each column in a table	Getting a Report with sp_help	sp_help
Find out the datatypes of selected columns in a table	Listing Tables, Columns, and Datatypes	sp_columns
Find out actual length of data in a column	datalength	datalength
Find out defined column length	col_length	col_length
Retrieve the value of a column	select Syntax	select
Specify which rows to retrieve	Choosing Specific Columns	where Clause
Find the last value inserted into an IDENTITY column for the current session	Checking IDENTITY Values with @@identity	select @@identity

Giving Others Permission to Use a Table

Find out which users can access one or more columns	Reporting Permissions on Specific Columns	sp_column_privileges
Find out which users can access a table	Reporting Permissions on Database Objects or Users, Reporting Permissions on Specific Tables	sp_helprotect, sp_table_privileges
Find out which columns a particular user can access	Reporting Permissions on Database Objects or Users	sp_helprotect
List all permissions information for the database	Reporting Permissions on Database Objects or Users	sp_helprotect
Grant a user, group, or role permission to access a table	Granting and Revoking Object Access Permissions	grant
Revoke permission from a user, group, or role	Granting and Revoking Object Access Permissions	revoke

Identifying Tables

List the tables in a database	Listing Tables, Columns, and Datatypes	sp_tables
Find the name of a table from its object ID	Finding an Object Name and ID	object_name()
Find the object ID of a table from its name	Finding an Object Name and ID	object_id()

Creating and Maintaining a Table's Indexes

Choose a valid name for the index	Identifiers	valid_name
Estimate space and time required to create an index	Using sp_estspace to Estimate Object Size	sp_estspace
Include existing IDENTITY column in index key	identity in nonunique index	sp_dboption "identity in nonunique index"
Create an index on a table	create index Syntax	create index
List the indexes for a table	Determining What Indexes Exist on a Table	sp_helpindex, sp_statistics
Correct distribution of key values in indexes	Updating Statistics About Indexes	update statistics
Assign future allocation to a particular segment	Placing Existing Objects on Segments	sp_placeobject
Remove an index from a table	Dropping Indexes	drop index

Check index consistency

Check the consistency of an index	dbcc checktable	dbcc checktable
Check the integrity of index page allocations	dbcc indexalloc	dbcc indexalloc
Identify suspect indexes after sort order change	Using sp_indsuspect to Find Corrupt Indexes	sp_indsuspect
Rebuild suspect indexes	Rebuilding Indexes After Changing the Sort Order	dbcc reindex

Find the space used by an index

Find out how many pages are allocated to an index	OAM Pages and Size Statistics	reserved_pgs()
Find out how many pages are used by an index	OAM Pages and Size Statistics	data_pgs()
Find out how much space an index uses	Finding Out How Much Space a Table Uses	sp_spaceused

Rename an index

Check a potential index name for validity	Identifiers	valid_name
Identify index names that are reserved words	Transact-SQL Keywords	sp_checkreswords
Rename an index	Renaming Tables and Other Objects	sp_rename

Manipulating Data

Add data to a table	Adding New Data	insert
Update data in a table; Change the value of rows	Changing Existing Data, Changing text and image Data	update
Remove all rows from a table	Deleting All Rows from a Table	truncate table, delete
Remove selected rows from a table	Deleting Data	delete

Monitoring Table Size

Find out how many KB are used by a table	Finding Out How Much Space a Table Uses	<code>sp_spaceused</code>
Find out how many KB are still available for table expansion	Finding Out How Much Space a Table Uses	<code>sp_spaceused</code>
Find out how many pages are allocated to a table	OAM Pages and Size Statistics	<code>reserved_pgs()</code>
Find out how many pages are being used for data	OAM Pages and Size Statistics	<code>data_pgs()</code>
Find out how many pages are being used for data and index	OAM Pages and Size Statistics	<code>used_pgs()</code>
Estimate the number of rows in a table	Checking the Amount of Space Used	<code>rowcnt</code>
Estimate the number of KB required for a table and indexes	Using <code>sp_estspace</code> to Estimate Object Size	<code>sp_estspace</code>

Limiting the Number of Rows per Page

Specify maximum number of rows for future page allocations	Applying <code>max_rows_per_page</code> to Existing Data	<code>sp_chgattribute</code>
Specify maximum number of rows on index leaf pages or data pages	Reducing Lock Contention with <code>max_rows_per_page</code>	<code>create table... max_rows_per_page</code> , <code>alter table... max_rows_per_page</code>

Moving a Table or an Index to Another Segment

Assign future allocations to a particular segment	Placing Existing Objects on Segments	<code>sp_placeobject</code>
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Partitioning a Table for Better Insert Performance

Create additional page chains for a table	Commands for Partitioning Tables	alter table...partition
Concatenate a table's partitions into a single page chain	alter table...unpartition Syntax	alter table...unpartition
Change the number of partitions in a table	Changing the Number of Partitions	alter table...unpartition, alter table...partition
Find out how many partitions a table has	Getting a Report with sp_help	sp_helppartition, sp_help

Removing a Table from a Database

If partitioned, concatenate a table's partitions into a single page chain	alter table...unpartition Syntax	alter table...unpartition
Remove a table from a database	Dropping Tables	drop table

8

Using Parallel Processing

This section contains information about the following tasks:

- [Configuring Parallel Processing](#) 8-2
- [Partitioning Heap Tables for Parallel Queries](#) 8-3
- [Creating a Clustered Index on a Partitioned Table](#) 8-4
- [Setting Up a Table for Parallel Queries](#) 8-4
- [Setting Up a Multitable Query for Parallel Processing](#) 8-5
- [Setting Up a Query that Involves an Internal Sort for Parallel Processing](#) 8-5
- [Troubleshooting Parallel Queries and Sorts](#) 8-6

Configuring Parallel Processing

Before You Start

Get an overview of configuring your system for parallel processing.	Controlling the Degree of Parallelism
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To Configure for Parallel Processing

1. Determine the best configuration settings.	Upper Limit to Degree of Parallelism	<code>sp_helpconfig</code>
2. Configure Adaptive Server for parallel processing.	Parallel Queries	<code>sp_configure</code>
3. Use session options or restricting the <code>select</code> command to adjust query plans.	Reducing the Likelihood of Run-Time Adjustments	<code>select</code> , <code>set</code>

Partitioning Heap Tables for Parallel Queries

Before You Start

Understand the basic parallel access methods	Parallel Access Methods	
Understand configuration parameters that affect parallelism	Configuration Parameters for Controlling Parallelism	
Understand which commands are eligible for parallel execution and can benefit from it	Types of Queries That Can Benefit from Parallel Processing	<code>select</code>

To Partition Heap Tables for Parallel Queries

1. Create a segment that spans physical drives.	Creating Segments	<code>sp_addsegment</code> <code>sp_extendsegment</code>
2. Create a table to partition.	Creating Tables	<code>create table...on segment_name</code>
3. Partition the table.	Commands for Partitioning Tables	<code>alter table...partition</code>
4. Add data to the table, distributing the data evenly to each partition.	Adding New Data See the utility guide for your platform.	<code>insert</code> <code>bcp</code>
5. Get help on partitions.	Getting Information About Partitions	<code>sp_helppartition</code>
6. Update partition statistics.	Updating Partition Statistics	<code>update all statistics</code> <code>update partition statistics</code>

Creating a Clustered Index on a Partitioned Table

1. Set the number of worker processes and max parallel degree configuration parameters to the number of partitions in the table plus 1.	Configuring Parallel Processing Parallel Queries number of worker processes max parallel degree	sp_configure
2. Set the database option "select into/bulkcopy/pllsort" to true.	select into/bulkcopy/pllsort	sp_dboption
3. If the table already has a clustered index on it, drop the index.	Dropping Indexes	drop index or alter table ...drop constraint
4. Create a segment and extend it to span more than 1 physical device.	Extending the Scope of Segments	sp_addsegment sp_extendsegment
5. Recreate the clustered index on a segment that spans physical devices.	create index Syntax	create index or alter table ...add constraint

Setting Up a Table for Parallel Queries

Before You Start

Understand the basic parallel access methods	Parallel Access Methods	
Understand configuration parameters that affect parallelism	Configuration Parameters for Controlling Parallelism	
Understand which commands are eligible for parallel execution and can benefit from it	Types of Queries That Can Benefit from Parallel Processing	select
To set up a table for parallel queries		
Set max parallel degree equal to or greater than the number of partitions	Configuring Parallel Processing max parallel degree	sp_configure

Setting Up a Multitable Query for Parallel Processing

Understand how Adaptive Server optimizes joins processed in parallel	Parallel Strategies for Joins	set showplan on
Understand how Adaptive Server optimizes joins processed serially	Optimizing Joins Multitable Joins	set showplan on
Set max parallel degree equal to or greater than the number of partitions; set max scan parallel degree to 2 or higher to enable hash-based scans	Configuring Parallel Processing max parallel degree max scan parallel degree	sp_configure

Setting Up a Query that Involves an Internal Sort for Parallel Processing

Understand which commands are eligible	Parallel Sort Requirements and Resources Overview	set showplan on
Understand resources required for parallel sorts	Configuring Resources for Parallel Sorting	set sort_resources on
Enable creation and population of the intermediate worktable in parallel by setting up the source table for parallel queries	Setting Up a Table for Parallel Queries	alter table...partition
Extend the <i>default</i> segment in <i>tempdb</i> to span more than one physical device to improve performance for the sort operation	Extending the Scope of Segments	sp_extendsegment

Troubleshooting Parallel Queries and Sorts

Troubleshooting Parallel Queries		
Use showplan in combination with noexec to view query plan before executing it	Understanding Query Plans and Combining showplan and noexec	set showplan set noexec
Use the set statistics options to get reports on logical and physical I/O and execution time before running a query	Using showplan	set statistics io on set statistics time on
Observe run-time adjustments of query plans	Run-Time Adjustment of Worker Processes Using set process_limit_action	set showplan
Monitor the use of adjusted query plans	Using set process_limit_action	set
Display the contents of adjusted query plans	Using showplan	set showplan
Reduce the likelihood of run-time adjustment	Reducing the Likelihood of Run-Time Adjustments	sp_recompile
Check run-time adjustments	Checking Run-Time Adjustments with sp_sysmon	sp_sysmon
Troubleshooting Parallel Sorts		
Get detailed information on how Adaptive Server can use parallel sorting to execute a create index command	Tools for Observing and Tuning Sort Behavior	set sort_resources on
Troubleshooting Parallel Performance		
Use other tools to diagnose parallel performance problems	Diagnosing Parallel Performance Problems	set showplan sp_sysmon

9

Auditing and Monitoring Server Activity

This section contains information about the following tasks:

- [Implementing and Managing Auditing](#) 9-2
- [Removing the Auditing System from a Server](#) 9-3
- [Measuring CPU Usage](#) 9-3
- [Monitoring Executing SQL Queries](#) 9-3

Implementing and Managing Auditing

1. Install auditing.	Installing the Audit System See the installation and configuration documentation for your platform.	
2. Set up the audit process to manage the audit trail.	Preparing to Manage the Audit Trail Single-Table Auditing Creating Threshold Procedures audit queue size current audit table suspend audit when device full	sp_configure sp_addthreshold
3. Set up the audit process to manage the <i>syslogs</i> transaction log in the <i>sybsecurity</i> database.	Preparing to Manage the Transaction Log; trunc log on chkpt Creating and Executing Stored Procedures Creating a Free-Space Threshold for the Log Segment	sp_dboption sp_addthreshold create procedure
4. Set auditing options	Setting Auditing Options	sp_audit
5. Enable auditing.	Enabling and Disabling Auditing	sp_configure
6. Audit and analyze the audit data.	Querying the Audit Trail Correlating Adaptive Server and Operating System Audit Records Understanding the Audit Tables auditing	select
Add comments to the the audit trail	Adding User-Specified Records to the Audit Trail	sp_addauditrecord
See the status of auditing options	Determining Current Auditing Settings	sp_displayaudit

Removing the Auditing System from a Server

1. Disable all current auditing.	Enabling and Disabling Auditing auditing	sp_configure
2. Remove the <i>sybsecurity</i> auditing database.	Using the drop database Command	drop database

Measuring CPU Usage

To measure CPU usage

1. Study the “Kernel Utilization” and “CPU Yields by Engine” sections of the <i>sp_sysmon</i> report.	Using <i>sp_sysmon</i> to Measure CPU Usage	sp_sysmon
2. Use operating system commands.	Refer to documentation for your operating system.	

Monitoring Executing SQL Queries

Before You Start

Configure shared memory for SQL batches	Configuring Adaptive Server to Save SQL Batch Text max SQL text monitored	sp_configure
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To Monitor Executing Queries

Read About Monitor Access to Executing SQL	See your Monitor Server documentation	
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10

Retrieving and Manipulating Data

This section contains information about the following tasks:

- Retrieving Data from a Table 10-2
- Joining Data from Multiple Tables 10-3
- Comparing Data in Tables 10-3
- Operating on Data 10-3
- Converting Data to Another Datatype or Format 10-4
- Manipulating Character Strings 10-5
- Operating on Data 10-3
- Manipulating Numbers 10-6
- Manipulating Dates and Times 10-8
- Manipulating text and image Data 10-8

Retrieving Data from a Table

Return the value of data	Queries: Selecting Data from a Table	select, union Operator, where Clause, group by and having Clauses, order by Clause
Select a set of rows through a cursor	Cursors: Accessing Data Row by Row	declare cursor, open, fetch
Read <i>text</i> or <i>image</i> data	Using readtext	readtext
Retrieving data using conditional expressions	case Expression	case

Adding Data to a Table or View

Add data to a table or view	Adding New Data, Selecting Rows: The where Clause	insert, where Clause
Allow inserts to an IDENTITY column	Explicitly Inserting Data into an IDENTITY Column	set identity_insert on

Remove Data from a Table or View

Remove all data from a table	Deleting All Rows from a Table, Deleting Data	truncate table, delete
Remove selected rows from a table or view	Deleting Data, Selecting Rows: The where Clause	delete, where Clause

Copy Data to or from a Table

Allow data to be copied to or from a table	select into/bulkcopy/plsort	sp_dboption "select into/bulk copy/plsort"
Copy data to or from a file	See the utility guide for your platform.	bcp
Create a table populated with data from another table	Creating New Tables from Query Results: select into	select into

Change the Value of Data

Change the value of data in a table or view	Changing Existing Data, Selecting Rows: The where Clause	update, where Clause
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Joining Data from Multiple Tables

Read about joins	Joins: Retrieving Data from Several Tables	select
Join operators	Join Operators	*=, =*
Read about subqueries	Subqueries: Using Queries Within Other Queries	select

Comparing Data in Tables

Compare two timestamps	The timestamp Datatype	tsequal
Comparison operators	Comparison Operators	=, >, <, >=, <=, !=, <>, !>, !<

Operating on Data

Read about operators and their precedence	Expressions in Adaptive Server	
Arithmetic operators	Arithmetic Operators	+, -, *, /, %
Bitwise operators	Bitwise Operators	&, , ^, ~
Comparison operators	Comparison Operators	=, >, <, >=, <=, !=, <>, !>, !<
Concatenation operator	Concatenation	+
Outer join operators	Join Operators	*=, =*

Converting Data to Another Datatype or Format

Convert one datatype to another	Using the General Purpose Conversion Function: <code>convert</code>	convert
Convert a date to another date format	Changing the Display Format for Dates	convert
Convert an angle from degrees to radians	Mathematical Functions	radians
Convert an angle from radians to degrees	Mathematical Functions	degrees
Find the ASCII code for the first character in an expression	String Functions Used for Character Strings or Expressions	ascii
Find the character with a specified ASCII code	String Functions Used for Character Strings or Expressions	char
Convert a floating point number to a character string	<code>str</code>	str
Find the integer equivalent of a hexadecimal string	The <code>hexint</code> Function	hexint
Find the hexadecimal equivalent of an integer	The <code>inttohex</code> Function	inttohex
Convert a string from uppercase to lowercase	String Functions Used for Character Strings or Expressions	lower
Convert a string from lowercase to uppercase	String Functions Used for Character Strings or Expressions	upper

Manipulating Character Strings

Concatenate data with the concatenation operator	Concatenation	select
Remove leading blanks from a string	String Functions Used for Character Strings or Expressions	ltrim
Remove trailing blanks from a string	String Functions Used for Character Strings or Expressions	rtrim
Retrieve a portion of a string	substring	right, substring
Find the ASCII code for the first character in a string	String Functions Used for Character Strings or Expressions	ascii
Find out how many bytes are in a string	String Functions Used for Character Strings or Expressions	datalength
Find out how many characters are in a string	String Functions Used for Character Strings or Expressions	char_length
Find the soundex code for a string	soundex, difference	soundex
Find the difference between two soundex values	soundex, difference	difference
Replace a portion of one string with another string	stuff	stuff
Substitute a value for nulls	isnull	isnull
Create a string with a specified number of blanks	String Functions Used for Character Strings or Expressions	space
Replicate a string a specified number of times	String Functions Used for Character Strings or Expressions	replicate
Reverse the order of a string	String Functions Used for Character Strings or Expressions	reverse

Find data that matches a pattern

Read about wildcard characters	Matching Character Strings: like	
Find a pattern's starting position within a string	charindex, patindex	charindex , patindex
Find data that matches a pattern	Matching Character Strings: like	like
Represent a single character	Matching Character Strings: like	_
Represent any number of characters	Matching Character Strings: like	%
Represent a range of characters	Square Brackets (Transact-SQL Extension)	[]
Represent "not"	Matching Character Strings: like	^

Handle blanks

Create a string consisting of a specified number of blanks	String Functions Used for Character Strings or Expressions	space
Remove leading blanks from a string	String Functions Used for Character Strings or Expressions	ltrim
Remove trailing blanks from a string	String Functions Used for Character Strings or Expressions	rtrim
Specify how blanks are handled	Compliance to ANSI Standards	set string_rtruncation

Manipulating Numbers

Create summary data

Calculate summary values for a set of rows	Summarizing Query Results Using Aggregate Functions	<code>avg()</code> , <code>count()</code> , <code>max()</code> , <code>min()</code> , <code>sum()</code>
Create separate row for summary data	Summarizing Groups of Data: The compute Clause	<code>compute Clause</code>
Specify how to evaluate nulls in aggregates, comparisons	Compliance to ANSI Standards	<code>set ansinull</code>
Find the absolute value of a number	Mathematical Functions	<code>abs()</code>
Exponents and logarithms	Mathematical Functions	<code>exp()</code> , <code>log()</code> , <code>log10()</code> , <code>power()</code> , <code>sqrt()</code>
Find the sign of a number	Mathematical Functions	<code>sign()</code>

Calculate trigonometric functions

Calculate the trigonometric function of an angle	Mathematical Functions	<code>abs()</code> , <code>asin()</code> , <code>atan()</code> , <code>atn2()</code> , <code>cos()</code> , <code>cot()</code> , <code>sin()</code> , <code>tan()</code>
Convert between degrees and radians	Mathematical Functions	<code>degrees()</code> , <code>radians()</code>
Calculate the value of pi	Mathematical Functions	<code>pi()</code>

Generate random numbers

Generate random numbers	Mathematical Functions	<code>rand()</code>
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Round data

Find the largest integer \leq to the specified value	Mathematical Functions	<code>floor()</code>
Find the smallest integer \geq the specified value	Mathematical Functions	<code>ceiling()</code>
Round a number to a specified number of significant digits	Mathematical Functions	<code>round()</code>

Manipulating Dates and Times

Find the current date	Get Current Date: <code>getdate</code>	<code>getdate()</code>
Calculate the interval between two dates	Calculate Intervals or Increment Dates	<code>datediff()</code>
Calculate the sum of a date and an interval	Add Date Interval: <code>dateadd</code>	<code>dateadd()</code>
Change the display format of a date	Changing the Display Format for Dates	<code>convert()</code>
Find the integer value of a date part	Find Date Parts As Numbers or Names	<code>datepart()</code>
Find the name of a date part	Find Date Parts As Numbers or Names	<code>datename()</code>
Set the internal date format	Entering Dates	<code>set dateformat</code>
Specify the name of the first day of the week	Entering Dates	<code>set datefirst</code>
Specify the names of days and months	Installing Date Strings for Unsupported Languages	<code>sp_addlanguage</code>

Manipulating *text* and *image* Data

Assign a pointer to the first <i>text</i> or <i>image</i> page	<code>text</code> Datatype	<code>insert</code>
Convert <i>text</i> data to a multibyte character set	Upgrading <code>text</code> Data After Changing Character Sets	<code>dbcc fix_text</code>
Find maximum number of <i>text</i> or <i>image</i> bytes for selects	Global Variables Affected by set Options Selecting <code>text</code> and <code>image</code> Values	<code>@@textsize</code> <code>set</code>
Read <i>text</i> or <i>image</i> data	Using <code>readtext</code>	<code>readtext</code>
Retrieve the pointer to the first <i>text</i> or <i>image</i> page	Examples of Using <code>Text</code> Functions	<code>textptr()</code>
Set the maximum number of <i>text</i> or <i>image</i> bytes for selects	Selecting <code>text</code> and <code>image</code> Values Global Variables Affected by set Options	<code>@@textsize</code> <code>set</code>
Validate the pointer to the first <i>text</i> or <i>image</i> page	Changing <code>text</code> and <code>image</code> Data	<code>textvalid()</code>
Write <i>text</i> or <i>image</i> data	Changing <code>text</code> and <code>image</code> Data	<code>writetext</code>

11

Using Defaults and Rules

This section contains information about the following tasks:

- [Creating Defaults and Rules](#) 11-2
- [Specifying a Default or Rule for a Datatype or Column](#) 11-2
- [Getting Help on Defaults and Rules](#) 11-2
- [Renaming a Default or Rule](#) 11-3
- [Removing a Default or Rule from a Database](#) 11-3

Creating Defaults and Rules

Check a potential name for validity	Identifiers	<code>valid_name()</code>
Create a default	create default Syntax	<code>create default</code>
Create a rule	create rule Syntax	<code>create rule</code>
Print the definition of the new default or rule	Viewing the Source Text of a Procedure with <code>sp_helptext</code>	<code>sp_helptext</code>
Copy the definition to a file	Renaming Dependent Objects	<code>defncopy</code>

Specifying a Default or Rule for a Datatype or Column

Bind a rule to a user-defined datatype or column	Binding Rules	<code>sp_bindrule</code>
Unbind a rule from a user-defined datatype or column	Unbinding Rules	<code>sp_unbindrule</code>
Bind a default to a user-defined datatype or column	Binding Defaults	<code>sp_bindefault</code>
Unbind a default from a user-defined datatype or column	Unbinding Defaults	<code>sp_unbindefault</code>

Getting Help on Defaults and Rules

Get help on defaults and rules	Getting a Report with <code>sp_help</code>	<code>sp_help</code>
Print the definition of a default or rule	Viewing the Source Text of a Procedure with <code>sp_helptext</code>	<code>sp_helptext</code>
Find out the name of a default or rule	Finding an Object Name and ID	<code>object_name()</code>
Find out the object ID of a default or rule	Finding an Object Name and ID	<code>object_id()</code>

Renaming a Default or Rule

Identify default and rule names that are reserved words	Transact-SQL Keywords	sp_checkreswords
Check a potential name for validity	Identifiers	valid_name()
Rename a default or rule	Renaming Tables and Other Objects	sp_rename

Removing a Default or Rule from a Database

Remove a rule from the current database	Dropping Rules	drop rule
Remove a default from the current database	Dropping Defaults	drop default

12

Error Handling and Messages

This section contains information about the following tasks:

- Determining How Arithmetic Errors Are Handled 12-2
- Monitoring Errors 12-2
- Creating and Printing Messages 12-2
- Logging Specific Messages 12-3
- Integrating Windows NT Event Logs 12-3

Determining How Arithmetic Errors Are Handled

Specify how arithmetic errors are handled	Arithmetic Errors, Conversion Errors	set arithabort, set arithignore
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Monitoring Errors

Audit the occurrence of errors	Setting Auditing Options	sp_audit
Find out how many errors occurred during reads and writes	Global Variables for Monitoring System Activity	<i>@@total_errors</i>
Find out the status of the most recent error	Checking for Errors with @@error	<i>@@error</i>
Record the status of the most recent error	raiserror	raiserror

Creating and Printing Messages

Create a user-defined message	Creating Messages for print and raiserror	sp_addmessage
Find out the default language for messages	Language and Character Set Information in Global Variables	<i>@@langid</i>
Print a message	Creating Messages for print and raiserror	print, raiserror
Retrieve the text of a message	Creating Messages for print and raiserror	sp_getmessage
Bind a message to a constraint	Creating Error Messages for Constraints	sp_bindmsg
Find out the messages associated with a constraint	Using sp_helpconstraint to Find a Table's Constraint Information	sp_helpconstraint
Unbind a message from a constraint	Creating Error Messages for Constraints	sp_unbindmsg
Remove a message from a database	Creating Messages for print and raiserror	sp_dropmessage

Logging Specific Messages

To configure logging of successful and unsuccessful logins

Configure log of successful logins	log audit logon success	sp_configure
Configure log of unsuccessful logins	log audit logon failure	sp_configure

To specify a message to be logged always

Add a new message to be logged		sp_addmessage
Enable or disable logging of an existing message		sp_altermessage

Integrating Windows NT Event Logs

To configure logging of Adaptive Server errors to the Windows NT Event Log

Configure event logging	event logging (Windows NT only)	sp_configure
Configure remote system to receive event logging	event log computer name (Windows NT only)	sp_configure
Log user-defined events to the Event Log	See the Configuration Guide for Windows NT.	xp_logevent

13

Using Global Variables to Get Information

This section contains information about the following tasks:

- Getting Information About Columns 13-2
- Getting Information About Connections 13-2
- Getting Information About Cursors 13-2
- Getting Information About Disk Reads and Writes 13-2
- Getting Information About Errors 13-3
- Getting Information About Languages and Character Sets 13-3
- Getting Information About Packets 13-3
- Getting Information About Processes 13-4
- Getting Information About Rows 13-4
- Getting Information About Adaptive Servers 13-4
- Getting Information About Stored Procedures and Triggers 13-4
- Getting Information About Thresholds 13-5
- Getting Information About Transactions 13-5

Getting Information About Columns

Find the last value inserted into an IDENTITY column	Checking IDENTITY Values with @@identity	
Find the maximum number of <i>text/image</i> bytes selected	Selecting text and image Values	<i>@@textsize</i> set
Find ID of last <i>text/image</i> column inserted or updated	Global Variables and text and image Data	<i>@@textcolid</i>
Find database ID of last <i>text/image</i> column inserted or updated	Global Variables and text and image Data	<i>@@textdbid</i>

Getting Information About Connections

Find the maximum number of simultaneous connections	number of user connections	<i>@@max_connections</i>
Find the number of connections attempted since server boot	Global Variables for Monitoring System Activity	<i>@@connections</i>

Getting Information About Cursors

Find the status of the last fetch	Sample Stored Procedure With a Cursor	<i>@@sqlstatus</i> values
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Getting Information About Disk Reads and Writes

Find the number of reads since restart	Global Variables for Monitoring System Activity	<i>@@total_read</i>
Find the number of writes since restart	Global Variables for Monitoring System Activity	<i>@@total_write</i>

Getting Information About Errors

Find the error status of most recent statement	Checking for Errors with <code>@@error</code>	
Find the number of errors during reads and writes	Global Variables for Monitoring System Activity	<code>@@total_errors</code>
Find the number of errors during packet transmission	Evaluation Tools with Adaptive Server	<code>@@packet_errors</code>

Getting Information About Languages and Character Sets

Find the ID of the current Adaptive Server language	Language and Character Set Information in Global Variables	<code>@@langid</code>
Find the name of the current Adaptive Server language	Language and Character Set Information in Global Variables	<code>@@language</code>
Find the average character length	Storage Sizes for Datatypes	<code>@@ncharsize</code>
Find the ID of the client character set	Language and Character Set Information in Global Variables	<code>@@client_csid</code>
Find the maximum character length	Language and Character Set Information in Global Variables	<code>@@maxcharlen</code>
Find the name of the client character set	Language and Character Set Information in Global Variables	<code>@@client_csname</code>
Find whether character set conversion is enabled	Language and Character Set Information in Global Variables	<code>@@char_convert</code> <code>set</code>

Getting Information About Packets

Find the number of errors while transmitting packets	Evaluation Tools with Adaptive Server	<code>@@packet_errors</code>
Find the number of packets received since restart	Evaluation Tools with Adaptive Server	<code>@@pack_received</code>
Find the number of packets sent since restart	Evaluation Tools with Adaptive Server	<code>@@pack_sent</code>

Getting Information About Processes

Find the server process ID of the current process	Server Information Stored in Global Variables	<i>@@spid</i>
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Getting Information About Rows

Find the number of rows affected by the last command	Testing Data Modifications Against the Trigger Test Tables	<i>@@rowcount</i> set
--	--	---------------------------------

Getting Information About Adaptive Servers

Find Adaptive Server idle time in ticks since last started	Global Variables for Monitoring System Activity	<i>@@idle</i>
Find the name of the current Adaptive Server	Server Information Stored in Global Variables	<i>@@servername</i>
Find the CPU time spent running Adaptive Server	Global Variables for Monitoring System Activity	<i>@@cpu_busy</i>
Find the number of microseconds per tick	Server Information Stored in Global Variables	<i>@@timeticks</i>
Find the time for input and output since last started	Global Variables for Monitoring System Activity	<i>@@io_busy</i>
Find the version number	Server Information Stored in Global Variables	<i>@@version</i>

Getting Information About Stored Procedures and Triggers

Find the ID of the currently executing procedure	Server Information Stored in Global Variables	<i>@@procid</i>
Find the nesting level of currently executing procedure	Nesting Procedures Within Procedures Checking the Nesting Level with <i>@@nestlevel</i>	<i>@@nestlevel</i>
Find the nesting level of currently executing trigger	Nesting Triggers Checking the Nesting Level with <i>@@nestlevel</i>	<i>@@nestlevel</i>

Getting Information About Thresholds

Find the minimum space required between thresholds	Controlling How Often sp_thresholdaction Executes	<i>@@thresh_hysteresis</i>
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Getting Information About Transactions

Find the transaction isolation level	Finding the Status of the Current Isolation Level	<i>@@isolation</i> set
Find the nesting level of transactions	Nested Transactions Checking the Transaction Nesting Level with @@trancount	<i>@@trancount</i>
Find the current state of a transaction	Checking the State of Transactions Checking the Transaction State with @@transtate	<i>@@transtate</i>
Find whether transactions are begun implicitly	Finding the Status of the Current Transaction Mode	<i>@@tranchained</i> set

14

Using System and Catalog Stored Procedures to Get Help

This section contains information about the following tasks:

- Getting Help on Adaptive Servers 14-2
- Getting Help on Languages, Character Sets, and Sort Orders 14-2
- Getting Help on Database Devices, Segments, and Thresholds 14-2
- Getting Help on Databases 14-3
- Getting Help on Datatypes, Tables, Views, and Columns 14-3
- Getting Help on Defaults, Constraints, and Rules 14-4
- Getting Help on Stored Procedures and Triggers 14-4
- Getting Help on Logins, Users, Groups, and Roles 14-4
- Getting Help on Permissions 14-5
- Getting Help on Auditing 14-6
- Getting Help on Locks 14-6

Getting Help on Adaptive Servers

Get information about remote servers	Getting Information About Servers	sp_helpserver
Get information about server options	Setting Server Connection Options	sp_serveroption
List the configuration parameter settings for an Adaptive Server	Using sp_configure	sp_configure
List the databases in Adaptive Server	Getting Help on Databases	sp_databases

Getting Help on Languages, Character Sets, and Sort Orders

Display Adaptive Server's default sort order and character set	Getting Information About Sort Orders	sp_helpsort
Get information about alternate languages	Configuring Character Sets, Sort Orders, and Languages	sp_helplanguage

Getting Help on Database Devices, Segments, and Thresholds

Get information about database and dump devices	Getting Information About Devices	sp_helpdevice
Find out which device contains the first log page	Moving the Transaction Log to Another Device	sp_helplog
Get information about segments	sp_helpsegment	sp_helpsegment
Get information about thresholds	Displaying Information About Existing Thresholds	sp_helpthreshold

Getting Help on Databases

Get information about a particular database	sp_helpdb	sp_helpdb
Get information about all databases in Adaptive Server	sp_helpdb	sp_helpdb
List a database's option settings	Viewing the Options on a Database	sp_dboption
List the databases in Adaptive Server	Getting Help on Databases	sp_databases

Getting Help on Datatypes, Tables, Views, and Columns

Get information about a particular datatype	Getting a Report with sp_help	sp_help
Get information about tables and views	Getting a Report with sp_help	sp_help, sp_tables
Get permissions information for a table or view	Reporting Permissions on Specific Tables	sp_table_privileges
Print the definition of a view	Viewing the Source Text of a Procedure with sp_helptext	sp_helptext
Get information about the indexes on a table	Getting a Report with sp_help, sp_help and sp_helpindex	sp_helpindex, sp_help
Get information about a table's foreign keys	Specifying Unique and Primary Key Constraints	sp_foreignkey, sp_fkeys
Get information about a table's primary keys	Specifying Unique and Primary Key Constraints	sp_primarykey, sp_pkeys
Find out the datatype of a column	Listing Tables, Columns, and Datatypes	sp_columns
Find out the permissions granted on a column	Reporting Permissions on Specific Columns	sp_column_privileges

Getting Help on Defaults, Constraints, and Rules

Get information about a default or rule	Getting a Report with sp_help	sp_help
Print the definition of a default, constraint, or rule	Viewing the Source Text of a Procedure with sp_helptext	sp_helptext
List a table's unique and primary key constraints	Getting a Report with sp_help	sp_help
List all constraints on a table	Using sp_helpconstraint to Find a Table's Constraint Information	sp_helpconstraint

Getting Help on Stored Procedures and Triggers

Get information about stored procedure	Getting a Report with sp_help	sp_help, sp_stored_procedures
Get information about triggers	Getting a Report with sp_help	sp_help
Print the definition of a stored procedure or trigger	Viewing the Source Text of a Procedure with sp_helptext	sp_helptext

Getting Help on Logins, Users, Groups, and Roles

Get help on server logins

Find out whether auditing is enabled for a login	Enabling and Disabling Auditing auditing	sp_configure
Get information about a login	Displaying Login Account Information, Getting Information About Login Accounts	sp_displaylogin
Get information about remote server logins	Getting Information About Remote Logins	sp_helpremotelogin
List all locked logins	Locking or Dropping Adaptive Server Login Accounts	sp_locklogin

Get help on database users

Find out who the database owner is	Getting Information About Database Users	sp_helpuser
Get information about a database user or all users	Getting Information About Database Users	sp_helpuser

Get help on groups and roles

Get information about a group	Getting Information About Users	sp_helpgroup
Get permissions information for a role	Reporting Permissions on Database Objects or Users	sp_helpprotect
Get information about roles	Viewing Information About System Roles	show_role(), sp_role
Check for roles in a stored procedure	Checking for Roles in Stored Procedures	proc_role()

Getting Help on Permissions

Get permissions information for one or more columns	Reporting Permissions on Specific Columns	sp_column_privileges
Get permissions information for a table or view	Reporting Permissions on Database Objects or Users, Reporting Permissions on Specific Tables	sp_helpprotect, sp_table_privileges
Get permissions information for a user, group, or role	Reporting Permissions on Database Objects or Users	sp_helpprotect

Getting Help on Auditing

Get information about the segments in the <i>sybsecurity</i> database	Audit Tables and Their Segments	select
Get information about the audit tables and the <i>sybsecurity</i> database	Audit Tables and Their Segments	sp_help sp_helpdb
Find out what global auditing options are turned on	Setting Auditing Options	sp_audit
Find out whether database access is audited	Setting Auditing Options	sp_audit
Find out whether procedure and trigger execution is audited	Setting Auditing Options	sp_audit
Find out whether table and view access is audited	Setting Auditing Options	sp_audit
Find out whether user actions are audited	Setting Auditing Options	sp_audit

Getting Help on Locks

Get information about locks held by a particular task	Viewing Locks with sp_lock , Observing Locks with sp_sysmon	sp_lock
Get information about tasks that hold locks	Viewing Locks with sp_lock , Observing Locks with sp_sysmon	sp_lock

15

Managing Languages, Character Sets, and Sort Orders

This section contains information about the following tasks:

- Installing, Changing and Removing Languages 15-2
- Specifying the Date Parts for a Language 15-2
- Using Aliases for Languages 15-2
- Changing a User's Language 15-2
- Identifying the Current Server Language 15-3
- Changing Character Sets 15-3
- Determining Character Length 15-3
- Converting Between Client and Server Character Sets 15-3
- Identifying Character Sets 15-4
- Finding the Default Sort Order 15-4
- Rebuilding Indexes After Changing Sort Orders 15-4

Installing, Changing and Removing Languages

Set the maximum number of languages on a server	number of languages in cache	sp_configure "number of languages in cache"
Set the language for system messages	default language id	sp_configure "default language id"
Install a language in Adaptive Server	Installing Date Strings for Unsupported Languages	sp_addlanguage , langinstall
Change language	Changing the Default Character Set, Sort Order, or Language	sqlloc , langinstall
Remove a language from Adaptive Server		sp_droplanguage

Specifying the Date Parts for a Language

Specify names for days of the week and for months	Installing Date Strings for Unsupported Languages	sp_addlanguage
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Using Aliases for Languages

Assign or change an alias for an alternate language		sp_setlangalias
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Changing a User's Language

Assign a user's default language		sp_addlogin
Change a user's default language	Setting the User's Default Language	sp_modifylogin
Set the language for a session		set language

Identifying the Current Server Language

Find out the ID of the current Adaptive Server language	Message Languages and Global Variables	@@langid
Find out the name of the current Adaptive Server language	Message Languages and Global Variables	@@language

Changing Character Sets

Find out Adaptive Server's default character set	Getting Information About Sort Orders	sp_helpsort
Configure Adaptive Server's default character set	default character set id	sp_configure "default character set id"
Change character sets	Changing the Default Character Set	sqlloc, langinstall
Upgrade text values after changing character sets	Upgrading text Data After Changing Character Sets	dbcc fix_text

Determining Character Length

Find out the average length of a national character	Character Sets and Global Variables	@@ncharsize
Find out the maximum length of a character	Character Sets and Global Variables	@@maxcharlen

Converting Between Client and Server Character Sets

Find out whether client/server conversion is enabled	Character Sets and Global Variables	@@char_convert
Enable client/server character set conversion	Controlling Character Conversion During a Session	set charconvert

Identifying Character Sets

Find out the ID of the client character set	Character Sets and Global Variables	<code>@@client_csid</code>
Find out the name of the client character set	Character Sets and Global Variables	<code>@@client_csname</code>

Finding the Default Sort Order

List the default sort order for a Adaptive Server	Getting Information About Sort Orders	<code>sp_helpsort</code>
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Rebuilding Indexes After Changing Sort Orders

Identify indexes affected by sort order change	Using <code>sp_indsuspect</code> to Find Corrupt Indexes	<code>sp_indsuspect</code>
Rebuild indexes affected by sort order change	Rebuilding Indexes After Changing the Sort Order	<code>dbcc reindex</code>

16

Managing Database Devices, Segments, and Thresholds

This section contains information about the following tasks:

- Creating a Database Device 16-2
- Placing a Database's Transaction Log on a Device 16-2
- Mirroring Database Devices 16-2
- Specifying the Default Database Devices for a Server 16-2
- Getting Help on Database Devices 16-2
- Writing Changed Pages to the Database Device 16-3
- Removing a Database Device from a Server 16-3
- Defining a Segment 16-3
- Get help on a segment or on all segments 16-3
- Putting Tables and Indexes on Segments 16-3
- Removing a Segment from a Database 16-3
- Using the Last-Chance Threshold (LCT) to Manage Log Space 16-4
- Using Thresholds to Manage Space on Data Segments 16-5

Creating a Database Device

Add a device to a restored <i>master</i> database	Step Nine: Restart Adaptive Server in Master-Recover Mode	disk refit, disk reinit
Initialize a database device for Adaptive Server	Using the disk init Command	disk init
Recognize a device added since the last dump	Summary of Recovery Procedure	disk refit, disk reinit

Placing a Database's Transaction Log on a Device

Find out which device contains the first log page	Moving the Transaction Log to Another Device	sp_helplog
Place the log on a separate database device	Moving the Transaction Log to Another Device	sp_logdevice

Mirroring Database Devices

Back up <i>master</i> after changing a mirror	Dump and Load Command Syntax	dump database
Create a software mirror for a database device	Initializing Mirrors	disk mirror
Disable a mirror	Unmirroring a Device	disk unmirror
Restart a mirror	Restarting Mirrors	disk remirror

Specifying the Default Database Devices for a Server

Specify a device as a default for database creation	Designating Default Devices	sp_diskdefault
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Getting Help on Database Devices

Get help on database and dump devices	Getting Information About Devices	sp_helpdevice
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Writing Changed Pages to the Database Device

Write changed pages to the database device	Changing Database Options	checkpoint
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Removing a Database Device from a Server

Remove a database or dump device from an Adaptive Server	Dropping Devices	sp_dropdevice
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Defining a Segment

Create a segment by defining the segment on the current database's device	Creating Segments	sp_addsegment
Add another database device to the segment	Extending the Scope of Segments	sp_extendsegment
Remove a database device from a segment	Reducing the Scope of a Segment	sp_dropsegment
Get help on a segment or on all segments	sp_helpsegment	sp_helpsegment

Putting Tables and Indexes on Segments

Determine which tables and indexes are located on a segment	sp_helpsegment	sp_helpsegment
Allocate space on a segment for an index or table	Placing Existing Objects on Segments	sp_placeobject

Removing a Segment from a Database

Remove a segment from a database	Reducing the Scope of a Segment	sp_dropsegment
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Using the Last-Chance Threshold (LCT) to Manage Log Space

Determine what happens to transactions running when the LCT is crossed

Abort transactions running when the LCT is crossed	abort tran on log full	sp_dboption "abort tran on log full"
Put the new database option into effect	Changing Database Options	checkpoint

Create and test a threshold procedure

Create a procedure for the LCT	Creating and Executing Stored Procedures	create procedure
Execute the database's default threshold procedure	Monitoring Free Space with the Last-Chance Threshold	sp_thresholdaction

Execute commands after the LCT has been crossed

Run commands after the LCT is crossed	Aborting or Suspending Processes	alter database, dump database, dump transaction, readtext, select, writetext
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Create an LCT for database created pre-release 10.0

Create a LCT for an existing database	Waking Suspended Processes	lct_admin("lastchance"), sp_logdevice
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Determine where the LCT is located

Find out where the LCT is located		lct_admin("reserve", log_pages")
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Determine whether the LCT has been crossed

Find out whether the LCT has
been crossed

`lct_admin("logfull")`

Disable the LCT

Disable the LCT

Waking Suspended Processes

`lct_admin("unsuspend")`

Kill processes suspended when a threshold has been crossed

Kill processes suspended
when a threshold has been
crossed

Waking Suspended Processes

`kill`

Using Thresholds to Manage Space on Data Segments

**Reviewers: C, Tables of varying width on Web. Would
look better all one length???**

Create a threshold

Find out the minimum space required between thresholds	Determining Threshold Placement	2 * @@thresh_hysteresis
Create a threshold on a segment	Adding a Free-Space Threshold	sp_addthreshold
Create a threshold procedure	Creating and Executing Stored Procedures	create procedure
Return threshold messages to the user as they are generated		set flushmessage

Disable a threshold

Disable a threshold on a data segment	no free space acctg	sp_dboption "no free space acctg"
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Get help on thresholds

Get help on thresholds	Displaying Information About Existing Thresholds	sp_helpthreshold
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Change a threshold's location or procedure

Change a threshold's location or procedure	Changing a Free-Space Threshold	sp_modifythreshold
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Remove a threshold from a segment

Remove a threshold from a segment	Dropping a Threshold	sp_droptreshold
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17

Setting Session-Wide Options

This section contains information about the following tasks:

- Ensuring Compliance with SQL Standards 17-2
- Enabling or Disabling Character Set Conversion 17-2
- Setting Options That Affect Columns 17-2
- Setting Options That Affect Cursors 17-3
- Specifying How Errors Are Handled 17-3
- Specifying How Nulls Are Handled 17-3
- Determining Whether Delimited Identifiers Are Allowed 17-3
- Specifying Permissions Required for Updates and Deletes 17-4
- Setting Options That Affect Query Processing 17-4
- Turning Roles On or Off 17-4
- Setting Options That Affect Statistics 17-4
- Setting Options That Affect Transaction Management 17-5
- Allowing Triggers to Fire Themselves 17-5
- See Also 17-5

Ensuring Compliance with SQL Standards

Close cursors automatically at end of transaction	Using Cursors in Transactions	set close on endtran on
Specify when to abort statements that cause arithmetic errors	Arithmetic Errors, Conversion Errors	set arithabort arith_overflow off, set arithabort numeric_truncation on
Display error message for division by zero, loss of precision	Arithmetic Errors, Arithmetic Overflow and Divide-by-Zero Errors	set arithignore off
Raise an exception when truncating nonblank characters	Right Truncation of Character Strings	set string_rtruncation on
Warn when ignoring nulls in aggregates and comparisons	Treatment of Nulls	set ansinull on
Allow delimited identifiers	Delimited Identifiers	set quoted_identifier on
Specify permissions required for updates and deletes	Permissions Required for update and delete Statements	set ansi_permissions on
Begin transactions implicitly	Chained Transactions and Isolation Levels, Choosing a Transaction Mode	set chained on
Prevent dirty reads, nonrepeatable reads, phantom reads	Selecting the Transaction Mode and Isolation Level, Choosing an Isolation Level	set transaction isolation level 3
Flag extensions to current conformance level	FIPS Flagger	set fipsflagger on

Enabling or Disabling Character Set Conversion

Enable client/server character set conversion	Controlling Character Conversion During a Session	set char_convert
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Setting Options That Affect Columns

Allow inserts to IDENTITY columns	Explicitly Inserting Data into an IDENTITY Column	set identity_insert on
Specify the size in bytes of <i>text/image</i> selects	Selecting text and image Values	set textsize

Setting Options That Affect Cursors

Close cursors automatically at end of transaction	Using Cursors in Transactions	set close on endtran
Specify the number of rows fetched at one time	Getting Multiple Rows with Each fetch	set cursor rows

Setting Options That Affect Date Parts

Specify the order in which date parts are listed	Entering Dates	set dateformat
Specify which is the first day of the week	Entering Dates	set datefirst

Specifying How Errors Are Handled

Specify how arithmetic errors are handled	Arithmetic Errors, Conversion Errors	set arithabort, set arithignore arith_overflow
Specify how string errors are handled	Right Truncation of Character Strings	set string_rtruncation
Return messages to the user as they are generated		set flushmessage
Specify the language in which messages are printed	Creating Messages for print and raiserror	set language

Specifying How Nulls Are Handled

Specify how nulls are handled	Compliance to ANSI Standards	set ansinull
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Determining Whether Delimited Identifiers Are Allowed

Specify whether delimited identifiers are allowed	Delimited Identifiers	set quoted_identifier
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Specifying Permissions Required for Updates and Deletes

Specify permissions required for delete and update	Compliance to ANSI Standards	set ansi_permissions
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Setting Options That Affect Query Processing

Check query syntax without executing		set parseonly
Compile queries without executing	Combining showplan and noexec	set noexec
Display the number of rows affected by a query		set nocount
Display query plans	Understanding Query Plans	set showplan
Set the maximum number of affected rows per query		set rowcount

Turning Roles On or Off

Turn roles on/off	set role
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Setting Options That Affect Statistics

Display the number of scans, reads, pages written	Indexes and I/O Statistics	set statistics io
Display the time for parsing, compiling, executing	Tools for Query Analysis and Tuning	set statistics time

Setting Options That Affect Transaction Management

Begin transactions implicitly	Chained Transactions and Isolation Levels, Choosing a Transaction Mode	set chained
Set the isolation level	Selecting the Transaction Mode and Isolation Level, Choosing an Isolation Level	set transaction isolation level

Allowing Triggers to Fire Themselves

Allow triggers to fire themselves	Trigger Self-Recursion	set self_recursion
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See Also

For related information, see the following task.

Establishing Execution Priorities 3-4

18 Using Stored Procedures and Triggers

This section contains information about the following tasks:

- Creating a Stored Procedure or Trigger 18-2
- Creating and Using Extended Stored Procedures (ESPs) 18-4
- Using Cursors 18-6
- Executing Stored Procedures and Firing Triggers 18-7
- Getting Help on Stored Procedures and Triggers 18-8
- Recompiling Stored Procedures and Triggers 18-8
- Renaming a Stored Procedure or Trigger 18-9
- Changing a Stored Procedure's Transaction Mode 18-9
- Removing Stored Procedures and Triggers from a Database 18-9
- Canceling the Effects of a Trigger 18-9

Creating a Stored Procedure or Trigger

Check a potential name for validity	Identifiers	valid_name
Read about parameters	Parameters	
Assign values to local variables	Parameters	select
Declare the name and datatype of local variables	Parameters	declare

Control flow in a stored procedure or trigger

Read about control flow	Control-of-Flow Language	begin...end, break, case, continue, declare, goto Label, if...else, print, raiserror, return, waitfor, while
Comments	Comments	<i>--comment, /*comment*/</i>
Branch conditionally	if...else	if...else
Delay execution of a statement block	waitfor	waitfor
Define a statement block	begin...end	begin...end
Enter a while loop	while and break...continue	while
Exit from a while loop	while and break...continue	break
Exit a batch or procedure unconditionally	return	return
Reenter a while loop	while and break...continue	continue
Branch unconditionally	goto	goto Label

Create the stored procedure or trigger

Create a stored procedure in the current database	Creating and Executing Stored Procedures	create procedure
Create a trigger in the current database	Creating Triggers	create trigger

Make a record of the new definition

Copy a procedure or trigger definition to a file	Renaming Dependent Objects	defncopy
Print a procedure or trigger definition	Viewing the Source Text of a Procedure with sp_helptext	sp_helptext

Excluding commands from a trigger definition

Commands you cannot include in a trigger	Trigger Restrictions	alter database, alter table, create database, create default, create index, create procedure, create rule, create table, create trigger, create view, disk init, disk mirror, disk reinit, disk remirror, disk unmirror, drop database, drop default, drop index, drop procedure, drop rule, drop table, drop trigger, drop view, grant, load database, load transaction, reconfigure, revoke, select into, truncate table, update statistics
Impersonate the table owner		setuser

Creating and Using Extended Stored Procedures (ESPs)

Tasks	Concepts	Commands
Before You Start		
Understand ESPs	Why Use Extended Stored Procedures?	
To use the system ESPs		
Invoke a system ESP	Introduction, System Extended Stored Procedures	execute xp_cmdshell xp_deletemail xp_enumgroups xp_findnextmsg xp_logevent xp_readmail xp_sendmail xp_startmail xp_stopmail
Set the user context for xp_cmdshell	xp_cmdshell context	sp_configure
To configure and administer ESPs		
Set the ESP execution priority	esp execution priority	sp_configure

Set the ESP execution stacksize	esp execution stacksize	sp_configure
Specify whether a dynamic link library supporting an ESP should be unloaded after the ESP call	esp unload dll Freeing Memory	sp_configure
Explicitly unload a dynamic link library supporting an ESP	Freeing Memory	sp_freedll
Get information on an ESP	Getting Information About ESPs	sp_helpextendedproc
To create and remove an ESP		
Create an ESP function	Creating Functions for ESPs	
Create an ESP	Creating and Removing ESPs	create procedure sp_addextendedproc
Remove an ESP	Creating and Removing ESPs	drop procedure sp_dropextendedproc
To execute an ESP		
Execute an ESP	Executing ESPs	execute

Using Cursors

Get information about cursors

Read about cursors	Cursors: Accessing Data Row by Row	
Include existing IDENTITY column in all indexes	identity in nonunique index	sp_dboption "identity in nonunique index"

Set session-specific options

Close open cursors when transactions end	Using Cursors in Transactions	set close on endtran
Set the transaction isolation level	Selecting the Transaction Mode and Isolation Level, Choosing an Isolation Level	set transaction isolation level
Set the number of rows retrieved per fetch	Getting Multiple Rows with Each fetch	set cursor rows

Create a cursor

Check a potential cursor name for validity	Identifiers	valid_name
Define a cursor	Declaring Cursors	declare cursor

Get help on the cursor

Get help on cursors	Getting Information About Cursors	sp_cursorinfo
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Open the cursor

Open a cursor for processing	Opening Cursors	open
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Retrieve and manipulate data

Retrieve data through a cursor	Fetching Data Rows Using Cursors	fetch
Determine how many rows have been fetched	Checking the Number of Rows Fetched	@@rowcount
Determine the status of the last fetch	Checking the Status from the Last fetch	@@sqlstatus values
Remove the row to which the cursor is pointing	Deleting Cursor Result Set Rows	delete where current of
Update the row to which the cursor is pointing	Updating Cursor Result Set Rows	update where current of

Close the cursor

Deactivate a cursor without releasing memory	Closing and Deallocating Cursors	close
Deactivate a cursor and release its allocated memory	Closing and Deallocating Cursors	deallocate cursor

Executing Stored Procedures and Firing Triggers

Delay execution of a stored procedure	Executing Procedures After a Time Delay	waitfor
Execute a stored procedure	Examples of Creating and Using Stored Procedures	execute
Verify that a user has the required role to execute a procedure	Checking Roles in Procedures	proc_role()
Allow triggers to fire other triggers	allow nested triggers	sp_configure "allow nested triggers"
Find number of procedures or triggers called by others	Nesting Procedures Within Procedures Checking the Nesting Level with @@nestlevel	
Allow triggers to fire themselves during a session		set self_recursion

Getting Help on Stored Procedures and Triggers

Get information about stored procedures	Getting a Report with <code>sp_help</code> , Viewing the Source Text of a Procedure with <code>sp_helptext</code>	<code>sp_help</code> , <code>sp_helptext</code> , <code>sp_stored_procedures</code>
Determine the datatype of parameters		<code>sp_sproc_columns</code>
Get help on a trigger	Getting a Report with <code>sp_help</code>	<code>sp_help</code>
Determine the current nesting level of a stored procedure	Nesting Procedures Within Procedures Checking the Nesting Level with <code>@@nestlevel</code>	
Determine the permissions granted on a stored procedure	Identifying Permissions with <code>sp_helprotect</code>	<code>sp_helprotect</code>
Determine the name of a procedure or trigger	Finding an Object Name and ID	<code>object_name()</code>
Determine the object ID of a procedure or trigger	Finding an Object Name and ID	<code>object_id()</code>
Determine the object ID of the currently executing procedure	Server Information Stored in Global Variables	<code>@@procid</code>

Recompiling Stored Procedures and Triggers

Identify the procedures and triggers that reference a table		<code>sp_depends</code>
Identify the tables referenced by a procedure or trigger	Identifying Dependent Objects with <code>sp_depends</code>	<code>sp_depends</code>
Recompile the procedures and triggers that reference a table	Stored Procedures and Performance	<code>sp_recompile</code>

Renaming a Stored Procedure or Trigger

Identify procedure names that are reserved words	Transact-SQL Keywords	sp_checkreswords
Check a potential procedure or trigger name for validity	Identifiers	valid_name
Rename a stored procedure or trigger	Renaming Tables and Other Objects	sp_rename

Changing a Stored Procedure's Transaction Mode

Change or display the transaction mode of a procedure	Setting Transaction Modes for Stored Procedures	sp_procxmode
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Removing Stored Procedures and Triggers from a Database

Remove a procedure from the current database	Dropping Stored Procedures	drop procedure
Remove a trigger from current database	Dropping Triggers	drop trigger

Canceling the Effects of a Trigger

Cancel the effects of a trigger	Rolling Back Triggers	rollback trigger
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19

Managing Transactions

This section contains information about the following tasks:

- Ensuring That Transactions Comply with SQL Standards 19-2
- Defining a Transaction 19-2
- Getting Information About a Transaction 19-2
- Determining What Happens to Transactions When the Log Is Full 19-3
- Changing the Transaction Mode of a Stored Procedure 19-3

Ensuring That Transactions Comply with SQL Standards

Find out whether transactions begin implicitly	Finding the Status of the Current Transaction Mode	<i>@@tranchained</i>
Begin transactions implicitly	Choosing a Transaction Mode	set chained
Find out the transaction isolation level	Finding the Status of the Current Isolation Level	<i>@@isolation</i>
Prevent dirty reads, nonrepeatable reads, phantom reads	Choosing an Isolation Level	set transaction isolation level 3

Defining a Transaction

Allow data definition language in transactions	ddl in tran	sp_dboption "ddl in tran"
Begin a user-defined transaction	Beginning and Committing Transactions	begin transaction
Cancel a user-defined transaction	Rolling Back and Saving Transactions	rollback
Define a savepoint within a transaction	Rolling Back and Saving Transactions	save transaction
Prepare a user-defined transaction to be committed		prepare transaction
Roll back a transaction to a savepoint	Rolling Back and Saving Transactions	rollback
Write a transaction to the transaction log	Beginning and Committing Transactions	commit

Getting Information About a Transaction

Find out the nesting level of a transaction	Nested Transactions Checking the Transaction Nesting Level with <i>@@trancount</i>	
Determine the state of a transaction	Checking the State of Transactions Checking the Transaction State with <i>@@transtate</i>	<i>@@transtate</i> values

Determining What Happens to Transactions When the Log Is Full

Abort transactions when the log is full	abort tran on log full	sp_dboption "abort tran on log full"
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Changing the Transaction Mode of a Stored Procedure

Change the transaction mode for a stored procedure	Setting Transaction Modes for Stored Procedures	sp_procxmode
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20

Creating and Using Views

This section contains information about the following tasks:

- [Creating a View](#) 20-2
- [Selecting and Manipulating Data Through Views](#) 20-2
- [Getting Help on Views](#) 20-2
- [Renaming a View](#) 20-3
- [Removing a View from a Database](#) 20-3

Creating a View

Check a potential view name for validity	Identifiers	valid_name
Allow delimited identifiers	Delimited Identifiers	set quoted_identifier on
Create a view in the current database	Creating Views	create view
Save the definition of the new view in a file	Renaming Dependent Objects	defncopy
Print the definition of the new view	Viewing the Source Text of a Procedure with sp_helptext	sp_helptext

Selecting and Manipulating Data Through Views

Retrieve data through a view	Retrieving Data Through Views	select, where Clause
Add data through a view	Modifying Data Through Views	insert, where Clause
Change the value of data	Modifying Data Through Views	update, where Clause
Remove selected data	Modifying Data Through Views	delete, where Clause

Getting Help on Views

Get help on views	Getting Information About Views, Getting a Report with sp_help	sp_help
List the views in a database	Listing All Views in a Database	sp_tables
Identify the views referenced by objects, or objects dependent on a view	Using sp_depends to List Dependent Objects	sp_depends
Find out what permissions have been granted on a view	Reporting Permissions on Database Objects or Users, Reporting Permissions on Specific Columns, Reporting Permissions on Specific Tables	sp_helprotect, sp_column_privileges, sp_table_privileges
Find out the name of a view	Finding an Object Name and ID	object_name()
Find out the object ID of a view	Finding an Object Name and ID	object_id()

Renaming a View

Identify views that must be renamed (view names that are reserved words)	Transact-SQL Keywords	sp_checkreswords
Check a potential trigger name for validity	Identifiers	valid_name
Allow delimited identifiers	Delimited Identifiers	set quoted_identifier on
Identify dependent procedures, triggers, and views	Identifying Dependent Objects with <code>sp_depends</code>	sp_depends
Copy definitions of dependent objects to a file	Renaming Dependent Objects	defncopy
Remove dependent objects from the database	Dropping Stored Procedures, Dropping Triggers, Dropping Views	drop procedure, drop trigger, drop view
Rename the view	Renaming Tables and Other Objects	sp_rename
Re-create the dependent objects from modified definitions	Renaming Dependent Objects	defncopy
Re-create the dependent objects from scratch	Creating and Executing Stored Procedures, Creating Triggers, Creating Views	create procedure, create trigger, create view
Back up the database that contains the renamed view	Dump and Load Command Syntax	dump database

Removing a View from a Database

Remove a view from the current database	Dropping Views	drop view
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21 Sending and Receiving Email (Windows NT Only)

This chapter contains information about the following topics:

- Using Sybmail 21-1

Using Sybmail

Tasks	Concepts	Commands
To start and stop an Adaptive Server mail session		
Start a mail session	See the Configuration Guide for Windows NT	<code>xp_startmail</code>
Stop a mail session	See the Configuration Guide for Windows NT	<code>xp_stopmail</code>
Configure automatic start of a mail session	start mail session (Windows NT only)	<code>sp_configure</code>
To process mail queries in the Adaptive Server inbox		
Read, process, send, and delete mail queries	See the Configuration Guide for Windows NT	<code>sp_processmail</code>
To read mail		
Get the message ID of the next message in the Adaptive Server inbox	See the Configuration Guide for Windows NT	<code>xp_findnextmsg</code>
Read a mail message	See the Configuration Guide for Windows NT	<code>xp_readmail</code>
Delete a mail message	See the Configuration Guide for Windows NT	<code>xp_deletemail</code>
To send mail		
Send a mail message	See the Configuration Guide for Windows NT	<code>xp_sendmail</code>

22

Using Component Integration Services

This chapter provides information on defining objects, configuring, and using Component Integration Services. This chapter covers three main topics:

- Adding a Remote Server 22-2
- Mapping a Remote Object to Local Proxy Tables 22-2
- Join Between Two Remote Tables 22-3

Adding a Remote Server

Before You Start

1. Configure for Component Integration Services.	Steps Needed to Use Component Integration Services enable cis	sp_configure
2. Understand adding a remote server.	Adding a Remote Server	

To Add a Remote Server

1. Add a server to the interfaces file.	Step 1: Add the Remote Server to the Interfaces File See the configuration or utility guide for your platform.	dsedit or dscp
2. Add the name, server class and network name of the remote server.	Step 2: Create Server Entries in System Tables	sp_addserver
3. Assign an alternate login name and password.	Step 3: Add an Alternate Login and Password	sp_addexternlogin

Mapping a Remote Object to Local Proxy Tables

Before You Start

1. Configure for Component Integration Services.	Steps Needed to Use Component Integration Services enable cis	sp_configure
2. Understand mapping remote objects to a local proxy table.	Mapping Remote Objects to Local Proxy Tables	

To Map Remote Object to Local Proxy Tables

1. Define the storage location of the remote object.	Step 1: Define the Storage Location of a Remote Object	sp_addobjectdef
2. Map the remote schema to the server.	Step 2: Map Remote Table Schema to Adaptive Server	create table or create existing table

Join Between Two Remote Tables

Before You Start

1. Configure for Component Integration Services.	Steps Needed to Use Component Integration Services enable cis	sp_configure
2. Understand joining between two remote tables.	Join Between Two Remote Tables	

To Join Between Two Remote Tables

1. Add remote servers to the interfaces file.	Step 1: Add the Remote Servers to the Interfaces File See the configuration or utility guide for your platform.	dsedit or dscp
2. Define each remote server	Step 2: Define the Remote Servers	sp_addserver
3. Define each remote object	Step 3: Define the Remote Objects	sp_addobjectdef
4. Map remote tables to server	Step 4: Map the Remote Tables to Adaptive Server	create existing table
5. Perform join	Step 5: Perform the Join	select

