SYBASE®

An SAP® Company

Utility Guide

Adaptive Server® Enterprise

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CHAPTER 1 Utility Commands Reference

Reference pages for the Adaptive Server® utility program commands.

In UNIX, you enter a utility program command at the system prompt in a UNIX shell.

In Windows, if a utility:

- Has an icon in the Sybase® for Windows or Sybase for the Windows program group, double-click the icon to launch the utility program.
- Does not have an icon in the program group, enter the utility program command at the Windows command prompt to launch the utility program.

Place characters with special meaning to the shell (the command prompt in Windows), such as the backslash (\), asterisk (*), slash (/), and spaces, in quotes. Precede some special characters with the backslash (\) to "escape" them to prevent the shell (command prompt) from interpreting the special characters.

The utility programs available with Adaptive Server are:

Utility	Description
backupserver	An executable form of the Backup Server™ program.
bcp	Copies rows in a database table to or from an operating system file in a user-specified format.
buildmaster	See **dataserver**.
certauth	Converts a server-certificate request into a certificate authority-signed certificate.
certpk12	Exports or imports a **PKCS**#12 file.
certreq	Creates a server certificate request and corresponding private key in two ways:
charset	Loads the character sets and sort order files.
cobpre	A precompiler for COBOL.
cpre	A precompiler for C.
dataserver	An executable form of the Adaptive Server program.
ddlgen	Generates data definition language for server- and database-level objects in ASE.

Utility	Description
defncopy	Copies definitions for specified views, rules, defaults, triggers, procedures, or reports from a database to an operating system file or from an operating system file to a database.
dscp	Allows you to view and edit server entries in the interfaces file in command-line mode.
dsedit	Allows you to view and edit server entries in the interfaces file using a graphical user interface.
extractjava	Copies a retained JAR from an Adaptive Server to a client file.
installjava	Installs a JAR from a client file into an Adaptive Server.
isql	Interactive SQL parser to Adaptive Server.
langinstall	Installs a new language on the Adaptive Server.
optdiag	Displays optimizer statistics or loads updated statistics into system tables.
preupgrade	Performs tests on an installation or database to determine its readiness for upgrade.
pwdcrypt	Creates and prints an encrypted LDAP password in the libtcl.cfg file.
qrmutil	(Cluster Edition only) allows you to back up, restore, and reconfigure the quorum device.
qptune	Enables you to fix missing statistics and identify the best query plan, optimization goal, or other configuration settings, and apply them at the query or server level.
showserver	Shows Adaptive Servers and Backup Servers that are currently running on the local machine.
sqldbgr	Debugs stored procedures and triggers.
sqlloc	Installs and modifies languages, character sets, and sort order defaults for Adaptive Server in GUI mode.
sqllocres	Installs and modifies languages, character sets, and sort order defaults for Adaptive Server in command-line mode.
sqlsrvr	An executable form of the Adaptive Server program.
sqlupgrade	Upgrades your currently installed release of Adaptive Server to the newest release in GUI mode.
sqlupgraderes	Upgrades your currently installed release of Adaptive Server to the newest release in command-line mode.

Utility	Description
srvbuild	Creates a new Adaptive Server, Backup Server, or XP Server in GUI mode with default or user-specified values for key configuration attributes.
srvbuildres	Creates a new Adaptive Server, Backup Server, or XP Server in command-line mode with default or user-specified values for key configuration attributes.
startserver	Starts an Adaptive Server or a Backup Server.
sybcluster	Manages a shared-disk cluster.
sybdiag	Collects comprehensive configuration and environment data for Adaptive Server.
sybmigrate	Enables you to migrate database from a server using 2K logical pages to a server using 4, 8, or 16K logical pages.
sybrestore	Enables you restore an Adaptive Server database to the time of failure from the most current full database backup dump files.
sybtsmpasswd	Records or changes the user password and creates the Tivoli Storage Manager (TSM) encrypted password file, `TSM.PWD`, on the TSM client machine.
updatease	Reinstalls scripts and updates system stored procedures and messages after a minor upgrade.
xpserver	Starts XP Server manually.

Note: These utility programs may allow you to use a **-P** parameter to enter your password. If security is an issue, do not use **-P** to specify your password; another user may have an opportunity to see it. Instead, log in as usual without the **-P** parameter, and let Adaptive Server prompt you for your password.

Threaded Versions of Utilities

Sybase includes the `_r` versions of some of the utilities for use with threaded drivers.

The utilities that have `_r` versions are:

- **bcp**
- **cobpre**
- **cpre**
- **defncopy**
- **dscp**
- **isql**

Installation or Configuration Utilities

Adaptive Server includes various utilities for installation and configuration.

Use these to install or configure databases:

- **dataserver**– allows you to build a new Adaptive Server.
- **dscp** – allows you to view and edit server entries in the interfaces file from the command line.
- **dsedit** – allows you to view and edit server entries in the interfaces file using a GUI.

  In Windows, allows you to create and modify network connection information in the interfaces file.
- **preupgrade** – performs tests on an installation or database to determine its readiness for upgrade, and reports problems found.
- **sqlupgrade** – upgrades your currently installed release of Adaptive Server to the newest release.
- **sqlupgraderes** – upgrades your currently installed release of Adaptive Server to the newest release using resource files in UNIX platforms.
- **srvbuild** – creates a new Adaptive Server, Backup Server, or XP Server with default or user-specified values for key configuration attributes using a graphical user interface.
- **srvbuildres** – creates a new Adaptive Server, Backup Server, or XP Server, using resource files to specify values for key configuration attributes in UNIX platforms.

Utilities for Languages, Character Sets, and Sort Orders

Adaptive Server includes various utilities to set languages, character sets and sort orders.

- **charset** – loads the character sets and sort order files in Windows.
- **langinstall** – installs a new language on an Adaptive Server.
- **sqlloc** – installs and modifies languages, character sets, and sort order defaults for Adaptive Server.
- **sqllocres** – installs and modifies languages, character sets, and sort order defaults for Adaptive Server, using a resource file in UNIX platforms.

Utilities to Start Servers

Adaptive Server includes various utilities to start servers manually.

- **backupserver** – starts the Backup Server executable. Use the **startserver** command instead of this utility to start Backup Server manually. In Windows, use the **srvmgr** utility instead to start Backup Server manually.

- **dataserver** – starts the Adaptive Server executable. Use the **startserver** command instead of this utility to start Adaptive Server manually.
- **sqlsrvr** – starts the Adaptive Server executable in Windows . Use the **services manager** utility instead of this utility to start Adaptive Server manually.
- **srvmgr** – starts, pauses, and stops Adaptive Server, Backup Server, and Adaptive Server Monitor™ as Windows services.
- **startserver** – starts an Adaptive Server and a Backup Server in UNIX platforms.

See also

- *startserver* on page 137

Database Creation and Manipulation Utilities

Adaptive Server includes various utilities to create and manipulate databases.

- **bcp** – copies a database table to or from an operating system file in a user-specified format.
- **ddlgen** – generates data definition language for server- and database-level objects in ASE.
- **defncopy** – copies definitions for specified views, rules, defaults, triggers, or procedures from a database to an operating system file or from an operating system file to a database.
- **extractjava** – copies a retained JAR and the classes it contains from an Adaptive Server to a client file.
- **installjava** – installs a JAR from a client file into an Adaptive Server database.
- **isql** – interactive SQL parser to Adaptive Server.
- **optdiag** – displays optimizer statistics or loads updated statistics into system table.

Utilities to Gather Information

Adaptive Server includes various utilities to gather information:

- **showserver** – shows the Adaptive Servers and Backup Servers that are currently running on the local machine in UNIX platforms.
- **sybdiag** – collects comprehensive Adaptive Server configuration and environment data to help Sybase Technical Support diagnose server issues.
- **wdllvers** – provides information about the Sybase DLLs (dynamic link libraries) that are loaded into memory in Windows.

Tuning Utility

qptune enables you to fix missing statistics and identify the best query plan, optimization goal, or other configuration settings, and apply them at the query or server level.

Utility to Manage a Cluster

(Cluster Edition only) Use the **sybcluster** utility to manage an Adaptive Server shared-disk cluster. **sybcluster** provides a set of interactive, command line options for creating and managing a cluster.

backupserver

The executable form of the Backup Server program.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_ASE/bin`.
- (Windows) `%SYBASE%\%SYBASE_ASE%\bin`, as **bcksrvr.exe**.

Syntax

```
backupserver
    [-C server_connections]
    [-S b_servername]
    [-I interfaces_file]
    [-e error_log_file]
    [-M sybmultbuf_binary]
    [-N network_connections]
    [-T trace_value]
    [-L Sybase_language_name]
    [-J Sybase_character_set_name]
    [-c tape_config_file]
    [-D n]
    [-A pathname]
    [-P active_service_threads]
    [-V level_number]
    [-p n]
    [-m max_shared_memory]
```

or:

```
backupserver -v
```

Parameters

- ***-C server_connections*** – specifies the number of server connections for the Backup Server, which requires:
  - Two connections for each dump session
  - One connection for each load session
  - One connection for volume change messages

Allow a maximum of three times the number of expected concurrent dump and load sessions. The default value is 30 server connections.

- **`-S`** ***`b_servername`*** – specifies the name of the Backup Server to start. The default is SYB_BACKUP. This entry must specify the name of a Backup Server in the interfaces file.
- **`-I`** ***`interfaces_file`*** – specifies the name and location of the interfaces file to search when connecting to Backup Server. If `-I` is omitted, **backupserver** looks for a file named `interfaces` in the directory pointed to by your SYBASE environment variable.
- **-v** – prints the version number and copyright message of the **backupserver** software and then exits.
- **`-e`** ***`error_log_file`*** – specifies the name and location of the Backup Server error log file used to report Open Server internal errors, **sybmultbuf** errors, errors that halt the Backup Server, and errors for disconnected sessions. All other errors are sent to the **notify** destination specified in the **dump database**, **dump transaction**, **load database**, and **load transaction** commands.
- **`-M`** ***`sybmultbuf_binary`*** – specifies the full path name of the **sybmultbuf** executable. Use this parameter only when starting Backup Server from a directory other than the `bin` directory of the Sybase installation directory, or when using a diagnostic version of **sybmultbuf**.
- **`-N`** ***`network_connections`*** – specifies the number of total network connections (DBPROCESSes) that the master Backup Server can originate. The default value is 25.
- **`-T`** ***`trace_value`*** – interprets *trace_value* as a bitmask (base-2 number). The 1 bits in *trace_value* correspond to Open Server Trace flags to turn on. If you specify more than one `-T` parameter on the command line, the final `-T` value overrides the values from earlier `-T` parameters. The *trace_value* must be a positive integer.
- **`-L`** ***`Sybase_language_name`*** – specifies the default language for Backup Server. If not specified, Backup Server uses the locale specified by the LC_ALL or LANG environment variables. If these variables are not set, Backup Server searches for the "default" entry in `locales.dat`.

Note: The **-L** parameter does not override the value set in the LANG environment variable.

- **`-J`** ***`Sybase_character_set_name`*** – specifies the default character set for Backup Server.
- **`-c`** ***`tape_config_file`*** – specifies the name and location of the tape configuration file to search for tape device configuration information before doing a **dump database** or a **dump transaction**. If you do not specify `-c`, the default path name for the tape configuration file is `$SYBASE/backup_tape.cfg`.
- **`-D`** ***`n`*** – specifies the bitmap (base 10 number) of the diagnostic flags used within Backup Server.
- **`-A`** ***`pathname`*** – specifies the pathname to the directory of the Archive API dynamically loadable library.

- ***`-P active_service_threads`*** – allows you to increase the number of stripes during multiple dump/load operations (with a maximum of 12,286 stripes per single operation).
- ***`-V level_number`*** – limits the messages that are printed to the Backup Server error log. The *level_number* variable determines the degree of error verbosity (`-V`) for Backup Server:
  - `-V4` – displays all `-V0` messages except "Connection from Server" messages printed for each connection event.
  - `-V3` – displays only completion messages from a normal **dump** or **load** command and these types of messages:
    - Error messages from Backup Server and **sybmultbuf**
    - Other **sybmultbuf** messages
    - Volume change messages
    - Open Server™ messages
    - Trace print messages
    - Informational messages from the System & Tape Auto Config modules
  - `-V2` – displays:
    - All **-V3** messages **plus**
    - File creation and file mount messages
  - `-V1` – displays:
    - All `-V2` messages **plus**
    - Phase messages
  - `-V0` (default) – displays all messages, including backup progress

  This limitation does not involve the messages that are sent to the client or console as determined by the **NOTIFY=** parameter in a **dump** or **load** command.

  This option also does not affect logging for these message types:

  - Open Server messages
  - Trace printing messages from **bs_traceprint**
  - **sybmultbuf** messages
- ***`-p n`*** – specifies the TDS packet size in bytes that the **local** Backup Server requests from the **remote** Backup Server during network dumps. The actual packet size used is limited to the `-p` parameter value of the remote Backup Server. If you do not specify `-p`, the default is 2048 bytes. The packet size should be an integer greater than, or equal to 256.
- ***`-m max_shared_memory`*** – specifies the maximum amount of shared memory in megabytes that Backup Server can use for all of its **dump** or **load** sessions.

Usage

- In Adaptive Server version 15.5 and later, both Adaptive Server and Backup Server can bypass the operating system buffer cache when you enable the **directio** parameter for the device using **disk init**, **disk reinit**, or **sp_deviceattr**. Adaptive Server passes the device options to Backup Server, which enables Backup Server to access the database device with the appropriate **directio** option.

- Backup Server versions 15.0.3 and earlier do not work with Adaptive Server 15.5 and later.
- Start Backup Server with the **startserver** command rather than by directly executing the **backupserver** program.
  - To change default values in UNIX, edit the `RUN_servername` file in your Sybase installation directory. See the **startserver** reference page for details.
  - To change default values in Windows, use Server Config to change the command line parameters of the Backup Server. See the *Configuration Guide* for details.
- Make sure that the device driver options you include with the dump command are accurate. Backupserver does not verify any device driver options you include during a dump command. For example, if you include a option that forces Backupserver to rewind a tape before use, it will always rewind the tape to the beginning instead of reading the tape from the point of the dump.
- If you do not specify a Backup Server name with the `–S` parameter, and you have not set the environment variable DSLISTEN, **backupserver** uses the default Backup Server name SYB_BACKUP in UNIX.

  (Windows) **bcksrvr** uses the default Backup Server name `server_name_BS`. The value of the DSLISTEN environment variable overrides this default value, and the **-S** parameter overrides both the default and the value specified in DSLISTEN.
- Whenever possible, the Backup Server and any Adaptive Servers that dump or load directly through the Backup Server should share the same interfaces file (`sql.ini` in UNIX). The interfaces file that Backup Server uses must contain entries for:
  - Backup Server
  - Any other Backup Servers with which this Backup Server communicates
- Trace flags cause the Backup Server to print information regarding its operation while it is running, for debugging problems in the Backup Server.
- If Backup Server cannot find the `locales` and `charsets` directories specified by the **-L** and **-J** parameters, or if these parameters specify an incorrect language and character set combination, Backup Server issues an error message and uses the default language and character set. Backup Server does not support use of the Open Server-defined SRV_TR symbols for **-T**.
- Backup Server cannot perform loads or dumps between servers that use different logical page sizes. For example, load a 4K logical page sized database dump into another server using a 4K logical page size. But Backup Server does not support dumping a 4K logical page sized database and loading it into a database that uses 16K logical page size.

See also *Open Server Server-Library/C Reference Manual* for more details on trace flags.

Permissions

Anyone with execute permission on the binary, and who has read/write access to all the files.

See also

- *startserver* on page 137

bcp

Copies a database table to or from an operating system file in a user-specified format.

bcp provides a convenient and high-speed method for transferring data between a database table or view and an operating system file. **bcp** can read or write files in a wide variety of formats. When copying in from a file, **bcp** inserts data into an existing database table; when copying out to a file, **bcp** overwrites any previous contents of the file.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **bcp.exe**.

Note: For parallel **bcp**, on:

- UNIX platforms – use **bcp_r**. The executable is in the same directory as the standard **bcp** command.
- Windows – use the standard **bcp.exe** utility.

Syntax

```
bcp [[database_name.]owner.]table_name [: partition_id |
slice_number
    [partition partition_name] {in | out} [datafile]
    [-a display_charset]
    [-A packet_size]
    [-b batch_size]
    [-c]
    [-C]
    [-d discardfileprefix]
    [-e errfile]
    [-E]
    [-f formatfile]
    [-F firstrow]
    [-g id_start_value]
    [-i input_file]
    [-I interfaces_file]
    [-J client_character_set]
    [-K keytab_file]
    [-L lastrow]
    [-m maxerrors]
    [-MLabelName LabelValue] [-labeled]
    [-n]
    [-N]
    [-o output_file]
    [-P password]
    [-Q]
    [-r row_terminator]
    [-R remote_server_principal]
    [-S server]
    [-t field_terminator]
    [-T text_or_image_size]
    [-U username]
    [-v]
    [-V [security_options]]
    [-W]
    [-x trusted.txt_file]
    [-X]
    [-y alternate_home_directory]
    [-Y ]
    [-z language]
    [-Z security_mechanism]
    [--colpasswd [[[db_name.[owner].]table_name.]
                            column_name [password]]]
    [--keypasswd [[db_name.[owner].]key_name [password]]]
    [--hide-vcc]
    [--initstring "TSQL_command"]
    [--maxconn maximum_connections]
    [--show-fi]
    [--skiprows nSkipRows]
```

Parameters

- ***database_name*** – is optional if the table being copied is in your default database or in `master`. Otherwise, specify a database name.
- ***owner*** – is optional if you or the database owner owns the table being copied. If you do not specify an owner, **bcp** looks first for a table of that name that you own, then looks for one owned by the database owner. If another user owns the table, specify the owner name or the command fails.
- ***table_name*** – specifies the name of the database table to copy. The table name cannot be a Transact-SQL™ reserved word.
- ***partition_id*** – specifies the partition number into which data is to be copied. Supported only for **bcp in**, *partition_id* is the equivalent of *slice_number* in Adaptive Server 12.5.x.
- ***slice_number*** – specifies the number of the slice of the database table into which data is to be copied. Supported only for **bcp in** and only for round-robin partitioned tables in Adaptive Server 15.0 and later.
- **partition *partition_name*** – specifies the name of the partition in Adaptive Server. For multiple partitions, use a comma-separated list of partition names.
- **in | out** – specifies the direction of the copy. `in` indicates a copy from a file into the database table; `out` indicates a copy to a file from the database table or view.

  Note: **bcp** raises an error and stops if the number of rows to be copied in or out exceeds 2147483647.

- ***datafile*** – specifies the full path name of an operating system file. The path name can be 1 to 255 characters long. For multiple files, use a comma-separated list of file names. If you enter more than one data file and partition name, the number of files and partitions must be the same.

- **`-a` *`display_charset`*** – allows you to run **bcp** from a terminal where the character set differs from that of the machine on which **bcp** is running. Using `-a` in conjunction with `-J` specifies the character set translation file (`.xlt` file) required for the conversion. Use `-a` without `-J` only if the client character set is the same as the default character set.

  You see this error message if the character translation file named with the `-a` parameter is missing, or you mistype the name:

  ```
  Error in attempting to determine the size of a pair of
  translation tables. : 'stat' utility failed.
  ```
- **`-A` *`packet_size`*** – specifies the network packet size to use for this **bcp** session. For example, set the packet size to 4096 bytes for the current **bcp** session, use:

  ```
  bcp pubs2..titles out table_out -A 4096
  ```

  packet_size must be:

  - Between the values of the `default network packet size` and `maximum network packet size` configuration variables,
  - A multiple of 512.

  To improve the performance of large bulk-copy operations, use network packet sizes that are larger than the default value.
- **`-b` *`batchsize`*** – specifies the number of rows per batch of data copied. By default, **bcp in** copies *n* rows in one batch, where *n* is equal to the batch size. Batch size applies only when you are bulk copying in; it has no effect on bulk copying out. The smallest number **bcp** accepts for *batchsize* is 1. The largest number **bcp** accepts for *batchsize* is 2147483647L.

  Note: Set the batch size to 1 for Adaptive Server to allocate one data page to one row copied in. This option applies only to fast **bcp**, and is useful only in locating corrupt rows of data. Use `-b1` with care—doing so causes a new page to be allocated for each row, and is an inefficient use of space.
- **`-c`** – performs the copy operation using the `char` datatype as the default. This option does not prompt for each field; it uses `char` as the default storage type, no prefixes, `\t` (tab) as the default field terminator, and `\n` (newline) as the default row terminator.
- **`-C`** – supports bulk copy of encrypted columns if Adaptive Server supports encrypted columns. `-C` enables the `ciphertext` option before initiating the bulk copy operation.
- **`-d` *`discardfileprefix`*** – logs the rejected rows into a dedicated discard file. The discard file has the same format as the host file and is created by appending the input file name to the discard file prefix supplied. You can correct the rows in this file and use the file to reload the corrected rows.

  - You can use `-d` *`discardfileprefix`* with `-e` *`errorfile`* to help identify and diagnose the problem rows logged in the discard file.

    - Specifying the `-d` option applies only when bulk copying in; it is silently ignored when used in bulk copying out.
    - If there are no rejected rows, no discard file is created.
    - If you use multiple input files, one discard file is created for every input file that has an erroneous row. If there are no rejected rows, no discard file is created.
    - If **bcp** reaches the maximum errors allowed and stops the operation, all the rows, from the beginning of the batch until the failed row are logged.
- ***`-e errfile`*** – specifies the full path name of an error file where **bcp** stores any rows that it was unable to transfer from the file to the database. Error messages from **bcp** appear on your terminal. **bcp** creates an error file only when you specify this parameter.

  SAP® recommends that you use `-e` *`errorfile`* with `-d` *`discardfileprefix`* to help identify and diagnose the problem rows logged in the discard file.
- **`-E`** – explicitly specifies the value of a table's `IDENTITY` column.

  By default, when you bulk copy data into a table with an `IDENTITY` column, **bcp** assigns each row a temporary `IDENTITY` column value of 0. This is effective only when copying data into a table. **bcp** reads the value of the ID column from the data file, but does not send it to the server. Instead, as **bcp** inserts each row into the table, the server assigns the row a unique, sequential `IDENTITY` column value, beginning with the value 1. If you specify the `-E` flag when copying data into a table, **bcp** reads the value from the data file and sends it to the server, which inserts the value into the table. If the number of inserted rows exceeds the maximum possible `IDENTITY` column value, Adaptive Server returns an error.

  By default, when you bulk copy data from a table with an `IDENTITY` column, **bcp** excludes all information about the column from the output file. If you specify the `-E` flag, **bcp** copies the existing `IDENTITY` column values into the output file.

  The `-E` parameter has no effect when you are bulk copying data out. Adaptive Server copies the `ID` column to the data file, unless you use the `-N` parameter.

  You cannot use the `-E` and `-g` flags together.
- ***`-f formatfile`*** – specifies the full path name of a file with stored responses from a previous use of **bcp** on the same table. After you answer **bcp**'s format questions, it prompts you to save your answers in a format file. Creation of the format file is optional. The default file name is `bcp.fmt`. The interactive **bcp** program can refer to a format file when you are copying data so that you do not have to duplicate your previous format responses. Use the `-f` parameter only if you previously created a format file that you now want to use for a copy in or copy out operation. If you do not specify this parameter, **bcp** interactively queries you for format information.
- ***`-F firstrow`*** – specifies the number of the first row to copy (default is the first row). If you use multiple files, this option applies to each file.

Do not use `-F` when performing heavy-duty, multiprocess copying, as doing so causes **bcp** to generally spend more effort to run, and does not provide you with a faster process. Instead, use `-F` for single-process, ad hoc copying.

Note: You cannot use `-F` with `--skiprows`.

- ***`-g id_start_value`*** – specifies the value of the `IDENTITY` column to use as a starting point for copying data in.

  Note: You cannot use the `-g` and `-E` flags together.

- ***`-i input_file`*** – specifies the name of the input file. Standard input (`stdin`) is used as the default.
- ***`-I interfaces_file`*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server. If you do not specify `-I`, **bcp** looks for an interfaces file (`sql.ini` in Windows) in the SYBASE release directory.
- ***`-J client_charset`*** – specifies the character set to use on the client. **bcp** uses a filter to convert input between *client_charset* and the Adaptive Server character set.

  `-J client_charset` requests that Adaptive Server convert to and from *client_charset*, the character set used on the client.

  `-J` with no argument disables character set conversion. No conversion takes place. Use this if the client and server use the same character set.

  Omitting `-J` sets the character set to a default for the platform, which may not necessarily be the character set that the client is using. For more information about character sets and associated flags, see the *Adaptive Server Enterprise System Administration Guide*.
- ***`-K keytab_file`*** – (Used only with Kerberos security) Specifies a Kerberos keytab file that contains the security key for the user name specified with the `-U` option. To create a keytab, see your Kerberos documentation.

  If you do not supply the `-K` option, the **bcp** user must be logged in to Kerberos with the same user name as specified with the `-U` option.
- ***`-L lastrow`*** – specifies the number of the last row to copy from an input file (default is the last row). If you use multiple files, this option applies to each file.
- **`-labeled`** – (secure Adaptive Server only) indicates that the data you are importing already has labels in the first field of every record.

  For exporting data, this option indicates that you want the sensitivity label of every row to be copied out as the first field.
- ***`-m maxerrors`*** – specifies the maximum number of errors permitted before **bcp** aborts the copy. **bcp** discards each row that it cannot insert (due to a data conversion error, or an attempt to insert a null value into a column that does not allow them), counting each rejected row as one error. If you do not include this option, **bcp** uses a default value of 10.

If you use multiple partitions, the same number of maxerrors is used for every file.

- ***-M LabelName LabelValue*** – (secure Adaptive Server only) enables multilevel users to set the session labels for the bulk copy. Values for *LabelName* are:

  - `curread` (current reading level) – is the initial level of data that you can read during this session, `curread` must dominate `curwrite`.
  - `curwrite` (current write level) – is the initial sensitivity level that is applied to any data that you write during this session.
  - `maxread` (maximum read level) – is the maximum level at which you can read data. This is the upper bound to which you as a multilevel user can set your curread during the session. `maxread` must dominate `maxwrite`.
  - `maxwrite` (maximum write level) – is the maximum level at which you can write data. This is the upper bound to which you as a multilevel user can set your `curwrite` during a session. `maxwrite` must dominate `minwrite` and `curwrite`.
  - `minwrite` (minimum write level) – is the minimum level at which you can write data. This is the lower bound to which you as a multilevel user can set `curwrite` during a session. `minwrite` must be dominated by `maxwrite` and `curwrite`.

  LabelValue is the actual value of the label, expressed in the human-readable format used on your system (for example, “Company Confidential Personnel”).

- **-n** – performs the copy operation using native (operating system) formats. Specifying the `-n` parameter means **bcp** does not prompt for each field. Files in native data format are not human-readable.

  Warning! Do not use:

  - **bcp** in native format for data recovery or salvage or to resolve an emergency situation.
  - **bcp** in native format to transport data between different hardware platforms, different operating systems, or different major releases of Adaptive Server.
  - Field terminators (`-t`) or row terminators (`-r`) with **bcp** in native format.

  Results are unpredictable and data may become corrupted.

  Using **bcp** in native format can create flat files that cannot be reloaded into Adaptive Server and it may be impossible to recover the data. If you cannot re-run **bcp** in character format (for example, a table was truncated or dropped, hardware damage occurred, a database was dropped, and so on) the data is unrecoverable.

- **-N** – skips the `IDENTITY` column. Use this option when copying data in if your host data file does not include a placeholder for the `IDENTITY` column values, or when copying data out, if you do not want to include the `IDENTITY` column information in the host file.

  You cannot use both `-N` and `-E` parameters when copying data in.

- ***-o output_file*** – specifies the name of the output file. Standard output (`stdout`) is used as the default.
- ***-P password*** – specifies an Adaptive Server password. If you do not specify `-P`, **bcp** prompts for a password. Omit the `-P` flag if your password is NULL.
- **-Q** – provides backward compatibility with **bcp** for copying operations involving nullable columns.
- ***-r row_terminator*** – specifies the row terminator.

  Warning! Do not use `-t` or `-r` parameters with **bcp** in native format. Results are unpredictable and data may become corrupted.

  When specifying terminators from the command line with the `-t` or `-r` parameter, you must escape characters that have special significance to the UNIX operating system (or the command prompt shell for Windows). See the examples for **bcp** for more information. Either place a backslash in front of the special character or enclose it in quotes. This is not necessary when **bcp** prompts you (interactive mode).
- ***-R remote_server_principal*** – specifies the principal name for the server. By default, a server's principal name matches the server's network name (which is specified with the `-S` option or the DSQUERY environment variable). Use the `-R` option when the server's principal name and network name are not the same.
- ***-S server*** – specifies the name of the Adaptive Server to connect to. If you specify `-S` with no argument, **bcp** uses the server specified by the DSQUERY environment variable.
- ***-t field_terminator*** – specifies the default field terminator.
- ***-T text_or_image_size*** – allows you to specify, in bytes, the maximum length of `text` or `image` data that Adaptive Server sends. The default is 32K. If a `text` or an `image` field is larger than the value of `-T` or the default, **bcp** does not send the overflow.
- ***-U username*** – specifies an Adaptive Server login name. If you do not specify this option, **bcp** uses the current user's operating system login name.
- **-v** – displays the version number of **bcp** and a copyright message and returns to the operating system.

  SDK binaries like **bcp** have the same names in both the 32-bit and 64-bit products. Installing Adaptive Server, the SDK, or Open Server 64-bit products with other Sybase 32-bit products overwrites the 32-bit binaries. Starting with Adaptive Server 15.0.2 and SDK/Open Server 15.0 ESD #9, the 64-bit binaries have been replaced with 32-bit binaries on all 64-bit UNIX platforms. Since 32-bit binaries are included in the 64-bit EBF, the `-v` option of **bcp** is no longer a valid way to check the EBF number for 64-bit products. Instead, use the UNIX strings and **grep** commands to confirm the EBF numbers for Adaptive Server.

  For example, to find the string containing the EBF number in the libsybct64.a library, enter:

  ```
  strings -a libsybct64.a | grep Sybase
  ```

  This returns a string similar to:

```
Sybase Client-Library/15.5/P/DRV.15.5.0/SPARC/Solaris
8/BUILD1550-001/64bit/OPT/Mon Aug 10 23:04:17 2009
```

To find the string containing the EBF number in the libsybsrv64.a library, enter:

```
strings -a libsybsrv64.a | grep Sybase
```

This returns a string similar to:

```
Sybase Server-Library/15.5/P/DRV.15.5.0/SPARC/Solaris
8/BUILD1550-001/64bit/OPT/Mon Aug 10 23:06:27 2009
```

- **`-V`** ***`security_options`*** – specifies network-based user authentication. With this option, the user must log in to the network's security system before running the utility. Users must supply their network user name with the `-U` option; any password supplied with the `-P` option is ignored.

  To enable additional security services, follow `-V` with a *security_options* string of key-letter options:

  - `c` – enables data confidentiality service.
  - `i` – enables data integrity service.
  - `m` – enables mutual authentication for connection establishment.
  - `o` – enables data origin stamping service.
  - `r` – enables data replay detection.
  - `q` – enables out-of-sequence detection.
- **`-W`** – specifies that if the server to which **bcp** is attempting to connect supports neither normal password encryption nor extended password encryption, plain text password retries are disabled.

  If you use this option, the CS_SEC_NON_ENCRYPTION_RETRY connection property is set to CS_FALSE, and plain text (unencrypted) passwords are used, the connection is not retried.
- **`-x`** ***`trusted.txt_file`*** – specifies an alternate *trusted.txt* file.
- **`-X`** – specifies that, in this connection to the server, the application initiates the login with client-side password encryption. **bcp** (the client) specifies to the server that password encryption is desired. The server sends back an encryption key, which **bcp** uses to encrypt your password, and the server uses the key to authenticate your password when it arrives.

  This option results in normal or extended password encryption, depending on connection property settings at the server. If CS_SEC_ENCRYPTION is set to CS_TRUE, normal password encryption is used. If CS_SEC_EXTENDED_ENCRYPTION is set to CS_TRUE, extended password encryption is used. If both CS_SEC_ENCRYPTION and CS_SEC_EXTENDED_ENCRYPTION are set to CS_TRUE, extended password encryption is used as the first preference.

  If **bcp** fails, the system creates a core file that contains your password. If you did not use the encryption option, the password appears in plain text in the file. If you used the encryption option, your password is not readable.

- **`-y`** ***`alternate_home_directory`*** – sets an alternate Sybase home directory.
- **`-Y`** – specifies that character-set conversion is disabled in the server, and is instead performed by **bcp** on the client side when using **bcp out**

  Note: A client-side Unicode conversion is supported only for Adaptive Server 15.0 and later.

  During **bcp out**, all character-set conversion is done in the server.

- **`-z`** ***`language`*** – is the official name of an alternate language the server uses to display **bcp** prompts and messages. Without the `-z` flag, **bcp** uses the server's default language.

  Add languages to an Adaptive Server during installation or afterwards, using either the **langinstall** utility (**langinst** in Windows) or the **sp_addlanguage** system procedure.

  If an incorrect or unrecognized language is named with the `-z` parameter, you see this error message:

  ```
  Unrecognized localization object. Using default value
  'us_english'.
  Starting copy...
  => warning.
  ```

- **`-Z`** ***`security_mechanism`*** – specifies the name of a security mechanism to use on the connection.

  Security mechanism names are defined in the `$SYBASE/install/libtcl.cfg` configuration file. The default mechanism is used if you do not supply *security_mechanism* name.

- **`--colpasswd [[`*`database_name`*`[`*`owner`*`].]`*`table_name`*`.]`*`column_name`*`[`*`password`*`]]]`** – sets the passwords for encrypted columns by sending `set encryption passwd` *`password`* `for column` *`column_name`* to Adaptive Server. This does not automatically apply passwords to other encrypted columns, even if the second column is encrypted with the same key. Supply the password a second time to access the second column.
- **`--hide-vcc`** – instructs **bcp** not to copy virtual computed columns (VCC) either to or from a data file. When you use this option in **bcp out**, the data file contains no data for VCC. When you use it in **bcp in**, the data file may contain no data for a VCC.

  If you use this option, Adaptive Server does not calculate or send virtual computed column data.

- **`--initstring "`*`Transact-SQL_command`*`"`** – sends Transact-SQL commands to Adaptive Server before data is transferred.

  Result sets issued by the initialization string are silently ignored, unless an error occurs. If Adaptive Server returns an error, **bcp** stops before data is transferred, and displays an error message.

- **`--keypasswd [[`*`database_name`*`.[`*`owner`*`].]`*`key_name`* `[`*`password`*`]]]`** – sets passwords for all columns accessed by a key by sending `set encryption passwd` *`password`* `for key` *`key_name`* to Adaptive Server.
- **`--maxconn`** ***`maximum_connections`*** – is the maximum number of parallel connections permitted for each bulk copy operation. You must use **bcp_r**, the threaded version of the **bcp** utility, to copy multiple files in parallel. For example, the following example sets the maximum number of parallel connection permitted for each operation to 2:

  ```
  bcp_r --maxconn 2
  ```

  If you do not include this option, **bcp** uses the default value of 10.
- **`--show-fi`** – instructs **bcp** to copy functional indexes, while using either **bcp in** or **bcp out**. If you do not specify this option, Adaptive Server generates the value for the functional index.
- **`--skiprows`** ***`nSkipRows`*** – instructs **bcp** to skip a specified number of rows before starting to copy from an input file. The valid range for `--skiprows` is between 0 and the actual number of rows in the input file. If you provide an invalid value, you see an error message.

  Note: You cannot use `--skiprows` with the `-F` option.

Examples

- **Character datatype (-c) –** The `-c` option copies data out of the `publishers` table in character format (using `char` for all fields). The `-t` *`field_terminator`* option ends each field with a comma, and the `-r` *`row_terminator`* option ends each line with a Return. **bcp** prompts only for a password. The first backslash before the final “r” escapes the second so that only one backslash prints.

  In UNIX:

  ```
  bcp pubs2..publishers out pub_out -c -t , -r \\r
  ```

  In Windows:

  ```
  bcp pubs2..publishers out pub_out -c -t , -r \r
  ```
- **Encrypted columns (-C) –** The `-C` parameter copies data out of the `publishers` table (with encrypted columns) in cipher-text format instead of plain text. Press Return to accept the defaults specified by the prompts. The same prompts appear when copying data into the publishers table:

  ```
  bcp pubs2..publishers out pub_out -C

  Password:
  Enter the file storage type of field pub_id [char]:
  Enter prefix length of field pub_id [0]:
  Enter length of field pub_id [4]:
  Enter field terminator [none]:
  Enter the file storage type of field pub_name [char]:
  ```

```
Enter prefix length of field pub_name [1]:
Enter length of field pub_name [40]:
Enter field terminator [none]:
Enter the file storage type of field city [char]:
Enter prefix length of field city [1]:
Enter length of field city [20]:
Enter field terminator [none]:
Enter the file storage type of field state [char]:
Enter prefix length of field state [1]:
Enter length of field state [2]:
Enter field terminator [none]:
```

In UNIX, you are then asked:

```
Do you want to save this format information in a
    file? [Y-n] y
Host filename [bcp.fmt]: pub_form
Starting copy...
3 rows copied.
 Clock Time (ms.): total = 1 Avg = 0 (3000.00 rows per sec.)
```

- **Copy out to a file –** Copies data from the publishers table to a file named `pub_out` for later reloading into Adaptive Server. Press Return to accept the defaults that the prompts specify. The same prompts appear when copying data into the publishers table:

```
bcp pubs2..publishers out pub_out

Password
Enter the file storage type of field pub_id [char]:
Enter prefix length of field pub_id [0]:
Enter length of field pub_id [4]:
Enter field terminator [none]:
Enter the file storage type of field pub_name [char]:
Enter prefix length of field pub_name [1]:
Enter length of field pub_name [40]:
Enter field terminator [none]:
Enter the file storage type of field city [char]:
Enter prefix length of field city [1]:
Enter length of field city [20]:
Enter field terminator [none]
Enter the file storage type of field state [char]:
Enter prefix length of field state [1]:
Enter length of field state [2]:
Enter field terminator [none]:
```

You are then asked:

```
Do you want to save this format information in a
    file? [Y-n]
Host filename [bcp.fmt]: pub_form
Starting copy...
3 rows copied.
 Clock time (ms.): total = 1 Avg = 0 (3000.00 rows per
 sec.)
```

- **Copy in –** Copies data back into Adaptive Server using the saved format file, `pub_form`:

```
bcp pubs2..publishers in pub_out -f pub_form
```

- **Client character set (-J) –** Copies a data file created with the iso_1 character set into the `pubs2..publishers` table. The `-z` flag displays **bcp** messages in French:

  ```
  bcp pubs2..publishers in datafile -J iso_1 -z french
  ```

- **Partitions –** Copies data out of partition `p1` of table `t1` to the `mypart.dat` file in the current directory:

  ```
  bcp t1 partition p1 out mypart.dat
  ```

  To copy in:

  ```
  bcp t1 partition p1 in mypart.dat
  ```

  To copy files `data.first`, `data.last` and `data.other` into partitions `p1`, `p2`, and `p3`, respectively:

  ```
  bcp t1 partition p1, p2, p3 in data.first, data.last,
      data.other
  ```

  To copy partition `p1`, `p2`, and `p3` to files `a`, `b`, and `c` respectively, into the `\work2\data` directory:

  ```
  bcp t1 partition p1, p2, p3 out \work2\data\1,
      \work2\data\b, \work2\data\c
  ```

- **Setting limits (--initstring) –** Limits this to the current session, disabling replication for the **bcp** connection during the transfer of data from `titles.txt` data into `pubs2..titles`.

  ```
  bcp pubs2..titles in titles.txt --initstring 'set replication off'
  ```

  You need not explicitly reset the configuration option after **bcp** is finished. If Adaptive Server returns an error, **bcp** stops the data transfer and displays an error message.

- **Password (-P) –** Sets the password to pwd1 for the encrypted column `col1`:

  ```
  bcp mydb..mytable out myfile –U uuu –P ppp --colpasswd
      db..tbl.col1 pwd1
  ```

- **Password prompts –** Sets a prompt to enter the password for encrypted column `col1`:

  ```
  bcp mydb..mytable out myfile –U uuu –P ppp --colpasswd
      db..tbl.col1
  Enter column db..tbl.col1’s password: ***?
  ```

- **External file password –** Reads the password for encrypted column `col1` from an external OS file named “`passwordfile`”:

  ```
  bcp mydb..mytable out myfile –U uuu –P ppp --colpasswd
      db..tbl.col1 < passwordfile
  ```

- **Encrypted key password –** Sets password pwd1 for encryption key key1:

  ```
  bcp mydb..mytable in myfile –U uuu –p ppp --keypasswd
      db..key1 pwd1
  ```

- **Discard file (-d) –** Creates the discard file `reject_titlesfile.txt`:

```
bcp pubs2..titles in titlesfile.txt -d reject_
```

- **Security (-V) –** For MIT Kerberos, requests credential delegation and forwards the client credentials to MY_GATEWAY:

  ```
  bcp -Vd -SMY_GATEWAY
  ```

- **Skip rows (--skiprows) – bcp** ignores the first two rows of the input file `titles.txt`, and starts to copy from the third row:

  ```
  bcp pubs2..titles in titles.txt -U username -P password
      --skiprows 2
  ```

- **Alternate directories (-y) –** Sets an alternate Sybase home directory:

  ```
  bcp tempdb..T1 out T1.out -y/work/NewSybase -Uuser1
      -Psecret -SMYSERVER
  ```

- **Text and image sizes (-T) –** Specifies that Adaptive Server send 40K of `text` or `image` data using a packet size of 4096 bytes:

  ```
  bcp pubs2..publishers out -T 40960 -A 4096
  ```

- **Maximum number of connections (--maxconn) –** Sets 2 as the maximum number of parallel connections permitted for each operation.

  ```
  bcp_r --maxconn 2
  ```

- **Materialized computed columns –** Copies out database `db_1`, which includes table `t1` with materialized computed column `c1`:

  ```
  bcp db_1..t1 out db_1.dat -Usa -P -S big_db -I./interfaces -f ./
  bcp.fmt
  ```

  The following then copies in the data file (`db_1.dat`) containing table `t1` with materialized computed column `c1`:

  ```
  bcp db_1..t1 in db_1.dat -Usa -P -S big_db -I./interfaces -f ./
  bcp.fmt
  ```

- **Fast logging –** Enables fast-logged **bcp** when you transfer the `titles.txt` data into the `pubs2..titles` table:

  ```
  bcp pubs2..titles in titles.txt --initstring 'set logbulkcopy on'
  ```

Permissions

You must have an Adaptive Server account and the appropriate permissions on the database tables or views, as well as the operating system files to use in the transfer to use **bcp**.

- To copy data into a table, you must have **insert** permission on the table.
- To copy a table to an operating system file, you must have **select** permission on these tables:
  - The table to copy
  - `sysobjects`
  - `syscolumns`

- `sysindexes`

Auditing

Values in `event` and `extrainfo` columns are:

Event	Audit option	Command or access audited	Information in **`extrainfo`**
4	**bcp**	**bcp in**	• *Roles* – Current active roles • *Keywords or options* – NULL • *Previous value* – NULL • *Current value* – NULL • *Other information* – NULL • *Proxy information* – Original login name, if **set proxy** in effect

Tables used

`sysaudits_01 – sysaudits_08`

See also

- *Chapter 2, Transferring Data to and from Adaptive Server with bcp* on page 159
- *Bulk Copying Encrypted Data* on page 175

Usage for bcp

There are a number of considerations when using **bcp**.

- **bcp_r** is a threaded version of **bcp**.
- You cannot use named pipes to copy files in or out.
- Using **--hide-vcc** improves performance because Adaptive Server does not transfer and calculate data from virtual computed columns.
- Although you can use any Transact-SQL command with **--initstring** as an initialization string for **bcp**, reset possible permanent changes to the server configuration after running **bcp**. You can, for example, reset changes in a separate **isql** session.
- *slice_number* is included for backward compatibility with Adaptive Server 12.5.x and earlier, and can be used only with round-robin partitioned tables.
- Specify either *partition_id* or *partition_name*, but not both.
- If you provide no partition name, **bcp** copies to the entire table.
- You can specify multiple partitions and data files. Separate each partition name or data file with commas.
- **bcp** provides a convenient and high-speed method for transferring data between a database table or view and an operating system file. **bcp** can read or write files in a wide variety of

formats. When copying in from a file, **bcp** inserts data into an existing database table; when copying out to a file, **bcp** overwrites any previous contents of the file.

- Upon completion, **bcp** informs you of the number of rows of data successfully copied, the total time the copy took, the average amount of time in milliseconds that it took to copy one row, and the number of rows copied per second.
- **bcp** does not insert any row that contains an entry exceeding the character length of the corresponding target table column. For example, **bcp** does not insert a row with a field of 300 bytes into a table with a character-column length of 256 bytes. Instead, **bcp** reports a conversion error and skips the row. **bcp** does not insert truncated data into the table. The conversion error is as follows:

  ```
  cs_convert: cslib user api layer: common library
  error: The result is truncated because the
  conversion/operation resulted in overflow
  ```

  To keep track of data that violates length requirements, run bcp with the **-e log-file name** option. **bcp** records the row and the column number of the rejected data, the error message, and the data in the log file you specify.

  To restrict the functionality of **bcp** to that of a previous version, set the CS_BEHAVIOR property in the [bcp] section of the `ocs.cfg` file:

  ```
  [bcp]
  CS_BEHAVIOR = CS_BEHAVIOR_100
  ```

  If CS_BEHAVIOR is not set to CS_BEHAVIOR_100, you can use functionality for **bcp** 11.1 and later.
- If **bcp** is invoked and no value is supplied for the **-c**, **-f**, or **-n** parameters, a **bcp** prompt requests the file storage type. The file storage type can be any valid Adaptive Server datatype. Storage types for the `bigdatetime` and `bigtime` Adaptive Server datatypes are specified as:

Storage Type	Table Datatype
A	`bigdatetime`
B	`bigtime`

- You can specify these datatypes for a bcp format file using the `bigdatetime` or `bigtime` datatypes:

Storage Format	Adaptive Server Datatype
SYBBIGDATETIME	`bigdatetime`
SYBBIGTIME	`bigtime`

- Use **bcp** to copy encrypted data in and out of the server.
- **bcp** versions 15.7 and later allow you to copy data into tables that contain nonmaterialized columns.

- Error message format is different than in versions of **bcp** earlier than 15.7. If you have scripts that perform routines based on the values of these messages you may need to rewrite them, for example:

  ```
  The display message that indicates the number of rows
  transferred has been changed. During a session, this
  version of bcp periodically reports a running total
  of rows transferred. This message replaces the "1000
  rows transferred" message displayed by the previous
  bcp.
  ```
- When using **bcp out**:
  - If *partition_name* and *datafile* are both specified, then either *datafile* must specify a single data file, or specify a one-to-one mapping between partition names and data files.
  - If *datafile* is not specified, data from each partition is copied to a file named for the named partition with a `.dat` extension. For example, if the partition name is `ptn1`, the data file is `ptn1.dat`.
- You may use **initstring** to run any Transact-SQL command, but you must reset any permanent changes to the server **initstring** causes after **bcp** finishes. For instance, as in the example for the password (`-p`) parameter, if the Adaptive Server account does not have the appropriate permissions, Adaptive Server returns an error message for the initialization string. **bcp** displays the server error message and stops before any data is transferred.

  Result sets issued by the initialization string are silently ignored unless an error occurs.
- When using **bcp in**, if *partition_name* is specified, *datafile* must specify a corresponding number of data files
- If you see a message similar to the following, the character translation file specified with the **-q** parameter is missing, or you mistyped the name:

  ```
  Error in attempting to load a view of translation tables.
  ```

See also:

- *Open Client and Open Server Configuration Guide* – the description for `libtcl.cfg` for security mechanism names
- *Performance and Tuning Guide* – on how changing certain parameters can affect **bcp** for large batches
- *Reference Manual: Commands* – **insert**
- *Reference Manual: Procedures* – **sp_audit**, **sp_dboption**, **sp_displayaudit**
- *System Administration Guide* – character sets and associated flags

Copying Tables with Indexes or Triggers Using bcp

bcp is optimized to load data into tables that do not have associated indexes or triggers. It loads data into tables without indexes or triggers at the fastest possible speed, with a minimum of logging. Page allocations are logged, but row insertions are not.

When you copy data into a table that has one or more indexes or triggers, a slower version of **bcp** is automatically used, which logs row inserts. This includes indexes that are implicitly created using the unique integrity constraint of a create table command. However, **bcp** does not enforce the other integrity constraints defined for a table.

Since the fast version of **bcp** inserts data without logging it, the system administrator or database owner must first set the **sp_dboption** procedure:

```
sp_dboption dbname, "select into/bulkcopy", true
```

If the option is not true and you try to copy data into a table that has no indexes or triggers, Adaptive Server generates an error message. You need not set this option to copy data out to a file or into a table that contains indexes or triggers.

Note: Because **bcp** logs inserts into a table that has indexes or triggers, the log can grow very large. You can truncate the log with **dump transaction** to truncate the log after the bulk copy completes, and after you have backed up your database with **dump database**.

While the **select into/bulkcopy** option is on, you cannot dump the transaction log. Issuing **dump transaction** produces an error message instructing you to use **dump database** instead.

Warning! Ensure that you dump your database before you turn off the **select into/bulkcopy** flag. You cannot recover your data if you have inserted unlogged data into your database and you then perform **dump transaction** before performing **dump database**.

Unlogged **bcp** runs slowly while a **dump database** is taking place.

Table 1. Comparing fast and slow bcp

	select into/bulkcopy on	select into/bulkcopy off
Fast **bcp** – no indexes or triggers on target table	Yes – **dump transaction** prohibited	No – Adaptive Server forces slow **bcp**
Slow **bcp** – one or more indexes or triggers	Yes – **dump transaction** prohibited	Yes – **dump transaction** OK

By default, the **select into/bulkcopy** option is off in newly created databases. To change the default, turn the option on in the `model` database.

Note: The performance penalty for copying data into a table that has indexes or triggers can be severe. If you are copying in a large number of rows, it may be faster to:

1. Use **drop index** (or **alter table** for indexes) and **drop trigger** to drop all the indexes and triggers
2. Set the database option.
3. Copy the data into the table.
4. Re-create the indexes and triggers.
5. Dump the database.

However, you must allocate extra disk space for the construction of indexes and triggers—about 2.2 times the amount of space needed for the data.

Using bcp with Compressed Data

Pages in a compressed table may have a combination of row-, page-, or uncompressed rows. Tables and partitions listed as **not compressed** may contain a mixture of rows in different states of compression because you may have created them when the table's compression level was different.

- **bcp out**:
  - Decompresses compressed rows and returns them to the client, either in native or character form.
  - Supports IDENTITY, encrypted columns, and so on.
  - Returns text data as uncompressed.
- **bcp in** compresses uncompressed data received from the client according to the table or partition's compression level.

Using **bcp** to copy data out and then **bcp** it back in to a table that is configured for compression results in compressed data, even if the data was originally uncompressed.

buildmaster

Adaptive Server does not use the **buildmaster** binary to build the master device. Instead, Sybase has incorporated the **buildmaster** functionality in the **dataserver** binary.

Syntax

```
None.
```

See also

- *Chapter 3, Building Servers Using dataserver* on page 203

certauth

Converts a server certificate request to a CA- (certificate authority) signed certificate.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **certarthr.exe**.

Syntax

```
certauth
    [-r]
    [-C caCert_file]
    [-Q request_filename]
    [-K caKey_filename]
    [-N serial_number
    [-O SignedCert_filename]
    [-P caPassword]
    [-s start_time]
    [-T valid_time]
```

Or

```
certauth -v
```

Parameters

- **`-r`** – when specified, creates a self-signed root certificate for the test environment.
- **`-C`** ***`caCert_file`*** – specifies the name of the CA's certificate request file when `-r` is specified, or specifies the name of the CA's root certificate.
- **`-Q`** ***`request_filename`*** – specifies the name of certificate request file.
- **`-K`** ***`caKey_filename`*** – specifies the name of the CA's private key.
- **`-N`** ***`serial_number`*** – specifies the serial number in the signed certificate. If `-N` is not specified, **certauth** generates a pseudo-random serial number.

  The maximum length of the serial number in the `-N` option is 20 hexadecimal characters. If the specified serial number is longer, **certauth** truncates the serial number to the maximum length.
- **`-O`** ***`SignedCert_filename`*** – specifies the name to use for the output when creating a signed certificate file. If `-r` is specified, *SignedCert_filename* is the self-signed root certificate. If `-r` option is not used, *SignedCert_filename* is the certificate signed by the *caCert_file*.
- **`-P`** ***`caPassword`*** – specifies the CA's password that is used to decrypt its private key.
- **`-s`** ***`start_time`*** – specifies the start of the valid time range, measured in days from the current time. The default is the current time.
- **`-T`** ***`valid_time`*** – specifies the length of the valid time range for a signed certificate. The valid time range is in units of days.
- **`-v`** – prints the version number and copyright message of the **certauth** tool, then exits.

Examples

- **Private keys –** Converts the CA's certificate request (`ca_req.txt`) to a certificate, using the private key (`ca_pkey.txt`). The private key is protected using *password*. This example sets the valid time range to 365 days, self-signs the certificate, and outputs it as a root certificate (`trusted.txt`):

  ```
  certauth -r -C ca_req.txt -Q ca_req.txt
      -K ca_pkey.txt -P password -T 365 -O trusted.txt
  ```

  The utility returns this message:

  ```
   -- Sybase Test Certificate Authority --
  Certificate Validity:
      startDate = Tue Sep 5  10:34:43  2000
  ```

```
endDate = Wed Sep 5  10:34:43  2001
CA sign certificate SUCCEED (0)
```

Note: You need to create a trusted root certificate for the test CA only once, after which you can use it to sign many server certificates in your test environment.

- **Time ranges –** Converts a server certificate request (`srv5_req.txt`) to a certificate, and sets the valid time range to 180 days. It signs the certificate with a CA's certificate and private key (`trusted.txt` and `ca_pkey.txt`), uses password protection, and outputs the signed certificate as `sybase_srv5.crt`

  ```
  certauth -C trusted.txt -Q srv5_req.txt
      -K ca_pkey.txt -P password -T 180 -O sybase_srv5.crt
  ```

  The utility returns this message:

  ```
   -- Sybase Test Certificate Authority --
  Certificate Validity:
      startDate = Tue Sep  5 10:38:32  2000
  endDate = Sun Mar  4 09:38:32  2001
  CA sign certificate SUCCEED (0)
  ```

  Note: If you do not set valid time, the default is 365 days.

  This is a sample certificate. See the **certauth** Usage section for additional steps to take to create a server certificate that the server can use.

  ```
  -----BEGIN CERTIFICATE-----
  MIICSTCCAgUCAVAwCwYHKoZIzjgEAwUAMG8xCzAJBgNVBAYTAlVTMRMwEQYDVQQI
  EwpDYWxpZm9ybmlhMRMwEQYDVQQHEwpFbWVyeXZpbGxlMQ8wDQYDVQQKFAZTeWh
  c2UxDDAKBgNVBAsUA0RTVDEXMBUGA1UEAxQOc3liYXNlX3Rlc3RfY2EwHhcNMDAw
  ODE4MTkxMzM0WhcNMDEwODE4MTkxMzM0WjBvMQswCQYDVQQGEwJVUzETMBEGAUE
  CBMKQ2FsaWZvcm5pYTETMBEGA1UEBxMKRW1lcnl2aWxsZTEPMA0GA1UEChQGU3li
  YXNlMQwwCgYDVQQLFANEU1QxFzAVBgNVBAMUDnN5YmFzZV90ZXN0X2NhMIHwMIo
  BgcqhkjOOAQBMIGcAkEA+6xG7XCxiklxbP96nHBnQrTLTCjHlcy8QhIekwv9OlqG
  EMG9AjJLxj6VCkPOD75vqVMEkaPPjoIbXEJEe/aYXQIVAPyvY1+B9phC2e2YFcf7
  cReCcSNxAkBHt7rnOJZ1Dnd8iLQGt0wd1w4lo/Xx2OeZS4CJW0KVKkGId1hNGz8r
  GrQTspWcwTh2rNGbXxlNXhAV5g4OCgrYA0MAAkA70uNEl90Kmhdt3RISiceCMgOf
  1J8dgtWF15mcHeS8OmF9s/vqPAR5NkaVk7LJK6kk7QvXUBY+8LMOugpJf/TYMAsG
  ByqGSM44BAMFAAMxADAuAhUAhM2Icn1pSavQtXFzXJUCoOmNLpkCFQDtE8RUGuo8
  ZdxnQtPu9uJDmoBiUQ==

          -----END CERTIFICATE-----
  ```

Usage for certauth

Running **certauth** requires that you place the entry for `$SYBASE/$SYBASE_OCS/lib3p` before the entry for `$SYBASE/$SYBASE_OCS/libp364` in the dynamic library search path.

Accomplish Certificate Management Tasks Using Open Source Utility

Adaptive Server includes the **openssl** open source utility in `$SYBASE/$SYBASE_OCS/bin` (`%SYBASE%\%SYBASE_OCS%\bin` in Windows).

Adaptive Server includes the **openssl** open source utility in `$SYBASE/$SYBASE_OCS/bin` (`%SYBASE%\%SYBASE_OCS%\bin` in Windows). Use **openssl** to accomplish all certificate management tasks implemented by **certreq**, **certauth** and **certpk12**. Sybase includes this binary as a convenience, and is not responsible for any issues incurred using the binary. See the *OpenSSL Web site* for details.

Creating a Server Certificate File that Adaptive Server Understands

To create a server certificate file that Adaptive Server understands, append the certificate requestor's private key to the end of the signed certificate file.

Using example 2 above, you would cut and paste `srv5_pkey.txt` to the end of the signed certificate file, `sybase_srv5.crt`.

To create a trusted roots file that the server can load upon start-up:

1. Rename `trusted.txt` to `sybase_srv5.txt`, where `sybase_srv5.txt` is the common name of the server.
2. Copy the `sybase_srv5.txt` file into the Adaptive Server installation directory; for example, `$SYBASE/$SYBASE_ASE/certificates`.

The options **-s** and **-T** together specify the time range for the certificate.

Use the file, which is required for an SSL-based session, to start the SSL-enabled Adaptive Server.

After the CA's root certificate is created, use it to sign multiple server certificates.

certpk12

Export or import a PKCS #12 file into a certificates file and a private key.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **certpk12.exe**.

Syntax

```
certpk12
    {-O Pkcs12_file | -I Pkcs12_file}
    [-C Cert_file]
    [-K Key_file]
    [-P key_password]
    [-E Pkcs12_password]
```

or:

```
certpk12 -v
```

Parameters

- ***-C Cert_file*** – specifies the name of certificate file to be exported to a PKCS #12 file if `-O` is on; or the name of certificate file to be imported from a PKCS #12 file if `-I` is on.
- ***-E Pkcs12_password*** – specifies the password used to protect the PKCS #12 file. If `-O` is on, the password is used to encrypt the PKCS #12 file to be exported; if `-I` is on, the password is used to decrypt the PKCS #12 file to be imported. The password is also called “transport password.”
- ***-I Pkcs12_file*** – specifies the name of a PKCS #12 file to be imported. The file can contain a certificate plus a private key, a single certificate, or a single private key. Either `-I` or `-O` needs to be on.
- ***-K Key_file*** – specifies the name of private key file to be exported to a PKCS #12 file if `-O` is on; or the name of private key file to be imported from a PKCS #12 file if `-I` is on.
- ***-O Pkcs12_file*** – specifies the name of a PKCS #12 file to be exported. The file can contain a certificate plus a private key, a single certificate, or a single private key. Either `-O` or `-I` needs to be on.
- ***-P Key_password*** – specifies the password which is used to protect the private key specified by `-K`. If `-O` is on, the password is required to export the private key to a PKCS #12 file; if `-I` is on, the password is required to output the private key to a text file after it is imported from a PKCS #12 file.
- **-v** – prints the version number and copyright message of the **certpk12** tool and exits.

Examples

- **Export certificate and private key file –** Exports `caRSA.crt`, the certificate file and `caRSApkey.txt`, the private key file, to a PKCS#12 file (`caRSA.p12`). *password* is the password used to decrypt `caRSApkey.txt`. *pk12password* is the password used to encrypt the final `caRSA.p12`:

  ```
  certpk12 -O caRSA.p12 -C caRSA.crt -K caRSApkey.txt
      -P password -E pk12password

  -- Sybase PKCS#12 Conversion Utility certpk12 Thu Nov 9 16:55:51
  2000--
  ```

- **Import file containing certificate and private key –** Imports `caRSA.p12`, a PKCS #12 file that contains a certificate and a private key. Output the embedded certificate to a text file (`caRSA_new.crt`) and the embedded private key to a text file (`caRSApkey_new.txt`):

```
certpk12 -I caRSA.p12 -C caRSA_new.crt -
K caRSApkey_new.txt
    -P new_password -E pk12password

-- Sybase PKCS#12 Conversion Utility certpk12 Thu Nov 9 16:55:51
2000--
```

new_password is used to protect `caRSApkey_new.txt`, and *pk12password* is required to decrypt `caRSA.p12` file.

Note: After you run examples 1 and 2, `caRSA.crt` and `caRSA_new.crt` are identical. `caRSApkey.txt` and `caRSApkey_new.txt` are different because they are encrypted randomly.

- **Export certificate file –** Exports the certificate file (`caRSA.crt`) to a PKCS#12 file (`caRSAcert.p12`). *pkcs12password* is used to encrypt `caRSAcert.p12`.

```
certpk12 -O caRSAcert.p12 -C caRSA.crt -E pk12password

-- Sybase PKCS#12 Conversion Utility certpk12 Thu Nov 9 16:55:51
2000--
```

- **Import file containing certificate –** Imports a PKCS#12 file (`caRSAcert.p12`) that contains a certificate. Output the embedded certificate to a text file (`caRSAcert.txt`).

```
certpk12 -I caRSAcert.p12 -C caRSAcert.txt -E pk12password

-- Sybase PKCS#12 Conversion Utility certpk12 Thu Nov 9 16:55:51
2000--
```

pk12password is required to decrypt `caRSAcert.p12` file.

Note: After you run Examples 3 and 4, the `caRSA.crt` and `caRSAcert.txt`, are identical.

Usage

- Adaptive Server includes the **openssl** open source utility in `$SYBASE/$SYBASE_OCS/bin` (`%SYBASE%\%SYBASE_OCS%\bin` in Windows). Use **openssl** to accomplish all certificate management tasks implemented by **certreq**, **certauth** and **certpk12**. Sybase includes this binary as a convenience, and is not responsible for any issues incurred using the binary. See the *OpenSSL Web site* for details.
- **certpk12** only supports triple-DES encrypted PKCS #12 file.
- Running **certpk12** requires that you place the entry for `$SYBASE/$SYBASE_OCS/lib3p` before the entry for `$SYBASE/$SYBASE_OCS/libp364` in the dynamic library search path
- Append certificate requestor's private key to the end of its signed certificate file.
- Name the file `servername.crt`, where *servername* is the name of the server. Place it in the certificates directory under `$SYBASE/$SYBASE_ASE` (`%SYBASE%\%SYBASE_ASE%` on Windows).

This file is needed to start the SSL-enabled Adaptive Server.

certreq

Creates a server certificate request and corresponding private key. Use **certreq** in interactive mode, or provide all optional parameters on the command line.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as.**certreq.exe**

Syntax

```
certreq
    [-F input_file]
    [-R request_filename]
    [-K PK_filename]
    [-P password]
```

Or

```
certreq -v
```

Parameters

- ***-F input_file*** – specifies the file name that contains attribute information to build a certificate request. If you do not specify an `input_file` name, the required information must be interactively entered by a user.

  The `input_file` needs an entry for each of these:

  ```
  req_certtype={Server,Client}
  req_keytype={RSA,DSA}
  req_keylength={for RSA: 512-4096;
                 for DSA: 512,768,1024}
  req_country={string}
  req_state={string}
  req_locality={string}
  req_organization={string}
  req_orgunit={string}
  req_commonname={string}
  ```

  Note: The common name must be the same as the server name.

  See the Examples section for a sample file called `input_file`.
- ***-R request_filename*** – specifies the name for the certificate-request file.
- ***-K PK_filename*** – specifies the name for the private-key file.
- ***-P password*** – specifies the password used to protect the private key.
- **-v** – displays the version number and copyright message, then exits.

Examples

- **Create request in interactive mode –** This example does not use the `-F` *`input_file`* parameter, and is therefore in interactive mode. To create a server certificate request (`server_req.txt`) and its private key (`server_pkey.txt`), enter:

```
certreq

Choose certificate request type:
    S - Server certificate request
    C - Client certificate request (not supported)
    Q - Quit
Enter your request [Q] : s

Choose key type:

    R - RSA key pair
    D - DSA/DHE key pair
    Q - Quit

Enter your request [Q] : r

Enter key length (512, 768, 1024 for DSA; 512-2048 for
RSA) : 512

Country: US

State: california

Locality: dublin

Organization: sybase

Organizational Unit: dst

Common Name: server
```

  The utility returns the message:

```
Generating key pair (please wait) . . .
```

  After the key pair is generated, the **certreq** utility prompts you for more information.

```
Enter password for private key : password

Enter file path to save request: server_req.txt

Enter file path to save private key : server_pkey.txt
```

- **Build certificate noninteractively –** The format, *`tag=value`*, is used for noninteractive entry for a certificate request in this sample text file. Use the `-F` option for noninteractive mode, making sure to use valid values and following the format described above to ensure that the certificate builds correctly.

```
certreq -F input_file
```

```
req_certtype=server
req_keytype=RSA
req_keylength=512
req_country=us
req_state=california
req_locality=dublin
req_organization=sybase
req_orgunit=dst
req_commonname=server
```

After you create and save this file, enter on the command line, where `path_and_file` is the location of the text file:

```
certreq -F path_and_file -R server_req.txt -K server_pkey.txt -
P password
```

This file creates a server certificate request, `server_req.txt`, and its private key, `server_pkey.txt` which is protected by *password*.

Edit the server certificate file with any standard ASCII text editor.

Usage

- Adaptive Server includes the **openssl** open source utility in `$SYBASE/$SYBASE_OCS/bin` (`%SYBASE%\%SYBASE_OCS%\bin` in Windows). Use **openssl** to accomplish all certificate management tasks implemented by **certreq**, **certauth** and **certpk12**. Sybase includes this binary as a convenience, and is not responsible for any issues incurred using the binary. See the *OpenSSL Web site* for details.
- The input file uses the format of *`tag`*`=`*`value`*. *tag* is case-sensitive and should be the same as described above.
- Running **certreq** requires that you place the entry for `$SYBASE/$SYBASE_OCS/lib3p` before the entry for `$SYBASE/$SYBASE_OCS/libp364` in the dynamic library search path
- The "=" is required. Valid *value* should start with a letter or digit, must be a single word, and there should not be any spaces within *value*.
- *value* is required for *req_certtype*, *req_keytype*, *req_keylength* and *req_commonname*.
- The space or tab around <*`tag`*>, = and *`value`* is allowed. Blank lines are also allowed.
- Each comment line should start with `#`.
- The certificate request file is in PKCS #10 format and used as acceptable input for the **certauth** tool to convert the request to a CA-signed certificate.

charset

(UNIX only) Loads the character sets and sort order files in Adaptive Server.

The utility is located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
charset
    [-Ppassword]
    [-Sserver]
    [-Iinterface]
    sort_order
    [ charset ]
```

Or

```
charset -v
```

Parameters

- ***-P password*** – specifies your password. If you do not specify `-P`, **charset** prompts for your password.
- ***-S server*** – specifies the name of the server on which to change the character set and sort order.
- ***-I interface*** – specifies the network interface used by the server.
- ***sort_order*** – specifies the name of the sort order file Adaptive Server will use.
- ***charset*** – specifies the character set Adaptive Server will use.
- **-v** – displays the version number and copyright message for **charset**.

Usage

Before using **charset**, set your SYBASE environment variable to point to the current release directory.

See also **set** command in *Reference Manual: Commands*.

Permissions

You must be a system administrator to use **charset**.

cobpre

Precompiler for COBOL.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`.

Syntax

```
See below.
```

Usage

For a full description of **cobpre**, see the *Open Client and Open Server Programmer's Supplement*.

cpre

Precompiler for C.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`.

Syntax

```
See below.
```

Usage

For a full description of **cpre**, see the *Open Client and Open Server Programmer's Supplement*.

dataserver

(UNIX only) The executable form of the Adaptive Server program, located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
dataserver [-f] [-g] [-G] [-h] [-H] [-m] [-q] [-v] [-X]
    [-A system_role
    [-a path_to_CAPs_directive_file]
    [-b master_device_size [k | K | m | M | g | G | t | T] ]
    [-c config_file_for_server]
    [-d device_name]
    [-D default_db_size]
    [-e path_to_error_log]
    [-i interfaces_file_directory]
    [-K keytab_file]
    [-L config_file_name_for_connectivity]
    [-M shared_memory_repository_directory]
    [-N licinstant]
    [-n system_privileges
    [-p sa_login_name]
    [-r mirror_disk_name]
    [-s server_name]
    [-T trace_flag]
    [-u sa/sso_name]
    [-w master | model database]
    [-y [password] ]
    [-z page_size [ k | K ] ]
    [-Z initial_master_db_size]
```

Syntax for the Cluster Edition:

```
dataserver
-u, --admin-name=sa/sso_name
    --buildquorum=[force]
-a, --caps-file=filename
-F, --cluster-input=filename
    --cluster-takeover
-L, --conn-config-file=[filename]
    --create-cluster-id [=quorum]
-D, --default-db-size=size_spec
-e, --error-log=[filename]
-G, --event-log-server=logserv_name
-f, --forcebuild
-H, --ha-server
-h, --help=[{0|1|2|3}[,display_width]]
    --instance=instance_name
-y, --key-password=[key_password]
-K, --keytab-file=filename
-N, --license-prop-file=filename
-z, --logical-page-size=page_size
-Z, --master-db-size=size_spec
-d, --master-dev=master_device_name
-b, --master-dev-size=[size_spec]
    --master_key_password [=password]
-r, --master-mirror=filename
-m, --masterrecover
-g, --no-event-logging
-n, --permission-login=system_privilege
-Q, --quorum-dev=quorum_dev
-q, --recover-quiesced
-w, --rewrite-db=database_name
-A, --role-logins=system_role
-p, --sa-name={SSO_login_account | sso_role | sa_role}
-k, --server-principal=s_principal
-M, --shared-mem-dir=directory_name
-X, --sybmon
-T, --trace=trace_flag
-v, --version
```

Or

```
dataserver -v
```

Parameters

- ***`-A system_role`*** – when enable granular permissions is set to 0, and all users are unable to log into Adaptive Server, provides the server administrator with a login account with sso_role.

- **`-a`** ***`path_to_CAPs_directive_file`*** – specifies the path to the CAPs directive file.
- **`-b`** ***`master_device_size`*** **`[ k | K | m | M | g | G | t | T ]`** – specifies the size of the master device or database you want to build. The server calculates the sizes, so you can use “K”, “M”, “G”, and “T” instead of exact byte numbers.
- **`-c`** ***`config_file_for_server`*** – specifies the full path name of an Adaptive Server configuration file. Use this parameter to start Adaptive Server with the configuration values in the specified configuration file. If you specify a configuration file with the **dataserver -c** parameter, make sure all the parameters in this configuration file are compatible before you boot the server. If some of the configuration parameters are incompatible, the server may not boot. To avoid this, do not specify a configuration file when you build the master device. The build phase uses all default settings when you do not specify a configuration file.For more information, see the *System Administration Guide*.
- **`-D`** ***`default_db_size`*** – declares how large the `model` database should be when creating a new installation. This sets the size of the smallest permitted database. Syntax is identical to the `-b` *`size`* parameter. `-D` is only valid when used in conjunction with **-b**. Default varies by server page size, because the smallest acceptable size is 1024 logical pages: 2 Mb on a 2k page, 4 Mb on an 8k page, and so on. If the flag provides a size smaller than the minimum, the server adjusts it up to the minimum.
- **`-d`** ***`device_name`*** – is the full path name of the device for the `master` database. The master database device must be writable by the user who starts Adaptive Server. If you do not use the `-d` parameter, the default `master` database device name is `d_master`.
- **`-e`** ***`errorlogfile`*** – is the full path name of the error log file for Adaptive Server system-level error messages.
- **`-f`** – forces initialization of a device or database. `-f` is valid only when used with `-b` and/or `-w`. The server fails to boot if you use `-f` without either `-b` or `-w`. `-f` forces the server in different ways, depending whether `-w` is present.
- **`-G`** ***`logserv_name`*** – specifies the name of the event log server.
- **`-g`** – turns off event-logging.
- **`-H`** – starts the high availability (HA) server, if you have the HA feature installed on your Adaptive Server.
- **`-h`** – prints this help message, then exists.
- **`-i`** ***`interfaces_file_directory`*** – specifies the directory location of the interfaces file to search when connecting Adaptive Server. If `-I` is omitted, **dataserver** looks for a file named `interfaces` in the directory pointed to by your SYBASE environment variable.
- **`-K`** ***`keytab_file`*** – specifies the path to the keytab file used for authentication in DCE.
- **`-k, --server-principal=`*****`s_principal`*** – specifies the server principal name.
- **`-L`** ***`config_file_name_for_connectivity`*** – specifies the name the configuration file for connectivity.

- **`-M`** ***`sharedmem_directory`*** – places shared memory files in the specified directory instead of in the default location, `$SYBASE`. If *sharedmem_directory* starts with "/", the directory name is assumed to be absolute. Otherwise, the directory name is interpreted relative to `$SYBASE`.
- **`--master_key_password [=`*`password`*`]`** – specifies the master key password when you provide the *password* on the command line or prompts for a master key password during Adaptive Server start-up. The password characters are not displayed, and the password is not validated until later in the Adaptive Server startup sequence.

  If you include the password on the command line, it is visible until the memory is read and used.
- **`-m`** – starts Adaptive Server in single-user mode.
- **`-N`** ***`licinstant`*** – specifies a nondefault directory location for the license cache file. The default location is `$SYBASE/$SYBASE_ASE/sysam/server_name.properties`.
- **`-n`** ***`system_privileges`*** – when enable granular permissions is set to 1, and all users are unable to log into Adaptive Server, provides the server administrator with a login account with **change password** privilege.
- **`-p`** ***`sso_login_name`*** – specifies the login name of a system security officer when starting Adaptive Server, for the purposes of getting a new password for that account. Adaptive Server generates a random password, displays it, encrypts it, and saves it in `master..syslogins` as that account's new password.

  Because Adaptive Server passwords are encrypted, you cannot recover forgotten passwords. If all system security officers lose their passwords, the `-p` parameter generates a new password for a system security officer account. Start Adaptive Server with `-p`, immediately log in to Adaptive Server with the new random password, and execute **sp_password** to reset your password to a more secure one.
- **`-q`** – treats quiesced databases as "in recovery."
- **`-r`** ***`mastermirror`*** – starts the mirror of the master device. Use this parameter to start Adaptive Server if the master device has been damaged.
- **`-s`** ***`servername`*** – specifies the name of the Adaptive Server to start.

  If you do not specify an Adaptive Server name with the `-s` parameter, and you have not set the DSLISTEN environment variable, **dataserver** uses the default Adaptive Server name SYBASE. The value of the DSLISTEN environment variable overrides this default value, and the `-s` parameter overrides both the default and the DSLISTEN environment variable.
- **`-T`** ***`trace_flag`*** – specifies a trace flag number.
- **`-u`** ***`sa/sso_name`*** – specifies the system administrator or system security officer's name you want to unlock.
- **`-v`** – prints the version number and copyright message for **dataserver**, then exits.
- **`-w [master | model]`** – specifies whether you want to write a `master` or `model` database.

When you use the `-w` parameter, **dataserver** uses the ascii-8 character set instead of the iso_1 character set. If you require the iso_8 character set for `master`, load a dump of the `master` database or change the character set with **sqlloc** (**sqlloc** requires the `sybsystemprocs` database.)

- **`-X`** – starts this server as **sybmon**, not **dataserver**.
- **`-y [`*`password`*`]`** – allows you to assign a password for the encrypted private key, so that the server prompts the user for a password. This password should match the password you used to encrypt the private key when it was created. You cannot use this parameter when you are running the server in the background.

  Note: Although you can set a password with `-y`, for security reasons Sybase strongly discourages you from doing so.

  A private key is included with your server's digital certificate. By default, the certificate file located at `/usr/local/sybase/certificates/<servername>.crt`.

  The location of the certificate file changes if you invoke the **sp_ssladmin addcert** command.
- **`-Z [`*`initial_master_db_size`*`]`** – declares how large the `master` database should be when creating a new installation, setting the size of the smallest permitted database. Syntax is identical to the `-b` *`size`* parameter. `-D` is only valid when used in conjunction with **-b**. Default varies by server page size, because the smallest acceptable size is 3072 logical pages: 6MB on a 2K page, 12MB on an 8K page, and so on. If the flag provides a size smaller than the minimum, the server adjusts it up to the minimum.
- **`-z`** ***`page_size`*** **`[ k | K ]`** – specifies the page size of the server. Use `-b` and `-w` to use this flag, and name an even power of two between 2K and 16K, or else the server does not boot.

Examples

- **Create new installation –** Creates a new installation with a 100MB master device and a 4K page:

  ```
  dataserver -d my_master_device -z 4k -b 100.02M
  ```

  The spaces between options and their following arguments are optional and acceptable. This example specifies "100.02M" for a 100MB master device because the server requires 16K of overhead for its configuration area.
- **Rewrite database –** Rewrites a corrupt `model` database:

  ```
  dataserver -d d_master -w model -s server_name
  ```
- **Rewrite database with device size –** Rewrites a corrupt `master` database, specifying device size:

  ```
  dataserver -d my_master_device -w master -z 4k
  ```

- **Rewrite database with device and page sizes –** Rewrites a corrupt `master` database, specifying device and page sizes, forcing the server to accept these values in preference to what it may find in the config block:

```
dataserver -d my_master_device -w master -z 4k -b
    100.02M -f
```

- **Rewrite database with nonmatching page size (generates error) –** Rewrites a corrupt `master` database, specifying a page size that does not match what the server finds in its config block. This produces a failure:

```
dataserver -d my_master_device -w master -z 8k

00:00000:00000:2001/01/19 12:01:26.94 server The
configured server page size does not match that
specified on the command line. To use the configured
size, omit the command line size; to use the command
line size, specify 'force' (-f).
```

- **Rewrite database with incorrect page size (generates error) –** Rewrites a corrupt `master` database, specifying an incorrect page size, even in a normal restart. This produces a failure:

```
dataserver -d my_master_device -z4000

dataserver: the 'z' flag may not be used without 'b' or
'w'. dataserver: server will ignore the 'z' flag.
dataserver: the 'z' flag contained an invalid page size.
dataserver: the page size must be an even power of two
between 2048 and 16384 bytes, inclusive.
```

- **Specify principal name –** Specifies the “aseprincipal@myrealm.com” principal name:

```
$SYBASE/$SYBASE_ASE/bin/dataserver -dmaster.dat
-s secure_ase -k aseprincipal@myrealm.com
```

- **Prompt for password –** Prompts for a master key password:

```
dataserver --master_key_passwd  -dd_master  -eerrorlog
```

- **List with role –** List account names with role sso_role:

```
$SYBASE/$SYBASE_ASE/bin/dataserver
-d master.dat
-s server_name
-A sso_role
```

  (Cluster Edition) To list account names with role login for sso_role:

```
$SYBASE/$SYBASE_ASE/bin/dataserver
-d master.dat
-s server_name
--role-logins sso_role
```

- **List with change password privilege –** List account names with privilege **change password**:

```
$SYBASE/$SYBASE_ASE/bin/dataserver
-d master.dat
```

```
-s server_name
-n "change password"
```

(Cluster Edition) To list account names with permission logins **change password**:

```
$SYBASE/$SYBASE_ASE/bin/dataserver
-d master.dat
-s server_name
--permission-logins "change password"
```

Permissions

Anyone with execute permission on the binary, and who has read/write access to all the files.

After you have finished running the Adaptive Server installation program, set the file permissions on the **dataserver** executable to limit who can execute it.

See also

- *Dependencies and Conditions of -b and -w Options* on page 44
- *Potential Issues of Using -f and -w Options Together* on page 44
- *Chapter 3, Building Servers Using dataserver* on page 203
- *startserver* on page 137

Usage for dataserver

There are additional considerations when using **dataserver**.

- **dataserver** allows you to create devices and databases that are up to 32Gb in size, depending on the limitation of your operating system. For more information on size limits, see the installation guide for your platform.
- Start Adaptive Server with the **startserver** command rather than by directly executing the **dataserver** program. If you need to change any of the default values, edit the `RUN_servername` file in your Sybase installation directory.
- Automatic login lockouts can cause a site to end up in a situation in which all accounts capable of unlocking logins (system administrators and system security officers) are locked. If this occurs, use the **dataserver** utility with the `-u` parameter to check the specified login for system administrator or system security officer authorization, unlock the account, and reset the value of the current failed logins counter to zero.

See also:

- *Reference Manual: Commands* – **disk mirror**, **disk remirror**, **disk unmirror**
- *Reference Manual: Procedures* – **sp_ssladmin**, **addcert**

See also

- *startserver* on page 137

Dependencies and Conditions of -b and -w Options

The effect of **-b** changes depending on whether **-w** is present.

- **-b** without **-w** creates a new master device as named by **-d** (the default is `d_master`) and with the page size as specified by **-z** (the default is 2048). If the named device:
  - Already exists as an OS file – the attempt fails, and you see a message such as:

    ```
    File already exists. You must remove the existing
    file before attempting to create a new one using
    the server's -b option.
    Unable to create master device.
    ```
  - Names an existing raw partition – the attempt fails unless you include the**-f** flag. This reinitializes the raw partition as a server master device.
- **-b** with **-w** `master` tells **dataserver** to use the size specified in **-z** for the master device when re-creating the `master` database. It implies nothing about creating a new device.

`-w` may or may not require additional flags if you use:

- **-w** `model` – the **-z** and **-b** flags are accepted but ignored.
- **-w** `master` for **new** installations – **-z** and **-b** are not required because the device size information is stored in the `config_block`.
- **-w** `master` to **upgrade** older installations:
  - The server requires **-b** and/or **-z** if the `config_block` does not contain a valid entry for the associated size(s). The command fails if it cannot get valid data for the page size or device size.
  - Provide **-b** and/or **-z** when the `config_block` contains valid entries for the sizes they represent. However if the sizes do not match what is in the `config_block`, add **-f** to force your new size preferences.

Potential Issues of Using -f and -w Options Together

Be particularly careful when using the **-f** and **-w** options together.

When rewriting `master` database using the **-w** option, the server requires that the configuration block page size and device size are correct. If you do not provide them on the command line they must agree. The server refits the master device, and puts master and all other included databases back in their proper places.

When you use the **-f** option to force initialization, your page size and master device size override those in the configuration block. In addition, **-f** assigns all other unknown spaces—allocation blocks that are either unused or are corrupted—to the `master` database.

ddlgen

A Java-based tool that generates definitions for server- and database-level objects in Adaptive Server.

The command-line version of **ddlgen** is located in:

- (UNIX) `$SYBASE/$SYBASE_ASE/bin`.
- (Windows) `%SYBASE%\%SYBASE_ASE%\bin`.

Syntax

```
ddlgen
    -Ulogin
    -Ppassword
    -S[[ssl:]server | host_name : port_number]
    [-I interfaces_file]
    [-Tobject_type]
    [-Nobject_name]
    [-Ddbname]
    [-Cproperty_name=property_value]
    [-Xextended_object_type]
    [-Ooutput_file]
    [-Eerror_file]
    [-Lprogress_log_file]
    [-Jclient_charset]
    [-LC -N logical_cluster_name
    -F[ % | SGM | GRP | USR | R | D | UDD | U | V |
        P | XP | I | RI | KC | TR | PC ]
```

Or

```
ddlgen -v
```

Parameters

- ***-U login*** – specifies a login name, and is case-sensitive.
- ***-P password*** – specifies your password.

  If you do not include the `-P` parameter in your **ddlgen** statement, **ddlgen** prompts you to specify a password.
- ***-S [[ssl:] server | host_name : port_number]*** – specifies the name of the Adaptive Server. **ddlgen** looks this name up in the interfaces file or LDAP configuration file. If you specify:
  - `[ssl:]` – allows you to generate DDL for objects in SSL-enabled servers. This parameter is optional.

  - `-S[`*`host_name`*`:`*`port_number`*`]` – **ddlgen** uses the *host_name* and *port_number* provided, and neither interfaces nor LDAP configuration files are read or parsed.
  - `-S[`*`server`*`] -I` – **ddlgen** parses the interfaces file specified at the user location for the server name (see the `-I` parameter description).
  - `-S[`*`server`*`]` – without specifying an interfaces file, **ddlgen** does:
    1. **ddlgen** first tries to read the LDAP configuration file from the standard location
    2. If the LDAP file does not exist, or exists but does not contain an Adaptive Server entry, then the interfaces file is parsed at its standard location for the server name
    3. If the LDAP file exists, then **ddlgen** uses it to search the server name. The interfaces file is not parsed, and the LDAP configuration file is parsed.

  Note: You must use the `-S` option because **ddlgen** does not connect to a default server.

- **`-I`** – specifies the interfaces file name, and corresponds to `$SYBASE/interfaces` for UNIX, and `%SYBASE%\ini\sql.ini` for Windows. Use this optional parameter with `-S`.
- **`-T`*`object_type`*** – specifies the type of object you are creating. If you do not use `-T`, **ddlgen** generates DDL for the default database of login. The object types for `-T` are:

  - `C` – cache
  - `D` – default
  - `DB` – database
  - `DBD` – database device
  - `DPD` – dump device
  - `EC` – execution class
  - `EG` – engine group
  - `EK` – encrypted keys
  - `GRP` – group
  - `I` – index
  - `IT` – `instead of` trigger for views
  - `KC` – key constraints
  - `L` – login
  - `LK` – logical key
  - `P` – stored procedure
  - `PN` – partition name
  - `R` – rule
  - `RI` – referential integrity
  - `RO` – role
  - `RS` – remote server
  - `SGM` – segment

    - `TR` – trigger
    - `U` – table
    - `UDD` – user-defined datatype
    - `USR` – user
    - `V` – view
    - `WS` – user-defined Web service
    - `WSC` – Web service consumer
    - `XOD` – local caches
    - `XOU` – global caches
    - `XP` – extended stored procedure
- ***-Nobject_name*** – specifies the fully qualified name of the object you are creating, such as `-N`*`db_name.owner_name.table_name.object_name`*. The `-N` option:
    - Is required if you specify any *object_type* other than `DB` (database) in the `-T` parameter.
    - Accepts wildcards with the use of `%`.
    - Generates DDL for a trigger for a table, using the `-N`*`db_name.table_owner.table_name.trigger_name`* format.

      To generate **all** triggers for a table, substitute *trigger_name* with `%` using the `-N`*`db_name.table_owner.table_name.`*`%` format.
    - Generates DDL for an encrypted key with `-N`*`db_name.owner.key_name`*.
    - Generates DDL for all items of a specific object type on your server.
    - Enforces strict order in which it parses the names in the `-N`*`db_name.owner_name.table_name.object_name`* format. If you only provide three arguments, **ddlgen** assumes they are *owner_name*, *table_name*, and *object_name*, in that order. Alternatively, you can also use `-N`*`owner_name.table_name`* `-D`*`db_name`*. **ddlgen** does not impose this restriction if *object_name* is an index (`I`).
- ***-Ddbname*** – specifies the name of the database for the object you specify in the `-N` option. The default is the user's default database.

  You cannot use the `-D` parameter when generating DDL for all triggers of a table.
- ***-Cproperty_name=property_value*** – allows you to set connection properties. You can set multiple properties; separate them with commas, such as:

  ```
  -Cproperty_value1=property_value1,property_name2=property_value2
  ```
- ***-Xextended_object_type*** – differentiates:
    - User tables (`OU`) from proxy tables (`OD`) when you specify a table as your object type (`-TU`)
    - Temporary databases (`OD`) from normal databases (`OU`) or archive databases (`OA`) when you specify database as your object type (`-TDB`)

- SQLJ procedures (`OD`) from stored procedures (`OU`) when you specify procedure as your object type (`-TP`).

If *object_type* (`-T`) is `U` (table) and `-X` is not specified, **ddlgen** generates DDL for both user tables and proxy tables. To generate DDL only for:

- **user tables** – use the `OU` extended object type with the `-X` option.
- **proxy tables** – use the `OD` extended object type with the `-X` option.
- **in-memory databases, caches, and devices** – use the `OI` extended object type with the `-X` option.
- **in-memory temporary databases** – use the `OIT` extended object type with the `-X` option.

Note: ddlgen does not support schema generation for system tables.

Use *extended_object_type* `DE` (`-XDE`), with the database object type (`-TDB`) to generate a database and all of its objects in correct dependent order.

- ***-Ooutput_file*** – specifies an output file for the generated DDL. If you do not specify `-O`, the DDL you create appears in a console window.
- ***-Eerror_file*** – specifies a log file for recording errors. If you do not specify `-E`, the generated errors appear in a console window.
- ***-Lprogress_log_file*** – specifies a log file for recording the progress of **ddlgen**. If you do not specify `-L`, the progress is not recorded.
- ***-Jclient_charset*** – specifies the character set to use on the client. `-Jclient_charset` requests that Adaptive Server convert to and from *client_charset*, the character set used on the client. A filter converts input between *client_charset* and the Adaptive Server character set.

  Omitting `-J` sets the character set to a default for the platform. The default may not necessarily be the character set that the client is using.

  Note: For HP platforms – you **must** use `-Jiso_1` to specify the correct character set.
- **-LC** – generate DDL for one or all logical clusters on a server.
- **-F** – filters out indexes, triggers, and constraints out of table and database definitions in the DDL of table- and database-level objects. The valid filters are:

  - **For tables** – `[ % | I | RI | KC | TR | PC ]`
  - **For databases** – `[ % | SGM | GRP | USR | R | D | UDD | U | V | P | XP | I | RI | KC | TR]`

  The filter options are:

  - `%` – everything. Retrieves the schema-only definition of a database or table.
  - `SGM` – segments

- `GRP` – groups
- `USR` – users
- `R` – rules
- `D` – defaults
- `UDD` – uer-defined datatypes
- `U` – user tables
- `V` – views
- `P` – stored procedures
- `PC` – partition condition
- `XP` – extended stored procedures
- `I` – indexes
- `RI` – referential integrity constraints
- `KC` – primary- and unique-key constraints
- `TR` – triggers

If you use an invalid filter parameter, **ddlgen** generates a warning, ignores that parameter, and continues with the rest of the valid parameters you specify.

If you specify `%` along with other filter parameters, ddlgen ignores all other filterable parameters, and only shows schema-only definitions. **ddlgen** then continues to evaluate the dependencies within the subset of the applied as the filterable parameters for the database.

- **`-v`** **–** displays the version and copyright message of **ddlgen** and returns to the operating system.

Examples

- **Archive database –** To generate DDL for all archive databases, use the extended filter option "OA."

```
ddlgen -Uroy -Proy123 -SHARBOR:1955 -TDB -N% -XOA
```

To generate DDL for a single archive database, use the syntax for normal databases. This example creates DDL for the archive database `adb1`.

```
ddlgen -Uroy -Proy123 -SHARBOR:1955 -TDB -Nadb1
```

- **Caches –** Generates DDL for a cache called `default data cache` on a machine named HARBOR using port 1955:

```
ddlgen -Uroy -Proy123 -SHARBOR:1955 -TC -N"default data cache"
```

To generate DDL for all caches:

```
ddlgen -Ulogin -Ppassword -Sserver:port -TC -N%
```

- **Connection properties –**

Generates DDL for a database that uses an encrypted password for its connection:

```
ddlgen -Usa -Psybase -Sbjrhx64:7710 -Tdb -Nmodel -
CENCRYPT_PASSWORD=true
```

- **Databases –** Generates DDL for a database called `pubs2` on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TDB -Npubs2
  ```

  If you do not specify a *dbname*, **ddlgen** generates DDL for the default database of *login*:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port
  ```

  If you do not use the `-T` parameter, **ddlgen** generates DDL for a default-type database:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -Ndbname
  ```

  To generate DDL for all databases:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDB -N%
  ```

- **Defaults –** Generates DDL for a default called “phondflt” owned by jones in the `pubs2` database on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TD -Njones.phonedflt -Dpubs2
  ```

  Alternatively, because **ddlgen** allows you to use a fully qualified name in the `-N` flag, omit the `-D`*`dbname`* and include the database name in the `-N` option:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TD -
  Ndbname.owner.defaultname
  ```

  To generate DDL for all defaults in a database owned by “owner”:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TD -Nowner.% -Ddbname
  ```

- **Database devices –** Generates DDL for a database device called `master` running on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TDBD -Nmaster
  ```

  To generate DDL for all database devices:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDBD -N%
  ```

- **Dump devices –** Generates DDL for a dump device called `tapedump1` running on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TDPD -Ntapedump1
  ```

  To generate DDL for all dump devices:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDPD -N%
  ```

- **Encrypted keys –** Generates DDL for all encryption keys in the `accounts` database on a machine named “HARBOR” using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TEK
      -Naccounts.dbo.%
  ```

  Alternatively, you use the `-D` option to specify the database name.

- **Encrypted keys –** Generate DDL for an encryption key “ssn_key” in a the `SampleKeysDB` database:

  ```
  ddlgen -Usa -P -Sserver -TEK -NSampleKeysDB.dbo.ssn_key
  ```

  Add `–FEKC` to avoid creating DDL for key copies when generating DDL for the “ssn_key” encryption key:

  ```
  ddlgen -Usa -P -Sserver -TEK -NSampleKeysDB.dbo.ssn_key      -FEKC
  ```

- **Encrypted passwords –** Generates system encryption passwords along with DDLs for encryption keys when you include the extended option `–XOD`. The output generates the **sp_encryption** statement followed by DDL statements for all encrypted keys. This generates DDL for the login “george” on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TEK -Ngeorge -XOD
  ```

  To generate DDL for all the encrypted keys in the `authors` database on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TEK -Nauthors.dbo.%
  ```

- **Engine groups –** Generates DDL for an engine group called LASTONLINE running on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TEG -NLASTONLINE
  ```

  To generate DDL for all engine groups:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TEG -N%
  ```

- **Execution class –** Generates DDL for an execution class called EC2 running on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TEC -NEC2
  ```

  To generate DDL for all execution classes:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TEC -N%
  ```

- **Extended object type**

  The example uses the following:

  ```
  create database tdb on default = '20M'

  use tdb

  create table test (
  fid varchar(10)
  )

  create view View_A as select * from test

  create view View_B as select * from View_A
  CREATE FUNCTION  Func_C(@ID VARCHAR(10))
  RETURNS varchar(8000)
  AS
  BEGIN
  declare @ret varchar(8000)
  ```

```
select @ret = (select  fid from View_B)
 return @ret

END
go

create view View_D as
select * from test where fid>dbo.Func_C('111')
go

CREATE FUNCTION  Func_no_depend(@ID VARCHAR(10))
RETURNS varchar(8000)
AS
BEGIN
declare @ret varchar(8000)
 return @ret
END
go
```

Issuing **ddlgen** returns all objects of database `tdb` in correct dependent order:

```
ddlgen -S -U -P -TDB -Ntdb -XDE
```

1. Segment
2. Group
3. User
4. Rules
5. Defaults
6. UDDs
7. Encrypted Keys
8. User Tables
9. Proxy Tables
10. Triggers
11. Functions and Views
    a. All functions without any dependency
    b. All views without any dependency
    c. All functions and all views with any dependency on any objects
12. Instead of trigger
13. Stored Procedures
14. Extended Stored Procedures
15. PRS
16. User Defined Web Services

- **Extended stored procedures –** Generates DDL for the **xp_cmdshell** extended stored procedure in the `pubs2` database, owned by Jones and running on a machine named HARBOR using port 1955, by using the fully qualified *`dbname.owner.extendedstoredprocedure`* format with the `-N` option:

```
ddlgen -Uroy -Proy123 -SHARBOR:1955 -TXP -
Npubs2.jones.xp_cmdshell
```

Alternatively, use the `-D` option instead of using the fully qualified name:

```
ddlgen -Ulogin -Ppassword -Sserver:port -TXP
    -Nowner.extendedstoredprocedure -Ddbname
```

To generate DDL for all extended stored procedures:

```
ddlgen -Ulogin -Ppassword -Sserver:port -TXP -Ndbname.owner.%
```

- **Filters –** Generates DDL for the `authors` table in the `pubs2` database, filtering for all indexes (`I`), and referential integrity constraints (`RI`), primary and unique key constraints (`KC`), triggers (`TR`), and partition condition (`PC`) from the DDL of a table:

  ```
  ddlgen -Uroy -Proy123 -TU -Nauthors -Dpubs2 -F%
  ```

  Alternatively, specify each of the filters individually:

  ```
  ddlgen -Ulogin -Ppassword -TU -Ndbname.owner.table
      -FI,RI,KC,TR
  ```

  This generates the definition of *table_name* while filtering out foreign keys and primary-unique keys:

  ```
  ddlgen -Ulogin -Ppassword -TU -Ntable_name -Ddbname
      -FRI,KC
  ```

  Both of these generate foreign keys for a specified user in the entire database:

  ```
  ddlgen -Ulogin -Ppassword -TRI -N%.%.% -Ddbname
  ```

  Or:

  ```
  ddlgen -Ulogin -Ppassword -TRI -Ndbname%.%.%
  ```

  Both of these generate DDL for the primary and unique keys of all the tables in a database that begin with “PK”:

  ```
  ddlgen -Ulogin -Ppassword -TKC -Ndbname.%.%.PK%
  ```

  Or:

  ```
  ddlgen -Ulogin -Ppassword -TKC -N%.%.PK% -Ddbname
  ```

  This generates schema-only definition of a database:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TF -Ndbname -F%
  ```

  Alternatively, specify each of the filters individually:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDB -Ndbname
      -FSGM,GRP,USR,R,D,UDD,V,P,XP,I,RI,KC,TR
  ```

  This generates the database DDL skipping the compiled object:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDB -Ndbname
      -FTR,D,XP,V,R
  ```

  This generates database definition without a table definition:

```
ddlgen -Ulogin -Ppassword -Sserver:port -TDB -Ndbname
    -FU
```

- **Groups –** Generates DDL for a group called "public" in the `pubs2` database, running on a machine named HARBOR using port 1955, by using the fully qualified *`dbname.groupname`* format in the `-N` option:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TGRP -Npubs2.public
  ```

  Alternatively, use the -D option to specify the *dbname*:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TGRP -Ngroupname -Ddbname
  ```

  To generate DDL for all groups:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TGRP -Ndbname.%
  ```

- **In-memory database –** Generates DDL for an in-memory database:

  ```
   ddlgen -Uroy -Proy123 -SHARBOR:1955 -TDB -Nimdb_1
  ```

  Use the same syntax to generate DDL for an in-memory temporary database:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TDB -Nimdb_temp1
  ```

- **Indexes –** Generates DDL for an index called `au_lname` for the table `authors` owned by dbo, in the `pubs2` database:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TI -Ndbo.authors.au_lname -
  Dpubs2
  ```

  Alternatively, because **ddlgen** allows you to use a fully qualified name in the `-N` flag, omit the `-D`*`dbname`* and include the database name in the `-N` option:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port
      -TI -Ndbname.owner.tablename.indexname
  ```

  If you use a fully qualified name, you may omit the `-D` option.

  To generate DDL for all indexes for a single table:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TI
      -Ndbname.owner.tablename.%
  ```

  To generate DDL for all indexes of all tables in a database:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TI
      -Ndbname.%.%.%
  ```

  For example, this generates DDL for all indexes for all tables in the `pubs2` database:

  ```
  ddlgen -Usa -P -SHARBOR:1955 -TI -Npubs2.%.%.%
  ```

- **Instead of triggers –** Generates one view and its (`instead of`) trigger, and next view and its (`instead of`) trigger:

  ```
  ddlgen -S -U -P -TV -Ndbname.ownername.viewname
  ```

  Generates triggers only for tables:

  ```
  ddlgen -S -U -P -TTR
  ```

  Generates `instead of` triggers for views:

```
ddlgen -S -U -P -TIT
```

- **Keys –** Both of these generate DDL for the primary and unique keys of all the tables in a database that begin with “PK”:

  ```
  ddlgen -Usa -P -TKC -Ndbname.%.%.PK%
  ```

  Or:

  ```
  ddlgen -Usa -P -TKC -N%.%.PK% -Ddbname
  ```

- **Logical cluster –** Generates DDL for “my_lcluster” on server “ase1”, enter:

  ```
  ddlgen -Usa -P -Sase1 -TLC -Nmy_lcluster
  ```

- **Logical cluster –** Generates DDL for all logical clusters on server “ase1”, enter:

  ```
  ddlgen -Usa -P -Sase1 -TLC -N%
  ```

- **Logical keys –** `LK` generates logical keys of table defined by **sp_primarykey**, **sp_commonkey**, **sp_foreignkey** statements. Since these keys do not have a name, the name of the object in this case would be the name of the table. This example generate a DDL for logical keys of table authors in database `pubs2` running on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TLK -Npubs2.dbo.authors
  ```

  To generate DDL for all logical keys in database `pub2` use:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TLK -Npubs2.%.%
  ```

  To filter out logical keys definition from DDL of table authors use LK in -F argument, use:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TLK -Npubs2.dbo.authors -FLK
  ```

- **Logins –** `TL` generates DDL for one or all logins. This example generates DDL for all logins on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TL -N%
  ```

  Note: The password in the DDL generated for all logins is “password”.

  Alternatively, specify an individual login by using `-N`*`username`* instead of `-N%`:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TL -Nusername
  ```

  If server-wide password complexity options have been specified for the login or logins, all **sp_addlogin** and **sp_loglogin** DDL statements are generated first, followed by DDL statements for the password options. This example generates DDL for the login “george” on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TL -Ngeorge
  ```

- **Remote servers –** Generates DDL for a remote server called ORANGE on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TRS -NORANGE
  ```

  To generate DDL for all remote servers:

```
ddlgen -Ulogin -Ppassword -Sserver:port -TRS -N%
```

- **Roles –** Generates DDL for the sa_role on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TRO -Nsa_role
  ```

  To generate DDL for all roles:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TRO -N%
  ```

  Note: The password in the DDL generated for all roles is "password".

- **Rules –** Generates DDL for all rules associated with `authors` on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TR -Nauthors.dbo.%
  ```

  The `%` symbol tells **ddlgen** to create DDLs for all rules that exist on the server.

  You can also give the fully qualified name of the rule:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TR -
  Ndbname.owner.rulename
  ```

  Alternatively, also use the `-D` parameter:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TR -Nowner.rulename -
  Ddbname
  ```

- **Segments –** Generates DDL using the fully qualified *`dbname.segmentname`* format in the `-N` option for a segment called `logsegment` for the `pubs2` database, on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TSGM -Npubs2.logsegment
  ```

  Alternatively, specify the *dbname* using the `-D` option:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TSGM -Nsegmentname -
  Ddbname
  ```

  To generate DDL for all segments:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TSGM -Ndbname.%
  ```

- **SQLJ functions –** Generates DDL for a SQLJ function named **region_of** owned by `dbo` in database `master`:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TF –Nmaster.dbo.region_of
  ```

  Alternatively also use the `-D` parameter:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TF –Ndbo.region_of –
  Dmaster
  ```

  To generate DDL for all SQLJ functions in a database, use object type `F`:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TF –Ndbname.owner.%
  ```

- **SQLJ procedures –** A kind of stored procedure, you generate DDL for SQL procedures along with DDL for stored procedures. This generates DDL for all stored procedures—including SQLJ procedures—owned by `dbo` in the `master` database:

```
ddlgen -Uroy -Proy123 -SHARBOR:1955 -TP –Nmaster.dbo.%
```

To generate DDL for all SQLJ procedures that are only owned by `dbo` in the `master` database, use this, where the extended type `OD` refers to SQLJ procedures:

```
ddlgen -Ulogin -Ppassword-Sserver:port -TP –Nmaster.dbo.% -XOD
```

To generate DDL for all procedures except SQLJ procedures owned by `dbo` in the `master` database, use this, where the extended type `OU` refers to all stored procedures except SQLJ procedures:

```
ddlgen -Ulogin -Ppassword-Sserver:port -TP –Nmaster.dbo.% -XOU
```

- **Stored procedures –** Generates DDL for the **sp_monitor** stored procedure for the `pubs2` database on a machine named HARBOR using port 1955, using the fully qualified *`dbname.owner.procedure_name`* format for the `-N` option:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TP -Npubs2.dbo.sp_monitor
  ```

  Alternatively, specify the *dbname* using the `-D` option:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TP -Nowner.procedurename
  -Ddbname
  ```

  To generate DDL for all stored procedures:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TP -Ndbname.owner.%
  ```

- **SSL-enabled servers –** Generates DDL for objects in the `pubs2` database for an SSL-enabled Adaptive Server running on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -Sssl:HARBOR:1955 -TDB -Npubs2
  ```

- **Tables –** Generates DDL for all user tables in the `pubs2` database owned by “dbo” and running on a machine named HARBOR using port 1955:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TU -Ndbo.% -Dpubs2
  ```

  You can also use the `-N` parameter to give the fully qualified name of the table:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TU
      -Ndbname.tableowner.tablename
  ```

  Alternatively, also use the `-D` parameter to specify the database:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TU
      -Ntableowner.tablename -Ddbname
  ```

  To generate DDL for all proxy tables, which uses the value `OD`, use `-XOD` instead, where `X` is the extended type, and `OD` denotes proxy tables:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TU
      -Ntableowner.% -Ddbname -XOD
  ```

  To generate DDL for all user tables, which uses the value `OU`, use `-XOU` instead, where `X` is the extended type, and `OU` denotes user tables:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TU
      -Ntableowner.% -Ddbname -XOU
  ```

  To generate DDL for all tables, including user tables and proxy tables:

```
ddlgen -Ulogin -Ppassword -Sserver:port -TU -Ndbname.tableowner.%
```

- **Temporary databases –** Generates DDL for all databases, including tempdb:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDB -N%
  ```

  To generate DDL for all temporary databases, use the `OD` extended database type:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDB -XOD -N%
  ```

  Although you can use the `OD` extended type in Adaptive Server versions 12.5.0.3 and later, versions earlier than 12.5.0.3 issue warning messages. Safely ignore this message; **ddlgen** continues processing the command.To generate DDL for all databases except temporary databases, use the `OU` extended type:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDB -XOU -N%
  ```

  This generates DDL for a temporary database named `tempdb1`:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TDB -Ntempdb1
  ```

  The output includes:

  - A **create temporary database** statement:

    ```
    create temporary database tempdb1 on master = 4,
        asdas = 2
    go
    ```

  - An **sp_tempdb bind** statement where the **isql** application is bound to `tempdb1`:

    ```
    sp_tempdb 'bind','ap', 'isql', 'DB', 'tempdb1'
    go
    ```

  Note: DDL for objects such as views, stored procedures, and tables is not generated along with DDL for a temporary database because these objects are temporary, and are re-created when the server restarts.

  When you use the `-F` parameter to filter a table while generating DDL for a database object, then indexes, referential integrity, key constraints and triggers automatically get filtered, as they are a subset of the table object.

- **Triggers –** Generates DDL for the trigger **checksum** for the `pubs2` database on a machine named HARBOR using port 1955, using the fully qualified *`dbname.owner.trigger_name`* format for the `-N` option:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TTR -Npubs2.dbo.checksum
  ```

  Alternatively, specify the *database_name* using the `-D` option:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TTR
      -Nowner.triggername -Ddbname
  ```

  You can also generate DDL for a trigger for a table, using:

  ```
  -Ndb_name.table_owner.table_name.trigger_name
  ```

  To generate DDL for all triggers of a database:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TTR -Ndbname.owner.%
  ```

You can also use this format to generate DDL for all triggers of a table:

```
-Ndb_name.table_owner.table_name.%
```

Note: You cannot use the `-D` parameter when generating DDL for all triggers of a table.

- **User-defined datatypes –** Generates DDL for the user-defined datatype "Identype" for the `pubs2` database on a machine named HARBOR using port 1955 using the fully qualified *`dbname.userdefined_datatype`* format for the `-N` option:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TUDD -Npubs2.Identype
  ```

  Alternatively, use the `-D` option to specify the *dbname*:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TUDD
      -Nuserdefined_datatype -Ddbname
  ```

  To generate DDL for all user-defined datatypes:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TUDD -Nbname.%
  ```

- **Views –** Generates DDL for a view named `retail` owned by Miller in the `pubs2` database running on a machine named HARBOR using port 1955, by using the fully qualified *`dbname.owner.viewname`* format with the `-N` option:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TV -Npubs2.miller.retail
  ```

  Alternatively, use the `-D` option instead of using the fully qualified name:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TV -Nowner.viewname -
  Ddbname
  ```

  To generate DDL for all views:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TV -Ndbname.owner.%
  ```

- **User-defined Web services –** Generates DDL for a named user-defined Web service, **sp_who_service**, in the `pubs2` database running on a machine named HARBOR using port 1995, by using a fully qualified *`dbname.username.webservice_name`* format with the `-N` and `-T` options:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1995 -TWS
      -Npubs2.dbo.sp_who_service
  ```

  The syntax for generating DDL for a named user-defined Web service is:

  ```
  ddlgen -Ulogin -Ppassword -Shost_name:port -TWS -
  Ndbname.owner.webservice_name
  ```

  To generate DDL for all user-defined Web services owned by all users in database *dbname*:

  ```
  ddlgen -Ulogin -Ppassword -Shost_name:port -TWS -Ndbname.%.%
  ```

Note: An **sp_webservices 'addalias'** statement is only generated if the DDL is to be generated for all user-defined web services or for a database.

- **Users –** Generates DDL for a user named Smith in the `pubs2` database running on a machine named HARBOR using port 1955, by using a fully qualified *`dbname.username`* format with the `-N` option:

  ```
  ddlgen -Uroy -Proy123 -SHARBOR:1955 -TUSR -Npubs2.smith
  ```

  Alternatively, use both the `-N` and `-D` options instead of using a fully qualified name in `-N`:

  ```
  ddlgen -Ulogin -Ppassword -Shost_name:port -TUSR -Nusername -
  Ddbname
  ```

  To generate DDL for all users:

  ```
  ddlgen -Ulogin -Ppassword -Sserver:port -TUSR -Ndbname.%
  ```

Permissions

Users must have either sa_role or sso_role to generate DDL for:

- Encryption keys
- Logins
- Roles

For all other objects, users do not need any specific permissions or roles to generate DDL.

See also

- *Hiding Passwords in ddlgen* on page 62

Usage for ddlgen

There are additional considerations when using **ddlgen**.

- **ddlgen** does not identify existing sequences within views, stored procedures or triggers. For this reason, when generating DDL for a database, first run **ddlgen** on those views, stored procedures and triggers that are independent, before running **ddlgen** on those with dependencies. For example, if view B depends on view A, first run **ddlgen** on view A, before running it on view B.
- The default information for **ddlgen** is:

Option	Parameter	Required	Default
`-U`	*username*	Yes	None
`-P`	*password*	Yes	None
`-S`	***host_name*:*port_number***	Yes	None

Op-tion	Parameter	Required	Default
`-T`	*object_type* See the `-T` parameter description for a list of valid object types	No	Database
`-N`	*object_name*	Yes, if *ob-ject_type* for `-T` is not **DB** (database)	Default database name of *user-name*, if `-T` *`ob-ject_type`* is `db` or if `-T` is not specified
`-D`	*database_name*	No	Default database of *username*
`-X`	*extended_object_type* Options are: • `OU` – for user tables, user databases (excluding temporary databases), and stored procedures (excluding SQLJ procedures). • `OD` – for proxy tables, temporary databases, and SQLJ procedures. Use only when the *object_type* for `-T` is: • **U** (user table) • **P** (procedure) • **DB** (database)	No	None
`-O`	*output_file_name*	No	Standard out
`-E`	*error_file_name*	No	Standard out
`-L`	*log_file_name*	No	None
`-V`	*version_number* of **ddlgen**	No	None

- At the command line, invoke **ddlgen** using the `ddlgen` shell script file (`ddlgen.bat` for Windows), included in your Adaptive Server installation. The main class in `DDLGen.jar` is `com.sybase.ddlgen.DDLGenerator`.
- To start **ddlgen** in the Sybase Central plug-in for Adaptive Server:
  1. Right-click on the object for which you want to generate DDL.
  2. Select **Generate DDL**.
- In the output DDL of **create table**, bind statements are generated as independent DLL instead of dependent DLL.

- The `PN` type allows you to generate DDL for tables with partition names. Use partition names and the **optdiag** utility to analyze optimizer behavior by creating empty partitioned tables with simulated metadata.

  To generate names for local index partitions, use:

  ```
  ddlgen - TU -XPN
  ```

  To generate DDL for all user tables with partition names, use:

  ```
  ddlgen  -TU -XPN,OU
  ddlgen -TU -XOU,PN
  ```

Hiding Passwords in ddlgen

When you issue the **ddlgen** utility in a UNIX command-line environment, other users on that UNIX machine can see your **ddlgen** command—including its password—if they issue the **ps** process management command, which shows the status of processes that are running on that machine.

The **ddlgen -P** password parameter option lets you to invoke **ddlgen** from a script so that the password is hidden from other users.

To achieve this, set the `$PSWD` environment variable to point to your Adaptive Server login password, and include the string "**ext**" in the `-P` parameter. **ext** acts as a pseudo password, allowing you to supply the actual password in the next line. Set `$PSWD` at the command line or a Bourne shell script, but not from the C-shell.

1. Set the `$PSWD` environment variable:

   ```
   setenv PSWD pass_word
   ```

2. Run **ddlgen**:

   ```
   ddlgen -Ulogin -Pext -Sserver:port -Ttype -Nname << END
   $PSWD
   END
   ```

If you prefer to keep your password in a file, replace `$PSWD` with **'cat *filename*'**, where *filename* is the location of your password file. For example:

```
ddlgen -Ulogin -Pext -Sserver:port -Ttype -Nname << END
'cat filename'
END
```

ddlgen for Encrypted Columns

You can use the **ddlgen** utility with encrypted columns.

- The **ddlgen** utility supports pre-15.0.2 encryption. Pre-15.0.2 **ddlgen** support includes generating DDL for an encryption key in a database, and generating DDL to synchronize encryption keys across servers.

  If you use **ddlgen** to generate DDL for encryption keys on Adaptive Server version 15.0.2 or later, the DDL may cause errors on a pre-15.0.2 version Adaptive Server, specifically if an encryption key is encrypted by a user specified-password or has key copies.

- The type `EK`, used for encryption key, generates the DDL to create an encryption key and to grant permissions on it. **ddlgen** generates encrypted column information and a **grant decrypt** statement, along with the table definition.
- If you do not specify the `–XOD` option, and the key to be migrated has been created in the source database using the **with passwd** clause, **ddlgen** generates a **create encryption key** command with **password** as its explicit password.This is similar to what **ddlgen** does for roles and login passwords.
- The `–XOD` generates the **create encryption key** that specifies the key's encrypted value as represented in `sysencryptkeys`. Use the `–XOD` to synchronize encryption keys across servers for data movement.

  ddlgen -XOD generates DDL that includes a system encryption password (if it was set and DDL is generated for a key encrypted with a system encryption password) and DDL for keys.

Encrypted Columns and Specifying the -XOD Flag in ddlgen

There are special considerations when using the **ddlgen -XOD** option with encrypted columns.

If you do not specify the **-XOD** flag in **ddlgen**, and you:

- **Did not** specify a password when the encryption key was created – **ddlgen** generates DDL with no password.
- Specified a password when the encryption key was first created – **ddlgen** generates the default password of '**password**'. This is similar to what **ddlgen** does for roles and login passwords, and its output looks similar to:

```
-----------------------------------------------------------------
--
-- DDL for EncryptedKey 'ssn_key'
-----------------------------------------------------------------
--
print 'ssn_key'

--The DDL is generated with a default password – 'password' as
--a password was specified when this key was created.

create encryption key SampleKeysDB.dbo.ssn_key for AES
with keylength 128
passwd 'password'
init_vector random
go
```

When you specify the**-XOD** flag in **ddlgen**, **ddlgen** generates DDL that includes a system encryption password (if it has been set and DDL is generated for a key encrypted with a system encryption password) and DDL for keys.

Use this syntax to generate a system encryption password:

```
ddlgen -Usa -P -Sserver -TEK -NsampleKeysdb.dbo.ek1 -XOD
```

The output would look like:

```
-- System Encryption Password
```

```
use SampleKeysDB
go

sp_encryption 'system_encr_passwd',
'0x8e050e3bb607225c60c7cb9f59124e99866ca22e677b2cdc9a4d09775850f472
1',
NULL, 2, 0
go

-------------------------------------------------------------------
----
-- DDL for EncryptedKey 'ek1'
-------------------------------------------------------------------
----

print '<<<<< CREATING EncryptedKey - "ek1" >>>>>'
go

create encryption key SampleKeysDB.dbo.ek1 for AES
with keylength 128
passwd 0x0000C7BC28C3020AC21401
init_vector NULL
keyvalue
0xCE74DB1E028FF15D908CD066D380AB4AD3AA88284D6F7742DFFCADCAABE4100D0
1
keystatus 32
go
```

Note: When migrating keys from a source to a target server using **ddlgen**, set the system encryption password to NULL (if it exists) in the target server if you want to run the **ddlgen** output (from the source server) for encryption keys generated using "`-XOD`" parameter. Failure to do this results in errors when you try to execute the **ddlgen** output against the target server.

ddlgen Support for Key Copies

The **ddlgen** utility also generates DDL for key copies along with the DDL for base key.

For example, this syntax would generate DDL for "ssn_key" and its key copies:

```
ddlgen -Usa -P -Sserver -TEK -NSampleKeysDB.dbo.ssn_key
```

The output from **ddlgen** would look like:

```
-------------------------------------------------------------------
----------
-- DDL for EncryptedKey 'ssn_key'
-------------------------------------------------------------------
----------
print 'ssn_key'

--The DDL is generated with a default password – 'password' as
--a password was specified when this key was created.

create encryption key SampleKeysDB.dbo.ssn_key for AES
with keylength 128
```

```
passwd 'password'
init_vector random
go

print 'Key Copies for ssn_key'

-- Generating DDL for Key Copies for 'ssn_key'

alter encryption key 'ssn_key'
with passwd 'password'
add encryption with passwd 'passwd'
for user 'dbo'.
```

If you include the `–XOD` flag, the DDL for key copy would look like:

```
alter encryption key SampleKeysDB.dbo.ssn_key add encryption
with keyvalue
0x84A7360AA0B28801D6D4CBF2F8219F634EE641E1082F221A2C58C9BBEC9F49B50
1
passwd 0x000062DF4B8DA5709E5E01
keystatus 257
for user 'user1'
go
```

EKC Encryption Key Copy Filter and ddlgen

The **ddlgen** utility supports the **EKC** (encryption key copy) extended type for its **-F** filter argument, to suppress the generation of key copies for encryption keys.

This example uses **-FEKC** to avoid creating DDL for key copies when generating DDL for the “ssn_key” encryption key:

```
ddlgen -Usa -P -Sserver -TEK -NSampleKeysDB.dbo.ssn_key  -FEKC
```

The output from **ddlgen** would look like:

```
-------------------------------------------------------------------
-------
-- DDL for EncryptedKey 'ssn_key'
-------------------------------------------------------------------
-------
print 'ssn_key'

--The DDL is generated with a default password – 'password' as
--a password was specified when this key was created.

create encryption key SampleKeysDB.dbo.ssn_key for AES
with keylength 128
passwd 'password'
init_vector random
go
```

Create Table DDL

ddlgen can generate **decrypt_default** statements (if set for an encrypted column) along with DDL of a table.

This example issues a **ddlgen** command on a table called `employee` which has an “`ssn`” column that is encrypted with encryption key “ssn_key,” and a decrypt default value that is set to “100”:

```
ddlgen -Usa -P -Sserver -TU -Nemployee
```

The DDL output would look like:

```
create table employee (
  ssn             int       not null  encrypt with ssn_key
decrypt_default 100 ,
  last_name       int       not null ,
  first_name      int       not null
)
lock allpages
 on 'default'
go
```

defncopy

Copies definitions for specified views, rules, defaults, triggers, or procedures from a database to an operating-system file or from an operating-system file to a database.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **defncopy.exe**.

Syntax

```
defncopy
    [-X]
    [-a display_charset]
    [-I interfaces_file]
    [-J [client_charset]]
    [-K keytab_file]
    [-P password]
    [-R remote_server_principal]
    [-S [server_name]]
    [-U username]
    [-V security_options]
    [-Z security_mechanism]
    [-z language]
    { in file_name database_name |
        out file_name database_name [owner.]object_name
     [[owner.]object_name...] }
```

Or

```
defncopy -v
```

Parameters

- ***-a display_charset*** – runs **defncopy** from a terminal whose character set differs from that of the machine on which **defncopy** is running. Use `-a` in conjunction with `-J` to specify the character set translation file (`.xlt` file) required for the conversion. Use `-a` without `-J` only if the client character set is the same as the default character set.

  Note: The ascii_7 character set is compatible with all character sets. If either the Adaptive Server character set or the client character set is set to ascii_7, any 7-bit ASCII character can pass unaltered between client and server. Other characters produce conversion errors. See the *System Administration Guide* for more information on character set conversion.
- ***-I interfaces_file*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server. If you do not specify `-I`, **defncopy** looks for a file named `interfaces` in the directory specified by the SYBASE environment variable in UNIX platforms, and `sql.ini` in the `ini` subdirectory for your Sybase release directory in Windows.
- ***-J client_charset*** – specifies the character set to use on the client. A filter converts input between *client_charset* and the Adaptive Server character set.

  `-J` *`client_charset`* requests that Adaptive Server convert to and from *client_charset*, the client's character set.

  `-J` with no argument sets character set conversion to NULL. No conversion takes place. Use this if the client and server are using the same character set.

  Omitting `-J` sets the character set to a default for the platform. The default may not be the character set that the client is using. For more information about character sets and their associated flags, see the *System Administration Guide* and configuration guide for your platform.
- ***-K keytab_file*** – specifies the path to the keytab file used for authentication in DCE.
- ***-P password*** – specifies your password. If you do not specify `-P`, **defncopy** prompts for your password.
- ***-R remote_server_principal*** – specifies the principal name for the server. By default, a server's principal name matches the server's network name (which is specified with the `-S` parameter or the DSQUERY environment variable). Use the `-R` parameter when the server's principal name and network name are not the same.
- ***-S server_name*** – specifies the name of the Adaptive Server to which to connect. If you specify `-S` with no argument, **defncopy** looks for a server named SYBASE. If you do not specify `-S`, **defncopy** uses the server specified by your DSQUERY environment variable.
- ***-U username*** – specifies a login name. Login names are case sensitive. If you do not specify *username*, **defncopy** uses the current user's operating system login name.

- **`-v`** – displays the version and copyright message of **defncopy** and returns to the operating system.
- **`-V`** ***`security_options`*** – specifies network-based user authentication. With this option, the user must log in to the network's security system before running the utility. In this case, users must supply their network user name with the `-U` option; any password supplied with the `-P` option is ignored.

  `-V` can be followed by a *security_options* string of key-letter options to enable additional security services. These key letters are:

  - `c` – Enable data confidentiality service
  - `i` – Enable data integrity service
  - `m` – Enable mutual authentication for connection establishment
  - `o` – Enable data origin stamping service
  - `r` – Enable data replay detection
  - `q` – Enable out-of-sequence detection
- **`-X`** – initiates the login with client-side password encryption in this connection to the server. **defncopy** (the client) specifies to the server that password encryption is desired. The server sends back an encryption key, which **defncopy** uses to encrypt your password, and the server uses to authenticate your password when it arrives.

  If **defncopy** crashes, the system creates a core file which contains your password. If you did not use the encryption option, the password appears in plain text in the file. If you used the encryption option, your password is not readable.
- **`-z`** ***`language`*** – is the official name of an alternate language that the server uses to display **defncopy** prompts and messages. Without the `-z` flag, **defncopy** uses the server's default language.

  Add languages to an Adaptive Server at installation, or afterwards with the utility **langinstall** (**langinst** in Windows) or the stored procedure **sp_addlanguage**.
- **`-Z`** ***`security_mechanism`*** – specifies the name of a security mechanism to use on the connection.

  Security mechanism names are defined in the `$SYBASE/install/libtcl.cfg` configuration file. If no *security_mechanism* name is supplied, the default mechanism is used. See the description of the `libtcl.cfg` file in the *Open Client and Open Server Configuration Guide*.
- ***database_name*** – specifies the name of the database to copy the definitions from or to.
- ***file_name*** – specifies the name of the operating system file destination or source for the definition copy. The copy out overwrites any existing file.
- **`in | out`** – specifies the direction of definition copy.
- ***object_name*** – specifies names of database object for **defncopy** to copy out. Do not use *objectname* when copying definitions in.

- ***owner* –** is optional if you or the database owner own the table being copied. If you do not specify an owner, **defncopy** first looks for a table of that name that you own, and then looks for one owned by the database owner. If another user owns the table, specify the owner name or the command fails.

Examples

- **Files –** Copies definitions from the file `new_proc` into the database `stagedb` on server MERCURY. The connection with MERCURY is established with a user of name "sa" and a NULL password:

  ```
  defncopy -Usa -P -SMERCURY in new_proc stagedb
  ```

- **Objects –** Copies definitions for objects `sp_calccomp` and `sp_vacation` from the `employees` database on the SYBASE server to the file `dc.out`. Messages and prompts display in french. The user is prompted for a password:

  ```
  defncopy -S -z french out dc.out employees sp_calccomp sp_vacation
  ```

Usage

- Use this syntax for **defncopy_r** if you are using threaded drivers.
- Use this syntax for **defncopy** you are using threaded drivers in the IBM platform.
- Set the SYBASE environment variable to the location of the current version of Adaptive Server before using **defncopy**.
- Invoke the **defncopy** program directly from the operating system. **defncopy** provides a noninteractive way to copy out definitions (**create** statements) for views, rules, defaults, triggers, or procedures from a database to an operating system file. Alternatively, it copies in all the definitions from a specified file.
- The `in` *`filename`* or `out` *`filename`* and the database name are required and must be stated unambiguously. For copying out, use file names that reflect both the object's name and its owner.
- **defncopy** ends each definition that it copies out with the comment:

  ```
  /* ### DEFNCOPY: END OF DEFINITION */
  ```

  Definitions created as text must end with this comment so that **defncopy** can copy them in successfully.
- Enclose values specified to **defncopy** in quotation marks, if they contain characters that could be significant to the shell.

  Warning! Long comments of more than 100 characters that are placed before a **create** statement may cause **defncopy** to fail.

- SDK binaries like **defncopy** use the same names in both 32-bit and 64-bit products. Installing Adaptive Server, the SDK, or Open Server 64-bit products with other Sybase 32-bit products overwrites the 32-bit binaries. Starting with Adaptive Server 15.0.2 and SDK/Open Server 15.0 ESD #9, the 64-bit binaries are replaced with 32-bit binaries on all 64-bit UNIX platforms. Since 32-bit binaries are included in the 64-bit EBF, the -v option of defncopy is no longer a valid way to check the EBF number for 64-bit products. Instead, use the UNIX strings and grep commands to confirm the EBF numbers for both Open Client and Open Server.

For example, to find the string containing the EBF number in the libsybct64.a library, enter:

```
strings -a libsybct64.a | grep Sybase
```

This returns a string similar to:

```
Sybase Client-Library/15.5/P/DRV.15.5.0/SPARC/Solaris
8/BUILD1550-001/64bit/OPT/Mon Aug 10 23:04:17 2009
```

To find the string containing the EBF number in the libsybsrv64.a library, enter:

```
strings -a libsybsrv64.a | grep Sybase
```

This returns a string similar to:

```
Sybase Server-Library/15.5/P/DRV.15.5.0/SPARC/Solaris
8/BUILD1550-001/64bit/OPT/Mon Aug 10 23:06:27 2009
```

See also:

- *Reference Manual: Commands* – **create**, **select**
- *Reference Manual: Procedures* – **sp_addlanguage**, **sp_checkreswords**, **sp_configure**, **sp_procqmode**, **sp_remap**

Permissions

- You must have **select** permission on the `sysobjects` and `syscomments` tables to copy out definitions; you do not need permission on the object itself.
- You may not have **select** permission on the `text` column of the `syscomments` table if the system security officer has reset the **allow select on syscomments.text column** parameter with the system procedure **sp_configure**. This reset restricts **select** permission to the object owner and the system administrator. This restriction is required in order to run Adaptive Server in the **evaluated configuration** , as described in the installation and configuration documentation for your platform. In this case, the object owner or a system administrator must execute **defncopy** to copy out definitions.

  Note: If the text has been encrypted, it may be hidden from you even if you have all the required permissions. See “Verifying and Encrypting Source Text” in the *Transact-SQL User’s Guide*.

- You must have the appropriate **create** permission for the type of object you are copying in. Objects copied in belong to the copier. A system administrator copying in definitions on behalf of a user must log in as that user to give the user proper access to the reconstructed database objects.

Tables used

`syscomments`, `sysobjects`

See also

- *langinstall* on page 95

dscp

(UNIX only) A text-based utility that allows you to view and edit server entries in the interfaces file from the command line in UNIX platforms.

The utility is located in `$SYBASE/$SYBASE_OCS/bin`.

Set the SYBASE environment variable to the location of the current version of Adaptive Server before using **dscp**.

Syntax

```
dscp [-p]
```

or:

```
dscp -v
```

To exit from **dscp**:

```
quit
```

or:

```
exit
```

Parameters

- **`-p`** **–** suppresses command-line prompts.
- **`-v`** **–** displays the version and copyright message of **dscp** and returns to the operating system.

Examples

- **Suppress command line prompt –** Opens the default interfaces file for editing and suppresses the command line prompt:

  ```
  dscp -p
  ```

Usage

You can perform various functions by entering commands at the **dscp** prompt:

- `add` *`servername`* – adds server entry *servername* in the current session. **dscp** prompts you for information about *servername*. Press Return to accept the default value, which is shown in square brackets [ ]. Enter “#done” to exit add mode.

- `addattr` *`servername`* – adds an attribute to the server entry *servername* in the current session.
- `close [`*`sess`*`]` – closes a session identified by the *sess* number. If you do not specify *sess*, closes the current session.
- `config` – displays configuration information related to your Sybase environment.
- `copy` *`name1`* `to {`*`name2`* `|` *`sess`* `|` *`sess name2`*`}` – copies server entry *name1* in the current session to:
  - Server entry *name2* in the current session,
  - Session *sess*, or
  - Server entry *name2 in session sess*.
- `copyall to` *`sess`* – copies all server entries in the current session to session *sess*.
- `del` *`servername`* – deletes server entry *servername* in the current session.
- `delete-all` – deletes all server entries in the current session.
- `exit` – exits **dscp**.
- `help`, `?`, `h` – displays the online help.
- `list [all]` – lists the server entries for the current session. To list the names of the entries, use the `list` command. To list the attributes for each entry, use the `list all` command.
- `mod` *`servername`* – modifies server entry *servername* in the current session. **dscp** prompts you for information about *servername*. Press Return to accept the default value, which is shown in square brackets [ ]. Enter "#done" to exit modify mode.
- `open [`*`dsname`*`]` – opens a session for the specified directory service, where *dsname* is the directory service name. If you do not specify a value for *dsname*, this command opens a session for the default directory service. To open a session, specify the value "InterfacesDriver" for *dsname*.
- `quit` – exits **dscp**.
- `read` *`servername`* – displays the contents of server entry *servername*.
- `sess` – lists all open sessions.
- `[switch]` *`sess`* – makes session number *sess* the current session.

See also

- *Chapter 4, Viewing and Editing Server Entries Using dscp* on page 209
- *dsedit* on page 72

dsedit

The **dsedit** utility allows you to view and edit server entries in the interfaces file using a GUI. In Windows, **dsedit** creates and modifies network connection information in the interfaces file.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **dsedit.exe**.

Syntax

```
dsedit
```

or:

```
dsedit -v
```

Parameters

- **`-v`** – displays the version and copyright message of **dsedit**.

Usage

- Set the SYBASE environment variable to the location of the current version of Adaptive Server before using **dsedit**.
- Set the DISPLAY environment variable before invoking **dsedit**, unless you are only using the `-v` parameter to display the version number.

See also

- *Chapter 5, Viewing and Editing Server Entries Using dsedit* on page 217
- *dscp* on page 71

extractjava

Copies a retained JAR and the classes it contains from an Adaptive Server into a client file.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **extrjava.exe**.

Syntax

```
extractjava (extrjava in Windows)
    -j jar_name
    -f file_name
    [-a display_charset]
    [-D database_name]
    [-I interfaces_file]
    [-J client_charset]
    [-P password]
    [-S server_name]
    [-t timeout]
    [-U user_name]
    [-v]
    [-z language]
```

or:

```
extractjava -v
```

Parameters

- ***-a display_charset*** – allows you to use **extractjava** from a machine where the character set differs that of the server. Use `-a` in conjunction with `-J` to specify the character set translation file (`.xlt` file) required for the conversion. Use `-a` without `-J` only if the client character set is the same as the default character set.
- ***-D database_name*** – specifies the name of the database in which to install the JAR. If you omit the `-D` flag, or if you specify the `-D` flag with no parameter, the user's default database is used.
- ***-f file_name*** – specifies the name of the client file that is the target of the transfer.
- ***-I interfaces_file*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server. If you omit the `-I` flag and parameter, or if you specify the `-I` flag with no parameter, the interfaces file in the directory designated by your SYBASE environment variable is used.
- ***-j jar_name*** – specifies the name assigned to the retained JAR in the database that is the source of the transfer.
- ***-J client_charset*** – specifies the character set to use on the client. **extractjava** uses a filter to convert input between *client_charset* and the Adaptive Server character set.

  `-J` *`client_charset`* requests that Adaptive Server convert to and from *client_charset*, the character set used on the client.

  `-J` with no argument disables character set conversion. Use this if the client and server use the same character set.

  Omitting `-J` sets the character set to a default for the platform, which may not necessarily be the character set that the client is using. See the *System Administration Guide* for more information about character sets and associated flags.
- ***-P password*** – specifies an Adaptive Server password. If you omit the `-P` flag and parameter, **extractjava** prompts for a password. If you specify the `-P` flag with no password, the null password is used.
- ***-S server_name*** – specifies the name of the server.
- ***-t timeout*** – specifies the number of seconds before a SQL command times out. If you do not specify a timeout, the command runs indefinitely. This affects commands issued from within **extractjava**, not the connection time. The default timeout for logging into **extractjava** is 60 seconds.

- ***`-U user_name`*** – specifies an Adaptive Server login name. If you omit the `-U` flag and parameter, or if you specify the `-U` flag with no parameter, Adaptive Server uses the current user's operating system login name.
- **`-v`** – prints the version number and copyright message for **extractjava** and then exits.
- ***`-z language`*** – specifies the name of an alternate language for displaying **extractjava** prompts and messages. Without the `-z` flag, **extractjava** uses the server's default language. Add languages to an Adaptive Server during installation or afterward, using the `langinstall` utility or the **sp_addlanguage** stored procedure.

Examples

- **Download classes –** Downloads the classes associated with the employees JAR to the client file `newaddr.jar`.
  - On UNIX:
    ```
    extractjava -j employees -f '/home/usera/jars/addr.jar' -new
    ```
  - On Windows:
    ```
    extrjava -j employees -f '\home\usera\jars\addr.jar' -new
    ```

Usage

- Set the SYBASE environment variable to the location of the current version of Adaptive Server before you use **extractjava**.
- If the target client file already exists, **extractjava** overwrites its contents.
- You can write parameter flags `-f`, `-j`, `-S`, `-U`, `-P`, `-D`, and `-I` with or without a space between the flag letter and the following parameter.

- When you execute **extractjava**, an exclusive lock is placed on `sysxtypes`.
- Specifying `-jar` places an exclusive table lock on `sysjars`.

See also:

- *Java in Adaptive Server Enterprise*
- *Reference Manual: Commands* – **remove java**
- *Reference Manual: Procedures* – **sp_helpjava**

Permissions

You need to be a system administrator or database owner to use **extractjava**.

Tables used

`sysjars`, `sysxtypes`

See also

- *installjava* on page 76
- *langinstall* on page 95

installjava

Installs a JAR from a client file into an Adaptive Server.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin` as **instjava.exe**.

Syntax

```
installjava
    -f file_name
    [ -new | -update ]
    [ -a display_charset ]
    [ -D database_name ]
    [ -I interfaces_file ]
    [ -J client_charset ]
    [ -j jar_name ]
    [ -P password ]
    [ -S server_name ]
    [ -t timeout ]
    [ -U user_name ]
    [ -v]
    [ -z language ]
```

Or

```
installjava -v
```

Parameters

- ***-a display_charset*** – allows you to use **installjava** from a machine where the character set differs that of the server. Use `-a` in conjunction with `-J` to specify the character set translation file (`.xlt` file) required for the conversion. Use `-a` without `-J` only if the client character set is the same as the default character set.
- ***-D database_name*** – is the name of the database in which to install the JAR. If you omit the `-D` flag, or if you specify the `-D` flag with no parameter, the user's default database is used.
- ***-f file_name*** – is the name of the source file containing the classes to be installed in the database.
- ***-I interfaces_file*** – is the name and location of the interfaces file to search when connecting to Adaptive Server. If you omit the `-I` flag and parameter, or if you specify the

`-I` flag with no parameter, the interfaces file in the directory designated by your SYBASE environment variable is used.

- ***`-J client_charset`*** – specifies the character set to use on the client. **installjava** uses a filter to convert input between *client_charset* and the Adaptive Server character set.

  `-J` *`client_charset`* requests that Adaptive Server convert to and from *client_charset*, the character set used on the client.

  `-J` with no argument disables character set conversion. Use this if the client and server use the same character set.

  Omitting `-J` sets the character set to a default for the platform, which may not necessarily be the character set that the client is using. See the *System Administration Guide* for more information about character sets and associated flags.
- ***`-j jar_name`*** – is the name of the JAR containing the classes to be installed in the database. Indicates that the JAR file should be saved in the database and associated with the classes it contains.
- **`-new | -update`** – specifies whether the classes in the file already exist in the database. If you specify:
  - `-new` – you cannot install a class with the same name as an existing class
  - `-update` – install a class with the same name as an existing class, and the newly installed class replaces the existing class
- ***`-P password`*** – is an Adaptive Server password. If you omit the `-P` flag and parameter, **installjava** prompts for a password. If you specify the `-P` flag with no password, the null password is used.
- ***`-S server_name`*** – is the name of the server.
- ***`-t timeout`*** – specifies the number of seconds before a SQL command times out. If you do not specify a timeout, the command runs indefinitely. This affects commands issued from within **installjava**, not the connection time. The default timeout for logging into **installjava** is 60 seconds.
- ***`-U user_name`*** – is an Adaptive Server login name. If you omit the `-U` flag and parameter, or if you specify the `-U` flag with no parameter, Adaptive Server uses the current user's operating system login name.
- **`-v`** – prints the version number and copyright message for **installjava** and then exits.
- ***`-z language`*** – is the name of an alternate language for displaying **installjava** prompts and messages. Without the `-z` flag, **installjava** uses the server's default language. Add languages to an Adaptive Server during installation or afterward, using the **langinstall** utility or the **sp_addlanguage** stored procedure.

Examples

- **Install –** Installs `addr.jar` and its classes, but does not retain the association between the JAR and classes:

```
installjava -f '/home/usera/jars/addr.jar' -new
```

In Windows:

```
instjava -f '\home\usera\jars\addr.jar' -new
```

- **Reinstall –** Reinstalls `addr.jar` and associates its classes with the employees JAR name:

  ```
  installjava -f '/home/usera/jars/addr.jar' -update -j employees
  ```

  In Windows:

  ```
  instjava -f '\home\usera\jars\addr.jar' -update -j employees
  ```

Permissions

You need to be a system administrator or database owner to use **installjava**.

Tables used

`sysjars`, `sysxtypes`

See also

- *extractjava* on page 73
- *langinstall* on page 95

Usage for installjava

There are additional considerations when using **installjava**.

- Set the SYBASE environment variable to the location of the current version of Adaptive Server before you can use **installjava**.
- Any user can reference installed classes.
- You can write the **-f**, **-j**, **-S**, **-U**, **-P**, **-D**, and **-I**parameter flags with or without a space between the flag letter and the following parameter.

See also:

- *Java in Adaptive Server Enterprise*
- *Reference Manual: Commands* – **remove java**
- *Reference Manual: Procedures* – **sp_helpjava**

Cases When Adding New JARs Causes Exceptions

An exception is raised under some conditions.

- You use **-new** with the **-j *jar_name*** option and a JAR of that name already exists in the database.
- Any classes of the same name as those in the source JAR already exist in the database, an exception is raised.

Updating JARs and Classes

If you alter a class used as a column datatype by reinstalling a modified version of the class, make sure that the modified class can read and use existing objects (rows) in tables using that class as a datatype. Otherwise, you may be unable to access those objects without reinstalling the class.

If you use **-update**:

- With the **-j *jar_name*** option:
    - All classes in the database associated with the target JAR are deleted from the database and the classes in the source JAR file installed in their place.
    - If a class in the source JAR file is already installed in the database but is not attached to a JAR, the class in the source JAR is installed in the database and the unattached class is deleted.
- Without the **-j *jar_name*** option:
    - Classes in the source JAR file replace unattached classes of the same name.
    - Classes in the source JAR that do not correspond to an installed class are installed as unattached classes in the database.

If you install a new JAR with a replacement for an installed class that is referenced by a SQLJ procedure or function, make sure that the newly installed class has a valid signature for the SQLJ routine. If the signature is invalid, an exception is raised when the SQLJ routine is invoked.

Locks

Using **installjava** causes some locks to occur.

- When you execute **installjava**, an exclusive lock is placed on `sysxtypes`.
- If **-j *jar_name*** is specified, an exclusive table lock is placed on `sysjars`.

isql

Interactive SQL parser to Adaptive Server.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **isql.exe**.

Syntax

```
isql [-b] [-e] [-F] [-n] [-p] [-v] [-W] [-X] [-Y] [-Q]
    [-a display_charset]
    [-A packet_size]
    [-c cmdend]
    [-D database]
    [-E editor]
    [-h header]
    [-H hostname]
    [-i inputfile]
    [-I interfaces_file]
    [-J client_charset]
    [-K keytab_file]
    [-l login_timeout]
    [-m errorlevel]
    [-M LabelName LabelValue]
    [-o outputfile]
    [-P password]
    [-R remote_server_principal]
    [-s col_separator]
    [-S server_name]
    [-t timeout]
    [-U username]    [-v]
    [-V [security_options]]
    [-w column-width]
    [-x trusted.txt_file]
    [-y sybase_directory]
    [-z localename]
    [-Z security_mechanism]
    [--appname "application_name"]
    [--conceal [':?' | 'wildcard']]
    [--help]
    [--history [p]history_length [--history_file history_filename]]
    [--retserverror]
    [--URP remotepassword
```

Parameters

- ***-a display_charset*** – allows you to run **isql** from a terminal where the character set differs from that of the machine on which **isql** is running. Use `-a` with `-J` to specify the character set translation file (`.xlt` file) required for the conversion. Use `-a` without `-J` only if the client character set is the same as the default character set.

  Note: The ascii_7 character set is compatible with all character sets. If either the Adaptive Server character set or the client character set is set to ascii_7, any 7-bit ASCII character can pass unaltered between client and server. Other characters produce conversion errors. For more information on character set conversion, see the *System Administration Guide*.

- ***-A packet_size*** – specifies the network packet size to use for this **isql** session. For example, to set the packet size to 4096 bytes for the **isql** session, use:

  ```
  isql -A 4096
  ```

  To check your network packet size, use:

  ```
  select * from sysprocesses
  ```

  The value appears under the `network_pktsz` heading.

packet_size must be between the values of the default network packet size and maximum network packet size configuration variables, and must be a multiple of 512. The default value is 2048.

Use larger-than-default packet sizes to perform I/O-intensive operations, such as **readtext** or **writetext** operations. Setting or changing the Adaptive Server packet size does not affect remote procedure calls' packet size.

- **`-b`** – disables the display of the table headers output.
- **`-c`** ***`cmdend`*** – changes the command terminator. By default, you terminate commands and send them to the server by typing "go" on a line by itself. When you change the command terminator, do not use SQL reserved words or control characters.
- **`-D`** ***`database`*** – selects the database in which the **isql** session begins.
- **`-e`** – echoes input.
- **`-E`** ***`editor`*** – specifies an editor other than the default editor **vi**. To invoke the editor, enter its name as the first word of a line in **isql**.
- **`-F`** – enables the FIPS flagger. When you specify the `-F` parameter, the server returns a message when it encounters a nonstandard SQL command. This option does not disable SQL extensions. Processing completes when you issue the non-ANSI SQL command.
- **`-h`** ***`headers`*** – specifies the number of rows to print between column headings. The default prints headings only once for each set of query results.
- **`-H`** ***`hostname`*** – sets the client host name.
- **`-i`** ***`inputfile`*** – specifies the name of the operating system file to use for input to **isql**. The file must contain command terminators (the default is "go").
  - Specifying the parameter is equivalent to **<** ***inputfile***:
    ```
    -i inputfile
    ```
  - If you use `-i` and do not specify your password on the command line, **isql** prompts you for it.
  - If you use **<** ***inputfile*** and do not specify your password on the command line, specify your password as the first line of the input file.
- **`-I`** ***`interfaces_file`*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server. If you do not specify `-I`, **isql** looks for a file named `interfaces` in the directory specified by your SYBASE environment variable.
- **`-J`** ***`client_charset`*** – specifies the character set to use on the client. The parameter requests that Adaptive Server convert to and from *client_charset*, the character set used on the client. A filter converts input between *client_charset* and the Adaptive Server character set.

  `-J` with no argument sets character set conversion to NULL. No conversion takes place. Use this if the client and server use the same character set.

  Omitting `-J` sets the character set to a default for the platform. The default may not necessarily be the character set that the client is using. For more information about character sets and the associated flags, see *Configuring Client/Server Character Set Conversions*, in the *System Administration Guide, Volume One*.

- **`-K` *`keytab_file`*** – specifies the path to the keytab file used for authentication in DCE. *keytab_file* specifies a DCE keytab that contains the security key for the user name you specify in `-U`. Create keytab files using the DCE **dcecp** utility. See your DCE documentation.

  If you do not specify `-K`, the **isql** user must be logged in to DCE with the same username specified in `-U`.
- **`-l` *`login_timeout`*** – specifies the maximum timeout value allowed when connecting to Adaptive Server. The default is 60 seconds. This value affects only the time that **isql** waits for the server to respond to a login attempt. To specify a timeout period for command processing, use the `-t`*`timeout`* parameter.
- **`-m` *`errorlevel`*** – customizes error message appearance. For errors of the severity level specified or higher, only the message number, state, and error level appear; no error text appears. For error levels lower than the specified level, nothing appears.
- **`-M` *`LabelName LabelValue`*** – (Secure SQL Server only) enables multilevel users to set the session labels for the this **isql** session. Valid values for *LabelName* are:

  - `curread` (current read level) – is the initial level of data that you can read during this session. curread must dominate curwrite.
  - `curwrite` (current write level) – is the initial sensitivity level that is applied to any data that you write during this session.
  - `maxread` (maximum read level) – is the maximum level at which you can read data. This is the upper bound to which you as a multilevel user can set curread during the session. maxread must dominate maxwrite.
  - `maxwrite` (maximum write level) – is the maximum level at which you can write data. This is the upper bound to which you as a multilevel user can set curwrite during a session. maxwrite must dominate minwrite and curwrite.
  - `minwrite` (minimum write level) – is the minimum level at which you can write data. This is the lower bound to which you as a multilevel user can set curwrite during a session. minwrite must be dominated by maxwrite and curwrite.

  LabelValue is the actual value of the label, expressed in the human-readable format used on your system (for example, “Company Confidential Personnel”).
- **`-n`** – removes numbering and the prompt symbol (>) from the echoed input lines in the output file when used with `-e`.
- **`-o` *`outputfile`*** – specifies the name of an operating system file to store the output from **isql**. Specifying the parameter as `-o` *`outputfile`* is similar to ***> outputfile***
- **`-p`** – prints performance statistics.
- **`-P` *`password`*** – specifies your Adaptive Server password. If you do not specify the `-P` flag, **isql** prompts for a password. If your password is NULL, use the`-P` flag without any password.

- **`-Q`** – provides clients with failover property. See *Using Sybase Failover in a High Availability System*.
- **`-R`** ***`remote_server_principal`*** – specifies the principal name for the server as defined to the security mechanism. By default, a server's principal name matches the server's network name (which is specified with the `-S` parameter or the DSQUERY environment variable). Use the `-R` parameter when the server's principal name and network name are not the same.
- **`-s`** ***`colseparator`*** – resets the column separator character, which is blank by default. To use characters that have special meaning to the operating system (for example, "|", ";", "&", "<", ">"), enclose them in quotes or precede them with a backslash.

  The column separator appears at the beginning and the end of each column of each row.
- **`-S`** ***`server_name`*** – specifies the name of the Adaptive Server to which to connect. **isql** looks this name up in the interfaces file. If you specify `-S` without *server_name*, **isql** looks for a server named SYBASE. If you do not specify `-S`, **isql** looks for the server specified by your DSQUERY environment variable.
- **`-t`** ***`timeout`*** – specifies the number of seconds before a SQL command times out. If you do not specify a timeout, the command runs indefinitely. This affects commands issued from within **isql**, not the connection time. The default timeout for logging into **isql** is 60 seconds.
- **`-U`** ***`username`*** – specifies a login name. Login names are case-sensitive.
- **`-v`** – prints the version and copyright message of **isql** and then exits.

  isql is available in both 32-bit and 64-bit versions. They both reside in the same directory and are differentiated by their executable file names (`isql` and `isql64`). Enter `isql -v` or `isql64 -v` to see the detailed version string of the **isql** you are using.
- **`-V`** ***`security_options`*** – specifies network-based user authentication. With this option, the user must log in to the network's security system before running the utility, and users must supply the network user name with the `-U` option; any password supplied with the `-P` option is ignored.

  Follow `-V` with a *security_options* string of key-letter options to enable additional security services. These key letters are:

  - `c` – enables data confidentiality service.
  - `d` – enables credential delegation and forwards the client credentials to the gateway application.
  - `i` – enables data integrity service.
  - `m` – enables mutual authentication for connection establishment.
  - `o` – enables data origin stamping servic.e
  - `q` – enables out-of-sequence detection
  - `r` – enables data replay detection
- **`-W`** – disables both extended password and password encrypted negotiations.

- ***-w columnwidth*** – sets the screen width for output. The default is 80 characters. When an output line reaches its maximum screen width, it breaks into multiple lines.
- ***-x trusted.txt_file*** – specifies an alternate `trusted.txt` file.
- **-X** – initiates the login connection to the server with client-side password encryption. **isql** (the client) specifies to the server that password encryption is desired. The server sends back an encryption key, which **isql** uses to encrypt your password, and the server uses the key to authenticate your password when it arrives.

  This option can result in normal or extended password encryption, depending on connection property settings at the server. If CS_SEC_ENCRYPTION is set to CS_TRUE, normal password encryption is used. If CS_SEC_EXTENDED_ENCRYPTION is set to CS_TRUE, extended password encryption is used. If both CS_SEC_ENCRYPTION and CS_SEC_EXTENDED_ENCRYPTION are set to CS_TRUE, extended password encryption takes precedence.

  If **isql** fails, the system creates a core file that contains your password. If you did not use the encryption option, the password appears in plain text in the file. If you used the encryption option, your password is not readable.

  For details on encrypted passwords, see the user documentation for the Open Client Client-Library.
- ***-y sybase_directory*** – sets an alternate Sybase home directory.
- **-Y** – tells the Adaptive Server to use chained transactions.
- ***-z locale_name*** – specifies the official name of an alternate language to display **isql** prompts and messages. Without `-z`, **isql** uses the server's default language. Add languages to an Adaptive Server during installation or afterward, using the **langinstall** utility (**langinst** in Windows) or the **sp_addlanguage** stored procedure.
- ***-Z security_mechanism*** – specifies the name of a security mechanism to use on the connection.

  Security mechanism names are defined in the `libtcl.cfg` configuration file located in the `ini` subdirectory below the Sybase installation directory. If no *security_mechanism* name is supplied, the default mechanism is used. For more information on security mechanism names, see the description of the `libtcl.cfg` file in the *Open Client and Open Server Configuration Guide*.
- **--appname "*application_name*"** – allows you to change the default application name **isql** to the **isql** client application name. This simplifies:
  - Testing of Adaptive Server cluster routing rules for incoming client connections based on the client application name.
  - Switching between alternative settings for **isql** in `$SYBASE/$SYBASE_OCS/config/ocs.cfg`, such as between debugging and normal sessions.
  - Identification of the script that started a particular **isql** session from within Adaptive Server.

  application_name:

- Is the client application name. You can retrieve the client application name from `sysprocesses.program_name` after connecting to your host server.
- Has a maximum length of 30 characters. You must enclose the entire application name in single quote or double quote characters if it contains any white spaces that do not use the backslash escape character. You can set the *application_name* to an empty string.

Note: You can also set the client application name in `ocs.cfg` using the CS_APPNAME property.

- **`--conceal [':?' | 'wildcard']`** – hides your input during an **isql** session. The `--conceal` option is useful when entering sensitive information, such as passwords.

  wildcard, a 32-byte variable, specifies the character string that triggers **isql** to prompt you for input during an **isql** session. For every wildcard that **isql** reads, **isql** displays a prompt that accepts your input but does not echo the input to the screen. The default wildcard is `:?`.

  Note: `--conceal` is silently ignored in batch mode.

- **`--help`** – displays a brief description of syntax and usage for the **isql** utility consisting of a list of available arguments.
- **`--history [p]history_length [--history_file history_filename]`** – Loads the contents of the command history log file, if it exists, when **isql** starts. By default, the command history feature is off. Use the `--history` command line option to activate it.

  - `p` – indicates command history persistence; in-memory command history is saved to disk when **isql** shuts down. If you do not use the `p` option, the command history log is deleted after its contents are loaded into memory.
  - *history_length* – this parameter, which is required if you use `--history`, is the number of commands that **isql** can store in the command history log. The maximum value of *history_length* is 1024; if a larger value is specified, **isql** silently truncates it to 1024.
  - `-history_file` *`history_filename`* – indicates that **isql** must retrieve the command history log from *history_filename*. If p is specified, **isql** also uses *history_filename* to store the current session's command history. *history_filename* can include an absolute or a relative path to the log file. A relative path is based on the current directory. If you do not indicate a path, the history log is saved in the current directory. When `--history_file` is not specified, **isql** uses the default log file in `$HOME/.sybase/isql/isqlCmdHistory.log`.

- **`--retserverror`** – forces **isql** to terminate and return a failure code when it encounters a server error with a severity greater than 10. When **isql** encounters this type of abnormal termination, it writes the label "Msg" together with the actual Adaptive Server error number to `stderr`, and returns a value of 2 to the calling program. **isql** prints the full server error message to `stdout`.

- ***--URP remotepassword*** **–** enables setting the universal remote password *remotepassword* for clients accessing Adaptive Server.

Examples

- **Query edit –** Opens a text editor where you can edit the query. When you write and save the file, you are returned to **isql**. The query appears; type "go" on a line by itself to execute it:

```
isql -Ujoe -Pabracadabra
1> select *
2> from authors
3> where city = "Oakland"
4> vi
```

- **Clearing and quitting – reset** clears the query buffer, and **quit** returns you to the operating system:

```
isql -Ualma
Password:
1> select *
2> from authors
3> where city = "Oakland"
4> reset
1> quit
```

- **Column separators –** Creates column separators using the "#" character in the output in the `pubs2` database for store ID 7896:

```
isql -Usa -P -s#
1> use pubs2
2> go
1> select * from sales where stor_id = "7896"
```

```
#stor_id#ord_num             #date                      #
#-------#--------------------#--------------------------#
#7896   #124152              #       Aug 14 1986 12:00AM#
#7896   #234518              #       Feb 14 1991 12:00AM#

(2 rows affected)
```

- **Credentials –** (MIT Kerberos) Requests credential delegation and forwards the client credentials to MY_GATEWAY:

```
isql -Vd -SMY_GATEWAY
```

- **Passwords –** Changes password without displaying the password entered. This example uses "old" and "new" as prompt labels:

```
$ isql -Uguest -Pguest -Smyase --conceal
sp_password
:? old
,
:?:? new
```

```
----------------
old
new
Confirm new
Password correctly set.

(Return status 0)
```

- **Hide input –** In this example of `--conceal`, the password is modified without displaying the password entered. This example uses "old" and "new" as prompt labels:

```
$ isql -Uguest -Pguest -Smyase --conceal
1> sp_password
2> :? old
3> ,
4> :?:? new
5> go

old
new
Confirm new
Password correctly set.
(return status = 0)
```

In this example of `--conceal`, the password is modified without displaying the password entered. This example uses the default wildcard as the prompt label:

```
$ isql -Uguest -Pguest -Smyase --conceal
1> sp_password
2> :?
3> ,
4> :?:?
5> go

:?
:?
Confirm :?
Password correctly set.
(return status = 0)
```

This example of `--conceal` uses a custom wildcard, and the prompt labels "role" and "password" to activate a role for the current user:

```
$ isql -UmyAccount --conceal '*'
Password:
1> set role
2> * role
3> with passwd
4> ** password
5> on
6> go

role
password
Confirm password
1>
```

- **Return server error –** returns 2 to the calling shell, prints “Msg 207” to `stderr`, and exits, when it encountered a server error of severity 16:

  ```
  guest> isql -Uguest -Pguestpwd -SmyASE --retserverror
      2> isql.stderr
  1> select no_column from sysobjects
  2> go

  Msg 207, Level 16, State 4:
  Server 'myASE', Line 1:
  Invalid column name 'no_column'.

  guest> echo $?
  2
  guest> cat isql.stderr
  Msg 207
  guest >
  ```

- **Application name –** Sets the application name to the name of the script that started the isql session:

  ```
  isql --appname $0
  ```

- **History –** Loads and saves the command history using the default log file:

  ```
  isql -Uguest -Ppassword -Smyase --history p1024
  ```

- **Run isql with configuration file –** This sample `ocs.cfg` file allows you to run **isql** normally or with network debug information. Because the configuration file is read and interpreted after the command line parameters are read and interpreted, setting CS_APPNAME to **isql** sets the application name back to **isql**:

  ```
  ;Sample ocs.cfg file
  [DEFAULT]
  ;place holder

  [isql]
  ;place holder

  [isql_dbg_net]
  CS_DEBUG = CS_DBG_NETWORK
  CS_APPNAME = "isql"
  ```

  To run **isql** normally:

  ```
  isql -Uguest
  ```

  To run **isql** with network debug information:

  ```
  isql -Uguest --appname isql_dbg_net
  ```

- **Load and save command history –** Loads and saves the command history using the default log file:

  ```
  isql -Uguest -Ppassword -Smyase --history p1024
  ```

- **Delete log –** Deletes `myaseHistory.log` after loading its contents to memory. The session’s command history is not stored.

```
isql -Uguest -Ppassword -Smyase --history 1024
   --history_file myaseHistory.log
```

- **All commands in command history –** Lists all the commands stored in the command history:

```
isql -Uguest -Ppassword -Smyase --history p1024
1> h

[1] select @@version
[2] select db_name()
[3] select @@servername

1>
```

- **Most recent commands –** Lists the two most recent commands issued:

```
isql -Uguest -Ppassword -Smyase --history p1024
1> h -2

[2] select db_name()
[3] select @@servername

1>
```

- **Recall labeled command from history –** Recalls the command labeled 1 from the command history:

```
isql -Uguest -Ppassword -Smyase --history p1024
1> ? 1

1> select @@version
2>
```

- **Recall last-issued command from history –** Recalls the latest issued command from the command history:

```
isql -Uguest -Ppassword -Smyase --history p1024
1> ? -1

1> select @@servername
2>
```

- **Set directory –** Sets an alternate Sybase home directory using the `-y` option:

```
isql -y/work/NewSybase -Uuser1 -Psecret -SMYSERVER
```

- **Roles –** Activates a role for the current user. This example uses a custom wildcard and the prompt labels “role” and “password”:

```
$ isql -UmyAccount --conceal '*'Password:
set role
* role
with passwd
** password
on
go

role
```

```
password
Confirm password
```

- **Application name –** Sets the application name to “**isql** Session 01”:

```
isql -UmyAccount -SmyServer --appname "isql Session 01"
Password:
1>select program_name from sysprocesses
2>where spid=@@spid
3>go

program_name
-------------------
isql Session 01
```

- **Deleting history –** Deletes `myaseHistory.log` after loading its contents to memory. The session’s command history is not stored:

```
isql -Uguest -Ppassword -Smyase --history 1024
  --history_file myaseHistory.log
```

See also

- *Interactive isql Commands* on page 92
- *Command History in isql* on page 94
- *Chapter 6, Using Interactive isql from the Command Line* on page 229

Usage for isql

Additional information for using **isql**.

- If you are using threaded drivers, use the **isql** syntax for **isql_r**.
- If you are using threaded drivers in the IBM platform, use the standard syntax for **isql**.
- Before using **isql**, set the SYBASE environment variable to the location of the current version of Adaptive Server.
- The 5701 (“changed database”) server message is no longer appears after logging in or issuing a **use database** command.
- Error message format differs from versions of **isql** earlier than 15.7. If you have scripts that perform routines based on the values of these messages you may need to rewrite them.
- When you include the **-X** parameter, the password-enabled connection proceeds according to server capabilities:
  - If the server can handle both extended password and password encryption, extended password encryption negotiations are used.
  - If the server can handle only password encryption, password encryption negotiations are used.
  - If the server cannot handle password encryption or extended password encryption, the first connection attempt fails and the client attempts to reconnect using a plain text password.
- Terminate a command by typing a line beginning with the default command terminator **go** or another command terminator, if the **-c** parameter is used. Follow the command

terminator with an integer to specify the number of times to run the command. For example, to execute this command 100 times, type:

```
select x = 1
go 100
```

The results appear once at the end of execution.

- If you enter an option more than once on the command line, **isql** uses the last value. For example, if you enter this command, "send", the second value for `-c`, overrides ".", the first value:

  ```
  isql -c"." -csend
  ```

  This enables you to override any aliases you set up.
- Execute operating system commands by starting a line with two exclamation points (`!!`) followed by the command.
- To clear the existing query buffer, type **reset** on a line by itself. **isql** discards any pending input. Press Ctrl+c anywhere on a line to cancel the current query and return to the **isql** prompt.
- Read in an operating system file containing a query for execution by **isql**:

  ```
  isql -U alma -Ppassword < input_file
  ```

  The file must include a command terminator. The results appear on your terminal. Read in an operating system file containing a query and direct the results to another file:

  ```
  isql -U alma -Ppassword < input_file > output_file
  ```
- **isql** displays only six digits of `float` or `real` data after the decimal point, rounding off the remainder.
- You can include comments in a Transact-SQL statement submitted to Adaptive Server by **isql**. Open a comment with "/*". Close it with "*/", as shown in this example:

  ```
  select au_lname, au_fname
  /*retrieve authors' last and first names*/
  from authors, titles, titleauthor
  where authors.au_id = titleauthor.au_id
  and titles.title_id = titleauthor.title_id
  /*this is a three-way join that links authors
  **to the books they have written.*/
  ```

  Do not comment out a **go** command at the beginning of a line. For example, use this to comment out the **go** command:

  ```
  /*
  **go
  */
  ```

  Do not use this:

  ```
  /*
  go
  */
  ```

- **isql** defines the order of the date format as month, date, and year (mm dd yyyy hh:mmAM (or PM)), regardless of the locale environment. To change this default order, use the **convert** function.
- In an **isql** session, the default prompt label is either the default wildcard **:?** or the value of *wildcard*. Customize the prompt label by providing a one-word character string, with a maximum length of 80 characters after a wildcard. If you specify a prompt label that is more than one word, the characters after the first word are ignored.

  Note: In an **isql** session, **isql** recognizes **:?**, or the value of *wildcard*, as wildcards only when these characters are placed at the beginning of an isql line.

See also:

- *Reference Manual: Building Blocks* – `exact` numeric datatypes, **convert** built-in function
- *Reference Manual: Commands* – **create schema**, **set**
- *Reference Manual: Procedures* – **xp_sendmail** extended stored procedure, **sp_addlanguage**, **sp_addlogin**, **sp_addremotelogin**, **sp_add_resource_limit**, **sp_bindexeclass**, **sp_configure**, **sp_defaultlanguage**, **sp_droplanguage**, **sp_helplanguage**, **sp_processmail**, **sp_remoteoption**, **sp_serveroption**, **sp_showcontrolinfo**, **sp_unbinexeclass**, **sp_volchanged**
- *System Administration Guide: Volume 1* – **default network packet size** and **maximum network packet size**configuration parameters

Interactive isql Commands

To use **isql** interactively, give the command **isql** (and any of the optional parameters) at your operating system prompt.

The **isql** program accepts SQL commands and sends them to Adaptive Server. The results are formatted and printed on standard output. Exit **isql** with **quit** or **exit**.

When using **isql** interactively:

- Read an operating system file into the command buffer using:

  ```
  :r filename
  ```

  Do not include a command terminator in the file; enter the terminator interactively once you have finished editing.
- Read and display an operating system file into the command buffer using:

  ```
  :R filename
  ```
- You can change the current database using:

  ```
  use databasename
  ```

The commands you execute from within interactive **isql** are:

Command	Description
`:r` ***`filename`***	Reads an operating system file into the command buffer. Do not include the command terminator in the file; once you have finished editing, enter the terminator interactively on a line by itself.
`:R` ***`filename`***	Reads an operating system file into the command buffer then shows the command. Do not include the command terminator in the file; once you have finished editing, enter the terminator interactively on a line by itself.
`use` ***`data-base_name`***	Changes the current database.
`!!` ***`os_command`***	Executes an operating system command. Place at the start of a line.

`>` ***`file_name`***	Redirects the output of the Transact-SQL command to *file_name*. This example inserts the server version into *file_name*:
	`select @@version`
	`go > file_name`

`>>` ***`file_name`***	Appends the output of the Transact-SQL command to *file_name*.This example appends the server version to *file_name*:
	`select @@version`
	`go >> file_name`

`| command`	Pipes the output of the Transact-SQL command to an external command. This example finds all instances of “sa” in the listing produced by **sp_who**:
	`sp_who`
	`go | grep sa`

`vi` **(UNIX) or edit (Windows)**	Calls the default editor.
`reset`	Clears the query buffer.
`quit` **or** **`exit`**	Exits **isql**.

isql Session Commands

Additional commands to use within **isql**.

Command	Description
>	Redirects command output to a file. File is overwritten if it exists.

Command	Description
>	Redirects command output to a file. The output is appended to the file if the file already exists.
|	Pipes the output of a command to an external application.
reset	Clears the query buffer.
quit or exit	Exits from **isql**.
vi	Calls the editor.
!! *command*	Executes an operating system command.
:r *filename*	Reads an operating system file.
:R *filename*	Reads and displays an operating system file.
use *dbname*	Changes the current database to *dbname*.

Prompt Labels and Double Wildcards in an isql Session

In an **isql** session, the default prompt label is either the default wildcard **:?** or the value of wildcard. You can customize the prompt label by providing a one-word character string with a maximum length of 80 characters, after a wildcard.

If you specify a prompt label that is more than one word, the characters after the first word are ignored. Double wildcards such as **:?:?** specify that **isql** needs to prompt you twice for the same input. The second prompt requests you to confirm your first input. If you use a double wildcard, the second prompt label starts with Confirm.

Note: In an **isql** session, `:?` or the value of a custom wildcard is only recognized by **isql** as such, when it is the first "word" of a line.

Command History in isql

The command history feature is available in command mode.

Only commands that are issued interactively in **isql** are included in the command history. Examples of commands that are not included in the command history are those that are executed using the `–i` command line option or as part of a redirected input, such as:

```
isql -Uguest -Ppassword -Smyase --history p1024
    --history_file myaseHistory.log <<EOF
exec sp_x_y_z
go
EOF
```

Command history contains the most recent commands issued in an **isql** session. When *history_length* is reached, **isql** drops the oldest command from the history and adds the newest command issued.

If you do not specify an alternate log file, and if the $HOME or %APPDATA% environment variable used by the default log file is not defined, an error message appears and the command history log is not saved.

In an **isql** session, use the `h [n]` command to display the command history. A page can display up to 24 lines of commands. If the command history contains more than 24 lines, press Enter to display the next set of commands or enter "`a`" to display all commands in one page. Enter "`q`" to return to **isql**.

n indicates the number of commands to appear. If *n* is:

- Positive – the commands that appear start from the oldest command in the history.
- Negative – the *n* most recent commands appear.

Use the `? n | ??` command to recall and reissue a command from the command history.

When *n* is positive, **isql** looks for the command labeled with the number *n* and loads this to the command buffer. When n is negative, **isql** loads the *n*th most recent command issued.

?? – recalls the latest command issued and is equivalent to **? -1**.

- When a command is recalled from history, the recalled command overwrites the command in the command buffer.
- You can edit a recalled command before resubmitting the command to the server.

langinstall

Installs a new language in an Adaptive Server.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_ASE/bin`.
- (Windows) `%SYBASE%\%SYBASE_ASE%\bin`, as **langinst.exe**.

Syntax

```
langinstall
    [-I path]
    [-P password]
    [-R release_number]
    [-S server]
    [-U user]
    language
    character_set
```

Or

```
langinstall -v
```

Parameters

- ***`-I path`*** – specifies the name and location of the interfaces file (`sql.ini` file in Windows) that **langinstall** searches when connecting to Adaptive Server. If you do not specify `-I`, **langinstall** uses the interfaces file in the directory specified by the SYBASE environment variable. If SYBASE is not set, **langinstall** looks for the default `SYBASE` directory.
- ***`-P password`*** – specifies the system administrator's ("sa" account) password. If you omit `-P`, **langinstall** prompts for the "sa" account password.
- ***`-R release_number`*** – specifies the release number, in the format *n.n.n*, to use to upgrade messages in `master..sysmessages`. Use `-R` only in failure conditions, such as if **langinstall** (**langinst** in Windows) fails, in case of user error, or when you think that messages in `sysmessages` are out of date.

  The `-R` parameter forces **langinstall** to collect messages from a release previous to the current one. **langinstall** compares the existing messages with the ones to be installed and replaces any that have changed.

  For example, if the current version is 15.0, and the previous version was 12.5, and you think `sysmessages` may not be correct, include the messages from the earlier version in the `syslanguages.upgrade` column (12.5 in this case) by specifying `-R12.5`. **langinstall** then installs all messages from Adaptive Server 12.5.
- ***`-S server`*** – specifies the name of the Adaptive Server to which to connect. If you do not specify `-S`, **langinstall** uses the server specified by your DSQUERY environment variable. If DSQUERY is not set, **langinstall** attempts to connect to a server named SYBASE.
- ***`-U user`*** – specifies a login name. Login names are case sensitive.
- ***`language`*** – is the official name of the language to be installed. You must specify a language.
- ***`character_set`*** – is the name of Adaptive Server default character set, and indicates the directory name of the localization files for the language. The `common.loc` and `server.loc` localization files for an official language reside in the character set directory `$SYBASE/locales/language/character_set` in UNIX platforms, or `%SYBASE%\locales\language\character_set` in Windows. You must specify a character set.
- **`-v`** – prints the version number and copyright message for **langinstall** and then exits.

Usage

The Adaptive Server installation program runs **langinstall** automatically for a new installation as well as for customers who are upgrading from an earlier version.

langinstall:

- Adds the specified language-specific information to master..syslanguages using **sp_addlanguage**. If the language already exists, **langinstall** updates the appropriate row in syslanguages.
- Adds to, updates, and deletes error messages as necessary from master..sysmessages.
- Updates `syslanguages.update`, inserting the new release number.
- Validates the entries in the localization file sections that it uses. If anything is missing, **langinstall** prints an error message and does not add the language to `syslanguages`.
- Compares the version numbers of each localization file it uses, `common.loc` and `server.loc`. If they are not the same, it prints a warning message. syslanguages.upgrade is always set according to the version number in `server.loc`.

See also:

- *Reference Manual: Procedures* – **sp_addlanguage**, **sp_addlogin**, **sp_configure**, **sp_defaultlanguage**, **sp_droplanguage**, **sp_helplanguage**

Permissions

Only a system administrator using the “sa” account can run **langinstall**.

Tables used

`master.dbo.syslanguages`, `master.dbo.sysmessages`

See also

- *defncopy* on page 66
- *srvbuild* on page 134

optdiag

Displays optimizer statistics or loads updated statistics into system tables.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_ASE/bin`.
- (Windows) `%SYBASE%\%SYBASE_ASE%\bin`, as **optidag.exe**.

Syntax

```
optdiag [binary] [simulate] statistics
    { -i input_file | database[.owner[.[table[.column] ] ] ]
    [-o output_file] }
    [-U user_name]
    [-P password]
    [-T trace_value]
    [-I interfaces_file]
    [-S server]
    [-v]
    [-h]
    [-s]
    [-z language]
    [-J client_character_set]
    [-a display_charset]
```

Parameters

- **`binary`** – extracts statistics in human-readable form and in binary form. When used with an input file (`-i input_file`), loads binary statistics into system tables.
- **`simulate`** – specifies that **optdiag** display or load simulated statistics. See the *Performance and Tuning Guide*.
- ***`-i input_file`*** – specifies the name of the operating system file to use for **optdiag** input. Specifying an input file causes **optdiag** to update optimizer statistics for the table or column by using the values in the specified file (also called "input mode").
- ***`database`*** – is the name of the database whose statistics you want displayed. In input mode, **optdiag** uses the database name as specified in the file, and does not accept a database name from the command line.
- ***`owner`*** – is the name of a table owner. In:
  - Display mode – if you do not specify an owner, but do specify a table name, **optdiag** displays output for all of the owners of a table.
  - Input mode – **optdiag** ignores the table owner specified on the command line and uses the value in the input file.
- ***`table`*** – is the name of the table to survey for statistics. If the command:
  - Does not include an owner name or a table name – **optdiag** displays statistics for all tables in the database.
  - Includes an owner name, but no table name – **optdiag** displays all of the tables that belong to the specified owner.

  In input mode, **optdiag** ignores the table name specified on the command line and uses the value from the input file.
- ***`column`*** – is the name of the colum to survey. If the command does not include a column name, **optdiag** displays all statistics for a table.

  In input mode, **optdiag** ignores the column name on the command line and uses the values from the input file.
- ***`-o output_file`*** – specifies the name of an operating system file to store the output from **optdiag**. If a file with the same name already exists, **optdiag** overwrites that file without warning.
- ***`-U user_name`*** – specifies an Adaptive Server login name.
- ***`-P password`*** – specifies your Adaptive Server password. If you do not specify the `-P` flag, **optdiag** prompts for a password.

- ***-T trace_value*** – sets trace flags for the **optdiag** session. The **optdiag** trace flags and their meanings are:
  - 1 – do not stop with a warning if the **optdiag** version of Adaptive Server in use does not match the Adaptive Server version in the input file.
  - 2 – display status message "Next table is *table_name*" when in input mode.
  - 4 – skip consistency checking for step numbers while loading histograms in input mode.
  - 6 – display lines of input file during input mode. This flag has no effect in display mode.
  - 7 – do not stop with a warning if the **optdiag** input file does not include sampling percent information.
- ***-I interfaces_file*** – specifies the name and location of the interfaces file to use when connecting to Adaptive Server.

  If you do not use `-I` and specify an interfaces file name, **optdiag** looks for the interfaces file (`interfaces` in UNIX), in the directory specified by the SYBASE environment variable. In Windows, **optdiag** looks for a file named `sql.ini` in the `ini` subdirectory in the Sybase installation directory (`d:\sybase`). Then, if SYBASE is not set, **optdiag** looks for the file in the default `$SYBASE` directory (`%SYBASE%` in Windows).
- ***-S server*** – specifies the name of the Adaptive Server to which to connect. **optdiag** looks for this name in the `interfaces` file (`sql.ini` in Windows).

  If you use `-S` without specifying a server name, **optdiag** looks for a server named SYBASE.

  When you do not use `-S`, **optdiag** looks for the server that your DSQUERY environment variable specifies.
- **-v** – displays the version number of and a copyright message for **optdiag** and exits.
- **-h** – displays the **optdiag** syntax help.
- **-s** – includes system tables in **optdiag** output. By default, only user tables are included.
- ***-z language*** – is the official name of an alternate language that the server uses both for date formats and to display **optdiag** prompts and messages. Without the `-z` flag, **optdiag** uses the server's default language.

  Add languages to Adaptive Server either during or after installation, After Adaptive Server installation, use either the **langinstall** utility or the **sp_addlanguage** stored procedure to add a language.
- ***-J client_charset*** – specifies the character set to use on the client. A filter converts input between *client_charset* and the Adaptive Server character set.

  By using `-J client_charset`, you request that Adaptive Server convert data to and from *client_charset*, the client's character set.

By using `-J` without a character set name, you specify character set conversion as NULL; no conversion takes place. Use this `-J` alone when the client and server are using the same character set.

By omitting `-J`, you set the character set to the default set for the platform. A filter converts input between the default set and the Adaptive Server character set. Keep in mind that the default may not necessarily be the character set that the client is using.

For more information about character sets and their associated flags, see the *System Administration Guide*.

- ***`-a display_charset`*** – runs **optdiag** from a terminal with a character set that differs from that of the machine on which **optdiag** is running. Use `-a`:
    - In conjunction with `-J` to specify the character set translation (`.xlt`) file required for the conversion.
    - Without `-J` only if the client character set is the same as the default character set.

Note: The ascii_7 character set is compatible with all character sets. If either the Adaptive Server character set or the client character set is set to ascii_7, any 7-bit ASCII character can pass unaltered between client and server. Any other characters produce conversion errors. For more on character-set conversion, see the *System Administration Guide*.

On some Linux platforms, the LANG environment variable might be set by default to "en_US.UTF-8," which can cause unnecessary LONGCHAR conversion between the client and server. If your server and client have different charsets, SAP recommends that you bypass the conversion using one of these methods:

- **unsetenv LANG**
- **setenv LANG C**
- **optdiag -J**
- **optdiag -Jiso-1** (if your server uses iso-1)

Examples

- **User tables –** Displays statistics for all user tables in the `pubs2` database and places the output in the `pubs2.opt` file:

```
optdiag statistics pubs2 -Usa -Ppasswd -o pubs2.opt
```

- **Table –** Displays statistics for the `titles` table:

```
optdiag statistics pubs2..titles -Usa -Ppasswd
    -o titles.opt
```

- **Character set –** Displays statistics using the roman8 character set and row labels and error messages in French:

```
optdiag statistics pubs2..titles -Usa -Ppasswd
    -o titles.opt -J roman8 -z french
```

- **Binary statistics –** Displays binary statistics for the `price` column in the `titles` table:

  ```
  optdiag binary statistics pubs2..titles.price
      -Usa -Ppasswd -o price.opt
  ```

- **Edited statistics –** Loads edited statistics from the `price.opt` file:

  ```
  optdiag statistics -i price.opt -Usa -Ppasswd
  ```

See also

- *ddlgen* on page 45

Usage for optdiag

Take these into consideration when using **optidag**.

- Set the SYBASE environment variable to the location of the current version of Adaptive Server before using **optdiag**.
- By default, **optdiag** does not include the system tables when you display statistics for a database. To include the system tables in the output, use the `-s` flag.
- You cannot specify a particular partition on the **optdiag** command line; **optdiag** displays statistics for all partitions of a specified table.
- When you use **binary** mode, **optdiag** displays the human-readable values with comment marks (#s) at the beginning of the lines, as shown in this example:

  ```
  Statistics for column:          "price"
  Last update of column statistics: Jan 20 1998   7:16PM
  Statistics loaded from Optdiag.
      Range cell density:         0x3f8b9cfefece26bf
  #   Range cell density:         0.0134830400000000
      Total density:              0x3f8b9cfefece26bf
  #   Total density:              0.0134830400000000
      Range selectivity:          default used (0.33)
  #   Range selectivity:          default used (0.33)
      In between selectivity:     default used (0.25)
  #   In between selectivity:     default used (0.25)
  ```
- When you use **optdiag** with an input file to change statistics, it ignores all characters after the “#” in a line.
- Converting floating-point values may lead to rounding errors when you use files for input. When you are loading statistics on the same hardware platform, edit the statistics using the binary values to provide greater precision.
- **optdiag** displays:
  - The statistic **sampling percent last used**, which indicates that statistics are gathered with a user-specified sampling percent.
  - Statistics for each partition of a multi-partitioned table or index.
  - Global- and partition-level statistics for each column in a table with multiple partitions.
- Use **ddlgen** partition names and the **optdiag** utility to analyze optimizer behavior by creating empty partitioned tables with simulated metadata.

See also:

- *Performance and Tuning Guide* – for details on **optidag** output, and changing statistics using **optidag**
- *Reference Manual: Commands* – **create index**, **delete statistics**, **set**, **update statistics**
- *Reference Manual: Procedures* – **sp_addlogin**, **sp_configure**, **sp_defaultlanguage**, **sp_droplanguage**, **sp_flushstats**, **sp_helplanguage**

Byte Ordering and Binary optdiag Files

Do not use the **binary** mode option to move statistics between Adaptive Servers on machines that use different byte ordering.

- On an incompatible architecture server, always comment out binary statistics and load the human-readable statistics.
- On a compatible architecture server, load either binary statistics or human-readable statistics.

optdiag Input Mode

When you use the `-i` *`input_file`* syntax, **optdiag** reads the file as named and updates statistics in `sysstatistics`.

optdiag input mode changes the **allow update to system tables** configuration parameter by setting the parameter to 1 at the beginning of the session, and then to 0 at the end of the session.

During histogram input, the process checks these rules and displays error messages for any violated rules:

- The step numbers must increase monotonically, unless the command includes the `-T4` trace flag.
- The column values for the steps must increase monotonically.
- The weight for each cell must be between 0.0 and 1.0.
- The total of weights for a column must be close to 1.0.
- The first cell represents null values, and it must be present, even in columns that do not allow null values. There must be only one cell to represent the null value.
- Two adjacent cells must not both use the **<** (less than) operator.

preupgrade

Performs tests on an installation or database to determine its readiness for upgrade, and reports found problems.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_ASE/upgrade`.
- (Windows) `%SYBASE%\%SYBASE_ASE%\upgrade`, as **preupgrd.exe**.

Syntax

```
preupgrade [-v] [-h] [-N]
    [-p [skip_sybprocs]
    [-D database_name]
    [-I interfaces_file]
    [-P password]
    [-S server_name]
    [-U user_name]
    [-X option[,option]...]
```

Parameters

- ***-D database_name*** – limits checking to the named database and a subset of possible checks. Use this parameter to check newly loaded databases before bringing them online.
- **-h** – prints help text and then exits.
- ***-I interfaces_file*** – specifies an interfaces file for the server. The default is `$SYBASE/interfaces`.
- **-N** – specifies **preupgrade** is to run in noninteractive mode. Thus, if **preupgrade** determines that any database is too small, the utility exits immediately.
- **-p [*skip_sybprocs*]** – specifies whether you want to skip the parsing validity test on stored procedures.

  During the upgrade process, stored procedures are automatically re-created internally from the text source, requiring that they be parsed correctly. The valid options for **preupgrade -p** are:

  - `-p` – skips the parsing in all databases
  - `-p skip_procs` – skips parsing in `sybsystemprocs` while parsing the other databases
  - Not using `-p` – parses text everywhere. This is the default.
- ***-P password*** – specifies the password for connecting to the server. SAP recommends that you do not use this option on the command line as the password is then visible to other users when they view displays of system information. Rather, wait until Adaptive Server prompts for a password, and enter the information then.
- ***-S server_name*** – specifies the name of the server to which you want to connect. This server must be listed in the interfaces file specified by the `-I` parameter. The default is $DSQUERY.
- ***-U user_name*** – specifies the user name to use when connecting to the server. The default is “sa.” *user_name* must have “sa_role” privileges on the server being checked.

  Note: If you use the `-D` option, which limits checking to a named database, and that database is offline, enter “sa” or accept the default as the user name.
- **-v** – prints version information and exits.
- ***-X option*[, *option*...]** – specifies a list of checks to be made. The default is all checks, except when using the `-D` option, which uses only a subset of available checks. If

you specify the `-X` option more than once on the command line, **preupgrade** performs only those checks in the last entered `-X` parameter.

When using the `-X` parameter with an options list, either:

- List options without a space between the comma and the next option, or
- Surround the options list with quotes.

Valid check options are:

Check Option	Option Used With the `-D` Parameter	Description
`all`		Performs all permitted checks. When used with the `-D` option, only checks subset of options. Otherwise, all options are checked.
`cache`		Checks the definition of default cache size. If the definition is DEFAULT, enter its current value in the configuration file as its actual value. This ensures that its size does not change because the new server's default value is different from the current server's default value.
`config`		Checks the server's configuration parameters to see if they are consistent with new requirements, and reports discrepancies. Discrepancies can cause errors or warnings for certain parameters: • Errors – occur when the current value of a parameter is outside the new server's range, or when its value is too low for upgrade. • Warnings – occur when the current value of a parameter is between the maximum and minimum values, but less than the default value
`da-ta_mods`		Performs updates to system tables, including clearing certain system table columns that are non-zero. Applies primarily to older Adaptive Servers, and will make no changes to newer systems.
`data-type`	X	Checks the `systypes` table to make sure that if existing datatypes use a system-defined name, type, or user type, they match what the new server expects. Reports discrepancies and suggests remedies.
`db_size`		Checks that certain system databases meet the minimum size requirements for installation.
`free_sp ace`	X	Checks for free space in the named database or in all databases. Makes sure that there is sufficient free data and log space to perform the necessary upgrade steps.

Check Option	Option Used With the `-D` Parameter	Description
`object_id`	X	Checks that object IDs of user-defined objects are not reserved for system objects. • Adaptive Server 15.0 and later reserves objects IDs 1 – 255. • Adaptive Server 12.5.x and earlier reserves object IDs 1 – 99. Does not issue an error. If you receive a warning that a user object ID is reserved, contact Sybase Technical support for directions for changing the user object ID after upgrade.
`required_dbs`		Checks that required system databases exist. Some versions of Adaptive Server may require specialized databases such as `sybsystemdb`.
`sproc_text`	X	Checks for the existence of stored procedure text in the named database or in all databases. After upgrade, Adaptive Server must recompile stored procedures from their source text. This check makes sure that all of the source text is both available and valid.
`srvclass`		Checks for servers classed as "generic" in `master.dbo.sysservers`. This class is deprecated by Adaptive Server 12.0 and later.
`statistics`		Checks for duplicate rows in `sysstatistics`. Duplicate rows may occur when upgrading from Adaptive Server 12.0 to Adaptive Server 15.0 and later due to schema changes in the `sysstatistics` table.

Sybase may occasionally change valid options for the `-X` parameter; use the `-h` parameter to view the current set of valid options.

Examples

- **Check options (-X) –** Specifies checks for the default cache size, minimum database size, and duplicate rows in `sysstatistics` for the installation:

  ```
  preupgrade -X cache,db_size,statistics
  ```

- **Check database (-D) –** Checks a newly loaded, offline database for datatypes, free space, object IDs, and stored procedure text:

  ```
  preupgrade -Dmy_db -Usa
  ```

- **Noninteractive mode (-N) –** Shows how the **sqlupgrade** utility uses **preupgrade**. When used in this way, **preupgrade** checks all databases, runs noninteractively, and exits with a failing status if any database is too small:

```
preupgrade –N
```

Permissions

The user login specified by the `–U` parameter must have system administrator privileges to run **preupgrade** on the server specified by the `–S` parameter.

When using the `–D` parameter to check an offline database, **preupgrade** must log in as user “sa.” The “sa_role” privilege is insufficient.

See also

- *sqlupgrade* on page 132
- *sqlupgraderes* on page 133

Usage for preupgrade

There are additional considerations when using **preupgrade**.

- When **preupgrade** finds no errors, it exits with status 0 (zero).
- **preupgrade** is primarily used before upgrading an installation to ensure the procedure will run smoothly. You can also run **preupgrade** after loading a database created by a previous version of Adaptive Server to check for problems that might prevent that database from upgrading while being brought online.
- **sqlupgrade** calls **preupgrade** as part of its normal procedure.

The preupgrade -D Parameter

Use the `–D` parameter primarily to check newly loaded databases before bringing them online.

To do so, **preupgrade** must force access to offline databases, which requires that **preupgrade** log in as user “sa” The “sa_role” privilege alone is insufficient. The default is `–Usa`.

When run as part of a normal upgrade, the `–D` parameter is optional, and you can choose a system administrator login other than “sa.”

Unless the `–D` parameter is included, **preupgrade** checks all databases in the system, and runs only on previous server versions.

sqlupgrade always runs the full set of **preupgrade** checks. Correct problems and run **preupgrade** to ensure that the problems are indeed corrected before letting **sqlupgrade** repeat the full **preupgrade** procedure.

If the `–D` parameter is included, **preupgrade**:

- Checks only the named database.
- Can run be run against server of the same version number as the **preupgrade** utility.
- Limits checking to a subset of possible checks. See `–X` parameter for a list of checks that are valid when used in conjunction with this parameter.

When running **preupgrade** after an upgrade to check a newly loaded but offline database, use the `-D` parameter and either specify the "sa" login or omit the `-U` parameter.

When you specify the `-D` option, or specify a partial list of options with the `-X` parameter, **preupgrade** performs the specified checks and, if there are no errors, displays a list of checks performed in the exit message.

You may want to use the `-D` and the `-X` parameters as part of the normal upgrade if **preupgrade** reports warnings or errors for a particular database or area. Using these parameters allows you to focus on problem areas without repeating unnecessary checks.

pwdcrypt

Creates and prints an encrypted LDAP password in the `libtcl.cfg` file.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_OCS/bin`.
- (Windows) `%SYBASE%\%SYBASE_OCS%\bin`, as **pwdcrypt.exe**.

Before using **pwdcrypt**, set the SYBASE environment variable to the location of the current version of Adaptive Server.

Syntax

```
pwdcrypt
```

Examples

- **Example of pwdcrypt –** Enter `pwdcrypt` at the prompt to return a request to enter your password twice, after which **pwdcrypt** returns the LDAP password:

  ```
  pwdcrypt
  Enter password please: password
  Enter password again : password
  ```

  ```
  The encrypted password:
  0x01312a775ab9d5c71f99f05f7712d2cded288d0ae1ce79268d0e8669313d1bc
  4c706
  ```

  Replace the last part of the LDAP URL in `libtcl.cfg` with this encrypted password:

  ```
  ldap=libsybdldap.so
  ldap://dolly:389/dc=sybase,dc=com????
  bindname=cn=Manager,dc=sybase,dc=com?
  0x01312a775ab9d5c71f99f05f7712d2cded288d0ae1ce79268d0e8669313d1bc
  4c706
  ```

  An unencrypted password looks similar to:

  ```
  ldap=libsybdldap.so
  ldap://dolly:389/dc=sybase,dc=com????
  ```

```
bindname=cn=Manager,dc=sybase,dc=com?
secret
```

Permissions

Use file system permissions to prevent unauthorized access to this encrypted password in your `libtcl.cfg` file.

qrmutil

(Cluster Edition only) **qrmutil** allows you to back up, restore, and reconfigure the quorum device.

The utility is located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
--additional-run-parameters=parameter_list
--ase-config-extract=file_name
--ase-config-info
--ase-config-store=file_name
--ase-config-version=version_number
--buildquorum=[force]--cluster-take-over
--config-file=file_name
--diag={all | boot | toc | nodes | locks | config | cms}
--display={boot | nodes | heartbeat | master | cluster |
        instance | config | state}
--drop-cluster=[force]
--drop-instance=instance_name
--errorlog=file_name
--extract-config=file_name
-h, --help
-F, --cluster-input=file_name
--fence-capable=device_path
--installation=installation_mode
-s, --instance=instance_name
--instance-node=node_name
--interfaces-dir=path_to_interfaces_file
--max-instances=number_of_instances
--master-dev=master_device
--membership-mode=membership_mode
--primary-address=interconnect_address
--primary-port=port_number
--primary-protocol=protocol
-Q, --quorum-dev=quorum_device
--register-node=node_name
--secondary-address=interconnect_address
--secondary-port=port_number
--secondary-protocol=protocol
--traceflags=traceflag_list
--unregister-node=node_name
--verify-node=node_name
-v, --version]
```

Parameters

- **`--additional-run-parameters=`*`parameter_list`*** – parameters that Unified Agent uses to start the data server. Unlike other settings, **dataserver** does not read additional run parameters. They are read by the unified agent and passed to the **dataserver** command line. If you include the `--instance` parameter, the additional run parameters apply to the specified instance. Otherwise, the additional run parameters apply to all instances in the cluster.
- **`--ase-config-extract=`*`file_name`*** – extracts the Adaptive Server configuration file stored on the quorum device to the named file.
- **`--ase-config-info`** – displays information about the Adaptive Server configuration file stored on the quorum device.
- **`--ase-config-store=`*`file_name`*** – stores the named file in the quorum device as the Adaptive Server configuration file.
- **`--ase-config-version=[`*`version_number`*`]`** – displays or sets the version of the master Adaptive Server configuration file stored on the quorum device.
- **`--buildquorum[=force]`** – builds a new quorum device. Use `=force` to overwrite an exiting file or an existing quorum device on a raw partition. You must include the `--cluster-input` parameter with `--buildquorum`.
- **`--config-file=`*`config_file_name`*** – if used with `-instance`, sets this path to the Adaptive Server configuration file for the specified instance. If you do not include `-instance`, sets the path to the cluster-wide configuration file.
- **`--diag={all | boot | toc | nodes | locks | config | cms}`** – for internal use only.
- **`--display={boot | nodes | heartbeat | master | cluster | instance | config | state}`** – displays the current state of cluster or instance:
  - `boot` – displays start-up information for the cluster, including the version of the quorum device, any trace flags issued at start-up, the boot ID of the cluster, and any messages displayed at start-up.
  - `nodes` – displays the registered management nodes.
  - `heartbeat` – displays heartbeat information for all nodes in the cluster.
  - `master` – displays master device information.
  - `cluster` – displays the cluster configuration.
  - `instance` – displays the instance configuration. You must include `--instance=`*`instance_name`* with this parameter.
  - `config` – displays configuration for the cluster and for all instances in the cluster.
  - `state` – displays the current state for the cluster and for all instances in the cluster.
- **`--drop-cluster=[force]`** – drops a cluster and removes the quorum device. Use `=force` to force the drop if the quorum indicates the cluster is running.

Warning! `--drop-cluster` removes the cluster.

- **`--drop-instance=`*`instance_name`*** – do not use; Sybase internal use only.

  Warning! Use the **sybcluster** utility to drop an instance from the cluster.
- **`--errorlog=`*`log_file_name`*** – full path to the error log for the specified instance. You must include the `-instance-name` parameter. Takes effect at next restart of the instance.
- **`--extract-config=`*`file_name`*** – extracts the configuration area of the quorum device to the specified file.
- **`-h | --help`** – displays the full syntax of **qrmutil**.
- **`-F | cluster-input=`*`file_name`*** – loads the cluster configuration from the specified cluster input file.
- **`--fence-capable=`*`device_path`*** – tests if specified device can be used for I/O fencing. Returns either “Device is fence capable” or “Device is not fence capable”.
- **`--installation=`*`installation_mode`*** – changes the installation mode for the cluster. Values are:
  - `shared` (default)
  - `private`
- **`-instance=`*`instance_name`*** – applies **qrmutil** parameters to a specified instance.
- **`--interfaces-dir=`*`interfaces_path`*** – the path to a directory that contains a file named interfaces. If this parameter is used with `--instance`, it sets the path to the interfaces file for the specified instance. If `--instance` is not included, sets the path to the cluster-wide interfaces file.
- **`--max-instances=`*`number_of _instances`*** – sets the maximum number of instances for the cluster configuration.
- **`--master-dev=`*`master_device_name`*** – changes the master device the cluster uses.
- **`--membership-mode=`*`membership_mode`*** – sets the membership mode. Values are:
  - `native` (default)
  - `vcs`
- **`--primary-address=`*`interconnect_address`*** – changes the primary interconnect address for a given instance.
- **`--primary-port=`*`port_number`*** – changes the starting port number for the primary interconnect for a given instance.
- **`--primary-protocol=`*`protocol`*** – changes the protocol used for the primary cluster interconnect.
- **`-Q | --quorum-dev=`*`quoum_path`*** – specifies the full path to the quorum device.
- **`--register-node=`*`node_name`*** – registers a node for quorum management.

- **`--secondary-address=`*`inteconnect_address`*** – changes the secondary interconnect address for a given instance.
- **`--secondary-port=`*`port_number`*** – changes the starting port number for the secondary interconnect for a given instance.
- **`--secondary-protocol=`*`protocol`*** – changes the protocol used for the secondary cluster interconnect.
- **`--traceflags=`*`trace_flag, trace_flag`*** – changes the cluster-wide or the instance-specific trace flags for start-up. If you do not include a list of trace flags, **qrmutil** clears the trace flags for the cluster instance.
- **`--unregister-node=`*`node_name`*** – unregisters a node from quorum management.
- **`--verify-node=`*`node_name`*** – indicates that the specified node is registered on the quorum device.
- **`-v | --version`** – displays the version information for the **qrmutil** utility.

Examples

- **Change path –** Changes the path to the error log to `/sybase/opt/cluster/ASE-15_0/ase1.log`:

```
qrmutil --quorum_dev=/dev/raw/raw101 --instance=ase1
--errorlog=/sybase/cluster/ASE-15_0/ASE-15_0/ase1.log
```

- **Register node –** Registers the node "blade5" for mycluster:

```
qrmutil --quorum_dev=/dev/raw/raw101 --register-node=blade5
```

- **Create quorum device –** Creates a new quorum device for the cluster "mycluster":

```
qrmutil --quorum-dev=/dev/raw/raw101 --cluster-input=/sybase/
cluster/ase1.inp -buildquorum
```

- **Back up device –** Backs up the quorum device to `/sybase/cluster_bak/quorum.bak`:

```
qrmutil --quorum-dev=/dev/raw/raw101
--extract-config=/sybase/cluster_bak/quorum.bak
```

- **Restore device –** Restores the quorum device from the backup created in `/sybase/cluster_bak/quorum.bak`:

```
qrmutil --quorum-dev=/dev/raw/raw101 --cluster-input=/sybase/
cluster_bak/quorum.bak --buildquorum=force
```

- **Display configuration –** Displays the cluster configuration stored on the quorum device:

```
qrmutil --quorum-dev=/dev/raw/raw101 --display=config
```

- **Test –** Tests whether the named device can be fenced:

```
qrmutil --quorum-dev=/dev/raw/raw101 --fence-capable=/dev/raw/
raw106
```

Usage

- **qrmutil** is primarily a diagnostic utility. SAP recommends that you use **sybcluster** to make configuration changes to the cluster.
- You may pass as many as 20 commands to **qrmutil**. However, you can specify the `--instance=` parameter only once.
- If you specify `--buildquorum`, the quorum is built and **qrmutil** exits without running any commands other than `--cluster-input`.
- **qrmutil** exits after it executes the `--drop-cluster` parameter.
- This is an example of using multiple commands:

  ```
  qrmutil --quorum-dev=/dev/raw/raw101 --display=cluster
  --register-node=blade1 --unregister-node=blade2 --verify-
  node=blade3
  ```

Permissions

To run **qrmutil**, you must be the same `sybase` user that started the instance, with execute priveledges on the **qrmutil** binary, have direct access to the quorum device, and at least **read** permissions on the quorum file.

qptune

qptune is an Adaptive Server utility written in Java/XML. It enables users to fix missing statistics and identify the best query plan, optimization goals, or other configuration settings, and apply them at the query or server level. This results in optimal performance of subsequent query executions.

Syntax

```
qptune
    [-U username]
    [-P password]
    [-S hostname:port/database]
    [-A action]
    [-M mode]
    [-T appTime]
    [-i inputFile]
    [-o outputFile]
    [-f fileList(,)]
    [-c configFile]
    [-l limit]
    [-e evalField]
    [-d difference]
    [-m missingCount]
    [-n login]
    [-J charset>]
    [-N (noexec)]
    [-g (applyOptgoal)]
    [-v (verbose)]
```

```
    [-s (sort)]
    [-h (help)]
```

Parameters

- **`-U`** ***`username`*** – specifies the database user name.
- **`-P`** ***`password`*** – specifies the database password.
- **`-S`** ***`server`*** – specifies the database server. The database server is denoted by *host*:*port*/*database*.

Note: Specify the `-S` option while using any **qptune** action.

- **`-A`** ***`action`*** – specifies the action to be taken. Valid actions are:
  - `start`
  - `collect` – the default value
  - `collect_full`
  - `compare`
  - `fix`
  - `start_stats`
  - `collect_stats`
  - `fix_stats`
  - `undo_fix_stats`
- **`-c`** ***`configFile`*** – specifies the configuration file. The default value is `config.xml`.
- **`-d`** ***`difference`*** – specifies the percentage and absolute value difference for performance improvement to be considered outstanding using the format `-d <`*`diff%`*` (,`*`diff_abs`*`)>`. The default value is 5,5. If you specify percentage but not the absolute value, then absolute value defaults to 0.
- **`-e`** ***`evalField`*** – is the evaluation field used for performance comparison. The default value is `elap.avg`.
- **`-f`** ***`fileList`*** – compares a list of files to get the best plans; use commas to separate filenames.
- **`-g`** – when used along with the `fix` action, applies the default goal. The default goal is the best optgoal setting that most queries used as the best plan using QPTune's `fix` action. This option only generates plans for queries that do not currently use the server's default optimization goal.
- **`-i`** ***`inputFile`*** – specifies the input file for the `fix`, `fix_stats`, and `undo_fix_stats` actions. You can also use `-i` to apply special rules to the specified queries for `start` for custom modes.
- **`-J`** ***`charset`*** – specifies the character set used to connect to Adaptive Server. If you do not specify this option, the Adaptive Server uses the server's default character set.

Note: If the installed JRE does not support the server's default charset encoding, you see an error message during the login process. Use the `-J` option to specify a more generic character set, such as `-J utf8`.

- ***`-l limit`*** – specifies a limit on the number of queries that should be analyzed and applied with special rules.
- ***`-M mode`*** – specifies the optimization goal or custom mode for an application. The valid options for *mode* are `allrows_oltp`, `allrows_dss`, `allrows_mix`. You may also define custom modes, however `_basic_` is a system-reserved custom mode. The default value is `allrows_dss`.
- ***`-m missingCount`*** – specifies the threshold value for missing statistics. The default value is 5.
- **`-N`** – used along with `fix_stats` and `undo_fix_stats`, `-N` generates a SQL script with **update statistics** or **delete statistics** statements. The **update** or **delete** statements are not executed through **qptune**. The statements are written into a SQL script that is specified by the `-o` option.
- ***`-n login`*** – specifies the user's login whose query executions are collected and analyzed.
- ***`-o outputFile`*** – specifies the output file. The default value is `metrics.xml`.
- ***`-T appTime`*** – specifies the application running time, in minutes. The default value is 0.
- **`-v`** – specifies verbose mode. Do not use `-v` when collecting more than 1,000 queries, as QPTune can take a long time to export all the query information on the console. Instead, view the output XML file for query details.

Examples

- **Fix stats –** Fixes missing statistics, starts the utility with the `start_stats` action:

```
QPTune -A start_stats -S my_host:4816/my_database  -v

Executing : QPTune -U sa -P [unshown]
-S jdbc:sybase:Tds:my_host:4816/my_database
-A start_stats -M allrows_dss -T 0 -i null
-o metrics.xml -f null -c config.xml -l 5
-e elap_avg -d 5,5 -m 5 -n null -v
You are now connected to database: my_database
[INFO] Config: sp_configure 'capture missing statistics', 1
[INFO] Config: sp_configure 'system table', 1
[INFO] Config: delete sysstatistics where formatid =110
```

- **Retrieve missing information –** Uses `collect_stats` to retrieve missing statistics information from the `sysstatistics` table for statistics that exceed a specified threshold for count of missing statistics:

```
QPTune -A collect_stats -m 1 -o missingstats.xml -v
        -S my_host:4816/my_database
```

```
Executing : QPTune -U sa -P [unshown] -S jdbc:sybase:Tds:my_host:
4816/my_database -A collect_stats -M allrows_dss -T 0 -i null -o
missingstats.xml -f null -c config.xml -l 5 -e elap_avg -d 5,5 -m 1
-n null -v
You are now connected to database: my_database
Now collecting missing statistics information from sysstatistics
on "Fri Sep 26 10:08:06 PDT 2008".
<?xml version="1.0" encoding="UTF-8"?>
<server url="jdbc:sybase:Tds:my_host:4816/my_database"
file="missingstats.xml"
type="missing stats" datetime="Fri Sep 26 10:08:06 PDT 2008" >
  <missingStat id="1">
    <id>1068527809</id>
    <stats>Y(y4,y2)</stats>
    <count>2</count>
  </missingStat>
  <missingStat id="2">
    <id>1068527809</id>
    <stats>Y(y3)</stats>
    <count>1</count>
  </missingStat>
  <missingStat id="3">
    <id>1068527809</id>
    <stats>Y(y2,y1)</stats>
    <count>1</count>
  </missingStat>
  <missingStat id="4">
    <id>1068527809</id>
    <stats>Y(y1)</stats>
    <count>1</count>
  </missingStat>
</server>
The missing statistics information is written into XML file:
missingstats.xml
[INFO] End config: sp_configure 'enable metrics capture', 0
[INFO] End config: sp_configure 'abstract plan dump', 0
[INFO] End config: sp_configure 'system table', 0
[INFO] End config: sp_configure 'capture missing statistics', 0
Program has restored the data source for metrics collection.
----- QPTune finished executing. ------
```

- **Update statistics –** After collecting missing statistics information into an XML file called `missingstats.xml`, updates the statistics using the `fix_stats` action:

```
QPTune -A fix_stats -m 1 -i missingstats.xml
       -v -S my_host:4816/my_database

Executing : QPTune -U sa -P [unshown] -S jdbc:sybase:Tds:my_host:
4816/my_database -A fix_stats -M allrows_dss -T 0 -i
missingstats.xml -o metrics.xml -f null -c config.xml -l 5 -e
elap_avg -d 5,5 -m 1 -n null -v
You are now connected to database: my_database
Fix statistics on "Fri Sep 26 10:14:59 PDT 2008"
----------------------------------------------------------
Details of statements(s) fixed:
------------------------------
```

```
Fixed statistics:[Update] Y(y4,y2)
[INFO] Fix Statement = update statistics Y(y4,y2)
Fixed statistics:[Update] Y(y3)
[INFO] Fix Statement = update statistics Y(y3)
Fixed statistics:[Update] Y(y2,y1)
[INFO] Fix Statement = update statistics Y(y2,y1)
Fixed statistics:[Update] Y(y1)
[INFO] Fix Statement = update statistics Y(y1)
----- QPTune finished executing. ------
```

Generates a SQL script for updating statistics, without executing the actual updates, by using the `-N` option to indicate “noexec”, and the `-o`option to indicate the output script file:

```
QPTune -U sa -P -S my_host:5000/my_database
       -A fix_stats -m 5 -i missingstats.xml
       -N -o missingstats.sql
```

- **Start QPTune –** Starts QPTune to apply standard optimization goal settings to queries:

  ```
  QPTune -S host:port/database -A start
          [-M {allrows_oltp, allrows_dss, allrows_mix}]
  ```

  Start QPTune to apply custom rules to specified queries:

  ```
  QPTune -S host:port/database -A start -M custom_1
          -i input.xml -l 3 [-v]
  ```

- **Collect metrics –** Runs your application and collect metrics into an XML file named `a2.xml`:

  ```
  QPTune -S host:port/database -A collect -T 0
          -o a2.xml -v

  Program has configured the data source for metrics collection.
  Now collecting information from sysquerymetrics on "Tue Feb 19
  22:16:04 PST 2008".
  <?xml version="1.0" encoding="UTF-8"?>
   <server url="jdbc:sybase:Tds:SHANGHI:5000" type="ASE"
  mode="custom_1" datetime="Tue Feb 19 22:16:04 PST 2008">
  <query id="1">
  <qtext> select count(T.title_id) from authors A, titleauthor T
  where A.au_id = T.au_id </qtext>
  <elap_avg>300</elap_avg>
  <bestmode> custom_1
  </bestmode>
  </query>
  </server>
  ```

- **Compare XML files –** Once metrics are collected, compares different XML files to get the best query optimization goal or criteria for each of the queries:

  ```
  QPTune -A compare -f a1.xml,a2.xml -d 51,10
       -o best.xml -S my_host:5000/my_database
  ```

  This result shows a comparison between two XML metrics files: `a1.xml` has six queries, and `a2.xml` has seven queries. Comparisons can only be made between the queries that are common to both files. There are three queries that ran faster in `a2.xml`:

```
Compare all the files: | a1.xml, a2.xml|
Report generated on "Tue Aug 19 21:13:04 PST 2008"
-----------------------------------------------------------------
---------
File #1: [name= a1.xml  :  mode=allrows_mix]
File #2: [name= a2.xml  :  mode=custom_1]
Query count in File #1 : [mode=allrows_mix]         6
Query count in File #2 : [mode=custom_1]            7
=================================================================
=========
Query count improved in File #2: [mode=allrows_mix] 3

Total performance improved [from 422 to 129]: 69 %

Following queries run better in File #2:
[mode=allrows_mix]
-----------------------------------------------------------------
---------
Group 1: improved by no more than 25% [0 queries]
Group 2: improved by 25% to 50% [1 queries]
Query: select count(T.title_id) from authors A, titleauthors T
where A.au_id = T.au_id
Average elapsed time (ms): File #1=100  File
#2=50  Improvement=50.0%  Outstanding=No
Group 3: improved by 50% to 75% [0 queries]
Group 4: improved by 75% to 100% [2 queries]
Query: select count(*) from titlles T, titleauthors TA where
T.title_id = TA.title_id
Average elapsed time (ms): File #1=34  File
#2=7  Improvement=79.0%  Outstanding=Yes
Query: select au_lname, au_fname from authors where state in
("CA", "AZ")
Average elapsed time (ms): File #1=9  File
#2=0  Improvement=100.0%  Outstanding=No
```

Usage

When you use QPTune to collect a very large number of queries, you may see a message such as:

```
Exception in thread "main" java.lang.OutOfMemoryError:
Java heap space
```

If this occurs, increase the value of the maximum heap size of the Java Virtual Machine (JVM) by using **sp_jreconfig** to set the `-Xmx` arguments of the `PCA_JVM_JAVA_OPTIONS` directive to a size larger than the default of 1024MB. See Chapter 2, “Managing the Java Environment” in *Java in Adaptive Server Enterprise* for more information about `-Xmx`.

When you use QPTune to collect a large amount of queries, do not use the `-v` verbose option.

See also:

- *Java in Adaptive Server Enterprise*

- *Migration Technology Guide*
- *Reference Manual: Procedures* – **sp_jreconfig**

Permissions

QPtune's **compare** action may be run by any user. All other actions of QPTune may only be run by users with `sa_role` and `sso_role`.

showserver

(UNIX only) Shows the Adaptive Servers and Backup Servers that are currently running on the local machine, available only in UNIX platforms.

The utility is located in `$SYBASE/$SYBASE_ASE/install`.

Syntax

```
showserver
```

Parameters

- **None –**

Examples

- **Servers running –** Shows the Adaptive Servers and Backup Servers that are currently running on the local machine:

```
showserver

USER        PID %CPU %MEM   SZ  RSS TT STAT START  TIME COMMAND
user114276  0.0  1.7  712 1000 ?  S    Apr  5514:05 dataserver
-d greensrv.dat -sgreensrv -einstall/greensrv+_errorlog
sybase    1071  0.0  1.4  408  820 ?  S    Mar 28895:38 /usr/local/
sybase/bin/dataserver -d/dev/rsd1f -e/install/errorlog
user128493  0.0  0.0 3692    0 ?  IW   Apr  1  0:10 backupserver -
SSYB_BACKUP
-e/install/backup.log -Iinterfaces -Mbin/sybmultbuf -Lus_english
-Jiso_1
```

Usage

showserver displays process information about Adaptive Server or Backup Server. If no servers are running, only the header appears.

See also:

- *Reference Manual: Building Blocks* – **host_name**
- *Reference Manual: Commands* – **startserver**

See also

- *dataserver* on page 37
- *startserver* on page 137
- *langinstall* on page 95

sqldbgr

sqldbgr is a command line utility that debugs stored procedures and triggers.

The utility is located in:

- (UNIX) `$SYBASE/$SYBASE_ASE/bin`.
- (Windows) `%SYBASE%\%SYBASE_ASE%\bin`, as **sqldbgr.exe**.

As with many source-level debuggers, you can:

- Attach **sqldbgr** to a task
- Set, enable, and disable breakpoints
- Step through a task one line at a time
- Step into and out of procedures
- Detach **sqldbgr** from stored procedures or triggers once the debugging is complete.

Note: You do not have the ability to view **sqldbgr** version strings.

Syntax

```
sqldbgr
    -U username
    -P password
    -S host:port
```

Parameters

- ***-U username*** – specifies the user name. Insert a space between `-U` and *username*.
- ***-P password*** – specifies the user password. Insert a space between `-P` and *password*.
- ***-S host:port*** – specifies the machine name and the port number. Insert a space between `-S` and *host:port*.

Examples

- **Debug stored procedures and triggers –** Shows **sqldbgr** debugging stored procedures and triggers on host MERCURY:

  ```
  $SYBASE/$SYBASE_ASE/bin/sqldbgr -U sa -P -S MERCURY:16896
  ```

  ```
  (sqldbg) stop in sp_who
  Breakpoint moved to line 20
  ```

```
(sqldbg) run sp_who
(sp_who::20)if @@trancount = 0
(sqldbg) next
(sp_who::22)    set chained off
(sqldbg) cont
fid spid status loginame origname hostname blk_spid dbname cmd
block_xloid
0   2    sleeping NULL   NULL     0        master   NETWORK HANDL
ER      0
0   3    sleeping NULL   NULL     0        master   NETWORK HANDL
ER      0
0   4    sleeping NULL   NULL     0        master   DEADLOCK TUNE
        0
0   5    sleeping NULL   NULL     0        master   MIRROR HANDLE
R       0
0   6    sleeping NULL   NULL     0        master   ASTC HANDLER
        0
0   7    sleeping NULL   NULL     0        master   ASTC HANDLER
        0
0   8    sleeping NULL   NULL     0        master   CHECKPOINT SL
EEP     0
0   9    sleeping NULL   NULL     0        master   HOUSEKEEPER
        0
0   10   running  sa     sa       0        master   SELECT
        0
0   11   sleeping sa     sa
(sqldbg) show breakpoints
1 stop in sp_who
(sqldbg)
```

- **Debug a stored procedure running in another task –** In this example, the system administrator first logs in to Adaptive Server using **isql**, then starts **sqldbgr** from the command line to debug a stored procedure that is running in another task:

```
$SYBASE/$SYBASE_OCS/bin/isql -U sa -P
1> select @@spid
2> go
------
12
1>

$SYBASE/$SYBASE_ASE/bin/sqldbgr -U sa -P -S MERCURY:16896
```

```
(sqldbg) attach 13
The spid is invalid
(sqldbg) attach 12
(sqldbg) show breakpoints
(sqldbg) stop in sp_who
Breakpoint moved to line 20
(sqldbg) /* at this point run the sp_who procedure from spid 12 */
(sqldbg) where
(sp_who::20::@loginname = <NULL>)
(ADHOC::1::null)
(sqldbg) next
(sp_who::22)    set chained off
(sqldbg) next
(sp_who::25)set transaction isolation level 1
```

```
(sqldbg) cont
(sqldbg) /* at this point the sp_who result will show up in the
isql screen */
(sqldbg) detach 12
(sqldbg)
```

Usage for sqldbgr

Additional usage instructions for **sqldbgr**.

- The **sql** command is executed in the context of debugged task, while the **mysql** command is executed in the context of debugger task. Setting session-specific information, such as for **set quoted_identifier on** through **sql** does not work.
- By default, the Sybase jConnect JDBC™ driver uses **set quoted_identifier on**. Since the **sqldbgr** utility is built using jConnect arguments that need quotes, use single quotes instead of double quotes when entering options. For example, use `sp_configure 'allow update'` instead of `sp_configure "allow update"`.
- Before running **sqldbgr**, set either the SYBASE_JRE or JAVA_HOME environments to the location containing the Java run environment.
- When you invoke **sqldbgr** at the command prompt, the utility starts and the prompt changes to a **sqldbgr** prompt:

  ```
  (sqldbgr)
  ```

  Once you see the `(sqldbgr)` prompt, enter these **sqldbgr** commands to perform your tasks:

sqldbgr commands and their descriptions are:

Command	Description
attach *spid*	Attaches a task to **sqldbgr** when you are already logged in to Adaptive Server. Do not use **attach *spid*** to attach to a procedure that is not running. **sqldbgr** cannot debug multiple tasks in the same session. If you try to attach the utility to multiple tasks, the first *spid* continues to be marked as attached. Since you cannot attach to a *spid* that is already attached, use the **detach** command, and then attach to another *spid*.
run *procname*	Debugs stored procedures and triggers without attaching **sqldbgr** to an existing task. If you attempt to use **run procname** while you are already debugging an existing task with **attach spid**, **run procname** fails and you see: `Cannot run a procedure while debugging another task`

Command	Description
stop in *procname* [at line #]	Sets a breakpoint to stop the stored procedure or trigger being debugged at the beginning of the specified procedure name. **stop in *procname* at line #** sets a breakpoint to stop the stored procedure or trigger being debugged at a designated line within the specified procedure. If you enter an invalid line number, **sqldbgr** moves the breakpoint to the next valid line number, and displays: `Invalid line number` You can also use this command to set multiple breakpoints.
show breakpoints	Displays the breakpoint handle in the form of a unique number, as well as the breakpoint statements given by the user during the **sqldbgr** session. If you specify a breakpoint line number that does not contain a valid SQL statement, Adaptive Server moves the breakpoint to the next valid line number. However, Adaptive Server does not change the command you entered. This is why **show breakpoints** can return a breakpoint handle and a breakpoint statement given during the **sqldbgr** session that can be different. An asterisk (*) in the breakpoint line indicates that the breakpoint is set, but currently disabled.
use *dbname*	Tells **sqldbgr** what database to use in order to debug that database's stored procedures or triggers.
show variables [at level #]	Dsplays all the variables and their values in the current SQL stored procedure or trigger. **show variables at level #**– displays the variables and their values in the current SQL stored procedure or trigger at the specified level. **Note: sqldbgr** does not support Java variables.
show where	Displays the call stack of the stored procedures and triggers that exist in the task being debugged.
step or next	Instructs **sqldbgr** to move to the next statement in the current stored procedure or trigger.
step into	Instructs **sqldbgr** to move into a procedure if the current statement is an **execute** statement. If the current statement is an **update**, **delete**, or **insert** statement, and if there are triggers in it, **step into** instructs **sqldbgr** to move into the **update**, **delete**, or **insert** triggers.
step out	Instructs **sqldbgr** to move out of the current stored procedure or trigger, and to stop at the next line in the calling procedure.

Command	Description
set @*varname* = VALUE	Sets the value of the indicated variable to the variable value declared in the command in the current stored procedure or trigger. The values for the variables set using **set @*varname* = VALUE** are valid only for the current session **sqldbgr**.
cont[inue]	Instructs **sqldbgr** to continue debugging, and to stop at the next breakpoint (if any).
delete #	Deletes the indicated breakpoint set in the current instance of **sqldbgr**.
enable #	Enables the indicated breakpoints, while **disable #** does the opposite.
sql *any_sql_statement*	Executes ad hoc SQL statements. Use this command to select and analyze data from temp tables created by the task being debugged. **sql *any_sql_statement*** returns a result set and any errors that occurred.
detach *spid*	Detaches **sqldbgr** from the indicated *spid*, and releases the task being debugged. It deletes the breakpoints that were set for the task being debugged during the current **sqldbgr** session.
help [all]	Display **sqldbgr** commands.

Error Messages in sqldbgr

Error messages for **sqldgbr**.

Message	Displays When
`Cannot allocate resource in ASE`	Adaptive Server does not have sufficient memory resources to execute **sqldbgr**. Increase **procedure cache size** and restart **sqldbgr**.
`Cannot create Debugger handle in ASE`	Adaptive Server does not have sufficient memory resources to create a debugger handle. Increase **procedure cache size** and restart **sqldbgr**.
`The spid is invalid`	You attempt to attach **sqldbgr** to an invalid *spid*. Double check the *spid* and try again.
`You cannot debug a task that is not owned by you`	You are attempting to debug a task that you do not own. You must log in to the server as the owner of the task to be debugged.
`Spid is already being debugged`	You execute **attach *spid*** and attempt to attach to a *spid* that is already being debugged.

Message	Displays When
`Spid is not debugged currently`	You execute **detach *spid*** and attempt to detach from a *spid* that is not attached to **sqldbgr**.
`Invalid command`	You enter an invalid command.
`Invalid procedure name`	You enter an invalid procedure name in **stop in *procname***.
`Invalid line number`	You enter an invalid line number in **stop in *procname* at line #**.
`Variable not found`	You enter an invalid variable in **show @*varname***, **show @*varname* at level #**, or **set @*varname* = VALUE**.
`Illegal conversion attempted`	You execute **set @*varname* = VALUE** and attempt to convert the variable to an invalid value.
`Conversion from text to datatype failed`	**set @*varname* = VALUE** is unsuccessful.
`Cannot run a procedure while debugging another task`	You use **run *procname*** while already debugging an existing task with **attach *spid***.

sqlloc

(UNIX only) Installs and modifies languages, character sets, and sort order defaults for Adaptive Server using a GUI.

The utility is located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
sqlloc
    [-S server]
    [-U user]
    [-P password]
    [-s sybase dir]
    [-I interfaces file]
    [-r resource file]
```

Or

```
sqlloc -v
```

Parameters

- ***-I interfaces file*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server.

- **`-P`** ***`password`*** – specifies the “sa” account password.
- **`-r`** ***`resource file`*** – executes the specified resource file.
- **`-S`** ***`server`*** – specifies the name of the Adaptive Server to which to connect.
- **`-U`** ***`user`*** – specifies a login name. Logins are case-sensitive.
- **`-s`** ***`sybase dir`*** – specifies the value to use for the SYBASE environment variable.
- **`-v`** – prints the version number and copyright message for **sqlloc** and then exits.

Usage

Set the:

- SYBASE environment variable to the location of the current version of Adaptive Server before using **sqlloc**.
- DISPLAY environment variable before invoking **sqlloc**, unless you are only using the `-v` parameter to display the version number.

See also:

- Installation guide for your platform

Permissions

You must be a Sybase system administrator to use **sqlloc**.

See also

- *langinstall* on page 95
- *sqllocres* on page 125

sqllocres

(UNIX only) Installs and modifies languages, character sets, and sort order defaults for Adaptive Server, using a resource file.

The utility is located in `$SYBASE/$SYBASE_OCS/bin`.

Syntax

```
sqllocres
    [-S server]
    [-U user]
    [-P password]
    [-s sybase dir]
    [-I interfaces file]
    [-r resource file]
```

Or

```
sqllocres -v
```

Parameters

- ***-I interfaces file*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server.
- ***-P password*** – specifies the “sa” account password.
- ***-r resource file*** – executes the specified resource file.
- ***-S server*** – specifies the name of the Adaptive Server to which to connect.
- ***-s sybase dir*** – specifies the value to use for the SYBASE environment variable.
- ***-U user*** – specifies a login name.
- **-v** – prints the version number and copyright message for **sqllocres**, then exits.

Usage

Set the SYBASE environment variable to the location of the current version of Adaptive Server before using **sqllocres**.

See also:

- Installation guide for your platform

Permissions

You must be a Sybase system administrator to use the **sqllocres** utility.

See also

- *langinstall* on page 95
- *sqlloc* on page 124

sqlsrvr

(Windows only) The executable form of the Adaptive Server program.

The utility is located in `%SYBASE%\%SYBASE_ASE%\bin`.

Syntax

```
sqlserver [-f] [-g] [-G] [-h] [-H] [-m] [-P] [-q] [-v] [-X]
    [-a path_to_CAPs_directive_file]
    [-b master_device_size] [k | K | m | M | g | G | t | T ]
    [-c config_file_for_server]
    [-d device_name]
    [-e path_to_error_log]
    [-i interfaces_file_directory]
    [-K keytab_file]
    [-L config_file_name_for_connectivity]
    [--master_key_password [=password]
    [-M shared_memory_repository_directory]
    [-p sa_login_name]
    [-r mirror_disk_name]
    [-s server_name]
    [-T trace_flag]
    [-u sa/sso_name]
    [-w master | model database]
    [-y [password] ]
    [-z page_size [ k | K ] ]
```

Parameters

- **`-a`** ***`path_to_CAPs_directive_file`*** – specifies the path to the CAPs directive file.
- **`-b`*****`master_device_size`*** **`[k | K | m | M | g | G | t | T ]`** – specifies the size of the master device.
- **`-c`** ***`config_file_for_server`*** – specifies the full path name of an Adaptive Server configuration file. Use this parameter to start Adaptive Server with the configuration values in the specified configuration file.If you specify a configuration file with the **sqlsrvr -c** parameter, make sure all the parameters in this configuration file are compatible before you boot the server. If some of the configuration parameters are incompatible, the server may not start. To avoid this, do not specify a configuration file when you build the master device. The build phase uses all default settings when you do not specify a configuration file.For more information, see the *System Administration Guide: Volume 1*.
- **`-d`*****`device_name`*** – is the full path name of the device for the `master` database. The master database device must be writable by the user who starts Adaptive Server. The default `master` database device name is `d_master`.
- **`-e`*****`errorlogfile`*** – is the full path name of the error log file for Adaptive Server system-level error messages.
- **`-f`** – forces initialization of a device or database. You must use both `-b` and `-w` to use `-f`.
- **`-G`** – specifies the name of the event log server.
- **`-g`** – turns off event-logging.
- **`-H`** – starts the high availability (HA) server, if you have the HA feature installed on your Adaptive Server.
- **`-i`*****`interfaces_file_directory`*** – specifies the directory location of the interfaces file to search when connecting Adaptive Server. If `-i` is omitted, **sqlsrvr** looks for a file named `interfaces` in the directory pointed to by your SYBASE environment variable.
- **`-h`** – prints this help message, then exists.
- **`-K`*****`keytab_file`*** – specifies the path to the keytab file used for authentication in DCE.
- **`-L`*****`config_file_name_for_connectivity`*** – specifies the name the configuration file for connectivity.

- **`-M`** ***`sharedmem_directory`*** – places shared memory files in the specified directory instead of in the default location, `%SYBASE%`. If *sharedmem_directory* starts with “\”, the directory name is assumed to be absolute. Otherwise, the directory name is interpreted relative to `%SYBASE%`.
- **`-m`** – starts Adaptive Server in single-user mode.
- **`--master_key_password [=`*`password`*`]`** – specifies the master key password when you provide the *password* on the command line or prompts for a master key password during Adaptive Server startup. The password characters do not appear, and the password is not validated until later in the Adaptive Server startup sequence.

  If you include the password on the command line, it is visible until the memory is read and used.
- **`-p`*`sso_login_name`*** – specifies the login name of a system security officer when starting Adaptive Server, for the purposes of getting a new password for that account. Adaptive Server generates a random password, displays it, encrypts it, and saves it in `master..syslogins` as that account’s new password.
- **`-q`** – treats quiesced databases as “in recovery.”
- ***`-rmastermirror`*** – starts the mirror of the master device. Use this parameter to start Adaptive Server if the master device has been damaged.
- **`-s`*`servername`*** – specifies the name of the Adaptive Server to start. If `-s` is omitted, a server named SYBASE is started.
- **`-T`*`trace_flag`*** –
- **`-u`*`sa/sso_name`*** – specifies the system administrator or system security officer’s name you want to unlock.
- **`-v`** – prints the version number and copyright message for **sqlsrvr** and then exits.
- **`-w`** ***`master | model_database`*** – specifies whether you want to write a master or model database.
- **`-X`** – starts this server as **sybmon**, not **dataserver**.
- **`-y [`*`password`*`]`** – allows you to assign a password for the encrypted private key, so that the server prompt the user for a password. This password should match the password you used to encrypt the private key when it was created. You cannot use this parameter when you are running the server in the background.

  Note: Although you can a password with `-y`, for security reasons Sybase strongly discourages you from doing so.

  A private key is included with your server’s digital certificate. By default, the certificate file located:

  ```
  %SYBASE%\%SYBASE_ASE%\certificates\servername.crt
  ```

  The location of the certificate file changes if you invoke the **sp_ssladmin addcert** command.

- ***-z page_size*** – specifies the page size of the server. Use `-b` and `-w` to use this flag, and name an even power of two between 2k and 16k, or else the server does not boot.

Examples

- **Create new installation –** Creates a new installation with a 100MB master device and a 4k page:

  ```
  sqlsrvr -d d_master -z 4k -b 100.02M
  ```

  The spaces between options and their following arguments are optional and acceptable. This example specifies "100.02M" for a 100MB master device because the server requires 16KB of overhead for its configuration area.

- **Rewrite a corrupt master –** Rewrites a corrupt `model` database:

  ```
  sqlsrvr -d d_master -w model
  ```

  To rewrite a corrupt `master` database specifying device size:

  ```
  sqlsrvr -d d_master -w master -z 4k
  ```

  To rewrite a corrupt `master` database, specifying device and page sizes, forcing the server to accept these values in preference to what it may find in the config block:

  ```
  sqlsrvr -d d_master -w master -z 4k -b 100.02M -f
  ```

  To rewrite a corrupt `master` database, specifying a page size that does not match what the server finds in its config block, which produces a failure:

  ```
  sqlsrvr -d d_master -w master -z 8k

  00:00000:00000:2001/01/19 12:01:26.94 server The
  configured server page size does not match that
  specified on the command line. To use the configured
  size, omit the command line size; to use the command
  line size, specify 'force' (-f).
  ```

  To rewrite a corrupt `master` database, specifying an incorrect page size, even in a normal boot, which produces a failure:

  ```
  sqlsrvr -d d_master -z4000

  sqlsrvr: the 'z' flag may not be used without 'b' or
  'w'. sqlsrvr: server will ignore the 'z' flag. sqlsrvr:
  the 'z' flag contained an invalid page size. sqlsrvr:
  the page size must be an even power of two between 2048
  and 16384 bytes, inclusive.
  ```

Permissions

Anyone with execute permission on the binary, and who has read/write access to all the files.

Tables used

`sysconfigures`

See also

- *startserver* on page 137

Usage for sqlsrvr

Usage considerations for **sqlsrvr**.

- The **sqlsrvr** utility is referred to as **dataserver** in other Sybase documents.
- Start Adaptive Server using the **services manager** utility rather than by executing the **sqlsrvr** program directly. If you need to change any of the default parameters, edit the Adaptive Server Registry keys. See the configuration guide for your platform for details.
- Adaptive Server derives its running environment from values in the `sysconfigures` system table. Run **sp_configure** to see the configuration values; use **sp_configure** and **reconfigure** to change the configuration.
- Because Adaptive Server passwords are encrypted, you cannot recover forgotten passwords. If all system security officers lose their passwords, the **-p** parameter generates a new password for a system security officer's account. Start Adaptive Server with **-p**, immediately log in to Adaptive Server with the new random password, and execute **sp_password** to reset your password to a more secure one.
- By default, Adaptive Server logs error messages in both the local error log file and the local Windows event log. You can disable Windows event logging by including the **-g** parameter and specifying a different event-logging machine with **-G *machine_name***. Use standard Windows conventions when entering the *machine_name*. For example, to designate a PC named "LOGSITE", substitute "\\LOGSITE" for the *machine_name*. See the configuration guide for your platform for details on logging error messages.
- After you have finished running the installer, set the file permissions on the **sqlsrvr** executable to limit who can execute it.
- If you do not specify an Adaptive Server name with the **-s** parameter, and you have not set the DSLISTEN environment variable, **sqlsrvr** uses the default Adaptive Server name SYBASE. The value of the DSLISTEN environment variable overrides this default value, and the **-s** parameter overrides both the default and the DSLISTEN environment variable.
- Automatic login lockouts can cause a site to end up in a situation in which all accounts capable of unlocking logins (system administrators and system security officers) are locked. If this occurs, use the **sqlsrvr** utility with the **-u** parameter to check the specified login for system administrator or system security officer authorization, unlock the account, and reset the value of the current failed logins counter to zero.
- **-f** is only valid when used with **-b** and/or **-w**. The server fails to boot if you use **-f** without either **-b** or **-w**. **-f** forces the server in different ways, depending whether **-w** is present. See **-b** and **-w** below.

See also:

- *Reference Manual: Commands* – **disk mirror**, **disk remirror**, **reconfigure**
- *Reference Manual: Procedures* – **sp_configure**, **sp_password**

Starting Adaptive Server

There are two methods to start Adaptive Server with a specified configuration file.
Use either method to start Adaptive Server:

- Use Server Config to configure the server to have the `-c` parameter. In the Configure Adaptive Server window, select the Command Line option, and in the Command Line Parameters window, enter:

  ```
  -Cconfiguration_file_pathname
  ```

  For example, entering `-chaze.cfg` starts the server using the `haze.cfg` configuration file.
- Start Adaptive Server from the command line and provide the `-c` parameter.

startsrvr Dependencies and Conditions with -b and -w

The effect of **-b** changes, depending on whether **-w** is present.

- **-b** without **-w** creates a new master device as named by **-d** (the default is `d_master`) and with the page size as specified by **-z** (the default is 2048):
  - If the named device already exists as an OS file, the attempt fails, and you must remove the existing file and try again.
  - If the named device names an existing raw partition, the attempt fails unless you include the **-f** flag. This reinitializes the raw partition as a server master device.
- **-b** with **-w** `master` tells **dataserver** to use the size specified in **-z** for the master device when recreating the master database. It implies nothing about creating a new device.

-w may or may not require additional flags. If you use:

- **-w** `model` – the **-z** and `-b` flags are accepted but ignored.
- **-w** `master` for **new** installations – the **-z** and **-b** parameters are not required because the device size information is stored in the `config_block`.
- **-w**`master` to **upgrade** older installations:
  - The server requires **-b** and/or **-z** if the `config_block` does not contain a valid entry for the associated sizes. The command fails if it can't get valid data for the page size or device size.
  - You may provide **-b** and/or **-z** when the `config_block` contains valid entries for the sizes they represent. However if the sizes do not match what is in the `config_block`, add **-f** to force your new size preferences.
  - **-f** may appear without either **-b** or **-z**, because **-f** also instructs the server to accept damaged allocation pages as belonging to the `master` database. This is useful for restoring badly corrupted databases. If you specify **-w** `master` **-f**, the server assigns to the `master` database every allocation page on the named master device that does not belong to some other database than `master`.

sqlupgrade

(UNIX only) Upgrades your currently installed version of Adaptive Server to the newest release using a GUI.

The utility is located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
sqlupgrade
    [-s sybase dir]
    [-r resource file]
```

Or

```
sqlupgrade -v
```

Parameters

- ***-r resource file*** – executes the specified resource file.
- ***-s sybase dir*** – specifies the value to use for the SYBASE environment variable.
- **-v** – prints the version number and copyright message for **sqlupgrade** and then exits.

Usage

Set the:

- SYBASE environment variable to the location of the current version of Adaptive Server before using **sqlupgrade**.
- DISPLAY environment variable before invoking **sqlupgrade**, unless you are only using the `-v` parameter to display the version number.

See also:

- The installation guide for your platform

Permissions

You must be a Sybase system administrator to use **sqlupgrade**.

See also

- *preupgrade* on page 102
- *sqlupgraderes* on page 133

sqlupgraderes

(UNIX only) Upgrades your currently installed release of Adaptive Server to the newest release using resource files.

The utility is located in `$SYBASE/$SYBASE_OCS/bin`.

Syntax

```
sqlupgraderes
    [-s sybase dir]
    [-r resource file]
```

Or

```
sqlupgraderes -v
```

Parameters

- ***`-r resource_file`*** – executes the specified resource file.
- ***`-s sybase_dir`*** – specifies the value to use for the SYBASE environment variable.
- **`-v`** – prints the version number and copyright message for **sqlupgraderes** and then exits.

Usage

Set the SYBASE environment variable to the location of the current version of Adaptive Server before using **sqlupgraderes**.

See also:

- The installation guide for your platform
- The configuration guide for your platform – *"Configuring New Servers with srvbuild"*
- *System Administration Guide – "Managing Adaptive Server Logins, Database Users, and Client Connections"*

Permissions

You must be a Sybase system administrator to use **sqlupgraderes**.

See also

- *sqlupgrade* on page 132

srvbuild

(UNIX only) Creates a new Adaptive Server, Backup Server, or XP Server with default or user-specified values for key configuration attributes. Use **srvbuild** in either GUI or non-GUI mode.

The utility is located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
srvbuild
    [-s sybase_dir]
    [-I interfaces_file]
    [-r resource_file]
```

Or

```
srvbuild -v
```

Parameters

- ***`-I interfaces_file`*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server.
- ***`-s sybase_dir`*** – specifies the value to use for the SYBASE environment variable.
- ***`-r resource_file`*** – executes the specified resource file.
- **`-v`** – prints the version number and copyright message for **srvbuild** and then exits.

Permissions

You must be a Sybase system administrator to use **srvbuild**.

See also

- *srvbuildres* on page 135

Usage for srvbuild

Set the SYBASE environment variable.

- To the location of the current version of Adaptive Server before using **srvbuild**.
- Before invoking **srvbuild**, unless you are only using the **-v** parameter to display the version number.

See also:

- The installation guide for your platform

Using LDAP with srvbuild in a 64-bit Environment

When you use **srvbuild** to build a new server using a Lightweight Directory Access Protocol (LDAP) service in a 64-bit environment, edit the LDAP server entry.

srvbuild is a 32-bit application and uses the LDAP server entry from the `$SYBASE/$SYBASE_OCS/config/libtcl.cfg` file. Adaptive Server is a 64-bit application and uses the LDAP server information from the `$SYBASE/$SYBASE_OCS/config/libtcl64.cfg` file.

Do not include any blank spaces after the LDAP server entry in the `libtcl.cfg` or `libtcl64.cfg` files; these prevent srvbuild from connecting to the LDAP server.

srvbuildres

(UNIX only) Creates, using resource files, a new Adaptive Server, Backup Server, or XP Server with default or user-specified values for key configuration attributes.

The utility is located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
srvbuildres
    [-s sybase_dir]
    [-I interfaces_file]
    [-r resource_file]
```

Or

```
srvbuildres -v
```

Parameters

- ***`-I interfaces_file`*** – specifies the name and location of the interfaces file to search when connecting to Adaptive Server.
- ***`-r resource_file`*** – executes the specified resource file.
- ***`-s sybase_dir`*** – specifies the value to use for the SYBASE environment variable.
- **`-v`** – prints the version number and copyright message for **srvbuildres** and then exits.

Usage

Set the SYBASE environment variable to the location of the current version of Adaptive Server before using **srvbuildres**.

The `$SYBASE/$SYBASE_ASE/init/sample_resource_files` directory contains these sample resource files:

- `sqlloc.rs*`
- `sqlupgrade.adaptive_server.rs*`
- `sqlupgrade.backup_server.rs*`
- `sqlupgrade.monitor_server.rs*`
- `srvbuild.adaptive_server.rs*`
- `srvbuild.backup_server.rs*`
- `srvbuild.job_scheduler.rs*`
- `srvbuild.monitor_server.rs*`
- `srvbuild.text_server.rs*`
- `srvbuild.xp_server.rs*`

The sample resource file from an Adaptive Server installation looks similar to:

```
sybinit.release_directory: USE_DEFAULT
sqlsrv.server_name: PUT_YOUR_SERVER_NAME_HERE
sqlsrv.sa_login: sa
sqlsrv.sa_password:
sqlsrv.default_language: USE_DEFAULT
sqlsrv.language_install_list: USE_DEFAULT
sqlsrv.language_remove_list: USE_DEFAULT
sqlsrv.default_characterset: USE_DEFAULT
sqlsrv.characterset_install_list: USE_DEFAULT
sqlsrv.characterset_remove_list: USE_DEFAULT
sqlsrv.sort_order: USE_DEFAULT
# An example sqlloc resource file...
# sybinit.release_directory: USE_DEFAULT
# sqlsrv.server_name: PUT_YOUR_SERVER_NAME_HERE
# sqlsrv.sa_login: sa
# sqlsrv.sa_password:
# sqlsrv.default_language: french
# sqlsrv.language_install_list: spanish,german
# sqlsrv.language_remove_list: USE_DEFAULT
# sqlsrv.default_characterset: cp437
# sqlsrv.characterset_install_list: mac,cp850
# sqlsrv.characterset_remove_list: USE_DEFAULT
# sqlsrv.sort_order: dictionary
```

See also:

- The installation guide for your platform

Permissions

You must be a Sybase system administrator to use **srvbuildres**.

See also

- *srvbuild* on page 134

startserver

(UNIX only) Starts an Adaptive Server or a Backup Server.

The utility is located in `$SYBASE/$SYBASE_ASE/bin`.

Syntax

```
startserver [[-f runserverfile] [-m]] ...
```

Parameters

- ***`-f runserverfile`*** – specifies the relative path name of a runserver file, which is used as a reference each time you start an Adaptive Server or Backup Server. By default, the runserver file is in the current directory and is named `RUN_servername`. If you start a second Adaptive Server on the same machine, **startserver** creates a new runserver file named `RUN_servername`.
- **`-m`** – starts Adaptive Server in single-user mode, allowing only one system administrator to log in, and turns the `allow updates to system tables` configuration parameter **on**. Use this mode to restore the `master` database. The system administrator can use the`dbo use only` parameter of **sp_dboption** for system administration activities that require more than one process, such as bulk copying or using the data dictionary. **startserver** normally starts up only one server per node.

  The `-m` parameter creates an `m_RUNSERVER` file and overwrites any existing `m_RUNSERVER` file.

Examples

- **Start Adaptive Server –** Starts an Adaptive Server named SYBASE from the runserver file named `RUN_servername` in the current directory:

  ```
  startserver
  ```

- **Start Adaptive Server and Backup Server –** Starts an Adaptive Server named MYSERVER and a Backup Server named SYB_BACKUP:

  ```
  startserver -f RUN_MYSERVER -f RUN_SYB_BACKUP
  ```

- **Start Backup Server –** Starts only the Backup Server SYB_BACKUP:

  ```
  startserver -f RUN_SYB_BACKUP
  ```

See also

- *backupserver* on page 6
- *dataserver* on page 37

Usage for startserver

Take usage information into consideration when running **startserver**.

- **startserver** uses the information in the runserver file to start an Adaptive Server or Backup Server. The master device must be writable by the user who starts Adaptive Server.
  The **startserver** command creates the Adaptive Server error log file (named `errorlog`) in the directory where the server is started, and adds this information as part of the `-e` parameter in the Adaptive Server executable line in the runserver file. If a second Adaptive Server is started on the same machine, a new error log named `errorlog_servername` is created; this information is added to that server's runserver file. The user must have execute permission on the specified runserver file.
- Start multiple servers by specifying more than one runserver file, as shown in example 2. Specify `-m` after each `-f` *`runserverfile`*.
- Adaptive Server derives its running environment from values in the `config` file. Run **sp_configure** or edit the `config` file to see or change configuration parameters.
- To ensure the integrity of your Adaptive Server, it is important that you apply appropriate operating-system protections to the **startserver** executable and the runserver file.

See also:

- *Reference Manual: Commands* – **disk mirror**, **disk remirror**, **disk unmirror**

The runserver File

The runserver file, which is created by **srvbuild** during installation, contains the **dataserver** command to start Adaptive Server or the **backupserver** command to start Backup Server.

By default, the file is in the current directory and is named `RUN_servername`. Edit the runserver file to correct the options and parameters for the commands. This example shows two sample runserver files.

Runserver file for server MYSERVER:

```
#!/bin/sh
#
# Adaptive Server Information:
#  name:                          /MYSERVER
#  master device:                 /remote/Masters/myserver_dat
#  master device size:            10752
#  errorlog:                      /remote/serverdev/install/errorlog
#  interfaces:                    /remote/serverdev/interfaces
#
#
/$SYBASE/$SYBASE_ASE/bin/dataserver -d/remote/Masters/myserver_dat
\
-sMYSERVER -e/remote/serverdev/install/MYSERVER_errorlog \
-i/remote/serverdev &
```

Runserver file for Backup Server SYB_BACKUP:

```
#!/bin/sh
#
```

```
# Backup Server Information:
#  name:                          SYB_BACKUP
#  errorlog:                    /remote/serverdev/install/backup.log
#  interfaces:                    /remote/serverdev/interfaces
#  location of multibuf:          /remote/serverdev/bin/sybmultbuf
#  language:                      us_english
#  character set:                 iso_1
#  tape configuration file:       /remote/serverdev/backup_tape.cfg
#
#
/remote/serverdev/bin/backupserver -SSYB_BACKUP \
-e/remote/serverdev/install/backup.log \
-I/remote/serverdev/interfaces \
-M/remote/serverdev/bin/sybmultbuf -Lus_english -Jiso_1 \
-c/remote/serverdev/backup_tape.cfg
```

sybcluster

Manages a Sybase shared-disk cluster. **sybcluster** lets you create, start, stop, and manage a cluster or any instance in a cluster.

sybcluster is available only in a shared-disk cluster environment. For information about how to use **sybcluster**, see the *Clusters Users Guide*.

Syntax

```
sybcluster
    [ -C cluster_name ]
    [ -d discovery_list ]
    [ -F agent_connection  ]
    [ -h ]
    [ -I instance_name ]
    [ -i input_file_path  ]
    [ -L  ]
    [ -m message_level  ]
    [  -P [ password  ]]
    [ -U user_name ] (the default value is "uafadmin")
    [ -v ]
```

Parameters

- ***-C cluster_name*** – is the unique name of the Sybase shared-disk cluster to be managed. **sybcluster** looks up the name in the cluster directory or uses agent discovery services.
- ***-d discovery_list*** – specifies the discovery services to be used to discover a shared-disk cluster agent and the discovery order. The format is:

  ```
  "method[(method_specification][,...)"]]
  ```

  For example:

  ```
  -d "udp(),jini(jinihost1;jinihost2)"
  ```

The supported discovery methods are:

- `UDP()` – performs a UDP broadcast and listens for a response from listening Unified Agents. UDP discovery does not cross subnet boundaries.
- `JINI(`*`JINI_spec`*`)` – specifies the JINI servers used to look up the locations of nodes in the cluster. The specification form is: *`host-name`*`[:`*`port_num`*`]`.

  Indicate multiple JINI servers by placing a semicolon between each specification. By default, **sybcluster** uses port number 4160 to attach to a JINI server.

  The JINI server must be running, and the management agents (UAF) must be registered with the JINI server. The locations of the nodes, and status of the instances are stored on the JINI server.
- `LDAP(`*`LDAP_spec`*`)` – specifies an LDAP server that will be used to look up the locations of the nodes in the cluster. The specification form is: *`host_name`*`[:`*`port_num`*`][?`*`registry`*`]`.

  Indicate multiple LDAP servers by placing a semicolon between each specification. By default, **sybcluster** uses port number 389 to attach to an LDAP server and the LDAP directory at “cn=ua-registry,ou=ua,dc=sybase,dc=com”.

- **`-F`** ***`agent_connection`*** – specifies the agent to be used to access the cluster. The format is:

  ```
  host_name[:port_num] [, host_name[:port_num ]]
  ```

  For example:

  ```
  -F "node1,node2,node3,node4:9999"
  ```

  The default port number is 9999.
- **`-h`** – displays **sybcluster** syntax and lists supported interactive commands.
- **`-I`** ***`instance_name`*** – specifies the instance to be accessed. If you do not specify the `-I` option when you execute **sybcluster**, you may need to specify it when entering certain interactive commands. **sybcluster** uses this name to discover the remote host, and as a default when executing interactive commands. If an interactive command affects multiple instances, the instance identified by `-I`, if available, is used as the priority connection.

  To override the instance specified by `-I`, execute the `use` command in interactive mode.
- **`-i`** – specifies an operating system file for input to **sybcluster**. This file contains **sybcluster** commands, one command per line. The final command in the file should be **quit**.
- **`-L`** – creates a `sybcluster.log` file. **sybcluster** writes all messages to this file irrespective of the message level set by the `-m` option.
- **`-m`** ***`message_level`*** – specifies which **sybcluster** and unified agent messages are displayed on the client console. Message levels are:

  - 0 – off (no messages to log file or console)
  - 1 – fatal

   - 2 – error
   - 3 – warning
   - 4 – information
   - 5 – debug

  sybcluster displays all messages of the level you choose and all messages of greater severity (with lower numbers). That is, if you select message level 3, **sybcluster** displays messages of level 3, 2, and 1. The default level is 4.
- **`-P [`*`password`*`]`** – is the management agent password for the Sybase Common Security Infrastructure in the Unified Agent framework. The default user name after installation is "uafadmin" with no password. This is the Simple Login Module in the Agent configuration. The user and password can be configured to use several different mechanisms for authentication and authorization, including using the running instance and the operating system logins.

  If you do not specify the `-P` option, **sybcluster** prompts for a password. For a blank or null password, use the `-P` option without a value or enter a set of quotation marks without content.

  You can encrypt the password using the Sybase **passencrypt** utility. See the *Clusters Users Guide*.
- **`-U`** ***`user_name`*** – is the management agent login name. The default login after installation is "uafadmin." See the `-P` description.
- **`-v`** – displays the **sybcluster** version number and other information.

Examples

- **Start using direct connect –** Starts **sybcluster** using direct connect and port numbers:

  ```
  sybcluster -U uafadmin -P -C mycluster
     -F "blade1:9100,blade2:9292,blade3:9393"
  ```

  To start **sybcluster** using direct connect and default port numbers:

  ```
  sybcluster -U uafadmin -P -C mycluster
     -F "blade1,blade2,blade3"
  ```
- **Use discovery to start –** You can also start **sybcluster** using discovery.

  ```
  sybcluster -U uafadmin -P -C mycluster
     -d "JINI(myjiniserver:4564)"
  ```

Usage

The recommended method for starting **sybcluster** and connecting to a cluster is:

```
sybcluster -U login_name -P password -C cluster_name
   -F agent_spec
```

The `-C` *`cluster_name`*, `-P` *`password`*, `-I` *`instance_name`*, `-F` *`agent_connection`*, and `-d` *`discovery_list`* parameters are default values that can be changed using subsequent **sybcluster** interactive commands. If you do not specify these values on the **sybcluster** command line, **sybcluster** prompts for them as they are required.

You can also start **sybcluster** and then use the interactive connect command to connect to the cluster. For example:

```
sybcluster
> connect to mycluster login uafadmin password " "
agent "blade1,blade2,blade3"
```

See also

- *Chapter 8, Interactive sybcluster Commands Reference* on page 255

sybdiag

sybdiag is a Java-based tool that collects comprehensive Adaptive Server configuration and environment data. Technical Support uses this information to diagnose server issues, thus expediting customer cases.

Note: Run **sybdiag** on the same machine as the monitored Adaptive Server.

Syntax

```
sybdiag -U username
    [-P password]
     -S [server_name | host:port]
    [-I interfaces_file]
    [-L log_file]
    [-N num_threads]
    [-O output_directory]
    [-R resource_file]
    [-T feature_list]
    [-h]
    [-m message_level]
    [-v]
```

Parameters

- ***-I interfaces_file*** – (optional) specifies the name of the interfaces file. If `-I` is specified, **sybdiag** uses the *interfaces_file* specified and displays an error if that file is not found. If `-I` is not specified, **sybdiag** first checks the LDAP server for the server entry, and if the entry is not found, **sybdiag** uses the default `interfaces` file in the directory specified by the SYBASE environment variable.
- ***-L log_file*** – (optional) specifies the name of the log file that **sybdiag** creates. If *log_file* is not an absolute path, the log file is created in the directory where **sybdiag** is executed.

Whether you specify this parameter or not, **sybdiag** creates a default log file called `sybdiag.log` in the `.zip` output file.

- ***-N num_threads*** – (optional) specifies the maximum number of parallel threads that **sybdiag** executes in parallel. The default value is 5. Do not change the default value unless you cannot execute parallel collections.
- ***-O output_directory*** – (optional) specifies the name of a local directory in which to store **sybdiag** output. If not specified, **sybdiag** creates the output `.zip` file in the directory where the command was executed. The output file is named "`sybdiag-<`*`server name`*`>-<`*`datetime stamp`*`>.zip`".
- ***-R resource_file*** – (optional) specifies the resource file that **sybdiag** uses on start-up. Use this option only at the direction of Sybase Technical Support.
- ***-P password*** – specifies your Adaptive Server password. If you do not specify the `-P` flag, **sybdiag** prompts for a password. If your password is NULL, use the`-P` flag without any password.
- ***-S server_name | host:port*** – *server_name* specifies the name of the Adaptive Server to which **sybdiag** connects. **sybdiag** looks for this name in the interfaces file or the LDAP directory.

  If you specify `-S` with no argument, **sybdiag** looks for a server named SYBASE. If you do not specify `-S`, **sybdiag** looks for the server specified by your DSQUERY environment variable.

  host:port specifies the machine name and the port number.
- ***-T feature_list*** – (optional) specifies the type of diagnostic data that **sybdiag** gathers, based on these *feature_list* values:
  - `osdata` – operating system data.
  - `asecore` – Adaptive Server configuration data.
  - `aseadd` – Adaptive Server monitoring data.
  - `keyfile` – information about Adaptive Server and operating system files.

  All diagnostic data is collected if you do not specify `-T`..
- ***-U username*** – specifies a case-sensitive login name.
- **-h** – (optional) displays all help options.
- ***-m message_level*** – (optional) displays different levels of error messages depending on the value of *message_level*:
  - 0 – no messages.
  - 1 – fatal errors only.
  - 2 – all errors.
  - 3 – warnings and all errors.
  - 4 – informational messages, warnings, and all errors.
  - 5 – debug and informational messages, warnings, and all errors.

By default, the error message display level is set to 4.

- **`-v`** – (optional) displays version information.

Examples

- **Example 1 –** Collects all Adaptive Server diagnostics from `/work/ASEInstall/ASE-15_0/bin`, and creates an output file called `sybdiag-testserver-20110312024652.zip` in the same directory:

```
sybdiag -Usa -P -Stestserver
```

Note: For readability, some lines have been omitted from this sample output.

```
Collecting data for "Adaptive Server Version" (ase_version) ...
Completed data collection for "Adaptive Server Version"
(ase_version).
Collecting data for "Server License" (ase_license) ...
Completed data collection for "Server License" (ase_license).
Collecting data for "Adaptive Server Configuration" (ase_cfg) ...
Completed data collection for "Adaptive Server Configuration"
(ase_cfg).
Collecting data for "Adaptive Server Non-default Configuration"
(ase_nondefault_cfg) ...
Completed data collection for "Adaptive Server Non-default
Configuration" (ase_nondefault_cfg).
...Lines deleted...
Collecting data for "Adaptive Server LDAP Configuration File"
(ase_libtcl) ...
Completed data collection for "Adaptive Server LDAP Configuration
File"
(ase_libtcl).
Collecting data for "Adaptive Server LDAP Configuration File
(64bit)"
(ase_libtcl64) ...
Completed data collection for "Adaptive Server LDAP Configuration
File
(64bit)" (ase_libtcl64).
Collecting data for "Virtual Memory Statistics" (os_vmstat) ...
Collecting data for "Adaptive Server General Performance
Information"
(ase_sysmon) ...
Collecting data for "I/O Statistics" (os_iostat) ...
Collecting data for "CPU Statistics" (os_mpstat) ...
Completed data collection for "Virtual Memory Statistics"
(os_vmstat).
Completed data collection for "I/O Statistics" (os_iostat).
Completed data collection for "CPU Statistics" (os_mpstat).
Completed data collection for "Adaptive Server General Performance
Information" (ase_sysmon).
Data collection statistics: 43 task(s) succeeded, 0 task(s)
skipped, and
0 task(s) failed.
The collected data is stored as
/work/ASEInstall/ASE-15_0/bin/sybdiag-
```

```
testserver-20110312024652.zip
Data collection completed.
```

- **Example 2 –** Collects basic Adaptive Server configuration data from `/work/ASEInstall/ASE-15_0/bin`, and creates an output file called `sybdiag-smmdi_9966-20110502202909.zip` in the same directory:

```
sybdiag -Usa -P -Ssmmdi:9966 -Tasecore
```

```
Collecting data for "Adaptive Server Version" (ase_version) ...
Completed data collection for "Adaptive Server Version"
(ase_version).
Collecting data for "Server License" (ase_license) ...
Completed data collection for "Server License" (ase_license).
Collecting data for "Adaptive Server Configuration" (ase_cfg) ...
Completed data collection for "Adaptive Server Configuration"
(ase_cfg).
Collecting data for "Adaptive Server Non-default Configuration"
(ase_nondefault_cfg) ...
Completed data collection for "Adaptive Server Non-default
Configuration"
(ase_nondefault_cfg).
Collecting data for "Remote Server Configuration"
(ase_remote_server)...
Completed data collection for "Remote Server Configuration"
(ase_remote_server).
Collecting data for "Adaptive Server Script Version"
(ase_script_version) ...
Completed data collection for "Adaptive Server Script Version"
(ase_script_version).
Collecting data for "Adaptive Server Configuration Monitor"
(ase_mon_cfg) ...
Completed data collection for "Adaptive Server Configuration
Monitor" (ase_mon_cfg).
Collecting data for "Adaptive Server Cache Configuration"
(ase_cache_cfg) ...
Completed data collection for "Adaptive Server Cache
Configuration" (ase_cache_cfg).
Collecting data for "Adaptive Server Pool Configuration"
(ase_pool_cfg) ...
Completed data collection for "Adaptive Server Pool
Configuration" (ase_pool_cfg).
Collecting data for "Adaptive Server Shared Memory Dump
Configuration"
(ase_shmdumpconfig) ...
Completed data collection for "Adaptive Server Shared Memory Dump
Configuration" (ase_shmdumpconfig).
Collecting data for "Adaptive Server Traceflags and Switches"
(ase_switches) ...
Completed data collection for "Adaptive Server Traceflags and
Switches"
(ase_switches).
Data collection statistics: 11 task(s) succeeded, 0 task(s)
skipped, and
0 task(s) failed.
The collected data is stored as /work/ASEInstall/ASE-15_0/bin/
```

```
sybdiag
smmdi_9966-20110502202909.zip
Data collection completed.
```

Permissions

- To gather all Adaptive Server data, you must have permission to access all datasources used by **sybdiag**. In a default Adaptive Server configuration, you must have `sa_role` and `mon_role` to collect Adaptive Server configuration and monitoring data. Use `sp_role` to grant `sa_role` and `mon_role` to the **sybdiag** user:

  ```
  sp_role "grant", sa_role, sybdiag_user
  go
  sp_role "grant", mon_role, sybdiag_user
  go
  ```

  You may need other permissions to access database objects if your system administrator has changed the default access restrictions. If you have insufficient permission to access certain database objects, you see an error message that lists the database objects that you cannot access.
- To gather all environment data, you must have authorized access to operating system and device files.

  Note: On Linux, you must have read permission to access operating system messages in `/var/log/messages`.
- You must have read permissions on these files:
  - Adaptive Server error log
  - Adaptive Server configuration file
  - Environment scripts such as `SYBASE.csh`, `SYBASE.sh` or `SYBASE.bat`
- You must have write permissions on an output directory specified by the `-O` parameter.

Note: If you do not have the required permissions on a file, **sybdiag** displays an error message does not process that file.

Usage for sybdiag

sybdiag connects to an Adaptive Server and executes stored procedures such as **sp_configure**, and queries to tables like `monLicense`. It collects operating system and platform diagnostic information by executing commands such as **ps**, **vmstat**, and **netstat**.

The output of **sybdiag** is a compressed ZIP file containing HTML and data files that can be uncompressed and viewed in a Web browser. The information collected includes operating system and environment data, Adaptive Server configuration and monitoring data, and Adaptive Server files and scripts.

sybdiag does not collect Adaptive Server or operating system data for logins, passwords, or user lists, and does not collect information from application database tables.

Viewing sybdiag output

The **sybdiag** output is in a compressed file in this format: `sybdiag-servername-datetime_stamp.zip`. To generate individual output files, uncompress the zip file.The ZIP file contains these HTML, data, and log files:

- `sybdiag_start.html` – an HTML file with links to diagnostic data files in the output directory. To view **sybdiag** output, open this file in any Web browser.

  sybdiag displays information in these categories:

  - Operating system information, including process status, physical and virtual memory, interprocess communication, disk usage, I/O, and network information.
  - Adaptive Server configuration data, including server version, platform and license information, configuration values, remote server configuration data, and so on. For the Cluster Edition, this also includes the cluster overview, cluster instances, and logical cluster information.
  - Adaptive Server monitoring data about processes, databases, devices, locks, and so on. For the Cluster Edition, this also includes cluster interprocess communication protocol information, cluster lock usage, and cluster quorum device dump information.
  - Adaptive Server files such as `errorlog`, `interfaces`, configuration file, SySAM properties file, and environment configuration scripts. For the Cluster Edition, a single report may contain information from many external files for several cluster instances.
- Diagnostic data files – collected Adaptive Server and environment information organized under different directories. These are the files that `sybdiag_start.html` accesses.
- Log file – by default, the ZIP file includes a log file called `sybdiag.log` that provides a log of the activities **sybdiag** performed.

Configuration Options for sybdiag

To generate certain reports, you must enable corresponding configuration options using **sp_configure**, or edit the server configuration file.

If configuration options are set incorrectly, **sybdiag** skips the related reports.

Option	Value	sybdiag Reports
enable monitoring	1	Adaptive Server Wait Events Adaptive Server Locks Adaptive Server Deadlock History
wait event timing	1	Adaptive Server Wait Events
deadlock pipe active	1	Adaptive Server Deadlock History

Option	Value	sybdiag Reports
deadlock pipe max messages	Nonzero value; must be large enough to capture all relevant deadlock rows	Adaptive Server Deadlock History

sybmigrate

sybmigrate allows you to convert an Adaptive Server from one page size to another page size, and to migrate between platforms.

The utility is located in:

- (UNIX platforms) `$SYBASE/$SYBASE_ASE/bin/`
- (Windows) `%SYBASE%\%SYBASE_ASE%\bin\sybmigrate.bat`, as **sybmigrate.bat**.

Warning! **sybmigrate** assumes that the source and target Adaptive Servers will not have any activity during the migration. If objects are created, modified, or deleted during the migration process (setup, migrate, and validate), Sybase cannot guarantee migration integrity.

Syntax

```
sybmigrate [-v ] [-h ] [-f ]
    [-D 1 | 2 | 3 | 4 ]
    [-I interfaces_file ]
    [-J client_charset ]
    [-l log_file ]
    [-m setup | migrate | validate | report ]
    [-r input_resource_file ]
    [-rn status | space_est | repl | diff | password ]
    [-T trace_flags ]
    [-t output_template_resource_file ]
    [-Tase trace_flags ]
    [-z language ]
```

Parameters

- **`-D 1 | 2 | 3 | 4`** – sets the debug level for **sybmigrate**. The default debug level is 2.
- **`-f`** – overrides the locking session.

  If **sybmigrate** exited a session inappropriately, use `-f` to override the source and target database binding that is created so that only one session of **sybmigrate** can run on a source and target database path.
- **`-h`** – prints the help information and syntax usage and exits.
- **`-I`** – identifies a specific `interfaces` file to find server names. If no `interfaces` file location is designated, **sybmigrate** uses:

- (UNIX) `$SYBASE/interfaces`
- (Windows) `%SYBASE%\ini\sql.ini`

Note: You can override **sybmigrate**, and use the `interfaces` file by providing the `-I` argument if the LDAP entry is defined in:

- (UNIX) `$SYBASE/$SYBASE_OCS/config/libtcl.cfg`
- (Windows) `%SYBASE%\%SYBASE_OCS%\ini\libtcl.cfg`

- **`-J`** – specifies the character set to be used for the Adaptive Server connection.
- **`-l`** – indicates a user-defined log file where the output of the migration process is stored. If `-l` is not used, the logs are stored in `$SYBASE/$SYBASE_ASE/init/logs` or the working directory.
- **`-m`** – designates the types of operations that are performed:
  - `setup` – to set up the repository and migration working database, and to migrate the server-wide data.
  - `migrate` – to perform data and object migration.
  - `validate` – to validate the migrated objects.
  - `report` – to run any of the five reports. The reports can be run in the GUI and resource file mode. The available reports are:
    - `status` – the migrate object status report gives information about objects that have been migrated. To run this report, issue:

      ```
      sybmigrate -r resource file -m report -rn
          status
      ```
    - `space_est` – use the target database space estimation report to verify that you have sufficient resources allocated to your target database. In the resource file mode, issue the following command to run the `space_est` report:

      ```
      sybmigrate -r resource file -m report -rn
          space_est
      ```
    - `repl` – use the replication report to check any explicitly replicated objects that have been migrated, determine the type of replication system, and to produce SQL commands for users to execute on the target Adaptive Server and the Replication Server. To run the `repl` report, issue:

      ```
      sybmigrate -r resource file -m report -rn repl
      ```
    - `diff` – checks the objects between the source and target databases. Users can run the report on individual objects, or the entire database, except for server and database information or metadata. You can run the `diff` report at any time. You do not need to run a setup session to run the `diff` report. The source and target database name do not need to be the same when running the `diff` report.

      The `diff` report provides the following information for the following object types:

        - Server information – compares the master database system catalogs row count between the source and target Adaptive Server. This task is similar to the validation session.
        - Database information – compares the user database system catalogs row count between the source and target Adaptive Server. This task is similar to the validation session.
        - DDL objects – the report displays whether the objects exist on the source or the target Adaptive Servers. If the objects exists in both databases, that object does not appear in the report.
        - User table data – compares the row count of the user tables in the source and target Adaptive Server. If the table only exists in the source or target databases, the `table` does not appear in the report.
    - `password` – creates a file for the changed passwords.
- **`-r`** – specifies that the resource file mode is to be used in the migration process. If the input resource file is not specified by using the `-r` parameter, **sybmigrate** operates in GUI mode.

  If you use the `-r` parameter, then you also need to use the `-m` argument to specify the type of operation to perform: `setup`, `migrate`, `validate`, or `report`. You can run the entire migration process in the resource file mode, or you can choose to run only parts of in this fashion.
- **`-rn`** – indicates what type of report to generate. If `-rn` is not specified, all five reports are run.
- **`-T`** – sets these command line trace flags:
    - `DUMP_SQL` – specifies that every query issued by **sybmigrate** is output to the log file.
    - `NO_SORTED_DATA` – overrides the default, which specifies that tables with clustered indexes are copied to the target server in order, and the clustered index is recreated using the `with_sorted_data` option.
    - `LEAVE_PTBL_ON_ERROR` – specifies that proxy tables are not deleted on failure.
    - `SKIP_CONFIG_CHECK` – specifies that configuration compatibility checks are not to be performed.
    - `SKIP_PARTITION_CHECK` – specifies that partition compatibility checks are not to be performed.
    - `DUMP_DDL` – specifies that DDL commands are to be output to the log file.
    - `DUMP_DEPEND_OBJECT` – specifies that when the `auto_select_dependent_objects` option is used, **sybmigrate** outputs a list of objects added as dependents.
    - `ONE_WORK_THREAD` – specifies that one work thread is to be used, overriding the current setting for schema creation threads.
    - `ALLOW_DATA_AND_INDEX` – overrides default behavior, in which indexes are created after all tables are created. Indexes are created as resources become available.

- **`-t`** – directs **sybmigrate** to generate an output template resource file, to be used for subsequent migrations in the resource file mode.

  `-t` requires that you start **sybmigrate** using the `-r` argument specifying the login information. This argument also requires `-m` to specify what type of resource file is to be generated.

  Note: You can use `-t` only in the resource file mode.
- **`-Tase`** – runs Adaptive Server trace flags (turned on using **dbcc traceon**) for all Adaptive Server connections opened by **sybmigrate**. Specify the trace flags in a comma-separated list.
- **`-v`** – prints the version string and exits.
- **`-z`** – specifies the language to be used for the Adaptive Server connection.

Examples

- **Example 1 –** Runs the `status` report:

  ```
  sybmigrate -r resource file -m report -rn status
  ```
- **Example 2 –** Runs the `space_est` report in the resource file mode:

  ```
  sybmigrate -r resource file -m report -rn space_est
  ```
- **Example 3 –** Runs the `repl` report, issue:

  ```
  sybmigrate -r resource file -m report -rn repl
  ```

Usage

- For security purposes, set file permissions at the highest level (preferably 600) for both the **sybmigrate** resource file and the file that contains the login and password information you are using for migrating logins from the source to the target server.
- Make sure the `allow resource limits` configuration parameter is set to 0 before running **sybmigrate**.
- You cannot migrate server data if metadata already exists on the target Adaptive Server.
- If **sybmigrate** exited a session inappropriately, use `-f` to override the source and target database binding that is created so that only one session of **sybmigrate** can run on a source and target database path.
- If you use the `-r` parameter, then you also need to use the `-m` argument to specify the type of operation to perform: `setup`, `migrate`, `validate`, or `report`. Run the entire migration process in the resource file mode, or run only parts in this fashion.
- Use `-t` only in the resource file mode. `-t` requires that you start **sybmigrate** using the `-r` argument specifying the login information. This argument also requires `-m` to specify what type of resource file is to be generated.
- You may specify the size and location of a work database on your target server.

- SAP does not support Adaptive Server version 12.5.1. SAP recommends that you upgrade from 12.5.1 to 12.5.4, then from 12.5.4 to 15.5 and later versions. To make the 12.5.1 server visible to the 12.5.4 or later server, use:

  ```
  sp_addserver 'servername', local
  ```

  Restart Adaptive Server to recognize the 12.5.1 server.
- You can override **sybmigrate**, and use the `interfaces` file by providing the `-I` argument if the LDAP entry is defined in:
  - UNIX – `$SYBASE/$SYBASE_OCS/config/libtcl.cfg`
  - Windows – `%SYBASE%\%SYBASE_OCS%\ini\libtcl.cfg`
- **sybmigrate** automatically migrates predicated privileges when:
  - **ddlgen** is called to generate the scheme definitions, including grants, denies, and revokes
  - Data is migrated using CIS and proxy tables.

Permissions

You must be a Sybase system administrator or log in with the sa_role to use **sybmigrate**.

If you want any user other than the SA to use **sybmigrate**, set the `cis rpc handling` configuration parameter to “1”.

See also

- *Chapter 9, Migrating Data Using sybmigrate* on page 293

sybrestore

sybrestore allows you to restore an Adaptive Server database to the time of failure from the most current full database backup dump files.

Syntax

```
sybrestore [-v ] [-h ]
    [-S server_name | host_name:port_number]
    [-t  restore database to point in time]
    [-D database_name ]
    [-d dump_directory]
    [-I interfaces_file ]
    [-J character_set ]
    [-P password ]
    [-U username]
    [-z language ]
```

Parameters

- **`-h`** – prints the help information and syntax usage and exits.
- **`-D`** ***`database_name`*** – specifies the source database name.
- **`-d`** ***`dump_directory`*** – specifies the dump directory for dumping the last log.
- **`-I`** ***`interfaces_file`*** – identifies a specific `interfaces` file in which to look for server names. If you do not specify this parameter, **sybrestore** uses:
  - (UNIX) `$SYBASE/interfaces`
  - (Windows) `%SYBASE%\ini\sql.ini`
- **`-J`** ***`character_set`*** – specifies the character set to be used for the Adaptive Server connection.
- **`-P`** ***`password`*** – specifies your Adaptive Server password. If you do not specify the `-P` parameter, **sybrestore** prompts for a password.
- **`-S`** ***`server_name | host_name:port_number]`*** – specifies the name of the source Adaptive Server. **sybrestore** looks for this name in the interfaces file.

  host_name:port_number specifies the machine name and the port number.
- **`-t`** ***`point_in_time`*** – restores the specified database to a point in time.
- **`-U`** ***`username`*** – specifies a case-sensitive login name.
- **`-v`** – prints the version string and exits.
- **`-z`** ***`language`*** – specifies the language to be used for the Adaptive Server connection.

Examples

- **command line mode –** Invokes the command line interactive Restore Database menu. Use single-key entries to navigate through the menu options to specify options for restoring a database:

```
sybrestore -Usa -P -SlinuxData
```

```
sybrestore -Usa -P -SlinuxData

<<<<<<<<<====Restore Database Menu ====>>>>>>>>
s : Select Database
t : Target Server
r : Recreate Database
e : Use External Dump
c : Check Geometry
d : Dump Directory
o : Online Database
p : Preview
g : Go
```

  To invoke the interactive command line Restore Database menu and execute the SQL statements for restoring the database to a point in time:

```
 sybrestore -Usa -P -SaseServer1 -t
```

- **Noninteractive mode –** Invokes **sybrestore** in noninteractive mode using Adaptive Server 15.7 ESD #2 and later. Executes the SQL statements for restoring the database and exits:

  ```
  sybrestore -Usa -P -SaseServer1 -Ddba_db
  ```

Usage

Verify settings before using **sybrestore**.

- Adaptive Server and Backup Server are running for both the target and source.
- The `master` database is available.
- The log segment of the source database is available for dumping and then loading back the most recent transaction logs that have not been dumped.
- Either history files or external dump files are available.

Permissions

To use **sybrestore**, you must be logged in with the sa_role, or as the database owner.

See also

- *Chapter 10, Restoring a Database Using sybrestore* on page 329

sybtsmpasswd

Records or changes the user password and creates the Tivoli Storage Manager (TSM) encrypted password file, `TSM.PWD`, on the TSM client machine. The location of the file is the directory specified by the **PASSWORDDIR** configuration parameter in the TSM configuration file.

Note: sybtsmpasswd is supported when the IBM Tivoli Storage Manager is licensed at your site.

Syntax

```
sybtsmpasswd
```

Examples

- **Example 1 – sybtsmpasswd** prompts for password information.

  ```
  sybtsmpasswd

  Enter your current password:
  Enter your new password:
  Enter your new password again:
  ```

```
Your new password has been accepted and updated.
```

Usage

Execute **sybtsmpasswd** when you record or change the user password. Make sure the same user name and password are present in the `TSM.PWD` file on the TSM client node.

Permissions

Only the operating system “root” user can execute **sybtsmpasswd**.

updatease

The **updatease** utility reinstalls scripts and updates system stored procedures and messages after a minor upgrade.

The **updatease** executable file is located in:

- (UNIX) `$SYBASE/SYBASE_ASE/bin/`
- (Windows) `%SYBASE%\%SYBASE_ASE%\bin\`

Syntax

```
updatease -Sserver_name -PASE_password
```

The syntax for Adaptive Server Cluster Edition:

```
updatease -FSCC_connection -PSCC_password -Ccluster_name -iinstance
-AASE_instance_password
```

Parameters

- ***-Sserver_name*** – (nonclustered Adaptive Server only) specifies the Adaptive Server you are updating.
- ***-PASE_password*** – (nonclustered Adaptive Server only) is the Adaptive Server "sa" password. If you do not specify this, updatease obtains the information from the SYBASE_ASE_SA_PWD environment variable or at the prompt.
- ***-FSCC_connection*** – (Adaptive Server Cluster Edition only) specifies the Sybase Control Center agent that you use to access the cluster. The value must be in the form "*hostname:port_number*".
- ***-PSCC_password*** – (Adaptive Server Cluster Edition only) specifies the SCC "uafadmin" password. If you do not specify this, updatease obtains the information from the UAFADMIN_PWD environment variable.
- ***-Ccluster_name*** – (Adaptive Server Cluster Edition only) specifies the name of the Adaptive Server cluster.

- ***-iinstance*** – (Adaptive Server Cluster Edition only) specifies the Adaptive Server instance you are updating.
- ***-AASE_instance_password*** – (Adaptive Server Cluster Edition only) specifies the Adaptive Server "sa" password.

Usage

When you perform a minor upgrade/update from Adaptive Server version 15.0 and higher, you need to update the system stored procedures and messages from the earlier version of Adaptive Server, as well as reinstall the scripts in the following directory:

- (UNIX) `$SYBASE/ASE-15_0/scripts/`
- (Windows) `%SYBASE%\ASE-15_0\scripts\`

Note: In a nonclustered Adaptive Server, when you perform the minor upgrade using the Adaptive Server installer, the installer runs **updatease** in the background; you need not perform any additional steps.

Permissions

You must be a Sybase system administrator, or log in with the sa_role to use **updatease**.

xpserver

Starts XP Server manually.

Syntax

```
xpserver -S XP_Server
```

```
xpserver
 -SXP_Server
    [-Iinterfaces_file]
    [-ppriority]
    [-sstack_size]
    [-u]
    [-v]
    [-x]
```

Parameters

- ***-S XP_Server*** – specifies the name of the XP Server to start. The format of the XP server name is *SQLSERVERNAME_XP*, where *SQLSERVERNAME* is the name of the Adaptive Server to which the XP Server is dedicated. For example, the XP Server for an Adaptive Server named SMOKE would be named SMOKE_XP. The XP Server name must be in uppercase.

- **`-I`** ***`interfaces_file`*** – specifies the name and location of the directory containing the interfaces file (`sql.ini`) that Adaptive Server searches when connecting to XP Server. If you do not specify `-I`, **xpserver** uses the `ini` subdirectory of the `%SYBASE%` release directory.
- **`-p`** ***`priority`*** – specifies the priority of the Open Server process. Values between 0 (lowest) and 15 (highest) are valid. Overrides the `esp execution priority` configuration parameter. The default is 8.
- **`-s`** ***`stack_size`*** – specifies (in bytes) the stack size of the process used to execute an extended stored procedure (ESP). Overrides the `esp execution stacksize` configuration parameter if it is set. The default is 34816 bytes.
- **`-u`** – specifies that the functions be automatically unloaded from XP Server memory after the ESP request terminates. Overrides the `esp unload dll` configuration parameter if it is set. The default is not to unload the function.
- **`-v`** – prints the version number and copyright message for XP Server and then exits.
- **`-x`** – specifies that the client security context be used to execute operating system commands using the system ESP, **xp_cmdshell**. Overrides the **xp_cmdshell context** configuration parameter if it is set. The default is to use the security context of the operating system account of the Adaptive Server session.

Usage

- When you run **xpserver** in root, **xpserver** automatically enables secure access on the machine as if you set the **xp_cmdshell context** configuration parameter to 1, thereby preventing users from accessing Adaptive Server unless they are also valid users on the machine.
- XP Server is normally started automatically by Adaptive Server. Use the manual command to start XP Server **only** when instructed to do so in an “XP Server Failed to Start” error message.
- There can be only one XP Server per Adaptive Server. An Adaptive Server running ESPs communicates with a single XP Server, and the ESPs execute synchronously.
- The `-p` parameter affects the priority used by the Open Server scheduler. If `-p` is set to a high number, the scheduler can run XP Server before running the other threads in its run queue. If `-p` is set to a low number, the scheduler can run XP Server only when there are no other Open Server threads in its run queue. This parameter is unrelated to the application queue priorities within Adaptive Server, which are set by **sp_bindexeclass**.

  See the discussion of multithread programming in the *Open Server Server Library/C Reference Manual*.
- If automatic unloading of ESP functions is not set by the `-u` parameter or by the `esp unload dll` configuration parameter, unload them at runtime using **sp_freedll**.
- Unlike Adaptive Server and Backup Server, XP Server does not have a runserver file.
- When configuring an XP Server, the directory service entry name must end with “_XP” in upper case, such as “abcdef_XP” or “ABCDEF_XP.”

See also:

- *Reference Manual: Procedures* – **sp_configure**, **sp_freedll**, **xp_cmdshell** extended stored procedure

Permissions

No special permissions are required to run **xpserver**.

CHAPTER 2 Transferring Data to and from Adaptive Server with bcp

This chapter discusses the **bcp** bulk copy utility, which provides a convenient, high-speed method for transferring data between a database table or view and an operating system file.

bcp can read or write files in a wide variety of formats. When copying in from a file, **bcp** inserts data into an existing database table; when copying out to a file, **bcp** overwrites any previous contents of the file.

Versions earlier than 15.0.3 did not allow you to run fast **bcp** on tables with nonclustered indexes or triggers. Cluster Edition version 15.0.3 and later removes this restriction.

See also

- *bcp* on page 10

Methods for Moving Data

There are two methods to move data to and from your Adaptive Server databases.

- **bcp** as a standalone program from the operating system.
- Client-Library, which calls bulk-library routines. See the *Open Client and Open Server Common Libraries Reference Manual*.

Import and Export Data with bcp

Transact-SQL commands cannot transfer data in bulk. For this reason, use **bcp** for any large transfers.

Uses for **bcp** include:

- Importing data that was previously associated with another program, such as the records from another database management system. This is the most common use for **bcp**.

  Before using **bcp**, create a file of the records you want to import. The general steps are:

  1. Put the data to transfer into an operating system file.
  2. Run **bcp** from the operating system command line.
- Moving tables between Adaptive Servers or between Adaptive Server and other data sources that can produce an operating-system file.
- Copying out data from a view.

Note: You cannot use **bcp** to copy **in** data to a view.

- Transferring data for use with other programs, for example, with a spreadsheet program. The general steps to transfer data are:
  1. Use **bcp** to move the data from Adaptive Server into an operating-system file from which the other program imports the data.
  2. When you finish using your data with the other program, copy it into an operating-system file, then use **bcp** to copy it into Adaptive Server.

Adaptive Server can accept data in any character or binary format, as long as the data file describes either the length of the fields or the *terminators*, the characters that separate columns.

The structures in the tables involved in the transfer need not be identical, because when **bcp**:

- Imports **from** a file, it appends data to an existing database table.
- Exports **to** a file, it overwrites the previous contents of the file.

When the transfer is complete, **bcp** informs you of the:

- Number of rows of data successfully copied
- Number of rows (if any) that it could not copy
- Total time the copy took
- Average amount of time, in milliseconds, that it took to copy one row
- Number of rows copied per second.

If **bcp** runs successfully, you see a return status of 0. The return status generally reflects errors from the operating system level and correspond to the ones listed in the `errno.h` file in the `/usr/include/sys/` directory.

See also

- *bcp* on page 10

bcp Modes

bcp in works in one of three modes.

- Slow **bcp** – logs each row insert that it makes, used for tables that have one or more indexes.
- Fast **bcp** – logs only page allocations, copying data into tables without indexes or at the fastest speed possible. Use fast **bcp** on tables with nonclustered indexes.
- Fully logged fast **bcp** – provides a full log for each row. Allows you to use fast **bcp** on indexed and replicated tables.

Although fast **bcp** might enhance performance, slow **bcp** gives you greater data recoverability. Fully-logged fast **bcp** provides a combination of both.

To determine the **bcp** mode that is best for your copying task, consider:

- Size of the table into which you are copying data
- Amount of data that you are copying in
- Number of indexes on the table
- Whether the table is replicated
- Amount of spare database device space that you have for re-creating indexes

The modes **bcp** uses depending on index type:

Table Properties	bcp Mode for bulk-copy on, With Logging	bcp Mode for bulk-copy on Without Logging
Clustered index	Slow mode	Slow mode
Replicated table with indexes or triggers, but no clustered index	Fast mode	Slow mode
Nonclustered index and no triggers	Fast mode	Slow mode
Triggers, and no indexes	Fast mode	Fast mode
Nonclustered index with triggers	Fast mode	Fast mode
No indexes, no triggers, and no replication	Fast mode	Fast mode

bcp Requirements

Before using **bcp**, provide it with basic data information and prepare both the data for transfer and the command to access the data.

To transfer data successfully to and from Adaptive Server, supply:

- Name of the database and table or view
- Name of the operating system file
- Direction of the transfer (**in** or **out**)

You may also use **bcp** to modify the storage type, storage length, and terminator for each column.

bcp Permissions

You need an Adaptive Server account and the appropriate permissions on the database tables or views, as well as the operating system files to use in the transfer to use **bcp**.

To copy:

- Data into a table – have **insert** and **select** permission on the table.
- A table to an operating system file – have **select** permission on:
  - The table to copy
  - `sysobjects`
  - `syscolumns`
  - `sysindexes`

Before You Transfer

Prepare the command and the data for transfer before using **bcp in**.

To use either fast or fast-logged **bcp**, set **select into/bulkcopy/pllsort** to **true**. For example, to turn on this option for the `pubs2` database, enter:

```
sp_dboption pubs2, "select into/bulkcopy/pllsort", true
```

To use fast **bcp**, remove indexes on the target table.

In addition:

- If you are running Open Client version 11.1 or later and are using an external Sybase configuration file, enable **bcp** by adding:

  ```
  [BCP]
  ```
- Set the `$SYBASE` environment variable to the location of the current version of Adaptive Server before using **bcp**.
- To use a previous version of **bcp**, set the CS_BEHAVIOR property in the [bcp] section of the `ocs.cfg` file:

  ```
  [bcp]
  CS_BEHAVIOR = CS_BEHAVIOR_100
  ```

  If you do not set CS_BEHAVIOR to CS_BEHAVIOR_100, use functionality for **bcp** 11.1 and later.

See also

- *bcp Modes* on page 160
- *Fast, Fast-logged, and Slow bcp* on page 163

Copy Data to Partitions Using bcp

Use **bcp** to copy data from a table to an operating system file. Specify a table name and one or more partitions as the source.

You can copy data to a single file for all partitions, or a single file for each partition.

If you do not specify a destination file name, Adaptive Server creates file names based on the partition names.

These examples show how to copy of data from `bigtable`, which is partitioned three ways —`ptn1`, `ptn2`, and `ptn3`—to various operating system files:

- Copies the data in `bigtable` to `file1`:

```
bcp mydb..bigtable out file1
```

- Copies the data from `ptn1`, `ptn2`, and `ptn3` to `file2`:

```
bcp mydb..bigtable partition ptn1, ptn2, ptn3 out file2
```

- Copies the data from `ptn1` and `ptn2` to data files `ptn1.dat` and `ptn2.dat`:

```
bcp mydb..bigtable partition ptn1, ptn2 out ptn1.dat,
ptn2.dat
```

- Copies the data from `ptn1` and `ptn2` to `ptn1.dat` and `ptn2.dat`:

```
bcp mydb..bigtable partition ptn1, ptn2 out
```

See also
- *bcp* on page 10

Improve bcp Performance

There are three ways to improve the performance of **bcp**.

Use:

- Fast-logged **bcp**
- Partitioned tables – several **bcp** sessions with a partitioned table can dramatically reduce the time required to copy the data. However, such performance improvements are more noticeable in fast and fast-logged **bcp** than in slow **bcp**.
- **bcp** in parallel to increase performance dramatically – parallel bulk copy can provide balanced data distribution across partitions.

Note: **bcp** does not fire any trigger that exists on the target table.

See also
- *Using Parallel Bulk Copy to Copy Data into a Specific Partition* on page 170

Fast, Fast-logged, and Slow bcp

Whether to use fast, fast-logged, or slow **bcp** depends on your situation.

The existence of indexes on tables can affect transfer speed, depending on certain attributes. Unless you explicitly specify fast-logged **bcp** on tables with indexes, **bcp** automatically uses slow mode, which logs data inserts in the transaction log. These logged inserts can cause the transaction log to become very large.

To control this data excess and ensure that the database is fully recoverable in the event of a failure, back up the log with **dump transaction**.

By default, the **select into/bulkcopy/pllsort** option is **false** (disabled) in newly created databases. When this option is disabled, **bcp** automatically uses slow mode. Fast and fast-logged **bcp** both require that **select into/bulkcopy/pllsort** option is set to **true**. To change the default setting for future databases, turn this option on in the `model` database.

Note: You need not set the **select into/bulkcopy/pllsort** option to **true** to copy out data from, or to copy in data to a table that has indexes. Slow **bcp** always copies tables with indexes and logs all inserts.

The differences between fast, fast-logged, and slow **bcp** are:

- Fast **bcp**:

Lock Scheme	Index Type	select into	Recovery
APL	Non-unique nonclustered	On	No
DOL	Non-unique nonclustered	On	No
DOL	Non-unique clustered	On	No

- Fast-logged **bcp** (in Adaptive Server 15.7 ESD #2):

Lock Scheme	Index Type	select into	Recovery
APL	Non-unique nonclustered	On	Yes
DOL	Non-unique nonclustered	On	Yes
DOL	Non-unique clustered	On	Yes

- Slow **bcp**:

Lock Scheme	Index Type	select into/bulkcopy	Recovery
APL	Unique	On/off	Yes
DOL	Unique	On/off	Yes
APL	Non-unique	Off	Yes
DOL	Non-unique	Off	Yes

While the **select into/bulkcopy/pllsort** option is on, you cannot dump the transaction log. Issuing **dump transaction** produces an error message instructing you to use **dump database** instead.

Warning! Be certain that you dump your database before you turn off the **select into/bulkcopy/pllsort** flag. If you have inserted unlogged data into your database, and you then perform a **dump transaction** before performing a **dump database**, you will not be able to recover your data.

Adaptive Server prohibits **dump transaction** after running fast **bcp**. Instead, use **dump database**. Because slow **bcp** is a minimally logged operation, Adaptive Server allows you to issue **dump transaction** after running slow **bcp** whether **select into/bulkcopy/pllsort** is set to **true** or **false** in the database.

Slow bcp

In certain situations, use slow **bcp**.

Use slow **bcp** when:

- **sp_dboption 'select into/bulkcopy/pllsort'** is off.
- **sp_dboption 'select into/bulkcopy/pllsort'** is on, but the table uses the allpages locking scheme and has a clustered index.
- **sp_dboption 'select into/bulkcopy/pllsort'** is on, but the table has a unique nonclustered index.

  If the option **ignore_dup_key** option is enabled on the unique index, performing fast **bcp** can put the table and index in an inconsistent state if rows with duplicate keys are inserted. To avoid the inconsistency, Adaptive Server performs slow **bcp**.
- If the table has nonclustered indexes or triggers, and the table is marked for replication or the database is used as a warm standby.

  Because fast **bcp** does not log inserts, if Adaptive Server uses fast **bcp**, the rows **bcp** copies cannot be recovered on the replication site if there is a problem. Adaptive Server uses slow **bcp** in these situations to maintain compatibility with applications that were written to use the old behavior.

Fast bcp

Adaptive Server uses fast bcp in certain situations.

Adaptive Server uses fast **bcp** when (in all cases **sp_dboption 'select into/bulkcopy/pllsort'** is enabled and the table does not have a unique clustered index):

- You do not explicitly specify fast-logged **bcp**.
- The table has a non-unique, nonclustered index. Adaptive Server logs the index updates and the page allocations only. It does not log inserts into the table.
- A table has triggers. However, **bcp** does not fire any triggers in the target table.
- A table has datarows or datapage locking scheme with a unique clustered index.

If the table includes nonclustered indexes or triggers, but **sp_dboption 'select into/bulkcopy/pllsort'** is not enabled, Adaptive Server uses slow **bcp**.

Fast **bcp** runs more slowly while a **dump database** is taking place.

Fast **bcp** logs only the page allocations. For copying data in, **bcp** is fastest if your database table has no indexes.

If you use fast **bcp** to make data inserts, which fast **bcp** does not log, you cannot back up (**dump**) the transaction log to a device. The changes are not in the log, and a restore cannot recover nonexistent backup data. The requested backup (**dump transaction**) produces an error message that instructs you to use **dump database** instead. This restriction remains in force until a **dump database** successfully completes. For more information about **dump database** and **dump transaction**, see the *System Administration Guide*, and the *Reference Manual*.

bcp optimization is performed by Adaptive Server and does not require that you use Open Client version 15.0 or later.

Fast-logged bcp

Use fast-logged **bcp** on any table the includes indexes and triggers (**bcp** does not fire any triggers in the target table). Fast-logged **bcp** logs inserts to tables.

Use the **set logbulkcopy {on | off }** command to configure fast-logged **bcp** for the session. You may include the **set logbulkcopy {on | off }** with the `--initstring 'Transact-SQL_command'` parameter, which sends Transact-SQL commands to Adaptive Server before transferring the data. For example, this enables logging when you transfer the `titles.txt` data into the `pubs2..titles` table:

```
bcp pubs2..titles in titles.txt --initstring 'set logbulkcopy on'
```

Copying Tables with Indexes

The **bcp** utility is optimized to load data into tables that do not have indexes associated with them.

bcp loads data into tables without indexes at the fastest possible speed. Fast-logged **bcp** logs any data changes to the table.

When you copy data into a table that has one or more indexes, depending on the index type and the locking scheme, you can use fast **bcp**. This includes indexes that are implicitly created using the unique integrity constraint of a **create table** statement. However, **bcp** does not enforce the other integrity constraints defined for a table.

Note: The log can grow very large during slow **bcp** because **bcp** logs inserts into a table that has indexes. After the bulk copy completes, back up your database with **dump database**, then truncate the log with **dump transaction** after the bulk copy completes and after you have backed up your database with **dump database**.

The performance penalty for copying data into a table that has indexes in place can be severe. If you are copying in a very large number of rows, it may be faster to drop all the indexes beforehand with **drop index** (or **alter table**, for indexes created as a unique constraint); set the database option; copy the data into the table; re-create the indexes; and then dump the database. Remember to allocate disk space for the construction of indexes: about 2.2 times the amount of space needed for the data.

Locking Scheme and Fast bcp

Regardless of the locking scheme, any table without indexes can utilize fast **bcp**.

For:

- APL tables – the index must be nonunique and nonclustered to enable fast **bcp**.
- DOL tables – the index need only be nonunique for fast **bcp**. It can be either clustered or nonclustered.

To access fast **bcp**, set **sp_dboption 'select into/bulkcopy/pllsort** to **true** in the database.

SAP recommends that you enable **dboption "trunc log on chkpt"** before using **bcp**. This ensures that the log will be truncated with each checkpoint.Adaptive Server issues a checkpoint with each batch completion. To implement more checkpoints, run **bcp -b *batchsize***.

Space Requirements for Copying

If you are copying a very large number of rows, you must have 1.2 times the amount of space needed for the data and enough space for the server to reconstruct a clustered index.

If space is

- Available – use **drop index** to drop all the indexes beforehand.
- Not available – if you do not have enough space for the server to sort the data and build the index or indexes, use slow **bcp.**

Summary of Steps for Fast and Fast-logged bcp

The various steps available for fast and fast-logged bcp can be performed by various users.

Table 2. Steps for copying in data using fast and fast-logged bcp

Step	Who can do it
Use **sp_dboption** to set **select into/bulkcopy/pllsort** to **true.**	System administrator or database owner
Have enough space to re-create any indexes on the table. Drop the indexes on the table.	Table owner
Have **insert** permission on the table.	Granted by the table owner
Perform the copy with **bcp**.	Any user with **insert** permission
Re-create the indexes.	Table owner
Reset **sp_dboption**, if required.	System administrator or database owner
Use **dump database** to back up the newly inserted data.	System administrator, operator, or database owner
Run stored procedures or queries to determine whether any of the newly loaded data violates rules.	Table owner or stored procedure owner

Bulk Copying Data into Partitioned Tables

In certain circumstances, you can improve **bcp** performance dramatically by executing several **bcp** sessions with a partitioned table.

Partitioned tables improve insert performance by reducing lock contention and by distributing I/O over multiple devices. **bcp** performance with partitioned tables is improved primarily because of this distributed I/O.

When you execute a **bcp** session on a partitioned table, consider:

- A partitioned table improves performance when you are bulk copying **in** to the table.
- The performance of slow **bcp** does not improve as much with partitioned tables. Instead, drop all indexes and use fast or fast-logged **bcp**.
- Network traffic can quickly become a bottleneck when multiple **bcp** sessions are being executed. If possible, use a local connection to the Adaptive Server to avoid this bottleneck.

When copying data into a partitioned table, you can:

- Copy the data randomly without regard to the partition to which data is copied. For example, to copy data from `file1` to `bigtable`, enter:

  ```
  bcp mydb..bigtable in file1
  ```

  To copy data from `file1`, `file2`, and `file3` to `bigtable`, enter:

  ```
  bcp mydb..bigtable in file1, file2, file3
  ```
- Copy the data into a specific partition For example, to copy data from `file1` to `ptn1`, `file2` to `ptn2`, and `file3` to `ptn3`, enter:

  ```
  bcp mydb..bigtable partition ptn1, ptn2, ptn3 in file1, file2,
  file3
  ```

  To copy data from `file1` to the first partition of `bigtable`, enter:

  ```
  bcp mydb..bigtable:1 in file1
  ```

  If the table has a clustered index, **bcp** runs in slow mode and allows the index to control the placement of rows.

See also

- *Chapter 1, Utility Commands Reference* on page 1

Copying Data Randomly into Partitions

You can copy data randomly into partitioned tables when using multiple **bcp** sessions.

1. Configure the table with as many partitions and physical devices as you require for your system.

   For more information, see the *Performance and Tuning Guide*.

2. Make sure Adaptive Server is configured with enough locks to support multiple **bcp** sessions. For information on configuring locks, see the *System Administration Guide*.
3. Remove the indexes on the table and enable fast or fast-logged **bcp**.

   Note: If you use slow **bcp**, performance may improve significantly after you remove the indexes.
4. Divide the **bcp** input file into as many files of equal size as the number of planned simultaneous **bcp** sessions.

   You also can use the **-F** ***first_row*** and **-L** ***last_row*** options to specify the start and end of each "input file."
5. Execute the **bcp** sessions with separate files in parallel on the local Adaptive Server machine.

   For example, on UNIX platforms, execute different sessions in different shell windows or start individual **bcp** sessions in the background.

See also

- *Using Parallel Bulk Copy to Copy Data into a Specific Partition* on page 170
- *Fast, Fast-logged, and Slow bcp* on page 163

Monitoring bcp Sessions with dbcc checktable and sp_helpsegment

If you do not specify which partition the **bcp** sessions should use, Adaptive Server randomly assigns the multiple **bcp** sessions to the table's available partitions.

If this random assignment occurs, be sure to monitor the partitions to ensure that the process has evenly distributed the inserts by using either of the following:

- **dbcc checktable** – to periodically to check the total page counts for each partition
- **sp_helpsegment** or **sp_helpartition** – to perform a similar check, but without locking the database objects

For more information about **dbcc checktable**, see the *System Administration Guide*. For more information about **sp_helpsegment** and **sp_helpartition**, see the *Reference Manual*.

For more information about table partitions, see the *Performance and Tuning Guide*.

Reducing Logging by Increasing Page Allocations

If you are using fast or fast-logged **bcp**, consider that each **bcp in** batch requires the page manager to allocate one or more extents. Each such allocation generates a single log record.

Use the **number of pre-allocated extents** configuration parameter to specify how many extents Adaptive Server is to allocate through the page manager:

- Valid values for the **number of pre-allocated extents** configuration parameter are from 1 to 32; the default value is 2.

- The **number of pre-allocated extents** parameter is dynamic, not static. For this reason, you need not restart Adaptive Server after you change its value.
- An object may be allocated more pages than actually needed, so the value of number of pre-allocated extents should be low if you are using **bcp** for small batches. If you are using **bcp** for large batches, increase the value of number of pre-allocated extents to reduce the amount of overhead required to allocate pages and to reduce the number of log records.

Adaptive Server may allocate more pages than are actually needed, so keep the value small when space is limited. These pages are deallocated at the end of the batch.

In Adaptive Server version 15.5 and later, the maximum values of preallocated extents has been increased increased from 31 to 32.

Using a value of 32 for the **number of pre-allocated extents** parameter has a special significance for configuration, and impacts the space allocations Adaptive Server performs internally. If you set the number of preallocated extents to 32, Adaptive Server attempts to reserve an entire allocation unit of extents for utility operations that use a large-scale allocation scheme of space reservation, such as **bcp in** and **select into**.

Using the maximum number of preallocated extents can greatly improve the performance of these utilities, particularly when you run them in parallel. Using a value of 32 greatly increases the likelihood that each engine running the utility can work independently on its own allocation unit without interference from other engines.

For more information, see “Setting Configuration Parameters” in the *System Administration Guide: Volume 1*.

Using Parallel Bulk Copy to Copy Data into a Specific Partition

Use parallel bulk copy to copy data in parallel to a specific partition. Parallel bulk copy substantially increases performance during **bcp** sessions because it can split large bulk copy jobs into multiple sessions and run the sessions concurrently.

To use parallel bulk copy:

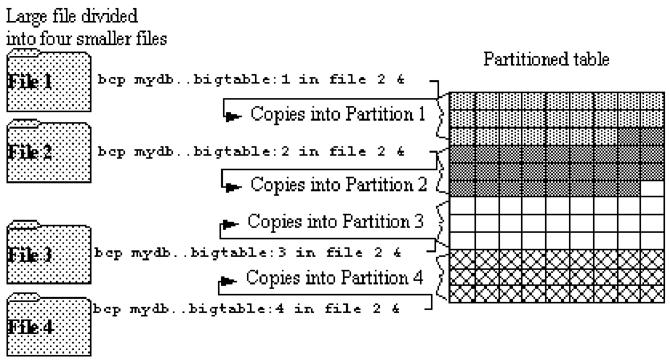
- The destination table must be partitioned. Use:
  - **sp_helppartition** – to see the number of partitions on the table.
  - **alter table ... partition** – to partition the table, if the table is not already partitioned.
- The destination table should not contain indexes because:
  - If the table has a clustered index, this index determines the physical placement of the data, causing the partition specification in the **bcp** command to be ignored.
  - If any indexes exist, **bcp** automatically uses its slow bulk copy instead of its fast bulk copy mode.
- If nonclustered indexes exist on the tables, parallel bulk copy is likely to lead to deadlocks on index pages.
- Each partition should reside on a separate physical disk for the best performance.

- Before you copy data into your database, partition the table destined to contain the data.
- Parallel bulk copy can copy in to a table from multiple operating system files.
  - For all types of partitioned tables, use:

    ```
    bcp tablename partition partition_name in file_name
    ```
  - For round-robin partitioned tables only, use:

    ```
    bcp tablename partition_number in file_name
    ```

Figure 1: Copying data into a round-robin partitioned table using parallel bulk copy


Large file divided into four smaller files
Partitioned table
File 1
bcp mydb..bigtable:1 in file 2 &
Copies into Partition 1
File 2
bcp mydb..bigtable:2 in file 2 &
Copies into Partition 2
Copies into Partition 3
File 3
bcp mydb..bigtable:3 in file 2 &
Copies into Partition 4
bcp mydb..bigtable:4 in file 2 &
File 4

See the *Transact-SQL Users Guide* for information about partitioning a table.

Note: When using parallel bulk copy to copy data out, you cannot specify a partition number. You can, however, specify a partition name.

bcp in and Locks

When you copy in to a table using **bcp**—particularly when you copy in to a table using parallel **bcp**—the copy process acquires an exclusive lock.

- An exclusive intent lock on the table
- An exclusive page lock on each data page or data row
- An exclusive lock on index pages, if any indexes exist

If you are copying in very large tables—especially if you are using simultaneous copies into a partitioned table—this can involve a very large number of locks.

To avoid running out of locks, increase the number of locks.

- To estimate the number of locks needed, use:

  ```
  # of simultaneous batches * (rows_per_batch / (2016/row_length))
  ```
- To see the row length for a table, use:

  ```
  1> select maxlen
  2> from sysindexes
  3> where id = object_id("tablename") and (indid = 0 or indid = 1)
  ```

See the *System Administration Guide* for more information about setting the number of locks.

- Use the **-b *batchsize*** flag to copy smaller batches; the default batch size is 1000 rows. The smallest batch size **bcp** can process is 1; the largest is 2147483647L.
- Run fewer batches concurrently.

Parallel Bulk Copy Methods

There are various methods to copy in data using parallel bulk copy.

- Start multiple **bcp** sessions in the background, and:
  - Specify the password at the command line.
  - Use native mode, character mode, or a format file.

  You can start **bcp** as many times as the table is partitioned.
- Create and use a format file:
  1. Start **bcp** in interactive mode.
  2. Answer the prompts.
  3. Create a format file that stores your responses.
  4. Put the process in the background when the copy begins.
  5. Issue the next **bcp** command, and specify the format file created with the first **bcp** command.
- Start **bcp** sessions in multiple windows.
- Specify a partition to file mapping in a single **bcp in** command.

  The client can execute independent **bcp in** sessions in parallel. The user can alternately specify the **--maxconn** option to control the maximum number of parallel connections that the **bcp** client can open to the server.

Alternatively, specify the **--maxconn** option to control the maximum number of parallel connections that the **bcp** client can open to the server. To ensure parallel execution on UNIX platforms, use the **bcp_r** variant.

Parallel Bulk Copy Syntax

Use this syntax for parallel bulk copy, when using several simultaneous sessions.

```
bcp table_name[:partition_number | partrition_name] in file_name
-Pmypassword
```

- ***table_name* –** is the name of the table into which you are copying the data.
- ***partition_name* –** is the name of the partition into which you are copying.
- ***file_name* –** is the host file that contains the data.
- ***mypassword* –** is your password.

Alternatively, you can execute parallel bulk copy using a multithreaded version of **bcp**:

- (UNIX) Perform this using the **bcp_r** command:

```
bcp_r database_name..table_name partition partition_number1
[,  partition_number2 ...] in file_name1 [,file_name2 ....]
-U[username] -P[password] -S[servername]
```

- (Windows) The standard **bcp** command is capable of paralled execution:

  ```
  bcp database_name..table_name partition partition_number1
  [,  partition_number2 ...] in file_name1 [,file_name2 ....]
  -U[username] -P[password] -S[servername]
  ```

Using Parallel Bulk Copy on Round-robin Partitioned Tables

Copy sorted data in parallel into a specific partition.

- Specify the partition by appending a colon (:) plus the partition number to the table name. For example:

  ```
  publishers:10
  ```

  Note: The partition you specify must exist before you issue the **bcp** command.
- Split the sorted data into separate files, or delineate the “files” by specifying the first row (**-F** ***first_row***) and the last row (**-L** ***last_row***) of the host file.
- Note the number of partitions in the table, as this number limits the number of parallel bulk copy sessions that you can start.

  For example, if a table has four partitions, and you start five parallel bulk copy jobs, only the first four jobs can run in parallel; the fifth job does not start until one of the first four jobs finish.

bcp copies each file or set of line numbers to a separate partition. For example, to use parallel bulk copy to copy in sorted data to `mydb..bigtable` from four files into four partitions, enter:

```
bcp mydb..bigtable:1 in file1 -Pmypassword -c &
bcp mydb..bigtable:2 in file2 -Pmypassword -c &
bcp mydb..bigtable:3 in file3 -Pmypassword -c &
bcp mydb..bigtable:4 in file4 -Pmypassword -c &
```

Parallel Bulk Copy and IDENTITY Columns

When you use parallel bulk copy, IDENTITY columns can cause a bottleneck.

As **bcp** reads in the data, the utility both generates the values of the IDENTITY column and updates the IDENTITY column’s maximum value for each row. This extra work may adversely affect the performance improvement that you expected to receive from using parallel bulk copy. To avoid this bottleneck, explicitly specify the IDENTITY starting point for each session.

Specifying the Starting Point from the Command Line

Use `–g` *`id_start_value`* to specify an IDENTITY starting point for a session in the command line.

The `–g` parameter instructs Adaptive Server to generate a sequence of IDENTITY column values for the **bcp** session without checking and updating the maximum value of the table’s

IDENTITY column for each row. Instead of checking, Adaptive Server updates the maximum value at the end of each batch.

Warning! When specifying overlapping identity value ranges, be cautious about inadvertently creating duplicate identity values.

To specify a starting IDENTITY value, enter:

```
bcp [-gid_start_value]
```

For example, to copy in four files, each of which has 100 rows, enter:

```
bcp mydb..bigtable in file1 -g100
bcp mydb..bigtable in file2 -g200
bcp mydb..bigtable in file3 -g300
bcp mydb..bigtable in file4 -g400
```

Using the `-g` parameter does not guarantee that the IDENTITY column values are unique. To ensure uniqueness:

- Know how many rows are in the input files and what the highest existing value is. Use this information to set the starting values with the `-g` parameter and generate ranges that do not overlap.

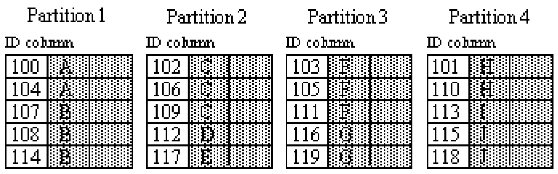
  In the example above, if any file contains more than 100 rows, the identity values overlap into the next 100 rows of data, creating duplicate identity values.
- Verify that no one else is inserting data that can produce conflicting IDENTITY values.

Retaining Sort Order

If you copy sorted data into the table without explicitly specifying the IDENTITY starting point, **bcp** might not generate the IDENTITY column values in sorted order.

Parallel bulk copy reads the information into all the partitions simultaneously and updates the values of the IDENTITY column as it reads in the data.

A **bcp** statement with no explicit starting point would produce IDENTITY column numbers similar to those shown as follows:



Partition 1			Partition 2			Partition 3			Partition 4		
ID column			ID column			ID column			ID column		
100	A		102	C		103	F		101	H	
104	A		106	C		105	F		110	H	
107	B		109	C		111	F		113	I	
108	B		112	D		116	G		115	J	
114	B		117	E		119	G		118	J	

The table has a maximum IDENTITY column number of 119, but the order is no longer meaningful.

To enforce unique IDENTITY column values in Adaptive Server, run **bcp** with either the **-g** or **-E** parameter.

Specifying the Value of a Table's IDENTITY Column

By default, when you bulk copy data into a table with an IDENTITY column, **bcp** assigns each row a temporary IDENTITY column value of 0.

This is effective only when copying data into a table. **bcp** reads the value of the ID column from the data file, but does not send it to the server. Instead, as **bcp** inserts each row into the table, the server assigns the row a unique, sequential, IDENTITY column value, beginning with the value 1.

If you specify the **-E** flag when copying data into a table, **bcp** reads the value from the data file and sends it to the server which inserts the value into the table. If the number of rows inserted exceeds the maximum possible IDENTITY column value, Adaptive Server returns an error.

The **-E** parameter has no effect when you are bulk copying data out. Adaptive Server copies the ID column to the data file, unless you use the **-N** parameter.

You cannot use the **-E** and **-g** flags together.

Bulk Copying Encrypted Data

bcp transfers encrypted data in and out of databases in either plain text or cipher text form. By default, **bcp** copies plain text data, data is automatically:

- Encrypted by Adaptive Server before insertion when executing **bcp in**. Slow **bcp** is used. The user must have **insert** and **select** permission on all columns.
- Decrypted by Adaptive Server when executing **bcp out**. **select** permission is required on all columns; in addition, **decrypt** permission is required on the encrypted columns.

This example copies the `customer` table out as plain text data in native machine format:

```
bcp uksales.dbo.customer out uk_customers -n -Uroy -Proy123
```

If the data to be copied out as plain text is encrypted by a key that uses an explicit password, supply that password to **bcp** using the **--c password** or **--colpasswd** options.

For example, if the salary column in the `employee` table is encrypted by a key that is protected by an explicit password, copy out only the `salary` data as plain text by providing **bcp** with the password, such as:

```
bcp hr.dbo.employee out  -c -Upjones -PX15tgol --
colpasswd hr.dbo.employee.salary '4mIneIsonly'
```

Alternatively, if you know the name of the key that encrypts the `salary` column, use:

```
bcp hr.dbo.employee out  -c -Upjones -PX15tgol --
keypasswd keydb.dbo.hr_key '4mIneIsonly'
```

bcp uses the password to issue a **set encryption passwd** command before selecting the data. Use the **--keypasswd** and **--colpasswd** options in a similar way on the **bcp** command line when copying the data back in.

Use the **-C** option for **bcp** to copy the data as cipher text. When copying cipher text, you may copy data out and in across different operating systems. If you are copying character data as cipher text, both platforms must support the same character set.

The **-C** option for **bcp** allows administrators to run **bcp** when they lack **decrypt** permission on the data. When you use the **-C** option:

- Data is assumed to be in cipher text format during execution of **bcp in**, and Adaptive Server performs no encryption.

  Use the **-C** option only if the file being copied into Adaptive Server was created using the **-C** option on **bcp out**. The cipher text must have been copied from a column with exactly the same column attributes and encrypted by the same key as the column into which the data is being copied. Fast **bcp** is used. The user must have **insert** and **select** permission on the table.
- **bcp in -C** bypasses the domain rule and check constraint for encrypted columns if either exist on an encrypted column because, in this situation, Adaptive Server uses fast **bcp**. Domain rules and check constraints do not affect **bcp out -C**.
- If an access rule exists on an encrypted column, using **bcp out -C** results in a 2929 error. Access rules do not affect **bcp in -C**.
- Data is copied out of Adaptive Server without decryption on **bcp out**. The cipher text data is in hexadecimal format. The user must have **select** permission on all columns. For copying cipher text, **decrypt** is not required on the encrypted columns.
- Encrypted `char` or `varchar` data retains the character set used by Adaptive Server at the time of encryption. If the data is copied in cipher text format to another server, the character set used on the target server must match that of the encrypted data copied from the source. The character set associated with the data on the source server when it was encrypted is not stored with the encrypted data and is not known or converted on the target server.

  You can also perform **bcp** without the **-C** option to avoid the character set issue.

  You cannot use the **-J** option (for character set conversion) with the **-C** option.

This example copies the `customer` table:

```
bcp uksales.dbo.customer out uk_customers -C -c -Uroy -Proy123
```

The `cc_card` column is copied out as human-readable cipher text. Other columns are copied in character format. User “roy” is not required to have decrypt permission on `customer cc_card`.

When copying data as cipher text, ensure that the same keys are available in the database when the data is copied back in. If necessary, use the **ddlgen** utility to move keys from one database to another.

bcp Options

The information in this section clarifies some of the more complex options of the **bcp** syntax.

See also

- *bcp* on page 10

Using the Default Formats

bcp provides two command line options that create files with frequently used default formats. These options provide the easiest way to copy data in and out from Adaptive Server.

- The **-n** option uses "native" (operating system) formats.
- The **-c** option uses "character" (`char` datatype) for all columns. This datatype supplies tabs between fields on a row and a newline terminator, such as a carriage return, at the end of each row.

When you use the native or character options, **bcp** operates noninteractively and only asks you for your Adaptive Server password.

Native Format

The **-n** option creates files using *native* (operating system-specific) formats.

Native formats usually create a more compact operating system file. For example, this command copies the `publishers` table to the file called `pub_out`, using native data format:

```
bcp pubs2..publishers out pub_out -n
```

The contents of `pub_out` are:

```
0736^MNew Age Books^FBoston^BMA0877^PBinnet  & Hardley^J
Washington^BDC1389^TAlgodata Infosystems^HBerkeley^BCA
```

bcp prefixed each field, except the `pub_id`, which is a `char(4)` datatype, with an ASCII character equal to the data length in the field. For example, "New Age Books" is 13 characters long, and ^M (Ctrl+m) is ASCII 13.

All the table data stored in `pub_out` is in the form of human-readable `char` or `varchar` data. In a table with numeric data, **bcp** writes the information to the file in the operating system's data representation format, which may not be human-readable.

bcp can copy data out to a file either as its native (database) datatype or as any datatype for which implicit conversion is supported for the datatype in question. **bcp** copies user-defined datatypes as their base datatype or as any datatype for which implicit conversion is supported. For more information on datatype conversions, see **dbconvert** in the *Open Client DB-Library/C Reference Manual* or the *Adaptive Server Enterprise Reference Manual*.

The **bcp** utility does not support copying data in native format from different operating systems; for example, copying from Windows to UNIX. Use the **-c** flag if you need to use **bcp** to copy files from one operating system to another.

Warning! Do not use row terminator (`-t`) or field terminator (`-r`) parameters with **bcp** in native format. Results are unpredictable and data may be corrupted.

Character Format

Character format (**-c**) uses the `char` datatype for all columns. It inserts tabs between fields in each row and a newline terminator at the end of each row.

For example, this command copies out the data from the `publishers` table in character format to the file `pub_out`:

```
bcp pubs2..publishers out pub_out -c
```

```
0736    New Age Books            Boston        MA
0877    Binnet & Hardley         Washington    DC
1389    Algodata Infosystems     Berkeley      CA
```

Change Terminators from the Command Line

Terminators are the characters that separate data fields (field terminators). The row terminator is the field terminator of the last field in the table or file.

Use the **-t*field_terminator*** and **-r*row_terminator*** command line options with the character format option (`-c`) to change the terminators from the command line.

This example uses the comma (`,`) as the field terminator, and returns (\r) as the row terminator.

- In UNIX platforms:

  ```
  bcp pubs2..publishers out pub_out -c -t , -r \\r
  ```

  If necessary, “escape” the backslash for your operating system command shell.
- In Windows:

  ```
  bcp pubs2..publishers out pub_out -c -t , -r \r
  ```

This **bcp** command line produces the following information:

```
0736,New Age Books,Boston,MA
0877,Binnet  & Hardley,Washington,DC
1389,Algodata Infosystems,Berkeley,CA
```

Note: You can use the **-t** and **-r** options to change the default terminators without including the character option (**-c**).

Change the Defaults in Interactive bcp

If you do not specify native (**-n**) or character (**-c**) format, **bcp** prompts you interactively

The prompts are for:

- The file storage type
- The prefix length
- The terminator for each column of data to be copied
- A field length for fields that are to be stored as `char` or `binary`

The default values for these prompts produce the same results as using the native format, and provide a simple means for copying data out of a database for reloading into Adaptive Server later.

If you are copying data to or from Adaptive Server for use with other programs, base your answers to the prompts on the format required by the other software.

These four prompts provide an extremely flexible system that allows you either to read a file from other software or to create a file that requires little or no editing to conform to many other data formats.

Respond to bcp Prompts

Unless you supplied **bcp** with the **-P** parameter, it prompts you for your password when you copy data in or out using the **-n** (native format) or **-c** (character format) parameters.

If you do not supply either the **-n**, `–c` or **-f *formatfile*** parameter, **bcp** prompts you for information for each field in the table or view.

- Each prompt displays a default value, in brackets, which you can accept by pressing Return. The prompts include:
  - The file storage type, which can be `character` or any valid Adaptive Server datatype
  - The prefix length, which is an integer indicating the length in bytes of the following data
  - The storage length of the data in the file for non-NULL fields
  - The field terminator, which can be any character string
  - (Windows) Scale and precision for numeric and decimal datatypes

  The row terminator is the field terminator of the last field in the table, view, or file.
- The bracketed defaults represent reasonable values for the datatypes of the field in question. For the most efficient use of space when copying out to a file:
  - Use the default prompts
  - Copy all data in the datatypes defined by their table
  - Use prefixes as indicated
  - Do not use terminators
  - Accept the default lengths

  The **bcp** prompts, defaults, and the possible alternate user responses are:

Table 3. Defaults and User Responses for bcp Prompts

Prompt	Default Provided	Possible User Response
File Storage Type	Use database storage type for most fields except: • `char` for `varchar` • `binary` for `varbinary`	`char` to create or read a human-readable file; any Adaptive Server datatype where implicit conversion is supported.
Prefix Length	• 0 for fields defined with `char` data-type (not storage type) and all fixed-length datatypes • 1 for most other datatypes • 2 for `binary` and `varbinary` saved as `char` • 4 for `text` and `image`	0 if no prefix is desired; otherwise, defaults are recommended.
Storage Length	• For `char` and `varchar`, use defined length. • For `binary` and `varbinary` saved as `char`, use double the defined length. • For all other datatypes, use maximum length needed to avoid truncation or data overflow.	Default values, or greater, are recommended.
Field or Row Terminator	None	Up to 30 characters, or one of the following: • `\t` – tab • `\n` – newline • `\r` – carriage return • `\0` – null terminator • `\` – backslash

- **bcp** can copy data out to a file either as its native (database) datatype, or as any datatype for which implicit conversion is supported. bcp copies user-defined datatypes as their base datatype or as any datatype for which implicit conversion is supported. See **dbconvert** in the *Open Client DB-Library/C Reference Manual*.

Note: Be careful when you copy data from different versions of Adaptive Server, because not all versions support the same datatypes.

- A prefix length is a 1-byte, 2-byte, or 4-byte integer that represents the length of each data value in bytes. It immediately precedes the data value in the host file.
- Be sure that fields defined in the database as `char`, `nchar`, and `binary` are always padded with spaces (null bytes for `binary`) to the full length defined in the database. `timestamp` data is treated as `binary(8)`.

- If data in `varchar` and `varbinary` fields is longer than the length you specify for copy out, **bcp** silently truncates the data in the file at the specified length.
- A field terminator string can be up to 30 characters long. The most common terminators are a tab (entered as "`\t`" and used for all columns except the last one), and a newline (entered as "`\n`" and used for the last field in a row). Other terminators are: "`\0`" (the null terminator), "`\`" (backslash), and "`\r`" (Return). When choosing a terminator, be sure that its pattern does not appear in any of your character data. For example, if you use tab terminators with a string that contains a tab, **bcp** cannot identify which tab represents the end of the string. **bcp** always looks for the first possible terminator, in this case, it will find the wrong one.
- When a terminator or prefix is present, it affects the actual length of data transferred. If the length of an entry being copied out to a file is smaller than the storage length, it is followed immediately by the terminator, or the prefix for the next field. The entry is not padded to the full storage length (`char`, `nchar`, and `binary` data is returned from Adaptive Server already padded to the full length).
- When copying in from a file, data is transferred until either the number of bytes indicated in the "Length" prompt has been copied, or the terminator is encountered. Once a number of bytes equal to the specified length has been transferred, the rest of the data is flushed until the terminator is encountered. When no terminator is used, the table storage length is strictly observed.
- These tables show the interaction of prefix lengths, terminators, and field length on the information in the file. "P" indicates the prefix in the stored table; "T" indicates the terminator; and dashes, "--", show appended spaces. "..." indicates that the pattern repeats for each field. The field length is 8 for each column, and "string" represents the 6-character field each time.

Table 4. Adaptive Server char data

	Prefix length 0	Prefix length 1, 2, or 4
No terminator	string--string--	Pstring--Pstring--
Terminator	string--Tstring--T	Pstring--TPstring--T

Table 5. Other datatypes converted to char storage

	Prefix length 0	Prefix length 1, 2 or 4
No terminator	string--string--	PstringPstring
Terminator	stringTstringT	PstringTPstringT

- The file storage type and length of a column do not have to be the same as the type and length of the column in the database table. However, if types and formats copied in are incompatible with the structure of the database table, the copy fails.
- File storage length generally indicates the maximum amount of data to be transferred for the column, excluding terminators and prefixes.

- When copying data into a table, **bcp** observes any defaults defined for columns and user-defined datatypes. However, **bcp** ignores rules to load data at the fastest possible speed.
- Because **bcp** considers any data column that can contain null values to be variable length, use either a length prefix or terminator to denote the length of each data row.
- Data written to a host file in its native format preserves all of its precision. datetime and float values preserve all of their precision even when they are converted to character format. Adaptive Server stores money values to a precision of one ten-thousandth of a monetary unit. However, when money values are converted to character format, their character format values are recorded only to the nearest two places.
- Before copying data in character format from a file into a database table, check the datatype entry rules in the *Datatypes* in *Reference Manual: Building Blocks*. Character data that is copied into the database with bcp must conform to those rules. Dates in the undelimited *(yy)yymmdd* format may result in overflow errors if the year is not specified first.
- When you send host data files to sites that use terminals different from your own, inform them of the `datafile_charset` that you used to create the files.

File Storage Type

The file storage type prompt offers you choices about how to store the data in the file.

Copy data into a file as:

- Its database table type,
- A character string, or
- Any datatype for which implicit conversion is supported.

Note: **bcp** copies user-defined datatypes as their base types.

Table 6. File storage datatypes for bcp

Table Datatype	Storage Type
`char, varchar`	c[har]
`text`	T[ext]
`int`	i[nt]
`smallint`	s[mallint]
`tinyint`	t[inyint]
`float`	f[loat]
`money`	m[oney]
`bit`	b[it]

Table Datatype	Storage Type
`datetime`	d[atetime]
`binary`, `varbinary`, `timestamp`	x
`image`	I[mage]
`smalldatetime`	D
`real`	r
`smallmoney`	M
`numeric`	n
`decimal`	e

The table shows the default storage type for each Adaptive Server datatype and the abbreviations that are acceptable to **bcp**.

- For the most compact storage, use the default value.
- For character files, use `char`.
- The `date` storage type is the Adaptive Server internal storage format of `datetime`, not the host operating system format of the date.
- `timestamp` data is treated as `binary(8)`.

The brackets [ ] in the table indicate that you can use the initial character or the beginning characters of the word. For example, for “bit” use “b,” “bi,” or “bit.”

To display this list while using **bcp** interactively, type a question mark (?) in response to the prompt `Enter the file storage type`.

The values that appear in the prompts are the defaults. Your response determines how the data is stored in the output file; you need not indicate the column’s type in the database table.

bcp fails if you enter a type that is neither implicitly convertible or `char`. For example, you may not be able to use `smallint` for `int` data (you may get overflow errors), but you can use `int` for `smallint`.

When storing noncharacter datatypes as their database types, **bcp** writes the data to the file in Adaptive Server’s internal data representation format for the host operating system, rather than in human-readable form.

Before copying data that is in character format from a file into a database table, check the datatype entry rules in the *Reference Manual: Building Blocks*. Character data copied into the database with **bcp** must conform to those rules. If you do not specify the year first, dates in the undelimited *(yy)yymmdd* format may result in overflow errors.

When you send host data files to sites that use terminals different from your own, inform them of the `datafile_charset` that you used to create the files.

Prefix Length

By default, **bcp** precedes each field that has a variable storage length with a string of one or more bytes indicating the length of the field, which enables the most compact file storage.

The default values in the prompts indicate the most efficient prefix length. For:

- Fixed-length fields – the prefix length should be 0.
- Fields of 255 bytes or less – the default prefix length is 1.
- `text` or `image` datatypes – the default prefix length is 4
- `binary` and `varbinary` datatypes being converted to `char` storage types – the default prefix length is 2, since each byte of table data requires 2 bytes of file storage.
- `binary`, `varbinary`, and `image` data – use even numbers for the prefix and length. This maintains consistency with Adaptive Server, which stores data as an even number of hexadecimal digits.
- Any data column that permits null values – use a prefix length, other than 0, or a terminator to denote the length of each row's data. **bcp** considers such columns, including columns with integer datatypes that might ordinarily be considered fixed-length columns, to be of variable length.
- Data with no prefix before its column – use a prefix length of 0.

A prefix length is a 1-, 2-, or 4-byte integer that represents the length of each data value in bytes, and it immediately precedes the data value in the host file.

Unless you supply a terminator, **bcp** pads each stored field with spaces to the full length specified at the next prompt, "length."

Because prefix lengths consist of **native** format integers, the resulting host file contains nonprintable characters, which could prevent you from printing the host file or from transmitting it through a communications program that cannot handle non-human-readable characters.

Field length

In almost all cases, use the **bcp** default value for the storage length while copying data out.

Note: The terms "length" and "storage length" in this discussion refer to the operating system file, not to Adaptive Server field lengths.

If you are creating:

- A file to reload into Adaptive Server – the default prefixes and length keep the storage space needed to a minimum.
- A human-readable file – the default length prevents the truncation of data or the creation of overflow errors that cause **bcp** to fail.

Be familiar with the data to transfer, since you can change the default length by supplying another value. If you are copying character data in from other software, examine the source file carefully before choosing length values.

Note: If the storage type is noncharacter, **bcp** stores the data in the operating system's native data representation and does not prompt for a length.

When **bcp** converts noncharacter data to character storage, it suggests a default field length large enough to store the data without truncating `datetime` data or causing an overflow of numeric data.

- The default lengths are the number of bytes needed to display the longest value for the Adaptive Server datatype.

Table 7. Default Field Lengths for Noncharacter to Character Datatypes

Datatype	Default Size
`int`	12 bytes
`smallint`	6 bytes
`tinyint`	3 bytes
`float`	25 bytes
`money`	24 bytes
`bit`	1 byte
`datetime`	26 bytes
`smalldatetime`	26 bytes
`real`	25 bytes
`smallmoney`	24 bytes

- If you specify a field length that is too short for numeric data when copying data out, **bcp** prints an overflow message and does not copy the data.
- The default length for `binary` and `varbinary` fields is twice the length defined for the column, since each byte of the field requires 2 bytes of file storage.
- If you accept the default storage length, the actual amount of storage space allocated depends on whether you specify a prefix length and terminators. If you specify a prefix length of:
  - 1, 2, or 4 – **bcp** uses a storage space of the actual length of the data, plus the length of the prefix, plus any terminators.
  - 0 and no terminator – **bcp** allocates the maximum amount of space shown in the prompt, which is the maximum space that may be needed for the datatype in question. **bcp** treats the field as if it were fixed length to determine where one field ends and the next begins.

For example, if the field is defined as `varchar(30)`, **bcp** uses 30 bytes for each value, even if some of the values are only 1 character long.

- Fields defined in the database as `char`, `nchar`, and `binary`, and those that do not permit null values, are always padded with spaces (null bytes for binary) to the full length defined in the database. `timestamp` data is treated as `binary(8)`.
- If data in the `varchar` and `varbinary` fields is longer than the length specified for copy out, **bcp** silently truncates the data in the file at the specified length.
- **bcp** does not know how large any one data value will be before copying all the data, so it always pads `char` datatypes to their full specified length.
- The file storage type and length of a column need not be the same as the type and length of the column in the database table. The coy fails if the types and formats copied in are incompatible with the structure of the database table.
- File storage length generally indicates the maximum amount of transferable data for the column, excluding terminators and/or prefixes.
- When copying data into a table, **bcp** observes any defaults defined for columns and user-defined datatypes, but ignores rules in order to load data at the fastest possible speed.
- **bcp** considers any data column that can contain a null value to be variable length, so use either a length prefix or a terminator to denote the length of each row of data.
- The file storage type and length of a column need not be the same as the type and length of the column in the database table. (If types and formats copied in are incompatible with the structure of the database table, the copy fails.)

Field and Row Terminators

Use a terminator to mark the end of a column or row, separating one from the next. The default is no terminator.

- Field terminators separate table columns.
- A row terminator is a field terminator for the last field in the row of the table or file.

Terminators are very useful for dealing with character data because you can choose human-readable terminators. The **bcp** character option, which uses tabs between each column with a newline terminator at the end of each row, is an example of using terminators that enhance the readability of a data file.

Supply your own terminators when you prepare data for use with other programs, and you want to use **bcp** to prepare tabular data. The available terminators are:

- Tabs, indicated by `\t`
- New lines, indicated by `\n`
- Carriage returns, indicated by `\r`
- Backslash, indicated by `\`
- Null terminators (no visible terminator), indicated by `\0`
- Any printable character, for example, *, A, t, |

- Strings of up to 10 printable characters, including some or all of the terminators listed above (for example, **\t**, end, !!!!!!!!!!, and \t--\n)

Note: Control characters (ASCII 0–25) cannot be printed.

Choose Terminators

Choose terminators with patterns that do not appear in any of the data.

For example, using a tab terminator with a string of data that also contains a tab creates ambiguity: which tab represents the end of the string? **bcp** always looks for the first possible terminator, which in this case would be incorrect, since the first tab it would encounter would be part of the data string.

Data in native format can also conflict with terminators. If the values of these integers are not strictly limited in a column containing a 4-byte integer in native format, it is impossible to choose a terminator that is guaranteed not to appear inside the data. Use **bcp**'s native format option for data in native format.

Note: "No terminator" differs from a "null terminator," which is an invisible—but real—character.

- A field terminator string can be up to 30 characters long. The most common terminators are a tab (entered as `\t` and used for all columns except the last one), and a newline (entered as `\n` and used for the last field in a row). Other terminators are: `\0` (the null terminator), `\` (backslash), and `\r` (Return). When choosing a terminator, its pattern cannot appear in any of your character data, since **bcp** always looks for the first possible terminator.

  For example, if you used tab terminators with a string that contained a tab, **bcp** cannot identify which tab represents the end of the string. **bcp** always looks for the first possible terminator, so, in this example it would find the wrong one.

  A terminator or prefix affects the actual length of data transferred:

  When a terminator or prefix is present, it affects the length of data transferred. If the length of an entry being copied out to a file is less than the storage length, it is immediately followed by the terminator or the prefix for the next field. The entry is not padded to the full storage length (`char`, `nchar`, and `binary` data is returned from Adaptive Server already padded to the full length).

  When **bcp** is copying in from a file, data is transferred until either the number of bytes indicated in the "Length" prompt has been copied or the terminator is encountered. Once the number of bytes equal to the specified length has been transferred, the rest of the data is flushed until the terminator is encountered. When no terminator is used, the table storage length is strictly observed.
- Fields stored as `char` (except `char`, `nchar`, and `binary` fields) instead of their database datatypes take less file storage space with the default length and prefix or a terminator. **bcp** can use either a terminator or a prefix to determine the most efficient use of

storage space. **bcp** suggests the maximum amount of storage space required for each field as the default. For `char` or `varchar` data, **bcp** accepts any length.

- The following two tables show the interaction of prefix lengths, terminators, and field length on the information in the file. "P" indicates the prefix in the stored table; "T" indicates the terminator; and dashes, (--) show appended spaces. An ellipsis (…) indicates that the pattern repeats for each field. The field length is 8 bytes for each column; "string" represents the 6-character field each time.

Table 8. Adaptive Server char Data

	Prefix length = 0	Prefix length–1, 2, or 4
No terminator	string--string--...	Pstring--Pstring--...
Terminator	string--Tstring--T...	Pstring--TPstring--T...

Table 9. Other Datatypes Converted to char Storage

	Prefix length = 0	Prefix length–1, 2, or 4
No terminator	string--string--...	PstringPstring...
Terminator	stringTstringT...	PstringTPstringT...

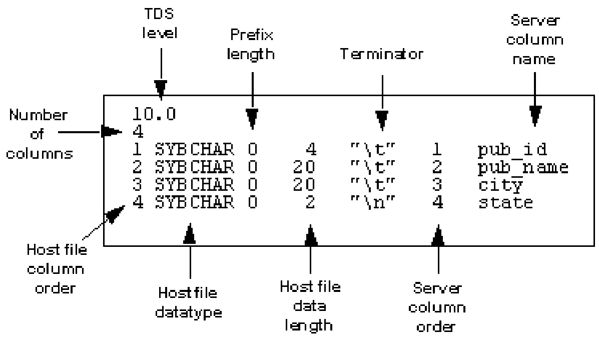
Format Files

After gathering information about each field in the table, **bcp** asks if you want to save the information to a *format file* and prompts for the file name.

Using a format file created for the data to be copied with **bcp** allows you to copy data in or out noninteractively without being prompted by **bcp** for information, since the format file supplies the information that **bcp** needs. Use this newly created format file at any other time to copy the data back into Adaptive Server or to copy data out from the table.

The figure illustrates the format of the **bcp** format files. It shows the `publishers` table from the `pubs2` database, with all the host file columns in character format, with no prefix, and using the default data length, a newline terminator at the end of the final column of a row, and tabs as terminators for all other columns.

Figure 2: bcp format file



```
10.0
4
1 SYBCHAR 0    4   "\t"   1   pub_id
2 SYBCHAR 0   20   "\t"   2   pub_name
3 SYBCHAR 0   20   "\t"   3   city
4 SYBCHAR 0    2   "\n"   4   state
```

Using this format file example, the names of the various elements of a **bcp** format file are:

- The Tabular Data Stream (TDS) version is always the first line of the file. It specifies the version of TDS that you are using, not the Adaptive Server version, and appears is a literal string without quotation marks. In the figure, the version is 10.0.
- The second line of a **bcp** format file is the number of columns, which refers to the number of records in the format file, not including lines 1 and 2. Each column in the host table has one line.
- One line for each column follows the first and second lines in the database table. Each line consists of elements that are usually separated by tabs, except for the host file datatype and the prefix length which are usually separated by a space. These elements are:

Elements	Description
Host file column order	The host file column order is the sequential number of the field in the host data file, which begins numbering at 1.
Host file datatype	The host file datatype refers to the storage format of the field in the host data file, not the datatype of the database table column. See the next table for the list of host file datatypes and their storage formats. Data written to a host file in its native format preserves all of its precision. `datetime` and `float` values preserve all of their precision, even when they are converted to character format. Adaptive Server stores `money` values to a precision of one ten-thousandth of a monetary unit. However, when `money` values are converted to character format, their character format values are recorded only to the nearest two places. See *System and User-Defined Datatypes* in the *Reference Manual: Building Blocks* for descriptions and appropriate uses of Adaptive Server datatypes.

Elements	Description
Prefix length	Prefix length indicates the number of bytes in the field length prefix. The prefix length is a 0-, 1-, 2-, or 4-byte unsigned integer value embedded in the host data file that specifies the actual length of data contained in the field. Some fields may have a length prefix while others do not. The allowable prefix length values in bytes, and their ranges are: • 0. Range: No prefix • 1. Range: 2^{8}-1; 0-255 • 2. Range: 2^{16}-1; 0-65535 • 4. Range: 2^{32} -1; 0-4,294,967,295
Host file data length	Host file data length refers to the maximum number of bytes to copy for the field. To decide how much data to copy in or out, **bcp** uses one of: • The maximum field length • The prefix length, if any • The field terminator string, if any If more than one method of field length specification is given, **bcp** chooses the one that copies the least amount of data.
Terminator	The terminator can be up to 30 bytes of characters enclosed in quotation marks (" "). The terminator designates the end of data for the host data file field.
Server column order	The server column order represents the `colid` (column ID) of the `sy-scolumns` column into which the host data file column is to be loaded. Together with the host file column order, this element maps host data file fields to the database table columns.
Server column name	The server column name is the name of the database table column into which this field is to be loaded.
Column precision	The column precision is the precision of the database table column into which this field is to be loaded. This element is present only if the storage format is `numeric` or `decimal`.
Column scale	The column scale is the scale of the database table column into which this field is to be loaded. This element is present only if the storage format is `numeric` or `decimal.`

Table 10. Host File Datatype Storage Formats

`SYBCHAR`	`char, chavarchar` (ASCII), `nchar, nvarchar`

SYBTEXT	text
SYBBINARY	binary, timestamp, unichar, univarchar, varbinary
SYBIMAGE	image
SYBINT1	tinyint
SYBINT2	smallint
SYBINT4	int
SYBINT8	bigint
SYBFLT8	float
SYBREAL	real
SYBBIT	bit
SYBNUMERIC	numeric
SYBDECIMAL	decimal
SYBMONEY	money
SYBMONEY4	smallmoney
SYBDATETIME	datetime
SYBDATETIME4	smalldatetime
SYBDATE	date
SYBTIME	time
SYBUINT8	unsigned bigint
SYBUINT4	unsigned int
SYBUINT2	unsigned smallint
SYBUNITEXT	unitext
SYBFLT8	double

Examples of Copying Out Data Interactively

By changing the default values of the prompts to **bcp**, you can prepare data for use with other software.

To create a human-readable file, respond to the **bcp** prompts:

- File storage type, enter `0`.
- Prefix length, enter `0`.
- Field length, accept the default.
- Terminator – the field terminator you enter depends on the software that you plan to use.
  - Choose between delimited fields or fixed-length fields. Always use `\n`, the newline terminator, to terminate the last field.

    For fixed-length fields, do not use a terminator. Each field has a fixed length, with spaces to pad the fields. Adjacent fields, where the data completely fills the first field seem to run together, since there are no field separators on each line of output. See the example below.
  - For comma-delimited output, use a comma (`,`) as the terminator for each field. To create tabular output, use the tab character (`\t`).

Copy Out Data with Field Lengths

This example uses fixed-length fields to create output in the personal computer format called SDF (system data format). This format can be easily read or produced by other software.

```
bcp pubs2..sales out sal_out
```

The results as stored in the `sal_out` file are:

```
5023      AB-123-DEF-425-1Z3    Oct 31 1985 12:00AM
5023      AB-872-DEF-732-2Z1    Nov 6 1985 12:00AM
5023      AX-532-FED-452-2Z7    Dec 1 1990 12:00AM
5023      BS-345-DSE-860-1F2    Dec 12 1986 12:00AM
5023      GH-542-NAD-713-9F9    Mar 15 1987 12:00AM
5023      NF-123-ADS-642-9G3    Jul 18 1987 12:00AM
5023      XS-135-DER-432-8J2    Mar 21 1991 12:00AM
5023      ZA-000-ASD-324-4D1    Jul 27 1988 12:00AM
5023      ZD-123-DFG-752-9G8    Mar 21 1991 12:00AM
5023      ZS-645-CAT-415-1B2    Mar 21 1991 12:00AM
5023      ZZ-999-ZZZ-999-0A0    Mar 21 1991 12:00AM
6380      234518                Sep 30 1987 12:00AM
6380      342157                Dec 13 1985 12:00AM
6380      356921                Feb 17 1991 12:00AM
7066      BA27618               Oct 12 1985 12:00AM
7066      BA52498               Oct 27 1987 12:00AM
7066      BA71224               Aug 5 1988 12:00AM
7067      NB-1.142              Jan 2 1987 12:00AM
7067      NB-3.142              Jun 13 1990 12:00AM
7131      Asoap132              Nov 16 1986 12:00AM
7131      Asoap432              Dec 20 1990 12:00AM
```

```
7131      Fsoap867              Sep 8 1987 12:00AM
7896      124152                Aug 14 1986 12:00AM
7896      234518                Feb 14 1991 12:00AM
8042      12-F-9                Jul 13 1986 12:00AM
8042      13-E-7                May 23 1989 12:00AM
8042      13-J-9                Jan 13 1988 12:00AM
8042      55-V-7                Mar 20 1991 12:00AM
8042      91-A-7                Mar 20 1991 12:00AM
8042      91-V-7                Mar 20 1991 12:00AM
```

The contents of the `sal_fmt` format file are:

```
10.0
3
1    SYBCHAR 04  "" 1  stor_id
2    SYBCHAR 020 "" 2  ord_num
3    SYBCHAR 026 "" 3  date
```

Comma-delimited, Newline-delimited with Format File

In this example, **bcp** copies data interactively from the `publishers` table to a file:

```
bcp pubs2..publishers out pub_out
```

The results as stored in the `pub_out` file are:

```
0736,New Age Books,Boston,MA
0877,Binnet  & Hardley,Washington,DC
1389,Algodata Infosystems,Berkeley,CA
```

The contents of the `pub_fmt` format file are:

```
10.0
4
1    SYBCHAR 0 4   ","   1  pub_id
2    SYBCHAR 0 40  ","   2  pub_name
3    SYBCHAR 0 20  ","   3  city
4    SYBCHAR 0 2   "\n"  4  state
```

This example creates:

- An output file with commas between all fields in a row and a newline terminator at the end of each row
- A format file (`pub_fmt`) that you can use later to copy the same or similar data back into Adaptive Server

Tab-delimited with Format File

This example creates tab-delimited output from the table `pubs2..publishers` in the `pub_out` file:

```
bcp pubs2..publishers out pub_out
```

The results as stored in the `pub_out` file are:

```
0736    New Age Books           Boston         MA
0877    Binnet & Hardley        Washington     DC
1389    Algodata Infosystems    Berkeley       CA
```

The contents of the `pub_fmt` format file are:

```
10.0
4
1    SYBCHAR 04   "\t"  1 pub_id
2    SYBCHAR 040  "\t"  2 pub_name
3    SYBCHAR 020  "\t"  3 city
4    SYBCHAR 02   "\n"  4 state
```

See also

- *Format Files* on page 188

Examples of Copying In Data Interactively

To copy in data successfully to a table from a file, know what the terminators in the file are or what the field lengths are and specify them when you use **bcp**.

The following examples show how to copy data in, either with fixed field lengths or with delimiters, using **bcp** with or without a format file.

Copy In Data with Field Lengths

In this example, **bcp** copies data from the `salesnew` file into the `pubs2..sales` table.

In the `salesnew` file are three fields: the first is 4 characters long, the second is 20, and the third is 26 characters long. Each row ends with a newline terminator (`\n`):

```
5023ZS-731-AAB-780-2B9       May 24 1993 12:00:00:000AM
5023XC-362-CFB-387-3Z5       May 24 1993 12:00:00:000AM
6380837206                   May 24 1993 12:00:00:000AM
6380838441                   May 24 1993 12:00:00:000AM
```

Use the following command to copy in the data interactively from `salesnew`:

```
bcp pubs2..sales in salesnew
```

The system responds to the **bcp** command:

```
Password:
Enter the file storage type of field stor_id [char]:
Enter prefix-length of field stor_id [0]:
Enter length of field stor_id [4]:
Enter field terminator [none]:
Enter the file storage type of field ord_num [char]:
Enter prefix-length of field ord_num [1]: 0
Enter length of field ord_num [20]:
Enter field terminator [none]:
Enter the file storage type of field date [datetime]: char
Enter prefix-length of field date [1]: 0
Enter length of field date [26]:
Enter field terminator [none]: \n
Do you want to save this format information in a file? [Y/n] y
Host filename [bcp.fmt]: salesin_fmt
Starting copy...
```

```
4 rows copied.
Clock Time (ms.): total = 1 Avg = 0 (116000.00 rows per sec.)
```

When you log in to Adaptive Server and access `sales`, you see the following data from `salesnew` appended to the table:

```
select * from sales
stor_id  ord_num               date
------- -------------------- -------------------------
5023     AB-123-DEF-425-1Z3    Oct 31 1985 12:00AM
5023     AB-872-DEF-732-2Z1    Nov 6 1985 12:00AM

5023     AX-532-FED-452-2Z7    Dec 1 1990 12:00AM
5023      BS-345-DSE-860-1F2   Dec 12 1986 12:00AM
5023      GH-542-NAD-713-9F9   Mar 15 1987 12:00AM
5023      NF-123-ADS-642-9G3   Jul 18 1987 12:00AM
5023      XS-135-DER-432-8J2   Mar 21 1991 12:00AM
5023      ZA-000-ASD-324-4D1   Jul 27 1988 12:00AM
5023      ZD-123-DFG-752-9G8   Mar 21 1991 12:00AM
5023      ZS-645-CAT-415-1B2   Mar 21 1991 12:00AM
5023      ZZ-999-ZZZ-999-0A0   Mar 21 1991 12:00AM
6380      234518               Sep 30 1987 12:00AM
6380      342157               Dec 13 1985 12:00AM
6380      356921               Feb 17 1991 12:00AM
7066      BA27618              Oct 12 1985 12:00AM
7066      BA52498              Oct 27 1987 12:00AM
7066      BA71224              Aug  5 1988 12:00AM
7067      NB-1.142             Jan  2 1987 12:00AM
7067      NB-3.142             Jun 13 1990 12:00AM
7131      Asoap132             Nov 16 1986 12:00AM
7131      Asoap432             Dec 20 1990 12:00AM
7131      Fsoap867             Sep  8 1987 12:00AM
7896      124152               Aug 14 1986 12:00AM
7896      234518               Feb 14 1991 12:00AM
8042      12-F-9               Jul 13 1986 12:00AM
8042      13-E-7               May 23 1989 12:00AM
8042      13-J-9               Jan 13 1988 12:00AM
8042      55-V-7               Mar 20 1991 12:00AM
8042      91-A-7               Mar 20 1991 12:00AM
8042      91-V-7               Mar 20 1991 12:00AM
(34 rows affected)
```

Since there is a unique clustered index on the `stor_id` and `ord_num` columns of `sales`, the new rows were sorted in order.

A conflict or violation can affect the copy process:

- Had there been any violations of the unique index on the columns in the data being copied from the file, **bcp** would have discarded the entire batch in which the violating row was encountered.

  A batch size of 1 evaluates each row individually, but loads more slowly and creates a separate data page for each row during a fast or fast-logged **bcp** session.
- If the types copied in are incompatible with the database types, the entire copy fails.

Copy In Data with Delimiters

In this example, **bcp** copies data from the file `newpubs` into the table `pubs2..publishers`. In the `newpubs` file, each field in a row ends with a tab character (`\t`) and each row ends with a newline terminator (`\n`):

```
1111  Stone Age Books             Boston       MA
2222  Harley & Davidson           Washington   DC
3333  Infodata Algosystems        Berkeley     CA
```

Since `newpubs` contains all character data, use the character command-line flag and specify the terminators with command line options:

- In UNIX platforms:

  ```
  bcp pubs2..publishers in newpubs -c -t\\t -r\\n
  ```
- In Windows:

  ```
  bcp pubs2..publishers in newpubs -c -t\t -r\n
  ```

Copy In Data with a Format File

To copy data back into Adaptive Server using the saved `pub_fmt` format file, run:

```
bcp pubs2..publishers in pub_out -fpub_fmt
```

Use the `pub_fmt` file to copy any data with the same format into Adaptive Server. If you have a similar data file with different delimiters, change the delimiters in the format file.

Similarly, edit the format file to reflect any changes to the field lengths, as long as all fields have the same length. For example, the `moresales` file contains:

```
804213-L-9 Jan 21 1993 12:00AM
804255-N-8 Mar 12 1993 12:00AM
804291-T-4 Mar 23 1993 12:00AM
804291-W-9 Mar 23 1993 12:00AM
```

Edit the `sal_fmt` format file to read:

```
10.0
3
1    SYBCHAR 0 4 "" 1 stor_id
2    SYBCHAR 0 7 "" 2 ord_num
3    SYBCHAR 0 21 "\n" 3 date
```

Then enter:

- For UNIX platforms:

  ```
  bcp pubs2..sales in moresales -fsal_fmt
  ```
- For Windows:

  ```
  bcp pubs2..sales in moresale -fsal_fmt
  ```

The system responds:

```
Starting copy...
4 rows copied.
```

```
 Clock Time (ms.): total = 1 Avg = 0 (116000.00 rows
per sec.)
```

bcp and Alternate Languages

Adaptive Server stores data using its default character set, which is configured during installation. If your terminal does not support that default character set, it may send confusing characters to **bcp** when you respond to prompts either by typing or by using host file scripts.

Omitting all character-set options causes **bcp** to use the character set that was named as the default for the platform. This default can cause communications problems:

- The default is not necessarily the same character set that was configured for Adaptive Server.
- The default may not necessarily be the character set that the client is using.

For more information about character sets and the associated flags, see Chapter 8, “Configuring Client/Server Character Set Conversions,” in the *System Administration Guide*.

Support for Initialization Strings

The **bcp** utility supports sending Transact-SQL commands, such as **set replication off**, to Adaptive Server before data is transferred.

Although you may use any Transact-SQL command as an initialization string for **bcp**, reset possible permanent changes to the server configuration after running **bcp**. For example, reset changes in a separate **isql** session.

bcp and Row-Level Access Rules

If Adaptive Server is enabled for row-level access, and you bulk-copy-out data, **bcp** copies out only the rows of data to which you have access. To copy out the entire table, first drop the access rules, then **bcp out**. Reinstate the access rules after you are done, if applicable.

If you bulk-copy-in data to a table that has access rules enabled, Adaptive Server may issue “uniqueness violation” errors. For example, if you load data from a **bcp** data file that was generated before the access rules were created on the table, and the **bcp** data file contains rows that were previously inserted into the table, you may receive this type of error.

If this happens, the table may look to the user like it does not include the rows that failed the **bcp** insert because of the uniqueness violation, but the user does not have access to the “missing” rows because of the access rules.

To copy in the entire table, drop the access rules, load the data, address any errors, then reinstate the access rules.

Copy In and Batch Files

Batching applies only to bulk copying in; it has no effect when copying out. By default, Adaptive Server copies all the rows in batches of 1000 lines. To specify a different batch size, use the command-line option (**-b**).

bcp copies each batch in a single transaction. If Adaptive Server rejects any row in the batch, the entire transaction is rolled back. By default, **bcp** copies all rows in a single batch; use the **-b** parameter to change the default batch size. Adaptive Server considers each batch a single **bcp** operation, writes each batch to a separate data page, and continues to the next batch, regardless of whether the previous transaction succeeded.

When data is being copied in, it can be rejected by either Adaptive Server or **bcp**.

- Adaptive Server treats each batch as a separate transaction. If the server rejects any row in the batch, it rolls back the entire transaction.
- When **bcp** rejects a batch, it then continues to the next batch. Only fatal errors roll back the transaction.
- Adaptive Server generates error messages on a batch-by-batch basis, instead of row-by-row, and rejects each batch in which it finds an error. Error messages appear on your terminal and in the error file.

Improve Recoverability

Ensure better recoverability with these actions.

- Break large input files into smaller units.

  For example, if you use **bcp** with a batch size of 100,000 rows to bulk copy in 300,000 rows, and a fatal error occurs after row 200,000, **bcp** would have successfully copied in the first two batches—200,000 rows—to Adaptive Server. If you had not used batching, **bcp** would not have been able to copy in any rows to Adaptive Server.
- Set the **trunc log on chkpt** to **true (on)**.

  The log entry for the transaction is available for truncation after the batch completes. If you copy into a database that has the **trunc log on chkpt** database option set on (**true**), the next automatic checkpoint removes the log entries for completed batches. This log cleaning breaks up large **bcp** operations and keeps the log from filling.
- Set **-b** ***batch_size*** to **10**.

  The batch size parameter set to 10 causes **bcp** to reject the batch of 10 rows, including the defective row. The error log from this setting allows you to identify exactly which row failed.

  A batch size of 1 is the smallest that **bcp** processes.

  Note: **bcp** creates 1 data page per batch, and setting **b** ***batch_size*** to 10 creates data pages with 10 rows on each page. If you set `-b` *`batch_size`* to 1, the setting creates data pages with 1 row on each page. This setting causes the data to load slowly and takes up storage space.

Batches and Partitioned Tables

When you bulk copy data into a partitioned table without specifying a partition number, Adaptive Server randomly assigns each batch to an available partition. Copying rows in a single batch places all those rows in a single partition, which can lead to load imbalance in the partitioned table.

To help keep partitioned tables balanced, use a small batch size when bulk copying data or specify the partition ID during the **bcp** session. For information about partitioning tables, see the *Performance and Tuning Guide*.

Copy Out and Text and Image Data

When you copy out `text` or `image` data, Adaptive Server, by default, copies only the first 32K of data in a `text` or `image` field.

The **-T *text_or_image_size*** parameter allows you to specify a different value. For example, if the `text` field to copy out contains up to 40K of data, use the following command to copy out all 40K:

```
bcp pubs2..publishers out -T40960
```

Note: If a `text` or `image` field is larger than the given value or the default, **bcp** does not copy out the remaining data.

Specify a Network Packet Size

To improve the performance of large bulk copy operations, you may want to use larger network packet sizes than the defaults. The **-A *size*** option specifies the network packet size to use for the **bcp** session that you are beginning.

The value of *size* must be:

- Between the values of the **default network packet size** and **max network packet size** configuration parameters, and
- A multiple of 512.

Note: The new packet size remains in effect for the current **bcp** session only.

For example, this command specifies that Adaptive Server send 40K of `text` or `image` data using a packet size of 4096 bytes for the **bcp** session:

```
bcp pubs2..authors out -A 4096 -T40960
```

Copy In and Error Files

When you specify the **-e *error_file*** option with **copy in**, **bcp** stores the rows that it cannot copy in to Adaptive Server in the specified error file.

- The error file stores a line that:
  - Indicates which row failed and the error that occurred, and
  - Is an exact copy of the row in the host file.
- If the file name specified after `-e` already exists, **bcp** overwrites the existing file.
- If **bcp** does not encounter any errors, it does not create the file.

bcp in detects two types of errors:

- Data conversion errors
- Errors in building the row – for example, attempts to insert a NULL into columns that do not accept null values or to use invalid data formats, such as a 3-byte integer

The copy in process displays error messages on your monitor.

This example loads the `newpubs` file into the `publishers` database, storing any error rows in the `pub_err` file:

```
bcp pubs2..publishers in newpubs -epub_err
```

When working with error files generated by **copy in**, note:

- **bcp** stores rows in an error file only when the **bcp** program itself detects the error.
- **bcp** continues to copy rows until **bcp** encounters the maximum number of error rows, at which point **bcp** stops the copy.
- **bcp** sends rows to Adaptive Server in batches, so **bcp** cannot save copies of rows that are rejected by Adaptive Server, for example, a duplicate row for a table that has a unique index.
- Adaptive Server generates error messages on a batch-by-batch basis, instead of row-by-row, and rejects the entire batch if it finds an error.
- It is not considered an error for Adaptive Server to reject duplicate rows if either **allow_dup_row** or **ignore_dup_key** was set when a table's index was created. The copy proceeds normally, but the duplicate rows are neither stored in the table nor in the **bcp** error file.

Copy Out and Error Files

During the copy out process, as with copy in, **bcp** overwrites any file of the same name and does not create an error file if no errors occurred.

There are two situations that cause rows to be logged in the error file during a **copy out**:

- A data conversion error in one of the row's columns
- An I/O error in writing to the host file

When working with error files generated by copy out, note that:

- **bcp** logs rows in the error file in the default character format.
- All data values print as characters with tabs between the columns and a newline terminator at the end of each row.

Data Integrity for Defaults, Rules, and Triggers

To ensure integrity, **bcp** handles data to copy depending upon its element.

Element Type	Description

Defaults and data-types	When copying data into a table, **bcp** observes any defaults defined for the columns and datatypes. That is, if there is a null field in the data in a file, **bcp** loads the default value instead of the null value during the copy.
	
	For example, here are two rows in a file to be loaded into `authors`:
	
	`409-56-7008,Bennet,David,415 658-9932,622 Pine`
	`St.,Berkeley,CA,USA,94705213-46-8915,Green,Marjorie,,309`
	`63rd St.`
	`#411,Oakland,CA,USA,94618`
	
	Commas separate the fields; a newline terminator separates the rows. There is no phone number for Marjorie Green. Because the `phone` column of the `authors` table has a default of "unknown," the rows in the loaded table look like this:
	
	`409-56-7008  Bennet  David     415 658-9932  622 Pine St.`
	`    Berkeley  CA  USA  94705`
	`213-46-8915  Green   Marjorie  unknown       309 63rd St.`
	`#411`
	`    Oakland  CA  USA  94618`

Rules and triggers	**bcp**, to enable its maximum speed for loading data, does not fire rules and triggers. To find any rows that violate rules and triggers, copy the data into the table and run queries or stored procedures that test the rule or trigger conditions.

How bcp Differs from Other Utilities

The **bcp** utility, which copies entire tables or portions of a single table, is distinct from the other utilities that move data from one place to another.

The following list names these other utilities and their commands, and describes how best to use them to move data.

Commands	Usage
dump database, load database, dump transaction, and load transaction	Use the SQL commands **dump database**, **load database**, **dump transaction**, and **load transaction** for backup purposes only. Unlike **bcp**, the **dump** commands create a physical image of the entire database. Use **load database** or **load transaction** to read data backed up with **dump database** or **dump transaction**. For information on using the SQL **dump** and **load** commands, see the *System Administration Guide* and the *Reference Manual*.
insert, update, and delete	Use the data modification commands **insert**, **update**, and **delete**, respectively, to add new rows to, change existing rows in, or remove rows from a table or view. • Use the **insert** command with a **select** statement to move data between tables. • Use the **select** statement with an **into** clause to create a new table, based on: • the columns named in the **select** statement, • the tables named in the **from** clause, and • data in the rows named in the **where** clause. For details on adding, changing, and deleting data, see **insert**, **update**, and **delete** in the *Reference Manual*.

CHAPTER 3 Building Servers Using dataserver

dataserver is the executable form of the Adaptive Server program.

Adaptive Server does not use the **buildmaster** binary to build the master device. Instead, Sybase has incorporated the **buildmaster** functionality in the **dataserver** binary. This chapter discusses how to use **dataserver** to build your server.

Note: The **dataserver** binary in Windows is called **sqlsrvr.exe**. If you are using the Windows platform, substitute all reference to **dataserver** in this chapter with **sqlsrvr**.

The **dataserver** command allows you to create master devices and databases with logical pages of size 2K, 4K, 8K, or 16K. Larger logical pages allow you to create larger rows, which can improve your performance because Adaptive Server accesses more data each time it reads a page. For example, a 16K page can hold eight times the amount of data as a 2K page, an 8K page holds four times as much data as a 2K page, and so on, for all the sizes for logical pages.

The logical page size is a server-wide setting; you cannot have databases with varying size logical pages within the same server. All tables are appropriately sized so that the row size does not exceed the current page size of the server. That is, rows cannot span multiple pages.

See also

- *dataserver* on page 37
- *sqlsrvr* on page 126

Building a New Master Device

You can create a new master device using the **dataserver** utility.

The master device is built using the **build** mode in **dataserver**. After the master device is built, the server shuts down. You must then manually start the server in the **start** mode. After this you can start, stop, and restart Adaptive Server whenever necessary without having to rebuild the master device

---

Note: When you are building a master device you should allow an additional 8K for the config block.

Adaptive Server uses:

- Logical page size – these are the pages that the database objects are built with. A databases and any of its related objects must use the same logical page size. Logical page sizes come in sizes of 2K, 4K, 8K, and 16K.
- Virtual page size – this is the physical page allocation at the disk level, and is always done in 2K pages. All disk I/O is done in multiples of virtual page size.
- Memory page size – the memory allocated and managed within Adaptive Server. The memory page size is always in units of 2K pages.

To create a new master device with **dataserver**, use:

```
dataserver -ddevice_name
. . .
    b [master_device_size [k|K|m|M|g|G]
    [-z logical_page_size [k|K]
-h
```

where:

-d *device_name* – is the full path name of the device for the `master` database. The master database device must be writable by the user who starts Adaptive Server. The default `master` database device name is `d_master`.

-b – indicates that **dataserver** is in build mode and creating a new master device, and indicates the size of the master device. If you do not provide a unit specifier (k, m, g) for the size of the device, **dataserver** assumes a size in virtual pages. The size of a virtual page is always 2K. For example:

- `-b 51204` – specifies a device of 51,204 virtual pages (100.0078125MB).
- `-b 100M` – specifies a device of 100MB

-z – specifies the logical page size, which is always 2K, 4K, 8K, or 16K. This parameter is optional during the build phase and is ignored during the start mode. If you do not include the **-z** parameter during the build mode, the master device is built with 2K logical pages.

-h – prints the syntax for the **dataserver** command.

See also

- *dataserver* on page 37

Environments When Using dataserver

When you start an Adaptive Server with **dataserver**, Adaptive Server derives its running environment from these places.

- The configuration file you specify in **-c *configuration_file***
- The default configuration file, *servername.cfg*, if you did not specify the **-c** parameter
- Default values if you did not specify either **-c *configuration_file*** or *servername.cfg*

See Chapter 17, “Setting Configuration Parameters,” in the *System Administration Guide*.

Specifying Device and Logical Page Sizes When Building a New Adaptive Server

Create a new Adaptive Server, by issuing **dataserver** using the **-b** and **-z** options.

For example, to:

- Build a 100MB master device using the default logical page size (2K) and start the server:

  ```
  dataserver -d /var/sybase/masterdb.dat -b100M -sMASTER2K
  ```
- Build a 100MB master device with a logical page size of size 4K:

  ```
  dataserver -d /var/sybase/masterdb.dat -b100M -z4K -sMASTER4K
  ```
- Build a master device of 102,400 virtual pages of size 2K, create databases using a logical page size of 8K, and boot the server:

  ```
  dataserver -d /var/sybase/masterdb.dat -b102400 -z8K -sMASTER8K
  ```

If the total requested space (102,400 x 2K = 200 MB) is insufficient to build all the required system databases using the specified logical page size, then an error message is reported, and the process fails.

Example

The following is a sample output of **dataserver** building a 200MB device with a 2K logical page size, called `personnel2k`:

```
dataserver -d /var/sybase/personnel2k.dat -b200M -z2k -sPERSONNEL2K
```

dataserver uses a default configuration file if you do not specify one:

```
00:00000:00000:2001/04/16 10:24:31.73 kernel  Warning: Using default
file
'/var/sybase/PERSONNEL2K.cfg' since a configuration file was not
specified.
Specify a configuration file name in the RUNSERVER file to avoid
this
message.
```

To specify your own configuration file, use the **dataserver** `-c` parameter. See Chapter 11, “Setting Configuration Parameters” in the *System Administration Guide* for more information.

Adaptive Server treats all installations as an upgrade, regardless of whether you have an existing version of Adaptive Server or not. For this reason, you see the following output when running **dataserver**:

```
00:00000:00001:2001/04/16 10:24:32.63 server  Database 'master'
appears to
be at an older revision than the present installation; SQL Server
will assess
it, and upgrade it as required.

00:00000:00001:2001/04/16 10:24:32.66 server  Database 'master':
beginning
```

```
upgrade step [ID    1]: Initialize disk and create empty allocation
units
on master device.

00:00000:00001:2001/04/16 10:24:34.74 server  Database 'master':
beginning
upgrade step [ID    2]: Bootstrap basic system catalogs in
database.
```

dataserver continues creating the `master` database, including all of its tables such as `systypes`, `sysobjects` and `sysusages`:

```
00:00000:00001:2001/04/16 10:24:35.21 server  Database 'master':
beginning upgrade step [ID    3]: creating index (table systypes,
index ncsystypes)

00:00000:00001:2001/04/16 10:24:35.36 server  Database 'master':
beginning
upgrade step [ID    4]: creating index (table sysobjects, index
ncsysobjects)

00:00000:00001:2001/04/16 10:24:35.44 server  Database 'master':
beginning
upgrade step [ID    20]: creating table (table sysusages)

[...]
```

When **dataserver** has created the `master` database, it creates the `model` database:

```
[...]

00:00000:00001:2001/04/16 10:24:43.14 server  Database 'model'
appears to
be at an older revision than the present installation; SQL Server
will assess
it, and upgrade it as required.

00:00000:00001:2001/04/16 10:24:43.14 server  Database 'model':
beginning
upgrade step [ID    1]: Initialize disk and create empty allocation
units
on master device.

00:00000:00001:2001/04/16 10:24:43.83 server  Database 'model':
beginning
upgrade step [ID    2]: Bootstrap basic system catalogs in database.

00:00000:00001:2001/04/16 10:24:43.89 server  Database 'model':
beginning
upgrade step [ID    3]: creating index (table systypes, index
ncsystypes)

00:00000:00001:2001/04/16 10:24:43.91 server  Database 'model':
beginning
upgrade step [ID    4]: creating index (table sysobjects, index
ncsysobjects)
```

```
[...]
```

When **dataserver** has created the `model` database, it creates the `tempdb` and `sybsystemdb` databases:

```
[...]

00:00000:00001:2001/04/16 10:24:45.23 server  CREATE DATABASE:
allocating
1024 logical pages (2.0 megabytes) on disk 'master'.

00:00000:00001:2001/04/16 10:24:46.79 server  Database sybsystemdb
successfully created.

[...]
```

dataserver is successful when the server changes the default sort order and shuts down:

```
[...]

00:00000:00001:2001/04/16 10:24:47.23 server  Now loading SQL
Server's new
default sort order and character set

[...]
00:00000:00001:2001/04/16 10:24:47.31 server  Default Sort Order
successfully changed.

00:00000:00001:2001/04/16 10:24:47.37 server  SQL Server shutdown
after
verifying System Indexes.

00:00000:00001:2001/04/16 10:24:47.37 kernel  ueshutdown: exiting
```

Error Messages

If **dataserver** is unsuccessful, you cannot start the server on that master device, and you see the following error message:

```
00:00000:00001:2001/04/16 19:02:39.53 kernel  Use license file
/var/sybase/SYSAM-1_0/licenses/license.dat.

00:00000:00001:2001/04/16 19:02:39.54 kernel  The master device's
configuration area appears to be corrupt. The server needs this data
to boot,
and so cannot continue. The server will shut down.
```

If you run **dataserver** with a user-specified configuration file that includes options that make it impossible to allocate a shared segment and start up a server, **dataserver** fails with an error message, and you cannot boot the server on that master device:

```
00:00000:00001:2001/04/16 19:04:01.11 kernel  Use license file
/var/sybase/SYSAM-1_0/licenses/license.dat.
```

```
00:00000:00000:2001/02/09 19:04:01.25 kernel  Using config area from
primary
master device.

00:00000:00001:2001/04/16 19:04:01.36 server  The value of the 'max
total_memory' parameter (33792) defined in the configuration file is
not high
enough to set the other parameter values specified in the
configuration file.
'max total_memory' should be greater than the logical memory '34343'.
```

Starting an Existing Adaptive Server

To start an existing Adaptive Server, issue **dataserver** without the **-b** and **-z** options:

```
dataserver -d /sybase/masterdb.dat
```

Upgrading to a Server With Larger Page Sizes

Adaptive Servers earlier than version 12.5 used 2K logical page sizes. You cannot change an installation's page size by upgrading. That is, if your current Adaptive Server uses 2K logical pages, you can upgrade only to an Adaptive Server that uses 2K logical pages.

However, you can migrate databases with 2K logical pages from earlier versions of Adaptive Server.

See also

- *Chapter 9, Migrating Data Using sybmigrate* on page 293

Viewing the Current Server Limits

To display information about Adaptive Server's limits:

- Run **dbcc serverlimits**, which includes the size of your server's logical page size in its output. For example, enter:
  ```
  dbcc serverlimits
  ```
- Search for the string "logical page size" in the error log.
- Run **select** using the ***@@maxpagesize*** global variable, which displays the server's logical page size:
  ```
  select @@maxpage size
  -----------
      8192
  ```

CHAPTER 4 Viewing and Editing Server Entries Using dscp

dscp is a utility program that you use to view and edit server entries in the interfaces file.

Note: dscp is not available for Windows.

- To start **dscp**, enter:

  ```
  $SYBASE/$SYBASE_OCS/bin/dscp
  ```

  The **dscp** prompt, >>, appears.
- To view the **dscp** help screen, enter one of the following commands:

  ```
  help
  ```

  ```
  h
  ```

  ```
  ?
  ```

See also

- *dscp* on page 71

Starting dscp

If you plan to add or modify entries, you must log in to the directory services, with the necessary privileges, before you start **dscp**.

To start **dscp**, enter:

```
$SYBASE/$SYBASE_OCS/bin/dscp
```

The **dscp** prompt, >>, appears. The commands you can use are:

Command	Description
open [*DSNAME*]	Opens a session with the specified directory service or interfaces. **dscp** – to open a session with interfaces, specify “InterfacesDriver” as DSNAME.
sess	Lists all open sessions.
[switch] *SESS*	Makes session number *SESS* the current session.

Command	Description
close [*SESS*]	Closes a session identified by the *SESS* number. If you do not specify *SESS*, closes the current session.
list [all]	Lists the server entries for the current session. To list the names of the entries, use the list command. To list the attributes for each entry, use the list all command.
read *SERVER-NAME*	Prints the contents of server entry *SERVERNAME* to the screen.
add *SERVERNAME*	Adds server entry *SERVERNAME* in the current session. dscp prompts you for information about *SERVERNAME*. Press Return to accept the default value, which is shown in brackets [ ].
adtr *SERVER-NAME*	Adds an attribute to the server entry *SERVERNAME* in the current session.
mod *SERVER-NAME*	Modifies server entry *SERVERNAME* in the current session. dscp prompts you for information about *SERVERNAME*. Press Return to accept the default value, which is shown in brackets [ ].
del *SERVERNAME*	Deletes server entry *SERVERNAME* in the current session.
delete-all	Deletes all server entries in the current session.
copy *NAME1* to {*NAME2* | *SESS* | *SESS NAME2*}	Copies server entry *NAME1* in the current session to: • Server entry NAME2 in the current session • Session SESS • Server entry NAME2 in session SESS
copyall to *SESS*	Copies all server entries in the current session to session *SESS*.
config	Prints configuration information related to your Sybase environment to the screen.
exit, quit	Exits dscp.
help, ?, h	Displays the help screen.

Working with Server Entries

Use **dscp** to add or modify server entries.

Note: When you add or modify a server entry, **dscp** automatically creates or modifies both master and query lines. The master line and the query line of an interfaces file entry contain identical information.

After you open a session, you can add or modify server entries associated with that session.

Each server entry is made up of a set of attributes. When you add or modify a server entry, **dscp** prompts you for information about each attribute.

Table 11. Server attributes

Attributes	Type of value	Default value and valid values	Can be edited when adding or modifying a server entry	
			Adding	Modifying
Server Object Version	Integer	110	No	No
Server Name	Character string	N/A	N/A	No
Server Service	Character string	SQL SERVER	Yes	No
Server Status	Integer	4 Valid values are: **1.** Active **2.** Stopped **3.** Failed **4.** Unknown	No	No
Transport Type	Character string	tcp. Valid values are: decnet, spx, tcp, tli, spx, tli tcp **Note:** Adaptive Server does not support the TLI interface in threaded mode.	Yes	Yes
Transport Address	Character string	None. Valid values are character strings recognized by the specified transport type	Yes	Yes

Attributes	Type of value	Default value and valid values	Can be edited when adding or modifying a server entry	
			Adding	Modifying
Security Mechanism	Character string **Note:** You can add up to 20 security mechanism strings for each server entry	None Valid values are character strings associated with object identifiers defined in the user's `objectid.dat`.	Yes	Yes

Adding and Modifying Server Entries

After you open a session, you can add or modify server entries associated with that session.

Adding a Server Entry

After you open a session, you can add server entries associated with that session.

1. Enter:

```
add servername
```

You are now in add mode. You can continue to add server entries, but you cannot execute any other **dscp** commands until you exit this mode. While in add mode, **dscp** prompts you for information about *servername*.

2. Either:

- Enter a value for each attribute, or
- Press **Return** to accept the default value, which is shown in brackets [ ]

For example, **dscp** prompts for this information when you enter:

```
add myserver

Service: [SQL Server]
Transport Type: [tcp] tcp
Transport Address: victory 8001
Security Mechanism []:
```

A server entry can have up to 20 transport type/address combinations associated with it.

3. When you are done adding a server enter, exit add mode:

```
#done
```

Modifying or Deleting a Server Entry

After you open a session, you can modify or delete server entries associated with that session.

You cannot use **dscp** to modify the Version, Service, and Status entries in the `interfaces` file.

1. Enter:

   ```
   mod servername
   ```

   You are now in modify mode. You can continue to modify server entries, but you cannot execute any other **dscp** commands until you exit this mode. In modify mode, **dscp** prompts you for information about *servername*.

2. Either:

   - Enter a value for each attribute, or
   - Press **Return** to accept the default value, which is shown in brackets [ ]

   For example, **dscp** prompts for the following information when you enter:

   ```
   mod myserver

   Version: [1]
   Service: [SQL Server] Open Server
   Status: [4]
   Address:
   Transport Type: [tcp]
   Transport Address: [victory 1824] victory 1826
   Transport Type: [tcp]
   Transport Address: [victory 1828]
   Transport Type: []
   Security Mechanism []:
   ```

   a) To delete an address:

   ```
   #del
   ```

3. When you are done modifying a server enter, exit modify mode:

   ```
   #done
   ```

Copy Server Entries

dscp allows you to copy server entries within a session and between two sessions.

When you are copying a server entry, you can:

Options	Descriptions
Create server entry to a new name in the current session	A server entry to a new name in the current session by entering: `copy name1 to name2` For example, **dscp** creates a new entry, "my_server," that is identical to "myserver" when you enter: `copy myserver to my_server` You can then modify the new entry and leave the original intact.

Options	Descriptions
Copy a server entry without changing the name	Copy a server entry without changing the name. Enter: `copy` *`name1`* `to` *`sess`* For example, **dscp** copies the "myserver" entry in the current session to session 2 when you enter: `copy myserver to 2`
Copy a server entry and rename it.	Enter: `copy` *`name1`* `to` *`sess name2`* For example, **dscp** copies the "myserver" entry in the current session to session 2 and renames it "my_server" when you enter: `copy myserver to 2 my_server`
Copy all entries in the current session to a different session.	Enter: `copyall` *`sess`* For example, **dscp** copies all entries in the current session to session 2 when you enter: `copyall 2`

List and View Contents of Server Entries

You can list names and attributes associated with a session.

Option	Description
List names of server entries	Enter: `list`
List the attributes of server entries	Enter: `list all`

Option	Description

View the contents of a server entry	Enter:
	`read servername`
	For example:
	`read myserver`
	
	`DIT base for object: interfaces`
	`Distinguish name: myserver`
	`Server Version: 1`
	`Server Name: myserver`
	`Server Service: SQL Server`
	`Server Status: 4 (Unknown)`
	`Server Address:`
	`Transport Type: tcp`
	`Transport Addr: victory 1824`
	`Transport Type: tcp`
	`Transport Addr: victory 1828`

Delete Server Entries

You can delete one entry or all entries associated with a session.

Option	Description

Delete entries associated with a session	Enter:
	`del servername`
	For example, **dscp** deletes the entry for “myserver” when you enter:
	`del myserver`

Delete all entries associated with a session	Enter: `delete-all`

Exiting dscp

Enter this command to exit **dscp**.
To exit **dscp**, enter either of the following:

- `exit`
- `quit`

CHAPTER 5 Viewing and Editing Server Entries Using dsedit

dsedit is a graphical utility that lets you view and edit server entries in the interfaces file (`sql.ini` in Windows).

Note: (UNIX) If your system does not have X-Windows, use **dscp** to configure server entries in the interfaces file.

See also

- *Chapter 4, Viewing and Editing Server Entries Using dscp* on page 209
- *dsedit* on page 72

Add, View, and Edit Server Entries

Once you are in an open session, you can add, modify, rename, and delete server entries associated with that session, as well as copy server entries within a session and between sessions.

Each server entry is made up of a set of attributes.

Table 12. Server attributes

Attribute name	Type of value	Description	Default value
Server Version	Integer	Version level of the server object definition. Sybase provides this attribute to identify future changes to the object definition.	150
Server Name	Character string	Server name.	N/A
Server Service	Character string	A description of the service provided by the server. This value can be any meaningful description.	Adaptive Server

Attribute name	Type of value	Description	Default value
Server Status	Integer	The operating status of the server. Values are: • Active • Stopped • Failed • Unknown	4
Security Mechanism	Character string	Object identifier strings (OID) that specify the security mechanisms supported by the server. This attribute is optional. If it is omitted, Open Server allows clients to connect with any security mechanism for which Open Server has a corresponding security driver.	N/A
Server Address	Character string	One or more addresses for the server. The format of the address varies by protocol, and some protocols allow more than one format. The options are: • TCP/IP – two formats: • *computer name,port number* • *ip-address,portnumber* • Named Pipe – *pipe name*: “\pipe” is a required prefix to all pipe names. Server pipes can be only local. • **Local** – `\pipe\sql\query` • **Remote** – `\\computer_name\pipe\sql\query` • IPX/SPX – three formats: • *server name* • *net number, node number, socket number* • *server name, socket number* • DECnet – four formats: • *area number.node number,object name* • *area number.node number,object number* • *node name,object name* • *node name,object number*	N/A

Using dsedit in UNIX

The **dsedit** utility allows you to view and edit server entries in the interfaces file using a GUI.

The server entries associated with the session appear in the Server box. Click a server entry to select it.

Note: If your system does not have X-Windows, use **dscp** to configure server entries in the interfaces file.

Starting dsedit in UNIX

Before starting **dsedit**, verify that you have write permission on the interfaces file.

Prerequisites

If you are running **dsedit** from a remote machine, verify that the DISPLAY environment variable is set so the **dsedit** screens display on your machine instead of on the remote machine by logging in to the remote machine and entering:

```
setenv DISPLAY your_machine_name:0.0
```

Task

Enter:

```
$SYBASE/bin/dsedit
```

The Select a Directory Service window appears, letting you open editing sessions for the interfaces file. The full path name of the default interfaces file is shown in the Interfaces File to Edit box, and the full path name of the configuration file is shown below it.

Open an Editing Session in UNIX

You can edit both the default interfaces file as well as other interfaces files to edit.

1. In **dsedit**, select **Sybase Interfaces File**.
2. To open:
   - The default interfaces file for editing, click **OK**.
   - A file other than the default interfaces file, edit the displayed file name, then click **OK**.

The Directory Service Session window appears.

Modify Server Entries in UNIX

The server entries associated with the session appear in the Server box. Click a server entry to select it.

Click **Close Session** to apply your edits to the interfaces file. Clicking this button also closes the interfaces session window.

See also

- *Open an Editing Session in Windows* on page 223

Adding a New Server Entry in UNIX

Use **dsedit** to add a server entry.

1. Click **Add new server entry**.
2. Specify the name and network addresses for a new server entry.

Viewing or Modifying a Server Entry in UNIX

Use **dsedit** to modify a server entry.

1. Click **Modify server entry**.
2. Modify the attributes.

Add or Edit Network Transport Addresses

You can view, edit, or create the transport addresses at which a server accepts client connections in the Network Transport Editor window.

This window displays the name of the server entry for the address and allows you to configure:

- Transport type – specifies the protocol and interface for the address.
- Address information – different address components are required depending on the transport type.

TCP/IP Addresses

The address information for a TCP/IP entry consists of a host name (or IP address) and a port number (entered as a decimal number). For **tli tcp**-formatted interfaces entries, the host's IP address and the port number are converted to the 16-byte hexadecimal representation required for **tli tcp**-formatted interfaces entries.

Note: Adaptive Server does not support the TLI interface in threaded mode.

In interfaces entries, use **tli tcp** for:

- All pre-10.0 clients on platforms that use **tli**-formatted interfaces entries
- Adaptive Server or Replication Server version 11.0.x or earlier on platforms that use **tli**-formatted interfaces entries

Use **tcp** for other clients and servers.

To indicate a TCP/IP address, choose **tcp** or **tli tcp** from the Transport Type menu.

SPX/IPX Addresses

SPX/IPX addresses allow Adaptive Server to listen for connections from client applications running on a Novell network.

To indicate an SPX/IPX address, choose **tli spx** or **spx** from the Transport Type menu.

Address Information	Description
Host address	An eight digit hexadecimal value representing the IP address of the computer on which the server runs. Each component of the dot-separated decimal IP address format maps to one byte in the hex address format. For example, if your host's IP address is 128.15.15.14, enter "800F0F0E" as the SPX/IPX host address value.
Port number	The port number, expressed as a four-digit hexadecimal number.
Endpoint	The path for the device file that points to the SPX device driver. Defaults to `/dev/mspx` on Solaris and `/dev/nspx` on any other platform. If necessary, adjust the path so that it is correct for the machine on which the server runs. The default path is based on the platform on which you are running **dsedit**.

Copying a Server Entry to Another Interfaces File in UNIX

Use **dsedit** to copy a server entry into another interfaces file.

1. Select the entries to copy.
   - Click once to copy a single entry.
   - Copy a range of consecutive entries by clicking the first entry in the range, then pressing and holding Shift key, and clicking the last entry in the range.
   - Select multiple, nonconsecutive entries by pressing and holding down the Ctrl key while you click each entry.
2. Click **Copy server entry**.
3. Select the Sybase interfaces file from the list.
4. Edit the file name, then click **OK**.

Copying Server Entries Within the Current Session

Use **dsedit** to copy server entries within the curent session.

1. Select one or more servers to copy. To select multiple entries, use the Shift key.
2. Click **Copy** from below the menu bar, or choose **Edit > Copy**.
3. Click **Paste** from below the menu bar, or choose **Edit > Paste**. **dsedit** appends the copied server entries with a version number of *_n*. To rename copied server entries, select **Server Object > Rename**.

See also

- *Renaming a Server Entry* on page 225

Copying Server Entries Between Sessions

Use **dsedit** to copy server entries between sessions.

1. Open a session with the directory service or `sql.ini` file you want the entries copied to.

   To open a session, choose **File > Open Directory Service**.
2. Select one or more servers to copy. To select multiple entries, use the Shift key.
3. Click **Copy** from below the menu bar, or choose **Edit > Copy**.

   To cut the server entries, click **Cut** below the menu bar, or choose **Edit > Cut**.
4. Activate the session where you want to paste the server entries.
5. Click **Paste** below the menu bar, or choose **Edit > Paste**.

You can rename the copied server entries using **Server Object** > **Rename**.

See also

- *Switching Between Sessions in Windows* on page 224
- *Opening Additional Sessions in Windows* on page 224
- *Renaming a Server Entry* on page 225

Using dsedit in Windows

The **dsedit** utility allows you to view and edit server entries in the interfaces file using a GUI. In Windows, **dsedit** creates and modifies network connection information in the interfaces file.

The server entries associated with the session appear in the Server box. Click a server entry to select it.

Starting dsedit in Windows

Start **dsedit** from the command prompt, the Windows Explorer, or the Sybase for Windows program group.

Method	Description
Command prompt	Enter: `dsedit` Specify these command-line arguments: • `-d`*`dsname`* – specifies which directory service to connect to. *dsname* is the local name of the directory service, as listed in the `libtcl.cfg` file. If you do not specify `-d`*`dsname`*, **dsedit** presents a list of directory service options in the first dialog box. • `-l`*`path`* – specifies the path to the `libtcl.cfg` file, if other than `SYBASE_home\INI`. Use this only if you want to use a `libtcl.cfg` file other than the one located in `SYBASE_home\INI`.
Windows Explorer	Double-click `DSEDIT.exe` in the `%SYBASE%\bin\` directory.
Windows Start menu	Choose **Start** > **Sybase for Windows** > **dsedit**.

Open an Editing Session in Windows

The Select Directory Service dialog box allows you to open a session with a directory service.

Open a session with:

- Any directory service that has a driver listed in the `libtcl.cfg` file
- The `sql.ini` file

Opening a Session in Windows

There are two methods to open a session in Windows.
Choose a method:

- Double-click the local name of the directory service you want to connect to, as listed in the DS Name box, or,
- Click the local name of the directory service you want to connect to, as listed in the DS Name box, and click **OK**.

Note: dsedit uses the SYBASE environment variable to locate the `libtcl.cfg` file. If the SYBASE environment variable is not set correctly, **dsedit** cannot locate the `libtcl.cfg` file.

The session number and local name of the directory service appear in the header bar.

Opening Additional Sessions in Windows

dsedit allows you to have multiple sessions open at one time.

1. Select **File > Open Directory Service** .
2. Double-click the local name of the directory service to which to connect. Alternatively, select the directory service and click **OK**.

Opening multiple sessions allows you to copy entries between directory services.

Switching Between Sessions in Windows

If you have multiple sessions open simultaeously, you must activate a session before you can work in it.
Perform either:

- Clicking in the session window
- Choosing the session from the Windows menu

The **dsedit** title bar shows which session is active.

Modify Server Entries in Windows

The server entries associated with the session appear in the Server box. Click a server entry to select it.

Adding a Server Entry

Use **dsedit** to add a server entry.

1. Choose **Server Object > Add**.
2. (Windows)Enter a server name, then click **OK**.

   (UNIX) Specify the name and network addresses for a new server entry.

   The server entry appears in the Server box. To specify an address for the server, you must modify the entry.

Modifying a Server Attribute

Use **dsedit** to modify a server entry.

Modify any attribute of a server entry.

1. Select a server.
2. (Windows) Choose **Server Object > Modify Attribute**.

   {UNIX) Click **Modify server entry**.

3. Select the attribute to modify. A dialog box appears that shows the current value of the attribute.
4. Enter or select the new attribute value, then click **OK**.

Renaming a Server Entry

Use **dsedit** to rename a server entry.

1. Select a server.
2. Choose **Server Object** > **Rename**.
3. Enter a new server name, then click **OK**.

Deleting a Server Entry

Use **dsedit** to delete a server entry.

1. Select a server.
2. Choose **Server Object** > **Delete**.

Copying server entries within the current session in Windows

Use **dsedit** to copy server entries within the current session.

1. Click one or more server entries in the Server box. Use the Shift key to select multiple entries.
2. Click **Copy** below the menu bar, or choose **Edit** > **Copy**.
3. Click **Paste** below the menu bar, or choose **Edit** > **Paste**. **dsedit** appends the copied server entries with a version number of *_n*. You can rename the copied server entries using **Server Object** > **Rename**.

See also

- *Renaming a Server Entry* on page 225

Copying server entries between sessions in Windows

Use **dsedit** to copy server entries between sessions.

1. Open a session with the directory service or `sql.ini` file that you want the entries copied to.
2. To open a session, choose **File** > **Open Directory Service**.
3. Click one or more server entries in the Server box of the session that you want the entries copied from. Use the Shift key to select multiple entries.
4. To copy the server entries, click **Copy** below the menu bar, or choose **Edit** > **Copy**.

   To cut the server entries, click **Cut** below the menu bar, or choose **Edit** > **Cut**.

5. Activate the session where you want to paste the server entries.
6. Click **Paste** below the menu bar, or choose **Edit** > **Paste**.

You can rename the copied server entries using the **Rename** command in the Server Object menu.

See also

- *Opening Additional Sessions in Windows* on page 224
- *Renaming a Server Entry* on page 225

Troubleshooting dsedit

Identify and correct common **dsedit** problems.

Problem	Solution
The **dsedit** utility does not start	Check for the following: • The SYBASE environment variable is not set or points to the wrong directory. • (UNIX platforms) X-Windows is not configured correctly. If you are running **dsedit** on a remote host, make sure that X-Windows clients on the remote host can connect to the X-Windows server on your own machine. See your X-Windows documentation for more troubleshooting information. If X-Windows is not available, use **dscp** instead of **dsedit**.
Error message: “Unable to open X display”	(UNIX platforms) **dsedit** might not work if the display machine is set up to reject X-Windows connections from remote hosts. If this is the problem, you see a message similar to the following: `Unable to open X display. Check the value of your $DISPLAY variable. If it is set correctly, use the 'xhost +' command on the display machine to authorize use of the X display. If no X display is available, run dscp instead of dsedit.` This error may be caused by either of the following situations: • The value for the DISPLAY environment variable is not entered correctly or is not set. **Solution** : Enter the DISPLAY environment variable correctly. • You are not authorized to open windows on the machine to which DISPLAY refers. **Solution** : Run the command **‘xhost +’** on the display machine.

Problem	Solution
Cannot add, modify, or delete server entries	Check for permissions problems with the interfaces file. To edit interfaces entries, you must have write permission on both the interfaces file and the Sybase installation directory.

CHAPTER 6 Using Interactive isql from the Command Line

isql is a command line interactive SQL parser to Adaptive Server.

If you are running Open Client version 11.1 or later and are using an external Sybase configuration file, add the following in your configuration file to enable **isql**:

```
[isql]
```

See also

- *isql* on page 79

Starting isql

Perform these steps to start **isql**.

1. Enter this command at the operating-system prompt:

   ```
   isql
   ```

2. When the prompt appears, enter your password.

   The password does not appear on the screen as you type. The **isql** prompt appears:

   ```
   1>
   ```

   You can now issue Transact-SQL commands.

Stopping isql

To stop isql, enter one of these commands on a line by itself.
Enter:

```
quit
exit
```

Using Transact-SQL in isql

isql sends Transact-SQL commands to Adaptive Server, formatting the results and printing them to standard output.

There is no maximum size for an **isql** statement. For more information about using Transact-SQL, see the *Transact-SQL User's Guide*.

Note: To use Transact-SQL directly from the operating system with the **isql** utility program, you must have an account, or login, on Adaptive Server.

To execute a Transact-SQL command, type the default command terminator “go” on a new line.

For example:

```
isql
Password:

1> use pubs2
2> go
1> select *
2> from authors
3> where city = "Oakland"
4> go
```

Formatting isql Output

The width for **isql** output is adjusted according to the character-set expansion or the character width, and displays a output column of the maximum possible bytes.

For example, for the UTF8 character set, each character may use at most 4 bytes, so the output column width is the character number multiplied by 4. However, the output column width can not be larger than the column defined value, and the column width is calculated using this formula:

Min(*character_number* X *max_character_width*, *column_defined_width*)

For example, if a column `col1` is defined as `varchar(10)`, then `left(col1, 2)` returns a width of eight, or four bytes per character. A value of `left(col1,5)` returns a width or 10, and cannot be larger than the defined length, even though, according to the formula, 5 X 4 = 20).

The options that change the format of **isql** output are:

- **-h** ***headers*** – the number of rows to print between column headings. The default is 1.
- **-s** ***colseparator*** – changes the column separator character. The default is single space.
- **-w** ***columnwidth*** – changes the line width. The default is 80 characters.
- **-e** – Includes each command issued to **isql** in the output
- **-n** – Removes numbering and prompt symbols

In this example, the query’s results are placed in a file called `output`:

```
isql -Uuser_name -Ppassword -Sserver -e -n -o output
use pubs2
go
select *
from authors
where city = "Oakland"
```

```
go
 quit
```

To view the contents of `output`, enter:

- (Windows) `type output`
- (UNIX) `cat output`

```
select *
from authors
where city = "Oakland"

au_id       au_lname   au_fname  phone        address
    city      state country    postalcode
----------- ---------- -------- -------------
------------------------------
------------- ---- ----------- -----------
213-46-8915 Green      Marjorie 415 986-7020 309 63rd St. #411
    Oakland   CA   USA   94618
274-80-9391 Straight   Dick     415 834-2919 5420 College Av.
    Oakland   CA   USA   94609
724-08-9931 Stringer   Dirk     415 843-2991 5420 Telegraph Av.
    Oakland   CA   USA   94609
724-80-9391 MacFeather Stearns  415 354-7128 44 Upland Hts.
    Oakland    CA    USA   94612
756-30-7391 Karsen     Livia    415 534-9219 5720 McAuley St.
    Oakland    CA    USA   94609
```

Note: The `output` file does not include the command terminator.

Correcting isql Input

You can correct input when you make an error when typing a Transact-SQL command.

You can:

- Press Ctrl-c or type the word “`reset`” on a line by itself – this clears the query buffer and returns the **isql** prompt.
- Type the name of your text editor on a line by itself – this opens a text file where you can edit the query. When you write and save the file, you are returned to **isql** and the corrected query appears. Type “`go`” to execute it.

set Options that Affect Output

A number of **set** options affect Transact-SQL output.

Option	Description
char_convert	Turns character-set conversion off and on between Adaptive Server and a client; also starts a conversion between the server character set and a different client character set. The default is off.

Option	Description
fipsflagger	Warns when any Transact-SQL extensions to entry-level SQL92 are used.This option does not disable the SQL extensions. Processing completes when you issue the non-ANSI SQL command. The default is off.
flushmessage	Sends messages as they are generated. The default is off.
language	Sets the language for system messages. The default is us_english.
nocount	Turns off report of number of rows affected. The default is off.
noexec	Compiles each query but does not execute it; often used with **showplan**. The default is off.
parseonly	Checks the syntax of queries and returns error messages without compiling or executing the queries. The default is off.
showplan	Generates a description of the processing plan for a query; does not print results when used inside a stored procedure or trigger. The default is off.
statistics io, statistics time	Displays performance statistics after each execution. The default is off.
statistics subquerycache	Displays the number of cache hits, misses, and rows in the subquery cache for each subquery. The default is off.
textsize	Controls the number of bytes of `text` or `image` data returned. The default is 32K.

For more information, see **set** in the *Reference Manual*

Changing the Command Terminator

If you include the command terminator argument (**-c**), you can choose your own terminator symbol; **go** is the default value for this option. Always enter the command terminator without blanks or tabs in front of it.

For example, to use a period as the command terminator, invoke **isql**:

```
isql -c.
```

A sample **isql** session with this command terminator looks like:

```
1> select name from sysusers
2> .

name
-----------
sandy
kim
```

```
leslie
(3 rows affected)
```

Using the **isql** command terminator option with scripts requires advance planning:

- When Adaptive Server supplies scripts, such as **installmaster**, use "`go`". Do not change the command terminator for any session that uses these scripts.
- Your own scripts may already have "`go`" in them. Remember to update your scripts to include the terminator you plan to use.

Performance Statistics Interaction with Command Terminator Values

isql provides a performance statistics option (**-p**).

For example, this syntax returns the following statistics:

```
isql -p
1> select * from sysobjects
2> go

Execution Time (ms.): 1000   Clock Time (ms.): 1000
1 xact:
```

This means that a single transaction took 100 milliseconds. The clock time value reflects the entire transaction, which starts when Client-Library™ builds the query and ends when Client-Library returns the information from Adaptive Server.

You can gather performance statistics based on the execution of one or more transactions. To gather statistics on more than one transaction, specify a number after the command terminator.

For example, the following command instructs Adaptive Server to execute three **select *** transactions and report the performance statistics:

```
isql -p
1> select * from sysobjects
2> go 3

Execution Time (ms.): 1000   Clock Time (ms.): 1000
Execution Time (ms.): 1000   Clock Time (ms.): 2000
Execution Time (ms.): 1000   Clock Time (ms.): 1000

Execution Time (ms.): 1000   Clock Time (ms.): 4000
3xact:
```

Input and Output Files

You can specify input and output files on the command line with the **-i** and **-o** options.

isql does not provide formatting options for the output. However, you can use the **-n** option to eliminate the **isql** prompts and other tools to reformat the output.

If you use the **-e** option, **isql** echoes the input to output. The resulting output file contains both the queries and their results.

UNIX command line redirection

The UNIX redirection symbols, " <" and ">", provide a similar mechanism to the **-i** and **-o** options.

For example:

```
isql -Usa < input > output
```

You can direct **isql** to take input from the terminal, as shown in this example:

```
isql -Usa -Ppassword -Sserver_name << EOF > output use pubs2
go
select * from table
go
EOF
```

"<<`EOF`" instructs **isql** to take input from the terminal up to the string "`EOF`." You can replace "`EOF`" with any character string. Similarly, the following example signals the end of input with Ctrl-d:

```
isql -Usa << > output
```

CHAPTER 7 Using Interactive SQL in Graphics Mode

Interactive SQL is the GUI-based **isql** utility, and allows you to execute SQL statements, build scripts, and display database data to the server..

You can use Interactive SQL to:

- Browse the information in a database.
- Test SQL statements that you plan to include in an application.
- Load data into a database and carrying out administrative tasks.

In addition, Interactive SQL can run command files or script files. For example, you can build repeatable scripts to run against a database and then use Interactive SQL to execute these scripts as batches.

Starting Interactive SQL

The menu item Open Interactive SQL opens a connection to a server. However, when you select the menu item for a server, Interactive SQL opens a connection to the default database for that server. When you select a specific database from the Open Interactive SQL menu, Interactive SQL opens to the selected database.

How you start Interactive SQL from the command line depends on your operating system.

If you start Interactive SQL independently, the Connect dialog appears, which lets you connect to a database just as you would in Sybase Central.

- (UNIX) You need not install Interactive SQL under `$SYBASE`, as `$SYBASE` does not even need to exist for them to start. Instead, Interactive SQL is installed under `$SYBROOT`, an environment variable set by the installer. Go to `$SYBROOT` and enter:

  ```
  dbisql
  ```

  (Windows) Change to the `%SYBROOT` directory and enter:

  ```
  dbisql.bat
  ```
- In the Connection dialog, enter the information to connect to a database in the Connect dialog box and click **OK**.

To open a new Interactive SQL window:

1. Choose **Window > New Window**. The Connect dialog appears.
2. In the Connect dialog, enter connection options, and click **OK** to connect.

The connection information (including the database name, your user ID, and the database server) appears on the title bar above the SQL Statements pane.

You can also connect to or disconnect from a database with the Connect and Disconnect commands in the SQL menu, or by executing a **connect** or **disconnect** statement in the SQL Statements pane.

The Main Interactive SQL Window

The Interactive SQL window includes four panes.

The window title displays the connection name. For Adaptive Server, the connection name is either the server name (determined by the server's interfaces file entry) or the host name and port number the user enters at the time of connection. The panes are:

Panes	Description
SQL Statement	Provides a place for you to type SQL statements.
Results	Displays the results of commands that you execute. For example, if you use SQL statements to search for specific data in the database, the Results tab in this pane displays the columns and rows that match the search criteria. If the information exceeds the size of the pane, scroll bars automatically appear. You can edit the result set on the Results tab.
Messages	Displays messages from the database server.
Plan	Displays the query optimizer's execution plan for a SQL statement.

See also

- *Plan Dialog Tab* on page 236

Plan Dialog Tab

The Plan tab displays a GUI representation of an execution engine's plan for the currently running SQL text, and helps you understand the performance and statistic characteristics of the currently running query.

Note: The Plan tab only appears if you connect to Adaptive Server version 15.0 and later.

The top half of the Plan tab shows the logical flow of the operators used in the plan in a tree-based, hierarchal structure, with each operator a separate node of the tree. The cost of each operator is based on the cost model used by the query processor. Each operator node in the tree is costed relative to other nodes, which makes it easier to identify operators based on their costs.

Each node includes tooltip text (text that appears when you move your mouse over the node) that provides details about each operator, so you do not have to select the nodes to compare details between operators.

Plan Tab Information	Description
Details	Shows the details of the operator statistics as: • Node Statistics table – shown for all the operators, and includes statistics like row count, logical I/O, and physical I/O. • Subtree Statistics table – the aggregate sum of all the operators below, and are shown for the non-leaf operators, and include statistics on row count, logical I/O, and physical I/O.
XML	Shows the result set as XML output.
Text	Shows the text version of the query plan (the same as the output of **showplan**).
Advanced	Includes: • Abstract query plan – shows the abstract query plan used by the query. • Resource utilization – describes the resources used by the plan, including number of threads and the auxiliary session descriptors (SDESs; every table scan requires one session descriptor to track the scan). • Cost – lists costs associated with the plan, including logical I/O, Physical I/O, and CPU usage. • Optimizer Metrics – lists the query-plan statistics, including query run time, run time for the first plan, number of plans evaluated, number of plans that were valid, and amount of procedure cache used. • Optimizer Statistics – lists the last time you ran **update statistics** on the table, any missing histogram steps, and the density of the steps.

The Interactive SQL Toolbar

The Interactive SQL toolbar appears at the top of the Interactive SQL window.

Use the buttons on this toolbar to:

- Recall the executed SQL statement immediately before your current position in the history list.
- View a list of up to 50 previously executed SQL statements.
- Recall the executed SQL statement immediately after your current position in the history list.

- Execute the SQL statement that appears in the SQL Statements pane.
- Interrupt the execution of the current SQL statement.

Open Multiple Windows

You can open multiple Interactive SQL windows. Each window corresponds to a separate connection.

You can connect simultaneously to two (or more) databases on different servers, or you can open concurrent connections to a single database.

Keyboard Shortcuts

Interactive SQL provides keyboard shortcuts.

Function	Description
Alt-F4	Exits Interactive SQL.
Alt-LEFT ARROW	Displays the previous SQL statement in the history list.
Alt-RIGHT ARROW	Displays the next SQL statement in the history list
Ctrl-C	Copies the selected rows and column headings to the clipboard.
Ctrl-End	Moves to the bottom of the current pane.
Ctrl-F6	Cycles through the open Interactive SQL windows.
Ctrl-H	Displays the history of your executed SQL statements during the current session.
Ctrl-Home	Moves to the top of the current pane.
Ctrl-N	Clears the contents of the Interactive SQL window.
Ctrl-Q	Displays the Query Editor, which helps you build SQL queries. When you have finished building your query, click OK to export it back into the SQL Statements pane.
Ctrl-S	Saves the contents of the SQL Statements pane.
Shift-F5	Refreshes the plan without executing the statement in the SQL Statements pane. This allows you to see the plan for a statement without altering table data.
Esc	Clears the SQL Statements pane.

Function	Description
F2	Allows you to edit the selected row in the result set. You can use the Tab key to move from column to column within the row.
F5	Executes all text in the SQL Statements pane. You can also perform this operation by clicking the Execute SQL Statement button on the toolbar.
F7	Displays the Lookup Table Name dialog. In this dialog, you can find and select a table and then press Enter to insert the table name into the SQL Statements pane at the cursor position. Or, with a table selected in the list, press F7 again to display the columns in that table. You can then select a column and press Enter to insert the column name into the SQL Statements pane at the cursor position.
F8	Displays the Lookup Procedure Name dialog. In this dialog, you can find and select a procedure, then press Enter to insert the procedure name into the SQL Statements pane at the cursor position.
F9	Executes the selected text in the SQL Statements pane. If no text is selected, all of the statements are executed.
Page Down	Moves down in the current pane.
Page Up	Moves up in the current pane.

Display Data Using Interactive SQL

Interactive SQL allows you to browse the information in databases.

You can display database information using the **select** statement in Interactive SQL. Once you enter the statement, click the Execute SQL Statement button on the toolbar.

After you execute the statement, the result set appears in the Results pane. You can use the scroll bars to see areas of the table that are outside your current view of the pane.

For example, to list all the columns and rows of the `authors` table:

1. Start Interactive SQL and connect to the `pubs2` database.
2. Enter this in the SQL Statements pane:
   ```
   select * from authors
   ```
3. On the toolbar, click the Execute SQL Statement button
   You can add, delete, and update rows within the result set.

Edit Table Values in Interactive SQL

Once you execute a query in Interactive SQL, you can edit the result set to modify the database. You can also select rows from the result set and copy them for use in other applications. Interactive SQL supports editing, inserting, and deleting rows. These actions have the same result as executing **update**, **insert**, and **delete** statements.

Before you can copy, edit, insert, or delete rows, you must execute a query in Interactive SQL that returns a result set on the Results tab in the Results pane. When you edit the result set directly, Interactive SQL creates and executes a SQL statement that makes your change to the database table.

To edit a row or value in the result set, you must have the proper permissions on the table or column you want to modify values from. For example, to delete a row, you must have **delete** permission for the table the row belongs to.

Editing the result set may fail if you:

- Attempt to edit a row or column you do not have permission on.
- Select columns from a table with a primary key, but do not select all of the primary key columns.
- Attempt to edit the result set of a **join** (for example, there is data from more than one table in the result set).
- Enter an invalid value (for example, a string in a numeric column or a NULL in a column that does not allow NULLs).

When editing fails, an Interactive SQL error message appears explaining the error, and the database table values remain unchanged.

Once you make changes to table values, you must enter a **commit** statement to make the changes permanent. To undo your changes, you must execute a **rollback** statement.

Copying Rows from the Interactive SQL Result Set

You can copy rows directly from the result set in Interactive SQL and then paste them into other applications. Copying rows also copies the column headings. Copied data is comma-delimited, which allows other applications, such as Microsoft Excel, to format the copied data correctly. By default, copied data is in ASCII format, and all strings are enclosed in single quotes. You can select only consecutive rows in the result set.

1. Choose a method to select the rows you want to copy:
   - Press and hold the Shift key while clicking the rows.
   - Press and hold the Shift key while using the Up or Down arrow.
2. Right-click the result set and select **Copy**. You can also copy the selected rows by pressing Ctrl-C.

   The selected rows, including their column headings, are copied to the clipboard. You can paste them into other applications by selecting **Edit > Paste** or by pressing Ctrl-V.

Editing Rows from the Interactive SQL Result Set

The **Edit** command allows you to change individual values within a row. You can change any or all of the values within existing rows in database tables. You must have **update** permission on the columns being modified. When you edit the result set, you can make changes to the values in only one row at a time.

1. Select the row to edit and choose an edit method:
   - Right-click the result set and choose **Edit** from the menu.
   - Press F2.

   A blinking cursor appears in the first value in the row.
2. Press **Tab** to move the cursor from column to column across the row. You can also edit a value by clicking the value in the selected row.
3. Enter the new value.

   You cannot enter invalid datatypes into a column. For example, you cannot enter a `string` datatype into a column that is configured for the `int` datatype.
4. Execute a **commit** statement to make your changes to the table permanent.

Inserting Rows into the Database from the Interactive SQL Result Set

The **Insert** command adds a new blank row to the database table. Use the Tab key to move between columns in the result set to add values to the row. When you add values to the table, characters are stored in the same case as they are entered.

You must have **insert** permission on the table to add new rows. See **insert** in *Reference Manual: Commands*.

1. Right-click the result set and choose **Add** from the menu.

   A new blank row appears in the result set with a blinking cursor in the first value in the row.

   Press Tab to move the cursor from column to column across the row. You can also insert a value by clicking on the appropriate field in the selected row.
2. Enter the new value.

   You cannot enter invalid datatypes into a column. For example, you cannot enter a `string` into a column that accepts the `int` datatype.
3. Execute a **commit** statement to make your changes to the table permanent.

Deleting Rows from the Database Using Interactive SQL

The **Delete** command removes the selected rows from a database table.

You must have **delete** permission on the table to delete rows.

1. Choose a method to select the rows you want to delete:
   - Press and hold the Shift key while clicking the rows.
   - Press and hold the Shift key while using the Up or Down arrow.

Delete nonconsecutive rows individually.

2. Right-click the result set and choose **Delete**. You can also delete the selected rows by pressing the **Delete** key.
3. Execute a **commit** statement to make your changes to the table permanent.

SQL Statements in Interactive SQL

You can enter all SQL statements as commands in the top pane of the Interactive SQL window. When you are finished typing, execute the statement to run it.

Execute a SQL statement by either:

- Press the Execute SQL Statement button, or
- Selecting F5.

To clear the SQL Statements pane:

- Choose **Edit > Clear SQL**, or
- Press Escape.

If you are running a long-running query, Interactive SQL displays a splash screen that describes some diagnostic tips.

Canceling an Interactive SQL Command

Use the Interrupt button on the Interactive SQL toolbar to cancel a command.

A Stop operation stops current processing and prompts for the next command. If a command file was being processed, you are prompted for an action to take (**Stop Command File**, **Continue**, or **Exit Interactive SQL**). You can control these actions with the Interactive SQL **ON_ERROR** option.When an interruption is detected, one of three different errors is reported, depending on when the interruption is detected. If the interruption is detected:

- When Interactive SQL is processing the request (as opposed to the database server), this message appears, and Interactive SQL stops processing immediately and the current database transaction is not updated:

  ```
  ISQL command terminated by user
  ```
- By the database server while processing a data manipulation command (**select**, **insert**, **delete**, or **update**), this message appears, and the effects of the current command are left unfinished but the rest of the transaction is left intact:

  ```
  Statement interrupted by user.
  ```
- While the database server is processing a data definition command (**create** *object*, **drop** *object*, **alter** *object*, and so on.), this message appears:

  ```
  Terminated by user -- transaction rolled back
  ```

  Since data definition commands all perform a **commit** automatically before the command starts, **rollback** simply cancels the current command.

This message also occurs when the database server is running in bulk operations mode executing a command that modifies the database (**insert**, **update**, and **delete**). In this case, **rollback** cancels not only the current command, but everything that has been done since the last **commit**. In some cases, it may take a considerable amount of time for the database server to perform the automatic **rollback**.

Combining Multiple Statements

Interactive SQL allows you to enter multiple statements at the same time. End each statement with the Transact-SQL command, `go`.

Enter multiple statements in the SQL Statements pane separated by `go`:

```
update titles
set price = 21.95
where pub_id = "1389"
go
update titles
set price = price + 2.05
where pub_id = "0736"
go
update titles
set price = price+2.0
where pub_id = "0877"
go
```

You then execute all three statements by clicking **Execute SQL Statement** on the toolbar (or by pressing F9). After execution, the commands remain in the SQL Statements pane. To clear this pane, press the Esc key.

You can roll back your changes by entering **rollback** and executing the statement.

Looking Up Tables, Columns, and Procedures

Use **Tools > Lookup Table Name** and **Tools > Lookup Procedure Name** to look up the names of tables, columns, or procedures stored in the current database and insert them at your cursor position.

Prerequisites

Install jConnect for JDBC in order to use these Interactive SQL tools.

Task

Enter the first characters of a table, column, or procedure in the Lookup Table Name and Lookup Procedure Name dialogs. This list narrows to display only those items that start with the text you entered.

You can use the standard SQL wildcard character `%` to mean “match anything”. Clear the search area to display all items.

Looking Up	Description
Table names	**1.** Choose **Tools > Lookup Table Name**. **2.** Select the table and click **OK** to insert the table name into the SQL Statements pane.
Column names	**1.** Choose **Tools > Lookup Table Name**. **2.** Find and select the table containing the column. **3.** Click **Show Columns**. **4.** Select the column and click **OK** to insert the column name into the SQL Statements pane.
Procedure names	**1.** Choose **Tools > Lookup Procedure Name**. **2.** Find and select the procedure. **3.** Click **OK** to insert the procedure name into the SQL Statements pane.

Recall Commands

When you execute a command, Interactive SQL automatically saves it in a history list that lasts for the duration of your current session. Interactive SQL maintains a record of as many as 50 of the most recent commands.

Choose one of these commands:

Recall Command Options	Description
View the commands list	To view the entire list of commands in the Command History dialog: • Press Ctrl-H, or • Select the book icon in the toolbar.
Recall a command from a list	The most recent commands appear at the bottom of the list. To recall a command, highlight it and click **OK**. It appears in the SQL Statements pane.
Recall a command	To recall commands without the Command History dialog: • Use the arrows in the toolbar to scroll back and forward through your commands, or • Press Alt-RIGHT ARROW and Alt-LEFT ARROW.
Save the commands	Save commands in text files for use in a subsequent Interactive SQL session.

Logging Commands

With the Interactive SQL logging feature, you can record commands as you execute them. Interactive SQL continues to record until you stop the logging process, or until you end the current session. The recorded commands are stored in a log file.
Start or stop logging:

Command	Description
Start logging	You can use either: • The GUI option: **1.** Choose **SQL > Start Logging**. **2.** In the Save dialog, specify a location and name for the log file. **3.** Click **Save** when finished • Enter the command, where `c:\`*`file_name`*`.sql` is the path, name, and extension of the log file: `start logging "c:\`*`file_name`*`.sql"` A log file must have the `.sql` extension. Include the single quotation marks if the path contains embedded spaces. Once you start logging, all commands that you try to execute are logged, including ones that do not execute properly.
Stop logging	You can use either: • The GUI option by choosing **SQL** > **Stop Logging**. • Enter the command: `stop logging` .

Note: The commands **start logging** and **stop logging** are not Transact-SQL commands, and are not supported by Adaptive Server outside the Interactive SQL dialog box.

Configure Interactive SQL

You can configure Interactive SQL in the Options dialog, which provides settings for commands, appearance, import/export features, and messages.

After you make your selections, choose **OK** or **Make Permanent**. Interactive SQL starts the configuration you select when you click **Make Permanent**..

Set each option by either using the GUI, or the **set option** statement.

To access the Options dialog, choose **Tools** > **Options**.

General Dialog Box

In the General dialog box, select when to commit transactions, how Interactive SQL acts when an error occurs, and whether to make a copy of scripts or commands into a log.

Components	Description
Commit	Lets you select when transactions are committed. You can commit transactions: • Automatically after each statement is executed, or • Only when you exit your Interactive SQL session You can also commit manually by entering an explicit **commit** command whenever appropriate. The default behavior is that transactions are committed when you exit Interactive SQL.
Command files	Determines how Interactive SQL acts when an error occurs: • Continue – Interactive SQL displays the error message in the Results pane but does not exit. Correct the problem, then reissue the command. • Exit – Interactive SQL exits when an error occurs. • Notify and Continue – Interactive SQL displays the error message in a dialog box and describes the error but does not exit • Notify and Exit – Interactive SQL displays the error message in a dialog box, describes the error, and exits. • Notify and stop – Interactive SQL displays the error message and describes the error. • Prompt – the default setting. Interactive SQL displays a message box asking if you want to continue. • Stop – Interactive SQL displays the error message in the Results pane. Correct, then reissue the command.
Echo Command Files to Log	When you enable logging, this option causes SQL statements executed from script files (or command files) to be copied to the log along with the SQL statements entered interactively. If you disable this option, only SQL statements entered interactively are copied to the log when you start logging.
Folders	Determines in which directory the browser should start looking for files. Select either **Last folder used** or **Current folder**.

Result Dialog Box

The Results dialog box has multiple components that let you configure how your results from Interactive SQL appear.

Component	Description
Display Null Values	Lets you specify how you want nulls to appear in the table columns when you browse data. The default setting is (NULL).
Maximum Number of Rows to Display	Lmits the number of rows that appear. The default setting is 500.
Truncation Length	Limits the number of characters that appear in each column in the Results pane in Interactive SQL. The default setting is 30.
Show Multiple Result Sets	Enables or disables the display of multiple result sets. For example, you can use this feature when you create a procedure containing multiple **select** statements. If you enable this option, you can see each result set on a separate tab in the Results pane when you call the procedure. If you are using the jConnect driver, choosing to display multiple result sets requires Interactive SQL to wait for an entire result set to be retrieved before any rows appear. This may result in longer waits for large result sets. This option is off by default.
Show Row Number	Check if you want the row numbers displayed in the result set.
Automatically Refetch Result	Enables or disables the ability of Interactive SQL to automatically regenerate the most recent result set after you execute an **insert**, **update**, or **delete** statement. For example, if you are updating a table with the Results tab in the Results pane displaying the rows about to be affected, this option causes Interactive SQL to automatically refresh the Results tab to reflect the executed changes. This option is on by default.
Console Mode	Select how you want the result sets displayed in the console; only the last result sets, all result sets, or no result sets.
Font	Select which font you want to use for the result set.

Import/Export Dialog Box

The Import/Export dialog box allows you to configure import and export settings in Interactive SQL.

Component	Description
Default export format	Select the default file format for exporting. This format is automatically selected in the Files of Type field in the Save dialog, but you can still choose other formats. The default is also used when Interactive SQL interprets an output statement if no format is specified. The default setting is ASCII.
Default import format	Select the default file format for importing. This format is automatically selected in the Files of Type field in the Open dialog, but you can still choose other formats. The default is also used when Interactive SQL interprets an **input** statement if no format is specified. The default setting is ASCII.
ASCII options	Specify the default symbols that are used for the field separator, quote string, escape character, and the default encoding datatype when you import or export data in the ASCII format. The default settings are the comma (,) for the field separator, an apostrophe (í) for the quote string, and a backslash (\) for the escape character. By default, Interactive SQL uses the default datatype of the server.

Messages Dialog Tab

The Messages dialog box allows you to configure specify message settings in Interactive SQL.

Component	Description
Measure execution time for SQL statements	Enables or disables the ability of Interactive SQL to measure the time it takes for a statement to execute. When this option is enabled (which is the default), the time appears in the Messages pane.
Show separate Messages pane	Lets you specify where information from the database server appears. By default, messages appear on the Messages tab in the Results pane. If you select this option, database server information appears in a separate Messages pane in the Interactive SQL window.
Default number of lines in Messages pane	Lets you specify the initial height (in lines) of the Messages pane. The default is 7 lines.

Editor Dialog Box

The Editor dialog box allows you to configure edit settings in Interactive SQL.

Component	Description
Editor	Select your scrollbar style preference: vertical, horizontal, or both.
Tabs	Determines how tabs are used in your SQL text: • Tab size – enter the number of spaces you want each tab to comprise. • Indent size – enter the number of spaces for each indent. • Tab radio buttons – select **Insert spaces** to convert tabs to spaces when you indent SQL text. Select **Keep tabs** to retain tabs as spaces when you indent SQL text. • Auto indent – Select: • **None** – if you do not want to automatically indent SQL text • **Default** – to use the default tab and indent settings • **Smart** – if you want Interactive SQL to automatically indent SQL text. Select **Indent open brace** to indent open braces or Indent closing brace to indent the closing braces. Interactive SQL displays how these decisions affect the text in the window below the buttons.
Format	Determines the look of your SQL text: • Text Highlighting – select the type of text you want to highlight from the list (keywords, comments, strings, and so on). • Foreground – select the foreground color of the text. • Background – select the color of the text’s background field.
Style	• Font size – select the size font. • Caret color – determines the color of the caret. • Reset All – returns all styles to original selections.
Print	Customizes your printed jobs: • Header – enter the header text. • Footer – enter the footer text. • Font size – select the font size.

Query Editor Dialog Box

The Query Editor dialog box allows you to configure the query editor settings in Interactive SQL.

Component	Description
Fully qualify table and column names	Select this to have Interactive SQL prefix table names with the owner (for example, `dbo.authors`) and prefix column names with the owner and table names (for example, `dbo.titles.price`).
Quote names	Select this to automatically put quotes around table and columns names to avoid conflicts with reserved words.
Get list of tables on startup	Select this to automatically get a list of tables in the database when the query editor is started.

Processing Command Files

This section describes how to process files consisting of a set of commands.

Saving SQL Statements to a File

In Interactive SQL, the output for each command remains in the Results pane until the next command is executed. To keep a record of your data, you can save the output of each statement to a separate file.

If statement1 and statement2 are two **select** statements, then you can save them them to `file1` and `file2`, respectively:

```
Statement1; OUTPUT TO file1
go
statement2; OUTPUT TO file2
go
```

For example, this command saves the result of a query:

```
select * from titles
go
output to "C:\My Documents\Employees.txt"
```

Executing Command Files

There are three ways to execute command files.

- Use the Interactive SQL **read** command to execute command files. this statement executes the file temp.sql:

  ```
  read temp.SQL
  ```

- Load a command file into the SQL Statements pane and execute it directly from there.

  You load command files back into the SQL Statements pane by choosing **File** > **Open**. Enter `transfer.sql` when prompted for the file name.

  The SQL Statements pane in Interactive SQL has a limit of 500 lines. For command files larger than this, use a generic editor capable of handling large files and use the **read** command to import it into Interactive SQL, which has no limit on the number of lines it can read.
- Supply a command file as a command-line argument for Interactive SQL.

Saving, Loading, and Running Command Files

Save the commands in the SQL Statements pane so they are available for future Interactive SQL sessions.

The files in which you save them, called command files and commonly referred to as scripts, are text files containing SQL statements. You can use any editor to create command files, and include comment lines along with the SQL statements to be executed. When you begin a new session, you can load the contents of a command file into the SQL Statements pane, or you can run the contents immediately.

Action	Description
Save the commands from the SQL Statements pane to a file	**1.** Choose **File** > **Save**. **2.** In the Save dialog, specify a location, name, and format for the file. Click **Save** when finished.
Load commands from a file into the SQL Statements pane	**1.** Choose **File** > **Open**. **2.** In the Open dialog, find and select the file. Click **Open** when finished.

Action	Description

Run a command file immediately	**1.** Choose **File** > **Run Script**.
	2. The Run Script menu item is the equivalent of a **read** statement. For example, in the SQL Statements pane, you can also run a command file by typing the following, where `c:\filename.sql` is the path, name, and extension of the file. Single quotation marks (as shown) are required only if the path contains spaces:
	`READ "c:\filename.sql"`
	3. In the Open dialog, find and select the file. Click **Open** when finished.
	
	The Run Script menu item is the equivalent of a READ statement. For example, in the SQL Statements pane, you can also run a command file by typing the following, where *c:\filename.sql* is the path, name, and extension of the file. Single quotation marks (as shown) are required only if the path contains spaces:
	`READ 'c:\filename.sql'`

The SQL Escape Syntax in Interactive SQL

Interactive SQL supports JDBC escape syntax, which allows you to call stored procedures from Interactive SQL regardless of the database management system you are using.

The general form for the escape syntax is:

```
{{ keyword parameters }}
```

You must use double braces. This doubling is specific to Interactive SQL. There must not be a space between successive braces: "`{{`" is acceptable, but "`{  {`" is not. As well, you cannot use newline characters in the statement. You cannot use the escape syntax in stored procedures because they are not executed by Interactive SQL.

You can use the escape syntax to access a library of functions implemented by the JDBC driver, including **number**, **string**, **time**, **date**, and **system** functions.

For example, to obtain the name of the current user in a database management system-neutral way, type:

```
select {{ fn user() }}
```

The functions that are available depend on the JDBC driver that you are using. The numeric functions that are supported by jConnect are:

abs	**cos**	**log10**	**sign**
acos	**cot**	**pi**	**sin**

asin	**degrees**	**power**	**sqrt**
atan	**exp**	**radians**	**tan**
atan2	**floor**	**rand**	
ceiling	**log**	**round**	

The string functions that are supported by jConnect are:

ascii	**difference**	**repeat**	**space**
char	**lcase**	**right**	**substring**
concat	**length**	**soundex**	**ucase**

The system functions that are supported by jConnect are:

database	**ifnull**	**user**	**convert**

The datetime functions that are supported by jConnect are:

curdate	**dayofweek**	**monthname**	**timestampadd**
curtime	**hour**	**now**	**timestampdiff**
dayname	**minute**	**quarter**	**year**
dayofmonth	**month**	**second**	

A statement using the escape syntax should work in Adaptive Server Anywhere, Adaptive Server Enterprise, Oracle, SQL Server, or another database management system that you are connected to from Interactive SQL. For example, to obtain database properties with the sa_db_info procedure using SQL escape syntax, type this in the SQL Statements pane in Interactive SQL:

```
((CANN sa_db_info(1)))
```

Interactive SQL Commands

Interactive SQL includes a set of commands that are entered in the top pane of the Interactive SQL display. These commands are intended only for Interactive SQL and are not sent to Adaptive Server for execution.

The commands available for Interactive SQL are:

Command	Description
clear	Clears the Interactive SQL panes.

Command	Description
configure	Opens the Interactive SQL Options dialog.
connect	Establishes a connection to a database.
disconnect	Drops the current connection to a database.
exit	Leaves Interactive SQL.
input	Imports data into a database table from an external file or from the keyboard.
output	Imports data into a database table from an external file or from the keyboard.
parameters	Specifies parameters to an Interactive SQL command file.
read	Reads Interactive SQL statements from a file.
set connection	Changes the current database connection to another server.
set option	Use this statement to change the values of Interactive SQL options.
start logging	Use this statement to start logging executed SQL statements to a log file.
stop logging	Use this statement to stop logging of SQL statements in the current session.
system	Use this statement to launch an executable file from within Interactive SQL.

See “Using DBISQL Commands” in the *Reference Manual: Commands*.

CHAPTER 8 Interactive sybcluster Commands Reference

Some interactive commands are active before you connect to a cluster, while others are active only after you connect to a cluster.

The **sybcluster** command prompt includes the current cluster and the default instance when these values have been set.

Prompt	When sybcluster is:
>	Not connected to a cluster.
***cluster_name*>**	Connected to a cluster.
***cluster_name instance_name*>**	Connected to a cluster and a default instance has been set.

See also

- *sybcluster* on page 139

Commands Active Before Connecting to a Cluster

These commands are active before you connect to a cluster, and are not available after you connect to a cluster.

Command	Description
connect	Connects to an existing cluster.
create cluster	Creates a new cluster.
deploy plugin	Deploys the configuration information for a single instance of the cluster to the Unified Agent.
exit	Exits **sybcluster**.
help	Lists the currently available **sybcluster** interactive commands.
quit	Exits **sybcluster**.
show agents	Displays information about available UAF agents.
upgrade server	Updates Adaptive Server to Adaptive Server Cluster Edition.

Commands Active After Connecting to a Cluster

These commands are active only after you connect to a cluster:

Command	Description
add backupserver	Configures one or more new Backup Servers on nodes in the cluster not currently configured for Backup Server.
add instance	Adds one new instance to the cluster.
create backupserver	Create Backup Server.
create xpserver	Creates an XP Server.
diagnose { cluster | instance }	Performs a set of checks to ensure the cluster or instance is working properly.
disconnect	Loses all connections to the current cluster and returns the cluster to the unconnected state.
drop backupserver	Drops the Backup Server.
drop cluster	Removes each instance from the cluster and deletes the cluster definition from the cluster configuration file.
drop xpserver	Drops the XP Server.
drop instance	Removes an instance from the cluster.
exit	Exits **sybcluster**.
help	Lists the currently available **sybcluster** interactive commands.
localize	Displays current values for default language, charset, and sort order. Allows you to change the default values and add or remove languages.
quit	Exits **sybcluster**.
set backupserver	Changes the listening port number for Backup Server on one or more nodes.
set cluster	Sets properties for the cluster.
set instance	Sets properties for the instance.
set xpserver	Changes the listening port number for XP Server on one or more nodes.
show backupserver config	Displays the names of the nodes on which Backup Server is configured and the associated listening port number.

Command	Description
show cluster	Displays configuration, log, and status values for the cluster.
show instance	Displays information about an instance.
show membership mode	Displays the cluster's current membership mode, which specifies whether or not the cluster supports Veritas Cluster Server integration.
show session	Displays current agent and discovery information.
show xpserver config	Displays the names of the instances and nodes on which XP Server is configured and the associated listening port number.
shutdown cluster	Shuts down the cluster by executing a Transact-SQL **shutdown** command for each instance in the cluster.
shutdown instance	Shuts down the instance by executing a Transact-SQL **shutdown** command.
start cluster	Starts all instances in the cluster.
start instance	Starts an instance in the cluster.
use	Sets the default instance.

add backupserver

Configures Backup Server for nodes not already configured for Backup Server.

Syntax

```
add backupserver
```

Examples

- **Add Backup Server –** Adds a Backup Server to "mycluster" on nodes "blade3" and "blade4."

  ```
  add backupserver
  ```

  ```
  Finding nodes for which Backup Server is not configured...
  Do you want to configure Backup Server for node "blade3"? [Y]
  Please enter the Backup Server port number for node "blade3": 5001
  Do you want to configure Backup Server for node "blade4"? [Y]
  Please enter the Backup Server port number for node "blade4":
  50011
  ```

Usage

You can configure Backup Server for one or more nodes in the cluster.

add backupserver lets you add additional nodes when configuring for single Backup Servers. You cannot use this command to add multiple Backup Servers.

add instance

Adds one new instance to the cluster.

You can add an instance interactively, with **sybcluster** prompting for necessary configuration information, or through an input file. **add instance** also creates a local system temporary database for the new instance. **add instance** prompts vary depending on whether configuration for the cluster is shared or private.

Syntax

```
add instance instance_name [file “input_file”]
```

Parameters

- ***instance_name* –** is the name of the instance.
- **file “*input_file*” –** specifies a file name that contains the configuration information for adding an instance.

Usage

- **add instance** creates a local system temporary database for the new instance. Before executing **add instance**, make sure that a device with sufficient space for the local system database exists.
- The input file for **add instance** has the same format as the cluster input file. However, the **add instance** input file may limit the instance definitions to the new instance in the node section.
- **add instance** may prompt for this information:
  - Instance name, if you did not enter an instance name in the command statement.
  - Node hosting the instance
  - Port number of the UAF agent on the node
  - Query port number
  - Primary and secondary address of the node
  - Primary and secondary port specification
- If you have configured single Backup Servers for the cluster, **add instance** asks whether Backup Server is already configured for the new instance node. If no, add instance asks if Backup Server should be configured. If yes, it prompts for the Backup Server port for the node.

  If you have configured multiple Backup Servers for the cluster, **add instance** prompts for:

- Name of the Backup Server
- Backup Server log file path
- Backup Server port for the new instance

add instance also prompts for XP Server port number information for the new instance.

- If the installation mode is private, **add instance** prompts for additional information for the new instance:
  - `$SYBASE` home directory.
  - Environment shell script path.
  - Adaptive Server home directory.
  - Server configuration file path.
  - Interfaces file path, if LDAP is not configured.

connect

Connects to an existing cluster.

Syntax

```
connect [ to cluster_name ]
    [ login login_name]
    [ password [password]]
    [ agent "agent_spec [, agent_spec [,...]]" ]
    [ discovery " discovery_spec [, discovery_spec [, ...]]" ]
```

Parameters

- ***cluster_name* –** is the name of the cluster to which you are connecting.
- **login *login_name* –** is the management agent login for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is "uafadmin" with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **password *password* –** is the management agent password for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is "uafadmin" with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **agent *agent_spec* –** is the agent specification that identifies the nodes in the cluster running a Unified Agent, and the port number that **sybcluster** uses to connect to the Unified Agent.

The format is ***node_name:port_number*[, *node_name*:*port_number*][,...]**. The default port number is 9999. This is the preferred method for connecting to a cluster.

- **discovery *discovery_spec* –** is the discovery method used to identify the agents responsible for the requested cluster.

  The format is **method[(*method_specification*)][, (*method_specification*)[,...]]**. See the description for **sybcluster -d *discovery_list*** for more information about discovery methods.

Examples

- **Example 1 –** Connects to "mycluster," when "mycluster" is the default cluster specified in the **sybcluster** command statement:

  ```
  connect
  ```

- **Example 2 –** Connects to "mycluster" using the agent specification and default port numbers:

  ```
  connect to mycluster agent "blade1,blade2,blade3"
  ```

Usage

A direct connection is one in which the user identifies the cluster nodes and, optionally, the port numbers for the UAF agents. Sample agent specifications are:

- myhost – identifies the host node and assumes the default listening port of 9999.
- myhost.mydomain.com – includes the host domain name.
- myhost:9999 – identifies the host node and listening port number.

create backupserver

Creates a Backup Server for the cluster, or, if the cluster is configured for multiple Backup Servers, creates a Backup Server for each instance in the cluster.

Syntax

```
create backupserver
```

Examples

- **Create Backup Server cluster –** Creates the Backup Server "mycluster_BS" for "mycluster":

  ```
  create backupserver

  Do you want to create multiple Backup Servers? [Y] N
  Enter the Backup Server name: [mycluster_BS]
  Enter the Backup Server log file path: [$SYBASE/ASE-15_0/
      install/mycluster_BS.log]
  Do you want to create a Backup Server for node "blade1"? [Y]
  ```

```
Enter the Backup Server port number for node "blade1":
The Backup Server "mycluster_BS" was successfully defined.
```

- **Create multiple Backup Servers –** Creates multiple Backup Servers for “mycluster” running on “ase1” on “blade1” and “ase2” on “blade2”:

```
create backupserver

Do you want to create multiple Backup Servers? [Y] Y
The "dump/load" commands would be routed to appropriate Backup
Server based on following policies:
1. Dedicated - Each instance associated with exactly one Backup
Server.
2. Round Robin - Choose the Backup Server with least number of
requests in round robin fashion starting from global cluster level
counter.
Enter the number corresponding to the policy to be used: [1] 1

Enter the Backup Server name for instance ase1: [ase1_BS]
Enter Backup Server log file path: [/remote/var/sybase/install/
ase1_BS_log]
Enter the Backup Server port for node "blade1": 23001

Enter the Backup Server name for instance ase2: [ase2_BS]
Enter Backup Server log file path: [/remote/var/sybase/install/
ase2_BS_log]
Enter the Backup Server port for node "blade2": 23002

Backup Servers successfully defined.
```

Usage

create backupserver prompts for the Backup Server listening port on each node. It copies other necessary configuration information from the cluster configuration file. **create backupserver**:

- Creates directory service entries for Backup Server on each node.
- Creates the Backup Server configuration and log files, and the **RUN_*backup_server*** script.
- Adds the Backup Server name to the cluster’s `sysservers` table.
- Enables Backup Server HA.

create cluster

Creates an Adaptive Server shared-disk cluster.

Enter the necessary configuration information interactively, as responses to a series of prompts, or use an input file.

Syntax

```
create cluster [cluster_name ]
    [ login login_name ]
    [ password password ]
    [ agent “agent_spec[, agent_spec[, ...]]” ]
    [ discovery “ discovery_spec[, discovery_spec[, ...]]” ]
    [ file “input_file” ]
```

Parameters

- ***cluster_name* –** is the name of the cluster.
- **login *login_name* –** is the management agent login for the Sybase Common Security Infrastructure in the Unified Agent framework. The default user name after installation is “uafadmin” with no password; this is the simple login module in the agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **password *password* –** is the management agent password for the Sybase Common Security Infrastructure in the Unified Agent framework. The default user name after installation is “uafadmin” with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **agent *agent_spec* –** is the agent specification that identifies the nodes in the cluster running a Unified Agent, and the port number that **sybcluster** uses to connect to the Unified Agent.

  The format is ***node_name*:*port_number* [, *node_name*:*port_number*] [,...]**. The default port number is “9999.”
- **discovery *discovery_spec* –** is the discovery method used to identify the agents responsible for the requested cluster.

  The format is **method[(*method_specification*)] [, (*method_specification*)[,...]]**. See the description for **sybcluster -d *discovery_list***.
- **file “*input_file*” –** is the operating system input file for creating the cluster.

Examples

- **Create a cluster with sybcluter prompts –** Creates a new cluster called “mycluster”; **sybcluster** prompts you for the information necessary to create the cluster:

  ```
  create cluster mycluster
  ```
- **Create a cluster using a configuration file –** Creates a new cluster called “mycluster1” using configuration information supplied in the **mycluster1.xml** file:

  ```
  create cluster mycluster1 file mycluster1.xml
  ```

Usage

When you create a cluster, **sybcluster** prompts for:

- Cluster name, if one has not been provided.

- Number of instances.
- Installation mode for the cluster (private or shared).
- Complete path to the master, quorum, PCI, `systemdb`, `sybsysprocs`, and temporary database devices.
- Path to the interfaces file, if LDAP is not configured and this is a shared install.
- (Optional) Trace flags.
- Complete path to the dataserver configuration file, if this is a shared install.
- Primary and secondary interconnection protocols.
- Instance host name, port number, private address, log file location, and start-up arguments.

  If this is a private installation, **sybcluster** also prompts for the `$SYBASE` installation directory, Adaptive Server home directory, **dataserver** configuration file location, and interfaces file location (if LDAP is not configured).

If **sybcluster** detects the Veritas Cluster Server (VCS) on the system, **sybcluster** asks if it should check whether device is managed by VCS.

After you create and confirm the cluster, **create cluster** prompts for an I/O fencing check, which checks whether or not each device has I/O fencing capability (see the Installation Guide for a description of I/O fencing).

create xpserver

Creates an XP Server for each instance in the cluster.

Syntax

```
create xpserver
```

Examples

- **Create an XP Server –** Creates an XP Server for each instance in “mycluster”:

  ```
  create xpserver
  ```

  ```
  Enter the XP Server port number for instance "ase1":
  Enter the XP Server port number for instance "ase2":
  Enter the XP Server port number for instance "ase3":
  The XP Server was successfully defined for each instance.
  ```

Usage

create xpserver prompts for the XP Server listening port for each node in the cluster. Other information necessary to create the XP Server is read from the cluster configuration file.

deploy plugin

Adds the configuration information for a single instance of the cluster to the Unified Agent.

You can use **deploy plugin** to configure the Unified Agent to manage a cluster if you created the cluster without using the Adaptive Server plug-in or **sybcluster** utility, or if you need to re-create the Unified Agent configuration for a cluster. The configuration of a cluster instance is performed by deploying a Unified Agent plug-in.

Syntax

```
deploy plugin
    [ login login_name ]
    [ password password ]
    [ agent agent_spec ]
    [ discovery discovery_spec ]
```

Parameters

- **login *login_name* –** is the management agent login for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is "uafadmin" with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **password *password* –** is the management agent password for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is "uafadmin" with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **agent *agent_spec* –** is the agent specification that identifies the nodes in the cluster running a Unified Agent, and the port number that **sybcluster** uses to connect to the Unified Agent.

  The format is "***node_name:port_number*** **[,** ***node_name*:*port_number*****] [,...]]**". The default port number is "9999".
- **discovery *discovery_spec* –** is the discovery method used to identify the agents responsible for the requested cluster.

  The format is "***method*****[(*****method_specification*****)] [, (*****method_specification*****)[,...]]**". See the description for **sybcluster -d *discovery_list*** for more information about discovery methods.

Examples

- **Deploy plug-in using UAF agent –** Deploys the plug-in using the UAF agent on host “system1501”:

  ```
  deploy plugin agent system1501
  ```

  sybcluster prompts for the cluster name, cluster node number, installation mode, full path to the quorum device, the environment shell script path, and the Adaptive Server home directory.

- **Deploy plug-in using discovery –** Deploys the plug-in using discovery to identify the agent:

  ```
  deploy plugin discovery udp
  ```

Usage

After you execute **deploy plugin**, **sybcluster** prompts you for:

- Path to the quorum device.
- Path to the Sybase home directory.
- Installation mode (private or shared) – the default is shared.
- Location of your Sybase environment script – this must be a shell script that can be loaded using the “.*file_name*” syntax, such as “sh” or “bash.” An example is `SYBASE.sh`.
- Location of your Adaptive Server software directory – the default is `<sybase_home_directory>/ASE-15_0`. When entering the location of the Adaptive Server software directory, include the full path. Do not use $SYBASE.

The **dataserver** login and password are configured using the **login** command, which updates all Adaptive Server plug-ins managing the cluster.

diagnose cluster

Performs a set of checks to ensure that the cluster is working correctly.

Syntax

```
diagnose cluster
```

Examples

- **Example 1 –** Checks that “mycluster” is working correctly:

  ```
  diagnose cluster

  Cluster name...................mycluster
  Maximum instances..............4
  Cluster node count.............1
  Instances defined..............4
  ```

```
Is cluster locked.............Yes
JDBC connection available......1 ase1 Yes
JDBC connection available......2 ase2 Yes
JDBC connection available......3 ase3 Yes
JDBC connection available......4 ase4 Yes
Instance Public Network........1 ase1 on blade1 (10.22.79.39)
Reachable: Yes
Instance Public Network........2 ase2 on blade1 (10.22.79.39)
Reachable: Yes
Instance Public Network........3 ase3 on blade1 (10.22.79.39)
Reachable: Yes
Instance Public Network........4 ase4 on blade1 (10.22.79.39)
Reachable: Yes
Has private Primary network.... No
Has private Secondary network.. No
Network ports required/instance 20
Minimum port allowed........... 1025
Maximum port allowed............65535

Current port strategy........... Public primary and secondary
unique.
...The ports are sequenced primary followed by the next instance
primary.
...When the primaries are are completed the secondary ports follow
the same
pattern.

Recommended port strategy....... Public primary and secondary
unique.
...The ports are sequenced primary followed by the next instance
primary.
...When the primaries are are completed the secondary ports follow
the same
pattern.
```

Usage

diagnose cluster checks that:

- A Unified Agent is running on each instance in the cluster.
- The number of instances in the cluster does not exceed the value set for maximum number of instances.
- The quorum file exists.
- All instances are defined in the interfaces file and that port numbers do not conflict.
- The primary and secondary protocol specifications do not overlap.
- Each of the `$SYBASE` directories are shared.

diagnose instance

Performs a set of checks to ensure that the instance is configured correctly.

Syntax

```
diagnose instance [instance_name]
```

Parameters

- ***instance_name*** **–** is the name of an instance. **sybcluster** uses the default value if you do not specify an instance name.

Examples

- **Example 1 –** Displays and verifies configuration information for “ase1” on “mycluster”:

```
diagnose instance ase1

Cluster name ................. mycluster
Instance id .................. 1
Instance name ................ ase1
Node name .................... blade1

Query port ................... 7101

JDBC connection available .... Yes

Instance Public Network ....... 1 ase1 on blade1 (10.33.108.139)
Reachable:.....Yes

Minimum port allowed.......... 1025
Maximum port allowed .......... 65535

Instance port range ........... 1 Primary ase1 17100 to 17115 (16)
Okay
Instance port range ........... 1 Secondary ase1 17165 to 17180
(16) Okay
```

Usage

Use **diagnose cluster** to ensure the cluster is configured correctly.

See also

- *diagnose cluster* on page 265

disconnect

Closes all connections to the current cluster and returns **sybcluster** to an unconnected state.

Syntax

```
disconnect
```

Usage

Use **connect** to reconnect to an existing cluster.

See also

- *connect* on page 259

drop backupserver

Drops Backup Server from a node or from the cluster. If the cluster is configured for multiple Backup Servers, drops all Backup Servers.

Syntax

```
drop backupserver
```

Examples

- **Drop a single Backup Server –**

```
drop backupserver

Do you want to drop the Backup Server from:
    1. Selected nodes
    2. Cluster
Enter choice: 1
Do you want to drop Backup Server from node "blade1"? [N] y
Do you want to drop Backup Server from node "blade2"? [N]
The Backup Server has been dropped from selected nodes.
```

- **Drop the Backup Server from the cluster –**

```
drop backupserver

Do you want to drop the Backup Server from:
    1. Selected nodes
    2. Cluster
Enter choice: 2
Are you sure you want to drop Backup Server mycluster_BS from
```

```
cluster mycluster? (Y or N): [N] y
The Backup Server has been dropped.
```

- **Drop all multiple Backup Servers –** Drops all of the multiple Backup Servers that were configured for the cluster:

  ```
  drop backupserver

  Multiple Backup Server are defined for the cluster. This command
  will drop all of them.
  Are you sure you want to continue? (Y/N): [N] y
  The Backup Server has been dropped.
  ```

Usage

Use **drop backupserver** to drop a Backup Server from the cluster.

drop cluster

Removes each instance from a cluster and then removes the cluster definition from the cluster configuration file.

The **drop cluster** command also removes regular files associated with the cluster and the cluster agent plug-ins that manage the cluster. The cluster must be down to use **drop cluster**.

Syntax

```
drop cluster
```

Examples

- **Drop all instances –** Drops all instances from the current cluster and deletes the cluster:

  ```
  drop cluster
  ```

Usage

- **sybcluster** prompts for confirmation before dropping the cluster.
- Due to certain file-system locking, the UAF plug-ins may not be deleted after you use **drop cluster**. Verify that the `$SYBASE_UA/nodes/*/plugins/<cluster_name>` directory has been deleted. If the directory still exists, delete it.
- **drop cluster**:
  - Removes cluster and instance entries from the interfaces file, configuration files, and specified data devices.
  - Marks the quorum device as unused.
  - Shuts down and removes the cluster's UAF agent plug-ins.

drop instance

Removes an instance from the cluster configuration file and updates the Unified Agent Framework (UAF) and discovery services.

drop instance also notifies the cluster that an instance is to be dropped, and removes the instance and interfaces file entries.

Syntax

```
drop instance [instance_name]
```

Parameters

- ***instance_name*** **–** identifies an instance in a cluster. If an instance name is not specified, **sybcluster** uses the default specified in the **sybcluster** command line.

Examples

- **Remove an instance –** Removes the "ase3" instance from the current cluster:

  ```
  drop instance ase3
  ```

Usage

- Before you use **drop instance**:
  - Start at least one instance in the cluster other than the instance you plan to drop.
  - Shut down the instance you plan to drop.
  - Manually remove instance-specific information. **drop instance** automatically removes the local system temporary database.
- **sybcluster** prompts for confirmation before removing the instance.
- You cannot drop the last instance in the cluster. You must use **drop cluster**.

drop instance:

- Removes references to the instance in the interfaces file, the instance entry in the quorum device, and notifies the cluster that the instance has been dropped.
- Removes entries for multiple and single Backup Servers if they were configured for the instance you are dropping.
- Drops XP Server and single or multiple Backup Servers if they have been configured for that instance.

See also

- *drop cluster* on page 269

drop xpserver

Drops the XP Server for each instance in the cluster.

Syntax

```
drop xpserver
```

Examples

- **Drop XP Server –** Drops the XP Servers for “mycluster”:

  ```
  drop xpserver

  Are you sure you want to drop the XP Servers from cluster
  mycluster"? {Y or N): [N] y
  The XP Servers have been dropped for all instances.
  ```

Usage

Use **drop xpserver** to drop an XP Server from the cluster.

exit

Exits the **sybcluster** utility.

Syntax

```
exit
```

Usage

exit and **quit** both exit the **sybcluster** utility.

If some agents have been shut down while connected to **sybcluster**, Adaptive Server may display error messages describing the connections. You can ignore these messages.

See also

- *quit* on page 273

help

Lists the currently available **sybcluster** interactive commands.

Syntax

```
help
```

Usage

The list of currently available interactive commands changes depending on whether or not **sybcluster** is connected to a cluster.

localize

Displays the current values for default language, charset, and sort order. Allows modification of default values, and addition or removal of languages.

Syntax

```
localize
```

Examples

- **Display default localization avlues –** Displays default localization values, and then prompts for changes. The default language changes to Chinese, the default charset to eucgb, and the default sort order to bin_eucgb:

  ```
  localize

  Current default locale properties are:
  Default Language - portuguese
  Default Charset - mac
  Default SortOrder - Binary ordering, for use with the Macintosh
  charcter
  set(mac).

  Options for default Language are:
  1. spanish
  2. portuguese
  3. german
  4. us_english
  5. thai
  6. french
  7. japanese
  8. chinese
  9. korean
  10. polish
  Enter the number representing the language to be set as defaults:
  ```

```
[2] 8

Options for default charsets are:
1. gb18030
2. eucgb
3. uttf8
Enter the number representing the charset to be set as default:
[1] 2

Options for sort orders are:

1. Binary ordering, for the EUC GB2312-80 character set (eucgb).
Enter the number representing the sort order to be set as default
[1]

Do you want to install any language? [Y] n
Do you want to remove any language? [N ]
The cluster mycluster was successfully localized with default
language
chinese, charset eucgb, sortorder bin_eucgb
```

Usage

- The current default localization value displays after each prompt. To accept the current value, enter a carriage return instead of a number.
- The options for default languages include all languages present in `$SYBASE_ASE`. If the selected default language is not configured, use **localize** to configure it or remove it.
- To ensure that new values are consistent for all instances in the cluster, restart the cluster after changing localization values.

quit

Exits the **sybcluster** utility.

Syntax

```
quit
```

Usage

exit and **quit** both exit the **sybcluster** utility.

See also

- *exit* on page 271

set backupserver

Changes the listening port number for Backup Server on specified nodes in a cluster.

Syntax

```
set backupserver
```

Examples

- **Change the listening port number for Backup Server –** Changes the listening port number for Backup Server on “blade1” of “mycluster”:

```
set backupserver

Backup Server is configured on the following nodes:
    1. blade1: 3001
    2. blade2: 3002
    3. blade3: 3003
Do you want to change the Backup Server port on any node? {Y}
Enter the number representing the node whose port you want to
change: 1
Enter the Backup Server port number for node "blade1":4001
Backup Server was successfully modified as per new properties.
```

- **Change the listening port number for one or more Backup Servers –** When “mycluster” has been configured for multiple Backup Servers, changes the listening port number for one or more Backup Servers:

```
set backupserver

Multiple Backup Servers are configured for the cluster. Their
configuration is as follows:
Backup Server Policy: Dedicated
1. Backup Server name: ase1_BS
   Configured for blade1:23001
   Log file location: /remote/sybase/ASE-15_0/install/ase1_BS.log
2. Backup Server name: ase2_BS
   Configured for blade2:23002
   Log file location: /remote/sybase/ASE-15_0/install/ase2_BS.log
3. Backup Server name: ase3_BS
   Configured for blade3:23003
   Log file location: /remote/sybase/ASE-15_0/install/ase3_BS.log

Do you want to edit any Backup Server (y/n)? [Y]
Enter the number representing the Backup Server you want to edit:
[1]
Enter the new port for Backup Server "ase1_BS":24001
Do you want to edit any more Backup Servers? [N]

Backup Server "ase1_BS" successfully updated.
```

Usage

When you set a new listening port number, Adaptive Server first checks to see if that port number is already in use.

set cluster

Changes configuration values for the cluster.

The cluster must be down to execute all **set cluster** commands except **set cluster login**.

Syntax

```
set cluster {
    maxinst max_num_instances |
    traceflags trace_flag[, trace_flag[,...]] |
    { primary | secondary } protocol udp |
    login login_name [password password ] }
```

Parameters

- **maxinst *max_instances* –** specifies the maximum number of instances that can run in the cluster.
- **traceflags *trace_flag*[, *trace_flag*[,...] –** specifies trace flags to be set when the cluster starts.
- **login *login_name* [password *password*] –** specifies a user name and password that the Unified Agent uses to log in to the cluster and perform shutdown and certain other tasks.

  Note: You can only use **set cluster login** to change the login or password that the Unified Agent uses to log in to the cluster. To change the login or password **sybcluster** uses to log in to the Unified Agent, use the Agent Management Console Sybase Central plug-in.
- **{ primary | secondary } protocol udp –** sets the protocol for the private network for the primary or secondary interface.

Examples

- **Change the maximum number of instances –** Changes the maximum number of instances to 4 for “mycluster”:

  ```
  set cluster maxinst 4
  ```
- **Add a trace flag –** Adds the trace flag 15506:

  ```
  set cluster traceflags 15506
  ```
- **Change the password –** Changes the password for the “sa” user name:

  ```
  set cluster login sa password abcde
  ```

Usage

To check that the cluster is down, enter **show cluster status**.

Permissions

The login for **login *login_name* [password *password*]** must have sa_role. By default, the Unified Agent uses the "sa" login with no password. To change this password, use **set cluster login**.

See also

- *set cluster* on page 275
- *show cluster* on page 280

set instance

Sets properties of the instance. The instance must be down.

Syntax

```
set instance instance_name
    {logpath path |
    startargs values |
    {primary | secondary} port port_range |
    {primary | secondary} address ip_address}
```

Parameters

- **logpath *logfile_path* –** specifies the path for the instance log file.
- ***instance_name* –** specifies an instance.
- **startargs *startup_args* –** specifies arguments for starting the instance.
- **{ primary | secondary } address *ip_address* –** specifies the primary or secondary IP address for the instance.
- **{ primary | secondary } port *port_range* –** specifies the primary or secondary port range for the instance. The format for *port_range* is *start_num end_num*.

Examples

- **Change the port range –** Changes the port range for the primary interface listening port:

  ```
  set instance primary port 7777
  ```

Usage

To check that the instance is down, enter **show cluster status**.

See also

- *show cluster* on page 280

set xpserver port

Changes the listening port number for XP Server on specified nodes of the cluster.

Syntax

```
set xpserver port
```

Examples

- **Example 1 –** Changes the listening port for the XP Server for instance “ase1” on “blade1” of “mycluster” without changing the listening ports for “ase2” and “ase3”:

  ```
  set xpserver port

  Enter the XP Server port number for instance "ase1" [3002]: 4002
  Enter the XP Server port number for instance "ase2" [3002]: <CR>
  Enter the XP Server port number for instance "ase3" [3002]: <CR>
  ```

Usage

You can change the XP Server listening port number on one or more instances.

show agents

Displays information about available UAF agents.

Syntax

```
show agents
    [ login login_name ]
    [ password password ]
    [ agent “agent_spec[, agent_spec[,...]]” ]
    [ discovery “discovery_spec[, discovery_spec[,...]]” ]
```

Parameters

- **login *login_name* –** is the management agent login for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is “uafadmin” with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.

- **password *password* –** is the management agent password for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is “uafadmin” with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **agent *agent_spec* –** is the agent specification that identifies the nodes in the cluster running a Unified Agent, and the port number that **sybcluster** uses to connect to the Unified Agent.

  The format is “***node_name:port_number* [, *node_name*:*port_number*] [,...]]**”. The default port number is “9999.”
- **discovery *discovery_spec* –** is the discovery method used to identify the agents responsible for the requested cluster.

  The format is “***method*[(*method_specification*)] [, (*method_specification*) [,...]]**”. See the description for **sybcluster -d *discovery_list*** for more information about discovery methods.

Examples

- **Display UAF agent information –**

```
show agents

Agent Information: service:jmx:rmi:///jndi/rmi://blade1:9985/
agent
-----------------------------------------------------

Node Name:       blade1
Agent Port:      9985
Agent Version:   2.5.0
Agent Build:     977

OS Name:         Linux
OS Version:      2.6.9-42.ELsmp
OS Architecture: amd64

Agent Service Info:

Agent Service (Agent)  Build: 977  Status: running
BootstrapService (BootstrapService)  Build: <unavailable>  Status:
running
Configuration Service (ConfigService)  Build: 977  Status:
running
Deployment Service (DeploymentService)  Build:
<unavailable>  Status: running
Environment Service (EnvironmentDiscoveryService)  Build:
977  Status: running
File Transfer Service (FileTransferService)  Build: 977  Status:
running
Plugin Registration Service (PluginRegisterService)  Build:
```

```
977  Status: running
RMI Service (RMIService)  Build: 977  Status: running
Remote Shell Service (RemoteShellService)  Build: 977  Status:
running Security
Service (SecurityService)  Build: 977  Status: running Self
Discovery Service
(SelfDiscoveryService)  Build: 977  Status: running Service
Registration Service
(ServiceRegistrationService)  Build: 977  Status: running Session
Service
(SessionService)  Build: 977  Status: running Sybase Home Service
(SybaseHomeService)
Build: 14  Status: running

Agent Plugin Info:

ASE Cluster Agent Plugin (com.sybase.ase.cluster) Version: 15.1.0
Build: 85 Instance:
1  Status: running
    Cluster Name: marion
    Env Shell:    /job1/miso/betaR1/SYBASE.sh Shell Type: sh
    Sybase Home:  /job1/miso/betaR1
    ASE Home:    /job1/miso/betaR1/ASE-15_0
    ASE Version: Adaptive Server Enterprise/15.0.1/EBF 14721
Cluster
Edition/B/x86_64/Enterprise Linux/asecluster3/2360/64-bit/FBO/Fri
Jul 20 10:04:16
2007
    ASE Login:    sa
    Update Time:  60 seconds
    Last Update:  2007-09-28 22:09:02 -0700
```

Usage

show agents is active before you connect to a cluster.

show backupserver config

Displays the nodes on which Backup Server is configured, the associated listening port numbers, and the Backup Server policy.

Syntax

```
show backupserver config
```

Examples

- **Display configuration information –** Displays configuration information for “mycluster,” which has been configured for multiple Backup Servers.

```
show backupserver config

Multiple Backup Servers are configured for cluster. Their
```

```
configuration is
as follows:
Backup Server policy: Dedicated
1. Backup Server for ase1: ase1_BS
   Configured on (host:port) - blade1:23001
2. Backup Server for ase2: ase2_BS
   Configured on (host:port) - blade2:23002

3. Backup Server for ase3: ase3_BS
   Configured on (host:port) - blade3:23003
```

Usage

- Use the **show backupserver config** command to display Backup Server configuration information.
- If you are configuring multiple Backup Servers, **show backupserver config** includes the Backup Server policy.

show cluster

Displays configuration, log, and status information about the cluster.

Syntax

```
show cluster
    config
        template
    log
        [errors]
    [minseverity severity_level]
    [startdate [date_string]]
    [enddate [date_string]]
    [last number_of_lines]
    status
```

Parameters

- **status –** displays status information for the cluster. Values are:
  - **Up**
  - **Down**
  - **Undefined**
  - **Invalid**
  - **Start**
  - **Init**
  - **Quiesce**
- **log –** displays logs from all instances in the cluster.

- **errors [minseverity *severity_level*] –** display log file entries for errors. (Optional) Limits displayed error entries to a severity level and above.

Note: Error *severities_level* is an attribute of Adaptive Server error messages, not **sybcluster** messages.

- **startdate [*date_string*] –** display log file entries that occur on and after the date specified. The format for *date_string* is: ***mm*:*dd*:*yy***.

  If you do not specify a **startdate** or **enddate** ***date_string***, the default is the current date (today).
- **enddate [*date_string*] –** display log file entries that occur on or before the date specified.
- **last *num_lines* –** limits the number of lines displayed, counting backward from the last line in the log files.
- **config –** displays configuration information for the cluster:
  - Maximum number of instances
  - Installation mode: shared or private
  - Primary and secondary protocols
  - Trace flags set
  - Location and name of the quorum device
  - LDAP information, if LDAP is configured
  - Location and name of the master device
- **template –** displays formatted configuration information for the cluster.

Examples

- **Display current information –** Displays current configuration and other information about the default cluster:

```
show cluster status

Id   Name      Node    State   Heartbeat
-----------------------------------------
1   ase1      blade1   Up      Yes
2   ase2      blade2   Up      Yes
3   ase3      blade3   Down    No
```

- **Display configuration information for a cluster configured for shared installation mode –** Displays configuration information—including LDAP, if it is configured—for the default cluster configured for shared installation mode:

```
show cluster config

**Cluster configuration for "mycluster" **
    Installation Mode shared
    Interfaces Path "/work2/sybase/ASE-15_0/"
    Trace Flags:
        15556
    Maximum Instances "4"
    Quorum "/dev/raw/raw101"
    Master Device
        "/dev/raw/raw102"
    logfile ase1 /work2/sybase/ASE-15_0/install/
        ase1.log
    run_parameters ase1 null
    logfile ase2 /work2/sybase/ASE-15_0/install/
        ase2.log
    run_parameters ase2 null

Primary Interconnect "udp"
    Server[1]ase1 tigger.sybase.com 26016 26031
    Server[2]ase2 christopher.sybase.com 26032 26047
Secondary Interconnect "udp"
    Server[1]ase1 tigger.sybase.com 26081 26096
    Server[2]ase2 christopher.sybase.com 26097 26112
```

- **Display configuration information for a cluster configured for private installation mode –** Displays configuration information for the default cluster configured for private installation mode:

```
show cluster config

**Cluster configuration for "localcluster" **
    Installation Mode "private"
    Trace Flags:
    There are no trace flags
    Maximum Instances "4"
    Quorum "/dev/raw/raw101"
    Master Device "/dev/raw/raw102"
    logfile ase1 /remote/work2/sybase/ASE-15_0/install/ase1.log
    run_parameters ase1 null
    logfile ase2 /work2/sybase/ASE-15_0/install/ase2.log
    run_parameters ase2 null

Primary Interconnect "udp"
    Server[1]ase1 tigger.sybase.com 26016 26031
    Server[2]ase2 christopher.sybase.com 26032 26047
Secondary Interconnect "udp"
    Server[1]ase1 tigger.sybase.com 26081 26096
    Server[2]ase2 christopher.sybase.com 26097 26112
LDAP server blade1 2250
```

Usage

show cluster status displays the results of a **show instance** command on each instance in the cluster.

See also

- *show instance* on page 283

show instance

Displays information about an instance.

Syntax

```
show instance [instance_name ] {
     config |
     status |
     log
        [ [ errors ] minseverity severity_level ] |
        [ startdate [ date_string ]] |
        [enddate [ date_string ]] |
        [ last num_lines ] ] }
```

Parameters

- ***instance_name*** **–** specifies a unique name for an instance in the cluster.
- **status –** displays status information for the instance. Values are:
  - **Up**
  - **Down**
  - **Undefined**
  - **Invalid**
  - **Start**
  - **Init**
  - **Quiesce**
- **log –** displays the instance log.
- **errors [minseverity *severity_level*] –** displays log file entries for errors. (Optional) Limits displayed error entries to a severity level and above.

  Note: Error *severities_level* is an attribute of Adaptive Server error messages, not **sybcluster** messages.
- **startdate [*date_string*] –** displays log file entries that occur on and after the date specified. The format for *date_string* is: mm:dd:yy.

  If a **startdate** or **enddate** ***date_string*** is not specified, *date_string* defaults to the current day.
- **enddate [*date_string*] –** displays log file entries that occur on or before the date specified. The format is: mm:dd:yy.
- **last *num_lines*** **–** Limits the number of lines displayed, counting backwards from the last line in the log file.

Examples

- **Display information about "ase1" –**

```
show instance ase1 status

Id    Name    State
------------------------
1     ase1    Down
```

- **Display configuration information for "ase1" –**

```
show instance ase1 config

Instance: ase1 at blade6:25001

Private Primary Network
    Address: blade1
    Port Range: 2541 - 2556
    Sybase home: /sybase/sybase_sdc
    ASE home: /sybase/sybase_sdc/ASE-15_0
    Config file: /sybase/sybase_sdc/ase1.cfg

Private Secondary Network
    Address: blade1
    Port Range: 2557 - 2572

Log Path: /blade1/sybase/
    ASE-15_0/install/mycluster_ase1.log
```

Usage

- **show instance status** displays one of seven different states for the named instance:
  - **Down**
  - **Init**
  - **Invalid**
  - **Quiesce**
  - **Start**
  - **Undefined**
  - **Up**
- **show instance config** includes this information when the installation mode is private:
  - The $SYBASE path
  - The ASE path
  - The server configuration file path

show membership mode

Displays the cluster's current membership mode. Membership mode specifies whether or not Veritas Cluster Integration is supported on the current cluster.

Syntax

```
show membership mode
```

Usage

Values for **show membership mode** are:

- **vcs** – VCS is supported for the current cluster.
- **native** – VCS is not supported for the current cluster.

If the cluster is running in VCS membership mode, make sure you shut down or start up servers and the cluster using VCS shut-down and start-up mechanisms.

show session

Displays current discovery and agent information.

Syntax

```
show session
```

Examples

- **Display agent status information –**

```
show session

Session information
------------------

Sybase sybcluster Command Line Utility/15.0.1/CE GA 2/S/jdk1.4.2/
sybclustermain/129/Mon Aug 13 09:59:51 PDT 2007Connected Cluster:
myclusterDefault Cluster:
  Default Instance:

  Agent Specifications:
    [1]: oddjob:7171

  Discovery Specifications:

  Agent Connections: 1

     Connection[1] URL: rmi://oddjob:7171        Node
```

```
Name:       oddjob1
        Agent Port:      7171
        Agent Version:   2.5.0
        Agent Build:     980
        OS Name:         Linux
        OS Version:      2.6.9-42.ELsmp
        OS Architecture: amd64

        Agent Service Info:
         Agent Service (Agent) Build:980 Status:running
        BootstrapService (BootstrapService)  Build:
          <unavailable>  Status: running
        Configuration Service (ConfigService)  Build:
          980  Status: running
        Deployment Service (DeploymentService)  Build:
          19  Status: running
        Environment Service(EnvironmentDiscoveryService)
          Build: 980  Status: running
        File Transfer Service (FileTransferService)
          Build: 980  Status: running
        Plugin Registration Service
          (PluginRegisterService)  Build:980 Status:
          running
        RMI Service (RMIService)  Build: 980  Status:
          running
        Remote Shell Service (RemoteShellService) Build:
          980  Status: running
        Security Service (SecurityService)  Build: 980
          Status: running
        Self Discovery Service (SelfDiscoveryService)
          Build: 980  Status: running
        Service Registration Service
          (ServiceRegistrationService)  Build: 980
          Status: running
        Session Service (SessionService)  Build: 980
          Status: running

        Sybase Home Service (SybaseHomeService)  Build:
          14  Status: running

        Agent Plugin Info:

        ASE Cluster Agent Plugin(com.sybase.ase.cluster)
          Version: 15.0.1 Build: 129 Instance: 1
          Status: running
        Cluster Name: mycluster
        Env Shell: /oddjob1/work2/
          sybase_sybclustermain_mycluster_vu/SYBASE.sh
          Shell Type: sh
        Sybase Home: /oddjob1/
          work2/sybase_sybclustermain_mycluster_vu
        ASE Home: /oddjob1/work2/
          sybase_sybclustermain_mycluster_vu/ASE-15_0
        ASE Version:  Adaptive Server Enterprise/
          15.0.1/EBF 14721 Cluster Edition/B/x86_64/
          Enterprise Linux/asecluster3/2381/64-bit/
          FBO/Mon Nov 12 07:44:23 2007
        ASE Login:  sa
        Update time:  300 seconds
        Last Update:  2007-11-13 15:27:39 -0800
```

Usage

Use the **sybcluster show session** command to view information about the current cluster.

show xpserver

Displays the XP Server name and listening port number, node name, and instance name configured on each node.

Syntax

```
show xpserver
```

Examples

- **Display XP Server configuration information –** Displays the XP Server name, listening port number, node name, and instance name:

```
show xpserver config

**XP Server configuration for the cluster**
---------------------------------------------------
XPServer Name          Port      Host     Node
---------------------------------------------------
ase1_XP                4010      blade1   ase1
ase2_XP                4011      blade2   ase2
ase3_XP                4012      blade3   ase3
```

Usage

Use the **sybcluster show xpserver** command to view information about XP Server.

shutdown cluster

Shuts down the cluster by executing a Transact-SQL **shutdown** command for each instance in the cluster's instance list, in the order specified in the cluster configuration file.

Syntax

```
shutdown cluster [nowait]
```

Parameters

- **nowait –** shuts down the cluster immediately, without waiting for transactions or statements currently executing to conclude. By default, **sybcluster** waits for all transactions and statements to execute before shutting down the cluster.

Examples

- **Shut down the current cluster –**

```
shutdown cluster

INFO - ...
INFO - 01:00:00000:00117:2007/06/02 00:23:53.56 kernel
ueshutdown: exiting
INFO - 01:00:00000:00117:2007/06/02 00:23:53.56 kernel SySAM:
Checked in
license for 1 ASE_CORE (2007.1031/31-oct-2007/1293 6876 8FE7
E217).
```

Usage

sybcluster prompts for confirmation before shutting down the cluster.

If the cluster is managed by VCS, **shutdown cluster** fails. You must use VCS shut-down mechanisms to shut down the cluster.

shutdown instance

Shuts down the instance by executing a Transact-SQL **shutdown** command.

Syntax

```
shutdown instance [instance_name] [nowait]
```

Parameters

- ***instance_name* –** is the unique name of an instance in the cluster.
- **nowait –** shuts down the instance immediately, without waiting for currently executing transactions or statements to finish.

Examples

- **Shut down an instance –** Shuts down the instance “ase1,” after waiting for currently executing transactions or statements to finish:

```
shutdown instance ase1

INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 kernel shutdown
server ase1
```

```
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 Server SHUTDOWN by
request.
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 ASE is terminating
this process
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 shut down local
cluster server.
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 kernel
coordinator to be shutdown, newcoo is 0.
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 kernel Single
server cluster.
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 kernel
cipcnode_down(): Node 1 down event.
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 server ASE
shutdown by request.
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 kernel
ueshutdown: exiting
INFO - 01:00:00000:00113:2007/06/02 00:31:24/14 kernel SySAM:
Checked in license for 1 ASE_CORE (2007.1031.31-oct-2007/1293 6876
8FE7 E 217).
```

Usage

- Shutting down the last instance in a cluster also shuts down the cluster.
- **sybcluster** prompts for confirmation before shutting down the instance.
- If the cluster is managed by VCS, **shutdown instance** fails. You must use VCS shut-down mechanisms to shut down the instance.

start cluster

Starts all instances in the cluster.

Syntax

```
start cluster
```

Examples

- **Start the current cluster –**

```
start cluster

INFO - [cluster boot log]
...

INFO - 02:00:00000:00002:2007/06/02 00:21:53.56 server  'ase1'
(ID=1).
INFO - 02:00:00000:00002:2007/06/02 00:21:53.56 server  Master
device
    size:
80 megabytes, or 40960 virtual pages.
```

Usage

Connect to the cluster before starting it.

start instance

Starts an instance.

Syntax

```
start instance [instance_name] [unlock]
```

Parameters

- ***instance_name* –** specifies a unique name for an instance in the cluster.

  If you do not enter a cluster name, **sybcluster** uses the instance specified in the **sybcluster** command line or specified with the **use** command.
- **unlock –** removes the lock from a cluster that was terminated unexpectedly. The cluster must be down before using **unlock**.

  Warning! Do not use the **unlock** parameter unless you have verified that all instances in the cluster are shut down.

Usage

The instance must be down to use **start instance unlock**.

upgrade server

Upgrades a nonclustered Adaptive Server to the Adaptive Server Cluster Edition, and creates a cluster with a single instance.

You can perform the upgrade by answering prompts at the command line or via an input file.

See the Adaptive Server Cluster Edition installation guide for your platform for upgrade information.

Syntax

```
upgrade server server_name
    [ login login_name ]
    [ password password ]
    [ agent agent_spec ]
    [ discovery discovery_spec ]
    [ file input_file_name ]
    [ checkonly ]
```

Parameters

- ***server_name* –** is the name of the non-clustered Adaptive Server.
- **login *login_name* –** is the management agent login for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is “uafadmin” with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **password *password* –** is the management agent password for the Sybase Common Security Infrastructure in the Unified Agent framework.

  The default user name after installation is “uafadmin” with no password; this is the Simple Login Module in the Agent configuration. You can configure the user name and password to use several different mechanisms for authentication and authorization, including operating system logins.
- **agent *agent_spec* –** is the agent specification that identifies the node in the cluster running a Unified Agent, and the port number that **sybcluster** uses to connect the Unified Agent.

  When upgrading a non-clustered Adaptive Server, there is only one node. The format for *agent_spec* is “***node_name*:*port_number***”. The default port number is “9999.”
- **discovery *discovery_spec* –** is the discovery method used to identify the agents responsible for the requested cluster.

  The format is “***method*[(*method_specification*)]** ”. See the description for **sybcluster -d *discovery_list*** for more information about discovery methods.
- **file *file_name* –** is the input file containing values required for upgrading the server.
- **checkonly –** performs a check run of the non-clustered Adaptive Server to determine its readiness for upgrade.

Examples

- **Upgrade “myserver” to the Cluster Edition –**

```
upgrade server

Enter the name of the cluster: new_cluster
Enter the existing Sybase installation directory for server
myserver:
Enter the name of the subdirectory containing the ASE installation
for server myserver:
Enter the name of the subdirectory containing the OCS installation
for server myserver:
Enter the name of an sa login on server exit: [sa]
Enter a password:
Cluster new_cluster - Enter the maximum number of instances: [4]
Verifying the supplied agent specifications...
   1>tigger 9999 2.5.0 Linux
Enter the number representing the cluster node 1 [1]
```

```
Will this cluster be configured using private SYBASE
installations? (Y/N)
...
```

The information required to upgrade a server or create a cluster are the same.

Usage

upgrade server prompts for these values:

- The Sybase installation directory of the non-clustered Adaptive Server.
- The release home directory of the non-clustered Adaptive Server.
- The Open Client home directory of the non-clustered Adaptive Server.
- The installation mode, private or shared.
- If **sybcluster** detects a VCS subsystem, asks if you want to include VCS integration with the cluster.
- If you have not configured LDAP, the path to the interfaces file.
- The name of the first instance in the cluster.
- Other values as required to create a cluster.

The **checkonly** option does not perform any upgrade steps, but instead check the server's readiness for upgrade. Resolve the error conditions **checkonly** finds before performing the upgrade.

See also

- *create cluster* on page 261

use

Specifies the default instance.

Syntax

```
use instance_name
```

Usage

use overrides the instance name specified in the **sybcluster** command line.

CHAPTER 9 Migrating Data Using sybmigrate

sybmigrate is the migration tool used to migrate data from one server to another.

By default, **sybmigrate** migrates encrypted columns in ciphertext format. This avoids the overhead of decrypting data at the source and encrypting at the target. In some cases, **sybmigrate** chooses the **reencrypt** method of migration, decrypting data at the source and encrypting at the target.

Note: When migrating from one Adaptive Server to another more recent version of Adaptive Server, you must specify the size and location of a work database on the target server.

The **sybmigrate** utility:

- Aids users in changing the page sizes of their database applications.
- Provides a manageable and smooth migration process.
- Allows customers to take advantage of the variable page size feature for existing databases with user data, thus realizing the full benefit of Adaptive Server versions 12.5 and later.

What sybmigrate Does

During the set-up portion of the migration process, **sybmigrate** migrates following server data to the target Adaptive Server:

- Remote servers
- Logins
- Login attributes
- Server roles
- Login roles
- Role attributes
- Users
- Alternate users
- Roles
- Permissions
- Remote logins
- External login attributes
- Timer
- Resource limits
- Replication attributes
- Display level attributes

- User messages in the `master` database
- Java classes in the `master` database
- JAR files in the `master` database
- Proxy objects

During the migration portion of the migration process, **sybmigrate** migrates following database-specific data to the target database:

- Defaults
- User-defined datatypes
- Rules
- User tables
- User table data
- Views
- Triggers
- Indexes
- Stored procedures
- Extended stored procedures
- Users
- Logins
- Roles
- Remote servers

- Database data
    - Users
    - Alternate users
    - Roles
    - Role attributes
    - Permissions
    - User messages
    - Java classes
    - JAR files
- Defaults
- Rules
- User-defined types
- Tables
- Indexes
- Referential constraints
- Views
- Stored procedures
- Triggers

What sybmigrate Does Not Do

The sybmigrate utility does not perform all tasks. Migrate these items manually.

- Migrate/downgrade databases from a higher version level. For example, you cannot use **sybmigrate** to downgrade Adaptive Server version 15.7 to an earlier version, such as 15.5.
- Table-level lock promotion attributes
- User-defined thresholds
- Abstract plan definitions maintained in `sysqueryplans`
- All system databases except the `model` database
- Any required database options like cache binding, recovery order, and the associated log I/O size as specified by **sp_logiosize**
- Proxy databases
- Engine groups
- Engine bindings
- Execution classes
- Cache configurations
- Auditing tables and auditing configuration
- Server-wide row-lock promotion settings
- Access rules

  Note: Drop access rules before beginning data migration; they can prevent the Database Owner from accessing all rows in a table, which prevents complete data migration.
- Compiled objects with hidden SQL text
- User-defined segments
- Constraints **are** migrated but when they are bound by name to user-defined message numbers, the bindings must be re-created manually
- Settings for objects such as `ascinserts`, `indextrips`, `oamtrips`, `datatrips`, and `sortbufsize` created using **dbcc tune**
- Device definitions
- SQLJ functions
- Proxy tables for external files
- Audit options and audit events
- Server configuration
- Database suspect threshold
- Recovery orders

Before You Begin

sybmigrate requires JRE 1.4, jConnect™ for JDBC™ 6.0, **ddlgen** components, and Component Integration Services in the source Adaptive Server.

sybmigrate is installed as part of the Adaptive Server software. For information about how to install Adaptive Server, see the installation guide for your platform.

Because **sybmigrate** requires a server-to-server connection, two Adaptive Servers must be running. Make sure that you have the appropriate licenses.

Before you begin the migration process, create databases, devices, and segments on the target Adaptive Server. Server and cache configurations must also be already installed on the target Adaptive Server.

Use **ddlgen** to extract the corresponding scripts from the source Adaptive Server, and modify them as needed before applying them to the target Adaptive Server.

See also

- *ddlgen* on page 45

Permissions

The System Administrator login is needed for the setup portion of the migration process. For the remainder of the process, the login must have “sa_role” and “sso_role” privileges to run **sybmigrate**.

Changing Target Login Accounts

Once you have migrated between different platforms, login passwords are not compatible. However, **sybmigrate** allows you to change the password on target Adaptive Server login accounts during the setup session of the migration process in either of two ways.

- Let **sybmigrate** generate a password on the target server. **sybmigrate** outputs a list of passwords used during migration after the process is complete.
- Supply a password file that contains user name and password pairs. **sybmigrate** sets these passwords on the target server. Thereafter, the System Administrator must run **sp_password** to create a new password for each login not included in the password file.

Note: After the migration process is complete, the System Administrator must change passwords manually on the target Adaptive Server. The System Administrator must issue **sp_password** for new login and for each login not reset during the migration process.

In addition to the changing password options, **sybmigrate** also allows you to lock and unlock target Adaptive Server accounts. This option is provided so that the System Administrator can block a user from logging into the target Adaptive Server during the migration process.

Platforms

sybmigrate works on both UNIX and Windows platforms.

- For UNIX, the executable file is located in `$SYBASE/$SYBASE_ASE/bin/sybmigrate`.
- For Windows, the executable file is located in `%SYBASE%\%SYBASE_ASE%\bin\sybmigrate.bat`.

Environment Settings

These environment variables must be set correctly. With the exception of SYBMIGRATE_MEMORY, these environment variables are defined in the `SYBASE.csh` or `SYBASE.sh` files that are created during the installation process.

Environment Variable	Description
SYBASE	Defines the location of the Sybase release path.
SYBASE_ASE	Defines the location of the Adaptive Server component directory.
SYBASE_JRE	Defines the location of the Java runtime environment. This is generally set to `$SYBASE/shared/jre-1_4` in the Adaptive Server release area. This environment variable overrides JAVA_HOME. SYBASE_JRE defaults to `$SYBASE/shared/jre142` (UNIX) and `%SYBASE%\Shared\Sun\jre142` (Windows).
SYBMIGRATE_MEMORY	Specifies the amount of memory to be used when invoking the Java virtual machine (JVM). This environment variable should be specified with a number, which refers to the amount of memory in megabytes. If SYBMIGRATE_MEMORY is not set, JVM uses the default memory setting of 512MB.

Migrating Proxy Tables

sybmigrate supports the migration of proxy tables. If you are planning to migrate proxy tables, you should do the following before you begin migration.

- Make sure that the remote servers involved in proxy table defintions is present in the target server interface file.
- In order to verify the DDL execution time, the remote server has to be accessible when the migration is performed.

Migration process

The goal of **sybmigrate** is to provide a means to migrate all objects and user data that exist on the source Adaptive Server. However, when migration takes place, there is some server-wide data that needs to be migrated before any user data or user objects can be migrated to individual databases.

The hierarchy of objects dictates the order in which objects are re-created. Generally, server-wide objects from the `master` database are created first. Independent objects like default languages and character are migrated to the target server before data from individual databases.

Overview of the Migration Process

The migration procedure consists of configuring the source and target Adaptive Servers, setting up the migration paths, migrating objects, and validating the migrated objects.

The setup session establishes the migration paths from the source database to the target database. The setup creates the repository database and the work databases, and registers the option to migrate the server data. The setup session can only be executed by an “sa” login.

The migrate session is used to migrate objects and data from the source database to the target database.

The validate session validates the migrated objects. Validation ensures the integrity of data and objects that have been successfully migrated from the source database to the target database.

sybmigrate does not migrate an archive database if an entire installation is being migrated.

sybmigrate migrates an archive database only if the archive database is specifically selected for migration. When you migrate an archive database to a target server, **sybmigrate** automatically creates a traditional database—rather than an archive database—on the target server.

Pre-migration Considerations

You must have the source Adaptive Server and the target Adaptive Server running concurrently when you migrate data from one to the other.

sybmigrate assumes that the target Adaptive Server has been installed and configured prior to data migration. Use **srvbuild** or **syconfig** to create a new Adaptive Server with the required logical page size.

Keep the following items in mind prior to migration, when you are creating the target Adaptive Server and configuring the source Adaptive Server:

- **sybmigrate** requires **allow resource limits** to be set to 0.
- If metadata already exists on the target server, you cannot migrate server data.
- When you create a new Adaptive Server with a different logical page size into which you want to migrate data, you must adequately adjust the size of the database on the target Adaptive Server to accommodate the inbound data. If you are migrating data to an Adaptive Server with a larger logical page size, this is especially important.

  Use the space estimation report, **space_est**, to determine how much space is available on your target database.
- To speed the migration process, you can run multiple sessions of **sybmigrate** within the same server. However, running more than one session of **sybmigrate** on the same source and target database path is not allowed.
- You must manually create segments on the target database before migrating tables and indexes.
- The data transfer rate for **sybmigrate** is configured through **CIS bulk insert array size**. The default configuration for **CIS bulk insert array size** is 50 rows. This means that as many as 50 rows of data are buffered by CIS before being transferred to the target Adaptive Server.

  To increase throughput, increase the configuration of **CIS bulk insert array size** to a larger value.

  However, increasing **CIS bulk insert array size** causes the source Adaptive Server to use memory from the operating system for local buffers. This can lead to excessive consumption of operating system memory.

  SAP recommends that if you do choose to increase the **CIS bulk insert array size** default value, you do so modestly. See the CIS documentation for more information.
- **CIS bulk insert array size** has no effect on data throughput if the table being transferred has a `text`, `image`, or `Java ADT` column. When a table has a `text`, `image`, or `Java ADT` column in it, all data is migrated one row at a time, for the duration of the migration of that particular table. Also, no array buffering takes place.
- As the data migration is being done using **CIS bulk transfer**, the value for the configuration parameter **CIS packet size** on the source Adaptive Server can affect the speed of the data transfer. The recommended value for **CIS packet size** on the source Adaptive Server is the logical page size (2K, 4K, 8K, or 16K) of the target Adaptive Server.
- **max packet size allowed** on the target Adaptive Server should match the value of **CIS packet size** on the source Adaptive Server.

  For more information on **max packet size allowed**, see the *System Administration Guide*.
- To maximize the performance of **sybmigrate**, increase the **additional network memory** configuration parameter on the target Adaptive Server to a value larger than the default.

  For more information on **additional network memory**, see the *System Administration Guide*.
- All the above considerations affect the **max memory** configuration parameter. Before migrating your data, make sure that **max memory** is set to a sufficiently large value.
- There are three types of data that are migrated: server data, database data, and user objects. To migrate metadata (the server and database data), the target Adaptive Server must be

newly installed so that the migrated metadata does not conflict with any residual data from previous usage.

If you are migrating only user objects, you can use a previously used Adaptive Server. For user data however, the target tables must be empty.

- Before migrating data, create the databases into which you want to migrate data on the target Adaptive Server. The databases should have the same name that they have on the source Adaptive Server.
- To enable conversion of character sets that do not have an internal Adaptive Server conversion routine, configure the target Adaptive Server with **enable unicode conversions** set to 1.
- Determine the size of the named caches and buffer pools on the target Adaptive Server. **sybmigrate** does not migrate cache configurations. You can use the information that is generated by **ddlgen** and apply it to the target Adaptive Server, or you can choose to configure larger amounts of memory, in light of the larger page size being used.

  However, **sybmigrate** migrates cache bindings, therefore if the required cache is not in the target Adaptive Server, warnings are generated in the migration log.
- Before running **sybmigrate**, you must install the desired languages on the target Adaptive Server. The default language should be the same on the source and the target Adaptive Server.

  If there are user messages on the source Adaptive Server that are not installed on the target Adaptive Server, **sybmigrate** aborts user message migration and reports an error.
- If you are migrating Java columns, you must enable Java on the source and target Adaptive Server prior to migration. Enter:

  ```
  sp_configure 'enable java', 1
  ```
- To complete the migration, the source and target Adaptive Servers must have different local server names. Set the local server name, and then restart the servers for the change to take effect.
- To migrate an Adaptive Server using single-byte character sets to an Adaptive Server using multibyte character sets (utf8):

  1. Use **sybmigrate** to migrate to a server using the same, single-byte character set.
  2. Change the character set to multibyte after migration is complete.

  sybcluster cannot migrate data directly from an Adaptive Server using single-byte character sets to an Adaptive Server using multibyte character sets.

See also

- *sybmigrate* on page 148

Configuration and Tuning for Higher Performance

Depending upon your server resources, you can configure **sybmigrate** and Adaptive Server for optimal performance.

Copy threads and create index threads are used to migrate tables and re-create indexes. When you are configuring **sybmigrate** during setup mode, the values of COPY_THREADS and INDEX_THREADS can increase the speed at which **sybmigrate** copies and migrates data.

The number of copy threads controls the number of tables for which data migration is done simultaneously. One copy thread is assigned to each table. When the thread has successfully completed one task, it moves on to another. Depending upon the size of your database and the resources for your Adaptive Server, you can increase the number of copy threads used during the migration process to improve performance.

Note: When you are migrating a large number of objects in parallel, check the value of SYBMIGRATE_MEMORY to verify that there is sufficient memory allocated to **sybmigrate**.

Index threads control the number of threads used to re-create indexes on the target Adaptive Server tables. One thread per table is used to re-create the indexes. Once the indexes have been re-created on a table, the thread proceeds to the next successfully migrated table. Any threads without a task exits. The number of create index threads is expected to be substantially smaller than the number of copy threads.

If you configure INDEX_THREADS to a large number, be sure that the target Adaptive Server is also configured with a large number of sort buffers. The use of index threads takes up space in the target database, so make sure that the target database is configured with adequate space for the designated number of index threads. Also, you must configure the target database with extra space if you are going to be re-creating clustered indexes.

Configuration Considerations for Adaptive Server

There are several configuration parameters on both the source and target Adaptive Server that affect the performance of the migration process.

Configuration parameters that affect the source Adaptive Server:

Parameter	Description
cis packet size	Should be equal to **max page size** of the target Adaptive Server.
number of user connections	Should be high enough to accommodate the migration of multiple tables simultaneously according to the value of COPY_THREADS and INDEX_THREADS.
max parallel degree	Should be set to a value that is larger than the largest number of partitions in a single table. Data migration is done in parallel, and if **max parallel degree** is not set to a value large enough to accommodate the partitioned tables, the tables do not migrate.

Parameter	Description
number of worker processes	Data migration for partitioned tables requires one worker thread per partition. Therefore, if *t* partitioned tables with *p* partitions each are migrating simultaneously, configure a total of *t* multiplied by *p* worker threads on the source Adaptive Server.
cis bulk insert batch size	Controls the number of rows after which the data transfer transaction is committed. The default value is 0. Using the default value is the safest way to ensure data integrity while migrating data, but it can result in a large number of page and row locks on the source Adaptive Server. To reduce the number of locks, increase this value. If you increase the value of **cis bulk insert batch size**, only a partial data migration completes if an error occurs during the process. In this situation, manually truncate the target table and restart **sybmigrate**.
cis bulk insert array size	Controls the number of rows that are copied in bulk at one time. The default is 50 rows per batch. For faster data migration, increase this value. If the table contains `text` or `image` columns, the data is transferred one row at a time, regardless of the value for **cis bulk insert array size**.

The following configuration parameters on the target Adaptive Server affect the performance of **sybmigrate**:

Parameter	Description
max network packet size	Should be set to a value that is at least equal to **max page size**.
number of user connections	Should be set to accommodate the migration of multiple tables in parallel and partitioned tables. For parallel data transfer for partitioned tables, worker processes are required on the source Adaptive Server, but user connections are required on the target Adaptive Server. If you are migrating partitioned tables, set the **number of user connections** on the target Adaptive Server to the same value as **number of worker processes** on the source Adaptive Server.
number of sort buffers	The default value of 500 is sufficient during the migration process. You can increase this value when **sybmigrate** rebuilds the indexes, especially if you are migrating indexes on partitioned tables.

Possible Errors to Avoid

Before beginning the data migration process, **sybmigrate** checks for the following error conditions. If any of these conditions are detected, the migration procedure is aborted.

- A target table with existing data – any attempt to migrate data to a table that already contains data results in the failure of **sybmigrate**.
- A target table with existing indexes – the presence of indexes on a target table causes **sybmigrate** to operate in slow **bcp**. Manually drop all indexes before you begin the data migration.

- Unmatching numbers of partitions on the source and target tables – if the number of partitions on the source and target table do not match, the attempt to migrate data fails. **sybmigrate** only migrates data; it does not redistribute it across partitions.

Auto-select Dependent Objects for Migration

sybmigrate selects dependent objects for migration when you use the auto-select feature.

The auto-select feature checks for the existence of dependent objects, and automatically migrates them to the target Adaptive Server. For a successful migration, SAP recommends that you use this feature.

Migrating an Archive Database

sybmigrate does not migrate an archive database if an entire installation is being migrated.

sybmigrate migrates an archive database only if the archive database is specifically selected for migration. When you migrate an archive database to a target server, **sybmigrate** automatically creates a traditional database—rather than an archive database—on the target server.

Upgrading an Adaptive Server with an Archive Database

You cannot upgrade an archive database. If you load a database dump from an older version of Adaptive Server onto an archive database hosted on a newer version of Adaptive Server, the database is not internally upgraded when you execute **online database**.

If you upgrade an Adaptive Server containing an archive database, all the databases except the archive databases are upgraded. The archive database remains on the older version of Adaptive Server.

SAP recommends you reload the archive database with a dump generated from an already upgraded database.

For more information about upgrading Adaptive Server, see the installation guide for your platform.

Downgrading an Adaptive Server with an Archive Database

When you are downgrading to a version of Adaptive Server that does not support archive databases, be aware of the following:

- If you must downgrade an Adaptive Server containing an archive database to a version of Adaptive Server that does not support archive databases, SAP recommends you drop the archive database before you downgrade.
  To eliminate the new `sysaltusages` table, drop the scratch database before you perform the downgrade procedure. `sysaltuages` does not cause any problems if the scratch database is not dropped.
- Backup Server versions 15.0 ESD #2 and later writes a format for compression (**with compression = *compression_level***) so that the dump can be loaded into an archive database. Therefore, if you must load a compressed dump onto a version of Adaptive

Server that does not support archive databases access, use the same version of Backup Server that created the compressed dump to load the compressed database dump. An earlier version of Backup Server does not support the new format of the compressed database dump.

When you are downgrading without compression, you need not worry about Backup Server at all.

GUI mode

You can use either the GUI or the resource file mode for the migration process. You can also elect to run parts of the migration process in GUI mode, and parts of it in resource file mode.

When you run **sybmigrate**, there are three phases of the migration process that you must follow: setup, migrate, and validate.

Setting up source databases for migration

Before migrating data, indicate your source and target Adaptive Servers and register the paths between the source and target databases they contain.

To do this, start **sybmigrate** with the `-m setup` command line option, or by selecting “Setup source databases for migration” when you are prompted in the Session Type window.

1. The Connect to ASE window allows you to designate the source and the target Adaptive Servers for your migration process.
    - Choose from the drop-down menu in the Server fields. The menus provide a list of Adaptive Servers that are located in the default `interfaces` file (`$SYBASE/interfaces` on UNIX or `%SYBASE%\ini\sql.ini` on Windows) or in the `interfaces` file that you specify with the `-I` command line argument.

      If you are not using the `interfaces` file, you cannot use the `-I` command line argument; you must specify the source and the target Adaptive Servers in the *host*:*port* format.
    - During the setup phase, you must be logged in to the servers as a System Administrator. Enter “sa” into the Login field, enter your password, and select Connect.

    Note: You can run only one session of **sybmigrate** at a time. Therefore, if there is another user running **sybmigrate** on the same source and target Adaptive Servers, you see the error message “Setup session lock: Either previous setup exit abnormal or there is another setup session running. Do you want to override?” You can override the session lock because it is possible that the previous session may have crashed or quit prematurely.

    Before proceeding with the setup and migration process, verify that there are no other users running **sybmigrate**. If there is more than one user running **sybmigrate** simultaneously, Sybase cannot guarantee data integrity.

2. The Session Type window prompts you to select the type of operation you want to perform. Choose from:

- Setup source databases for migration
- Migrate database objects and data
- Validate the migrated objects and data
- Reports – when you select Reports, a Reports type window displays. You can choose from **status**, **space_est**, **repl**, **diff**, or **password**. When you select either the space estimation or the replication report, a Report Paths Window prompts you to select the database paths on which to run the reports.

  The Password, Status, and Replications reports are disabled if the setup session has not been completed between the source and target Adaptive Servers.

If you started **sybmigrate** with the `-m` option specifying **setup**, **migrate**, **validate**, or **reports** you do not see this window.

3. Use the Setup wizard to prepare databases for migration. The Setup wizard displays several windows:

   - Choose Database window

     This window prompts you to select the source and target databases located within your source and target Adaptive Servers, so that **sybmigrate** knows where to put the data from the source Adaptive Server in the target Adaptive Server.

     Note: The source and target databases must have identical names.

     The Source Database drop-down list has a list of the databases in your source Adaptive Server.

     The Target Database drop-down list has a list of the databases available in the target Adaptive Server. **sybmigrate** requires that you create the databases in the target Adaptive Server before beginning the migration process.

     The **migration path** is a selected source and target database pair.
   - Configure DDL threads

     Choose the number of threads to be used to create database objects on the target server for the specified migration path.
   - Configure copy threads

     Chose the number of threads to be used to copy data from the source to the target for the migration path. Make sure you use sufficient numbers of threads for systems with multiple engines.
   - Configure index threads

     Chose the number of threads to be used to create indexes on the target server for the specified migration path. Make sure you use sufficient numbers of threads for systems with multiple engines.

     You control the number of threads used for parallel table transfer. When several tables are transferred concurrently, each table requires a one-server-to-one-server CIS connection.

     Suppose the data migration is performed on unpartitioned tables (each table contains a single partition). When you migrate such tables, a single server-to-server connection is established, which uses a single user connection on the source Adaptive Server and a single user connection on the target Adaptive Server.

If the data migration is performed on *n*-way partitioned tables, the data transfer is performed in parallel with an *n*-way degree of parallelism. This requires *n* worker processes on the source server and 2*n* user connections on the target server.

For example, suppose you have 10 *n*-way partitioned tables to migrate. You use four threads in **sybmigrate**, and configure the source Adaptive Server to have at least four worker processes and eight user connections. You must configure the target Adaptive Server to have at least eight user connections.

Note: The value you assign to each property in the setup session becomes the default value. You can temporarily override default values in the migrate or validate session. Limit these values to the resources available to Adaptive Server.

- Configuring the work database

  sybmigrate requires at least one work database during the migration process. The Database size field provides a default value in megabytes. The default value is based on the number of copy and create index threads specified in a previous window. The default is the minimum value; you can increase but not decrease it.

  The Device field lets you indicate the device on which to create the work database.

  Note: When migrating from a source Adaptive Server version 12.0 through 12.5.0, **sybmigrate** also requires a work database on the target server. The wizard prompts for the same information for the target work database.

- Current paths

  Review the migration paths you have selected. Right-click a migration path to display edit and delete options.

  You can add paths by selecting Add Migration Path. To add paths later on, rerun **sybmigate** in Setup mode.

- Configure repository

  sybmigrate creates a repository database on the source server to track the migration of all migration paths. The default database size is a minimum; you can increase but not decrease it.

- Migration of server-wide data

  You can choose whether or not to migrate information in system catalogs, such as login information. The options are:

  - Yes – server-wide data is migrated at the end of the Setup phase.
  - No – server-wide data is not migrated. You can return to this window and choose to migrate data at any time—as long as database migration has not yet begun.
  - Undecided – allows you to return and choose another migration option later on. However, you cannot begin the Migration phase until you have chosen Yes or No. Undecided is useful when you want to set up the migration process, but plan to migrate data at a later date.

If the target server already has been configured for logins or other server-wide information, **sybmigrate** defaults this option to No.

The Options button provides advanced options for handling login accounts. The options let you specify:

- Whether or not to lock login accounts after migration
- How to handle login passwords when migrating across platforms
  - No change – use when migrating to the same platform (default)
  - Generate random passwords
  - Assign passwords from a list in a file

- Summary

  Displays a summary of options chosen. Click Finish to perform the chosen setup tasks.

4. The Setup Progress window displays the progress of the setup phase.

   During this time, **sybmigrate** is creating the repository database, installing the database schema, creating a working database for each selected path, and migrating the server data based on your selection, in that order. If you are running **sybmigrate** in setup mode a subsequent time, it is creating new paths for data migration. If you do not want to create new paths, there is no reason to run **sybmigrate** through the setup mode more than once.

   You can to view the progress in the log by clicking Show Log. The completion of the setup process is indicated when the Current Task window displays DONE, and when the log shows SETUP_COMPLETE. Click Close to exit the log and the Setup Progress window.

5. You return to the Connect to ASE window. Select Quit to exit **sybmigrate**. To begin the migration phase of the data migration process, exit **sybmigrate** and restart it in the migrate mode.

Begin the migration

After you have completed setup, you are ready to begin migrating.

Restart **sybmigrate** with the `-m migrate` command line option, or choose the migrate database objects and data option from the GUI window.

1. In the Connect to ASE window, select the source and target Adaptive Servers to which you want to connect.
2. If you have not started **sybmigrate** with the `-m migrate` command line argument, select the session type in the Session Type window.
3. The Object Selection window allows you to choose what types of database data you want to migrate.

   In the Object Selection window, you can set the Copy thread, create index thread, and work thread parameters from the Setting menu bar.

   In the Object Selection window, you can also request that **sybmigrate** Auto-Select Dependent Objects on your selected objects by right clicking the object tree node.

When you expand the database data folder, there is a file for each path that you created during setup. Each file allows you to select the data you want to migrate for that particular database. You can choose from the following:

- Database Data

Note: If you choose to migrate database data, you must migrate all of it. If you deselect parts of the database data, you see an error message asking you whether or not you want to migrate database data.

If you do not migrate the server data during setup, the Database Data selection is disabled.

- Defaults
- Rules
- User-defined Datatypes
- Tables
- Indexes
- Referential Constraints
- Views
- Stored Procedures
- Triggers

The Status field for these objects indicates whether or not the data has successfully migrated. “Success” indicates that the data has already migrated. “Initial” means that the migration has not yet begun. If you find an error in the data that has been migrated, you can reset the Status field to Initial so that the data migrates again. The validation process acts only on those objects that have been migrated successfully, so to begin the validation process without all of the data having successfully migrated, reset the Status field to Success. “Work in Progress” means that the object was selected for migration, but that the migration was not attempted because there was some error causing **sybmigrate** to exit abnormally.

You can see whether or not the server data has been selected to be migrated, but this is for informational purposes only since the server data has already been migrated at this point in the migration process.

When you have selected the data that you want to migrate, click Migrate.

Validating the migration

The validation phase is the same as the migrate phase.
The windows ask you to indicate the same information, but rather than selecting data for migration, you are selecting data for validation.

You can validate only those objects that have successfully been migrated.

Migration and Validation Progress

sybmigrate keeps you informed of the migration and validation progress on the Migration/validation screen. It shows migration progress, messages reported, and a summary count of objects pending, failed, and succeeded for each task type.

You can select **Cancel** at any time, which starts a graceful shutdown of the execution progress.

Resource File Mode

Make these changes to the resource file mode:

- **data_copy_thread**, **create_index_thread**, and **work_thread** attributes are recognized in the setup, migration, and validate sessions of **sybmigrate**. In the setup session, these values are recorded in the repository database, and used as default values during the migrate and validate sessions. During the migrate and validate sessions, you can override the default values by specifying a new value.
- **lock_account** is a new login account management feature. **lock_account** tells **sybmigrate** to lock or unlock all accounts on the target Adaptive Server after copying the login information. Valid values are “Yes” and “No”, with “Yes” instructing **sybmigrate** to lock the target Adaptive Server accounts. To activate **lock_account**, you must set **migrate_server_data** to “Yes” in the setup session.

  If the **lock_account** attribute is not set, nothing is done to target login accounts.
- **login_password_file** has been added to support changing the passwords on the target Adaptive Server. In the setup session, **login_password_file** takes the input password file or the value “<generate>”. “<generate>” is a special key used to tell **sybmigrate** to generate the passwords instead of reading them from the password file. If this attribute is not set in the resource file during the setup session, there is no change to the target Adaptive Server login passwords. To activate **login_password_file**, you must set **migrate_server_data** to “Yes” in the setup session.
- The password file must be in plain text. The content of this file consists of two columns: the login name column and the password string column. The separator between the columns are tabs and or spaces. Any lines beginning with “#” are comments.
- **auto_select_dependent_objects** is a new value that is available during the migrate and validate sessions. This attribute tells **sybmigrate** to automatically select the dependent objects for migration and validation. The valid values for this attribute are either “Yes” or “No”; “No” is the default.
- If **source_ase**, **source_ase_login**, **source_ase_password**, **target_ase**, **target_ase_login**, and **target_ase_password** attributes are not in the resource file, **sybmigrate** prompts the user for these attributes.
- In the database section of the resource file, if you do not specify any objects or SQL, all objects and types are selected.

  For example, in the following resource file all object types (default, rule, table, and so on) are migrated from `pubs2` and `pubs3` databases:

  ```
  [server}
  source_ase=tho:5002
  ```

```
source_ase_login=sa
source_ase_password=

target_ase=tho:6002
target_ase_login=sa
target_ase_password=

[database]
source_database_name=pubs2
target_database_name=pubs2

[database]
source_database_name=pubs3
target_database_name=pubs3
```

Resource file mode is a non-interactive mode. The resource file contains all the information required for migration. You can use the resource file mode if you do not have GUI support or if you need to run batch files.

If you do not specify any object type attributes to migrate in the resource file, **sybmigrate** migrates the entire database.

If you do not specify the source or target Adaptive Server login or password in the resource file, **sybmigrate** prompts the user for this information.

Following is the format for the resource file to run **sybmigrate** in noninteractive mode. To create a resource file, type all the values into a file:

```
#
# This is a sample Migration Tool resource file.
# This resource file will migrate objects in pubs2,
# pubs3, and foo databases.
#

######################################################
# Server wide information
######################################################
[server]
# "<host name>:<port number>" or just server name.
source_ase=tho:5002
source_ase_login=sa
source_ase_password=

# "<host name>:<port number>" or just server name.
target_ase=tho:6002
target_ase_login=sa
target_ase_password=

# Repository database setup attributes.  This is
required with "setup" mode.
# Repository database size in MB.
repository_database_size=7
# Device used to create the "sybmigrate" database.
repository_device=master

# Migrate server wide data - logins, roles, remote servers, etc...
# valid only with "setup" mode, default is yes
migrate_server_data=yes

# Tell sybmigrate to lock or unlock all login accounts on the
# target Adaptive Server.  Valid values are "yes" and "no":
# "yes" to lock and "no" to unlock.  This is only valid if
# "migrate_server_data" is set to "yes" and run in "setup" mode.
# If this attribute is not specified, target Adaptive Server login
# accounts are not change.
lock_account=no

# Change target Adaptive Server login passwords.  This is only valid
# if "migrate_server_data" is set to "yes" and run in "setup" mode.
# If this attribute is not specified, target Adaptive Server login
# accounts are not change.
# The valid values are "<generate>" and password file.
# "<generate>" instructs sybmigrate to use random passwords.
# Password file instructs sybmigrate to use the passwords from
# this file.
# The content of the password file consists of two columns:
# the login name column and the password string column.
# The separator between the columns are tabs and or spaces.
login_password_file=<generate>

######################################################
# Database information
######################################################
#
# Migrate the "pubs2" database objects
#
[database]
# Specify the source target database to migrate.
source_database_name=pubs2
target_database_name=pubs2

# Migrate database data, valid only if "migrate_server_data"
# was set to "yes" in "setup" mode. This is default to yes.
migrate_database_data=yes

# Work database setup attributes.  This is required with "setup"
mode.
# Work database size in MB.
work_database_size=5
# Device used to create the work database.
work_database_device=master

# Number of threads use to do user table data copy
data_copy_thread=5

# Number of thread use to create indexes.
create_index_thread=1

# Number of thread use to do ddl migration/validation
work_thread=10

# Automatically select the depedent objects for migration and
# validation.  Valid values are "yes" or "no".
auto_select_dependent_objects=yes

#
## Migrate objects
#
# These attributes specify the list of DDL object to
# migrate or validate. User can directly specify the
# list of DDL object or ask Migration tool to query the
# list. Directly specifying the list has the higher
# precedence. The SQL command will ignore if the list
# is given.
#
# Note:
# * The SQL command for the "*_list_from_sql" attributes
# must return column <object name> or columns <user
# name> and <object name>
# * Index type must also specify the table name. For
# example, "<table>.<index name>" for
# "index_create_list" attribute or columns <table>,
# <index name> for "index_create_list_from_sql"
# attribute.
# * Value "<ALL_OBJECTS>" can be used on any of the
# attributes to specify all objects for the type.
# * If none of these attributes are given, all objects
# and data are migrated.
#
user_defined_type_create_list=
id
dbo.tid

default_create_list_from_sql=
select user_name(uid), name from sysobjects
where type = 'D'

rule_create_list=
pub_idrule, title_idrule

table_create_list=
publishers
titles
dbo.authors
dbo.titleauthor
dbo.roysched
stores
dbo.sales
dbo.salesdetail
dbo.discounts
dbo.au_pix
blurbs

table_migrate_list=
dbo.publishers titles dbo.authors dbo.titleauthor
dbo.roysched
stores dbo.sales dbo.salesdetail dbo.discounts au_pix
dbo.blurbs
```

```
index_create_list=
dbo.authors.auidind
dbo.authors.aunmind
publishers.pubind
roysched.titleidind
sales.salesind
salesdetail.titleidind
salesdetail.salesdetailind
titleauthor.taind
titleauthor.auidind
titleauthor.titleidind
titles.titleidind
titles.titleind

trigger_create_list=
deltitle
totalsales_trig

store_procedure_create_list_from_sql=
select name from sysobjects where type = 'P'

view_create_list_from_sql=<ALL_OBJECTS>

referential_constraint_create_list_from_sql=<ALL_OBJECTS>

logical_key_create_list_from_sql=<ALL_OBJECTS>

#####################################################

#
# Migrate the "pubs3" database objects
#
[database]
source_database_name=pubs3
target_database_name=pubs3

# Migrate database data - user, etc.
migrate_database_data=yes

# These two attributes valid only with "setup" mode
work_database_size=5
work_database_device=master

# Number of threads use to do user table data copy
data_copy_thread=5

# Number of thread use to create indexes.
create_index_thread=1

# Number of thread use to do ddl migration/validation
work_thread=10

# Migrate objects
user_defined_type_create_list=<ALL_OBJECTS>
```

```
default_create_list=<ALL_OBJECTS>

rule_create_list=<ALL_OBJECTS>

table_create_list=
dbo.authors
publishers
dbo.titles
dbo.roysched
stores
dbo.sales
dbo.store_employees
salesdetail
dbo.titleauthor
dbo.discounts
blurbs

table_migrate_list_from_sql=<ALL_OBJECTS>

index_create_list=<ALL_OBJECTS>

trigger_create_list=<ALL_OBJECTS>

store_procedure_create_list=<ALL_OBJECTS>

view_create_list=<ALL_OBJECTS>

referential_constraint_create_list_from_sql=<ALL_OBJECTS>

logical_key_create_list_from_sql=<ALL_OBJECTS>

#####################################################

#
# Migrate all the "foo" database objects with default settings.
#
[database]
source_database_name=foo
target_database_name=foo

# Migrate database data - user, etc.
migrate_database_data=yes

# These two attributes valid only with "setup" mode
work_database_size=5
work_database_device=master

# Number of threads use to do user table data copy
data_copy_thread=5

# Number of thread use to create indexes.
create_index_thread=1

# Number of thread use to do ddl migration/validation
work_thread=10
```

Using sybmigrate with Encrypted Columns

For databases with encrypted columns, **sybmigrate** migrates the following.

1. The system encryption password – if you specify not to migrate the system encryption password, **sybmigrate** migrates the encrypted columns using the **reencrypt** method instead of migrating the ciphertext directly.
2. Encrypted columns in cipher text format by default – this avoids the overhead of decrypting data at the source and reencrypting it at the target. In some cases, however, **sybmigrate** chooses the **reencrypt** method of migration, which does decrypt data at the source and reencrypts it at the target.
3. The encryption keys – you may select the keys to migrate. **sybmigrate** automatically selects keys in the current database used to encrypt columns in the same database. If you have selected migration of the system encryption password, **sybmigrate** migrates the encryption keys using their actual values. The key values from the `sysencryptkeys` system table have been encrypted using the system encryption password and these are the values that are migrated. If you have not migrated the system encryption password, **sybmigrate** migrates the keys by name, to avoid migrating keys that will not decrypt correctly at the target. Migrating the key by name causes the key at the target to be created with a different key value from the key at the source.
4. The data – by default, the data is transferred in its ciphertext form. Ciphertext data can be migrated to a different operating system. Character data requires that the target server uses the same character set as the source.

sybmigrate works on a database as a unit of work. If your database on the source server has data encrypted by a key in another database, migrate the key's database first.

sybmigrate chooses to reencrypt migrated data when:

- Any keys in the current database are specifically not selected for migration, or already exist in the target server. There is no guarantee that the keys at the target are identical to the keys are the source, so the migrating data must be reencrypted.
- The system password was not selected for migration. When the system password at the target differs from that at the source, the keys cannot be migrated by value. In turn, the data cannot be migrated as ciphertext.
- The user uses the following flag:

  ```
  sybmigrate -T 'ALWAYS_REENCRYPT'
  ```

Reencrypting data can slow performance. A message to this effect is written to the migration log file when you perform migration with reencryption mode.

To migrate encrypted columns, you must have both `sa_role` and `sso_role` enabled.

Post-migration Activities

These are additional activities you perform after migration.

Activity	Description
Migrate schema objects, configuration information	**sybmigrate** supports the migration of only the objects listed elsewhere in this document. Manually migrate other schema objects and configuration information to ensure the target Adaptive Server is fully functional.
Statistics from non-index columns	Statistics for indexes are automatically re-created when you rebuild the indexes. However, **sybmigrate** does not re-create statistics from non-index columns. Any user-defined step values for index statistics are not retained during migration. To obtain target-server-side statistics similar to the source-server-side statistics, use **optdiag** to identify the tables with non-index columns that include statistics. Once you have determined which non-index columns include statistics, update the statistics manually.
Messages	Any message requiring user attention preceded by the word “attention” and logged in the migration log.
Status report	Run the object migrations status report to verify that all objects have been migrated.
Clean up source and target servers	When you no longer need to perform additional sessions (such as to validate or to report), clean up the source and target Adaptive Servers. On the source Adaptive Server and target Adaptive Servers: • Drop the temporary working databases `mtpdb$%`. • Drop the repository database `sybmigratedb`. • Drop all remote servers `mtrs$%`.

Migrate Databases in the Replication Server Domain

The Replication Server domain includes one or more of these types of databases.

- Primary databases
- Replicate databases
- Replication Server System Databases (RSSDs)

Note: The RSSD stores Replication Server system tables; in addition, it can also be a primary or a replicate database.

You can migrate any of these databases, but the process requires additional steps to ensure success.

Preparing for migration

Make sure that replication from or into each database is complete before initiating migration.

This means that:

- For a primary database – all changes have been applied to all subscribing databases
- For a replicate database – all changes to which the database subscribes have been applied

Note: All transactions in the Replication Server inbound and outbound queues must be applied. After migration, there is no way to restore data left in the Adaptive Server transaction log.

1. Log in to the Replication Server and suspend log transfer. Enter:
   ```
   suspend log transfer from server.database
   ```
2. Log in to the Adaptive Server, and shut down the RepAgent. Enter:
   ```
   use database
   sp_stop_rep_agent database
   ```
3. Suspend all DSI connections to the replicate database. Log in to the Replication Server and enter:
   ```
   suspend connection to server.database
   ```
4. Put the Replication Server in hibernation mode. Enter:
   ```
   sysadmin hibernate_on, replication_server
   ```

Before starting the migration process, **sybmigrate** records replication information in its log. The information needed to restore the replication information during the postmigration steps can be retrieved from this log.

See also

- *Postmigration Procedures* on page 317

Postmigration Procedures

After migration, restore the replication information in the database. These steps can be generated by the **repl** report.

If the page size changes between the source and target, amend the system tables.

Replication Server identifies all connections by *server_name.database_name*. After migration, you must change the name of the target server (the server you are migrating to) to that of the source server (the server you are migrating from).

See also

- *Amending system tables when the logical page size changes* on page 319

Restoring primary databases

Follow this procedure for all primary databases, including the RSSD, if it is a primary database.

If the page size changes during the migration, you must also alter the `rs_lastcommit` and `rs_threads` system tables.

1. If the original primary database had warm standby on, restore the standby status. Enter:

   ```
   sp_reptostandby database_name, status
   ```

   sybmigrate saves the standby status in the migration log of the source database.
2. Increase the generation ID by 1. Enter:

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

   You can view the current generation ID in the migration log of the source database.
3. Reset the secondary truncation point:

   ```
   dbcc settrunc ("ltm", "valid")
   ```
4. Zero the Replication Server locator value for this database. Enter:

   ```
   rs_zeroltm server, database_name
   ```
5. If this database is an active connection in a warm standby configuration, rematerialize the standby database by dumping the primary and loading the dumps into the standby. See the Replication Server documentation for instructions.
6. Start the RepAgent on the primary database. Enter:

   ```
   sp_start_rep_agent database_name
   ```
7. Log in to the Replication Server and restart log transfer:

   ```
   resume log transfer from server.database
   ```

See also

- *Amending system tables when the logical page size changes* on page 319

Restoring the RSSD

Follow this procedure to restore the RSSD.

1. If the RSSD is a primary database, restore the primary databases.

   If the page size changes, make sure you alter the `rs_lastcommit` and `rs_threads` system tables as instructed.
2. Turn off hibernation for the Repliction Server. Log in to Replication Server and enter:

   ```
   sysadmin hiberate_off replication_server
   ```

See also

- *Restoring primary databases* on page 318

Amending system tables when the logical page size changes

Follow this procedure for **all** databases in which the page size has changed.

If the logical page size changes during migration, you must alter the `rs_lastcommit` and `rs_threads` system tables to account for the change.

1. Alter the `rs_lastcommit` table. Enter:

```
declare @pad8_size integer
declare @alter_cmd varchar(200)

select @pad8_size = (@@maxpagesize / 2)
- (select sum(A.length) from
syscolumns A, sysobjects B
where A.id = B.id
and B.name = 'rs_lastcommit')
+ (select A.length from
syscolumns A, sysobjects B
where A.id = B.id
and B.name = 'rs_lastcommit'
and A.name = 'pad8')

select @alter_cmd = "alter table rs_lastcommit "
+ "modify pad8 char("
+ convert(varchar(100), @pad8_size)
+ ")"
execute (@alter_cmd)
go
```

2. Alter the `rs_threads` table. Enter:

```
declare @pad4_size integer
declare @alter_cmd varchar(200)

select @pad4_size = (@@maxpagesize / 2)
- (select sum(A.length) from
syscolumns A, sysobjects B
where A.id = B.id
and B.name = 'rs_threads')
+ (select A.length from
syscolumns A, sysobjects B
where A.id = B.id
and B.name = 'rs_threads'
and A.name = 'pad4')

select @alter_cmd = "alter table rs_threads "
+ "modify pad4 char("
+ convert(varchar(100), @pad4_size)
+ ")"
execute (@alter_cmd)
go
```

Restoring Replicate Databases

If the page size does not change during migration, there are no postmigration steps necessary for replicate databases.

If the page size does change, amend the system tables. .

See also

- *Amending system tables when the logical page size changes* on page 319

Logs

In the migration tool log, information about replicated objects is preceded by this banner:

```
=== Replication Information for Database 'pdb1' ===
```

This is a sample log file for a primary database named `pdb1`:

```
sp_repostandby 'pdb1' is NONE.
```

If the standby status for the database is not NONE, use the standby status as described in the post-migration steps above.

```
sp_config_rep_agent 'pdb1'
```

sp_config_rep_agent requests the current RepAgent configuration. The migration tool automatically restores RepAgent configuration, and you can use this log to verify the RepAgent configuration.

```
Parameter name                 Default      Config Value     Run value
priority                         5               5                5
fade timeout                     30              30               30
scan timeout                     15              15               15
retry timeout                    60              60               60
rs username                     n/a           rs1_user        rs1_user
trace flags                      0               8194             8194
batch ltl                        true            true             true
rs servername                    n/a             rs1              rs1
send buffer size                 2k              2k               2k
trace log file                   n/a             n/a              n/a
connect database                 n/a             pdb1             pdb1
connect dataserver               n/a             pds1             pds1
can batch size                   1000            1000             1000
security mechanism               n/a             n/a              n/a
msg integrity                    false           false            false
unified login                   false          false            falses
kip ltl errors                   false           false            false
msg origin check                 false           false            false
short ltl keywords               false           false            false
msg confidentiality              false           false            false
data limits filter mode          stop            stop             stop
msg replay detection             false           false            false
mutual authentication            false           false            false
send structured oqids            false           false            false
send warm standby xacts          false           false            false
```

```
msg out-of-sequence check      false           false           false
skip unsupported features      false           false           false
send maint xacts to replicate  false           false           false
(28 rows affected)
```

This is a list of explicitly replicated tables. **sybmigrate** automatically restores the replication status for explicitly replicated tables, and you can use this part of the log to verify the replication status of explicitly replicated tables.

```
sp_setreptable
Name                           Repdef Mode
------------------------------ ----------
t1                             owner_off
t2                             owner_on
(2 rows affected)
```

This is a list of explicitly replicated stored procedures. The migration tool automatically restores the replication status for explicitly replicated stored procedures, and you can use this part of the log to verify the replication status of explicitly replicated stored procedures.

```
sp_setrepproc
Name                     Type          Log Mode
----------------------- ------------- -----------
p1                       function      log_sproc
p2                       function      log_current
p3                       table         log_sproc
p4                       table         log_current
(4 rows affected)
```

This is information about the secondary truncation page. You will need the `generation_id` column during the post-migration steps.

```
dbcc gettrunc
secondary_trunc_page  secondary_trunc_state  dbrepstat  generation_i
d
      database_id        database_name       ltl_version
----------------------------------------------------------
621                  1                    167        0
      6                 pdb1                 400
(1 row affected)

This appears to be a replicated primary database.
Make sure the post processing steps for a replicated primary
database are performed. Please consult the manuals for
the steps that need to be performed.
```

This is an example log entry if your database is a replicate database.

```
This appears to be a replicate database.
If the pagesize is greater than 2K, make sure the
post processing steps for a replicate database
are performed. Please consult the manuals for the
steps that need to be performed.
```

This is an example log entry for an RSSD database.

```
This appears to be a replication system database
Make sure the post processing steps for a replication system
database are performed. Please consult the manuals for
the steps that need to be performed
```

All three logs can be present for a database, since a database can list the three categories.

Migrating Databases That Support Wide Data

Adaptive Server version 12.5 and later can generate data wider than what Replication Server version 12.1 and earlier can handle. If RepAgent passes wide data to Replication Server 12.1 or earlier, Replication Server threads may shut down.

RepAgent communicates with Replication Server using Log Transfer Language (LTL). When the RepAgent connects to Replication Server, it returns an LTL version.

Table 13. Replication Server and LTL versions

Replication Server version	LTL version
12.1 and earlier	< 400
12.5 and later	>= 400

If Replication Server returns an LTL version less than 400, RepAgent uses the setting of the **data limits filter mode** option to determine how to treat wide data.

You can set the **data limits filter mode** option using **sp_config_rep_agent**. Values for **data limits filter mode** are:

- **stop** – RepAgent shuts down when it encounters data too wide for Replication Server to process (the default when the LTL version is less than 400).
- **skip** – RepAgent ignores data too wide for Replication Server to process, and logs an informational message.
- **truncate** – RepAgent truncates wide data so that Replication Server can process it. If the table or stored procedures has more than 250 columns or parameters, only the first 250 columns or parameters are sent. If the column or parameter is wider than 255 bytes, only the first 255 bytes are sent.
- **off** – RepAgent sends wide data to the Replication Server; Replication Server threads may shut down.

This table shows column and width limits for Replication Server 12.1 and earlier and Replication Server 12.5 and later:

Table 14. Replication Server column number and width limits

Property	Replication Server 12.1 and earlier	Replication Server 12.5 and later
Column count	250	65535

Property	Replication Server 12.1 and earlier	Replication Server 12.5 and later
Column width	255	65535

Limitations

When migrating server data, **sybmigrate** requires that the target Adaptive Server catalog contain only default data. Default data on Windows machines is different from UNIX machines. This causes problems when migrating from UNIX to Windows machines.

To successfully migrate from a UNIX machine to a Windows machine, delete the XP Server name and the `mon_user` login on the target Windows machine.

Stopping High Availability

Data migration is not supported while you are in high availability. You must stop high availability before beginning database migration.

1. Decouple primary and secondary Adaptive Servers.
2. Migrate primary source Adaptive Server and secondary source Adaptive Server data to the primary target Adaptive Server and secondary target Adaptive Server separately.
3. Configure the target Adaptive Server for high availability.

Warning! The primary and the secondary Adaptive Servers must be configured to the same logical page size to run high availability.

Other Limitations

These are additional limitations for migration.

- **sybmigrate** does not do any special processing for a DTM/XA environment. The status of open transactions and outstanding prepared transactions should be given consideration. If any special handling is required, you must do it manually.
- There is no reliable way for **sybmigrate** to determine the dependency of various objects. **sybmigrate** does not attempt to create an order in which objects are migrated based on their dependencies on other objects. Views can be dependent upon other views, and they will not be re-created if the view on which they are dependent has not yet been migrated. The migration of stored procedures and triggers may not be successful if the data on which they depend has not yet been migrated. Cross-database dependencies mean that you need to coordinate the migration of related objects. If dependencies are within the selected set, **sybmigrate** takes care of those dependencies. However, if dependencies exist outside the selected set, you may need to run **sybmigrate** through migration more than one time. For this reason, you may need to perform some partial retries to successfully complete the data migration.

- Adaptive Server versions 12.5.3 and later allow you to specify the size and location of a work database on your target server. When migrating a database or server from a source server with Adaptive Server Enterprise versions 12.0 and later but earlier than 12.5.0.1, you must specify the size and location of a work database on the target server.
- The name of the source and the target databases must be the same. SQL schema generated by **ddlgen** may have objects that must be qualified with the source Adaptive Server name.
- **sybmigrate** does not support any kind of auditing for migration activities.
- When renaming any of the compiled objects (procs, views, rules, defaults) the object name in `syscomments` is not updated.

  During the migration, the **ddlgen** query the object from `syscomments` with the old name in the text. This old name in the text causes problems for **sybmigrate** during the DDL migration.

Troubleshooting and Error Messages

This section discusses common errors and how to address them, as well as different error messages and their meaning.

Table 15. Migration-related errors and their descriptions

Issue	Description
Objects fail to migrate	Objects often fail to migrate on the first attempt. **sybmigrate** automatically retries all failed migration attempts. However, if you choose to migrate an object that is dependent upon another object that is not migrated, the migration fails. To prevent failed migration of objects, examine the dependencies of objects that you select for migration. For example, you cannot migrate a trigger if the table on which the trigger is defined is not also migrated. Similarly, views can be created on other views or tables, and if these objects are not migrated, the migration of the view fails.
Beginning database migration	When you are in the setup phase of the migration process, you are asked to decide whether or not you want to migrate server data. You must select from yes, no, or undecided. “Undecided” provides you with the flexibility of setting up the migration process, but being able to return to the process at a later date that is more convenient for migration. If you select Undecided, you cannot begin the database migration until you indicate whether you want to migrate server data. If you indicate that you do not want to migrate server data during setup, you cannot migrate database data during migration. You can override this limitation in GUI mode.

Issue	Description
"Connection refused" and "Unable to obtain connection to the server"	There are two possible reasons why you may encounter these error messages. • If either the source or the target Adaptive Server is not running, **sybmigrate** cannot establish a connection. • The **number of user connections** configuration parameter must be configured to provide sufficient resources on both the source and target Adaptive Servers.
Target server cannot be reached from source server	The interfaces file is used to start the source Adaptive Server. Verify that it has an entry that identifies the target Adaptive Server. Verify that your login can access the target Adaptive Server from the source Adaptive Server.
If **sybmigrate** hangs during migration	If **sybmigrate** hangs during the migration process, check the `sybmigrate` log in `$SYBASE/$SYBASE_ASE/init/logs` for any errors or exceptions. Also, check your Adaptive Server logs. If the Adaptive Server logs run out of space on the database, increase the database size, and install the **sp_threasholdaction** stored procedure to do **dump tran** when the log is full.
Merging two databases	To merge two databases on the source Adaptive Server into one database on the target Adaptive Server, use the following procedure. • Set up and migrate the first database. • After migrating the first database, rename the target database so that it has the same name as the second source database. • Set up and migrate the second database. **Note:** You cannot migrate the database data for the second database because the users, roles and other database data already exist on the target database. You can still migrate user data.

Issue	Description
Post-migration failure cleanup	If **sybmigrate** fails unexpectedly, rerun **sybmigrate** on the areas that failed. If it fails again with no more progress, clean up the source and target Adaptive Servers, and begin migration again. There are actions that you must perform on both the source and target Adaptive Server. On the source Adaptive Server: • Drop the temporary working databases `mtpdb$%`. • Drop the repository database `sybmigratedb`. • Drop all remote servers `mtrs$%`. On the target Adaptive Server: • If server data was migrated, rebuild the target Adaptive Server with **srvbuild** or **syconfig**. • Re-create the target databases.
Remigrating one data-base	To remigrate a specific database: **1.** Start **sybmigrate**. **2.** In the Setup Paths window, during the setup session, right-click the migration path you want to redo. **3.** Select Delete Migration Path on the pop-up menu. **4.** Clean up or remove the migrated data and objects on the target data-base, or drop and re-create the target database. **5.** Restart **sybmigrate** and run it from setup mode.
Re-creating an individu-al object	To re-create an individual object: **1.** In the target Adaptive Server, drop the object you want to re-create. **2.** Start **sybmigrate** in the migration session, and go to the Migrate Object Selection window. Highlight the object you want to create and right-click. **3.** From the pop-up menu, select Reset Object to Initial status. **4.** Complete the migration process.
Connection fail	If you receive a connection fail error message even though the source and target Adaptive Servers are running, you may be using the wrong character set. When you are using **sybmigrate**, you must use the default character set. Run **sybmigrate** with the `-J` *charset* option, to change the character set you are using.

Issue	Description

"Insufficient memory in JVM shared class"	If you see the following error in the server log, it indicates that you must reconfigure the **size of shared class heap** configuration parameter to a larger value.
	`01:00000:00036:2002/01/28 14:17:05.63 server Java VM`
	`Host: Memory allocation request failed because of`
	`insufficient memory in Jvm Shared Class.`

"There is not enough memory in the procedure cache"	If you see the error message `there is not enough memory in the procedure cache` during the migration of indexes, use **sp_configure procedure cache size** to increase the procedure cache.
java.lang related error	If you receive `java.lang.NoClassDefFoundError:com/sybase/jdbcx/SybDriver` when you are connecting to Adaptive Server, check to make sure you have jConnect 6.0 installed in your `$SYBASE` directory (`$SYBASE/jConnect-6_0`).

CHAPTER 10 Restoring a Database Using sybrestore

Use **sybrestore**, which supports Adaptive Server versions 15.7 ESD #2 and later, to restore an Adaptive Server database to the time of failure from the most current full database backup dump files.

In Adaptive Server versions 15.7 SP100 and later, **sybrestore** also supports restoring from Tivoli Support Manager and cumulative dumps, as well as applying database attributes via **sp_dboption** when a database is re-created and restored from the dump file.

sybrestore offers two modes—interactive and noninteractive—and is supported on both Windows and UNIX platforms.

Noninteractive Mode

Providing the database name invokes the utility in noninteractive mode, which restores a database using the most current dump history files.

To use noninteractive mode:

- Use Adaptive Server 15.7 ESD #2 and later.
- The target and source servers must be the same server and the target database to be restored must be the same database as the source.
- You cannot use external dump files.
- Specify the server name, a user name, and the database name. If you do not provide a password, you are prompted to do so when you invoke **sybrestore**.
- (Optional) Specify a dump directory and an interfaces file.

Interactive Mode

In interactive mode, you can specify:

- A different target server than the source server. If the target database you specify does not exist, a new database is automatically created.
- Whether the last transaction is dumped from the source server and loaded on to the target server. If your data device fails and the database is inaccessible, the dump transaction does not truncate the log.
- Whether to drop and re-create the database.

- Whether to use the current dump history files or external dump files.
- The location for the dump transaction.
- Whether to bring the database online immediately after the restore.
- A point in time, within the range of time during which the database is backed up in the dump history files, from which to restore the database.
- Reinitialize and re-create the database devices of an offline database for which the devices are offline. Then restore the re-created database.

Before You Begin

Perform these tasks before using **sybrestore**.

- You must be a user with **sa_role** privilege. To work on an offline database that has offline or inactivated devices, you must be a user with **mon_role** and **sa_role**.
- Make sure these environment variables are set correctly:
  - `SYBASE` -- the location of the current version of Adaptive Server.
  - `SYBASE_ASE` -- the location of the Adaptive Server component directory.
  - `SYBASE_JRE6` and `SYBASE_JRE7` -- the location of JRE 1.6 and JRE 1.7 respectively.
- Adaptive Server and Backup Server must be running for both the target and source servers.
- The `master` database must be available.
- The source database must be connected to the server in a recovered or unrecovered state.
- The log segment of the source database must be available for dumping and then loading back the last transaction logs that have not been dumped.
- Dump history files or external dump files must be available.

sybrestore is installed as part of the Adaptive Server software. For information about how to install Adaptive Server, see the installation guide for your platform. The executable file is located in:

```
$SYBASE/ASE-15_0/bin/
```

Using sybrestore

sybrestore performs checks in both interactive and noninteractive modes:

- A check is performed to determine the version of Adaptive Server. In version 15.7 ESD #2, enhancements called dump configurations were introduced in the dump and load commands. **sybrestore** supports dump configurations in version 15.7 ESD #2 and later. If you are using Adaptive Server 15.7 ESD #1 or earlier, you must use external dump files
- Another check determines whether Backup Server is running. The session is terminated if it is not.

- The dumped database and target database are checked for geometry compatibility, which verifies that the database dump can be loaded successfully into the target database.
- A final check determines whether dump history files exist for the database. If there is no such file, **sybrestore** prompts you to provide external dump files.

See also

- *Compatibility Geometry Check* on page 331

Compatibility Geometry Check

A geometry compatibility check verifies whether a database dump can be loaded successfully into the target database.

The rules that verify this compatibility are:

- The size and the order of the data and log fragments must match. If two or more consecutive fragments are of the same type (data or log), the sizes for these consecutive fragments are combined together before a comparison is done between the dumped database and the target database.
- The size of all fragments before the last fragment for the target database must match exactly with the size of the dumped database. The last fragment of the target database can be bigger than the database that is dumped. There may be extra fragments in the target database after matching all fragments in the dumped database.

sybrestore Syntax

To start **sybrestore**, you must provide a login and server name (or host name and port number). If you do not provide a password, you are prompted to enter one when you execute the command. If the connection to the server fails, an error message is raised.

By default, the `$SYBASE/interfaces` file is used. If you specify an interfaces file, that file is used instead of `$SYBASE/interfaces`.

See also

- *sybrestore* on page 152

Interactive Mode Syntax

The interactive mode syntax is:

```
sybrestore
    -S server_name | host_name:port_number
    -U username
    [-P password ]
    [-t  [point in time of restore]]
    [-I interfaces_file ]
```

Noninteractive Mode Syntax

Providing the database name invokes noninteractive mode. The noninteractive mode syntax is:

```
sybrestore
    -S server_name | host_name:port_number
    -U username
    [-P password]
    -D database_name
    [-d dump_directory]
    [-I interfaces_file]
```

Restoring a Database in Noninteractive Mode

In Adaptive Server 15.7 ESD #2 and later, use **sybrestore** in noninteractive mode to restore a database to the time of failure from the most current dump history files.

In noninteractive mode, the dump history files must be available.

The current full database dump files are used, along with either: - A series of transaction log dumps, if dump transaction is used, or, - The most recent cumulative dump, if cumulative dump is used. Cumulative dump is supported only in Adaptive Server versions later than 15.7 ESD #3

Start **sybrestore** with the user name, password, server name, and database name options. For example:

```
sybrestore -Usa -P -SaseServer1 -Ddba_db
```

You see the Restore Database wizard, which shows a preview of the SQL to be executed for restoring the database, along with any progress or error messages.

Optionally, you can specify an interfaces file, and a directory for dumping the last transaction log. If you specify a directory for dumping the last transaction log in the sybrestore command, it overrides the default location of the dump directory.

A geometry check, which verifies that the database dump can be loaded successfully into the target database is performed. If dump files do not exist or the geometry check fails, the session is terminated.

See also

- *Compatibility Geometry Check* on page 331

Restoring a Database in Interactive Mode

The interactive command line interface allows single-key entry, plus the Enter key to navigate through each menu. Use:

- Space – to move back to the previous menu.
- q – to quit the session.
- ? – to display help.

When the Restore Database wizard starts, which is based on the given parameters. For example, you see the menu shown below when you start **sybrestore** with the minimal options of user name, password, and server name:

```
sybrestore -Usa -P -SaseServer1

<<<<<<====Restore Database Menu ====>>>>>>>

s : Select Database
t : Target Server
r : Recreate Database
e : Use External Dump
c : Check Geometry
d : Dump Directory
o : Online Database
p : Preview
g : Go
```

This example illustrates how the Restore Database menu is affected if you include the point-in-time parameter in the **sybrestore** command:

```
sybrestore -Usa -P -SaseServer1 -t

<<<<<<====Restore Database Menu ====>>>>>>>

s : Select Database
t : Target Server
r : Recreate Database
i : Point-In-Time
c : Check Geometry
o : Online Database
p : Preview
g : Go
```

Table 16. Restore Database menu

Menu Option	Input Required
Select Database	Select the database to be restored.

Menu Option	Input Required
Target Server	Select the target server if it is not same as source server. Provide the target server information: • Server name or host name and port number. • User name. • Password. • A mapping directory that maps the mount point of the dump files in the source server to the mount point of the dump files in the target server. • Specify whether the target database has the same name as the source data-base.
Recreate Database	When the input is yes, the database is dropped and re-created using specified devices and device sizes, and log devices and log sizes.
Use External Dump	Whether you want to restore the database from dump history files. When the input is no, provide the external backup files to restore the database: • The archive directory for the dump database file location and the dump database file name, including respective stripe names. • The dump transaction log file location and multiple dump transaction log file names, including respective stripes names. Using the external dump option overrides using dump history files.
Geometry Check	When the input is yes, you see the comparison between the data size and log size of the device fragments of the dumped database, and the corresponding data size and log size of the device fragments of the target database. This option is provided when dump history files exist and external dump files are not being used to restore the database.
Dump Directory	When yes, you can change whether to dump the last transaction of the source database, and change the dump directory for dumping the last transaction.
Online Database	When yes, the database is brought online after restoring the database.
Point-In-Time	Select the point in time to restore the database.
Preview	Shows the SQL statements that will be executed.
Go	Use “Go” to run all the menus options without having to select menus individ-ually. “Go” runs all menu options in sequence and then exits. If a menu item has already been executed, for example, if you have already selected a database, you are not prompted again to select a database.

Providing a Mapping Directory

When using the interactive command line to restore a database, you can provide one or more mapping directories.

- If the mounted directory of the target server backup files is the same as the source server, provide an empty mapping directory by leaving the prompt blank.
- If the mounted directory of the target server backup files is not the same as the source server, provide a mapping directory in this form:
  `/path1>>/path2`

Do not use cyclic path entries, as they cannot be resolved. For example:

Mapping	Results in

`/path1>>/path2`
`/path2>>/path1`
	`/path1>>/path1`

`/path1>>/path2`
`/path2>>/path3`
`/path3>>/path5`
	`/path1>>/path5`
	`/path2>>/path5`
	`/path3>>/path5`

Restoring a Database Using the Interactive Command Line

You can restore a database using the interactive commadn line.

Restoring a database

Follow these steps to restore a database.

1. In the command window, start **sybrestore**:

   ```
   sybrestore -Usa -P -serverName:portNumber
   ```

   Once the Restore Database wizard starts, you see the Restore Database menu.

   ```
   <<<<<<====Restore Database Menu ====>>>>>>>

   s : Select Database
   t : Target Server
   r : Recreate Database
   e : Use External Dump
   c : Check Geometry
   d : Dump Directory
   o : Online Database
   p : Preview
   g : Go
   ```

2. Enter:

   ```
   g
   ```

You see a list of available source databases.

3. Select a database by entering the number associated with the database or the name of the database.
4. Specify whether the target server to be restored is the same as the source server.

   If the target server is not the same as the source server, you are prompted to specify a target server by providing the server name (or hostname:port number), login, and password. You can then provide a mapping directory.
5. Specify whether the name of the target database is the same as the source database:
   - If the target database name is not the same as the source database name, select a target database.
   - If the target database does not exist, a database is created, and you must specify devices and devices sizes and log devices and log sizes.
   - If the database is offline and its devices do not exist, you are prompted to reinitialize the database devices.
6. Specify whether to drop and re-create the database.

   When re-creating the database, you are prompted to specify devices and devices sizes, and log devices and log sizes.
7. If you choose to restore the database from dump history files, specify whether to use the current dump files or external dump files.

   If you are using external backup files to restore the database:
   - Specify the archive directory for the dump database file location and the dump database file name, including respective stripe names.
   - Specify the dump transaction log file location and multiple dump transaction log file names, including respective stripes names.

   Note: Provide the transaction log files in the same time sequence as they were dumped.

   If you have selected dump history files, a geometry check verifies that the database dump can be loaded successfully into the target database.

   In Adaptive Server versions 15.7 ESD #2 and earlier, specify external dump files; no geometry check is performed.
8. Specify whether to dump the last transaction of the source database, provided that:
   - The status of the database is not "for load," or "offline."
   - The database passes the **tran_dumpable_status** check.
9. Use the archive directory as the location of the dump directory, or specify a different location for dumping the transaction.
10. Specify whether to bring the database online after the restore.

    You see a preview of the SQL statements to be executed for restoring the database.

11. Specify whether to execute the SQL.

You see any progress or error messages.

See also

- *Providing a Mapping Directory* on page 335
- *Compatibility Geometry Check* on page 331

Restoring a database to a point in time

Follow these steps to restore a database to a specific point in time.

1. In the command window, start **sybrestore**.

```
sybrestore -Usa -P -serverName -t
```

Once the Restore Database wizard starts, you see the Restore Database menu.

```
<<<<<<====Restore Database Menu ====>>>>>>>

s : Select Database
t : Target Server
r : Recreate Database
i : Point-In-Time
c : Check Geometry
o : Online Database
p : Preview
g : Go
```

2. Enter:

```
g
```

You see a list of available source databases.

3. Select a database by entering the number associated with the database or the name of the database.

4. Specify whether the target server to be restored is the same as the source server.

If the target server is not the same as the source server, you are prompted to specify a target server by providing the server name (or hostname:port number), login, and password. You can then provide a mapping directory.

5. Specify whether the name of the target database is the same as the source database.

If the target database name is not the same as the source database name, select a target database.

If the target database does not exist, a database is created, and you must specify devices and devices sizes and log devices and log sizes.

6. Specify whether to drop and re-create the database.

When re-creating the database, you are prompted to specify devices and devices sizes, and log devices and log sizes.

7. The dates and times of the dumped database are given.

First, specify the range of time from which to restore the database. You then see the low and high time ranges. Specify a point in time that falls within the available range.

8. A geometry check is performed. If dump files do not exist or the geometry check fails, the session is terminated.

9. Specify whether to bring the database online after the restore.

You see a preview of the SQL to be executed for restoring the database.

10. Specify whether you want to execute the SQL.

You see any progress or error messages.

See also

- *Providing a Mapping Directory* on page 335
- *Compatibility Geometry Check* on page 331
- *Example of Restore to a Point-in-time* on page 338

Example of Restore to a Point-in-time

The following is an example of restoring a database to a point-in-time based on the dump database dates and times.

Table 17. Example of dump history

Date	Dump time	Type of dump
Aug 14	11:04 AM	database dump
	12:20 PM	transaction dump
	2:20 PM	transaction dump
	7:00 PM	transaction dump
Aug 17	9:00 AM	transaction dump
	9:00 AM	transaction dump
	2:16 PM	transaction dump
Aug 23	10:27 AM	database dump
	2:00 PM	transaction dump
	9:30 PM	transaction dump
Sep 28	8:00 AM	transaction dump

Date	Dump time	Type of dump
	9:00 AM	transaction dump
	12:14 PM	transaction dump

sybrestore prompts you to select a range of time based on the database dump history.

For example, based on the information in the above table, you see:

```
1 : [Aug 23 2012 10:27:45:206AM, Sep 28 2012 12:14:50:063PM]
2 : [Aug 14 2012 11:04:58:330AM, Aug 17 2012  2:16:17:206PM]
```

You can select a time range by entering the list number. For example, enter `2` for the time range [Aug 14 2012 11:04:58:330AM, Aug 17 2012 2:16:17:206PM].

Next, enter a time that falls between Aug 14 2012 11:04:58:330AM and Aug 17 2012 2:16:17:206PM. For example, enter:

```
Aug 16 2012 10:00 A.M
```

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